The Air Compliance Group, LLC

5075 Hollins Road
Roanoke, VA 24019
Phone: (540) 265-1987
Fax: (540) 265-0082

Air Emissions Test Report For Compliance Testing Conducted on Units 1, 2, and 3 at Pinellas County Resource Recovery Facility in St. Petersburg, Florida

Facility ID No. 1030117

Prepared for

GCS Energy Recovery of Pinellas, Inc.
St. Petersburg, Florida

Test Dates: April 9-13, 2013

Report Date: May 23, 2013

ACG Contract Number: V13030

The Air Compliance Group, LLC

TEST REPORT CERTIFICATION

Air Emissions Test Report for Compliance Testing
Conducted on Units 1, 2, & 3 at Pinellas County Resource Recovery Facility

Prepared by: The Air Compliance Group, LLC of Roanoke, Virginia for
Prepared for: GCS Energy Recovery of Pinellas, Inc. of St. Petersburg, Florida

Test Dates: April 9-13, 2013
Report Date: May 23, 2013
Contract Number V13030

We certify that, to the best of our knowledge, this source test report has been checked for completeness, and that the results presented herein are accurate, error-free, legible, and representative of the actual emissions measured during testing.

Signature . . . . . *Date* .5/23/2013. . . . . .

Kenley Houtz, QSTI (electronic signature)
Project Manager
The Air Compliance Group, LLC

Signature . . . . . *Date* . 5/23/2013. . . . . .

David Vecellio, QSTI (electronic signature)
Project Manager - Reporting
The Air Compliance Group, LLC

Signature . . . . . *Date* . 5/23/2013. . . . . .

Arthur B. Nunn, III, QEP (electronic signature)
President
The Air Compliance Group, LLC

I have supplied facility data in Appendix N of this test report, and I certify that I believe the information provided to be true, accurate, and complete. For results of the facility's QA/QC program, refer to the Pinellas County Resource Recovery Facility.

Signature . . . . . *Date* . . . . . .

Rebecca Bigari
Environmental Manager
Representative of Pinellas County Resource Recovery Facility

TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

LIST OF TABLES

*Note – See Appendix A.1 for detailed summary tables

LIST OF FIGURES*

*See Appendix A.2 for detailed list of figures

LIST OF APPENDICES

1.0 Introduction

1.1 Background

An air emissions test program was conducted for GCS Energy Recovery of Pinellas, Inc. (GCS) at the Pinellas County Resource Recovery Facility (PCRRF) in St. Petersburg, Florida. The plant is owned by Pinellas County and operated by GCS. The plant consists of three municipal waste combustor units, designated Unit 1, Unit 2, and Unit 3. The test program was conducted April 9–13, 2013 by The Air Compliance Group, LLC (ACG) of Roanoke, Virginia. The following personnel participated in the test program:

Name	Affiliation	Test Program Position
Rebecca Bigari	GCS	Overall Program Manager
Kenley Houtz	ACG	Project Manager
Tony Underwood	ACG	Field Technician
Mike Henry	ACG	Field Technician
James Stultz	ACG	Field Technician
Cooper Franks	ACG	Field Technician
Ian Wilmer	ACG	Field Technician
Michael Wilson	ACG	Field Technician

1.2 Objective

Testing was conducted on Units 1, 2, and 3 (Emission Unit ID Nos. -001, -002, and -003, respectively), as well as the Residue Storage and Processing Building (Emission Unit ID No. -005), the Activated Carbon Storage Silo (Emission Unit ID No. -006), the Lime Storage Silo for SDA (Emission Unit ID No. -007), the Ash Conditioning Building (Emission Unit ID No. -008), and the Ash Handling System at the facility, as required by Title V Permit No. 1030117-008-AV and Construction Permit No 1030117-009-AC. In accordance with the permit, testing was conducted for the following pollutants on Units 1, 2, and 3 while the units were being operated at or near the maximum permitted operating rate:

Particulate Matter (PM)	PM ≤2.5 microns ($PM_{2.5}$)
Visible Emissions (VE) (also conducted at vents)	Cadmium (Cd)
Fugitive Emissions (only conducted at the Ash Handling System)	Lead (Pb)
Hydrogen Chloride (HCl)	Mercury (Hg)

1.3 Test Program

The majority of the sampling program was conducted at the Spray Dryer Absorber (SDA) inlet and the Fabric Filter (FF) outlet of each unit. Additionally, visible (at the vents) and fugitive (at the ash handling system) emissions were visually determined at the applicable test locations.

Three valid measurements were made at the Units 1, 2, and 3 FF outlets for: PM, $PM_{2.5}$ (filterable and condensable $PM_{2.5}$), VE, HCl and metals (Cd, Pb, and Hg). For the purpose of determining reduction efficiency, concurrent testing was also conducted at the Units 1, 2, and 3 SDA inlets for Hg. Three valid fugitive emission measurements were conducted at the Ash Handling System, and one valid VE test was also conducted at each of the silos and vents.

Each pollutant measurement (excluding visible emissions) included determination of the given pollutant emissions as well as average gas temperature, moisture content, molecular weight, and volumetric flow rate. Unit steam flow and conditions were also recorded during the testing period. The testing was conducted in accordance with the procedures of Appendix A of the *Code of Federal Regulations*, Title 40, Part 60 (40 CFR 60), or other methods accepted by the EPA and the Florida Department of Environmental Protection (FDEP). Appendix A.3 contains a test log that provides the exact date and time for each test.

2.0 Summary of Results

2.1 Presentation

Table 1 summarizes the average emissions for each pollutant tested versus the established permit limits. Detailed test results can be found in Tables 2 through 15, which are located in Appendix A.1. Appendices B through E contain detailed data and results for each test.

2.2 Particulate Emissions

During the test program, particulate emissions from Unit 1 Method 5/26A averaged 0.004 grains per dry standard cubic foot corrected 7% O_2 (gr/dscf @ 7% O_2) and 8.9 milligrams per dry standard cubic meter corrected to 7% O_2 (mg/dscm @ 7% O_2). Particulate emissions from Unit 2 averaged 0.004 gr/dscf @ 7% O_2 and 9.3 mg/dscm @ 7% O_2. Particulate emissions from Unit 3 averaged 0.003 gr/dscf @ 7% O_2 and 8.0 mg/dscm @ 7% O_2. The Title V permit limit for PM for each unit is 0.012 gr/dscf @ 7% O_2 and 25 mg/dscm @ 7% O_2, and the MACT limit is 25 mg/dscm @ 7% O_2. Tables 8 through 10 and Appendix C contain more detailed results.

2.3 $PM_{2.5}$ Emissions

During the test program, $PM_{2.5}$ emissions from Units 1, 2 and 3 Method 201A/202 averaged 25, 42 and 27 mg/dscm @ 7% O_2, respectively. The BACT limit is 30 mg/dscm @ 7% O_2. Tables 11 through 13 and Appendix D contain more detailed results. Please see Section 3.0 for discussion concerning the Unit 2 results.

2.4 Visible and Fugitive Emissions

Opacity of visible emissions (maximum six-minute average value measured by EPA Method 9, concurrently with particulate testing) was 0.00 percent for each of Units 1, 2, and 3. The permitted limit for each unit is 10 percent opacity (six-minute average).

No VEs were observed (all were uniformly zero percent opacity) at the Ash Conditioning Building (ACB), the Residue Storage and Processing Building (RSPB), the Activated Carbon Storage Silo (CS), and the Lime Storage Silo for SDA (LS).

Table 1 – Overall Summary of Test Program Results

Pinellas County Resource Recovery Facility (April 2013)

Pollutant		Reporting Units	Title V Emission Limits	MACT Emission Limits	Average Emissions		
					Unit 1	Unit 2	Unit 3
Particulate Matter		gr/dscf @7% O_2	0.012	N/A	0.004	0.004	0.003
		mg/dscm @7% O_2	25		8.9	9.3	8.0
PM2.5		mg/dscm @7% O_2	30 (BACT Standard)		25	42*	27
Cadmium		mg/dscm @7% O_2	0.035 (3.5E-02)		2.57E-03	1.61E-03	9.23E-04
Lead		mg/dscm @7% O_2	0.400 (4.00E-01)		1.68E-02	1.85E-02	9.65E-03
Mercury	*Outlet concentration*	mg/dscm @7% O_2	0.050 (5.0E-02)		4.20E-03	2.45E-03	6.59E-03
			OR				
	Removal efficiency	Reduction Efficiency % (based on mass flow - lb/hr)	85		91	96	86
Hydrogen Chloride	*Outlet concentration*	ppmdv @7% O_2	20		10	9	18
Visible Emissions		% Opacity (6-minute Average)	10		0.00	0.00	0.00
			5		All tested sources were 0.00%.		
Fugitive Emissions		% of Observation Period	5		Fugitive emissions were observed for 0.00% of the observation period duration on the Ash Handling System.		
Avg. carbon mass feed				lb/hr	15 (1)	15 (1)	15 (1)

* The Unit 2 Run 1 inorganic condensable result is an outlier that is significantly greater than all other test runs. The analytical laboratory noted that the sample contained significantly more white, flaky residue than the other samples. If Run 1 is excluded, then average is 22 mg/dscm @ 7% O_2, which is more than 20% below the emission limit.

(1) Average value during three valid EPA Method 29 metals test runs.

Fugitive visible emissions measured by EPA Method 22 at the ash handling system were observed for 0 seconds (0.00%) of the three 60-minute tests. Table 14 and Appendix E contain more detailed results for the visible and fugitive emissions tests. Please note that Appendix E only contains data reduction for test locations in which emissions were observed, and the raw field data for all locations is in Appendix K.

2.5 Hydrogen Chloride (HCl) Emissions

HCl emissions from Units 1, 2, and 3 averaged 10, 9, and 18 ppmdv @ 7% O_2, respectively. The Title V permit limit, as well as the MACT standard, for each unit is 20 ppmdv @ 7% O_2. Tables 8 through 10 and Appendix C contain more detailed results.

2.6 Metals Emissions and Reduction Efficiency

Cadmium emissions from Units 1, 2, and 3 averaged 2.57×10^{-3}, 1.61×10^{-3}, and 9.23×10^{-4} mg/dscm @ 7% O_2, respectively. Lead emissions from Units 1, 2, and 3 averaged 1.68×10^{-2}, 1.85×10^{-2}, and 9.65×10^{-3} mg/dscm @ 7% O_2, respectively. Mercury emissions from Units 1, 2, and 3 averaged 4.20×10^{-3}, 2.45×10^{-3}, and 6.59×10^{-3} mg/dscm @ 7% O_2, respectively. Mercury reduction efficiency for Units 1, 2, and 3 averaged 91%, 96%, and 86%, respectively. The Title V permit and MACT limits (in mg/dscm @ 7% O_2) for each unit are: 0.035 (3.5×10^{-2} for cadmium); 0.400 (4.00×10^{-1} for lead); and 0.050 (5.0×10^{-2} mercury) or 85% mercury reduction. Tables 2 through 7 and Appendix B contain more detailed results.

2.7 Audit Samples

No audit samples were analyzed for the test program, as none were provided.

2.8 Facility Operation

Appendix N contains the facility operating data (steam flow in Klb/hr) recorded during the test program. Testing of emissions was conducted at or near the maximum permitted operating rate. Only MSW was burned during the testing.

3.0 Test Program Changes and Problems

Except as noted below, all testing was conducted in accordance with the test protocol submitted to the FDEP, issued by ACG and dated March 7, 2013, and no significant problems were experienced by the test team or the contracted analytical laboratories during the execution of the test program. The following should be noted:

- EPA Method 23 dioxins/furans testing was not conducted on Unit 2 because the unit malfunctioned and was brought off-line before testing could be completed. The dioxins/furans testing and results will be addressed in a separate report.

- The visible emissions tests were not conducted at the Hydrated Lime Storage Silo for Lime Softening (Emission Unit ID No. -004, which is also known as the Hydrated Lime Storage Silo or Hydrated Lime Silo Vent), due to coordination issues. Once testing occurs at that location, results will be addressed in a separate report.

- The analytical laboratory result for the Unit 2 $PM_{2.5}$ Run 1 inorganic fraction is an outlier that was significantly greater than those of the other runs. The high result caused the average total $PM_{2.5}$ results for Unit 2 to be above the BACT limit, as the total $PM_{2.5}$ average result of Runs 2 and 3 was greater than 20% below the limit. As noted in the narrative of the lab's report contained in Appendix L.4, the Unit 2 Run 1 inorganic sample contained significantly more white, flaky residue than the other runs. It is not known whether the Unit 2 Run 1 high result can be attributed to an unknown process upset or an unknown form of contamination but that result appears to be suspect.

4.0 Facility Description

PCRRF consists of three 1,100 tons per day (nominal per MWC unit) municipal waste fired combustors. Each combustor consists of a Riley Stoker water wall boiler with a reciprocating grate stoker system. Each combustor is equipped with a spray dryer absorber (SDA), a fabric filter (FF), a Selective Non-Catalytic Reduction (SNCR) NOx control system, and a powdered activated carbon injection system (PACIS) supplied by Wheelabrator Air Pollution Control, Inc. Combustion gases exit the boiler economizer and pass through the SDA and FF, then to an induced draft fan prior to entering separate flues in a common stack.

Figure 1 presents a general flow arrangement of the process. Figure 2 depicts a cross-section of the SDA Inlet test locations. Figure 3 depicts a cross-section of the FF Outlet

test locations. The test locations meet EPA Methods 1 and 2 minimum criteria for upstream (2.0) and downstream (0.5) dimensions. All figures are in Appendix A.2.

5.0 Sampling and Analytical Procedures

All sampling and analytical procedures followed those recommended by the U.S. Environmental Protection Agency (EPA), Title 40, Part 60, Appendix A of the *Code of Federal Regulations* (40 CFR 60), or other methods generally accepted by the EPA and the Florida Department of Environmental Protection. The following specific methods were used:

- EPA Method 1 for determining sampling and traverse points;
- EPA Method 2 for determining flue gas velocity and volumetric flow rate;
- EPA Method 3 (sampling procedure) and 3A (analytical procedure) for determining flue gas composition and molecular weight;
- EPA Method 4 for determining flue gas moisture content;
- EPA Method 5 (in conjunction with EPA Methods 26A at the outlet locations) for determining total particulate emissions;
- EPA Method 9 for determining visible emissions;
- EPA Method 201A (in conjunction with EPA Method 202 at the outlet locations) for determining particulate emissions <2.5 microns;
- EPA Method 202 (in conjunction with EPA Method 201A at the outlet locations) for determining condensable particulate emissions;
- EPA Method 22 for determining fugitive emissions;
- EPA Method 26A (in conjunction with EPA Method 5 at the outlet locations) for determining HCl emissions; and
- EPA Method 29 for determining metals emissions (cadmium, lead and mercury).

5.1 Sampling Procedures

5.1.1 Sampling Point Determination - EPA Method 1

At each FF Outlet, thirty sampling and traverse points (five for each of six ports – see Figure 3) were used for all isokinetic pollutant sampling and gas flow rate measurements.

At each SDA Inlet (see Figure 2), twenty-four sampling and traverse points were used for all isokinetic pollutant sampling and gas flow rate measurements.

5.1.2 Volumetric Measurements - EPA Method 2

EPA Reference Method 2 was used to determine the velocity and volumetric flow rates of the stack gases. Stainless steel type-S pitot tubes were used to measure the gas velocity heads. The pitot tubes were assigned a baseline coefficient of 0.84 as allowed by Method 2. Calibrated type-K thermocouples were used to determine gas temperatures.

Velocity and temperature measurements were made at each of the traverse points, as shown in Figures 2 and 3. These measurements were performed in conjunction with the pollutant sampling described below.

5.1.3 Molecular Weight Determination - EPA Method 3

Gas compositional measurements (O_2 and CO_2) for determining the average molecular weight of the stack gases, and for correction of pollutant emissions to 7% O_2, were conducted in accordance with EPA Reference Method 3. Multipoint, integrated sampling was used to obtain a constant-rate sample of flue gas concurrent with the pollutant testing. Sampling was of the same duration as the pollutant testing.

A stainless steel probe affixed to the pollutant sampling probe was used for this purpose, and a peristaltic pump was used to fill a Tedlar bag. Moisture was removed from the sample gas by an air-cooled condenser located prior to the pump. Figure 4 shows a schematic of the Method 3 sampling train.

5.1.4 Flue Gas Moisture Content - EPA Method 4

The flue gas moisture was measured in conjunction with the pollutant tests according to the sampling and analytical procedures outlined in EPA Method 4. The flue gas moisture for each test was determined by gravimetric or volumetric analysis of the water collected in the impingers of the pollutant sampling trains. All impingers were contained in an ice bath throughout the testing to ensure complete condensation of the moisture in the flue gas stream. Any moisture not condensed in the impinger condensers was captured in the silica gel contained in the final impinger.

5.1.5 Metals Sampling - EPA Method 29

Sampling at the FF Outlet for cadmium, lead and mercury, and at the SDA Inlet for mercury only, was performed in accordance with EPA Method 29.

5.1.5.1 Sampling Train Description

The Method 29 testing was conducted using the metals sampling train illustrated in Figure 5. A heated stainless steel probe with a glass liner was used to withdraw the gas sample. The probe was equipped with an appropriately sized glass nozzle for isokinetic gas withdrawal.

From the nozzle and probe, sample gas was drawn through a Pallflex ultra-pure 2500 QUAT-UP quartz filter supported on a Teflon frit in a heated glass filter holder. The filter was maintained at a temperature sufficiently high to prevent the condensation of water ($250 \pm 25^{o}F$). Sample gas subsequently passed through an impinger train consisting of seven glass impingers immersed in an ice bath. The first impinger was initially empty. The second and third impingers each initially contained 100 ml of 5% nitric acid/10% hydrogen peroxide solution. The fourth impinger initially was empty. The fifth and sixth impingers each initially contained 100 ml of 4% potassium permanganate/10% sulfuric acid solution. The seventh impinger initially contained approximately 250 grams of silica gel. The moisture collected in the sampling train was quantified to determine the stack gas moisture content in accordance with Method 4.

5.1.5.2 Sampling Train Operation

Sampling was done in accordance with EPA Method 29 procedures and specifications, including leak checking, isokinetic sampling rate and stack traversing. Sampling at each SDA Inlet and FF Outlet was conducted concurrently for the purpose of determining the mercury reduction percentage. Sampling was conducted for 5 minutes at each of the 24 traverse points at each SDA Inlet, resulting in a 120-minute test per run, excluding the time required to change. Sampling was conducted for 4 minutes at each of the 30 traverse points at each FF Outlet, resulting in a 120-minute test per run, excluding the time required to change ports. A minimum sample volume of 60 dscf (1.7 m^3) was drawn, as measured by the dry gas meter.

5.1.5.3 Sample Recovery and Clean-Up

Recovery of the sampling probe was accomplished using a Teflon-fiber probe brush. The probe was cleaned in the mobile laboratory, while the remainder of the sample train was transported to a clean-up site for recovery. Sample recovery then proceeded as follows:

1) **Front-half acid rinse:** The probe, front half of filter holder, and all connecting lines between the probe and filter holder were rinsed and brushed three times with 100 mls of 0.1N nitric acid. A Teflon-fiber probe brush was used to brush the probe between rinses. Rinses were collected in pre-cleaned polyethylene (PE) bottles fitted with a Teflon-lined screw caps.

2) **Filter catch:** The filter was removed from the housing with Teflon tweezers and placed into a pre-cleaned glass petri dish. The dish was sealed externally with Teflon tape.

3) **Back-half and impingers 1-3 recovery:** Condensate from the first three impingers was transferred to a graduated cylinder and the volumes were recorded. The back half of the filter holder, all connecting lines from the filter to the first impinger, and the first three impingers were rinsed with 100 mls of 0.1N

nitric acid. The rinses were collected into the same container (PE bottle fitted with a Teflon-lined cap) as the condensate.

4) **Fourth impinger catch and rinses:** The amount of condensate in the fourth impinger was measured and recorded. The impinger was then rinsed with 100 mls of 0.1N nitric acid and recovered in a pre-cleaned PE bottle fitted with a Teflon-lined screw cap. The rinses were collected into the same container as the condensate.

5) **Impinger five and six catch and rinses:** The sample liquid in the fifth and sixth impingers was transferred to a graduated cylinder and the volumes were recorded. The impingers were then rinsed three times with an acidified potassium permanganate solution, followed by a water rinse, then a rinse with 8 Normal HCl to remove any residue in the impingers. All solutions were transferred to glass bottles for storage. The permanganate and HCl rinses were recovered into separate containers to prevent chlorine generation.

6) **Silica gel:** The silica gel was transferred from the seventh impinger to its original container, sealed, and weighed.

5.1.5.4 Blanks

A field blank was performed for the test program for the metals tests. The field blank consisted of a sample train setup at the test location and leak checked as the sample train. The field blank train was then recovered following the same sample recovery procedures as the sample trains.

5.1.6 Particulate and HCl Sampling - EPA Methods 5 and 26A

Compliance sampling for particulate matter and hydrogen chloride at each FF Outlet followed EPA Method 26A procedures, except for substituting de-ionized water impingers for the NaOH impingers, since chlorine sampling was not required. As noted in the pre-test protocol, this modification was approved by the FDEP for previous test programs utilizing a modified EPA Method 26 sampling train. Additionally, the outlet

testing met 40 CFR 60, Subpart Eb, EPA Method 5 temperature requirements of heating the probe and filter to no greater than 320^{o}F.

5.1.6.1 Sampling Train Description

Figure 6 shows the major components of Method 26A sampling train. A stainless steel probe sheath containing a heated glass liner was used to withdraw the gas sample. The probe was equipped with an appropriately sized nozzle for isokinetic gas withdrawal. From the nozzle and probe, sample gas was pulled through a heated filter for capture of particulate matter. The filter temperature was maintained at 300-320^{o}F to prevent water condensation. Sample gas subsequently passed into an impinger train consisting of six glass impingers immersed in an ice bath. The first impinger initially contained 50 mls of 0.1N H_2SO_4, the second and third impingers each initially contained 100 mls of 0.1N H_2SO_4, the fourth and fifth impingers each initially contained DI water, and the last impinger initially contained approximately 250 grams of silica gel.

5.1.6.2 Sampling Train Operation

Except for the modifications previously noted, sampling was conducted in accordance with EPA Method 5/26A procedures and specifications, including leak checking. Sampling was conducted for 4 minutes at each of the 30 traverse points at each FF Outlet, resulting in a 120-minute test per run, excluding the time required to change ports. A minimum sample volume of 60 dscf (1.7 m^3) was obtained for each run.

5.1.6.3 Sample Recovery and Clean-Up

Front half recovery (including the filters and probe rinses) of the sampling trains was performed in accordance with EPA Method 5 procedures and specifications. Recovery of the probe was accomplished using a Nylon bristle or Teflon-fiber probe brush. The nozzle, probe and front-half filter housing were rinsed with acetone at least three times each and brushed between rinses. The filter was recovered into a Petri dish. The impinger contents were first quantified volumetrically to determine the stack gas moisture content in accordance with EPA Method 4. The catches were collected into a high density polyethylene bottle, which was fitted with a Teflon-lined cap. The first three

impingers were rinsed with deionized distilled water, and the rinses were combined with the impinger catches from the first three impingers. The fourth and fifth impinger contents were quantified and discarded, as necessary. The silica gel from the last impinger was transferred back to its original container.

5.1.6.4 Blanks

One set of reagent blanks was collected during the test program for the Method 5/26A tests. The blanks consisted of all reagents required in the setup and recovery of the Method 5/26A sampling train.

5.1.7 Visible Emissions Evaluation - EPA Method 9

Opacity of visible emissions from each applicable test location was evaluated in accordance with EPA Method 9 by a certified observer. Certification(s) can be found in Appendix M.4 of this report. During each opacity test, 10 sets of 24 readings (readings taken every 15 seconds) were made, yielding a 60-minute test.

5.1.7.1 Observer Position

The observer was positioned such that he had a clear view of the emissions with the sun oriented in the 140^{o} sector to his back. In addition, the observer made observations from a position at which his line of vision was approximately perpendicular to the plume direction.

5.1.7.2 Opacity Observations

Opacity observations were made at the point of greatest opacity in the portion of the plume where condensed water vapor was not present. A clearly visible background which gave the highest degree of contrast was used when the readings were made. Opacity was read at 15-second intervals, and readings were recorded to the nearest 5 percent opacity.

5.1.8 Fugitive Emission Evaluations - EPA Method 22

A fugitive emissions evaluation was performed on the facility's ash handling system for three 1-hour periods.

5.1.8.1 Observer Position

The observer surveyed the area for potential sources of emissions and selected an observation point that enabled a clear view. The observer ensured that the sun was not in his field of vision.

5.1.8.2 Fugitive Emissions Observations

The observer recorded the clock time for the start and end of observations. In accordance with Method 22, the potential emissions points were watched continuously during each test, which consisted of 20-minute observation periods separated by short rest breaks. The clock time was recorded at the beginning and end of each rest break. If any emission was observed, the observer started a stopwatch, then stopped it (without resetting to zero) when the emissions ceased. At the end of the observation period, the elapsed time recorded on the stopwatch was recorded as the total emission time.

Fugitive emission results are reported as emission frequency (percentage of time that emissions are visible during the observation period), and emission time (accumulated amount of time that emissions are visible during the observation period).

5.1.9 $PM_{2.5}$ Sampling - EPA Methods 201A and 202

Filterable and condensable particulate emissions less than or equal to 2.5 micrometers in diameter ($PM_{2.5}$) were measured in accordance with EPA Method 201A (for filterable $PM_{2.5}$), coupled with a back-half analysis in accordance with EPA Method 202 (for condensable $PM_{2.5}$).

5.1.9.1 Sampling Train Description

Figure 7 shows the major components of the Method 201A/202 sampling train. The train consisted of one cyclone ($PM_{2.5}$ cyclone) followed by an out-of-stack heated glass fiber filter, maintained at $248^{o}F \pm 25^{o}F$. The probe was equipped with an appropriately sized stainless steel nozzle for isokinetic gas withdrawal. After the $PM_{2.5}$ cyclone, the sample gas passed through a glass-lined heated probe, a heated glass fiber filter, a water-

cooled glass condenser, capable of cooling the stack gas to below 85°F, and a series of glass impingers. The first two impingers were initially clean and empty. Impinger 1 was a condensate dropout impinger without a bubbler tube and Impinger 2 was a modified Greenburg Smith impinger. The sample gas then passed through the condensable particulate matter (CPM) Teflon filter, maintained at > 65°F and ≤ 85°F, and subsequently passed through moisture traps. The moisture traps consisted of a modified Greenburg Smith impinger (Impinger 3) containing 100 ml of water followed by an impinger (Impinger 4) containing approximately 250 grams of silica gel. The moisture trap impingers were maintained in an ice bath to keep the gas temperature below 68° F at the exit of the impinger train.

5.1.9.2 Pre-Test Preparation

Before sampling, a velocity traverse of the stack was performed. This traverse, along with a gas analysis of the stack gas, was used to determine the nozzle diameter(s) needed to maintain a flow rate through the cyclone to achieve a cyclone separation size of >2.5µm and <2.5µm. A nozzle was selected by comparing the velocity heads from the velocity traverse with the minimum and maximum differential pitot pressures (Δp_{min} and Δp_{max}) calculated for each nozzle, as required by the method. The nozzle was chosen to bracket all the Δp's from the velocity traverse. If one nozzle did not meet this criterion, then the nozzle was changed during the sampling run so that the velocity head at that sampling point was within the Δp_{min} and Δp_{max} for that nozzle. The details of the calculations are given in Method 201A.

Two additional pretest calculations were also be performed: the orifice pressure head needed to maintain the necessary cyclone flow rate, and the dwell time for the first traverse point. These calculations are also detailed in Method 201A.

5.1.9.3 Sampling Train Operation

Throughout the sampling run, flow through the cyclone, as indicated by the orifice pressure head, was maintained at the pretest calculated value. If the stack gas

temperature varied by more than 50°F from the pretest average temperature, the orifice pressure head was determined using the pretest average ±50°F.

Sampling time (or dwell time) at the first sampling point was determined by the pretest calculations. At each subsequent sampling point, dwell time was calculated as a function of the velocity head. The dwell time calculations are provided in Method 201A and in Appendix F.

Appropriate traverse points for each stack were sampled, and a test duration of 60 minutes was targeted, excluding the time required to change ports. The test duration varied as determined by velocity fluctuations in the flue gas steam. Nozzles were changed as necessary. Filters were also changed as necessary.

5.1.9.4 Sample Train Recovery

For the Method 201A sample recovery, the hot filter was recovered into a clean petri dish, which was sealed externally with Teflon tape. The $PM_{2.5}$ filterable fraction was recovered by acetone rinsing and brushing all the surfaces from the $PM_{2.5}$ cyclone exit to the front half of the heated filter holder. The rinses were placed into a labeled glass bottle. The filters and rinses were transported to the ACG laboratory for gravimetric analyses as described by EPA Method 5.

For EPA Method 202 recovery, moisture gain in the impingers was quantified volumetrically for the first three impingers and gravimetrically for the silica gel impinger, then a post-test purge was performed with ultra-pure nitrogen. The purge was performed whether or not water was collected in the first impinger. The moisture collected in the first impinger was measured and transferred to the second impinger, then the purge was conducted through the condenser, second impinger, and the CPM filter. The purge of the condenser and train was performed for 60 minutes at a rate of 14 liters per minute. Sample recovery for Method 202 proceeded as follows:

1. **Aqueous Liquid Impinger**: The liquid from the dropout and impinger prior to the CPM filter (i.e., the first two impingers) was measured in a graduated cylinder and transferred to clean glass or plastic sample bottle. The condenser, Impingers 1 and 2, connecting glassware, and the front half of the CPM filter housing were rinsed twice with water. The rinses were collected into the same bottle.

2. **CPM Organic Rinses**: After the water rinse, the condenser, Impingers 1 and 2, connecting glassware, and the front half of the CPM filter housing were rinsed with acetone, followed by two rinses of hexane. The organic rinses were collected together into the same container, which was separate from the aqueous rinses.

3. **CPM Filter**: The filter was removed from the CPM filter housing and placed into a petri dish, which was then sealed with Teflon tape.

4. **Cold Impinger Water**: The volume of the contents of the cold water impinger was transferred to a graduated cylinder, measured, and recorded.

5. **Silica Gel**: The silica gel was transferred back to its original container, weighed, and recorded.

5.1.9.5 Blanks

One set of reagent blanks was collected during the test program for the Method 201A/202 tests. The blanks consisted of all reagents required in the setup and recovery of the Method 201A/202 sampling train. Also, a field train recovery blank was collected for the Method 202 portion of the tests by assembling and recovering a sampling train in the same manner that it was used for testing but without exposure to the sample gas.

5.2 Analytical Procedures

5.2.1 Molecular Weight Determination - EPA Method 3A

Flue gas compositional analysis for molecular weight determination, and for correction of pollutant emissions to 7% O_2, was conducted using instrumental analyzers set up and operated in accordance with EPA Method 3A. The EPA Method 3 samples were injected directly into the instruments, which were calibrated with EPA Protocol G1 calibration gas standards. Calibration data are contained in Appendix M.3. Results of the O_2 and CO_2 analyses are in Appendix L.1.

5.2.2 Moisture Content - EPA Method 4

Moisture contents were determined gravimetrically/volumetrically in accordance with Method 4 by measuring either the volume or mass gain of each impinger in the pollutant sampling trains.

5.2.3 Particulate Analysis - EPA Method 5

Particulate matter was determined in accordance with EPA Method 5 procedures. The filter was analyzed gravimetrically to a constant weight. The front-half acetone rinse was evaporated and analyzed gravimetrically to a constant weight. The total particulate catch equaled the sum of the front-half acetone rinse and the filter. Gravimetric laboratory data are contained in Appendix L.2.

5.2.4 Hydrogen Chloride Analysis - EPA Method 26A

The contents and rinses of the first three impingers of the HCl sampling trains were analyzed by ion chromatography for total chloride in accordance with EPA Method 26A procedures. The analytical laboratory data for the modified EPA Method 26A samples are found in Appendix L.5.

5.2.5 Metals Analyses - EPA Method 29

The filter, front-half rinses, and contents of impingers 1 through 3 of the metals sampling train were analyzed for cadmium, lead and mercury. The contents and rinses of impinger 4 were collected separately and analyzed for mercury. Impingers 5 and 6 contents and rinses were also analyzed for mercury. The analytical laboratory data for the EPA Method 29 samples are found in Appendix L.6.

The sampling train components (including the digested filter, probe washes, and impinger contents and rinses) were prepared for analysis in accordance with the procedures of EPA Method 29. After preparation, samples were analyzed by inductively coupled plasma - mass spectrometry (ICP-MS) for cadmium and lead. A cold vapor atomic absorption spectrometer (CVAAS) was used to analyze the samples for mercury.

5.2.6 $PM_{2.5}$ Analysis – EPA Methods 201A and 202

Analyses of the filters and cyclone acetone rinses from the EPA Method 201A sampling trains were performed gravimetrically in accordance with EPA Method 201A procedures. The filters were analyzed gravimetrically to a constant weight. The acetone rinses were evaporated and analyzed gravimetrically to a constant weight. The total filterable $PM_{2.5}$ catch for each run equaled the sum of the mass gains of the $PM_{2.5}$ acetone rinse and the filter. The gravimetric laboratory data for the EPA Method 201A samples are contained in Appendix L.3.

Condensable particulate matter was determined in accordance with EPA Method 202 procedures. The water soluble CPM was extracted from the CPM filter and the aqueous extract combined with the contents of the aqueous sample container. The organic soluble CPM was extracted from the CPM filter and the organic extract was combined with the contents of the organic sample container. The aqueous impinger contents were placed in a separatory funnel and extracted three times with hexane. This organic extract was combined with the sampling train's organic rinse. The organic phase extracts and rinses were evaporated to dryness. Following evaporation, the organic fraction was desiccated for 24 hours, and then weighed at 6-hour intervals to a constant weight.

The contents of the inorganic fraction were also dried at room temperature. Following evaporation, the inorganic fraction was desiccated for 24 hours and then weighed at 6-hour intervals to a constant weight. If the residue could not be weighed to a constant weight, then it was re-dissolved in deionized, distilled ultra-filtered water and titrated with NH_4OH to subtract out NH_4^+ retained in the sample. Following titration, the volume of the aqueous phase was reduced and then allowed to dry at room temperature and pressure. Following evaporation, the inorganic fraction was desiccated for 24 hours, and then weighed at 6-hour intervals to a constant weight. The back-half condensable particulate catch equals the organic residue plus the inorganic residue. The gravimetric laboratory data for the EPA Method 202 samples are contained in Appendix L.4.

5.3 Data Analyses

All equations related to the sampling, including gas flow rates, temperatures, percent isokinetics, moisture contents, and pollutant emissions, are shown in Appendix F. This appendix also includes sample calculations using actual data from the test program.

5.4 Equipment Calibration

All field equipment was calibrated in accordance with the requirements of the applicable EPA Methods. Recommendations within the *Quality Assurance Handbook for Air Pollution Measurement Systems: Volume III* (EPA/600/R-94/038c, September 1994) were also considered. Appendix M contains records for all the calibrations.

6.0 Quality Assurance

Specific quality control (QC) procedures were followed to ensure the continuous production of useful and valid data throughout the course of this test program. The QC checks and procedures described in this section represent an integral part of the overall sampling and analytical scheme. A discussion of both the sampling and analytical QC checks used during this program is presented below.

6.1 Equipment Inspection and Maintenance

Each critical item of field test equipment is assigned a unique identification number. An effective preventive maintenance program is necessary to ensure data quality. Each item of equipment returning from the field is inspected before it is returned to storage. During the course of these inspections, items are cleaned, repaired, reconditioned and recalibrated where necessary.

Each item of equipment transported to the field is inspected again before being packed to detect equipment problems that may originate during periods of storage. This minimizes lost time on the job site due to equipment failure. Occasional equipment failure in the field is unavoidable despite the most rigorous inspection and maintenance procedures. For this reason, ACG routinely transports to the job site spare equipment for all critical sampling train components.

6.2 Equipment Calibration

New items for which calibration is required are calibrated before initial field use. Equipment whose calibration status may change with use or time is inspected in the field before testing begins and again upon return from each field use. When an item of equipment is found to be out of calibration, it is repaired and recalibrated, or retired from service. All equipment is periodically recalibrated in full, regardless of the outcome of these regular inspections.

Calibrations are conducted in a manner, and at a frequency, which meets or exceeds U.S. EPA specifications. ACG generally follows the calibration procedures outlined in the EPA methods, and those recommended within the *Quality Assurance Handbook for Air Pollution Measurement Systems: Volume III* (EPA/600/R-94/038c, September 1994). When these methods are inapplicable, ACG uses methods such as those prescribed by the American Society for Testing and Materials (ASTM).

Data obtained during calibrations are recorded on standardized forms, which are double checked for completeness and accuracy. Data reduction and subsequent calculations are performed using ACG's own computer facilities. Calculations are checked at least twice for accuracy. Copies of calibrations are included in the test or project reports.

Emissions sampling equipment requiring calibration includes pitot tubes, nozzles, gas analyzers, barometers, dry gas meters and thermocouples.

6.3 Sampling Quality Control Procedures

The following **pretest** QC checks are conducted:

- All sampling equipment is thoroughly checked to ensure clean and operable components.
- Equipment is inspected for possible damage from shipment.
- The oil manometer used to measure pressure across the type-S pitot tube is leveled and zeroed.

- The number and location of the sampling traverse points are checked before taking measurements.

- The temperature measurement system is visually checked for damage and operability by measuring the ambient temperature before each traverse.

In addition to the general QC procedures listed above, QC procedures specific to each sampling method are also incorporated into the sampling scheme. The following QC procedures are emphasized:

Before start of tests

- Keep all cleaned glassware and sample train components sealed until train assembly.

- Assemble the sampling trains in an environment free from uncontrolled dust.

- Visually inspect each sampling train for proper assembly.

- Perform pretest calculations to determine the proper sampling nozzle size.

During testing each day

- Readings of temperature and differential pressure are taken at each traverse point.

- All sampling data and calculations are recorded on preformatted data sheets.

- All calibration data forms are reviewed for completeness and accuracy.

- Any unusual occurrences are noted during each run on the appropriate data form.

- Project supervisor reviews sampling data sheets daily during testing.

- Properly maintain the roll and pitch axis of the type-S pitot tube and the sampling nozzle.

- Leak-check the train before and after each run, or if a filter change takes place.

- Conduct additional leak checks if the sampling time $\geq$ 2 hours.

- Maintain the probe, filter and impingers at the proper temperature.

- Maintain ice in the ice bath at all times.

- Make proper readings of the dry gas meter, delta P and delta H, temperature, and pump vacuum during sampling at each traverse point.

- Maintain isokinetic sampling within ± 10% of 100%, as applicable.

After testing each day

- Visually inspect the sampling nozzle.

- Visually inspect the type-S pitot tube.

- Leak-check each leg of the type-S pitot tube.

- Leak-check the entire sampling train.

6.4 Analytical Quality Control Procedures

All analyses for this program were performed using accepted laboratory procedures in accordance with the specified analytical protocols. Adherence to prescribed QC procedures ensured data of consistent and measurable quality. Analytical QC focused upon the use of control standards to provide a measure of analytical precision and accuracy. Also, specific acceptance criteria were defined for various analytical operations including calibrations, control standard analyses, drift checks, blanks, etc. If any QC criteria were not met, then an explanation, and the impact that this may have had on the results, was provided.

Appendix A

Detailed Summary Tables, Figures, and Test Log

Appendix A.1

Detailed Summary Tables

TABLE 2

SUMMARY OF CADMIUM, LEAD AND MERCURY EMISSIONS / MERCURY REDUCTION EFFICIENCY
PINELLAS COUNTY RRF

UNIT 1 FF OUTLET

RUN I.D.	**U1O-M29-R1**	**U1O-M29-R2**	**U1O-M29-R3**	AVERAGE
DATE	04/09/13	04/09/13	04/09/13	
TIME STARTED	9:05	13:24	16:22	
TIME ENDED	11:28	15:36	18:33	
SAMPLING PARAMETERS				
Metered Volume (dcf)	81.384	81.677	81.819	81.627
Corrected Volume (dscf)	76.456	75.437	75.872	75.922
Total Test Time (min)	120	120	120	120
Isokinetics (%)	102.9	99.2	100.3	100.8
GAS PARAMETERS				
Gas Temperature (°F)	316	317	317	317
Oxygen (%)	9.98	10.06	10.33	10.12
Carbon Dioxide (%)	9.37	9.35	9.11	9.28
Moisture (%)	21.32	21.38	22.58	21.76
GAS FLOW RATE				
Velocity (ft/sec)	46.27	47.37	47.83	47.16
Actual Volume (acfm)	267181	273588	276223	272331
Standard Volume (dscfm)	139513	142753	141945	141403
Standard Volume @ 7% O2 (dscfm)	109603	111327	107939	109623
STEAM PRODUCTION RATE (Klb/hr)	233	235	236	235
CARBON RATE (lb/hr)	15	15	15	15
CADMIUM EMISSIONS				
Concentration (mg/dscm @ 7% O2)	2.65E-03	1.66E-03	3.40E-03	2.57E-03
Mass Rate (lb/hr)	1.09E-03	6.93E-04	1.37E-03	1.05E-03
LEAD EMISSIONS				
Concentration (mg/dscm @ 7% O2)	1.48E-02	1.29E-02	2.27E-02	1.68E-02
Mass Rate (lb/hr)	6.08E-03	5.37E-03	9.17E-03	6.88E-03
MERCURY EMISSIONS				
Concentration (mg/dscm @ 7% O2)	3.61E-03	4.26E-03	4.72E-03	4.20E-03
Mass Rate (lb/hr)	1.48E-03	1.78E-03	1.91E-03	1.72E-03
MERCURY REDUCTION EFFICIENCY				
Inlet Mass Rate (lb/hr)	2.07E-02	1.96E-02	1.78E-02	1.94E-02
Outlet Mass Rate (lb/hr)	1.48E-03	1.78E-03	1.91E-03	1.72E-03
Reduction Efficiency	92.9	90.9	89.3	91.0

Pollutant	**Title V Permit Limit**	**MACT Limit**
Cadmium	0.035 mg/dscm @ 7% O2	0.035 mg/dscm @ 7% O2
Lead	0.400 mg/dscm @ 7% O2	0.400 mg/dscm @ 7% O2
Mercury	0.050 mg/dscm @ 7% O2 or 85% Reduction	0.050 mg/dscm @ 7% O2 or 85% Reduction

TABLE 3

SUMMARY OF CADMIUM, LEAD AND MERCURY EMISSIONS / MERCURY REDUCTION EFFICIENCY
PINELLAS COUNTY RRF

UNIT 2 FF OUTLET

RUN I.D.	**U2O-M29-R1**	**U2O-M29-R2**	**U2O-M29-R3**	AVERAGE
DATE	04/10/13	04/10/13	04/10/13	
TIME STARTED	8:45	12:09	15:25	
TIME ENDED	11:15	14:28	17:35	
SAMPLING PARAMETERS				
Metered Volume (dcf)	81.193	82.192	82.726	82.037
Corrected Volume (dscf)	77.137	76.432	75.218	76.262
Total Test Time (min)	120	120	120	120
Isokinetics (%)	99.7	98.1	94.9	97.6
GAS PARAMETERS				
Gas Temperature (°F)	294	296	297	295
Oxygen (%)	10.60	11.16	11.72	11.16
Carbon Dioxide (%)	8.60	8.19	7.70	8.16
Moisture (%)	18.44	18.94	17.19	18.19
GAS FLOW RATE				
Velocity (ft/sec)	45.10	45.87	45.75	45.57
Actual Volume (acfm)	260454	264895	264216	263188
Standard Volume (dscfm)	145261	146184	148751	146732
Standard Volume @ 7% O2 (dscfm)	107639	102434	98240	102771
STEAM PRODUCTION RATE (Klb/hr)	234	234	234	234
CARBON RATE (lb/hr)	15	15	15	15
CADMIUM EMISSIONS				
Concentration (mg/dscm @ 7% O2)	8.71E-04	3.55E-03	4.18E-04	1.61E-03
Mass Rate (lb/hr)	3.51E-04	1.36E-03	1.54E-04	6.23E-04
LEAD EMISSIONS				
Concentration (mg/dscm @ 7% O2)	1.14E-02	3.41E-02	1.01E-02	1.85E-02
Mass Rate (lb/hr)	4.60E-03	1.31E-02	3.71E-03	7.14E-03
MERCURY EMISSIONS				
Concentration (mg/dscm @ 7% O2)	1.30E-03	3.65E-03	2.39E-03	2.45E-03
Mass Rate (lb/hr)	5.25E-04	1.40E-03	8.79E-04	9.34E-04
MERCURY REDUCTION EFFICIENCY				
Inlet Mass Rate (lb/hr)	1.61E-02	2.71E-02	3.52E-02	2.61E-02
Outlet Mass Rate (lb/hr)	5.25E-04	1.40E-03	8.79E-04	9.34E-04
Reduction Efficiency	96.7	94.8	97.5	96.4

Pollutant	**Title V Permit Limit**	**MACT Limit**
Cadmium	0.035 mg/dscm @ 7% O2	0.035 mg/dscm @ 7% O2
Lead	0.400 mg/dscm @ 7% O2	0.400 mg/dscm @ 7% O2
Mercury	0.050 mg/dscm @ 7% O2 or 85% Reduction	0.050 mg/dscm @ 7% O2 or 85% Reduction

TABLE 4

SUMMARY OF CADMIUM, LEAD AND MERCURY EMISSIONS / MERCURY REDUCTION EFFICIENCY
PINELLAS COUNTY RRF

UNIT 3 FF OUTLET

RUN I.D.	**U3O-M29-R1**	**U3O-M29-R2**	**U3O-M29-R3**	AVERAGE
DATE	04/11/13	04/11/13	04/11/13	
TIME STARTED	8:37	11:45	14:36	
TIME ENDED	10:56	13:54	17:04	
SAMPLING PARAMETERS				
Metered Volume (dcf)	78.811	79.315	77.034	78.387
Corrected Volume (dscf)	74.099	73.441	70.040	72.527
Total Test Time (min)	120	120	120	120
Isokinetics (%)	104.8	104.4	99.2	102.8
GAS PARAMETERS				
Gas Temperature (°F)	308	305	306	306
Oxygen (%)	8.54	8.52	8.17	8.41
Carbon Dioxide (%)	10.45	10.51	10.65	10.54
Moisture (%)	23.05	24.18	23.81	23.68
GAS FLOW RATE				
Velocity (ft/sec)	44.75	44.98	45.01	44.91
Actual Volume (acfm)	258433	259755	259953	259380
Standard Volume (dscfm)	132648	132061	132522	132410
Standard Volume @ 7% O2 (dscfm)	117952	117619	121367	118979
STEAM PRODUCTION RATE (Klb/hr)	235	233	236	235
CARBON RATE (lb/hr)	15	15	15	15
CADMIUM EMISSIONS				
Concentration (mg/dscm @ 7% O2)	9.92E-04	9.50E-04	8.26E-04	9.23E-04
Mass Rate (lb/hr)	4.38E-04	4.19E-04	3.75E-04	4.11E-04
LEAD EMISSIONS				
Concentration (mg/dscm @ 7% O2)	1.01E-02	1.27E-02	6.10E-03	9.65E-03
Mass Rate (lb/hr)	4.47E-03	5.61E-03	2.77E-03	4.28E-03
MERCURY EMISSIONS				
Concentration (mg/dscm @ 7% O2)	6.40E-03	7.18E-03	6.19E-03	6.59E-03
Mass Rate (lb/hr)	2.83E-03	3.17E-03	2.82E-03	2.94E-03
MERCURY REDUCTION EFFICIENCY				
Inlet Mass Rate (lb/hr)	4.91E-02	2.25E-02	1.32E-02	2.83E-02
Outlet Mass Rate (lb/hr)	2.83E-03	3.17E-03	2.82E-03	2.94E-03
Reduction Efficiency	94.2	85.9	78.7	86.3

Pollutant	**Title V Permit Limit**	**MACT Limit**
Cadmium	0.035 mg/dscm @ 7% O2	0.035 mg/dscm @ 7% O2
Lead	0.400 mg/dscm @ 7% O2	0.400 mg/dscm @ 7% O2
Mercury	0.050 mg/dscm @ 7% O2 or 85% Reduction	0.050 mg/dscm @ 7% O2 or 85% Reduction

TABLE 5

SUMMARY OF MERCURY LOADINGS
PINELLAS COUNTY RESOURCE RECOVERY FACILITY

UNIT 1 SDA INLET

RUN I.D.	**U1I-M29-R1**	**U1I-M29-R2**	**U1I-M29-R3**	AVERAGE
DATE	04/09/13	04/09/13	04/09/13	
TIME STARTED	9:05	13:24	16:22	
TIME ENDED	11:26	15:34	18:31	
SAMPLING PARAMETERS				
Metered Volume (dcf)	80.291	81.696	80.460	80.816
Corrected Volume (dscf)	78.065	78.318	76.865	77.749
Total Test Time (min)	120	120	120	120
Isokinetics (%)	97.2	96.1	96.1	96.5
GAS PARAMETERS				
Gas Temperature (°F)	590	597	599	596
Oxygen (%)	8.10	8.54	8.29	8.31
Carbon Dioxide (%)	10.90	10.55	10.97	10.81
Moisture (%)	17.19	17.24	17.89	17.44
GAS FLOW RATE				
Velocity (ft/sec)	62.71	64.07	63.50	63.43
Actual Volume (acfm)	295490	301940	299253	298894
Standard Volume (dscfm)	122996	124764	122464	123408
Standard Volume @ 7% O2 (dscfm)	113263	110941	111099	111768
STEAM PRODUCTION RATE (lb/hr)	233	235	236	235
MERCURY EMISSIONS				
Conc. (mg/dscm @ 7% O2)	0.049	0.047	0.043	0.046
Mass Rate (lb/hr)	2.07E-02	1.96E-02	1.78E-02	1.94E-02

Pollutant	**Limit**
Mercury	Not Applicable to Inlet Location

TABLE 6

SUMMARY OF MERCURY LOADINGS
PINELLAS COUNTY RESOURCE RECOVERY FACILITY

UNIT 2 SDA INLET

RUN I.D.	**U2I-M29-R1**	**U2I-M29-R2**	**U2I-M29-R3**	AVERAGE
DATE	04/10/13	04/10/13	04/10/13	
TIME STARTED	8:45	12:09	15:25	
TIME ENDED	11:13	14:26	17:33	
SAMPLING PARAMETERS				
Metered Volume (dcf)	79.161	77.852	80.191	79.068
Corrected Volume (dscf)	77.343	74.446	75.144	75.644
Total Test Time (min)	120	120	120	120
Isokinetics (%)	97.6	95.8	95.3	96.3
GAS PARAMETERS				
Gas Temperature (°F)	516	520	520	519
Oxygen (%)	8.56	9.01	9.84	9.14
Carbon Dioxide (%)	10.31	9.94	9.25	9.83
Moisture (%)	16.75	17.18	14.61	16.18
GAS FLOW RATE				
Velocity (ft/sec)	57.21	56.60	55.77	56.53
Actual Volume (acfm)	269606	266728	262800	266378
Standard Volume (dscfm)	121366	118954	120717	120346
Standard Volume @ 7% O2 (dscfm)	107745	101753	96053	101850
STEAM PRODUCTION RATE (lb/hr)	234	234	234	234
MERCURY EMISSIONS				
Conc. (mg/dscm @ 7% O2)	0.040	0.071	0.098	0.070
Mass Rate (lb/hr)	1.61E-02	2.71E-02	3.52E-02	2.61E-02

Pollutant	**Limit**
Mercury	Not Applicable to Inlet Location

TABLE 7

SUMMARY OF MERCURY LOADINGS
PINELLAS COUNTY RESOURCE RECOVERY FACILITY

UNIT 3 SDA INLET

RUN I.D.	**U3I-M29-R1**	**U3I-M29-R2**	**U3I-M29-R3**	AVERAGE
DATE	04/11/13	04/11/13	04/11/13	
TIME STARTED	8:37	11:45	14:36	
TIME ENDED	10:54	13:52	17:02	
SAMPLING PARAMETERS				
Metered Volume (dcf)	75.549	75.719	77.573	76.280
Corrected Volume (dscf)	72.968	72.200	73.067	72.745
Total Test Time (min)	120	120	120	120
Isokinetics (%)	99.2	99.9	100.0	99.7
GAS PARAMETERS				
Gas Temperature (°F)	610	610	610	610
Oxygen (%)	6.79	6.98	7.11	6.96
Carbon Dioxide (%)	12.05	11.72	11.49	11.75
Moisture (%)	18.83	19.90	18.79	19.18
GAS FLOW RATE				
Velocity (ft/sec)	60.03	59.66	59.55	59.75
Actual Volume (acfm)	282881	281147	280616	281548
Standard Volume (dscfm)	112650	110707	111944	111767
Standard Volume @ 7% O2 (dscfm)	114352	110866	111058	112092
STEAM PRODUCTION RATE (lb/hr)	235	233	236	235
MERCURY EMISSIONS				
Conc. (mg/dscm @ 7% O2)	0.115	0.054	0.032	0.067
Mass Rate (lb/hr)	4.91E-02	2.25E-02	1.32E-02	2.83E-02

Pollutant	**Limit**
Mercury	Not Applicable to Inlet Location

TABLE 8

SUMMARY OF PARTICULATE AND HCl EMISSIONS
PINELLAS COUNTY RESOURCE RECOVERY FACILITY

UNIT 1 FF OUTLET

RUN I.D.	**U1O-M26A-R1**	**U1O-M26A-R2**	**U1O-M26A-R3**	AVERAGE
DATE	04/09/13	04/09/13	04/09/13	
TIME STARTED	9:05	13:24	16:22	
TIME ENDED	11:28	15:36	18:33	
SAMPLING PARAMETERS				
Metered Volume (dcf)	77.124	78.945	79.906	78.658
Corrected Volume (dscf)	77.672	79.278	80.330	79.093
Total Test Time (min)	120	120	120	120
Isokinetics (%)	106.3	104.3	105.4	105.3
GAS PARAMETERS				
Gas Temperature (°F)	315	315	317	316
Oxygen (%)	9.56	10.22	10.24	10.01
Carbon Dioxide (%)	9.62	9.10	9.01	9.24
Moisture (%)	21.11	20.70	21.14	20.98
GAS FLOW RATE				
Velocity (ft/sec)	45.20	46.80	47.25	46.42
Actual Volume (acfm)	261018	270271	272882	268057
Standard Volume (dscfm)	137153	142655	142979	140929
Standard Volume @ 7% O2 (dscfm)	111893	109608	109652	110384
STEAM PRODUCTION RATE (Klb/hr)	233	235	236	235
PARTICULATE EMISSIONS				
Concentration (gr/dscf @ 7 % O2)	0.003	0.005	0.004	0.004
Concentration (mg/dscm @ 7% O2)	7.579	10.552	8.541	8.891
Mass Rate (lb/hr)	3.18	4.33	3.51	3.67
HCl OUTLET EMISSIONS				
Concentration (ppmdv)	6.09	8.08	9.80	7.99
Concentration (ppmdv @ 7% O_2)	7.46	10.52	12.78	10.25
Mass Rate (lb/hr)	4.74	6.55	7.96	6.42

Pollutant	**Title V Permit Limit**	**MACT Limit**
Particulate Matter	25 mg/dscm @ 7% O2 and 0.012 gr/dscf @ 7% O2	25 mg/dscm @ 7% O2
Hydrogen Chloride	20 ppmdv @ 7% O2	

TABLE 9

SUMMARY OF PARTICULATE AND HCl EMISSIONS
PINELLAS COUNTY RESOURCE RECOVERY FACILITY

UNIT 2 FF OUTLET

RUN I.D.	**U2O-M26A-R1**	**U2O-M26A-R2**	**U2O-M26A-R3**	AVERAGE
DATE	04/10/13	04/10/13	04/10/13	
TIME STARTED	8:45	12:09	15:25	
TIME ENDED	11:15	14:28	17:35	
SAMPLING PARAMETERS				
Metered Volume (dcf)	77.049	80.575	79.840	79.155
Corrected Volume (dscf)	78.551	80.408	77.948	78.969
Total Test Time (min)	120	120	120	120
Isokinetics (%)	99.0	101.1	97.3	99.1
GAS PARAMETERS				
Gas Temperature (°F)	295	297	296	296
Oxygen (%)	10.74	10.93	11.63	11.10
Carbon Dioxide (%)	8.52	8.42	7.72	8.22
Moisture (%)	17.04	18.10	16.69	17.28
GAS FLOW RATE				
Velocity (ft/sec)	45.61	46.38	45.87	45.95
Actual Volume (acfm)	263408	267842	264906	265385
Standard Volume (dscfm)	148964	149272	150357	149531
Standard Volume @ 7% O2 (dscfm)	108883	107068	100274	105408
STEAM PRODUCTION RATE (Klb/hr)	234	234	234	234
PARTICULATE EMISSIONS				
Concentration (gr/dscf @ 7 % O2)	0.004	0.004	0.005	0.004
Concentration (mg/dscm @ 7% O2)	8.857	8.634	10.530	9.340
Mass Rate (lb/hr)	3.61	3.46	3.95	3.68
HCl OUTLET EMISSIONS				
Concentration (ppmdv)	7.15	5.77	6.81	6.58
Concentration (ppmdv @ 7% O_2)	9.78	8.04	10.22	9.35
Mass Rate (lb/hr)	6.05	4.89	5.82	5.58

Pollutant	**Title V Permit Limit**	**MACT Limit**
Particulate Matter	25 mg/dscm @ 7% O2 and 0.012 gr/dscf @ 7% O2	25 mg/dscm @ 7% O2
Hydrogen Chloride	20 ppmdv @ 7% O2	

TABLE 10

SUMMARY OF PARTICULATE AND HCl EMISSIONS
PINELLAS COUNTY RESOURCE RECOVERY FACILITY

UNIT 3 FF OUTLET

RUN I.D.	**U3O-M26A-R1**	**U3O-M26A-R2**	**U3O-M26A-R3**	AVERAGE
DATE	04/11/13	04/11/13	04/11/13	
TIME STARTED	8:37	11:45	14:36	
TIME ENDED	10:56	13:54	17:04	
SAMPLING PARAMETERS				
Metered Volume (dcf)	76.592	78.278	74.593	76.488
Corrected Volume (dscf)	77.227	77.678	72.820	75.908
Total Test Time (min)	120	120	120	120
Isokinetics (%)	107.0	107.8	101.0	105.2
GAS PARAMETERS				
Gas Temperature (°F)	306	302	305	304
Oxygen (%)	8.33	7.83	8.00	8.05
Carbon Dioxide (%)	10.67	11.15	10.86	10.89
Moisture (%)	22.46	23.67	23.35	23.16
GAS FLOW RATE				
Velocity (ft/sec)	45.17	45.55	45.57	45.43
Actual Volume (acfm)	260836	263026	263191	262351
Standard Volume (dscfm)	135446	135284	135380	135370
Standard Volume @ 7% O2 (dscfm)	122486	127206	125640	125111
STEAM PRODUCTION RATE (Klb/hr)	235	233	236	235
PARTICULATE EMISSIONS				
Concentration (gr/dscf @ 7% O2)	0.004	0.003	0.003	0.003
Concentration (mg/dscm @ 7% O2)	8.445	7.543	7.995	7.994
Mass Rate (lb/hr)	3.87	3.59	3.76	3.74
HCl OUTLET EMISSIONS				
Concentration (ppmdv)	19.28	16.62	15.23	17.04
Concentration (ppmdv @ 7% O_2)	21.32	17.67	16.41	18.47
Mass Rate (lb/hr)	14.82	12.76	11.71	13.10

Pollutant	**Title V Permit Limit**	**MACT Limit**
Particulate Matter	25 mg/dscm @ 7% O2 and 0.012 gr/dscf @ 7% O2	25 mg/dscm @ 7% O2
Hydrogen Chloride	20 ppmdv @ 7% O2	

TABLE 11

SUMMARY OF PM2.5 EMISSIONS
PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 1 OUTLET

RUN I.D.	**U1O-M201A/202-R1**	**U1O-M201A/202-R2**	**U1O-M201A/202-R3**	AVERAGE
DATE	04/10/13	04/10/13	04/10/13	
TIME STARTED	10:08	12:11	15:03	
TIME ENDED	11:08	13:12	16:03	
SAMPLING PARAMETERS				
Metered Volume (dcf)	19.606	20.112	19.711	19.810
Corrected Volume (dscf)	18.964	19.363	18.898	19.075
Corrected Volume (dscm)	0.537	0.548	0.535	0.540
Total Test Time (min)	59.5	61.1	60.1	60.2
% Isokinetics	116.2	118.1	115.5	116.6
GAS PARAMETERS				
Gas Temperature (deg F)	325	324	311	320
Oxygen (%)	9.47	8.84	9.30	9.20
Carbon Dioxide (%)	9.67	10.17	9.88	9.91
Moisture (%)	18.67	19.15	18.55	18.79
GAS FLOWRATE				
Velocity (ft/sec)	49.08	48.26	47.81	48.38
Actual Volume (acfm)	283412	278728	276113	279417
Standard Volume (dscfm)	151039	147796	149919	149585
Standard Volume @ 7% O2 (dscfm)	124200	128232	125112	125848
STEAM PRODUCTION RATE - kpph	236.0	233.0	234.0	234.3
FILTERABLE PM2.5 EMISSIONS				
Concentration (mg/dscm)	1.30	1.64	1.87	1.60
Concentration (mg/dscm @ 7%O2)	1.59	1.89	2.24	1.91
Mass Rate (lb/hr)	0.74	0.91	1.05	0.90
CONDENSABLE PM2.5 EMISSIONS				
Concentration (gr/dscf)	0.0075	0.0068	0.0114	0.0085
Concentration (gr/dscf @ 7%O2)	0.0091	0.0078	0.0136	0.0102
Concentration (mg/dscm)	17.13	15.50	25.97	19.54
Concentration (mg/dscm @ 7%O2)	20.83	17.87	31.12	23.28
Mass Rate (lb/hr)	9.69	8.58	14.59	10.95
TOTAL PM2.5 EMISSIONS				
Concentration (gr/dscf)	0.0081	0.0075	0.0122	0.0092
Concentration (gr/dscf @ 7%O2)	0.0098	0.0086	0.0146	0.0110
Concentration (mg/dscm)	18.44	17.14	27.84	21.14
Concentration (mg/dscm @ 7%O2)	22.42	19.76	33.36	25.18
Mass Rate (lb/hr)	10.43	9.49	15.64	11.85

Pollutant	**BACT Standard**
Particulate Matter	30 mg/dscm @ 7% O2

TABLE 12

SUMMARY OF PM2.5 EMISSIONS
PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 2 OUTLET

RUN I.D.	**U2O-M201A/202-R1**	**U2O-M201A/202-R2**	**U2O-M201A/202-R3**	AVERAGE
DATE	04/11/13	04/11/13	04/11/13	
TIME STARTED	7:32	10:14	12:08	
TIME ENDED	8:38	11:14	13:08	
SAMPLING PARAMETERS				
Metered Volume (dcf)	22.397	20.157	20.184	20.913
Corrected Volume (dscf)	21.895	19.469	19.308	20.224
Corrected Volume (dscm)	0.620	0.551	0.547	0.573
Total Test Time (min)	66.3	60.6	60.3	62.4
% Isokinetics	109.0	119.4	120.2	116.2
GAS PARAMETERS				
Gas Temperature (deg F)	302	302	304	303
Oxygen (%)	9.98	9.51	9.81	9.77
Carbon Dioxide (%)	9.16	9.59	9.44	9.40
Moisture (%)	16.21	16.57	18.05	16.94
GAS FLOWRATE				
Velocity (ft/sec)	44.93	45.59	46.09	45.54
Actual Volume (acfm)	259499	263289	266193	262994
Standard Volume (dscfm)	146594	148208	146697	147166
Standard Volume @ 7% O2 (dscfm)	115166	121445	117041	117884
STEAM PRODUCTION RATE (Klb/hr)	231	233	232	232
PM2.5 EMISSIONS				
Concentration (gr/dscf)	0.0003	0.0003	0.0004	0.0003
Concentration (gr/dscf @ 7%O2)	0.0004	0.0004	0.0005	0.0004
Concentration (mg/dscm)	0.65	0.73	0.91	0.76
Concentration (mg/dscm @ 7%O2)	0.82	0.89	1.15	0.95
Mass Rate (lb/hr)	0.35	0.40	0.50	0.42
CONDENSABLE PM2.5 EMISSIONS				
Concentration (gr/dscf)	0.0276 *	0.0063	0.0088	0.0143
Concentration (gr/dscf @ 7%O2)	0.0352 *	0.0077	0.0110	0.0180
Concentration (mg/dscm)	63.23 *	14.51	20.12	32.62
Concentration (mg/dscm @ 7%O2)	80.48 *	17.71	25.22	41.14
Mass Rate (lb/hr)	34.72 *	8.06	11.05	17.94
TOTAL PM2.5 EMISSIONS				
Concentration (gr/dscf)	0.0279 *	0.0067	0.0092	0.0146
Concentration (gr/dscf @ 7%O2)	0.0355 *	0.0081	0.0115	0.0184
Concentration (mg/dscm)	63.87 *	15.24	21.03	33.38
Concentration (mg/dscm @ 7%O2)	81.30 *	18.59	26.36	42.09
Mass Rate (lb/hr)	35.07 *	8.46	11.56	18.36

Pollutant	**BACT Standard**
Particulate Matter	30 mg/dscm @ 7% O2

* The Unit 2 Run 1 inorganic condensable result is an outlier that is significantly greater than all other test runs. The analytical laboratory noted that the sample contained significantly more white, flaky residue than the other samples. If Run 1 is excluded, then average is 22 mg/dscm @ 7% O2, which is more than 20% below the emission limit.

TABLE 13

SUMMARY OF PM2.5 EMISSIONS
PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 3 OUTLET

RUN I.D.	**U3O-M201A/202-R1**	**U3O-M201A/202-R2**	**U3O-M201A/202-R3**	AVERAGE
DATE	04/09/13	04/09/13	04/09/13	
TIME STARTED	11:56	14:08	16:38	
TIME ENDED	12:58	15:08	17:38	
SAMPLING PARAMETERS				
Metered Volume (dcf)	18.528	18.466	19.243	18.746
Corrected Volume (dscf)	17.918	17.581	18.298	17.933
Corrected Volume (dscm)	0.507	0.498	0.518	0.508
Total Test Time (min)	57.5	59.6	59.7	58.9
% Isokinetics	110.7	103.9	110.9	108.5
GAS PARAMETERS				
Gas Temperature (deg F)	310	309	308	309
Oxygen (%)	9.57	8.85	9.71	9.38
Carbon Dioxide (%)	9.84	10.33	9.57	9.91
Moisture (%)	20.43	19.56	21.49	20.49
GAS FLOWRATE				
Velocity (ft/sec)	50.50	50.30	50.14	50.31
Actual Volume (acfm)	291622	290484	289542	290549
Standard Volume (dscfm)	154991	156389	152213	154531
Standard Volume @ 7% O2 (dscfm)	126334	135575	122537	128149
STEAM PRODUCTION RATE (Klb/hr)	232	240	233	235
PM2.5 EMISSIONS				
Concentration (gr/dscf)	0.0028	0.0010	0.0005	0.0014
Concentration (gr/dscf @ 7%O2)	0.0034	0.0012	0.0006	0.0017
Concentration (mg/dscm)	6.35	2.34	1.17	3.29
Concentration (mg/dscm @ 7%O2)	7.79	2.70	1.45	3.98
Mass Rate (lb/hr)	3.69	1.37	0.67	1.91
CONDENSABLE PM2.5 EMISSIONS				
Concentration (gr/dscf)	0.0071	0.0101	0.0081	0.0084
Concentration (gr/dscf @ 7%O2)	0.0088	0.0116	0.0101	0.0102
Concentration (mg/dscm)	16.36	23.10	18.53	19.33
Concentration (mg/dscm @ 7%O2)	20.07	26.65	23.01	23.24
Mass Rate (lb/hr)	9.50	13.53	10.56	11.20
TOTAL PM2.5 EMISSIONS				
Concentration (gr/dscf)	0.0099	0.0111	0.0086	0.0099
Concentration (gr/dscf @ 7%O2)	0.0122	0.0128	0.0107	0.0119
Concentration (mg/dscm)	22.71	25.44	19.70	22.62
Concentration (mg/dscm @ 7%O2)	27.86	29.35	24.47	27.23
Mass Rate (lb/hr)	13.18	14.90	11.23	13.11

Pollutant	**BACT Standard**
Particulate Matter	30 mg/dscm @ 7% O2

TABLE 14

SUMMARY OF VISIBLE AND FUGITIVE EMISSIONS
PINELLAS COUNTY RESOURCE RECOVERY FACILITY

MWC STACKS, SILOS AND VENTS, AND ASH HANDLING SYSTEM

LOCATION	MWC UNIT 1 STACK			
RUN I.D.	**U1O-M9-R1**	**U1O-M9-R2**	**U1O-M9-R3**	**Average**
DATE	04/12/13	04/12/13	04/12/13	
TIME STARTED	10:13	11:13	12:13	
TIME ENDED	11:13	12:13	13:13	
STEAM PRODUCTION RATE (Klb/hr)	228	233	229	230
All values are percent opacity				
Maximum 6-Minute Value	0.00	0.00	0.00	0.00
Average for 60 Minutes	0.00	0.00	0.00	0.00

POLLUTANT	**LIMIT**
Visible Emissions	10% opacity (6-min. avg.)

LOCATION	MWC UNIT 2 STACK			
RUN I.D.	**U2O-M9-R1**	**U2O-M9-R2**	**U2O-M9-R3**	**Average**
DATE	04/10/13	04/12/13	04/12/13	
TIME STARTED	8:51	13:20	14:30	
TIME ENDED	9:51	14:20	15:30	
STEAM PRODUCTION RATE (Klb/hr)	236	233	227	232
All values are percent opacity				
Maximum 6-Minute Value	0.00	0.00	0.00	0.00
Average for 60 Minutes	0.00	0.00	0.00	0.00

POLLUTANT	**LIMIT**
Visible Emissions	10% opacity (6-min. avg.)

LOCATION	MWC UNIT 3 STACK			
RUN I.D.	**U3O-M9-R1**	**U3O-M9-R2**	**U3O-M9-R3**	**Average**
DATE	04/12/13	04/12/13	04/12/13	
TIME STARTED	10:13	11:13	12:13	
TIME ENDED	11:13	12:13	13:13	
STEAM PRODUCTION RATE (Klb/hr)	234	242	237	238
All values are percent opacity				
Maximum 6-Minute Value	0.00	0.00	0.00	0.00
Average for 60 Minutes	0.00	0.00	0.00	0.00

POLLUTANT	**LIMIT**
Visible Emissions	10% opacity (6-min. avg.)

LOCATION	ASH COND. BLDG.	RESIDUE S & P BLDG.	CARBON SILO	LIME STORAGE SILO
RUN I.D.	**M9-ACBO-R1**	**M9-RSPB-R1**	**CS-M9-R1**	**M9-Pebbel Lime Silo-R1**
DATE	04/13/13	04/12/13	04/12/13	04/09/13
TIME STARTED	12:15	16:47	8:51	10:22
TIME ENDED	13:15	17:47	9:51	11:22
All values are percent opacity				
Maximum 6-Minute Value	0.00	0.00	0.00	0.00
Average for 60 Minutes	0.00	0.00	0.00	0.00

POLLUTANT	**LIMIT**
Visible Emissions	5% opacity (6-min. avg.)

LOCATION	ASH HANDLING SYSTEM		
	East Face	**West Face**	**Northeast Face**
RUN I.D.	**AHS-M22-R1**	**AHS-M22-R2**	**AHS-M22-R3**
DATE	04/12/13	04/12/13	04/12/13
TIME STARTED	8:58	10:22	11:45
TIME ENDED	10:13	11:37	13:00
Observation Period Duration (min:sec)	60:00	60:00	60:00
Accumulated Fugitive Emissions Time (min:sec)	00:00	00:00	00:00
Fugitive Emissions (% of Observation Period Duration)	0.00	0.00	0.00

POLLUTANT	**LIMIT**
Fugitive Emissions	5% of observation period duration

TABLE 15

SUMMARY OF RUN-BY-RUN ISOKINETIC TEST AIR FLOW RESULTS AT UNITS 1-3 FF OUTLETS
PINELLAS COUNTY RRF

Unit No.	Run No.	Run Date	Run Time	Steam Flow (Klbs/hr)	Flue Gas Temp. (°F)	SDA Outlet Temp	Activated Carbon	Air Flow (ACFM)	O2 (%dv)	Air Flow (DSCFM)	Air Flow (DSCFM @ 7% O2)
1	U1O-M26A-R1	4/9/2013	09:05-11:28	233	315	Not Applicable	Not Applicable	261018	9.56	137153	111,893
	U1O-M26A-R2	4/9/2013	13:24-15:36	235	315	Not Applicable	Not Applicable	270271	10.22	142655	109,608
	U1O-M26A-R3	4/9/2013	16:22-18:33	236	317	Not Applicable	Not Applicable	272882	10.24	142979	109,652
	U1O-M29-R1	4/9/2013	09:05-11:28	233	316	Not Applicable	15	267181	9.98	139513	109,603
	U1O-M29-R2	4/9/2013	13:24-15:36	235	317	Not Applicable	15	273588	10.06	142753	111327
	U1O-M29-R3	4/9/2013	16:22-18:33	236	317	Not Applicable	15	276223	10.33	141945	107939
	U1O-M201A/202-R1	4/10/2013	10:08-11:08	236	325	Not Applicable	Not Applicable	283412	9.47	151039	124,200
	U1O-M201A/202-R2	4/10/2013	12:11-13:12	233	324	Not Applicable	Not Applicable	278728	8.84	147796	128,232
	U1O-M201A/202-R3	4/10/2013	15:03-16:03	234	311	Not Applicable	Not Applicable	276113	9.30	149919	125,112
	Average =>			235	317	Not Applicable	15	273,268	9.78	143,972	115,285
2	U2O-M26A-R1	4/10/2013	08:45-11:L15	234	295	Not Applicable	Not Applicable	263408	10.74	148964	108,883
	U2O-M26A-R2	4/10/2013	12:09-14:28	234	297	Not Applicable	Not Applicable	267842	10.93	149272	107,068
	U2O-M26A-R3	4/10/2013	15:25-17:35	234	296	Not Applicable	Not Applicable	264906	11.63	150357	100,274
	U2O-M29-R1	4/10/2013	08:45-11:15	234	294	Not Applicable	15	260454	10.60	145261	107,639
	U2O-M29-R2	4/10/2013	12:09-14:28	234	296	Not Applicable	15	264895	11.16	146184	102,434
	U2O-M29-R3	4/10/2013	15:25-17:35	234	297	Not Applicable	15	264216	11.72	148751	98,240
	U2O-M201A/202-R1	4/11/2013	07:32-08:38	231	302	Not Applicable	Not Applicable	259499	9.98	146594	115,166
	U2O-M201A/202-R2	4/11/2013	10:14-11:14	233	302	Not Applicable	Not Applicable	263289	9.51	148208	121,445
	U2O-M201A/202-R3	4/11/2013	12:08-13:08	232	304	Not Applicable	Not Applicable	266193	9.81	146697	117,041
	Average =>			233	298	Not Applicable	15	263,856	10.68	147,810	108,688
3	U3O-M26A-R1	4/11/2013	08:37-10:56	235	306	Not Applicable	Not Applicable	260836	8.33	135446	122,486
	U3O-M26A-R2	4/11/2013	11:45-13:54	233	302	Not Applicable	Not Applicable	263026	7.83	135284	127,206
	U3O-M26A-R3	4/11/2013	14:36-17:04	236	305	Not Applicable	Not Applicable	263191	8.00	135380	125,640
	U3O-M29-R1	4/11/2013	08:37-10:56	235	308	Not Applicable	15	258433	8.54	132648	117,952
	U3O-M29-R2	4/11/2013	11:45-13:54	233	305	Not Applicable	15	259755	8.52	132061	117,619
	U3O-M29-R3	4/11/2013	14:36-17:04	236	306	Not Applicable	15	259953	8.17	132522	121,367
	U3O-M201A/202-R1	4/9/2013	11:56-12:53	232	310	Not Applicable	Not Applicable	291622	9.57	154991	126,334
	U3O-M201A/202-R2	4/9/2013	14:08-15:08	240	309	Not Applicable	Not Applicable	290484	8.85	156389	135,575
	U3O-M201A/202-R3	4/9/2013	16:38-17:38	233	308	Not Applicable	Not Applicable	289542	9.71	152213	122,537
	Average =>			235	306	Not Applicable	15	270,760	8.61	140,770	124,080
	Facility Average =>			**234**	**307**	Not Applicable	**15**	**269,295**	**9.69**	**144,184**	**116,017**

Table 16 – Summary of Pollutant Mass Rates

Pinellas County Resource Recovery Facility (April 2013)

Pollutant		Reporting Units	Title V Emission Limits	MACT Emission Limits	Average Emissions		
					Unit 1	Unit 2	Unit 3
Particulate Matter		lb/hr	N/A		3.67	3.68	3.74
PM2.5					11.85	18.36*	13.01
Cadmium					1.05E-03	6.23E-04	4.11E-04
Lead					6.88E-03	7.14E-03	4.28E-03
Mercury	*Inlet concentration*				1.94E-02	2.61E-02	2.83E-02
	Outlet concentration				1.72E-03	9.34E-04	2.94E-03
Hydrogen Chloride	*Outlet concentration*				6.42	5.58	13.11

* The Unit 2 Run 1 inorganic condensable result is an outlier that is significantly greater than all other test runs. The analytical laboratory noted that the sample contained significantly more white, flaky residue than the other samples. If Run 1 is excluded, then average is 22 mg/dscm @ 7% O_2, which is more than 20% below the emission limit.

Appendix A.2

Figures

LIST OF FIGURES

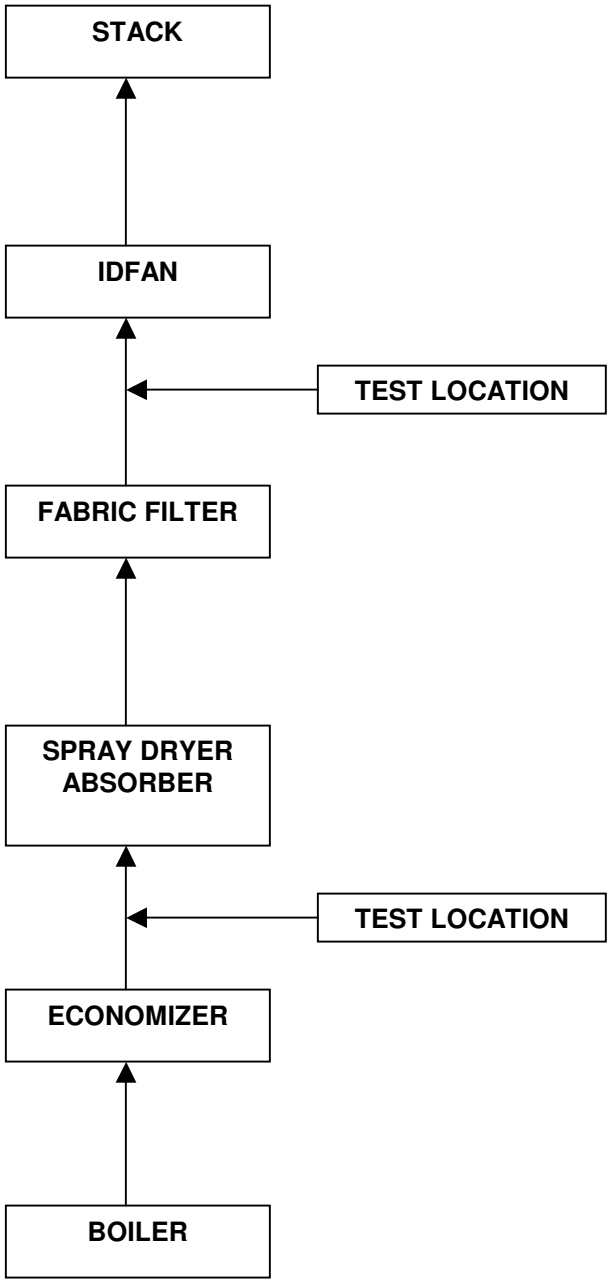
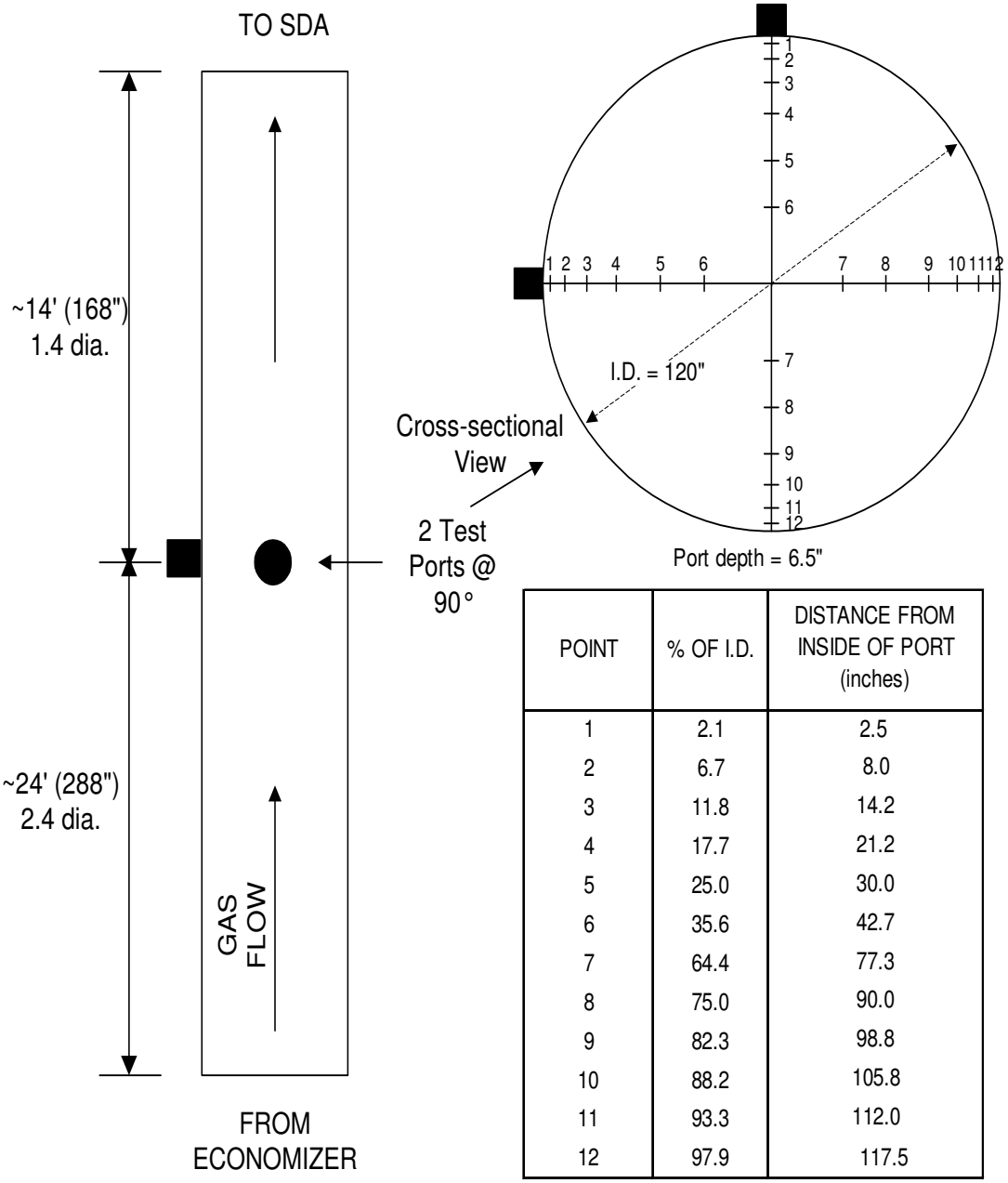


Figure 1 - Simplified Process General Flow Arrangement (Units 1, 2, & 3 are identical)



POINT	% OF I.D.	DISTANCE FROM INSIDE OF PORT (inches)
1	2.1	2.5
2	6.7	8.0
3	11.8	14.2
4	17.7	21.2
5	25.0	30.0
6	35.6	42.7
7	64.4	77.3
8	75.0	90.0
9	82.3	98.8
10	88.2	105.8
11	93.3	112.0
12	97.9	117.5

INSIDE DIAMETER	120.0 in.	10.0 ft.
DISTANCE UPSTREAM FROM DISTURBANCE	168 in.	1.4 dia.
DISTANCE DOWNSTREAM FROM DISTURBANCE	288 in.	2.4 dia.

Figure 2 - SDA Inlet Sampling Location
(Units 1, 2, and 3 are Identical)

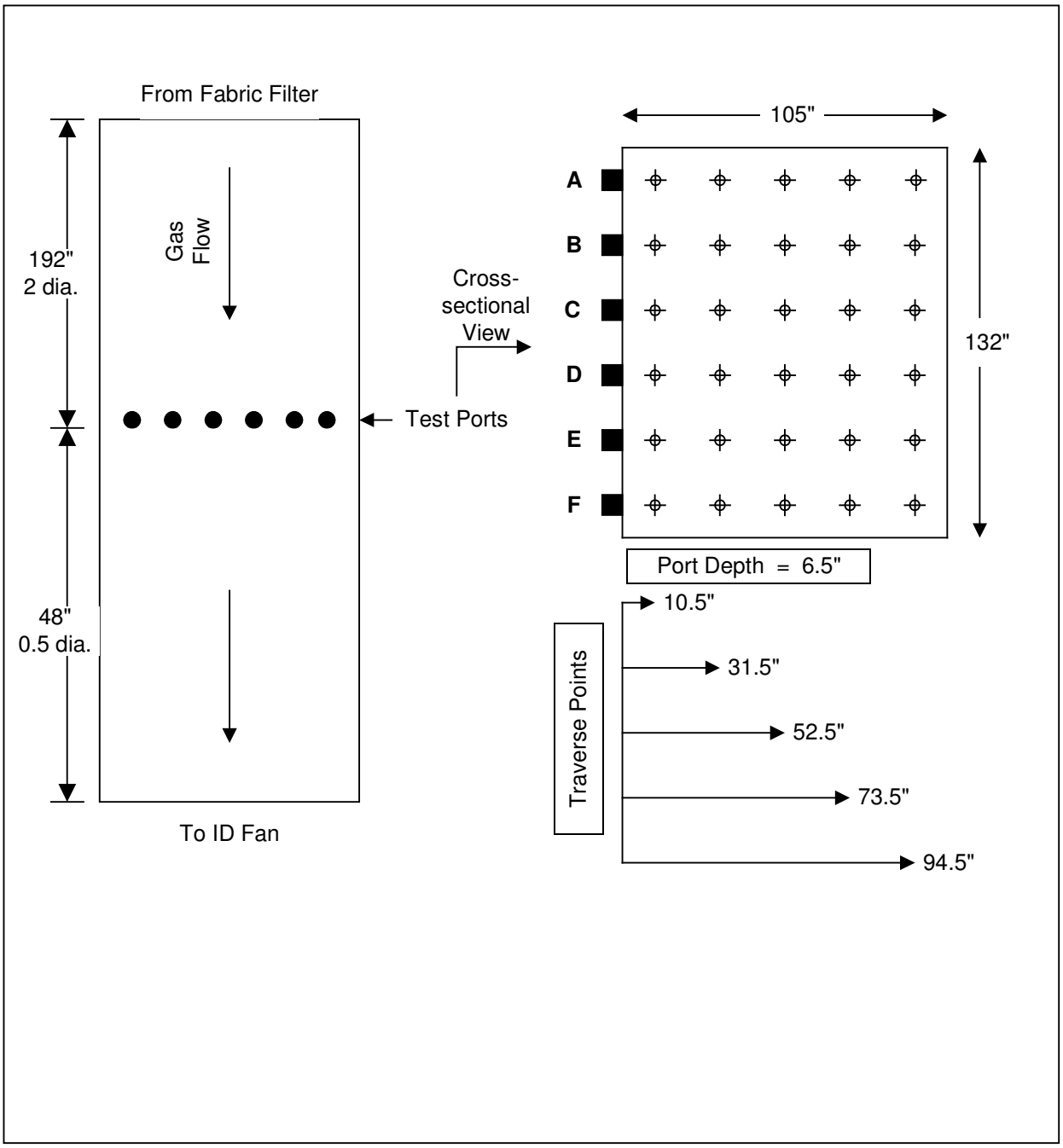


Figure 3 - FF Outlet Sampling Location
(Units 1, 2, & 3 are Identical)

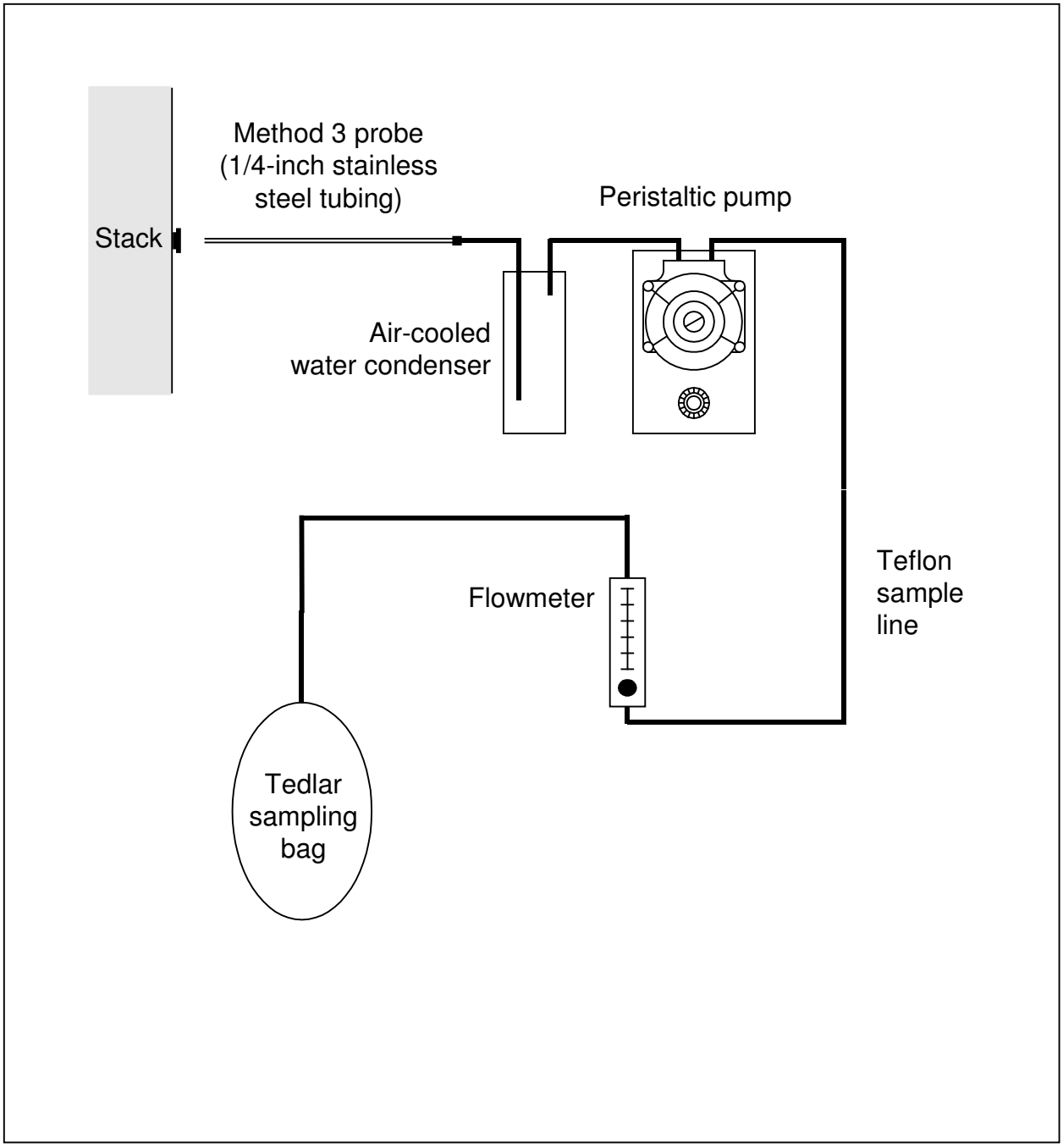


Figure 4 - EPA Method 3 Sampling Train

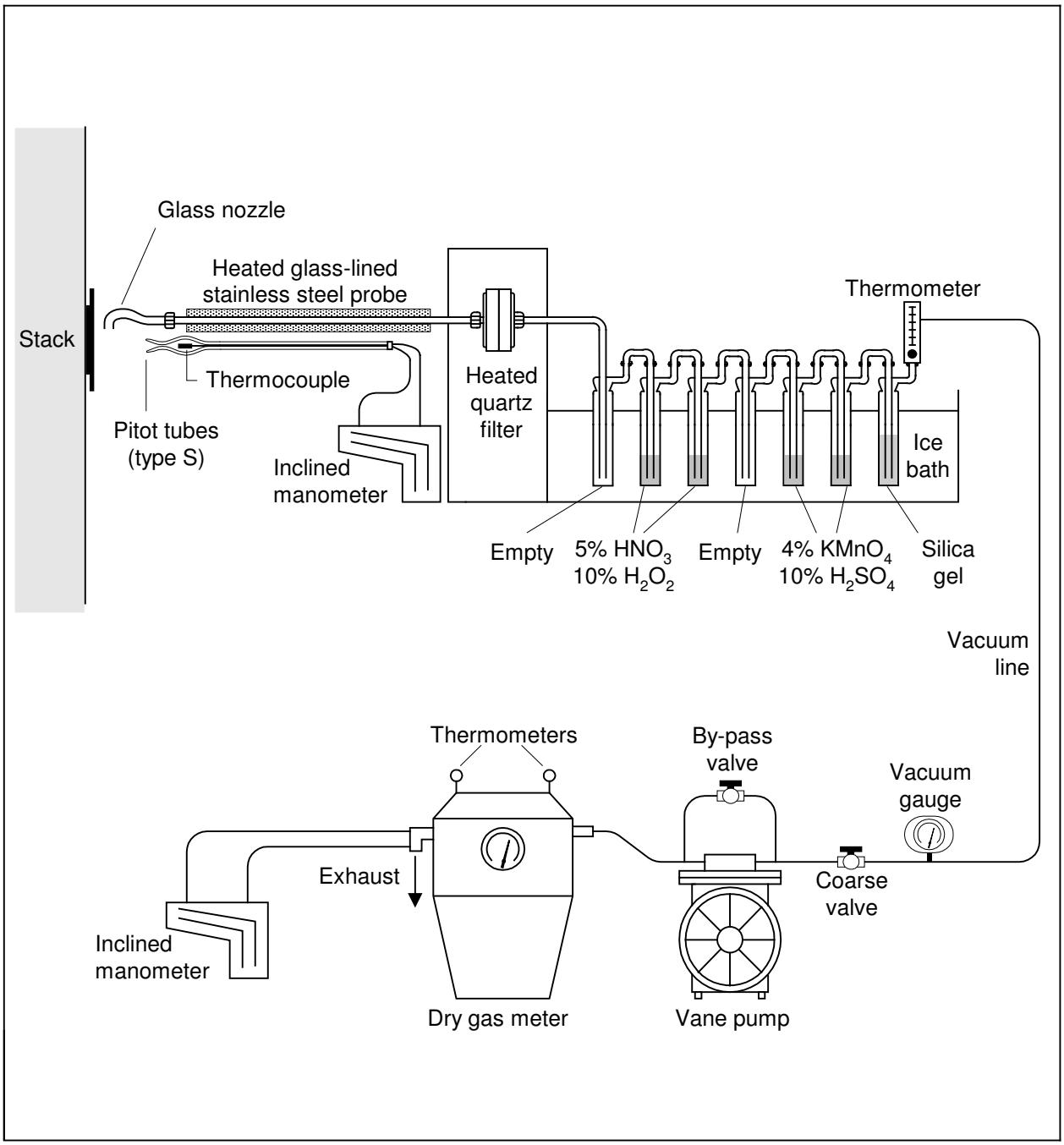


Figure 5 - EPA Method 29 Sampling Train

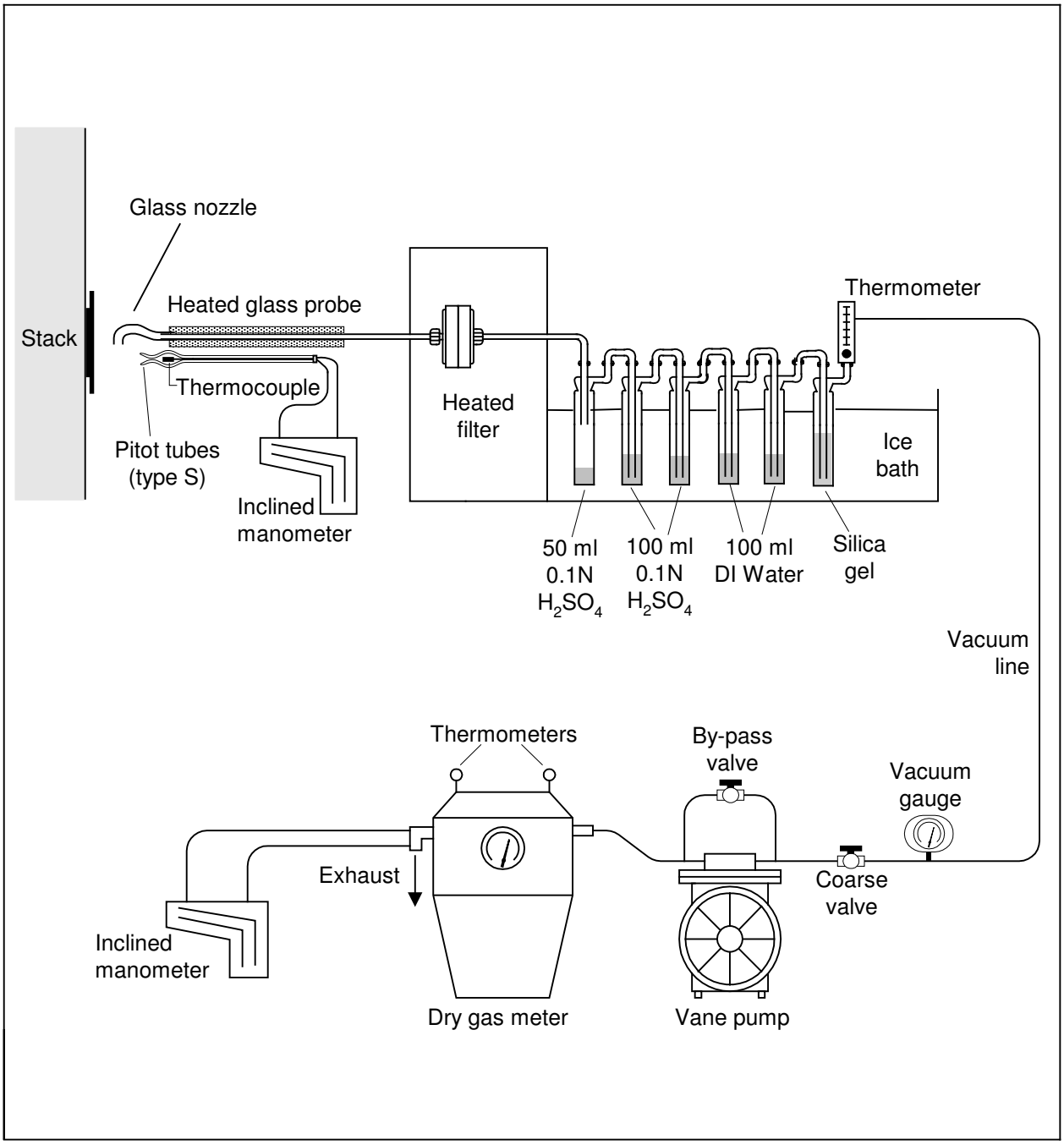


Figure 6 - EPA Method 5/26A Sampling Train

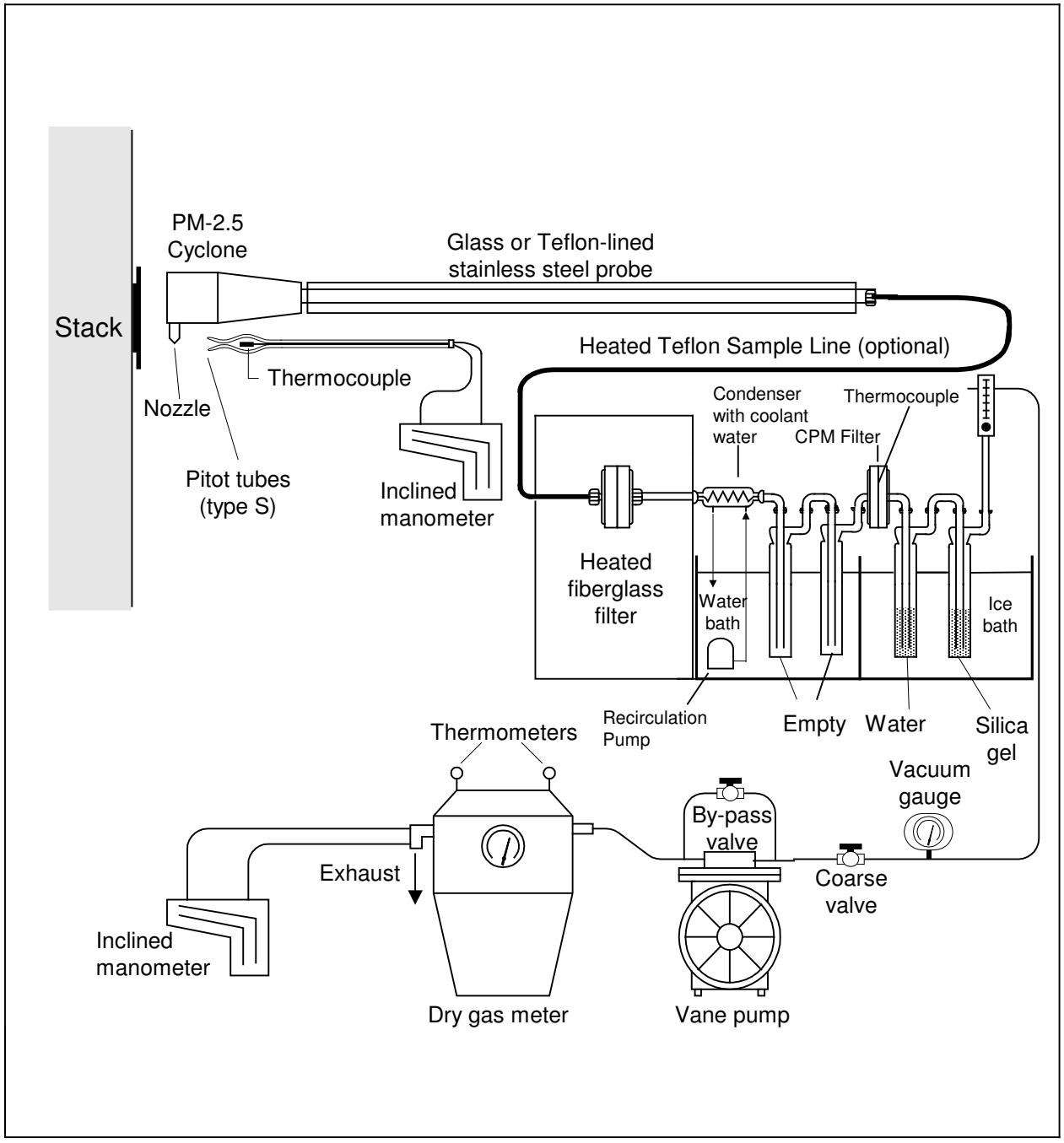


Figure 7 - EPA Method 201A/202 Sampling Train

Appendix A.3

Test Log

TEST LOG UNIT 1 Pinellas County Resource Recovery Facility St. Petersburg, Florida					
Test Location	**Run I.D.**	**Test Parameter**	**Test Date**	**Start Time**	**End Time**
Unit 1 FF Outlet	U1O-M9-R1	Opacity EPA Method 9	4/12/13	10:13	11:13
	U1O-M9-R2			11:13	12:13
	U1O-M9-R3			12:13	13:13
	U1O-M201A/202-R1	PM <2.5 and Condensable Particulate EPA Method 201A/202	4/10/13	10:08	11:08
	U1O-M201A/202-R2			12:11	13:12
	U1O-M201A/202-R3			15:03	16:03
	U1O-M26A-R1*	Particulate and Hydrogen Chloride EPA Method 5/26A	4/9/13	09:05	11:28*
	U1O-M26A-R2			13:24	15:36
	U1O-M26A-R3			16:22	18:33
	U1O-M29-R1*	Cadmium, Lead, and Mercury EPA Method 29		09:05	11:28*
	U1O-M29-R2			13:24	15:36
	U1O-M29-R3			16:22	18:33
Unit 1 SDA Inlet	U1I-M29-R1*	Mercury EPA Method 29		09:05	11:26*
	U1I-M29-R2			13:24	15:34
	U1I-M29-R3			16:22	18:31

* Delay 09:30-09:39 during the run because of a power loss.

TEST LOG
UNIT 2
Pinellas County Resource Recovery Facility
St. Petersburg, Florida

Test Location	Run I.D.	Test Parameter	Test Date	Start Time	End Time
Unit 2 FF Outlet	U2O-M9-R1	Opacity EPA Method 9	4/10/13	08:51	09:51
	U2O-M9-R2		4/12/13	13:20	14:20
	U2O-M9-R3			14:30	15:30
	U2O-M201A/202-R1	PM <2.5 and Condensable Particulate EPA Method 201A/202	4/11/13	07:32	08:38
	U2O-M201A/202-R2			10:14	11:14
	U2O-M201A/202-R3			12:08	13:08
	U2O-M26A-R1*	Particulate and Hydrogen Chloride EPA Method 5/26A	4/10/13	08:45	11:15*
	U2O-M26A-R2			12:09	14:28
	U2O-M26A-R3			15:25	17:35
	U2O-M29-R1*	Cadmium, Lead, and Mercury EPA Method 29		08:45	11:15*
	U2O-M29-R2			12:09	14:28
	U2O-M29-R3			15:25	17:35
Unit 2 SDA Inlet	U2I-M29-R1*	Mercury EPA Method 29		08:45	11:13*
	U2I-M29-R2			12:09	14:26
	U2I-M29-R3			15:25	17:33

* Delay 08:57-08:59 during the run because of a power loss.
* Delay 09:32-09:40 during the run because of a power loss.
* Delay 10:35-10:44 during the run because of a power loss.

TEST LOG UNIT 3 Pinellas County Resource Recovery Facility St. Petersburg, Florida					
Test Location	**Run I.D.**	**Test Parameter**	**Test Date**	**Start Time**	**End Time**
Unit 3 FF Outlet	U3O-M9-R1	Opacity EPA Method 9	4/12/13	10:13	11:13
	U3O-M9-R2			11:13	12:13
	U3O-M9-R3			12:13	13:13
	U3O-M201A/202-R1	PM <2.5 and Condensable Particulate EPA Method 201A/202	4/9/13	11:56	12:53
	U3O-M201A/202-R2			14:08	15:08
	U3O-M201A/202-R3			16:38	17:38
	U3O-M26A-R1	Particulate and Hydrogen Chloride EPA Method 5/26A	4/11/13	08:37	10:56
	U3O-M26A-R2			11:45	13:54
	U3O-M26A-R3*			14:36	17:04*
	U3O-M29-R1	Cadmium, Lead, and Mercury EPA Method 29		08:37	10:56
	U3O-M29-R2			11:45	13:54
	U3O-M29-R3*			14:36	17:04*
Unit 3 SDA Inlet	U3I-M29-R1	Mercury EPA Method 29		08:37	10 :54
	U3I-M29-R2			11 :45	13 :52
	U3I-M29-R3*			14:36	17:02*

* Delay 15:06-15:23 during the run because of a power loss.

TEST LOG

Additional Visible and Fugitive Emissions Test Locations

Pinellas County Resource Recovery Facility

St. Petersburg, Florida

Location	Parameter	Method	Run ID	Date	Start Time	End Time
Ash Conditioning Building (Ash Handling Vent)	Visible Emissions	EPA Method 9	M9-ACBO-R1	4/13/13	12:15	13:15
Residue Storage and Processing Building (Rod Mill Vent)			M9-RSPB-R1	4/12/13	16:47	17:47
Activated Carbon Storage Silo			CS-M9-R1		08:51	09:51
Lime Storage Silo for SDA (Pebble Bin Vent)			M9-Pebble Lime Silo-R1	4/9/13	10:22	11:22
Ash Handling System	Fugitive Emissions	EPA Method 22	(EF)AHS-M22-R1	4/12/13	08:58	10:13
			(WF)AHS-M22-R2		10:22	11:37
			(NE)AHS-M22-R3		11:45	13:00

Appendix A.4

Contact Information

Contact Information

Facility Pinellas County Resource Recovery Facility (PCRRF) Operator: GCS Energy Recovery of Pinellas, Inc. 3001 110th Avenue North St. Petersburg, Florida 33716	*Plant Contact* Ms. Rebecca Bigari Environmental Manager Phone: (727) 572-9163 Email: mailto:rbigari@gcspinellas.com
Testing Firm The Air Compliance Group, LLC 5075 Hollins Road Roanoke, Virginia 24019	*Testing Firm Contact* Mr. Tony Underwood Vice President - Operations Phone: (540) 265-1987 Ext. 240 Email:tony.underwood@aircompgroup.com
Analytical Lab Names, Addresses and Contacts	
EPA Methods 5 and 201A Analyses The Air Compliance Group, LLC – see Testing Firm above	See Testing Firm Contact above
EPA Methods 26A, 29 and 202 Analyses Element One, Inc. 5022-C Wrightsville Ave. Wilmington, North Carolina 28403	*Element One Contact* Ken Smith Phone: (910) 793-0128 Email: e1lab@e1lab.com

Appendix B

EPA Method 29 Data and Results

Appendix B.1

EPA Method 29 Data and Results: Unit 1 FF Outlet

Run Number **U1O-M29-R1**

Date	04/09/13	
Start Time	9:05	
End Time	11:28	
Stack Length	105	inches
Stack Width	132	inches
Nozzle I.D.	0.280	inches
Meter Box Gamma	0.9604	
Meter Box dH@	2.0614	
Barometric	30.02	in.Hg
Cp	0.84	
Test Duration	120	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	0.0	228.0	228.0
Impinger 2	100.0	247.0	147.0
Impinger 3	100.0	146.0	46.0
Impinger 4	0.0	6.0	6.0
Impinger 5	100.0	101.0	1.0
Impinger 6	100.0	92.0	-8.0
Impinger 7			0.0
Total	400.0	820.0	420.0
Silica gel (g)	250.0	270.0	20.0

METHOD 1-4 RESULTS

Metered Volume	81.384	dcf
Volume @ Std.Cond.	76.456	dscf
% Water	21.32	%
% Isokinetics	102.9	%
Velocity	46.27	ft/sec
Actual Flow	267181	acfm
Std. Flow	177308	scfm
Dry Std. Flow	139513	dscfm

METHOD 3 DATA

%O2	9.98	Md	29.90
%CO2	9.37	Ms	27.36
%CO	0.0	Ps	29.18
%N2	80.7	Fo	1.165
O2+CO2	19.4	%EA	88

POINT	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Meter Temp. (Deg. F) Inlet	Meter Temp. (Deg. F) Outlet
1	312	-11.50	0.42	1.60	199.714	75	75
2	314	-12.00	0.43	1.60	240.988	76	75
3	316	-11.00	0.44	1.60		76	75
4	316	-11.50	0.43	1.60	241.997	77	75
5	318	-11.50	0.46	1.70	282.107	80	76
6	316	-11.00	0.44	1.60		81	77
7	316		0.43	1.60		82	77
8	314		0.41	1.50		81	77
9	314		0.42	1.60		81	77
10	315		0.43	1.60		83	77
11	315		0.38	1.80		84	78
12	317		0.48	1.80		84	78
13	315		0.45	1.70		86	79
14	315		0.43	1.60		87	79
15	316		0.42	1.60		88	80
16	315		0.40	1.50		86	83
17	315		0.39	1.50		87	84
18	315		0.41	1.50		88	84
19	315		0.42	1.60		88	84
20	315		0.42	1.60		90	85
21	316		0.44	1.60		90	85
22	316		0.45	1.70		90	85
23	318		0.44	1.60		91	85
24	317		0.42	1.60		92	86
25	316		0.43	1.70		91	86
26	317		0.44	1.70		93	87
27	315		0.45	1.70		93	87
28	320		0.43	1.60		94	87
29	320		0.41	1.50		95	88
30	320		0.40	1.50		95	88
AVG.	316	-11.42	0.43	1.61	81.384		84

EPA Method 29: Analytical Data and Results

PINELLAS COUNTY RRF
UNIT 1 FF OUTLET

SAMPLING DATA

Run Number	**U1O-M29-R1**	
Date	04/09/13	
Corr. Sample Volume	76.456	dscf
Corr. Flowrate	139513	dscfm
O2 Content	9.98	%
CO2 Content	9.37	%

TRACE METALS ANALYTICAL DATA AND RESULTS

		LABORATORY DATA					METALS EMISSIONS				
		Sample Fraction 1	Blank Fraction 1	Sample Fraction 2	Blank Fraction 2	Sample	CONCENTRATION				MASS
COMPONENT		(µg)	(µg)	(µg)	(µg)	Total (µg)	ACTUAL (µg/dscm)	@ 12% CO2 (µg/dscm)	@7% O2 (µg/dscm)	@ 7% O2 (mg/dscm)	RATE (lb/hr)
Mercury	Hg	0.10	0.00	6.03	0.00	6.13	2.83	3.63	3.61	3.61E-03	1.48E-03
Cadmium	Cd	4.51	0.00			4.51	2.08	2.67	2.65	2.65E-03	1.09E-03
Lead	Pb	26.00	0.83			25.17	11.63	14.89	14.80	1.48E-02	6.08E-03

Notes

Front Half = Probe Wash and Filter
Back Half = Impinger Catch
Blank = Field Blank

Run Number **U1O-M29-R2**

Date	04/09/13	
Start Time	13:24	
End Time	15:36	
Stack Depth	105	inches
Stack Width	132	inches
Nozzle I.D.	0.280	inches
Meter Box Gamma	0.9604	
Meter Box dH@	2.0614	
Barometric	30.04	in.Hg
Cp	0.84	
Test Duration	120	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	0.0	248.0	248.0
Impinger 2	100.0	233.0	133.0
Impinger 3	100.0	122.0	22.0
Impinger 4	0.0	5.0	5.0
Impinger 5	100.0	104.0	4.0
Impinger 6	100.0	103.0	3.0
Impinger 7			0.0
Total	400.0	815.0	415.0
Silica gel (g)	250.0	270.7	20.7

METHOD 1-4 RESULTS

Metered Volume	81.677	dcf
Volume @ Std.Cond.	75.437	dscf
% Water	21.38	%
% Isokinetics	99.2	%
Velocity	47.37	ft/sec
Actual Flow	273588	acfm
Std. Flow	181565	scfm
Dry Std. Flow	142753	dscfm

METHOD 3 DATA

%O2	10.06	Md	29.90
%CO2	9.35	Ms	27.35
%CO	0.0	Ps	29.22
%N2	80.6	Fo	1.159
O2+CO2	19.4	%EA	90

POINT	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Meter Temp. (Deg. F) Inlet	Meter Temp. (Deg. F) Outlet
1	306	-11.0	0.43	1.50	289.826	89	89
2	312	-11.0	0.44	1.50	330.015	90	89
3	317	-11.5	0.46	1.60		90	89
4	316	-11.0	0.47	1.60	331.010	91	90
5	315	-11.5	0.42	1.50	372.498	92	90
6	313	-11.0	0.42	1.50		94	91
7	313		0.45	1.60		95	91
8	318		0.43	1.50		95	91
9	328		0.43	1.60		96	93
10	330		0.46	1.60		97	92
11	320		0.45	1.60		98	93
12	321		0.40	1.40		98	93
13	320		0.43	1.50		98	93
14	321		0.42	1.50		99	94
15	321		0.43	1.50		100	94
16	316		0.43	1.50		95	94
17	318		0.45	1.60		97	94
18	320		0.46	1.60		98	94
19	317		0.44	1.50		97	94
20	316		0.43	1.50		96	94
21	313		0.48	1.70		93	91
22	315		0.48	1.70		93	91
23	315		0.45	1.60		94	90
24	316		0.46	1.60		94	90
25	312		0.48	1.70		96	90
26	314		0.48	1.70		96	90
27	316		0.50	1.80		96	90
28	316		0.47	1.70		97	90
29	317		0.45	1.60		97	90
30	317		0.44	1.50		97	90
AVG.	317	-11.17	0.45	1.58	81.677	93	

EPA Method 29: Analytical Data and Results

PINELLAS COUNTY RRF
UNIT 1 FF OUTLET

SAMPLING DATA

Run Number	**U1O-M29-R2**	
Date	04/09/13	
Corr. Sample Volume	75.437	dscf
Corr. Flowrate	142753	dscfm
O2 Content	10.06	%
CO2 Content	9.35	%

TRACE METALS ANALYTICAL DATA AND RESULTS

		LABORATORY DATA					METALS EMISSIONS				
		Sample Fraction 1	Blank Fraction 1	Sample Fraction 2	Blank Fraction 2	Sample Total	CONCENTRATION				MASS RATE
COMPONENT		(µg)	(µg)	(µg)	(µg)	(µg)	ACTUAL (µg/dscm)	@ 12% CO2 (µg/dscm)	@7% O2 (µg/dscm)	@ 7% O2 (mg/dscm)	(lb/hr)
Mercury	Hg	0.15	0.00	6.95	0.00	7.10	3.32	4.26	4.26	4.26E-03	1.78E-03
Cadmium	Cd	2.77	0.00			2.77	1.30	1.66	1.66	1.66E-03	6.93E-04
Lead	Pb	22.30	0.83			21.47	10.05	12.90	12.89	1.29E-02	5.37E-03

Notes

Front Half = Probe Wash and Filter
Back Half = Impinger Catch
Blank = Field Blank

Run Number **U1O-M29-R3**

Date	04/09/13	
Start Time	16:22	
End Time	18:33	
Stack Depth	105	inches
Stack Width	132	inches
Nozzle I.D.	0.280	inches
Meter Box Gamma	0.9604	
Meter Box dH@	2.0614	
Barometric	30.04	in.Hg
Cp	0.84	
Test Duration	120	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	0.0	308.0	308.0
Impinger 2	100.0	230.0	130.0
Impinger 3	100.0	112.0	12.0
Impinger 4	0.0	4.0	4.0
Impinger 5	100.0	90.0	-10.0
Impinger 6	100.0	104.0	4.0
Impinger 7			0.0
Total	400.0	848.0	448.0
Silica gel (g)	250.0	272.0	22.0

METHOD 1-4 RESULTS

Metered Volume	81.819	dcf
Volume @ Std.Cond.	75.872	dscf
% Water	22.58	%
% Isokinetics	100.3	%
Velocity	47.83	ft/sec
Actual Flow	276223	acfm
Std. Flow	183337	scfm
Dry Std. Flow	141945	dscfm

METHOD 3 DATA

%O2	10.33	Md	29.87
%CO2	9.11	Ms	27.19
%CO	0.0	Ps	29.22
%N2	80.6	Fo	1.160
O2+CO2	19.4	%EA	94

POINT	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Meter Temp. (Deg. F) Inlet	Meter Temp. (Deg. F) Outlet
1	314	-11.00	0.40	1.40	374.091	86	86
2	316	-11.50	0.40	1.40	414.596	87	86
3	316	-11.00	0.44	1.50		88	87
4	316	-11.00	0.45	1.60	414.732	89	87
5	315	-11.50	0.46	1.60	456.046	89	87
6	315	-11.00	0.43	1.50		91	88
7	315		0.44	1.50		92	88
8	317		0.46	1.60		93	88
9	317		0.47	1.60		94	89
10	317		0.46	1.60		94	89
11	318		0.46	1.60		95	91
12	319		0.48	1.70		95	92
13	318		0.48	1.70		95	91
14	319		0.47	1.60		96	90
15	319		0.45	1.60		96	90
16	315		0.45	1.60		92	89
17	315		0.48	1.70		93	89
18	316		0.45	1.60		93	89
19	317		0.44	1.50		93	89
20	317		0.46	1.60		94	89
21	314		0.44	1.50		95	90
22	315		0.45	1.60		97	90
23	317		0.43	1.50		97	90
24	317		0.44	1.50		97	90
25	320		0.46	1.60		97	91
26	320		0.50	1.80		96	92
27	317		0.51	1.80		93	91
28	319		0.47	1.70		92	90
29	318		0.45	1.60		92	90
30	318		0.44	1.50		92	89
AVG.	317	-11.17	0.45	1.59	81.819	91	

EPA Method 29: Analytical Data and Results

PINELLAS COUNTY RRF
UNIT 1 FF OUTLET

SAMPLING DATA

Run Number	**U1O-M29-R3**	
Date	04/09/13	
Corr. Sample Volume	75.872	dscf
Corr. Flowrate	141945	dscfm
O2 Content	10.33	%
CO2 Content	9.11	%

TRACE METALS ANALYTICAL DATA AND RESULTS

		LABORATORY DATA					METALS EMISSIONS				
		Sample Fraction 1	Blank Fraction 1	Sample Fraction 2	Blank Fraction 2	Sample	CONCENTRATION				MASS
COMPONENT		(µg)	(µg)	(µg)	(µg)	Total (µg)	ACTUAL (µg/dscm)	@ 12% CO2 (µg/dscm)	@7% O2 (µg/dscm)	@ 7% O2 (mg/dscm)	RATE (lb/hr)
Mercury	Hg	0.42	0.00	7.30	0.00	7.72	3.59	4.73	4.72	4.72E-03	1.91E-03
Cadmium	Cd	5.55	0.00			5.55	2.58	3.40	3.40	3.40E-03	1.37E-03
Lead	Pb	37.90	0.83			37.07	17.26	22.73	22.69	2.27E-02	9.17E-03

Notes

Front Half = Probe Wash and Filter
Back Half = Impinger Catch
Blank = Field Blank

Appendix B.2

EPA Method 29 Data and Results: Unit 1 SDA Inlet

Run Number **U1I-M29-R1**

Date	04/09/13	
Start Time	9:05	
End Time	11:26	
Stack Diameter	120	inches
Nozzle I.D.	0.280	inches
Meter Box Gamma	0.9798	
Meter Box dH@	1.8708	
Barometric	30.02	in.Hg
Cp	0.84	
Test Duration	120	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	0.0	133.0	133.0
Impinger 2	100.0	250.0	150.0
Impinger 3	100.0	137.0	37.0
Impinger 4	0.0	2.0	2.0
Impinger 5	100.0	100.0	0.0
Impinger 6	100.0	94.0	-6.0
Impinger 7			0.0
Total	400.0	716.0	316.0
Silica gel (g)	250.0	278.3	28.3

METHOD 1-4 RESULTS

Metered Volume	80.291	dcf
Volume @ Std.Cond.	78.065	dscf
% Water	17.19	%
% Isokinetics	97.2	%
Velocity	62.71	ft/sec
Actual Flow	295490	acfm
Std. Flow	148534	scfm
Dry Std. Flow	122996	dscfm

METHOD 3 DATA

%O2	8.10	Md	30.07
%CO2	10.90	Ms	27.99
%CO	0.0	Ps	29.92
%N2	81.0	Fo	1.174
O2+CO2	19.0	%EA	61

POINT	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Meter Temp. (Deg. F) Inlet	Meter Temp. (Deg. F) Outlet
1	587	-1.50	0.54	1.40	472.068	73	73
2	586	-1.30	0.62	1.60	513.015	74	73
3	587		0.66	1.70		75	73
4	587		0.65	1.70	513.244	76	73
5	586		0.68	1.80	552.588	76	73
6	588		0.66	1.70		77	73
7	587		0.64	1.70		77	74
8	587		0.65	1.70		77	74
9	590		0.63	1.60		79	75
10	591		0.63	1.60		78	75
11	592		0.59	1.50		78	75
12	592		0.62	1.60		78	75
13	592		0.50	1.30		76	76
14	593		0.54	1.40		77	76
15	593		0.60	1.60		78	76
16	593		0.60	1.60		78	76
17	592		0.62	1.60		77	76
18	592		0.61	1.60		77	75
19	593		0.62	1.60		78	75
20	593		0.63	1.60		77	75
21	592		0.61	1.60		78	76
22	592		0.60	1.60		78	76
23	592		0.57	1.50		78	77
24	590		0.54	1.40		78	77
AVG.	590	-1.40	0.61	1.58	80.291	76	

EPA Method 29: Analytical Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 1 SDA INLET

SAMPLING DATA

Run Number	**U1I-M29-R1**	
Date	04/09/13	
Corr. Sample Volume	78.065	dscf
Corr. Sample Volume	2.211	dscm
Corr. Flowrate	122996	dscfm
O2 Content	8.10	%
CO2 Content	10.90	%

TRACE METALS ANALYTICAL DATA AND RESULTS

	LABORATORY DATA					METALS EMISSIONS				
						CONCENTRATION				
COMPONENT	Front Half Sample (µg)	Front Half Blank (µg)	Back Half Sample (µg)	Back Half Blank (µg)	Sample Total (µg)	ACTUAL (ug/dscm)	@ 12% CO2 (ug/dscm)	@7% O2 (ug/dscm)	@ 7% O2 (mg/dscm)	MASS RATE lb/hr
Mercury Hg	25.10	0.0000	74.281	0.00	99.38	44.96	49.49	48.82	0.049	2.07E-02

Notes

Front Half = Probe Wash and Filter
Back Half = Impinger Catch
Blank = Field Blank

Run Number **U1I-M29-R2**

Date	04/09/13	
Start Time	13:24	
End Time	15:34	
Stack Diameter	120	inches
Nozzle I.D.	0.280	inches
Meter Box Gamma	0.9798	
Meter Box dH@	1.8708	
Barometric	30.02	in.Hg
Cp	0.84	
Test Duration	120	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	0.0	154.0	154.0
Impinger 2	100.0	218.0	118.0
Impinger 3	100.0	140.0	40.0
Impinger 4	0.0	2.0	2.0
Impinger 5	100.0	104.0	4.0
Impinger 6	100.0	100.0	0.0
Impinger 7			0.0
Total	400.0	718.0	318.0
Silica gel (g)	250.0	278.6	28.6

METHOD 1-4 RESULTS

Metered Volume	81.696	dcf
Volume @ Std.Cond.	78.318	dscf
% Water	17.24	%
% Isokinetics	96.1	%
Velocity	64.07	ft/sec
Actual Flow	301940	acfm
Std. Flow	150757	scfm
Dry Std. Flow	124764	dscfm

METHOD 3 DATA

%O2	8.54	Md	30.03
%CO2	10.55	Ms	27.96
%CO	0.0	Ps	29.91
%N2	80.9	Fo	1.172
O2+CO2	19.1	%EA	67

POINT	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Meter Temp. (Deg. F) Inlet	Meter Temp. (Deg. F) Outlet
1	597	-1.60	0.62	1.60	553.523	81	82
2	598	-1.40	0.64	1.70	594.857	85	82
3	599		0.66	1.70		85	82
4	599		0.65	1.70	595.066	85	82
5	598		0.67	1.70	635.428	86	83
6	599		0.67	1.70		86	83
7	599		0.66	1.70		86	83
8	600		0.64	1.70		86	83
9	600		0.65	1.70		86	84
10	599		0.63	1.60		86	84
11	598		0.60	1.60		86	84
12	598		0.58	1.50		86	84
13	597		0.56	1.50		83	83
14	598		0.61	1.60		85	83
15	598		0.63	1.60		84	83
16	599		0.65	1.70		84	83
17	595		0.65	1.70		83	83
18	593		0.64	1.70		82	82
19	594		0.63	1.60		83	82
20	594		0.65	1.70		83	82
21	595		0.62	1.60		84	82
22	594		0.62	1.60		84	82
23	595		0.60	1.60		84	83
24	595		0.59	1.50		84	83
AVG.	597	-1.50	0.63	1.64	81.696	84	

EPA Method 29: Analytical Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 1 SDA INLET

SAMPLING DATA

Run Number	**U1I-M29-R2**	
Date	04/09/13	
Corr. Sample Volume	78.318	dscf
Corr. Sample Volume	2.218	dscm
Corr. Flowrate	124764	dscfm
O2 Content	8.54	%
CO2 Content	10.55	%

TRACE METALS ANALYTICAL DATA AND RESULTS

	LABORATORY DATA					METALS EMISSIONS				
						CONCENTRATION				
COMPONENT	Front Half Sample (µg)	Front Half Blank (µg)	Back Half Sample (µg)	Back Half Blank (µg)	Sample Total (µg)	ACTUAL (ug/dscm)	@ 12% CO2 (ug/dscm)	@7% O2 (ug/dscm)	@ 7% O2 (mg/dscm)	MASS RATE lb/hr
Mercury Hg	24.00	0.0000	68.87	0.00	92.87	41.88	47.63	47.09	0.047	1.96E-02

Notes

Front Half = Probe Wash and Filter
Back Half = Impinger Catch
Blank = Field Blank

Run Number **U1I-M29-R3**

Date	04/09/13	
Start Time	16:22	
End Time	18:31	
Stack Diameter	120	inches
Nozzle I.D.	0.280	inches
Meter Box Gamma	0.9798	
Meter Box dH@	1.8708	
Barometric	30.04	in.Hg
Cp	0.84	
Test Duration	120	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	0.0	145.0	145.0
Impinger 2	100.0	235.0	135.0
Impinger 3	100.0	130.0	30.0
Impinger 4	0.0	11.0	11.0
Impinger 5	100.0	115.0	15.0
Impinger 6	100.0	95.0	-5.0
Impinger 7			0.0
Total	400.0	731.0	331.0
Silica gel (g)	250.0	274.7	24.7

METHOD 1-4 RESULTS

Metered Volume	80.460	dcf
Volume @ Std.Cond.	76.865	dscf
% Water	17.89	%
% Isokinetics	96.1	%
Velocity	63.50	ft/sec
Actual Flow	299253	acfm
Std. Flow	149143	scfm
Dry Std. Flow	122464	dscfm

METHOD 3 DATA

%O2	8.29	Md	30.09
%CO2	10.97	Ms	27.92
%CO	0.0	Ps	29.92
%N2	80.7	Fo	1.149
O2+CO2	19.3	%EA	64

POINT	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Meter Temp. (Deg. F) Inlet	Meter Temp. (Deg. F) Outlet
1	594	-1.60	0.55	1.40	636.623	85	85
2	595	-1.70	0.59	1.50	677.298	84	83
3	598		0.62	1.60		85	83
4	598		0.63	1.60	678.967	86	83
5	599		0.63	1.60	718.752	86	86
6	598		0.65	1.70		86	84
7	599		0.64	1.70		86	84
8	599		0.64	1.70		87	83
9	599		0.65	1.70		87	83
10	600		0.63	1.60		87	84
11	600		0.63	1.60		87	84
12	600		0.61	1.60		87	84
13	601		0.60	1.60		85	84
14	601		0.63	1.60		88	85
15	600		0.62	1.60		88	85
16	600		0.65	1.70		88	85
17	600		0.64	1.70		88	85
18	601		0.63	1.60		88	86
19	601		0.63	1.60		88	86
20	601		0.62	1.60		87	86
21	601		0.60	1.60		87	86
22	600		0.61	1.60		88	86
23	600		0.58	1.50		89	87
24	600		0.53	1.40		89	87
AVG.	599	-1.65	0.62	1.60	80.460	86	

EPA Method 29: Analytical Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 1 SDA INLET

SAMPLING DATA

Run Number	**U1I-M29-R3**	
Date	04/09/13	
Corr. Sample Volume	76.865	dscf
Corr. Sample Volume	2.177	dscm
Corr. Flowrate	122464	dscfm
O2 Content	8.29	%
CO2 Content	10.97	%

TRACE METALS ANALYTICAL DATA AND RESULTS

		LABORATORY DATA					METALS EMISSIONS				
							CONCENTRATION				
COMPONENT		**Front Half Sample (µg)**	**Front Half Blank (µg)**	**Back Half Sample (µg)**	**Back Half Blank (µg)**	**Sample Total (µg)**	**ACTUAL (ug/dscm)**	**@ 12% CO2 (ug/dscm)**	**@7% O2 (ug/dscm)**	**@ 7% O2 (mg/dscm)**	**MASS RATE lb/hr**
Mercury	Hg	21.05	0.0000	63.329	0.00	84.38	38.77	42.41	42.73	0.043	1.78E-02

Notes

Front Half = Probe Wash and Filter
Back Half = Impinger Catch
Blank = Field Blank

Appendix B.3

EPA Method 29 Data and Results: Unit 2 FF Outlet

Run Number **U2O-M29-R1**

Date	04/10/13	
Start Time	8:45	
End Time	11:15	
Stack Length	105	inches
Stack Width	132	inches
Nozzle I.D.	0.280	inches
Meter Box Gamma	0.9604	
Meter Box dH@	2.0614	
Barometric	29.99	in.Hg
Cp	0.84	
Test Duration	120	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	0.0	176.0	176.0
Impinger 2	100.0	228.0	128.0
Impinger 3	100.0	137.0	37.0
Impinger 4	0.0	8.0	8.0
Impinger 5	100.0	97.0	-3.0
Impinger 6	100.0	107.0	7.0
Impinger 7			0.0
Total	400.0	753.0	353.0
Silica gel (g)	250.0	267.6	17.6

METHOD 1-4 RESULTS

Metered Volume	81.193	dcf
Volume @ Std.Cond.	77.137	dscf
% Water	18.44	%
% Isokinetics	99.7	%
Velocity	45.10	ft/sec
Actual Flow	260454	acfm
Std. Flow	178113	scfm
Dry Std. Flow	145261	dscfm

METHOD 3 DATA

%O2	10.60	Md	29.80
%CO2	8.60	Ms	27.62
%CO	0.0	Ps	29.20
%N2	80.8	Fo	1.198
O2+CO2	19.2	%EA	99

POINT	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Meter Temp. (Deg. F) Inlet	Meter Temp. (Deg. F) Outlet
1	282	-11.00	0.48	1.80	470.436	70	70
2	297	-10.50	0.48	1.80	511.836	72	71
3	298	-11.00	0.45	1.70		73	71
4	291	-10.50	0.40	1.50	511.997	75	71
5	302	-11.00	0.33	1.30	551.790	75	71
6	292	-10.50	0.47	1.80		77	72
7	292		0.49	1.90		78	73
8	293		0.46	1.70		78	74
9	298		0.42	1.60		79	74
10	303		0.34	1.30		80	75
11	292		0.45	1.70		81	75
12	297		0.47	1.80		78	75
13	288		0.44	1.70		80	75
14	291		0.43	1.60		80	75
15	293		0.35	1.30		80	75
16	288		0.48	1.80		78	76
17	280		0.47	1.80		79	76
18	305		0.43	1.60		79	76
19	299		0.40	1.50		80	76
20	289		0.33	1.30		81	76
21	291		0.47	1.80		81	77
22	292		0.45	1.70		82	77
23	290		0.45	1.70		82	77
24	291		0.40	1.50		80	78
25	300		0.35	1.30		80	78
26	291		0.40	1.50		81	78
27	291		0.43	1.60		82	78
28	292		0.43	1.60		83	78
29	297		0.41	1.50		83	78
30	300		0.35	1.30		84	79
AVG.	294	-10.75	0.42	1.60	81.193		77

EPA Method 29: Analytical Data and Results

PINELLAS COUNTY RRF
UNIT 2 FF OUTLET

SAMPLING DATA

Run Number	**U2O-M29-R1**	
Date	04/10/13	
Corr. Sample Volume	77.137	dscf
Corr. Flowrate	145261	dscfm
O2 Content	10.60	%
CO2 Content	8.60	%

TRACE METALS ANALYTICAL DATA AND RESULTS

		LABORATORY DATA					METALS EMISSIONS				
		Sample Fraction 1	Blank Fraction 1	Sample Fraction 2	Blank Fraction 2	Sample Total	CONCENTRATION				MASS RATE
COMPONENT		(µg)	(µg)	(µg)	(µg)	(µg)	ACTUAL (µg/dscm)	@ 12% CO2 (µg/dscm)	@7% O2 (µg/dscm)	@ 7% O2 (mg/dscm)	(lb/hr)
Mercury	Hg	0.16	0.00	1.95	0.00	2.11	0.97	1.35	1.30	1.30E-03	5.25E-04
Cadmium	Cd	1.41	0.00			1.41	0.65	0.90	0.87	8.71E-04	3.51E-04
Lead	Pb	19.30	0.83			18.47	8.46	11.80	11.41	1.14E-02	4.60E-03

Notes

Front Half = Probe Wash and Filter
Back Half = Impinger Catch
Blank = Field Blank

Run Number **U2O-M29-R2**

Date	04/10/13	
Start Time	12:09	
End Time	14:28	
Stack Depth	105	inches
Stack Width	132	inches
Nozzle I.D.	0.280	inches
Meter Box Gamma	0.9604	
Meter Box dH@	2.0614	
Barometric	29.95	in.Hg
Cp	0.84	
Test Duration	120	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	0.0	213.0	213.0
Impinger 2	100.0	235.0	135.0
Impinger 3	100.0	120.0	20.0
Impinger 4	0.0	0.0	0.0
Impinger 5	100.0	98.0	-2.0
Impinger 6	100.0	95.0	-5.0
Impinger 7			0.0
Total	400.0	761.0	361.0
Silica gel (g)	250.0	268.4	18.4

METHOD 1-4 RESULTS

Metered Volume	82.192	dcf
Volume @ Std.Cond.	76.432	dscf
% Water	18.94	%
% Isokinetics	98.1	%
Velocity	45.87	ft/sec
Actual Flow	264895	acfm
Std. Flow	180343	scfm
Dry Std. Flow	146184	dscfm

METHOD 3 DATA

%O2	11.16	Md	29.76
%CO2	8.19	Ms	27.53
%CO	0.0	Ps	29.16
%N2	80.7	Fo	1.189
O2+CO2	19.4	%EA	110

POINT	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Meter Temp. (Deg. F) Inlet	Meter Temp. (Deg. F) Outlet
1	294	-11.0	0.48	1.80	556.062	84	81
2	294	-10.5	0.48	1.80	596.820	85	81
3	298	-10.5	0.45	1.70		84	82
4	297	-11.0	0.41	1.60	596.967	85	82
5	295	-11.0	0.35	1.30	638.401	86	82
6	295	-10.5	0.45	1.70		87	83
7	295		0.46	1.70		88	83
8	297		0.44	1.70		88	83
9	294		0.40	1.50		88	84
10	292		0.36	1.40		89	84
11	292		0.47	1.80		89	84
12	296		0.48	1.80		90	85
13	302		0.45	1.70		90	85
14	294		0.41	1.60		90	85
15	292		0.37	1.40		91	85
16	293		0.49	1.90		88	87
17	293		0.47	1.80		89	87
18	300		0.44	1.70		90	87
19	304		0.41	1.60		90	87
20	292		0.35	1.30		90	88
21	292		0.51	1.90		91	88
22	294		0.50	1.90		91	88
23	304		0.48	1.80		92	89
24	305		0.43	1.60		93	90
25	293		0.40	1.50		95	91
26	304		0.47	1.80		94	91
27	299		0.45	1.70		94	91
28	291		0.45	1.70		94	92
29	292		0.40	1.50		95	92
30	292		0.33	1.30		95	92
AVG.	296	-10.75	0.43	1.65	82.192	88	

EPA Method 29: Analytical Data and Results

PINELLAS COUNTY RRF
UNIT 2 FF OUTLET

SAMPLING DATA

Run Number	**U2O-M29-R2**	
Date	04/10/13	
Corr. Sample Volume	76.432	dscf
Corr. Flowrate	146184	dscfm
O2 Content	11.16	%
CO2 Content	8.19	%

TRACE METALS ANALYTICAL DATA AND RESULTS

		LABORATORY DATA					METALS EMISSIONS				
		Sample Fraction 1	Blank Fraction 1	Sample Fraction 2	Blank Fraction 2	Sample Total	CONCENTRATION				MASS RATE
COMPONENT		(µg)	(µg)	(µg)	(µg)	(µg)	ACTUAL (µg/dscm)	@ 12% CO2 (µg/dscm)	@7% O2 (µg/dscm)	@ 7% O2 (mg/dscm)	(lb/hr)
Mercury	Hg	0.98	0.00	4.55	0.00	5.53	2.55	3.74	3.65	3.65E-03	1.40E-03
Cadmium	Cd	5.39	0.00			5.39	2.49	3.65	3.55	3.55E-03	1.36E-03
Lead	Pb	52.60	0.83			51.77	23.92	35.05	34.14	3.41E-02	1.31E-02

Notes

Front Half = Probe Wash and Filter
Back Half = Impinger Catch
Blank = Field Blank

Run Number **U2O-M29-R3**

Date	04/10/13	
Start Time	15:25	
End Time	17:35	
Stack Depth	105	inches
Stack Width	132	inches
Nozzle I.D.	0.280	inches
Meter Box Gamma	0.9604	
Meter Box dH@	2.0614	
Barometric	29.95	in.Hg
Cp	0.84	
Test Duration	120	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	0.0	133.0	133.0
Impinger 2	100.0	241.0	141.0
Impinger 3	100.0	134.0	34.0
Impinger 4	0.0	7.0	7.0
Impinger 5	100.0	101.0	1.0
Impinger 6	100.0	95.0	-5.0
Impinger 7			0.0
Total	400.0	711.0	311.0
Silica gel (g)	250.0	270.6	20.6

METHOD 1-4 RESULTS

Metered Volume	82.726	dcf
Volume @ Std.Cond.	75.218	dscf
% Water	17.19	%
% Isokinetics	94.9	%
Velocity	45.75	ft/sec
Actual Flow	264216	acfm
Std. Flow	179622	scfm
Dry Std. Flow	148751	dscfm

METHOD 3 DATA

%O2	11.72	Md	29.70
%CO2	7.70	Ms	27.69
%CO	0.0	Ps	29.15
%N2	80.6	Fo	1.192
O2+CO2	19.4	%EA	123

POINT	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Meter Temp. (Deg. F) Inlet	Meter Temp. (Deg. F) Outlet
1	298	-10.50	0.40	1.50	643.160	94	94
2	301	-11.00	0.48	1.80	685.316	96	93
3	294	-10.50	0.50	1.90		97	95
4	294	-11.00	0.46	1.70	685.620	96	97
5	293	-11.00	0.40	1.50	726.190	97	98
6	294	-11.00	0.48	1.80		99	100
7	295		0.47	1.80		99	100
8	292		0.44	1.60		101	101
9	298		0.44	1.60		101	102
10	298		0.38	1.40		102	102
11	292		0.50	1.90		102	102
12	295		0.46	1.70		103	104
13	304		0.48	1.80		103	104
14	306		0.44	1.60		103	104
15	300		0.38	1.40		101	102
16	292		0.45	1.70		102	103
17	292		0.46	1.70		102	103
18	294		0.43	1.60		102	103
19	294		0.41	1.50		102	103
20	308		0.35	1.30		101	102
21	306		0.40	1.50		101	102
22	292		0.44	1.60		102	101
23	292		0.44	1.60		102	102
24	303		0.38	1.40		101	99
25	295		0.35	1.30		101	99
26	290		0.47	1.80		101	101
27	291		0.48	1.80		101	101
28	300		0.45	1.70		102	98
29	300		0.40	1.50		102	98
30	300		0.40	1.50		102	98
AVG.	297	-10.83	0.43	1.62	82.726	100	

EPA Method 29: Analytical Data and Results

PINELLAS COUNTY RRF
UNIT 2 FF OUTLET

SAMPLING DATA

Run Number	**U2O-M29-R3**	
Date	04/10/13	
Corr. Sample Volume	75.218	dscf
Corr. Flowrate	148751	dscfm
O2 Content	11.72	%
CO2 Content	7.70	%

TRACE METALS ANALYTICAL DATA AND RESULTS

		LABORATORY DATA					METALS EMISSIONS				
		Sample Fraction 1	Blank Fraction 1	Sample Fraction 2	Blank Fraction 2	Sample Total	CONCENTRATION				MASS RATE
COMPONENT		(µg)	(µg)	(µg)	(µg)	(µg)	ACTUAL (µg/dscm)	@ 12% CO2 (µg/dscm)	@7% O2 (µg/dscm)	@ 7% O2 (mg/dscm)	(lb/hr)
Mercury	Hg	< 0.10	0.00	3.36	0.00	3.36	1.58	2.46	2.39	2.39E-03	8.79E-04
Cadmium	Cd	0.59	0.00			0.59	0.28	0.43	0.42	4.18E-04	1.54E-04
Lead	Pb	15.00	0.83			14.17	6.65	10.37	10.08	1.01E-02	3.71E-03

Notes

"<" denotes that one or more fractions were below the detection limit. Detection limits were used in cases of non-detect results.

Front Half = Probe Wash and Filter
Back Half = Impinger Catch
Blank = Field Blank

Appendix B.4

EPA Method 29 Data and Results: Unit 2 SDA Inlet

Run Number **U2I-M29-R1**

Date	04/10/13	
Start Time	8:45	
End Time	11:13	
Stack Diameter	120	inches
Nozzle I.D.	0.280	inches
Meter Box Gamma	0.9798	
Meter Box dH@	1.8708	
Barometric	29.99	in.Hg
Cp	0.84	
Test Duration	120	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	0.0	94.0	94.0
Impinger 2	100.0	237.0	137.0
Impinger 3	100.0	157.0	57.0
Impinger 4	0.0	12.0	12.0
Impinger 5	100.0	106.0	6.0
Impinger 6	100.0	101.0	1.0
Impinger 7			0.0
Total	400.0	707.0	307.0
Silica gel (g)	250.0	273.5	23.5

METHOD 1-4 RESULTS

Metered Volume	79.161	dcf
Volume @ Std.Cond.	77.343	dscf
% Water	16.75	%
% Isokinetics	97.6	%
Velocity	57.21	ft/sec
Actual Flow	269606	acfm
Std. Flow	145780	scfm
Dry Std. Flow	121366	dscfm

METHOD 3 DATA

%O2	8.56	Md	29.99
%CO2	10.31	Ms	27.98
%CO	0.0	Ps	29.91
%N2	81.1	Fo	1.197
O2+CO2	18.9	%EA	67

POINT	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Meter Temp. (Deg. F) Inlet	Meter Temp. (Deg. F) Outlet
1	518	-1.10	0.46	1.30	727.148	69	68
2	519	-1.00	0.50	1.40	766.703	72	70
3	519		0.52	1.50		73	70
4	520		0.54	1.50	766.913	73	71
5	518		0.54	1.50	806.519	73	70
6	517		0.55	1.50		74	71
7	517		0.58	1.60		73	71
8	516		0.59	1.70		73	70
9	516		0.58	1.60		73	71
10	515		0.60	1.70		74	71
11	515		0.59	1.70		74	71
12	516		0.59	1.70		75	72
13	516		0.43	1.20		73	72
14	515		0.46	1.30		74	73
15	515		0.49	1.40		74	72
16	515		0.50	1.40		74	73
17	516		0.51	1.40		74	72
18	515		0.54	1.50		75	72
19	515		0.57	1.60		75	73
20	515		0.58	1.60		74	73
21	516		0.58	1.60		75	74
22	516		0.60	1.70		75	74
23	515		0.59	1.70		75	74
24	515		0.60	1.70		75	74
AVG.	516	-1.05	0.55	1.53	79.161	73	

EPA Method 29: Analytical Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 2 SDA INLET

SAMPLING DATA

Run Number	**U2I-M29-R1**	
Date	04/10/13	
Corr. Sample Volume	77.343	dscf
Corr. Sample Volume	2.190	dscm
Corr. Flowrate	121366	dscfm
O2 Content	8.56	%
CO2 Content	10.31	%

TRACE METALS ANALYTICAL DATA AND RESULTS

	LABORATORY DATA					METALS EMISSIONS				
						CONCENTRATION				
COMPONENT	Front Half Sample (µg)	Front Half Blank (µg)	Back Half Sample (µg)	Back Half Blank (µg)	Sample Total (µg)	ACTUAL (ug/dscm)	@ 12% CO2 (ug/dscm)	@7% O2 (ug/dscm)	@ 7% O2 (mg/dscm)	MASS RATE lb/hr
Mercury Hg	45.75	0.0000	31.979	0.00	77.73	35.49	41.31	39.98	0.040	1.61E-02

Notes

Front Half = Probe Wash and Filter
Back Half = Impinger Catch
Blank = Field Blank

Run Number **U2I-M29-R2**

Date	04/10/13	
Start Time	12:09	
End Time	14:26	
Stack Diameter	120	inches
Nozzle I.D.	0.280	inches
Meter Box Gamma	0.9798	
Meter Box dH@	1.8708	
Barometric	29.98	in.Hg
Cp	0.84	
Test Duration	120	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	0.0	116.0	116.0
Impinger 2	100.0	240.0	140.0
Impinger 3	100.0	129.0	29.0
Impinger 4	0.0	10.0	10.0
Impinger 5	100.0	100.0	0.0
Impinger 6	100.0	105.0	5.0
Impinger 7			0.0
Total	400.0	700.0	300.0
Silica gel (g)	250.0	278.0	28.0

METHOD 1-4 RESULTS

Metered Volume	77.852	dcf
Volume @ Std.Cond.	74.446	dscf
% Water	17.18	%
% Isokinetics	95.8	%
Velocity	56.60	ft/sec
Actual Flow	266728	acfm
Std. Flow	143627	scfm
Dry Std. Flow	118954	dscfm

METHOD 3 DATA

%O2	9.01	Md	29.95
%CO2	9.94	Ms	27.90
%CO	0.0	Ps	29.90
%N2	81.1	Fo	1.196
O2+CO2	19.0	%EA	73

POINT	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Meter Temp. (Deg. F) Inlet	Meter Temp. (Deg. F) Outlet
1	515	-0.98	0.44	1.20	807.109	77	77
2	515	-1.10	0.47	1.30	846.015	78	78
3	516		0.49	1.40		80	78
4	516		0.52	1.50	846.307	82	79
5	515		0.53	1.50	885.253	83	81
6	515		0.55	1.50		85	82
7	516		0.55	1.50		89	84
8	519		0.58	1.60		89	84
9	523		0.56	1.60		88	84
10	522		0.57	1.60		88	83
11	522		0.55	1.50		89	83
12	523		0.56	1.60		88	83
13	523		0.46	1.30		83	83
14	522		0.47	1.30		86	83
15	522		0.49	1.40		87	84
16	523		0.51	1.40		88	83
17	522		0.53	1.50		87	83
18	522		0.53	1.50		87	84
19	523		0.55	1.50		87	84
20	522		0.56	1.60		87	85
21	522		0.55	1.50		86	84
22	521		0.57	1.60		86	84
23	521		0.56	1.60		86	85
24	520		0.56	1.60		86	85
AVG.	520	-1.04	0.53	1.48	77.852	84	

EPA Method 29: Analytical Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 2 SDA INLET

SAMPLING DATA

Run Number	**U2I-M29-R2**	
Date	04/10/13	
Corr. Sample Volume	74.446	dscf
Corr. Sample Volume	2.108	dscm
Corr. Flowrate	118954	dscfm
O2 Content	9.01	%
CO2 Content	9.94	%

TRACE METALS ANALYTICAL DATA AND RESULTS

	LABORATORY DATA					METALS EMISSIONS				
						CONCENTRATION				
COMPONENT	Front Half Sample (µg)	Front Half Blank (µg)	Back Half Sample (µg)	Back Half Blank (µg)	Sample Total (µg)	ACTUAL (ug/dscm)	@ 12% CO2 (ug/dscm)	@7% O2 (ug/dscm)	@ 7% O2 (mg/dscm)	MASS RATE lb/hr
Mercury Hg	36.40	0.0000	91.87	0.00	128.27	60.85	73.46	71.13	0.071	2.71E-02

Notes

Front Half = Probe Wash and Filter
Back Half = Impinger Catch
Blank = Field Blank

Run Number **U2I-M29-R3**

Date	04/10/13	
Start Time	15:25	
End Time	17:33	
Stack Diameter	120	inches
Nozzle I.D.	0.280	inches
Meter Box Gamma	0.9798	
Meter Box dH@	1.8708	
Barometric	29.95	in.Hg
Cp	0.84	
Test Duration	120	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	0.0	71.0	71.0
Impinger 2	100.0	232.0	132.0
Impinger 3	100.0	137.0	37.0
Impinger 4	0.0	13.0	13.0
Impinger 5	100.0	100.0	0.0
Impinger 6	100.0	97.0	-3.0
Impinger 7			0.0
Total	400.0	650.0	250.0
Silica gel (g)	250.0	273.2	23.2

METHOD 1-4 RESULTS

Metered Volume	80.191	dcf
Volume @ Std.Cond.	75.144	dscf
% Water	14.61	%
% Isokinetics	95.3	%
Velocity	55.77	ft/sec
Actual Flow	262800	acfm
Std. Flow	141379	scfm
Dry Std. Flow	120717	dscfm

METHOD 3 DATA

%O2	9.84	Md	29.87
%CO2	9.25	Ms	28.14
%CO	0.0	Ps	29.87
%N2	80.9	Fo	1.196
O2+CO2	19.1	%EA	85

POINT	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Meter Temp. (Deg. F) Inlet	Meter Temp. (Deg. F) Outlet
1	521	-1.10	0.43	1.20	886.015	85	86
2	522	-1.00	0.45	1.30	926.124	86	87
3	522		0.46	1.30		88	86
4	521		0.49	1.40	926.355	90	88
5	523		0.51	1.50	966.437	90	88
6	520		0.51	1.50		92	88
7	519		0.54	1.60		94	89
8	518		0.57	1.70		94	90
9	519		0.56	1.70		95	91
10	520		0.58	1.70		95	92
11	520		0.58	1.70		95	91
12	520		0.57	1.70		93	91
13	520		0.40	1.20		88	88
14	521		0.44	1.30		95	90
15	520		0.46	1.40		98	92
16	519		0.49	1.50		101	95
17	519		0.52	1.60		102	96
18	520		0.52	1.60		103	97
19	519		0.55	1.70		104	99
20	518		0.55	1.70		106	100
21	518		0.57	1.70		106	101
22	519		0.58	1.70		105	102
23	520		0.56	1.70		105	103
24	520		0.56	1.70		104	103
AVG.	520	-1.05	0.52	1.55	80.191	95	

EPA Method 29: Analytical Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 2 SDA INLET

SAMPLING DATA

Run Number	**U2I-M29-R3**	
Date	04/10/13	
Corr. Sample Volume	75.144	dscf
Corr. Sample Volume	2.128	dscm
Corr. Flowrate	120717	dscfm
O2 Content	9.84	%
CO2 Content	9.25	%

TRACE METALS ANALYTICAL DATA AND RESULTS

		LABORATORY DATA					METALS EMISSIONS				
							CONCENTRATION				
COMPONENT		**Front Half Sample (µg)**	**Front Half Blank (µg)**	**Back Half Sample (µg)**	**Back Half Blank (µg)**	**Sample Total (µg)**	**ACTUAL (ug/dscm)**	**@ 12% CO2 (ug/dscm)**	**@7% O2 (ug/dscm)**	**@ 7% O2 (mg/dscm)**	**MASS RATE lb/hr**
Mercury	Hg	55.25	0.0000	110.275	0.00	165.53	77.79	100.92	97.76	0.098	3.52E-02

Notes

Front Half = Probe Wash and Filter
Back Half = Impinger Catch
Blank = Field Blank

Appendix B.5

EPA Method 29 Data and Results: Unit 3 FF Outlet

Run Number **U3O-M29-R1**

Date	04/11/13	
Start Time	8:37	
End Time	10:56	
Stack Length	105	inches
Stack Width	132	inches
Nozzle I.D.	0.280	inches
Meter Box Gamma	0.9604	
Meter Box dH@	2.0614	
Barometric	29.84	in.Hg
Cp	0.84	
Test Duration	120	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	0.0	160.0	160.0
Impinger 2	100.0	335.0	235.0
Impinger 3	100.0	153.0	53.0
Impinger 4	0.0	5.0	5.0
Impinger 5	100.0	100.0	0.0
Impinger 6	100.0	98.0	-2.0
Impinger 7			0.0
Total	400.0	851.0	451.0
Silica gel (g)	250.0	270.4	20.4

METHOD 1-4 RESULTS

Metered Volume	78.811	dcf
Volume @ Std.Cond.	74.099	dscf
% Water	23.05	%
% Isokinetics	104.8	%
Velocity	44.75	ft/sec
Actual Flow	258433	acfm
Std. Flow	172372	scfm
Dry Std. Flow	132648	dscfm

METHOD 3 DATA

%O2	8.54	Md	30.01
%CO2	10.45	Ms	27.24
%CO	0.0	Ps	29.03
%N2	81.0	Fo	1.183
O2+CO2	19.0	%EA	66

POINT	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Meter Temp. (Deg. F) Inlet	Meter Temp. (Deg. F) Outlet
1	311	-11.00	0.45	1.70	739.165	75	74
2	310	-11.00	0.45	1.70	779.116	76	74
3	312	-11.00	0.43	1.60		76	74
4	312	-11.00	0.40	1.50	779.360	77	74
5	312	-11.00	0.34	1.30	818.220	78	74
6	320	-11.00	0.44	1.70		79	75
7	320		0.45	1.70		80	75
8	305		0.41	1.60		80	76
9	304		0.39	1.50		81	76
10	306		0.35	1.30		82	77
11	307		0.43	1.60		82	77
12	307		0.42	1.60		83	77
13	308		0.40	1.50		82	78
14	308		0.38	1.50		83	78
15	307		0.35	1.30		83	78
16	306		0.43	1.60		79	78
17	306		0.42	1.60		80	79
18	307		0.41	1.50		81	79
19	307		0.40	1.50		82	79
20	308		0.34	1.30		82	79
21	306		0.42	1.60		83	80
22	306		0.41	1.60		84	80
23	306		0.41	1.60		84	80
24	306		0.39	1.50		85	80
25	307		0.33	1.30		86	81
26	303		0.42	1.60		85	81
27	306		0.43	1.60		86	81
28	307		0.40	1.50		86	82
29	307		0.38	1.50		86	83
30	306		0.34	1.30		87	83
AVG.	308	-11.00	0.40	1.52	78.811		80

EPA Method 29: Analytical Data and Results

PINELLAS COUNTY RRF
UNIT 3 FF OUTLET

SAMPLING DATA

Run Number	**U3O-M29-R1**	
Date	04/11/13	
Corr. Sample Volume	74.099	dscf
Corr. Flowrate	132648	dscfm
O2 Content	8.54	%
CO2 Content	10.45	%

TRACE METALS ANALYTICAL DATA AND RESULTS

		LABORATORY DATA					METALS EMISSIONS				
		Sample Fraction 1	Blank Fraction 1	Sample Fraction 2	Blank Fraction 2	Sample Total	CONCENTRATION				MASS RATE
COMPONENT		(µg)	(µg)	(µg)	(µg)	(µg)	ACTUAL (µg/dscm)	@ 12% CO2 (µg/dscm)	@7% O2 (µg/dscm)	@ 7% O2 (mg/dscm)	(lb/hr)
Mercury	Hg	< 0.10	0.00	11.95	0.00	11.95	5.70	6.54	6.40	6.40E-03	2.83E-03
Cadmium	Cd	1.85	0.00			1.85	0.88	1.01	0.99	9.92E-04	4.38E-04
Lead	Pb	19.70	0.83			18.87	8.99	10.33	10.12	1.01E-02	4.47E-03

Notes

"<" denotes that one or more fractions were below the detection limit. Detection limits were used in cases of non-detect results.

Front Half = Probe Wash and Filter
Back Half = Impinger Catch
Blank = Field Blank

Run Number **U3O-M29-R2**

Date	04/11/13	
Start Time	11:45	
End Time	13:54	
Stack Depth	105	inches
Stack Width	132	inches
Nozzle I.D.	0.280	inches
Meter Box Gamma	0.9604	
Meter Box dH@	2.0614	
Barometric	29.87	in.Hg
Cp	0.84	
Test Duration	120	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	0.0	273.0	273.0
Impinger 2	100.0	260.0	160.0
Impinger 3	100.0	136.0	36.0
Impinger 4	0.0	4.0	4.0
Impinger 5	100.0	100.0	0.0
Impinger 6	100.0	101.0	1.0
Impinger 7			0.0
Total	400.0	874.0	474.0
Silica gel (g)	250.0	273.6	23.6

METHOD 1-4 RESULTS

Metered Volume	79.315	dcf
Volume @ Std.Cond.	73.441	dscf
% Water	24.18	%
% Isokinetics	104.4	%
Velocity	44.98	ft/sec
Actual Flow	259755	acfm
Std. Flow	174181	scfm
Dry Std. Flow	132061	dscfm

METHOD 3 DATA

%O2	8.52	Md	30.02
%CO2	10.51	Ms	27.12
%CO	0.0	Ps	29.06
%N2	81.0	Fo	1.178
O2+CO2	19.0	%EA	66

POINT	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Meter Temp. (Deg. F) Inlet	Meter Temp. (Deg. F) Outlet
1	292	-11.0	0.44	1.70	821.630	84	83
2	298	-11.0	0.45	1.70	861.484	84	83
3	305	-11.0	0.43	1.60		85	83
4	305	-11.0	0.41	1.60	861.650	86	83
5	307	-11.0	0.38	1.40	901.111	86	83
6	301	-11.0	0.43	1.60		87	83
7	306		0.43	1.60		88	84
8	306		0.40	1.50		88	84
9	307		0.38	1.40		89	84
10	307		0.34	1.30		89	85
11	306		0.45	1.70		90	85
12	306		0.44	1.70		91	85
13	306		0.41	1.60		91	85
14	306		0.41	1.60		92	85
15	306		0.34	1.30		91	86
16	304		0.43	1.60		89	87
17	304		0.44	1.60		89	87
18	306		0.41	1.60		91	88
19	306		0.34	1.50		91	88
20	306		0.35	1.30		92	89
21	307		0.43	1.60		92	89
22	307		0.43	1.60		93	90
23	307		0.41	1.60		93	90
24	307		0.39	1.50		94	90
25	306		0.37	1.40		95	91
26	304		0.40	1.50		95	91
27	304		0.44	1.60		96	91
28	304		0.44	1.60		96	91
29	304		0.39	1.40		97	92
30	304		0.34	1.30		97	92
AVG.	305	-11.00	0.41	1.53	79.315	89	

EPA Method 29: Analytical Data and Results

PINELLAS COUNTY RRF
UNIT 3 FF OUTLET

SAMPLING DATA

Run Number	**U3O-M29-R2**	
Date	04/11/13	
Corr. Sample Volume	73.441	dscf
Corr. Flowrate	132061	dscfm
O2 Content	8.52	%
CO2 Content	10.51	%

TRACE METALS ANALYTICAL DATA AND RESULTS

		LABORATORY DATA					METALS EMISSIONS				
							CONCENTRATION				MASS
COMPONENT		Sample Fraction 1 (µg)	Blank Fraction 1 (µg)	Sample Fraction 2 (µg)	Blank Fraction 2 (µg)	Sample Total (µg)	ACTUAL (µg/dscm)	@ 12% CO2 (µg/dscm)	@7% O2 (µg/dscm)	@ 7% O2 (mg/dscm)	RATE (lb/hr)
Mercury	Hg	< 0.10	0.00	13.31	0.00	13.31	6.40	7.31	7.18	7.18E-03	3.17E-03
Cadmium	Cd	1.76	0.00			1.76	0.85	0.97	0.95	9.50E-04	4.19E-04
Lead	Pb	24.40	0.83			23.57	11.34	12.94	12.73	1.27E-02	5.61E-03

Notes

"<" denotes that one or more fractions were below the detection limit. Detection limits were used in cases of non-detect results.

Front Half = Probe Wash and Filter
Back Half = Impinger Catch
Blank = Field Blank

Run Number **U3O-M29-R3**

Date	04/11/13	
Start Time	14:36	
End Time	17:04	
Stack Depth	105	inches
Stack Width	132	inches
Nozzle I.D.	0.280	inches
Meter Box Gamma	0.9604	
Meter Box dH@	2.0614	
Barometric	29.85	in.Hg
Cp	0.84	
Test Duration	120	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	0.0	196.0	196.0
Impinger 2	100.0	294.0	194.0
Impinger 3	100.0	144.0	44.0
Impinger 4	0.0	8.0	8.0
Impinger 5	100.0	106.0	6.0
Impinger 6	100.0	100.0	0.0
Impinger 7			0.0
Total	400.0	848.0	448.0
Silica gel (g)	250.0	266.9	16.9

METHOD 1-4 RESULTS

Metered Volume	77.034	dcf
Volume @ Std.Cond.	70.040	dscf
% Water	23.81	%
% Isokinetics	99.2	%
Velocity	45.01	ft/sec
Actual Flow	259953	acfm
Std. Flow	173929	scfm
Dry Std. Flow	132522	dscfm

METHOD 3 DATA

%O2	8.17	Md	30.03
%CO2	10.65	Ms	27.17
%CO	0.0	Ps	29.04
%N2	81.2	Fo	1.195
O2+CO2	18.8	%EA	62

POINT	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Meter Temp. (Deg. F) Inlet	Meter Temp. (Deg. F) Outlet
1	305	-11.00	0.43	1.60	901.177	92	91
2	305	-11.00	0.44	1.60	939.704	92	91
3	305	-11.00	0.41	1.50		92	91
4	308	-11.00	0.40	1.40	939.884	93	91
5	307	-11.00	0.35	1.30	978.391	94	91
6	306	-11.00	0.42	1.50		95	92
7	306		0.43	1.50		96	92
8	307		0.40	1.40		96	93
9	307		0.40	1.40		97	93
10	304		0.35	1.30		99	98
11	304		0.44	1.60		99	98
12	308		0.45	1.60		100	98
13	306		0.44	1.60		102	99
14	306		0.40	1.40		104	99
15	306		0.34	1.20		104	99
16	306		0.40	1.40		103	102
17	307		0.45	1.60		103	102
18	307		0.44	1.60		104	103
19	306		0.41	1.40		105	103
20	306		0.36	1.30		105	103
21	306		0.43	1.50		104	103
22	306		0.43	1.50		103	102
23	306		0.40	1.40		102	101
24	306		0.39	1.40		101	100
25	305		0.36	1.30		101	99
26	306		0.42	1.50		100	99
27	305		0.43	1.50		99	99
28	305		0.40	1.40		99	98
29	306		0.38	1.30		98	97
30	306		0.36	1.30		98	97
AVG.	306	-11.00	0.41	1.44	77.034	98	

EPA Method 29: Analytical Data and Results

PINELLAS COUNTY RRF
UNIT 3 FF OUTLET

SAMPLING DATA

Run Number	**U3O-M29-R3**	
Date	04/11/13	
Corr. Sample Volume	70.040	dscf
Corr. Flowrate	132522	dscfm
O2 Content	8.17	%
CO2 Content	10.65	%

TRACE METALS ANALYTICAL DATA AND RESULTS

		LABORATORY DATA					METALS EMISSIONS				
							CONCENTRATION				MASS
COMPONENT		Sample Fraction 1 (µg)	Blank Fraction 1 (µg)	Sample Fraction 2 (µg)	Blank Fraction 2 (µg)	Sample Total (µg)	ACTUAL (µg/dscm)	@ 12% CO2 (µg/dscm)	@7% O2 (µg/dscm)	@ 7% O2 (mg/dscm)	RATE (lb/hr)
Mercury	Hg	< 0.10	0.00	11.25	0.00	11.25	5.67	6.39	6.19	6.19E-03	2.82E-03
Cadmium	Cd	1.50	0.00			1.50	0.76	0.85	0.83	8.26E-04	3.75E-04
Lead	Pb	11.90	0.83			11.07	5.58	6.29	6.10	6.10E-03	2.77E-03

Notes

"<" denotes that one or more fractions were below the detection limit. Detection limits were used in cases of non-detect results.

Front Half = Probe Wash and Filter
Back Half = Impinger Catch
Blank = Field Blank

Appendix B.6

EPA Method 29 Data and Results: Unit 3 SDA Inlet

Run Number **U3I-M29-R1**

Date	04/11/13	
Start Time	8:37	
End Time	10:54	
Stack Diameter	120	inches
Nozzle I.D.	0.280	inches
Meter Box Gamma	0.9798	
Meter Box dH@	1.8708	
Barometric	29.84	in.Hg
Cp	0.84	
Test Duration	120	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	0.0	119.0	119.0
Impinger 2	100.0	264.0	164.0
Impinger 3	100.0	141.0	41.0
Impinger 4	0.0	12.0	12.0
Impinger 5	100.0	100.0	0.0
Impinger 6	100.0	106.0	6.0
Impinger 7			0.0
Total	400.0	742.0	342.0
Silica gel (g)	250.0	267.7	17.7

METHOD 1-4 RESULTS

Metered Volume	75.549	dcf
Volume @ Std.Cond.	72.968	dscf
% Water	18.83	%
% Isokinetics	99.2	%
Velocity	60.03	ft/sec
Actual Flow	282881	acfm
Std. Flow	138790	scfm
Dry Std. Flow	112650	dscfm

METHOD 3 DATA

%O2	6.79	Md	30.20
%CO2	12.05	Ms	27.90
%CO	0.0	Ps	29.74
%N2	81.2	Fo	1.171
O2+CO2	18.8	%EA	46

POINT	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Meter Temp. (Deg. F) Inlet	Outlet
1	606	-1.40	0.44	1.10	976.029	73	73
2	608	-1.40	0.48	1.20	1013.419	74	73
3	609		0.52	1.40		76	73
4	610		0.51	1.30	1013.604	77	73
5	610		0.53	1.40	1051.763	78	73
6	609		0.53	1.40		77	74
7	609		0.54	1.40		78	74
8	610		0.57	1.50		78	74
9	610		0.58	1.50		78	74
10	610		0.58	1.50		78	75
11	609		0.57	1.50		78	75
12	609		0.59	1.50		78	75
13	609		0.46	1.20		75	75
14	610		0.49	1.30		77	75
15	610		0.53	1.40		78	75
16	611		0.52	1.40		78	75
17	611		0.54	1.40		78	76
18	610		0.57	1.50		78	76
19	610		0.57	1.50		77	76
20	611		0.58	1.50		78	76
21	610		0.57	1.50		78	76
22	610		0.59	1.50		78	77
23	609		0.59	1.50		78	77
24	610		0.58	1.50		78	77
AVG.	610	-1.40	0.54	1.41	75.549	76	

EPA Method 29: Analytical Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 3 SDA INLET

SAMPLING DATA

Run Number	**U3I-M29-R1**	
Date	04/11/13	
Corr. Sample Volume	72.968	dscf
Corr. Sample Volume	2.066	dscm
Corr. Flowrate	112650	dscfm
O2 Content	6.79	%
CO2 Content	12.05	%

TRACE METALS ANALYTICAL DATA AND RESULTS

	LABORATORY DATA					METALS EMISSIONS				
						CONCENTRATION				
COMPONENT	Front Half Sample (µg)	Front Half Blank (µg)	Back Half Sample (µg)	Back Half Blank (µg)	Sample Total (µg)	ACTUAL (ug/dscm)	@ 12% CO2 (ug/dscm)	@7% O2 (ug/dscm)	@ 7% O2 (mg/dscm)	MASS RATE lb/hr
Mercury Hg	54.65	0.0000	186.012	0.00	240.66	116.47	115.99	114.74	0.115	4.91E-02

Notes

Front Half = Probe Wash and Filter
Back Half = Impinger Catch
Blank = Field Blank

Run Number **U3I-M29-R2**

Date	04/11/13	
Start Time	11:45	
End Time	13:52	
Stack Diameter	120	inches
Nozzle I.D.	0.280	inches
Meter Box Gamma	0.9798	
Meter Box dH@	1.8708	
Barometric	29.87	in.Hg
Cp	0.84	
Test Duration	120	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	0.0	88.0	88.0
Impinger 2	100.0	275.0	175.0
Impinger 3	100.0	168.0	68.0
Impinger 4	0.0	16.0	16.0
Impinger 5	100.0	106.0	6.0
Impinger 6	100.0	106.0	6.0
Impinger 7			0.0
Total	400.0	759.0	359.0
Silica gel (g)	250.0	272.0	22.0

METHOD 1-4 RESULTS

Metered Volume	75.719	dcf
Volume @ Std.Cond.	72.200	dscf
% Water	19.90	%
% Isokinetics	99.9	%
Velocity	59.66	ft/sec
Actual Flow	281147	acfm
Std. Flow	138208	scfm
Dry Std. Flow	110707	dscfm

METHOD 3 DATA

%O2	6.98	Md	30.15
%CO2	11.72	Ms	27.74
%CO	0.0	Ps	29.80
%N2	81.3	Fo	1.188
O2+CO2	18.7	%EA	48

POINT	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Meter Temp. (Deg. F) Inlet	Meter Temp. (Deg. F) Outlet
1	610	-1.00	0.41	1.10	52.247	80	79
2	609	-0.98	0.45	1.20	89.952	81	79
3	610		0.49	1.30		82	79
4	609		0.51	1.30	90.229	83	79
5	610		0.52	1.40	128.243	83	80
6	611		0.54	1.40		84	80
7	612		0.54	1.40		84	80
8	611		0.56	1.50		85	81
9	610		0.58	1.60		85	81
10	610		0.58	1.60		85	82
11	610		0.59	1.60		85	82
12	609		0.58	1.60		85	82
13	610		0.43	1.20		82	82
14	610		0.47	1.30		85	83
15	609		0.50	1.40		86	84
16	609		0.52	1.40		88	84
17	608		0.55	1.50		88	84
18	608		0.56	1.50		88	84
19	609		0.57	1.50		88	85
20	609		0.58	1.60		87	85
21	610		0.58	1.60		86	85
22	610		0.57	1.50		86	84
23	610		0.57	1.50		86	84
24	609		0.58	1.60		87	84
AVG.	610	-0.99	0.53	1.44	75.719	84	

EPA Method 29: Analytical Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 3 SDA INLET

SAMPLING DATA

Run Number	**U3I-M29-R2**	
Date	04/11/13	
Corr. Sample Volume	72.200	dscf
Corr. Sample Volume	2.044	dscm
Corr. Flowrate	110707	dscfm
O2 Content	6.98	%
CO2 Content	11.72	%

TRACE METALS ANALYTICAL DATA AND RESULTS

	LABORATORY DATA					METALS EMISSIONS				
						CONCENTRATION				
COMPONENT	Front Half Sample (µg)	Front Half Blank (µg)	Back Half Sample (µg)	Back Half Blank (µg)	Sample Total (µg)	ACTUAL (ug/dscm)	@ 12% CO2 (ug/dscm)	@7% O2 (ug/dscm)	@ 7% O2 (mg/dscm)	MASS RATE lb/hr
Mercury Hg	61.80	0.0000	49.14	0.00	110.94	54.26	55.56	54.18	0.054	2.25E-02

Notes

Front Half = Probe Wash and Filter
Back Half = Impinger Catch
Blank = Field Blank

Run Number **U3I-M29-R3**

Date	04/11/13	
Start Time	14:36	
End Time	17:02	
Stack Diameter	120	inches
Nozzle I.D.	0.280	inches
Meter Box Gamma	0.9798	
Meter Box dH@	1.8708	
Barometric	29.85	in.Hg
Cp	0.84	
Test Duration	120	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	0.0	138.0	138.0
Impinger 2	100.0	248.0	148.0
Impinger 3	100.0	135.0	35.0
Impinger 4	0.0	9.0	9.0
Impinger 5	100.0	109.0	9.0
Impinger 6	100.0	101.0	1.0
Impinger 7			0.0
Total	400.0	740.0	340.0
Silica gel (g)	250.0	269.2	19.2

METHOD 1-4 RESULTS

Metered Volume	77.573	dcf
Volume @ Std.Cond.	73.067	dscf
% Water	18.79	%
% Isokinetics	100.0	%
Velocity	59.55	ft/sec
Actual Flow	280616	acfm
Std. Flow	137850	scfm
Dry Std. Flow	111944	dscfm

METHOD 3 DATA

%O2	7.11	Md	30.12
%CO2	11.49	Ms	27.84
%CO	0.0	Ps	29.77
%N2	81.4	Fo	1.200
O2+CO2	18.6	%EA	49

POINT	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Meter Temp. (Deg. F) Inlet	Meter Temp. (Deg. F) Outlet
1	609	-1.00	0.42	1.10	129.249	87	86
2	610	-1.10	0.46	1.20	167.915	89	87
3	610		0.49	1.30		90	87
4	610		0.52	1.40	168.242	92	87
5	609		0.53	1.40	207.149	93	88
6	610		0.53	1.40		93	88
7	609		0.55	1.50		93	89
8	609		0.56	1.50		93	91
9	610		0.59	1.60		94	90
10	610		0.58	1.60		94	91
11	610		0.58	1.60		92	90
12	610		0.59	1.60		91	89
13	609		0.44	1.20		87	87
14	609		0.47	1.30		90	87
15	609		0.49	1.30		92	88
16	610		0.51	1.40		93	89
17	610		0.53	1.40		93	91
18	609		0.53	1.40		93	91
19	609		0.56	1.50		92	91
20	609		0.57	1.50		91	90
21	610		0.58	1.60		90	89
22	610		0.58	1.60		89	88
23	609		0.57	1.50		87	88
24	610		0.59	1.60		87	88
AVG.	610	-1.05	0.53	1.44	77.573	90	

EPA Method 29: Analytical Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 3 SDA INLET

SAMPLING DATA

Run Number	**U3I-M29-R3**	
Date	04/11/13	
Corr. Sample Volume	73.067	dscf
Corr. Sample Volume	2.069	dscm
Corr. Flowrate	111944	dscfm
O2 Content	7.11	%
CO2 Content	11.49	%

TRACE METALS ANALYTICAL DATA AND RESULTS

		LABORATORY DATA					METALS EMISSIONS				
							CONCENTRATION				
COMPONENT		Front Half Sample (µg)	Front Half Blank (µg)	Back Half Sample (µg)	Back Half Blank (µg)	Sample Total (µg)	ACTUAL (ug/dscm)	@ 12% CO2 (ug/dscm)	@7% O2 (ug/dscm)	@ 7% O2 (mg/dscm)	MASS RATE lb/hr
Mercury	Hg	8.15	0.0000	57.162	0.00	65.31	31.56	32.96	31.82	0.032	1.32E-02

Notes

Front Half = Probe Wash and Filter
Back Half = Impinger Catch
Blank = Field Blank

Appendix C

EPA Methods 5 and 26A Data and Results

Appendix C.1

EPA Method 5/26A Data and Results: Unit 1 FF Outlet

Run Number **U1O-M26A-R1**

Date	04/09/13	
Start Time	9:05	
End Time	11:28	
Stack Depth	105	inches
Stack Width	132	inches
Nozzle I.D.	0.280	inches
Meter Box Gamma	1.0215	
Meter Box dH@	1.6942	
Barometric	30.02	in.Hg
Cp	0.84	
Test Duration	120	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	50.0	302.0	252.0
Impinger 2	100.0	250.0	150.0
Impinger 3	100.0	118.0	18.0
Impinger 4	100.0	97.0	-3.0
Impinger 5	100.0	102.0	2.0
Impinger 6			0.0
Impinger 7			0.0
Total	450.0	869.0	419.0
Silica gel (g)	250.0	272.5	22.5

METHOD 1-4 RESULTS

Metered Volume	77.124	dcf
Volume @ Std.Cond.	77.672	dscf
% Water	21.11	%
% Isokinetics	106.3	%
Velocity	45.20	ft/sec
Actual Flow	261018	acfm
Std. Flow	173851	scfm
Dry Std. Flow	137153	dscfm

METHOD 3 DATA

%O2	9.56	Md	29.92
%CO2	9.62	Ms	27.41
%CO	0.0	Ps	29.24
%N2	80.8	Fo	1.179
O2+CO2	19.2	%EA	81

POINT	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Meter Temp. (Deg. F) Inlet	Meter Temp. (Deg. F) Outlet
1	313	-10.0	0.33	1.10	176.584	74	77
2	314	-11.0	0.33	1.10	214.945	75	77
3	313	-10.0	0.45	1.50		76	77
4	313	-10.0	0.45	1.50	215.157	76	77
5	315	-11.0	0.40	1.30	253.920	76	77
6	312	-12.0	0.35	1.20		78	77
7	314		0.37	1.20		81	80
8	312		0.42	1.40		81	80
9	313		0.42	1.40		82	81
10	312		0.40	1.30		84	82
11	315		0.40	1.30		83	83
12	314		0.42	1.40		84	83
13	314		0.45	1.50		84	82
14	313		0.43	1.40		84	82
15	312		0.42	1.40		85	82
16	313		0.43	1.40		82	83
17	315		0.44	1.50		82	84
18	316		0.44	1.50		82	81
19	315		0.42	1.40		79	79
20	315		0.42	1.40		79	78
21	316		0.41	1.40		77	76
22	315		0.42	1.40		77	76
23	315		0.42	1.40		78	77
24	317		0.43	1.40		77	76
25	315		0.40	1.50		77	76
26	312		0.40	1.30		77	75
27	317		0.40	1.30		79	76
28	318		0.42	1.40		80	76
29	320		0.42	1.40		78	75
30	320		0.40	1.30		80	76
AVG.	315	-10.67	0.41	1.37	77.124	79	

EPA Method 26A: Gravimetric Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 1 FF OUTLET

SAMPLING DATA

Run Number	**U1O-M26A-R1**	
Corr. Sample Volume	77.672	dscf
Corr. Sample Volume	2.199	dscm
Corr. Flowrate	137153	dscfm
O2 Content	9.6	%
CO2 Content	9.6	%

ANALYTICAL DATA

		Weights (grams)			
Component	Sample I.D.	Tare	Final	Net	Volume (mL)
Probe Wash	801	65.2035	65.2145	0.01100	100.0
Corr. for Blank				0.01100	
Filter	800	0.3703	0.3729	0.00260	
TOTAL				0.01360	

Acetone Blank

Actual Residue	0.00000	grams
Applicable Blank Corr.	0.00000	grams
Max Allowable Residue	0.00078	grams
Blank used	0.00000	grams
Volume	150.0	ml

PARTICULATE LOADING

Actual Grain Loading	0.00270	gr/dscf
Corrected to 7% O2	0.00331	gr/dscf @ 7% O2
Actual Loading	6.18338	mg/dscm
Corrected to 7% O2	7.57927	mg/dscm @ 7% O2
Corrected to 12% CO2	7.71315	mg/dscm @ 12% CO2
Corrected to 50% Excess Air	7.46865	mg/dscm @ 50% EA
Mass Rate	3.1766	lb/hr

EPA Method 26A: Analytical Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 1 FF OUTLET

SAMPLING DATA

Run Number	**U1O-M26A-R1**	
Date	04/09/13	
Corr. Sample Volume	77.672	dscf
Corr. Flowrate	137153	dscfm
O2 Content	9.6	%
CO2 Content	9.6	%

LABORATORY DATA

	IMPINGERS 1 - 3	H_2SO_4 BLANK
Sample ID	802	838
CHLORIDE LABORATORY DATA		
HCl in Sample (mg)	20.30	< 0.115

POLLUTANT EMISSIONS

Pollutant	Concentration (ppmdv)	Concentration (ppmdv @7% O2)	Mass Rate (lb/hr)
HCl	6.09	7.46	4.74

Notes

"<" denotes not detected, detection limit given. Non-detect blanks were treated as zero.

Run Number **U1O-M26A-R2**

Date	04/09/13	
Start Time	13:24	
End Time	15:36	
Stack Depth	105	inches
Stack Width	132	inches
Nozzle I.D.	0.280	inches
Meter Box Gamma	1.0215	
Meter Box dH@	1.6942	
Barometric	30.04	in.Hg
Cp	0.84	
Test Duration	120	minutes

METHOD 1-4 RESULTS

Metered Volume	78.945	dcf
Volume @ Std.Cond.	79.278	dscf
% Water	20.70	%
% Isokinetics	104.3	%
Velocity	46.80	ft/sec
Actual Flow	270271	acfm
Std. Flow	179884	scfm
Dry Std. Flow	142655	dscfm

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	50.0	290.0	240.0
Impinger 2	100.0	246.0	146.0
Impinger 3	100.0	128.0	28.0
Impinger 4	100.0	102.0	2.0
Impinger 5	100.0	100.0	0.0
Impinger 6			0.0
Impinger 7			0.0
Total	450.0	866.0	416.0
Silica gel (g)	250.0	273.5	23.5

METHOD 3 DATA

%O2	10.22	Md	29.86
%CO2	9.10	Ms	27.41
%CO	0.0	Ps	29.24
%N2	80.7	Fo	1.174
O2+CO2	19.3	%EA	92

POINT	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Meter Temp. (Deg. F) Inlet	Meter Temp. (Deg. F) Outlet
1	315	-10.0	0.43	1.30	254.215	79	81
2	315	-12.0	0.43	1.30	293.353	80	81
3	315	-10.0	0.42	1.30		80	80
4	315	-11.0	0.42	1.30	293.480	81	80
5	313	-11.0	0.44	1.40	333.287	81	80
6	312	-11.0	0.44	1.40		82	80
7	314		0.46	1.40		82	80
8	313		0.45	1.40		82	80
9	316		0.46	1.40		82	80
10	330		0.45	1.40		83	81
11	320		0.43	1.30		83	82
12	320		0.43	1.30		83	82
13	318		0.43	1.30		83	83
14	318		0.42	1.30		83	82
15	320		0.42	1.30		82	81
16	315		0.45	1.40		82	81
17	314		0.46	1.40		82	81
18	315		0.46	1.40		82	81
19	313		0.45	1.40		82	81
20	313		0.45	1.40		82	81
21	313		0.40	1.30		81	80
22	314		0.40	1.30		81	80
23	313		0.41	1.30		81	79
24	314		0.43	1.30		81	79
25	315		0.43	1.30		83	80
26	312		0.47	1.50		81	80
27	313		0.49	1.50		81	80
28	313		0.49	1.50		81	79
29	316		0.43	1.30		81	79
30	314		0.43	1.30		81	80
AVG.	315	-10.83	0.44	1.36	78.945	81	

EPA Method 26A: Gravimetric Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 1 FF OUTLET

SAMPLING DATA

Run Number	**U1O-M26A-R2**	
Corr. Sample Volume	79.278	dscf
Corr. Sample Volume	2.245	dscm
Corr. Flowrate	142655	dscfm
O2 Content	10.2	%
CO2 Content	9.1	%

ANALYTICAL DATA

		Weights (grams)			
Component	Sample I.D.	Tare	Final	Net	Volume (mL)
Probe Wash	805	65.9841	66.0004	0.01630	105.0
Corr. for Blank				0.01630	
Filter	804	0.3702	0.3721	0.00190	
TOTAL				0.01820	

Acetone Blank

Actual Residue	0.00000	grams
Applicable Blank Corr.	0.00000	grams
Max Allowable Residue	0.00082	grams
Blank used	0.00000	grams
Volume	150.0	ml

PARTICULATE LOADING

Actual Grain Loading	0.00354	gr/dscf
Corrected to 7% O2	0.00461	gr/dscf @ 7% O2
Actual Loading	8.10725	mg/dscm
Corrected to 7% O2	10.55157	mg/dscm @ 7% O2
Corrected to 12% CO2	10.69088	mg/dscm @ 12% CO2
Corrected to 50% Excess Air	9.79241	mg/dscm @ 50% EA
Mass Rate	4.3320	lb/hr

EPA Method 26A: Analytical Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 1 FF OUTLET

SAMPLING DATA

Run Number	**U1O-M26A-R2**	
Date	04/09/13	
Corr. Sample Volume	79.278	dscf
Corr. Flowrate	142655	dscfm
O2 Content	10.2	%
CO2 Content	9.1	%

LABORATORY DATA

	IMPINGERS 1 - 3	H_2SO_4 BLANK
Sample ID	806	838
CHLORIDE LABORATORY DATA		
HCl in Sample (mg)	27.50	< 0.115

POLLUTANT EMISSIONS

Pollutant	Concentration (ppmdv)	Concentration (ppmdv @7% O2)	Mass Rate (lb/hr)
HCl	8.08	10.52	6.55

Notes

"<" denotes not detected, detection limit given. Non-detect blanks were treated as zero.

Run Number **U1O-M26A-R3**

Date	04/09/13	
Start Time	16:22	
End Time	18:33	
Stack Depth	105	inches
Stack Width	132	inches
Nozzle I.D.	0.280	inches
Meter Box Gamma	1.0215	
Meter Box dH@	1.6942	
Barometric	30.04	in.Hg
Cp	0.84	
Test Duration	120	minutes

METHOD 1-4 RESULTS

Metered Volume	79.906	dcf
Volume @ Std.Cond.	80.330	dscf
% Water	21.14	%
% Isokinetics	105.4	%
Velocity	47.25	ft/sec
Actual Flow	272882	acfm
Std. Flow	181302	scfm
Dry Std. Flow	142979	dscfm

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	50.0	328.0	278.0
Impinger 2	100.0	246.0	146.0
Impinger 3	100.0	116.0	16.0
Impinger 4	100.0	100.0	0.0
Impinger 5	100.0	100.0	0.0
Impinger 6			0.0
Impinger 7			0.0
Total	450.0	890.0	440.0
Silica gel (g)	250.0	267.4	17.4

METHOD 3 DATA

%O2	10.24	Md	29.85
%CO2	9.01	Ms	27.35
%CO	0.0	Ps	29.24
%N2	80.8	Fo	1.183
O2+CO2	19.3	%EA	92

POINT	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Meter Temp. (Deg. F) Inlet	Meter Temp. (Deg. F) Outlet
1	314	-11.0	0.40	1.20	334.140	80	78
2	314	-10.0	0.45	1.40	374.000	81	79
3	314	-10.0	0.45	1.40		80	79
4	316	-12.0	0.44	1.30	374.348	81	80
5	318	-11.0	0.49	1.50	414.394	81	80
6	315	-11.0	0.40	1.20		82	80
7	318		0.43	1.30		82	80
8	318		0.43	1.30		82	80
9	319		0.47	1.40		81	79
10	317		0.45	1.40		81	79
11	317		0.42	1.30		81	78
12	318		0.46	1.40		81	79
13	317		0.46	1.40		81	79
14	317		0.45	1.40		82	78
15	318		0.46	1.40		82	79
16	315		0.43	1.30		80	78
17	316		0.43	1.30		80	79
18	315		0.46	1.40		80	79
19	315		0.47	1.40		80	79
20	317		0.45	1.40		81	79
21	316		0.43	1.30		82	79
22	315		0.43	1.30		82	80
23	319		0.45	1.40		82	80
24	319		0.45	1.40		83	80
25	318		0.46	1.40		83	80
26	317		0.46	1.40		83	81
27	317		0.46	1.40		83	81
28	316		0.45	1.40		83	81
29	318		0.47	1.40		82	80
30	319		0.42	1.30		82	80
AVG.	317	-10.83	0.45	1.36	79.906	80	

EPA Method 26A: Gravimetric Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 1 FF OUTLET

SAMPLING DATA

Run Number	**U1O-M26A-R3**	
Corr. Sample Volume	80.330	dscf
Corr. Sample Volume	2.275	dscm
Corr. Flowrate	142979	dscfm
O2 Content	10.2	%
CO2 Content	9.0	%

ANALYTICAL DATA

		Weights (grams)			
Component	Sample I.D.	Tare	Final	Net	Volume (mL)
Probe Wash	809	66.0690	66.0807	0.01170	105.0
Corr. for Blank				0.01170	
Filter	808	0.3663	0.3695	0.00320	
TOTAL				0.01490	

Acetone Blank

Actual Residue	0.00000	grams
Applicable Blank Corr.	0.00000	grams
Max Allowable Residue	0.00082	grams
Blank used	0.00000	grams
Volume	150.0	ml

PARTICULATE LOADING

Actual Grain Loading	0.00286	gr/dscf
Corrected to 7% O2	0.00373	gr/dscf @ 7% O2
Actual Loading	6.55030	mg/dscm
Corrected to 7% O2	8.54120	mg/dscm @ 7% O2
Corrected to 12% CO2	8.72405	mg/dscm @ 12% CO2
Corrected to 50% Excess Air	7.91184	mg/dscm @ 50% EA
Mass Rate	3.5080	lb/hr

EPA Method 26A: Analytical Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 1 FF OUTLET

SAMPLING DATA

Run Number	**U1O-M26A-R3**	
Date	04/09/13	
Corr. Sample Volume	80.330	dscf
Corr. Flowrate	142979	dscfm
O2 Content	10.2	%
CO2 Content	9.0	%

LABORATORY DATA

	IMPINGERS 1 - 3	H_2SO_4 BLANK
Sample ID	810	838
CHLORIDE LABORATORY DATA		
HCl in Sample (mg)	33.80	< 0.115

POLLUTANT EMISSIONS

Pollutant	Concentration (ppmdv)	Concentration (ppmdv @7% O2)	Mass Rate (lb/hr)
HCl	9.80	12.78	7.96

Notes

"<" denotes not detected, detection limit given. Non-detect blanks were treated as zero.

Appendix C.2

EPA Method 5/26A Data and Results: Unit 2 FF Outlet

Run Number **U2O-M26A-R1**

Date	04/10/13	
Start Time	8:45	
End Time	11:15	
Stack Depth	105	inches
Stack Width	132	inches
Nozzle I.D.	0.280	inches
Meter Box Gamma	1.0215	
Meter Box dH@	1.6942	
Barometric	29.99	in.Hg
Cp	0.84	
Test Duration	120	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	50.0	255.0	205.0
Impinger 2	100.0	205.0	105.0
Impinger 3	100.0	113.0	13.0
Impinger 4	100.0	100.0	0.0
Impinger 5	100.0	100.0	0.0
Impinger 6			0.0
Impinger 7			0.0
Total	450.0	773.0	323.0
Silica gel (g)	250.0	269.8	19.8

METHOD 1-4 RESULTS

Metered Volume	77.049	dcf
Volume @ Std.Cond.	78.551	dscf
% Water	17.04	%
% Isokinetics	99.0	%
Velocity	45.61	ft/sec
Actual Flow	263408	acfm
Std. Flow	179567	scfm
Dry Std. Flow	148964	dscfm

METHOD 3 DATA

%O2	10.74	Md	29.79
%CO2	8.52	Ms	27.78
%CO	0.0	Ps	29.16
%N2	80.7	Fo	1.192
O2+CO2	19.3	%EA	102

POINT	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Meter Temp. (Deg. F) Inlet	Meter Temp. (Deg. F) Outlet
1	295	-11.0	0.35	1.10	451.437	67	64
2	298	-12.0	0.40	1.30	489.540	69	65
3	298	-11.0	0.40	1.30		69	65
4	295	-11.0	0.40	1.30	489.742	69	65
5	295	-12.0	0.42	1.30	528.688	71	66
6	298	-11.0	0.43	1.30		71	66
7	293		0.49	1.50		72	68
8	293		0.48	1.50		73	67
9	299		0.48	1.50		73	67
10	297		0.47	1.50		74	68
11	295		0.45	1.40		73	69
12	295		0.45	1.40		73	70
13	298		0.45	1.40		73	71
14	295		0.49	1.50		73	69
15	293		0.49	1.50		74	70
16	295		0.48	1.50		73	70
17	295		0.49	1.50		74	71
18	295		0.47	1.50		74	71
19	296		0.47	1.50		74	71
20	299		0.44	1.40		75	71
21	290		0.47	1.50		76	70
22	291		0.47	1.50		75	72
23	293		0.46	1.40		76	71
24	294		0.47	1.50		78	73
25	295		0.34	1.10		78	73
26	294		0.36	1.10		80	74
27	290		0.32	1.00		80	75
28	293		0.42	1.30		80	74
29	295		0.42	1.30		81	74
30	291		0.31	1.00		81	74
AVG.	295	-11.33	0.43	1.36	77.049	72	

EPA Method 26A: Gravimetric Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 2 FF OUTLET

SAMPLING DATA

Run Number	**U2O-M26A-R1**	
Corr. Sample Volume	78.551	dscf
Corr. Sample Volume	2.224	dscm
Corr. Flowrate	148964	dscfm
O2 Content	10.7	%
CO2 Content	8.5	%

ANALYTICAL DATA

		Weights (grams)			
Component	Sample I.D.	Tare	Final	Net	Volume (mL)
Probe Wash	813	66.3244	66.3375	0.01310	100.0
Corr. for Blank				0.01310	
Filter	812	0.3813	0.3826	0.00130	
TOTAL				0.01440	

Acetone Blank

Actual Residue	0.00000	grams
Applicable Blank Corr.	0.00000	grams
Max Allowable Residue	0.00078	grams
Blank used	0.00000	grams
Volume	150.0	ml

PARTICULATE LOADING

Actual Grain Loading	0.00283	gr/dscf
Corrected to 7% O2	0.00387	gr/dscf @ 7% O2
Actual Loading	6.47388	mg/dscm
Corrected to 7% O2	8.85698	mg/dscm @ 7% O2
Corrected to 12% CO2	9.11814	mg/dscm @ 12% CO2
Corrected to 50% Excess Air	8.69903	mg/dscm @ 50% EA
Mass Rate	3.6123	lb/hr

EPA Method 26A: Analytical Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 2 FF OUTLET

SAMPLING DATA

Run Number	**U2O-M26A-R1**	
Date	04/10/13	
Corr. Sample Volume	78.551	dscf
Corr. Flowrate	148964	dscfm
O2 Content	10.7	%
CO2 Content	8.5	%

LABORATORY DATA

	IMPINGERS 1 - 3	H_2SO_4 BLANK
Sample ID	814	838
CHLORIDE LABORATORY DATA		
HCl in Sample (mg)	24.1	< 0.115

POLLUTANT EMISSIONS

Pollutant	Concentration (ppmdv)	Concentration (ppmdv @7% O2)	Mass Rate (lb/hr)
HCl	7.15	9.78	6.05

Notes

"<" denotes not detected, detection limit given. Non-detect blanks were treated as zero.

Run Number **U2O-M26A-R2**

Date	04/10/13	
Start Time	12:09	
End Time	14:28	
Stack Depth	105	inches
Stack Width	132	inches
Nozzle I.D.	0.280	inches
Meter Box Gamma	1.0215	
Meter Box dH@	1.6942	
Barometric	29.98	in.Hg
Cp	0.84	
Test Duration	120	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	50.0	272.0	222.0
Impinger 2	100.0	214.0	114.0
Impinger 3	100.0	114.0	14.0
Impinger 4	100.0	100.0	0.0
Impinger 5	100.0	100.0	0.0
Impinger 6			0.0
Impinger 7			0.0
Total	450.0	800.0	350.0
Silica gel (g)	250.0	277.5	27.5

METHOD 1-4 RESULTS

Metered Volume	80.575	dcf
Volume @ Std.Cond.	80.408	dscf
% Water	18.10	%
% Isokinetics	101.1	%
Velocity	46.38	ft/sec
Actual Flow	267842	acfm
Std. Flow	182263	scfm
Dry Std. Flow	149272	dscfm

METHOD 3 DATA

%O2	10.93	Md	29.78
%CO2	8.42	Ms	27.65
%CO	0.0	Ps	29.20
%N2	80.7	Fo	1.184
O2+CO2	19.4	%EA	105

POINT	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Meter Temp. (Deg. F) Inlet	Meter Temp. (Deg. F) Outlet
1	297	-11.0	0.33	1.00	530.465	80	76
2	298	-10.0	0.45	1.40	570.850	80	79
3	298	-11.0	0.45	1.40		80	79
4	299	-11.0	0.49	1.50	570.960	80	78
5	298	-10.0	0.49	1.50	611.150	80	78
6	295	-11.0	0.48	1.50		81	78
7	296		0.49	1.50		82	79
8	299		0.49	1.50		83	79
9	297		0.47	1.50		83	79
10	294		0.35	1.10		83	79
11	292		0.49	1.50		84	80
12	296		0.49	1.50		85	78
13	295		0.47	1.50		85	79
14	293		0.46	1.40		85	79
15	297		0.35	1.10		86	78
16	296		0.49	1.50		86	81
17	298		0.49	1.50		86	82
18	297		0.48	1.50		86	82
19	298		0.47	1.50		87	81
20	298		0.33	1.00		86	82
21	299		0.50	1.60		87	82
22	301		0.48	1.50		88	82
23	300		0.49	1.50		89	83
24	298		0.42	1.30		89	84
25	297		0.37	1.20		90	84
26	298		0.49	1.50		92	86
27	298		0.48	1.50		93	86
28	299		0.41	1.30		93	86
29	297		0.41	1.30		93	85
30	296		0.34	1.10		93	85
AVG.	297	-10.67	0.45	1.39	80.575		83

EPA Method 26A: Gravimetric Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 2 FF OUTLET

SAMPLING DATA

Run Number	**U2O-M26A-R2**	
Corr. Sample Volume	80.408	dscf
Corr. Sample Volume	2.277	dscm
Corr. Flowrate	149272	dscfm
O2 Content	10.9	%
CO2 Content	8.4	%

ANALYTICAL DATA

		Weights (grams)			
Component	Sample I.D.	Tare	Final	Net	Volume (mL)
Probe Wash	817	65.3171	65.3230	0.00590	100.0
Corr. for Blank				0.00590	
Filter	816	0.4354	0.4436	0.00820	
TOTAL				0.01410	

Acetone Blank

Actual Residue	0.00000	grams
Applicable Blank Corr.	0.00000	grams
Max Allowable Residue	0.00078	grams
Blank used	0.00000	grams
Volume	150.0	ml

PARTICULATE LOADING

Actual Grain Loading	0.00271	gr/dscf
Corrected to 7% O2	0.00377	gr/dscf @ 7% O2
Actual Loading	6.19257	mg/dscm
Corrected to 7% O2	8.63358	mg/dscm @ 7% O2
Corrected to 12% CO2	8.82552	mg/dscm @ 12% CO2
Corrected to 50% Excess Air	8.32104	mg/dscm @ 50% EA
Mass Rate	3.4624	lb/hr

EPA Method 26A: Analytical Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 2 FF OUTLET

SAMPLING DATA

Run Number	**U2O-M26A-R2**	
Date	04/10/13	
Corr. Sample Volume	80.408	dscf
Corr. Flowrate	149272	dscfm
O2 Content	10.9	%
CO2 Content	8.4	%

LABORATORY DATA

	IMPINGERS 1 - 3	H_2SO_4 BLANK
Sample ID	818	838
CHLORIDE LABORATORY DATA		
HCl in Sample (mg)	19.9	< 0.115

POLLUTANT EMISSIONS

Pollutant	Concentration (ppmdv)	Concentration (ppmdv @7% O2)	Mass Rate (lb/hr)
HCl	5.77	8.04	4.89

Notes

"<" denotes not detected, detection limit given. Non-detect blanks were treated as zero.

Run Number **U2O-M26A-R3**

Date	04/10/13	
Start Time	15:25	
End Time	17:35	
Stack Depth	105	inches
Stack Width	132	inches
Nozzle I.D.	0.280	inches
Meter Box Gamma	1.0215	
Meter Box dH@	1.6942	
Barometric	29.95	in.Hg
Cp	0.84	
Test Duration	120	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	50.0	183.0	133.0
Impinger 2	100.0	234.0	134.0
Impinger 3	100.0	128.0	28.0
Impinger 4	100.0	108.0	8.0
Impinger 5	100.0	104.0	4.0
Impinger 6			0.0
Impinger 7			0.0
Total	450.0	757.0	307.0
Silica gel (g)	250.0	274.6	24.6

METHOD 1-4 RESULTS

Metered Volume	79.840	dcf
Volume @ Std.Cond.	77.948	dscf
% Water	16.69	%
% Isokinetics	97.3	%
Velocity	45.87	ft/sec
Actual Flow	264906	acfm
Std. Flow	180468	scfm
Dry Std. Flow	150357	dscfm

METHOD 3 DATA

%O2	11.63	Md	29.70
%CO2	7.72	Ms	27.75
%CO	0.0	Ps	29.17
%N2	80.7	Fo	1.201
O2+CO2	19.4	%EA	120

POINT	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Meter Temp. (Deg. F) Inlet	Meter Temp. (Deg. F) Outlet
1	293	-10.0	0.49	1.50	611.600	94	90
2	298	-12.0	0.48	1.50	651.425	94	90
3	297	-11.0	0.42	1.30		96	91
4	295	-11.0	0.42	1.30	651.550	96	91
5	296	-10.0	0.32	1.00	691.565	96	91
6	293	-10.0	0.47	1.50		98	92
7	293		0.47	1.50		99	92
8	295		0.48	1.50		100	92
9	296		0.40	1.20		100	93
10	294		0.36	1.10		100	93
11	298		0.49	1.50		102	95
12	296		0.49	1.50		100	94
13	297		0.48	1.50		100	95
14	299		0.44	1.40		96	92
15	297		0.37	1.20		96	92
16	293		0.47	1.50		94	89
17	293		0.46	1.40		94	90
18	295		0.45	1.40		95	89
19	292		0.45	1.40		95	88
20	292		0.38	1.20		95	88
21	300		0.49	1.50		96	90
22	300		0.49	1.50		98	91
23	298		0.47	1.50		100	92
24	295		0.43	1.30		101	93
25	295		0.37	1.20		101	94
26	295		0.45	1.40		99	95
27	298		0.45	1.40		99	95
28	294		0.42	1.30		98	94
29	295		0.40	1.20		99	94
30	293		0.39	1.20		99	96
AVG.	296	-10.67	0.44	1.36	79.840		95

EPA Method 26A: Gravimetric Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 2 FF OUTLET

SAMPLING DATA

Run Number	**U2O-M26A-R3**	
Corr. Sample Volume	77.948	dscf
Corr. Sample Volume	2.207	dscm
Corr. Flowrate	150357	dscfm
O2 Content	11.6	%
CO2 Content	7.7	%

ANALYTICAL DATA

		Weights (grams)			
Component	Sample I.D.	Tare	Final	Net	Volume (mL)
Probe Wash	821	68.9617	68.9760	0.01430	140.0
Corr. for Blank				0.01430	
Filter	820	0.3649	0.3661	0.00120	
TOTAL				0.01550	

Acetone Blank

Actual Residue	0.00000	grams
Applicable Blank Corr.	0.00000	grams
Max Allowable Residue	0.00110	grams
Blank used	0.00000	grams
Volume	150.0	ml

PARTICULATE LOADING

Actual Grain Loading	0.00307	gr/dscf
Corrected to 7% O2	0.00460	gr/dscf @ 7% O2
Actual Loading	7.02233	mg/dscm
Corrected to 7% O2	10.52970	mg/dscm @ 7% O2
Corrected to 12% CO2	10.91554	mg/dscm @ 12% CO2
Corrected to 50% Excess Air	9.43599	mg/dscm @ 50% EA
Mass Rate	3.9549	lb/hr

EPA Method 26A: Analytical Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 2 FF OUTLET

SAMPLING DATA

Run Number	**U2O-M26A-R3**	
Date	04/10/13	
Corr. Sample Volume	77.948	dscf
Corr. Flowrate	150357	dscfm
O2 Content	11.6	%
CO2 Content	7.7	%

LABORATORY DATA

	IMPINGERS 1 - 3	H_2SO_4 BLANK
Sample ID	822	838
CHLORIDE LABORATORY DATA		
HCl in Sample (mg)	22.8	< 0.115

POLLUTANT EMISSIONS

Pollutant	Concentration (ppmdv)	Concentration (ppmdv @7% O2)	Mass Rate (lb/hr)
HCl	6.81	10.22	5.82

Notes

"<" denotes not detected, detection limit given. Non-detect blanks were treated as zero.

Appendix C.3

EPA Method 5/26A Data and Results: Unit 3 FF Outlet

Run Number **U3O-M26A-R1**

Date	04/11/13	
Start Time	8:37	
End Time	10:56	
Stack Depth	105	inches
Stack Width	132	inches
Nozzle I.D.	0.280	inches
Meter Box Gamma	1.0215	
Meter Box dH@	1.6942	
Barometric	29.84	in.Hg
Cp	0.84	
Test Duration	120	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	50.0	305.0	255.0
Impinger 2	100.0	263.0	163.0
Impinger 3	100.0	121.0	21.0
Impinger 4	100.0	100.0	0.0
Impinger 5	100.0	104.0	4.0
Impinger 6			0.0
Impinger 7			0.0
Total	450.0	893.0	443.0
Silica gel (g)	250.0	282.2	32.2

METHOD 1-4 RESULTS

Metered Volume	76.592	dcf
Volume @ Std.Cond.	77.227	dscf
% Water	22.46	%
% Isokinetics	107.0	%
Velocity	45.17	ft/sec
Actual Flow	260836	acfm
Std. Flow	174680	scfm
Dry Std. Flow	135446	dscfm

METHOD 3 DATA

%O2	8.33	Md	30.04
%CO2	10.67	Ms	27.34
%CO	0.0	Ps	29.07
%N2	81.0	Fo	1.178
O2+CO2	19.0	%EA	64

POINT	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Meter Temp. (Deg. F) Inlet	Meter Temp. (Deg. F) Outlet
1	303	-11.0	0.45	1.40	725.336	74	70
2	305	-10.0	0.40	1.20	763.808	71	69
3	310	-10.0	0.42	1.30		72	70
4	311	-11.0	0.43	1.30	765.030	72	70
5	308	-11.0	0.34	1.10	803.150	72	69
6	318	-10.0	0.46	1.40		73	70
7	313		0.41	1.30		75	71
8	315		0.41	1.30		75	71
9	305		0.41	1.30		75	71
10	302		0.35	1.10		76	71
11	304		0.44	1.40		76	73
12	305		0.44	1.40		76	73
13	305		0.43	1.30		77	72
14	306		0.40	1.20		78	73
15	304		0.33	1.00		78	74
16	305		0.45	1.40		77	74
17	303		0.45	1.40		77	75
18	304		0.44	1.40		78	75
19	305		0.41	1.30		79	76
20	306		0.36	1.10		78	75
21	305		0.43	1.30		79	75
22	306		0.43	1.30		79	75
23	305		0.42	1.30		80	76
24	303		0.41	1.30		79	76
25	303		0.32	1.00		79	76
26	301		0.45	1.40		80	76
27	303		0.45	1.40		80	76
28	306		0.42	1.30		81	77
29	306		0.43	1.30		81	77
30	304		0.35	1.10		80	77
AVG.	306	-10.50	0.41	1.28	76.592		75

EPA Method 26A: Gravimetric Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 3 FF OUTLET

SAMPLING DATA

Run Number	**U3O-M26A-R1**	
Corr. Sample Volume	77.227	dscf
Corr. Sample Volume	2.187	dscm
Corr. Flowrate	135446	dscfm
O2 Content	8.3	%
CO2 Content	10.7	%

ANALYTICAL DATA

		Weights (grams)			
Component	Sample I.D.	Tare	Final	Net	Volume (mL)
Probe Wash	825	67.1311	67.1468	0.01570	190.0
Corr. for Blank				0.01570	
Filter	824	0.3696	0.3706	0.00100	
TOTAL				0.01670	

Acetone Blank

Actual Residue	0.00000	grams
Applicable Blank Corr.	0.00000	grams
Max Allowable Residue	0.00149	grams
Blank used	0.00000	grams
Volume	150.0	ml

PARTICULATE LOADING

Actual Grain Loading	0.00334	gr/dscf
Corrected to 7% O2	0.00369	gr/dscf @ 7% O2
Actual Loading	7.63663	mg/dscm
Corrected to 7% O2	8.44464	mg/dscm @ 7% O2
Corrected to 12% CO2	8.58852	mg/dscm @ 12% CO2
Corrected to 50% Excess Air	8.33980	mg/dscm @ 50% EA
Mass Rate	3.8744	lb/hr

EPA Method 26A: Analytical Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 3 FF OUTLET

SAMPLING DATA

Run Number	**U3O-M26A-R1**	
Date	04/11/13	
Corr. Sample Volume	77.227	dscf
Corr. Flowrate	135446	dscfm
O2 Content	8.3	%
CO2 Content	10.7	%

LABORATORY DATA

	IMPINGERS 1 - 3	H_2SO_4 BLANK
Sample ID	826	838
CHLORIDE LABORATORY DATA		
HCl in Sample (mg)	63.9	< 0.115

POLLUTANT EMISSIONS

Pollutant	Concentration (ppmdv)	Concentration (ppmdv @7% O2)	Mass Rate (lb/hr)
HCl	19.28	21.32	14.82

Notes

"<" denotes not detected, detection limit given. Non-detect blanks were treated as zero.

Run Number **U3O-M26A-R2**

Date	04/11/13	
Start Time	11:45	
End Time	13:54	
Stack Depth	105	inches
Stack Width	132	inches
Nozzle I.D.	0.280	inches
Meter Box Gamma	1.0215	
Meter Box dH@	1.6942	
Barometric	29.87	in.Hg
Cp	0.84	
Test Duration	120	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	50.0	336.0	286.0
Impinger 2	100.0	243.0	143.0
Impinger 3	100.0	152.0	52.0
Impinger 4	100.0	106.0	6.0
Impinger 5	100.0	102.0	2.0
Impinger 6			0.0
Impinger 7			0.0
Total	450.0	939.0	489.0
Silica gel (g)	250.0	272.6	22.6

METHOD 1-4 RESULTS

Metered Volume	78.278	dcf
Volume @ Std.Cond.	77.678	dscf
% Water	23.67	%
% Isokinetics	107.8	%
Velocity	45.55	ft/sec
Actual Flow	263026	acfm
Std. Flow	177227	scfm
Dry Std. Flow	135284	dscfm

METHOD 3 DATA

%O2	7.83	Md	30.10
%CO2	11.15	Ms	27.23
%CO	0.0	Ps	29.09
%N2	81.0	Fo	1.172
O2+CO2	19.0	%EA	58

POINT	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Meter Temp. (Deg. F) Inlet	Meter Temp. (Deg. F) Outlet
1	303	-11.0	0.46	1.40	803.450	81	80
2	303	-11.0	0.46	1.40	842.425	81	80
3	300	-10.0	0.44	1.40		81	80
4	301	-11.0	0.40	1.20	842.627	81	81
5	302	-10.0	0.36	1.10	881.930	82	81
6	301	-11.0	0.43	1.30		82	80
7	303		0.43	1.30		83	80
8	301		0.43	1.30		83	80
9	302		0.41	1.30		84	80
10	301		0.37	1.20		84	81
11	301		0.45	1.40		84	81
12	302		0.44	1.40		85	81
13	302		0.44	1.40		85	82
14	302		0.38	1.20		85	82
15	302		0.38	1.20		85	82
16	301		0.46	1.40		86	83
17	301		0.46	1.40		86	83
18	302		0.44	1.40		86	82
19	301		0.37	1.20		86	83
20	300		0.37	1.20		87	83
21	302		0.44	1.40		88	84
22	302		0.44	1.40		88	84
23	301		0.43	1.30		88	85
24	302		0.40	1.20		89	84
25	301		0.35	1.10		88	84
26	305		0.45	1.40		94	89
27	305		0.45	1.40		94	87
28	303		0.43	1.30		91	88
29	301		0.43	1.30		91	87
30	300		0.37	1.20		90	86
AVG.	302	-10.67	0.42	1.30	78.278		84

EPA Method 26A: Gravimetric Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 3 FF OUTLET

SAMPLING DATA

Run Number	**U3O-M26A-R2**	
Corr. Sample Volume	77.678	dscf
Corr. Sample Volume	2.200	dscm
Corr. Flowrate	135284	dscfm
O2 Content	7.8	%
CO2 Content	11.2	%

ANALYTICAL DATA

		Weights (grams)			
Component	Sample I.D.	Tare	Final	Net	Volume (mL)
Probe Wash	829	65.8345	65.8490	0.01450	100.0
Corr. for Blank				0.01450	
Filter	828	0.4452	0.4463	0.00110	
TOTAL				0.01560	

Acetone Blank

Actual Residue	0.00000	grams
Applicable Blank Corr.	0.00000	grams
Max Allowable Residue	0.00078	grams
Blank used	0.00000	grams
Volume	150.0	ml

PARTICULATE LOADING

Actual Grain Loading	0.00310	gr/dscf
Corrected to 7% O2	0.00330	gr/dscf @ 7% O2
Actual Loading	7.09217	mg/dscm
Corrected to 7% O2	7.54255	mg/dscm @ 7% O2
Corrected to 12% CO2	7.63283	mg/dscm @ 12% CO2
Corrected to 50% Excess Air	7.74521	mg/dscm @ 50% EA
Mass Rate	3.5938	lb/hr

EPA Method 26A: Analytical Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 3 FF OUTLET

SAMPLING DATA

Run Number	**U3O-M26A-R2**	
Date	04/11/13	
Corr. Sample Volume	77.678	dscf
Corr. Flowrate	135284	dscfm
O2 Content	7.8	%
CO2 Content	11.2	%

LABORATORY DATA

	IMPINGERS 1 - 3	H_2SO_4 BLANK
Sample ID	830	838
CHLORIDE LABORATORY DATA		
HCl in Sample (mg)	55.4	< 0.115

POLLUTANT EMISSIONS

Pollutant	Concentration (ppmdv)	Concentration (ppmdv @7% O2)	Mass Rate (lb/hr)
HCl	16.62	17.67	12.76

Notes

"<" denotes not detected, detection limit given. Non-detect blanks were treated as zero.

Run Number **U3O-M26A-R3**

Date	04/11/13	
Start Time	14:36	
End Time	17:04	
Stack Depth	105	inches
Stack Width	132	inches
Nozzle I.D.	0.280	inches
Meter Box Gamma	1.0215	
Meter Box dH@	1.6942	
Barometric	29.85	in.Hg
Cp	0.84	
Test Duration	120	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	50.0	264.0	214.0
Impinger 2	100.0	292.0	192.0
Impinger 3	100.0	137.0	37.0
Impinger 4	100.0	104.0	4.0
Impinger 5	100.0	102.0	2.0
Impinger 6			0.0
Impinger 7			0.0
Total	450.0	899.0	449.0
Silica gel (g)	250.0	272.3	22.3

METHOD 1-4 RESULTS

Metered Volume	74.593	dcf
Volume @ Std.Cond.	72.820	dscf
% Water	23.35	%
% Isokinetics	101.0	%
Velocity	45.57	ft/sec
Actual Flow	263191	acfm
Std. Flow	176626	scfm
Dry Std. Flow	135380	dscfm

METHOD 3 DATA

%O2	8.00	Md	30.06
%CO2	10.86	Ms	27.24
%CO	0.0	Ps	29.08
%N2	81.1	Fo	1.188
O2+CO2	18.9	%EA	60

POINT	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Meter Temp. (Deg. F) Inlet	Meter Temp. (Deg. F) Outlet
1	300	-11.0	0.45	1.40	882.264	91	89
2	304	-10.0	0.45	1.40	919.457	91	89
3	302	-11.0	0.44	1.20		92	90
4	305	-10.0	0.41	1.20	919.757	94	88
5	305	-10.0	0.37	1.00	957.157	95	89
6	308	-11.0	0.44	1.20		94	89
7	307		0.43	1.20		94	88
8	308		0.42	1.20		96	90
9	307		0.38	1.10		96	90
10	305		0.36	1.00		96	90
11	305		0.45	1.30		98	90
12	305		0.45	1.30		99	91
13	306		0.44	1.20		95	95
14	308		0.44	1.20		96	95
15	307		0.35	1.00		96	94
16	306		0.46	1.30		95	92
17	303		0.44	1.20		94	91
18	303		0.43	1.20		95	91
19	301		0.40	1.10		95	92
20	301		0.39	1.10		95	92
21	304		0.43	1.20		95	92
22	305		0.43	1.20		95	93
23	305		0.41	1.20		95	93
24	304		0.41	1.20		95	93
25	303		0.37	1.00		96	93
26	304		0.45	1.30		94	90
27	305		0.45	1.30		93	90
28	305		0.46	1.30		94	89
29	305		0.40	1.10		93	90
30	303		0.33	0.92		93	90
AVG.	305	-10.50	0.42	1.18	74.593	93	

EPA Method 26A: Gravimetric Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 3 FF OUTLET

SAMPLING DATA

Run Number	**U3O-M26A-R3**	
Corr. Sample Volume	72.820	dscf
Corr. Sample Volume	2.062	dscm
Corr. Flowrate	135380	dscfm
O2 Content	8.0	%
CO2 Content	10.9	%

ANALYTICAL DATA

		Weights (grams)			
Component	Sample I.D.	Tare	Final	Net	Volume (mL)
Probe Wash	833	66.3811	66.3955	0.01440	100.0
Corr. for Blank				0.01440	
Filter	832	0.4594	0.4603	0.00090	
TOTAL				0.01530	

Acetone Blank

Actual Residue	0.00000	grams
Applicable Blank Corr.	0.00000	grams
Max Allowable Residue	0.00078	grams
Blank used	0.00000	grams
Volume	150.0	ml

PARTICULATE LOADING

Actual Grain Loading	0.00324	gr/dscf
Corrected to 7% O2	0.00349	gr/dscf @ 7% O2
Actual Loading	7.41984	mg/dscm
Corrected to 7% O2	7.99502	mg/dscm @ 7% O2
Corrected to 12% CO2	8.19872	mg/dscm @ 12% CO2
Corrected to 50% Excess Air	8.10305	mg/dscm @ 50% EA
Mass Rate	3.7625	lb/hr

EPA Method 26A: Analytical Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 3 FF OUTLET

SAMPLING DATA

Run Number	**U3O-M26A-R3**	
Date	04/11/13	
Corr. Sample Volume	72.820	dscf
Corr. Flowrate	135380	dscfm
O2 Content	8.0	%
CO2 Content	10.9	%

LABORATORY DATA

	IMPINGERS 1 - 3	H_2SO_4 BLANK
Sample ID	834	838
CHLORIDE LABORATORY DATA		
HCl in Sample (mg)	47.6	< 0.115

POLLUTANT EMISSIONS

Pollutant	Concentration (ppmdv)	Concentration (ppmdv @7% O2)	Mass Rate (lb/hr)
HCl	15.23	16.41	11.71

Notes

"<" denotes not detected, detection limit given. Non-detect blanks were treated as zero.

Appendix D

EPA Methods 201A and 202 Data and Results

Appendix D.1

EPA Method 201A/202 Data and Results: Unit 1 FF Outlet

RUN NUMBER PRE-U1O-M201A-R1

Date	04/09/13	
Meter Box dH@	1.7473	
Barometric	30.02	in.Hg
Cp' (for Prelim.)	0.84	
Cp (for actual run)	0.84	
Test Duration	60	minutes

PM-2.5 fraction to be included (Y or N)?	Y
PM-10 fraction to be included? (Y or N)?	N

No. of Sample Points 30

METHOD 3 AND 4 DATA

%O2	10.0	
%CO2	10.00	
% Water	20.00	%

METHOD 2 RESULTS

Velocity 47.64 ft/sec

METHOD 3 DATA

		Md	30.00
		Ms	27.60
%CO	0.0	Ps	29.20
%N2	80.0	Fo	1.090
O2+CO2	20.0	%EA	90

Point	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Pitot Coefficient Adjusted Delta P (in.WC)	**ESTIMATED** Meter Temp Inlet (DegF)	Meter Temp Outlet (DegF)
1	314	-11.00	0.44	0.44	88	88
2	316	-11.00	0.44	0.44		
3	316	-11.00	0.44	0.44		
4	316	-11.50	0.45	0.45		
5	315	-11.00	0.46	0.46		
6	315	-11.50	0.43	0.43		
7	315		0.44	0.44		
8	317		0.46	0.46		
9	317		0.47	0.47		
10	317		0.46	0.46		
11	318		0.46	0.46		
12	319		0.48	0.48		
13	318		0.48	0.48		
14	319		0.47	0.47		
15	319		0.45	0.45		
16	315		0.45	0.45		
17	315		0.48	0.48		
18	316		0.45	0.45		
19	317		0.44	0.44		
20	317		0.46	0.46		
21	314		0.44	0.44		
22	315		0.45	0.45		
23	317		0.43	0.43		
24	317		0.44	0.44		
25	320		0.46	0.46		
26	320		0.50	0.50		
27	317		0.51	0.51		
28	319		0.47	0.47		
29	318		0.45	0.45		
30	318		0.44	0.44		
AVG.	317	-11.17	0.46	0.46	88	

EPA METHOD 201A

PRELIMINARY TRAVERSE

ORIFICE HEAD, NOZZLE, AND DWELL TIME CALCULATIONS

RUN I.D. **PRE-U1O-M201A-R2**

ORIFICE HEAD DETERMINATION (dH)

TEMP. (°F)	CYCLONE FLOW (ft3/min)	ORIFICE HEAD (in. H2O)
325	0.588	**0.31**
275	0.541	0.30
375	0.634	0.32

Nre	=	2354

NOZZLE SIZE DETERMINATION

Min. dP from Traverse:	0.44
Max. dP from Traverse:	0.54
Average dP from Traverse:	0.48

dPmin and dPmax Calculations at Stack Temperature of **325**

Stack Gas Viscosity (micropoise)	221.064
Stack Gas Viscosity (micropoise) @ -50°F	209.504
Stack Gas Viscosity (micropoise) @ +50°F	232.409

D (calc. nozzle dia.) = 0.191

Nozzle No.	Dn (in.)	OPTIONAL NOZZLES	vn (ft/s)	Conditional Rmin Step 1	Conditional Rmin Step 2	vmin (ft/s)	Conditional Rmax	Conditional Rmax	vmax (ft/s)	dPmin (in. H2O)	dPmax (in. H2O)
1	0.114		138.179	0.280	0.775	107.074	1.218	1.218	168.276	2.279	5.629
2	0.129		107.913	0.268	0.763	82.364	1.226	1.226	132.265	1.349	3.478
3	0.148		81.984	0.248	0.743	60.953	1.238	1.238	101.532	0.739	2.049
4	0.158		71.935	0.235	0.730	52.539	1.247	1.247	89.667	0.549	1.598
5	0.179	**OK**	56.046	0.202	0.695	38.965	1.267	1.267	70.997	0.302	1.002
6	0.191	**OK**	49.225	0.179	0.669	32.949	1.280	1.280	63.028	0.216	0.790
7	0.201	**OK**	44.449	0.158	0.644	28.609	1.293	1.293	57.471	0.163	0.657
8	0.230		33.947	0.084	0.536	18.190	1.336	1.336	45.341	0.066	0.409
9	0.253		28.055	0.010	0.347	9.749	1.376	1.376	38.610	0.019	0.296
10	0.274		23.919	-0.070	0.500	11.960	1.418	1.418	33.926	0.028	0.229
11	0.296		20.496	-0.168	0.500	10.248	1.468	1.468	30.081	0.021	0.180

DWELL TIME DETERMINATION

Dwell Time at Point 1 (T1) is: **1.98** minutes

TRAVERSE POINT DETERMINATION

DATA FROM PRELIMINARY TRAVERSE:

Average dP from Traverse: **0.48**

Run Number **U1O-M201A/202-R1**

Date	04/10/13	
Start Time	10:08	
End Time	11:08	
Stack Length	132	inches
Stack Width	105	inches
Nozzle I.D.	0.179	inches
Meter Box Gamma	0.991	
Meter Box dH@	1.7473	
Barometric	29.98	in.Hg
Cp	0.84	
Test Duration	59.50	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	0.0	80.0	80.0
Impinger 2	0.0	0.0	0.0
Impinger 3	100.0	102.0	2.0
Impinger 4			0.0
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Total	100.0	182.0	82.0
Silica gel (g)	250.0	260.5	10.5

METHOD 1-4 RESULTS

Metered Volume	19.606	dcf
Volume @ Std.Cond.	18.964	dscf
% Water	18.67	%
% Isokinetics	116.2	%
Velocity	49.08	ft/sec
Actual Flow	283412	acfm
Std. Flow	185723	scfm
Dry Std. Flow	151039	dscfm

METHOD 3 DATA

%O2	9.47	Md	29.93
%CO2	9.67	Ms	27.70
%CO	0.0	Ps	29.15
%N2	80.9	Fo	1.182
O2+CO2	19.1	%EA	80

POINT	Dwell Time (Min.)	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Iso (%)	Meter Temp. (Deg. F) Inlet	Meter Temp. (Deg. F) Outlet
1	2.0	320	-11.0	0.47	0.32	594.831	86.0	82	81
2	2.0	329	-10.0	0.48	0.32	595.3	125.1	83	81
3	1.9	324	-12.0	0.46	0.32	596.0	133.9	84	81
4	1.9	328	-11.0	0.45	0.32	596.7	116.3	84	81
5	2.0	329	-12.0	0.48	0.32	597.3	124.9	84	81
6	2.0	319	-12.0	0.49	0.32	598.0	122.8	84	82
7	2.0	324		0.47	0.32	598.7	125.7	84	82
8	2.0	327		0.49	0.32	599.4	105.8	84	82
9	1.9	325		0.48	0.32	600.0	112.3	84	82
10	1.9	325		0.45	0.32	600.6	116.0	84	82
11	2.0	321		0.48	0.32	601.2	124.2	84	82
12	1.9	327		0.44	0.32	601.9	137.1	84	82
13	1.9	325		0.46	0.32	602.6	114.8	84	82
14	2.0	324		0.48	0.32	603.2	124.4	84	82
15	1.9	323		0.45	0.32	603.9	115.9	84	82
16	2.0	325		0.48	0.32	604.5	124.5	84	82
17	2.1	327		0.54	0.32	605.2	112.0	84	81
18	2.0	326		0.50	0.32	605.9	122.3	83	81
19	2.0	325		0.48	0.32	606.6	124.7	83	81
20	2.0	324		0.47	0.32	607.3	108.0	83	81
21	2.1	326		0.54	0.32	607.9	112.1	83	81
22	2.1	326		0.52	0.32	608.6	114.2	83	81
23	2.0	328		0.48	0.32	609.3	124.9	84	81
24	2.0	325		0.51	0.32	610.0	103.6	84	81
25	2.0	323		0.50	0.32	610.6	121.9	84	81
26	2.0	328		0.49	0.32	611.3	123.7	83	81
27	2.0	326		0.48	0.32	612.0	107.0	83	81
28	2.0	325		0.47	0.32	612.6	108.0	83	81
29	1.9	324		0.45	0.32	613.2	116.2	83	81
30	2.0	319		0.48	0.32	613.8	113.1	83	81
						614.437			
AVG.		325	-11.33	0.48	0.32	19.606	117.4	82	

EPA METHOD 201A CALCULATIONS
PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 1 OUTLET
U1O-M201A/202-R1

C1	=	-150.3162	micropoise
C2	=	18.0614	micropoise/K^0.5
	=	13.4622	micropoise/R^0.5
C3	=	1.19183E+06	micropoise/K^2
	=	3.86153E+06	micropoise/R^2
C4	=	0.591123	micropoise
C5	=	91.9723	micropoise
C6	=	4.91705E-05	micropoise/K^2
	=	1.51761E-05	micropoise/R^2
Preliminary Data			
Ts	=	316.87	degrees F
Ts	=	776.87	degrees R
%O2, dry	=	10.00	%
%O2, wet	=	8.00	%
Bws	=	0.20	
Pbar	=	30.02	in. Hg
Pstatic	=	-11.17	in. H2O
Ps	=	29.20	in. Hg
Dp (for 2.25 micrometer cut size)	=	2.25	micrometers
Mw (same as Ms)	=	27.60	lb/lb-mole
Tm	=	88.00	degrees F
Tm	=	548.00	degrees R
Md	=	30.00	lb/lb-mole
ΔH@	=	1.7473	
Cp' (for Prelim.)	=	0.84	
Vs	=	47.64	ft/sec
μ	=	219.471	
C (for 2.25 micrometer cut size)	=	1.10	
D50LL (for Nre< 3162)	=	9.86	
D50T (for Nre< 3162)	=	10.43	
Qs (=QI for Nre< 3162)	=	0.581	
Nre	=	2371	
D50LL (for Nre >= 3162)	=	10.56	
D50T (for Nre >= 3162)	=	10.78	
Qs (=QI for Nre >= 3162)	=	0.554	
Sampling Rate ΔH	=	0.32	in. H2O
Sampling Rate ΔH @ Ts - 50 deg. F	=	0.31	in. H2O
Sampling Rate ΔH @ Ts + 50 deg. F	=	0.33	in. H2O
D (calc. nozzle dia.)	=	0.193	in.
D (actual selected)	=	0.179	in.
Vn	=	55.36	ft/sec
ΔPmin allowed	=	0.298	in. H2O
ΔPmax allowed	=	0.990	in. H2O
Dwell Time at Point 1 (T1) is:		1.96	min.
Actual Run Data			
Ts	=	324.90	degrees F
Ts	=	784.90	degrees R
%O2, dry	=	9.47	%
%O2, wet	=	7.70	%
Vwc	=	3.860	
Vsg	=	0.495	
Bws	=	0.1867	
Pbar	=	29.98	in. Hg
Pstatic	=	-11.33	in. H2O
Ps	=	29.15	in. Hg
Mw (same as Ms)	=	27.70	lb/lb-mole
Tm	=	82.47	degrees F
Tm	=	542.5	degrees R
Md	=	29.93	lb/lb-mole
Cp (for actual run)	=	0.84	
Meter Calibration Factor (Gamma)	=	0.9910	
Meter Box Delta H During Test	=	0.32	in. H2O
Meter Volume	=	19.606	dcf
Meter Volume at Std. Cond.	=	18.964	dscf
Avg. Sqare Root of Delta P	=	0.6931	
Velocity	=	49.08	ft/sec
Area of Nozzle	=	0.0001748	ft^2
Test Duration	=	59.5	min.
Isokinetics (rounded to nearest whole #)	=	116%	
No. of Points < 71% or > 129% Iso.	=	2	
ΔPmin allowed	=	0.315	in. H2O
ΔPmax allowed	=	1.040	in. H2O
Actual ΔPmin from run	=	0.44	in. H2O
Actual ΔPmax from run	=	0.54	in. H2O
No. of ΔPs outside of allowed range	=	0	
Recalculated μ	=	222.232	
Qs	=	0.598	acfm
D50 (for PM-10 cyclone I)	=	10.32	
Nre (actual test conditions)	=	2392	
C (where Dp = 2.5)	=	1.09	
D50 (for PM-2.5 cyclone IV)	=	2.45	
Cr	=	1.25	
D50-1	=	2.28	
Z	=	0.93	
Recalculated Cr	=	1.27	
Recalculated D50 (for cyclone IV)	=	2.27	
Recalculated D50-1	=	2.27	
Recalculated Z	=	1.00	

EPA Method 201A: Performance Criteria Calculations

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 1 OUTLET

Run Number	**U1O-M201A/202-R1**
Stack Gas Viscosity (micropoise)	219.471
Cyclone Flow Rate (dscf/min)	0.319
Cyclone Flow Rate (acfm)	0.598
D50	10.320

dPmin and dPmax Calculations and Performance:

Stack Gas Viscosity (micropoise)	222.232
Cyclone Flow Rate (acfm)	0.598
Vmstd - dscf	18.964
Sample Time - min	59.5
Ts	324.900
% O2	9.470
% Water	18.675
Vwc	3.860
Vsg	0.495
Ps	29.147
Mw	27.699
Cp	0.84
Nozzle Size(s) Used For Test:	0.179
Minimum dP During Test:	0.44
Maximum dP During Test:	0.54

Nozzle No.	Dn (in.)	vn (ft/s)	Conditional Rmin Step 1	Conditional Rmin Step 2	vmin (ft/s)	Conditional Rmax Step 1	Conditional Rmax Step 2	vmax (ft/s)	dPmin (in. H2O)	dPmax (in. H2O)	Acceptance Criteria	Nozzle Selection for Next Run
1	0.114	140.634	0.280	0.775	109.020	1.218	1.218	171.235	2.371	5.850		
2	0.129	109.830	0.268	0.764	83.878	1.225	1.225	134.581	1.404	3.613		
3	0.148	83.440	0.249	0.744	62.097	1.238	1.238	103.297	0.769	2.129		
4	0.158	73.213	0.236	0.731	53.539	1.246	1.246	91.220	0.572	1.660		
5	0.179	57.042	0.203	0.697	39.738	1.266	1.266	72.213	0.315	1.040	**OK**	**OK**
6	0.191	50.099	0.181	0.671	33.626	1.279	1.279	64.100	0.226	0.820		**OK**
7	0.201	45.238	0.160	0.646	29.220	1.292	1.292	58.443	0.170	0.681		**OK**
8	0.230	34.550	0.087	0.541	18.674	1.334	1.334	46.093	0.070	0.424		
9	0.253	28.553	0.014	0.364	10.394	1.374	1.374	39.240	0.022	0.307		
10	0.274	24.344	-0.065	0.500	12.172	1.416	1.416	34.471	0.030	0.237		
11	0.296	20.860	-0.162	0.500	10.430	1.465	1.465	30.556	0.022	0.186		

EPA Method 202: Gravimetric Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 1 OUTLET

SAMPLING DATA

Run number	**U1O-M201A/202-R1**
Corrected sample volume	18.964 dscf
	0.537 dscm
Corrected flow rate	151039 dscfm
O2 Content	9.47 %
CO2 Content	9.67 %

SUMMARY

COMPONENT	NET (grams)	CORRECTED FOR BLANK (grams)
FILTERABLE PM2.5		
Probe Wash	0.00080	0.00000
Filter	0.00070	0.00070
CONDENSIBLE PM2.5		
Inorganic CPM	0.00360	0.00179
Organic CPM	0.00760	0.00741
TOTAL CPM	0.01120	0.00920
TOTAL PM	0.01270	0.00990

ANALYTICAL DATA

METHOD 201A COMPONENTS	TARE (grams)	FINAL (grams)	NET (grams)	VOLUME (ml)
PM2.5 Acetone Probe Wash	67.0124	67.0132	0.00080	170
Acetone Blank Residue	67.9233	67.9245	0.00120	125
Applicable Acetone Blank			0.00163	
Max. Allowable Blank			0.00133	
Blank Value Used for Correction			0.00133	
Filter	0.3468	0.3475	0.00070	

METHOD 202 COMPONENTS	NET (grams)		Volume (mL)	CPM RATIO (%)
Inorganic CPM in Sample	0.00360		260	29.71%
Organic CPM in Sample	0.00760		232	70.29%
Inorganic CPM in Field Blank	0.00280		180	90.32%
Organic CPM in Field Blank	0.00040		240	9.68%
Total CPM in Field Blank	0.00440	*		
Max. Allowable Field Blank	0.00200			
Inorganic CPM Field Blank Value Used for Correction	0.00181	**		
Organic CPM Field Blank Value Used for Correction	0.00019	**		
Total CPM Field Blank Value Used for Correction	0.00200			

PM2.5 EMISSIONS

	FILTERABLE (FPM)	**Inorganic (CPM)**	**Organic (CPM)**	**Total (CPM)**	**TOTAL (FPM+CPM)**
Actual Grain Loading (gr/dscf)	0.0006	0.0015	0.0060	0.0075	0.0081
Corrected to 7% O2 (gr/dscf)	0.0007	0.0018	0.0073	0.0091	0.0098
Corrected to 12% CO2 (gr/dscf)	0.0007	0.0018	0.0075	0.0093	0.0100
Actual Grain Loading (mg/dscm)	1.30	3.34	13.79	17.13	18.44
Corrected to 7% O2 (mg/dscm)	1.59	4.06	16.77	20.83	22.42
Corrected to 12% CO2 (mg/dscm)	1.62	4.14	17.12	21.26	22.88
Mass Rate (lb/hr)	0.74	1.89	7.80	9.69	10.43

Notes

* The field blank value was corrected for the volume difference between the sample and the blank.
Field blank corrected value = actual value x sample volume over blank volume.

** If the Total CPM in Field Blank value is > 2 mg, then the inorganic and organic blank fractions were calculated by:
2 mg x CPM Ratio % of Uncorrected CPM in Field Blank (Inorganic or Organic, as applicable).

RUN NUMBER PRE-U1O-M201A-R2

Date	04/10/13	
Start Time	10:08	
End Time	11:08	
Meter Box dH@	1.7473	
Barometric	29.98	in.Hg
Cp' (for Prelim.)	0.84	
Cp (for actual run)	0.84	
Test Duration	60	minutes

PM-2.5 fraction to be included (Y or N)?	Y
PM-10 fraction to be included? (Y or N)?	N

No. of Sample Points 24

METHOD 3 AND 4 DATA

%O2	9.47	
%CO2	9.67	
% Water	20.00	%

METHOD 2 RESULTS

Velocity	49.16	ft/sec

METHOD 3 DATA

		Md	29.93
		Ms	27.54
%CO	0.0	Ps	29.21
%N2	80.9	Fo	1.182
O2+CO2	19.1	%EA	80

Point	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Pitot Coefficient Adjusted Delta P (in.WC)	**ESTIMATED** Meter Temp Inlet (DegF)	Meter Temp Outlet (DegF)
1	320	-11.00	0.47	0.47	82	81
2	329	-10.00	0.48	0.48	83	81
3	324		0.46	0.46	84	81
4	328		0.45	0.45	84	81
5	329		0.48	0.48	84	81
6	319		0.49	0.49	84	82
7	324		0.47	0.47	84	82
8	327		0.49	0.49	84	82
9	325		0.48	0.48	84	82
10	325		0.45	0.45	84	82
11	321		0.48	0.48	84	82
12	327		0.44	0.44	84	82
13	325		0.46	0.46	84	82
14	324		0.48	0.48	84	82
15	323		0.45	0.45	84	82
16	325		0.48	0.48	84	82
17	327		0.54	0.54	84	81
18	326		0.50	0.50	83	81
19	325		0.48	0.48	83	81
20	324		0.47	0.47	83	81
21	326		0.54	0.54	83	81
22	326		0.52	0.52	83	81
23	328		0.48	0.48	84	81
24	325		0.51	0.51	84	81
25	323		0.50	0.50	84	81
26	328		0.49	0.49	83	81
27	326		0.48	0.48	83	81
28	325		0.47	0.47	83	81
29	324		0.45	0.45	83	81
30	319		0.48	0.48	83	81
AVG.	325	-10.50	0.48	0.48	82	

EPA METHOD 201A

PRELIMINARY TRAVERSE

ORIFICE HEAD, NOZZLE, AND DWELL TIME CALCULATIONS

RUN I.D. **PRE-U1O-M201A-R2**

ORIFICE HEAD DETERMINATION (dH)

TEMP. (°F)	CYCLONE FLOW (ft3/min)	ORIFICE HEAD (in. H2O)
325	0.588	**0.31**
275	0.541	0.30
375	0.634	0.32

Nre	=	2354

NOZZLE SIZE DETERMINATION

Min. dP from Traverse:	0.44
Max. dP from Traverse:	0.54
Average dP from Traverse:	0.48

dPmin and dPmax Calculations at Stack Temperature of **325**

Stack Gas Viscosity (micropoise)	221.064
Stack Gas Viscosity (micropoise) @ -50°F	209.504
Stack Gas Viscosity (micropoise) @ +50°F	232.409

D (calc. nozzle dia.)	**=**	**0.191**

Nozzle No.	**Dn** (in.)	**OPTIONAL NOZZLES**	**vn** (ft/s)	**Conditional Rmin Step 1**	**Conditional Rmin Step 2**	**vmin** (ft/s)	**Conditional Rmax**	**Conditional Rmax**	**vmax** (ft/s)	**dPmin** (in. H2O)	**dPmax** (in. H2O)
1	0.114		138.179	0.280	0.775	107.074	1.218	1.218	168.276	2.279	5.629
2	0.129		107.913	0.268	0.763	82.364	1.226	1.226	132.265	1.349	3.478
3	0.148		81.984	0.248	0.743	60.953	1.238	1.238	101.532	0.739	2.049
4	0.158		71.935	0.235	0.730	52.539	1.247	1.247	89.667	0.549	1.598
5	0.179	**OK**	56.046	0.202	0.695	38.965	1.267	1.267	70.997	0.302	1.002
6	0.191	**OK**	49.225	0.179	0.669	32.949	1.280	1.280	63.028	0.216	0.790
7	0.201	**OK**	44.449	0.158	0.644	28.609	1.293	1.293	57.471	0.163	0.657
8	0.230		33.947	0.084	0.536	18.190	1.336	1.336	45.341	0.066	0.409
9	0.253		28.055	0.010	0.347	9.749	1.376	1.376	38.610	0.019	0.296
10	0.274		23.919	-0.070	0.500	11.960	1.418	1.418	33.926	0.028	0.229
11	0.296		20.496	-0.168	0.500	10.248	1.468	1.468	30.081	0.021	0.180

DWELL TIME DETERMINATION

Dwell Time at Point 1 (T1) is: **1.98** minutes

TRAVERSE POINT DETERMINATION

DATA FROM PRELIMINARY TRAVERSE:

Average dP from Traverse: **0.48**

Run Number **U1O-M201A/202-R2**

Date	04/10/13	
Start Time	12:11	
End Time	13:12	
Stack Length	132	inches
Stack Width	105	inches
Nozzle I.D.	0.179	inches
Meter Box Gamma	0.9910	
Meter Box dH@	1.7473	
Barometric	29.98	in.Hg
Cp	0.84	
Test Duration	61.10	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	0.0	93.0	93.0
Impinger 2	0.0	0.0	0.0
Impinger 3	100.0	98.0	-2.0
Impinger 4			0.0
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Total	100.0	191.0	91.0
Silica gel (g)	250.0	256.4	6.4

METHOD 1-4 RESULTS

Metered Volume	20.112	dcf
Volume @ Std.Cond.	19.363	dscf
% Water	19.15	%
% Isokinetics	118.1	%
Velocity	48.26	ft/sec
Actual Flow	278728	acfm
Std. Flow	182794	scfm
Dry Std. Flow	147796	dscfm

METHOD 3 DATA

%O2	8.84	Md	29.98
%CO2	10.17	Ms	27.69
%CO	0.0	Ps	29.13
%N2	81.0	Fo	1.186
O2+CO2	19.0	%EA	70

	Dwell Time	Stack Temp.	Static Pressure	Delta P	Delta H	Meter Volume	Iso	Meter Temp. (Deg. F)	
POINT	(Min.)	(DegF)	(in.WC)	(in.WC)	(in.WC)	(dcf)	(%)	Inlet	Outlet
1	2.1	314	-12.00	0.47	0.31	615.268	110.9	82	82
2	2.1	318	-11.00	0.49	0.31	615.9	117.7	82	82
3	2.1	322	-11.00	0.48	0.31	616.6	119.3	82	82
4	2.0	324	-12.00	0.46	0.31	617.3	128.0	83	82
5	2.0	327	-11.00	0.45	0.31	618.0	111.1	83	82
6	2.1	325	-12.00	0.48	0.31	618.6	119.4	83	82
7	2.0	323		0.47	0.31	619.3	126.5	83	82
8	2.1	325		0.49	0.31	620.0	118.1	83	82
9	1.9	323		0.46	0.31	620.7	115.4	83	82
10	2.0	320		0.46	0.31	621.3	127.6	83	82
11	2.1	327		0.49	0.31	622.0	118.0	85	83
12	2.2	326		0.52	0.31	622.7	109.2	85	83
13	2.1	325		0.48	0.31	623.4	118.8	86	84
14	2.0	325		0.43	0.31	624.1	131.8	86	84
15	1.9	327		0.41	0.31	624.8	121.7	88	84
16	2.1	325		0.49	0.31	625.4	100.6	88	84
17	2.2	327		0.53	0.31	626.0	107.9	88	84
18	2.2	326		0.54	0.31	626.7	122.2	87	84
19	2.0	323		0.47	0.31	627.5	107.6	87	86
20	2.0	320		0.44	0.31	628.1	129.5	87	86
21	2.0	324		0.45	0.31	628.8	128.4	87	86
22	1.9	325		0.42	0.31	629.5	120.0	87	86
23	1.9	327		0.42	0.31	630.1	120.2	87	86
24	2.0	326		0.46	0.31	630.7	108.9	88	86
25	2.1	328		0.49	0.31	631.3	117.4	88	86
26	2.1	325		0.48	0.31	632.0	118.4	88	86
27	2.0	327		0.44	0.31	632.7	129.9	89	86
28	1.9	323		0.42	0.31	633.4	119.6	89	86
29	2.0	322		0.43	0.31	634.0	130.8	89	87
30	2.0	320		0.44	0.31	634.7	125.5	89	87
						635.380			
AVG.		324	-11.50	0.47	0.31	20.112	119.4	85	

EPA METHOD 201A CALCULATIONS
PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 1 OUTLET
U1O-M201A/202-R2

C1	=	-150.3162	micropoise
C2	=	18.0614	micropoise/K^0.5
	=	13.4622	micropoise/R^0.5
C3	=	1.19183E+06	micropoise/K^2
	=	3.86153E+06	micropoise/R^2
C4	=	0.591123	micropoise
C5	=	91.9723	micropoise
C6	=	4.91705E-05	micropoise/K^2
	=	1.51761E-05	micropoise/R^2
Preliminary Data			
Ts	=	324.90	degrees F
Ts	=	784.90	degrees R
%O2, dry	=	9.47	%
%O2, wet	=	7.58	%
Bws	=	0.20	
Pbar	=	29.98	in. Hg
Pstatic	=	-10.50	in. H2O
Ps	=	29.21	in. Hg
Dp (for 2.25 micrometer cut size)	=	2.25	micrometers
Mw (same as Ms)	=	27.54	lb/lb-mole
Tm	=	82.47	degrees F
Tm	=	542.47	degrees R
Md	=	29.93	lb/lb-mole
ΔH@	=	1.7473	
Cp' (for Prelim.)	=	0.84	
Vs	=	49.16	ft/sec
μ	=	221.064	
C (for 2.25 micrometer cut size)	=	1.10	
D50LL (for Nre< 3162)	=	9.84	
D50T (for Nre< 3162)	=	10.42	
Qs (=QI for Nre< 3162)	=	0.588	
Nre	=	2354	
D50LL (for Nre >= 3162)	=	10.56	
D50T (for Nre >= 3162)	=	10.78	
Qs (=QI for Nre >= 3162)	=	0.560	
Sampling Rate ΔH	=	0.31	in. H2O
Sampling Rate ΔH @ Ts - 50 deg. F	=	0.30	in. H2O
Sampling Rate ΔH @ Ts + 50 deg. F	=	0.32	in. H2O
D (calc. nozzle dia.)	=	0.191	in.
D (actual selected)	=	0.179	in.
Vn	=	56.04	ft/sec
ΔPmin allowed	=	0.302	in. H2O
ΔPmax allowed	=	1.002	in. H2O
Dwell Time at Point 1 (T1) is:		2.47	min.
Actual Run Data			
Ts	=	323.97	degrees F
Ts	=	783.97	degrees R
%O2, dry	=	8.84	%
%O2, wet	=	7.15	%
Vwc	=	4.283	
Vsg	=	0.302	
Bws	=	0.1915	
Pbar	=	29.98	in. Hg
Pstatic	=	-11.50	in. H2O
Ps	=	29.13	in. Hg
Mw (same as Ms)	=	27.69	lb/lb-mole
Tm	=	84.98	degrees F
Tm	=	545.0	degrees R
Md	=	29.98	lb/lb-mole
Cp (for actual run)	=	0.84	
Meter Calibration Factor (Gamma)	=	0.9910	
Meter Box Delta H During Test	=	0.31	in. H2O
Meter Volume	=	20.112	dcf
Meter Volume at Std. Cond.	=	19.363	dscf
Avg. Sqare Root of Delta P	=	0.6818	
Velocity	=	48.26	ft/sec
Area of Nozzle	=	0.0001748	ft^2
Test Duration	=	61.1	min.
Isokinetics (rounded to nearest whole #)	=	118%	
No. of Points < 71% or > 129% Iso.	=	4	
Actual ΔPmin from run	=	0.41	in. H2O
Actual ΔPmax from run	=	0.54	in. H2O
Actual ΔPmin from run	=	0.41	in. H2O
Actual ΔPmax from run	=	0.54	in. H2O
No. of ΔPs outside of allowed range	=	0	
Recalculated μ	=	221.302	
Qs	=	0.598	acfm
D50 (for PM-10 cyclone I)	=	10.29	
Nre (actual test conditions)	=	2401	
C (where Dp = 2.5)	=	1.09	
D50 (for PM-2.5 cyclone IV)	=	2.44	
Cr	=	1.25	
D50-1	=	2.27	
Z	=	0.93	
Recalculated Cr	=	1.27	
Recalculated D50 (for cyclone IV)	=	2.26	
Recalculated D50-1	=	2.26	
Recalculated Z	=	1.00	

EPA Method 201A: Performance Criteria Calculations

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 1 OUTLET

Run Number	**U1O-M201A/202-R2**
Stack Gas Viscosity (micropoise)	221.064
Cyclone Flow Rate (dscf/min)	0.317
Cyclone Flow Rate (acfm)	0.598
D50	10.294

dPmin and dPmax Calculations and Performance:

Stack Gas Viscosity (micropoise)	221.302
Cyclone Flow Rate (acfm)	0.598
Vmstd - dscf	19.363
Sample Time - min	61.1
Ts	323.967
% O2	8.840
% Water	19.146
Vwc	4.283
Vsg	0.302
Ps	29.134
Mw	27.687
Cp	0.84
Nozzle Size(s) Used For Test:	0.179
Minimum dP During Test:	0.41
Maximum dP During Test:	0.54

Nozzle No.	Dn (in.)	vn (ft/s)	Conditional Step 1	Conditional Step 2	vmin (ft/s)	Conditional Rmax	Conditional Rmax	vmax (ft/s)	dPmin (in. H2O)	dPmax (in. H2O)	Acceptance Criteria	Nozzle Selection for Next Run
1	0.114	140.540	0.280	0.775	108.960	1.218	1.218	171.112	2.369	5.843		
2	0.129	109.756	0.268	0.764	83.836	1.225	1.225	134.481	1.403	3.609		
3	0.148	83.384	0.249	0.744	62.072	1.238	1.238	103.217	0.769	2.126		
4	0.158	73.163	0.236	0.732	53.522	1.246	1.246	91.147	0.572	1.658		
5	0.179	57.004	0.204	0.697	39.735	1.266	1.266	72.152	0.315	1.039	**OK**	**OK**
6	0.191	50.066	0.181	0.672	33.630	1.279	1.279	64.044	0.226	0.819		**OK**
7	0.201	45.208	0.161	0.647	29.230	1.292	1.292	58.390	0.171	0.680		**OK**
8	0.230	34.527	0.088	0.542	18.707	1.334	1.334	46.047	0.070	0.423		
9	0.253	28.534	0.015	0.368	10.509	1.374	1.374	39.197	0.022	0.307		
10	0.274	24.328	-0.064	0.500	12.164	1.415	1.415	34.432	0.030	0.237		
11	0.296	20.846	-0.161	0.500	10.423	1.464	1.464	30.518	0.022	0.186		

EPA Method 202: Gravimetric Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 1 OUTLET

SAMPLING DATA

Run number	**U1O-M201A/202-R2**
Corrected sample volume	19.363 dscf
	0.548 dscm
Corrected flow rate	147796 dscfm
O2 Content	8.84 %
CO2 Content	10.17 %

SUMMARY

COMPONENT	NET (grams)	CORRECTED FOR BLANK (grams)
FILTERABLE PM2.5		
Probe Wash	0.00100	0.00000
Filter	0.00090	0.00090
CONDENSIBLE PM2.5		
Inorganic CPM	0.00480	0.00299
Organic CPM	0.00570	0.00551
TOTAL CPM	0.01050	0.00850
TOTAL PM	0.01240	0.00940

ANALYTICAL DATA

METHOD 201A COMPONENTS	TARE (grams)	FINAL (grams)	NET (grams)	VOLUME (ml)
PM2.5 Acetone Probe Wash	66.3309	66.3319	0.00100	140
Acetone Blank Residue	67.9233	67.9245	0.00120	125
Applicable Acetone Blank			0.00134	
Max. Allowable Blank			0.00110	
Blank Value Used for Correction			0.00110	
Filter	0.3603	0.3612	0.00090	

METHOD 202 COMPONENTS	NET (grams)		Volume (mL)	CPM RATIO (%)
Inorganic CPM in Sample	0.00480		270	45.71%
Organic CPM in Sample	0.00570		270	54.29%
Inorganic CPM in Field Blank	0.00280		180	90.32%
Organic CPM in Field Blank	0.00040		240	9.68%
Total CPM in Field Blank	0.00470	*		
Max. Allowable Field Blank	0.00200			
Inorganic CPM Field Blank Value Used for Correction	0.00181	**		
Organic CPM Field Blank Value Used for Correction	0.00019	**		
Total CPM Field Blank Value Used for Correction	0.00200			

PM2.5 EMISSIONS

	FILTERABLE (FPM)	**Inorganic (CPM)**	**Organic (CPM)**	**Total (CPM)**	**TOTAL (FPM+CPM)**
Actual Grain Loading (gr/dscf)	0.0007	0.0024	0.0044	0.0068	0.0075
Corrected to 7% O2 (gr/dscf)	0.0008	0.0027	0.0051	0.0078	0.0086
Corrected to 12% CO2 (gr/dscf)	0.0008	0.0028	0.0052	0.0080	0.0088
Actual Grain Loading (mg/dscf)	1.64	5.46	10.04	15.50	17.14
Corrected to 7% O2 (mg/dscf)	1.89	6.29	11.57	17.87	19.76
Corrected to 12% CO2 (mg/dscf)	1.94	6.44	11.85	18.29	20.23
Mass Rate (lb/hr)	0.91	3.02	5.56	8.58	9.49

Notes

* The field blank value was corrected for the volume difference between the sample and the blank.
Field blank corrected value = actual value x sample volume over blank volume.

** If the Total CPM in Field Blank value is > 2 mg, then the inorganic and organic blank fractions were calculated by:
2 mg x CPM Ratio % of Uncorrected CPM in Field Blank (Inorganic or Organic, as applicable).

RUN NUMBER PRE-U1O-M201A-R3

Date	04/10/13
Start Time	12:11
End Time	13:12
Meter Box dH@	1.7473
Barometric	29.98 in.Hg
Cp' (for Prelim.)	0.84
Cp (for actual run)	0.84
Test Duration	60 minutes

PM-2.5 fraction to be included (Y or N)?	Y
PM-10 fraction to be included? (Y or N)?	N

No. of Sample Points 30

METHOD 3 AND 4 DATA

%O2	8.84
%CO2	10.17
% Water	20.00 %

METHOD 2 RESULTS

Velocity 48.35 ft/sec

METHOD 3 DATA

		Md	29.98
		Ms	27.58
%CO	0.0	Ps	29.13
%N2	81.0	Fo	1.186
O2+CO2	19.0	%EA	70

Point	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Pitot Coefficient Adjusted Delta P (in.WC)	**ESTIMATED** Meter Temp Inlet (DegF)	Meter Temp Outlet (DegF)
1	314	-12.00	0.47	0.47	82	82
2	318	-11.00	0.49	0.49	82	82
3	322		0.48	0.48	82	82
4	324		0.46	0.46	83	82
5	327		0.45	0.45	83	82
6	325		0.48	0.48	83	82
7	323		0.47	0.47	83	82
8	325		0.49	0.49	83	82
9	323		0.46	0.46	83	82
10	320		0.46	0.46	83	82
11	327		0.49	0.49	85	83
12	326		0.52	0.52	85	83
13	325		0.48	0.48	86	84
14	325		0.43	0.43	86	84
15	327		0.41	0.41	88	84
16	325		0.49	0.49	88	84
17	327		0.53	0.53	88	84
18	326		0.54	0.54	87	84
19	323		0.47	0.47	87	86
20	320		0.44	0.44	87	86
21	324		0.45	0.45	87	86
22	325		0.42	0.42	87	86
23	327		0.42	0.42	87	86
24	326		0.46	0.46	88	86
25	328		0.49	0.49	88	86
26	325		0.48	0.48	88	86
27	327		0.44	0.44	89	86
28	323		0.42	0.42	89	86
29	322		0.43	0.43	89	87
30	320		0.44	0.44	89	87
AVG.	324	-11.50	0.47	0.47	85	

EPA METHOD 201A

PRELIMINARY TRAVERSE

ORIFICE HEAD, NOZZLE, AND DWELL TIME CALCULATIONS

RUN I.D. **PRE-U1O-M201A-R3**

ORIFICE HEAD DETERMINATION (dH)

TEMP. (°F)	CYCLONE FLOW (ft3/min)	ORIFICE HEAD (in. H2O)
324	0.586	**0.31**
274	0.540	0.30
374	0.633	0.32

Nre	=	2354

NOZZLE SIZE DETERMINATION

Min. dP from Traverse:	0.41
Max. dP from Traverse:	0.54
Average dP from Traverse:	0.47

dPmin and dPmax Calculations at Stack Temperature of **324**

Stack Gas Viscosity (micropoise)	220.552
Stack Gas Viscosity (micropoise) @ -50°F	208.988
Stack Gas Viscosity (micropoise) @ +50°F	231.901

D (calc. nozzle dia.)	**=**	**0.192**

Nozzle No.	**Dn** (in.)	**OPTIONAL NOZZLES**	**vn** (ft/s)	**Conditional Rmin Step 1**	**Conditional Rmin Step 2**	**vmin** (ft/s)	**Conditional Rmax**	**Conditional Rmax**	**vmax** (ft/s)	**dPmin** (in. H2O)	**dPmax** (in. H2O)
1	0.114		137.847	0.280	0.775	106.816	1.218	1.218	167.872	2.269	5.603
2	0.129		107.654	0.268	0.763	82.165	1.226	1.226	131.948	1.342	3.462
3	0.148		81.787	0.248	0.743	60.806	1.238	1.238	101.288	0.735	2.040
4	0.158		71.762	0.235	0.730	52.412	1.247	1.247	89.452	0.546	1.591
5	0.179	**OK**	55.912	0.202	0.695	38.870	1.267	1.267	70.826	0.300	0.997
6	0.191	**OK**	49.107	0.179	0.669	32.869	1.280	1.280	62.876	0.215	0.786
7	0.201	**OK**	44.342	0.158	0.644	28.539	1.293	1.293	57.333	0.162	0.654
8	0.230		33.865	0.084	0.536	18.145	1.336	1.336	45.232	0.065	0.407
9	0.253		27.988	0.010	0.347	9.722	1.376	1.376	38.517	0.019	0.295
10	0.274		23.862	-0.070	0.500	11.931	1.418	1.418	33.845	0.028	0.228
11	0.296		20.447	-0.168	0.500	10.223	1.468	1.468	30.009	0.021	0.179

DWELL TIME DETERMINATION

Dwell Time at Point 1 (T1) is: **2.01** minutes

TRAVERSE POINT DETERMINATION

DATA FROM PRELIMINARY TRAVERSE:

Average dP from Traverse: **0.47**

Run Number **U1O-M201A/202-R3**

Date	04/10/13	
Start Time	15:03	
End Time	16:03	
Stack Length	132	inches
Stack Width	105	inches
Nozzle I.D.	0.179	inches
Meter Box Gamma	0.9910	
Meter Box dH@	1.7473	
Barometric	29.96	in.Hg
Cp	0.84	
Test Duration	60.10	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	0.0	92.0	92.0
Impinger 2	0.0	0.0	0.0
Impinger 3	100.0	85.0	-15.0
Impinger 4			0.0
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Total	100.0	177.0	77.0
Silica gel (g)	250.0	264.4	14.4

METHOD 1-4 RESULTS

Metered Volume	19.711	dcf
Volume @ Std.Cond.	18.898	dscf
% Water	18.55	%
% Isokinetics	115.5	%
Velocity	47.81	ft/sec
Actual Flow	276113	acfm
Std. Flow	184057	scfm
Dry Std. Flow	149919	dscfm

METHOD 3 DATA

%O2	9.30	Md	29.95
%CO2	9.88	Ms	27.74
%CO	0.0	Ps	29.14
%N2	80.8	Fo	1.174
O2+CO2	19.2	%EA	77

POINT	Dwell Time (Min.)	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Iso (%)	Meter Temp. (Deg. F) Inlet	Meter Temp. (Deg. F) Outlet
1	2.0	317	-12.0	0.47	0.31	636.637	117.0	87	86
2	2.0	310	-12.0	0.45	0.31	637.3	108.3	87	86
3	1.9	312	-10.0	0.43	0.31	637.9	117.1	85	85
4	2.0	313	-11.0	0.46	0.31	638.5	125.4	86	85
5	2.0	310	-11.0	0.45	0.31	639.2	108.5	86	85
6	2.1	316	-11.0	0.49	0.31	639.8	116.0	86	85
7	2.1	309		0.50	0.31	640.5	114.3	86	85
8	2.0	310		0.47	0.31	641.2	106.2	86	85
9	2.1	312		0.49	0.31	641.8	115.5	87	86
10	2.1	314		0.50	0.31	642.5	114.5	87	86
11	2.1	308		0.51	0.31	643.2	112.9	87	86
12	2.1	311		0.53	0.31	643.9	95.1	87	86
13	2.0	313		0.46	0.31	644.5	107.3	87	86
14	1.9	310		0.42	0.31	645.1	137.5	88	86
15	1.9	313		0.40	0.31	645.8	141.2	88	86
16	1.9	312		0.43	0.31	646.5	136.1	88	86
17	2.0	314		0.47	0.31	647.2	106.2	88	86
18	2.0	310		0.48	0.31	647.8	122.2	88	86
19	2.0	312		0.45	0.31	648.5	108.3	88	86
20	1.9	307		0.44	0.31	649.1	134.1	88	86
21	2.0	313		0.46	0.31	649.8	107.2	88	86
22	2.0	315		0.47	0.31	650.4	123.9	88	86
23	1.9	309		0.44	0.31	651.1	114.9	89	87
24	2.0	310		0.45	0.31	651.7	126.0	89	87
25	2.0	308		0.45	0.31	652.4	107.9	89	87
26	2.1	312		0.52	0.31	653.0	111.8	89	87
27	2.2	310		0.54	0.31	653.7	104.5	90	87
28	1.9	310		0.43	0.31	654.4	116.2	90	87
29	2.0	314		0.46	0.31	655.0	124.8	90	87
30	1.9	308		0.43	0.31	655.7	125.3	90	87
						656.348			
AVG.		311	-11.17	0.47	0.31	19.711	116.9	87	

EPA METHOD 201A CALCULATIONS
PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 1 OUTLET
U1O-M201A/202-R3

C1	=	-150.3162	micropoise
C2	=	18.0614	micropoise/K^0.5
	=	13.4622	micropoise/R^0.5
C3	=	1.19183E+06	micropoise/K^2
	=	3.86153E+06	micropoise/R^2
C4	=	0.591123	micropoise
C5	=	91.9723	micropoise
C6	=	4.91705E-05	micropoise/K^2
	=	1.51761E-05	micropoise/R^2
Preliminary Data			
Ts	=	323.97	degrees F
Ts	=	783.97	degrees R
%O2, dry	=	8.84	%
%O2, wet	=	7.07	%
Bws	=	0.20	
Pbar	=	29.98	in. Hg
Pstatic	=	-11.50	in. H2O
Ps	=	29.13	in. Hg
Dp (for 2.25 micrometer cut size)	=	2.25	micrometers
Mw (same as Ms)	=	27.58	lb/lb-mole
Tm	=	84.98	degrees F
Tm	=	544.98	degrees R
Md	=	29.98	lb/lb-mole
ΔH@	=	1.7473	
Cp' (for Prelim.)	=	0.84	
Vs	=	48.35	ft/sec
μ	=	220.552	
C (for 2.25 micrometer cut size)	=	1.10	
D50LL (for Nre< 3162)	=	9.84	
D50T (for Nre< 3162)	=	10.42	
Qs (=QI for Nre< 3162)	=	0.586	
Nre	=	2354	
D50LL (for Nre >= 3162)	=	10.55	
D50T (for Nre >= 3162)	=	10.78	
Qs (=QI for Nre >= 3162)	=	0.559	
Sampling Rate ΔH	=	0.31	in. H2O
Sampling Rate ΔH @ Ts - 50 deg. F	=	0.30	in. H2O
Sampling Rate ΔH @ Ts + 50 deg. F	=	0.32	in. H2O
D (calc. nozzle dia.)	=	0.192	in.
D (actual selected)	=	0.179	in.
Vn	=	55.91	ft/sec
ΔPmin allowed	=	0.300	in. H2O
ΔPmax allowed	=	0.997	in. H2O
Dwell Time at Point 1 (T1) is:		2.01	min.
Actual Run Data			
Ts	=	311.40	degrees F
Ts	=	771.40	degrees R
%O2, dry	=	9.30	%
%O2, wet	=	7.58	%
Vwc	=	3.624	
Vsg	=	0.679	
Bws	=	0.1855	
Pbar	=	29.96	in. Hg
Pstatic	=	-11.17	in. H2O
Ps	=	29.14	in. Hg
Mw (same as Ms)	=	27.74	lb/lb-mole
Tm	=	86.90	degrees F
Tm	=	546.9	degrees R
Md	=	29.95	lb/lb-mole
Cp (for actual run)	=	0.84	
Meter Calibration Factor (Gamma)	=	0.9910	
Meter Box Delta H During Test	=	0.31	in. H2O
Meter Volume	=	19.711	dcf
Meter Volume at Std. Cond.	=	18.898	dscf
Avg. Sqare Root of Delta P	=	0.6815	
Velocity	=	47.81	ft/sec
Area of Nozzle	=	0.0001748	ft^2
Test Duration	=	60.1	min.
Isokinetics (rounded to nearest whole #)	=	116%	
No. of Points < 71% or > 129% Iso.	=	4	
Actual ΔPmin from run	=	0.40	in. H2O
Actual ΔPmax from run	=	0.54	in. H2O
Actual ΔPmin from run	=	0.40	in. H2O
Actual ΔPmax from run	=	0.54	in. H2O
No. of ΔPs outside of allowed range	=	0	
Recalculated μ	=	219.167	
Qs	=	0.579	acfm
D50 (for PM-10 cyclone I)	=	10.41	
Nre (actual test conditions)	=	2392	
C (where Dp = 2.5)	=	1.09	
D50 (for PM-2.5 cyclone IV)	=	2.47	
Cr	=	1.24	
D50-1	=	2.31	
Z	=	0.94	
Recalculated Cr	=	1.26	
Recalculated D50 (for cyclone IV)	=	2.30	
Recalculated D50-1	=	2.30	
Recalculated Z	=	1.00	

EPA Method 201A: Performance Criteria Calculations

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 1 OUTLET

Run Number	**U1O-M201A/202-R3**
Stack Gas Viscosity (micropoise)	220.552
Cyclone Flow Rate (dscf/min)	0.314
Cyclone Flow Rate (acfm)	0.579
D50	10.415

dPmin and dPmax Calculations and Performance:

Stack Gas Viscosity (micropoise)	219.167
Cyclone Flow Rate (acfm)	0.579
Vmstd - dscf	18.898
Sample Time - min	60.1
Ts	311.400
% O2	9.300
% Water	18.548
Vwc	3.624
Vsg	0.679
Ps	29.139
Mw	27.736
Cp	0.84
Nozzle Size(s) Used For Test:	0.179
Minimum dP During Test:	0.40
Maximum dP During Test:	0.54

Nozzle No.	Dn (in.)	vn (ft/s)	Conditional Step 1	Conditional Step 2	vmin (ft/s)	Conditional Rmax	Conditional Rmax	vmax (ft/s)	dPmin (in. H2O)	dPmax (in. H2O)	Acceptance Criteria	Nozzle Selection for Next Run
1	0.114	136.182	0.280	0.775	105.505	1.218	1.218	165.858	2.262	5.590		
2	0.129	106.353	0.268	0.763	81.149	1.226	1.226	130.369	1.338	3.454		
3	0.148	80.799	0.247	0.743	60.043	1.239	1.239	100.082	0.733	2.035		
4	0.158	70.895	0.234	0.730	51.748	1.247	1.247	88.390	0.544	1.588		
5	0.179	55.236	0.201	0.695	38.363	1.267	1.267	69.991	0.299	0.996	**OK**	**OK**
6	0.191	48.513	0.179	0.668	32.429	1.281	1.281	62.139	0.214	0.785		**OK**
7	0.201	43.806	0.157	0.643	28.146	1.293	1.293	56.663	0.161	0.652		**OK**
8	0.230	33.456	0.083	0.534	17.850	1.336	1.336	44.711	0.065	0.406		
9	0.253	27.650	0.009	0.338	9.356	1.377	1.377	38.078	0.018	0.295		
10	0.274	23.574	-0.072	0.500	11.787	1.420	1.420	33.463	0.028	0.228		
11	0.296	20.200	-0.171	0.500	10.100	1.469	1.469	29.674	0.021	0.179		

EPA Method 202: Gravimetric Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 1 OUTLET

SAMPLING DATA

Run number	**U1O-M201A/202-R3**
Corrected sample volume	18.898 dscf
	0.535 dscm
Corrected flow rate	149919 dscfm
O2 Content	9.30 %
CO2 Content	9.88 %

SUMMARY

COMPONENT	NET (grams)	CORRECTED FOR BLANK (grams)
FILTERABLE PM2.5		
Probe Wash	0.00090	0.00000
Filter	0.00100	0.00100
CONDENSIBLE PM2.5		
Inorganic CPM	0.00790	0.00609
Organic CPM	0.00800	0.00781
TOTAL CPM	0.01590	0.01390
TOTAL PM	0.01780	0.01490

ANALYTICAL DATA

METHOD 201A COMPONENTS	TARE (grams)	FINAL (grams)	NET (grams)	VOLUME (ml)
PM2.5 Acetone Probe Wash	65.3940	65.3949	0.00090	210
Acetone Blank Residue	67.9233	67.9245	0.00120	125
Applicable Acetone Blank			0.00202	
Max. Allowable Blank			0.00165	
Blank Value Used for Correction			0.00165	
Filter	0.3482	0.3492	0.00100	

METHOD 202 COMPONENTS	NET (grams)		Volume (mL)	CPM RATIO (%)
Inorganic CPM in Sample	0.00790		250	44.38%
Organic CPM in Sample	0.00800		202	55.62%
Inorganic CPM in Field Blank	0.00280		180	90.32%
Organic CPM in Field Blank	0.00040		240	9.68%
Total CPM in Field Blank	0.00420	*		
Max. Allowable Field Blank	0.00200			
Inorganic CPM Field Blank Value Used for Correction	0.00181	**		
Organic CPM Field Blank Value Used for Correction	0.00019	**		
Total CPM Field Blank Value Used for Correction	0.00200			

PM2.5 EMISSIONS

	FILTERABLE (FPM)	**Inorganic (CPM)**	**Organic (CPM)**	**Total (CPM)**	**TOTAL (FPM+CPM)**
Actual Grain Loading (gr/dscf)	0.0008	0.0050	0.0064	0.0114	0.0122
Corrected to 7% O2 (gr/dscf)	0.0010	0.0060	0.0076	0.0136	0.0146
Corrected to 12% CO2 (gr/dscf)	0.0010	0.0060	0.0077	0.0138	0.0148
Actual Grain Loading (mg/dscf)	1.87	11.39	14.59	25.97	27.84
Corrected to 7% O2 (mg/dscf)	2.24	13.64	17.48	31.12	33.36
Corrected to 12% CO2 (mg/dscf)	2.27	13.83	17.72	31.55	33.82
Mass Rate (lb/hr)	1.05	6.39	8.19	14.59	15.64

Notes

* The field blank value was corrected for the volume difference between the sample and the blank.
Field blank corrected value = actual value x sample volume over blank volume.

** If the Total CPM in Field Blank value is > 2 mg, then the inorganic and organic blank fractions were calculated by:
2 mg x CPM Ratio % of Uncorrected CPM in Field Blank (Inorganic or Organic, as applicable).

Appendix D.2

EPA Method 201A/202 Data and Results: Unit 2 FF Outlet

RUN NUMBER PRE-U2O-M201A-R1

Date	04/10/13	
Meter Box dH@	1.7473	
Barometric	29.95	in.Hg
Cp' (for Prelim.)	0.84	
Cp (for actual run)	0.84	
Test Duration	60	minutes

PM-2.5 fraction to be included (Y or N)?	Y
PM-10 fraction to be included? (Y or N)?	N

No. of Sample Points 30

METHOD 3 AND 4 DATA

%O2	11.0	
%CO2	8.00	
% Water	18.00	%

METHOD 2 RESULTS

Velocity	45.99	ft/sec

METHOD 3 DATA

		Md	29.72
		Ms	27.61
%CO	0.0	Ps	29.17
%N2	81.0	Fo	1.238
O2+CO2	19.0	%EA	106

Point	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Pitot Coefficient Adjusted Delta P (in.WC)	**ESTIMATED** Meter Temp Inlet (DegF)	Meter Temp Outlet (DegF)
1	293	-10.00	0.49	0.49	85	85
2	298	-12.00	0.48	0.48		
3	297	-11.00	0.42	0.42		
4	295	-11.00	0.42	0.42		
5	296	-10.00	0.32	0.32		
6	293	-10.00	0.47	0.47		
7	293		0.47	0.47		
8	295		0.48	0.48		
9	296		0.40	0.40		
10	294		0.36	0.36		
11	298		0.49	0.49		
12	296		0.49	0.49		
13	297		0.48	0.48		
14	299		0.44	0.44		
15	297		0.37	0.37		
16	293		0.47	0.47		
17	293		0.46	0.46		
18	295		0.45	0.45		
19	292		0.45	0.45		
20	292		0.38	0.38		
21	300		0.49	0.49		
22	300		0.49	0.49		
23	298		0.47	0.47		
24	295		0.43	0.43		
25	295		0.37	0.37		
26	295		0.45	0.45		
27	298		0.45	0.45		
28	294		0.42	0.42		
29	295		0.40	0.40		
30	293		0.39	0.39		
AVG.	296	-10.67	0.44	0.44	85	

EPA METHOD 201A

PRELIMINARY TRAVERSE

ORIFICE HEAD, NOZZLE, AND DWELL TIME CALCULATIONS

RUN I.D. **PRE-U2O-M201A-R1**

ORIFICE HEAD DETERMINATION (dH)

TEMP. (°F)	CYCLONE FLOW (ft3/min)	ORIFICE HEAD (in. H2O)
296	0.567	**0.33**
246	0.521	0.32
346	0.614	0.34

Nre	=	2409

NOZZLE SIZE DETERMINATION

Min. dP from Traverse:	0.32
Max. dP from Traverse:	0.49
Average dP from Traverse:	0.44

dPmin and dPmax Calculations at Stack Temperature of **296**

Stack Gas Viscosity (micropoise)	216.812
Stack Gas Viscosity (micropoise) @ -50°F	205.152
Stack Gas Viscosity (micropoise) @ +50°F	228.260

D (calc. nozzle dia.) = 0.194

Nozzle No.	Dn (in.)	OPTIONAL NOZZLES	vn (ft/s)	Conditional Rmin Step 1	Conditional Rmin Step 2	vmin (ft/s)	Conditional Rmax	Conditional Rmax	vmax (ft/s)	dPmin (in. H2O)	dPmax (in. H2O)
1	0.114		133.359	0.280	0.774	103.283	1.218	1.218	162.444	2.205	5.456
2	0.129		104.148	0.267	0.763	79.426	1.226	1.226	127.694	1.304	3.371
3	0.148		79.124	0.247	0.743	58.750	1.239	1.239	98.038	0.714	1.987
4	0.158		69.425	0.234	0.729	50.622	1.247	1.247	86.590	0.530	1.550
5	0.179	**OK**	54.091	0.200	0.693	37.503	1.268	1.268	68.576	0.291	0.972
6	0.191	**OK**	47.508	0.177	0.667	31.683	1.282	1.282	60.888	0.208	0.766
7	0.201	**OK**	42.898	0.156	0.641	27.480	1.294	1.294	55.527	0.156	0.637
8	0.230		32.762	0.081	0.530	17.349	1.338	1.338	43.826	0.062	0.397
9	0.253		27.076	0.006	0.320	8.669	1.379	1.379	37.333	0.016	0.288
10	0.274		23.085	-0.076	0.500	11.543	1.421	1.421	32.815	0.028	0.223
11	0.296		19.781	-0.176	0.500	9.890	1.471	1.471	29.106	0.020	0.175

DWELL TIME DETERMINATION

Dwell Time at Point 1 (T1) is: **2.12** minutes

TRAVERSE POINT DETERMINATION

DATA FROM PRELIMINARY TRAVERSE:

Average dP from Traverse: **0.44**

Run Number **U2O-M201A/202-R1**

Date	04/11/13	
Start Time	7:32	
End Time	8:38	
Stack Length	132	inches
Stack Width	105	inches
Nozzle I.D.	0.191	inches
Meter Box Gamma	0.991	
Meter Box dH@	1.7473	
Barometric	29.84	in.Hg
Cp	0.84	
Test Duration	66.30	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	0.0	90.0	90.0
Impinger 2	0.0	0.0	0.0
Impinger 3	100.0	93.0	-7.0
Impinger 4			0.0
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Total	100.0	183.0	83.0
Silica gel (g)	250.0	257.0	7.0

METHOD 1-4 RESULTS

Metered Volume	22.397	dcf
Volume @ Std.Cond.	21.895	dscf
% Water	16.21	%
% Isokinetics	109.0	%
Velocity	44.93	ft/sec
Actual Flow	259499	acfm
Std. Flow	174962	scfm
Dry Std. Flow	146594	dscfm

METHOD 3 DATA

%O2	9.98	Md	29.86
%CO2	9.16	Ms	27.94
%CO	0.0	Ps	29.12
%N2	80.9	Fo	1.192
O2+CO2	19.1	%EA	88

POINT	Dwell Time (Min.)	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Iso (%)	Meter Temp. (Deg. F) Inlet	Meter Temp. (Deg. F) Outlet
1	2.1	304	-10.0	0.38	0.33	667.676	101.0	72	72
2	2.2	304	-9.0	0.40	0.33	668.3	121.7	72	72
3	2.2	305	-10.0	0.43	0.33	669.1	88.0	73	72
4	2.2	305	-10.0	0.42	0.33	669.7	89.0	73	72
5	2.3	301	-10.0	0.44	0.33	670.3	96.7	74	72
6	2.2	302	-10.0	0.43	0.33	671.0	102.3	74	72
7	2.2	303		0.40	0.33	671.7	106.2	74	72
8	2.1	302		0.37	0.33	672.4	132.1	74	72
9	2.1	301		0.39	0.33	673.2	144.7	74	72
10	2.1	302		0.38	0.33	674.1	114.1	74	72
11	2.4	301		0.47	0.33	674.8	102.5	74	72
12	2.3	302		0.45	0.33	675.6	95.7	74	72
13	2.2	301		0.43	0.33	676.3	116.9	74	72
14	2.2	302		0.43	0.33	677.1	102.3	74	72
15	2.2	301		0.40	0.33	677.8	121.0	75	73
16	2.3	302		0.46	0.33	678.6	94.5	75	73
17	2.3	300		0.44	0.33	679.3	110.3	75	73
18	2.2	300		0.43	0.33	680.1	116.3	77	74
19	2.2	302		0.41	0.33	680.9	119.2	77	74
20	2.2	304		0.39	0.33	681.7	107.1	77	74
21	2.1	303		0.45	0.33	682.4	119.3	77	74
22	2.3	301		0.42	0.33	683.2	112.6	77	74
23	2.2	302		0.42	0.33	684.0	117.8	77	74
24	2.2	303		0.40	0.33	684.8	120.8	77	74
25	2.3	301		0.44	0.33	685.6	96.2	77	75
26	2.2	303		0.42	0.33	686.3	117.8	77	75
27	2.2	301		0.43	0.33	687.1	116.1	78	75
28	2.2	302		0.40	0.33	687.9	105.4	78	75
29	2.2	301		0.42	0.33	688.6	102.8	78	75
30	2.2	302		0.40	0.33	689.3	116.4	78	75
						690.073			
AVG.		302	-9.83	0.42	0.33	22.397	110.2	74	

EPA METHOD 201A CALCULATIONS
PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 2 OUTLET
U2O-M201A/202-R1

C1	=	-150.3162	micropoise
C2	=	18.0614	micropoise/K^0.5
	=	13.4622	micropoise/R^0.5
C3	=	1.19183E+06	micropoise/K^2
	=	3.86153E+06	micropoise/R^2
C4	=	0.591123	micropoise
C5	=	91.9723	micropoise
C6	=	4.91705E-05	micropoise/K^2
	=	1.51761E-05	micropoise/R^2
Preliminary Data			
Ts	=	295.50	degrees F
Ts	=	755.50	degrees R
%O2, dry	=	11.00	%
%O2, wet	=	9.02	%
Bws	=	0.18	
Pbar	=	29.95	in. Hg
Pstatic	=	-10.67	in. H2O
Ps	=	29.17	in. Hg
Dp (for 2.25 micrometer cut size)	=	2.25	micrometers
Mw (same as Ms)	=	27.61	lb/lb-mole
Tm	=	85.00	degrees F
Tm	=	545.00	degrees R
Md	=	29.72	lb/lb-mole
ΔH@	=	1.7473	
Cp' (for Prelim.)	=	0.84	
Vs	=	45.99	ft/sec
μ	=	216.812	
C (for 2.25 micrometer cut size)	=	1.10	
D50LL (for Nre< 3162)	=	9.91	
D50T (for Nre< 3162)	=	10.45	
Qs (=QI for Nre< 3162)	=	0.567	
Nre	=	2409	
D50LL (for Nre >= 3162)	=	10.56	
D50T (for Nre >= 3162)	=	10.78	
Qs (=QI for Nre >= 3162)	=	0.543	
Sampling Rate ΔH	=	0.33	in. H2O
Sampling Rate ΔH @ Ts - 50 deg. F	=	0.32	in. H2O
Sampling Rate ΔH @ Ts + 50 deg. F	=	0.34	in. H2O
D (calc. nozzle dia.)	=	0.194	in.
D (actual selected)	=	0.191	in.
Vn	=	47.50	ft/sec
ΔPmin allowed	=	0.208	in. H2O
ΔPmax allowed	=	0.766	in. H2O
Dwell Time at Point 1 (T1) is:		2.12	min.
Actual Run Data			
Ts	=	302.10	degrees F
Ts	=	762.10	degrees R
%O2, dry	=	9.98	%
%O2, wet	=	8.36	%
Vwc	=	3.907	
Vsg	=	0.330	
Bws	=	0.1621	
Pbar	=	29.84	in. Hg
Pstatic	=	-9.83	in. H2O
Ps	=	29.12	in. Hg
Mw (same as Ms)	=	27.94	lb/lb-mole
Tm	=	74.25	degrees F
Tm	=	534.3	degrees R
Md	=	29.86	lb/lb-mole
Cp (for actual run)	=	0.84	
Meter Calibration Factor (Gamma)	=	0.9910	
Meter Box Delta H During Test	=	0.33	in. H2O
Meter Volume	=	22.397	dcf
Meter Volume at Std. Cond.	=	21.895	dscf
Avg. Sqare Root of Delta P	=	0.6465	
Velocity	=	44.93	ft/sec
Area of Nozzle	=	0.0001990	ft^2
Test Duration	=	66.3	min.
Isokinetics (rounded to nearest whole #)	=	109%	
No. of Points < 71% or > 129% Iso.	=	2	
ΔPmin allowed	=	0.223	in. H2O
ΔPmax allowed	=	0.814	in. H2O
Actual ΔPmin from run	=	0.37	in. H2O
Actual ΔPmax from run	=	0.47	in. H2O
No. of ΔPs outside of allowed range	=	0	
Recalculated μ	=	219.432	
Qs	=	0.585	acfm
D50 (for PM-10 cyclone I)	=	10.31	
Nre (actual test conditions)	=	2457	
C (where Dp = 2.5)	=	1.09	
D50 (for PM-2.5 cyclone IV)	=	2.42	
Cr	=	1.24	
D50-1	=	2.26	
Z	=	0.94	
Recalculated Cr	=	1.26	
Recalculated D50 (for cyclone IV)	=	2.25	
Recalculated D50-1	=	2.25	
Recalculated Z	=	1.00	

EPA Method 201A: Performance Criteria Calculations

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 2 OUTLET

Run Number	**U2O-M201A/202-R1**
Stack Gas Viscosity (micropoise)	216.812
Cyclone Flow Rate (dscf/min)	0.330
Cyclone Flow Rate (acfm)	0.585
D50	10.314

dPmin and dPmax Calculations and Performance:

Stack Gas Viscosity (micropoise)	219.432
Cyclone Flow Rate (acfm)	0.585
Vmstd - dscf	21.895
Sample Time - min	66.3
Ts	302.100
% O2	9.980
% Water	16.213
Vwc	3.907
Vsg	0.330
Ps	29.117
Mw	27.941
Cp	0.84
Nozzle Size(s) Used For Test:	0.191
Minimum dP During Test:	0.37
Maximum dP During Test:	0.47

Nozzle No.	Dn (in.)	vn (ft/s)	Conditional Rmin Step 1	Conditional Rmin Step 2	vmin (ft/s)	Conditional Rmax Step 1	Conditional Rmax Step 2	vmax (ft/s)	dPmin (in. H2O)	dPmax (in. H2O)	Acceptance Criteria	Nozzle Selection for Next Run
1	0.114	137.465	0.280	0.775	106.528	1.218	1.218	167.401	2.350	5.802		
2	0.129	107.355	0.268	0.763	81.947	1.226	1.226	131.576	1.390	3.585		
3	0.148	81.560	0.248	0.744	60.649	1.238	1.238	101.000	0.762	2.112		
4	0.158	71.563	0.235	0.731	52.279	1.246	1.246	89.197	0.566	1.647		
5	0.179	55.757	0.202	0.695	38.778	1.267	1.267	70.622	0.311	1.033		**OK**
6	0.191	48.971	0.180	0.670	32.795	1.280	1.280	62.694	0.223	0.814	**OK**	**OK**
7	0.201	44.219	0.159	0.644	28.479	1.293	1.293	57.165	0.168	0.677		**OK**
8	0.230	33.771	0.085	0.537	18.125	1.335	1.335	45.097	0.068	0.421		
9	0.253	27.910	0.011	0.351	9.787	1.376	1.376	38.400	0.020	0.305		
10	0.274	23.796	-0.069	0.500	11.898	1.418	1.418	33.741	0.029	0.236		
11	0.296	20.390	-0.167	0.500	10.195	1.467	1.467	29.915	0.022	0.185		

EPA Method 202: Gravimetric Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 2 OUTLET

SAMPLING DATA

Run number	**U2O-M201A/202-R1**
Corrected sample volume	21.895 dscf
	0.620 dscm
Corrected flow rate	146594 dscfm
O2 Content	9.98 %
CO2 Content	9.16 %

SUMMARY

COMPONENT	NET (grams)	CORRECTED FOR BLANK (grams)
FILTERABLE PM2.5		
Probe Wash	0.00130	0.00000
Filter	0.00040	0.00040
CONDENSIBLE PM2.5		
Inorganic CPM	0.03240	0.03059
Organic CPM	0.00880	0.00861
TOTAL CPM	0.04120	0.03920
TOTAL PM	0.04290	0.03960

ANALYTICAL DATA

METHOD 201A COMPONENTS	TARE (grams)	FINAL (grams)	NET (grams)	VOLUME (ml)
PM2.5 Acetone Probe Wash	64.3671	64.3684	0.00130	230
Acetone Blank Residue	67.9233	67.9245	0.00120	125
Applicable Acetone Blank			0.00221	
Max. Allowable Blank			0.00180	
Blank Value Used for Correction			0.00180	
Filter	0.3469	0.3473	0.00040	

METHOD 202 COMPONENTS	NET (grams)		Volume (mL)	CPM RATIO (%)
Inorganic CPM in Sample	0.03240		250	79.04%
Organic CPM in Sample	0.00880		256	20.96%
Inorganic CPM in Field Blank	0.00280		180	90.32%
Organic CPM in Field Blank	0.00040		240	9.68%
Total CPM in Field Blank	0.00430	*		
Max. Allowable Field Blank	0.00200			
Inorganic CPM Field Blank Value Used for Correction	0.00181	**		
Organic CPM Field Blank Value Used for Correction	0.00019	**		
Total CPM Field Blank Value Used for Correction	0.00200			

PM2.5 EMISSIONS

	FILTERABLE (FPM)	**Inorganic (CPM)**	**Organic (CPM)**	**Total (CPM)**	**TOTAL (FPM+CPM)**
Actual Grain Loading (gr/dscf)	0.0003	0.0216	0.0061	0.0276	0.0279
Corrected to 7% O2 (gr/dscf)	0.0004	0.0274	0.0077	0.0352	0.0355
Corrected to 12% CO2 (gr/dscf)	0.0004	0.0282	0.0079	0.0362	0.0366
Actual Grain Loading (mg/dscm)	0.65	49.34	13.88	63.23	63.87
Corrected to 7% O2 (mg/dscm)	0.82	62.81	17.67	80.48	81.30
Corrected to 12% CO2 (mg/dscm)	0.85	64.64	18.19	82.83	83.67
Mass Rate (lb/hr)	0.35	27.09	7.62	34.72	35.07

Notes

* The field blank value was corrected for the volume difference between the sample and the blank.
Field blank corrected value = actual value x sample volume over blank volume.

** If the Total CPM in Field Blank value is > 2 mg, then the inorganic and organic blank fractions were calculated by:
2 mg x CPM Ratio % of Uncorrected CPM in Field Blank (Inorganic or Organic, as applicable).

RUN NUMBER PRE-U2O-M201A-R2

Date	04/11/13	
Start Time	7:32	
End Time	8:38	
Meter Box dH@	1.7473	
Barometric	29.84	in.Hg
Cp' (for Prelim.)	0.84	
Cp (for actual run)	0.84	
Test Duration	60	minutes

PM-2.5 fraction to be included (Y or N)?	Y
PM-10 fraction to be included? (Y or N)?	N

No. of Sample Points 30

METHOD 3 AND 4 DATA

%O2	9.98	
%CO2	9.16	
% Water	20.00	%

METHOD 2 RESULTS

Velocity	45.28	ft/sec

METHOD 3 DATA

		Md	29.86
		Ms	27.49
%CO	0.0	Ps	29.14
%N2	80.9	Fo	1.192
O2+CO2	19.1	%EA	88

Point	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Pitot Coefficient Adjusted Delta P (in.WC)	**ESTIMATED** Meter Temp Inlet (DegF)	Meter Temp Outlet (DegF)
1	304	-10.00	0.38	0.38	72	72
2	304	-9.00	0.40	0.40	72	72
3	305		0.43	0.43	73	72
4	305		0.42	0.42	73	72
5	301		0.44	0.44	74	72
6	302		0.43	0.43	74	72
7	303		0.40	0.40	74	72
8	302		0.37	0.37	74	72
9	301		0.39	0.39	74	72
10	302		0.38	0.38	74	72
11	301		0.47	0.47	74	72
12	302		0.45	0.45	74	72
13	301		0.43	0.43	74	72
14	302		0.43	0.43	74	72
15	301		0.40	0.40	75	73
16	302		0.46	0.46	75	73
17	300		0.44	0.44	75	73
18	300		0.43	0.43	77	74
19	302		0.41	0.41	77	74
20	304		0.39	0.39	77	74
21	303		0.45	0.45	77	74
22	301		0.42	0.42	77	74
23	302		0.42	0.42	77	74
24	303		0.40	0.40	77	74
25	301		0.44	0.44	77	75
26	303		0.42	0.42	77	75
27	301		0.43	0.43	78	75
28	302		0.40	0.40	78	75
29	301		0.42	0.42	78	75
30	302		0.40	0.40	78	75
AVG.	302	-9.50	0.42	0.42	74	

EPA METHOD 201A

PRELIMINARY TRAVERSE

ORIFICE HEAD, NOZZLE, AND DWELL TIME CALCULATIONS

RUN I.D. **PRE-U2O-M201A-R2**

ORIFICE HEAD DETERMINATION (dH)

TEMP. (°F)	CYCLONE FLOW (ft3/min)	ORIFICE HEAD (in. H2O)
302	0.568	**0.31**
252	0.522	0.30
352	0.615	0.32

Nre	=	2390

NOZZLE SIZE DETERMINATION

Min. dP from Traverse:	0.37
Max. dP from Traverse:	0.47
Average dP from Traverse:	0.42

dPmin and dPmax Calculations at Stack Temperature of **302**

Stack Gas Viscosity (micropoise)	216.060
Stack Gas Viscosity (micropoise) @ -50°F	204.405
Stack Gas Viscosity (micropoise) @ +50°F	227.503

D (calc. nozzle dia.)	**=**	**0.196**

Nozzle No.	**Dn** (in.)	**OPTIONAL NOZZLES**	**vn** (ft/s)	**Conditional Rmin Step 1**	**Conditional Rmin Step 2**	**vmin** (ft/s)	**Conditional Rmax**	**Conditional Rmax**	**vmax** (ft/s)	**dPmin** (in. H2O)	**dPmax** (in. H2O)
1	0.114		133.676	0.280	0.775	103.549	1.218	1.218	162.816	2.186	5.405
2	0.129		104.396	0.267	0.763	79.639	1.226	1.226	127.982	1.293	3.340
3	0.148		79.312	0.247	0.743	58.918	1.239	1.239	98.253	0.708	1.968
4	0.158		69.590	0.234	0.730	50.773	1.247	1.247	86.777	0.526	1.535
5	0.179	**OK**	54.220	0.201	0.694	37.629	1.267	1.267	68.719	0.289	0.963
6	0.191	**OK**	47.621	0.178	0.668	31.801	1.281	1.281	61.011	0.206	0.759
7	0.201	**OK**	43.000	0.157	0.642	27.593	1.294	1.294	55.636	0.155	0.631
8	0.230		32.840	0.082	0.532	17.466	1.337	1.337	43.906	0.062	0.393
9	0.253		27.141	0.007	0.331	8.988	1.378	1.378	37.396	0.016	0.285
10	0.274		23.140	-0.074	0.500	11.570	1.420	1.420	32.867	0.027	0.220
11	0.296		19.828	-0.173	0.500	9.914	1.470	1.470	29.148	0.020	0.173

DWELL TIME DETERMINATION

Dwell Time at Point 1 (T1) is: **1.91** minutes

TRAVERSE POINT DETERMINATION

DATA FROM PRELIMINARY TRAVERSE:

Average dP from Traverse: **0.42**

Run Number **U2O-M201A/202-R2**

Date	04/11/13	
Start Time	10:14	
End Time	11:14	
Stack Length	132	inches
Stack Width	105	inches
Nozzle I.D.	0.179	inches
Meter Box Gamma	0.9910	
Meter Box dH@	1.7473	
Barometric	29.86	in.Hg
Cp	0.84	
Test Duration	60.60	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	0.0	81.0	81.0
Impinger 2	0.0	0.0	0.0
Impinger 3	100.0	88.0	-12.0
Impinger 4			0.0
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Total	100.0	169.0	69.0
Silica gel (g)	250.0	263.1	13.1

METHOD 1-4 RESULTS

Metered Volume	20.157	dcf
Volume @ Std.Cond.	19.469	dscf
% Water	16.57	%
% Isokinetics	119.4	%
Velocity	45.59	ft/sec
Actual Flow	263289	acfm
Std. Flow	177634	scfm
Dry Std. Flow	148208	dscfm

METHOD 3 DATA

%O2	9.51	Md	29.91
%CO2	9.59	Ms	27.94
%CO	0.0	Ps	29.12
%N2	80.9	Fo	1.188
O2+CO2	19.1	%EA	80

	Dwell Time	Stack Temp.	Static Pressure	Delta P	Delta H	Meter Volume	Iso	Meter Temp. (Deg. F)	
POINT	(Min.)	(DegF)	(in.WC)	(in.WC)	(in.WC)	(dcf)	(%)	Inlet	Outlet
1	1.9	300	-9.00	0.38	0.31	692.737	135.4	77	77
2	2.1	302	-10.00	0.47	0.31	693.4	99.5	79	78
3	2.2	303	-10.00	0.49	0.31	694.0	124.0	79	79
4	2.0	303	-11.00	0.44	0.31	694.8	144.1	79	78
5	2.0	302	-10.00	0.41	0.31	695.6	111.9	79	78
6	2.0	301	-10.00	0.43	0.31	696.2	109.0	80	79
7	2.0	301		0.43	0.31	696.8	109.0	80	79
8	2.0	302		0.44	0.31	697.4	125.9	80	78
9	2.1	301		0.46	0.31	698.1	117.0	81	79
10	2.0	302		0.42	0.31	698.8	110.2	81	79
11	2.1	300		0.45	0.31	699.4	118.2	81	79
12	2.0	302		0.42	0.31	700.1	128.5	82	79
13	2.0	303		0.42	0.31	700.8	110.2	82	79
14	2.1	301		0.46	0.31	701.4	116.9	82	79
15	1.9	301		0.40	0.31	702.1	138.3	83	80
16	2.1	304		0.47	0.31	702.8	115.6	83	80
17	2.1	301		0.45	0.31	703.5	117.9	83	80
18	2.1	303		0.48	0.31	704.2	114.2	83	81
19	2.0	304		0.42	0.31	704.9	128.3	83	81
20	2.0	302		0.41	0.31	705.6	129.7	83	81
21	1.9	305		0.40	0.31	706.3	138.5	83	81
22	1.9	303		0.38	0.31	707.0	121.5	84	81
23	2.0	303		0.41	0.31	707.6	111.1	84	81
24	2.0	301		0.43	0.31	708.2	126.4	84	81
25	2.1	300		0.45	0.31	708.9	117.5	84	82
26	2.0	299		0.42	0.31	709.6	127.7	84	82
27	2.0	302		0.43	0.31	710.3	108.4	84	82
28	2.1	302		0.45	0.31	710.9	117.5	85	83
29	2.0	301		0.41	0.31	711.6	129.1	85	83
30	1.9	300		0.40	0.31	712.3	116.7	85	83
						712.894			
AVG.		302	-10.00	0.43	0.31	20.157	120.6	81	

EPA METHOD 201A CALCULATIONS
PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 2 OUTLET
U2O-M201A/202-R2

C1	=	-150.3162	micropoise
C2	=	18.0614	micropoise/K^0.5
	=	13.4622	micropoise/R^0.5
C3	=	1.19183E+06	micropoise/K^2
	=	3.86153E+06	micropoise/R^2
C4	=	0.591123	micropoise
C5	=	91.9723	micropoise
C6	=	4.91705E-05	micropoise/K^2
	=	1.51761E-05	micropoise/R^2
Preliminary Data			
Ts	=	302.10	degrees F
Ts	=	762.10	degrees R
%O2, dry	=	9.98	%
%O2, wet	=	7.98	%
Bws	=	0.20	
Pbar	=	29.84	in. Hg
Pstatic	=	-9.50	in. H2O
Ps	=	29.14	in. Hg
Dp (for 2.25 micrometer cut size)	=	2.25	micrometers
Mw (same as Ms)	=	27.49	lb/lb-mole
Tm	=	74.25	degrees F
Tm	=	534.25	degrees R
Md	=	29.86	lb/lb-mole
ΔH@	=	1.7473	
Cp' (for Prelim.)	=	0.84	
Vs	=	45.28	ft/sec
μ	=	216.060	
C (for 2.25 micrometer cut size)	=	1.10	
D50LL (for Nre< 3162)	=	9.88	
D50T (for Nre< 3162)	=	10.44	
Qs (=QI for Nre< 3162)	=	0.568	
Nre	=	2390	
D50LL (for Nre >= 3162)	=	10.56	
D50T (for Nre >= 3162)	=	10.78	
Qs (=QI for Nre >= 3162)	=	0.543	
Sampling Rate ΔH	=	0.31	in. H2O
Sampling Rate ΔH @ Ts - 50 deg. F	=	0.30	in. H2O
Sampling Rate ΔH @ Ts + 50 deg. F	=	0.32	in. H2O
D (calc. nozzle dia.)	=	0.196	in.
D (actual selected)	=	0.179	in.
Vn	=	54.22	ft/sec
ΔPmin allowed	=	0.289	in. H2O
ΔPmax allowed	=	0.963	in. H2O
Dwell Time at Point 1 (T1) is:		1.91	min.
Actual Run Data			
Ts	=	301.80	degrees F
Ts	=	761.80	degrees R
%O2, dry	=	9.51	%
%O2, wet	=	7.93	%
Vwc	=	3.248	
Vsg	=	0.618	
Bws	=	0.1657	
Pbar	=	29.86	in. Hg
Pstatic	=	-10.00	in. H2O
Ps	=	29.12	in. Hg
Mw (same as Ms)	=	27.94	lb/lb-mole
Tm	=	81.07	degrees F
Tm	=	541.1	degrees R
Md	=	29.91	lb/lb-mole
Cp (for actual run)	=	0.84	
Meter Calibration Factor (Gamma)	=	0.9910	
Meter Box Delta H During Test	=	0.31	in. H2O
Meter Volume	=	20.157	dcf
Meter Volume at Std. Cond.	=	19.469	dscf
Avg. Sqare Root of Delta P	=	0.6562	
Velocity	=	45.59	ft/sec
Area of Nozzle	=	0.0001748	ft^2
Test Duration	=	60.6	min.
Isokinetics (rounded to nearest whole #)	=	119%	
No. of Points < 71% or > 129% Iso.	=	5	
Actual ΔPmin from run	=	0.38	in. H2O
Actual ΔPmax from run	=	0.49	in. H2O
Actual ΔPmin from run	=	0.38	in. H2O
Actual ΔPmax from run	=	0.49	in. H2O
No. of ΔPs outside of allowed range	=	0	
Recalculated μ	=	218.818	
Qs	=	0.571	acfm
D50 (for PM-10 cyclone I)	=	10.47	
Nre (actual test conditions)	=	2407	
C (where Dp = 2.5)	=	1.09	
D50 (for PM-2.5 cyclone IV)	=	2.48	
Cr	=	1.24	
D50-1	=	2.33	
Z	=	0.94	
Recalculated Cr	=	1.25	
Recalculated D50 (for cyclone IV)	=	2.31	
Recalculated D50-1	=	2.31	
Recalculated Z	=	1.00	

EPA Method 201A: Performance Criteria Calculations

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 2 OUTLET

Run Number	**U2O-M201A/202-R2**
Stack Gas Viscosity (micropoise)	216.060
Cyclone Flow Rate (dscf/min)	0.321
Cyclone Flow Rate (acfm)	0.571
D50	10.469

dPmin and dPmax Calculations and Performance:

Stack Gas Viscosity (micropoise)	218.818
Cyclone Flow Rate (acfm)	0.571
Vmstd - dscf	19.469
Sample Time - min	60.6
Ts	301.800
% O2	9.510
% Water	16.566
Vwc	3.248
Vsg	0.618
Ps	29.125
Mw	27.941
Cp	0.84
Nozzle Size(s) Used For Test:	0.179
Minimum dP During Test:	0.38
Maximum dP During Test:	0.49

Nozzle No.	Dn (in.)	vn (ft/s)	Conditional Step 1	Conditional Step 2	vmin (ft/s)	Conditional Rmax	Conditional Rmax	vmax (ft/s)	dPmin (in. H2O)	dPmax (in. H2O)	Acceptance Criteria	Nozzle Selection for Next Run
1	0.114	134.207	0.280	0.774	103.930	1.218	1.218	163.484	2.238	5.538		
2	0.129	104.811	0.267	0.763	79.920	1.226	1.226	128.514	1.323	3.422		
3	0.148	79.627	0.247	0.742	59.110	1.239	1.239	98.670	0.724	2.017		
4	0.158	69.867	0.234	0.729	50.928	1.247	1.247	87.150	0.537	1.574		
5	0.179	54.435	0.200	0.693	37.722	1.268	1.268	69.022	0.295	0.987	**OK**	**OK**
6	0.191	47.810	0.177	0.666	31.863	1.282	1.282	61.286	0.210	0.778		**OK**
7	0.201	43.171	0.156	0.640	27.631	1.295	1.295	55.891	0.158	0.647		**OK**
8	0.230	32.971	0.080	0.528	17.421	1.338	1.338	44.117	0.063	0.403		
9	0.253	27.249	0.005	0.314	8.559	1.379	1.379	37.583	0.015	0.293		
10	0.274	23.232	-0.077	0.500	11.616	1.422	1.422	33.037	0.028	0.226		
11	0.296	19.907	-0.177	0.500	9.953	1.472	1.472	29.305	0.021	0.178		

EPA Method 202: Gravimetric Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 2 OUTLET

SAMPLING DATA

Run number	**U2O-M201A/202-R2**
Corrected sample volume	19.469 dscf
	0.551 dscm
Corrected flow rate	148208 dscfm
O2 Content	9.51 %
CO2 Content	9.59 %

SUMMARY

COMPONENT	NET (grams)	CORRECTED FOR BLANK (grams)
FILTERABLE PM2.5		
Probe Wash	0.00050	0.00000
Filter	0.00040	0.00040
CONDENSIBLE PM2.5		
Inorganic CPM	0.00360	0.00179
Organic CPM	0.00640	0.00621
TOTAL CPM	0.01000	0.00800
TOTAL PM	0.01090	0.00840

ANALYTICAL DATA

METHOD 201A COMPONENTS	TARE (grams)	FINAL (grams)	NET (grams)	VOLUME (ml)
PM2.5 Acetone Probe Wash	69.0587	69.0592	0.00050	260
Acetone Blank Residue	67.9233	67.9245	0.00120	125
Applicable Acetone Blank			0.00250	
Max. Allowable Blank			0.00204	
Blank Value Used for Correction			0.00204	
Filter	0.3559	0.3563	0.00040	

METHOD 202 COMPONENTS	NET (grams)		Volume (mL)	CPM RATIO (%)
Inorganic CPM in Sample	0.00360		240	32.56%
Organic CPM in Sample	0.00640		206	67.44%
Inorganic CPM in Field Blank	0.00280		180	90.32%
Organic CPM in Field Blank	0.00040		240	9.68%
Total CPM in Field Blank	0.00410	*		
Max. Allowable Field Blank	0.00200			
Inorganic CPM Field Blank Value Used for Correction	0.00181	**		
Organic CPM Field Blank Value Used for Correction	0.00019	**		
Total CPM Field Blank Value Used for Correction	0.00200			

PM2.5 EMISSIONS

	FILTERABLE (FPM)	**Inorganic (CPM)**	**Organic (CPM)**	**Total (CPM)**	**TOTAL (FPM+CPM)**
Actual Grain Loading (gr/dscf)	0.0003	0.0014	0.0049	0.0063	0.0067
Corrected to 7% O2 (gr/dscf)	0.0004	0.0017	0.0060	0.0077	0.0081
Corrected to 12% CO2 (gr/dscf)	0.0004	0.0018	0.0062	0.0079	0.0083
Actual Grain Loading (mg/dscf)	0.73	3.25	11.26	14.51	15.24
Corrected to 7% O2 (mg/dscf)	0.89	3.97	13.74	17.71	18.59
Corrected to 12% CO2 (mg/dscf)	0.91	4.07	14.09	18.16	19.07
Mass Rate (lb/hr)	0.40	1.81	6.25	8.06	8.46

Notes

* The field blank value was corrected for the volume difference between the sample and the blank.
Field blank corrected value = actual value x sample volume over blank volume.

** If the Total CPM in Field Blank value is > 2 mg, then the inorganic and organic blank fractions were calculated by:
2 mg x CPM Ratio % of Uncorrected CPM in Field Blank (Inorganic or Organic, as applicable).

RUN NUMBER PRE-U2O-M201A-R3

Date	04/11/13	
Start Time	10:14	
End Time	11:14	
Meter Box dH@	1.7473	
Barometric	29.86	in.Hg
Cp' (for Prelim.)	0.84	
Cp (for actual run)	0.84	
Test Duration	60	minutes

PM-2.5 fraction to be included (Y or N)?	Y
PM-10 fraction to be included? (Y or N)?	N

No. of Sample Points 30

METHOD 3 AND 4 DATA

%O2	9.51	
%CO2	9.59	
% Water	20.00	%

METHOD 2 RESULTS

Velocity 45.90 ft/sec

METHOD 3 DATA

		Md	29.91
		Ms	27.53
%CO	0.0	Ps	29.16
%N2	80.9	Fo	1.188
O2+CO2	19.1	%EA	80

Point	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Pitot Coefficient Adjusted Delta P (in.WC)	**ESTIMATED** Meter Temp Inlet (DegF)	Meter Temp Outlet (DegF)
1	300	-9.00	0.38	0.38	77	77
2	302	-10.00	0.47	0.47	79	78
3	303		0.49	0.49	79	79
4	303		0.44	0.44	79	78
5	302		0.41	0.41	79	78
6	301		0.43	0.43	80	79
7	301		0.43	0.43	80	79
8	302		0.44	0.44	80	78
9	301		0.46	0.46	81	79
10	302		0.42	0.42	81	79
11	300		0.45	0.45	81	79
12	302		0.42	0.42	82	79
13	303		0.42	0.42	82	79
14	301		0.46	0.46	82	79
15	301		0.40	0.40	83	80
16	304		0.47	0.47	83	80
17	301		0.45	0.45	83	80
18	303		0.48	0.48	83	81
19	304		0.42	0.42	83	81
20	302		0.41	0.41	83	81
21	305		0.40	0.40	83	81
22	303		0.38	0.38	84	81
23	303		0.41	0.41	84	81
24	301		0.43	0.43	84	81
25	300		0.45	0.45	84	82
26	299		0.42	0.42	84	82
27	302		0.43	0.43	84	82
28	302		0.45	0.45	85	83
29	301		0.41	0.41	85	83
30	300		0.40	0.40	85	83
AVG.	302	-9.50	0.43	0.43	81	

EPA METHOD 201A

PRELIMINARY TRAVERSE

ORIFICE HEAD, NOZZLE, AND DWELL TIME CALCULATIONS

RUN I.D. **PRE-U2O-M201A-R3**

ORIFICE HEAD DETERMINATION (dH)

TEMP. (°F)	CYCLONE FLOW (ft3/min)	ORIFICE HEAD (in. H2O)
302	0.567	**0.31**
252	0.521	0.30
352	0.614	0.32

Nre	=	2393

NOZZLE SIZE DETERMINATION

Min. dP from Traverse:	0.38
Max. dP from Traverse:	0.49
Average dP from Traverse:	0.43

dPmin and dPmax Calculations at Stack Temperature of **302**

Stack Gas Viscosity (micropoise)	215.768
Stack Gas Viscosity (micropoise) @ -50°F	204.112
Stack Gas Viscosity (micropoise) @ +50°F	227.213

D (calc. nozzle dia.)	**=**	**0.194**

Nozzle No.	**Dn** (in.)	**OPTIONAL NOZZLES**	**vn** (ft/s)	**Conditional Rmin Step 1**	**Conditional Rmin Step 2**	**vmin** (ft/s)	**Conditional Rmax**	**Conditional Rmax**	**vmax** (ft/s)	**dPmin** (in. H2O)	**dPmax** (in. H2O)
1	0.114		133.358	0.280	0.775	103.299	1.218	1.218	162.432	2.181	5.393
2	0.129		104.148	0.267	0.763	79.445	1.226	1.226	127.680	1.290	3.332
3	0.148		79.123	0.247	0.743	58.773	1.239	1.239	98.023	0.706	1.964
4	0.158		69.425	0.234	0.730	50.647	1.247	1.247	86.574	0.524	1.532
5	0.179	**OK**	54.091	0.201	0.694	37.533	1.267	1.267	68.559	0.288	0.961
6	0.191	**OK**	47.507	0.178	0.668	31.718	1.281	1.281	60.870	0.206	0.757
7	0.201	**OK**	42.898	0.157	0.642	27.519	1.294	1.294	55.508	0.155	0.630
8	0.230		32.762	0.082	0.531	17.411	1.337	1.337	43.806	0.062	0.392
9	0.253		27.076	0.007	0.329	8.917	1.378	1.378	37.311	0.016	0.285
10	0.274		23.085	-0.074	0.500	11.542	1.421	1.421	32.793	0.027	0.220
11	0.296		19.781	-0.174	0.500	9.890	1.470	1.470	29.083	0.020	0.173

DWELL TIME DETERMINATION

Dwell Time at Point 1 (T1) is: **1.88** minutes

TRAVERSE POINT DETERMINATION

DATA FROM PRELIMINARY TRAVERSE:

Average dP from Traverse: **0.43**

Run Number **U2O-M201A/202-R3**

Date	04/11/13	
Start Time	12:08	
End Time	13:08	
Stack Length	132	inches
Stack Width	105	inches
Nozzle I.D.	0.179	inches
Meter Box Gamma	0.9910	
Meter Box dH@	1.7473	
Barometric	29.87	in.Hg
Cp	0.84	
Test Duration	60.30	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	0.0	77.0	77.0
Impinger 2	0.0	1.0	1.0
Impinger 3	100.0	96.0	-4.0
Impinger 4			0.0
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Total	100.0	174.0	74.0
Silica gel (g)	250.0	266.3	16.3

METHOD 1-4 RESULTS

Metered Volume	20.184	dcf
Volume @ Std.Cond.	19.308	dscf
% Water	18.05	%
% Isokinetics	120.2	%
Velocity	46.09	ft/sec
Actual Flow	266193	acfm
Std. Flow	179000	scfm
Dry Std. Flow	146697	dscfm

METHOD 3 DATA

%O2	9.81	Md	29.90
%CO2	9.44	Ms	27.75
%CO	0.0	Ps	29.12
%N2	80.8	Fo	1.175
O2+CO2	19.3	%EA	85

	Dwell Time	Stack Temp.	Static Pressure	Delta P	Delta H	Meter Volume	Iso	Meter Temp. (Deg. F)	
POINT	(Min.)	(DegF)	(in.WC)	(in.WC)	(in.WC)	(dcf)	(%)	Inlet	Outlet
1	1.9	302	-10.0	0.38	0.31	718.174	108.7	86	84
2	1.9	303	-11.0	0.40	0.31	718.7	139.5	87	84
3	2.0	302	-11.0	0.42	0.31	719.4	110.8	87	84
4	2.0	304	-9.0	0.44	0.31	720.0	126.6	86	84
5	2.0	302	-10.0	0.43	0.31	720.7	127.8	86	84
6	2.1	302	-10.0	0.44	0.31	721.4	120.4	86	84
7	2.0	309		0.42	0.31	722.1	130.0	86	84
8	2.1	310		0.47	0.31	722.8	117.1	86	84
9	1.9	307		0.41	0.31	723.5	118.4	87	84
10	2.0	303		0.43	0.31	724.1	127.7	87	85
11	2.0	304		0.45	0.31	724.8	107.1	87	85
12	2.1	303		0.46	0.31	725.4	117.6	87	85
13	2.0	304		0.43	0.31	726.1	127.8	87	85
14	2.0	304		0.42	0.31	726.8	129.2	88	85
15	1.9	303		0.40	0.31	727.5	139.2	88	85
16	2.2	305		0.51	0.31	728.2	106.6	88	85
17	2.1	303		0.48	0.31	728.9	115.0	88	85
18	2.0	306		0.45	0.31	729.6	125.0	88	85
19	2.0	303		0.44	0.31	730.3	125.9	89	86
20	2.1	300		0.46	0.31	731.0	117.0	89	86
21	2.1	302		0.47	0.31	731.7	115.9	89	86
22	2.2	305		0.52	0.31	732.4	105.5	88	86
23	2.0	307		0.45	0.31	733.1	107.1	88	86
24	2.0	308		0.44	0.31	733.7	126.4	88	86
25	1.9	305		0.40	0.31	734.4	119.4	88	86
26	1.9	303		0.38	0.31	735.0	122.3	88	86
27	2.0	305		0.43	0.31	735.6	127.3	90	87
28	1.9	307		0.40	0.31	736.3	139.1	90	87
29	2.0	304		0.42	0.31	737.0	110.3	90	87
30	2.0	303		0.44	0.31	737.6	136.1	90	87
						738.358			
AVG.		304	-10.17	0.44	0.31	20.184	121.6	86	

EPA METHOD 201A CALCULATIONS
PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 2 OUTLET
U2O-M201A/202-R3

C1	=	-150.3162	micropoise
C2	=	18.0614	micropoise/K^0.5
	=	13.4622	micropoise/R^0.5
C3	=	1.19183E+06	micropoise/K^2
	=	3.86153E+06	micropoise/R^2
C4	=	0.591123	micropoise
C5	=	91.9723	micropoise
C6	=	4.91705E-05	micropoise/K^2
	=	1.51761E-05	micropoise/R^2
Preliminary Data			
Ts	=	301.80	degrees F
Ts	=	761.80	degrees R
%O2, dry	=	9.51	%
%O2, wet	=	7.61	%
Bws	=	0.20	
Pbar	=	29.86	in. Hg
Pstatic	=	-9.50	in. H2O
Ps	=	29.16	in. Hg
Dp (for 2.25 micrometer cut size)	=	2.25	micrometers
Mw (same as Ms)	=	27.53	lb/lb-mole
Tm	=	81.07	degrees F
Tm	=	541.07	degrees R
Md	=	29.91	lb/lb-mole
ΔH@	=	1.7473	
Cp' (for Prelim.)	=	0.84	
Vs	=	45.90	ft/sec
μ	=	215.768	
C (for 2.25 micrometer cut size)	=	1.10	
D50LL (for Nre< 3162)	=	9.88	
D50T (for Nre< 3162)	=	10.44	
Qs (=QI for Nre< 3162)	=	0.567	
Nre	=	2393	
D50LL (for Nre >= 3162)	=	10.56	
D50T (for Nre >= 3162)	=	10.78	
Qs (=QI for Nre >= 3162)	=	0.542	
Sampling Rate ΔH	=	0.31	in. H2O
Sampling Rate ΔH @ Ts - 50 deg. F	=	0.30	in. H2O
Sampling Rate ΔH @ Ts + 50 deg. F	=	0.32	in. H2O
D (calc. nozzle dia.)	=	0.194	in.
D (actual selected)	=	0.179	in.
Vn	=	54.09	ft/sec
ΔPmin allowed	=	0.288	in. H2O
ΔPmax allowed	=	0.961	in. H2O
Dwell Time at Point 1 (T1) is:		1.88	min.
Actual Run Data			
Ts	=	304.27	degrees F
Ts	=	764.27	degrees R
%O2, dry	=	9.81	%
%O2, wet	=	8.04	%
Vwc	=	3.483	
Vsg	=	0.769	
Bws	=	0.1805	
Pbar	=	29.87	in. Hg
Pstatic	=	-10.17	in. H2O
Ps	=	29.12	in. Hg
Mw (same as Ms)	=	27.75	lb/lb-mole
Tm	=	86.48	degrees F
Tm	=	546.5	degrees R
Md	=	29.90	lb/lb-mole
Cp (for actual run)	=	0.84	
Meter Calibration Factor (Gamma)	=	0.9910	
Meter Box Delta H During Test	=	0.31	in. H2O
Meter Volume	=	20.184	dcf
Meter Volume at Std. Cond.	=	19.308	dscf
Avg. Sqare Root of Delta P	=	0.6601	
Velocity	=	46.09	ft/sec
Area of Nozzle	=	0.0001748	ft^2
Test Duration	=	60.3	min.
Isokinetics (rounded to nearest whole #)	=	120%	
No. of Points < 71% or > 129% Iso.	=	5	
Actual ΔPmin from run	=	0.38	in. H2O
Actual ΔPmax from run	=	0.52	in. H2O
Actual ΔPmin from run	=	0.38	in. H2O
Actual ΔPmax from run	=	0.52	in. H2O
No. of ΔPs outside of allowed range	=	0	
Recalculated μ	=	218.217	
Qs	=	0.581	acfm
D50 (for PM-10 cyclone I)	=	10.34	
Nre (actual test conditions)	=	2433	
C (where Dp = 2.5)	=	1.09	
D50 (for PM-2.5 cyclone IV)	=	2.43	
Cr	=	1.24	
D50-1	=	2.28	
Z	=	0.94	
Recalculated Cr	=	1.26	
Recalculated D50 (for cyclone IV)	=	2.26	
Recalculated D50-1	=	2.26	
Recalculated Z	=	1.00	

EPA Method 201A: Performance Criteria Calculations

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 2 OUTLET

Run Number	**U2O-M201A/202-R3**
Stack Gas Viscosity (micropoise)	215.768
Cyclone Flow Rate (dscf/min)	0.320
Cyclone Flow Rate (acfm)	0.581
D50	10.338

dPmin and dPmax Calculations and Performance:

Stack Gas Viscosity (micropoise)	218.217
Cyclone Flow Rate (acfm)	0.581
Vmstd - dscf	19.308
Sample Time - min	60.3
Ts	304.267
% O2	9.810
% Water	18.046
Vwc	3.483
Vsg	0.769
Ps	29.122
Mw	27.755
Cp	0.84
Nozzle Size(s) Used For Test:	0.179
Minimum dP During Test:	0.38
Maximum dP During Test:	0.52

Nozzle No.	Dn (in.)	vn (ft/s)	Conditional Step 1	Conditional Step 2	vmin (ft/s)	Conditional Rmax	Conditional Rmax	vmax (ft/s)	dPmin (in. H2O)	dPmax (in. H2O)	Acceptance Criteria	Nozzle Selection for Next Run
1	0.114	136.630	0.280	0.775	105.879	1.218	1.218	166.385	2.300	5.679		
2	0.129	106.703	0.268	0.763	81.447	1.226	1.226	130.778	1.361	3.508		
3	0.148	81.065	0.248	0.744	60.278	1.238	1.238	100.388	0.745	2.067		
4	0.158	71.128	0.235	0.730	51.958	1.246	1.246	88.657	0.554	1.612		
5	0.179	55.418	0.202	0.695	38.539	1.267	1.267	70.195	0.305	1.011	**OK**	**OK**
6	0.191	48.673	0.180	0.670	32.592	1.280	1.280	62.315	0.218	0.797		**OK**
7	0.201	43.950	0.159	0.644	28.302	1.293	1.293	56.820	0.164	0.662		**OK**
8	0.230	33.566	0.085	0.536	18.008	1.335	1.335	44.826	0.067	0.412		
9	0.253	27.741	0.011	0.350	9.707	1.376	1.376	38.169	0.019	0.299		
10	0.274	23.651	-0.069	0.500	11.826	1.418	1.418	33.538	0.029	0.231		
11	0.296	20.266	-0.167	0.500	10.133	1.467	1.467	29.736	0.021	0.181		

EPA Method 202: Gravimetric Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 2 OUTLET

SAMPLING DATA

Run number	**U2O-M201A/202-R3**
Corrected sample volume	19.308 dscf
	0.547 dscm
Corrected flow rate	146697 dscfm
O2 Content	9.81 %
CO2 Content	9.44 %

SUMMARY

COMPONENT	NET (grams)	CORRECTED FOR BLANK (grams)
FILTERABLE PM2.5		
Probe Wash	0.00070	0.00000
Filter	0.00050	0.00050
CONDENSIBLE PM2.5		
Inorganic CPM	0.00430	0.00249
Organic CPM	0.00870	0.00851
TOTAL CPM	0.01300	0.01100
TOTAL PM	0.01420	0.01150

ANALYTICAL DATA

METHOD 201A COMPONENTS	TARE (grams)	FINAL (grams)	NET (grams)	VOLUME (ml)
PM2.5 Acetone Probe Wash	63.9044	63.9051	0.00070	120
Acetone Blank Residue	67.9233	67.9245	0.00120	125
Applicable Acetone Blank			0.00115	
Max. Allowable Blank			0.00094	
Blank Value Used for Correction			0.00094	
Filter	0.3586	0.3591	0.00050	

METHOD 202 COMPONENTS	NET (grams)		Volume (mL)	CPM RATIO (%)
Inorganic CPM in Sample	0.00430		250	29.73%
Organic CPM in Sample	0.00870		214	70.27%
Inorganic CPM in Field Blank	0.00280		180	90.32%
Organic CPM in Field Blank	0.00040		240	9.68%
Total CPM in Field Blank	0.00420	*		
Max. Allowable Field Blank	0.00200			
Inorganic CPM Field Blank Value Used for Correction	0.00181	**		
Organic CPM Field Blank Value Used for Correction	0.00019	**		
Total CPM Field Blank Value Used for Correction	0.00200			

PM2.5 EMISSIONS

	FILTERABLE (FPM)	**Inorganic (CPM)**	**Organic (CPM)**	**Total (CPM)**	**TOTAL (FPM+CPM)**
Actual Grain Loading (gr/dscf)	0.0004	0.0020	0.0068	0.0088	0.0092
Corrected to 7% O2 (gr/dscf)	0.0005	0.0025	0.0085	0.0110	0.0115
Corrected to 12% CO2 (gr/dscf)	0.0005	0.0025	0.0086	0.0112	0.0117
Actual Grain Loading (mg/dscf)	0.91	4.56	15.56	20.12	21.03
Corrected to 7% O2 (mg/dscf)	1.15	5.72	19.50	25.22	26.36
Corrected to 12% CO2 (mg/dscf)	1.16	5.80	19.78	25.57	26.74
Mass Rate (lb/hr)	0.50	2.51	8.55	11.05	11.56

Notes

* The field blank value was corrected for the volume difference between the sample and the blank.
Field blank corrected value = actual value x sample volume over blank volume.

** If the Total CPM in Field Blank value is > 2 mg, then the inorganic and organic blank fractions were calculated by:
2 mg x CPM Ratio % of Uncorrected CPM in Field Blank (Inorganic or Organic, as applicable).

Appendix D.3

EPA Method 201A/202 Data and Results: Unit 3 FF Outlet

RUN NUMBER PRE-U3O-M201A-R1

Date	04/09/13	
Meter Box dH@	1.7473	
Barometric	30.02	in.Hg
Cp' (for Prelim.)	0.84	
Cp (for actual run)	0.84	
Test Duration	60	minutes

PM-2.5 fraction to be included (Y or N)?	Y
PM-10 fraction to be included? (Y or N)?	N

No. of Sample Points 30

METHOD 3 AND 4 DATA

%O2	10.0	
%CO2	10.00	
% Water	16.00	%

METHOD 2 RESULTS

Velocity 50.32 ft/sec

METHOD 3 DATA

		Md	30.00
		Ms	28.08
%CO	0.0	Ps	29.10
%N2	80.0	Fo	1.090
O2+CO2	20.0	%EA	90

Point	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Pitot Coefficient Adjusted Delta P (in.WC)	**ESTIMATED** Meter Temp Inlet (DegF)	Meter Temp Outlet (DegF)
1	305	-13.00	0.52	0.52	85	85
2	308	-11.00	0.51	0.51		
3	304	-14.00	0.56	0.56		
4	305	-12.00	0.55	0.55		
5	303	-12.00	0.52	0.52		
6	304	-13.00	0.50	0.50		
7	303		0.51	0.51		
8	304		0.54	0.54		
9	305		0.53	0.53		
10	303		0.54	0.54		
11	306		0.54	0.54		
12	305		0.52	0.52		
13	304		0.51	0.51		
14	303		0.56	0.56		
15	305		0.52	0.52		
16	300		0.55	0.55		
17	304		0.56	0.56		
18	300		0.53	0.53		
19	300		0.52	0.52		
20	301		0.52	0.52		
21	297		0.55	0.55		
22	303		0.53	0.53		
23	300		0.56	0.56		
24	300		0.46	0.46		
25	296		0.55	0.55		
26	299		0.43	0.43		
27	302		0.54	0.54		
28	303		0.56	0.56		
29	300		0.49	0.49		
30	300		0.52	0.52		
AVG.	302	-12.50	0.53	0.53	85	

EPA METHOD 201A

PRELIMINARY TRAVERSE

ORIFICE HEAD, NOZZLE, AND DWELL TIME CALCULATIONS

RUN I.D. **PRE-U3O-M201A-R1**

ORIFICE HEAD DETERMINATION (dH)

TEMP. (°F)	CYCLONE FLOW (ft3/min)	ORIFICE HEAD (in. H2O)
302	0.573	**0.35**
252	0.527	0.34
352	0.620	0.36

Nre	=	2416

NOZZLE SIZE DETERMINATION

Min. dP from Traverse:	0.43
Max. dP from Traverse:	0.56
Average dP from Traverse:	0.53

dPmin and dPmax Calculations at Stack Temperature of **302**

Stack Gas Viscosity (micropoise)	219.701
Stack Gas Viscosity (micropoise) @ -50°F	208.092
Stack Gas Viscosity (micropoise) @ +50°F	231.095

D (calc. nozzle dia.)	**=**	**0.187**

Nozzle No.	**Dn** (in.)	**OPTIONAL NOZZLES**	**vn** (ft/s)	**Conditional Rmin Step 1**	**Conditional Rmin Step 2**	**vmin** (ft/s)	**Conditional Rmax**	**Conditional Rmax**	**vmax** (ft/s)	**dPmin** (in. H2O)	**dPmax** (in. H2O)
1	0.114		134.787	0.280	0.774	104.380	1.218	1.218	164.190	2.265	5.604
2	0.129		105.264	0.267	0.763	80.266	1.226	1.226	129.068	1.339	3.463
3	0.148		79.971	0.247	0.742	59.366	1.239	1.239	99.095	0.733	2.041
4	0.158		70.169	0.234	0.729	51.150	1.247	1.247	87.526	0.544	1.593
5	0.179	**OK**	54.670	0.200	0.693	37.887	1.268	1.268	69.320	0.298	0.999
6	0.191	**OK**	48.017	0.177	0.666	32.003	1.282	1.282	61.549	0.213	0.788
7	0.201	**OK**	43.358	0.156	0.640	27.753	1.295	1.295	56.131	0.160	0.655
8	0.230		33.113	0.080	0.528	17.500	1.338	1.338	44.306	0.064	0.408
9	0.253		27.366	0.005	0.315	8.613	1.379	1.379	37.744	0.015	0.296
10	0.274		23.332	-0.077	0.500	11.666	1.422	1.422	33.179	0.028	0.229
11	0.296		19.993	-0.177	0.500	9.996	1.472	1.472	29.430	0.021	0.180

DWELL TIME DETERMINATION

Dwell Time at Point 1 (T1) is: **1.99** minutes

TRAVERSE POINT DETERMINATION

DATA FROM PRELIMINARY TRAVERSE:

Average dP from Traverse: **0.53**

Run Number **U3O-M201A/202-R1**

Date	04/09/13	
Start Time	11:56	
End Time	12:58	
Stack Length	132	inches
Stack Width	105	inches
Nozzle I.D.	0.179	inches
Meter Box Gamma	0.991	
Meter Box dH@	1.7473	
Barometric	30.04	in.Hg
Cp	0.84	
Test Duration	57.50	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	0.0	86.0	86.0
Impinger 2	0.0	10.0	10.0
Impinger 3	100.0	89.0	-11.0
Impinger 4			0.0
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Total	100.0	185.0	85.0
Silica gel (g)	250.0	262.7	12.7

METHOD 1-4 RESULTS

Metered Volume	18.528	dcf
Volume @ Std.Cond.	17.918	dscf
% Water	20.43	%
% Isokinetics	110.7	%
Velocity	50.50	ft/sec
Actual Flow	291622	acfm
Std. Flow	194778	scfm
Dry Std. Flow	154991	dscfm

METHOD 3 DATA

%O2	9.57	Md	29.96
%CO2	9.84	Ms	27.51
%CO	0.0	Ps	29.13
%N2	80.6	Fo	1.151
O2+CO2	19.4	%EA	82

POINT	Dwell Time (Min.)	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Delta H (in.WC)	Meter Volume (dcf)	Iso (%)	Meter Temp. (Deg. F) Inlet	Meter Temp. (Deg. F) Outlet
1	2.0	303	-12.0	0.55	0.35	517.799	102.0	75	75
2	2.0	304	-13.0	0.53	0.35	518.4	120.5	78	78
3	1.9	309	-12.0	0.52	0.35	519.1	109.4	82	81
4	1.9	310	-11.0	0.50	0.35	519.7	111.5	83	81
5	1.9	310	-12.0	0.51	0.35	520.3	110.4	83	81
6	2.0	308	-14.0	0.56	0.35	520.9	100.0	83	81
7	1.9	302		0.51	0.35	521.5	127.9	84	82
8	1.9	310		0.52	0.35	522.2	127.3	84	82
9	1.9	316		0.54	0.35	522.9	125.4	84	82
10	2.0	320		0.53	0.35	523.6	103.3	85	82
11	1.9	312		0.50	0.35	524.2	111.3	85	82
12	1.9	310		0.52	0.35	524.8	109.0	85	82
13	2.0	315		0.55	0.35	525.4	101.0	85	83
14	1.9	308		0.49	0.35	526.0	112.0	86	83
15	2.0	307		0.57	0.35	526.6	98.6	86	83
16	1.9	310		0.50	0.35	527.2	111.0	86	83
17	1.8	313		0.47	0.35	527.8	121.1	86	83
18	1.9	308		0.52	0.35	528.4	108.6	87	83
19	1.8	307		0.46	0.35	529.0	121.8	87	83
20	1.9	306		0.50	0.35	529.6	110.6	87	83
21	1.9	310		0.48	0.35	530.2	132.0	87	83
22	2.0	312		0.54	0.35	530.9	101.5	87	83
23	1.9	314		0.52	0.35	531.5	109.0	87	83
24	2.0	314		0.57	0.35	532.1	98.9	87	83
25	1.9	310		0.53	0.35	532.7	107.6	87	84
26	1.9	308		0.50	0.35	533.3	110.6	87	84
27	1.9	313		0.50	0.35	533.9	111.0	87	84
28	1.9	310		0.52	0.35	534.5	108.6	87	84
29	1.9	307		0.48	0.35	535.1	112.8	87	84
30	1.8	306		0.47	0.35	535.7	125.6	88	84
						536.327			
AVG.		310	-12.33	0.52	0.35	18.528	112.0	84	

EPA METHOD 201A CALCULATIONS
PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 3 OUTLET
U3O-M201A/202-R1

C1	=	-150.3162	micropoise
C2	=	18.0614	micropoise/K^0.5
	=	13.4622	micropoise/R^0.5
C3	=	1.19183E+06	micropoise/K^2
	=	3.86153E+06	micropoise/R^2
C4	=	0.591123	micropoise
C5	=	91.9723	micropoise
C6	=	4.91705E-05	micropoise/K^2
	=	1.51761E-05	micropoise/R^2
Preliminary Data			
Ts	=	302.40	degrees F
Ts	=	762.40	degrees R
%O2, dry	=	10.00	%
%O2, wet	=	8.40	%
Bws	=	0.16	
Pbar	=	30.02	in. Hg
Pstatic	=	-12.50	in. H2O
Ps	=	29.10	in. Hg
Dp (for 2.25 micrometer cut size)	=	2.25	micrometers
Mw (same as Ms)	=	28.08	lb/lb-mole
Tm	=	85.00	degrees F
Tm	=	545.00	degrees R
Md	=	30.00	lb/lb-mole
ΔH@	=	1.7473	
Cp' (for Prelim.)	=	0.84	
Vs	=	50.32	ft/sec
μ	=	219.701	
C (for 2.25 micrometer cut size)	=	1.10	
D50LL (for Nre< 3162)	=	9.92	
D50T (for Nre< 3162)	=	10.46	
Qs (=QI for Nre< 3162)	=	0.573	
Nre	=	2416	
D50LL (for Nre >= 3162)	=	10.57	
D50T (for Nre >= 3162)	=	10.79	
Qs (=QI for Nre >= 3162)	=	0.549	
Sampling Rate ΔH	=	0.35	in. H2O
Sampling Rate ΔH @ Ts - 50 deg. F	=	0.34	in. H2O
Sampling Rate ΔH @ Ts + 50 deg. F	=	0.36	in. H2O
D (calc. nozzle dia.)	=	0.187	in.
D (actual selected)	=	0.179	in.
Vn	=	54.67	ft/sec
ΔPmin allowed	=	0.298	in. H2O
ΔPmax allowed	=	0.999	in. H2O
Dwell Time at Point 1 (T1) is:		1.99	min.
Actual Run Data			
Ts	=	309.73	degrees F
Ts	=	769.73	degrees R
%O2, dry	=	9.57	%
%O2, wet	=	7.62	%
Vwc	=	4.001	
Vsg	=	0.599	
Bws	=	0.2043	
Pbar	=	30.04	in. Hg
Pstatic	=	-12.33	in. H2O
Ps	=	29.13	in. Hg
Mw (same as Ms)	=	27.51	lb/lb-mole
Tm	=	83.68	degrees F
Tm	=	543.7	degrees R
Md	=	29.96	lb/lb-mole
Cp (for actual run)	=	0.84	
Meter Calibration Factor (Gamma)	=	0.9910	
Meter Box Delta H During Test	=	0.35	in. H2O
Meter Volume	=	18.528	dcf
Meter Volume at Std. Cond.	=	17.918	dscf
Avg. Sqare Root of Delta P	=	0.7176	
Velocity	=	50.50	ft/sec
Area of Nozzle	=	0.0001748	ft^2
Test Duration	=	57.5	min.
Isokinetics (rounded to nearest whole #)	=	111%	
No. of Points < 71% or > 129% Iso.	=	1	
ΔPmin allowed	=	0.307	in. H2O
ΔPmax allowed	=	1.012	in. H2O
Actual ΔPmin from run	=	0.46	in. H2O
Actual ΔPmax from run	=	0.57	in. H2O
No. of ΔPs outside of allowed range	=	0	
Recalculated μ	=	217.249	
Qs	=	0.586	acfm
D50 (for PM-10 cyclone I)	=	10.27	
Nre (actual test conditions)	=	2428	
C (where Dp = 2.5)	=	1.09	
D50 (for PM-2.5 cyclone IV)	=	2.42	
Cr	=	1.25	
D50-1	=	2.26	
Z	=	0.94	
Recalculated Cr	=	1.26	
Recalculated D50 (for cyclone IV)	=	2.25	
Recalculated D50-1	=	2.25	
Recalculated Z	=	1.00	

EPA Method 201A: Performance Criteria Calculations

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 3 OUTLET

Run Number	**U3O-M201A/202-R1**
Stack Gas Viscosity (micropoise)	219.701
Cyclone Flow Rate (dscf/min)	0.312
Cyclone Flow Rate (acfm)	0.586
D50	10.273

dPmin and dPmax Calculations and Performance:

Stack Gas Viscosity (micropoise)	217.249
Cyclone Flow Rate (acfm)	0.586
Vmstd - dscf	17.918
Sample Time - min	57.5
Ts	309.733
% O2	9.570
% Water	20.427
Vwc	4.001
Vsg	0.599
Ps	29.133
Mw	27.515
Cp	0.84
Nozzle Size(s) Used For Test:	0.179
Minimum dP During Test:	0.46
Maximum dP During Test:	0.57

Nozzle No.	Dn (in.)	vn (ft/s)	Conditional Rmin Step 1	Conditional Rmin Step 2	vmin (ft/s)	Conditional Rmax Step 1	Conditional Rmax Step 2	vmax (ft/s)	dPmin (in. H2O)	dPmax (in. H2O)	Acceptance Criteria	Nozzle Selection for Next Run
1	0.114	137.876	0.280	0.775	106.893	1.218	1.218	167.871	2.308	5.692		
2	0.129	107.676	0.268	0.764	82.245	1.225	1.225	131.934	1.366	3.516		
3	0.148	81.804	0.249	0.744	60.893	1.238	1.238	101.263	0.749	2.071		
4	0.158	71.777	0.236	0.731	52.504	1.246	1.246	89.422	0.557	1.615		
5	0.179	55.923	0.204	0.697	38.978	1.266	1.266	70.787	0.307	1.012	**OK**	**OK**
6	0.191	49.117	0.181	0.672	32.988	1.279	1.279	62.833	0.220	0.797		**OK**
7	0.201	44.351	0.161	0.646	28.671	1.292	1.292	57.286	0.166	0.663		**OK**
8	0.230	33.872	0.088	0.542	18.345	1.334	1.334	45.178	0.068	0.412		
9	0.253	27.994	0.015	0.368	10.288	1.374	1.374	38.457	0.021	0.299		
10	0.274	23.867	-0.064	0.500	11.934	1.415	1.415	33.782	0.029	0.231		
11	0.296	20.451	-0.161	0.500	10.226	1.464	1.464	29.943	0.021	0.181		

EPA Method 202: Gravimetric Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 3 OUTLET

SAMPLING DATA

Run number	**U3O-M201A/202-R1**
Corrected sample volume	17.918 dscf
	0.507 dscm
Corrected flow rate	154991 dscfm
O2 Content	9.57 %
CO2 Content	9.84 %

SUMMARY

COMPONENT	NET (grams)	CORRECTED FOR BLANK (grams)
FILTERABLE PM2.5		
Probe Wash	0.00400	0.00282
Filter	0.00040	0.00040
CONDENSIBLE PM2.5		
Inorganic CPM	0.00500	0.00319
Organic CPM	0.00530	0.00511
TOTAL CPM	0.01030	0.00830
TOTAL PM	0.01470	0.01152

ANALYTICAL DATA

METHOD 201A COMPONENTS	TARE (grams)	FINAL (grams)	NET (grams)	VOLUME (ml)
PM2.5 Acetone Probe Wash	65.3892	65.3932	0.00400	150
Acetone Blank Residue	67.9233	67.9245	0.00120	125
Applicable Acetone Blank			0.00144	
Max. Allowable Blank			0.00118	
Blank Value Used for Correction			0.00118	
Filter	0.3598	0.3602	0.00040	

METHOD 202 COMPONENTS	NET (grams)		Volume (mL)	CPM RATIO (%)
Inorganic CPM in Sample	0.00500		240	54.60%
Organic CPM in Sample	0.00530		306	45.40%
Inorganic CPM in Field Blank	0.00280		180	90.32%
Organic CPM in Field Blank	0.00040		240	9.68%
Total CPM in Field Blank	0.00420	*		
Max. Allowable Field Blank	0.00200			
Inorganic CPM Field Blank Value Used for Correction	0.00181	**		
Organic CPM Field Blank Value Used for Correction	0.00019	**		
Total CPM Field Blank Value Used for Correction	0.00200			

PM2.5 EMISSIONS

	FILTERABLE (FPM)	**Inorganic (CPM)**	**Organic (CPM)**	**Total (CPM)**	**TOTAL (FPM+CPM)**
Actual Grain Loading (gr/dscf)	0.0028	0.0028	0.0044	0.0071	0.0099
Corrected to 7% O2 (gr/dscf)	0.0034	0.0034	0.0054	0.0088	0.0122
Corrected to 12% CO2 (gr/dscf)	0.0034	0.0034	0.0054	0.0087	0.0121
Actual Grain Loading (mg/dscm)	6.35	6.29	10.06	16.36	22.71
Corrected to 7% O2 (mg/dscm)	7.79	7.72	12.35	20.07	27.86
Corrected to 12% CO2 (mg/dscm)	7.75	7.68	12.27	19.95	27.70
Mass Rate (lb/hr)	3.69	3.65	5.84	9.50	13.18

Notes

* The field blank value was corrected for the volume difference between the sample and the blank.
Field blank corrected value = actual value x sample volume over blank volume.

** If the Total CPM in Field Blank value is > 2 mg, then the inorganic and organic blank fractions were calculated by:
2 mg x CPM Ratio % of Uncorrected CPM in Field Blank (Inorganic or Organic, as applicable).

RUN NUMBER PRE-U3O-M201A-R2

Date	04/09/13	
Start Time	11:56	
End Time	12:58	
Meter Box dH@	1.7473	
Barometric	30.04	in.Hg
Cp' (for Prelim.)	0.84	
Cp (for actual run)	0.84	
Test Duration	60	minutes

PM-2.5 fraction to be included (Y or N)?	Y
PM-10 fraction to be included? (Y or N)?	N

No. of Sample Points 24

METHOD 3 AND 4 DATA

%O2	9.57			Md	29.96
%CO2	9.84			Ms	27.57
% Water	20.00 %	%CO	0.0	Ps	29.12
		%N2	80.6	Fo	1.151
METHOD 2 RESULTS		O2+CO2	19.4	%EA	82
Velocity	50.46 ft/sec				

Point	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Pitot Coefficient Adjusted Delta P (in.WC)	**ESTIMATED** Meter Temp Inlet (DegF)	Outlet (DegF)
1	303	-12.00	0.55	0.55	75	75
2	304	-13.00	0.53	0.53	78	78
3	309		0.52	0.52	82	81
4	310		0.50	0.50	83	81
5	310		0.51	0.51	83	81
6	308		0.56	0.56	83	81
7	302		0.51	0.51	84	82
8	310		0.52	0.52	84	82
9	316		0.54	0.54	84	82
10	320		0.53	0.53	85	82
11	312		0.50	0.50	85	82
12	310		0.52	0.52	85	82
13	315		0.55	0.55	85	83
14	308		0.49	0.49	86	83
15	307		0.57	0.57	86	83
16	310		0.50	0.50	86	83
17	313		0.47	0.47	86	83
18	308		0.52	0.52	87	83
19	307		0.46	0.46	87	83
20	306		0.50	0.50	87	83
21	310		0.48	0.48	87	83
22	312		0.54	0.54	87	83
23	314		0.52	0.52	87	83
24	314		0.57	0.57	87	83
25	310		0.53	0.53	87	84
26	308		0.50	0.50	87	84
27	313		0.50	0.50	87	84
28	310		0.52	0.52	87	84
29	307		0.48	0.48	87	84
30	306		0.47	0.47	88	84
AVG.	310	-12.50	0.52	0.52	84	

EPA METHOD 201A

PRELIMINARY TRAVERSE

ORIFICE HEAD, NOZZLE, AND DWELL TIME CALCULATIONS

RUN I.D. **PRE-U3O-M201A-R2**

ORIFICE HEAD DETERMINATION (dH)

TEMP. (°F)	CYCLONE FLOW (ft3/min)	ORIFICE HEAD (in. H2O)
310	0.574	**0.31**
260	0.528	0.30
360	0.621	0.32

Nre	=	2378

NOZZLE SIZE DETERMINATION

Min. dP from Traverse:	0.46
Max. dP from Traverse:	0.57
Average dP from Traverse:	0.52

dPmin and dPmax Calculations at Stack Temperature of **310**

Stack Gas Viscosity (micropoise)	217.627
Stack Gas Viscosity (micropoise) @ -50°F	206.004
Stack Gas Viscosity (micropoise) @ +50°F	229.037

D (calc. nozzle dia.)	**=**	**0.187**

Nozzle No.	**Dn** (in.)	**OPTIONAL NOZZLES**	**vn** (ft/s)	**Conditional Rmin Step 1**	**Conditional Rmin Step 2**	**vmin** (ft/s)	**Conditional Rmax**	**Conditional Rmax**	**vmax** (ft/s)	**dPmin** (in. H2O)	**dPmax** (in. H2O)
1	0.114		135.078	0.280	0.775	104.646	1.218	1.218	164.516	2.215	5.475
2	0.129		105.491	0.268	0.763	80.487	1.226	1.226	129.315	1.310	3.383
3	0.148		80.144	0.247	0.743	59.551	1.239	1.239	99.274	0.717	1.994
4	0.158		70.320	0.234	0.730	51.322	1.247	1.247	87.677	0.533	1.555
5	0.179	**OK**	54.788	0.201	0.694	38.045	1.267	1.267	69.428	0.293	0.975
6	0.191	**OK**	48.120	0.179	0.668	32.158	1.281	1.281	61.639	0.209	0.769
7	0.201	**OK**	43.451	0.157	0.642	27.909	1.294	1.294	56.208	0.158	0.639
8	0.230		33.185	0.083	0.533	17.691	1.337	1.337	44.353	0.063	0.398
9	0.253		27.425	0.008	0.337	9.232	1.377	1.377	37.774	0.017	0.289
10	0.274		23.383	-0.073	0.500	11.691	1.420	1.420	33.197	0.028	0.223
11	0.296		20.036	-0.172	0.500	10.018	1.469	1.469	29.439	0.020	0.175

DWELL TIME DETERMINATION

Dwell Time at Point 1 (T1) is: **2.07** minutes

TRAVERSE POINT DETERMINATION

DATA FROM PRELIMINARY TRAVERSE:

Average dP from Traverse: **0.52**

Run Number **U3O-M201A/202-R2**

Date	04/09/13	
Start Time	14:08	
End Time	15:08	
Stack Length	132	inches
Stack Width	105	inches
Nozzle I.D.	0.179	inches
Meter Box Gamma	0.9910	
Meter Box dH@	1.7473	
Barometric	30.04	in.Hg
Cp	0.84	
Test Duration	59.60	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	0.0	72.0	72.0
Impinger 2	0.0	10.0	10.0
Impinger 3	100.0	94.0	-6.0
Impinger 4			0.0
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Total	100.0	176.0	76.0
Silica gel (g)	250.0	264.8	14.8

METHOD 1-4 RESULTS

Metered Volume	18.466	dcf
Volume @ Std.Cond.	17.581	dscf
% Water	19.56	%
% Isokinetics	103.9	%
Velocity	50.30	ft/sec
Actual Flow	290484	acfm
Std. Flow	194417	scfm
Dry Std. Flow	156389	dscfm

METHOD 3 DATA

%O2	8.85	Md	30.01
%CO2	10.33	Ms	27.66
%CO	0.0	Ps	29.16
%N2	80.8	Fo	1.167
O2+CO2	19.2	%EA	71

	Dwell Time	Stack Temp.	Static Pressure	Delta P	Delta H	Meter Volume	Iso	Meter Temp. (Deg. F)	
POINT	(Min.)	(DegF)	(in.WC)	(in.WC)	(in.WC)	(dcf)	(%)	Inlet	Outlet
1	2.1	298	-13.00	0.55	0.31	544.278	83.1	92	88
2	2.0	298	-11.00	0.52	0.31	544.8	100.5	93	89
3	2.0	301	-12.00	0.56	0.31	545.4	96.8	93	92
4	2.0	303	-11.00	0.51	0.31	546.0	101.5	93	92
5	1.9	309	-12.00	0.47	0.31	546.6	111.8	94	91
6	2.0	313	-13.00	0.54	0.31	547.2	99.4	93	91
7	1.9	309		0.51	0.31	547.8	107.3	94	91
8	2.0	310		0.55	0.31	548.4	98.2	94	91
9	2.0	309		0.53	0.31	549.0	100.0	94	91
10	2.0	307		0.50	0.31	549.6	119.8	94	92
11	1.9	309		0.49	0.31	550.3	109.4	94	92
12	2.1	312		0.57	0.31	550.9	91.9	94	92
13	2.0	313		0.50	0.31	551.5	103.2	94	91
14	1.9	309		0.48	0.31	552.1	110.6	94	91
15	1.9	311		0.48	0.31	552.7	110.6	94	92
16	1.9	314		0.46	0.31	553.3	113.3	94	91
17	2.0	317		0.52	0.31	553.9	101.5	94	91
18	2.0	314		0.53	0.31	554.5	117.0	94	91
19	2.0	309		0.50	0.31	555.2	120.2	93	91
20	2.0	309		0.52	0.31	555.9	101.0	93	91
21	2.0	311		0.54	0.31	556.5	99.3	93	91
22	2.0	310		0.52	0.31	557.1	117.9	93	91
23	1.9	308		0.49	0.31	557.8	109.5	93	91
24	2.0	309		0.51	0.31	558.4	102.0	93	91
25	2.0	305		0.50	0.31	559.0	120.0	93	90
26	2.1	309		0.56	0.31	559.7	92.8	93	90
27	2.0	314		0.51	0.31	560.3	102.3	93	91
28	2.0	311		0.52	0.31	560.9	101.2	93	91
29	2.0	306		0.50	0.31	561.5	102.8	94	90
30	2.0	307		0.51	0.31	562.1	109.3	94	91
						562.744			
AVG.		309	-12.00	0.52	0.31	18.466	105.1	92	

EPA METHOD 201A CALCULATIONS
PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 3 OUTLET
U3O-M201A/202-R2

C1	=	-150.3162	micropoise
C2	=	18.0614	micropoise/K^0.5
	=	13.4622	micropoise/R^0.5
C3	=	1.19183E+06	micropoise/K^2
	=	3.86153E+06	micropoise/R^2
C4	=	0.591123	micropoise
C5	=	91.9723	micropoise
C6	=	4.91705E-05	micropoise/K^2
	=	1.51761E-05	micropoise/R^2
Preliminary Data			
Ts	=	309.73	degrees F
Ts	=	769.73	degrees R
%O2, dry	=	9.57	%
%O2, wet	=	7.66	%
Bws	=	0.20	
Pbar	=	30.04	in. Hg
Pstatic	=	-12.50	in. H2O
Ps	=	29.12	in. Hg
Dp (for 2.25 micrometer cut size)	=	2.25	micrometers
Mw (same as Ms)	=	27.57	lb/lb-mole
Tm	=	83.68	degrees F
Tm	=	543.68	degrees R
Md	=	29.96	lb/lb-mole
ΔH@	=	1.7473	
Cp' (for Prelim.)	=	0.84	
Vs	=	50.46	ft/sec
μ	=	217.627	
C (for 2.25 micrometer cut size)	=	1.10	
D50LL (for Nre< 3162)	=	9.87	
D50T (for Nre< 3162)	=	10.43	
Qs (=QI for Nre< 3162)	=	0.574	
Nre	=	2378	
D50LL (for Nre >= 3162)	=	10.56	
D50T (for Nre >= 3162)	=	10.78	
Qs (=QI for Nre >= 3162)	=	0.549	
Sampling Rate ΔH	=	0.31	in. H2O
Sampling Rate ΔH @ Ts - 50 deg. F	=	0.30	in. H2O
Sampling Rate ΔH @ Ts + 50 deg. F	=	0.32	in. H2O
D (calc. nozzle dia.)	=	0.187	in.
D (actual selected)	=	0.179	in.
Vn	=	54.78	ft/sec
ΔPmin allowed	=	0.293	in. H2O
ΔPmax allowed	=	0.975	in. H2O
Dwell Time at Point 1 (T1) is:		2.58	min.
Actual Run Data			
Ts	=	308.80	degrees F
Ts	=	768.80	degrees R
%O2, dry	=	8.85	%
%O2, wet	=	7.12	%
Vwc	=	3.577	
Vsg	=	0.698	
Bws	=	0.1956	
Pbar	=	30.04	in. Hg
Pstatic	=	-12.00	in. H2O
Ps	=	29.16	in. Hg
Mw (same as Ms)	=	27.66	lb/lb-mole
Tm	=	92.20	degrees F
Tm	=	552.2	degrees R
Md	=	30.01	lb/lb-mole
Cp (for actual run)	=	0.84	
Meter Calibration Factor (Gamma)	=	0.9910	
Meter Box Delta H During Test	=	0.31	in. H2O
Meter Volume	=	18.466	dcf
Meter Volume at Std. Cond.	=	17.581	dscf
Avg. Sqare Root of Delta P	=	0.7174	
Velocity	=	50.30	ft/sec
Area of Nozzle	=	0.0001748	ft^2
Test Duration	=	59.6	min.
Isokinetics (rounded to nearest whole #)	=	104%	
No. of Points < 71% or > 129% Iso.	=	0	
Actual ΔPmin from run	=	0.46	in. H2O
Actual ΔPmax from run	=	0.57	in. H2O
Actual ΔPmin from run	=	0.46	in. H2O
Actual ΔPmax from run	=	0.57	in. H2O
No. of ΔPs outside of allowed range	=	0	
Recalculated μ	=	217.460	
Qs	=	0.548	acfm
D50 (for PM-10 cyclone I)	=	10.77	
Nre (actual test conditions)	=	2284	
C (where Dp = 2.5)	=	1.09	
D50 (for PM-2.5 cyclone IV)	=	2.61	
Cr	=	1.23	
D50-1	=	2.46	
Z	=	0.94	
Recalculated Cr	=	1.24	
Recalculated D50 (for cyclone IV)	=	2.45	
Recalculated D50-1	=	2.45	
Recalculated Z	=	1.00	

EPA Method 201A: Performance Criteria Calculations

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 3 OUTLET

Run Number	**U3O-M201A/202-R2**
Stack Gas Viscosity (micropoise)	217.722
Cyclone Flow Rate (dscf/min)	0.295
Cyclone Flow Rate (acfm)	0.548
D50	10.769

dPmin and dPmax Calculations and Performance:

Stack Gas Viscosity (micropoise)	217.460
Cyclone Flow Rate (acfm)	0.548
Vmstd - dscf	17.581
Sample Time - min	59.6
Ts	308.800
% O2	8.850
% Water	19.560
Vwc	3.577
Vsg	0.698
Ps	29.158
Mw	27.658
Cp	0.84
Nozzle Size(s) Used For Test:	0.179
Minimum dP During Test:	0.46
Maximum dP During Test:	0.57

Nozzle No.	Dn (in.)	vn (ft/s)	Conditional Step 1	Conditional Step 2	vmin (ft/s)	Conditional Rmax	Conditional Rmax	vmax (ft/s)	dPmin (in. H2O)	dPmax (in. H2O)	Acceptance Criteria	Nozzle Selection for Next Run
1	0.114	128.845	0.279	0.773	99.659	1.219	1.219	157.033	2.021	5.017		
2	0.129	100.623	0.266	0.761	76.589	1.227	1.227	123.469	1.193	3.102		
3	0.148	76.446	0.245	0.740	56.584	1.240	1.240	94.830	0.651	1.830		
4	0.158	67.075	0.231	0.726	48.713	1.249	1.249	83.776	0.483	1.428		
5	0.179	52.260	0.196	0.689	35.994	1.270	1.270	66.384	0.264	0.897	**OK**	**OK**
6	0.191	45.900	0.172	0.661	30.339	1.285	1.285	58.962	0.187	0.707		**OK**
7	0.201	41.446	0.150	0.633	26.244	1.298	1.298	53.788	0.140	0.589		**OK**
8	0.230	31.653	0.072	0.514	16.266	1.343	1.343	42.495	0.054	0.367		
9	0.253	26.160	-0.006	0.500	13.080	1.385	1.385	36.230	0.035	0.267		
10	0.274	22.304	-0.091	0.500	11.152	1.429	1.429	31.871	0.025	0.207		
11	0.296	19.111	-0.194	0.500	9.556	1.480	1.480	28.292	0.019	0.163		

EPA Method 202: Gravimetric Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 3 OUTLET

SAMPLING DATA

Run number	**U3O-M201A/202-R2**
Corrected sample volume	17.581 dscf
	0.498 dscm
Corrected flow rate	156389 dscfm
O2 Content	8.85 %
CO2 Content	10.33 %

SUMMARY

COMPONENT	NET (grams)	CORRECTED FOR BLANK (grams)
FILTERABLE PM2.5		
Probe Wash	0.00160	0.00027
Filter	0.00090	0.00090
CONDENSIBLE PM2.5		
Inorganic CPM	0.00690	0.00509
Organic CPM	0.00660	0.00641
TOTAL CPM	0.01350	0.01150
TOTAL PM	0.01600	0.01267

ANALYTICAL DATA

METHOD 201A COMPONENTS	TARE (grams)	FINAL (grams)	NET (grams)	VOLUME (ml)
PM2.5 Acetone Probe Wash	67.5381	67.5397	0.00160	170
Acetone Blank Residue	67.9233	67.9245	0.00120	125
Applicable Acetone Blank			0.00163	
Max. Allowable Blank			0.00133	
Blank Value Used for Correction			0.00133	
Filter	0.3581	0.3590	0.00090	

METHOD 202 COMPONENTS	NET (grams)		Volume (mL)	CPM RATIO (%)
Inorganic CPM in Sample	0.00690		250	47.46%
Organic CPM in Sample	0.00660		216	52.54%
Inorganic CPM in Field Blank	0.00280		180	90.32%
Organic CPM in Field Blank	0.00040		240	9.68%
Total CPM in Field Blank	0.00420	*		
Max. Allowable Field Blank	0.00200			
Inorganic CPM Field Blank Value Used for Correction	0.00181	**		
Organic CPM Field Blank Value Used for Correction	0.00019	**		
Total CPM Field Blank Value Used for Correction	0.00200			

PM2.5 EMISSIONS

	FILTERABLE (FPM)	**Inorganic (CPM)**	**Organic (CPM)**	**Total (CPM)**	**TOTAL (FPM+CPM)**
Actual Grain Loading (gr/dscf)	0.0010	0.0045	0.0056	0.0101	0.0111
Corrected to 7% O2 (gr/dscf)	0.0012	0.0052	0.0065	0.0116	0.0128
Corrected to 12% CO2 (gr/dscf)	0.0012	0.0052	0.0065	0.0117	0.0129
Actual Grain Loading (mg/dscf)	2.34	10.23	12.87	23.10	25.44
Corrected to 7% O2 (mg/dscf)	2.70	11.80	14.84	26.65	29.35
Corrected to 12% CO2 (mg/dscf)	2.72	11.89	14.95	26.83	29.56
Mass Rate (lb/hr)	1.37	5.99	7.54	13.53	14.90

Notes

* The field blank value was corrected for the volume difference between the sample and the blank.
Field blank corrected value = actual value x sample volume over blank volume.

** If the Total CPM in Field Blank value is > 2 mg, then the inorganic and organic blank fractions were calculated by:
2 mg x CPM Ratio % of Uncorrected CPM in Field Blank (Inorganic or Organic, as applicable).

RUN NUMBER PRE-U3O-M201A-R3

Date	04/09/13	
Start Time	14:08	
End Time	15:08	
Meter Box dH@	1.7473	
Barometric	30.04	in.Hg
Cp' (for Prelim.)	0.84	
Cp (for actual run)	0.84	
Test Duration	60	minutes

PM-2.5 fraction to be included (Y or N)?	Y
PM-10 fraction to be included? (Y or N)?	N

No. of Sample Points 30

METHOD 3 AND 4 DATA

%O2	8.85	
%CO2	10.33	
% Water	20.00	%

METHOD 2 RESULTS

Velocity	50.35	ft/sec

METHOD 3 DATA

		Md	30.01
		Ms	27.61
%CO	0.0	Ps	29.16
%N2	80.8	Fo	1.167
O2+CO2	19.2	%EA	71

Point	Stack Temp. (DegF)	Static Pressure (in.WC)	Delta P (in.WC)	Pitot Coefficient Adjusted Delta P (in.WC)	**ESTIMATED** Meter Temp Inlet (DegF)	Meter Temp Outlet (DegF)
1	298	-13.00	0.55	0.55	92	88
2	298	-11.00	0.52	0.52	93	89
3	301		0.56	0.56	93	92
4	303		0.51	0.51	93	92
5	309		0.47	0.47	94	91
6	313		0.54	0.54	93	91
7	309		0.51	0.51	94	91
8	310		0.55	0.55	94	91
9	309		0.53	0.53	94	91
10	307		0.50	0.50	94	92
11	309		0.49	0.49	94	92
12	312		0.57	0.57	94	92
13	313		0.50	0.50	94	91
14	309		0.48	0.48	94	91
15	311		0.48	0.48	94	92
16	314		0.46	0.46	94	91
17	317		0.52	0.52	94	91
18	314		0.53	0.53	94	91
19	309		0.50	0.50	93	91
20	309		0.52	0.52	93	91
21	311		0.54	0.54	93	91
22	310		0.52	0.52	93	91
23	308		0.49	0.49	93	91
24	309		0.51	0.51	93	91
25	305		0.50	0.50	93	90
26	309		0.56	0.56	93	90
27	314		0.51	0.51	93	91
28	311		0.52	0.52	93	91
29	306		0.50	0.50	94	90
30	307		0.51	0.51	94	91
AVG.	309	-12.00	0.52	0.52	92	

EPA METHOD 201A

PRELIMINARY TRAVERSE

ORIFICE HEAD, NOZZLE, AND DWELL TIME CALCULATIONS

RUN I.D. **PRE-U3O-M201A-R3**

ORIFICE HEAD DETERMINATION (dH)

TEMP. (°F)	CYCLONE FLOW (ft3/min)	ORIFICE HEAD (in. H2O)
309	0.572	**0.31**
259	0.526	0.30
359	0.619	0.32

Nre	=	2384

NOZZLE SIZE DETERMINATION

Min. dP from Traverse:	0.46
Max. dP from Traverse:	0.57
Average dP from Traverse:	0.52

dPmin and dPmax Calculations at Stack Temperature of **309**

Stack Gas Viscosity (micropoise)	217.071
Stack Gas Viscosity (micropoise) @ -50°F	205.444
Stack Gas Viscosity (micropoise) @ +50°F	228.486

D (calc. nozzle dia.)	**=**	**0.186**

Nozzle No.	**Dn** (in.)	**OPTIONAL NOZZLES**	**vn** (ft/s)	**Conditional Rmin Step 1**	**Conditional Rmin Step 2**	**vmin** (ft/s)	**Conditional Rmax**	**Conditional Rmax**	**vmax** (ft/s)	**dPmin** (in. H2O)	**dPmax** (in. H2O)
1	0.114		134.520	0.280	0.775	104.209	1.218	1.218	163.841	2.205	5.451
2	0.129		105.055	0.268	0.763	80.148	1.226	1.226	128.786	1.304	3.368
3	0.148		79.813	0.247	0.743	59.298	1.239	1.239	98.869	0.714	1.985
4	0.158		70.030	0.234	0.730	51.102	1.247	1.247	87.320	0.530	1.548
5	0.179	**OK**	54.562	0.201	0.694	37.878	1.267	1.267	69.147	0.291	0.971
6	0.191	**OK**	47.922	0.178	0.668	32.014	1.281	1.281	61.390	0.208	0.765
7	0.201	**OK**	43.272	0.157	0.642	27.781	1.294	1.294	55.982	0.157	0.636
8	0.230		33.048	0.082	0.532	17.598	1.337	1.337	44.176	0.063	0.396
9	0.253		27.312	0.008	0.334	9.121	1.378	1.378	37.625	0.017	0.287
10	0.274		23.286	-0.073	0.500	11.643	1.420	1.420	33.067	0.028	0.222
11	0.296		19.953	-0.172	0.500	9.977	1.470	1.470	29.324	0.020	0.175

DWELL TIME DETERMINATION

Dwell Time at Point 1 (T1) is: **2.07** minutes

TRAVERSE POINT DETERMINATION

DATA FROM PRELIMINARY TRAVERSE:

Average dP from Traverse: **0.52**

Run Number **U3O-M201A/202-R3**

Date	04/09/13	
Start Time	16:38	
End Time	17:38	
Stack Length	132	inches
Stack Width	105	inches
Nozzle I.D.	0.179	inches
Meter Box Gamma	0.9910	
Meter Box dH@	1.7473	
Barometric	30.02	in.Hg
Cp	0.84	
Test Duration	59.70	minutes

METHOD 4 DATA

	Impinger Volume (mL)		
	Initial	Final	Net
Impinger 1	0.0	100.0	100.0
Impinger 2	0.0	0.0	0.0
Impinger 3	100.0	90.0	-10.0
Impinger 4			0.0
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Total	100.0	190.0	90.0
Silica gel (g)	250.0	266.4	16.4

METHOD 1-4 RESULTS

Metered Volume	19.243	dcf
Volume @ Std.Cond.	18.298	dscf
% Water	21.49	%
% Isokinetics	110.9	%
Velocity	50.14	ft/sec
Actual Flow	289542	acfm
Std. Flow	193886	scfm
Dry Std. Flow	152213	dscfm

METHOD 3 DATA

%O2	9.71	Md	29.92
%CO2	9.57	Ms	27.36
%CO	0.0	Ps	29.15
%N2	80.7	Fo	1.169
O2+CO2	19.3	%EA	84

	Dwell Time	Stack Temp.	Static Pressure	Delta P	Delta H	Meter Volume	Iso	Meter Temp. (Deg. F)	
POINT	(Min.)	(DegF)	(in.WC)	(in.WC)	(in.WC)	(dcf)	(%)	Inlet	Outlet
1	2.1	301	-12.0	0.55	0.31	565.211	110.2	93	93
2	2.0	302	-11.0	0.53	0.31	565.9	84.0	97	94
3	2.0	300	-11.0	0.50	0.31	566.4	103.9	96	93
4	2.0	300	-13.0	0.50	0.31	567.0	121.2	96	93
5	1.9	305	-12.0	0.48	0.31	567.7	111.8	97	93
6	2.1	303	-12.0	0.57	0.31	568.3	108.4	95	93
7	2.0	304		0.53	0.31	569.0	101.3	94	93
8	2.0	309		0.51	0.31	569.6	103.6	94	93
9	2.0	311		0.50	0.31	570.2	122.3	94	93
10	1.9	314		0.46	0.31	570.9	115.2	94	93
11	1.8	307		0.43	0.31	571.5	125.3	94	92
12	2.0	313		0.50	0.31	572.1	105.0	94	92
13	2.0	317		0.49	0.31	572.7	124.1	94	92
14	1.9	315		0.44	0.31	573.4	118.1	93	92
15	2.0	313		0.49	0.31	574.0	123.9	93	92
16	2.1	306		0.57	0.31	574.7	93.3	94	91
17	2.0	311		0.53	0.31	575.3	119.0	94	91
18	2.0	310		0.53	0.31	576.0	101.9	94	91
19	2.0	308		0.50	0.31	576.6	122.2	94	91
20	2.0	309		0.51	0.31	577.3	103.8	94	91
21	2.1	302		0.54	0.31	577.9	111.9	92	90
22	2.1	309		0.58	0.31	578.6	93.0	92	90
23	2.0	312		0.53	0.31	579.2	119.4	92	90
24	2.0	310		0.50	0.31	579.9	122.7	92	90
25	1.9	308		0.46	0.31	580.6	115.3	92	90
26	2.0	307		0.53	0.31	581.2	119.0	92	90
27	2.0	310		0.50	0.31	581.9	122.7	92	90
28	1.9	309		0.48	0.31	582.6	112.9	92	90
29	1.9	313		0.46	0.31	583.2	115.8	92	89
30	2.0	308		0.50	0.31	583.8	114.6	92	89
						584.454			
AVG.		308	-11.83	0.51	0.31	19.243	112.2	93	

EPA METHOD 201A CALCULATIONS
PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 3 OUTLET
U3O-M201A/202-R3

C1	=	-150.3162	micropoise
C2	=	18.0614	micropoise/K^0.5
	=	13.4622	micropoise/R^0.5
C3	=	1.19183E+06	micropoise/K^2
	=	3.86153E+06	micropoise/R^2
C4	=	0.591123	micropoise
C5	=	91.9723	micropoise
C6	=	4.91705E-05	micropoise/K^2
	=	1.51761E-05	micropoise/R^2
Preliminary Data			
Ts	=	308.80	degrees F
Ts	=	768.80	degrees R
%O2, dry	=	8.85	%
%O2, wet	=	7.08	%
Bws	=	0.20	
Pbar	=	30.04	in. Hg
Pstatic	=	-12.00	in. H2O
Ps	=	29.16	in. Hg
Dp (for 2.25 micrometer cut size)	=	2.25	micrometers
Mw (same as Ms)	=	27.61	lb/lb-mole
Tm	=	92.20	degrees F
Tm	=	552.20	degrees R
Md	=	30.01	lb/lb-mole
ΔH@	=	1.7473	
Cp' (for Prelim.)	=	0.84	
Vs	=	50.35	ft/sec
μ	=	217.071	
C (for 2.25 micrometer cut size)	=	1.10	
D50LL (for Nre< 3162)	=	9.87	
D50T (for Nre< 3162)	=	10.44	
Qs (=QI for Nre< 3162)	=	0.572	
Nre	=	2384	
D50LL (for Nre >= 3162)	=	10.56	
D50T (for Nre >= 3162)	=	10.78	
Qs (=QI for Nre >= 3162)	=	0.547	
Sampling Rate ΔH	=	0.31	in. H2O
Sampling Rate ΔH @ Ts - 50 deg. F	=	0.30	in. H2O
Sampling Rate ΔH @ Ts + 50 deg. F	=	0.32	in. H2O
D (calc. nozzle dia.)	=	0.186	in.
D (actual selected)	=	0.179	in.
Vn	=	54.56	ft/sec
ΔPmin allowed	=	0.291	in. H2O
ΔPmax allowed	=	0.971	in. H2O
Dwell Time at Point 1 (T1) is:		2.07	min.
Actual Run Data			
Ts	=	308.20	degrees F
Ts	=	768.20	degrees R
%O2, dry	=	9.71	%
%O2, wet	=	7.62	%
Vwc	=	4.236	
Vsg	=	0.773	
Bws	=	0.2149	
Pbar	=	30.02	in. Hg
Pstatic	=	-11.83	in. H2O
Ps	=	29.15	in. Hg
Mw (same as Ms)	=	27.36	lb/lb-mole
Tm	=	92.53	degrees F
Tm	=	552.5	degrees R
Md	=	29.92	lb/lb-mole
Cp (for actual run)	=	0.84	
Meter Calibration Factor (Gamma)	=	0.9910	
Meter Box Delta H During Test	=	0.31	in. H2O
Meter Volume	=	19.243	dcf
Meter Volume at Std. Cond.	=	18.298	dscf
Avg. Sqare Root of Delta P	=	0.7114	
Velocity	=	50.14	ft/sec
Area of Nozzle	=	0.0001748	ft^2
Test Duration	=	59.7	min.
Isokinetics (rounded to nearest whole #)	=	111%	
No. of Points < 71% or > 129% Iso.	=	0	
Actual ΔPmin from run	=	0.43	in. H2O
Actual ΔPmax from run	=	0.58	in. H2O
Actual ΔPmin from run	=	0.43	in. H2O
Actual ΔPmax from run	=	0.58	in. H2O
No. of ΔPs outside of allowed range	=	0	
Recalculated μ	=	216.014	
Qs	=	0.583	acfm
D50 (for PM-10 cyclone I)	=	10.28	
Nre (actual test conditions)	=	2421	
C (where Dp = 2.5)	=	1.09	
D50 (for PM-2.5 cyclone IV)	=	2.43	
Cr	=	1.25	
D50-1	=	2.27	
Z	=	0.94	
Recalculated Cr	=	1.26	
Recalculated D50 (for cyclone IV)	=	2.25	
Recalculated D50-1	=	2.25	
Recalculated Z	=	1.00	

EPA Method 201A: Performance Criteria Calculations

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 3 OUTLET

Run Number	**U3O-M201A/202-R3**
Stack Gas Viscosity (micropoise)	217.071
Cyclone Flow Rate (dscf/min)	0.306
Cyclone Flow Rate (acfm)	0.585
D50	10.243

dPmin and dPmax Calculations and Performance:

Stack Gas Viscosity (micropoise)	215.734
Cyclone Flow Rate (acfm)	0.585
Vmstd - dscf	18.298
Sample Time - min	59.7
Ts	308.200
% O2	9.710
% Water	21.810
Vwc	4.236
Vsg	0.868
Ps	29.150
Mw	27.320
Cp	0.84
Nozzle Size(s) Used For Test:	0.179
Minimum dP During Test:	0.43
Maximum dP During Test:	0.58

Nozzle No.	Dn (in.)	vn (ft/s)	Conditional Step 1	Conditional Step 2	vmin (ft/s)	Conditional Rmax	Conditional Rmax	vmax (ft/s)	dPmin (in. H2O)	dPmax (in. H2O)	Acceptance Criteria	Nozzle Selection for Next Run
1	0.114	137.652	0.281	0.775	106.737	1.217	1.217	167.585	2.291	5.647		
2	0.129	107.501	0.269	0.764	82.133	1.225	1.225	131.705	1.356	3.488		
3	0.148	81.671	0.249	0.745	60.819	1.238	1.238	101.082	0.744	2.054		
4	0.158	71.660	0.236	0.732	52.447	1.246	1.246	89.259	0.553	1.602		
5	0.179	55.832	0.204	0.698	38.949	1.265	1.265	70.653	0.305	1.004	**OK**	**OK**
6	0.191	49.037	0.182	0.672	32.973	1.279	1.279	62.711	0.219	0.791		**OK**
7	0.201	44.279	0.161	0.647	28.667	1.291	1.291	57.172	0.165	0.657		**OK**
8	0.230	33.817	0.089	0.544	18.382	1.333	1.333	45.082	0.068	0.409		
9	0.253	27.948	0.016	0.374	10.447	1.373	1.373	38.371	0.022	0.296		
10	0.274	23.828	-0.062	0.500	11.914	1.414	1.414	33.703	0.029	0.228		
11	0.296	20.418	-0.158	0.500	10.209	1.463	1.463	29.869	0.021	0.179		

EPA Method 202: Gravimetric Data and Results

PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 3 OUTLET

SAMPLING DATA

Run number	**U3O-M201A/202-R3**
Corrected sample volume	18.298 dscf
	0.518 dscm
Corrected flow rate	152213 dscfm
O2 Content	9.71 %
CO2 Content	9.57 %

SUMMARY

COMPONENT	NET (grams)	CORRECTED FOR BLANK (grams)
FILTERABLE PM2.5		
Probe Wash	0.00130	0.00001
Filter	0.00060	0.00060
CONDENSIBLE PM2.5		
Inorganic CPM	0.00480	0.00299
Organic CPM	0.00680	0.00661
TOTAL CPM	0.01160	0.00960
TOTAL PM	0.01350	0.01021

ANALYTICAL DATA

METHOD 201A COMPONENTS	TARE (grams)	FINAL (grams)	NET (grams)	VOLUME (ml)
PM2.5 Acetone Probe Wash	66.6928	66.6941	0.00130	165
Acetone Blank Residue	67.9233	67.9245	0.00120	125
Applicable Acetone Blank			0.00158	
Max. Allowable Blank			0.00129	
Blank Value Used for Correction			0.00129	
Filter	0.3591	0.3597	0.00060	

METHOD 202 COMPONENTS	NET (grams)		Volume (mL)	CPM RATIO (%)
Inorganic CPM in Sample	0.00480		230	37.80%
Organic CPM in Sample	0.00680		198	62.20%
Inorganic CPM in Field Blank	0.00280		180	90.32%
Organic CPM in Field Blank	0.00040		240	9.68%
Total CPM in Field Blank	0.00390	*		
Max. Allowable Field Blank	0.00200			
Inorganic CPM Field Blank Value Used for Correction	0.00181	**		
Organic CPM Field Blank Value Used for Correction	0.00019	**		
Total CPM Field Blank Value Used for Correction	0.00200			

PM2.5 EMISSIONS

	FILTERABLE (FPM)	**Inorganic (CPM)**	**Organic (CPM)**	**Total (CPM)**	**TOTAL (FPM+CPM)**
Actual Grain Loading (gr/dscf)	0.0005	0.0025	0.0056	0.0081	0.0086
Corrected to 7% O2 (gr/dscf)	0.0006	0.0031	0.0069	0.0101	0.0107
Corrected to 12% CO2 (gr/dscf)	0.0006	0.0032	0.0070	0.0102	0.0108
Actual Grain Loading (mg/dscf)	1.17	5.78	12.75	18.53	19.70
Corrected to 7% O2 (mg/dscf)	1.45	7.18	15.84	23.01	24.47
Corrected to 12% CO2 (mg/dscf)	1.47	7.24	15.99	23.23	24.70
Mass Rate (lb/hr)	0.67	3.29	7.27	10.56	11.23

Notes

* The field blank value was corrected for the volume difference between the sample and the blank.
Field blank corrected value = actual value x sample volume over blank volume.

** If the Total CPM in Field Blank value is > 2 mg, then the inorganic and organic blank fractions were calculated by:
2 mg x CPM Ratio % of Uncorrected CPM in Field Blank (Inorganic or Organic, as applicable).

Appendix E

EPA Method 9 Data and Results

Note:

Visible emissions were uniformly zero percent opacity for all applicable test locations; therefore, this appendix contains no data and results for testing of those locations. Please refer to Appendix K for all of the raw field data sheets from the visible emissions evaluations.

Appendix F

Equations and Sample Calculations

EPA METHODS 2-4 CALCULATIONS

1. **Metered Gas Sample Volume at Standard Conditions**

$$V_{m(std)} = V_m \, x \, \gamma \, x \, \frac{528}{29.92} \, x \left[\frac{P_B + \frac{\Delta H}{13.6}}{T_m + 460} \right]$$

2. **Gas Volume of Water Vapor Collected in Impinger Liquid**

$$V_{WC(std)} = (v_f - v_i) \, x \, 0.04707$$

3. **Gas Volume of Water Vapor Collected in Silica Gel**

$$V_{wsg(std)} = (w_f - w_i) \, x \, 0.04715$$

4. **Moisture Volume Fraction in Flue Gas**

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

5. **Moisture Volume Percentage in Flue Gas**

$$\%H_2O = B_{ws} \, x \, 100$$

6. **Absolute Pressure of Flue Gas**

$$P_s = P_B + \frac{P_{static}}{13.6}$$

7. **Nitrogen Content of Flue Gas**

$$\%N_2 = 100 - (\%CO_2 + \%O_2 + \%CO)$$

8. **Dry Molecular Weight of Flue Gas**

$$M_d = 0.44 \, x \, \%CO_2 + 0.32 \, x \, \%O_2 + 0.28 \, x \, (\%N_2 + \%CO)$$

9. **Wet Molecular Weight of Flue Gas**

$$M_s = M_d \, x \, (1 - B_{ws}) + 18 \, x \, B_{ws}$$

EPA METHODS 2-4 CALCULATIONS - continued

10. Fuel Factor Based on Flue Gas Composition

$$F_o = \frac{20.9 - \%O_2}{\%CO_2}$$

11. Excess Air of Flue Gas

$$\%EA = \frac{\%O_2 - 0.5\%CO}{0.264\%N_2 - (\%O_2 - 0.5\%CO)} x100$$

12. Average Gas Velocity, ft/sec

$$v_s = 85.49 \, x \, C_p \, x (\Delta P^{1/2})_{avg} \, x \frac{(T_s + 460)^{1/2}}{(P_s \, x \, M_s)^{1/2}}$$

13. Area of Round Duct or Stack

$$A_s = \frac{\pi \, x \, D^2}{4 \, x \, 144} \quad (round \; ducts)$$

14. Area of Rectangular Duct

$$A_s = \frac{L \, x \, W}{144} \quad (rectangular \; ducts)$$

15. Actual Volumetric Flow Rate of Flue Gas

$$Q_a = v_s \, x \, A_s \, x \, 60$$

16. Flow Rate of Flue Gas at Standard Temperature and Pressure

$$Q_s = Q_a \, x \left[\frac{P_s \, x \, 528}{(T_s + 460) \, x \, 29.92} \right]$$

17. Dry Flow Rate of Flue Gas at Std. Temperature and Pressure

$$Q_{sd} = Q_s \, x (1 - B_{ws})$$

NOMENCLATURE FOR EPA METHODS 2-4

A_s	=	Stack area, ft^2
B_{ws}	=	Moisture volume fraction
C_p	=	Pitot tube coefficient (S-type≈0.84, Std.≈0.99)
D_s	=	Stack diameter, inches
ΔH	=	Average meter orifice pressure, in.W.C.
ΔP	=	Pitot tube differential pressure, in.W.C.
F_o	=	Combustion factor
γ	=	Meter calibration factor, gamma
L	=	Length of rectangular stack or duct, inches
M_D	=	Dry molecular weight, lb/lb-mole
M_s	=	Wet molecular weight, lb/lb-mole
P_B	=	Barometric pressure, in.Hg
P_s	=	Absolute stack pressure, in.Hg
P_{static}	=	Average static pressure, in.W.C.
Q_a	=	Actual gas flow rate, acfm
Q_s	=	Standard gas flow rate, scfm
Q_{sd}	=	Dry standard gas flow rate, dscfm
T_m	=	Average meter temperature, °F
T_s	=	Average stack temperature, °F
v_f	=	Final impinger volume, ml
v_i	=	Initial impinger volume, ml
V_m	=	Uncorrected metered gas volume, dcf
$V_{m(std)}$	=	Corrected gas volume, dscf
v_s	=	Average gas velocity, ft/sec
$V_{wc(std)}$	=	Gas volume of water caught in impingers, scf
$V_{wsg(std)}$	=	Gas volume of water caught in silica gel, scf
W	=	Width of rectangular stack or duct, inches
w_f	=	Final silica gel mass, grams
w_i	=	Initial silica gel mass, grams
$\%O_2$	=	Dry volumetric concentration of O_2, %dv
$\%CO_2$	=	Dry volumetric concentration of CO_2, %dv
%CO	=	Dry volumetric concentration of CO, %dv
$\%N_2$	=	Dry volumetric concentration of N_2, %dv
%EA	=	Percent excess air

Sample Calculations for Pinellas County RRF
April 2013 Testing

EPA Methods 2-4: Actual Calculations for Unit 1, Run 1
Run ID: U1O-M29-R1

1. Metered gas sample volume at standard conditions

   Vm(std) = 81.384*.9604*(528/29.92)*(30.02+(1.61/13.6))/(84+460)

   = 76.416 dscf

2. Gas volume of water vapor collected in impinger liquid

   Vwc(std) = (820-400.0)*0.04707

   = 19.769 scf

3. Gas volume of water vapor collected in silica gel

   Vwsg(std) = (270-250.0)*0.04715

   = 0.943 scf

4. Moisture volume fraction in flue gas

   Bws = (19.769+0.943)/(19.769+0.943+76.416)

   = 0.2132

5. Moisture volume percentage in flue gas

   %H2O = 0.2132 x 100

   = 21.32 %

6. Absolute pressure of flue gas

   Ps = 30.02+(-11.42/13.6)

   = 29.18 in. Hg

7. Nitrogen content of flue gas

   %N2 = 100-(9.98+9.37+0.0)

   = 80.65 %

8. Dry molecular weight of flue gas

   Md = (0.44*9.37)+(0.32*9.98)+(0.28*(80.65+0.0))

   = 29.90 lb/lb-mole

9. Wet molecular weight of flue gas

Ms = 29.90*(1-0.2132)+(18*0.2132)

= 27.36 lb/lb-mole

10. Fuel factor based on flue gas composition

Fo = (20.9-9.98)/9.37

= 1.165

11. Excess air of flue gas

%EA = (9.98-(0.5*0.0))/((0.264*80.65)-(9.98-(0.5*0.0)))*100

= 88.23 %

12. Average gas velocity

Vs = 85.49*0.84*0.6535*(((316+460)^0.5)/(29.18*27.36)^0.5)

= 46.27 ft/sec

13. Area of rectangular stack

As = (105*132)/144

= 96.25 square feet

14. Area of round duct or stack - not applicable

15. Actual volumetric flow rate of flue gas

Qa = 46.27*96.25*60

= 267209 acfm

16. Flow rate of flue gas at standard temperature and pressure

Qs = 267209*((29.18*528)/((316+460)*29.92))

= 177316 scfm

17. Dry flow rate of flue gas at standard temperature and pressure

Qsd = 177316*(1-0.2132)

= 139512 dscfm

Sample Calculations for Pinellas County RRF
April 2013 Testing

EPA Methods 2-4: Actual Calculations for Unit 2, Run 1
Run ID: U2O-M29-R1

1. Metered gas sample volume at standard conditions

   Vm(std) = 81.193*0.9604*(528/29.92)*(29.99+(1.6/13.6))/(77+460)

   = 77.152 dscf

2. Gas volume of water vapor collected in impinger liquid

   Vwc(std) = (753.0-400.0)*0.04707

   = 16.616 scf

3. Gas volume of water vapor collected in silica gel

   Vwsg(std) = (267.6-250.0)*0.04715

   = 0.830 scf

4. Moisture volume fraction in flue gas

   Bws = (16.616+0.830)/(16.616+0.830+77.152)

   = 0.1844

5. Moisture volume percentage in flue gas

   %H2O = 0.1844 x 100

   = 18.44 %

6. Absolute pressure of flue gas

   Ps = 29.99+(-10.75/13.6)

   = 29.20 in. Hg

7. Nitrogen content of flue gas

   %N2 = 100-(8.6+10.6+0.0)

   = 80.80 %

8. Dry molecular weight of flue gas

   Md = (0.44*8.6)+(0.32*10.6)+(0.28*(80.8+0.0))

   = 29.80 lb/lb-mole

9. Wet molecular weight of flue gas

Ms = 29.80*(1-0.1844)+(18*0.1844)

= 27.62 lb/lb-mole

10. Fuel factor based on flue gas composition

Fo = (20.9-10.6)/8.6

= 1.198

11. Excess air of flue gas

%EA = (10.6-(0.5*0.0))/((0.264*80.8)-(10.6-(0.5*0.0)))*100

= 99 %

12. Average gas velocity

Vs = 85.49*0.84*0.6498*(((294+460)^0.5)/(29.20*27.62)^0.5)

= 45.12 ft/sec

13. Area of rectangular stack

As = (105*132)/144

= 96.25 square feet

14. Area of round duct or stack - not applicable

15. Actual volumetric flow rate of flue gas

Qa = 45.12*96.25*60

= 260568 acfm

16. Flow rate of flue gas at standard temperature and pressure

Qs = 260568*((29.20*528)/((294+460)*29.92))

= 178076 scfm

17. Dry flow rate of flue gas at standard temperature and pressure

Qsd = 178076*(1-0.1844)

= 145239 dscfm

Sample Calculations for Pinellas County RRF
April 2013 Testing

EPA Methods 2-4: Actual Calculations for Unit 3, Run 1
Run ID: U3O-M29-R1

1. Metered gas sample volume at standard conditions

   Vm(std) = 78.811*0.9604*(528/29.92)*(29.84+(1.52/13.6))/(80+460)

   = 74.087 dscf

2. Gas volume of water vapor collected in impinger liquid

   Vwc(std) = (851-400.0)*0.04707

   = 21.229 scf

3. Gas volume of water vapor collected in silica gel

   Vwsg(std) = (270.4-250.0)*0.04715

   = 0.962 scf

4. Moisture volume fraction in flue gas

   Bws = (21.229+0.962)/(21.229+.962+74.087)

   = 0.2305

5. Moisture volume percentage in flue gas

   %H2O = 0.2305 x 100

   = 23.05 %

6. Absolute pressure of flue gas

   Ps = 29.84+(-11/13.6)

   = 29.03 in. Hg

7. Nitrogen content of flue gas

   %N2 = 100-(10.45+8.54+0.0)

   = 81.01 %

8. Dry molecular weight of flue gas

   Md = (0.44*10.45)+(0.32*8.54)+(0.28*(81.01+0.0))

   = 30.01 lb/lb-mole

9. Wet molecular weight of flue gas

Ms = 30.01*(1-0.2305)+(18*0.2305)

= 27.24 lb/lb-mole

10. Fuel factor based on flue gas composition

Fo = (20.9-8.54)/10.45

= 1.183

11. Excess air of flue gas

%EA = (8.54-(0.5*0.0))/((0.264*81.01)-(8.54-(0.5*0.0)))*100

= 66 %

12. Average gas velocity

Vs = 85.49*0.84*0.6324*(((308+460)^0.5)/(29.03*27.24)^0.5)

= 44.75 ft/sec

13. Area of rectangular stack

As = (105*132)/144

= 96.25 square feet

14. Area of round duct or stack - not applicable

15. Actual volumetric flow rate of flue gas

Qa = 44.75*96.25*60

= 258431 acfm

16. Flow rate of flue gas at standard temperature and pressure

Qs = 258431*((29.03*528)/((308+460)*29.92))

= 172386 scfm

17. Dry flow rate of flue gas at standard temperature and pressure

Qsd = 172386*(1-0.2305)

= 132651 dscfm

EPA METHOD 5 GRAVIMETRIC CALCULATIONS

1. PM Collected in Probe Wash - M_{pw}

$$M_{pw} = (W_{pw})_{final} - (W_{pw})_{tare}$$

2. Applicable Acetone Blank Correction - B_{apw}

$$B_{apw} = [(W_{ab})_{final} - (W_{ab})_{tare}] \times \frac{v_{pw}}{v_{ab}}$$

3. Maximum Allowable Acetone Blank - B_{amax}

$$B_{amax} = 0.7845 \times 0.00001 \times v_{pw}$$

4. Actual Probe Wash Blank Correction - B_{pw}

$$B_{pw} = MINIMUM\ [B_{apw},\ B_{amax}]$$

5. PM Collected on Filter - M_f

$$M_f = (W_f)_{final} - (W_f)_{tare}$$

6. Total PM Collected for Method 5 Calculations - M_5

$$M_5 = M_{pw} + M_f - B_{pw}$$

NOMENCLATURE

B_{amax}	=	Maximum allowable acetone blank correction, based on weight of acetone in probe wash, grams
B_{apw}	=	Acetone blank correction based on residue of blank, grams
B_{pw}	=	Acetone blank correction actually used, grams
M_5	=	Total mass of particulate in train corrected for acetone blank, grams
M_f	=	Mass gain of filter, grams
M_{pw}	=	Probe wash residue, grams
v_{ab}	=	Liquid volume of acetone blank, ml
v_{pw}	=	Liquid volume of probe wash, ml
$(W_{ab})_{final}$	=	Final weight of beaker containing acetone blank residue, grams
$(W_{ab})_{tare}$	=	Tare weight of beaker containing acetone blank residue, grams
$(W_f)_{final}$	=	Final weight of filter, grams
$(W_f)_{tare}$	=	Tare weight of filter, grams
$(W_{pw})_{final}$	=	Final weight of beaker containing probe wash residue, grams
$(W_{pw})_{tare}$	=	Tare weight of beaker containing probe wash residue, grams

Sample Calculations for Pinellas County RRF
April 2013 Testing

EPA Method 5: Actual Calculations for Unit 1, Run 1
Run ID: U1O-M26A-R1

1. PM collected in probe wash

   Mpw = 65.2145-65.2035

   = 0.01100 grams

2. Applicable acetone blank correction

   Bapw = (66.9915-66.9920)*(100/150)

   = -0.00033 grams (Negative result treated as Zero)

3. Maximum allowable acetone blank

   Bamax = 0.7845*0.00001*100

   = 0.00078 grams

4. Actual probe wash blank correction

   Bpw = minimum (0.00000, 0.00078)

   = 0.00000 grams

5. PM collected on filter

   Mf = .3729-.3703

   = 0.00260 grams

6. Total PM collected for method 5 calculations

   M5 = 0.01100+0.00260-0.0000

   = 0.01360 grams

Sample Calculations for Pinellas County RRF
April 2013 Testing

EPA Method 5: Actual Calculations for Unit 2, Run 1
Run ID: U2O-M26A-R1

1. PM collected in probe wash

   Mpw = 66.3375-66.3244

   = 0.01310 grams

2. Applicable acetone blank correction

   Bapw = (66.9915-66.9920)*(100/150)

   = -0.00033 grams (Negative result treated as Zero)

3. Maximum allowable acetone blank

   Bamax = 0.7845*0.00001*100

   = 0.00078 grams

4. Actual probe wash blank correction

   Bpw = minimum (0.00000, 0.00078)

   = 0.00000 grams

5. PM collected on filter

   Mf = 0.3826-0.3813

   = 0.00130 grams

6. Total PM collected for method 5 calculations

   M5 = 0.01310+0.00130-0.00000

   = 0.01440 grams

Sample Calculations for Pinellas County RRF
April 2013 Testing

EPA Method 5: Actual Calculations for Unit 3, Run 1
Run ID: U3O-M26A-R1

1. PM collected in probe wash

   Mpw = 67.1468-67.1311

   = 0.01570 grams

2. Applicable acetone blank correction

   Bapw = (66.9915-66.9920)*(100/150)

   = -0.00033 grams (Negative result treated as Zero)

3. Maximum allowable acetone blank

   Bamax = 0.7845*0.00001*190

   = 0.00149 grams

4. Actual probe wash blank correction

   Bpw = minimum (0.00000, 0.00078)

   = 0.00000 grams

5. PM collected on filter

   Mf = 0.3706-0.3696

   = 0.00100 grams

6. Total PM collected for method 5 calculations

   M5 = 0.01570+0.00100+0.0000

   = 0.01670 grams

PARTICULATE EMISSIONS CALCULATIONS

1. **Particulate Concentration - C_{sd}**

$$C_{sd} = \frac{\Sigma(M_i)}{V_{m(std)}} \times \frac{7000}{453.593}$$

2. **Particulate Concentration Corrected to 7% O_2 - C_{sd}@7%O_2**

$$C_{sd@7\%} = C_{sd} \times \frac{20.9 - 7.0}{20.9 - \%O_2}$$

3. **Particulate Concentration Corrected to 12% CO_2 - C_{sd}@12%CO_2**

$$C_{sd@12\%} = C_{sd} \times \frac{12}{\%CO_2}$$

4. **Particulate Concentration Corrected to 50% Excess Air - C_{sd}@50%EA**

$$C_{sd@50\%EA} = C_{sd} \times \frac{100 + \%EA}{150}$$

5. **Particulate Mass Rate - M_p**

$$M_p = \frac{\Sigma(M_i)}{V_{m(std)}} \times Q_{sd} \times \frac{60}{453.593}$$

6. **Isokinetic Variation - %ISO**

$$\%Iso = \frac{0.09450 \times (T_s + 460) \times V_{m(std)}}{P_s \times v_s \times A_n \times time \times (1 - B_{ws})}$$

PARTICULATE EMISSIONS CALCULATIONS (continued)

NOMENCLATURE

A_n	=	Nozzle area, ft^2
B_{ws}	=	Moisture volume fraction
C_{sd}	=	Particulate concentration, grains/dscf
D_n	=	Nozzle diameter, inches
ΣM_i	=	Summation of PM collected in sample train, grams
M_p	=	Mass rate of particulate emissions, lb/hr
P_s	=	Absolute stack pressure, in.Hg
Q_{sd}	=	Dry standard gas flow rate, dscfm
time	=	Net sampling time, minutes
T_s	=	Average stack temperature, ^oF
$V_{m(std)}$	=	Corrected gas volume, dscf
v_s	=	Average gas velocity, ft/sec
$\%O_2$	=	Dry volumetric concentration of O_2, %dv
$\%CO_2$	=	Dry volumetric concentration of CO_2, %dv
%EA	=	Percent excess air
%Iso	=	Percent isokinetics

PARTICULATE EMISSIONS CALCULATIONS (METRIC)

1. **Total sample weight - W_i (milligrams)***

$$W_i = M_5 \times 1000$$

2. **Particulate Concentration - Cm_i (milligrams/dscm)**

$$C_{m_i} = \frac{W_i \times 35.3145}{Vmstd}$$

3. **Particulate Concentration corrected to 7% O_2 - C_{mi7}**

$$C_{mi_7} = C_{mi} \times \frac{13.9}{20.9 - \%O_2}$$

4. **Particulate Concentration corrected to 12% CO_2 - C_{mi12}**

$$C_{mi_{12}} = C_{mi} \times \frac{12}{\%CO_2}$$

5. **Particulate Concentration Corrected to 50% Excess Air - C_{mi}@50%EA**

$$C_{mi\,@\,50\%\,EA} = C_{mi}\, x \frac{100 + \%EA}{150}$$

6. **Particulate Mass Rate - M_p**

$$G_i = \frac{M_5 \times Q_{sd} \times 60}{V_{mstd} \times 453.593}$$

7. **Isokinetic Variation - %ISO**

$$\%Iso = \frac{0.09450\, x\, (T_s + 460)\, x\, V_{m(std)}}{P_s\, x\, v_s\, x\, A_n\, x\, time\, x\, (1 - B_{ws})}$$

NOMENCLATURE

A_n	=	Nozzle Area (ft^2)
B_{ws}	=	Moisture volume fraction
C_{mi}	=	Particulate concentration (mg/dscm)
M_5	=	Total mass of particulate matter (grams)
M_P	=	Mass Rate of particulate emissions (lb/hr)
P_s	=	Absolute Stack Pressure (in. Hg)
Q_{sd}	=	stack gas flow rate (dscfm)
time	=	Net sampling time (minutes)
T_s	=	Average Stack Temperature (°F)
Vmstd	=	the volume of gas sampled at STP (dscf)
v_s	=	Average Gas Velocity (ft/sec)
W_i	=	total sample weight (milligrams)
$\%O_2$	=	oxygen content in stack gas, dry %
$\%CO_2$	=	carbon dioxide content in stack gas, dry %
%EA	=	Percent excess air
% ISO	=	Percent Isokinetics
60	=	min/hr
1000	=	milligrams per gram
35.3145	=	cubic feet per cubic meter
453.593	=	grams/lb

Sample Calculations for Pinellas County RRF
April 2013 Testing

EPA Method 5: Actual Calculations for Unit 1, Run 1
Run ID: U1O-M26A-R1

1. Particulate concentration

Csd	= (0.01360/77.672)*7000/453.593		
	=	0.00270	gr/dscf
	= (0.01360/77.672)*35.3145*1000		
	=	6.18340	mg/dscm

2. Particulate concentration corrected to 7% O2

Csd@7%O2	= 0.00270*((20.9-7.0)/(20.9-9.6))		
	=	0.00332	gr/dscf @ 7%O2
	= 6.18340*((20.9-7.0)/(20.9-9.6))		
	=	7.60613	mg/dscm @ 7%O2

3. Particulate concentration corrected to corrected to 12% CO2

Csd@12%CO2	= 6.18340*(12/9.6)		
	=	7.72925	mg/dscm @ 12%CO2

4. Particulate concentration corrected to 50% excess air

Csd@50%EA	= 6.18340*((100+81)/150)		
	=	7.46130	mg/dscm @ 50%EA

5. Particulate mass rate

Mp	= (0.01360/77.672)*137153*(60/453.593)		
	=	3.1766	lb/hr

6. Isokinetic variation

%ISO	= (0.0945*(315+460)*77.672)/(29.24*45.20*0.000428*120*(1-0.2111))		
	=	106.2	%

nozzle area	=	0.000428	ft2

Sample Calculations for Pinellas County RRF
April 2013 Testing

EPA Method 5: Actual Calculations for Unit 2, Run 1
Run ID: U2O-M26A-R1

1. Particulate concentration

Csd	= (0.01440/78.551)*7000/453.593	
	= 0.00283	gr/dscf
	= (0.01440/78.551)*35.3145*1000	
	= 6.47387	mg/dscm

2. Particulate concentration corrected to 7% O2

Csd@7%O2	= 0.00283*((20.9-7.0)/(20.9-10.7))	
	= 0.00386	gr/dscf @ 7%O2
	= 6.47387*((20.9-7.0)/(20.9-10.7))	
	= 8.82223	mg/dscm @ 7%O2

3. Particulate concentration corrected to corrected to 12% CO2

Csd@12%CO2	= 6.47387*(12/8.5)	
	= 9.13958	mg/dscm @ 12%CO2

4. Particulate concentration corrected to 50% excess air

Csd@50%EA	= 6.47387*((100+102)/150)	
	= 8.71814	mg/dscm @ 50%EA

5. Particulate mass rate

Mp	= (0.01440/78.551)*148964*(60/453.593)	
	= 3.6122	lb/hr

6. Isokinetic variation

%ISO	= (0.0945*(295+460)*78.551)/(29.16*45.61*0.000427606*120*(1-0.1704))	
	= 99.0	%

nozzle area	= 0.000427606	ft2

Sample Calculations for Pinellas County RRF
April 2013 Testing

EPA Method 5: Actual Calculations for Unit 3, Run 1
Run ID: U3O-M26A-R1

1. Particulate concentration

   Csd = (0.01670/77.227)*7000/453.593

   = 0.00334 gr/dscf

   = (0.0167/77.227)*35.3145*1000

   = 7.63661 mg/dscm

2. Particulate concentration corrected to 7% O2

   Csd@7%O2 = 0.00334*((20.9-7.0)/(20.9-8.3))

   = 0.00368 gr/dscf @ 7%O2

   = 7.63661*((20.9-7.0)/(20.9-8.3))

   = 8.42451 mg/dscm @ 7%O2

3. Particulate concentration corrected to corrected to 12% CO2

   Csd@12%CO2 = 7.63661*(12/10.7)

   = 8.56442 mg/dscm @ 12%CO2

4. Particulate concentration corrected to 50% excess air

   Csd@50%EA = 7.63661*((100+64)/150)

   = 8.34936 mg/dscm @ 50%EA

5. Particulate mass rate

   Mp = (0.0167/77.227)*135446*(60/453.593)

   = 3.8743 lb/hr

6. Isokinetic variation

   %ISO = (0.0945*(306+460)*77.227)/(29.07*45.17*0.000427606*120*(1-0.2246))

   = 107.0 %

   nozzle area = 0.000427606 ft2

EPA METHOD 26A CALCULATIONS

1. MASS OF HCl IN SAMPLE - mg

$$M_H = (C_H - C_B) \, x \, V_o \, x \left(\frac{1 \, liter}{1000 \, mliter} \right)$$

2. CONCENTRATION OF HCl - ppmdv

$$C_{H(D)} = \frac{M_H}{V_{m(std)}} \, x \left(\frac{1 \, gram}{1000 \, mg} \right) x \left(\frac{g - mole}{MW_H \, grams} \right) x \left(\frac{0.84948 \, ft^3}{g - mole} \right) x \, 10^6$$

3. CONCENTRATION AT 7% O_2 - ppmdv

$$C_{7_H} = C_{H(D)} \, x \, \frac{20.9 - 7.0}{20.9 - \%O_2}$$

4. HOURLY EMISSIONS RATE - lb/hr

$$E_H = \frac{C_{H(D)} \, x \, Q_{sd} \, x \, 60 \, x \, MW_H}{10^6 \, x \, 0.84948 \, x \, 453.593}$$

NOMENCLATURE FOR EPA METHOD 26A

C_B	=	concentration of HCl in blank - mg/L
C_H	=	concentration of HCl in sample - mg/L
$C_{H(D)}$	=	Dry basis HCl concentration - ppmdv
C_{7H}	=	Concentration of gas HCl corrected to 7% O_2
E_H	=	Mass emissions rate of HCl - lb/hr
M_H	=	Mass of HCl in sample - mg
MW_H	=	Molecular weight of HCl
	=	36.461
Q_{sd}	=	Average flue gas flow rate - dscfm
$V_{m(std)}$	=	Sample gas volume - dscf
V_o	=	Volume of sample solution - mL
$\%O_2$	=	Actual gas concentration of O_2, % dry volume
60	=	Minutes per hour
0.84948	=	Molar volume of ideal gas - ft^3/mole
453.593	=	Grams per pound
10^6	=	Parts per million

Sample Calculations for Pinellas County RRF
April 2013 Testing

EPA Method 26A: Actual Calculations for Unit 1, Run 1
Run ID: U1O-M26A-R1

1. Mass of HCl in sample

   M_H = 20.30 mg (ND Blank = 0)

   Note: Non-detect blank treated as zero.

2. Concentration of HCl

   $C_{H(D)}$ = (20.30/77.672)*(1/1000)*(0.84948/36.461)*10^6

   = 6.09 ppmdv

3 Concentration at 7% O2

   C_{7H} = 6.09*((20.9-7.0)/(20.9-9.56))

   = 7.46 ppmdv @ 7% O2

4 Hourly emissions rate

   C_{HCl} = (6.09*137153*60*36.461/10^6/0.84948/453.593)

   = 4.74 lb/hr

Sample Calculations for Pinellas County RRF
April 2013 Testing

EPA Method 26A: Actual Calculations for Unit 2, Run 1
Run ID: U2O-M26A-R1

1. Mass of HCl in sample

   M_H = 24.10 mg (ND Blank = 0)

   Note: Non-detect blank treated as zero.

2. Concentration of HCl

   $C_{H(D)}$ = (24.1/78.551)*(1/1000)*(0.84948/36.461)*10^6

   = 7.15 ppmdv

3 Concentration at 7% O2

   C_{7H} = 7.15*((20.9-7)/(20.9-10.74))

   = 9.78 ppmdv @ 7% O2

4 Hourly emissions rate

   C_{HCl} = (7.15*148964*60*36.461/10^6/0.84948/453.593)

   = 6.05 lb/hr

Sample Calculations for Pinellas County RRF
April 2013 Testing

EPA Method 26A: Actual Calculations for Unit 3, Run 1
Run ID: U3O-M26A-R1

1. Mass of HCl in sample

   M_H = 63.90 mg (ND Blank = 0)

   Note: Non-detect blank treated as zero.

2. Concentration of HCl

   $C_{H(D)}$ = (63.90/77.227)*(1/1000)*(0.84948/36.461)*10^6

   = 19.28 ppmdv

3 Concentration at 7% O2

   C_{7H} = 19.28*((20.9-7.0)/(20.9-8.33))

   = 21.32 ppmdv @ 7% O2

4 Hourly emissions rate

   C_{HCl} = (19.28*135492*60*36.461/10^6/0.84948/453.593)

   = 14.83 lb/hr

EPA METHOD 29 METALS CALCULATIONS

1. Total sample weight - W_i (micrograms)*

For Mercury:

$$W_i = [m_{front} - mb_{front}] + [m_{back} - mb_{back}]$$

For All Metals Except Mercury:

$$W_i = [m_{front} + m_{back}] - [mb_{front} + mb_{back}]$$

2. Gas Concentration - Cm_i (micrograms/dscm)

$$C_{m_i} = \frac{W_i \times 35.3145}{Vmstd}$$

3. Concentration corrected to 7% O_2, C_{i7}

$$C_{i_7} = C_i \times \frac{13.9}{20.9 - \%O_2}$$

4. Concentration corrected to 12% CO_2, C_{i12}

$$C_{i_{12}} = C_i \times \frac{12}{\%CO_2}$$

5. The mass flow rate of substance (I), G_i (lb/hr),

$$G_i = \frac{W_i \times Q_{sd} \times 60}{V_{mstd} \times 10^6 \times 453.593}$$

NOMENCLATURE

i	=	metal of interest (e.g., Hg)
m_{front}	=	total sample weight collected in front half of sample train (micrograms)
m_{back}	=	total sample weight collected in back half of sample train (micrograms)
mb_{front}	=	front half blank correction (micrograms)
mb_{back}	=	back half blank correction (micrograms)
Q_{sd}	=	stack gas flow rate (dscfm)
Vmstd	=	the volume of gas sampled at STP (dscf)
W_i	=	total sample weight of *i* (micrograms)
$\%O_2$	=	oxygen content in stack gas, dry %
$\%CO_2$	=	carbon dioxide content in stack gas, dry %
60	=	min/hr
10^6	=	micrograms per gram
35.3145	=	cubic feet per cubic meter
453.593	=	grams/lb

EPA METHOD 29 METALS CALCULATIONS (continued)

*BLANK CORRECTION RULES

For All Metals Except Mercury (combined front half and back half fractions)
If the measured blank value is in the range of 0.0 to 1.0 µg, then use that value to correct the total sample value. If the blank value exceeds 1.0 µg, then the greater of the two following values may be used: (1) 1.0 µg, or (2) 5 percent of the total sample.

For Mercury (separate front half and back half fractions)
If the sum of the front and back half blank values is in the range of 0.0 to 0.6 µg, then use this value. If it exceeds 0.6 µg, then use the greater of (a) 0.6 µg or (b) the lesser of the sum of the front and back half blank values or 5 percent of the emission sample value (all mercury fractions added together).

METALS CALCULATION RULES

For All Fractions above MDL (Minimum Detection Limit)
Emissions are calculated using arithmetic sum of all fractions. Results are reported as detected or actual emissions (no "<" prefix designation).

For One (Or More) Fractions above MDL and One (Or More) Fractions below MDL
Emissions are calculated based only on the data above the MDL. Data below the MDL are treated as zero. Results are reported as detected or actual emissions (no "<" prefix designation).

For All Fractions below MDL
Emissions are calculated based on arithmetic sum of all fractions. Results are reported as being less than the MDL (preceded with "<" designation).

In cases where the blank corrected sample total is less than the MDL, the MDL is applied.

Sample Calculations for Pinellas County RRF
April 2013 Testing

EPA Method 29: Actual Calculations for Unit 1, Run 1
Run ID: U1O-M29-R1

1. Total sample weight (Pb)

   W_i = (26.0-0.83)

   = 25.17 µg

2. Gas concentration (Pb)

   C_{mi} = (25.17*35.3145)/76.456

   = 11.63 µg/dscm

3 Concentration (Pb) corrected to 7% O2

   C_{i7} = 11.63*(13.9/(20.9-9.98))

   = 14.80 µg/dscm @ 7% O2

4 Concentration (Pb) corrected to 12% CO2

   C_{i12} = 11.63*(12/9.37)

   = 14.89 µg/dscm @ 12% CO2

5 The mass flow rate of substance (Pb)

   G_i = (25.17*139513*60)/76.456/10^6/453.593

   = 6.08E-03 lb/hr

Sample Calculations for Pinellas County RRF
April 2013 Testing

EPA Method 29: Actual Calculations for Unit 2, Run 1
Run ID: U2O-M29-R1

1. Total sample weight (Pb)

   W_i = (19.30-0.83)

   = 18.47 µg

2. Gas concentration (Pb)

   C_{mi} = (18.47*35.3145)/77.137

   = 8.46 µg/dscm

3 Concentration (Pb) corrected to 7% O2

   C_{i7} = 8.46*(13.9/(20.9-10.60))

   = 11.42 µg/dscm @ 7% O2

4 Concentration (Pb) corrected to 12% CO2

   C_{i12} = 8.46*(12/8.60)

   = 11.80 µg/dscm @ 12% CO2

5 The mass flow rate of substance (Pb)

   G_i = (18.47*145261*60)/77.137/10^6/453.593

   = 4.60E-03 lb/hr

Sample Calculations for Pinellas County RRF
April 2013 Testing

EPA Method 29: Actual Calculations for Unit 3, Run 1
Run ID: U3O-M29-R1

1. Total sample weight (Pb)

   W_i = (19.7-0.83)

   = 18.87 µg

2. Gas concentration (Pb)

   C_{mi} = (18.87*35.3145)/74.099

   = 8.99 µg/dscm

3 Concentration (Pb) corrected to 7% O2

   C_{i7} = 8.99*(13.9/(20.9-8.54))

   = 10.11 µg/dscm @ 7% O2

4 Concentration (Pb) corrected to 12% CO2

   C_{i12} = 8.99*(12/10.45)

   = 10.32 µg/dscm @ 12% CO2

5 The mass flow rate of substance (Pb)

   G_i = (18.87*132648*60)/74.099/10^6/453.593

   = 4.47E-03 lb/hr

REDUCTION EFFICIENCY CALCULATION

1. Reduction efficiency

$$Eff = \frac{M_i - M_o}{M_i} x\,100$$

or

$$Eff = \frac{Ci - C_o}{C_i} x\,100$$

Nomenclature

Eff	=	Reduction efficiency, percent
C_i	=	Pollutant concentration, corrected to 7% oxygen (ppmdv @ 7% O_2), at inlet to control device
C_o	=	Pollutant concentration, corrected to 7% oxygen (ppmdv @ 7% O_2), at outlet to control device
M_i	=	Pollutant mass emissions rate (lb/hr) at inlet to control device
M_o	=	Pollutant mass emissions rate (lb/hr) at outlet to control device
100	=	Correction for percentage calculation

Sample Calculations for Pinellas County RRF
April 2013 Testing

Reduction Efficiency: Actual Calculations for Unit 1, Run 1
Run IDs: U1O-M29-R1 / U1IN-M29-R1

1. Reduction Efficiency (Hg lb/hr)

   Eff = (2.07E-02-1.48E-03)/2.07E-02*100

   = 92.9 %

Sample Calculations for Pinellas County RRF
April 2013 Testing

Reduction Efficiency: Actual Calculations for Unit 2, Run 1
Run IDs: U2O-M29-R1 / U2IN-M29-R1

1. Reduction Efficiency (Hg lb/hr)

   Eff = (1.61E-02-5.25E-04)/1.61E-02*100

   = 96.7 %

Sample Calculations for Pinellas County RRF
April 2013 Testing

Reduction Efficiency: Actual Calculations for Unit 3, Run 1
Run IDs: U3O-M29-R1 / U3IN-M29-R1

1. Reduction Efficiency (Hg lb/hr)

   Eff = (4.91E-02-2.83E-03)/4.91E-02*100

   = 94.2 %

EPA METHOD 201A EQUATIONS

Molecular Weight of Dry Gas

eq 1	Md	=	0.44*CO2+0.32*O2+0.28*(100-O2-CO2)

Molecular Weight of Wet Gas

eq 2	Mw	=	Md*(1 - Bws) + 18*(Bws)

Gas Stream Viscosity

eq 3	μ	=	C1 + C2*(Ts^0.5) + C3*(Ts^-2) + C4*(O2wet) - C5*Bws + C6*Bws*Ts^2

Cunningham Correction Factor

eq 4	C	=	1 + 0.0057193 * (μ/(Ps*Dp))*(Ts/Mw)^0.5

Lower Limit Cut Diameter for Cyclone I for Nre < 3,162

eq 5	D50LL	=	9.507 * C^0.3007 * ((Mw*Ps)/Ts)^0.1993

Cut Diameter for Cyclone I for the Middle of the Overlap Zone

eq 6	D50T	=	((11 + D50LL)/2)

Sampling Rate Using Both PM10 and PM2.5 Cyclones

eq 7	Qs	=	Qi	=	0.07296 * μ *((Ts/(Mw*Ps))^0.2949)*(1/D50T)^1.4102

Sampling Rate Using Only PM2.5 Cyclone

eq 8 and 9	QIV	=	Not applicable.

Reynolds Number

eq 10	Nre	=	(8.64*10^5) * ((Ps*Mw)/Ts) * (Qs/μ)

EPA METHOD 201A EQUATIONS

Meter Box Orifice Pressure Drop

eq 11	ΔH	=	(((Qs*(1-Bws)*Ps)/Ts)^2) * ((1.083*Tm*Md*ΔH@)/Pbar)

Lower Limit Cut Diameter for Cyclone I for Nre ≥ 3,162

eq 12	D50LL	=	10.0959 * C^0.4400 * ((Mw*Ps)/Ts)^0.0600

Velocity of Stack Gas

eq 13	Vs	=	Kp * Cp * (Δp^0.5)avg * (Ts/(Ps*Mw))^0.5

Calculated Nozzle Diameter for Acceptable Sampling Rate

eq 14	D	=	((3.056*Qs)/Vs)^0.5

Velocity of Gas in Nozzle

eq 15	Vn	=	(Qs/60)/An

Minimum Nozzle/Stack Velocity Ratio Parameter

eq 16	Rmin	=	0.2457+(0.3072-((0.2603*μ*Qs^0.5)/Vn^1.5)^0.5)

Maximum Nozzle/Stack Velocity Ratio Parameter

eq 17	Rmax	=	0.4457+(0.5690-((0.2603*μ*Qs^0.5)/Vn^1.5)^0.5)

Minimum Gas Velocity for Rmin < 0.5

eq 18	Rmin < 0.5	Vmin	=	Vn * 0.5

EPA METHOD 201A EQUATIONS

Minimum Gas Velocity for Rmin ≥ 0.5

eq 19	Rmin ≥ 0.5	Vmin	=	Vn * Rmin

Maximum Gas Velocity for Rmax < 1.5

eq 20	Rmax < 1.5	Vmax	=	Vn * Rmax

Maximum Gas Velocity for Rmax ≥ 1.5

eq 21	Rmax ≥ 1.5	Vmax	=	Vn * 1.5

Minimum Velocity Pressure

eq 22		ΔPmin	=	(1.3686*10^-4)*((Ps*Mw)/Ts)*(Vmin/Cp)^2

Maximum Velocity Pressure

eq 23		ΔPmax	=	(1.3686*10^-4)*((Ps*Mw)/Ts)*(Vmax/Cp)^2

Sampling Dwell Time at Each Point

eq 24		tn	=	(Cp*(ΔP1)^0.5) / (C'p*(ΔP_1^0.5)avg) * (tr/Ntp)

Adjusted Velocity Pressure

eq 25		Δps	=	ΔPm*(Cp/C'p)^2

Average Probe Blockage Factor

eq 26		bf	=	22.0 / A

EPA METHOD 201A EQUATIONS

Velocity Pressure

eq 27	Δps2	=	Δps1*(1/(1-bf))^2	

Dry Gas Volume Sampled at Standard Conditions

eq 28	Vms	=	(528*29.92)*(Y*Vm)*((Pbar+(ΔH/13.6))/Tm)	

Sample Flow Rate at Standard Conditions

eq 29	QsST	=	Vms / theta	

Volume of Water Vapor

eq 30	Vwc	=	0.04707 * Vc	(for liquid impingers)
	Vsg	=	0.04715 * Vc	(for silica gel impinger)
	Vws	=	Vwc + Vsg	

Moisture Content of Gas Stream

eq 31	Bws	=	Vws / (Vms+Vws)	

Sampling Rate

eq 32	Qs	=	(29.92/528)*QsST*(1/(1-Bws))*(Ts/Ps)	

Actual Particle Cut Diameter for Cyclone I

eq 33	D50	=	0.15625*((Ts/(Mw*Ps))^0.2091)*(μ/Qs)^0.7091	

Particle Cut Diameter for Nre < 3,162 for Cyclone IV

eq 34	D50	=	0.0024302*((μ/Qs)^1.1791)*((1/C)^0.5)*((Ts/(Ps*Mw))^0.6790)	

EPA METHOD 201A EQUATIONS

Particle Cut Diameter for Nre ≥ 3,162 for Cyclone IV

eq 35 $D50 = 0.019723*((\mu/Qs)^{0.8058})*((1/C)^{0.5})*((Ts/(Ps*Mw))^{0.3058})$

Re-estimated Cunningham Correction Factor

eq 36 $Cr = 1+0.0057193*(\mu/(Ps*D50))*(Ts/Mw)^{0.5}$

Re-calculated Particle Cut Diameter for Nre < 3,162

eq 37 $D50\text{-}1 = 0.0024302*((\mu/Qs)^{1.1791})*((1/Cr)^{0.5})*((Ts/(Ps*Mw))^{0.3058})$

Re-calculated Particle Cut Diameter for Nre ≥ 3,162

eq 38 $D50\text{-}1 = 0.019723*((\mu/Qs)^{0.8058})*((1/Cr)^{0.5})*((Ts/(Ps*Mw))^{0.3058})$

Ratio (Z) Between D50 and D50-1 Values

eq 39 $Z = D50\text{-}1 / D50$

Acceptance Criteria for Z Values

eq 40 $0.99 \leq [\, Z = (D50N / D50N+1) \,] \leq 1.01$

Percent Isokinetic Sampling

eq 41 $I = (100*Ts*Vms*29.92)/(60*Vs*theta*An*Ps*(1-Bws)*528)$

Acetone Blank Concentration

eq 42 $Ca = ma/(Va*\rho a)$

EPA METHOD 201A EQUATIONS

Acetone Blank Correction Weight

eq 43	$M_{(2)}$	=	$W_{(2)} - Wa_{(2)}$
	$M_{(3,4)}$	=	$W_{(3,4)} - Wa_{(3,4)}$

Acetone Blank Weight

eq 44	Wa	=	Ca*Vaw*ρa

Concentration of Total Filterable Particulate Matter

eq 45	Ctf	=	(7000/453592)*((M1+M2+M3+M4)/Vms)

Concentration of Filterable PM10 Particulate Matter

eq 46	Cf PM10	=	(7000/453592)*((M1+M3+M4)/Vms)

Concentration of Filterable PM2.5 Particulate Matter

eq 47	Cf PM2.5	=	(7000/453592)*((M1+M4)/Vms)

EPA METHOD 201A EQUATIONS

Nomenclature

A = Area of stack or duct at sampling location, square inches.

A_n = Area of nozzle, square feet.

b_f = Average blockage factor calculated in Equation 26, dimensionless.

B_{ws} = Moisture content of gas stream, fraction (e.g., 10 percent H_2O is B_{ws} = 0.10).

C = Cunningham correction factor for particle diameter, D_p, and calculated using the actual stack gas temperature, dimensionless.

$\%CO_2$ = Carbon Dioxide content of gas stream, percent by volume.

C_a = Acetone blank concentration, mg/mg.

$CfPM_{10}$ = Conc. of filterable PM_{10}, gr/DSCF.

$CfPM_{2.5}$ = Conc. of filterable $PM_{2.5}$, gr/DSCF.

C_p = Pitot coefficient for the combined cyclone pitot, dimensionless.

C_p' = Coefficient for the pitot used in the preliminary traverse, dimensionless.

C_r = Re-estimated Cunningham correction factor for particle diameter equivalent to the actual cut size diameter and calculated using the actual stack gas temperature, dimensionless.

C_{tf} = Conc. of total filterable PM, gr/DSCF.

C_1 = -150.3162 (micropoise)

C_2 = 18.0614 (micropoise/$K^{0.5}$)
= 13.4622 (micropoise/$R)^{0.5}$

C_3 = 1.19183 × 10^6 (micropoise/K^2)
= 3.86153 × 10^6 (micropoise/R^2)

C_4 = 0.591123 (micropoise)

C_5 = 91.9723 (micropoise)

C_6 = 4.91705 × 10^{-5} (micropoise/K^2)
= 1.51761 × 10^{-5} (micropoise/R^2)

D = Inner diameter of sampling nozzle mounted on Cyclone I, inches.

D_p = Physical particle size, micrometers.

EPA METHOD 201A EQUATIONS

D_{50} = Particle cut diameter, micrometers.

$D_{50\text{-}1}$ = Re-calculated particle cut diameters based on re-estimated C_r, micrometers.

D_{50LL} = Cut diameter for cyclone I corresponding to the 2.25 micrometer cut diameter for cyclone IV, micrometers.

D_{50N} = D_{50} value for cyclone IV calculated during the Nth iterative step, micrometers.

$D_{50(N+1)}$ = D_{50} value for cyclone IV calculated during the N+1 iterative step, micrometers.

D_{50T} = Cyclone I cut diameter corresponding to the middle of the overlap zone shown in Figure 10 of Section 17, micrometers.

I = Percent isokinetic sampling, dimensionless.

K_p = 85.49, ((ft/sec)/(pounds/mole -^oR)).

m_a = Mass of residue of acetone after evaporation, mg.

M_d = Molecular weight of dry gas, pounds/pound mole.

mg = Milligram.

mg/L = Milligram per liter.

M_w = Molecular weight of wet gas, pounds/pound mole.

M_1 = Milligrams of PM collected on the filter, less than or equal to 2.5 micrometers.

M_2 = Milligrams of PM recovered from Container #2 (acetone blank corrected), greater than 10 micrometers.

M_3 = Milligrams of PM recovered from Container #3 (acetone blank corrected), less than or equal to 10 and greater than 2.5 micrometers.

M_4 = Milligrams of PM recovered from Container #4 (acetone blank corrected), less than or equal to 2.5 micrometers.

N_{tp} = Number of iterative steps or total traverse points.

N_{re} = Reynolds number, dimensionless.

EPA METHOD 201A EQUATIONS

$\%O_{2,wet}$ = Oxygen content of gas stream, % by volume of wet gas. (Note: The oxygen percentage used in Equation 3 is on a wet gas basis. That means that since oxygen is typically measured on a dry gas basis, the measured percent O_2 must be multiplied by the quantity $(1 - B_{ws})$ to convert to the actual volume fraction. Therefore, $\%O_{2,wet} = (1 - B_{ws}) * \%O_{2, dry}$)

P_{bar} = Barometric pressure, inches Hg.

P_s = Absolute stack gas pressure, inches Hg.

Q_s = Sampling rate for cyclone I to achieve specified D_{50}.

Q_{sST} = Dry gas sampling rate through the sampling assembly, DSCFM.

Q_I = Sampling rate for cyclone I to achieve specified D_{50}.

R_{max} = Nozzle/stack velocity ratio parameter, dimensionless.

R_{min} = Nozzle/stack velocity ratio parameter, dimensionless.

T_m = Meter box and orifice gas temperature, ^oR.

t_n = Sampling time at point n, min.

t_r = Total projected run time, min.

T_s = Absolute stack gas temperature, ^oR.

t_1 = Sampling time at point 1, min.

v_{max} = Maximum gas velocity calculated from Equations 18 or 19, ft/sec.

v_{min} = Minimum gas velocity calculated from Equations 16 or 17, ft/sec.

v_n = Sample gas velocity in the nozzle, ft/sec.

v_s = Velocity of stack gas, ft/sec.

V_a = Volume of acetone blank, ml.

V_{aw} = Volume of acetone used in sample recovery wash, ml.

V_c = Quantity of water captured in impingers and silica gel, ml.

V_m = Dry gas meter volume sampled, ACF.

V_{ms} = Dry gas meter volume sampled, corrected to standard conditions, DSCF.

V_{ws} = Volume of water vapor, SCF.

EPA METHOD 201A EQUATIONS

V_b = Volume of aliquot taken for IC analysis, ml.

V_{ic} = Volume of impinger contents sample, ml.

W_a = Weight of blank residue in acetone used to recover samples, mg.

$W_{2,3,4}$ = Weight of PM recovered from Containers #2, #3, and #4, mg.

Z = Ratio between estimated cyclone IV D50 values, dimensionless.

ΔH = Meter box orifice pressure drop, inches W.C.

$\Delta H_@$ = Pressure drop across orifice at flow rate of 0.75 SCFM at standard conditions, inches W.C. (Note: Specific to each orifice and meter box.)

$[(\Delta p)^{0.5}]_{avg}$ = Average of square roots of the velocity pressures measured during the preliminary traverse, inches W.C.

Δp_m = Observed velocity pressure using S-type pitot tube in preliminary traverse, inches W.C.

Δp_{avg} = Average velocity pressure, inches W.C.

Δp_{max} = Maximum velocity pressure, inches W.C.

Δp_{min} = Minimum velocity pressure, inches W.C.

Δp_n = Velocity pressure measured at point n during the test run, inches W.C.

Δp_s = Velocity pressure calculated in Equation 25, inches W.C.

Δp_{s1} = Velocity pressure adjusted for combined cyclone pitot tube, inches W.C.

Δp_{s2} = Velocity pressure corrected for blockage, inches W.C.

Δp_1 = Velocity pressure measured at point 1, inches W.C.

γ = Dry gas meter gamma value, dimensionless.

μ = Gas viscosity, micropoise.

θ = Total run time, min.

ρ_a = Density of acetone, mg/ml.

12.0 = Constant calculated as 60 percent of 20.5 square inch cross-sectional area of combined cyclone head, square inches.

EPA METHOD 201A CALCULATIONS
PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 1 OUTLET
U1O-M201A/202-R1

Molecular Weight of Dry Gas

eq 1	Md	=	0.44*CO2+0.32*O2+0.28*(100-O2-CO2)
		=	29.93

Molecular Weight of Wet Gas

eq 2	Mw	=	Md*(1 - Bws) + 18*(Bws)
		=	27.70

Gas Stream Viscosity

eq 3	μ	=	C1 + C2*(Ts^0.5) + C3*(Ts^-2) + C4*(O2wet) - C5*Bws + C6*Bws*Ts^2
		=	222.23

Cunningham Correction Factor

eq 4	C	=	1 + 0.0057193 * (μ/(Ps*Dp))*(Ts/Mw)^0.5
		=	1.09

Lower Limit Cut Diameter for Cyclone I for Nre < 3,162

eq 5	D50LL	=	9.507 * C^0.3007 * ((Mw*Ps)/Ts)^0.1993
		=	9.82

Cut Diameter for Cyclone I for the Middle of the Overlap Zone

eq 6	D50T	=	((11 + D50LL)/2)
		=	10.41 (Depends on value of Nre from Eq. 10)

Sampling Rate Using Both PM10 and PM2.5 Cyclones

eq 7	Qs =	Qi	=	0.07296 * μ *((Ts/(Mw*Ps))^0.2949)*(1/D50T)^1.4102
			=	0.591

Sampling Rate Using Only PM2.5 Cyclone

eq 8 and 9	QIV	=	Not applicable.

Reynolds Number

eq 10	Nre	=	(8.64*10^5) * ((Ps*Mw)/Ts) * (Qs/μ)
			Qs obtained from Eq. 32
		=	2392

Meter Box Orifice Pressure Drop

eq 11	ΔH	=	(((Qs*(1-Bws)*Ps)/Ts)^2) * ((1.083*Tm*Md*ΔH@)/Pbar)
		=	0.32

Lower Limit Cut Diameter for Cyclone I for Nre ≥ 3,162

eq 12	D50LL	=	10.0959 * C^0.4400 * ((Mw*Ps)/Ts)^0.0600
		=	10.52

Velocity of Stack Gas

eq 13	Vs	=	Kp * Cp * (Δp^0.5)avg * (Ts/(Ps*Mw))^0.5
		=	85.49 * Cp * (Δp^0.5)avg * (Ts/(Ps*Mw))^0.5
		=	49.08

Calculated Nozzle Diameter for Acceptable Sampling Rate

eq 14		D	=	((3.056*Qs)/Vs)^0.5
			=	0.193

Velocity of Gas in Nozzle

eq 15		Vn	=	(Qs/60)/An
			=	55.36

Minimum Nozzle/Stack Velocity Ratio Parameter

eq 16		Rmin	=	0.2457+(0.3072-((0.2603*μ*Qs^0.5)/Vn^1.5)^0.5)
			=	0.692

Maximum Nozzle/Stack Velocity Ratio Parameter

eq 17		Rmax	=	0.4457+(0.5690-((0.2603*μ*Qs^0.5)/Vn^1.5)^0.5)
			=	1.268

Minimum Gas Velocity for Rmin < 0.5

eq 18	Rmin < 0.5	Vmin	=	Vn * 0.5
			=	Not applicable

Minimum Gas Velocity for Rmin ≥ 0.5

eq 19	Rmin ≥ 0.5	Vmin	=	Vn * Rmin
			=	38.317

Maximum Gas Velocity for Rmax < 1.5

eq 20	Rmax < 1.5	Vmax	=	Vn * Rmax
			=	70.228

Maximum Gas Velocity for Rmax ≥ 1.5

eq 21	Rmax ≥ 1.5	Vmax	=	Vn * 1.5
			=	Not applicable

Minimum Velocity Pressure

eq 22		ΔPmin	=	(1.3686*10^-4)*((Ps*Mw)/Ts)*(Vmin/Cp)^2
			=	0.298

Maximum Velocity Pressure

eq 23		ΔPmax	=	(1.3686*10^-4)*((Ps*Mw)/Ts)*(Vmax/Cp)^2
			=	0.990

Sampling Dwell Time at Each Point

eq 24		tn	=	(Cp*(ΔP1)^0.5) / (C'p*(ΔP_1^0.5)avg) * (tr/Ntp)
			=	1.96

Adjusted Velocity Pressure

eq 25		Δps	=	ΔPm*(Cp/C'p)^2
			=	0.44 (Point 1 from preliminary traverse)

Average Probe Blockage Factor

eq 26		bf	=	22.0 / A
			=	Not Applicable

Velocity Pressure

eq 27	Δps2	=	Δps1*(1/(1-bf))^2
		=	Not Applicable

Dry Gas Volume Sampled at Standard Conditions

eq 28	Vms	=	(528*29.92)*(Y*Vm)*((Pbar+(ΔH/13.6))/Tm)
		=	18.964

Sample Flow Rate at Standard Conditions

eq 29	QsST	=	Vms / theta
		=	Meter Volume at Std. Cond. / minutes of test duration
		=	0.319

Volume of Water Vapor

eq 30	Vwc	=	0.04707 * Vc	(for liquid impingers)
		=	3.860	
	Vsg	=	0.04715 * Vc	(for silica gel impinger)
		=	0.495	
	Vws	=	Vwc + Vsg	
		=	4.355	

Moisture Content of Gas Stream

eq 31	Bws	=	Vws / (Vms+Vws)
		=	0.1867

Sampling Rate

eq 32	Qs	=	(29.92/528)*QsST*(1/(1-Bws))*(Ts/Ps)
		=	0.598

Actual Particle Cut Diameter for Cyclone I

eq 33	D50	=	0.15625*((Ts/(Mw*Ps))^0.2091)*(μ/Qs)^0.7091
		=	10.32 (Not applicable to PM2.5 only.)

Particle Cut Diameter for Nre < 3,162 for Cyclone IV

eq 34	D50	=	0.0024302*((μ/Qs)^1.1791)*((1/C)^0.5)*((Ts/(Ps*Mw))^0.6790)
		=	2.45 (Not applicable to PM10 only.)

Particle Cut Diameter for Nre ≥ 3,162 for Cyclone IV

eq 35	D50	=	0.019723*((μ/Qs)^0.8058)*((1/C)^0.5)*((Ts/(Ps*Mw))^0.3058)
		=	Not applicable (Not applicable to PM10 only.)

Re-estimated Cunningham Correction Factor

eq 36	Cr	=	1+0.0057193*(μ/(Ps*D50))*(Ts/Mw)^0.5
		=	1.25 (Not applicable to PM10 only.)

Re-calculated Particle Cut Diameter for Nre < 3,162

eq 37	D50-1	=	0.0024302*((μ/Qs)^1.1791)*((1/Cr)^0.5)*((Ts/(Ps*Mw))^0.3058)
		=	2.28 (Not applicable to PM10 only.)

Re-calculated Particle Cut Diameter for Nre ≥ 3,162

eq 38	D50-1	=	0.019723*((μ/Qs)^0.8058)*((1/Cr)^0.5)*((Ts/(Ps*Mw))^0.3058)
		=	Not applicable (Not applicable to PM10 only.)

Ratio (Z) Between D50 and D50-1 Values

eq 39 Z = D50-1 / D50

= 0.93 (Not applicable to PM10 only.)
(final Z value is below in eq 40)

Acceptance Criteria for Z Values

eq 40 $0.99 \leq$ [Z = (D50N / D50N+1)] ≤ 1.01

= 1.00 (Not applicable to PM10 only.)

Percent Isokinetic Sampling

eq 41 I = (100*Ts*Vms*29.92)/(60*Vs*theta*An*Ps*(1-Bws)*528)

= 116.0%

Acetone Blank Concentration

eq 42 Ca = ma/(Va*ρa)

= 1.22E-05

Acetone Blank Correction Weight

eq 43 $M_{(4)}$ = $W_{(4)} - Wa_{(4)}$

= 0.00000

Acetone Blank Weight

eq 44 Wa = Ca*Vaw*ρa

= 0.00163 (for PM2.5 fraction)

Concentration of Total Filterable Particulate Matter

eq 45 Ctf = (7000/453592)*((M1+M2+M3+M4)/Vms)

= Not applicable to PM2.5 only

Concentration of Filterable PM10 Particulate Matter

eq 46 Cf PM10 = (7000/453592)*((M1+M3+M4)/Vms)

= Not applicable to PM2.5 only

Concentration of Filterable PM2.5 Particulate Matter

eq 47 Cf PM2.5 = (7000/453592)*((M1+M4)/Vms)

= 0.0006

EPA METHOD 201A CALCULATIONS
PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 2 OUTLET
U2O-M201A/202-R1

Molecular Weight of Dry Gas

eq 1 Md = 0.44*CO2+0.32*O2+0.28*(100-O2-CO2)

= 29.86

Molecular Weight of Wet Gas

eq 2 Mw = Md*(1 - Bws) + 18*(Bws)

= 27.94

Gas Stream Viscosity

eq 3 μ = C1 + C2*(Ts^0.5) + C3*(Ts^-2) + C4*(O2wet) - C5*Bws + C6*Bws*Ts^2

= 219.43

Cunningham Correction Factor

eq 4 C = 1 + 0.0057193 * (μ/(Ps*Dp))*(Ts/Mw)^0.5

= 1.09

Lower Limit Cut Diameter for Cyclone I for Nre < 3,162

eq 5 D50LL = 9.507 * C^0.3007 * ((Mw*Ps)/Ts)^0.1993

= 9.88

Cut Diameter for Cyclone I for the Middle of the Overlap Zone

eq 6 D50T = ((11 + D50LL)/2)

= 10.44 (Depends on value of Nre from Eq. 10)

Sampling Rate Using Both PM10 and PM2.5 Cyclones

eq 7 Qs = Qi = 0.07296 * μ *((Ts/(Mw*Ps))^0.2949)*(1/D50T)^1.4102

= 0.575

Sampling Rate Using Only PM2.5 Cyclone

eq 8 and 9 QIV = Not applicable.

Reynolds Number

eq 10 Nre = (8.64*10^5) * ((Ps*Mw)/Ts) * (Qs/μ)

Qs obtained from Eq. 32

= 2457

Meter Box Orifice Pressure Drop

eq 11 ΔH = (((Qs*(1-Bws)*Ps)/Ts)^2) * ((1.083*Tm*Md*ΔH@)/Pbar)

= 0.33

Lower Limit Cut Diameter for Cyclone I for Nre ≥ 3,162

eq 12 D50LL = 10.0959 * C^0.4400 * ((Mw*Ps)/Ts)^0.0600

= 10.53

Velocity of Stack Gas

eq 13 Vs = Kp * Cp * (Δp^0.5)avg * (Ts/(Ps*Mw))^0.5

= 85.49 * Cp * (Δp^0.5)avg * (Ts/(Ps*Mw))^0.5

= 44.93

Calculated Nozzle Diameter for Acceptable Sampling Rate

eq 14		D	=	((3.056*Qs)/Vs)^0.5
			=	0.194

Velocity of Gas in Nozzle

eq 15		Vn	=	(Qs/60)/An
			=	47.50

Minimum Nozzle/Stack Velocity Ratio Parameter

eq 16		Rmin	=	0.2457+(0.3072-((0.2603*μ*Qs^0.5)/Vn^1.5)^0.5)
			=	0.664

Maximum Nozzle/Stack Velocity Ratio Parameter

eq 17		Rmax	=	0.4457+(0.5690-((0.2603*μ*Qs^0.5)/Vn^1.5)^0.5)
			=	1.283

Minimum Gas Velocity for Rmin < 0.5

eq 18	Rmin < 0.5	Vmin	=	Vn * 0.5
			=	Not applicable

Minimum Gas Velocity for Rmin ≥ 0.5

eq 19	Rmin ≥ 0.5	Vmin	=	Vn * Rmin
			=	31.543

Maximum Gas Velocity for Rmax < 1.5

eq 20	Rmax < 1.5	Vmax	=	Vn * Rmax
			=	60.953

Maximum Gas Velocity for Rmax ≥ 1.5

eq 21	Rmax ≥ 1.5	Vmax	=	Vn * 1.5
			=	Not applicable

Minimum Velocity Pressure

eq 22		ΔPmin	=	(1.3686*10^-4)*((Ps*Mw)/Ts)*(Vmin/Cp)^2
			=	0.208

Maximum Velocity Pressure

eq 23		ΔPmax	=	(1.3686*10^-4)*((Ps*Mw)/Ts)*(Vmax/Cp)^2
			=	0.766

Sampling Dwell Time at Each Point

eq 24		tn	=	(Cp*(ΔP1)^0.5) / (C'p*(ΔP_1^0.5)avg) * (tr/Ntp)
			=	2.12

Adjusted Velocity Pressure

eq 25		Δps	=	ΔPm*(Cp/C'p)^2
			=	0.49 (Point 1 from preliminary traverse)

Average Probe Blockage Factor

eq 26		bf	=	22.0 / A
			=	Not Applicable

Velocity Pressure

eq 27	Δps2	=	Δps1*(1/(1-bf))^2
		=	Not Applicable

Dry Gas Volume Sampled at Standard Conditions

eq 28	Vms	=	(528*29.92)*(Y*Vm)*((Pbar+(ΔH/13.6))/Tm)
		=	21.895

Sample Flow Rate at Standard Conditions

eq 29	QsST	=	Vms / theta
		=	Meter Volume at Std. Cond. / minutes of test duration
		=	0.330

Volume of Water Vapor

eq 30	Vwc	=	0.04707 * Vc	(for liquid impingers)
		=	3.907	
	Vsg	=	0.04715 * Vc	(for silica gel impinger)
		=	0.330	
	Vws	=	Vwc + Vsg	
		=	4.237	

Moisture Content of Gas Stream

eq 31	Bws	=	Vws / (Vms+Vws)
		=	0.1621

Sampling Rate

eq 32	Qs	=	(29.92/528)*QsST*(1/(1-Bws))*(Ts/Ps)
		=	0.585

Actual Particle Cut Diameter for Cyclone I

eq 33	D50	=	0.15625*((Ts/(Mw*Ps))^0.2091)*(μ/Qs)^0.7091
		=	10.31 (Not applicable to PM2.5 only.)

Particle Cut Diameter for Nre < 3,162 for Cyclone IV

eq 34	D50	=	0.0024302*((μ/Qs)^1.1791)*((1/C)^0.5)*((Ts/(Ps*Mw))^0.6790)
		=	2.42 (Not applicable to PM10 only.)

Particle Cut Diameter for Nre ≥ 3,162 for Cyclone IV

eq 35	D50	=	0.019723*((μ/Qs)^0.8058)*((1/C)^0.5)*((Ts/(Ps*Mw))^0.3058)
		=	Not applicable (Not applicable to PM10 only.)

Re-estimated Cunningham Correction Factor

eq 36	Cr	=	1+0.0057193*(μ/(Ps*D50))*(Ts/Mw)^0.5
		=	1.24 (Not applicable to PM10 only.)

Re-calculated Particle Cut Diameter for Nre < 3,162

eq 37	D50-1	=	0.0024302*((μ/Qs)^1.1791)*((1/Cr)^0.5)*((Ts/(Ps*Mw))^0.3058)
		=	2.26 (Not applicable to PM10 only.)

Re-calculated Particle Cut Diameter for Nre ≥ 3,162

eq 38	D50-1	=	0.019723*((μ/Qs)^0.8058)*((1/Cr)^0.5)*((Ts/(Ps*Mw))^0.3058)
		=	Not applicable (Not applicable to PM10 only.)

Ratio (Z) Between D50 and D50-1 Values

eq 39	Z	=	D50-1 / D50
		=	0.94 (Not applicable to PM10 only.) (final Z value is below in eq 40)

Acceptance Criteria for Z Values

eq 40	0.99 ≤ [Z	=	(D50N / D50N+1)] ≤ 1.01
		=	1.00 (Not applicable to PM10 only.)

Percent Isokinetic Sampling

eq 41	I	=	(100*Ts*Vms*29.92)/(60*Vs*theta*An*Ps*(1-Bws)*528)
		=	109.0%

Acetone Blank Concentration

eq 42	Ca	=	ma/(Va*ρa)
		=	1.22E-05

Acetone Blank Correction Weight

eq 43	$M_{(4)}$	=	$W_{(4)}$ - $Wa_{(4)}$
		=	0.00000

Acetone Blank Weight

eq 44	Wa	=	Ca*Vaw*ρa
		=	0.00221 (for PM2.5 fraction)

Concentration of Total Filterable Particulate Matter

eq 45	Ctf	=	(7000/453592)*((M1+M2+M3+M4)/Vms)
		=	Not applicable to PM2.5 only

Concentration of Filterable PM10 Particulate Matter

eq 46	Cf PM10	=	(7000/453592)*((M1+M3+M4)/Vms)
		=	Not applicable to PM2.5 only

Concentration of Filterable PM2.5 Particulate Matter

eq 47	Cf PM2.5	=	(7000/453592)*((M1+M4)/Vms)
		=	0.0003

EPA METHOD 201A CALCULATIONS
PINELLAS COUNTY RESOURCE RECOVERY FACILITY
UNIT 3 OUTLET
U3O-M201A/202-R1

Molecular Weight of Dry Gas

eq 1	Md	=	0.44*CO2+0.32*O2+0.28*(100-O2-CO2)
		=	29.96

Molecular Weight of Wet Gas

eq 2	Mw	=	Md*(1 - Bws) + 18*(Bws)
		=	27.51

Gas Stream Viscosity

eq 3	μ	=	C1 + C2*(Ts^0.5) + C3*(Ts^-2) + C4*(O2wet) - C5*Bws + C6*Bws*Ts^2
		=	217.25

Cunningham Correction Factor

eq 4	C	=	1 + 0.0057193 * (μ/(Ps*Dp))*(Ts/Mw)^0.5
		=	1.09

Lower Limit Cut Diameter for Cyclone I for Nre < 3,162

eq 5	D50LL	=	9.507 * C^0.3007 * ((Mw*Ps)/Ts)^0.1993
		=	9.84

Cut Diameter for Cyclone I for the Middle of the Overlap Zone

eq 6	D50T	=	((11 + D50LL)/2)
		=	10.42 (Depends on value of Nre from Eq. 10)

Sampling Rate Using Both PM10 and PM2.5 Cyclones

eq 7	Qs =	Qi	=	0.07296 * μ *((Ts/(Mw*Ps))^0.2949)*(1/D50T)^1.4102
			=	0.575

Sampling Rate Using Only PM2.5 Cyclone

eq 8 and 9	QIV	=	Not applicable.

Reynolds Number

eq 10	Nre	=	(8.64*10^5) * ((Ps*Mw)/Ts) * (Qs/μ)
			Qs obtained from Eq. 32
		=	2428

Meter Box Orifice Pressure Drop

eq 11	ΔH	=	(((Qs*(1-Bws)*Ps)/Ts)^2) * ((1.083*Tm*Md*ΔH@)/Pbar)
		=	0.35

Lower Limit Cut Diameter for Cyclone I for Nre ≥ 3,162

eq 12	D50LL	=	10.0959 * C^0.4400 * ((Mw*Ps)/Ts)^0.0600
		=	10.51

Velocity of Stack Gas

eq 13	Vs	=	Kp * Cp * (Δp^0.5)avg * (Ts/(Ps*Mw))^0.5
		=	85.49 * Cp * (Δp^0.5)avg * (Ts/(Ps*Mw))^0.5
		=	50.50

Calculated Nozzle Diameter for Acceptable Sampling Rate

eq 14		D	=	((3.056*Qs)/Vs)^0.5
			=	0.187

Velocity of Gas in Nozzle

eq 15		Vn	=	(Qs/60)/An
			=	54.67

Minimum Nozzle/Stack Velocity Ratio Parameter

eq 16		Rmin	=	0.2457+(0.3072-((0.2603*μ*Qs^0.5)/Vn^1.5)^0.5)
			=	0.694

Maximum Nozzle/Stack Velocity Ratio Parameter

eq 17		Rmax	=	0.4457+(0.5690-((0.2603*μ*Qs^0.5)/Vn^1.5)^0.5)
			=	1.267

Minimum Gas Velocity for Rmin < 0.5

eq 18	Rmin < 0.5	Vmin	=	Vn * 0.5
			=	Not applicable

Minimum Gas Velocity for Rmin ≥ 0.5

eq 19	Rmin ≥ 0.5	Vmin	=	Vn * Rmin
			=	37.947

Maximum Gas Velocity for Rmax < 1.5

eq 20	Rmax < 1.5	Vmax	=	Vn * Rmax
			=	69.280

Maximum Gas Velocity for Rmax ≥ 1.5

eq 21	Rmax ≥ 1.5	Vmax	=	Vn * 1.5
			=	Not applicable

Minimum Velocity Pressure

eq 22		ΔPmin	=	(1.3686*10^-4)*((Ps*Mw)/Ts)*(Vmin/Cp)^2
			=	0.298

Maximum Velocity Pressure

eq 23		ΔPmax	=	(1.3686*10^-4)*((Ps*Mw)/Ts)*(Vmax/Cp)^2
			=	0.999

Sampling Dwell Time at Each Point

eq 24		tn	=	(Cp*(ΔP1)^0.5) / (C'p*(ΔP$_1$^0.5)avg) * (tr/Ntp)
			=	1.99

Adjusted Velocity Pressure

eq 25		Δps	=	ΔPm*(Cp/C'p)^2
			=	0.52 (Point 1 from preliminary traverse)

Average Probe Blockage Factor

eq 26		bf	=	22.0 / A
			=	Not Applicable

Velocity Pressure

eq 27	Δps2	=	Δps1*(1/(1-bf))^2
		=	Not Applicable

Dry Gas Volume Sampled at Standard Conditions

eq 28	Vms	=	(528*29.92)*(Y*Vm)*((Pbar+(ΔH/13.6))/Tm)
		=	17.918

Sample Flow Rate at Standard Conditions

eq 29	QsST	=	Vms / theta
		=	Meter Volume at Std. Cond. / minutes of test duration
		=	0.312

Volume of Water Vapor

eq 30	Vwc	=	0.04707 * Vc	(for liquid impingers)
		=	4.001	
	Vsg	=	0.04715 * Vc	(for silica gel impinger)
		=	0.599	
	Vws	=	Vwc + Vsg	
		=	4.600	

Moisture Content of Gas Stream

eq 31	Bws	=	Vws / (Vms+Vws)
		=	0.2043

Sampling Rate

eq 32	Qs	=	(29.92/528)*QsST*(1/(1-Bws))*(Ts/Ps)
		=	0.586

Actual Particle Cut Diameter for Cyclone I

eq 33	D50	=	0.15625*((Ts/(Mw*Ps))^0.2091)*(μ/Qs)^0.7091
		=	10.27 (Not applicable to PM2.5 only.)

Particle Cut Diameter for Nre < 3,162 for Cyclone IV

eq 34	D50	=	0.0024302*((μ/Qs)^1.1791)*((1/C)^0.5)*((Ts/(Ps*Mw))^0.6790)
		=	2.42 (Not applicable to PM10 only.)

Particle Cut Diameter for Nre ≥ 3,162 for Cyclone IV

eq 35	D50	=	0.019723*((μ/Qs)^0.8058)*((1/C)^0.5)*((Ts/(Ps*Mw))^0.3058)
		=	Not applicable (Not applicable to PM10 only.)

Re-estimated Cunningham Correction Factor

eq 36	Cr	=	1+0.0057193*(μ/(Ps*D50))*(Ts/Mw)^0.5
		=	1.25 (Not applicable to PM10 only.)

Re-calculated Particle Cut Diameter for Nre < 3,162

eq 37	D50-1	=	0.0024302*((μ/Qs)^1.1791)*((1/Cr)^0.5)*((Ts/(Ps*Mw))^0.3058)
		=	2.25 (Not applicable to PM10 only.)

Re-calculated Particle Cut Diameter for Nre ≥ 3,162

eq 38	D50-1	=	0.019723*((μ/Qs)^0.8058)*((1/Cr)^0.5)*((Ts/(Ps*Mw))^0.3058)
		=	Not applicable (Not applicable to PM10 only.)

Ratio (Z) Between D50 and D50-1 Values

eq 39 Z = D50-1 / D50

= 0.93 (Not applicable to PM10 only.)
(final Z value is below in eq 40)

Acceptance Criteria for Z Values

eq 40 $0.99 \leq$ [Z = (D50N / D50N+1)] ≤ 1.01

= 1.00 (Not applicable to PM10 only.)

Percent Isokinetic Sampling

eq 41 I = (100*Ts*Vms*29.92)/(60*Vs*theta*An*Ps*(1-Bws)*528)

= 111.0%

Acetone Blank Concentration

eq 42 Ca = ma/(Va*ρa)

= 1.22E-05

Acetone Blank Correction Weight

eq 43 $M_{(4)}$ = $W_{(4)} - Wa_{(4)}$

= 0.00282

Acetone Blank Weight

eq 44 Wa = Ca*Vaw*ρa

= 0.00144 (for PM2.5 fraction)

Concentration of Total Filterable Particulate Matter

eq 45 Ctf = (7000/453592)*((M1+M2+M3+M4)/Vms)

= Not applicable to PM2.5 only

Concentration of Filterable PM10 Particulate Matter

eq 46 Cf PM10 = (7000/453592)*((M1+M3+M4)/Vms)

= Not applicable to PM2.5 only

Concentration of Filterable PM2.5 Particulate Matter

eq 47 Cf PM2.5 = (7000/453592)*((M1+M4)/Vms)

= 0.00278

EPA METHOD 202 CONDENSABLE PM EMISSIONS CALCULATIONS

1. Mass of Field Blank

$$M_{Fb} = M_{ib} * IS_{vol}/IB_{vol} + M_{ob} * OS_{vol}/OB_{vol}$$

**Note: The max allowable field blank is 0.002 grams*

2. Total Condensable Particulate Matter (CPM)

$$M_{CPM} = M_{ic} + M_o - M_{FB}$$

3. Particulate Concentration

$$C_{sd}\ (gr/dscf) = \frac{M_{CPM}}{V_{m(std)}} * \frac{7000}{453.593}$$

or

$$C_{sd}\ (mg/dscm) = \frac{M_{CPM}}{V_{m(std)}} * \frac{1000*35.3145}{1}$$

4. Particulate Concentration Corrected to 7% O_2

$$C_{sd@7\%} = C_{sd} * \frac{20.9 - 7.0}{(20.9 - \%O2)}$$

5. Particulate Concentration Corrected to 12% CO_2

$$C_{sd@12\%} = C_{sd} * \frac{12}{\%CO_2}$$

6. Particulate Emissions Rate

$$M_p = \frac{\sum(M_i)}{V_{m(std)}} * Q_{sd} * \frac{60}{453.593}$$

7. Heat Input (O_2 based)

$$T_{C\text{-}O2} = \frac{60 * Q_{sd}}{F_d} * \frac{20.9 - \%O_2}{20.9}$$

EPA METHOD 202 CONDENSABLE PM EMISSIONS CALCULATIONS (continued)

8. Particulate Mass Rate (O_2 based)

$$E_{O2} = \frac{M_p}{T_{C\text{-}O2}}$$

9. Heat Input (CO_2 based)

$$T_{C\text{-}CO2} = \frac{60 * Q_{sd} * \%CO_2}{F_c * 100}$$

10. Particulate Mass Rate (CO_2 based)

$$E_{CO2} = \frac{M_p}{T_{C\text{-}CO2}}$$

Nomenclature for EPA Method 202 Condensable PM Emissions Calculations

IB_{vol}	=	Inorganic blank volume (milliliters)
IS_{vol}	=	Inorganic sample volume (milliliters)
OB_{vol}	=	Organic blank volume (milliliters)
OS_{vol}	=	Organic sample volume (milliliters)
M_{ib}	=	Inorganic blank weight (grams)
M_{ob}	=	Organic blank correction (grams)
M_{FB}	=	Total mass of Inorganic + Organic blank correction (grams)
M_{CPM}	=	Total mass of CPM in sample (grams)
M_{ic}	=	Mass of Inorganic CPM in sample (grams)
M_o	=	Mass of Organic CPM in sample (grams)
Q_{sd}	=	Stack gas flow rate (dscfm)
M_p	=	Mass rate of particulate emissions (lb/hr)
V_{mstd}	=	The volume of gas sampled at STP (dscf)
C_{sd}	=	Particulate concentration (gr/dscf or mg/dscm)
$C_{sd@7\%}$	=	Particulate concentration @7% O2 (gr/dscf or mg/dscm)
$C_{sd@12\%}$	=	Particulate concentration @12% CO2 (gr/dscf or mg/dscm)
$\%O_2$	=	Oxygen content in stack gas (dry %)
$\%CO_2$	=	Carbon dioxide content in stack gas (dry %)
T_{CO2}	=	Heat input, CO2 based (MMBtu/hr)
T_{O2}	=	Heat input, O2 based (MMBtu/hr)
E_{CO2}	=	Particulate Mass Emissions rate, CO2 based (lb/MMBtu)
E_{O2}	=	Particulate Mass Emissions rate, O2 based (lb/MMBtu)
60	=	min/hr
7000	=	grains/lb
453.593	=	grams/lb
35.3145	=	cubic feet per cubic meter
1000	=	milligrams per gram

EPA METHOD 202 CONDENSABLE PM EMISSIONS CALCULATIONS

EPA Method 201A: Gravimetric Data and Results
UNIT 1 OUTLET
U1O-M201A/202-R1

1. Mass of Field Blank

$M_{Fb} = M_{ib} * IS_{vol}/IB_{vol} + M_{ob} * OS_{vol}/OB_{vol}$

**Note: The max allowable field blank is 0.002 grams*

= 0.0028*260/180+0.0004*232/240
= 0.0044 g
= 0.002 g (max allowed)

2. Total Condensable Particulate Matter (CPM)

$M_{CPM} = M_{ic} + M_o - M_{FB}$

= 0.0036+0.0076-0.002
= 0.0092 g

3. Particulate Concentration

$$C_{sd} = \frac{M_{CPM}}{V_{m(std)}} * \frac{7000}{453.593}$$

or

$$= \frac{M_{CPM}}{V_{m(std)}} * \frac{1000*35.3145}{1}$$

= 0.0092/18.964*7000/453.593
= 0.0075 gr/dscf
or
= 0.0092*1000*35.3145/18.964
= 17.13 mg/dscm

4. Particulate Concentration Corrected to 7% O_2

$$C_{sd@7\%} = C_{sd} * \frac{20.9 - 7.0}{(20.9 - \%O2)}$$

= 0.0075*(20.9-7)/(20.9-9.47)
= 0.0091 gr/dscf @ 7%O2
or
= 17.13*(20.9-7)/(20.9-9.47)
= 20.83 mg/dscm @ 7%O2

5. Particulate Concentration Corrected to 12% CO_2

$$C_{sd@12\%} = C_{sd} * \frac{12}{\%CO_2}$$

= 0.0075*12/9.67
= 0.0093 gr/dscf @ 7%O2
or
= 17.13*12/9.67
= 21.26 mg/dscm @ 7%O2

6. Particulate Emissions Rate

$$M_p = \frac{\sum(M_i)}{V_{m(std)}} * Q_{sd} * \frac{60}{453.593}$$

= 0.0092/18.964*151039*60/453.593
= 9.69

7. Heat Input (O_2 based)

$$T_{C\text{-}O2} = \frac{60 * Q_{sd}}{F_d} * \frac{20.9 - \%O_2}{20.9}$$

= Not Applicable

8. Particulate Mass Rate (O_2 based)

$$E_{O2} = \frac{M_p}{T_{C\text{-}O2}}$$

= Not Applicable

9. Heat Input (CO_2 based)

$$T_{C\text{-}CO2} = \frac{60 * Q_{sd} * \%CO_2}{F_c * 100}$$

= Not Applicable

10. Particulate Mass Rate (CO_2 based)

$$E_{CO2} = \frac{M_p}{T_{C\text{-}CO2}}$$

= Not Applicable

EPA METHOD 202 CONDENSABLE PM EMISSIONS CALCULATIONS

EPA Method 201A: Gravimetric Data and Results
UNIT 2 OUTLET
U2O-M201A/202-R1

---

1. Mass of Field Blank

$M_{Fb} = M_{ib} * IS_{vol}/IB_{vol} + M_{ob} * OS_{vol}/OB_{vol}$

**Note: The max allowable field blank is 0.002 grams*

= 0.0028*260/180+0.0004*232/240
= 0.0044 g
= 0.002 g (max allowed)

2. Total Condensable Particulate Matter (CPM)

$M_{CPM} = M_{ic} + M_o - M_{FB}$

= 0.0324+0.0088-0.002
= 0.0392 g

3. Particulate Concentration

$$C_{sd} = \frac{M_{CPM}}{V_{m(std)}} * \frac{7000}{453.593}$$

or

$$= \frac{M_{CPM}}{V_{m(std)}} * \frac{1000*35.3145}{1}$$

= 0.0392/21.895*7000/453.593
= 0.0276 gr/dscf
or
= 0.0392*1000*35.3145/21.895
= 63.23 mg/dscm

4. Particulate Concentration Corrected to 7% O_2

$$C_{sd@7\%} = C_{sd} * \frac{20.9 - 7.0}{(20.9 - \%O2)}$$

= 0.0276*(20.9-7)/(20.9-9.98)
= 0.0351 gr/dscf @ 7%O2
or
= 63.23*(20.9-7)/(20.9-9.98)
= 80.49 mg/dscm @ 7%O2

5. Particulate Concentration Corrected to 12% CO_2

$$C_{sd@12\%} = C_{sd} * \frac{12}{\%CO_2}$$

= 0.0276*12/9.16
= 0.0362 gr/dscf @ 7%O2
or
= 63.23*12/9.16
= 82.83 mg/dscm @ 7%O2

6. Particulate Emissions Rate

$$M_p = \frac{\sum(M_i)}{V_{m(std)}} * Q_{sd} * \frac{60}{453.593}$$

= 0.0392/21.895*146594*60/453.593
= 34.72

7. Heat Input (O_2 based)

$$T_{C\text{-}O2} = \frac{60 * Q_{sd}}{F_d} * \frac{20.9 - \%O_2}{20.9}$$

= Not Applicable

8. Particulate Mass Rate (O_2 based)

$$E_{O2} = \frac{M_p}{T_{C\text{-}O2}}$$

= Not Applicable

9. Heat Input (CO_2 based)

$$T_{C\text{-}CO2} = \frac{60 * Q_{sd} * \%CO_2}{F_c * 100}$$

= Not Applicable

10. Particulate Mass Rate (CO_2 based)

$$E_{CO2} = \frac{M_p}{T_{C\text{-}CO2}}$$

= Not Applicable

EPA METHOD 202 CONDENSABLE PM EMISSIONS CALCULATIONS

EPA Method 201A: Gravimetric Data and Results
UNIT 3 OUTLET
U3O-M201A/202-R1

1. Mass of Field Blank

$M_{Fb} = M_{ib} * IS_{vol}/IB_{vol} + M_{ob} * OS_{vol}/OB_{vol}$

**Note: The max allowable field blank is 0.002 grams*

= 0.0028*260/180+0.0004*232/240
= 0.0044 g
= 0.002 g (max allowed)

2. Total Condensable Particulate Matter (CPM)

$M_{CPM} = M_{ic} + M_o - M_{FB}$

= 0.0050+0.0053-0.002
= 0.0083 g

3. Particulate Concentration

$$C_{sd} = \frac{M_{CPM}}{V_{m(std)}} * \frac{7000}{453.593}$$

or

$$= \frac{M_{CPM}}{V_{m(std)}} * \frac{1000*35.3145}{1}$$

= 0.0083/17.918*7000/453.593
= 0.0071 gr/dscf
or
= 0.0083*1000*35.3145/17.918
= 16.36 mg/dscm

4. Particulate Concentration Corrected to 7% O_2

$$C_{sd@7\%} = C_{sd} * \frac{20.9 - 7.0}{(20.9 - \%O2)}$$

= 0.0071*(20.9-7)/(20.9-9.57)
= 0.0087 gr/dscf @ 7%O2
or
= 16.36*(20.9-7)/(20.9-9.57)
= 20.07 mg/dscm @ 7%O2

5. Particulate Concentration Corrected to 12% CO_2

$$C_{sd@12\%} = C_{sd} * \frac{12}{\%CO_2}$$

= 0.0071*12/9.84
= 0.0087 gr/dscf @ 7%O2
or
= 16.36*12/9.84
= 19.95 mg/dscm @ 7%O2

6. Particulate Emissions Rate

$$M_p = \frac{\sum(M_i)}{V_{m(std)}} * Q_{sd} * \frac{60}{453.593}$$

= 0.0083/17.918*154991*60/453.593
= 9.50

7. Heat Input (O_2 based)

$$T_{C\text{-}O2} = \frac{60 * Q_{sd}}{F_d} * \frac{20.9 - \%O_2}{20.9}$$

= Not Applicable

8. Particulate Mass Rate (O_2 based)

$$E_{O2} = \frac{M_p}{T_{C\text{-}O2}}$$

= Not Applicable

9. Heat Input (CO_2 based)

$$T_{C\text{-}CO2} = \frac{60 * Q_{sd} * \%CO_2}{F_c * 100}$$

= Not Applicable

10. Particulate Mass Rate (CO_2 based)

$$E_{CO2} = \frac{M_p}{T_{C\text{-}CO2}}$$

= Not Applicable

Appendix G

EPA Method 1 Cyclonic Flow Checks

CYCLONIC FLOW CHECK
40 CFR 60, APPENDIX A, METHOD 1, SECTION 11.4

Facility: Pinellas County RRF
Location: Unit 1 Inlet
Date: 4/8/2013

Load Condition: Compliance
Start Time: 10:43
End Time: 11:04

Port/Point	Angle Degree (α)
A 1	4
2	8
3	5
4	5
5	2
6	4
7	0
8	2
9	10
10	8
11	4
12	2

Port/Point	Angle Degree (α)
B 1	2
2	4
3	0
4	5
5	8
6	5
7	11
8	6
9	2
10	0
11	8
12	5

Sum of the Absolute Value of the Rotation Angles ($\Sigma|\alpha|_{i=1,n}$): 110

where: α = rotation angle for point i, and
n = number of sampling points.

Average Rotation Angle ($\frac{\Sigma|\alpha|_{i=1,n}}{n}$): 4.6 (Pass*)

where: α = rotation angle for point i, and
n = number of sampling points.

* Note: the flow is determined to be cyclonic if the Average Rotation Angle is greater than 20^{o}.

Flow Check Done by: JS

CYCLONIC FLOW CHECK
40 CFR 60, APPENDIX A, METHOD 1, SECTION 11.4

Facility: Pinellas County RRF
Location: Unit 2 Inlet
Date: 4/10/2013

Load Condition: Compliance
Start Time: 7:16
End Time: 7:41

Port/Point	Angle Degree (α)
A 1	8
2	4
3	10
4	2
5	4
6	5
7	0
8	2
9	4
10	5
11	0
12	6

Port/Point	Angle Degree (α)
B 1	2
2	5
3	0
4	3
5	5
6	4
7	10
8	6
9	2
10	0
11	4
12	2

Sum of the Absolute Value of the Rotation Angles ($\Sigma|\alpha|_{i=1,n}$): 93

where: α = rotation angle for point i, and
n = number of sampling points.

Average Rotation Angle ($\frac{\Sigma|\alpha|_{i=1,n}}{n}$): 3.9 (Pass*)

where: α = rotation angle for point i, and
n = number of sampling points.

* Note: the flow is determined to be cyclonic if the Average Rotation Angle is greater than 20°.

Flow Check Done by: JS

CYCLONIC FLOW CHECK
40 CFR 60, APPENDIX A, METHOD 1, SECTION 11.4

Facility: Pinellas County RRF
Location: Unit 3 Inlet
Date: 4/5/2013

Load Condition: Compliance
Start Time: 7:13
End Time: 7:37

Port/Point	Angle Degree (α)
A 1	8
2	4
3	2
4	0
5	4
6	6
7	5
8	3
9	7
10	8
11	5
12	4

Port/Point	Angle Degree (α)
B 1	2
2	0
3	4
4	5
5	2
6	10
7	4
8	5
9	2
10	0
11	4
12	9

Sum of the Absolute Value of the Rotation Angles ($\Sigma|\alpha|_{i=1,n}$): 103

where: α = rotation angle for point i, and
n = number of sampling points.

Average Rotation Angle ($\frac{\Sigma|\alpha|_{i=1,n}}{n}$): 4.3 (Pass*)

where: α = rotation angle for point i, and
n = number of sampling points.

* Note: the flow is determined to be cyclonic if the Average Rotation Angle is greater than 20°.

Flow Check Done by: JS

CYCLONIC FLOW CHECK
40 CFR 60, APPENDIX A, METHOD 1, SECTION 11.4

Facility: Pinellas County RRF
Location: Unit 1 Outlet
Date: 4/8/2013

Load Condition: Compliance
Start Time: 13:16
End Time: 13:52

Port/Point		Angle Degree (α)
A	1	2
	2	6
	3	4
	4	10
	5	5
B	1	7
	2	2
	3	5
	4	10
	5	12
C	1	14
	2	2
	3	4
	4	6
	5	8

Port/Point		Angle Degree (α)
D	1	15
	2	5
	3	4
	4	0
	5	6
E	1	16
	2	8
	3	6
	4	4
	5	7
F	1	14
	2	10
	3	4
	4	8
	5	7

Sum of the Absolute Value of the Rotation Angles ($\Sigma|\alpha|_{i=1,n}$): 211

where: α = rotation angle for point i, and
n = number of sampling points.

Average Rotation Angle ($\frac{\Sigma|\alpha|_{i=1,n}}{n}$): 7.0 (Pass*)

where: α = rotation angle for point i, and
n = number of sampling points.

* Note: the flow is determined to be cyclonic if the Average Rotation Angle is greater than 20^{o}.

Flow Check Done by: IAW & MSH

CYCLONIC FLOW CHECK
40 CFR 60, APPENDIX A, METHOD 1, SECTION 11.4

Facility: Pinellas County RRF
Location: Unit 2 Outlet
Date: 4/10/2013

Load Condition: Compliance
Start Time: 7:53
End Time: 8:23

Port/Point		Angle Degree (α)
A	1	10
	2	8
	3	5
	4	7
	5	4
B	1	5
	2	8
	3	12
	4	10
	5	9
C	1	5
	2	8
	3	7
	4	11
	5	8

Port/Point		Angle Degree (α)
D	1	4
	2	6
	3	5
	4	8
	5	9
E	1	11
	2	12
	3	5
	4	9
	5	6
F	1	12
	2	14
	3	9
	4	7
	5	7

Sum of the Absolute Value of the Rotation Angles ($\Sigma|\alpha|_{i=1,n}$): 241

where: α = rotation angle for point i, and
n = number of sampling points.

Average Rotation Angle ($\frac{\Sigma|\alpha|_{i=1,n}}{n}$): 8.0 (Pass*)

where: α = rotation angle for point i, and
n = number of sampling points.

* Note: the flow is determined to be cyclonic if the Average Rotation Angle is greater than 20^{o}.

Flow Check Done by: IAW & MRW

CYCLONIC FLOW CHECK
40 CFR 60, APPENDIX A, METHOD 1, SECTION 11.4

Facility: Pinellas County RRF
Location: Unit 3 Outlet
Date: 4/5/2013

Load Condition: Compliance
Start Time: 13:50
End Time: 14:38

Port/Point	Angle Degree (α)
F 1	4
2	2
3	0
4	5
5	2
E 1	4
2	8
3	5
4	6
5	10
D 1	4
2	9
3	8
4	2
5	0

Port/Point	Angle Degree (α)
C 1	2
2	5
3	4
4	0
5	2
B 1	8
2	10
3	2
4	5
5	0
A 1	5
2	2
3	4
4	2
5	2

Sum of the Absolute Value of the Rotation Angles ($\Sigma|\alpha|_{i=1,n}$): 122
where: α = rotation angle for point i, and
n = number of sampling points.

Average Rotation Angle ($\frac{\Sigma|\alpha|_{i=1,n}}{n}$): 4.1 (Pass*)
where: α = rotation angle for point i, and
n = number of sampling points.

* Note: the flow is determined to be cyclonic if the Average Rotation Angle is greater than 20°.

Flow Check Done by: JS

Appendix H

EPA Method 29 Raw Field Data

Appendix H.1

EPA Method 29 Raw Field Data: Unit 1 FF Outlet

ISOKINETIC SAMPLING DATA SHEET

FACILITY: Veolia Pinellas TEST LOCATION: Unit 1 outlet DATE: 4/9/13

TECHNICIAN IAW P_{BAR} 30.02 POLLUTANT: metals RUN I.D.: u1o -M29 -R1

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM TEMP. INLET	DGM TEMP. OUTLET	EXIT TEMP	FILTER TEMP.	METER VAC.
A 1	0	0905		312	.42	1.6	199.714	75	75	63	248	5
2	4			314	.43	1.6	202.5	76	75	66	259	5
3	8			316	.44	1.6	205.4	76	75	65	260	5
4	12		-11.5"	316	.43	1.6	208.3	77	75	63	248	5
5	16			318	.46	1.7	211.1	80	76	60	251	6
B 1	20	0925 0926		316	.44	1.6	213.9	81	77	58	268	6
2	24	0930 0939		316	.43	1.6	216.5	82	77	57	255	6
3	28			314	.41	1.5	219.1	81	77	55	252	6
4	32		-12"	314	.42	1.6	221.7	81	77	54	266	6
5	36			315	.43	1.6	224.4	83	77	53	256	6
C 1	40	0955 0956		315	.48	1.8	227.1	84	78	53	256	6
2	44			317	.48	1.8	229.9	84	78	54	257	6
3	48		-11"	315	.45	1.7	232.7	86	79	55	252	6
4	52			315	.43	1.6	235.5	87	79	54	252	6
5	56			316	.42	1.6	238.2	88	80	56	250	6
	60	1016		—	—	—	240.988	—	—	—	—	—
D 1	60	1026		315	.40	1.5	241.997	86	83	55	261	5
2	64			315	.39	1.5	244.4	87	84	57	255	6
3	68		-11.5"	315	.41	1.5	246.9	88	84	57	253	6
4	72			315	.42	1.6	249.4	88	84	58	252	6
5	76			315	.42	1.6	252.2	90	85	61	253	6
E 1	80	1046 1047		316	.44	1.6	254.9	90	85	64	257	6
2	84			316	.45	1.7	257.6	90	85	64	259	6
3	88		-11.5"	318	.44	1.6	260.4	91	85	64	256	6
4	92			317	.42	1.6	263.1	92	86	62	253	6

*tripped power

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	300	Filter
	302	Front.
	303	Imp 1-3
	304	Imp 4
	305	Imp 5-6
	306	Ucc H_2O
	307	Silica

LEAK CHECK: I<=3.7

						PITOT
VACUUM	11"	11"	11"			PRE: ✓
RATE	.006	.006	.007			POST: ✓

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	0	228
#2	100	247
#3	100	146
#4	0	6
#5	100	101
#6	100	92
#7	250.√	2700

NOZZLE Φ	C11 0.280
PITOT #	158
BOX ID	18
GAMMA γ	0.9664
ΔH@	2.0614
PROBE ID	PL 9-6
SYSTEM ID	u-so-2/4A4/m-p-1
FILTER ID	—

ISOKINETIC SAMPLING DATA SHEET PAGE 2 OF 2

FACILITY: Veolia - Pinellas TEST LOCATION: unit 1 outlet DATE: 4/9/13

TECHNICIAN: JAW POLLUTANT: metals RUN I.D.: 410-M29-R1

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM IN TEMP.	DGM OUT TEMP.	EXIT TEMP	FILTER TEMP.	METER VAC.
5	96			316	.43	1.7	265.8	91	86	63	253	6
F 1	100	1107 1108		317	.44	1.7	268.5	93	87	63	254	6
2	104			315	.45	1.7	271.2	93	87	62	248	6
3	108		-11"	320	.43	1.6	274.0	94	87	63	250	6
4	112			320	.41	1.5	276.7	95	88	64	249	6
5	116			320	.40	1.5	279.4	95	88	64	255	6
	120	1128		—	—	—	282.107	—	—	—	—	—

Pinellas Co. RRF

ISOKINETIC SAMPLING DATA SHEET

PAGE 1 OF 3

FACILITY: ~~Veolia - Pinellas~~ TEST LOCATION: unit 1 outlet DATE: 4/9/13

TECHNICIAN JAW P_{BAR} 30.04 POLLUTANT: metals RUN I.D.: U10 -M 29 -R 2

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME Ft³	DGM TEMP. INLET	DGM TEMP. OUTLET	EXIT TEMP	FILTER TEMP.	METER VAC.
F 1	0	1324		306	.43	1.5	289.826	89	89	62	263	5
2	4			312	.44	1.5	292.05	90	89	64	266	5
3	8		-11"	317	.46	1.6	295.1	90	89	66	259	5
4	12			316	.47	1.6	297.8	91	90	66	252	5
5	16			315	.42	1.5	300.5	92	90	65	252	5
E 1	20	1344 / 1345		313	.42	1.5	303.2	94	91	65	251	5
2	24			313	.45	1.6	305.8	95	91	64	262	5
3	28		-11"	318	.43	1.5	308.6	95	91	64	256	5
4	32			328	.45	1.6	311.2	96	92	63	255	5
5	36			330	.46	1.6	313.9	97	92	64	259	5
D 1	40	1405 / 1406		320	.45	1.6	316.7	98	93	64	258	5
2	44			321	.40	1.4	319.4	98	93	63	255	5
3	48		-11.5"	320	.43	1.5	322.0	98	93	64	225	5
4	52			321	.42	1.5	324.6	99	94	64	254	5
5	56			321	.43	1.5	327.3	100	94	65	255	5
	60	1426		-	-	-	330.015	-	-	-	-	-
C 1	60	1434		316	.43	1.5	331.010	95	94	62	259	5
2	64			318	.45	1.6	333.7	97	94	61	263	5
3	68			320	.46	1.6	336.4	98	94	61	262	5
4	72		-11"	317	.44	1.5	339.2	97	94	62	254	5
5	76			316	.43	1.5	341.9	96	94	62	246	5
B 1	80	1454 / 1455		313	.48	1.7	344.6	93	91	61	264	5
2	84			315	.48	1.7	347.3	93	91	62	262	5
3	88			315	.45	1.6	350.2	94	90	63	257	5
4	92		-11.5"	316	.46	1.6	353.0	94	90	64	255	5

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	308	Filter
	310	FH Nitric
	311	Imp 1-3
	312	Imp 4
	313	Imp 5-6
	314	HCl H₂O
	315	S. gel

LEAK CHECK: K=3.5

VACUUM	11"	11"	11"		
RATE	.007	.007	.010		

PITOT

PRE: ✓

POST: ✓

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	0	248
#2	100	233
#3	100	122
#4	0	5
#5	100	104
#6	100	103
#7	250	270.7

NOZZLE Φ	C11 0.280
PITOT #	~~158~~ 322
BOX ID	18
GAMMA γ	0.9604
ΔH@	2.0614
PROBE ID	~~PL 9-6~~ PL 9-1
SYSTEM ID	U-50-2/UA4/M-PI
FILTER ID	

JAW

Pinellas Co RRF

ISOKINETIC SAMPLING DATA SHEET

FACILITY: ~~Veolia Pinellas~~ TEST LOCATION: unit 1 outlet DATE: 4/9/13

TECHNICIAN: PAW POLLUTANT: metals RUN I.D.: u10 - M 29 - R 2

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM IN TEMP.	DGM OUT TEMP.	EXIT TEMP	FILTER TEMP.	METER VAC.
5	96			312	.48	1.7	355.8	96	90	63	262	5
A 1	100	~~1515~~ 1516		314	.48	1.7	358.5	96	90	64	250	5
2	104			316	.50	1.8	361.4	96	90	64	260	5
3	108		-11"	316	.47	1.7	364.2	97	90	65	248	5
4	112			317	.45	1.6	367.1	97	90	66	257	5
5	116			317	.44	1.5	369.8	97	90	66	258	5
	120	1536		—	—	—	372.498	—	—	—	—	—

ISOKINETIC SAMPLING DATA SHEET

FACILITY: ~~Veolia~~ Pinellas County RRF TEST LOCATION: unit 1 outlet DATE: 4/9/13

TECHNICIAN IAW P_{BAR} 30.04 POLLUTANT: metals RUN I.D.: u1o -M 29 -R 3

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME Ft^3	DGM TEMP. INLET	DGM TEMP. OUTLET	EXIT TEMP	FILTER TEMP.	METER VAC.
A 1	0	1622		314	.40	1.4	374.091	86	86	65	255	5
2	4			316	.40	1.4	376.6	87	86	64	260	5
3	8			316	.44	1.5	379.2	88	87	63	257	6
4	12		-11"	316	.45	1.6	381.8	89	87	62	260	6
5	16			315	.46	1.6	384.5	89	87	62	253	6
B 1	20	1642 / 1643		315	.43	1.5	387.3	91	88	62	255	6
2	24			315	.44	1.5	389.9	92	88	61	261	6
3	28		-11.5"	317	.46	1.6	392.6	93	88	61	257	6
4	32			317	.47	1.6	395.3	94	89	62	255	6
5	36			317	.46	1.6	398.0	94	89	62	257	6
C 1	40	1703 / 1704		318	.46	1.6	400.7	95	91	62	256	6
2	44			319	.48	1.7	403.5	95	92	62	248	6
3	48			318	.48	1.7	406.2	95	91	62	258	6
4	52		-11"	319	.47	1.6	409.0	96	90	62	254	6
5	56			319	.45	1.6	411.8	96	90	63	255	6
	60	1724		—	—	—	414.596	—	—	—	—	—
D 1	60	1731		315	.45	1.6	414.732	92	89	59	251	6
2	64			315	.48	1.7	417.6	93	89	58	255	6
3	68		-11"	316	.45	1.6	420.4	93	89	59	250	6
4	72			317	.44	1.5	423.2	93	89	60	250	6
5	76			317	.46	1.6	425.8	94	89	61	255	6
E 1	80	1751 / 1752		314	.44	1.5	428.5	95	90	62	253	6
2	84			315	.45	1.6	431.2	97	90	62	248	6
3	88		-11.5"	317	.43	1.5	433.9	97	90	63	250	6
4	92			317	.44	1.5	436.6	97	90	64	255	6

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	316	FILTER
	318	FH N. trix
	319	Imp 1-3
	320	Imp 4
	321	Imp 5-6
	322	HCl H_2O
	327	Silica

LEAK CHECK: K= 3.5

						PITOT
VACUUM	10"	11"	11"			PRE: ✓
RATE	.008	.009	.007			POST: ✓

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	0	308
#2	100	230
#3	100	112
#4	0	4
#5	100	90
#6	100	104
#7	250.0	272.0

NOZZLE Φ	C11 0.280
PITOT #	158
BOX ID	18
GAMMA γ	0.9604
ΔH@	2.0614
PROBE ID	PL 9-6
SYSTEM ID	u-50-2/uA4/ m-pl
FILTER ID	—

ISOKINETIC SAMPLING DATA SHEET

FACILITY: ~~Teotia~~ - Pinellas County RRF TEST LOCATION: unit 1 DATE: 4/9/13

TECHNICIAN: IAW POLLUTANT: metals RUN I.D.: 40 - M 29 - R 3

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft³	DGM IN TEMP.	DGM OUT TEMP.	EXIT TEMP	FILTER TEMP.	METER VAC.
5	96			320	.46	1.6	439.2	97	91	64	250	6
F 1	100	~~1812~~ 1813		320	.50	1.8	442.0	96	92	64	257	6
2	104			317	.51	1.8	444.8	93	91	65	260	6
3	108		-11"	319	.47	1.7	447.7	92	90	65	253	6
4	112			318	.45	1.6	450.5	92	90	64	255	6
5	116			318	.44	1.5	453.2	92	89	65	261	6
	120	1833		—	—	—	456.046	—	—	—	—	—

Appendix H.2

EPA Method 29 Raw Field Data: Unit 1 SDA Inlet

ISOKINETIC SAMPLING DATA SHEET

FACILITY: Pinellas County BRC TEST LOCATION: Unit 1 Inlet DATE: 4-9-12

TECHNICIAN JS P_{BAR} 30.02 POLLUTANT: Metals RUN I.D.: U1I-M29-R1

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME F't³	DGM TEMP. INLET	DGM TEMP. OUTLET	EXIT TEMP	FILTER TEMP.	METER VAC.
A 1	0	905		587	.54	1.4	472.668	73	73	65	254	4
2	5			586	.62	1.6	475.2	74	73	53	251	4
3	10			587	.66	1.7	478.5	75	73	55	252	5
4	15			587	.65	1.7	482.0	76	73	57	249	7
5	20			586	.68	1.8	485.5	76	73	58	250	8
6	25	930/939	-1.5	588	.66	1.7	489.1	77	73	59	246	8
7	30			587	.64	1.7	492.6	77	74	58	251	9
8	35			587	.65	1.7	496.1	77	74	59	247	10
9	40			590	.63	1.6	499.5	79	75	60	250	10
10	45			591	.63	1.6	502.9	78	75	61	248	11
11	50			592	.59	1.5	506.3	78	75	61	251	11
12	55			592	.62	1.6	509.6	78	75	61	253	11
	60	1014					513.015					
B 1	60	1026		592	.50	1.3	513.244	76	76	62	247	11
2	65			593	.54	1.4	516.4	77	76	63	245	11
3	70			593	.60	1.6	519.6	78	76	63	251	12
4	75			593	.60	1.6	522.9	78	76	64	254	13
5	80			592	.62	1.6	526.2	77	76	63	252	13
6	85		-1.3	592	.61	1.6	529.5	77	75	61	250	14
7	90			593	.62	1.6	532.9	78	75	61	252	14
8	95			593	.63	1.6	536.2	77	75	60	254	15
9	100			592	.61	1.6	539.4	78	76	61	255	15
10	105			592	.60	1.6	542.7	78	76	61	251	16
11	110			592	.57	1.5	546.0	78	77	64	253	17
12	115			590	.54	1.4	549.3	78	77	65	251	18

110 1126

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	100	Filter
	101	FH Nitric
	102	IMP 1-3
	103	IMP 4
	104	IMP 5-6
	105	HCL 226.0
	106	Sil Gel

LEAK CHECK: 552.588

						PITOT
VACUUM	15	15	15			PRE: ✓
RATE	.008	.006	.005			POST: ✓

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	0	133
#2	100	250
#3	100	137
#4	0	2
#5	100	100
#6	100	94
#7	250.0	278.3

NOZZLE Φ	A-11, .280
PITOT #	105 A
BOX ID	17
GAMMA γ	0.9798
ΔH@	1.8708
PROBE ID	PL-10-1
SYSTEM ID	U-50-4, PNHB-1, UA-17
FILTER ID	UNTARED

ISOKINETIC SAMPLING DATA SHEET

PAGE 1 OF 1

FACILITY: Pinellas County RRF TEST LOCATION: UNIT 1 ~~OUTLET~~ INLET DATE: 4-9-13

2.6 TECHNICIAN JS P_{BAR} 30.02 POLLUTANT: METALS RUN I.D.: ~~EXIT~~ INLET M 29 - R 2

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME F't³	DGM TEMP. INLET	DGM TEMP. OUTLET	EXIT TEMP	FILTER TEMP.	METER VAC.
R 1	0	1324		597	.62	1.6	553.523	81	82	63	256	4
2	5			598	.64	1.7	556.9	85	82	61	249	5
3	10			599	.66	1.7	560.4	85	82	62	251	5
4	15			599	.65	1.7	563.9	85	82	63	250	6
5	20			598	.67	1.7	567.4	86	83	62	247	7
6	25			599	.67	1.7	570.8	86	83	59	249	8
7	30		-1.6	599	.66	1.7	574.3	86	83	58	252	9
8	35			600	.64	1.7	577.7	86	83	58	249	10
9	40			600	.65	1.7	581.2	86	84	58	248	10
10	45			599	.63	1.6	584.7	86	84	58	251	11
11	50			598	.60	1.6	588.1	86	84	59	254	11
12	55			598	.58	1.5	591.5	86	84	60	253	11
	60	1424					594.857					
R 1	60	1434		597	.56	1.5	595.066	83	83	62	251	11
2	65			598	.61	1.6	598.3	85	83	60	250	12
3	70			598	.63	1.6	601.7	84	83	59	248	13
4	75			599	.65	1.7	605.1	84	83	60	246	14
5	80			595	.65	1.7	608.6	83	83	60	253	15
6	85			593	.64	1.7	612.0	82	82	61	253	15
7	90		-1.4	594	.63	1.6	615.4	83	82	60	255	16
8	95			594	.65	1.7	618.8	83	82	61	253	17
9	100			595	.62	1.6	622.2	84	82	61	251	17
10	105			594	.62	1.6	625.5	84	82	62	248	17
11	110			595	.60	1.6	628.8	84	83	62	247	18
12	115			595	.59	1.5	632.1	84	83	63	250	18
	120	1534					635.428					

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	107	Filter
	108	PM Nitric
	109	Imp 1-3
	110	Imp 4
	111	Imp 5-6
	112	HCl/H_2O
	113	Silica

LEAK CHECK:

						PITOT
VACUUM	15	15	20 ~~15~~			PRE: ✓
RATE	.005	.004	.004			POST: ✓

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	0	154
#2	100	218
#3	100	140
#4	0	2
#5	100	104
#6	100	100
#7	250.0	278.6

NOZZLE Φ	B-10 ~~A-4~~ .280
PITOT #	~~125~~ 152
BOX ID	17
GAMMA γ	0.9798
ΔH@	1.8708
PROBE ID	PL-10-2
SYSTEM ID	U-50-4, PNHR-1, UA17
FILTER ID	UNTARED

ISOKINETIC SAMPLING DATA SHEET

FACILITY: Pinellas County RRF TEST LOCATION: Unit 1 Inlet DATE: 4-9-13

2.6 TECHNICIAN JS P_{BAR} 30.04 POLLUTANT: Metals RUN I.D.: U1-M29-R3

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME F't^3	DGM TEMP. INLET	DGM TEMP. OUTLET	EXIT TEMP	FILTER TEMP.	METER VAC.
A1	0	1622		594	.55	1.4	636.623	85	85	62	245	4
2	5			595	.59	1.5	639.8	84	83	60	248	4
3	10			598	.62	1.6	643.0	85	83	61	251	5
4	15			598	.63	1.6	646.3	86	83	60	249	5
5	20			599	.63	1.6	649.6	86	86	59	251	6
6	25			598	.65	1.7	652.9	86	84	59	253	7
7	30		-1.6	599	.64	1.7	656.3	86	84	60	249	8
8	35			599	.64	1.7	659.8	87	83	60	246	8
9	40			599	.65	1.7	663.3	87	83	61	245	9
10	45			600	.63	1.6	666.8	87	84	60	247	9
11	50			600	.63	1.6	670.2	87	84	59	255	10
12	55			600	.61	1.6	673.8	87	84	59	252	10
	60	1722	/	/	/	/	677.298	/	/	/	/	/
B1	60	1731		601	.60	1.6	678.967	85	84	63	255	11
2	65			601	.63	1.6	682.4	88	85	61	254	12
3	70			600	.62	1.6	685.3	88	85	60	251	12
4	75			600	.65	1.7	688.6	88	85	60	253	13
5	80			600	.64	1.7	692.1	88	85	59	251	13
6	85			601	.63	1.6	695.6	88	86	59	248	14
7	90		-1.7	601	.63	1.6	699.0	88	86	60	256	14
8	95			601	.62	1.6	702.4	87	86	61	251	15
9	100			601	.60	1.6	705.6	87	86	62	246	15
10	105			600	.61	1.6	709.0	88	86	62	253	16
11	110			600	.58	1.5	712.3	89	87	62	254	16
12	115			600	.53	1.4	715.5	89	87	63	246	16
	120	1831					718.752					

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	114	FILTER
	115	Fun. Tric
	116	Imp 1-3
	117	Imp 4
	118	Imp 5-6
	119	HCl H_2O
	120	S.Gel

LEAK CHECK:

						PITOT
VACUUM	15	15	~~20~~ 25			PRE: ✓
RATE	.007	.006	.005			POST: ✓

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	0	145
#2	100	235
#3	100	130
#4	0	11
#5	100	115
#6	100	95
#7	250.4	274.7

NOZZLE Φ	A-11, .280
PITOT #	125A
BOX ID	17
GAMMA γ	0.9798
ΔH@	1.8708
PROBE ID	PL-10-1
SYSTEM ID	U-SD-4, PROBE-1, UA-17
FILTER ID	UNTARED

Appendix H.3

EPA Method 29 Raw Field Data: Unit 2 FF Outlet

ISOKINETIC SAMPLING DATA SHEET

FACILITY: Pinellas County RRF TEST LOCATION: unit 2 DATE: 4/10/13

TECHNICIAN DAW P_{BAR} 29.99 POLLUTANT: metals RUN I.D.: U20-M29-R1

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM TEMP. INLET	DGM TEMP. OUTLET	EXIT TEMP.	FILTER TEMP.	METER VAC.
F1	0	0845		282	.48	1.8	470.436	70	70	55	258	5
2	4			297	.48	1.8	473.8	72	71	54	255	5
3	8	0857 / 0859	-11"	298	.45	1.7	476.6	73	71	55	256	5
4	12			291	.40	1.5	479.5	75	71	56	256	5
5	16			302	.33	1.3	482.1	75	71	57	257	5
E1	20	0907 / 0908		292	.47	1.8	484.7	77	72	58	248	5
2	24			292	.49	1.9	487.6	78	73	59	255	5
3	28			293	.46	1.7	490.4	78	74	59	256	5
4	32		-10.5"	298	.42	1.6	493.2	79	74	59	254	5
5	36			303	.34	1.3	495.9	80	75	61	256	5
D1	40	0928 / 0929		292	.45	1.7	498.3	81	75	62	248	5
2	44			297	.47	1.8	500.9	78	75	62	253	5
3	48	0932 / 0940		288	.44	1.7	503.8	80	75	62	247	5
4	52		-11"	291	.43	1.6	506.6	80	75	63	252	5
5	56			293	.35	1.3	509.3	80	75	63	255	5
	60	0959		—	—	—	511.836	—	—	—	—	—
C1	60	1004		288	.48	1.8	511.997	78	76	63	252	5
2	64			290	.47	1.8	514.6	79	76	62	255	5
3	68		-10.5"	305	.43	1.6	517.5	79	76	63	257	5
4	72			295	.40	1.5	520.2	80	76	63	260	5
5	76			269	.33	1.3	522.8	81	76	64	254	5
B1	80	1024 / 1025		291	.47	1.8	525.6	81	77	60	255	5
2	84			292	.45	1.7	528.0	82	77	60	253	5
3	88		-11"	290	.45	1.7	530.7	82	77	59	260	5
4	92	1035 / 1044		291	.40	1.5	533.3	80	78	58	261	5

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	324	Filter
	326	Probe
	327	Imp 1-3
	328	Imp 4
	329	Imp 5-6
	330	HCl + H_2O
	331	S. Gel

LEAK CHECK: Ic = 3.8

PITOT

VACUUM	10"	10"	11"			PRE: V
RATE	.008	.009	.011			POST: V

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	0 ~~50~~	176
#2	100 ~~100~~	228
#3	100 ~~100~~	137
#4	0 ~~100~~	8
#5	100 ~~100~~	97
#6	100 ~~50~~	107
#7	250	262

NOZZLE Φ	D10 0.280
PITOT #	322
BOX ID	18
GAMMA γ	0.4604
ΔH@	2.0614
PROBE ID	PL 9-1
SYSTEM ID	U-50-2/U44/mpl
FILTER ID	—

ISOKINETIC SAMPLING DATA SHEET PAGE 2 OF 2

FACILITY: Pinellas County RRF TEST LOCATION: Unit 2 DATE: 4/10/13

TECHNICIAN: IAW POLLUTANT: metals RUN I.D.: U20-M 2q-R 1

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft³	DGM IN TEMP.	DGM OUT TEMP.	EXIT TEMP	FILTER TEMP.	METER VAC.
5	96			300	.35	1.3	536.0	80	78	64	252	5
A1	100	~~1054~~ 1055		291	.40	1.5	538.5	81	78	63	261	5
2	104			291	.43	1.6	541.2	82	78	63	257	5
3	108		-10.5"	292	.43	1.6	543.9	83	78	64	254	5
4	112			297	.41	1.5	546.6	83	78	65	258	5
5	116			300	.35	1.3	549.2	84	79	65	255	5
	120	1115		—	—	—	551.790	—	—	—	—	—

ISOKINETIC SAMPLING DATA SHEET

FACILITY: Pinellas County RRF TEST LOCATION: Unit 2 DATE: 4/10/13

TECHNICIAN DAW P_{BAR} 29.95 POLLUTANT: metals RUN I.D.: U2O -M 29 -R 2

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM TEMP. INLET	DGM TEMP. OUTLET	EXIT TEMP	FILTER TEMP.	METER VAC.
A1	0	1209		294	.48	1.8	556.062	84	81	64	242	5
2	4	1212 / 1222		294	.48	1.8	558.7	85	81	60	255	5
3	8		-11"	298	.45	1.7	561.5	84	82	55	255	5
4	12			297	.41	1.6	564.4	85	82	56	256	5
5	16			295	.35	1.3	567.1	86	82	56	254	5
B1	20	1239 / 1240		295	.45	1.7	569.5	87	83	56	258	5
2	24			295	.46	1.7	572.2	88	83	57	260	5
3	28		-10.5"	297	.44	1.7	574.9	88	83	57	257	5
4	32			294	.40	1.5	577.7	88	84	58	255	5
5	36			292	.36	1.4	580.3	89	84	58	260	5
C1	40	1300 / 1301		292	.47	1.8	583.0	89	84	59	261	5
2	44			296	.48	1.8	585.8	90	85	59	255	5
3	48			302	.45	1.7	588.7	90	85	60	253	5
4	52		-10.5"	294	.41	1.6	591.4	90	85	60	257	5
5	56			292	.37	1.4	594.1	91	85	61	255	5
	60	1321		—	—	—	596.820	—	—	—	—	—
D1	60	1326		293	.49	1.9	596.967	88	87	61	258	5
2	64			293	.47	1.8	599.6	89	87	62	260	5
3	68		-11"	300	.44	1.7	602.4	90	87	62	255	5
4	72			304	.41	1.6	605.2	90	87	62	260	5
5	76			292	.35	1.3	608.0	90	88	63	258	5
E1	80	1346 / 1347		292	.51	1.9	610.5	91	88	63	261	5
2	84			294	.50	1.9	613.5	91	88	64	258	5
3	88		-11"	304	.48	1.8	616.4	92	89	64	255	5
4	92			305	.43	1.6	619.5	93	90	64	253	5

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	332	Filter
	334	Fluoride
	335	Imp 1-3
	336	Imp 4
	337	Imp 5-6
	338	HCl + H_2O
	339	5:6:1

LEAK CHECK:

						PITOT
VACUUM	11"	11"	0"			PRE: ✓
RATE	.005	.007	.008			POST: ✓

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	0	213
#2	100	235
#3	100	120
#4	0	0
#5	100	98
#6	100	95
#7	250 v	268.4

NOZZLE Φ	C11 0.280
PITOT #	158
BOX ID	18
GAMMA γ	0.9604
ΔH@	2.0614
PROBE ID	PL 9-6
SYSTEM ID	U-SO-2/UA4/M-P1
FILTER ID	—

ISOKINETIC SAMPLING DATA SHEET

FACILITY: Pinellas County RRF TEST LOCATION: Unit 2 DATE: 4/10/13

TECHNICIAN: JAM POLLUTANT: metals RUN I.D.: 420-M 29-R2

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM IN TEMP.	DGM OUT TEMP.	EXIT TEMP	FILTER TEMP.	METER VAC.
5	96			~~293~~ 292	.40	1.5	622.1	95	91	64	261	5
F 1	100	1407 / 1408		304	.47	1.8	624.9	94	91	65	250	5
2	104			299	.45	1.7	627.6	94	91	65	253	5
3	108		-10.5"	291	.45	1.7	630.4	94	92	65	255	5
4	112			292	.40	1.5	633.3	95	92	66	257	5
5	116			292	.33	1.3	635.9	95	92	66	256	5
	120	1428		—	—	—	638.401	—	—	—	—	—

ISOKINETIC SAMPLING DATA SHEET

FACILITY: Pinellas County RRF TEST LOCATION: unit 2 DATE: 4/10/13

TECHNICIAN JAW P_{BAR} 29.95 POLLUTANT: metals RUN I.D.: u20 - M 29 - R 3

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME Ft³	DGM TEMP. INLET	DGM TEMP. OUTLET	EXIT TEMP	FILTER TEMP.	METER VAC.
F 1	0	1525		298	.40	1.5	643.160	94	94	55	260	5
2	4			301	.48	1.8	645.8	96	93	55	256	5
3	8		-10.5"	294	.50	1.9	648.8	97	95	58	252	5
4	12			294	.46	1.7	651.8	96	97	59	260	5
5	16			293	.40	1.5	654.5	97	98	60	251	5
E 1	20	1545 / 1546		294	.48	1.8	657.2	99	100	61	256	5
2	24			295	.47	1.8	660.0	99	100	61	260	5
3	28			292	.44	1.6	663.1	101	101	61	249	5
4	32		-11"	298	.44	1.6	665.8	101	102	62	251	5
5	36			298	.38	1.4	668.5	102	102	62	252	5
D 1	40	1606 / 1607		292	.50	1.9	671.0	102	102	62	252	5
2	44			295	.46	1.7	673.9	103	104	63	254	5
3	48			304	.48	1.8	676.8	103	104	63	255	5
4	52		-10.5"	306	.44	1.6	679.9	103	104	63	254	5
5	56			300	.38	1.4	682.7	101	102	64	256	5
	60	1627		—	—	—	685.316	—	—	—	—	—
C 1	60	1633		292	.45	1.7	685.620	102	103	60	248	5
2	64			292	.46	1.7	688.5	102	103	60	257	5
3	68			294	.43	1.6	691.3	102	103	61	256	5
4	72		-11"	294	.41	1.5	694.0	102	103	61	260	5
5	76			308	.35	1.3	696.7	101	102	61	255	5
B 1	80	1653 / 1654		306	.40	1.5	699.1	101	102	62	253	5
2	84			292	.44	1.6	701.8	102	101	60	254	5
3	88		-11"	292	.44	1.6	704.5	102	102	61	255	5
4	92			303	.38	1.4	707.2	101	99	61	254	5

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	340	F.H.
	342	FH Acetone
	343	Imp 1-3
	344	Imp 4
	345	Imp 5-6
	346	HCl H_2O
	347	Si Gel

LEAK CHECK:

						PITOT
VACUUM	10"	11"				PRE: ✓
RATE	.004	.007				POST: ✓

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	0	133
#2	100	241
#3	100	134
#4	0	7
#5	100	101
#6	100	95
#7	250.0	270.6

NOZZLE Φ	C10 0.280
PITOT #	322
BOX ID	18
GAMMA γ	0.9604
ΔH@	2.0614
PROBE ID	BL 9-1
SYSTEM ID	u-80-2/UA4/m-p1
FILTER ID	—

ISOKINETIC SAMPLING DATA SHEET PAGE 2 OF 3

FACILITY: Pinellas County RRF TEST LOCATION: Unit 2 DATE: 4/10/13

TECHNICIAN: JAW POLLUTANT: Metals RUN I.D.: 2020-M 29 -R 3

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM IN TEMP.	DGM OUT TEMP.	EXIT TEMP	FILTER TEMP.	METER VAC.
5	96			285	.35	1.3	709.8	101	99	61	255	5
A 1	100	~~1714~~ 1715		290	.47	1.8	712.3	101	101	61	252	5
2	104		-11"	291	.48	1.8	715.2	101	101	62	253	5
3	108			300	.45	1.7	718.0	102	98	62	260	5
4	112			300	.40	1.5	720.8	102	98	63	255	5
5	116			300	.40	1.5	723.4	102	98	63	255	5
	120	1735		—	—	—	726.190	—	—	—	—	—

Appendix H.4

EPA Method 29 Raw Field Data: Unit 2 SDA Inlet

ISOKINETIC SAMPLING DATA SHEET

FACILITY: PINELLAS CO RRF TEST LOCATION: UNIT 2 INLET DATE: 4-10-13

TECHNICIAN JS P_{BAR} 29.99 POLLUTANT: METALS RUN I.D.: U2I-M29-R1

2.4
2.8

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME FT^3	DGM TEMP. INLET	DGM TEMP. OUTLET	EXIT TEMP	FILTER TEMP.	METER VAC.
A 1	0	845		518	.46	1.3	727.148	69	68	58	246	4
2	5			519	.50	1.4	730.3	72	70	51	245	5
3	10			519	.52	1.5	733.3	73	70	54	249	6
4	15	857/859		520	.54	1.5	736.5	73	71	58	251	7
5	20			518	.54	1.5	739.7	73	70	58	247	7
6	25			517	.55	1.5	743.0	74	71	59	242	8
7	30		-1.1	517	.58	1.6	746.2	73	71	60	246	9
8	35			516	.59	1.7	749.6	73	70	61	252	9
9	40			516	.58	1.6	753.0	73	71	62	250	10
10	45	932/940		515	.60	1.7	756.4	74	71	63	251	10
11	50			515	.59	1.7	759.8	74	71	63	254	11
12	55			516	.59	1.7	763.3	75	72	64	253	11
	60	955					766.703					
B 1	60	1004		516	.43	1.2	766.913	73	72	64	249	10
2	65			515	.46	1.3	770.0	74	73	56	256	10
3	70			515	.49	1.4	772.9	74	72	56	256	11
4	75			515	.50	1.4	776.0	74	73	56	251	12
5	80			516	.51	1.4	779.2	74	72	56	253	12
6	85			515	.54	1.5	782.3	75	72	57	251	13
7	90	1035/1040/1044	-1.0	515	.57	1.6	785.6	75	73	57	247	13
8	95			515	.58	1.6	788.5	74	73	56	248	13
9	100			516	.58	1.6	791.9	75	74	58	251	14
10	105			516	.60	1.7	795.3	75	74	61	256	14
11	110			515	.59	1.7	798.7	75	74	62	246	15
12	115			515	.60	1.7	803.1	75	74	62	249	15

120 1113 806.519

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	121 ~~120~~	FILTER
	122 121	FUNNEL
	123 122	IMP 1-3
	124 ~~123~~	IMP 4
	125 124	IMP 5-6
	126 125	HCl H_2O
	127 126	S. GEL
	~~129~~	
	(VOA)	

LEAK CHECK:

						PITOT
VACUUM	15	15	15			PRE: ✓
RATE	.005	.004	.004			POST: ✓

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	0	94
#2	100	237
#3	100	157
#4	0	12
#5	100	106
#6	100	101
#7	250.1	273.5

NOZZLE Φ	B-10, .280
PITOT #	152
BOX ID	17
GAMMA γ	0.9798
ΔH@	1.8708
PROBE ID	PL-10-2
SYSTEM ID	U-50-4, PM#13-1, VA#17
FILTER ID	UNTARED

ISOKINETIC SAMPLING DATA SHEET

FACILITY: Pinellas Co. RRC TEST LOCATION: Unit 2 Inlet DATE: 4-10-13

2.8 TECHNICIAN JS P_{BAR} 29.98 POLLUTANT: METALS RUN I.D.: U2IM29-R 2

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME Ft³	DGM TEMP. INLET	DGM TEMP. OUTLET	EXIT TEMP	FILTER TEMP.	METER VAC.
B 1	0	1209		515	.44	1.2	807.109	77	77	63	243	4
2	5	~~1213~~ 1222		515	.47	1.3	810.0	78	78	61	247	5
3	10			516	.49	1.4	813.1	80	78	60	243	6
4	15			516	.52	1.5	816.3	82	79	60	247	7
5	20			515	.53	1.5	819.6	83	81	59	243	7
6	25			515	.55	1.5	822.8	85	82	61	245	8
7	30		-.98	516	.55	1.5	826.0	89	84	61	249	8
8	35			519	.58	1.6	829.2	89	84	62	252	9
9	40			523	.56	1.6	832.6	88	84	61	250	9
10	45			522	.57	1.6	836.0	88	83	63	254	10
11	50			522	.55	1.5	839.3	89	83	63	253	10
12	55			523	.56	1.6	842.7	88	83	62	250	11
	60	1318					846.015					
A 1	60	1326		523	.46	1.3	846.307	83	83	64	245	11
2	65			522	.47	1.3	849.5	86	83	62	249	11
3	70			522	.49	1.4	852.5	87	84	61	252	12
4	75			523	.51	1.4	855.7	88	83	61	251	12
5	80			522	.53	1.5	858.9	87	83	60	257	13
6	85			522	.53	1.5	862.2	87	84	60	255	13
7	90		-1.1	523	.55	1.5	865.5	87	84	61	251	14
8	95			522	.56	1.6	868.7	87	85	61	253	14
9	100			522	.55	1.5	872.0	86	84	62	248	14
10	105			521	.57	1.6	875.3	86	84	62	251	14
11	110			521	.56	1.6	878.6	86	85	62	250	15
12	115			520	.56	1.6	881.9	86	85	62	246	15
	120	1426					885.253					

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	128	FILTER
	129	Fhh.Frnt
	130	Imp 1-3
	131	Imp 4
	132	Imp 5-6
	133	HCl/H2O
	134	S.Gel

LEAK CHECK:

VACUUM	15	15	15		
RATE	.007	.005	.005		

PITOT

PRE:	✓
POST:	✓

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	0	116
#2	100	240
#3	100	129
#4	0	10
#5	100	100
#6	100	105
#7	250.J	278.J

NOZZLE Φ	A-11, .280
PITOT #	125 A
BOX ID	17
GAMMA γ	0.9798
ΔH@	1.8708
PROBE ID	PL-10-1
SYSTEM ID	U-50-4, PWHD-1, V0-17
FILTER ID	UNTARED

3.0
~~3.1~~
~~2.8~~

ISOKINETIC SAMPLING DATA SHEET

FACILITY: Pinellas Co. RRC TEST LOCATION: Unit 2 Inlet DATE: 4-10-13

TECHNICIAN JS P_{BAR} 29.95 POLLUTANT: METALS RUN I.D.: U2I-M29-R3

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM TEMP. INLET	DGM TEMP. OUTLET	EXIT TEMP	FILTER TEMP.	METER VAC.
A 1	0	1525		521	.43	1.2	886.015	85	86	64	251	4
2	5			522	.45	1.3	889.0	86	87	62	253	5
3	10			522	.46	1.3	892.1	88	86	61	250	5
4	15			521	.49	1.4	895.2	90	88	62	252	6
5	20			523	.51	1.5	898.4	90	88	62	246	7
6	25			520	.51	1.5	901.7	92	88	61	249	7
7	30		-1.1	519	.54	1.6	905.0	94	89	60	251	8
8	35			518	.57	1.7	908.4	94	90	61	252	9
9	40			519	.56	1.7	911.8	95	91	61	249	9
10	45			520	.58	1.7	915.4	95	92	62	243	10
11	50			520	.58	1.7	918.9	95	91	62	247	10
12	55			520	.57	1.7	922.5	93	91	63	250	11
	60	1625	✓	✓	✓	✓	926.124	✓	✓	✓	✓	✓
B 1	60	1633		520	.40	1.2	926.355	88	88	63	252	11
2	65			521	.44	1.3	929.5	95	90	61	250	11
3	70			520	.46	1.4	932.5	98	92	60	251	12
4	75			519	.49	1.5	935.6	101	95	60	250	13
5	80			519	.52	1.6	938.7	102	96	61	256	13
6	85			520	.52	1.6	942.0	103	97	61	253	14
7	90		-1.0	519	.55	1.7	945.4	104	99	60	251	14
8	95			518	.55	1.7	948.9	106	100	61	251	14
9	100			518	.57	1.7	952.4	106	101	61	246	15
10	105			519	.58	1.7	955.9	105	102	62	248	16
11	110			520	.56	1.7	959.4	105	103	62	251	16
12	115			520	.56	1.7	962.9	104	103	63	247	17
	120	1733					966.437					

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	135	Filter
	136	Fill Nitric
	137	Imp 1-3
	138	Imp 4
	139	Imp 5-6
	140	Acid H_2O
	141	Si Gel

LEAK CHECK:

						PITOT
VACUUM	15	15	18			PRE: ✓
RATE	.007	.004	.002			POST: ✓

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	0	71
#2	100	232
#3	100	137
#4	0	13
#5	100	100
#6	100	97
#7	250.0	273.2

NOZZLE Φ	.152
PITOT #	S-10, .280
BOX ID	17
GAMMA γ	0.9798
ΔH@	1.8708
PROBE ID	PL-10-2
SYSTEM ID	U-50-4, PNHB-1, VA-17
FILTER ID	UNTARED

Appendix H.5

EPA Method 29 Raw Field Data: Unit 3 FF Outlet

ISOKINETIC SAMPLING DATA SHEET

FACILITY: Pinellas County RRF TEST LOCATION: Unit 3 DATE: 4/11/18

TECHNICIAN JAW P_{BAR} 29.84 POLLUTANT: metals RUN I.D.: W30 - M 29 - R 1

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME F³	DGM TEMP. INLET	DGM TEMP. OUTLET	EXIT TEMP	FILTER TEMP.	METER VAC.
A 1	0	837		311	.45	1.7	739.165	75	74	60	249	5
2	4			310	.45	1.7	742.3	76	74	61	252	5
3	8		-11"	312	.43	1.6	745.0	76	74	58	259	5
4	12			312	.40	1.5	747.7	77	74	57	256	5
5	16			312	.34	1.3	750.3	78	74	58	255	5
B 1	20	857/858		320	.44	1.7	752.8	79	75	59	252	5
2	24			320	.45	1.7	755.5	80	75	60	257	5
3	28		-11"	305	.41	1.6	758.2	80	76	61	253	5
4	32			304	.39	1.5	760.9	81	76	61	254	5
5	36			306	.35	1.3	763.5	82	77	61	247	5
C 1	40	918/919		307	.43	1.6	766.0	82	77	60	255	5
2	44			307	.42	1.6	768.6	83	77	61	249	5
3	48			308	.40	1.5	771.2	82	78	61	261	5
4	52		-11"	306	.38	1.5	773.8	83	78	62	258	5
5	56			307	.35	1.3	776.4	83	78	62	255	5
	60	939		—	—	—	779.116	—	—	—	—	—
D 1	60	0954		306	.43	1.6	779.360	79	78	59	248	5
2	64			306	.42	1.6	782.0	80	79	60	252	5
3	68		-11"	307	.41	1.6	784.7	81	79	60	256	5
4	72			307	.40	1.5	787.2	82	79	61	261	5
5	76			308	.34	1.3	789.8	82	79	61	257	5
E 1	80	1014/1015		306	.42	1.6	792.3	83	80	61	261	5
2	84			306	.41	1.6	794.9	84	80	62	262	5
3	88		-11"	306	.41	1.6	797.5	84	80	62	257	5
4	92			306	.39	1.5	800.0	85	80	62	260	5

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	348	Filter
	350	FH Nitric
	351	Imp 1-3
	352	Imp 4
	353	Imp 5-6
	354	HCl + H_2O_2
	355	Gel

LEAK CHECK: K=3.8

						PITOT
VACUUM	11"	10"	10"			PRE: ✓
RATE	.010	.007	.008			POST: ✓

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	0	16.0
#2	100	335
#3	100	153
#4	0	5
#5	100	104
#6	100	98
#7	250.4	270.4

NOZZLE Φ	C11 0.280
PITOT #	158
BOX ID	18
GAMMA γ	0.9604
ΔH@	2.0614
PROBE ID	PL 9-6
SYSTEM ID	W-30-2/M4/M-P1
FILTER ID	—

ISOKINETIC SAMPLING DATA SHEET

FACILITY: Pinellas County RRF TEST LOCATION: Unit 3 DATE: 4/30

TECHNICIAN: DAW POLLUTANT: metals RUN I.D.: 430 - M2 9 - R 3

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft³	DGM IN TEMP.	DGM OUT TEMP.	EXIT TEMP	FILTER TEMP.	METER VAC.
5	96			307	.33	1.3	802.5	86	81	62	257	5
F 1	100	~~1035~~ 1036		303	.42	1.6	805.0	95	81	63	255	5
2	104			306	.43	1.6	807.7	86	81	63	257	5
3	108			307	.40	1.5	810.3	86	82	63	252	5
4	112		-11"	307	.38	1.5	812.9	86	83	64	259	5
5	116			306	.34	1.3	815.6	87	83	64	260	5
	120	1056		—	—	—	818.220	—	—	—	—	—

ISOKINETIC SAMPLING DATA SHEET

FACILITY: Pinellas County RRF TEST LOCATION: unit 3 DATE: 4/11/13

TECHNICIAN JAW P_{BAR} 29.87 POLLUTANT: metals RUN I.D.: U30 - M 29 - R 2

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME Ft^3	DGM TEMP. INLET	DGM TEMP. OUTLET	EXIT TEMP	FILTER TEMP.	METER VAC.
F1	0	1145		292	.44	1.7	821.630	84	83	59	252	5
2	4			298	.45	1.7	824.3	84	83	58	255	5
3	8		-11	305	.43	1.6	827.1	85	83	58	251	5
4	12			305	.41	1.6	829.8	86	83	59	256	5
5	16			307	.38	1.4	832.5	86	83	59	255	5
E1	20	1205 / 1206		301	.43	1.6	835.0	87	83	60	254	5
2	24			306	.43	1.6	837.6	88	84	60	262	5
3	28		-11	306	.40	1.5	840.3	88	84	60	264	5
4	32			307	.38	1.4	843.0	89	84	60	255	5
5	36			307	.34	1.3	845.6	89	85	60	255	5
D1	40	1226 / 1227		306	.45	1.7	848.0	90	85	61	250	5
2	44			306	.44	1.7	850.7	91	85	61	251	5
3	48			306	.41	1.6	853.6	91	85	61	261	5
4	52		-11	306	.41	1.6	856.1	92	85	62	250	5
5	56			306	.34	1.3	858.9	91	86	62	252	5
	60	1247		—	—	—	861.484	—	—	—	—	—
C1	60	1252		304	.43	1.6	861.650	89	87	61	260	5
2	64			304	.44	1.6	864.2	89	87	61	255	5
3	68		-11	306	.41	1.6	867.0	91	88	62	250	5
4	72			306	.34	1.5	869.7	91	88	62	266	5
5	76			306	.35	1.3	872.4	92	89	63	254	5
B1	80	1312 / 1313		307	.43	1.6	875.0	92	89	63	250	5
2	84			307	.43	1.6	877.6	93	90	63	248	5
3	88		-11	307	.41	1.6	880.2	93	90	64	255	5
4	92			307	.39	1.5	882.8	94	90	64	257	5

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	356	Filter
	358	Filter
	359	Imp 1-3
	360	Imp 4
	361	Imp 5-6
	362	HCl + H_2O
	363	sil gel

LEAK CHECK:

						PITOT
VACUUM	10"	10"	11"			PRE: ✓
RATE	.007	.008	.010			POST: ✓

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	0	273
#2	100	260
#3	100	136
#4	0	4
#5	100	100
#6	100	101
#7	250.0	273.6

NOZZLE Φ	C10 0.280
PITOT #	322
BOX ID	18
GAMMA γ	0.9604
ΔH@	2.0614
PROBE ID	PL 9-1
SYSTEM ID	U-90-2/UA4/M-91
FILTER ID	—

ISOKINETIC SAMPLING DATA SHEET PAGE __ OF __

FACILITY: Pinellas County RRF TEST LOCATION: Unit 3 DATE: 4/11/13

TECHNICIAN: DAW POLLUTANT: metals RUN I.D.: U30-M 29-R 2

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM IN TEMP.	DGM OUT TEMP.	EXIT TEMP	FILTER TEMP.	METER VAC.
5	96			306	.37	1.4	865.5	95	91	64	252	5
A1	100	1333 / 1334		304	.40	1.5	888.0	95	91	64	260	5
2	104			304	.44	1.6	890.6	96	91	65	255	5
3	108		-11	304	.44	1.6	893.3	96	91	65	261	5
4	112			304	.38	1.4	896.0	97	92	65	253	5
5	116			304	.34	1.3	898.5	97	92	66	255	5
	120	1354		—	—	—	901.11	—	—	—	—	—

ISOKINETIC SAMPLING DATA SHEET

FACILITY: Pinellas County RRF TEST LOCATION: unit 3 DATE: 4/11/13

TECHNICIAN JAW P_{BAR} 29.85 POLLUTANT: metals RUN I.D.: u30 - M29 - R3

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME F'ft³	DGM TEMP. INLET	DGM TEMP. OUTLET	EXIT TEMP	FILTER TEMP.	METER VAC.
A1	0	1436		305	.43	1.6	901.177	92	91	55	253	5
2	4			305	.44	1.6	903.6	92	91	56	254	5
3	8			305	.41	1.5	906.7	92	91	56	253	5
4	12		-11	308	.40	1.4	908.8	93	91	57	257	5
5	16			307	.35	1.3	911.3	94	91	57	260	5
B1	20	1456 / 1457		306	.42	1.5	912.9	95	92	58	251	5
2	24			306	.43	1.5	916.6	96	92	58	253	5
3	28		-11	307	.40	1.4	919.0	96	93	59	262	5
4	32	1507 / 1523		307	.40	1.4	921.6	97	93	55	255	5
5	36			304	.35	1.3	924.0	99	98	55	251	5
C1	40	1533 / 1534		304	.44	1.6	926.5	99	98	56	258	5
2	44			308	.45	1.6	929.1	100	98	56	262	5
3	48		-11	306	.44	1.6	931.8	102	99	57	257	5
4	52			306	.40	1.4	934.5	104	99	59	254	5
5	56			306	.34	1.2	937.1	104	99	60	255	5
	60	1555		—	—	—	939.704	—	—	—	—	—
D1	60	1602		306	.40	1.4	939.884	103	102	62	259	5
2	64			307	.45	1.6	942.5	103	102	62	260	5
3	68		-11	307	.44	1.6	945.1	104	103	62	247	5
4	72			306	.41	1.4	947.8	105	103	63	253	5
5	76			306	.36	1.3	950.4	105	103	60	254	5
E1	80	1622 / 1623		306	.43	1.5	952.9	104	103	61	255	5
2	84		-11	306	.43	1.5	955.4	103	102	62	261	5
3	88			306	.40	1.4	958.0	102	101	62	262	5
4	92			306	.39	1.4	960.6	101	100	62	255	5

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	364	Filter
	366	Front rinse
	367	Imp 1-3
	368	Imp 4
	369	Imp 5-6
	370	HCl + H_2O
	371	S.G.

LEAK CHECK: K=3.6

PITOT

VACUUM	11"	11"	11"			PRE: ✓
RATE	.003	.004	.003			POST: ✓

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	0	196
#2	100	294
#3	100	144
#4	0	8
#5	100	106
#6	100	100
#7	250.0	266.9

NOZZLE Φ	CR 0280
PITOT #	158
BOX ID	18
GAMMA γ	0.9604
ΔH@	2.0614
PROBE ID	PL 9-6
SYSTEM ID	u-50-2 / u94 / m-pl
FILTER ID	—

ISOKINETIC SAMPLING DATA SHEET

FACILITY: Pinellas County RRF TEST LOCATION: Unit 3 DATE: 4/11/13

TECHNICIAN: DAW POLLUTANT: metals RUN I.D.: 430-M 29-R 3

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM IN TEMP.	DGM OUT TEMP.	EXIT TEMP	FILTER TEMP.	METER VAC.
5	96			305	.36	1.3	963.1	101	99	64	252	5
F 1	100	1643 1644		306	.42	1.5	965.6	100	99	64	260	5
2	104		-11"	305	.43	1.5	968.2	99	99	65	257	5
3	108			305	.40	1.4	970.8	99	98	65	261	5
4	112			306	.38	1.3	973.3	98	97	66	258	5
5	116			306	.36	1.3	975.8	98	97	66	255	5
	120	1704		—	—	—	978.391	—	—	—	—	—

Appendix H.6

EPA Method 29 Raw Field Data: Unit 3 SDA Inlet

ISOKINETIC SAMPLING DATA SHEET

FACILITY: Pinellas Co. RRC TEST LOCATION: UNIT 3 INLET DATE: 4-11-13

TECHNICIAN JS P_{BAR} 29.84 POLLUTANT: METALS RUN I.D.: U3I-M29-R1

2.6

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM TEMP. INLET	DGM TEMP. OUTLET	EXIT TEMP	FILTER TEMP.	METER VAC.
A 1	0	837		606	.44	1.1	976.029	73	73	62	240	4
2	5			608	.48	1.2	979.0	74	73	57	247	5
3	10			609	.52	1.4	981.9	76	73	58	249	6
4	15			610	.51	1.3	985.0	77	73	58	250	6
5	20			610	.53	1.4	987.9	78	73	59	251	7
6	25			609	.53	1.4	991.0	77	74	59	252	7
7	30		-1.4	609	.54	1.4	994.1	78	74	60	250	8
8	35			610	.57	1.5	997.3	78	74	60	249	9
9	40			610	.58	1.5	000.5	78	74	61	246	10
10	45			610	.58	1.5	003.8	78	75	61	249	10
11	50			609	.57	1.5	007.0	78	75	62	256	10
12	55			609	.59	1.5	010.1	78	75	62	253	11
	60	937	✓	✓	✓	✓	013.419	✓	✓	✓	✓	✓
B 1	60	954 ~~947~~		609	.46	1.2	013.604	75	75	64	251	11
2	65			610	.49	1.3	016.5	77	75	61	253	12
3	70			610	.53	1.4	019.3	78	75	58	249	13
4	75			611	.52	1.4	022.4	78	75	58	251	13
5	80		-1.4	611	.54	1.4	025.5	78	76	57	252	14
6	85			610	.56	1.5	028.6	78	76	57	251	15
7	90			610	.56	1.5	031.9	77	76	58	253	15
8	95			611	.58	1.5	035.2	78	76	58	251	16
9	100			610	.57	1.5	038.5	78	76	59	247	16
10	105			610	.59	1.5	041.8	78	77	59	248	17
11	110			609	.59	1.5	045.1	78	77	60	251	17
12	115			610	.58	1.5	648.4	78	77	60	254	18
	120	1054					051.763					

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	149	FILTER
	150	FH Nitric
	151	Imp 1-3
	152	Imp 4
	153	Imp 5/6
	154	HCl/H2O
	155	Silica

LEAK CHECK:

						PITOT
VACUUM	15	15	20			PRE: ✓
RATE	.007	.005	.005			POST: ✓

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	0	119
#2	100	264
#3	100	141
#4	0	12
#5	100	100
#6	100	106
#7	250.0	262.7

NOZZLE Φ	A-11, .280
PITOT #	125A
BOX ID	17
GAMMA γ	0.9798
ΔH@	1.8708
PROBE ID	PL-10-1
SYSTEM ID	6-50-4, PIMB-1, UA-17
FILTER ID	UNTARED

ISOKINETIC SAMPLING DATA SHEET

FACILITY: Pinellas Co. RRF TEST LOCATION: Unit 3 Inlet DATE: 4-11-13

~~2.6~~ 2.7 TECHNICIAN JS P_{BAR} ~~29.85~~ 29.82 (wv) POLLUTANT: Metals RUN I.D.: 63E-M29-R1

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME Ft³	DGM TEMP. INLET	DGM TEMP. OUTLET	EXIT TEMP	FILTER TEMP.	METER VAC.
B1	0	1145		610	.41	1.1	052.247	80	79	65	243	4
2	5			609	.45	1.2	055.3	81	79	62	248	5
3	10			610	.49	1.3	058.3	82	79	61	251	6
4	15			609	.51	1.3	061.3	83	79	61	249	6
5	20			610	.52	1.4	064.3	83	80	60	253	7
6	25			611	.54	1.4	067.5	84	80	60	252	7
7	30		-1.0	612	.54	1.4	070.5	84	80	61	254	8
8	35			611	.56	1.5	073.7	85	81	61	254	9
9	40			610	.58	1.6	076.8	85	81	62	255	10
10	45			610	.58	1.6	079.9	85	82	62	251	10
11	50			610	.59	1.6	083.2	85	82	63	247	11
12	55			609	.58	1.6	086.5	85	82	62	246	11
	60	1245	/	/	/	/	089.952	/	/	/	/	/
A1	60	1252		610	.43	1.2	090.229	82	82	64	245	11
2	65			610	.47	1.3	093.0	85	83	61	247	11
3	70			609	.50	1.4	095.9	86	84	61	251	12
4	75			609	.52	1.4	099.1	88	84	60	250	12
5	80			608	.55	1.5	102.2	88	84	60	252	13
6	85			608	.56	1.5	105.4	88	84	61	254	13
7	90		-.98	609	.57	1.5	108.7	88	85	61	251	14
8	95			609	.58	1.6	111.8	87	85	62	253	14
9	100			610	.58	1.6	115.2	86	85	62	252	15
10	105			610	.57	1.5	118.5	86	84	63	251	16
11	110			610	.57	1.5	121.7	86	84	63	246	16
12	115			609	.58	1.6	124.9	87	84	63	249	17

120 1352 128.243

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	149	FILTER
	150	Acetone
	151	Imp 1-3
	152	Imp 4
	153	Imp 5-6
	154	HCl H_2O
	155	Gel

LEAK CHECK:

						PITOT
VACUUM	15	15	18			PRE: ✓
RATE	.008	.005	.004			POST: ✓

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	0	88
#2	100	275
#3	100	168
#4	0	16
#5	100	106
#6	100	101
#7	251.0	272.0

NOZZLE Φ	.310, .280
PITOT #	152
BOX ID	17
GAMMA γ	0.9798
ΔH@	1.8708
PROBE ID	PL-10-2
SYSTEM ID	U-50-4, PNHS-1, UA-17
FILTER ID	UNTARED

ISOKINETIC SAMPLING DATA SHEET

FACILITY: PINELLAS CO. RRF TEST LOCATION: UNIT 3 INLET DATE: 4-11-13

TECHNICIAN JS P_{BAR} 29.85 POLLUTANT: METALS RUN I.D.: U3I-M29-R3

2.7

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM TEMP. INLET	DGM TEMP. OUTLET	EXIT TEMP	FILTER TEMP.	METER VAC.
A 1	0	1436		609	.42	1.1	129.249	87	86	65	243	4
2	5			610	.46	1.2	132.1	89	87	61	247	5
3	10			610	.49	1.3	135.1	90	87	61	251	6
4	15			610	.52	1.4	138.2	92	87	60	253	7
5	20			609	.53	1.4	141.4	93	88	60	248	7
6	25			610	.53	1.4	144.6	93	88	61	251	8
7	30		-1.0	609	.55	1.5	147.8	93	89	61	250	8
8	35	1506/1521		609	.56	1.5	151.1	93	91	62	247	9
9	40			610	.59	1.6	154.4	94	90	60	249	9
10	45			610	.58	1.6	157.8	94	91	60	255	10
11	50			610	.58	1.6	161.3	92	90	62	253	10
12	55			610	.59	1.6	164.5	91	89	61	254	11
	60	1553					167.915					
B 1	60	1602		609	.44	1.2	168.242	87	87	63	251	11
2	65			609	.47	1.3	171.4	90	87	60	253	12
3	70			609	.49	1.3	174.5	92	88	61	252	12
4	75			610	.51	1.4	177.5	93	89	61	256	13
5	80			610	.53	1.4	180.7	93	91	60	247	13
6	85			609	.53	1.4	183.9	93	91	60	243	14
7	90		-1.1	609	.56	1.5	187.1	92	91	61	246	14
8	95			609	.57	1.5	190.4	91	90	61	249	15
9	100			610	.58	1.6	193.7	90	89	61	253	16
10	105			610	.58	1.6	197.0	89	88	62	251	16
11	110			609	.57	1.5	200.4	87	88	62	249	17
12	115			610	.59	1.6	203.7	87	88	64	246	17
	120	1702					207.149					

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	156	FILTER
	157	FRNTric
	158	Imp 1-3
	159	Imp 4
	160	Imp 5-6
	161	HNO_3/H_2O
	162	5.6-1

LEAK CHECK:

						PITOT
VACUUM	15	15	18			PRE: ✓
RATE	.009	.007	.007			POST: ✓

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	0	138
#2	100	248
#3	100	135
#4	0	9
#5	100	109
#6	100	101
#7	251.3	269.7

NOZZLE Φ	A-11, .280
PITOT #	125A
BOX ID	17
GAMMA γ	0.9798
ΔH@	1.8708
PROBE ID	PL-10-2
SYSTEM ID	U-50-4, PNOH3-1, MA-7
FILTER ID	UNTARED

Appendix I

EPA Methods 5 and 26A Raw Field Data

Appendix I.1

EPA Method 5/26A Raw Field Data: Unit 1 FF Outlet

ISOKINETIC SAMPLING DATA SHEET

FACILITY: Veolia Pinellas TEST LOCATION: Unit 1 Outlet DATE: 04.09.13

TECHNICIAN MRW P_{BAR} 30.02 POLLUTANT: HCl/PM RUN I.D.: U10_MBGA_R 1

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME Ft³	DGM TEMP. INLET	DGM TEMP. OUTLET	EXIT TEMP	FILTER TEMP.	METER VAC.
F 5	0	905		313	.33	1.1	176.584	74	77	55	311	6
4	4			314	.33	1.1	180.0	75	77	55	312	6
3	8		-10	313	.45	1.5	183.5	76	77	54	312	7
2	12			313	.45	1.5	184.2	76	77	54	313	7
1	16			315	.40	1.3	186.9	76	77	58	310	7
E 5	20	925/926		312	.35	1.2	189.4	78	77	59	312	7
4	24	930/939		314	.37	1.2	191.7	81	80	58	311	7
3	28		-11	312	.42	1.4	194.3	81	80	59	311	7
2	32			313	.42	1.4	196.9	80	81	61	312	7
1	36			312	.40	1.3	199.5	84	80	60	312	7
D 5	40	955/956		315	.40	1.3	202.1	83	83	61	311	7
4	44			314	.42	1.4	204.5	84	83	60	312	7
3	48		-10	314	.45	1.5	207.0	84	82	62	313	7
2	52			313	.43	1.4	209.6	84	82	60	310	7
1	56			312	.42	1.4	212.2	85	82	61	312	7
C 5	60	1014/1026		313	.43	1.4	214.945/215.137	82	83	64	313	7
4	64			315	.44	1.5	217.5	80	84	62	310	7
3	68		-10	316	.44	1.5	220.3	82	81	61	311	7
2	72			315	.42	1.4	222.8	79	79	60	312	7
1	76			315	.42	1.4	225.4	79	78	60	312	7
B 5	80	1046/1047		316	.41	1.4	227.9	77	76	59	311	7
4	84			315	.42	1.4	230.5	77	76	59	311	7
3	88		-11	315	.42	1.4	233.0	78	77	60	312	7
2	92			317	.43	1.4	235.5	77	76	61	312	7
1	96			315	.40	1.3	238.0	77	76	60	311	7

CHAIN OF CUSTODY: 3.3

CONTAINER	SAMPLE I.D.	DESCRIPTION
	800	FILTER
	801	FH Acetone
	802	Acetone Rinse
	803	S-Gel

LEAK CHECK:

						PITOT
VACUUM	15"	14"	15"			PRE: ✓
RATE	.010	.007	.005			POST: ✓

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	50	302
#2	100	250
#3	100	118
#4	100	97
#5	100	102
#6	250.5	272.5
#7		

NOZZLE Φ	C10 .280
PITOT #	319
BOX ID	4
GAMMA γ	1.0215
ΔH@	1.6942
PROBE ID	PC 9-7
SYSTEM ID	USG-1 / MM5-10 / UA-12
FILTER ID	Q 12-42

ISOKINETIC SAMPLING DATA SHEET PAGE 2 OF 2

FACILITY: Nebula Plants TEST LOCATION: Unit 1 Outlet DATE: 04.09.13

TECHNICIAN: MRH POLLUTANT: HCL/PM RUN I.D.: U1O-M26A-R1

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM IN TEMP.	DGM OUT TEMP.	EXIT TEMP	FILTER TEMP.	METER VAC.
A 5	100	1107 / 1109		312	.40	1.5	240.6	77	75	61	312	7
4	104			317	.40	1.3	243.5	79	76	62	313	7
3	108		-12	318	.42	1.4	246.0	80	76	61	310	7
2	112			320	.42	1.4	248.5	78	75	62	311	7
1	116			320	.40	1.3	251.3	80	76	62	313	7
	120	1128	-	-	-	-	253.920	-	-	-	-	-

ISOKINETIC SAMPLING DATA SHEET

FACILITY: Veolia Pinellas TEST LOCATION: Unit 1 outlet DATE: 04.09.13

TECHNICIAN MRW P_{BAR} 30.04 POLLUTANT: HCL / PM RUN I.D.: U10 -M26A -R2

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME Ft³	DGM TEMP. INLET	DGM TEMP. OUTLET	EXIT TEMP	FILTER TEMP.	METER VAC.
A 5	0	1324		315	.43	1.3	254.215	79	81	64	311	6
4	4			315	.43	1.3	256.7	80	81	62	313	6
3	8		-10	315	.42	1.3	259.3	80	80	60	315	6
2	12			315	.42	1.3	261.8	81	80	59	313	6
1	16			313	.44	1.4	264.4	81	80	60	314	6
B 5	20	1344 / 1345		312	.44	1.4	267.0	82	80	62	313	6
4	24			314	.46	1.4	269.5	82	80	60	311	6
3	28		-12	313	.45	1.4	272.1	82	80	60	310	6
2	32			316	.46	1.4	275.0	82	80	59	312	6
1	36			330	.45	1.4	277.7	83	81	60	313	6
C 5	40	1405 / 1406		320	.43	1.3	280.5	83	82	61	310	6
4	44			320	.43	1.3	283.1	83	82	60	311	6
3	48		-10	318	.43	1.3	285.6	83	83	59	313	6
2	52			318	.42	1.3	288.2	83	82	61	312	6
1	56			320	.42	1.3	290.7	82	81	60	310	6
D 5	60	1426 / 1434		315	.45	1.4	293.353 / 293.480	82	81	63	311	6
4	64			314	.46	1.4	296.1	82	81	61	311	6
3	68		-11	315	.46	1.4	298.7	82	81	60	312	6
2	72			313	.45	1.4	301.3	82	81	59	312	6
1	76			313	.45	1.4	303.8	82	81	61	310	6
E 5	80	1454 / 1455		313	.40	1.3	306.7	81	80	60	311	6
4	84			314	.40	1.3	309.3	81	80	63	311	6
3	88		-11	313	.41	1.3	311.7	81	79	64	312	6
2	92			314	.43	1.3	314.2	81	79	63	313	6
1	96			315	.43	1.3	317.1	83	80	62	311	6

K 3.1

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	804	Filter
	805	Acetone
	806	Acid Imps

LEAK CHECK:

						PITOT
VACUUM	15"	12"	12"			PRE: ✓
RATE	.009	.006	.005			POST: ✓

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	50	290
#2	100	246
#3	100	128
#4	100	102
#5	100	100
#6	251.0	273.5
#7		

NOZZLE Φ	C10 .280
PITOT #	1C7
BOX ID	4
GAMMA γ	1.0215
ΔH@	1.6942
PROBE ID	PL 9-5
SYSTEM ID	PUSC-1/NHB10/UA12
FILTER ID	Q 12-43

ISOKINETIC SAMPLING DATA SHEET PAGE 2 OF 2

FACILITY: Veolia Pinellas TEST LOCATION: Unit 1 outlet DATE: 04-09-13

TECHNICIAN: MLW POLLUTANT: HCl RUN I.D.: U1O - M2GA - R2

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM IN TEMP.	DGM OUT TEMP.	EXIT TEMP	FILTER TEMP.	METER VAC.
F 5	100	~~1515~~ 1516		318	.47	1.5	319.7	81	80	62	310	7
4	104			313	.49	1.5	322.4	81	80	60	312	7
3	108		-11	313	.49	1.5	325.2	81	79	63	312	7
2	112			316	.43	1.3	328.0	81	79	63	313	7
1	116			314	.43	1.3	330.6	81	80	63	312	7
	120	1536	—	—	—	—	333.287	—	—	—	—	-

PinellasCounty RRF

ISOKINETIC SAMPLING DATA SHEET

PAGE 1 OF 2

FACILITY: ~~Veolia Pinellas~~ (W) TEST LOCATION: Unit 1 Outlet DATE: 04.09.13

TECHNICIAN MRW P_{BAR} 30.04 POLLUTANT: HCl/PM RUN I.D.: U10 - M26A - R 3

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM TEMP. INLET	DGM TEMP. OUTLET	EXIT TEMP	FILTER TEMP.	METER VAC.
F 5	0	1622		314	.40	1.2	334,140	80	78	63	313	6
4	4			314	.45	1.4	336.7	81	79	60	312	6
3	8		-11	314	.45	1.4	339.3	80	79	60	313	6
2	12			316	.44	1.3	342.1	81	80	61	312	6
1	16			318	.49	1.5	344.7	81	80	60	312	6
E 5	20	1642 / 1643		315	.40	1.2	347.4	82	80	61	313	6
4	24			318	.43	1.3	350.0	82	80	62	311	6
3	28		-10	318	.43	1.3	352.6	82	80	60	311	6
2	32			319	.47	1.4	355.2	81	79	61	313	6
1	36			317	.45	1.4	357.9	81	79	61	312	6
D 5	40	1703 / 1704		317	.42	1.3	360.6	81	78	60	312	6
4	44			318	.46	1.4	363.2	81	79	61	312	6
3	48		-10	317	.46	1.4	365.8	81	79	61	313	6
2	52			317	.45	1.4	368.4	82	78	59	310	6
1	56			318	.46	1.4	371.2	82	79	60	312	6
C 5	60	1724 / 1731		315	.43	1.3	374,000 / 374,348	80	78	64	312	6
(W) ~~4~~	64			316	.43	1.3	377.0	80	79	60	312	6
3 ~~4~~	68		-12	315	.46	1.4	379.5	80	79	60	313	6
2 ~~3~~	72			315	.47	1.4	382.0	80	79	60	311	6
1 ~~2~~	76			317	.45	1.4	384.6	81	79	59	312	6
B ~~5~~	80	1751 / 1752		316	.43	1.3	387.6	82	79	61	311	6
4	84			315	.43	1.3	390.1	82	80	62	312	6
3	88		-11	319	.45	1.4	392.8	82	80	63	312	6
2	92			319	.45	1.4	395.3	83	80	62	312	6
1	96			318	.46	1.4	397.9	83	80	61	310	6

CHAIN OF CUSTODY: K = 3.0

CONTAINER	SAMPLE I.D.	DESCRIPTION
	808	FILTER
	809	Acetone
	810	Imp
	811	S. Bal

LEAK CHECK:

						PITOT
VACUUM	14"	12"	12"			PRE: ✓
RATE	.010	.008	.005			POST: ✓

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	50	328
#2	100	246
#3	100	116
#4	100	100
#5	100	100
#6	250.0	267.4
#7		

NOZZLE Φ	C10 .280
PITOT #	319
BOX ID	4
GAMMA γ	1.0215
ΔH@	1.6942
PROBE ID	PL 9-7
SYSTEM ID	PUSG-1 / NHB10 / UA 12
FILTER ID	Q 12-44

Pinellas County RRF

ISOKINETIC SAMPLING DATA SHEET

FACILITY: ~~Southern Pinellas~~ (RRF) TEST LOCATION: Unit 1 Outlet DATE: 04.09.13

TECHNICIAN: MRW POLLUTANT: HCl / PM RUN I.D.: U10 - M2A - R 3

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft³	DGM IN TEMP.	DGM OUT TEMP.	EXIT TEMP	FILTER TEMP.	METER VAC.
A5	100	~~1812~~ 1813		317	.46	1.4	400.9	83	81	62	313	6
4	104			317	.46	1.4	403.6	83	81	63	312	6
3	108		-11	316	.45	1.4	406.3	83	81	61	312	6
2	112			318	.47	1.4	409.0	82	80	60	311	6
1	116			319	.42	1.3	411.7	82	80	60	313	6
	120	1833	-	-	-	-	414.394	-	-	-	-	-

Appendix I.2

EPA Method 5/26A Raw Field Data: Unit 2 FF Outlet

ISOKINETIC SAMPLING DATA SHEET

FACILITY: Pinellas County RRF TEST LOCATION: Unit 2 Outlet DATE: 04.10.13

TECHNICIAN MLW P_{BAR} 29.99 POLLUTANT: HCL / PM RUN I.D.: U2O - M26A - R 1

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM TEMP. INLET	DGM TEMP. OUTLET	EXIT TEMP	FILTER TEMP.	METER VAC.
A 5	0	845		295	.35	1.1	451.437	67	64	64	311	6
4	4	857		298	.40	1.3	453.8	69	65	60	311	6
3	8	909	-11	298	.40	1.3	454.9	69	65	60	313	6
2	12			295	.40	1.3	455.4	69	65	61	313	6
1	16			295	.42	1.3	459.9	71	66	60	311	6
B 5	20	907/908		298	.43	1.3	463.6	71	66	58	312	6
4	24			293	.49	1.5	466.2	72	68	55	312	6
3	28		-12	293	.48	1.5	467.8	73	67	55	313	6
2	32			299	.48	1.5	470.4	73	67	56	312	6
1	36			297	.47	1.5	473.3	74	68	57	311	6
C 5	40	923/924		295	.45	1.4	476.0	73	69	58	312	6
4	44			295	.45	1.4	478.6	73	70	59	312	6
3	48	935/940	-11	298	.45	1.4	481.2	73	71	56	313	6
2	52			295	.49	1.5	483.9	73	69	56	312	6
1	56			293	.49	1.5	486.7	74	70	57	311	6
D 5	60	949/1004		295	.48	1.5	489.540/489.743	73	70	60	312	6
4	64			295	.49	1.5	492.4	74	71	60	313	6
3	68		-11	295	.47	1.5	495.0	74	71	60	311	6
2	72			296	.47	1.5	497.7	74	71	61	312	6
1	76			299	.44	1.4	500.6	75	71	62	313	6
E 5	80	1004/1025		290	.47	1.5	503.3	76	70	61	311	6
4	84			291	.47	1.5	506.0	75	72	63	313	6
3	88	1035/1044	-12	293	.46	1.4	508.6	76	71	63	313	6
2	92	[illegible]		294	.47	1.5	511.5	78	73	60	311	6
1	96			295	.34	1.1	513.9	74	73	60	312	6

CHAIN OF CUSTODY: 3.1

CONTAINER	SAMPLE I.D.	DESCRIPTION
	816	Filter
	817	Acetone
	818	DI H2O
	819	5.6-C

LEAK CHECK:

						PITOT
VACUUM	14"	12"	12"			PRE: ✓
RATE	.007	.008	.005			POST: ✓

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	50	255
#2	100	205
#3	100	113
#4	100	100
#5	100	100
#6	250.4	269.8
#7		

NOZZLE Φ	C16 .280
PITOT #	117
BOX ID	4
GAMMA γ	1.0215
ΔH@	1.6942
PROBE ID	PL 9-5
SYSTEM ID	USG1 / NHS10 / UA12
FILTER ID	@ 12-45

ISOKINETIC SAMPLING DATA SHEET PAGE 2 OF 2

FACILITY: Pinellas County RRF TEST LOCATION: Unit 2 Outlet DATE: 04.10.13

TECHNICIAN: MCW POLLUTANT: HCl / PM RUN I.D.: U20 - M26A - R 1

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM IN TEMP.	DGM OUT TEMP.	EXIT TEMP	FILTER TEMP.	METER VAC.
F 5	100	~~1054~~ 1055		294	.36	1.1	516.4	80	74	60	311	6
4	104			290	.32	1.0	518.7	80	75	59	310	6
3	108		-11	293	.42	1.3	521.0	80	74	61	311	6
2	112			295	.42	1.3	523.6	81	74	62	313	6
1	116			291	.31	1.0	526.2	81	74	62	311	6
	120	1115	-	-	-	-	528.689	-	-	-	-	-

ISOKINETIC SAMPLING DATA SHEET

FACILITY: Pinellas County RRF TEST LOCATION: Unit 2 outlet DATE: 04.10.13

TECHNICIAN MRH P_{BAR} 29.53 POLLUTANT: HCL / PM RUN I.D.: U20 - M26A - R 2

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME FT^3	DGM TEMP. INLET	DGM TEMP. OUTLET	EXIT TEMP	FILTER TEMP.	METER VAC.
F 5	0 ~~1208~~	1209		297	.33	1.0	530.465	80	76	64	311	5
4	4	1210 / 1222		298	.45	1.4	532.9	80	79	63	312	6
3	8		-11	298	.45	1.4	535.4	80	79	62	312	6
2	12			299	.49	1.5	538.1	80	78	60	311	6
1	16			298	.49	1.5	540.8	80	78	59	313	6
E 5	20	1239 / 1240		295	.48	1.5	543.7	81	78	60	312	6
4	24			296	.49	1.5	546.4	82	79	61	312	6
3	28		-10	299	.49	1.5	549.1	83	79	59	311	6
2	32			297	.47	1.5	551.9	83	79	59	310	6
1	36			294	.35	1.1	554.7	83	79	60	312	6
D 5	40	1300 / 1301		292	.49	1.5	557.1	84	80	62	311	6
4	44			296	.49	1.5	560.0	85	78	60	310	6
3	48		-11	295	.47	1.5	562.8	85	79	61	312	6
2	52			293	.46	1.4	565.5	85	79	60	311	6
1	56			297	.35	1.1	568.3	86	78	61	312	6
C 5	60	1321 / 1324		296	.49	1.5	570.450 / 570.960	86	81	63	311	7
4	64			298	.49	1.5	573.6	86	82	63	312	7
3	68		-11	297	.48	1.5	576.3	86	82	62	311	7
2	72			298	.47	1.5	579.0	87	81	63	311	7
1	76			298	.33	1.0	581.9	86	82	61	310	6
B 5	80	1346 / 1347		299	.50	1.6	584.3	87	82	63	312	7
4	84			301	.48	1.5	587.2	88	82	62	312	7
3	88		-10	300	.49	1.5	590.0	89	83	61	311	7
2	92			298	.42	1.3	592.8	89	84	60	312	7
1	96			297	.37	1.2	595.3	90	84	60	312	7

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	816	Filter
	817	Front Half
	818	Imp
	819	Silica

LEAK CHECK:

						PITOT
VACUUM	15"	14"	12"			PRE: N
RATE	.009	.007	.005			POST: N

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	50	272
#2	100	214
#3	100	114
#4	100	100
#5	100	100
#6	250.5	271.6
#7		

NOZZLE Φ	.280
PITOT #	319
BOX ID	4
GAMMA γ	1.0215
ΔH@	1.6942
PROBE ID	PL 9-7
SYSTEM ID	PL26-1 / WHB10 / UA12
FILTER ID	Q 12-48

ISOKINETIC SAMPLING DATA SHEET PAGE 2 OF 3

FACILITY: Pinellas County RRF TEST LOCATION: Unit 2 Outlet DATE: 04.10.13

TECHNICIAN: MLW POLLUTANT: HCL / PM RUN I.D.: U20 - MQGA-R 2

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM IN TEMP.	DGM OUT TEMP.	EXIT TEMP	FILTER TEMP.	METER VAC.
A 5	100	1401 / 1408		298	.49	1.5	597.9	92	86	63	310	7
4	104			298	.48	1.5	600.6	93	84	63	310	7
3	108		-11	299	.41	1.3	603.4	93	86	64	311	7
2	112			297	.41	1.3	606.0	93	85	63	312	7
1	116			296	.34	1.1	608.6	93	85	63	312	6
	120	1428	-	-	-	-	611.150	-	-	-	-	-

ISOKINETIC SAMPLING DATA SHEET

FACILITY: Pinellas County RRF TEST LOCATION: Unit 2 Outlet DATE: 04.10.19

TECHNICIAN MRW P_{BAR} 29.95 POLLUTANT: HCl / PM RUN I.D.: U20 - M 2&4 - R 3

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM TEMP. INLET	DGM TEMP. OUTLET	EXIT TEMP	FILTER TEMP.	METER VAC.
A 5	0	1525		293	.49	1.5	611.600	94	90	63	312	6
4	4			298	.48	1.5	614.2	94	90	60	312	6
3	8		-10	297	.42	1.3	616.9	96	91	60	311	6
2	12			295	.40	1.3	619.5	96	91	61	312	6
1	16			296	.32	1.0	622.1	96	91	60	313	6
B 5	20	1545 / 1546		293	.47	1.5	624.4	98	92	62	313	6
4	24			293	.47	1.6	627.2	99	92	61	312	6
3	28		-12	295	.48	1.5	629.9	100	92	60	311	6
2	32			296	.40	1.2	632.7	100	93	60	312	6
1	36			294	.36	1.1	635.3	100	93	61	313	6
C 5	40	1606 / 1607		298	.49	1.5	637.6	102	95	62	312	7
4	44			296	.49	1.6	640.3	101	94	61	313	7
3	48		-11	297	.48	1.5	643.1	100	95	62	312	7
2	52			299	.44	1.4	645.9	96	92	63	311	6
1	56			297	.37	1.2	648.5	96	92	63	312	6
D 5	60	1627 / 1633		293	.47	1.5	651.425 / 651.550	94	89	64	313	7
4	64			293	.46	1.4	654.2	94	90	62	313	7
3	68		-11	295	.45	1.4	656.8	95	89	61	311	7
2	72			292	.45	1.4	659.4	95	88	60	312	7
1	76			292	.38	1.2	662.3	95	88	58	312	7
E 5	80	1653 / 1654		300	.49	1.5	665.0	96	90	63	311	7
4	84			300	.49	1.5	667.7	98	91	62	311	7
3	88		-10	298	.47	1.5	670.5	100	92	62	310	7
2	92			295	.43	1.3	673.2	101	93	60	310	7
1	96			295	.37	1.2	676.0	101	94	57	310	7

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	820	F. Filter
	821	FH Acetone
	822	Imp.
	823	S. Gel

LEAK CHECK:

						PITOT
VACUUM	15"	14"	12"			PRE: ✓
RATE	.009	.008	.005			POST: ✓

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	50	183
#2	100	234
#3	100	128
#4	100	108
#5	100	104
#6	250.0	274.6
#7		

NOZZLE Φ	C10 .280
PITOT #	117
BOX ID	4
GAMMA γ	1.0215
ΔH@	1.6942
PROBE ID	PL 9-5
SYSTEM ID	p1156-1/NHB16/UA12
FILTER ID	Q12-49

ISOKINETIC SAMPLING DATA SHEET PAGE 2 OF 2

FACILITY: Pinellas County RRF TEST LOCATION: Unit 2 Outlet DATE: 04, 10, 13

TECHNICIAN: MRW POLLUTANT: HCl / PM RUN I.D.: U20 - M26A - R 3

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft³	DGM IN TEMP.	DGM OUT TEMP.	EXIT TEMP	FILTER TEMP.	METER VAC.
F 5	100	~~1714~~ 1715		295	.45	1.4	678.4	99	95	64	312	7
4	104			298	.45	1.4	681.2	99	95	63	310	7
3	108		-10	294	.42	1.3	683.9	98	94	43	311	7
2	112			295	.40	1.2	686.4	99	94	62	311	7
1	116			293	.39	1.2	688.9	99	96	41	311	7
	120	1735	-	-	-	-	691.565	-	-	-	-	-

Appendix I.3

EPA Method 5/26A Raw Field Data: Unit 3 FF Outlet

ISOKINETIC SAMPLING DATA SHEET

FACILITY: Pinellas County RRF TEST LOCATION: Unit 3 outlet DATE: 04.11.13

TECHNICIAN MRW P_{BAR} 29.84 POLLUTANT: HCl/PM RUN I.D.: U30 - M26A - R 1

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME Ft³	DGM TEMP. INLET	DGM TEMP. OUTLET	EXIT TEMP	FILTER TEMP.	METER VAC.
F5	0	837		303	.45	1.4	725.336	74	70	63	312	6
4	4			305	.40	1.2	728.0	71	69	60	312	6
3	8		-11	310	.42	1.3	730.5	72	70	57	311	6
2	12			311	.43	1.3	733.1	72	70	57	311	6
1	16			308	.34	1.1	735.7	72	69	56	310	6
E5	20	857 / 858		318	.46	1.4	738.1	73	70	60	312	6
4	24			313	.41	1.3	740.6	75	71	57	312	6
3	28		-10	315	.41	1.3	743.2	75	71	57	311	6
2	32			305	.41	1.3	745.8	75	71	60	312	6
1	36			308	.35	1.1	748.4	76	71	59	312	6
D5	40	918 / 919		304	.44	1.4	750.8	76	73	60	311	6
4	44			305	.44	1.4	753.5	76	73	60	312	6
3	48		-10	305	.43	1.3	756.2	77	72	60	313	6
2	52			306	.40	1.2	758.8	78	73	61	313	6
1	56			304	.33	1.0	761.3	78	74	60	311	6
C5	60	939 / ~~946~~		305	.45	1.4	~~763.808~~ ~~763.450~~	77	74	63	312	6
4	64	954		303	.45	1.4	~~765.030~~ 766.7	77	75	62	312	6
3	68		-11	304	.44	1.4	769.4	78	75	62	311	6
2	72			305	.41	1.3	772.1	79	76	61	311	6
1	76			306	.36	1.1	774.7	78	75	62	312	6
B5	80	1014 / 1015		305	.43	1.3	777.1	79	75	63	312	6
4	84			306	.43	1.3	779.7	79	75	62	312	4
3	88		-11	305	.42	1.3	782.3	80	76	60	311	4
2	92			303	.41	1.3	784.9	79	76	61	310	4
1	96			303	.32	1.0	787.6	79	76	61	312	4

CHAIN OF CUSTODY: 3.1

CONTAINER	SAMPLE I.D.	DESCRIPTION
	824	Filter
	825	FH Acetone
	826	Imps
	827	S.Gel

LEAK CHECK:

VACUUM	15"	13"	12"	13"	
RATE	.008	.007	.006	.005	

PITOT	
PRE:	✓
POST:	✓

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	50	305
#2	100	263
#3	100	121
#4	100	100
#5	100	104
#6	250.1	282.2
#7		

NOZZLE Φ	C10 .280
PITOT #	319
BOX ID	4
GAMMA γ	1.0215
ΔH@	1.6842
PROBE ID	PL 9-7
SYSTEM ID	PD36-1 / NHB10 / UA17
FILTER ID	Q 12-50

B10 .280

ISOKINETIC SAMPLING DATA SHEET PAGE 2 OF 2

FACILITY: Pinellas County/RRF TEST LOCATION: Unit 3 Outlet DATE: 04.11.13

TECHNICIAN: MRW POLLUTANT: HCL / PM RUN I.D.: U3O - M2QA - R 1

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM IN TEMP.	DGM OUT TEMP.	EXIT TEMP	FILTER TEMP.	METER VAC.
A 5	100	~~1035~~ 1036		301	.45	1.4	790.0	80	76	57	311	6
4	104			303	.45	1.4	792.7	80	76	58	313	6
3	108		-10	306	.42	1.3	795.4	81	77	59	313	6
2	112			306	.43	1.3	798.0	81	77	60	311	6
1	116			304	.35	1.1	800.6	80	77	61	311	6
	120	~~1045~~	-	-	-	-	803.150	-	-	-	-	-

ISOKINETIC SAMPLING DATA SHEET

FACILITY: Pinellas County RRF TEST LOCATION: Unit 3 outlet DATE: 04.11.13

TECHNICIAN MBW P_{BAR} 29.87 POLLUTANT: HCL / PM RUN I.D.: U30 - M26A - R 2

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME Ft^3	DGM TEMP. INLET	DGM TEMP. OUTLET	EXIT TEMP	FILTER TEMP.	METER VAC.
A5	0	1145		303	.46	1.4	803.450	91	80	63	312	6
4	4			303	.46	1.4	806.1	81	80	62	312	6
3	8		-11	300	.44	1.4	808.8	81	80	62	311	6
2	12			301	.40	1.2	811.7	81	81	61	312	6
1	16			302	.36	1.1	814.1	82	81	60	312	6
B5	20	1205 / 1206		301	.43	1.3	816.5	82	80	61	313	6
4	24			303	.43	1.3	819.1	83	80	60	313	6
3	28		-11	301	.43	1.3	821.7	83	80	61	312	6
2	32			302	.41	1.3	824.3	84	80	60	312	6
1	36			301	.37	1.2	826.9	84	81	59	311	6
C5	40	1226 / 1227		301	.45	1.4	829.4	84	81	57	312	6
4	44			302	.44	1.4	832.1	85	81	59	312	6
3	48	"	-10	302	.44	1.4	834.8	85	82	59	312	6
2	52			302	.38	1.2	837.4	85	82	60	311	6
1	56			302	.38	1.2	839.9	85	82	61	311	6
D5	60	1247 / 1248		301	.46	1.4	842.425 / 843.627	86	83	63	312	6
4	64			301	.46	1.4	845.5	86	83	61	312	6
3	68		-11	302	.44	1.4	848.2	86	82	60	312	6
2	72			301	.37	1.2	851.0	86	83	60	311	6
1	76			300	.37	1.2	853.5	87	83	61	312	6
E5	80	1312 / 1313		302	.44	1.4	856.0	88	84	62	311	6
4	84			302	.44	1.4	858.7	88	84	61	313	6
3	88		-10	301	.43	1.3	861.2	88	85	60	313	6
2	92			302	.40	1.2	863.8	89	84	60	312	6
1	96			301	.35	1.1	866.4	88	84	60	312	6

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	828	Filter
	829	Acetone
	830	Imp 2
	831	Gel

LEAK CHECK:

						PITOT
VACUUM	13"	14"	12"			PRE: ✓
RATE	.009	.009	.006			POST: ✓

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	50	336
#2	100	243
#3	100	152
#4	100	106
#5	100	102
#6	250.0	272.6
#7		

NOZZLE Φ	e10 .280
PITOT #	117
BOX ID	4
GAMMA γ	1.0215
ΔH@	1.6947
PROBE ID	PL 9-5
SYSTEM ID	pulse-1 / NAB10 / Unit 3
FILTER ID	@ 12-52

ISOKINETIC SAMPLING DATA SHEET PAGE 2 OF 2

FACILITY: Pinella-County RRF TEST LOCATION: Unit 3 Outlet DATE: 04 . 11 . 13

TECHNICIAN: MRW POLLUTANT: HCL / PM RUN I.D.: U30-MOGA-R 2

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM IN TEMP.	DGM OUT TEMP.	EXIT TEMP	FILTER TEMP.	METER VAC.
F 5	100	1333 / 1334		305	.45	1.4	868.8	94	89	60	311	6
4	104			305	.45	1.4	871.4	94	87	61	312	6
3	108		-11	303	.43	1.3	874.2	91	88	60	312	6
2	112			301	.43	1.3	876.7	91	87	60	313	6
1	116			300	.37	1.2	879.3	96	86	62	312	6
	120	1354	-	-	-	-	881.930	-	-	-	-	-

ISOKINETIC SAMPLING DATA SHEET

FACILITY: Pinellas County RRF TEST LOCATION: Unit 3 Outlet DATE: 04.11.13

TECHNICIAN MRW P_{BAR} 29.85 POLLUTANT: HCL / PM RUN I.D.: U30 - M26A - R 3

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME Ft³	DGM TEMP. INLET	DGM TEMP. OUTLET	EXIT TEMP	FILTER TEMP.	METER VAC.
F5	0	1436		300	.45	1.4	882.264	91	89	63	311	7
4	4			304	.45	1.4	885.4	91	89	60	312	7
3	8		-11	302	.44	1.2	887.5	92	90	60	312	7
2	12			305	.41	1.2	890.0	94 ~~96~~	88	59	311	7
1	16			305	.37	1.0	892.4	95	89	60	313	7
E5	20	1454 / 1455		308	.44	1.2	894.7	94	89	60	313	7
4	24			307	.43	1.2	896.9	94	88	59	312	7
3	28		-10	308	.42	1.2	899.4	96	90	60	311	7
2	32	1509 / 1523		307	.38	1.1	901.8	96	90	61	313	7
1	36			305	.36	1.0	904.9	96	90	62	311	7
D5	40	1527 / 1533 / 1539		305	.45	1.3	908.9	98	90	63	313	7
4	44			305	.45	1.3	909.4	99	91	62	312	7
3	48		-11	306	.44	1.2	911.9	95	95	60	313	7
2	52			308	.44	1.2	914.6	96	95	61	313	7
1	56			307	.35	1.0	917.1	96	94	63	312	7
C5	60	1555 / 1602		306	.46	1.3	~~914.457~~ / 919.757	95	92	63	311	7
4	64			303	.44	1.2	922.2	94	91	62	313	7
3	68		-10	303	.43	1.2	924.7	95	91	60	313	7
2	72			301	.40	1.1	927.3	95	92	60	311	7
1	76			301	.39	1.1	929.6	95	92	59	312	7
B5	80	1622 / 1623		304	.43	1.2	932.1	95	92	60	311	7
4	84			305	.43	1.2	934.6	95	93	61	310	7
3	88		-10	305	.41	1.2	937.1	95	93	60	312	7
2	92			304	.41	1.2	938.6	95	93	59	312	7
1	96			307	.37	1.0	939.8	94	93	61	312	7

CHAIN OF CUSTODY: X 2.8

CONTAINER	SAMPLE I.D.	DESCRIPTION
	832	F. Htr
	833	FH Acetone
	834	Filter
	835	Silica

LEAK CHECK: X 2.8

						PITOT
VACUUM	15"	12"	14"			PRE: ✓
RATE	.010	.007	.006			POST: ✓

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	50	264
#2	100	292
#3	100	137
#4	100	104
#5	100	102
#6	250.0	272.3
#7		

NOZZLE Φ	B 10 .280
PITOT #	319
BOX ID	4
GAMMA γ	1.0215
ΔH@	1.6942
PROBE ID	PL 9-7
SYSTEM ID	pU5G1 / NHB10 / UA12
FILTER ID	B 12 - 52 53 (JV)

ISOKINETIC SAMPLING DATA SHEET PAGE 2 OF 2

FACILITY: Pinellas County RRF TEST LOCATION: Unit 3 Outlet DATE: 04.11.13

TECHNICIAN: MRW POLLUTANT: HCL / PM RUN I.D.: U30 - M2CA - R 3

POINT	RUN TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft³	DGM IN TEMP.	DGM OUT TEMP.	EXIT TEMP	FILTER TEMP.	METER VAC.
A 5	100	~~1053~~ 1059		304	.45	1.3	944.4	94	90	61	313	7
4	104			305	.43	1.3	946.9	93	90	62	313	7
3	108		-11	305	.46	1.3	949.5	94	89	62	311	7
2	112			305	.40	1.1	952.3	93	90	63	312	7
1	116			303	.33	.92	954.8	93	90	62	312	7
	120	1107	-	-	-	-	957.157	-	-	-	-	-

Appendix J

EPA Methods 201A and 202 Raw Field Data

Appendix J.1

EPA Methods 201A and 202 Raw Field Data: Unit 1 FF Outlet

M201A/202 SAMPLING DATA SHEET

FACILITY: Pinellas Co. RRF TEST LOCATION: Unit 1 outlet DATE: 4-10-13

TECHNICIAN MSH .30-.99 P_{BAR} 29.98 POLLUTANT: Pm 2.5 RUN I.D.: U10 - M201A/202R 1

POINT	TIME	RUN TIME	DWELL TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft³	DGM TEMP. INLET	DGM TEMP. OUTLET	COND TEMP	EXIT TEMP	FILTER TEMP	CPM FILTER TEMP.	METER VAC.
A 1	1008	0	1.96		320	.47	.32	594.831	82	81	65	63	252	74	3
2		1.96	2.0		329	.48		595.3	83	81	65	65	253	74	3
3		3.96	1.9	-11	324	.46		596.0	84	81	65	65	253	75	3
4		5.9	1.9		328	.45		596.7	84	81	63	62	250	74	3
5		7.8	2.0		329	.48		597.3	84	81	60	59	252	73	3
B 1		9.8	2.0		319	.49		598.0	84	82	58	57	253	73	3
2		11.8	2.0	-10	324	.47		598.7	84	82	58	56	251	72	3
3		13.8	2.0		327	.49		599.4	84	82	58	55	254	72	3
4		15.8	1.9		325	.46		600.0	84	82	59	56	251	73	3
5		17.7	1.9		325	.45		600.6	84	82	59	57	252	73	3
C 1		19.6	2.0		321	.48		601.2	84	82	59	58	252	74	3
2		21.6	1.9		327	.44		601.9	84	82	59	58	254	74	3
3		23.5	1.9	-12	325	.46		602.6	84	82	60	58	250	74	3
4		25.4	2.0		324	.48		603.2	84	82	61	58	253	74	3
5		27.4	1.9		323	.45		603.9	84	82	61	59	252	75	3
D 1		29.3	2.0		325	.48		604.5	84	82	61	59	253	75	3
2		31.3	2.1	-11	327	.54		605.2	84	81	60	60	254	75	3
3		33.4	2.0		326	.50		605.9	83	81	60	60	255	77	3
4		35.4	2.0		325	.48		606.6	83	81	62	60	254	77	3
5		37.4	2.0		324	.47		607.3	83	81	62	60	252	77	3
E 1		39.4	2.1		326	.54		607.9	83	81	62	60	253	78	3
2		41.5	2.1		326	.52		608.6	83	81	63	60	253	78	3
3		43.6	2.0	-12	328	.48		609.3	84	81	64	60	253	78	3
4		45.6	2.0		325	.51		610.0	84	81	64	61	253	78	3
5		47.6	2.0		323	.50	.32	610.6	84	81	64	61	252	79	3

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	4000	< 2.5 Filter
	4001	> PM2.5 Rinse
	4002	< PM2.5 Rinse
	4003	Aqueous
	4004	Organic
	4005	Cond. Pm Filter
	4006	S. Gel

LEAK CHECK:

VACUUM	14"	9"
RATE	.013	.008

PITOT

DWELL TIME POINT 1 = t_1	1.96
$t_1/\sqrt{\Delta P_1} = K$	K= 2.85
Subsequent Dwell Times = $K \times \sqrt{\Delta P_n}$	

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	0	80
#2	0	0
#3	100	102
#4	250.1	260.5
#5		
#6		
#7		

NOZZLE Φ	AS .179
PITOT #	319
BOX ID	16
GAMMA γ	0.9910
ΔH@	1.7473
PROBE ID	PL-9-21
SYSTEM ID	P-S0-2 UA-15 AUB3
FILTER	12-38

M201A/202 SAMPLING DATA SHEET

FACILITY: Pinellas Co. RRF TEST LOCATION: Unit 1 outlet DATE: 4-10-13

TECHNICIAN MSH P_{BAR} 29.98 POLLUTANT: Pm 2.5 RUN I.D.: U10 - M201/202R 1

POINT	TIME	RUN TIME	DWELL TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM TEMP. INLET	DGM TEMP. OUTLET	FILTER TEMP	COND TEMP	CPM FILTER TEMP	EXIT TEMP.	METER VAC.
F 1		49.6	2.0		328	.419	.32	611.3	83	81	253	64	79	62	3
2		51.6	2.0	-12	326	.48	|	612.0	83	81	254	65	80	62	3
3		53.6	2.0		325	.47	|	612.6	83	81	252	65	80	62	3
4		55.6	1.9		324	.45	|	613.2	83	81	280	65	80	63	3
5		57.5	2.0		319	.48	.32	613.8	83	81	251	65	80	62	3
	1104	59.5	—	—	—	—	—	614.437	—	—	—	—	—	—	—

M201A/202 SAMPLING DATA SHEET

PAGE 1 OF 2

FACILITY: Pinellas Co. RRF TEST LOCATION: Unit 1 outlet DATE: 4-10-13

TECHNICIAN MSH P_{BAR} 29.98 POLLUTANT: PM 2.5 RUN I.D.: U10 - M201A/202R 2

Range: 30 - 1.0

POINT	TIME	RUN TIME	DWELL TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft³	DGM TEMP. INLET	DGM TEMP. OUTLET	COND TEMP	EXIT TEMP	FILTER TEMP	CPM FILTER TEMP.	METER VAC.
A 1	1211	0	205		314	.47	.31	615.268	82	82	83	58	248	72	3
2		2.05	2.1		318	.49	.31	615.9	82	82	60	57	250	72	3
3		4.1	2.1	-12	322	.48	.	616.6	82	82	60	54	252	72	3
4		6.2	2.0		324	.46		617.3	83	82	61	54	252	73	3
5		8.2	2.0		327	.45		618.0	83	82	61	54	252	73	3
B 1		10.2	2.1		325	.48		618.6	83	82	60	53	250	73	3
2		12.3	2.0		323	.47		619.3	83	82	60	53	250	74	3
3		14.3	2.1	-11	325	.49		620.0	83	82	58	54	252	74	3
4		16.5	1.9		323	.46		620.7	83	82	58	54	252	74	3
5		18.3	2.0		320	.46		621.3	83	82	58	54	252	74	3
C 1		20.3	2.1		327	.49		622.0	85	83	58	55	254	74	3
2		22.4	2.2		326	.52		622.7	85	83	59	55	253	74	3
3		24.6	2.1	-11	325	.48		623.4	86	84	61	56	255	74	3
4		26.7	2.0		325	.43		624.1	86	84	61	56	252	75	3
5		28.7	1.9		327	.41		624.8	88	84	63	57	251	75	3
D 1		30.6	2.1		325	.49		625.41	88	84	64	58	250	75	3
2		32.7	2.2		327	.53		626.0	88	84	64	58	253	75	3
3		34.9	2.2		326	.54		626.7	87	84	65	59	251	76	3
4		37.1	2.0	-12	323	.47		627.5	87	86	65	60	253	77	3
5		39.1	2.0		320	.44		628.1	87	86	65	60	252	77	3
E 1		41.1	2.0		324	.45		628.8	87	86	66	62	253	77	3
2		43.1	1.9		325	.42		629.5	87	86	66	63	252	78	3
3		45.0	1.9		327	.42		630.1	87	86	66	64	251	78	3
4		46.9	2.0	-11	326	.46		630.7	88	86	65	64	252	78	3
5		48.9	2.1		328	.49	.31	631.3	88	86	64	63	254	78	3

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	4007	<2.5 Filter
	4008	>2.5 Rinse
	4009	<2.5 Rinse
	4010	Aqueous
	4011	Organic
	4012	Cond. PM Filter
	4013	Silica

LEAK CHECK:

VACUUM	15"	10"
RATE	.010	.004

PITOT

DWELL TIME POINT 1 = t_1	2.05
$t_1/\sqrt{\Delta P_1} = K$	K= 2.99
Subsequent Dwell Times = $K \times \sqrt{\Delta P_n}$	

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	0	93
#2	0	0
#3	100	98
#4	250.0	256.4
#5		
#6		
#7		

NOZZLE Φ	AS .179
PITOT #	159
BOX ID	16
GAMMA γ	0.9910
ΔH@	1.7473
PROBE ID	PL-9-2
SYSTEM ID	PL-SO-2 VA-15 PMHB-3
FILTER	12-45

M201A/202 SAMPLING DATA SHEET

FACILITY: Pinellas Co. RRF TEST LOCATION: Unit 1 outlet DATE: 4-10-13

TECHNICIAN MSM P_{BAR} 29.98 POLLUTANT: Pm 25 RUN I.D.: 010 - M201/202R2

POINT	TIME	RUN TIME	DWELL TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM TEMP. INLET	DGM TEMP. OUTLET	FILTER TEMP	COND TEMP	CPM FILTER TEMP	EXIT TEMP.	METER VAC.
F 1		51.0	2.1		325	.48	.31	632.0	88	86	251	63	78	60	3
2		53.1	2.0	-12	327	.44	|	632.7	89	86	251	60	79	59	3
3		55.1	1.9		323	.42	|	633.4	89	86	250	58	79	59	3
4		57.0	2.0		322	.43	|	634.0	89	87	253	58	79	56	3
5		59.0	2.0		320	.44	.31	634.7	89	87	253	58	80	56	3
	1312	61.0	—	—	—	—	—	635.380	—	—	—	—	—	—	—

M201A/202 SAMPLING DATA SHEET

PAGE 1 OF 2

FACILITY: Pinellas Co. RRF TEST LOCATION: Unit 1 outlet DATE: 4-10-13

TECHNICIAN MBM ,30 -1.0 P_{BAR} 29.96 POLLUTANT: PM 2.5 RUN I.D.: U10 - M201A/202R 3

POINT	TIME	RUN TIME	DWELL TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM TEMP. INLET	DGM TEMP. OUTLET	COND TEMP	EXIT TEMP	FILTER TEMP	CPM FILTER TEMP.	METER VAC.
A 1	1503	0	2.01		317	.47	.31	636.637	87	86	65	65	253	73	3
2		2	2.0		310	.45		637.3	87	86	64	65	255	73	3
3		4	1.9	-12	312	.43		637.9	85	85	62	64	254	73	3
4		5.9	2.0		313	.46		638.5	86	85	61	62	251	74	3
5		7.9	2.0		310	.45		639.2	86	85	60	58	252	74	3
B 1		9.9	2.1		316	.49		639.8	86	85	59	56	250	73	3
2		12.0	2.1		309	.50		640.5	86	85	58	54	253	72	3
3		14.1	2.0	-12	310	.47		641.2	86	85	58	54	254	72	3
4		16.1	2.1		312	.49		641.8	87	86	59	55	254	73	3
5		18.2	2.1		314	.50		642.5	87	86	59	55	255	73	3
C 1		20.3	2.1		308	.51		643.2	87	86	59	54	253	74	3
2		22.4	2.1		311	.53		643.9	87	86	59	54	252	74	3
3		24.5	2.0	-10	313	.46		644.5	87	86	59	54	251	74	3
4		26.5	1.9		310	.42		645.1	88	86	60	55	253	74	3
5		28.4	1.9		313	.40		645.6	88	86	60	57	252	75	3
D 1		30.3	1.9		312	.43		646.5	88	86	60	58	254	77	3
2		32.2	2.0		314	.47		647.2	88	86	60	59	254	76	3
3		34.2	2.0	-11	310	.48		647.8	88	86	61	59	255	77	3
4		36.2	2.0		312	.45		648.5	88	86	61	59	252	77	3
5		38.2	1.9		307	.441		649.1	88	86	61	59	252	77	3
E 1		40.1	2.0		313	.46		649.8	88	86	61	60	253	78	3
2		42.1	2.0		315	.47		650.4	88	86	61	60	252	78	3
3		44.1	1.9	-11	309	.44		651.1	89	87	62	60	253	79	3
4		46.0	2.0		310	.45		651.7	89	87	62	60	251	79	3
5		48.0	2.0		308	.45	.31	652.4	89	87	62	61	250	79	3

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	4014	<2.5 PM Filter
	4015	>PM2.5 Rinse
	4016	<PM2.5 Rinse
	4017	Aqueous
	4018	Organic
	4019	Cond. PM Rinse
	4020	S.Blk

LEAK CHECK:

VACUUM	12"	10"
RATE	.007	.005

PITOT

DWELL TIME POINT 1 = t_1	2.01
$t_1/\sqrt{\Delta P_1} = K$	K=2.93
Subsequent Dwell Times = $K \times \sqrt{\Delta P_n}$	

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	0	92
#2	0	0
#3	100	85
#4	250.0	264
#5		
#6		
#7		

NOZZLE Φ	AS .179
PITOT #	309
BOX ID	16
GAMMA γ	0.9910
ΔH@	1.7773
PROBE ID	P1-9-41
SYSTEM ID	PAS02
FILTER	12-416

M201A/202 SAMPLING DATA SHEET

FACILITY: Pinellas Co. RRF TEST LOCATION: Unit 1 outlet DATE: 4-10-13

TECHNICIAN MSM P_{BAR} 29.96 POLLUTANT: PM 2.5 RUN I.D.: U1O - M202/202-R 3

POINT	TIME	RUN TIME	DWELL TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft³	DGM TEMP. INLET	DGM TEMP. OUTLET	FILTER TEMP	COND TEMP	CPM FILTER TEMP	EXIT TEMP.	METER VAC.
F 1		50	2.1		312	.52	.31	653.0	89	87	253	63	(max) 479	63	3
2		52.1	2.2	-11	310	.54	|	653.7	90	87	252	64	79	63	3
3		54.3	1.9		310	.43	|	654.4	90	87	251	64	80	63	3
4		56.2	2.0		314	.46	|	655.0	90	87	251	64	80	63	3
5		58.2	1.9		308	.43	.31	655.7	90	87	252	64	80	63	3
	1603	60.1	-	-	-	-	-	656.348	-	-	-	-	-	-	-

Appendix J.2

EPA Methods 201A and 202 Raw Field Data: Unit 2 FF Outlet

M201A/202 SAMPLING DATA SHEET

PAGE 1 OF 2

FACILITY: Pinellas Co. RRF | TEST LOCATION: Unit 2 outlet | DATE: 4-11-13

TECHNICIAN MSN | P_{BAR} 29.84 | POLLUTANT: Pm 2.5 | RUN I.D.: U20 - M201/202 R 1

.24 - .97

POINT	TIME	RUN TIME	DWELL TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft³	DGM TEMP. INLET	DGM TEMP. OUTLET	COND TEMP	EXIT TEMP	FILTER TEMP	CPM FILTER TEMP.	METER VAC.
A 1	0732	0	2.12		304	.38	1.33	667.676	72	72	63	63	253	70	3
2		2.1	2.2		304	.40	1.34	668.3	72	72	63	63	252	70	3
3		4.3	2.2		305	.43		669.1	73	72	63	61	253	70	3
4		6.5	2.2	-10	305	.42		669.7	73	72	60	59	255	71	3
5		8.7	2.3		301	.41		670.3	74	72	60	57	251	71	3
B 1		11	2.2		302	.43		671.0	74	72	58	56	253	71	3
2		13.2	2.2		303	.40		671.7	74	72	57	56	252	71	3
3		15.4	2.1	-9	302	.37		672.4	74	72	56	54	255	71	3
4		17.5	2.1		301	.39		673.2	74	72	56	54	253	71	3
5		19.6	2.1		302	.38		674.1	74	72	55	52	253	71	3
C 1		21.5	2.4		301	.47		674.8	74	72	55	52	251	71	3
2		23.9	2.3	-10	302	.45		675.6	74	72	55	52	250	72	3
3		26.2	2.2		301	.43		676.3	74	72	56	50	252	72	3
4		28.4	2.2		302	.43		677.1	74	72	56	51	253	72	3
5		30.6	2.2		301	.40		677.8	75	73	57	51	253	72	3
D 1		32.8	2.3		302	.46		678.6	75	73	57	52	251	72	3
2		35.1	2.3		300	.44		679.3	75	73	57	52	253	73	3
3		37.4	2.2		303	.43		680.1	77	74	57	52	251	73	3
4		39.6	2.2	-10	302	.41		680.9	77	74	58	53	250	74	3
5		41.8	2.2		304	.39		681.7	77	74	58	53	252	74	3
E 1		43.9	2.1		303	.45		682.4	77	74	58	52	250	75	3
2		46.2	2.3		301	.42		683.2	77	74	58	55	251	75	3
3		48.4	2.2	-10	302	.42		684.0	77	74	58	55	252	75	3
4		50.6	2.2		303	.40		684.8	77	74	58	55	252	75	3
5		52.8	2.3		301	.44	.33	685.6	77	75	58	55	251	75	3

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	4021	2.5 Filter
	4022	2.5 Rinse
	4023	2.5 Rinse
	4024	Aqueous
	4025	Organics
	4026	Condn Pm Filter
	4027	5.0µl

LEAK CHECK:

VACUUM	15"	11"
RATE	.012	.008

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	0	90
#2	0	0
#3	100	93
#4	251.0	257.0
#5		
#6		
#7		

PITOT

DWELL TIME POINT 1 = t_1	2.12
$t_1/\sqrt{\Delta P_1} = K$	K= 3.43
Subsequent Dwell Times = K x $\sqrt{\Delta P_n}$	

A-6

NOZZLE Φ	~~.46~~ .479 .191
PITOT #	319
BOX ID	16
GAMMA γ	0.9910
ΔH@	1.7473
PROBE ID	PL-041
SYSTEM ID	PL-SD-2-UA-15-PM13-3
FILTER	12-47

M201A/202 SAMPLING DATA SHEET

FACILITY: Pinellas Co. RRF TEST LOCATION: Unt 2 outlet DATE: 4-11-13

TECHNICIAN MSM P_{BAR} 29.84 POLLUTANT: Pm 2.5 RUN I.D.: U20 - M201A/202 R 1

POINT	TIME	RUN TIME	DWELL TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft³	DGM TEMP. INLET	DGM TEMP. OUTLET	FILTER TEMP	COND TEMP	CPM FILTER TEMP	EXIT TEMP.	METER VAC.
1		55.1	2.2		303	.42	.33	686.3	77	75	252	58	75	56	3
2		57.3	2.2		301	.43	|	687.1	78	75	252	58	75	56	3
3		59.5	2.2	-10	302	.40	|	687.9	78	75	254	59	75	57	3
4		61.7	2.2		301	.42	|	688.6	78	75	251	59	76	57	3
5		63.9	2.2		~~302~~	.40	.33	689.3	78	75	253	60	76	57	3
	0638	66.1	—	—	—	—	—	690.073	—	—	—	—	—	—	—

M201A/202 SAMPLING DATA SHEET

FACILITY: Pinellas Co. RRF | TEST LOCATION: Unit 2 outlet | DATE: 4-11-13

TECHNICIAN MSM | P_{BAR} 29.86 (.29 - .96) | POLLUTANT: PM 2.5 | RUN I.D.: U20 - M 201A 202 - R 2

POINT	TIME	RUN TIME	DWELL TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft³	DGM TEMP. INLET	DGM TEMP. OUTLET	COND TEMP	EXIT TEMP	FILTER TEMP	CPM FILTER TEMP.	METER VAC.
A 1	~~0953~~ 1014	0	1.9		300	.38	.31	~~691.746~~	77	77	62	60	251	72	3
2		1.9	2.1		302	.47		692.737 693.4	79	78	64	60	252	72	3
3		4.0	2.2		303	.49		694.0	79	79	62	58	250	73	3
4		6.2	2.0	-9	303	.44		694.8	79	78	60	58	251	73	3
5		8.2	2.0		302	.41		695.6	79	78	60	57	250	73	3
B 1		10.2	2.0		301	.43		696.2	80	79	60	57	250	73	3
2		12.2	2.0		301	.43		696.8	80	79	60	56	250	73	3
3		14.2	2.0	-10	302	.44		697.4	80	78	60	55	252	73	3
4		16.2	2.1		301	.46		698.1	81	79	59	55	252	73	3
5		18.3	2.0		302	.42		698.4	81	79	59	55	252	73	3
C 1		20.3	2.1		300	.45		699.4	81	79	58	53	250	74	3
2		22.4	2.0		302	.42		700.1	82	79	58	53	251	74	3
3		24.4	2.0	-10	303	.42		700.8	82	79	58	53	251	74	3
4		26.4	2.1		301	.46		701.4	82	79	58	54	253	74	3
5		28.5	1.9		301	.40		702.1	83	80	59	55	253	75	3
D 1		30.4	2.1		304	.47		702.8	83	80	59	55	252	76	3
2		32.5	2.1	-11	301	.45		703.5	83	80	59	55	250	77	3
3		34.6	2.1		303	.48		704.2	83	81	60	57	254	78	3
4		36.7	2.0		304	.42		704.9	83	81	60	57	250	78	3
5		38.7	2.0		302	.41		705.6	83	81	60	57	250	78	3
E 1		40.7	1.9		305	.40		706.3	83	81	60	58	251	78	3
2		42.6	1.9		303	.38		707.0	84	81	61	58	251	78	3
3		44.5	2.0	-10	303	.41		707.6	84	81	61	58	253	79	3
4		46.5	2.0		301	.43		708.2	84	81	62	59	252	79	3
5		48.5	2.1		300	.45	.31	708.9	84	82	62	59	252	79	3

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	4028	2.5 Filter
	4029	725 Rinse
	4030	<25 Rinse
	4031	Aqueous
	4032	Organic
	4033	Cond. PM Filter
	4034	Job...

LEAK CHECK:

VACUUM	14"	9"
RATE	.013	.006

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	0	81
#2	0	0
#3	100	88
#4	250.0	263.1
#5		
#6		
#7		

PITOT

DWELL TIME POINT 1 = t_1	1.91
$t_1/\sqrt{\Delta P_1} = K$	K=3.08
Subsequent Dwell Times = K x $\sqrt{\Delta P_n}$	

NOZZLE Φ	AS .179
PITOT #	~~154~~ 319
BOX ID	16
GAMMA γ	0.9910
ΔH@	1.7773
PROBE ID	~~P-4-2~~ P2-4-41
SYSTEM ID	P2-50-2 UA-15-PMB-3
FILTER	12-47

M201A/202 SAMPLING DATA SHEET

FACILITY: Pinellas Co. RRF TEST LOCATION: Unit 2 outlet DATE: 4-11-13

TECHNICIAN MSM P_{BAR} 29.86 POLLUTANT: PM 2.5 RUN I.D.: 020 - M201A/202-R 2

POINT	TIME	RUN TIME	DWELL TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM TEMP. INLET	DGM TEMP. OUTLET	FILTER TEMP	COND TEMP	CPM FILTER TEMP	EXIT TEMP.	METER VAC.
1	.	50.6	2.0		299	.42	.31	709.6	81	82	253	62	79	60	3
2		52.6	2.0	-10	302	.43	|	710.3	84	82	251	62	80	61	3
3		54.6	2.1		302	.45	|	710.9	85	83	250	63	80	61	3
4		56.7	2.0		301	.41	|	711.6	85	83	252	63	81	61	3
5		58.7	1.9		300	.40	.31	712.3	85	83	251	63	81	61	3
	1124	60.6	—	—	—	—	—	712.8944	—	—	—	—	—	—	—

M201A/202 SAMPLING DATA SHEET

PAGE 1 OF 2

FACILITY: Pinellas Co. RRF TEST LOCATION: Unit 2 outlet DATE: 4-11-13

TECHNICIAN MSH ΔH .29 - .96 P_{BAR} 29.87 POLLUTANT: PM 2.5 RUN I.D.: U20 - M201A/202 - R 3

POINT	TIME	RUN TIME	DWELL TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM TEMP. INLET	DGM TEMP. OUTLET	COND TEMP	EXIT TEMP	FILTER TEMP	CPM FILTER TEMP.	METER VAC.
A 1	1208	0	1.88		302	.38	.31	718.174	86	84	66	63	251	75	3
2		1.88	1.9		303	.40		718.7	87	84	65	61	254	75	3
3		3.8	2.0	-10	302	.42		719.4	87	84	64	60	253	75	3
4		5.8	2.0		304	.44		720.0	86	84	62	58	252	75	3
5		7.8	2.0		302	.43		720.7	86	84	59	56	254	75	3
B 1		9.8	2.1		302	.44		721.4	86	84	59	56	254	75	3
2		11.9	2.0		309	.42		722.1	86	84	57	55	253	75	3
3		13.9	2.1		310	.47		722.8	86	84	57	55	250	76	3
4		16.0	1.9	-11	307	.41		723.5	87	84	55	51	253	78	3
5		17.9	2.0		303	.43		724.1	87	85	55	51	254	78	3
C 1		19.9	2.0		304	.45		724.8	87	85	58	51	253	78	3
2		21.9	2.1		303	.46		725.4	87	85	56	51	255	78	3
3		23.0	2.0	-11	304	.43		726.1	87	85	57	52	255	78	3
4		26.0	2.0		304	.42		726.8	88	85	57	52	253	78	3
5		24.0	1.9		303	.40		727.5	88	85	58	52	255	78	3
D 1	(MSH)	29.9	~~2.0~~ 2.2		305	.51		728.2	88	85	58	52	252	79	3
2		32.1	2.1		303	.48		728.9	86	85	58	52	255	79	3
3		34.2	2.0		306	.45		729.6	88	85	58	52	251	79	3
4		36.2	2.0	-9	303	.44		730.3	89	86	59	53	253	79	3
5		38.2	2.1		300	.46		731.0	89	86	60	54	255	79	3
E 1		40.3	2.1		302	.47		731.7	89	86	60	56	255	79	3
2		42.4	2.2		305	.52		732.4	86	86	60	56	251	79	3
3		44.6	2.0	-10	307	.45		733.1	88	86	61	57	250	80	3
4		46.6	2.0		308	.44		733.7	88	86	61	57	250	81	3
5		48.6	1.9		305	.40	.31	734.41	88	86	62	58	253	81	3

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	4035	<2.5 Filter
	4036	2.5 Acetone
	4037	<2.5 Acetone
	4038	Aqueous
	4039	Organic
	4040	Condensation Filter
	4041	S. Gel

LEAK CHECK:

VACUUM	14"	10
RATE	.009	.007

PITOT

DWELL TIME POINT 1 = t_1	1.88
$t_1/\sqrt{\Delta P_1} = K$	K=3.04
Subsequent Dwell Times = $K \times \sqrt{\Delta P_n}$	

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	0	77
#2	0	1
#3	100	96
#4	250.0	261.3
#5		
#6		
#7		

NOZZLE Φ	AS .179
PITOT #	314
BOX ID	16
GAMMA γ	6.9910
$\Delta H@$	1.7473
PROBE ID	PL 9-4
SYSTEM ID	PL-SG-2
FILTER	12-49

M201A/202 SAMPLING DATA SHEET

FACILITY: Pinellas Co. RRF TEST LOCATION: Unit 2 outlet DATE: 4-11-13

TECHNICIAN MSH P_{BAR} 29.87 POLLUTANT: PM 25 RUN I.D.: U20 - M201A/202 R 3

POINT	TIME	RUN TIME	DWELL TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft³	DGM TEMP. INLET	DGM TEMP. OUTLET	FILTER TEMP	COND TEMP	CPM FILTER TEMP	EXIT TEMP.	METER VAC.
F 1	~~1308~~	50.5	1.9		303	.38	.31	735.0	88	86	254	62	81	58	3
2		52.4	2.0		305	.43	|	735.6	90	87	251	62	81	59	3
3		54.4	1.9	-10	307	.40	|	736.3	90	87	252	62	81	59	3
4		56.3	2.0		304	.42	|	737.0	90	87	250	63	82	59	3
5		58.3	2.0		303	.41	|	737.6	90	87	253	63	82	59	3
	1308	60.3	–	–	–	–	–	738.358	–	–	–	–	–	–	–

Appendix J.3

EPA Methods 201A and 202 Raw Field Data: Unit 3 FF Outlet

M201A/202 SAMPLING DATA SHEET

FACILITY: Pinellas Co. RRF TEST LOCATION: Unit 3 outlet DATE: 4-9-13

TECHNICIAN MSH P_{BAR} 30.04 POLLUTANT: PM 2.5 RUN I.D.: 030 - M201A/202 - R 1

POINT	TIME	RUN TIME	DWELL TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft³	DGM TEMP. INLET	DGM TEMP. OUTLET	COND TEMP	EXIT TEMP	FILTER TEMP	CPM FILTER TEMP.	METER VAC.
A 1	1156	0	2.0		303	.55	.35	517.799	75	75	66	59	252	72	3
2		2.0	2.0		304	.53		518.4	78	78	59	57	253	74	3
3		4.0	1.9	-12	309	.52		519.1	82	81	57	55	253	75	3
4		5.9	1.9		310	.50		519.7	83	81	58	54	252	74	3
5		7.8	1.9		310	.51		520.3	83	81	58	55	252	77	3
B 1		9.7	2.0		308	.56		520.9	83	81	57	55	255	77	3
2		11.7	1.9		302	.51		521.5	84	82	57	56	257	77	3
3		13.6	1.9	-13	310	.52		522.2	84	82	57	55	257	77	3
4		15.5	1.9		316	.54		522.9	84	82	56	56	255	77	3
5		17.4	2.0		320	.53		523.6	85	82	56	55	252	76	3
C 1		19.4	1.9		312	.50		524.2	85	82	57	55	252	75	3
2		21.3	1.9		310	.52		524.8	85	82	58	56	252	75	3
3		23.2	2.0		315	.55		525.4	85	83	59	57	254	76	3
4		25.2	1.9	-12	308	.49		526.0	86	83	59	57	256	76	3
5		27.1	2.0		307	.57		526.6	86	83	60	57	255	75	3
D 1		29.1	1.9		310	.50		527.2	86	83	62	58	255	75	3
2		31.0	1.8		313	.47		527.8	86	83	61	58	254	75	3
3		32.8	1.9		308	.52		528.4	87	83	61	57	255	76	3
4		34.7	1.8	-11	307	.46		529.0	87	83	61	57	255	76	3
5		36.5	1.9		306	.50		529.6	87	83	61	57	256	77	3
E 1		38.4	1.9		310	.48		530.2	87	83	61	58	256	76	3
2		40.3	2.0		312	.54		530.9	87	83	62	58	257	76	3
3		42.3	1.9		314	.52		531.5	87	83	62	59	257	75	3
4		44.2	2.0	-12	314	.57		532.1	87	83	62	59	255	74	3
5		46.2	1.9		310	.53	.35	532.7	87	84	62	59	252	74	3

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	4042	<2.5 F.Hr.
	4043	>2.5 Rinse
	4044	<2.5 Rinse
	4045	Aqueous
	4046	Organic
	4047	Cond. PM F.Hr.

LEAK CHECK:

VACUUM	15"	12"
RATE	.011	.007

PITOT

DWELL TIME POINT 1 = t_1	2.00
$t_1/\sqrt{\Delta P_1} = K$	K= 2.69
Subsequent Dwell Times = $K \times \sqrt{\Delta P_n}$	

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	0	86
#2	0	10
#3	100	89 (SG)
#4	250.5	262.9 ~~225~~
#5		
#6		
#7		

NOZZLE Φ	A5 .179
PITOT #	319
BOX ID	16
GAMMA γ	0.9910
ΔH@	1.7473
PROBE ID	PL-9-4
SYSTEM ID	Po-So-2 UA-15-PMHB-3
FILTER	12-35

M201A/202 SAMPLING DATA SHEET

FACILITY: Pinellas Co. RRF TEST LOCATION: Unit 3 outlet DATE: 4-9-13

TECHNICIAN MSH P_{BAR} 30.04 POLLUTANT: Pm 2.5 RUN I.D.: U30 - M201A/202-R 1

POINT	TIME	RUN TIME	DWELL TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM TEMP. INLET	DGM TEMP. OUTLET	FILTER TEMP	COND TEMP	CPM FILTER TEMP	EXIT TEMP.	METER VAC.
F 1		48.1	1.9		308	.50	.35	533.3	87	84	253	62	75	60	3
2		50.0	1.9	-14	313	.50	|	533.9	87	84	255	63	75	61	3
3		51.9	1.9		310	.52	|	534.5	87	84	252	63	76	62	3
4		53.8	1.9		307	.48	|	535.1	87	84	255	63	76	62	3
5		55.7	1.8		306	.47	.35	535.7	88	84	252	63	75	62	3
	1253	57.5	-	-	-	-	-	536.327	-	-	-	-	-	-	-

M201A/202 SAMPLING DATA SHEET

PAGE 1 OF 2

FACILITY: Pinellas Co. RRF TEST LOCATION: Unit 3 outlet DATE: 4-9-13

TECHNICIAN MSM P_{BAR} 30.04 POLLUTANT: PM 25 RUN I.D.: U30 - M201/202 R 2

:29-.97

POINT	TIME	RUN TIME	DWELL TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM TEMP. INLET	DGM TEMP. OUTLET	COND TEMP	EXIT TEMP	FILTER TEMP	CPM FILTER TEMP.	METER VAC.
A 1	1408	0	2.05		298	.55	.31	544.278	92	88	66	64	254	79	3
2		2.0	2.0		298	.52		544.8	93	89	64	64	252	80	3
3		4.0	2.0	-13	301	.56		545.41	93	92	63	61	250	78	3
4		6.0	2.0		303	.51		546.0	93	92	62	60	254	77	3
5		7.9	1.9		309	.47		546.6	94	91	60	57	252	75	3
B 1		9.9	2.0		313	.54		547.2	93	91	60	56	252	73	3
2		11.8	1.9		309	.51		547.8	94	91	60	55	253	72	3
3		13.7	2.0	-11	310	.55		548.4	94	91	59	53	252	70	3
4		15.7	2.0		309	.53		549.0	94	91	58	52	250	68	3
5		17.7	2.0		307	.50		549.6	94	92	58	52	252	69	3
C 1		19.7	1.9		309	.49		550.3	94	92	59	53	252	70	3
2		21.6	2.1		312	.57		550.9	94	92	59	53	250	70	3
3		23.7	2.0	-12	313	.50		551.5	94	91	60	54	250	71	3
4		25.7	1.9		309	.48		552.1	94	91	61	54	250	71	3
5		27.6	1.9		311	.48		552.7	94	92	61	55	254	72	3
D 1		29.5	1.9		314	.46		553.3	94	91	61	57	255	72	3
2		31.4	2.0		317	.52		553.9	94	91	61	57	254	72	3
3		33.4	2.0	-11	314	.53		554.5	94	91	61	58	252	72	3
4		35.4	2.0		309	.50		555.2	93	91	62	58	251	74	3
5		37.4	2.0		309	.52		555.9	93	91	62	59	252	74	3
E 1		39.4	2.0		311	.54		556.5	93	91	61	59	250	75	3
2		41.4	2.0		310	.52		557.1	93	91	62	60	252	75	3
3		43.4	1.9	-12	308	.49		557.8	93	91	62	60	250	76	3
4		45.3	2.0		309	.51		558.4	93	91	63	61	250	76	3
5		47.3	2.0		305	.50	.31	559.0	93	90	63	61	252	76	3

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	4049	22.5 F. Hx
	4050	72.5 Rinse
	4051	22.5 Rinse
	4052	Aqueous
	4053	Organic
	4054	Cond. Filter
	4055	Blank

LEAK CHECK:

VACUUM	14"	10"
RATE	.013	.0

PITOT

DWELL TIME POINT 1 = t_1	2.05
$t_1/\sqrt{\Delta P_1} = K$	K=2.76
Subsequent Dwell Times = $K \times \sqrt{\Delta P_n}$	

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	0	72
#2	0	10
#3	100	94
#4	250.0	264.8
#5		
#6		
#7		

NOZZLE Φ	AS .179
PITOT #	319
BOX ID	16
GAMMA γ	0.9910
ΔH@	1.7473
PROBE ID	~~PC-4~~ (MSM) 9-2
SYSTEM ID	PC-50-2 UA-15 pNHS-3
FILTER	D-36

M201A/202 SAMPLING DATA SHEET

FACILITY: Pinellas Co. RRF TEST LOCATION: Unit 3 outlet DATE: 4-9-13

TECHNICIAN MSH P_{BAR} 30.04 POLLUTANT: PM 2.5 RUN I.D.: U30 - M201A/202R 2

POINT	TIME	RUN TIME	DWELL TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM TEMP. INLET	DGM TEMP. OUTLET	FILTER TEMP	COND TEMP	CPM FILTER TEMP	EXIT TEMP.	METER VAC.
F 1		49.3	2.1		309	.56	.31	559.7	93	90	252	63	~~765~~	63	3
2		51.4	2.0		314	.51	|	560.3	93	91	252	63	77	63	3
3		53.4	2.0	-13	311	.52	|	560.9	93	91	252	63	78	63	3
4		55.4	2.0		306	.50	|	561.5	94	90	253	64	78	63	3
5		57.4	2.0		307	.51	.31	562.1	94	91	251	65	78	63	3
	1508	59.4	—	—	—	—	—	562.741	—	—	—	—	—	—	—

M201A/202 SAMPLING DATA SHEET

PAGE 1 OF 2

FACILITY: Pinellas Co. RRF TEST LOCATION: Unit 3 outlet DATE: 4-9-13

TECHNICIAN: MSM PBAR: 30.02 POLLUTANT: Pm 2.5 RUN I.D.: U30 - M201A/202 - R3

2a - 0.97

POINT	TIME	RUN TIME	DWELL TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft³	DGM TEMP. INLET	DGM TEMP. OUTLET	COND TEMP	EXIT TEMP	FILTER TEMP	CPM FILTER TEMP.	METER VAC.
A 1	1638	0	2.07		301	.55	.31	565.211	93	93	67	67	252	80	3
2		2.0	2.0		302	.53	.31	565.9	97	94	64	63	253	77	3
3		4.0	2.0		300	.50	.31	566.4	96	93	62	60	251	74	3
4		6.0	2.0	-12	300	.50		567.0	96	93	62	60	250	74	3
5		8.0	1.9		305	.48		567.7	97	93	60	58	252	73	3
B 1		9.9	2.1		303	.57		568.3	96	93	60	57	254	73	3
2		12.0	2.0		304	.53		569.0	94	93	59	55	251	71	3
3		14.0	2.0	-11	309	.51		569.6	94	93	59	55	252	71	3
4		16.0	2.0		311	.50		570.2	94	93	59	55	253	70	3
5		18	1.9		314	.46		570.9	94	93	58	55	253	70	3
C 1		19.9	1.8		307	.43		571.5	94	92	57	54	252	70	3
2		21.7	2.0		313	.50		572.1	94	92	57	54	252	71	3
3		23.7	2.0	-11	317	.49		572.7	94	92	57	54	253	71	3
4		25.7	1.9		315	.44		573.4	93	92	56	54	252	72	3
5		27.6	2.0		313	.49		574.0	93	92	56	55	254	72	3
D 1		29.6	2.1		306	.57		574.7	94	91	58	56	252	72	3
2		31.7	2.0		311	.53		575.3	94	91	58	56	252	72	3
3		33.7	2.0	-13	310	.53		576.0	94	91	58	57	254	72	3
4		35.7	2.0		308	.50		576.6	94	91	59	57	251	73	3
5		37.7	2.0		309	.51		577.3	94	91	60	58	252	74	3
E 1		39.7	2.1		302	.54		577.9	92	90	60	58	251	74	3
2		41.8	2.1		309	.58		578.6	92	90	60	58	252	75	3
3		43.9	2.0	-12	312	.53		579.2	92	90	61	58	252	75	3
4		45.9	2.0		310	.50		579.9	92	90	62	59	254	75	3
5		47.9	1.9		308	.46	.31	580.6	92	90	62	59	254	77	3

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
	4056	<2.5 Filter
	4057	>2.5 Rinse
	4058	<2.5 Rinse
	4059	Aqueous
	4060	Organic
	4061	Cond. Pm Filter
	4062	Blank

LEAK CHECK:

VACUUM	15"	12"
RATE	.008	.006

PITOT

DWELL TIME POINT 1 = t_1	2.07
$t_1/\sqrt{\Delta P_1} = K$	K= 2.79
Subsequent Dwell Times = $K \times \sqrt{\Delta P_n}$	

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1	0	100
#2	0	0
#3	100	90
#4	250.0	268.4
#5		
#6		
#7		

NOZZLE Φ	AS .179
PITOT #	319
BOX ID	16
GAMMA γ	0.9910
ΔH@	1.7473
PROBE ID	P2-9-4
SYSTEM ID	PU-SO-2 VA-15 PM#3
FILTER	24-37

M201A/202 SAMPLING DATA SHEET

FACILITY: Pinellas Co. RRF TEST LOCATION: Unit 3 Outlet DATE: 4-4-13

TECHNICIAN MSM P_{BAR} 30.02 POLLUTANT: PM 25 RUN I.D.: U30 - M201A/202 R 3

POINT	TIME	RUN TIME	DWELL TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft³	DGM TEMP. INLET	DGM TEMP. OUTLET	FILTER TEMP	COND TEMP	CPM FILTER TEMP	EXIT TEMP.	METER VAC.
F 1		49.8	2.0		307	.53	.31	581.2	92	90	254	62	76	60	3
2		51.8	2.0	-12	310	.50		581.9	92	90	252	62	77	60	3
3		53.8	1.9		309	.48		582.6	92	90	252	62	77	60	3
4		55.7	1.9		313	.46		583.2	92	89	251	63	78	60	3
5		57.6	2.0		308	.50	.31	583.8	92	89	251	63	78	62	3
	1738	59.6	—	—	—	—	—	584.454	—	—	—	—	—	—	—

Appendix K

EPA Methods 9 and 22 Raw Field Data

Appendix K.1

EPA Method 9 Raw Field Data: Unit 1 Stack

EPA
VISIBLE EMISSION OBSERVATION FORM 1

Form Number | Page 1 Of 1

Continued on VEO Form Number: WD-M9-R1

Method Used (Circle One): (Method 9) 203A 203B Other:

Company Name: PINELLAS COUNTY RRF

Facility Name:

Street Address:

City: CLEARWATER | State: FL | Zip:

Process: MUNICIPAL WASTE INC | Unit #: 1 | Operating Mode: NORMAL

Control Equipment: BAGHOUSE | Operating Mode: NORMAL

Describe Emission Point: SOUTHERN STACK PROTRUDING FROM THE ANNULUS.

Height of Emiss. Pt.: Start 200 End 200 | Height of Emiss. Pt. Rel. to Observer: Start 200 End 200

Distance to Emiss. Pt.: Start 800 End 800 | Direction to Emiss. Pt. (Degrees): Start 270 End 270

Vertical Angle to Obs. Pt.: Start 8 End SAME | Direction to Obs. Pt. (Degrees): Start 270 End 270

Distance and Direction to Observation Point from Emission Point: Start SAME End SAME

Describe Emissions: Start NONE End NONE

Emission Color: Start N/A End N/A | Water Droplet Plume: Attached ☐ Detached ☐ None ☒

Describe Plume Background: Start SKY End SAME

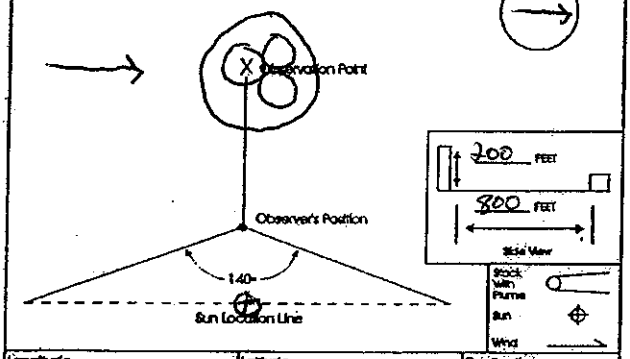
Background Color: Start GRAY End SAME | Sky Conditions: Start OVERCAST End SAME

Wind Speed: Start 9 MPH End 14 MPH | Wind Direction: Start S End SW

Ambient Temp.: Start 77 End 78 | Wet Bulb Temp.: 73 | RH Percent: 86

Source Layout Sketch

Draw North Arrow: ☐ TN ☒ MN



Longitude | Latitude | Declination

Additional Information: NONE

Observation Date	Time Zone	Start Time	End Time
4-12-13	EST	1013	1113

Sec / Min	0	15	30	45	Sec / Min	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

Observer's Name (Print): JAMES STULTZ

Observer's Signature: [signature] | Date: 4-12-13

Organization: ACS

Certified By: ETA | Date:

VEOF1.1

EPA
VISIBLE EMISSION OBSERVATION FORM 1

Form Number: | Page 1 Of 1

Continued on VEO Form Number: V10-M9-R0

Method Used (Circle One): Method 9 | 203A | 203B | Other:

Company Name: PINELLAS COUNTY RRF

Facility Name:

Street Address:

City: CLEARWATER | State: FL | Zip:

Process: MUNICIPAL WASTE INC. | Unit: 1 | Operating Mode: NORMAL

Control Equipment: BAGHOUSE | Operating Mode: NORMAL

Describe Emission Point: SOUTHERN STACK PREDOMINATE FROM THE ANNOLIS

Height of Emiss. Pt. Start 200 End 200 | Height of Emiss. Pt. Rel. to Observer Start 200 End 200

Distance to Emiss. Pt. Start 800 End 800 | Direction to Emiss. Pt. (Degrees) Start 270 End 270

Vertical Angle to Obs. Pt. Start 8 End 8 | Direction to Obs. Pt. (Degrees) Start 270 End 270

Distance and Direction to Observation Point from Emission Point Start SAME End SAME

Describe Emissions Start NONE End NONE

Emission Color Start N/A End N/A | Water Droplet Plume Attached ☐ Detached ☐ None ☒

Describe Plume Background Start SKY End SAME

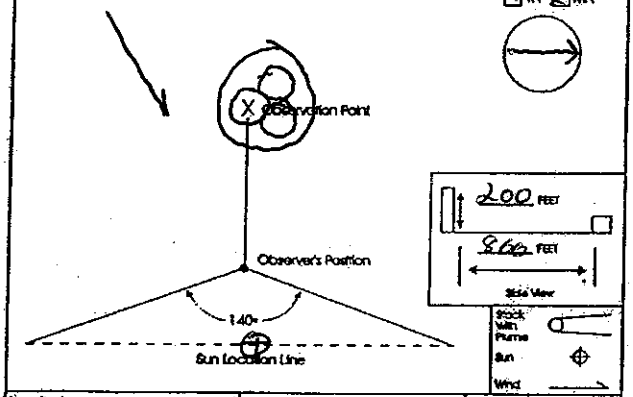
Background Color Start GRAY End SAME | Sky Conditions Start OVERCAST End SAME

Wind Speed Start 14 MPH End 14 MPH | Wind Direction Start SW End SW

Ambient Temp. Start 78 End 79 | Wet Bulb Temp. 71 | RH Percent 84

Source Layout Sketch

Draw North Arrow ☐ TN ☒ MN



Longitude | Latitude | Declination

Additional Information: NONE

Observation Date	Time Zone	Start Time	End Time
4-12-13	EST	1113	1213

Min \ Sec	0	15	30	45	Min \ Sec	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

Observer's Name (Print): JAMES STULZ

Observer's Signature: [signature] | Date: 4-12-13

Organization: ACG

Certified By: EPA | Date:

VEOF1.1

EPA
VISIBLE EMISSION OBSERVATION FORM 1

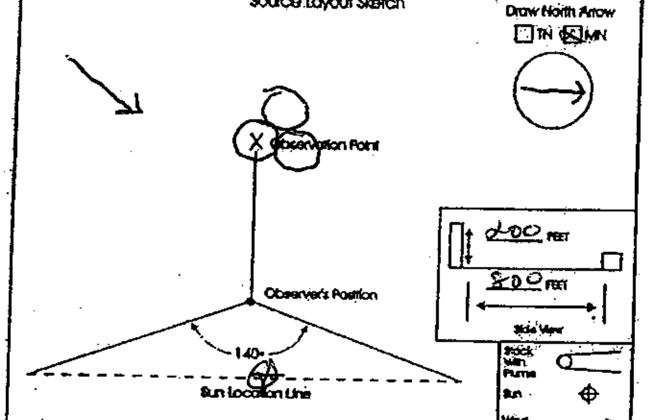
Form Number	Page 1 of 1
Continued on VEO Form Number	U/O - M9 - RT

Method Used (Circle One): (Method 9 — circled) 203A 203B Other: ________

Field	Entry
Company Name	Pinellas County RRF
Facility Name	
Street Address	
City	Clearwater
State	FL
Zip	
Process	Municipal waste En
Unit #	1
Operating Mode	Normal
Control Equipment	Baghouse
Operating Mode	Normal
Describe Emission Point	Southern stack protruding from the annulus
Height of Emiss. Pt.	Start 200 End 200
Height of Emiss. Pt. Rel. to Observer	Start 200 End 200
Distance to Emiss. Pt.	Start 800 End 800
Direction to Emiss. Pt. (Degrees)	Start 270 End 270
Vertical Angle to Obs. Pt.	Start 8 End 8
Direction to Obs. Pt. (Degrees)	Start 270 End 270
Distance and Direction to Observation Point from Emission Point	Start Same End Same
Describe Emissions	Start None End None
Emission Color	Start N/A End N/A
Water Droplet Plume	Attached ☐ Detached ☐ None ☒
Describe Plume Background	Start Sky End Same
Background Color	Start Gray End Same
Sky Conditions	Start Overcast End Same
Wind Speed	Start 14 mph End 16 mph
Wind Direction	Start SW End SW
Ambient Temp.	Start 79 End 80
Wet Bulb Temp.	75
RH Percent	82

Source Layout Sketch

Draw North Arrow ☐ TN ☒ MN



Longitude	Latitude	Declination

Additional Information: None

Observation Date	Time Zone	Start Time	End Time
4-12-13	EST	1213	1313

Min \ Sec	0	15	30	45	Min \ Sec	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

Field	Entry
Observer's Name (Print)	James Stultz
Observer's Signature	[signature]
Date	4-12-13
Organization	ACG
Certified By	ETA
Date	

VEOF1.1

Appendix K.2

EPA Method 9 Raw Field Data: Unit 2 Stack

EPA
VISIBLE EMISSION OBSERVATION FORM 1

Form Number	Page 1	Of 1
Continued on VEO Form Number	~~A9-U2-R1~~ (IAW) U2O-M9-R1	

Method Used (Circle One): (Method 9) 203A 203B Other: ______

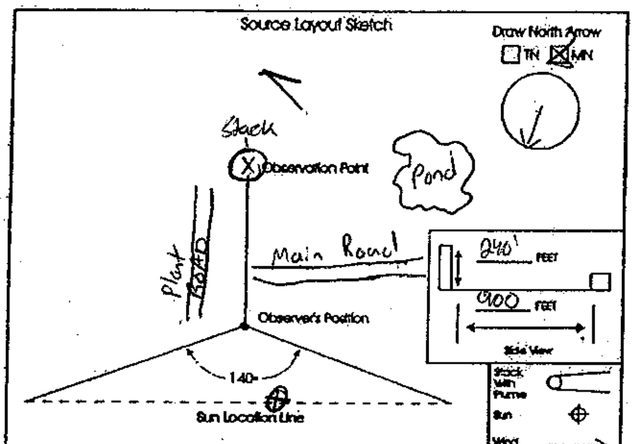
Company Name	
Facility Name	Pinellas Co. RRF
Street Address	
City: St Petersburg	State: FL	Zip:

Process: Waste Incinerator	Unit #: 2	Operating Mode:
Control Equipment: Baghouse		Operating Mode:

Describe Emission Point: Annulus w/ 3 stacks. ~~Testing~~ Observing Unit 2 Stack

Height of Emiss. Pt.: Start 260' End	Height of Emiss. Pt. Rel. to Observer: Start 240 End 240'
Distance to Emiss. Pt.: Start 300 yds End 300 yds	Direction to Emiss. Pt. (Degrees): Start SE 162° End
Vertical Angle to Obs. Pt.: Start 10° End	Direction to Obs. Pt. (Degrees): Start SE 162° End SE 162°
Distance and Direction to Observation Point from Emission Point: Start 0	End 0
Describe Emissions: Start N/A	End N/A
Emission Color: Start N/A End N/A	Water Droplet Plume: Attached ☐ Detached ☐ None ☒
Describe Plume Background: Start Sky	End Sky
Background Color: Start Blue End	Sky Conditions: Start Clear End Clear
Wind Speed: Start 9 mph End ~9 mph	Wind Direction: Start E End E
Ambient Temp.: Start 65 End	Wet Bulb Temp.: 64 / RH Percent: 97%

Source Layout Sketch — Draw North Arrow: ☐ TN ☒ MN



Longitude	Latitude	Declination

Additional Information:

Observation Date	Time Zone	Start Time	End Time
4-10-13	EST	0851	0951

Min \ Sec	0	15	30	45	Min \ Sec	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

Observer's Name (Print): Mike Henry	
Observer's Signature: [signature]	Date: 4-10-13
Organization: Air Compliance Group	
Certified By: ETS	Date: 3-2013

VEOF1.1

EPA
VISIBLE EMISSION OBSERVATION FORM 1

Form Number | Page 1 Of 1

Continued on VEO Form Number: V20-M9-R2

Method Used (Circle One): Method 9 | 203A | 203B | Other: _____

Company Name: Pinellas County RRF

Facility Name:

Street Address:

City: Clearwater | State: FL | Zip:

Process: Municipal Waste Comb | Unit #: 2 | Operating Mode: Normal

Control Equipment: Baghouse | Operating Mode: Normal

Describe Emission Point: Northern stack protruding from the annulus

Height of Emiss. Pt.: Start 200 End 200 | Height of Emiss. Pt. Rel. to Observer: Start 200 End 200

Distance to Emiss. Pt.: Start 800 End 800 | Direction to Emiss. Pt. (Degree): Start 270 End 270

Vertical Angle to Obs. Pt.: Start 8 End 8 | Direction to Obs. Pt. (Degrees): Start 270 End 270

Distance and Direction to Observation Point from Emission Point: Start SAME End SAME

Describe Emissions: Start NONE End NONE

Emission Color: Start N/A End N/A | Water Droplet Plume: Attached ☐ Detached ☐ None ☒

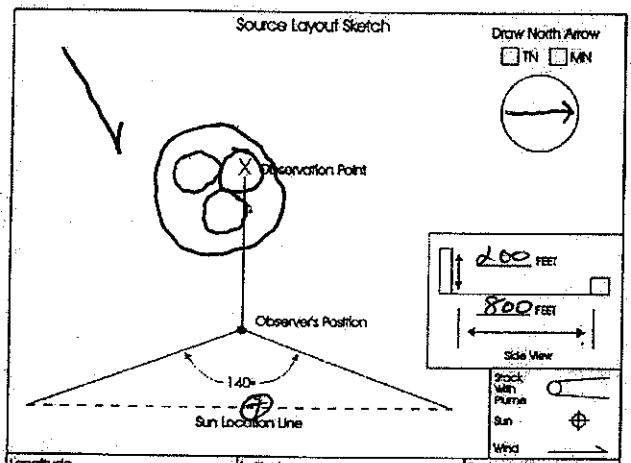
Describe Plume Background: Start Sky End Sky

Background Color: Start GRAY End GRAY | Sky Condition: Start OVERCAST End OVERCAST

Wind Speed: Start 16 MPH End 14 mph | Wind Direction: Start SW End SW

Ambient Temp.: Start 80 End 78 | Wet Bulb Temp. 74 | RH Percent 75

Source Layout Sketch



Longitude | Latitude | Declination

Additional Information: NONE

Observation Date	Time Zone	Start Time	End Time
4-12-13	EST	1320	1430

Sec \ Min	0	15	30	45	Sec \ Min	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

Observer's Name (Print): JAMES STULTZ

Observer's Signature: [signature] | Date: 4-12-13

Organization: ACG

Certified By: ETA | Date:

VEOF1.1

EPA
VISIBLE EMISSION OBSERVATION FORM 1

Method Used (Circle One): Method 9 | 203A | 203B | Other: _____

Form Number: _____ Page: 1 Of: 1

Continued on VEO Form Number: U20-M9-R3

Company Name: Pinellas County RRF

Facility Name:

Street Address:

City: Clearwater | State: FL | Zip:

Process: Municipal Waste Fn 2 | Unit #: | Operating Mode: Normal

Control Equipment: Baghouse | Operating Mode: Normal

Describe Emission Point: Northern stack protruding from the annulus

Height of Emiss. Pt.: Start 200 End 200

Height of Emiss. Pt. Rel. to Observer: Start 206 End 200

Distance to Emiss. Pt.: Start 800 End 800

Direction to Emiss. Pt. (Degrees): Start 270 End 270

Vertical Angle to Obs. Pt.: Start 8 End 8

Direction to Obs. Pt. (Degrees): Start 270 End 270

Distance and Direction to Observation Point from Emission Point: Start Same End Same

Describe Emissions: Start None End None

Emission Color: Start N/A End N/A

Water Droplet Plume: Attached ☐ Detached ☐ None ☒

Describe Plume Background: Start Sky End Sky

Background Color: Start Gray End Same

Sky Conditions: Start Overcast End Same

Wind Speed: Start 14 MPH End 15 MPH

Wind Direction: Start SW End SW

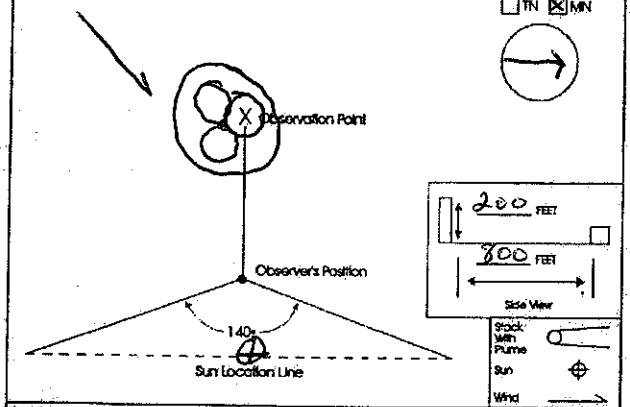
Ambient Temp.: Start 78 End 78

Wet Bulb Temp.: 74

RH Percent: 84

Source Layout Sketch

Draw North Arrow: ☐ TN ☒ MN



Longitude | Latitude | Declination

Additional Information: None

Observation Date	Time Zone	Start Time	End Time
4-12-13	EST	1430	1530

Min \ Sec	0	15	30	45	Min \ Sec	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

Observer's Name (Print): James Stultz

Observer's Signature: _____ Date: 4-12-13

Organization: ACG

Certified by: ETA Date: _____

VEOF1.1

Appendix K.3

EPA Method 9 Raw Field Data: Unit 3 Stack

EPA
VISIBLE EMISSION OBSERVATION FORM 1

Form Number | Page 1 Of 1

Continued on VEO Form Number: V35 - M9 - R1

Method Used (Circle One): Method 9 | 203A | 203B | Other:

Company Name: Pinellas County RRF

Facility Name:

Street Address:

City: Clearwater | State: FL | Zip:

Process: Municipal waste in | Unit #: 3 | Operating Mode: Normal

Control Equipment: Baghouse | Operating Mode: Normal

Describe Emission Point: Eastern stack protruding from the annulus

Height of Emiss. Pt.: Start 200 End 200

Height of Emiss. Pt. Rel. to Observer: Start 200 End 200

Distance to Emiss. Pt.: Start 800 End 800

Direction to Emiss. Pt. (Degrees): Start 270 End 270

Vertical Angle to Obs. Pt.: Start 8 End same

Direction to Obs. Pt. (Degrees): Start 270 End 270

Distance and Direction to Observation Point from Emission Point: Start same End same

Describe Emissions: Start none End none

Emission Color: Start n/a End n/a

Water Droplet Plume: Attached ☐ Detached ☐ None ☒

Describe Plume Background: Start sky End sky

Background Color: Start Gray End Gray

Sky Conditions: Start overcast End same

Wind Speed: Start 9 mph End 14 mph

Wind Direction: Start S End SW

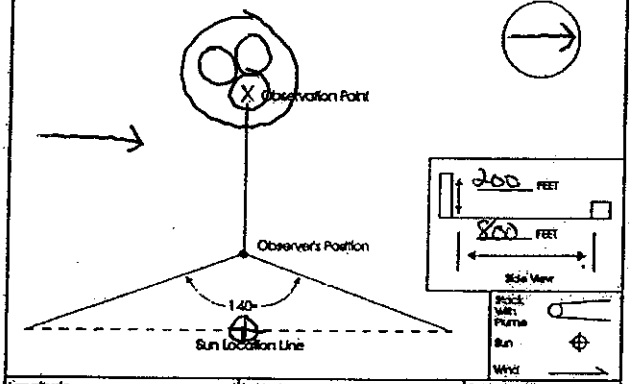
Ambient Temp: Start 77 End 78

Wet Bulb Temp.: 73

RH Percent: 86

Source Layout Sketch

Draw North Arrow: ☐ TN ☒ MN



Longitude | Latitude | Declination

Additional Information: none

Observation Date	Time Zone	Start Time	End Time
4-11-13	EST	1013	1113

Sec / Min	0	15	30	45	Sec / Min	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

Observer's Name (Print): James Stultz

Observer's Signature: [signature] | Date: 4-11-13

Organization: ACG

Certified by: EPA | Date:

VEOF1.1

EPA
VISIBLE EMISSION OBSERVATION FORM 1

Form Number | Page 1 Of 1

Continued on VEO Form Number: 030-M9-R2

Method Used (Circle One): Method 9 | 203A | 203B | Other:

Company Name: PINELLAS COUNTY RRF

Facility Name:

Street Address:

City: CLEARWATER | State: FL | Zip:

Process: MUNICIPAL WASTE EN | Unit #: 3 | Operating Mode: NORMAL

Control Equipment: BAGHOUSE | Operating Mode: NORMAL

Describe Emission Point: EASTERN STACK PROTRUDING FROM THE ANNULUS

Height of Emiss. Pt. Start 200 End 200 | Height of Emiss. Pt. Rel. to Observer Start 200 End 200

Distance to Emiss. Pt. Start 800 End 800 | Direction to Emiss. Pt. (Degrees) Start 270 End 270

Vertical Angle to Obs. Pt. Start 8 End 8 | Direction to Obs. Pt. (Degrees) Start 270 End 270

Distance and Direction to Observation Point from Emission Point: Start SAME End SAME

Describe Emissions: Start NONE End NONE

Emission Color: Start N/A End N/A | Water Droplet Plume: Attached ☐ Detached ☐ None ☒

Describe Plume Background: Start SKY End SAME

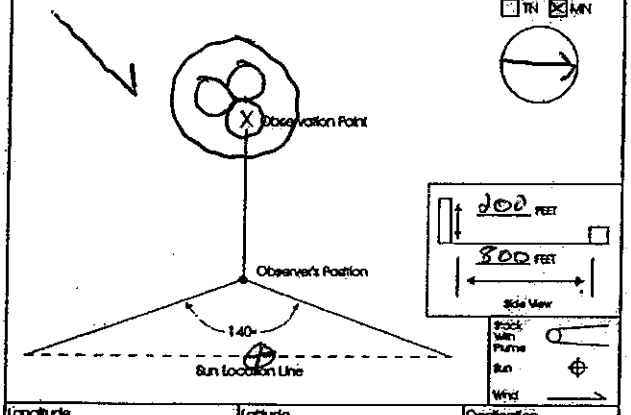
Background Color: Start GRAY End SAME | Sky Conditions: Start OVERCAST End SAME

Wind Speed: Start 14 mph End 14 mph | Wind Direction: Start SW End SW

Ambient Temp.: Start 78 End 79 | Wet Bulb Temp. 71 | RH Percent 84

Source Layout Sketch

Draw North Arrow: ☐ TN ☒ MN



Longitude | Latitude | Declination

Additional Information: NONE

Observation Date	Time Zone	Start Time	End Time
4-12-13	EST	1113	1213

Min \ Sec	0	15	30	45
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
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
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
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
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
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
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
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
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
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
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
55	0	0	0	0
56	0	0	0	0
57	0	0	0	0
58	0	0	0	0
59	0	0	0	0
60	0	0	0	0

Observer's Name (Print): JAMES SPITZ

Observer's Signature: [signature] | Date: 4-12-13

Organization: ACS

Certified by: ETA | Date:

VEOF1.1

EPA
VISIBLE EMISSION OBSERVATION FORM 1

Form Number | Page 1 Of 1

Continued on VEO Form Number: 0230-M9-R3

Method Used (Circle One): **Method 9** 203A 203B Other:

Company Name: Pinellas County RRF

Facility Name:

Street Address:

City: Clearwater | State: FL | Zip:

Process: Municipal waste inc. | Unit #: 3 | Operating Mode: Normal

Control Equipment: Baghouse | Operating Mode: Normal

Describe Emission Point: Eastern stack protruding from the annulus

Height of Emiss. Pt. Start 200 End 200 | Height of Emiss. Pt. Rel. to Observer Start 200 End 200

Distance to Emiss. Pt. Start 800 End 800 | Direction to Emiss. Pt. (Degrees) Start 270 End 270

Vertical Angle to Obs. Pt. Start 8 End 8 | Direction to Obs. Pt. (Degrees) Start 270 End 270

Distance and Direction to Observation Point from Emission Point: Start Same End Same

Describe Emissions: Start None End None

Emission Color: Start n/a End n/a | Water Droplet Plume: Attached ☐ Detached ☐ None ☒

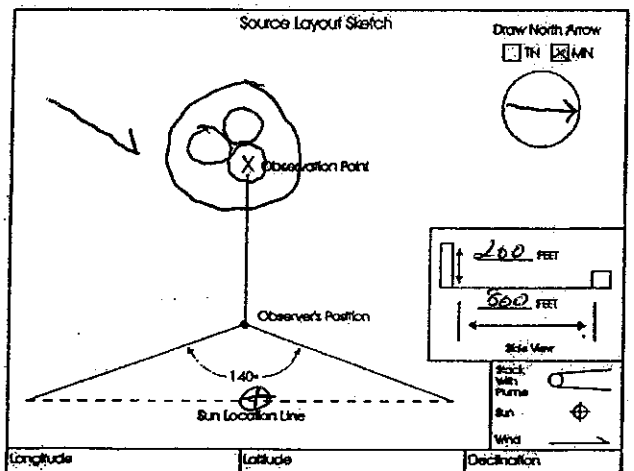
Describe Plume Background: Start Sky End Sky

Background Color: Start Gray End Gray | Sky Conditions: Start Overcast End Same

Wind Speed: Start 14 mph End 16 mph | Wind Direction: Start SW End SW

Ambient Temp.: Start 79 End 80 | Wet Bulb Temp. 75 | RH Percent 82

Source Layout Sketch



Longitude | Latitude | Declination

Additional Information: None

Observation Date	Time Zone	Start Time	End Time
4-12-13	EST	1213	1313

Sec \ Min	0	15	30	45	Sec \ Min	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

Observer's Name (Print): James Stultz

Observer's Signature: [signature] | Date: 4-12-13

Organization: ACG

Certified By: ETA | Date:

VEOF1.1

Appendix K.4

EPA Method 9 Raw Field Data: Silos and Vents

Ash Conditioning Building

Residue Storage and Processing Bldg.

Activated Carbon Storage Silo

Lime Storage Silo for SDA

EPA
VISIBLE EMISSION OBSERVATION FORM 1

Form Number: | Page: Of

Continued on VEO Form Number: M9-ACBO-R1

Method Used (Circle One): **Method 9** 203A 203B Other:

Company Name:

Facility Name: Pinellas Co. RRF

Street Address:

City: St. Petersburg | State: FL | Zip:

Process: Ash handeling vent | Unit #: | Operating Mode:

Control Equipment: | Operating Mode:

Describe Emission Point: From Eastern most end of cooling tower if you look between the waste water tank and lime silo there is a small grey vent with a Cone Shape Cap

Height of Emiss. Pt. Start: 100 End: 100' | Height of Emiss. Pt. Rel. to Observer Start: End:

Distance to Emiss. Pt. Start: 300 End: 300' | Direction to Emiss. Pt. (Degrees) Start: SE 154° End: SE 154°

Vertical Angle to Obs. Pt. Start: 19° End: 14° | Direction to Obs. Pt. (Degrees) Start: SE 154° End: SE 154°

Distance and Direction to Observation Point from Emission Point Start: N/A End: N/A

Describe Emissions: Start: End:

Emission Color Start: End: | Water Droplet Plume: Attached ☐ Detached ☐ None ☐

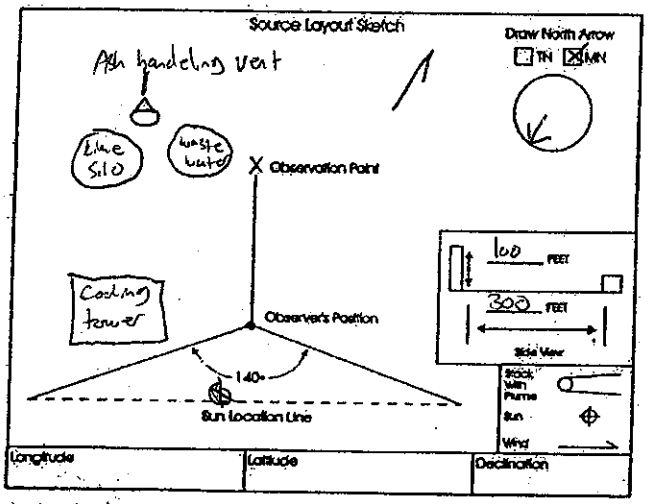
Describe Plume Background: Start: Sky End: Sky

Background Color Start: Blue End: Blue | Sky Conditions Start: Clear End: Clear

Wind Speed Start: ~3 mph End: ~3mph | Wind Direction Start: NE End: NE

Ambient Temp. Start: 79° End: 83° | Wet Bulb Temp.: 67° | RH Percent: 66%

Source Layout Sketch



Longitude | Latitude | Declination

Additional Information:

Observation Date	Time Zone	Start Time	End Time
4-13-2013	EST	1215	1315

Sec / Min	0	15	30	45	Sec / Min	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

Observer's Name (Print): Mike Morril

Observer's Signature: | Date: 4-13-04

Organization: ACG

Certified by: ETS | Date: 3-13

VEOF1.1

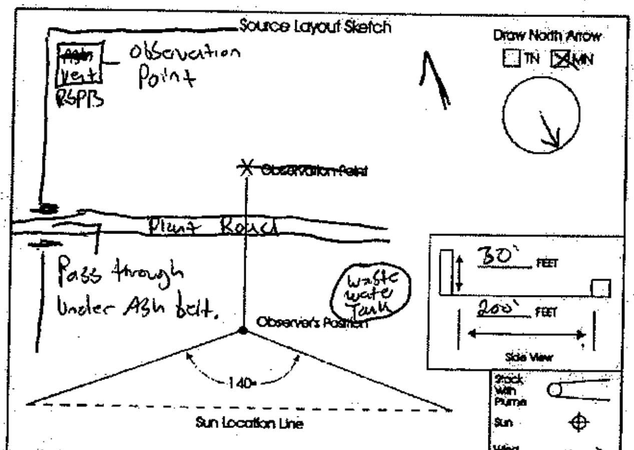
EPA
VISIBLE EMISSION OBSERVATION FORM 1

Form Number		Page 1 of 1
Continued on VEO Form Number: MG - RSPB - R1		

Method Used (Circle One): **Method 9** (circled) 203A 203B Other: ______

Field	Value
Company Name	
Facility Name	Pinellas Co. RRF
Street Address	3001 - 110th Avenue North
City	St. Petersburg
State	FL
Zip	33716
Process	~~Air handling~~ vent RSPB
Unit #	
Operating Mode	Running
Control Equipment	Bag House
Operating Mode	
Describe Emission Point	Square Duct attached to Grey ash hopper in the Corner of the ash building to right of green water tank From Cooling tower
Height of Emiss. Pt.	Start 30' End 30'
Height of Emiss. Pt. Rel. to Observer	Start 30' End 30'
Distance to Emiss. Pt.	Start 200' End 200'
Direction to Emiss. Pt. (Degrees)	Start S 180° End S 180°
Vertical Angle to Obs. Pt.	Start 10° End 10°
Direction to Obs. Pt. (Degrees)	Start S 180° End S 180°
Distance and Direction to Observation Point from Emission Point	Start ~~S 180°~~ No Distance End ~~S 180°~~ No Distance
Describe Emissions	Start N/A End N/A
Emission Color	Start N/A End N/A
Water Droplet Plume	Attached ☐ Detached ☐ None ☒
Describe Plume Background	Start Ash building End Ash building
Background Color	Start TAN/Brown End TAN/Brown
Sky Conditions	Start overcast End overcast
Wind Speed	Start 14-29 mph End 14-29 mph
Wind Direction	Start S End S
Ambient Temp.	Start 77 End 75
Wet Bulb Temp.	73
RH Percent	88%

Source Layout Sketch



Longitude	Latitude	Declination

Additional Information:

Observation Date	Time Zone	Start Time	End Time
4-12-13	EST	1247	1347

Min \ Sec	0	15	30	45	Min \ Sec	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

Field	Value
Observer's Name (Print)	Mike Henry
Observer's Signature	[signature]
Date	4-12-13
Organization	ACG
Certified By	ETS
Date	3-2013

VEOF1.1

EPA
VISIBLE EMISSION OBSERVATION FORM 1

Method Used (Circle One): Method 9 | 203A | 203B | Other: _____

Form Number: _____ Page 1 Of 1

Continued on VEO Form Number: CS-MG-R1

Company Name: PINELLAS COUNTY RRF

Facility Name: _____

Street Address: _____

City: CLEARWATER | State: FL | Zip: _____

Process: CARBON SILO | Unit #: N/A | Operating Mode: NORMAL

Control Equipment: _____ | Operating Mode: _____

Describe Emission Point: BROWN SILO TO THE NORTH WEST

Height of Emiss. Pt. Start 60 End SAME | Height of Emiss. Pt. Rel. to Observer Start 60 End SAME

Distance to Emiss. Pt. Start 200 End SAME | Direction to Emiss. Pt. (Degrees) Start 290 End SAME

Vertical Angle to Obs. Pt. Start 6 End SAME | Direction to Obs. Pt. (Degrees) Start 290 End SAME

Distance and Direction to Observation Point from Emission Point: Start SAME End SAME

Describe Emissions: Start NONE End SAME

Emission Color: Start N/A End N/A | Water Droplet Plume: Attached ☐ Detached ☐ None ☒

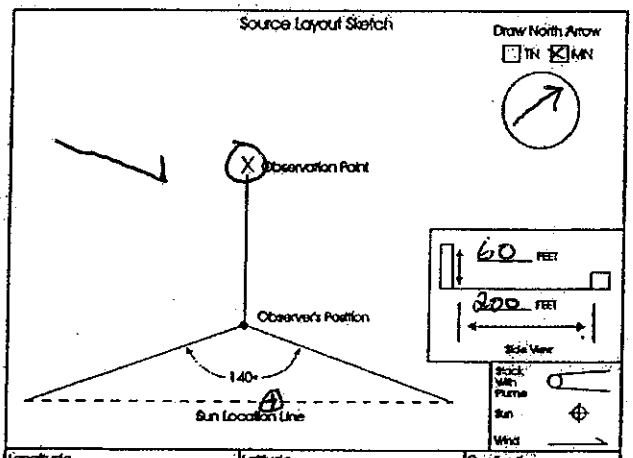
Describe Plume Background: Start BUILDING End SAME

Background Color: Start BROWN End SAME | Sky Conditions: Start OVERCAST End SAME

Wind Speed: Start 9 MPH End 7MPH | Wind Direction: Start S.W. End S

Ambient Temp.: Start 75 End 77 | Wet Bulb Temp. 73 | RH Percent 92

Source Layout Sketch



Longitude | Latitude | Declination

Additional Information: NONE

Observation Date	Time Zone	Start Time	End Time
4-12-13	EST	851	951

Min \ Sec	0	15	30	45	Min \ Sec	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

Observer's Name (Print): JAMES STU

Observer's Signature: _____ Date: 4-12-13

Organization: _____

Certified By: _____ Date: _____

VEOF1.1

EPA
VISIBLE EMISSION OBSERVATION FORM 1

Method Used (Circle One): (Method 9) 203A 203B Other: _____

Form Number: | Page 1 Of 1

Continued on VEO Form Number: M9 - Pebbel Lime Silo - R1

Company Name:

Facility Name: Pinellas Co. RRF

Street Address:

City: St. Petersburg | State: FL | Zip:

Process: Filling Pebbel Lime Silo | Unit #: | Operating Mode: Filling Silo

Control Equipment: Bag House | Operating Mode:

Describe Emission Point: Duct on Top of Brown Pebbel Lime Silo

Height of Emiss. Pt. Start: 120' End: 120' | Height of Emiss. Pt. Rel. to Observer Start: 180' End: 110'

Distance to Emiss. Pt. Start: ~~500~~ 400' End: | Direction to Emiss. Pt. (Degrees) Start: E 72° End: E 72°

Vertical Angle to Obs. Pt. Start: 14° End: 14° | Direction to Obs. Pt. (Degrees) Start: E 72° End: E 72°

Distance and Direction to Observation Point from Emission Point: Start: 0 End: 0

Describe Emissions: Start: N/A End: N/A

Emission Color: Start: N/A End: N/A | Water Droplet Plume: Attached ☐ Detached ☐ None ☒

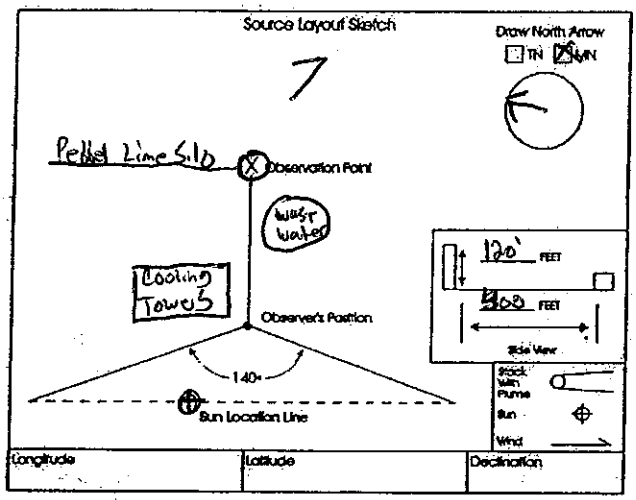
Describe Plume Background: Start: Sky End: Sky

Background Color: Start: Blue End: Blue | Sky Conditions: Start: Clear End: Clear

Wind Speed: Start: ~4 mph End: ~8 mph | Wind Direction: Start: ESE End:

Ambient Temp.: Start: 74° End: 74° | Wet Bulb Temp.: 66° | RH Percent: 40%

Source Layout Sketch



Longitude | Latitude | Declination

Additional Information:

Observation Date	Time Zone	Start Time	End Time
4-9-13	EST	1027	1122

Sec / Min	0	15	30	45	Sec / Min	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

Observer's Name (Print): Mike Henry

Observer's Signature: | Date: 4-9-2013

Organization: Air Compliance Group

Certified By: ETS | Date: 3-2013

VEOF1.1

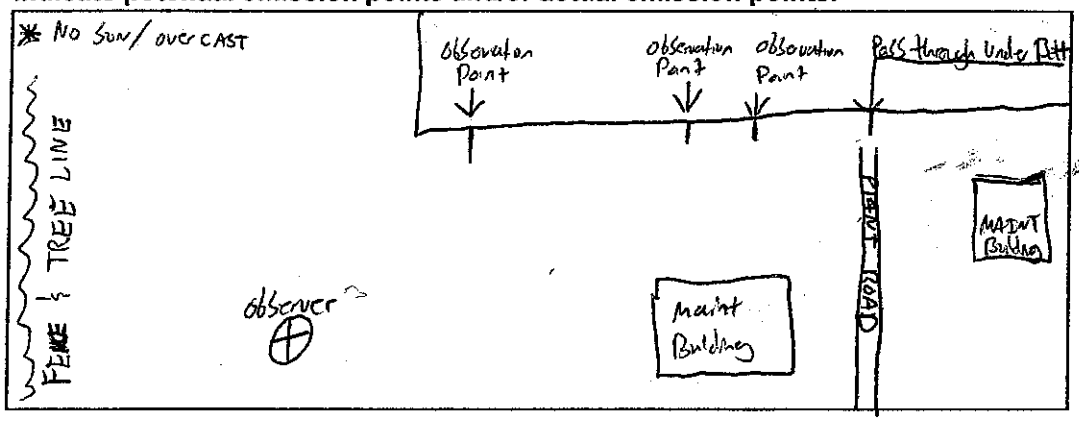
Appendix K.5

EPA Method 22 Raw Field Data: Ash Handling System

FUGITIVE OR SMOKE EMISSION INSPECTION: OUTDOOR LOCATION

Company Pinellas Co. RRF	Observer Mike Henry
Location Ash handeling Building / System	Affiliation Air Compliance Group
Company contact Bobby	Date 4-12-13
Sky conditions overcast	Wind direction SSE
Precipitation 0	Wind speed ~ 8mph
Industry MWI	Process unit Ash Handeling

Sketch process unit: indicate observer position relative to source and sun; indicate potential emission points and/or actual emission points.



OBSERVATIONS

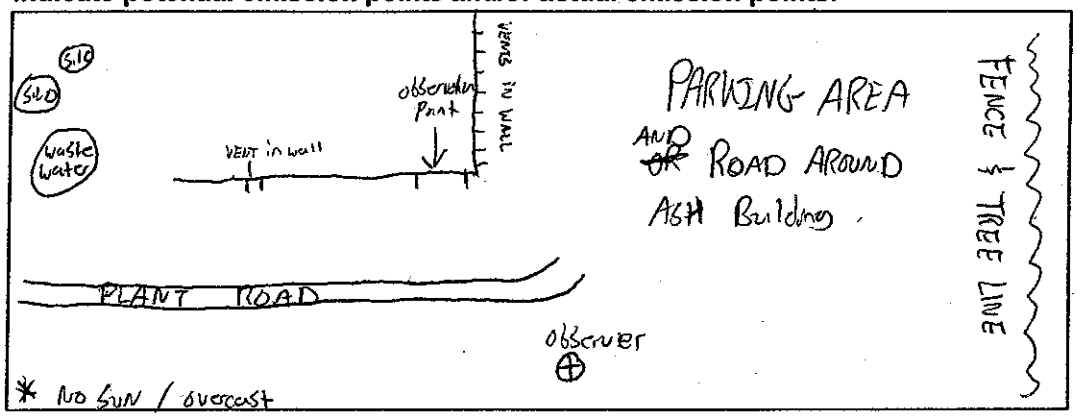
	Clock Time	Observation Period Duration (min:sec)	Accumulated Emission Time (min:sec)
Begin Observation	0858	20:00 min	0
	0923	20:00 min	0
	0948	20:00 min	0
	1013		
End Observation			

EPA M-22. 1/98

FUGITIVE OR SMOKE EMISSION INSPECTION: OUTDOOR LOCATION

Company Pinellas Co. RRF	Observer Mike Henry
Location Ash handeling Building	Affiliation Air Compliance Group
Company contact Becky	Date 4-12-13
Sky conditions Overcast	Wind direction SSE
Precipitation None	Wind speed ~9 mph
Industry MWI	Process unit Ash handeling

Sketch process unit: indicate observer position relative to source and sun; indicate potential emission points and/or actual emission points.



OBSERVATIONS

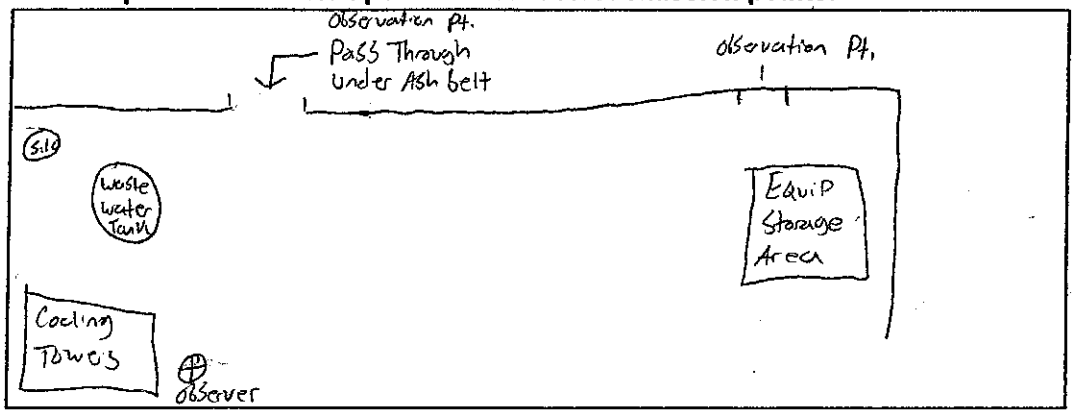
	Clock Time	Observation Period Duration (min:sec)	Accumulated Emission Time (min:sec)
Begin Observation	10:22	20:00 min	0
	10:47	20:00 min	0
	11:12	20:00 min	0
	11:37		
End Observation			

EPA M-22. 1/98

FUGITIVE OR SMOKE EMISSION INSPECTION: OUTDOOR LOCATION

Company Pinellas Co. RRF	Observer Mike Henry
Location Ash handelling building	Affiliation Air Compliance Group
Company contact Becky	Date 4-2-13
Sky conditions Overcast	Wind direction SSE
Precipitation NONE	Wind speed ~7-9 mph
Industry MWI	Process unit Ash handeling

Sketch process unit: indicate observer position relative to source and sun; indicate potential emission points and/or actual emission points.



OBSERVATIONS

	Clock Time	Observation Period Duration (min:sec)	Accumulated Emission Time (min:sec)
Begin Observation	11:45	20:00 min	0
	12:10	20:00 min	0
	12:35	20:00 min	0
End Observation	13:00		

EPA M-22. 1/98

Appendix L

Analytical Data

Appendix L.1

EPA Method 3A Analytical Data

INTEGRATED BAG ANALYSIS DATA

Job Name	**Pinellas County RRF**
Contract	**V13030**
Method of Analysis	**EPA Method 3/3A**
Date	**April 9-13, 2013**

Run Number	$\%O_2$	$\%CO_2$	
U1O-M29-R1	9.98	9.37	
U1O-M29-R2	10.06	9.35	
U1O-M29-R3	10.33	9.11	
U2O-M29-R1	10.60	8.60	
U2O-M29-R2	11.16	8.19	
U2O-M29-R3	11.72	7.70	
U3O-M29-R1	8.54	10.45	
U3O-M29-R2	8.52	10.51	
U3O-M29-R3	8.17	10.65	
U1I-M29-R1	8.10	10.90	
U1I-M29-R2	8.54	10.55	
U1I-M29-R3	8.29	10.97	
U2I-M29-R1	8.56	10.31	
U2I-M29-R2	9.01	9.94	
U2I-M29-R3	9.84	9.25	
U3I-M29-R1	6.79	12.05	
U3I-M29-R2	6.98	11.72	
U3I-M29-R3	7.11	11.49	

INTEGRATED BAG ANALYSIS DATA

Job Name	**Pinellas County RRF**
Contract	**V13030**
Method of Analysis	**EPA Method 3/3A**
Date	**April 9-13, 2013**

Run Number	$\%O_2$	$\%CO_2$	
U1O-M26A-R1	9.56	9.62	
U1O-M26A-R2	10.22	9.10	
U1O-M26A-R3	10.24	9.01	
U2O-M26A-R1	10.74	8.52	
U2O-M26A-R2	10.93	8.42	
U2O-M26A-R3	11.63	7.72	
U3O-M26A-R1	8.33	10.67	
U3O-M26A-R2	7.83	11.15	
U3O-M26A-R3	8.00	10.86	

INTEGRATED BAG ANALYSIS DATA

Job Name	**Pinellas County RRF**
Contract	**V13030**
Method of Analysis	**EPA Method 3/3A**
Date	**April 9-13, 2013**

Run Number	%O_2	%CO_2	
U1O-M201A/202-R1	9.47	9.67	
U1O-M201A/202-R2	8.84	10.17	
U1O-M201A/202-R3	9.30	9.88	
U2O-M201A/202-R1	9.98	9.16	
U2O-M201A/202-R2	9.51	9.59	
U2O-M201A/202-R3	9.81	9.44	
U3O-M201A/202-R1	9.57	9.84	
U3O-M201A/202-R2	8.85	10.33	
U3O-M201A/202-R3	9.71	9.57	

Appendix L.2

EPA Method 5 Gravimetric Analytical Data

GRAVIMETRIC LABORATORY DATA
FINAL BEAKER WEIGHTS

JOB NAME: Pinellas County RRF

CONTRACT NO: V13030

		BEAKER WT. (g)			
RUN ID	U10-M26A-R1	(1)	66.5984	(6)	
SAMPLE / LAB ID #	800 / L13-0024	(2)	66.5988	(7)	
BEAKER #	13-037	(3)		(8)	
FILTER #	Q12-42	(4)		(9)	
PW VOL. (mL)	--	(5)		(10)	
CONSTANT WT. (g)		66.5988			
BEAKER TARE (g)		66.2259			
NET BEAKER GAIN (g)		0.3729			
FILTER TARE (g)		0.3703			
NET FILTER GAIN (g)		0.0026			

		BEAKER WT. (g)			
RUN ID	U10-M26A-R1	(1)	65.2147	(6)	
SAMPLE / LAB ID #	801 / L13-0025	(2)	65.2145	(7)	
BEAKER #	13-038	(3)		(8)	
FILTER #	--	(4)		(9)	
PW VOL. (mL)	100	(5)		(10)	
CONSTANT WT. (g)		65.2145			
BEAKER TARE (g)		65.2035			
NET BEAKER GAIN (g)		0.0110			
FILTER TARE (g)					
NET FILTER GAIN (g)					

		BEAKER WT. (g)			
RUN ID	U10-M26A-R2	(1)	69.3461	(6)	
SAMPLE / LAB ID #	804 / L13-0026	(2)	69.3464	(7)	
BEAKER #	13-039	(3)		(8)	
FILTER #	Q12-43	(4)		(9)	
PW VOL. (mL)	--	(5)		(10)	
CONSTANT WT. (g)		69.3464			
BEAKER TARE (g)		68.9743			
NET BEAKER GAIN (g)		0.3721			
FILTER TARE (g)		0.3702			
NET FILTER GAIN (g)		0.0019			

		BEAKER WT. (g)			
RUN ID	U10-M26A-R2	(1)	66.0007	(6)	
SAMPLE / LAB ID #	805 / L13-0027	(2)	66.0004	(7)	
BEAKER #	13-040	(3)		(8)	
FILTER #	--	(4)		(9)	
PW VOL. (mL)	105	(5)		(10)	
CONSTANT WT. (g)		66.0004			
BEAKER TARE (g)		65.9841			
NET BEAKER GAIN (g)		0.0163			
FILTER TARE (g)					
NET FILTER GAIN (g)					

		BEAKER WT. (g)			
RUN ID	U10-M26A-R3	(1)	67.0571	(6)	
SAMPLE / LAB ID #	808 / L13-0028	(2)	67.0575	(7)	
BEAKER #	13-041	(3)		(8)	
FILTER #	Q12-44	(4)		(9)	
PW VOL. (mL)	--	(5)		(10)	
CONSTANT WT. (g)		67.0575			
BEAKER TARE (g)		66.6880			
NET BEAKER GAIN (g)		0.3695			
FILTER TARE (g)		0.3663			
NET FILTER GAIN (g)		0.0032			

		BEAKER WT. (g)			
RUN ID	U10-M26A-R3	(1)	66.0805	(6)	
SAMPLE / LAB ID #	809 / L13-0029	(2)	66.0807	(7)	
BEAKER #	13-042	(3)		(8)	
FILTER #	--	(4)		(9)	
PW VOL. (mL)	105	(5)		(10)	
CONSTANT WT. (g)		66.0807			
BEAKER TARE (g)		66.0690			
NET BEAKER GAIN (g)		0.0117			
FILTER TARE (g)					
NET FILTER GAIN (g)					

		BEAKER WT. (g)			
RUN ID	U20-M26A-R1	(1)	66.5858	(6)	
SAMPLE / LAB ID #	812 / L13-0030	(2)	66.5862	(7)	
BEAKER #	13-043	(3)		(8)	
FILTER #	Q12-45	(4)		(9)	
PW VOL. (mL)	--	(5)		(10)	
CONSTANT WT. (g)		66.5862			
BEAKER TARE (g)		66.2036			
NET BEAKER GAIN (g)		0.3826			
FILTER TARE (g)		0.3813			
NET FILTER GAIN (g)		0.0013			

		BEAKER WT. (g)			
RUN ID	U20-M26A-R1	(1)	66.3377	(6)	
SAMPLE / LAB ID #	813 / L13-0031	(2)	66.3375	(7)	
BEAKER #	13-044	(3)		(8)	
FILTER #	--	(4)		(9)	
PW VOL. (mL)	100	(5)		(10)	
CONSTANT WT. (g)		66.3375			
BEAKER TARE (g)		66.3244			
NET BEAKER GAIN (g)		0.0131			
FILTER TARE (g)					
NET FILTER GAIN (g)					

WEIGHING	DATE	TIME	REL. HUMIDITY (%)	TEMP (°F)	INITIAL ZERO CAL RESPONSE (g)	WEIGHT ID	INITIAL HIGH CAL RESPONSE (g)	SECONDARY HIGH CAL RESPONSE	TECHNICIAN
(1)	4/18/2013	10:12	44	75	0.0000	38998	99.9999	100.0000	JS
(2)	4/19/2013	8:40	45	71	0.0001	38998	100.0001	100.0000	JS
(3)									
(4)									
(5)									
(6)									
(7)									
(8)									
(9)									
(10)									

Final Weights Meet Acceptance Criteria: YES NO

I Certify That This Sheet Has Been Checked For Accuracy and Completeness: _____

GRAVIMETRIC LABORATORY DATA
FINAL BEAKER WEIGHTS

JOB NAME: Pinellas County RRF

CONTRACT NO: V13030

		BEAKER WT. (g)			
RUN ID	U20-M26A-R2	(1)	66.0114	(6)	
SAMPLE / LAB ID #	816 / L13-0032	(2)	66.0109	(7)	
BEAKER #	13-045	(3)		(8)	
FILTER #	Q12-48	(4)		(9)	
PW VOL. (mL)	--	(5)		(10)	
CONSTANT WT. (g)		66.0109			
BEAKER TARE (g)		65.5673			
NET BEAKER GAIN (g)		0.4436			
FILTER TARE (g)		0.4354			
NET FILTER GAIN (g)		0.0082			

		BEAKER WT. (g)			
RUN ID	U20-M26A-R2	(1)	65.3226	(6)	
SAMPLE / LAB ID #	817 / L13-0033	(2)	65.3230	(7)	
BEAKER #	13-046	(3)		(8)	
FILTER #	--	(4)		(9)	
PW VOL. (mL)	100	(5)		(10)	
CONSTANT WT. (g)		65.3230			
BEAKER TARE (g)		65.3171			
NET BEAKER GAIN (g)		0.0059			
FILTER TARE (g)					
NET FILTER GAIN (g)					

		BEAKER WT. (g)			
RUN ID	U20-M26A-R3	(1)	66.7697	(6)	
SAMPLE / LAB ID #	820 / L13-0034	(2)	66.7695	(7)	
BEAKER #	13-047	(3)		(8)	
FILTER #	Q12-49	(4)		(9)	
PW VOL. (mL)	--	(5)		(10)	
CONSTANT WT. (g)		66.7695			
BEAKER TARE (g)		66.4034			
NET BEAKER GAIN (g)		0.3661			
FILTER TARE (g)		0.3649			
NET FILTER GAIN (g)		0.0012			

		BEAKER WT. (g)			
RUN ID	U20-M26A-R3	(1)	68.9761	(6)	
SAMPLE / LAB ID #	821 / L13-0035	(2)	68.9760	(7)	
BEAKER #	13-048	(3)		(8)	
FILTER #	--	(4)		(9)	
PW VOL. (mL)	140	(5)		(10)	
CONSTANT WT. (g)		68.9760			
BEAKER TARE (g)		68.9617			
NET BEAKER GAIN (g)		0.0143			
FILTER TARE (g)					
NET FILTER GAIN (g)					

		BEAKER WT. (g)			
RUN ID	U30-M26A-R1	(1)	67.0189	(6)	
SAMPLE / LAB ID #	824 / L13-0036	(2)	67.0193	(7)	
BEAKER #	13-049	(3)		(8)	
FILTER #	Q12-50	(4)		(9)	
PW VOL. (mL)	--	(5)		(10)	
CONSTANT WT. (g)		67.0193			
BEAKER TARE (g)		66.6487			
NET BEAKER GAIN (g)		0.3706			
FILTER TARE (g)		0.3696			
NET FILTER GAIN (g)		0.0010			

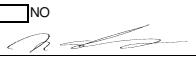
		BEAKER WT. (g)			
RUN ID	U30-M26A-R1	(1)	67.1466	(6)	
SAMPLE / LAB ID #	825 / L13-0037	(2)	67.1468	(7)	
BEAKER #	13-050	(3)		(8)	
FILTER #	--	(4)		(9)	
PW VOL. (mL)	190	(5)		(10)	
CONSTANT WT. (g)		67.1468			
BEAKER TARE (g)		67.1311			
NET BEAKER GAIN (g)		0.0157			
FILTER TARE (g)					
NET FILTER GAIN (g)					

		BEAKER WT. (g)			
RUN ID	U30-M26A-R2	(1)	66.3529	(6)	
SAMPLE / LAB ID #	828 / L13-0038	(2)	66.3530	(7)	
BEAKER #	13-051	(3)		(8)	
FILTER #	Q12-52	(4)		(9)	
PW VOL. (mL)	--	(5)		(10)	
CONSTANT WT. (g)		66.3530			
BEAKER TARE (g)		65.9067			
NET BEAKER GAIN (g)		0.4463			
FILTER TARE (g)		0.4452			
NET FILTER GAIN (g)		0.0011			

		BEAKER WT. (g)			
RUN ID	U30-M26A-R2	(1)	65.8489	(6)	
SAMPLE / LAB ID #	829 / L13-0039	(2)	65.8490	(7)	
BEAKER #	13-052	(3)		(8)	
FILTER #	--	(4)		(9)	
PW VOL. (mL)	100	(5)		(10)	
CONSTANT WT. (g)		65.8490			
BEAKER TARE (g)		65.8345			
NET BEAKER GAIN (g)		0.0145			
FILTER TARE (g)					
NET FILTER GAIN (g)					

WEIGHING	DATE	TIME	REL. HUMIDITY (%)	TEMP (°F)	INITIAL ZERO CAL RESPONSE (g)	WEIGHT ID	INITIAL HIGH CAL RESPONSE (g)	SECONDARY HIGH CAL RESPONSE	TECHNICIAN
(1)	4/18/2013	10:12	44	75	0.0000	38998	99.9999	100.0000	JS
(2)	4/19/2013	8:40	45	71	0.0001	38998	100.0001	100.0000	JS
(3)									
(4)									
(5)									
(6)									
(7)									
(8)									
(9)									
(10)									

Final Weights Meet Acceptance Criteria: YES NO

I Certify That This Sheet Has Been Checked For Accuracy and Completeness: 

GRAVIMETRIC LABORATORY DATA
FINAL BEAKER WEIGHTS

JOB NAME: Pinellas County RRF

CONTRACT NO: V13030

		BEAKER WT. (g)			
RUN ID	U30-M26A-R3	(1)	67.3142	(6)	
SAMPLE / LAB ID #	832 / L13-0040	(2)	67.3143	(7)	
BEAKER #	13-053	(3)		(8)	
FILTER #	Q12-53	(4)		(9)	
PW VOL. (mL)	--	(5)		(10)	
CONSTANT WT. (g)		67.3143			
BEAKER TARE (g)		66.8540			
NET BEAKER GAIN (g)		0.4603			
FILTER TARE (g)		0.4594			
NET FILTER GAIN (g)		0.0009			

		BEAKER WT. (g)			
RUN ID	U30-M26A-R3	(1)	66.3959	(6)	
SAMPLE / LAB ID #	833 / L13-0041	(2)	66.3955	(7)	
BEAKER #	13-054	(3)		(8)	
FILTER #	--	(4)		(9)	
PW VOL. (mL)	100	(5)		(10)	
CONSTANT WT. (g)		66.3955			
BEAKER TARE (g)		66.3811			
NET BEAKER GAIN (g)		0.0144			
FILTER TARE (g)					
NET FILTER GAIN (g)					

		BEAKER WT. (g)			
RUN ID	Blank M26A	(1)	66.2755	(6)	
SAMPLE / LAB ID #	836 / L13-0042	(2)	66.2758	(7)	
BEAKER #	13-086	(3)		(8)	
FILTER #	Q12-09	(4)		(9)	
PW VOL. (mL)	--	(5)		(10)	
CONSTANT WT. (g)		66.2758			
BEAKER TARE (g)		65.8868			
NET BEAKER GAIN (g)		0.3890			
FILTER TARE (g)		0.3891			
NET FILTER GAIN (g)		-0.0001			

		BEAKER WT. (g)			
RUN ID	Blank M26A	(1)	69.9917	(6)	
SAMPLE / LAB ID #	837 / L13-0043	(2)	69.9915	(7)	
BEAKER #	13-087	(3)		(8)	
FILTER #	--	(4)		(9)	
PW VOL. (mL)	150	(5)		(10)	
CONSTANT WT. (g)		69.9915			
BEAKER TARE (g)		69.9920			
NET BEAKER GAIN (g)		-0.0005			
FILTER TARE (g)					
NET FILTER GAIN (g)					

		BEAKER WT. (g)			
RUN ID	U1O-M26A-R1 Duplicate	(1)	66.5986	(6)	
SAMPLE / LAB ID #	800 / L13-0024	(2)	66.5987	(7)	
BEAKER #	13-037	(3)		(8)	
FILTER #	Q12-42	(4)		(9)	
PW VOL. (mL)	--	(5)		(10)	
CONSTANT WT. (g)		66.5987			
BEAKER TARE (g)		66.2259			
NET BEAKER GAIN (g)		0.3728			
FILTER TARE (g)		0.3703			
NET FILTER GAIN (g)		0.0025			

		BEAKER WT. (g)			
RUN ID	2nd Control	(1)	199.9998	(6)	
SAMPLE / LAB ID #	0336 / L13-0044	(2)	200.0000	(7)	
BEAKER #	--	(3)		(8)	
FILTER #	--	(4)		(9)	
PW VOL. (mL)	--	(5)		(10)	
CONSTANT WT. (g)		200.0000			
BEAKER TARE (g)					
NET BEAKER GAIN (g)		200.0000			
FILTER TARE (g)					
NET FILTER GAIN (g)					

		BEAKER WT. (g)			
RUN ID		(1)		(6)	
SAMPLE / LAB ID #		(2)		(7)	
BEAKER #		(3)		(8)	
FILTER #		(4)		(9)	
PW VOL. (mL)		(5)		(10)	
CONSTANT WT. (g)					
BEAKER TARE (g)					
NET BEAKER GAIN (g)		0.0000			
FILTER TARE (g)					
NET FILTER GAIN (g)		0.0000			

		BEAKER WT. (g)			
RUN ID		(1)		(6)	
SAMPLE / LAB ID #		(2)		(7)	
BEAKER #		(3)		(8)	
FILTER #		(4)		(9)	
PW VOL. (mL)		(5)		(10)	
CONSTANT WT. (g)					
BEAKER TARE (g)					
NET BEAKER GAIN (g)		0.0000			
FILTER TARE (g)					
NET FILTER GAIN (g)					

WEIGHING	DATE	TIME	REL. HUMIDITY (%)	TEMP (°F)	INITIAL ZERO CAL RESPONSE (g)	WEIGHT ID	INITIAL HIGH CAL RESPONSE (g)	SECONDARY HIGH CAL RESPONSE	TECHNICIAN
(1)	4/18/2013	10:12	44	75	0.0000	38998	99.9999	100.0000	JS
(2)	4/19/2013	8:40	45	71	0.0001	38998	100.0001	100.0000	JS
(3)									
(4)									
(5)									
(6)									
(7)									
(8)									
(9)									
(10)									

Final Weights Meet Acceptance Criteria: YES NO

I Certify That This Sheet Has Been Checked For Accuracy and Completeness: _____

Appendix L.3

EPA Method 201A Gravimetric Analytical Data

GRAVIMETRIC LABORATORY DATA
FINAL BEAKER WEIGHTS

JOB NAME: Pinellas County RRF

CONTRACT NO: V13030

		BEAKER WT. (g)			
RUN ID	U10-M201A/202-R1	(1)	64.7669	(6)	
SAMPLE / LAB ID #	4000 / L13-0045	(2)	64.7670	(7)	
BEAKER #	13-055	(3)		(8)	
FILTER #	12-38	(4)		(9)	
PW VOL. (mL)	--	(5)		(10)	
CONSTANT WT. (g)		64.7670			
BEAKER TARE (g)		64.4195			
NET BEAKER GAIN (g)		0.3475			
FILTER TARE (g)		0.3468			
NET FILTER GAIN (g)		0.0007			

		BEAKER WT. (g)			
RUN ID	U10-M201A/202-R1	(1)	67.0133	(6)	
SAMPLE / LAB ID #	4002 / L13-0046	(2)	67.0132	(7)	
BEAKER #	13-057	(3)		(8)	
FILTER #	--	(4)		(9)	
PW VOL. (mL)	170	(5)		(10)	
CONSTANT WT. (g)		67.0132			
BEAKER TARE (g)		67.0124			
NET BEAKER GAIN (g)		0.0008			
FILTER TARE (g)					
NET FILTER GAIN (g)					

		BEAKER WT. (g)			
RUN ID	U10-M201A/202-R2	(1)	66.4993	(6)	
SAMPLE / LAB ID #	4007 / L13-0047	(2)	66.4996	(7)	
BEAKER #	13-058	(3)		(8)	
FILTER #	12-45	(4)		(9)	
PW VOL. (mL)	--	(5)		(10)	
CONSTANT WT. (g)		66.4996			
BEAKER TARE (g)		66.1384			
NET BEAKER GAIN (g)		0.3612			
FILTER TARE (g)		0.3603			
NET FILTER GAIN (g)		0.0009			

		BEAKER WT. (g)			
RUN ID	U10-M201A/202-R2	(1)	66.3317	(6)	
SAMPLE / LAB ID #	4009 / L13-0048	(2)	66.3319	(7)	
BEAKER #	13-060	(3)		(8)	
FILTER #	--	(4)		(9)	
PW VOL. (mL)	140	(5)		(10)	
CONSTANT WT. (g)		66.3319			
BEAKER TARE (g)		66.3309			
NET BEAKER GAIN (g)		0.0010			
FILTER TARE (g)					
NET FILTER GAIN (g)					

		BEAKER WT. (g)			
RUN ID	U10-M201A/202-R3	(1)	65.9606	(6)	
SAMPLE / LAB ID #	4014 / L13-0049	(2)	65.9601	(7)	
BEAKER #	13-061	(3)		(8)	
FILTER #	12-46	(4)		(9)	
PW VOL. (mL)	--	(5)		(10)	
CONSTANT WT. (g)		65.9601			
BEAKER TARE (g)		65.6109			
NET BEAKER GAIN (g)		0.3492			
FILTER TARE (g)		0.3482			
NET FILTER GAIN (g)		0.0010			

		BEAKER WT. (g)			
RUN ID	U10-M201A/202-R3	(1)	65.3952	(6)	
SAMPLE / LAB ID #	4016 / L13-0050	(2)	65.3949	(7)	
BEAKER #	13-063	(3)		(8)	
FILTER #	--	(4)		(9)	
PW VOL. (mL)	210	(5)		(10)	
CONSTANT WT. (g)		65.3949			
BEAKER TARE (g)		65.3940			
NET BEAKER GAIN (g)		0.0009			
FILTER TARE (g)					
NET FILTER GAIN (g)					

		BEAKER WT. (g)			
RUN ID	U20-M201A/202-R1	(1)	64.2082	(6)	
SAMPLE / LAB ID #	4021 / L13-0051	(2)	64.2094	(7)	
BEAKER #	13-064	(3)	64.2090	(8)	
FILTER #	12-48	(4)		(9)	
PW VOL. (mL)	--	(5)		(10)	
CONSTANT WT. (g)		64.2090			
BEAKER TARE (g)		63.8617			
NET BEAKER GAIN (g)		0.3473			
FILTER TARE (g)		0.3469			
NET FILTER GAIN (g)		0.0004			

		BEAKER WT. (g)			
RUN ID	U20-M201A/202-R1	(1)	64.3681	(6)	
SAMPLE / LAB ID #	4023 / L13-0052	(2)	64.3684	(7)	
BEAKER #	13-066	(3)		(8)	
FILTER #	--	(4)		(9)	
PW VOL. (mL)	230	(5)		(10)	
CONSTANT WT. (g)		64.3684			
BEAKER TARE (g)		64.3671			
NET BEAKER GAIN (g)		0.0013			
FILTER TARE (g)					
NET FILTER GAIN (g)					

WEIGHING	DATE	TIME	REL. HUMIDITY (%)	TEMP (°F)	INITIAL ZERO CAL RESPONSE (g)	WEIGHT ID	INITIAL HIGH CAL RESPONSE (g)	SECONDARY HIGH CAL RESPONSE	TECHNICIAN
(1)	4/18/2013	10:33	44	76	0.0000	38998	100.0001	100.0000	JS
(2)	4/19/2013	8:59	44	72	0.0001	38998	99.9999	100.0000	JS
(3)	4/22/2013	9:10	46	65	0.0000	38998	100.0000	99.9999	JS
(4)									
(5)									
(6)									
(7)									
(8)									
(9)									
(10)									

Final Weights Meet Acceptance Criteria: YES NO

I Certify That This Sheet Has Been Checked For Accuracy and Completeness: _____

GRAVIMETRIC LABORATORY DATA
FINAL BEAKER WEIGHTS

JOB NAME: Pinellas County RRF

CONTRACT NO: V13030

		BEAKER WT. (g)			
RUN ID	U20-M201A/202-R2	(1)	65.8517	(6)	
SAMPLE / LAB ID #	4028 / L13-0053	(2)	65.8518	(7)	
BEAKER #	13-067	(3)		(8)	
FILTER #	12-47	(4)		(9)	
PW VOL. (mL)	--	(5)		(10)	
CONSTANT WT. (g)		65.8518			
BEAKER TARE (g)		65.4955			
NET BEAKER GAIN (g)		0.3563			
FILTER TARE (g)		0.3559			
NET FILTER GAIN (g)		0.0004			

		BEAKER WT. (g)			
RUN ID	U20-M201A/202-R2	(1)	69.0593	(6)	
SAMPLE / LAB ID #	4030 / L13-0054	(2)	69.0592	(7)	
BEAKER #	13-069	(3)		(8)	
FILTER #	--	(4)		(9)	
PW VOL. (mL)	260	(5)		(10)	
CONSTANT WT. (g)		69.0592			
BEAKER TARE (g)		69.0587			
NET BEAKER GAIN (g)		0.0005			
FILTER TARE (g)					
NET FILTER GAIN (g)					

		BEAKER WT. (g)			
RUN ID	U20-M201A/202-R3	(1)	67.0706	(6)	
SAMPLE / LAB ID #	4035 / L13-0055	(2)	67.0709	(7)	
BEAKER #	13-070	(3)		(8)	
FILTER #	12-49	(4)		(9)	
PW VOL. (mL)	--	(5)		(10)	
CONSTANT WT. (g)		67.0709			
BEAKER TARE (g)		66.7118			
NET BEAKER GAIN (g)		0.3591			
FILTER TARE (g)		0.3586			
NET FILTER GAIN (g)		0.0005			

		BEAKER WT. (g)			
RUN ID	U20-M201A/202-R3	(1)	63.9056	(6)	
SAMPLE / LAB ID #	4037 / L13-0056	(2)	63.9051	(7)	
BEAKER #	13-072	(3)		(8)	
FILTER #	--	(4)		(9)	
PW VOL. (mL)	120	(5)		(10)	
CONSTANT WT. (g)		63.9051			
BEAKER TARE (g)		63.9044			
NET BEAKER GAIN (g)		0.0007			
FILTER TARE (g)					
NET FILTER GAIN (g)					

		BEAKER WT. (g)			
RUN ID	U30-M201A/202-R1	(1)	70.2146	(6)	
SAMPLE / LAB ID #	4042 / L13-0057	(2)	70.2145	(7)	
BEAKER #	13-074	(3)		(8)	
FILTER #	12-35	(4)		(9)	
PW VOL. (mL)	--	(5)		(10)	
CONSTANT WT. (g)		70.2145			
BEAKER TARE (g)		69.8543			
NET BEAKER GAIN (g)		0.3602			
FILTER TARE (g)		0.3598			
NET FILTER GAIN (g)		0.0004			

		BEAKER WT. (g)			
RUN ID	U30-M201A/202-R1	(1)	65.3928	(6)	
SAMPLE / LAB ID #	4044 / L13-0058	(2)	65.3932	(7)	
BEAKER #	13-076	(3)		(8)	
FILTER #	--	(4)		(9)	
PW VOL. (mL)	150	(5)		(10)	
CONSTANT WT. (g)		65.3932			
BEAKER TARE (g)		65.3892			
NET BEAKER GAIN (g)		0.0040			
FILTER TARE (g)					
NET FILTER GAIN (g)					

		BEAKER WT. (g)			
RUN ID	U30-M201A/202-R2	(1)	67.1324	(6)	
SAMPLE / LAB ID #	4049 / L13-0059	(2)	67.1324	(7)	
BEAKER #	13-077	(3)		(8)	
FILTER #	12-36	(4)		(9)	
PW VOL. (mL)	--	(5)		(10)	
CONSTANT WT. (g)		67.1324			
BEAKER TARE (g)		66.7734			
NET BEAKER GAIN (g)		0.3590			
FILTER TARE (g)		0.3581			
NET FILTER GAIN (g)		0.0009			

		BEAKER WT. (g)			
RUN ID	U30-M201A/202-R2	(1)	67.5393	(6)	
SAMPLE / LAB ID #	4051 / L13-0060	(2)	67.5397	(7)	
BEAKER #	13-079	(3)		(8)	
FILTER #	--	(4)		(9)	
PW VOL. (mL)	170	(5)		(10)	
CONSTANT WT. (g)		67.5397			
BEAKER TARE (g)		67.5381			
NET BEAKER GAIN (g)		0.0016			
FILTER TARE (g)					
NET FILTER GAIN (g)					

WEIGHING	DATE	TIME	REL. HUMIDITY (%)	TEMP (°F)	INITIAL ZERO CAL RESPONSE (g)	WEIGHT ID	INITIAL HIGH CAL RESPONSE (g)	SECONDARY HIGH CAL RESPONSE	TECHNICIAN
(1)	4/18/2013	10:33	44	76	0.0000	38998	100.0001	100.0000	JS
(2)	4/19/2013	8:59	44	72	0.0001	38998	99.9999	100.0000	JS
(3)									
(4)									
(5)									
(6)									
(7)									
(8)									
(9)									
(10)									

Final Weights Meet Acceptance Criteria: YES NO

I Certify That This Sheet Has Been Checked For Accuracy and Completeness: 

GRAVIMETRIC LABORATORY DATA
FINAL BEAKER WEIGHTS

JOB NAME: Pinellas County RRF

CONTRACT NO: V13030

		BEAKER WT. (g)			
RUN ID	U30-M201A/202-R3	(1)	67.8984	(6)	
SAMPLE / LAB ID #	4056 / L13-0061	(2)	67.8987	(7)	
BEAKER #	13-080	(3)		(8)	
FILTER #	12-37	(4)		(9)	
PW VOL. (mL)	--	(5)		(10)	
CONSTANT WT. (g)		67.8987			
BEAKER TARE (g)		67.5390			
NET BEAKER GAIN (g)		0.3597			
FILTER TARE (g)		0.3591			
NET FILTER GAIN (g)		0.0006			

		BEAKER WT. (g)			
RUN ID	U30-M201A/202-R3	(1)	66.6945	(6)	
SAMPLE / LAB ID #	4058 / L13-0062	(2)	66.6941	(7)	
BEAKER #	13-082	(3)		(8)	
FILTER #	--	(4)		(9)	
PW VOL. (mL)	165	(5)		(10)	
CONSTANT WT. (g)		66.6941			
BEAKER TARE (g)		66.6928			
NET BEAKER GAIN (g)		0.0013			
FILTER TARE (g)					
NET FILTER GAIN (g)					

		BEAKER WT. (g)			
RUN ID	Blank M201A/202	(1)	64.6506	(6)	
SAMPLE / LAB ID #	4063 / L13-0063	(2)	64.6508	(7)	
BEAKER #	13-083	(3)		(8)	
FILTER #	12-50	(4)		(9)	
PW VOL. (mL)	--	(5)		(10)	
CONSTANT WT. (g)		64.6508			
BEAKER TARE (g)		64.3030			
NET BEAKER GAIN (g)		0.3478			
FILTER TARE (g)		0.3477			
NET FILTER GAIN (g)		0.0001			

		BEAKER WT. (g)			
RUN ID	Blank M201A/202	(1)	67.9247	(6)	
SAMPLE / LAB ID #	4065 / L13-0064	(2)	67.9245	(7)	
BEAKER #	13-085	(3)		(8)	
FILTER #	--	(4)		(9)	
PW VOL. (mL)	125	(5)		(10)	
CONSTANT WT. (g)		67.9245			
BEAKER TARE (g)		67.9233			
NET BEAKER GAIN (g)		0.0012			
FILTER TARE (g)					
NET FILTER GAIN (g)					

		BEAKER WT. (g)			
RUN ID	U1O-M201A/202-R1 Duplicate	(1)	64.7678	(6)	
SAMPLE / LAB ID #	4000 / L13-0045	(2)	64.7673	(7)	
BEAKER #	13-055	(3)		(8)	
FILTER #	12-38	(4)		(9)	
PW VOL. (mL)	--	(5)		(10)	
CONSTANT WT. (g)		64.7673			
BEAKER TARE (g)		64.4195			
NET BEAKER GAIN (g)		0.3478			
FILTER TARE (g)		0.3468			
NET FILTER GAIN (g)		0.0010			

		BEAKER WT. (g)			
RUN ID	2nd Control	(1)	200.0001	(6)	
SAMPLE / LAB ID #	0336 / L13-0065	(2)	200.0000	(7)	
BEAKER #	--	(3)		(8)	
FILTER #	--	(4)		(9)	
PW VOL. (mL)	--	(5)		(10)	
CONSTANT WT. (g)		200.0000			
BEAKER TARE (g)					
NET BEAKER GAIN (g)		200.0000			
FILTER TARE (g)					
NET FILTER GAIN (g)					

		BEAKER WT. (g)			
RUN ID		(1)		(6)	
SAMPLE / LAB ID #		(2)		(7)	
BEAKER #		(3)		(8)	
FILTER #		(4)		(9)	
PW VOL. (mL)		(5)		(10)	
CONSTANT WT. (g)					
BEAKER TARE (g)					
NET BEAKER GAIN (g)		0.0000			
FILTER TARE (g)					
NET FILTER GAIN (g)		0.0000			

		BEAKER WT. (g)			
RUN ID		(1)		(6)	
SAMPLE / LAB ID #		(2)		(7)	
BEAKER #		(3)		(8)	
FILTER #		(4)		(9)	
PW VOL. (mL)		(5)		(10)	
CONSTANT WT. (g)					
BEAKER TARE (g)					
NET BEAKER GAIN (g)		0.0000			
FILTER TARE (g)					
NET FILTER GAIN (g)					

WEIGHING	DATE	TIME	REL. HUMIDITY (%)	TEMP (°F)	INITIAL ZERO CAL RESPONSE (g)	WEIGHT ID	INITIAL HIGH CAL RESPONSE (g)	SECONDARY HIGH CAL RESPONSE	TECHNICIAN
(1)	4/18/2013	10:33	44	76	0.0000	38998	100.0001	100.0000	JS
(2)	4/19/2013	8:59	44	72	0.0001	38998	99.9999	100.0000	JS
(3)									
(4)									
(5)									
(6)									
(7)									
(8)									
(9)									
(10)									

Final Weights Meet Acceptance Criteria: YES NO

I Certify That This Sheet Has Been Checked For Accuracy and Completeness: _____

Appendix L.4

EPA Method 202 Laboratory Analytical Data

The Air Compliance Group, LLC

5075 Hollins Rd.
Roanoke, VA 24019

Project ID: V13030

Condensables

EPA Method 202

Analytical Report
20344

Element One, Inc.
6319-D Carolina Beach Rd., Wilmington, NC 28412
910-793-0128 FAX: 910-792-6853 e1lab@e1lab.com

The following data for Analytical Report 20344
has been reviewed for completeness, accuracy,
adherence to method protocol,
and compliance with quality assurance guidelines.

Review by:

Katie Strickland, Chemist
May 1, 2013

Report Reviewed and Finalized By:

Ken Smith, Laboratory Director
May 1, 2013

SUMMARY OF RESULTS

Summary of Analysis

Summary of Method 202 Particulate Analysis

Fraction	U1-O-R1 e20344-39 Catch, mg	U1-O-R2 e20344-40 Catch, mg	U1-O-R3 e20344-41 Catch, mg
Inorganic CPM	3.6	4.8	7.9
Organic CPM	7.6	5.7	8.0
Total CPM	11.2	10.5	15.9

Fraction	U2-O-R1 e20344-42 Catch, mg	U2-O-R2 e20344-43 Catch, mg	U2-O-R3 e20344-44 Catch, mg
Inorganic CPM	32.4*	3.6	4.3
Organic CPM	8.8	6.4	8.7
Total CPM	41.2	10.0	13.0

Fraction	U3-O-R1 e20344-45 Catch, mg	U3-O-R2 e20344-46 Catch, mg	U3-O-R3 e20344-47 Catch, mg
Inorganic CPM	5.0	6.9	4.8
Organic CPM	5.3	6.6	6.8
Total CPM	10.3	13.5	11.6

Fraction	Blank e20344-48 Catch, mg
Inorganic CPM	2.8
Organic CPM	0.4
Total CPM	3.2

*See Analytical Narrative p.6.

ANALYTICAL NARRATIVE

Element One Analytical Narrative

Client:	The Air Compliance Group, LLC	Element One #:	20344
Client ID:	V13030 Pinellas County RRF	Analyst:	LAL
Method:	M 202	Dates Received:	04.17.13
Analytes:	Condensables	Dates Analyzed:	04.23-05.01.13

Summary of Analysis

The Method 202 samples were prepared and extracted according to method protocol. All samples were measured to a constant weight of ±0.5mg, and reported to the nearest 0.1mg.
Per EPA Dry Impinger Method 202 section 11.2.2.1 the NH_4OH titration is not necessary to subtract the NH_4^+ retained in the sample when the residue can be weighed to a constant weight.

Analysis QA/QC

All laboratory QA/QC guidelines were followed in the analysis of the samples.

Additional Comments

The Method 202 NH_4OH titration has not been implemented.
The reported results have not been blank corrected for any blank values.
There were visible particles in the Blank samples.

*Ref. page4; sample U2-O-R1inorganic fraction contains visibly more white, flakey residue than other inorganic samples.

SAMPLE CUSTODY

20344

CHAIN OF CUSTODY

CONTRACT ID: Pinellas County RRF

CONTRACT NUMBER: V13030

SAMPLE ID	CONTAINER NUMBER	TEST LOCATION	RUN ID	SAMPLE TYPE	VOLUME	INITIALS	DATE	ANALYSIS WANTED: CPM by M202	COMMENTS
4003		Unit 1 Exhaust	U1O - M201A/202 - R1	Aq. Imp		KMH	4/10/2013	X	
4004				Org Rinse				X	Measure Volumes
4005				CPM Filter				X	
4010		Unit 1 Exhaust	U1O - M201A/202 - R2	Aq. Imp		KMH	4/10/2013	X	
4011				Org Rinse				X	Measure Volumes
4012				CPM Filter				X	
4017		Unit 1 Exhaust	U1O - M201A/202 - R3	Aq. Imp		KMH	4/10/2013	X	
4018				Org Rinse				X	Measure Volumes
4019				CPM Filter				X	

COLLECTED BY:	DATE	RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
[signature]	4/10/13	[signature]	4/17/13		
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE	RELINQUISHED BY:	DATE
[signature]	4/17-13	[signature]	4-17-13		
RECEIVED BY:	DATE	RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
				[signature]	4/17/13 1520

Air Compliance Group, LLC
5075 HOLLINS ROAD
ROANOKE, VA 24012

Samples received in good condition. No empty container.

20344

CHAIN OF CUSTODY

CONTRACT ID: Pinellas County RRF

CONTRACT NUMBER: V13030

SAMPLE ID	CONTAINER NUMBER	TEST LOCATION	RUN ID	SAMPLE TYPE	VOLUME	INITIALS	DATE	ANALYSIS WANTED: CPM by M202	COMMENTS
4024				Aq. Imp				X	
4025				Org Rinse				X	Measure Volumes
4026		Unit 2 Exhaust	U2O - M201A/202 - R1	CPM Filter		KMH	4/11/2013	X	
4031				Aq. Imp				X	
4032				Org Rinse				X	Measure Volumes
4033		Unit 2 Exhaust	U2O - M201A/202 - R2	CPM Filter		KMH	4/11/2013	X	
4038				Aq. Imp				X	
4039				Org Rinse				X	Measure Volumes
4040		Unit 2 Exhaust	U2O - M201A/202 - R3	CPM Filter		KMH	4/11/2013	X	

COLLECTED BY:	DATE	RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
[signature]	4/11/13	[signature]	4/17/13		
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE	RELINQUISHED BY:	DATE
[signature]	4-17-13	[signature]	4-17-13		
RECEIVED BY:	DATE	RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
				[signature]	4/17/13 1520

Air Compliance Group, LLC
5075 HOLLINS ROAD
ROANOKE, VA 24012

20344

CHAIN OF CUSTODY

CONTRACT ID: Pinellas County RRF

CONTRACT NUMBER: V13030

SAMPLE ID	CONTAINER NUMBER	TEST LOCATION	RUN ID	SAMPLE TYPE	VOLUME	INITIALS	DATE	ANALYSIS WANTED: CPM by M202	COMMENTS
4045				Aq. Imp				X	
4046				Org Rinse				X	Measure Volumes
4047		Unit3 Exhaust	U3O - M201A/202 - R1	CPM Filter		KMH	4/9/2013	X	
4052				Aq. Imp				X	
5053				Org Rinse				X	Measure Volumes
5054		Unit3 Exhaust	U3O - M201A/202 - R2	CPM Filter		KMH	4/9/2013	X	
4059				Aq. Imp				X	
4060				Org Rinse				X	Measure Volumes
4061		Unit3 Exhaust	U3O - M201A/202 - R3	CPM Filter		KMH	4/9/2013	X	
4066				Aq. Imp				X	
4067				Org Rinse				X	Measure Volumes
4068		M202-Blank	M202-Blank	CPM Filter		KMH	4/12/2013	X	

COLLECTED BY:	DATE	RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
[signature]	4/9/13	[signature]	4/17/13		
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE	RELINQUISHED BY:	DATE
[signature]	4-17-13	[signature]	4-17-13		
RECEIVED BY:	DATE	RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
				Lisa Breton	4/17/13 1520

Air Compliance Group, LLC
5075 HOLLINS ROAD
ROANOKE, VA 24012

20344
~~20334~~ KRB
4.17.13

THE AIR COMPLIANCE GROUP, LLC

April 16, 2013

ElementOne Inc.
6319-D Carolina Beach Rd.
Wilmington, NC 28412
(910) 793-0128

Subject: **Method 202 Analyses**
ACG P.O. #: **V13030-02**
ACG Contract: **Pinellas County RRF**

Dear Sample Custodian:

Included with this letter are nine (10) sets of EPA Method 202 samples (9 runs and 1 blank). These samples are to be analyzed in accordance with EPA Method 202 for condensable particulate matter. I need a standard lab turnaround for all samples.

Chain-of-Custody sheets accompany the samples and should be checked to ensure that any holding time requirements are met.

Please include a narrative stating any problems, or lack thereof, with the sample processing or analyses.

The analyses are covered under purchase order # V13030-02. If you have any questions, please contact me at ACG (540-265-1987 ext. 219) or on my cell (540-556-6212).

Regards,

The Air Compliance Group, LLC

Kenley Houtz, QSTI
Project Manager

The Air Compliance Group, LLC
5075 Hollins Road
Roanoke, VA 24019

Phone: (540) 265-1987
Fax: (540) 265-0082

ANALYTICAL DATA

elementOne **AIR TESTING SAMPLE SUBMISSION FORM** **Lab ID 20344**

Analysis Due Date 04.25.13
QA/QC/Report Due Date 04.29.13

Client	The Air Compliance Group, LLC
Project No	V13030

Date Rec	04.17.13
Time Rec	1520

Acetone Lot	Volume Marked Y / N	**Ref. Method:**
Hexane Lot 120502	Volume Loss Y / N ?	**202**
0.1N NH_4OH Lot	Temp < 30ºC Yes / No	

Run Fractions Received: C1, C2, C3—LLB 04.17.13

Sample Identification

39	U1-O-M202-R1	42	U2-O-M202-R1	45	U3-O-M202-R1
40	U1-O-M202-R2	43	U2-O-M202-R2	46	U3-O-M202-R2
41	U1-O-M202-R3	44	U2-O-M202-R3	47	U3-O-M202-R3
				48	Blank

Analyses Requested Samples 39-48 Condensables

NOTE: After PM Analysis complete, reconstitute H2O Rinse with 100 mLs UPDI and archive.

Runs / FB

Lab ID.	Imp.+ H_2O Rinse CPM Container 1 LAC 4.24.13			Hexane Rinse Container 2	CPM Filter Container 3	Cold Water Impinger Container 4	Comments
	BV, ml	Constant Wt		BV, ml		BV, ml	
39	232 260	Yes	No	232			
40	270	Yes	No	270			
41	250	Yes	No	202			
42	250	Yes	No	256			
43	240	Yes	No	206			
44	250	Yes	No	214			
45	240	Yes	No	306			
46	250	Yes	No	216			
47	230	Yes	No	198			
48	180	Yes	No				

Lab Communications

Filters 20344-47, 46, 45, 41, 39 all had a pink residue on them when received (LAC 4.24.13)

Bag # X72 (20344-42 Imp) Has much more visible residue (white/flaky) than any other bag

Bag # 674 (20344-48 Blank Imp) Has white, flaky debris in bag pix taken

SS Page 3 of 3
SS by KCS
4/22/2013 10:25:33 AM

M202 Prep By/Date
M202 Prep By/Date LAC 4.23.13
Labeled By/Date LAC 4.22.13
ID Verification By/Date KCS 4.22.13

elementOne

Method 202 Particulate

Lab # **e 20344**

Client ACG

Balance checks Date: 04.29.13 2 g = 1.9999
Date: 04.30.13 2g= 2.0000
Date: 05.01.13 2g= 2.0001

Impinger Water

Sample ID #	Sample Water Volume, ml	Baggie ID	Baggie Tare, g	Date 04.29.13 Initials LAL		Date 04.30.13 Initials LAL		Date 05.01.13 Initials LAL			Catch Description and Loading
				Time	Baggie & Sample Wt., g	Time	Baggie & Sample Wt., g	Time	Baggie & Sample Wt., g		
20344-39	260	X53	10.2547	2:15	10.2583	11:15	10.2587				
20344-40	270	504	10.0933	2:15	10.0981	11:15	10.0983				
20344-41	250	X15	9.9744	2:15	9.9823	11:15	9.9825				
20344-42	250	X72	10.4413	2:15	10.4737	11:15	10.4738				
20344-43	240	522	10.0902	2:15	10.0942	11:15	10.0938				
20344-44	250	600	10.1110	2:15	10.1161	11:15	10.1153	11:00	10.1153		
Client Water Blk	180	674	10.2701	2:15	10.2730	11:15	10.2729				
Element 1 Water Blk	100	698	10.5792	2:15	10.5793	11:15	10.5792				

Hexane Extract

Sample ID #	Sample Hexane Volume, ml	Baggie ID	Baggie Tare, g	Date 04.29.13 Initials LAL		Date 04.30.13 Initials LAL		Date 05.01.13 Initials LAL		Total Extraction Hexane Volume, ml	Catch Description and Loading
				Time	Baggie & Sample Wt., g	Time	Baggie & Sample Wt., g	Time	Baggie & Sample Wt., g		
20344-39	232	547	9.8376	2:15	9.8452	11:15	9.8456				
20344-40	270	505	10.2465	2:15	10.2522	11:15	10.2526				
20344-41	202	632	10.0061	2:15	10.0145	11:15	10.0141				
20344-42	256	503	10.3511	2:15	10.3615	11:15	10.3603	11:00	10.3599		
20344-43	206	559	10.4038	2:15	10.4106	11:15	10.4102				
20344-44	214	688	10.3185	2:15	10.3282	11:15	10.3275	11:00	10.3272		
Client Hexane Blk	240	699	10.1492	2:15	10.1498	11:15	10.1496				
Element 1 Hexane Blk	90	X01	10.4607	2:15	10.4610	11:15	10.4609				

Total Catches

Sample ID #	NH4 added, mg	Baggie Tare, g	Baggie+ Water Catch, g	**Inorganic Catch, mg**	Hexane Bag ID	Baggie Tare, g	Baggie + Hexane Weight, g	**Organic Catch, mg**	**Total CPM Catch, mg**
20344-39	0.0	10.2547	10.2583	3.6	547	9.8376	9.8452	7.6	11.2
20344-40	0.0	10.0933	10.0981	4.8	505	10.2465	10.2522	5.7	10.5
20344-41	0.0	9.9744	9.9823	7.9	632	10.0061	10.0141	8.0	15.9
20344-42	0.0	10.4413	10.4737	32.4	503	10.3511	10.3599	8.8	41.2
20344-43	0.0	10.0902	10.0938	3.6	559	10.4038	10.4102	6.4	10.0
20344-44	0.0	10.1110	10.1153	4.3	688	10.3185	10.3272	8.7	13.0
Client Blank		10.2701	10.2729	2.8	699	10.1492	10.1496	0.4	3.2
Element 1 Blank		10.5792	10.5792	< 0.1	X01	10.4607	10.4609	0.2	0.2

Element One, Inc. Form 137 - Revision 2.0

elementOne

Method 202 Particulate

Lab # **e 20344**

Client ACG

Balance checks Date: 04.29.13 2 g = 1.9999
Date: 04.30.13 2g= 2.0000
Date: 05.01.13 2g = 2.0001

Impinger Water

Sample ID #	Sample Water Volume, ml	Baggie ID	Baggie Tare, g	Date 04.29.13 Initials LAL		Date 04.30.13 Initials LAL		Date Initials			Catch Description and Loading
				Time	Baggie & Sample Wt., g	Time	Baggie & Sample Wt., g	Time	Baggie & Sample Wt., g		
20344-45	240	581	10.2620	2:15	10.2673	11:15	10.2670				
20344-46	250	X87	10.7165	2:15	10.7234	11:15	10.7234				
20344-47	230	572	10.2445	2:15	10.2496	11:15	10.2493				
Client Water Blk 48	180	674	10.2701	2:15	10.2730	11:15	10.2729				
Element 1 Water Blk	100	698	10.5792	2:15	10.5793	11:15	10.5792				

Hexane Extract

Sample ID #	Sample Hexane Volume, ml	Baggie ID	Baggie Tare, g	Date 04.29.13 Initials LAL		Date 04.30.13 Initials LAL		Date 05.01.13 Initials LAL		Total Extraction Hexane Volume, ml	Catch Description and Loading
				Time	Baggie & Sample Wt., g	Time	Baggie & Sample Wt., g	Time	Baggie & Sample Wt., g		
20344-45	306	X24	10.2664	2:15	10.2717	11:15	10.2719				
20344-46	216	645	10.0129	2:15	10.0208	11:15	10.0200	11:00	10.0195		
20344-47	198	561	10.0042	2:15	10.0115	11:15	10.0110				
Client Hexane Blk-48	240	699	10.1492	2:15	10.1498	11:15	10.1496				
Element 1 Hexane Blk	90	X01	10.4607	2:15	10.4610	11:15	10.4609				

Total Catches

Sample ID #	NH4 added, mg	Baggie Tare, g	Baggie+ Water Catch, g	**Inorganic Catch, mg**	Hexane Bag ID	Baggie Tare, g	Baggie + Hexane Weight, g	**Organic Catch, mg**	**Total CPM Catch, mg**
20344-45	0.0	10.2620	10.2670	5.0	X24	10.2664	10.2717	5.3	10.3
20344-46	0.0	10.7165	10.7234	6.9	645	10.0129	10.0195	6.6	13.5
20344-47	0.0	10.2445	10.2493	4.8	561	10.0042	10.0110	6.8	11.6
Client Blank		10.2701	10.2729	2.8	699	10.1492	10.1496	0.4	3.2
Element 1 Blank		10.5792	10.5792	< 0.1	X01	10.4607	10.4609	0.2	0.2

Element One, Inc. Form 137 - Revision 2.0

Appendix L.5

EPA Method 26A Laboratory Analytical Data

(See Attached CD for Full Lab Report)

The Air Compliance Group, LLC

5075 Hollins Road
Roanoke, VA 24019

Project No: V13030

Hydrogen Chloride

EPA Method 26A

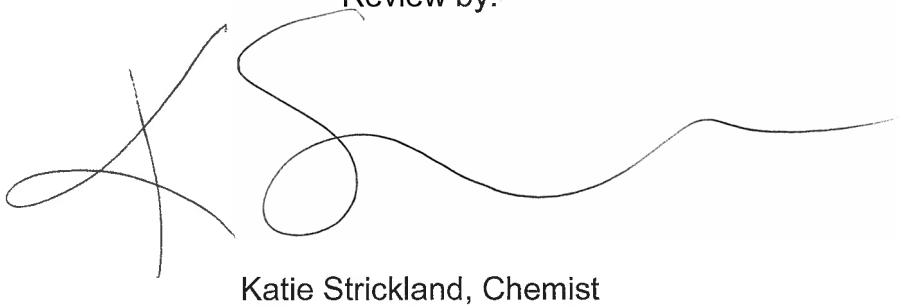
Analytical Report
20344

el1

Element One, Inc.
6319-D Carolina Beach Rd., Wilmington, NC 28412
910-793-0128 FAX: 910-792-6853 e1lab@e1lab.com

The following data for Analytical Report 20344
has been reviewed for completeness, accuracy,
adherence to method protocol,
and compliance with quality assurance guidelines.

Review by:



Katie Strickland, Chemist
May 1, 2013

Report Reviewed and Finalized By:

Ken Smith, Laboratory Director
May 1, 2013

SUMMARY OF RESULTS

Summary of Analysis

Summary of Method 26A Analysis

Element	U1-I-R1 e20344-20 Total mg	U1-I-R2 e20344-21 Total mg	U1-I-R3 e20344-22 Total mg
HCl	1577	1860	1581

Element	U1-O-R1 e20344-23 Total mg	U1-O-R2 e20344-24 Total mg	U1-O-R3 e20344-25 Total mg
HCl	20.3	27.5	33.8

Element	U2-I-R1 e20344-26 Total mg	U2-I-R2 e20344-27 Total mg	U2-I-R3 e20344-28 Total mg
HCl	1430	1272	1385

Element	U2-O-R1 e20344-29 Total mg	U2-O-R2 e20344-30 Total mg	U2-O-R3 e20344-31 Total mg
HCl	24.1	19.9	22.8

Element	U3-I-R1 e20344-32 Total mg	U3-I-R2 e20344-33 Total mg	U3-I-R3 e20344-34 Total mg
HCl	1613	1603	1343

Element	U3-O-R1 e20344-35 Total mg	U3-O-R2 e20344-36 Total mg	U3-O-R3 e20344-37 Total mg
HCl	63.9	55.4	47.6

Element	Blank e20344-38 Total mg
HCl	< 0.115

ANALYTICAL NARRATIVE

Element One Analytical Narrative

Client:	The Air Compliance Group, LLC	Element One #:	20344
Client ID:	V13030 Pinellas County RRF	Analyst:	KLS
Method:	M26A	Dates Received:	04.17.13
Analytes:	HCl	Dates Analyzed:	04.29-30.13

Summary of Analysis

The samples were prepared and analyzed according to Method 26A protocol. The samples were analyzed for chloride on a Metrohm 761/788 ion chromatograph system.

Detection Limits

The Metrohm reporting limit was 0.1µg/mL for chloride.

Analysis QA/QC

Duplicate analyses relative percent difference (RPD) and spike recovery data are summarized in the Quality Control section. All QA/QC data was within the criteria of the method.

Additional Comments

The reported results have not been corrected for any blank values or spike recovery values.

QUALITY CONTROL SUMMARY

Summary of Quality Control Data

Summary of Method 26A Duplicate Analysis RPD

Element	U1-I-R1 RPD	U1-I-R2 RPD	U1-I-R3 RPD
HCl	0.6%	0.3%	0.5%

Element	U1-O-R1 RPD	U1-O-R2 RPD	U1-O-R3 RPD
HCl	0.3%	1.2%	1.6%

Element	U2-I-R1 RPD	U2-I-R2 RPD	U2-I-R3 RPD
HCl	1.2%	1.4%	1.1%

Element	U2-O-R1 RPD	U2-O-R2 RPD	U2-O-R3 RPD
HCl	3.2%	0.6%	1.7%

Element	U3-I-R1 RPD	U3-I-R2 RPD	U3-I-R3 RPD
HCl	0.8%	0.1%	0.3%

Element	U3-O-R1 RPD	U3-O-R2 RPD	U3-O-R3 RPD
HCl	2.4%	0.6%	0.7%

Element	Blank RPD
HCl	NA

Summary of Quality Control Data

Summary of Method 26A Spike Recoveries

Element	U1-I-R3 Recovery	U1-O-R3 Recovery
HCl	103%	104%

Element	U2-I-R3 Recovery	U2-O-R3 Recovery
HCl	105%	106%

Element	U3-I-R3 Recovery	U3-O-R3 Recovery
HCl	105%	107%

SAMPLE CUSTODY

20344

CHAIN OF CUSTODY

CONTRACT ID Pinellas County RRF

CONTRACT NUMBER V13030

SAMPLE ID	CONTAINER NUMBER	TEST LOCATION	RUN ID	SAMPLE TYPE	VOLUME	INITIALS	DATE	ANALYSIS WANTED H	ANALYSIS WANTED C	ANALYSIS WANTED I	COMMENTS
8000		UNIT 1 INLET	U1 IN-M26A-R1	Train Contents		KMH	4/9/2013	X			
8001		UNIT 1 INLET	U1 IN-M26A-R2	Train Contents		KMH	4/9/2013	X			
8002		UNIT 1 INLET	U1 IN-M26A-R3	Train Contents		KMH	4/9/2013	X			
8003		UNIT 2 INLET	U2 IN-M26A-R1	Train Contents		KMH	4/10/2013	X			
8004		UNIT 2 INLET	U2 IN-M26A-R2	Train Contents		KMH	4/10/2013	X			
8005		UNIT 2 INLET	U2 IN-M26A-R3	Train Contents		KMH	4/10/2013	X			
8006		UNIT 3 INLET	U3 IN-M26A-R1	Train Contents		KMH	4/11/2013	X			
8007		UNIT 3 INLET	U3 IN-M26A-R2	Train Contents		KMH	4/11/2013	X			
8008		UNIT 3 INLET	U3 IN-M26A-R3	Train Contents		KMH	4/11/2013	X			

COLLECTED BY:	DATE	RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
[signature]	4/9/13	[signature]	4/17/13		
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE	RELINQUISHED BY:	DATE
[signature]	4-17-13	[signature] 4-17-13			
RECEIVED BY:	DATE	RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
				[signature]	4/17/13 1520

Air Compliance Group, LLC
5075 HOLLINS ROAD
ROANOKE, VA 24012

Samples received in good condition. No empty container.

20344

CHAIN OF CUSTODY

CONTRACT ID Pinellas County RRF

CONTRACT NUMBER V13030

SAMPLE ID	CONTAINER NUMBER	TEST LOCATION	RUN ID	SAMPLE TYPE	VOLUME	INITIALS	DATE	ANALYSIS WANTED H C l	COMMENTS
802		UNIT 1 OUTLET	U1O-M26A-R1	Train Contents		KMH	4/9/2013	X	
806		UNIT 1 OUTLET	U1O-M26A-R2	Train Contents		KMH	4/9/2013	X	
810		UNIT 1 OUTLET	U1O-M26A-R3	Train Contents		KMH	4/9/2013	X	
814		UNIT 2 OUTLET	U2O-M26A-R1	Train Contents		KMH	4/10/2013	X	
818		UNIT 2 OUTLET	U2O-M26A-R2	Train Contents		KMH	4/10/2013	X	
822		UNIT 2 OUTLET	U2O-M26A-R3	Train Contents		KMH	4/10/2013	X	
826		UNIT 3 OUTLET	U3O-M26A-R1	Train Contents		KMH	4/11/2013	X	
830		UNIT 3 OUTLET	U3O-M26A-R2	Train Contents		KMH	4/11/2013	X	
834		UNIT 3 OUTLET	U3O-M26A-R3	Train Contents		KMH	4/11/2013	X	
838		BLANK	BLANK	Train Contents		KMH	4/12/2013	X	

COLLECTED BY:	DATE	RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
	4/9/13		4/17/13		
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE	RELINQUISHED BY:	DATE
	4-17-13				
RECEIVED BY:	DATE	RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
					4/17/13 1520

Air Compliance Group, LLC
5075 HOLLINS ROAD
ROANOKE, VA 24012

20374
~~20334~~ AKB 4.17

THE AIR COMPLIANCE GROUP, LLC

April 16, 2013

ElementOne Inc.
6319-D Carolina Beach Rd.
Wilmington, NC 28412
(910) 793-0128

Subject: **HCl Analyses for Pinellas County RRF**
ACG Inc. P.O. # **V13030-02**

ATTN Sample Custodian:

Accompanying this letter are samples from nine (9) inlet and nine (9) outlet EPA Method 26A sampling runs plus a reagent blank. The samples are to be analyzed in accordance with EPA Method 26A procedures for HCl. I need standard lab turnaround on these analyses. Sampling was performed April 9-11, 2013. No sodium thiosulfate has been added to the samples.

An on-site HCl titration was done for preliminary HCl analysis. For the titration, a 40mL aliquot was taken. Please adjust the final volumes to correct for this.

Please note the following:

- Chain-of-Custody sheets accompany the samples and should be checked to ensure that any holding time requirements are met.
- Include a narrative stating any problems, or lack thereof, with the sample processing or analyses.

The analyses are covered under ACG purchase order #V13030-02. If you have any questions, please contact me at ACG (540-265-1987 ext. 219) or on my cell (540-556-6212).

Sincerely,

ACG, LLC.

Kenley Houtz, QSTI
Project Manager

Enclosure

The Air Compliance Group, LLC
5075 Hollins Road
Roanoke, VA 24019

Phone: (540) 265-1987
Fax: (540) 265-0082

Appendix L.6

EPA Method 29 Laboratory Analytical Data

(See Attached CD for Full Lab Report)

The Air Compliance Group, LLC

5075 Hollins Road
Roanoke, VA 24019

Project Number: V13030

Cadmium, Lead and Mercury

EPA Method 29 Analysis

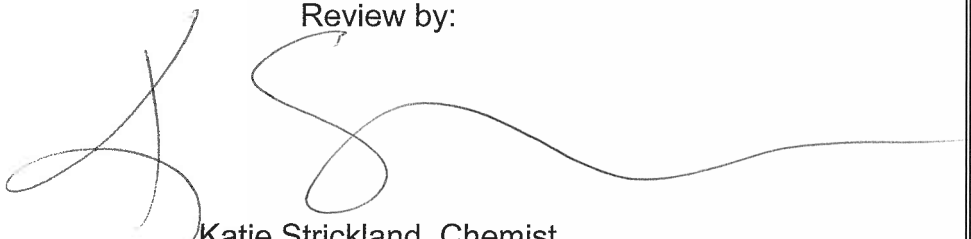
Analytical Report
20344

el1

Element One, Inc.
6319-D Carolina Beach Rd., Wilmington, NC 28412
910-793-0128 FAX: 910-792-6853 e1lab@e1lab.com

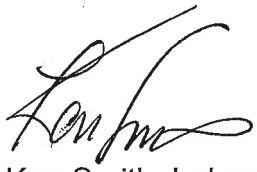
The following data for Analytical Report 20344
has been reviewed for completeness, accuracy,
adherence to method protocol,
and compliance with quality assurance guidelines.

Review by:



Katie Strickland, Chemist
May 1, 2013

Report Reviewed and Finalized By:



Ken Smith, Laboratory Director
May 1, 2013

SUMMARY OF RESULTS

Summary of Analysis

Unit 1 - Summary of Method 29 Mercury Analysis

Run Number		Average Total Catch, µg	Front Half µg	H_2O_2 /HNO_3 µg	Empty Impinger µg	$KMnO_4$ µg	HCl µg
U1-I-R1	#1	99.4	25.2	70.0	0.720	1.58	2.37
	#2		25.0	69.2	0.731	1.60	2.36
U1-I-R2	#1	92.9	24.2	63.9	0.965	0.770	3.54
	#2		23.8	63.3	0.981	0.768	3.52
U1-I-R3	#1	84.4	21.1	62.4	0.306	< 0.5	0.669
	#2		21.0	62.3	0.311	< 0.5	0.671
U1-O-R1	#1	6.13	0.100	6.07	< 0.2	< 0.5	< 0.4
	#2		0.104	5.99	< 0.2	< 0.5	< 0.4
U1-O-R2	#1	7.10	0.152	6.96	< 0.2	< 0.5	< 0.4
	#2		0.144	6.94	< 0.2	< 0.5	< 0.4
U1-O-R3	#1	7.72	0.421	7.31	< 0.2	< 0.5	< 0.4
	#2		0.415	7.29	< 0.2	< 0.5	< 0.4

Unit 1 - Summary of Method 29 Metals Analysis

	U1-O-R1 e20344-4	U1-O-R2 e20344-5	U1-O-R2 e20344-5 dup	U1-O-R3 e20344-6
Element	Total µg	Total µg	Total µg	Total µg
Cadmium	4.51	2.77	2.85	5.55
Lead	26.0	22.3	22.6	37.9

Summary of Analysis

Unit 2 - Summary of Method 29 Mercury Analysis

Run Number		Average Total Catch, µg	Front Half µg	H_2O_2 /HNO_3 µg	Empty Impinger µg	$KMnO_4$ µg	HCl µg
U2-I-R1	#1	77.7	45.7	30.1	0.316	< 0.5	1.55
	#2		45.8	30.1	0.322	< 0.5	1.57
U2-I-R2	#1	128	36.4	88.4	0.529	< 0.5	3.60
	#2		36.4	87.1	0.521	< 0.5	3.59
U2-I-R3	#1	166	55.3	109	0.625	< 0.5	1.52
	#2		55.2	107	0.631	< 0.5	1.53
U2-O-R1	#1	2.11	0.165	1.94	< 0.2	< 0.5	< 0.4
	#2		0.164	1.95	< 0.2	< 0.5	< 0.4
U2-O-R2	#1	5.53	0.983	4.57	< 0.2	< 0.5	< 0.4
	#2		0.985	4.52	< 0.2	< 0.5	< 0.4
U2-O-R3	#1	3.36	< 0.1	2.11	< 0.2	< 0.5	1.26
	#2		< 0.1	2.10	< 0.2	< 0.5	1.26

Unit 2 - Summary of Method 29 Metals Analysis

Element	U2-O-R1 e20344-10 Total µg	U2-O-R2 e20344-11 Total µg	U2-O-R2 e20344-11 dup Total µg	U2-O-R3 e20344-12 Total µg
Cadmium	1.41	5.39	4.72	0.588
Lead	19.3	52.6	46.5	15.0

Summary of Analysis

Unit 3 - Summary of Method 29 Mercury Analysis

Run Number		Average Total Catch, µg	Front Half µg	H_2O_2 /HNO_3 µg	Empty Impinger µg	$KMnO_4$ µg	HCl µg
U3-I-R1	#1	241	54.7	186	0.512	< 0.5	< 0.4
	#2		54.6	185	0.512	< 0.5	< 0.4
U3-I-R2	#1	111	62.0	38.2	1.37	< 0.5	9.84
	#2		61.6	37.6	1.37	< 0.5	9.89
U3-I-R3	#1	65.3	8.26	55.1	0.376	< 0.5	1.88
	#2		8.03	54.7	0.377	< 0.5	1.89
U3-O-R1	#1	12.0	< 0.1	12.0	< 0.2	< 0.5	< 0.4
	#2		< 0.1	11.9	< 0.2	< 0.5	< 0.4
U3-O-R2	#1	13.3	< 0.1	12.8	< 0.2	< 0.5	0.498
	#2		< 0.1	12.8	< 0.2	< 0.5	0.516
U3-O-R3	#1	11.3	< 0.1	11.3	< 0.2	< 0.5	< 0.4
	#2		< 0.1	11.2	< 0.2	< 0.5	< 0.4
Blank	#1	< 0.5	< 0.1	< 0.3	< 0.2	< 0.5	< 0.4
	#2		< 0.1	< 0.3	< 0.2	< 0.5	< 0.4

Unit 3 - Summary of Method 29 Metals Analysis

Element	U3-O-R1 e20344-16 Total µg	U3-O-R2 e20344-17 Total µg	U3-O-R2 e20344-17 dup Total µg	U3-O-R3 e20344-18 Total µg	Blank e20344-19 Total µg
Cadmium	1.85	1.76	1.81	1.50	< 0.2
Lead	19.7	24.4	25.2	11.9	0.827

ANALYTICAL NARRATIVE

Element One Analytical Narrative

Client:	The Air Compliance Group, LLC	Element One #:	20344
Client ID:	V13030 Pinellas County RRF	Analyst:	LAL & DBW
Method:	Method 29	Dates Received:	04/17/13
Analytes:	Cd, Pb & Hg	Dates Analyzed:	04/23-30/13

Summary of Analysis

The Method 29 samples were digested, prepared, and analyzed according to Method 29 protocol. Samples were analyzed for mercury on a PerkinElmer FIMS-100 CVAA mercury analyzer. The samples were analyzed for metals on a PerkinElmer ELAN 6100 ICP-MS.

Detection Limits

The FIMS-100 CVAA instrument reporting limit for mercury was 0.004 µg per aliquot analyzed. The ICP-MS instrument reporting limit was 1.0µg/L for the other metals.

Analysis QA/QC

Duplicate analyses relative percent difference (RPD), spike sample recovery and second source calibration verification data are summarized in the Quality Control Section. All QA/QC data was within the criteria of the method.

Additional Comments

The reported results have not been corrected for any blank values or spike recovery values. The ICP analysis of the blank sample revealed detectable concentrations of lead.

QUALITY CONTROL SUMMARY

Summary of Quality Control Data

Mercury Duplicate Analysis RPD

(Method 29 QC limits: < 10% for RPD)

Run Number	Front Half	H_2O_2/HNO_3	Empty Imp	$KMnO_4$	HCl
U1-I-R1	0.7%	1.1%	1.4%	0.9%	0.4%
U1-I-R2	1.5%	1.1%	1.6%	0.3%	0.4%
U1-I-R3	0.5%	0.2%	1.4%	NA	0.4%
U1-O-R1	3.1%	1.3%	NA	NA	NA
U1-O-R2	5.5%	0.2%	NA	NA	NA
U1-O-R3	1.5%	0.3%	NA	NA	NA
U2-I-R1	0.1%	0.0%	1.9%	NA	1.2%
U2-I-R2	0.0%	1.4%	1.4%	NA	0.2%
U2-I-R3	0.1%	1.3%	1.0%	NA	0.6%
U2-O-R1	0.4%	0.3%	NA	NA	NA
U2-O-R2	0.3%	1.2%	NA	NA	NA
U2-O-R3	NA	0.3%	NA	NA	0.1%
U3-I-R1	0.3%	0.4%	0.1%	NA	NA
U3-I-R2	0.6%	1.6%	0.0%	NA	0.5%
U3-I-R3	2.8%	0.7%	0.4%	NA	0.7%
U3-O-R1	NA	0.5%	NA	NA	NA
U3-O-R2	NA	0.2%	NA	NA	3.4%
U3-O-R3	NA	1.3%	NA	NA	NA
Blank	NA	NA	NA	NA	NA

Summary of Quality Control Data

Mercury Spike Recoveries

(Method 29 QC limits: 75-125% for Spike Recoveries)

Run Number		Front Half	H_2O_2/HNO_3	Empty Imp	$KMnO_4$	HCl
U1-I-R3	#1	91%	85%	101%	95%	97%
	#2	90%	85%	101%	95%	97%
U1-O-R3	#1	90%	95%	101%	94%	101%
	#2	90%	94%	101%	94%	102%
U2-I-R3	#1	89%	85%	112%	92%	93%
	#2	88%	86%	112%	93%	93%
U2-O-R3	#1	91%	103%	96%	98%	93%
	#2	90%	103%	97%	99%	93%
U3-I-R3	#1	96%	105%	100%	93%	95%
	#2	96%	105%	101%	94%	93%
U3-O-R3	#1	99%	97%	104%	90%	103%
	#2	98%	96%	104%	90%	99%

Summary of Quality Control Data

Metals Duplicate Analysis RPD

(Method 29 QC limits: < 20% for RPD)

Element	U1-O-R2 RPD	U2-O-R2 RPD	U3-O-R2 RPD
Cadmium	2.9%	13.4%	3.0%
Lead	1.3%	12.3%	3.2%

Metals Analysis Spike Recoveries

(Method 29 QC limits: 75-125% for Spike Recoveries)

Element	U1-O-R3 Recovery	U2-O-R3 Recovery	U3-O-R3 Recovery
Cadmium	107%	103%	122%
Lead	112%	120%	106%

Second Source Calibration Check Recoveries

(QC limits: ±10% for Second Source Continuing Check Standard)*

Element	1 ppb	50 ppb	100 ppb*	250 ppb
Cadmium	100%	104%	103%	106%
Lead	94%	110%	105%	103%

SAMPLE CUSTODY

20344

CHAIN OF CUSTODY

CONTRACT ID: Pinellas County RRF

CONTRACT NUMBER: V13030

SAMPLE ID	CONTAINER NUMBER	TEST LOCATION	RUN ID	SAMPLE TYPE	VOLUME	INITIALS	DATE	ANALYSIS WANTED: H G	COMMENTS
100		UNIT 1 INLET	U1IN-M29-R1	Filter		KMH	4/9/2013	X	
101		UNIT 1 INLET	U1IN-M29-R1	FH Nitric		KMH	4/9/2013	X	
102		UNIT 1 INLET	U1IN-M29-R1	Impinger 1-3		KMH	4/9/2013	X	
103		UNIT 1 INLET	U1IN-M29-R1	Impinger 4		KMH	4/9/2013	X	
104		UNIT 1 INLET	U1IN-M29-R1	Impinger 5-6		KMH	4/9/2013	X	
105		UNIT 1 INLET	U1IN-M29-R1	HCl & H2O		KMH	4/9/2013	X	
107		UNIT 1 INLET	U1IN-M29-R2	Filter		KMH	4/9/2013	X	
108		UNIT 1 INLET	U1IN-M29-R2	FH Nitric		KMH	4/9/2013	X	
109		UNIT 1 INLET	U1IN-M29-R2	Impinger 1-3		KMH	4/9/2013	X	
110		UNIT 1 INLET	U1IN-M29-R2	Impinger 4		KMH	4/9/2013	X	
111		UNIT 1 INLET	U1IN-M29-R2	Impinger 5-6		KMH	4/9/2013	X	
112		UNIT 1 INLET	U1IN-M29-R2	HCl & H2O		KMH	4/9/2013	X	
114		UNIT 1 INLET	U1IN-M29-R3	Filter		KMH	4/9/2013	X	
115		UNIT 1 INLET	U1IN-M29-R3	FH Nitric		KMH	4/9/2013	X	
116		UNIT 1 INLET	U1IN-M29-R3	Impinger 1-3		KMH	4/9/2013	X	
117		UNIT 1 INLET	U1IN-M29-R3	Impinger 4		KMH	4/9/2013	X	
118		UNIT 1 INLET	U1IN-M29-R3	Impinger 5-6		KMH	4/9/2013	X	
119		UNIT 1 INLET	U1IN-M29-R3	HCl & H2O		KMH	4/9/2013	X	

COLLECTED BY:	DATE	RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
Kenley Hollow	4/9/13	Kenley Hollow	4/17/13		
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE	RELINQUISHED BY:	DATE
	4-17-13		4/17/13		
RECEIVED BY:	DATE	RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
				Ross Brinton	4/17/13 1520

Air Compliance Group, LLC
5075 HOLLINS ROAD
ROANOKE, VA 24012

Samples received in good condition. No empty container.
Per Kenley via phone, FH/BH Combined - LFB 4.18.13

20344

CHAIN OF CUSTODY

CONTRACT ID: Pinellas County RRF

CONTRACT NUMBER: V13030

SAMPLE ID	CONTAINER NUMBER	TEST LOCATION	RUN ID	SAMPLE TYPE	VOLUME	INITIALS	DATE	ANALYSIS WANTED: TARGET	HG				COMMENTS
300		UNIT 1 OUTLET	U1O-M29-R1	Filter		KMH	4/9/2013	X	X				
302		UNIT 1 OUTLET	U1O-M29-R1	FH Nitric		KMH	4/9/2013	X	X				Target metals are:
303		UNIT 1 OUTLET	U1O-M29-R1	Impinger 1-3		KMH	4/9/2013	X	X				Cadmium
304		UNIT 1 OUTLET	U1O-M29-R1	Impinger 4		KMH	4/9/2013		X				Lead
305		UNIT 1 OUTLET	U1O-M29-R1	Impinger 5-6		KMH	4/9/2013		X				
306		UNIT 1 OUTLET	U1O-M29-R1	HCl & H2O		KMH	4/9/2013		X				
308		UNIT 1 OUTLET	U1O-M29-R2	Filter		KMH	4/9/2013	X	X				
310		UNIT 1 OUTLET	U1O-M29-R2	FH Nitric		KMH	4/9/2013	X	X				
311		UNIT 1 OUTLET	U1O-M29-R2	Impinger 1-3		KMH	4/9/2013	X	X				
312		UNIT 1 OUTLET	U1O-M29-R2	Impinger 4		KMH	4/9/2013		X				
313		UNIT 1 OUTLET	U1O-M29-R2	Impinger 5-6		KMH	4/9/2013		X				
314		UNIT 1 OUTLET	U1O-M29-R2	HCl & H2O		KMH	4/9/2013		X				
316		UNIT 1 OUTLET	U1O-M29-R3	Filter		KMH	4/9/2013	X	X				
318		UNIT 1 OUTLET	U1O-M29-R3	FH Nitric		KMH	4/9/2013	X	X				
319		UNIT 1 OUTLET	U1O-M29-R3	Impinger 1-3		KMH	4/9/2013	X	X				
320		UNIT 1 OUTLET	U1O-M29-R3	Impinger 4		KMH	4/9/2013		X				
321		UNIT 1 OUTLET	U1O-M29-R3	Impinger 5-6		KMH	4/9/2013		X				
322		UNIT 1 OUTLET	U1O-M29-R3	HCl & H2O		KMH	4/9/2013		X				

COLLECTED BY:	DATE	RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
	4/9/13		4/17/13		
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE	RELINQUISHED BY:	DATE
	4/17/13		4/17/13		
RECEIVED BY:	DATE	RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
					4/17/13 1520

Air Compliance Group, LLC
5075 HOLLINS ROAD
ROANOKE, VA 24012

20344

CHAIN OF CUSTODY

CONTRACT ID: Pinellas County RRF

CONTRACT NUMBER: V13030

SAMPLE ID	CONTAINER NUMBER	TEST LOCATION	RUN ID	SAMPLE TYPE	VOLUME	INITIALS	DATE	ANALYSIS WANTED: H G	COMMENTS
121		UNIT 2 INLET	U2IN-M29-R1	Filter		KMH	4/10/2013	X	
122		UNIT 2 INLET	U2IN-M29-R1	FH Nitric		KMH	4/10/2013	X	
123		UNIT 2 INLET	U2IN-M29-R1	Impinger 1-3		KMH	4/10/2013	X	
124		UNIT 2 INLET	U2IN-M29-R1	Impinger 4		KMH	4/10/2013	X	
125		UNIT 2 INLET	U2IN-M29-R1	Impinger 5-6		KMH	4/10/2013	X	
126		UNIT 2 INLET	U2IN-M29-R1	HCl & H2O		KMH	4/10/2013	X	
128		UNIT 2 INLET	U2IN-M29-R2	Filter		KMH	4/10/2013	X	
129		UNIT 2 INLET	U2IN-M29-R2	FH Nitric		KMH	4/10/2013	X	
130		UNIT 2 INLET	U2IN-M29-R2	Impinger 1-3		KMH	4/10/2013	X	
131		UNIT 2 INLET	U2IN-M29-R2	Impinger 4		KMH	4/10/2013	X	
132		UNIT 2 INLET	U2IN-M29-R2	Impinger 5-6		KMH	4/10/2013	X	
133		UNIT 2 INLET	U2IN-M29-R2	HCl & H2O		KMH	4/10/2013	X	
135		UNIT 2 INLET	U2IN-M29-R3	Filter		KMH	4/10/2013	X	
136		UNIT 2 INLET	U2IN-M29-R3	FH Nitric		KMH	4/10/2013	X	
137		UNIT 2 INLET	U2IN-M29-R3	Impinger 1-3		KMH	4/10/2013	X	
138		UNIT 2 INLET	U2IN-M29-R3	Impinger 4		KMH	4/10/2013	X	
139		UNIT 2 INLET	U2IN-M29-R3	Impinger 5-6		KMH	4/10/2013	X	
140		UNIT 2 INLET	U2IN-M29-R3	HCl & H2O		KMH	4/10/2013	X	

COLLECTED BY:	DATE	RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
[signature]	4/10/13	[signature]	4/17/13		
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE	RELINQUISHED BY:	DATE
[signature]	4-17-13	[signature]	4/17/13		
RECEIVED BY:	DATE	RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
				[signature]	4/17/13 1520

Air Compliance Group, LLC
5075 HOLLINS ROAD
ROANOKE, VA 24012

20344

CHAIN OF CUSTODY

CONTRACT ID: Pinellas County RRF

CONTRACT NUMBER: V13030

SAMPLE ID	CONTAINER NUMBER	TEST LOCATION	RUN ID	SAMPLE TYPE	VOLUME	INITIALS	DATE	ANALYSIS WANTED: TARGET	HG				COMMENTS
324		UNIT 2 OUTLET	U2O-M29-R1	Filter		KMH	4/10/2013	X	X				
326		UNIT 2 OUTLET	U2O-M29-R1	FH Nitric		KMH	4/10/2013	X	X				Target metals are:
327		UNIT 2 OUTLET	U2O-M29-R1	Impinger 1-3		KMH	4/10/2013	X	X				Cadmium
328		UNIT 2 OUTLET	U2O-M29-R1	Impinger 4		KMH	4/10/2013		X				Lead
329		UNIT 2 OUTLET	U2O-M29-R1	Impinger 5-6		KMH	4/10/2013		X				
330		UNIT 2 OUTLET	U2O-M29-R1	HCl & H2O		KMH	4/10/2013		X				
332		UNIT 2 OUTLET	U2O-M29-R2	Filter		KMH	4/10/2013	X	X				
334		UNIT 2 OUTLET	U2O-M29-R2	FH Nitric		KMH	4/10/2013	X	X				
335		UNIT 2 OUTLET	U2O-M29-R2	Impinger 1-3		KMH	4/10/2013	X	X				
336		UNIT 2 OUTLET	U2O-M29-R2	Impinger 4		KMH	4/10/2013		X				
337		UNIT 2 OUTLET	U2O-M29-R2	Impinger 5-6		KMH	4/10/2013		X				
338		UNIT 2 OUTLET	U2O-M29-R2	HCl & H2O		KMH	4/10/2013		X				
340		UNIT 2 OUTLET	U2O-M29-R3	Filter		KMH	4/10/2013	X	X				
342		UNIT 2 OUTLET	U2O-M29-R3	FH Nitric		KMH	4/10/2013	X	X				
343		UNIT 2 OUTLET	U2O-M29-R3	Impinger 1-3		KMH	4/10/2013	X	X				
344		UNIT 2 OUTLET	U2O-M29-R3	Impinger 4		KMH	4/10/2013		X				
345		UNIT 2 OUTLET	U2O-M29-R3	Impinger 5-6		KMH	4/10/2013		X				
346		UNIT 2 OUTLET	U2O-M29-R3	HCl & H2O		KMH	4/10/2013		X				

COLLECTED BY:	DATE	RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
[signature]	4/10/13	[signature]	4/17/13		
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE	RELINQUISHED BY:	DATE
[signature]	4/17/13	[signature]	4/17/13		
RECEIVED BY:	DATE	RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
				[signature]	4/17/13 1520

Air Compliance Group, LLC
5075 HOLLINS ROAD
ROANOKE, VA 24012

20344

CHAIN OF CUSTODY

CONTRACT ID: Pinellas County RRF

CONTRACT NUMBER: V13030

SAMPLE ID	CONTAINER NUMBER	TEST LOCATION	RUN ID	SAMPLE TYPE	VOLUME	INITIALS	DATE	ANALYSIS WANTED: H G	COMMENTS
142		UNIT 3 INLET	U3IN-M29-R1	Filter		KMH	4/11/2013	X	
143		UNIT 3 INLET	U3IN-M29-R1	FH Nitric		KMH	4/11/2013	X	
144		UNIT 3 INLET	U3IN-M29-R1	Impinger 1-3		KMH	4/11/2013	X	
145		UNIT 3 INLET	U3IN-M29-R1	Impinger 4		KMH	4/11/2013	X	
146		UNIT 3 INLET	U3IN-M29-R1	Impinger 5-6		KMH	4/11/2013	X	
147		UNIT 3 INLET	U3IN-M29-R1	HCl & H2O		KMH	4/11/2013	X	
149		UNIT 3 INLET	U3IN-M29-R2	Filter		KMH	4/11/2013	X	
150		UNIT 3 INLET	U3IN-M29-R2	FH Nitric		KMH	4/11/2013	X	
151		UNIT 3 INLET	U3IN-M29-R2	Impinger 1-3		KMH	4/11/2013	X	
152		UNIT 3 INLET	U3IN-M29-R2	Impinger 4		KMH	4/11/2013	X	
153		UNIT 3 INLET	U3IN-M29-R2	Impinger 5-6		KMH	4/11/2013	X	
154		UNIT 3 INLET	U3IN-M29-R2	HCl & H2O		KMH	4/11/2013	X	
156		UNIT 3 INLET	U3IN-M29-R3	Filter		KMH	4/11/2013	X	
157		UNIT 3 INLET	U3IN-M29-R3	FH Nitric		KMH	4/11/2013	X	
158		UNIT 3 INLET	U3IN-M29-R3	Impinger 1-3		KMH	4/11/2013	X	
159		UNIT 3 INLET	U3IN-M29-R3	Impinger 4		KMH	4/11/2013	X	
160		UNIT 3 INLET	U3IN-M29-R3	Impinger 5-6		KMH	4/11/2013	X	
161		UNIT 3 INLET	U3IN-M29-R3	HCl & H2O		KMH	4/11/2013	X	

COLLECTED BY:	DATE	RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
	4/11/13		4/17/13		
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE	RELINQUISHED BY	DATE
	4/17/13		4/17/13		
RECEIVED BY:	DATE	RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
					4/17/13 1520

Air Compliance Group, LLC
5075 HOLLINS ROAD
ROANOKE, VA 24012

20344

CHAIN OF CUSTODY

CONTRACT ID: Pinellas County RRF

CONTRACT NUMBER: V13030

SAMPLE ID	CONTAINER NUMBER	TEST LOCATION	RUN ID	SAMPLE TYPE	VOLUME	INITIALS	DATE	ANALYSIS WANTED: TARGET	HG				COMMENTS
348		UNIT 3 OUTLET	U3O-M29-R1	Filter		KMH	4/11/2013	X	X				
350		UNIT 3 OUTLET	U3O-M29-R1	FH Nitric		KMH	4/11/2013	X	X				Target metals are:
351		UNIT 3 OUTLET	U3O-M29-R1	Impinger 1-3		KMH	4/11/2013	X	X				Cadmium
352		UNIT 3 OUTLET	U3O-M29-R1	Impinger 4		KMH	4/11/2013		X				Lead
353		UNIT 3 OUTLET	U3O-M29-R1	Impinger 5-6		KMH	4/11/2013		X				
354		UNIT 3 OUTLET	U3O-M29-R1	HCl & H2O		KMH	4/11/2013		X				
356		UNIT 3 OUTLET	U3O-M29-R2	Filter		KMH	4/11/2013	X	X				
358		UNIT 3 OUTLET	U3O-M29-R2	FH Nitric		KMH	4/11/2013	X	X				
359		UNIT 3 OUTLET	U3O-M29-R2	Impinger 1-3		KMH	4/11/2013	X	X				
360		UNIT 3 OUTLET	U3O-M29-R2	Impinger 4		KMH	4/11/2013		X				
361		UNIT 3 OUTLET	U3O-M29-R2	Impinger 5-6		KMH	4/11/2013		X				
362		UNIT 3 OUTLET	U3O-M29-R2	HCl & H2O		KMH	4/11/2013		X				
364		UNIT 3 OUTLET	U3O-M29-R3	Filter		KMH	4/11/2013	X	X				
366		UNIT 3 OUTLET	U3O-M29-R3	FH Nitric		KMH	4/11/2013	X	X				
367		UNIT 3 OUTLET	U3O-M29-R3	Impinger 1-3		KMH	4/11/2013	X	X				
368		UNIT 3 OUTLET	U3O-M29-R3	Impinger 4		KMH	4/11/2013		X				
369		UNIT 3 OUTLET	U3O-M29-R3	Impinger 5-6		KMH	4/11/2013		X				
370		UNIT 3 OUTLET	U3O-M29-R3	HCl & H2O		KMH	4/11/2013		X				

COLLECTED BY:	DATE	RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
[signature]	4/11/13	[signature]	4/17/13		
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE	RELINQUISHED BY:	DATE
[signature]	4/17/13	[signature]	4-17-13		
RECEIVED BY:	DATE	RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
				[signature]	4/17/13 1520

Air Compliance Group, LLC
5075 HOLLINS ROAD
ROANOKE, VA 24012

20344

CHAIN OF CUSTODY

CONTRACT ID: Pinellas County RRF

CONTRACT NUMBER: V13030

SAMPLE ID	CONTAINER NUMBER	TEST LOCATION	RUN ID	SAMPLE TYPE	VOLUME	INITIALS	DATE	ANALYSIS WANTED TARGET HG					COMMENTS
372		BLANK	BLANK-M29	Filter		KMH	4/12/2013	X	X				
374		BLANK	BLANK-M29	FH Nitric		KMH	4/12/2013	X	X				Target metals are:
375		BLANK	BLANK-M29	Impinger 1-3		KMH	4/12/2013	X	X				Cadmium
376		BLANK	BLANK-M29	Impinger 4		KMH	4/12/2013		X				Lead
377		BLANK	BLANK-M29	Impinger 5-6		KMH	4/12/2013		X				
378		BLANK	BLANK-M29	HCl & H2O		KMH	4/12/2013		X				

COLLECTED BY:	DATE	RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
[signature]	4/12/13	[signature]	4/17/13		
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE	RELINQUISHED BY:	DATE
[signature]	4/17/13	[signature]	4/17/13		
RECEIVED BY:	DATE	RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
				[signature]	4/17/13 1520

Air Compliance Group, LLC
5075 HOLLINS ROAD
ROANOKE, VA 24012

20344
~~20334~~ KRB
4.17.13

THE AIR COMPLIANCE GROUP, LLC

April 16, 2013

ElementOne Inc.
6319-D Carolina Beach Rd.
Wilmington, NC 28412
(910) 793-0128

Subject: **Metals Analyses for Pinellas County RRF**
ACG Inc. P.O. # **V13030-02**
ACG Contract # **V13030**

ATTN Sample Custodian:

Accompanying this letter are samples from ten (10) EPA Method 29 outlet samples (9 runs and 1 field blank). The samples are to be analyzed in accordance with EPA Method 29 for a) Cadmium, b) Lead, and c) Mercury.

There are also nine (9) EPA Method 29 inlet samples, which are to be analyzed for mercury only.

Please note the following:

- Chain-of-Custody sheets accompany the samples and should be checked to ensure that any holding time requirements are met.
- Please submit complete documentation for the analysis of one single sampling run.
- Please include a narrative stating any problems, or lack thereof, with the sample processing or analyses.

The analyses are covered under ACG purchase order #V13030-02. If you have any questions, please contact me at ACG (540-265-1987 ext. 219) or on my cell (540-556-6212).

Sincerely,
The Air Compliance Group, LLC

Kenley Houtz, QSTI
Project Manager

The Air Compliance Group, LLC
5075 Hollins Road
Roanoke, VA 24019

Phone: (540) 265-1987
Fax: (540) 265-0082

Appendix M

Field Equipment Calibration Data

Appendix M.1

Pitot Tube, Barometer and Nozzle Calibration Data

TYPE S PITOT TUBE INSPECTION DATA FORM

PITOT TUBE ID	FPI8-3	DATE	10/11/2012

	yes	no	
PITOT TUBE ASSEMBLY LEVEL?	X		
PITOT TUBE OPENINGS DAMAGED?		X	if yes, see Note A

alpha1	5	< 10º	alpha2	5	< 10º
beta1	0	< 5º	beta2	0	< 5º
z	0	< 0.32 cm	w	0	< 0.08 cm
Pa	1.1	= Pb	Pb	1.1	= Pa
Dt	0.95	0.48 - 0.95 cm	Pa = Pb = [1.05 - 1.50] x Dt		

Note A

Other comments

	yes	no
CALIBRATION REQUIRED?		X

IF NO CALIBRATION REQUIRED, BY DEFAULT PITOT COEFFICIENT (Cp) = 0.84

INSPECTED BY: CMG

QA/QC Performed By: Kim Vyhnan Date: 10/11/2012

TYPE S PITOT TUBE INSPECTION DATA FORM

PITOT TUBE ID	117	DATE	1/8/2013

	yes	no	
PITOT TUBE ASSEMBLY LEVEL?	x		
PITOT TUBE OPENINGS DAMAGED?		x	if yes, see Note A

alpha1	1	< 10º	alpha2	1	< 10º
beta1	2	< 5º	beta2	2	< 5º
z	0	< 0.32 cm	w	0	< 0.08 cm
Pa	1.25	= Pb	Pb	1.25	= Pa
Dt	0.95	0.48 - 0.95 cm	Pa = Pb = [1.05 - 1.50] x Dt		

Note A

Other comments

	yes	no
CALIBRATION REQUIRED?		x

IF NO CALIBRATION REQUIRED, BY DEFAULT PITOT COEFFICIENT (Cp) = 0.84

INSPECTED BY: MRW

QA/QC Performed By: David Mecello Date: 1/15/2013

TYPE S PITOT TUBE INSPECTION DATA FORM

PITOT TUBE ID	125	DATE	1/8/2013

	yes	no	
PITOT TUBE ASSEMBLY LEVEL?	x		
PITOT TUBE OPENINGS DAMAGED?		x	if yes, see Note A

alpha1	3	< 10º	alpha2	6	< 10º
beta1	2	< 5º	beta2	0	< 5º
z	0	< 0.32 cm	w	0	< 0.08 cm
Pa	1.25	= Pb	Pb	1.25	= Pa
Dt	0.95	0.48 - 0.95 cm	Pa = Pb = [1.05 - 1.50] x Dt		

Note A

Other comments

	yes	no
CALIBRATION REQUIRED?		x

IF NO CALIBRATION REQUIRED, BY DEFAULT PITOT COEFFICIENT (Cp) = 0.84

INSPECTED BY: MRW

QA/QC Performed By: David Mecello Date: 1/15/2013

TYPE S PITOT TUBE INSPECTION DATA FORM

PITOT TUBE ID	152	DATE	1/8/2013

	yes	no	
PITOT TUBE ASSEMBLY LEVEL?	x		
PITOT TUBE OPENINGS DAMAGED?		x	if yes, see Note A

alpha1	0	< 10º	alpha2	0	< 10º
beta1	0	< 5º	beta2	0	< 5º
z	0	< 0.32 cm	w	0.02	< 0.08 cm
Pa	1.25	= Pb	Pb	1.25	= Pa
Dt	0.95	0.48 - 0.95 cm	Pa = Pb = [1.05 - 1.50] x Dt		

Note A

Other comments

	yes	no
CALIBRATION REQUIRED?		x

IF NO CALIBRATION REQUIRED, BY DEFAULT PITOT COEFFICIENT (Cp) = 0.84

INSPECTED BY: MRW

QA/QC Performed By: David Mecello Date: 1/15/2013

TYPE S PITOT TUBE INSPECTION DATA FORM

PITOT TUBE ID	158	DATE	1/8/2013

	yes	no	
PITOT TUBE ASSEMBLY LEVEL?	x		
PITOT TUBE OPENINGS DAMAGED?		x	if yes, see Note A

alpha1	1	< 10º	alpha2	0	< 10º
beta1	0	< 5º	beta2	0	< 5º
z	0	< 0.32 cm	w	0	< 0.08 cm
Pa	1.25	= Pb	Pb	1.25	= Pa
Dt	0.95	0.48 - 0.95 cm	Pa = Pb = [1.05 - 1.50] x Dt		

Note A

Other comments

	yes	no
CALIBRATION REQUIRED?		x

IF NO CALIBRATION REQUIRED, BY DEFAULT PITOT COEFFICIENT (Cp) = 0.84

INSPECTED BY: MRW

QA/QC Performed By: David Mecello Date: 1/15/2013

TYPE S PITOT TUBE INSPECTION DATA FORM

PITOT TUBE ID	159	DATE	1/8/2013

	yes	no	
PITOT TUBE ASSEMBLY LEVEL?	x		
PITOT TUBE OPENINGS DAMAGED?		x	if yes, see Note A

alpha1	1	< 10º	alpha2	1	< 10º
beta1	1	< 5º	beta2	1	< 5º
z	0	< 0.32 cm	w	0	< 0.08 cm
Pa	1.25	= Pb	Pb	1.25	= Pa
Dt	0.95	0.48 - 0.95 cm	Pa = Pb = [1.05 - 1.50] x Dt		

Note A

Other comments

	yes	no
CALIBRATION REQUIRED?		x

IF NO CALIBRATION REQUIRED, BY DEFAULT PITOT COEFFICIENT (Cp) = 0.84

INSPECTED BY: MRW

QA/QC Performed By: David Mecello Date: 1/15/2013

TYPE S PITOT TUBE INSPECTION DATA FORM

PITOT TUBE ID	319	DATE	1/8/2013

	yes	no	
PITOT TUBE ASSEMBLY LEVEL?	x		
PITOT TUBE OPENINGS DAMAGED?		x	if yes, see Note A

alpha1	0	< 10º	alpha2	0	< 10º
beta1	0	< 5º	beta2	1	< 5º
z	0	< 0.32 cm	w	0	< 0.08 cm
Pa	1.25	= Pb	Pb	1.25	= Pa
Dt	0.95	0.48 - 0.95 cm	Pa = Pb = [1.05 - 1.50] x Dt		

Note A

Other comments

	yes	no
CALIBRATION REQUIRED?		x

IF NO CALIBRATION REQUIRED, BY DEFAULT PITOT COEFFICIENT (Cp) = 0.84

INSPECTED BY: MRW

QA/QC Performed By: David Mecello Date: 1/15/2013

TYPE S PITOT TUBE INSPECTION DATA FORM

PITOT TUBE ID	322	DATE	1/8/2013

	yes	no	
PITOT TUBE ASSEMBLY LEVEL?	x		
PITOT TUBE OPENINGS DAMAGED?		x	if yes, see Note A

alpha1	0	< 10º	alpha2	1	< 10º
beta1	0	< 5º	beta2	0	< 5º
z	0.02	< 0.32 cm	w	0.02	< 0.08 cm
Pa	1.25	= Pb	Pb	1.25	= Pa
Dt	0.95	0.48 - 0.95 cm	Pa = Pb = [1.05 - 1.50] x Dt		

Note A

Other comments

	yes	no
CALIBRATION REQUIRED?		x

IF NO CALIBRATION REQUIRED, BY DEFAULT PITOT COEFFICIENT (Cp) = 0.84

INSPECTED BY: MRW

QA/QC Performed By: David Mecello Date: 1/15/2013

TYPE S PITOT TUBE INSPECTION DATA FORM

PITOT TUBE ID	323	DATE	1/8/2013

	yes	no	
PITOT TUBE ASSEMBLY LEVEL?	x		
PITOT TUBE OPENINGS DAMAGED?		x	if yes, see Note A

alpha1	2	< 10º	alpha2	0	< 10º
beta1	1	< 5º	beta2	0	< 5º
z	0	< 0.32 cm	w	0.02	< 0.08 cm
Pa	1.25	= Pb	Pb	1.25	= Pa
Dt	0.95	0.48 - 0.95 cm	Pa = Pb = [1.05 - 1.50] x Dt		

Note A

Other comments

	yes	no
CALIBRATION REQUIRED?		x

IF NO CALIBRATION REQUIRED, BY DEFAULT PITOT COEFFICIENT (Cp) = 0.84

INSPECTED BY: MRW

QA/QC Performed By: David Mecello Date: 1/15/2013

Field Barometer Calibration Form

JOB ID V13030 Facility ID Pinellas County RRF

DATE	Field Barometer ID	Reference Barometer ("Hg)	Field Barometer ("Hg)	Diff "Hg	Pass/ Fail	Tech
4/6/2013	ACG-BAR-3	29.10	29.11	0.01	Pass	KMH
4/17/2013	ACG-BAR-3	29.07	29.05	0.02	Pass	KMH

For acceptance, the field barometer must be within 0.1" Hg of the absolute barometric pressure obtained from the nearby National Weather Service Station (adjusted for elevation differences).

ACG Field Nozzle Calibration Form

Nozzle Set I.D. Glass Set A

Technician: FPC Date: 10/25/2012

Nozzle Identification Number	Nozzle Diameter[a]			ΔD,[b] inches	D_{avg}[c]	Pass/Fail
	D_1, inches	D_2, inches	D_3, inches			
A1	0.156	0.156	0.156	0.000	0.156	Pass
A2	0.156	0.156	0.155	0.001	0.156	Pass
A3	0.191	0.190	0.191	0.001	0.191	Pass
A4	0.185	0.185	0.185	0.000	0.185	Pass
A5	0.217	0.218	0.218	0.001	0.218	Pass
A6	0.218	0.219	0.218	0.001	0.218	Pass
A7	0.250	0.250	0.250	0.000	0.250	Pass
A8	0.250	0.249	0.250	0.001	0.250	Pass
A9	0.250	0.250	0.250	0.000	0.250	Pass
A10	0.279	0.280	0.280	0.001	0.280	Pass
A11	0.281	0.280	0.280	0.001	0.280	Pass
A12	0.312	0.312	0.312	0.000	0.312	Pass
A13	0.310	0.310	0.310	0.000	0.310	Pass
A14	0.375	0.375	0.375	0.000	0.375	Pass
A15	0.375	0.375	0.375	0.000	0.375	Pass
A16	0.437	0.438	0.437	0.001	0.437	Pass
A17	0.437	0.437	0.437	0.000	0.437	Pass
A18	0.495	0.495	0.495	0.000	0.495	Pass
A19	0.502	0.502	0.502	0.000	0.502	Pass
A20	0.620	0.620	0.620	0.000	0.620	Pass
A21	0.622	0.622	0.621	0.001	0.622	Pass
A22	0.809	0.809	0.809	0.000	0.809	Pass
A23	0.741	0.741	0.740	0.001	0.741	Pass

where:

[a] $D_{1, 2, 3,}$ = three different nozzles diameters, mm (in.); measure to the nearest 0.025 mm (0.001 in.)

[b] ΔD = maximum difference between any two diameters, mm (in.), ΔD #(0.10 mm) 0.004 in.

[c] D_{avg} = average of D_1, D_2, and D_3.

ACG Field Nozzle Calibration Form

Nozzle Set I.D. Glass Set B

Technician: FPC Date: 4/9/2013

Nozzle Identification Number	Nozzle Diameter[a]			ΔD,[b] inches	D_{avg}[c]	Pass/Fail
	D_1, inches	D_2, inches	D_3, inches			
B1	0.156	0.156	0.156	0.000	0.156	Pass
B2	0.156	0.156	0.156	0.000	0.156	Pass
B3	0.185	0.185	0.185	0.000	0.185	Pass
B4	0.185	0.185	0.185	0.000	0.185	Pass
B5	0.219	0.219	0.219	0.000	0.219	Pass
B6	0.225	0.226	0.225	0.001	0.225	Pass
B7	0.250	0.250	0.250	0.000	0.250	Pass
B8	0.250	0.250	0.250	0.000	0.250	Pass
B9	0.250	0.252	0.253	0.003	0.252	Pass
B10	0.280	0.280	0.280	0.000	0.280	Pass
B11	0.280	0.280	0.279	0.001	0.280	Pass
B12	0.312	0.312	0.312	0.000	0.312	Pass
B13	0.311	0.312	0.312	0.001	0.312	Pass
B14	0.375	0.375	0.374	0.001	0.375	Pass
B15	0.375	0.375	0.375	0.000	0.375	Pass
B16	0.440	0.440	0.440	0.000	0.440	Pass
B17	0.437	0.437	0.437	0.000	0.437	Pass
B18	0.500	0.500	0.500	0.000	0.500	Pass
B19	0.500	0.500	0.500	0.000	0.500	Pass
B20	0.624	0.624	0.624	0.000	0.624	Pass
B21	0.625	0.625	0.625	0.000	0.625	Pass
B22	0.750	0.750	0.750	0.000	0.750	Pass
B24	0.750	0.750	0.750	0.000	0.750	Pass

where:

[a] $D_{1, 2, 3,}$ = three different nozzles diameters, mm (in.); measure to the nearest 0.025 mm (0.001 in.)

[b] ΔD = maximum difference between any two diameters, mm (in.), ΔD ≤(0.10 mm) 0.004 in.

[c] D_{avg} = average of D_1, D_2, and D_3.

ACG Field Nozzle Calibration Form

Nozzle Set I.D. Glass Set C

Technician: JBS Date: 6/6/2012

Nozzle Identification Number	Nozzle Diameter[a]			ΔD,[b] inches	D_{avg}[c]	Pass/Fail
	D_1, inches	D_2, inches	D_3, inches			
C1	0.155	0.155	0.155	0.000	0.155	Pass
C2	0.155	0.154	0.155	0.001	0.155	Pass
C3	0.185	0.185	0.184	0.001	0.185	Pass
C4	0.184	0.185	0.185	0.001	0.185	Pass
C5	0.218	0.218	0.218	0.000	0.218	Pass
C6	0.218	0.217	0.218	0.001	0.218	Pass
C7	0.250	0.249	0.250	0.001	0.250	Pass
C8	0.250	0.250	0.250	0.000	0.250	Pass
C9	0.256	0.256	0.256	0.000	0.256	Pass
C10	0.280	0.280	0.280	0.000	0.280	Pass
C11	0.279	0.280	0.280	0.001	0.280	Pass
C12	0.312	0.311	0.312	0.001	0.312	Pass
C13	0.310	0.310	0.310	0.000	0.310	Pass
C14	0.375	0.375	0.374	0.001	0.375	Pass
C15	0.375	0.375	0.375	0.000	0.375	Pass
C16	0.428	0.428	0.428	0.000	0.428	Pass
C17	0.437	0.436	0.436	0.001	0.436	Pass
C18	0.501	0.502	0.502	0.001	0.502	Pass
C19	0.500	0.500	0.500	0.000	0.500	Pass
C20	0.624	0.625	0.625	0.001	0.625	Pass
C21	0.625	0.625	0.624	0.001	0.625	Pass
C22	0.750	0.750	0.750	0.000	0.750	Pass
C23	0.804	0.804	0.804	0.000	0.804	Pass

where:

[a] $D_{1, 2, 3,}$ = three different nozzles diameters, mm (in.); measure to the nearest 0.025 mm (0.001 in.)

[b] ΔD = maximum difference between any two diameters, mm (in.), ΔD #(0.10 mm) 0.004 in.

[c] D_{avg} = average of D_1, D_2, and D_3.

Appendix M.2

Meter Console and Thermocouple Calibration Data

The Air Compliance Group, LLC
EPA Method 5
Meter Box Calibration
Pre-Test Orifice Method

Meter Box # 4
Date: 03/16/13

Barometric Pressure: 29.300 (in. Hg)
Theoretical Critical Vacuum: 13.82 (in. Hg)
Calibration Technician: MRW

DRY GAS METER READINGS

ΔH (in H2O)	Time (min)	Volume Initial (ft^3)	Volume Final (ft^3)	Volume Total (ft^3)	Initial Temperature Inlet (deg F)	Initial Temperature Outlet (deg F)	Final Temperature Inlet (deg F)	Final Temperature Outlet (deg F)
0.27	5	85.117	86.647	1.530	61	63	61	63
0.27	5	86.647	88.163	1.516	61	63	61	62
0.6	6	88.163	90.826	2.663	63	63	61	62
0.6	6	90.826	93.514	2.688	61	62	61	61
1.1	5	93.514	96.408	2.894	61	61	61	61
1.1	5	96.408	99.308	2.900	61	61	62	61
1.9	6	99.308	103.910	4.602	62	61	64	61
1.9	6	103.910	108.527	4.617	64	61	66	62
3.4	5	108.527	113.673	5.146	66	62	68	63
3.4	5	113.673	118.818	5.145	68	63	69	63

CRITICAL ORIFICE READINGS

Orifice Serial# (number)	K' Orifice Coefficient	Actual Vacuum (in Hg)	Ambient Temperature Initial (deg F)	Ambient Temperature Final (deg F)	Ambient Temperature Average (deg F)	Average Temperature DGM Outlet (deg R)	Average Temperature DGM Overall (deg R)	Average Temperature Ambient Temp (deg R)
KV-40	0.2404	24	62	62	62	523	522	522
KV-40	0.2404	24	62	62	62	523	522	522
KV-48	0.3504	23	62	62	62	523	522	522
KV-48	0.3504	23	62	62	62	522	521	522
KV-55	0.4616	22	62	62	62	521	521	522
KV-55	0.4616	22	62	62	62	521	521	522
KV-63	0.6012	20	62	62	62	521	522	522
KV-63	0.6012	20	62	62	62	522	523	522
KV-73	0.8227	18	62	62	62	523	525	522
KV-73	0.8227	18	62	62	62	523	526	522

IMPORTANT:

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

The Air Compliance Group, LLC
EPA Method 5
Meter Box Calibration
Pre-Test Orifice Method

Meter Box # 4
Date: 03/16/13
Barometric Pressure: 29.30 (in. Hg)
Theoretical Critical Vacuum: 13.82 (in. Hg)
Calibration Technician: MRW

********** **RESULTS** **********

------ DRY GAS METER ------		---------- ORIFICE ----------		
VOLUME CORR. Vm(std) (ft^3)	VOLUME CORR. Vm(std) (liters)	VOLUME CORR. Vcr(std) (ft^3)	VOLUME CORR. Vcr(std) (liters)	VOLUME NOMINAL Vcr (ft^3)
1.516	42.9	1.541	43.7	1.557
1.503	42.6	1.541	43.7	1.557
2.639	74.7	2.696	76.4	2.723
2.669	75.6	2.696	76.4	2.723
2.879	81.5	2.960	83.8	2.989
2.883	81.7	2.960	83.8	2.989
4.578	129.7	4.626	131.0	4.672
4.582	129.8	4.626	131.0	4.672
5.112	144.8	5.275	149.4	5.328
5.101	144.5	5.275	149.4	5.328

------ DRY GAS METER ------			---------- ORIFICE ----------		
	CALIBRATION FACTOR			CALIBRATION FACTOR	
	"Y" Value (number)	Variation (number) [1]		"ΔH@" Value (in H2O)	Value (mm H2O)	Variation (in H2O) [2]
	1.0168	0.00		1.5797	40.13	-0.1
	1.0257	0.00		1.5812	40.16	-0.1
	1.0215	0.00		1.6540	42.01	0.0
	1.0101	-0.01		1.6571	42.09	0.0
	1.0281	0.01		1.7523	44.51	0.1
	1.0265	0.00		1.7523	44.51	0.1
	1.0104	-0.01		1.7843	45.32	0.1
	1.0095	-0.01		1.7826	45.28	0.1
	1.0320	0.01		1.7002	43.19	0.0
	1.0341	0.01		1.6986	43.14	0.0
Average	1.0215	0.00	Average	1.6942	43.03	0.0

Average Y =	**1.0215**
Average ΔH@ =	**1.6942**
Pass/Fail?	**Pass**

Notes:

[1] 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. Variations shown have been rounded to nearest 0.01.

[2] For Orifice Calibration Factor ΔH@, the orifice differential pressure in inches of H20 that equates to 0.75 cfm of air at 68 deg F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is ± 0.2. Variations shown have been rounded to nearest 0.1.

QA/QC Performed By: David Mecello **Date:** 03/21/13

The Air Compliance Group, LLC
EPA Method 5
Meter Box Calibration
Post-Test Orifice Method

Meter Box # 4
Date: 4/16/2013

Barometric Pressure: 29.090 (in. Hg)
Theoretical Critical Vacuum: 13.72 (in. Hg)
Calibration Technician: DCF

---------- DRY GAS METER READINGS ----------

ΔH	Time	Volume Initial	Volume Final	Volume Total	Initial Temperature		Final Temperature	
					Inlet	Outlet	Inlet	Outlet
(in H2O)	(min)	(ft^3)	(ft^3)	(ft^3)	(deg F)	(deg F)	(deg F)	(deg F)
1.20	5.0	234.022	236.944	2.922	78	76	79	77
1.20	5.0	236.944	239.891	2.947	79	77	80	77
1.20	5.0	239.891	242.821	2.930	80	77	80	77

---------- CRITICAL ORIFICE READINGS ----------

Orifice		Actual	Ambient Temperature			Average Temperature		
						DGM	DGM	Ambient
Serial#	K' Orifice	Vacuum	Initial	Final	Average	Outlet	Overall	Temp
(number)	Coefficient	(in Hg)	(deg F)	(deg F)	(deg F)	(deg R)	(deg R)	(deg R)
KX-55	0.4578	20	72	72	72	537	538	532
KX-55	0.4578	20	72	72	72	537	538	532
KX-55	0.4578	20	72	72	72	537	539	532

IMPORTANT:

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

The Air Compliance Group, LLC
EPA Method 5
Meter Box Calibration
Post-Test Orifice Method

Meter Box # 4
Date: 04/16/13
Barometric Pressure: 29.09 (in. Hg)
Theoretical Critical Vacuum: 13.72 (in. Hg)
Calibration Technician: DCF

********** **RESULTS** **********

------ DRY GAS METER ------		---------- ORIFICE ----------		
VOLUME CORR. Vm(std) (ft^3)	VOLUME CORR. Vm(std) (liters)	VOLUME CORR. Vcr(std) (ft^3)	VOLUME CORR. Vcr(std) (liters)	VOLUME NOMINAL Vcr (ft^3)
2.798	79.2	2.887	81.8	2.993
2.818	79.8	2.887	81.8	2.993
2.801	79.3	2.887	81.8	2.993

------ DRY GAS METER ------		---------- ORIFICE ----------		
CALIBRATION FACTOR		CALIBRATION FACTOR		
"Y" Value (number)	Variation (number)	"ΔH@" Value (in H2O)	Value (mm H2O)	Variation (in H2O)
1.0317	0.003	1.9374	49.21	0.001
1.0244	-0.005	1.9356	49.16	-0.001
1.0308	0.002	1.9356	49.16	-0.001

Average $Y_{(post)}$ 1.0290 Average $dH@_{(post)}$ 1.9362 49.18

Calibration Factor Gamma (Y):	**1.0215**
Post Test Avg. Gamma ($Y_{(post)}$):	**1.0290**
Variation:	**0.0075**
5% of Y:	**0.0511**
Variation ≤ 5% of Y?	**Yes**

Note:
The Variation [absolute value of the Calibration Factor Gamma (Y) minus the Post Test Average Gamma ($Y_{(post)}$)] must be less than or equal to 5% of Calibration Factor Gamma (Y).

QA/QC Performed By: David Mecello **Date:** 4/17/2013

The Air Compliance Group, LLC
EPA Method 5
Meter Box Calibration
Pre-Test Orifice Method

Meter Box # 16 | Barometric Pressure: 29.46 (in. Hg)

Date: 01/10/13 | Theoretical Critical Vacuum: 13.90 (in. Hg)

Calibration Technician: CSB

DRY GAS METER READINGS

ΔH (in H2O)	Time (min)	Volume Initial (ft^3)	Volume Final (ft^3)	Volume Total (ft^3)	Initial Temperature Inlet (deg F)	Initial Temperature Outlet (deg F)	Final Temperature Inlet (deg F)	Final Temperature Outlet (deg F)
0.28	5	35.040	36.615	1.575	68.0	66.0	68.0	67.0
0.28	5	36.615	38.205	1.590	68.0	67.0	69.0	67.0
0.64	5	38.205	40.504	2.299	69.0	67.0	69.0	68.0
0.64	5	40.504	42.822	2.318	69.0	68.0	70.0	68.0
1.1	5	42.822	45.858	3.036	70.0	68.0	70.0	69.0
1.1	5	45.858	48.905	3.047	70.0	69.0	71.0	69.0
1.9	5	48.905	52.812	3.907	71.0	69.0	72.0	70.0
1.9	5	52.812	56.714	3.902	72.0	70.0	73.0	71.0
3.5	5	56.714	61.978	5.264	73.0	71.0	73.0	71.0
3.5	5	61.978	67.229	5.251	73.0	71.0	74.0	72.0

CRITICAL ORIFICE READINGS

Orifice Serial# (number)	K' Orifice Coefficient	Actual Vacuum (in Hg)	Ambient Temperature Initial (deg F)	Ambient Temperature Final (deg F)	Ambient Temperature Average (deg F)	Average Temperature DGM Outlet (deg R)	Average Temperature DGM Overall (deg R)	Average Temperature Ambient Temp (deg R)
KX-40	0.2376	23.0	60.0	60.0	60.0	526.5	527.3	520.0
KX-40	0.2376	23.0	61.0	61.0	61.0	527.0	527.8	521.0
KX-48	0.3472	22.0	61.0	61.0	61.0	527.5	528.3	521.0
KX-48	0.3472	22.0	61.0	61.0	61.0	528.0	528.8	521.0
KX-55	0.4578	20.0	61.0	61.0	61.0	528.5	529.3	521.0
KX-55	0.4578	20.0	61.0	61.0	61.0	529.0	529.8	521.0
KX-63	0.5924	18.0	61.0	61.0	61.0	529.5	530.5	521.0
KX-63	0.5924	18.0	61.0	61.0	61.0	530.5	531.5	521.0
KX-73	0.8053	16.0	61.0	61.0	61.0	531.0	532.0	521.0
KX-73	0.8053	16.0	61.0	61.0	61.0	531.5	532.5	521.0

IMPORTANT:

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

The Air Compliance Group, LLC
EPA Method 5
Meter Box Calibration
Pre-Test Orifice Method

Meter Box # 16 | Barometric Pressure: 29.46 (in. Hg)

Date: 01/10/13 | Theoretical Critical Vacuum: 13.90 (in. Hg)

Calibration Technician: CSB

********** **RESULTS** **********

------ DRY GAS METER ------		---------- ORIFICE ----------		
VOLUME CORR. Vm(std) (ft^3)	VOLUME CORR. Vm(std) (liters)	VOLUME CORR. Vcr(std) (ft^3)	VOLUME CORR. Vcr(std) (liters)	VOLUME NOMINAL Vcr (ft^3)
1.553	44.0	1.535	43.5	1.536
1.567	44.4	1.533	43.4	1.537
2.265	64.2	2.241	63.5	2.246
2.282	64.6	2.241	63.5	2.246
2.989	84.7	2.954	83.7	2.962
2.997	84.9	2.954	83.7	2.962
3.845	108.9	3.823	108.3	3.833
3.833	108.6	3.823	108.3	3.833
5.187	146.9	5.197	147.2	5.210
5.169	146.4	5.197	147.2	5.210

------ DRY GAS METER ------			---------- ORIFICE ----------		
	CALIBRATION FACTOR			CALIBRATION FACTOR	
	"Y" Value (number)	Variation (number) [1]		"ΔH@" Value (in H2O)	Value (mm H2O)	Variation (in H2O) [2]
	0.9880	0.00		1.6505	41.92	-0.1
	0.9786	-0.01		1.6521	41.96	-0.1
	0.9891	0.00		1.7668	44.88	0.0
	0.9819	-0.01		1.7651	44.83	0.0
	0.9883	0.00		1.7434	44.28	0.0
	0.9857	-0.01		1.7417	44.24	0.0
	0.9942	0.00		1.7949	45.59	0.0
	0.9973	0.01		1.7916	45.51	0.0
	1.0019	0.01		1.7842	45.32	0.0
	1.0053	0.01		1.7826	45.28	0.0
Average	0.9910	0.00	Average	1.7473	44.38	0.0

Average Y =	**0.9910**
Average ΔH@ =	**1.7473**
Pass/Fail?	**Pass**

Notes:

[1] 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. Variations shown have been rounded to nearest 0.01.

[2] For Orifice Calibration Factor ΔH@, the orifice differential pressure in inches of H20 that equates to 0.75 cfm of air at 68 deg F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is ± 0.2. Variations shown have been rounded to nearest 0.1.

QA/QC Performed By: David Mecello **Date:** 1/11/2013

The Air Compliance Group, LLC
EPA Method 5
Meter Box Calibration
Post-Test Orifice Method

Meter Box # 16
Date: 4/16/2013

Barometric Pressure: 29.090 (in. Hg)
Theoretical Critical Vacuum: 13.72 (in. Hg)
Calibration Technician: DCF

---------- DRY GAS METER READINGS ----------

ΔH	Time	Volume Initial	Volume Final	Volume Total	Initial Temperature		Final Temperature	
					Inlet	Outlet	Inlet	Outlet
(in H2O)	(min)	(ft^3)	(ft^3)	(ft^3)	(deg F)	(deg F)	(deg F)	(deg F)
1.10	5.0	13.590	16.446	2.856	70	69	71	70
1.10	5.0	16.446	19.423	2.977	71	70	72	71
1.10	5.0	19.423	22.378	2.955	72	71	74	74

---------- CRITICAL ORIFICE READINGS ----------

Orifice		Actual	Ambient Temperature			Average Temperature		
						DGM	DGM	Ambient
Serial#	K' Orifice	Vacuum	Initial	Final	Average	Outlet	Overall	Temp
(number)	Coefficient	(in Hg)	(deg F)	(deg F)	(deg F)	(deg R)	(deg R)	(deg R)
KX-55	0.4578	18	68	68	68	530	530	528
KX-55	0.4578	18	68	68	68	531	531	528
KX-55	0.4578	18	68	68	68	533	533	528

IMPORTANT:

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

The Air Compliance Group, LLC
EPA Method 5
Meter Box Calibration
Post-Test Orifice Method

Meter Box # 16 | Barometric Pressure: 29.09 (in. Hg)

Date: 04/16/13 | Theoretical Critical Vacuum: 13.72 (in. Hg)

Calibration Technician: DCF

********** **RESULTS** **********

------ DRY GAS METER ------		---------- ORIFICE ----------		
VOLUME CORR. Vm(std) (ft^3)	VOLUME CORR. Vm(std) (liters)	VOLUME CORR. Vcr(std) (ft^3)	VOLUME CORR. Vcr(std) (liters)	VOLUME NOMINAL Vcr (ft^3)
2.773	78.5	2.898	82.1	2.982
2.885	81.7	2.898	82.1	2.982
2.854	80.8	2.898	82.1	2.982

------ DRY GAS METER ------		---------- ORIFICE ----------		
CALIBRATION FACTOR		CALIBRATION FACTOR		
"Y" Value (number)	Variation (number)	"ΔH@" Value (in H2O)	Value (mm H2O)	Variation (in H2O)
1.0451	0.023	1.7859	45.36	0.004
1.0045	-0.017	1.7825	45.28	0.001
1.0153	-0.006	1.7758	45.11	-0.006

Average $Y_{(post)}$ 1.0216 | Average dH@ $_{(post)}$ 1.7814 | 45.25

Calibration Factor Gamma (Y):	**0.9910**
Post Test Avg. Gamma ($Y_{(post)}$):	**1.0216**
Variation:	**0.0306**
5% of Y:	**0.0496**
Variation ≤ 5% of Y?	**Yes**

Note:

The Variation [absolute value of the Calibration Factor Gamma (Y) minus the Post Test Average Gamma ($Y_{(post)}$)] must be less than or equal to 5% of Calibration Factor Gamma (Y).

QA/QC Performed By: David Mecello **Date:** 4/17/2013

The Air Compliance Group, LLC
EPA Method 5
Meter Box Calibration
Pre-Test Orifice Method

Meter Box # 17
Date: 02/12/13

Barometric Pressure: 28.95 (in. Hg)
Theoretical Critical Vacuum: 13.66 (in. Hg)
Calibration Technician: CSB

DRY GAS METER READINGS

ΔH (in H2O)	Time (min)	Volume Initial (ft^3)	Volume Final (ft^3)	Volume Total (ft^3)	Initial Temperature Inlet (deg F)	Initial Temperature Outlet (deg F)	Final Temperature Inlet (deg F)	Final Temperature Outlet (deg F)
0.31	5	514.819	516.416	1.597	68	66	68	66
0.31	5	516.416	518.014	1.598	68	66	68	66
0.65	5	518.014	520.337	2.323	68	66	69	67
0.65	5	520.337	522.671	2.334	69	67	69	67
1.2	5	522.671	525.722	3.051	69	67	69	67
1.2	5	525.722	528.798	3.076	69	67	69	68
2.0	5	528.798	532.785	3.987	69	68	70	68
2.0	5	532.785	536.763	3.978	70	68	70	68
3.6	5	536.763	542.126	5.363	70	68	70	68
3.6	5	542.126	547.476	5.350	70	68	70	68

CRITICAL ORIFICE READINGS

Orifice Serial# (number)	K' Orifice Coefficient	Actual Vacuum (in Hg)	Ambient Temperature Initial (deg F)	Ambient Temperature Final (deg F)	Ambient Temperature Average (deg F)	DGM Outlet (deg R)	DGM Overall (deg R)	Ambient Temp (deg R)
KS-40	0.2406	24	60	60	60	526	527	520
KS-40	0.2406	24	60	60	60	526	527	520
KS-48	0.3497	23	60	60	60	527	528	520
KS-48	0.3497	23	60	60	60	527	528	520
KS-55	0.4591	21	60	60	60	527	528	520
KS-55	0.4591	21	60	60	60	528	528	520
KS-63	0.5898	19	60	60	60	528	529	520
KS-63	0.5898	19	60	60	60	528	529	520
KS-73	0.8057	17	60	60	60	528	529	520
KS-73	0.8057	17	60	60	60	528	529	520

IMPORTANT:

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

The Air Compliance Group, LLC
EPA Method 5
Meter Box Calibration
Pre-Test Orifice Method

Meter Box # 17
Date: 02/12/13

Barometric Pressure: 28.95 (in. Hg)
Theoretical Critical Vacuum: 13.66 (in. Hg)
Calibration Technician: CSB

********** **RESULTS** **********

------ DRY GAS METER ------		---------- ORIFICE ----------		
VOLUME CORR. Vm(std) (ft^3)	VOLUME CORR. Vm(std) (liters)	VOLUME CORR. Vcr(std) (ft^3)	VOLUME CORR. Vcr(std) (liters)	VOLUME NOMINAL Vcr (ft^3)
1.549	43.9	1.527	43.3	1.555
1.550	43.9	1.527	43.3	1.555
2.253	63.8	2.220	62.9	2.260
2.261	64.0	2.220	62.9	2.260
2.960	83.8	2.914	82.5	2.967
2.983	84.5	2.914	82.5	2.967
3.870	109.6	3.744	106.0	3.812
3.860	109.3	3.744	106.0	3.812
5.225	148.0	5.114	144.8	5.208
5.212	147.6	5.114	144.8	5.208

------ DRY GAS METER ------			---------- ORIFICE ----------		
	CALIBRATION FACTOR			CALIBRATION FACTOR	
	"Y" Value (number)	Variation (number) [1]		"ΔH@" Value (in H2O)	Value (mm H2O)	Variation (in H2O) [2]
	0.9861	0.01		1.8152	46.11	-0.1
	0.9855	0.01		1.8152	46.11	-0.1
	0.9854	0.01		1.8000	45.72	-0.1
	0.9817	0.00		1.7983	45.68	-0.1
	0.9846	0.00		1.9262	48.93	0.1
	0.9770	0.00		1.9244	48.88	0.1
	0.9673	-0.01		1.9415	49.31	0.1
	0.9700	-0.01		1.9415	49.31	0.1
	0.9789	0.00		1.8727	47.57	0.0
	0.9813	0.00		1.8727	47.57	0.0
Average	0.9798	0.00	Average	1.8708	47.52	0.0

Average Y =	**0.9798**
Average ΔH@ =	**1.8708**
Pass/Fail?	**Pass**

Notes:

[1] 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. Variations shown have been rounded to nearest 0.01.

[2] For Orifice Calibration Factor ΔH@, the orifice differential pressure in inches of H20 that equates to 0.75 cfm of air at 68 deg F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is ± 0.2. Variations shown have been rounded to nearest 0.1.

QA/QC Performed By: David Mecellio **Date:** 2/12/2013

The Air Compliance Group, LLC
EPA Method 5
Meter Box Calibration
Post-Test Orifice Method

Meter Box # 17
Date: 4/16/2013

Barometric Pressure: 29.900 (in. Hg)
Theoretical Critical Vacuum: 14.10 (in. Hg)
Calibration Technician: dcf

---------- DRY GAS METER READINGS ----------

ΔH	Time	Volume Initial	Volume Final	Volume Total	Initial Temperature		Final Temperature	
					Inlet	Outlet	Inlet	Outlet
(in H2O)	(min)	(ft^3)	(ft^3)	(ft^3)	(deg F)	(deg F)	(deg F)	(deg F)
1.20	5.0	228.645	231.670	3.025	64	63	65	64
1.20	5.0	231.670	234.707	3.037	65	64	66	64
1.20	5.0	234.707	237.751	3.044	66	64	66	65

---------- CRITICAL ORIFICE READINGS ----------

Orifice		Actual	Ambient Temperature			Average Temperature		
						DGM	DGM	Ambient
Serial#	K' Orifice	Vacuum	Initial	Final	Average	Outlet	Overall	Temp
(number)	Coefficient	(in Hg)	(deg F)	(deg F)	(deg F)	(deg R)	(deg R)	(deg R)
KX-55	0.4578	21	60	60	60	524	524	520
KX-55	0.4578	21	60	60	60	524	525	520
KX-55	0.4578	21	60	60	60	525	525	520

IMPORTANT:

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

The Air Compliance Group, LLC
EPA Method 5
Meter Box Calibration
Post-Test Orifice Method

Meter Box # 17
Date: 04/16/13
Barometric Pressure: 29.90 (in. Hg)
Theoretical Critical Vacuum: 14.10 (in. Hg)
Calibration Technician: dcf

********** **RESULTS** **********

------ DRY GAS METER ------		---------- ORIFICE ----------		
VOLUME CORR. Vm(std) (ft^3)	VOLUME CORR. Vm(std) (liters)	VOLUME CORR. Vcr(std) (ft^3)	VOLUME CORR. Vcr(std) (liters)	VOLUME NOMINAL Vcr (ft^3)
3.054	86.5	3.001	85.0	2.959
3.062	86.7	3.001	85.0	2.959
3.066	86.8	3.001	85.0	2.959

------ DRY GAS METER ------		---------- ORIFICE ----------		
CALIBRATION FACTOR		CALIBRATION FACTOR		
"Y" Value (number)	Variation (number)	"ΔH@" Value (in H2O)	Value (mm H2O)	Variation (in H2O)
0.9828	0.002	1.8881	47.96	0.002
0.9803	0.000	1.8863	47.91	0.000
0.9790	-0.002	1.8845	47.87	-0.002

Average $Y_{(post)}$ 0.9807 Average dH@ $_{(post)}$ 1.8863 47.91

Calibration Factor Gamma (Y):	**0.9798**
Post Test Avg. Gamma ($Y_{(post)}$):	**0.9807**
Variation:	**0.0009**
5% of Y:	**0.0490**
Variation ≤ 5% of Y?	**Yes**

Note:

The Variation [absolute value of the Calibration Factor Gamma (Y) minus the Post Test Average Gamma ($Y_{(post)}$)] must be less than or equal to 5% of Calibration Factor Gamma (Y).

QA/QC Performed By: David Mecello **Date:** 4/17/2013

The Air Compliance Group, LLC
EPA Method 5
Meter Box Calibration
Pre-Test Orifice Method

Meter Box # 18
Date: 03/16/13

Barometric Pressure: 29.300 (in. Hg)
Theoretical Critical Vacuum: 13.82 (in. Hg)
Calibration Technician: MRW

DRY GAS METER READINGS

ΔH (in H2O)	Time (min)	Volume Initial (ft^3)	Volume Final (ft^3)	Volume Total (ft^3)	Initial Temperature Inlet (deg F)	Initial Temperature Outlet (deg F)	Final Temperature Inlet (deg F)	Final Temperature Outlet (deg F)
0.34	5	570.417	572.042	1.625	68	67	68	67
0.34	5	572.042	573.665	1.623	68	67	69	68
0.75	5	573.665	576.043	2.378	69	68	69	68
0.75	5	576.043	578.419	2.376	69	68	70	68
1.3	5	578.419	581.563	3.144	70	68	70	69
1.3	5	581.563	584.718	3.155	70	69	71	70
2.2	5	584.718	588.754	4.036	71	70	72	70
2.2	5	588.754	592.783	4.029	72	70	73	70
4.1	5	592.783	598.271	5.488	73	70	74	71
4.1	5	598.271	603.776	5.505	74	71	76	71

CRITICAL ORIFICE READINGS

Orifice Serial# (number)	K' Orifice Coefficient	Actual Vacuum (in Hg)	Ambient Temperature Initial (deg F)	Ambient Temperature Final (deg F)	Ambient Temperature Average (deg F)	Average Temperature DGM Outlet (deg R)	Average Temperature DGM Overall (deg R)	Average Temperature Ambient Temp (deg R)
HB-40	0.2414	25	72	72	72	527	528	532
HB-40	0.2414	25	72	72	72	528	528	532
HB-48	0.3525	23	72	72	72	528	529	532
HB-48	0.3525	23	72	72	72	528	529	532
HB-55	0.4629	22	72	72	72	529	529	532
HB-55	0.4629	22	72	72	72	530	530	532
HB-63	0.5923	20	72	72	72	530	531	532
HB-63	0.5923	20	72	72	72	530	531	532
HB-73	0.8236	18	72	72	72	531	532	532
HB-73	0.8236	18	72	72	72	531	533	532

IMPORTANT:

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

The Air Compliance Group, LLC
EPA Method 5
Meter Box Calibration
Pre-Test Orifice Method

Meter Box # 18 | Barometric Pressure: 29.30 (in. Hg)

Date: 03/16/13 | Theoretical Critical Vacuum: 13.82 (in. Hg)

Calibration Technician: MRW

********** **RESULTS** **********

------ DRY GAS METER ------		---------- ORIFICE ----------		
VOLUME CORR. Vm(std) (ft^3)	VOLUME CORR. Vm(std) (liters)	VOLUME CORR. Vcr(std) (ft^3)	VOLUME CORR. Vcr(std) (liters)	VOLUME NOMINAL Vcr (ft^3)
1.594	45.1	1.533	43.4	1.578
1.590	45.0	1.533	43.4	1.578
2.330	66.0	2.239	63.4	2.305
2.327	65.9	2.239	63.4	2.305
3.080	87.2	2.940	83.3	3.026
3.087	87.4	2.940	83.3	3.026
3.952	111.9	3.762	106.5	3.872
3.941	111.6	3.762	106.5	3.872
5.387	152.5	5.231	148.1	5.384
5.393	152.7	5.231	148.1	5.384

------ DRY GAS METER ------			---------- ORIFICE ----------		
	CALIBRATION FACTOR			CALIBRATION FACTOR	
	"Y" Value (number)	Variation (number) [1]		"ΔH@" Value (in H2O)	Value (mm H2O)	Variation (in H2O) [2]
	0.9622	0.00		1.9954	50.68	-0.1
	0.9643	0.00		1.9935	50.63	-0.1
	0.9609	0.00		2.0603	52.33	0.0
	0.9622	0.00		2.0603	52.33	0.0
	0.9545	-0.01		2.0690	52.55	0.0
	0.9525	-0.01		2.0651	52.45	0.0
	0.9519	-0.01		2.1325	54.17	0.1
	0.9545	-0.01		2.1325	54.17	0.1
	0.9711	0.01		2.0535	52.16	0.0
	0.9700	0.01		2.0516	52.11	0.0
Average	0.9604	0.00	Average	2.0614	52.36	0.0

Average Y =	**0.9604**
Average ΔH@ =	**2.0614**
Pass/Fail?	**Pass**

Notes:

[1] 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. Variations shown have been rounded to nearest 0.01.

[2] For Orifice Calibration Factor ΔH@, the orifice differential pressure in inches of H20 that equates to 0.75 cfm of air at 68 deg F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is ± 0.2. Variations shown have been rounded to nearest 0.1.

QA/QC Performed By: David Mecello **Date:** 03/21/13

The Air Compliance Group, LLC
EPA Method 5
Meter Box Calibration
Post-Test Orifice Method

Meter Box # 18
Date: 4/16/2013

Barometric Pressure: 29.090 (in. Hg)
Theoretical Critical Vacuum: 13.72 (in. Hg)
Calibration Technician: DCF

---------- DRY GAS METER READINGS ----------

ΔH (in H2O)	Time (min)	Volume Initial (ft^3)	Volume Final (ft^3)	Volume Total (ft^3)	Initial Temperature Inlet (deg F)	Initial Temperature Outlet (deg F)	Final Temperature Inlet (deg F)	Final Temperature Outlet (deg F)
1.30	5.0	24.605	27.674	3.069	71	70	72	71
1.30	5.0	27.674	30.756	3.082	72	71	72	71
1.30	5.0	30.756	33.836	3.080	72	71	73	71

---------- CRITICAL ORIFICE READINGS ----------

Orifice Serial# (number)	K' Orifice Coefficient	Actual Vacuum (in Hg)	Ambient Temperature Initial (deg F)	Ambient Temperature Final (deg F)	Ambient Temperature Average (deg F)	Average Temperature DGM Outlet (deg R)	Average Temperature DGM Overall (deg R)	Average Temperature Ambient Temp (deg R)
KX-55	0.4591	22	64	64	64	531	531	524
KX-55	0.4591	22	64	64	64	531	532	524
KX-55	0.4591	22	64	64	64	531	532	524

IMPORTANT:

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

The Air Compliance Group, LLC
EPA Method 5
Meter Box Calibration
Post-Test Orifice Method

Meter Box # 18 | Barometric Pressure: 29.09 (in. Hg)

Date: 04/16/13 | Theoretical Critical Vacuum: 13.72 (in. Hg)

Calibration Technician: DCF

********** **RESULTS** **********

------ DRY GAS METER ------		---------- ORIFICE ----------		
VOLUME CORR. Vm(std) (ft^3)	VOLUME CORR. Vm(std) (liters)	VOLUME CORR. Vcr(std) (ft^3)	VOLUME CORR. Vcr(std) (liters)	VOLUME NOMINAL Vcr (ft^3)
2.976	84.3	2.917	82.6	2.979
2.985	84.5	2.917	82.6	2.979
2.982	84.5	2.917	82.6	2.979

------ DRY GAS METER ------		---------- ORIFICE ----------		
CALIBRATION FACTOR		CALIBRATION FACTOR		
"Y" Value (number)	Variation (number)	"ΔH@" Value (in H2O)	Value (mm H2O)	Variation (in H2O)
0.9804	0.002	2.0788	52.80	0.001
0.9771	-0.001	2.0769	52.75	-0.001
0.9782	0.000	2.0769	52.75	-0.001

Average $Y_{(post)}$ 0.9786 | Average dH@ $_{(post)}$ 2.0775 | 52.77

Calibration Factor Gamma (Y):	**0.9604**
Post Test Avg. Gamma ($Y_{(post)}$):	**0.9786**
Variation:	**0.0182**
5% of Y:	**0.0480**
Variation ≤ 5% of Y?	**Yes**

Note:

The Variation [absolute value of the Calibration Factor Gamma (Y) minus the Post Test Average Gamma ($Y_{(post)}$)] must be less than or equal to 5% of Calibration Factor Gamma (Y).

QA/QC Performed By: David Mecello **Date:** 4/17/2013

The Air Compliance Group, LLC
EPA Method 5
Meter Box Calibration
Pre-Test Orifice Method

Meter Box # 19 | Barometric Pressure: 29.30 (in. Hg)

Date: 01/07/13 | Theoretical Critical Vacuum: 13.82 (in. Hg)

Calibration Technician: MSH

DRY GAS METER READINGS

ΔH (in H2O)	Time (min)	Volume Initial (ft^3)	Volume Final (ft^3)	Volume Total (ft^3)	Initial Temperature Inlet (deg F)	Initial Temperature Outlet (deg F)	Final Temperature Inlet (deg F)	Final Temperature Outlet (deg F)
0.29	5	825.214	826.789	1.575	67.0	63.0	68.0	64.0
0.29	5	826.789	828.345	1.556	68.0	64.0	69.0	65.0
0.65	5	828.345	830.637	2.292	69.0	65.0	70.0	66.0
0.65	5	830.637	832.926	2.289	70.0	66.0	71.0	67.0
1.1	5	836.117	839.154	3.037	71.0	67.0	73.0	69.0
1.1	5	839.154	842.186	3.032	73.0	69.0	74.0	69.0
1.9	5	842.186	846.120	3.934	74.0	69.0	75.0	70.0
1.9	5	846.120	850.069	3.949	75.0	70.0	76.0	71.0
3.6	5	850.069	855.407	5.338	76.0	71.0	77.0	72.0
3.6	5	855.407	860.749	5.342	77.0	72.0	79.0	73.0

CRITICAL ORIFICE READINGS

Orifice Serial# (number)	K' Orifice Coefficient	Actual Vacuum (in Hg)	Ambient Temperature Initial (deg F)	Ambient Temperature Final (deg F)	Ambient Temperature Average (deg F)	Average Temperature DGM Outlet (deg R)	Average Temperature DGM Overall (deg R)	Average Temperature Ambient Temp (deg R)
KS-40	0.2406	25.0	58.0	58.0	58.0	523.5	525.5	518.0
KS-40	0.2406	25.0	58.0	58.0	58.0	524.5	526.5	518.0
KS-48	0.3497	24.0	58.0	58.0	58.0	525.5	527.5	518.0
KS-48	0.3497	24.0	60.0	60.0	60.0	526.5	528.5	520.0
KS-55	0.4591	23.0	60.0	60.0	60.0	528.0	530.0	520.0
KS-55	0.4591	23.0	60.0	60.0	60.0	529.0	531.3	520.0
KS-63	0.5898	21.0	60.0	60.0	60.0	529.5	532.0	520.0
KS-63	0.5898	21.0	60.0	60.0	60.0	530.5	533.0	520.0
KS-73	0.8057	18.0	60.0	60.0	60.0	531.5	534.0	520.0
KS-73	0.8057	18.0	60.0	60.0	60.0	532.5	535.3	520.0

IMPORTANT:

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

The Air Compliance Group, LLC
EPA Method 5
Meter Box Calibration
Pre-Test Orifice Method

Meter Box # 19
Date: 01/07/13

Barometric Pressure: 29.30 (in. Hg)
Theoretical Critical Vacuum: 13.82 (in. Hg)
Calibration Technician: MSH

********** **RESULTS** **********

------ DRY GAS METER ------		---------- ORIFICE ----------		
VOLUME CORR. Vm(std) (ft^3)	VOLUME CORR. Vm(std) (liters)	VOLUME CORR. Vcr(std) (ft^3)	VOLUME CORR. Vcr(std) (liters)	VOLUME NOMINAL Vcr (ft^3)
1.550	43.9	1.549	43.9	1.552
1.529	43.3	1.549	43.9	1.552
2.249	63.7	2.251	63.7	2.256
2.242	63.5	2.247	63.6	2.260
2.970	84.1	2.949	83.5	2.967
2.958	83.8	2.949	83.5	2.967
3.840	108.8	3.789	107.3	3.812
3.848	109.0	3.789	107.3	3.812
5.213	147.6	5.176	146.6	5.208
5.205	147.4	5.176	146.6	5.208

------ DRY GAS METER ------			---------- ORIFICE ----------		
	CALIBRATION FACTOR			CALIBRATION FACTOR	
	"Y" Value (number)	Variation (number) [1]		"ΔH@" Value (in H2O)	Value (mm H2O)	Variation (in H2O) [2]
	0.9990	0.00		1.6793	42.66	-0.1
	1.0132	0.02		1.6761	42.57	-0.1
	1.0007	0.00		1.7750	45.09	0.0
	1.0020	0.01		1.7785	45.17	0.0
	0.9931	0.00		1.7413	44.23	0.0
	0.9971	0.00		1.7380	44.14	0.0
	0.9867	-0.01		1.8172	46.16	0.0
	0.9848	-0.01		1.8138	46.07	0.0
	0.9929	0.00		1.8381	46.69	0.1
	0.9945	0.00		1.8347	46.60	0.1
Average	0.9964	0.00	Average	1.7692	44.94	0.0

Average Y =	**0.9964**
Average ΔH@ =	**1.7692**
Pass/Fail?	**Pass**

Notes:

[1] 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. Variations shown have been rounded to nearest 0.01.

[2] For Orifice Calibration Factor ΔH@, the orifice differential pressure in inches of H20 that equates to 0.75 cfm of air at 68 deg F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is ± 0.2. Variations shown have been rounded to nearest 0.1.

QA/QC Performed By: David Mecello **Date:** 1/11/2013

The Air Compliance Group, LLC
EPA Method 5
Meter Box Calibration
Post-Test Orifice Method

Meter Box # 19
Date: 4/16/2013

Barometric Pressure: 29.090 (in. Hg)
Theoretical Critical Vacuum: 13.72 (in. Hg)
Calibration Technician: DCF

---------- DRY GAS METER READINGS ----------

ΔH	Time	Volume Initial	Volume Final	Volume Total	Initial Temperature		Final Temperature	
					Inlet	Outlet	Inlet	Outlet
(in H2O)	(min)	(ft^3)	(ft^3)	(ft^3)	(deg F)	(deg F)	(deg F)	(deg F)
1.10	5.0	93.920	96.906	2.986	73	72	75	73
1.10	5.0	96.906	99.908	3.002	75	73	75	73
1.10	5.0	99.908	102.913	3.005	75	73	76	74

---------- CRITICAL ORIFICE READINGS ----------

Orifice		Actual	Ambient Temperature			Average Temperature		
						DGM	DGM	Ambient
Serial#	K' Orifice	Vacuum	Initial	Final	Average	Outlet	Overall	Temp
(number)	Coefficient	(in Hg)	(deg F)	(deg F)	(deg F)	(deg R)	(deg R)	(deg R)
KX-55	0.4591	22	70	70	70	533	533	530
KX-55	0.4591	22	70	70	70	533	534	530
KX-55	0.4591	22	70	70	70	534	535	530

IMPORTANT:

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

The Air Compliance Group, LLC
EPA Method 5
Meter Box Calibration
Post-Test Orifice Method

Meter Box # 19
Date: 04/16/13
Barometric Pressure: 29.09 (in. Hg)
Theoretical Critical Vacuum: 13.72 (in. Hg)
Calibration Technician: DCF

********** **RESULTS** **********

------ DRY GAS METER ------		---------- ORIFICE ----------		
VOLUME CORR. Vm(std) (ft^3)	VOLUME CORR. Vm(std) (liters)	VOLUME CORR. Vcr(std) (ft^3)	VOLUME CORR. Vcr(std) (liters)	VOLUME NOMINAL Vcr (ft^3)
2.881	81.6	2.901	82.1	2.996
2.893	81.9	2.901	82.1	2.996
2.893	81.9	2.901	82.1	2.996

------ DRY GAS METER ------		---------- ORIFICE ----------		
CALIBRATION FACTOR		CALIBRATION FACTOR		
"Y" Value (number)	Variation (number)	"ΔH@" Value (in H2O)	Value (mm H2O)	Variation (in H2O)
1.0066	0.003	1.7725	45.02	0.002
1.0027	-0.001	1.7708	44.98	0.000
1.0026	-0.001	1.7691	44.94	-0.002

Average $Y_{(post)}$ 1.0040 Average dH@ $_{(post)}$ 1.7708 44.98

Calibration Factor Gamma (Y):	**0.9964**
Post Test Avg. Gamma ($Y_{(post)}$):	**1.0040**
Variation:	**0.0076**
5% of Y:	**0.0498**
Variation ≤ 5% of Y?	**Yes**

Note:
The Variation [absolute value of the Calibration Factor Gamma (Y) minus the Post Test Average Gamma ($Y_{(post)}$)] must be less than or equal to 5% of Calibration Factor Gamma (Y).

QA/QC Performed By: David Mecello **Date:** 4/17/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 4 Date: 1/12/2013

Meter Box Thermocouple: Stack Temp.

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (%)
1	0	0	0.0
2	32	33	0.2
3	100	101	0.2
4	212	212	0.0
5	300	300	0.0
6	400	400	0.0
7	500	500	0.0
8	600	600	0.0
9	700	700	0.0
10	800	801	0.1
11	900	900	0.0

Average[b]	**0.0**
Pass/Fail ?	**Pass**

a Difference, % (Based on degrees Rankin):

$$\text{Absolute Difference} = \frac{|(\text{Ref. Temp.} + 460) - (\text{TC Temp.} + 460)|}{\text{Ref. Temp.} + 460} \times 100$$

b Average Absolute Difference must be ≤ 1.5%.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/14/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 4 Date: 1/12/2013

Meter Box Thermocouple: Probe Heat

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (%)
1	0	0	0.0
2	32	52	4.1
3	100	101	0.2
4	212	212	0.0
5	300	300	0.0
6	400	400	0.0
7	500	500	0.0

Average[b]	**0.6**
Pass/Fail ?	**Pass**

a Difference, % (Based on degrees Rankin):

$$\text{Absolute Difference} = \frac{|(\text{Ref. Temp.} + 460) - (\text{TC Temp.} + 460)|}{\text{Ref. Temp.} + 460} \times 100$$

b Average Absolute Difference must be ≤ 1.5%.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/14/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 4 Date: 1/12/2013

Meter Box Thermocouple: Filter Heat

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (%)
1	0	0	0.0
2	32	33	0.2
3	100	101	0.2
4	212	212	0.0
5	300	300	0.0
6	400	400	0.0
7	500	500	0.0

Average[b]	**0.1**
Pass/Fail ?	**Pass**

a Difference, % (Based on degrees Rankin):

$$\text{Absolute Difference} = \frac{|(\text{Ref. Temp.} + 460) - (\text{TC Temp.} + 460)|}{\text{Ref. Temp.} + 460} \times 100$$

b Average Absolute Difference must be ≤ 1.5%.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/14/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 4 Date: 1/12/2013

Meter Box Thermocouple: Aux. (High)

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (%)
1	0	0	0.0
2	32	32	0.0
3	100	101	0.2
4	212	212	0.0
5	300	300	0.0
6	400	401	0.1
7	500	500	0.0
8	600	600	0.0
9	700	701	0.1
10	800	799	0.1
11	900	899	0.1

Average[b]	**0.1**
Pass/Fail ?	**Pass**

a Difference, % (Based on degrees Rankin):

$$\text{Absolute Difference} = \frac{\text{I (Ref. Temp.+ 460) - (TC Temp.+ 460) I}}{\text{Ref. Temp. + 460}} \times 100$$

b Average Absolute Difference must be ≤ 1.5%.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/14/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 4 Date: 1/12/2013

Meter Box Thermocouple: Impinger Exit / XAD Condenser

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (°F)
1	0	0	0
2	10	11	1
3	20	19	1
4	32	32	0
5	40	41	1
6	50	50	0
7	60	60	0
8	68	67	1

Average	**1**
Pass/Fail ?	**Pass**

(a) Absolute Difference must be ≤ 2°F.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/14/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 4 Date: 1/12/2013

Meter Box Thermocouple: Aux. (Low)

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (°F)
1	0	0	0
2	10	10	0
3	20	21	1
4	32	32	0
5	40	41	1
6	50	50	0
7	60	60	0
8	68	68	0
9	80	80	0
10	90	91	1
11	100	100	0

Average	**0**
Pass/Fail ?	**Pass**

(a) Absolute Difference must be ≤ 2°F.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Recello Date: 1/14/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 4 Date: 1/12/2013

Meter Box Thermocouple: Meter Inlet

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (°F)
1	0	0	0
2	32	32	0
3	50	50	0
4	68	68	0
5	80	80	0
6	90	90	0
7	100	101	1
8	110	111	1
9	120	121	1
10	130	130	0
11	140	140	0

Average	**0**
Pass/Fail ?	**Pass**

(a) Absolute Difference must be ≤ 5.4°F.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/14/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 4 Date: 1/12/2013

Meter Box Thermocouple: Meter Outlet

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (°F)
1	0	0	0
2	32	32	0
3	50	50	0
4	68	68	0
5	80	80	0
6	90	90	0
7	100	101	1
8	110	111	1
9	120	120	0
10	130	130	0
11	140	140	0

Average	**0**
Pass/Fail ?	**Pass**

(a) Absolute Difference must be ≤ 5.4°F.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Recello Date: 1/14/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 16 Date: 1/12/2013

Meter Box Thermocouple: Stack Temp.

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (%)
1	0	1	0.2
2	32	32	0.0
3	100	101	0.2
4	212	212	0.0
5	300	300	0.0
6	400	400	0.0
7	500	501	0.1
8	600	600	0.0
9	700	700	0.0
10	800	801	0.1
11	900	900	0.0

Average[b]	**0.1**
Pass/Fail ?	**Pass**

a Difference, % (Based on degrees Rankin):

$$\text{Absolute Difference} = \frac{|(\text{Ref. Temp.} + 460) - (\text{TC Temp.} + 460)|}{\text{Ref. Temp.} + 460} \times 100$$

b Average Absolute Difference must be ≤ 1.5%.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 16 Date: 1/12/2013

Meter Box Thermocouple: Probe Heat

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (%)
1	0	0	0.0
2	32	33	0.2
3	100	101	0.2
4	212	212	0.0
5	300	300	0.0
6	400	400	0.0
7	500	501	0.1

Average[b]	**0.1**
Pass/Fail ?	**Pass**

a Difference, % (Based on degrees Rankin):

$$\text{Absolute Difference} = \frac{|(\text{Ref. Temp.} + 460) - (\text{TC Temp.} + 460)|}{\text{Ref. Temp.} + 460} \times 100$$

b Average Absolute Difference must be ≤ 1.5%.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 16 Date: 1/12/2013

Meter Box Thermocouple: Filter Heat

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (%)
1	0	0	0.0
2	32	32	0.0
3	100	100	0.0
4	212	212	0.0
5	300	300	0.0
6	400	401	0.1
7	500	501	0.1

Average[b]	**0.0**
Pass/Fail ?	**Pass**

a Difference, % (Based on degrees Rankin):

$$\text{Absolute Difference} = \frac{|(\text{Ref. Temp.} + 460) - (\text{TC Temp.} + 460)|}{\text{Ref. Temp.} + 460} \times 100$$

b Average Absolute Difference must be ≤ 1.5%.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Recello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 16 Date: 1/12/2013

Meter Box Thermocouple: Aux. (High)

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (%)
1	0	0	0.0
2	32	32	0.0
3	100	100	0.0
4	212	212	0.0
5	300	301	0.1
6	400	400	0.0
7	500	500	0.0
8	600	601	0.1
9	700	700	0.0
10	800	801	0.1
11	900	900	0.0

Average[b]	**0.0**
Pass/Fail ?	**Pass**

a Difference, % (Based on degrees Rankin):

$$\text{Absolute Difference} = \frac{|(\text{Ref. Temp.} + 460) - (\text{TC Temp.} + 460)|}{\text{Ref. Temp.} + 460} \times 100$$

b Average Absolute Difference must be ≤ 1.5%.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 16 Date: 1/12/2013

Meter Box Thermocouple: Impinger Exit / XAD Condenser

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (°F)
1	0	0	0
2	10	11	1
3	20	20	0
4	32	33	1
5	40	40	0
6	50	50	0
7	60	60	0
8	68	67	1

Average	**0**
Pass/Fail ?	**Pass**

(a) Absolute Difference must be ≤ 2°F.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 16 Date: 1/12/2013

Meter Box Thermocouple: Aux. (Low)

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (°F)
1	0	0	0
2	10	10	0
3	20	20	0
4	32	32	0
5	40	40	0
6	50	51	1
7	60	61	1
8	68	68	0
9	80	80	0
10	90	90	0
11	100	100	0

Average	**0**
Pass/Fail ?	**Pass**

(a) Absolute Difference must be ≤ 2°F.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Recello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 16 Date: 1/12/2013

Meter Box Thermocouple: Meter Inlet

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (°F)
1	0	0	0
2	32	33	1
3	50	50	0
4	68	68	0
5	80	81	1
6	90	90	0
7	100	100	0
8	110	111	1
9	120	121	1
10	130	130	0
11	140	140	0

Average	**0**
Pass/Fail ?	**Pass**

(a) Absolute Difference must be ≤ 5.4°F.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 16 Date: 1/12/2013

Meter Box Thermocouple: Meter Outlet

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (°F)
1	0	0	0
2	32	32	0
3	50	50	0
4	68	67	1
5	80	80	0
6	90	91	1
7	100	100	0
8	110	110	0
9	120	121	1
10	130	130	0
11	140	140	0

Average	**0**
Pass/Fail ?	**Pass**

(a) Absolute Difference must be ≤ 5.4°F.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 17 Date: 1/12/2013

Meter Box Thermocouple: Stack Temp.

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (%)
1	0	0	0.0
2	32	32	0.0
3	100	100	0.0
4	212	212	0.0
5	300	301	0.1
6	400	400	0.0
7	500	500	0.0
8	600	601	0.1
9	700	700	0.0
10	800	800	0.0
11	900	901	0.1

Average[b]	**0.0**
Pass/Fail ?	**Pass**

a Difference, % (Based on degrees Rankin):

$$\text{Absolute Difference} = \frac{|(\text{Ref. Temp.} + 460) - (\text{TC Temp.} + 460)|}{\text{Ref. Temp.} + 460} \times 100$$

b Average Absolute Difference must be ≤ 1.5%.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 17 Date: 1/12/2013

Meter Box Thermocouple: Probe Heat

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (%)
1	0	0	0.0
2	32	32	0.0
3	100	101	0.2
4	212	212	0.0
5	300	300	0.0
6	400	401	0.1
7	500	500	0.0

Average[b]	**0.0**
Pass/Fail ?	**Pass**

a Difference, % (Based on degrees Rankin):

$$\text{Absolute Difference} = \frac{|(\text{Ref. Temp.} + 460) - (\text{TC Temp.} + 460)|}{\text{Ref. Temp.} + 460} \times 100$$

b Average Absolute Difference must be ≤ 1.5%.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 17 Date: 1/12/2013

Meter Box Thermocouple: Filter Heat

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (%)
1	0	0	0.0
2	32	33	0.2
3	100	101	0.2
4	212	212	0.0
5	300	300	0.0
6	400	401	0.1
7	500	500	0.0

Average[b]	**0.1**
Pass/Fail ?	**Pass**

a Difference, % (Based on degrees Rankin):

$$\text{Absolute Difference} = \frac{|(\text{Ref. Temp.} + 460) - (\text{TC Temp.} + 460)|}{\text{Ref. Temp.} + 460} \times 100$$

b Average Absolute Difference must be ≤ 1.5%.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 17 Date: 1/12/2013

Meter Box Thermocouple: Aux. (High)

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (%)
1	0	0	0.0
2	32	31	0.2
3	100	101	0.2
4	212	212	0.0
5	300	300	0.0
6	400	400	0.0
7	500	500	0.0
8	600	601	0.1
9	700	700	0.0
10	800	800	0.0
11	900	901	0.1

Average[b]	**0.1**
Pass/Fail ?	**Pass**

a Difference, % (Based on degrees Rankin):

$$\text{Absolute Difference} = \frac{|(\text{Ref. Temp.} + 460) - (\text{TC Temp.} + 460)|}{\text{Ref. Temp.} + 460} \times 100$$

b Average Absolute Difference must be ≤ 1.5%.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 17 Date: 1/12/2013

Meter Box Thermocouple: Impinger Exit / XAD Condenser

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (°F)
1	0	0	0
2	10	10	0
3	20	20	0
4	32	32	0
5	40	41	1
6	50	51	1
7	60	60	0
8	68	67	1

Average	**0**
Pass/Fail ?	**Pass**

(a) Absolute Difference must be ≤ 2°F.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 17 Date: 1/12/2013

Meter Box Thermocouple: Aux. (Low)

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (°F)
1	0	0	0
2	10	10	0
3	20	20	0
4	32	32	0
5	40	40	0
6	50	50	0
7	60	60	0
8	68	68	0
9	80	80	0
10	90	90	0
11	100	100	0

Average	**0**
Pass/Fail ?	**Pass**

(a) Absolute Difference must be ≤ 2°F.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Recello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 17 Date: 1/12/2013

Meter Box Thermocouple: Meter Inlet

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (°F)
1	0	0	0
2	32	32	0
3	50	50	0
4	68	68	0
5	80	81	1
6	90	91	1
7	100	101	1
8	110	110	0
9	120	120	0
10	130	130	0
11	140	140	0

Average	**0**
Pass/Fail ?	**Pass**

(a) Absolute Difference must be ≤ 5.4°F.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 17 Date: 1/12/2013

Meter Box Thermocouple: Meter Outlet

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (°F)
1	0	0	0
2	32	32	0
3	50	50	0
4	68	67	1
5	80	80	0
6	90	90	0
7	100	101	1
8	110	111	1
9	120	120	0
10	130	130	0
11	140	140	0

Average	**0**
Pass/Fail ?	**Pass**

(a) Absolute Difference must be ≤ 5.4°F.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 18 Date: 1/12/2013

Meter Box Thermocouple: Stack Temp.

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (%)
1	0	0	0.0
2	32	32	0.0
3	100	100	0.0
4	212	213	0.1
5	300	300	0.0
6	400	400	0.0
7	500	501	0.1
8	600	601	0.1
9	700	700	0.0
10	800	799	0.1
11	900	900	0.0

Average[b]	**0.0**
Pass/Fail ?	**Pass**

a Difference, % (Based on degrees Rankin):

$$\text{Absolute Difference} = \frac{|(\text{Ref. Temp.} + 460) - (\text{TC Temp.} + 460)|}{\text{Ref. Temp.} + 460} \times 100$$

b Average Absolute Difference must be ≤ 1.5%.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 18 Date: 1/12/2013

Meter Box Thermocouple: Probe Heat

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (%)
1	0	0	0.0
2	32	32	0.0
3	100	100	0.0
4	212	212	0.0
5	300	300	0.0
6	400	400	0.0
7	500	500	0.0

Average[b]	**0.0**
Pass/Fail ?	**Pass**

a Difference, % (Based on degrees Rankin):

$$\text{Absolute Difference} = \frac{|(\text{Ref. Temp.} + 460) - (\text{TC Temp.} + 460)|}{\text{Ref. Temp.} + 460} \times 100$$

b Average Absolute Difference must be ≤ 1.5%.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 18 Date: 1/12/2013

Meter Box Thermocouple: Filter Heat

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (%)
1	0	0	0.0
2	32	32	0.0
3	100	101	0.2
4	212	212	0.0
5	300	301	0.1
6	400	401	0.1
7	500	500	0.0

Average[b]	**0.1**
Pass/Fail ?	**Pass**

a Difference, % (Based on degrees Rankin):

$$\text{Absolute Difference} = \frac{|(\text{Ref. Temp.} + 460) - (\text{TC Temp.} + 460)|}{\text{Ref. Temp.} + 460} \times 100$$

b Average Absolute Difference must be ≤ 1.5%.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 18 Date: 1/12/2013

Meter Box Thermocouple: Aux. (High)

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (%)
1	0	0	0.0
2	32	32	0.0
3	100	101	0.2
4	212	212	0.0
5	300	300	0.0
6	400	400	0.0
7	500	500	0.0
8	600	600	0.0
9	700	700	0.0
10	800	801	0.1
11	900	900	0.0

Average[b]	**0.0**
Pass/Fail ?	**Pass**

a Difference, % (Based on degrees Rankin):

$$\text{Absolute Difference} = \frac{|(\text{Ref. Temp.} + 460) - (\text{TC Temp.} + 460)|}{\text{Ref. Temp.} + 460} \times 100$$

b Average Absolute Difference must be ≤ 1.5%.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 18 Date: 1/12/2013

Meter Box Thermocouple: Impinger Exit / XAD Condenser

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (°F)
1	0	0	0
2	10	10	0
3	20	20	0
4	32	32	0
5	40	40	0
6	50	51	1
7	60	60	0
8	68	67	1

Average	**0**
Pass/Fail ?	**Pass**

(a) Absolute Difference must be ≤ 2°F.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 18 Date: 1/12/2013

Meter Box Thermocouple: Aux. (Low)

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (°F)
1	0	0	0
2	10	10	0
3	20	20	0
4	32	32	0
5	40	40	0
6	50	50	0
7	60	60	0
8	68	67	1
9	80	81	1
10	90	90	0
11	100	100	0

Average	**0**
Pass/Fail ?	**Pass**

(a) Absolute Difference must be ≤ 2°F.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 18 Date: 1/12/2013

Meter Box Thermocouple: Meter Inlet

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (°F)
1	0	0	0
2	32	32	0
3	50	50	0
4	68	68	0
5	80	80	0
6	90	91	1
7	100	101	1
8	110	110	0
9	120	120	0
10	130	130	0
11	140	141	1

Average	**0**
Pass/Fail ?	**Pass**

(a) Absolute Difference must be ≤ 5.4°F.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 18 Date: 1/12/2013

Meter Box Thermocouple: Meter Outlet

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (°F)
1	0	0	0
2	32	32	0
3	50	51	1
4	68	67	1
5	80	81	1
6	90	90	0
7	100	100	0
8	110	110	0
9	120	120	0
10	130	130	0
11	140	141	1

Average	**0**
Pass/Fail ?	**Pass**

(a) Absolute Difference must be ≤ 5.4°F.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Riccello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 19 Date: 1/12/2013

Meter Box Thermocouple: Stack Temp.

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (%)
1	0	1	0.2
2	32	32	0.0
3	100	101	0.2
4	212	212	0.0
5	300	300	0.0
6	400	400	0.0
7	500	501	0.1
8	600	600	0.0
9	700	700	0.0
10	800	801	0.1
11	900	900	0.0

Average[b]	**0.1**
Pass/Fail ?	**Pass**

a Difference, % (Based on degrees Rankin):

$$\text{Absolute Difference} = \frac{|(\text{Ref. Temp.} + 460) - (\text{TC Temp.} + 460)|}{\text{Ref. Temp.} + 460} \times 100$$

b Average Absolute Difference must be ≤ 1.5%.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 19 Date: 1/12/2013

Meter Box Thermocouple: Probe Heat

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (%)
1	0	0	0.0
2	32	33	0.2
3	100	101	0.2
4	212	212	0.0
5	300	300	0.0
6	400	400	0.0
7	500	501	0.1

Average[b]	**0.1**
Pass/Fail ?	**Pass**

a Difference, % (Based on degrees Rankin):

$$\text{Absolute Difference} = \frac{|(\text{Ref. Temp.} + 460) - (\text{TC Temp.} + 460)|}{\text{Ref. Temp.} + 460} \times 100$$

b Average Absolute Difference must be ≤ 1.5%.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 19 Date: 1/12/2013

Meter Box Thermocouple: Filter Heat

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (%)
1	0	0	0.0
2	32	32	0.0
3	100	100	0.0
4	212	212	0.0
5	300	300	0.0
6	400	401	0.1
7	500	501	0.1

Average[b]	**0.0**
Pass/Fail ?	**Pass**

a Difference, % (Based on degrees Rankin):

$$\text{Absolute Difference} = \frac{|(\text{Ref. Temp.} + 460) - (\text{TC Temp.} + 460)|}{\text{Ref. Temp.} + 460} \times 100$$

b Average Absolute Difference must be ≤ 1.5%.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 19 Date: 1/12/2013

Meter Box Thermocouple: Aux. (High)

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (%)
1	0	0	0.0
2	32	32	0.0
3	100	100	0.0
4	212	212	0.0
5	300	301	0.1
6	400	400	0.0
7	500	500	0.0
8	600	601	0.1
9	700	700	0.0
10	800	801	0.1
11	900	900	0.0

Average[b]	**0.0**
Pass/Fail ?	**Pass**

a Difference, % (Based on degrees Rankin):

$$\text{Absolute Difference} = \frac{|(\text{Ref. Temp.} + 460) - (\text{TC Temp.} + 460)|}{\text{Ref. Temp.} + 460} \times 100$$

b Average Absolute Difference must be ≤ 1.5%.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 19 Date: 1/12/2013

Meter Box Thermocouple: Impinger Exit / XAD Condenser

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (°F)
1	0	0	0
2	10	11	1
3	20	20	0
4	32	33	1
5	40	40	0
6	50	50	0
7	60	60	0
8	68	67	1

Average	**0**
Pass/Fail ?	**Pass**

(a) Absolute Difference must be ≤ 2°F.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 19 Date: 1/12/2013

Meter Box Thermocouple: Aux. (Low)

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (°F)
1	0	0	0
2	10	10	0
3	20	20	0
4	32	32	0
5	40	40	0
6	50	51	1
7	60	61	1
8	68	68	0
9	80	80	0
10	90	90	0
11	100	100	0

Average	**0**
Pass/Fail ?	**Pass**

(a) Absolute Difference must be ≤ 2°F.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Recello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 19 Date: 1/12/2013

Meter Box Thermocouple: Meter Inlet

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (°F)
1	0	0	0
2	32	33	1
3	50	50	0
4	68	68	0
5	80	81	1
6	90	90	0
7	100	100	0
8	110	111	1
9	120	121	1
10	130	130	0
11	140	140	0

Average	**0**
Pass/Fail ?	**Pass**

(a) Absolute Difference must be ≤ 5.4°F.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/15/2013

THERMOCOUPLE CALIBRATION DATA

Meter Box ID: 19 Date: 1/12/2013

Meter Box Thermocouple: Meter Outlet

Reference Calibrator ID: T-259402

Reference Calibrator Model: HH-20-CAL

Reference Calibrator Type: J-K-T

Reference Point	Reference Temperature (°F)	Thermocouple Temperature (°F)	Absolute Difference[a] (°F)
1	0	0	0
2	32	32	0
3	50	50	0
4	68	67	1
5	80	80	0
6	90	91	1
7	100	100	0
8	110	110	0
9	120	121	1
10	130	130	0
11	140	140	0

Average	**0**
Pass/Fail ?	**Pass**

(a) Absolute Difference must be ≤ 5.4°F.

Calibration Performed By: MRW Date: 1/12/2013

QA/QC Check Performed By: David Mecello Date: 1/15/2013

The Air Compliance Group, LLC
Post-Test Thermocouple System Calibration Form
(EPA ALT-011)

Date: 4/18/2013 Job ID: Green Conversion Systems

Performed By: MSH Contract No.: V13030

Reference Thermometer ID: ASTM 7

Meter Box ID: 4

Probe Stack TC ID: FP 8-3

Umbilical ID: UF 100-2

Meter Inlet TC ID: DGM IN

Meter Outlet TC ID: DGM OUT

Reference Temp. (°F)[1]	Post-Test Temp. (°F)	Difference (°F)[2]	Pass/Fail
	Probe Stack TC		
68	69	1	Pass
	Meter Inlet TC		
68	67	-1	Pass
	Meter Outlet TC		
68	66	-2	Pass

Acceptance Criteria

[1] Must be at ambient temperature, or any other temperature, within the range specified by the manufacturer.

[2] Must meet the following temperature differences:

Probe Stack TC	must be within ± 2°F of the reference temperature.
Meter Inlet TC	must be within ± 2°F of the reference temperature.
Meter Outlet TC	must be within ± 2°F of the reference temperature.

QA/QC Performed By: David Mecello **Date:** 4/18/2013

The Air Compliance Group, LLC
Post-Test Thermocouple System Calibration Form
(EPA ALT-011)

Date: 4/18/2013 Job ID: Green Conversion Systems

Performed By: MSH Contract No.: V13030

Reference Thermometer ID: ASTM 7

Meter Box ID: 4

Probe Stack TC ID: PL 9-6

Umbilical ID: U-50-2

Meter Inlet TC ID: DGM IN

Meter Outlet TC ID: DGM OUT

Reference Temp. (°F)[1]	Post-Test Temp. (°F)	Difference (°F)[2]	Pass/Fail
	Probe Stack TC		
66	67	1	Pass
	Meter Inlet TC		
66	65	-1	Pass
	Meter Outlet TC		
66	66	0	Pass

Acceptance Criteria

[1] Must be at ambient temperature, or any other temperature, within the range specified by the manufacturer.

[2] Must meet the following temperature differences:

Probe Stack TC	must be within ± 2°F of the reference temperature.
Meter Inlet TC	must be within ± 2°F of the reference temperature.
Meter Outlet TC	must be within ± 2°F of the reference temperature.

QA/QC Performed By: David Mecello **Date:** 4/18/2013

The Air Compliance Group, LLC
Post-Test Thermocouple System Calibration Form
(EPA ALT-011)

Date: 4/18/2013 Job ID: Green Conversion Systems

Performed By: MSH Contract No.: V13030

Reference Thermometer ID: ASTM 7

Meter Box ID: 4

Probe Stack TC ID: PL 9-7

Umbilical ID: PU-56-1

Meter Inlet TC ID: DGM IN

Meter Outlet TC ID: DGM OUT

Reference Temp. (°F)[1]	Post-Test Temp. (°F)	Difference (°F)[2]	Pass/Fail
	Probe Stack TC		
70	69	-1	Pass
	Meter Inlet TC		
70	69	-1	Pass
	Meter Outlet TC		
70	70	0	Pass

Acceptance Criteria

[1] Must be at ambient temperature, or any other temperature, within the range specified by the manufacturer.

[2] Must meet the following temperature differences:

Probe Stack TC	must be within ± 2°F of the reference temperature.
Meter Inlet TC	must be within ± 2°F of the reference temperature.
Meter Outlet TC	must be within ± 2°F of the reference temperature.

QA/QC Performed By: David Mecello **Date:** 4/18/2013

The Air Compliance Group, LLC
Post-Test Thermocouple System Calibration Form
(EPA ALT-011)

Date: 4/18/2013 Job ID: Green Conversion Systems

Performed By: MSH Contract No.: V13030

Reference Thermometer ID: ASTM 7

Meter Box ID: 16

Probe Stack TC ID: PL 9-4

Umbilical ID: PU-50-2

Meter Inlet TC ID: DGM IN

Meter Outlet TC ID: DGM OUT

Reference Temp. (°F)[1]	Post-Test Temp. (°F)	Difference (°F)[2]	Pass/Fail
	Probe Stack TC		
70	69	-1	Pass
	Meter Inlet TC		
71	70	-1	Pass
	Meter Outlet TC		
71	70	-1	Pass

Acceptance Criteria

[1] Must be at ambient temperature, or any other temperature, within the range specified by the manufacturer.

[2] Must meet the following temperature differences:

Probe Stack TC	must be within ± 2°F of the reference temperature.
Meter Inlet TC	must be within ± 2°F of the reference temperature.
Meter Outlet TC	must be within ± 2°F of the reference temperature.

QA/QC Performed By: David Mecello **Date:** 4/18/2013

The Air Compliance Group, LLC
Post-Test Thermocouple System Calibration Form
(EPA ALT-011)

Date: 4/19/2013 Job ID: reen Conversion Systen

Performed By: MSH Contract No.: V13030

Reference Thermometer ID: ASTM 7

Meter Box ID: 16

Probe Stack TC ID: PL 9-2

Umbilical ID: PU-50-2

Meter Inlet TC ID: DGM IN

Meter Outlet TC ID: DGM OUT

Reference Temp. (°F)[1]	Post-Test Temp. (°F)	Difference (°F)[2]	Pass/Fail
	Probe Stack TC		
68	67	-1	Pass
	Meter Inlet TC		
68	67	-1	Pass
	Meter Outlet TC		
67	66	-1	Pass

Acceptance Criteria

[1] Must be at ambient temperature, or any other temperature, within the range specified by the manufacturer.

[2] Must meet the following temperature differences:

Probe Stack TC	must be within ± 2°F of the reference temperature.
Meter Inlet TC	must be within ± 2°F of the reference temperature.
Meter Outlet TC	must be within ± 2°F of the reference temperature.

QA/QC Performed By: David Mecello **Date:** 4/19/2013

The Air Compliance Group, LLC
Post-Test Thermocouple System Calibration Form
(EPA ALT-011)

Date: 4/18/2013 Job ID: Green Conversion Systems

Performed By: MSH Contract No.: V13030

Reference Thermometer ID: ASTM 7

Meter Box ID: 17

Probe Stack TC ID: PL 10-2

Umbilical ID: U-50-4

Meter Inlet TC ID: DGM IN

Meter Outlet TC ID: DGM OUT

Reference Temp. (°F)[1]	Post-Test Temp. (°F)	Difference (°F)[2]	Pass/Fail
	Probe Stack TC		
69	70	1	Pass
	Meter Inlet TC		
67	69	2	Pass
	Meter Outlet TC		
69	70	1	Pass

Acceptance Criteria

[1] Must be at ambient temperature, or any other temperature, within the range specified by the manufacturer.

[2] Must meet the following temperature differences:

Probe Stack TC	must be within ± 2°F of the reference temperature.
Meter Inlet TC	must be within ± 2°F of the reference temperature.
Meter Outlet TC	must be within ± 2°F of the reference temperature.

QA/QC Performed By: David Mecello **Date:** 4/18/2013

The Air Compliance Group, LLC
Post-Test Thermocouple System Calibration Form
(EPA ALT-011)

Date: 4/19/2013 Job ID: Green Conversion Systems

Performed By: MSH Contract No.: V13030

Reference Thermometer ID: ASTM 7

Meter Box ID: 17

Probe Stack TC ID: PL 10-1

Umbilical ID: U-50-4

Meter Inlet TC ID: DGM IN

Meter Outlet TC ID: DGM OUT

Reference Temp. (°F)[1]	Post-Test Temp. (°F)	Difference (°F)[2]	Pass/Fail
	Probe Stack TC		
68	67	-1	Pass
	Meter Inlet TC		
67	67	0	Pass
	Meter Outlet TC		
67	67	0	Pass

Acceptance Criteria

[1] Must be at ambient temperature, or any other temperature, within the range specified by the manufacturer.

[2] Must meet the following temperature differences:

Probe Stack TC	must be within ± 2°F of the reference temperature.
Meter Inlet TC	must be within ± 2°F of the reference temperature.
Meter Outlet TC	must be within ± 2°F of the reference temperature.

QA/QC Performed By: David Mecello **Date:** 4/19/2013

The Air Compliance Group, LLC
Post-Test Thermocouple System Calibration Form
(EPA ALT-011)

Date: 4/18/2013 Job ID: Green Conversion Systems

Performed By: MSH Contract No.: V13030

Reference Thermometer ID: ASTM 7

Meter Box ID: 18

Probe Stack TC ID: PL 9-6

Umbilical ID: U-50-2

Meter Inlet TC ID: DGM IN

Meter Outlet TC ID: DGM OUT

Reference Temp. (°F)[1]	Post-Test Temp. (°F)	Difference (°F)[2]	Pass/Fail
	Probe Stack TC		
70	71	1	Pass
	Meter Inlet TC		
69	68	-1	Pass
	Meter Outlet TC		
70	70	0	Pass

Acceptance Criteria

[1] Must be at ambient temperature, or any other temperature, within the range specified by the manufacturer.

[2] Must meet the following temperature differences:

Probe Stack TC	must be within ± 2°F of the reference temperature.
Meter Inlet TC	must be within ± 2°F of the reference temperature.
Meter Outlet TC	must be within ± 2°F of the reference temperature.

QA/QC Performed By: David Mecello **Date:** 4/18/2013

The Air Compliance Group, LLC
Post-Test Thermocouple System Calibration Form
(EPA ALT-011)

Date: 4/19/2013 Job ID: Green Conversion Systems

Performed By: MSH Contract No.: V13030

Reference Thermometer ID: ASTM 7

Meter Box ID: 18

Probe Stack TC ID: PL 9-1

Umbilical ID: U-50-2

Meter Inlet TC ID: DGM IN

Meter Outlet TC ID: DGM OUT

Reference Temp. (°F)[1]	Post-Test Temp. (°F)	Difference (°F)[2]	Pass/Fail
	Probe Stack TC		
66	64	-2	Pass
	Meter Inlet TC		
66	65	-1	Pass
	Meter Outlet TC		
65	65	0	Pass

Acceptance Criteria

[1] Must be at ambient temperature, or any other temperature, within the range specified by the manufacturer.

[2] Must meet the following temperature differences:

Probe Stack TC	must be within ± 2°F of the reference temperature.
Meter Inlet TC	must be within ± 2°F of the reference temperature.
Meter Outlet TC	must be within ± 2°F of the reference temperature.

QA/QC Performed By: David Mecello **Date:** 4/19/2013

The Air Compliance Group, LLC
Post-Test Thermocouple System Calibration Form
(EPA ALT-011)

Date: 4/18/2013 Job ID: Green Conversion Systems

Performed By: MSH Contract No.: V13030

Reference Thermometer ID: ASTM 7

Meter Box ID: 19

Probe Stack TC ID: PL-7-4

Umbilical ID: U-50-1

Meter Inlet TC ID: DGM IN

Meter Outlet TC ID: DGM OUT

Reference Temp. (°F)[1]	Post-Test Temp. (°F)	Difference (°F)[2]	Pass/Fail
	Probe Stack TC		
70	69	-1	Pass
	Meter Inlet TC		
68	69	1	Pass
	Meter Outlet TC		
71	70	-1	Pass

Acceptance Criteria

[1] Must be at ambient temperature, or any other temperature, within the range specified by the manufacturer.

[2] Must meet the following temperature differences:

Probe Stack TC	must be within ± 2°F of the reference temperature.
Meter Inlet TC	must be within ± 2°F of the reference temperature.
Meter Outlet TC	must be within ± 2°F of the reference temperature.

QA/QC Performed By: David Mecello **Date:** 4/18/2013

Appendix M.3

Gas Analyzer Calibration and Related Data

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E03NI77E15AC592	Reference Number:	54-124356176-1
Cylinder Number:	CC202388	Cylinder Volume:	151.5 CF
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12013	Valve Outlet:	590
Gas Code:	CO2,O2	Certification Date:	Jan 30, 2013

Expiration Date: Jan 30, 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	10.60 %	10.46 %	G1	+/- 1% NIST Traceable	01/30/2013
OXYGEN	12.00 %	11.84 %	G1	+/- 1% NIST Traceable	01/30/2013
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM/CO2	06120403	CC185079	19.66 % CARBON DIOXIDE/NITROGEN	+/- 0.5%	May 01, 2016
NTRM/O2	06120202	CC195927	20.9 % OXYGEN/NITROGEN	+/- 0.4%	Dec 01, 2015

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
CO2-1 HORIBA VIA-510 V1E3H7P5	NDIR	Jan 28, 2013
O2-1 HORIBA MPA-510 3VUYL9NR	Paramagnetic	Jan 08, 2013

Triad Data Available Upon Request

Notes:

Signature on file

Approved for Release

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E03NI60E15A2996	Reference Number:	54-124307341-1
Cylinder Number:	CC43457	Cylinder Volume:	158.9 CF
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12012	Valve Outlet:	590
Gas Code:	OC2	Analysis Date:	Mar 12, 2012

Expiration Date: Mar 12, 2020

This cylinder has been analytically certified as directly traceable to NIST with a total analytical uncertainty as stated below with a confidence level of 95%, in accordance with Airgas ISO procedures. 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 150 psig. i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
CARBON DIOXIDE	19.00 %	18.70 %	G1	+/- 1% NIST Traceable
OXYGEN	21.00 %	20.95 %	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM/CO2	06120403	CC184925	19.66 % CARBON DIOXIDE/NITROGEN	May 01, 2016
NTRM/O2	06120209	CC195927	20.9 % OXYGEN/NITROGEN	Dec 01, 2015

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
CO2-1 HORIBA VIA-510 V1E3H7P5	NDIR	Feb 26, 2012
O2-1 HORIBA MPA-510 3VUYL9NR	Paramagnetic	Feb 27, 2012

Triad Data Available Upon Request

Notes:

Signature on file

Approved for Release

CERTIFICATE OF BATCH ANALYSIS

NITROGEN - CEM-CAL ZERO

Part Number:	NI CZ300	Reference Number:	40-400045487-1
Cylinder Analyzed:	SG1020754	Cylinder Volume:	304.0 CF
Laboratory:	MID - Saint Louis SGL (SAP) - MO	Cylinder Pressure:	2640 PSIG
Analysis Date:	Mar 05, 2012	Valve Outlet:	580
Lot Number:	40-400045487-1		

Expiration Date: Mar 05, 2015

ANALYTICAL RESULTS

Component		Requested Purity		Certified Concentration
CARBON DIOXIDE	<	1.0 PPM	<LDL	0.12 PPM
Moisture	<	1.0 PPM		0.080 PPM
NOx	<	0.1 PPM		0.10 PPM
SO2	<	0.1 PPM		0.10 PPM
THC	<	0.1 PPM		0.04 PPM
CARBON MONOXIDE	<	0.5 PPM	<LDL	0.12 PPM
Oxygen	<	0.5 PPM		0.47 PPM
NitrogenCEM		99.9995 %		99.9995 %

Permanent Notes:Airgas certifies that the contents of this cylinder meet the requirements of 40 CFR 72.

Cylinders in Batch:

38742, C66914, SG1020754

Notes:

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

Signature on file

Approved for Release

ANALYZER CALIBRATION DATA

JOB I.D.:	GCS Pinellas
CONTRACT NO.:	V13030
TECHNICIAN:	KMH

TEST METHOD/ANALYTICAL METHOD: Test Method - Method 3 / Analytical Method - Method 3A
TEST LOCATION: Units 1 and 3 — TEST DATE: 4/9/2013
ANALYZER: Oxygen — DATE OF ANALYSIS: 4/9/2013
REPORTING UNITS (ppm,%): % dv — SPAN: 20.95

RANGE	GAS CYLINDER ID	GAS VALUE (%dv)	ANALYZER RESPONSE (%dv)	ABSOLUTE DIFFERENCE (%dv)	CAL ERROR (% OF SPAN)
ZERO	70037	0.00	0.01	0.0	0.0
MID	4013	11.84	12.01	0.2	0.8
HIGH	4025	20.95	20.97	0.0	0.1
OTHER					

TEST METHOD/ANALYTICAL METHOD: Test Method - Method 3 / Analytical Method - Method 3A
TEST LOCATION: Units 1 and 3 — TEST DATE: 4/9/2013
ANALYZER: Carbon Dioxide — DATE OF ANALYSIS: 4/9/2013
REPORTING UNITS (ppm,%): % dv — SPAN: 18.7

RANGE	GAS CYLINDER ID	GAS VALUE (%dv)	ANALYZER RESPONSE (%dv)	ABSOLUTE DIFFERENCE (%dv)	CAL ERROR (% OF SPAN)
ZERO	70037	0.00	-0.01	0.0	0.1
MID	4013	10.46	10.55	0.1	0.5
HIGH	4025	18.70	18.72	0.0	0.1
OTHER					

Note: The allowable calibration error is 2% of span.

ANALYZER CALIBRATION DATA

JOB I.D.:	GCS Pinellas
CONTRACT NO.:	V13030
TECHNICIAN:	KMH

TEST METHOD/ANALYTICAL METHOD: Test Method - Method 3 / Analytical Method - Method 3A
TEST LOCATION: Units 1 and 2 TEST DATE: 4/10/2013
ANALYZER: Oxygen DATE OF ANALYSIS: 4/10/2013
REPORTING UNITS (ppm,%): % dv SPAN: 20.95

RANGE	GAS CYLINDER ID	GAS VALUE (%dv)	ANALYZER RESPONSE (%dv)	ABSOLUTE DIFFERENCE (%dv)	CAL ERROR (% OF SPAN)
ZERO	70037	0.00	-0.01	0.0	0.0
MID	4013	11.84	11.98	0.1	0.7
HIGH	4025	20.95	20.96	0.0	0.0
OTHER					

TEST METHOD/ANALYTICAL METHOD: Test Method - Method 3 / Analytical Method - Method 3A
TEST LOCATION: Units 1 and 2 TEST DATE: 4/10/2013
ANALYZER: Carbon Dioxide DATE OF ANALYSIS: 4/10/2013
REPORTING UNITS (ppm,%): % dv SPAN: 18.7

RANGE	GAS CYLINDER ID	GAS VALUE (%dv)	ANALYZER RESPONSE (%dv)	ABSOLUTE DIFFERENCE (%dv)	CAL ERROR (% OF SPAN)
ZERO	70037	0.00	0.00	0.0	0.0
MID	4013	10.46	10.53	0.1	0.4
HIGH	4025	18.70	18.72	0.0	0.1
OTHER					

Note: The allowable calibration error is 2% of span.

ANALYZER CALIBRATION DATA

JOB I.D.:	GCS Pinellas
CONTRACT NO.:	V13030
TECHNICIAN:	KMH

TEST METHOD/ANALYTICAL METHOD: Test Method - Method 3 / Analytical Method - Method 3A
TEST LOCATION: Units 1 and 2 TEST DATE: 4/11/2013
ANALYZER: Oxygen DATE OF ANALYSIS: 4/11/2013
REPORTING UNITS (ppm,%): % dv SPAN: 20.95

RANGE	GAS CYLINDER ID	GAS VALUE (%dv)	ANALYZER RESPONSE (%dv)	ABSOLUTE DIFFERENCE (%dv)	CAL ERROR (% OF SPAN)
ZERO	70037	0.00	0.01	0.0	0.0
MID	4013	11.84	11.99	0.2	0.7
HIGH	4025	20.95	20.96	0.0	0.0
OTHER					

TEST METHOD/ANALYTICAL METHOD: Test Method - Method 3 / Analytical Method - Method 3A
TEST LOCATION: Units 1 and 2 TEST DATE: 4/11/2013
ANALYZER: Carbon Dioxide DATE OF ANALYSIS: 4/11/2013
REPORTING UNITS (ppm,%): % dv SPAN: 18.7

RANGE	GAS CYLINDER ID	GAS VALUE (%dv)	ANALYZER RESPONSE (%dv)	ABSOLUTE DIFFERENCE (%dv)	CAL ERROR (% OF SPAN)
ZERO	70037	0.00	0.00	0.0	0.0
MID	4013	10.46	10.52	0.1	0.3
HIGH	4025	18.70	18.71	0.0	0.1
OTHER					

Note: The allowable calibration error is 2% of span.

Model 602
CO_2 Interference Data

Interference Response

Date of Test	6/28/2006
Analyzer Type	CO2
Model No.	602
Serial No.	T04050
Calibration Span	10%

Test Gas Type		Concentration		Analyzer Response	
		(ppm)		Wet	Dry
H2O		2.5%		0.01	0
CO		50		0	0
CH4		50		0.01	0
SO2		20		0	0
NH3		15		0	0
NO		13		0.01	0
N2O		11		0.02	0.01
NO2		9		0.01	0

10. MAINTENANCE

Warning

All replacement parts must be as supplied and/or specified by California Analytical Instruments. Failure to used specified parts may reduce the safety features of the instrument or create a hazardous condition.

10.1. Zero and Span Calibration

The zero and span levels should be checked and/or calibrated daily (or as often as required.)

Note: On the 0-25% range of the analyzer ambient air may be used as span gas. While flowing ambient air to the analyzer adjust the span potentiometer to 20.9% O2.

10.2. Routine Maintenance:

Prepare and check the sample system. Adjust the flow of sample gas to about 1 L/min. The instrument should show a meter indication. The paramagnetic oxygen analyzer is designed for extended operation and may be left switched ON continuously.

10.3. Cross sensitivity of gases

The paramagnetic measuring principle is based on the very high magnetic susceptibility of oxygen. In comparison to oxygen, other gases have such a minor susceptibility that most of them are insignificant. Exceptions to this are the nitrogen oxides. However, as these gases are in most cases present in a very low concentration, the error is still negligible.

10.3.1. Example 1

The residual oxygen percentage is measured in a closed carbon dioxide (CO_2) atmosphere. The "zero calibration" is done by means of nitrogen (N_2).-0.1080
According to the list of cross-sensitivities, the error for 100 % CO_2 at 20° C is 0.27%. In order to obtain a higher accuracy, this means that for the zero calibration the reading should be adjusted at +0.27% with N_2, in order to compensate the error of CO_2.
Since the values of cross-sensitivities are based on 100% volume of that particular gas, the error at 50% by volume CO_2 and 50% by volume N_2 is 0.135%.

10.3.2. Example 2
Given the following gas composition at a temperature of 20° C:

5% volume Oxygen (O_2)	$+100.00 \times 10^{-2} \times 5 = +5.0000$
40% volume Carbon Dioxide(CO_2)	$-0.27 \times 10^{-2} \times 40 = -0.1080$
1% volume Ethane(C21-14)	$-0.43 \times 10^{-2} \times 1 = -0.0043$
54% volume Nitrogen (N2)	$0.00 \times 10^{-2} \times 54 = 0.0000$
Gives a reading (% by volume) of:	+4.8877

As this example shows, the total error (5.000 minus 4.8877) is 0.1123.

Note: see Table 4-1 below for cross sensitivity values of typical gases.

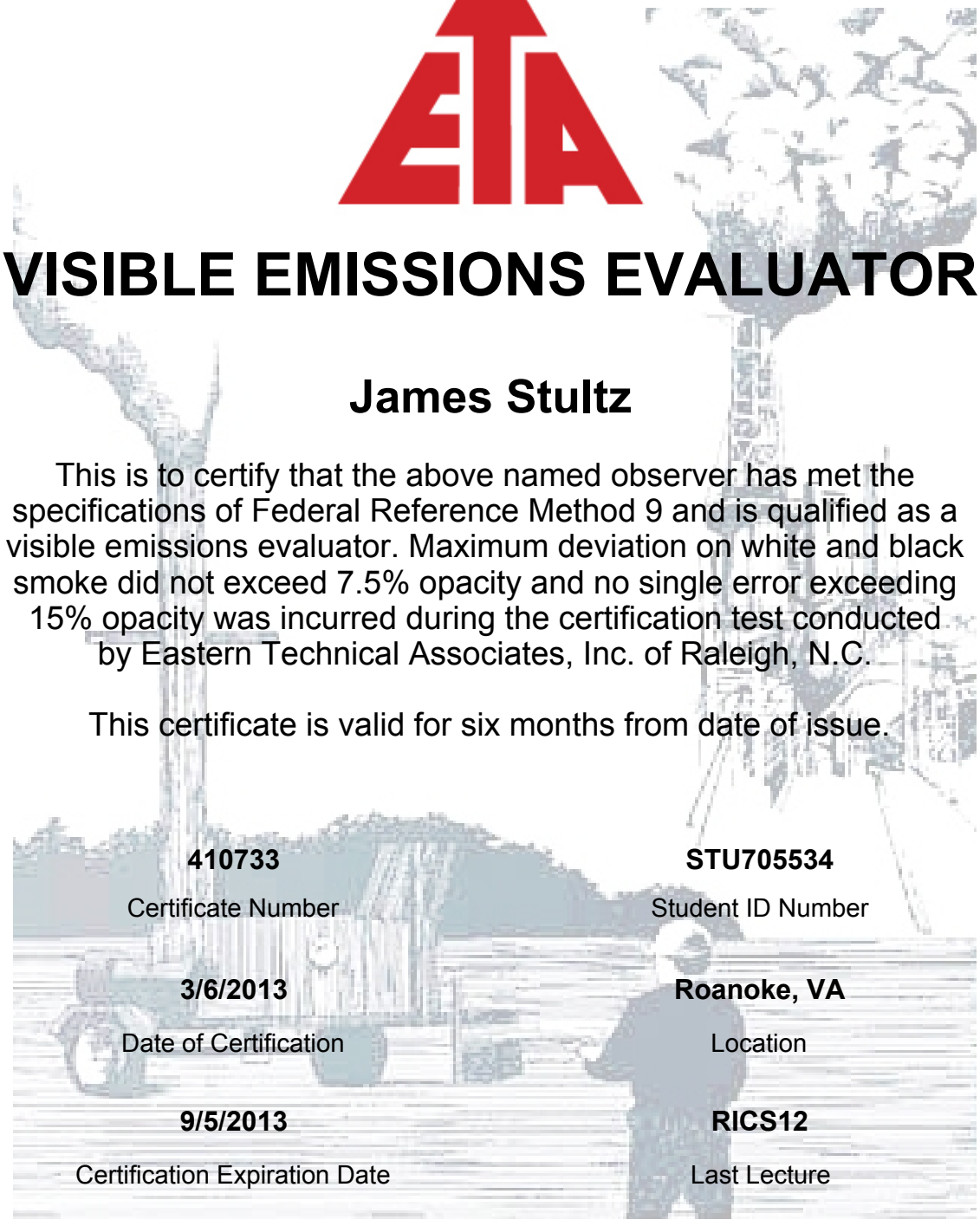
Table 4-1 Cross Sensitivity of gases

All values based on nitrogen 0% / oxygen 100%

Gas	Formula	20 °C	50 °C
Argon	Ar	-0.23	-0.25
Acetylene	C_2H_2	-0.26	-0.28
Acetone	C_3H_60	-0.63	-0.69
Acetaidehyde	C_2H_4O	-0.31	-0.34
Ammonia	N_3	-0.17	-0.19
Benzene	C_6H_4	-1.24	-1.34
Bromine	Br_2	-1.78	-1.97
Butadiene	C_4H_6	-0.85	-0.93
Isobutylene	$(CH_3)2CH=CH_2$	-0.94	-1.06
n-Butane	C_4H_{10}	-1.10	-1.22
Chlorine	CL_2	-0.83	-0.91
Hydrogen Chloride	HCL	-0.31	-0.34
Nitrous Oxide	N_2O	-0.20	-0.22
Diacetylene	$(CHCl)_2$	-1.09-	-1.20
Ethane	C_2H_4	-0.43	-0.47
Ethylene Oxide	$C_2H_4O_2$	-0.54	-0.60
Ethylene	C_2H_4	-0.20	-0.22
Ethylene Glycol	CH_2OHCH_2OH	-0.78	-0.88
Ethylbenzene	C_8H_{10}	-1.89	-2.08
Hydrogen Fluoride	HF	+0.12	+0.14
Furan	C_4H_40	-0.90	-0.99
Helium	He	+0.29	+0.32
n-Hexane	C_6H_{14}	-1.78	-1.97
Krypton	Kr	-0.49	-0.54
Carbon Monoxide	CO	-0.06	-0.07
Carbon Dioxide	CO_2	-0.27	-0.29
Methane	CH_4	-0.16	-0.17
Methanol	CH_4O	-0.27	-0.31
Methylene Chloride	CH_2Cl_2	-1.00	-1.10
Neon	Ne	+0.16	+0.17
n-Octane	C_8H_{18}	-2.45	-2.70
Phenol	C_6H_6O	-1.40	-1.54
Propane	C_3H_8	-0.77	-0.85
Propylene	C_3H_6	-0.57	-0.62
Propene	$CH_3CH=CH_{12}$	-0.58	-0.64
Propylene Oxide	C_3H_6O	-0.90	-1.00
Propylene Chloride	C_3H_7Cl	-1.42	-1.44
Silane	SiH_4	-0.24	-0.27
Styrene	$C_7H_6=CH_2$	-1.63	-1.80
Nitrogen	N_2	-0.00	-0.00
Nitrogen Monoxide	NO	+42.70	+43.00
Nitrogen Dioxide	NO_2	+5.00	+16.00
Oxygen	O_2	+100.00	+100.00
Sulfur Dioxide	SO_2	-0.18	-0.20
Sulfur Fluoride	SF_6	-0.98	-1.05
Hydrogen Sulfide	H_2S	-0.41	-0.43
Toluene	C_7H_8	-1.57	-1.73
Trichloroethylene	C_2HCl_3	-1.56	-1.72
Vinyl Chloride	C_2H_3Cl	-0.68	-0.74
Vinyl.Fluoride	CH_3F	-0.49	-0.54
Water	H_2O	-0.03	-0.03
Hydrogen	H_2	+0.23	+0.26
Xenon	Xe	-0.95	-1.02

Appendix M.4

Visible Emissions Evaluator Certification



VISIBLE EMISSIONS EVALUATOR

James Stultz

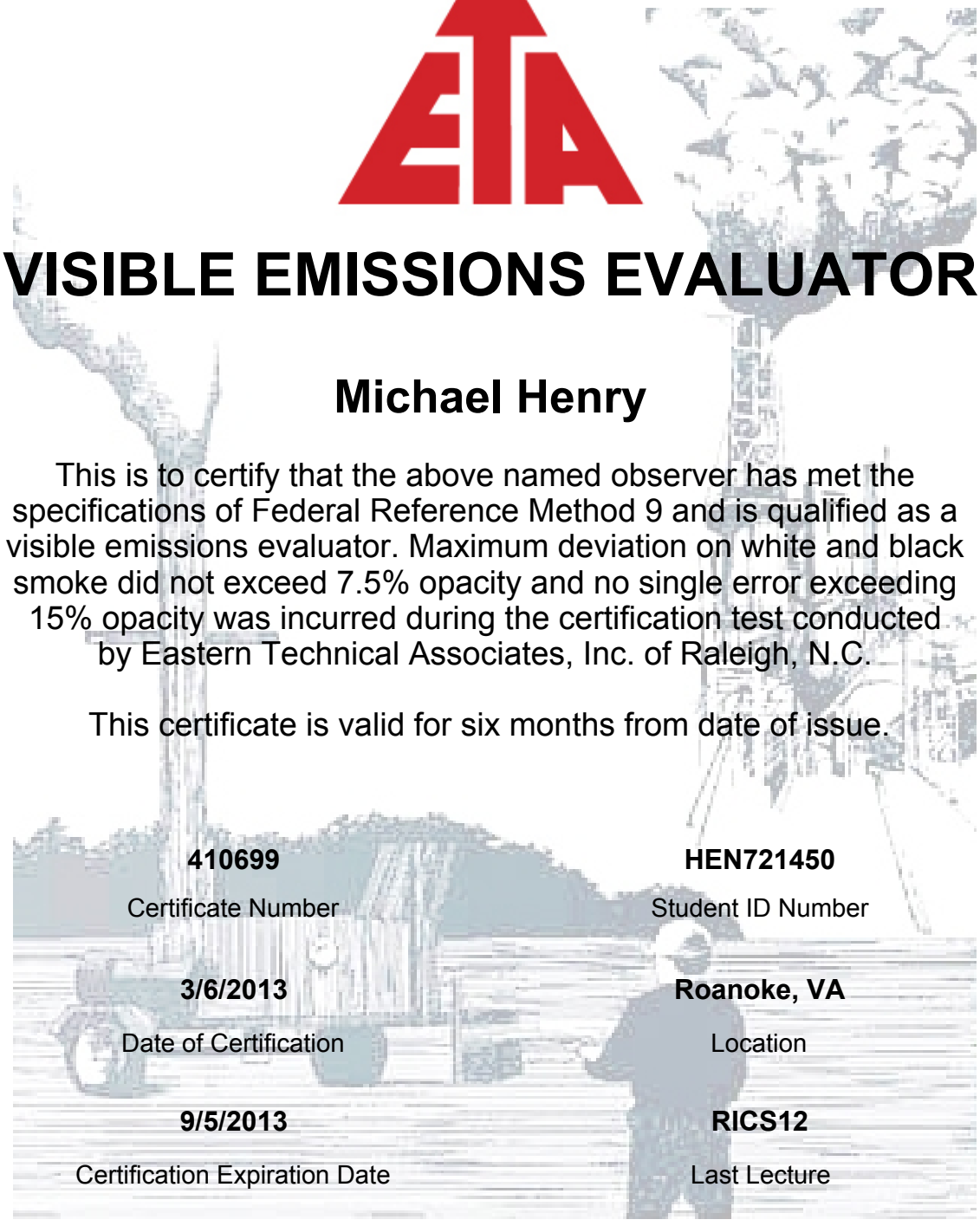
This is to certify that the above named observer has met the specifications of Federal Reference Method 9 and is qualified as a visible emissions evaluator. Maximum deviation on white and black smoke did not exceed 7.5% opacity and no single error exceeding 15% opacity was incurred during the certification test conducted by Eastern Technical Associates, Inc. of Raleigh, N.C.

This certificate is valid for six months from date of issue.

410733	**STU705534**
Certificate Number	Student ID Number
3/6/2013	**Roanoke, VA**
Date of Certification	Location
9/5/2013	**RICS12**
Certification Expiration Date	Last Lecture

Marty Hughes

Director of Training



VISIBLE EMISSIONS EVALUATOR

Michael Henry

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.

410699	**HEN721450**
Certificate Number	Student ID Number
3/6/2013	**Roanoke, VA**
Date of Certification	Location
9/5/2013	**RICS12**
Certification Expiration Date	Last Lecture

Marty Hughes
Director of Training

Appendix N

Facility Operating Data

Appendix N.1

Facility Operating Data: Unit 1

TEST LOG
MWC Unit 1
Pinellas County Resource Recovery Facility
St. Petersburg, Florida

							Steam Flow	Air Flow[1]
Test Location	**Test Parameter**	**EPA Method**	**Run I.D.**	**Date**	**Start Time**	**End Time**	*kilo-pounds*	*dscfm @7% oxygen*
Unit 1 FF Outlet	Opacity	EPA Method 9	U1-M9-R1	4/12/2013	10:13	11:13	228	Not Isokinetic
Unit 1 FF Outlet	Opacity	EPA Method 9	U1-M9-R2	4/12/2013	11:13	12:13	233	Not Isokinetic
Unit 1 FF Outlet	Opacity	EPA Method 9	U1-M9-R3	4/12/2013	12:13	13:13	229	Not Isokinetic

							Steam Flow	Air Flow
Test Location	**Test Parameter**	**EPA Method**	**Run I.D.**	**Date**	**Start Time**	**End Time**	*kilo-pounds*	*dscfm @7% oxygen*
Unit 1 FF Outlet	PM2.5	EPA Methods 201A/202	U1O-M201A/202-R1	4/10/2013	10:08	11:08	236	124,200
Unit 1 FF Outlet	PM2.5	EPA Methods 201A/202	U1O-M201A/202-R2	4/10/2013	12:11	13:12	233	128,232
Unit 1 FF Outlet	PM2.5	EPA Methods 201A/202	U1O-M201A/202-R3	4/10/2013	15:03	16:03	234	125,112

							Steam Flow	Air Flow[1]
Test Location	**Test Parameter**	**EPA Method**	**Run I.D.**	**Date**	**Start Time**	**End Time**	*kilo-pounds*	*dscfm @7% oxygen*
Unit 1 FF Outlet	Particulate and HCl	EPA Method 5/26A	U1O-M26A-R1	4/9/2013	9:05	11:28	233	111,893
Unit 1 FF Outlet	Particulate and HCl	EPA Method 5/26A	U1O-M26A-R2	4/9/2013	13:24	15:36	235	109,608
Unit 1 FF Outlet	Particulate and HCl	EPA Method 5/26A	U1O-M26A-R3	4/9/2013	16:22	18:33	236	109,652

Unit #1
STOP Times
09:30-09:39
* removed from avg

							Steam Flow	Air Flow[1]	Activated Carbon
Test Location	**Test Parameter**	**EPA Method**	**Run I.D.**	**Date**	**Start Time**	**End Time**	*kilo-pounds*	*dscfm @7% oxygen*	*pounds per hour*
Unit 1 FF Outlet	Cadmium, Lead and Mercury	EPA Method 29	U1O-M29-R1	4/9/2013	9:05	11:28	233	109,603	15
Unit 1 FF Outlet	Cadmium, Lead and Mercury	EPA Method 29	U1O-M29-R2	4/9/2013	13:24	15:36	235	111327	15
Unit 1 FF Outlet	Cadmium, Lead and Mercury	EPA Method 29	U1O-M29-R3	4/9/2013	16:22	18:33	236	107939	15

Unit #1
STOP Times
09:30-09:39
* removed from avg

[1] All air flows obtained from ACG using the EPA Methods 1-4 portions of the appropriate test method.

Appendix N.2

Facility Operating Data: Unit 2

TEST LOG
MWC UNIT 2
Pinellas County Resource Recovery Facility
St. Petersburg, Florida

							Steam Flow	Air Flow[1]
Test Location	**Test Parameter**	**EPA Method**	**Run I.D.**	**Date**	**Start Time**	**End Time**	*kilo-pounds*	*dscfm @7% oxygen*
Unit 2 FF Outlet	Opacity	EPA Method 9	U2-M9-R1	4/10/2013	8:51	9:51	236	Not Isokinetic
Unit 2 FF Outlet	Opacity	EPA Method 9	U2-M9-R2	4/12/2013	13:20	14:20	233	Not Isokinetic
Unit 2 FF Outlet	Opacity	EPA Method 9	U2-M9-R3	4/12/2013	14:30	15:30	227	Not Isokinetic

							Steam Flow	Air Flow
Test Location	**Test Parameter**	**EPA Method**	**Run I.D.**	**Date**	**Start Time**	**End Time**	*kilo-pounds*	*dscfm @7% oxygen*
Unit 2 FF Outlet	PM2.5	EPA Methods 201A/202	U2O-M201A/202-R1	4/11/2013	7:32	8:38	231	115,166
Unit 2 FF Outlet	PM2.5	EPA Methods 201A/202	U2O-M201A/202-R2	4/11/2013	10:14	11:14	233	121,445
Unit 2 FF Outlet	PM2.5	EPA Methods 201A/202	U2O-M201A/202-R3	4/11/2013	12:08	13:08	232	117,041

							Steam Flow	Air Flow[1]
Test Location	**Test Parameter**	**EPA Method**	**Run I.D.**	**Date**	**Start Time**	**End Time**	*kilo-pounds*	*dscfm @7% oxygen*
Unit 2 FF Outlet	Particulate and HCl	EPA Method 5/26A	U2O-M26A-R1	4/10/2013	8:45	11:15	234	108,883
Unit 2 FF Outlet	Particulate and HCl	EPA Method 5/26A	U2O-M26A-R2	4/10/2013	12:09	14:28	234	107,068
Unit 2 FF Outlet	Particulate and HCl	EPA Method 5/26A	U2O-M26A-R3	4/10/2013	15:25	17:35	234	100,274

Unit #2
STOP Times
08:57-08:59; 09:32-09:40; and 10:35-10:44.
* removed from avg

							Steam Flow	Air Flow[1]	Activated Carbon
Test Location	**Test Parameter**	**EPA Method**	**Run I.D.**	**Date**	**Start Time**	**End Time**	*kilo-pounds*	*dscfm @7% oxygen*	*pounds per hour*
Unit 2 FF Outlet	Cadmium, Lead and Mercury	EPA Method 29	U2O-M29-R1	4/10/2013	8:45	11:15	234	107,639	15
Unit 2 FF Outlet	Cadmium, Lead and Mercury	EPA Method 29	U2O-M29-R2	4/10/2013	12:09	14:28	234	102,434	15
Unit 2 FF Outlet	Cadmium, Lead and Mercury	EPA Method 29	U2O-M29-R3	4/10/2013	15:25	17:35	234	98,240	15

Unit #2
STOP Times
08:57-08:59; 09:32-09:40; and 10:35-10:44.
* removed from avg

(1) All air flows obtained from ACG using the EPA Methods 1-4 portions of the appropriate test method.

Appendix N.3

Facility Operating Data: Unit 3

TEST LOG
MWC UNIT 3
Pinellas County Resource Recovery Facility
St. Petersburg, Florida

							Steam Flow	Air Flow[1]
Test Location	**Test Parameter**	**EPA Method**	**Run I.D.**	**Date**	**Start Time**	**End Time**	*kilo-pounds*	*dscfm @7% oxygen*
Unit 3 FF Outlet	Opacity	EPA Method 9	U3-M9-R1	4/12/2013	10:13	11:13	234	Not Isokinetic
Unit 3 FF Outlet	Opacity	EPA Method 9	U3-M9-R2	4/12/2013	11:13	12:13	242	Not Isokinetic
Unit 3 FF Outlet	Opacity	EPA Method 9	U3-M9-R3	4/12/2013	12:13	13:13	237	Not Isokinetic

							Steam Flow	Air Flow[1]
Test Location	**Test Parameter**	**EPA Method**	**Run I.D.**	**Date**	**Start Time**	**End Time**	*kilo-pounds*	*dscfm @7% oxygen*
Unit 3 FF Outlet	PM2.5	EPA Methods 201A/202	U3O-M201A/202-R1	4/9/2013	11:56	12:53	232	126,334
Unit 3 FF Outlet	PM2.5	EPA Methods 201A/202	U3O-M201A/202-R2	4/9/2013	14:08	15:08	240	135,575
Unit 3 FF Outlet	PM2.5	EPA Methods 201A/202	U3O-M201A/202-R3	4/9/2013	16:38	17:38	233	122,537

							Steam Flow	Air Flow[1]
Test Location	**Test Parameter**	**EPA Method**	**Run I.D.**	**Date**	**Start Time**	**End Time**	*kilo-pounds*	*dscfm @7% oxygen*
Unit 3 FF Outlet	Particulate and HCl	EPA Method 5/26A	U3O-M26A-R1	4/11/2013	8:37	10:56	235	122,486
Unit 3 FF Outlet	Particulate and HCl	EPA Method 5/26A	U3O-M26A-R2	4/11/2013	11:45	13:54	233	127,206
Unit 3 FF Outlet	Particulate and HCl	EPA Method 5/26A	U3O-M26A-R3	4/11/2013	14:36	17:04	236	125,640

Unit #3
STOP Times
15:06-15:23
* removed from avg

							Steam Flow	Air Flow[1]	Activated Carbon
Test Location	**Test Parameter**	**EPA Method**	**Run I.D.**	**Date**	**Start Time**	**End Time**	*kilo-pounds*	*dscfm @7% oxygen*	*pounds per hour*
Unit 3 FF Outlet	Cadmium, Lead and Mercury	EPA Method 29	U3O-M29-R1	4/11/2013	8:37	10:56	235	117,952	16
Unit 3 FF Outlet	Cadmium, Lead and Mercury	EPA Method 29	U3O-M29-R2	4/11/2013	11:45	13:54	233	117,619	15
Unit 3 FF Outlet	Cadmium, Lead and Mercury	EPA Method 29	U3O-M29-R3	4/11/2013	14:36	17:04	236	121,367	15

Unit #3
STOP Times
15:06-15:23
* removed from avg

[1] All air flows obtained from ACG using the EPA Methods 1-4 portions of the appropriate test method.