Almega
ENVIRONMENTAL

September 4, 2019

Mr. Michael Garibay
Source Test Manager
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Subject: AQMD Metal Melting Test Program "Facility A"

Dear Mr. Garibay:

Please find enclosed an electronic copy of the source test report on the emissions of Particulate Matter (PM) and selected metals from the metals (chromium alloy) melting facility located in [redacted], California. Additionally, two hard copies of the report have been mailed to your attention. Testing was conducted on May 21 through 23, 2019.

If you have any questions or comments regarding the enclosed package, please contact us at 714-889-4000.

Sincerely,

Charles M. Figueroa
Senior Project Manager
Almega Environmental

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SOURCE TEST REPORT

Emissions Testing of Metal Melting “Facility A” for Selected Metals and Particulate Matter

Facility ID: [redacted]

Prepared for:
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Equipment Location:
Metal Melting Facility A
[redacted], CA [redacted]

Test Date(s): May 21-23, 2019

Report Date: September 4, 2019

Project No.: 10562

Prepared by:

Almega Environmental & Technical Services
10602 Walker Street
Cypress, CA 90630

Gyawali
Prepared by & Title:______________________________
Tulasi Gyawali, QA Engineer

Reviewed by & Title: ______________________________
Charles Figueroa, Sr. Project Manager

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1.0 EXECUTIVE SUMMARY

Key project information is provided in the summary below. Test results are summarized in Table 1-1.

Customer:	South Coast Air Quality Management District (SCAQMD) 21865 East Copley Drive Diamond Bar, CA 91765-4182 Contact: Mr. Michael Garibay, (909) 396-2249
Facility & Location:	Metal Melting Facility A [redacted] CA
Facility ID:	[redacted]
Equipment:	Inlets (Furnace and Upstream to Baghouse) / HEPA Baghouse Outlet
Test Objective:	To determine the Particulate Matter (PM), Arsenic, Cadmium, Nickel, Chromium, and Hexavalent Chromium (Cr^{6+}) emissions from the chromium alloy melting operations
Test Requested by:	South Coast Air Quality Management District (SCAQMD)
Test Date(s):	May 21-23, 2019
Test Personal	Neal Conroy, Morgan Nguyen, Dorian Johnson, Cody Harwood, James Odulio, and Tim Ta of Almega Environmental & Technical Services
Testing Firm:	Almega Environmental & Technical Services 10602 Walker Street Cypress, CA 90630 Contact: Mr. Charles Figueroa, tel (714) 889-4000
Regulatory Agency:	South Coast Air Quality Management District (SCAQMD) 21865 East Copley Drive Diamond Bar, CA 91765-4182 Contact: Mr. Brian Speaks, (909) 396-3212
Measurements:	
Volumetric flow rates	SCAQMD Methods 1.1 - 4.1
Selected Metals (As, Cd, Cr, & Ni)	CARB Method 436
Chromium (Hex/Total)	CARB Method 425
Particulate Matter (PM)	SCAQMD Method 5.1

TABLE 1-1. SUMMARY OF TEST RESULTS

Facility: **Metal Melting Facility A**
City, State: **[redacted], CA**
Test Location: **Baghouse Outlet & Inlets**
Test Date(s): **May 21-23, 2019**

Test Data	Units	Baghouse Outlet	Inlet 1 Furnace (Inside)	Inlet 1 (Upstream to Baghouse)
CARB Method 436		3-Run Avg.	3-Run Avg.	3-Run Avg.
Sampling Data		05/21-22/19	05/21-22/19	05/21-22/19
Stack Temperature	°F	86	130	87
Sample Volume	dscf	94	87	89
Stack Flow Rate	acfm	-	3,187	40,074
Stack Flow Rate	dscfm	47,648*	2,703	36,750
Concentration (CARB 436)		Total	Total	Total
Arsenic	ug/dscm	< 0.377	0.630	< 0.400
Cadmium	ug/dscm	< 0.377	0.415	< 0.415
Chromium	ug/dscm	5.42	118	12.3
Nickel	ug/dscm	2.12	24.5	9.56
Mass Emissions (CARB 436)		Total	Total	Total
Arsenic	lb/hr	< 6.72E-05	6.38E-06	< 5.50E-05
Cadmium	lb/hr	< 6.72E-05	4.45E-06	< 5.69E-05
Chromium	lb/hr	9.51E-04	1.19E-03	1.70E-03
Nickel	lb/hr	3.78E-04	2.48E-04	1.32E-03
CARB Method 425		3-Run Avg.	3-Run Avg.	3-Run Avg.
Sampling Data		05/22-23/19	05/22-23/19	05/22-23/19
Stack Temperature	°F	87	140	86
Sample Volume	dscf	91	103	104
Stack Flow Rate	acfm	-	3,226	41,147
Stack Flow Rate	dscfm	48,533*	2,683	37,621
Concentration (CARB 425)				
Chromium VI	ug/dscm	< 0.021	9.76	0.89
Total Chromium	ug/dscm	< 0.776	77.1	4.58
Mass Emissions (CARB 425)				
Chromium VI	lb/hr	< 3.76E-06	9.81E-05	1.25E-04
Total Chromium	lb/hr	< 1.41E-04	7.80E-04	6.45E-04
SCAQMD Method 5.1		Single Run	Single Run	Single Run
Sampling Data		05/23/19	05/23/19	05/23/19
Stack Temperature	°F	87	128	84
Sample Volume	dscf	89	102	101
Stack Flow Rate	acfm	-	3,142	40,129
Stack Flow Rate	dscfm	47,272*	2,629	36,230
Particulate Catch	mg	3.32	60.4	16.3
Particulate Concentration	gr/dscf	0.000574	0.00916	0.00250
Particulate Emission Rates	lb/hr	0.233	0.206	0.775
	lb/day	5.59	4.95	18.60

Flags
ND or "<" - Not detected, reporting limit reported.
*The total flows from inlet 1 (upstream to Baghouse) and inlet 3 (only flows) was utilize the outlet mass emissions calculations.

TABLE 1-2. SUMMARY OF TEST RESULTS
(INLET 1 INSIDE)

Facility: AQMD Facility A
City: [redacted], CA
Source: Baghouse
Location: Inlet 1 Furnace (Inside)

Test Data	**Units**	**Source Test Results**			**Average**
Run Number	--	**Run 1**	**Run 2**	**Run 3**	
CARB Method 436					
Sampling Data		05/21/19	05/21/19	05/22/19	**3-Run Avg.**
Stack Temperature	°F	123	134	132	**130**
Sample Volume	dscf	75	81	104	**87**
Stack Flow Rate	acfm	3,027	3,311	3,224	**3,187**
Stack Flow Rate	dscfm	2,599	2,795	2,716	**2,703**
Material Charged (SS316)	lbs/hr	1125	1125	900	**1050**
CARB Method 436					
MASS EMISSION RATE		Total	Total	Total	
Arsenic	lb/hr	ND 4.60E-06	ND 4.55E-06	1.00E-05	**6.38E-06**
Cadmium	lb/hr	ND 4.60E-06	ND 4.55E-06	4.21E-06	**4.45E-06**
Chromium	lb/hr	1.01E-03	1.80E-04	2.37E-03	**1.19E-03**
Nickel	lb/hr	2.66E-04	2.73E-05	4.44E-04	**2.46E-04**
Emissions Factor (lb/lbs)					
Arsenic	lb-As/lb-316ss	< 4.09E-09	< 4.04E-09	1.11E-08	**1.55E-05**
Cadmium	lb-Cd/lb-316ss	< 4.09E-09	< 4.04E-09	4.67E-09	**1.29E-06**
Chromium	lb-Cr/lb-316ss	8.94E-07	1.60E-07	2.64E-06	**9.84E-07**
Nickel	lb-Ni/lb-316ss	2.36E-07	2.43E-08	4.93E-07	**5.65E-07**
CARB Method 425					
Sampling Data		05/22/19	05/22/19	05/23/19	**3-Run Avg.**
Stack Temperature	°F	152	138	128	**140**
Sample Volume	dscf	103	100	106	**103**
Stack Flow Rate	acfm	3,272	3,179	3,227	**3,226**
Stack Flow Rate	dscfm	2,661	2,644	2,743	**2,683**
Material Charged (SS316)	lbs/hr	1125	1125	900	**1050**
Mass Emissions (CARB 425)					
Chromium VI	lb/hr	2.01E-04	1.32E-05	8.05E-05	**9.81E-05**
Total Chromium	lb/hr	9.63E-04	1.91E-04	1.19E-03	**7.80E-04**
Emissions Factor (lb/lbs)					
Chromium VI	lb-Cr+6/lb-316ss	1.78E-07	1.18E-08	8.95E-08	**9.32E-08**
Total Chromium	lb-Cr/lb-316ss	8.56E-07	1.70E-07	1.32E-06	**7.81E-07**
SCAQMD Method 5.1					
Sampling Data		05/23/19			**Single Run**
Stack Temperature	°F	128			**128**
Sample Volume	dscf	102			**102**
Stack Flow Rate	acfm	3,142			**3,142**
Stack Flow Rate	dscfm	2,629			**2,629**
Material Charged (SS316)	lbs/hr	1125			**1125**
PM Emissions					
Emission Rate	lb/hr	0.206			**2.06E-01**
Emissions Factor (lb/lbs)					
PM Emissions	lb-PM/lb-316ss	1.84E-04			**1.84E-04**

2.0 INTRODUCTION

Almega Environmental & Technical Services (Almega) was contracted by South Coast Air Quality Management District (SCAQMD) to conduct stationary source emissions testing of the baghouse serving the chromium alloy melting operations at facility designated as “Facility A” located in [redacted], California. The purpose of the test program is to determine the Particulate Matter (PM), Arsenic, Cadmium, Nickel, Chromium, and Hexavalent Chromium (Cr^{6+}) emissions from chromium alloy melting operations.

Due to the rising level of hexavalent chromium in the ambient air in the city of Paramount and its vicinity, SCAQMD staff initiated the rule development process to amend Rule 1407 to address toxic air contaminant emissions from ferrous metal melting operations and update existing requirements for non-ferrous metal melting operations currently regulated under the rule. Through working group meetings with industry stakeholders, it was requested that the rule be separated in to two rules for ferrous and non-ferrous metal melting. After additional input and working group meetings, the SCAQMD staff decided to bifurcate the rule and reclassify characterization into (1) non-chromium alloy (Rule 1407) and (2) chromium alloy (Rule 1407.1) metal melting. In regards to the chromium alloy melting, additional data from melting operations of metals with a chromium content greater than 0.5% is needed to quantify the conversion rate of chromium to hexavalent chromium and quantify toxic air contaminant emissions from these facilities to aid in the rulemaking process. Three facilities have agreed to allow source testing for the purposes of collecting this data [Ref. SCAQMD Source Test Plan to be conducted at Metal Melting facilities].

Almega was selected as a third-party source test contractor to perform this testing. The test matrix employed during the testing is presented in Table 2-1.

TABLE 2-1. TEST MATRIX

PARAMETER	TEST METHOD	# OF TEST RUNS	TEST TIME	LOCATION
Traverse Points	SCAQMD Methods 1.1 & 2.1	3 Per Location	≥ 120 min.	Simultaneous testing at the outlet and two inlets of the HEPA/ Baghouse
Molecular Weight and Excess Air	SCAQMD Method 10.1	1 per day, each Location	60 min.	
Moisture Content	Method 4.1 (Inclusive in the CARB M436, M425, & SCAQMD M5.1)	3 Per Location	≥ 120 min.	
Hexavalent and Total Chromium	CARB Method 425	3 Per Location	≥ 120 min.	
Selected Metals (As, Cd, Cr, & Ni)	CARB Method 436	3 Per Location	≥ 120 min.	
Particulate Matter (PM)	SCAQMD Method 5.1	3 Per Location		
Fugitive Emissions	Determination of overall capture efficiency	--	n/a	HEPA/ Baghouse Inlets

Almega performed source testing at the outlet and two designated inlets of the baghouse simultaneously over a three-day period May 21-23, 2019. The sampling was conducted in triplicate at each of the three (3) sampling locations for metals and chromium with just a single test conducted for the particulate matter. Testing was conducted as specified in the reference methods and Source Test Plan prepared by SCAQMD. The source test plan is included in the Appendix I for reference. Capture/Collection efficiency test was conducted by the SCAQMD personal and provided to Almega for the inclusion in the source test report. All pertinent process data was collected and provided by the facility and included in the Appendix H.

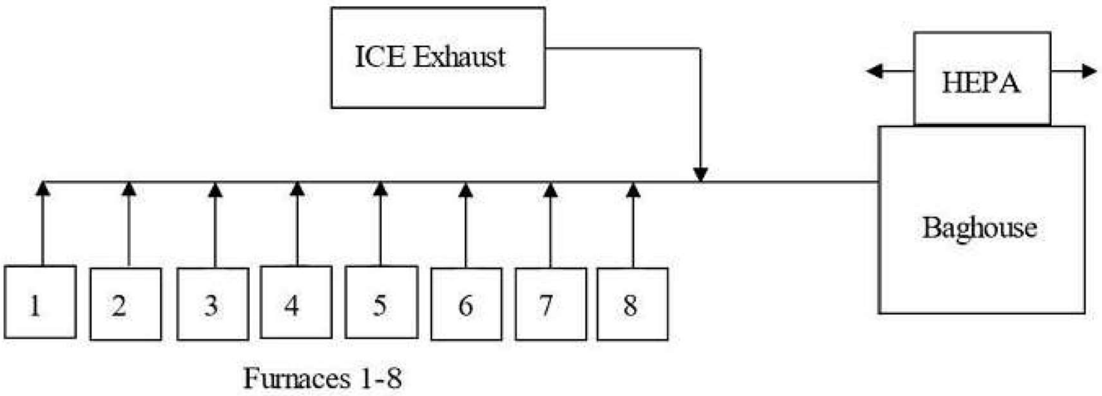
2.1 Document Outline

This report is organized as follows. Section 1.0 is a summary of the project and test results. Section 2.0 describes the project, its objectives and approach. Section 3.0 describes the equipment tested and applicable sampling locations. Section 4.0 describes the sampling and analysis procedures used to conduct the testing. Section 5.0 describes Quality Assurance and Quality Control activities performed, and section 6.0 discusses test results. The Appendices contain test results, calculated data, raw field data, analytical data, calibration records, and certification documents.

3.0 EQUIPMENT AND PROCESS DESCRIPTION

The metal melting facility A uses electric induction furnaces for the processing of materials including brass, zinc, steel, stainless steel, iron, aluminum, cobalt and nickel. A general schematic of the test locations follows:

Facility A - Basic Process Flow Diagram



Note: Courtesy of SCAQMD Source Test Plan

3.1 Process and Equipment Description

The facility has eight electric induction furnaces in three sizes as follows:

800 lb material capacity with a power rating of 250 kW
3,000 lb material capacity with a power rating of 350 kW
4,500 lb material capacity with a power rating of 1,000 kW (shared power supply)

[redacted] A heat cycle (or "heat") begins when the metal is placed in the electric induction furnace. Electrical current is applied and the material becomes molten. Stainless steel materials are typically melted in one of the 4,500 lb furnaces with typical temperatures in the 3000°F range. During the melting process emissions are captured by an exhaust system which mounts to the furnace lid and utilizes a slot design. Suction is provided by the blower which is part of the baghouse/HEPA system. The HEPA filters are mounted in an enclosure above the baghouse and exhaust through two rectangular openings on either side of the enclosure. Because the exhaust does not exit through a typical exhaust stack design, special consideration was applied for the outlet testing.

[redacted] A typical heat cycle lasts for approximately 2 hours. Each furnace has individual exhaust ducting allowing for testing during a specific heat before being combined into a common exhaust header.

The baghouse and HEPA filter system controls emissions from the eight electric induction furnaces, five casting machines, one Hawley system, four mold spray and coating stations, [redacted] [Ref. SCAQMD Source Test Plan to be conducted at Metal Melting facilities].

3.2 Operating Conditions during Test

Testing was performed during the processing of 316 stainless steel in one of the 4,500 lb capacity furnaces (Furnace 7). The individual exhaust duct that vents Furnace 7 was designated as "Inlet 1". The control device is a slot exhaust system mounted on the base of the furnace's lid. Furnaces No. 2, 3, and 7 were operated during the test program. The Inlet 2 (Upstream to Baghouse) location is the general inlet that vents all eight furnaces to the control device.

[redacted] The total inlet flow to the baghouse/HEPA system was the sum of Inlet 2 and a third inlet location designated as Inlet 3. This third inlet provided auxiliary facility process emissions to the baghouse/HEPA system not associated the specific with the metal melting process.

The process data including process material, baghouse differential pressure, HEPA filter differential pressure, ambient conditions, etc are included in the Appendix H.

3.3 Sampling Locations

Inlet 1 (Inside):

The reference method sampling locations meet the following specifications:

Sampling Location Configuration – Inlet Furnace (Inlet Inside)	
Distance from Upstream Disturbance	16.5 in. (1.6 duct diameter)-B
Distance from Downstream Disturbance	25 in. (2.5 duct diameter)-A
Port Length	3.5 in. (measured from outside wall)-L
Port Inside Diameter	3 in. - d
Number of sampling ports	2 (located at 90º intervals)
Stack Diameter	10 in. (internal diameter)-D

Sampling locations comply with the requirements of SCAQMD Method 1.2.

Inlet 2 (Upstream to Baghouse):

Sampling Location Configuration – Inlet 1 Outside (Upstream of Baghouse)	
Distance from Upstream Disturbance	48.5 in. (1.4 duct diameter)-B
Distance from Downstream Disturbance	87 in. (2.4 duct diameter)-A
Port Length	2 in. (measured from outside wall)-L
Port Inside Diameter	2.5 in.-d
Number of sampling ports	2 (located at 90º intervals)
Stack Diameter	36 in. (internal diameter)-D

Sampling locations comply with the requirements of SCAQMD Method 1.1.

Inlet 3 (Flows Only):

The reference method sampling locations are located on the rectangular inlet stack. The stack measured 21” x 25” and consists of five 3” diameter port. The sampling location complies with the requirements of SCAQMD Method 1.1.

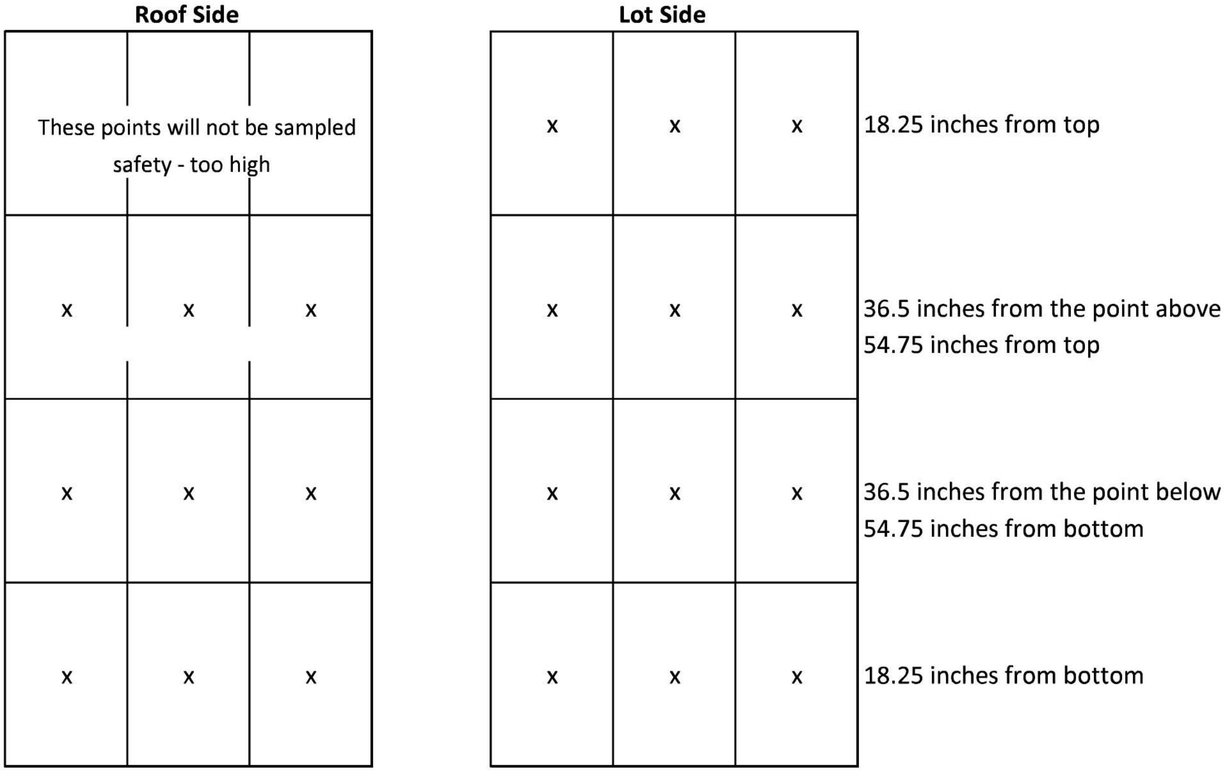
Exhaust

Exhaust of the baghouse/HEPA system is through openings that are 154 inches tall by 46 inches wide. Prior to testing, a complete traverse was conducted at the Inlet 2 and Inlet 3. These flows (scfm) were summed and assumed to be the flow exhaust from the system (SCFM). The theoretical dP values were back calculated from the total flows of Inlet 2 and 3 and utilized to calculate the nozzle sizes for CARB Method 436, Method 425, and SCAQMD Method 5.1 testing.

The exhaust test location was accessed from a manlift for one side of the exhaust system and a platform was installed bridging the roof and the stack for the other side.

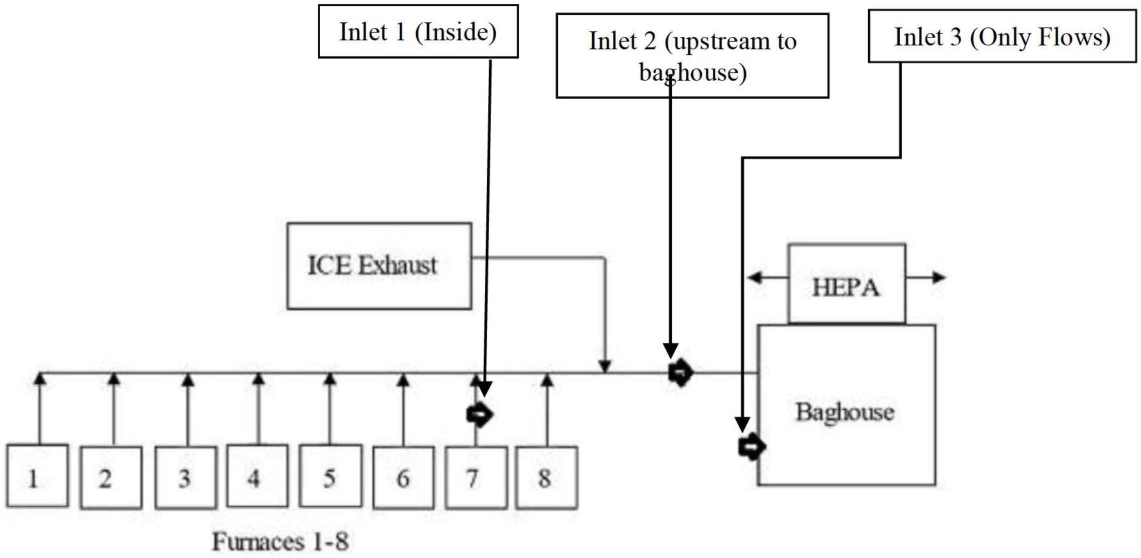
Figure 3-1. General Stack Schematic

146 inches divided by 4, and then by 2
36.50 Div 4
18.25 Div 2
54.75 Sum
60 minutes at 5 minutes a point



Note: Sampled 9 Points from roof side & 12 points from lot side.

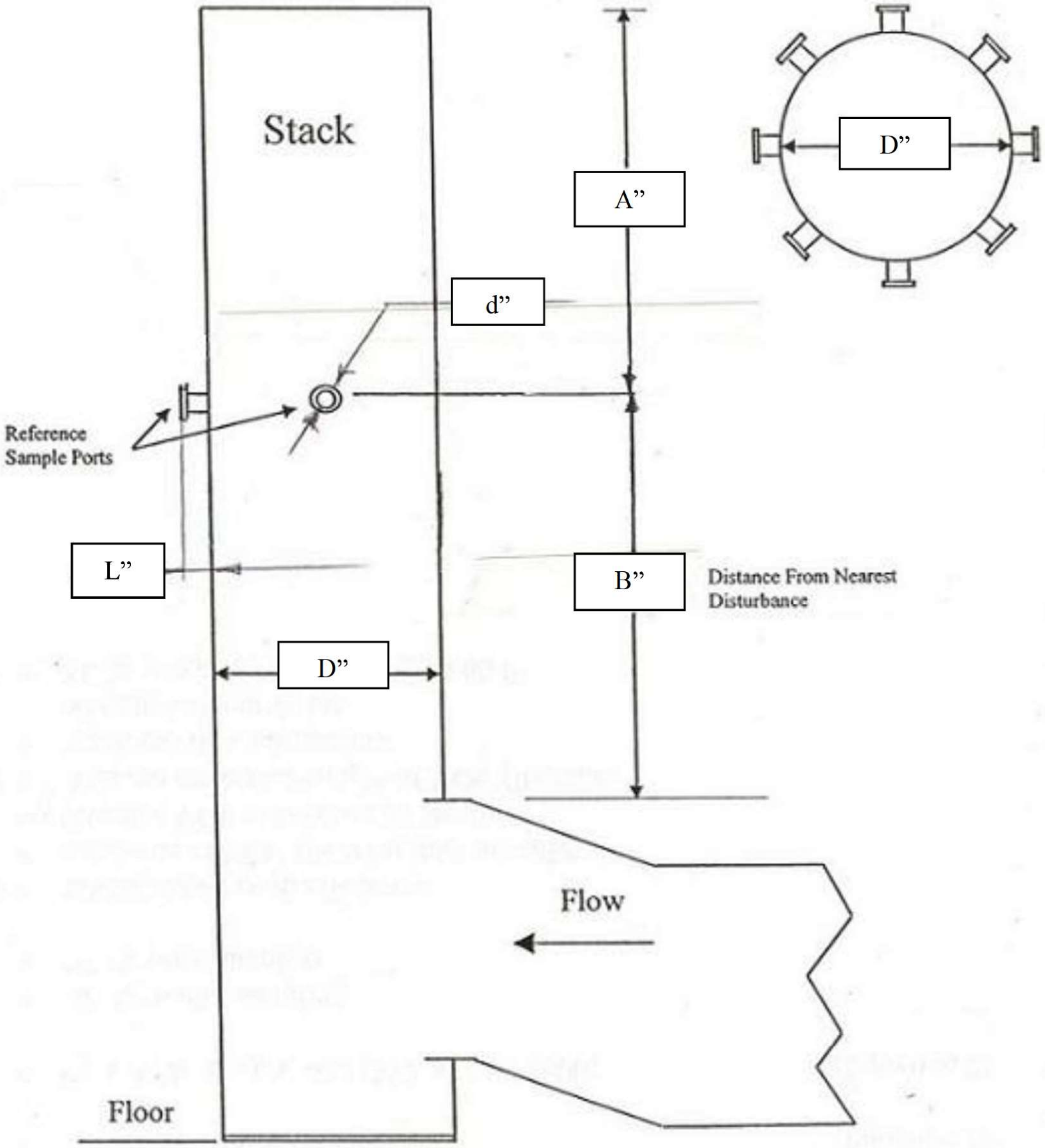
Figure 3-2. Stack Schematic & Sampling Locations



[redacted]

Note: Courtesy of SCAQMD Source Test Plan

Figure 3-3. General Stack Schematic



4.0 SAMPLING AND ANALYTICAL PROCEDURES

Test measurements were performed according to sampling and analysis procedures promulgated by the South Coast Air Quality Management District (SCAQMD), California Air Resources Board (CARB), or US Environmental Protection Agency (EPA). The sampling and analysis procedures used for this test program are summarized below. Any modifications or deviations not addressed herein are discussed in Section 3 of this report.

4.1 SCAQMD Methods 1.1-4.1 – Determination of Stack Gas Volumetric Flow Rate, Molecular Weight, and Moisture Content

The flue gas flow characteristics (i.e. flow rate, molecular weight, and moisture content) were determined according to SCAQMD Methods 1.1 through 4.1. The testing was conducted as follows:

4.1.1 SCAQMD Method 1.1/1.2 – Sampling and Velocity Traverse Points

The number and location of traverse points are determined according to SCAQMD Method 1.1/1.2 based on the physical dimensions of the sampling location and process parameters. In principle, the stack cross-section is divided into equal areas, each of which is represented by a "traverse point". Generally, the number of traverse points diminishes as the flow profile at the sampling location becomes uniform. In most cases, the maximum number of sampling points is 24 for particulate/metals testing and 16 for velocity traverses. Fewer traverse points are permitted as described in the method.

4.1.2 SCAQMD Method 2.1 – Gas Velocity and Traverse Points

The velocity and volumetric flow rate of the laser exhaust was determined according to SCAQMD Method 2.1. In this method, the velocity head (differential pressure) and temperature is measured at the required traverse points. The stack gas differential pressure head was determined using an "S" type Pitot tube and inclined liquid manometer. The temperature was measured using a type "K" thermocouple and digital temperature readout.

Prior to testing, the measurement system was set-up and leak-checked. Then the velocity head and temperature was recorded at predetermined traverse points. After the last traverse is completed, the system was again leak-checked. After completion of the traverse, the static pressure in the stack was determined near the centroid of the stack. The stack gas velocity was calculated using the velocity head, and stack gas temperature, pressure and molecular weight.

QA/QC for the method included field performance checks, and periodic calibrations of test equipment including the Pitot tube, differential pressure gauge, TC and TC-readout. A swirl check was also performed to assess cyclonic flow.

4.1.3 SCAQMD Method 3.1 - Gas Molecular Weight

The stack gas molecular weight (MW) was calculated based on the fraction of its major constituents including: oxygen (O_2), carbon dioxide, (CO_2), nitrogen (N_2), carbon monoxide (CO), and water (H_2O). The dry MW was calculated based on the partial fractions of O_2, CO_2, N_2, and CO. Specifically, the O_2 and CO_2 fractions were determined by CEMS, integrated sampling, or grab sampling, and the balance was assumed to be N_2 and CO. The wet MW was calculated based on the fractions of dry gas and water vapor. The dry and wet MW were calculated according to the following equations:

$$MW_{DRY} = 0.32 \times \%O_2 + 0.44 \times \%CO_2 + 0.28 \times (\%N_2 + \%CO)$$

$$MW_{WET} = 0.18 \times \%H_2O + MW_{DRY} \times (1 - \%H_2O/100)$$

where: MW_{DRY} = stack gas molecular weight, dry-basis
MW_{WET} = stack gas molecular weight, wet-basis
0.32 = molecular weight fraction for O_2
0.44 = molecular weight fraction for CO_2
0.28 = molecular weight fraction for N_2 and CO
0.18 = molecular weight fraction for H_2O (water vapor)
%X = fraction of X in stack gas, dry basis, where X = O_2, CO_2, N_2, CO
$\%H_2O$ = fraction of water vapor in stack gas, wet-basis

For this test, single bag sample was collected at each test location/each day over a period of 60 minutes. These samples were analyzed for oxygen and carbon dioxide via SCAQMD Method 10.1. The analysis of those bag samples shows that the O_2/CO_2 concentration for all sampling locations is in ambient level. In case of the bag leaks or some anomalies the default ambient level O_2/CO_2 was used for gas density calculations.

4.1.4 SCAQMD Method 4.1- Gas Moisture Content

The stack gas moisture content was determined according to SCAQMD Method 4.1. In this method, water vapor is collected in a condenser while the dry stack gas volume is measured using a dry gas meter. The volume of water vapor was calculated from the amount of water condensed and the total gas volume is the sum of water vapor plus dry stack gas. The moisture content was determined as a fraction of the total wet stack gas volume. The following calculations were used.

$$B_{WS} = \frac{V_{W,Std}}{V_{M,Std} + V_{W,Std}}$$

$$V_{W,Std} = K_1 \textbf{ x } V_{H2O}$$

$$V_{M,Std} = T_{Std}/P_{Std} \textbf{ x } Y_M \textbf{ x } V_M \textbf{ x } P_M/T_M$$

where:
B_{WS} = Fraction of water vapor in stack gas
$V_{W,Std}$ = Volume of water vapor (scf)
$V_{M,Std}$ = Volume of stack gas sampled (dscf)
K_1 = Unit volume of water vapor (0.04707 scf @68^{o}F or 0.0464 scf @60^{o}F)
T_{Std} = Standard Temperature (528^{o}R or 520^{o}R)
P_{Std} = Standard Pressure, 29.92 in. Hg
Y_M = Dry gas meter calibration factor
V_M = Measured volume of stack gas sampled
P_M = Dry gas meter pressure (in. Hg)
T_M = Dry gas meter temperature (^{o}R)

The moisture content was simultaneously determined if sampling was performed isokinetically otherwise performed as follows:

Moisture was collected in a sampling train consisting of a probe, TFE line, four impingers in an ice bath, a leak-free pump, a vacuum gauge and a dry gas meter. Figure 4-1 is a schematic of a typical moisture train. Initially, impingers #1 and #2 contained 100 ml of water, impinger #3 was empty, and impinger #4 contained a known amount (approximately 300 g) of desiccant (e.g. Silica Gel). Prior to sampling, a leak check of the sampling train was performed. Then, the sampling probe was inserted into the centroid of the stack, the initial meter readings (volume, temperatures, etc.) were recorded, the sample pump is started and the sampling rate is adjusted to the desired sampling rate (typically 0.75 dry cfm). Sampling was conducted until at least 22 dry cubic feet were collected. After sampling, the final meter readings were recorded and the impinger train was recovered. The change in volume and/or weight of the impinger train components was used to determine the amount of moisture condensed. The volume of water vapor and the corrected volume of dry gas sampled were used to calculate the moisture fraction as described above.

4.2 SCAQMD Method 5.1 - Total Particulate Matter

Measurements to determine total particulate matter were performed according to SCAQMD Method 5.1. In this method, a stack gas sample is isokinetically extracted from the stack through a stainless-steel nozzle and probe and transported to an impinger train in an ice bath. Entrained particulates were collected in the impingers and on a back-up filter placed between the 3rd and 4th impingers. Figure 4-3 is a schematic of the sampling apparatus.

Prior to testing, a series of measurements were made to determine location and number of traverse points, gas velocity, MW, and moisture content. The results of these measurements were used to determine the appropriate nozzle size for isokinetic sampling. The sampling rate was adjusted to maintain isokinetic conditions based on pitot and TC measurements.

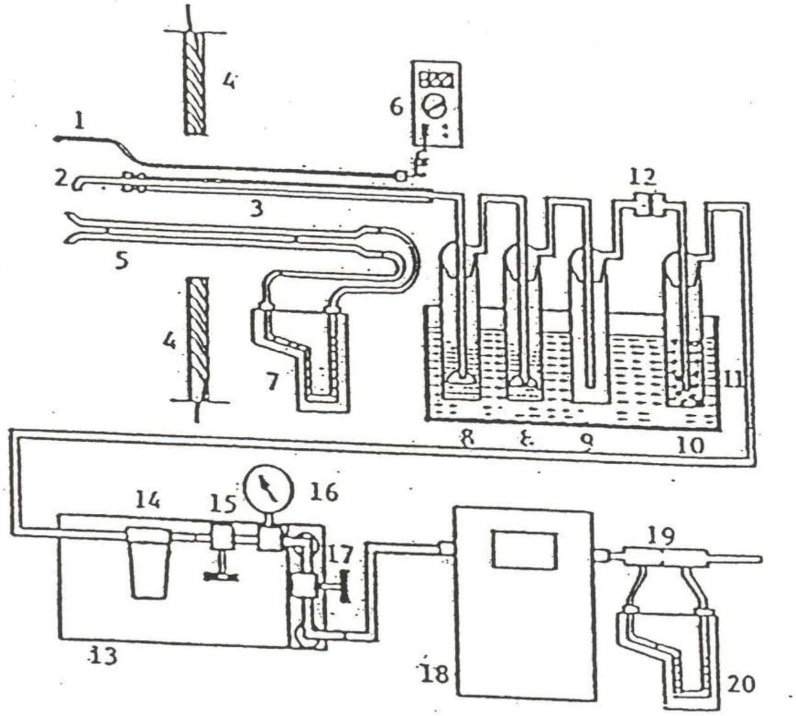
The sampling train was prepared by charging impingers # 1 and # 2 with 100 ml of D.I. water and impinger # 4 with approximately 200 g of silica gel. Impinger # 3 was left empty. Finally, the sampling train was the sealed, transported to the sampling location, and leak-checked. Sampling was performed at each traverse point. After completing the test, the Method 5.1 sample was taken to a secured area (i.e.. Mobile test van or Almega's laboratory) and recovered.

The recovered samples were entered into Almega's Sample Custody Program and delivered to the laboratory for analysis. At the laboratory, samples were analyzed as follows:

The filter was removed and placed in a desiccator until completely dry. Following drying, the filter was weighed to determine the fraction of sample acquired on the filter. The probe, nozzle, sampling lines, and impingers were washed with deionized water and methylene chloride, and the washing solutions were combined with the impinger solutions. The combined solution was extracted with methylene chloride. The aqueous fraction was heated to boil off water, and the organic fraction was allowed to evaporate at room temperature. Residues from both fractions were weighed and combined with the sample weight from the filter to determine the total particulate sample weight. Samples were stored at 4 ºC until analyzed at the Almega in-house laboratory.

Field and laboratory data were used to calculate sample volume corrected to standard conditions, stack gas flow rate, and particulate emissions. Emissions were reported in gr/dscf and lb/hr.

Figure 4-1. Sampling Apparatus for Particulate Matter



1. Temperature Sensor
2. Nozzle
3. Glass Lined Stainless Steel Probe
4. S-type Pitot Tube
5. Stack Wall
6. Temperature Sensor Meter
7. Pitot Tube Inclined Manometer
8. Impinger with 100 ml H_2O
9. Empty Bubbler
10. Bubbler with Silica Gel
11. Ice Bath
12. Filter
13. Sealed Pump (Leak Free)
14. Filter for Pump
15. Metering Valve
16. Vacuum Gauge
17. By-pass Valve
18. Temperature Compensated Dry Gas Meter
19. Orifice
20. Orifice Inclined Manometer

4.3 SCAQMD METHOD 10.1 – INTEGRATED GAS SAMPLING (O2 & CO2)

In this method, gaseous components of the stack gas (e.g. O_2, & CO_2) are measured using integrated sampling in accordance with the procedures specified in SCAQMD Method 10.1. Sample was collected in a Tedlar bag for each test event and analyzed by Almega's in-house laboratory via GC.

4.4 Total and Hexavalent Chromium (CARB Method 425)

Hexavalent chromium and total chromium were measured according to CARB Method 425. The sampling was conducted isokinetically for 2-hours in order to achieve target detection limits. After sampling, the sampling train was recovered and analyzed for both total chromium and hexavalent chromium.

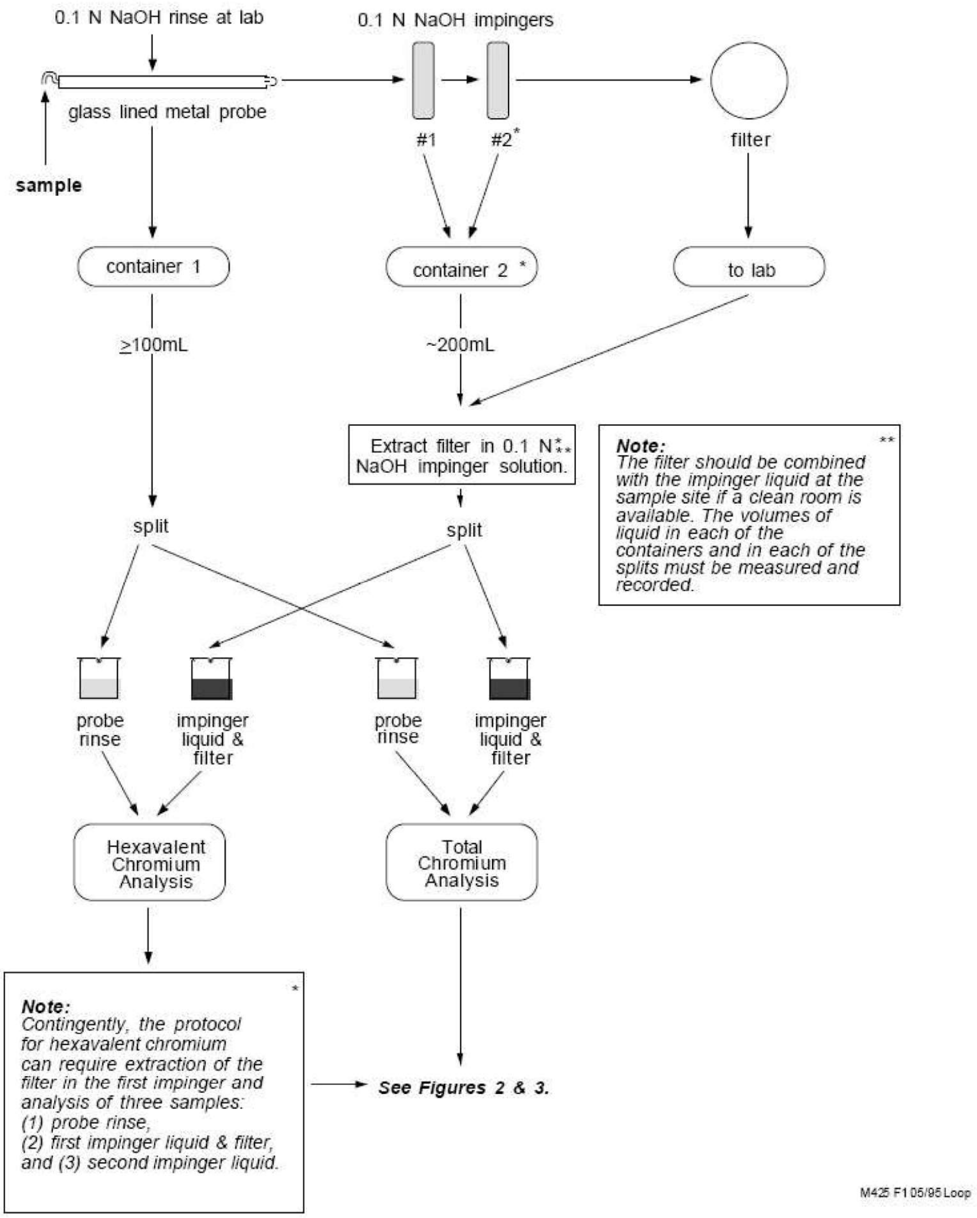
The sampling apparatus included a glass probe, a Teflon union, a flexible Teflon sample line from the probe to the first impinger, two Greenburg-Smith impingers each containing 100 ml of 0.1N NaHCO3 solution, an empty modified impinger, and a modified impinger containing silica gel. The glass probe is fitted with a glass nozzle for isokinetic sampling. The remaining components of the sampling apparatus included an umbilical line, a vacuum pump, a dry gas meter, and a calibrated orifice connected to an inclined manometer. The sampling train is shown in Figure 4-3.

The volume of the impinger solution and the weight of the silica gel were recorded before and after the tests to determine the moisture content of the stack gas. All sample weights were recorded on the sampling data sheet during charging and sample recovery. Leak checks were performed before and after each test.

Volumetric flow rates at the sampling locations were calculated from the measured velocity head and the cross-sectional area of the duct. As each traverse point was sampled, the velocity head of the flue gas was measured with an S-type pitot tube connected to an inclined manometer, and the temperature of the flue gas was measured with a type "K" thermocouple and a digital readout (SCAQMD Method 2.1). This information was used to adjust the sampling rate to isokinetic conditions.

After the test, the contents of the impingers were recovered as described in the method and stored in pre-cleaned sample bottles. The final pH of the sample was verified using multiple-field pH paper. The samples were then stored at 4°C or less until delivered to the Laboratory for analysis. Samples were analyzed for hexavalent chromium as described in the method. Hexavalent chromium was determined by ion chromatography (IC) by Weck Laboratories, Inc. located in City of Industry, California. A reagent blank was provided to determine background levels of target analytes for blank corrections, if applicable. All samples are accompanied by a chain of custody until disposed.

Figure 4-2 CARB Method 425 Sampling



Note: 0.1NaHCO3 was used instead 0.1NaOH.

4.5 CARB METHOD 436 - DETERMINATION OF MULTIPLE METALS EMISSIONS

Multiple metals samples were collected isokinetically in accordance with CARB Method 436, "Determination of Multiple Metals Emissions from Stationary Sources." Stack sample was withdrawn from the source, with particulate emissions collected in the probe and on a heated filter and gaseous emissions collected in a series of chilled impingers containing an aqueous solution of dilute nitric acid combined with dilute hydrogen peroxide in two impingers.

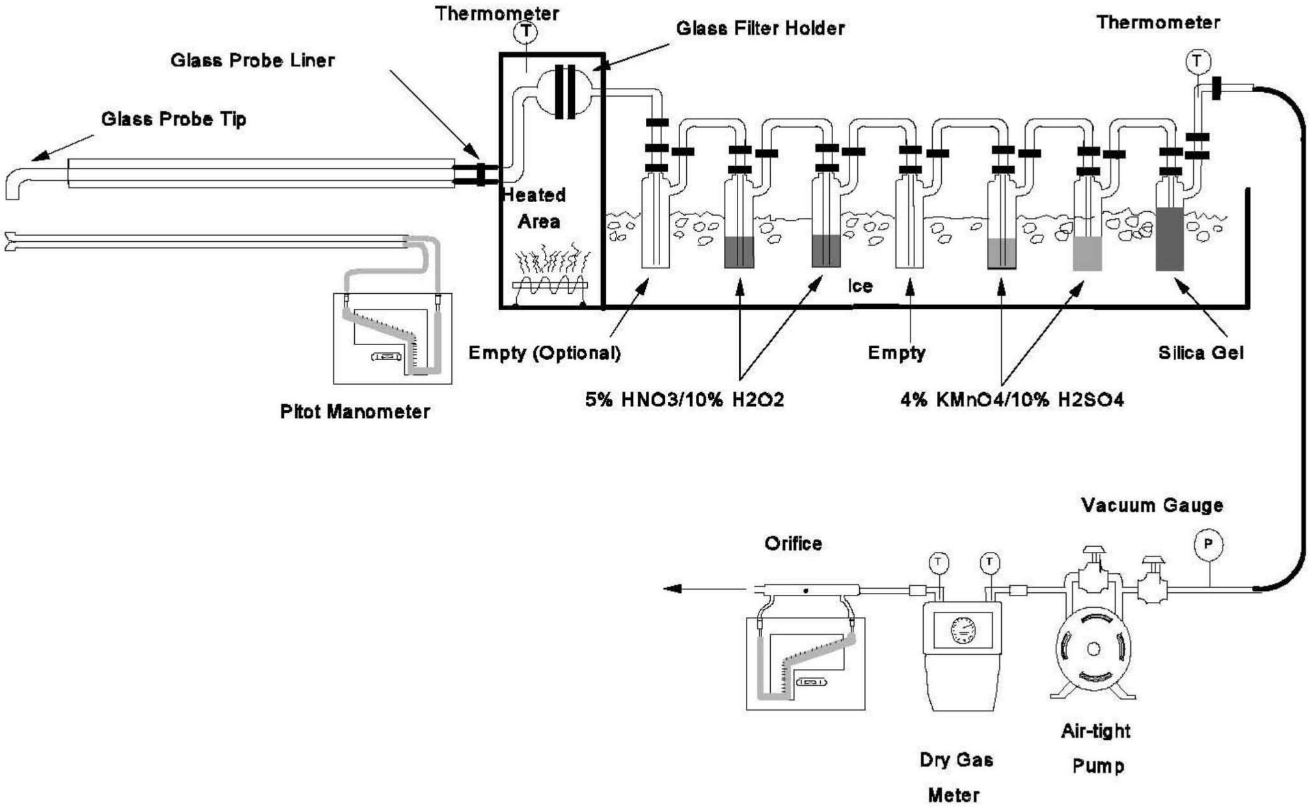
A schematic of the sampling apparatus is shown in Figure 4-2. The sampling train consists of a nozzle, heated probe, heated filter, and a series of three impingers immersed in an ice bath and a silica gel impinger. The probe is made of borosilicate glass with a heating system of maintaining an exit gas temperature during sampling of 248±25°F.

The Teflon line was used to transfer the sample from the filter to the impingers. The impinger train was setup as follows: the first and second impingers each contained 100 mL of a nitric acid/hydrogen peroxide solution (5% HNO_3/10% H_2O_2), the third was empty, the last impinger contained silica gel (for moisture collection), and an umbilical line connected to an isokinetic sampling console. The sampling console includes a vacuum pump, a dry gas meter, and additional monitors and controls for collecting a sample. A thermometer capable of measuring to within 1°C (2°F) was placed at the outlet of the last impinger.

Sampling train components were recovered into separate front and back half fractions and acid digested using conventional digestion techniques to dissolve inorganic and to remove organic constituents that created analytical interferences. After digestion, portions of the probe catch, filter catch, and nitric acid/hydrogen peroxide catch were combined into a single composite sample and analyzed for all target metals according to ICP/MS as prescribed by the Method. Sample analyses were performed by Weck Laboratory in City of Industry, California.

Quality assurance samples include field blanks and reagent blanks. Quality control samples include laboratory method blanks and duplicates. Field sampling and laboratory data were used to calculate emissions concentrations and mass emission rates as described in the Method. Final test results were corrected for background levels found in reagent blanks. Results are reported for concentration in milligram per dry standard cubic meter (mg/dscm). Analysis results that are below the limit of detection (i.e. not detected or ND) were substituted for the one-half of detection limit in calculating three-run averages.

Figure 4-3. CARB Method 436 Sampling Apparatus



Note: Impingers 5 and 6 containing 4% KMnO4/10% H2SO4 were not used in actual sampling since Mercury was not measured.

4.6 Verification of Capture/Collection Efficiency

SCAQMD conducted the verification of capture efficiency test and documented prior to the source test. Detail summary test report can be found in Appendix F. The smoke test video recording is also included in a CD-ROM and will be submitted with the report.

5.0 QUALITY ASSURANCE AND QUALITY CONTROL

Almega applies stringent quality assurance and quality control (QA/QC) procedures to ensure the validity of measurements for all test methods. The following section discusses general and project-specific QA/QC measures.

5.1 General QA/QC

Almega's QA/QC procedures follow guidelines from the "Quality Assurance Handbook for Air Pollution Measurement Systems," Volume I through III. And, procedures for pretest preparation and calibration of sampling equipment are followed. Standardized written procedures, calculator programs, and computer spreadsheets are used for test planning, pre-survey, equipment checklist, preliminary calculations, testing, data analysis, and reporting. Pretest equipment preparation and maintenance include organization of the following equipment prior to testing:

- Mobile RM CEM test van: Check fluids, fuel, mechanical conditions, verify operation of CEM instruments, sample lines and sample conditioner prior to the date of the source test.

- Sampling Equipment: Check meter boxes, pitot tubes, manometers and thermocouples to ensure in good working conditions and in proper calibrations. Preclean sampling trains and seal all openings prior to use.

Calibrations are performed in accordance with Chapter III of the SCAQMD Source Test Manual (March 1989). Table 5-1 shows the test equipment calibration schedules. Table 5-2 shows the test equipment maintenance schedules.

5.2 Project-Specific QA/QC

This project included specific QA/QC activities required to validate the test results. These QA/QC activities are based on the test methods discussed in Section 5 and generally acceptable test procedures. Reference Methods used for source testing are promulgated by the South Coast Air Quality Management District (SCAQMD), the California Air Resource Board (CARB), or the US Environmental Protection Agency (EPA). Any deviations from published Methods are approved in advance by the regulatory agency (i.e. SCAQMD), prior to implementation if possible. Project-specific QA/QC activities and results that may impact test results are discussed in Section 3.

TABLE 5-1. TEST EQUIPMENT CALIBRATION SCHEDULE

Equipment	Calibration Period	Standard or Method of Calibration
Thermocouples	6 Months and 2 Months	Mercury Thermometer, three point (ice, boiling water, hot oil)
Dry Gas Meters	6 Months and 2 Months	Critical orifice
Field Barometers	6 Months, Check prior to usage	Mercury Barometer
S-Type Pitot	6 Months Check prior to usage	EPA Method 2, Measure physical configuration. Reshape pitot tips or calibrate if configuration does not meet the limits.
Pressure gauges	6 Months	Five-point calibration against manometer
	2 Months	Three-point check
Temp. Meters	6 Months	Precision Potentiometer
CEM Systems	Bimonthly, or as needed	Specified by Manufacturer

TABLE 5-2. TEST EQUIPMENT MAINTENANCE

Equipment	Check For	Correction	Frequency
CEM Systems	Absence of malfunction, noise, drift, conversion efficiency for NOx anlzr.	As required by the manufacture, or depending on performance	Bimonthly
Pumps	Absence of leakage, flow, proper vacuum	Replace parts, inspect, clean	300 hours of usage
Flow Devices	Levelling, zeroing, obstruction, deformation	Clean, replace, or re-calibrate	300 hours of usage
Calibration Gases	Expiration date, tank pressure	Re-certify, order new gases	2 months and prior to field testing
Regulators	Malfunction, Gauge precision	Repair or replace	3 months and prior to field testing
Gas Divider	Malfunction, precision	Repair or replace	Monthly and before field testing
Condensers	Leakage, temperature	Repair or replace	Monthly and before field testing
Heated lines	Leakage, temperature, cleanliness	Repair, replace, clean	Monthly and before field testing

6.0 TEST RESULTS AND DISCUSSION

The testing was conducted on May 21 through 23, 2019. The sampling locations and equipment were prepared prior to initiating the sampling activities. Testing was conducted after the arrival of Almega's test personnel and set-up of test equipment.

6.1 DISCUSSION

The scope of work included the testing to determine the emissions of Particulate Matter (PM) and selected metals (As, Cd, Ni, Cr, and Cr^{+6}) at the two designated inlets and the outlet of the baghouse/HEPA system. The metals testing were conducted in triplicate with just a single run conducted for PM.

Test calculations are corrected to 68°F for CARB methods and 60°F for SCAQMD methods. The sampling system was setup on May 20, 2019. Sampling was conducted for all three locations on May 21 through 23, 2019.

The metals and PM emissions in the stack gas effluent were reported in micrograms per dry standard cubic meter (µg/dscm), microgram per dry standard cubic feet (ug/dscf), and pounds per hours (lbs/hr). The results are summarized in Table 1-1. Test-specific results for all three sampling locations are presented in Tables 6-1 through 6-9. Supporting data including calculations, field test data, laboratory analysis reports, and QA/QC data are found in the Appendices.

6.1.1 TEST RESULTS – CARB METHOD 436 MULTIPLE METALS

Sampling and analysis for Multiple Metals was conducted for the select metals in triplicate according to CARB Method 436. The mercury testing option was not used. The CARB Method 436 sampling was conducted simultaneously for all three locations. The sampling duration for each run was two hours. The first and second runs were conducted on May 21 and the third run was conducted on May 22, 2019. The field blank was prepared and collected on May 21 before Run 1. Only Arsenic, Cadmium, Chromium, and Nickel were analyzed as purpose in this testing program. One set of reagent blank was analyzed for those selected metals and the reported results are corrected with the detectable results.

The detailed test results are presented in Table 6-1 for the outlet and Tables 6-4 and 6-7 for the inlets.

6.1.2 TEST RESULTS – CARB M425 HEXAVALENT CHROMIUM AND TOTAL CHROMIUM

Sampling and analysis for hexavalent chromium and total chromium was conducted in triplicate according to CARB Method 425 simultaneously at all three locations. The sampling duration for each run was two hours. The first run was conducted on May 22 with the remaining two runs conducted on May 23, 2019. The field blank was prepared and collected on May 22 before Run 1. The CARB Method 425 test method used was modified to include the absorbing solution of 0.1N sodium bicarbonate. One set of reagent blank was analyzed for hexavalent chromium and total chromium, the reagent blank results were not detected and no correction was necessary.

These samples were analyzed within the holding time recommended by the method. However, the samples were re-analyzed to achieve a lower reporting limit without dilution and that second analysis exceeded the recommended holding time (see detail in CARB Method 425 lab report).

The detailed test results are presented in Table 6-2 for the outlet and Tables 6-5 and 6-8 for the inlets.

6.1.3 TEST RESULTS – PARTICULATE MATTER

The single run sampling and analysis for particulate matter was conducted according to SCAQMD Method 5.1. The sampling duration for the test run was two hours. The sampling for PM was conducted simultaneously for all three locations on May 24, 2019. The field blank was prepared and collected prior to sampling.

The detailed test results are presented in Table 6-3 for the outlet and Tables 6-6 and 6-9 for the inlets.

6.2 OTHERS

- Filter and probe temperatures were maintained at 248± 25°F for CARB Method 436 isokinetic sampling.
- Each impinger solution was maintained at a pH greater than eight (8) for CARB Method 425, and this was documented on the field data sheets.
- Impinger trains and XAD temperatures, where applicable, were maintained below 68°F for all sampling event.
- Percent (%) Isokinetics was within the allowable range of 90-110% for all isokinetic sampling events.
- Cyclonic flow check was performed prior to sampling. No cyclonic flow was found.
- The single bag sample was collected at each test location/each day over a period of 60 minutes. These samples were analyzed for oxygen and carbon dioxide via SCAQMD Method 10.1. The analysis of those bag samples shows that the O_2/CO_2 concentration for all sampling locations is in ambient level. In cases where the bag leaked or other issue the default ambient level O_2/CO_2 was used for gas density calculations.
- The baghouse outlet does not have a traditional stack or duct and the exhaust exits from the HEPA filter enclosure from two sides horizontal directions. Based EPA Method 5D, the exhaust differential velocity pressure was determined by applying the inlet flow to the

entire area of the HEPA filter enclosure (see Appendix C5). The calculated differential pressure was then used for nozzle selection and corresponding isokinetic sampling rate. No corrections were made for temperature.

- No unusual operating conditions or field-testing observations were reported. Field data and calculations for all the emissions are presented in respective appendices.

Testing was performed as specified in the reference methods and the SCAQMD Source Test Plan. No modifications to proposed sampling and analysis procedures other than those noted above were required.

6.3 TEST CHRONOLOGY

All testing was conducted during the periods listed below:

Parameter Measurement	Test Date	Time	Run No.
CARB Method 436 Baghouse Outlet, Inlet 1 (inside), and Inlet 1 (Outside)	05/21/19	12:10 – 14:33	Run 1
	05/21/19	15:10 – 17:40	Run 2
	05/22/19	08:30 – 10:48	Run 3
CARB Method 425 Baghouse Outlet, Inlet 1 (inside), and Inlet 1 (Outside)	05/22/19	11:50 – 14:15	Run 1
	05/24/19	14:38 – 16:53	Run 2
	05/23/19	08:25 – 10:45	Run 3
SCAQMD Method 5.1 Baghouse Outlet, Inlet 1 (inside), and Inlet 1 (Outside)	05/23/19	11:20 – 13:36	Run 1

TABLE 6-1. TEST RESULTS
CARB 436 (Multiple Metals)

Facility: AQMD Facility A
City: [redacted], CA
Source: Baghouse
Location: Outlet

Test Data	**Units**	**Source Test Results**							**Average**
Run Number	--		**Run 1**		**Run 2**		**Run 3**		
Test Date	mm/dd/yy		05/21/19		05/21/19		05/22/19		--
Test Time	hh:mm		12:10 - 14:33		15:10 - 17:40		08:30 - 10:48		--
Sampling Data*									
Stack Temperature	°F		85.0		86.2		86.6		**85.9**
Moisture	%		1.3		1.2		1.6		**1.4**
Sample Volume	dscf		95.0		95.0		91.3		**93.8**
Oxygen**	% v/v		20.9		20.9		20.9		**20.9**
Carbon Dioxide**	% v/v		< 0.04		< 0.04		< 0.04		**< 0.04**
Stack Flow Rate	dscfm		46,646		48,131		48,166		**47,648**
CARB Method 436									
CONCENTRATION			Total		Total		Total		
Arsenic	ug/dscm	ND	0.372	ND	0.372	ND	0.387	<	**0.377**
	ug/dscf	ND	0.0105	ND	0.0105	ND	0.0109	<	**0.011**
Cadmium	ug/dscm	ND	0.372	ND	0.372	ND	0.387	<	**0.377**
	ug/dscf	ND	0.0105	ND	0.0105	ND	0.0109	<	**0.011**
Chromium	ug/dscm		14.7	RL	0.781	RL	0.812		**5.42**
	ug/dscf		0.416	RL	0.0221	RL	0.0230		**0.154**
Nickel	ug/dscm		2.27	RL	2.01	RL	2.09		**2.12**
	ug/dscf		0.0642	RL	0.0569	RL	0.0591		**0.0601**
CARB Method 436									
MASS EMISSION RATE			Total		Total		Total		
Arsenic	lbs/hr	ND	6.49E-05	ND	6.71E-05	ND	6.98E-05	<	**6.72E-05**
Cadmium	lbs/hr	ND	6.49E-05	ND	6.71E-05	ND	6.98E-05	<	**6.72E-05**
Chromium	lbs/hr		2.56E-03	RL	1.41E-04	RL	1.46E-04		**9.51E-04**
Nickel	lbs/hr		3.96E-04	RL	3.62E-04	RL	3.77E-04		**3.78E-04**

Notes:
* Performed during isokinetic sampling (e.g. CARB Method 436).
**SCAQMD Method 10.1 Tedlar bag sample was leaked, ambient level O2/CO2 was used for gas density calculations.
ND or "<" - Not detected, reporting limit reported.

TABLE 6-2. TEST RESULTS

CARB 425 (Hexavalent & Total Chromium)

Facility: AQMD Facility A
City: [redacted], CA
Source: Baghouse
Location: Outlet

TEST DATA	**UNITS**	**TEST RESULTS**			**AVERAGE**
Run Number	-	**Run 1**	**Run 2**	**Run 3**	
Test Date	mm/dd/yy	5/22/19	5/22/19	5/23/19	--
Test Time	hh:mm	11:50 - 14:15	14:38 - 16:53	8:25 - 10:45	--
Sampling Data*					
Stack Temperature	°F	87.2	86.9	86.5	**86.9**
Moisture	%	1.8	1.7	1.7	**1.7**
Sample Volume	dscf	91.2	91.2	90.7	**91.0**
Oxygen**	% v/v	20.9	20.9	20.9	**20.9**
Carbon Dioxide**	% v/v	0.04	0.04	0.04	**0.04**
Stack Flow Rate	acfm	-	-	-	**-**
Stack Flow Rate	dscfm	47,814	48,789	48,995	**48,533**
Total Catch (CARB 425)					
Chromium VI	ug	< 0.0460	< 0.0420	< 0.0720	< **0.0533**
Total Chromium	ug	< 2.000	< 2.000	< 2.000	< **2.00**
Concentration (CARB 425)					
Chromium VI	ug/dscm	< 0.0178	< 0.0163	< 0.0280	< **0.0207**
	ug/dscf	< 0.000504	< 0.000461	< 0.000794	< **0.000586**
Total Chromium	ug/dscm	< 0.7742	< 0.7748	< 0.7786	< **0.776**
	ug/dscf	< 0.0219	< 0.0219	< 0.0220	< **0.022**
Mass Emissions (CARB 425)					
Chromium VI	ug/hr	< 1446	< 1349	< 2333	< **1710**
Chromium VI	mg/hr	< 1.45	< 1.35	< 2.33	< **1.71**
Chromium VI	lb/hr	< 3.2E-06	< 3.0E-06	< 5.1E-06	< **3.77E-06**
Total Chromium	ug/hr	< 62890	< 64226	< 64816	< **63977**
Total Chromium	mg/hr	< 62.89	< 64.23	< 64.82	< **64.0**
Total Chromium	lb/hr	< 1.4E-04	< 1.4E-04	< 1.4E-04	< **1.41E-04**

Notes:
* Performed during isokinetic sampling by CARB 425.
** SCAQMD Method 10.1 sample reported error values, ambient O2/CO2 used for gas density calculations.
"<" Indicates an analytical result of non-detect (ND) and the use of laboratory MRL for emission calculations.

TABLE 6-3. TEST RESULTS
SCAQMD Method 5.1 (Particulate Matter)

Facility: AQMD Facility A

City: [redacted], CA

Source: Baghouse

Location: Outlet

Run Number	1	
Run Date	05/23/19	
Run Start Time	11:20	
Run Stop Time	13:30	
Test Train Parameters		**AVERAGE**
Volume of Dry Gas Sample, SCF*	89.20	89.20
Flue Gas Parameters		
CO2, Percent By Volume, Dry**	0.04	0.04
O2, Percent By Volume, Dry**	20.90	20.90
Temperature, Degrees F	86.7	86.7
Moisture, %	1.86	1.86
Air Flow Rate, ACFM	-	-
Air Flow Rate, Dry SCFM*	47,272	47,272
Total Particulate		
Catch, mg	3.32	3.32
Concentration, Gr/DSCF	0.000574	0.000574
Emission Rate, lb/hr	0.233	0.233

* 60 Degrees F and 29.92 Inches of Mercury

** Ambient O2/CO2 was used in gas density calculations.

TABLE 6-4. TEST RESULTS
CARB 436 (Multiple Metals)

Facility: AQMD Facility A
City: [redacted], CA
Source: Baghouse
Location: Inlet 1 Furnace (Inside)

Test Data	**Units**	**Source Test Results**			**Average**
Run Number	--	**Run 1**	**Run 2**	**Run 3**	
Test Date	mm/dd/yy	05/21/19	05/21/19	05/22/19	--
Test Time	hh:mm	12:10 - 14:30	15:10 - 17:40	08:30 - 10:45	--
Sampling Data*					
Stack Temperature	°F	123.4	133.6	132.1	**129.7**
Moisture	%	1.4	1.4	1.1	**1.3**
Sample Volume	dscf	74.7	81.3	104.2	**86.7**
Oxygen**	% v/v	20.0	19.9	20.2	**20.0**
Carbon Dioxide**	% v/v	< 0.3	< 0.3	< 0.3	**< 0.3**
Gas Velocity	ft/min	5,549	6,070	5,910	**5,843**
Stack Flow Rate	acfm	3,027	3,311	3,224	**3,187**
Stack Flow Rate	dscfm	2,599	2,795	2,716	**2,703**
CARB Method 436					
CONCENTRATION		Total	Total	Total	
Arsenic	ug/dscm	ND 0.47	ND 0.43	0.98	**0.63**
	ug/dscf	ND 0.013	ND 0.012	0.028	**0.018**
Cadmium	ug/dscm	ND 0.473	ND 0.435	0.339	**0.415**
	ug/dscf	ND 0.027	ND 0.025	0.019	**0.024**
Chromium	ug/dscm	103.3	17.2	233	**118**
	ug/dscf	2.93	0.49	6.61	**3.34**
Nickel	ug/dscm	27.3	2.61	43.6	**24.5**
	ug/dscf	0.772	0.074	1.235	**0.694**
CARB Method 436					
MASS EMISSION RATE		Total	Total	Total	
Arsenic	lb/hr	ND 4.60E-06	ND 4.55E-06	1.00E-05	**4.86E-06**
Cadmium	lb/hr	ND 4.60E-06	ND 4.55E-06	4.21E-06	**2.93E-06**
Chromium	lb/hr	1.01E-03	1.80E-04	2.37E-03	**1.19E-03**
Nickel	lb/hr	2.66E-04	2.73E-05	4.44E-04	**2.46E-04**

Notes:
* Performed during isokinetic sampling (e.g. CARB Method 436).
** Measured via SCAQMD Method 10.1.
ND or "<" - Not detected, reporting limit reported.

TABLE 6-5. TEST RESULTS

CARB 425 (Hexavalent & Total Chromium)

Facility: AQMD Facility A
City: [redacted] CA
Source: Baghouse
Location: Inlet 1 Furnace (Inside)

TEST DATA	UNITS	TEST RESULTS			AVERAGE
Run Number	-	**Run 1**	**Run 2**	**Run 3**	
Test Date	mm/dd/yy	5/22/19	5/22/19	5/23/19	--
Test Time	hh:mm	11:50 - 14:15	14:38 - 16:53	8:25 - 10:45	--
Sampling Data*					
Stack Temperature	°F	152.3	138.0	128.4	**139.6**
Moisture	%	1.2	1.3	1.5	**1.4**
Sample Volume	dscf	102.7	100.5	105.9	**103.0**
Oxygen**	% v/v	19.9	19.9	20.2	**20.0**
Carbon Dioxide**	% v/v	0.30	0.30	0.30	**0.30**
Gas Velocity	ft/min	6,000.0	5,828.0	5,917.3	**5,915**
Stack Flow Rate	acfm	3,272	3,179	3,227	**3,226**
Stack Flow Rate	dscfm	2,661	2,644	2,743	**2,683**
Total Catch (CARB 425)					
Chromium VI	ug	58.5	3.8	23.5	**28.6**
Total Chromium	ug	281	55	346	**227**
Concentration (CARB 425)					
Chromium VI	ug/dscm	20.12	1.34	7.84	**9.76**
	ug/dscf	0.570	0.038	0.222	**0.276**
Total Chromium	ug/dscm	96.64	19.29	115.44	**77.1**
	ug/dscf	2.74	0.55	3.27	**2.18**
Mass Emissions (CARB 425)					
Chromium VI	ug/hr	90955	6000	36528	**44494**
Chromium VI	mg/hr	91.0	6.00	36.5	**44.5**
Chromium VI	lb/hr	2.01E-04	1.32E-05	8.05E-05	**9.81E-05**
Total Chromium	ug/hr	436895	86678	537974	**353849**
Total Chromium	mg/hr	437	87	538	**354**
Total Chromium	lb/hr	9.63E-04	1.91E-04	1.19E-03	**7.80E-04**

Notes:
* Performed during isokinetic sampling by CARB 425.
** O2/CO2 was measured via SCAQMD Method 10.1 by GC.

TABLE 6-6. TEST RESULTS
SCAQMD Method 5.1 (Particulate Matter)

Facility: AQMD Facility A
City: [redacted], CA
Source: Baghouse
Location: Inlet 1 Furnace (Inside)

Run Number	1	
Run Date	05/23/19	
Run Start Time	11:20	
Run Stop Time	13:36	
Test Train Parameters		**AVERAGE**
Volume of Dry Gas Sample, SCF*	101.79	101.79
Flue Gas Parameters		
CO2, Percent By Volume, Dry**	< 0.30	< 0.30
O2, Percent By Volume, Dry**	20.20	20.20
Temperature, Degrees F	128.0	128.0
Moisture, %	1.55	1.55
Air Flow Rate, Wet ACFM	3,142	3,142
Air Flow Rate, Dry SCFM*	2,629	2,629
Total Particulate		
Catch, mg	60.42	60.42
Concentration, Gr/DSCF	0.009160	0.009160
Emission Rate, lb/hr	0.206	0.206

* 60 Degrees F and 29.92 Inches of Mercury
** O2/CO2 was sampled in Tedlar bag and analysed via SCAQMD Method 10.1 by GC.

TABLE 6-7. TEST RESULTS
CARB 436 (Multiple Metals)

Facility: AQMD Facility A
City: [redacted], CA
Source: Baghouse
Location: Inlet 1 (Upstream to Baghouse)

Test Data	Units	Source Test Results			Average
Run Number	--	**Run 1**	**Run 2**	**Run 3**	
Test Date	mm/dd/yy	05/21/19	05/21/19	05/22/19	--
Test Time	hh:mm	12:10 - 14:30	15:10 - 17:40	08:30 - 10:40	--
Sampling Data*					
Stack Temperature	°F	90	84	87	**87**
Moisture	%	1.4	1.3	1.2	**1.3**
Sample Volume	dscf	80	85	102	**89**
Oxygen**	% v/v	20.1	20.1	20.2	**20.1**
Carbon Dioxide**	% v/v	< 0.3	< 0.3	< 0.3	**< 0.3**
Gas Velocity	ft/min	5,534	5,695	5,778	**5,669**
Stack Flow Rate	acfm	39,119	40,259	40,843	**40,074**
Stack Flow Rate	dscfm	35,723	37,208	37,320	**36,750**
CARB Method 436 CONCENTRATION		Total	Total	Total	
Arsenic	ug/dscm	ND 0.44	ND 0.42	ND 0.34	< **0.40**
	ug/dscf	ND 0.012	ND 0.012	ND 0.010	< **0.011**
Cadmium	ug/dscm	0.483	ND 0.416	ND 0.345	**0.415**
	ug/dscf	0.014	ND 0.012	ND 0.010	**0.012**
Chromium	ug/dscm	13.4	3.41	20.2	**12.3**
	ug/dscf	0.379	0.097	0.571	**0.349**
Nickel	ug/dscm	9.09	4.87	14.7	**9.56**
	ug/dscf	0.257	0.138	0.417	**0.27**
CARB Method 436 MASS EMISSION RATE		Total	Total	Total	
Arsenic	lb/hr	ND 5.88E-05	ND 5.80E-05	ND 4.82E-05	< **5.50E-05**
Cadmium	lb/hr	6.47E-05	ND 5.80E-05	ND 4.82E-05	**5.69E-05**
Chromium	lb/hr	1.79E-03	4.75E-04	2.82E-03	**1.70E-03**
Nickel	lb/hr	1.22E-03	6.78E-04	2.06E-03	**1.32E-03**

Notes:
* Performed during isokinetic sampling (e.g. CARB Method 436).
** Measured via SCAQMD Method 10.1.
ND or "<" - Not detected, reporting limit reported.

TABLE 6-8. TEST RESULTS

CARB 425 (Hexavalent & Total Chromium)

Facility: AQMD Facility A
City: [redacted], CA
Source: Baghouse
Location: Inlet 2 (Upstream to Baghouse)

TEST DATA	**UNITS**	**TEST RESULTS**			**AVERAGE**
Run Number	-	**Run 1**	**Run 2**	**Run 3**	
Test Date	mm/dd/yy	5/22/19	5/22/19	5/23/19	--
Test Time	hh:mm	11:50 - 14:12	14:38 - 16:50	8:25 - 10:42	--
Sampling Data*					
Stack Temperature	°F	91	85	81	**86**
Moisture	%	1.4	1.5	1.5	**1.5**
Sample Volume	dscf	102.2	105.0	105.0	**104.1**
Oxygen**	% v/v	20.2	20.2	19.9	**20.1**
Carbon Dioxide**	% v/v	0.30	0.30	0.30	**0.30**
Gas Velocity	ft/min	5,774.9	5,873.0	5,815.4	**5,821**
Stack Flow Rate	acfm	40,820	41,514	41,106	**41,147**
Stack Flow Rate	dscfm	36,968	37,943	37,953	**37,621**
Total Catch (CARB 425)					
Chromium VI	ug	4.30	0.52	3.04	**2.62**
Total Chromium	ug	13.7	5.1	21.7	**13.5**
Concentration (CARB 425)					
Chromium VI	ug/dscm	1.49	0.17	1.02	**0.89**
	ug/dscf	0.042	0.005	0.029	**0.025**
Total Chromium	ug/dscm	4.73	1.72	7.30	**4.58**
	ug/dscf	0.13	0.05	0.21	**0.13**
Mass Emissions (CARB 425)					
Chromium VI	ug/hr	93299	11274	65907	**56827**
Chromium VI	mg/hr	93.3	11.3	65.9	**56.8**
Chromium VI	lb/hr	2.1E-04	2.5E-05	1.5E-04	**1.25E-04**
Total Chromium	ug/hr	297255	110574	470457	**292762**
Total Chromium	mg/hr	297.26	110.57	470.46	**292.8**
Total Chromium	lb/hr	6.6E-04	2.4E-04	1.0E-03	**6.45E-04**

Notes:
* Performed during isokinetic sampling by CARB 425.
**O2/CO2 was measured via SCAQMD Method 10.1 by GC.

TABLE 6-9. TEST RESULTS
SCAQMD Method 5.1 (Particulate Matter)

Facility: AQMD Facility A

City: [redacted], CA

Source: Baghouse

Location: Inlet 1 (Upstream to Baghouse)

Run Number	1	
Run Date	05/23/19	
Run Start Time	11:20	
Run Stop Time	13:36	
Test Train Parameters		**AVERAGE**
Volume of Dry Gas Sample, SCF*	100.62	100.62
Flue Gas Parameters		
CO2, Percent By Volume, Dry**	< 0.30	< 0.30
O2, Percent By Volume, Dry**	19.90	19.90
Temperature, Degrees F	83.7	83.7
Moisture, %	1.84	1.84
Air Flow Rate, Wet ACFM	40,129	40,129
Air Flow Rate, Dry SCFM*	36,230	36,230
Total Particulate		
Catch, mg	16.27	16.27
Concentration, Gr/DSCF	0.002495	0.002495
Emission Rate, lb/hr	0.775	0.775

* 60 Degrees F and 29.92 Inches of Mercury

** O2/CO2 was sampled in Tedlar bag and analysed via SCAQMD Method 10.1 by GC.

APPENDICES

APPENDIX A

GENERAL CALCULATIONS AND FORMULAE

GENERAL CALCULATIONS

Standard conditions: 29.92 in.Hg, 68 ^{o}F for CARB, 60^{o}F for SCAQMD

Gas Moisture at standard conditions (scf): $V_{WTR} = K2*V_{COND}$
$K2 = 0.04707$ @ 68 ^{o}F, 0.0464 @ 60 ^{o}F

Sample volume at standard conditions (scf):
Vmstd =K1*Vmacf*Ym*(Pbar+dH/13.6)/(Tm+460)
K1 = 17.64 @ 68 ^{o}F, 17.38 @ 60 ^{o}F

Percent of water: $\%H_2O = 100*Vmstd/(Vmstd+Vwtr)$

Dry molecular weight: $M_d = (44*\%CO_2+32*\%O_2+28*(\%N_2+\%CO))/100$

Wet molecular weight: $M_w = M_d*(1-\%H_2O/100)+18*(\%H_2O/100)$

Stack gas pressure (In. Hg): $P_{stk} = P_{bar}+P_{sta}/13.6$

Average velocity head: Ave. dP = $\{SQRT\ (dP)\}^2$

Stack gas velocity (fps): $V = 85.49*C_p*SQRT(dP)*SQRT((T_S+460)/(P_{STK}*M_w))$

Percent of excess air: $\%EXCA = 100*(\%O_2-0.5\%CO)/(0.264(\%N_2-(\%O_2-0.5\%CO)))$

Stack gas flow (scfm): $Q_{STK} = 60(1-\%H_2O/100)*V*A*(528/(T_s+460))*P_{stk}/29.92$

Concentration at 3% O_2: PPM @ 3% O_2 = $PPM_{measured}*17.9/(20.9-\%O_2)$

Emissions lb/MMBtu:
$lb/MMBtu=PPM*10^{-6}*(MW\ lb/lb\text{-}mole)/SV\ Mole*F_d*20.9/(20.9-\%O_2)$

Emissions lb/hr:
$lb/hr = PPM*10^{-6}*((MW\ lb/lb\text{-}mole)/SV)*F_d*FF*(1050\ Btu/scf)*20.9/(20.9-\%O_2)$

Concentration (ug/dscm), Ci = Mi/VmStd*35.315

Metals Mass Emission Rate (ug/hr), Ei,m = Ci*Qsdm*60,

Metals Mass Emission Rate (lbs/hr) = Ei/453.6/1000000

DEFINITIONS

A: Stack cross area, Square feet
Cp: Pitot coefficient
@h: Orifice Pressure, In. H2O
MW: Molecular weight
Md: Dry molecular weight of flue gas
Mw: Wet molecular weight of flue gas
Pbar: Barometric pressure, In. Hg
Psta: Static Pressure, In. H2O
Pstk: Stack pressure, In, Hg
P: Stack differential pressure, In. H2O
Qstk: Stack gas flow, scfm
Tm: Meter temperature, F
Ts: Stack gas temperature, F
Vcond: Volume of water condensation, ml
Vm: Meter volume, acf
Vmstd: Sample gas at standard conditions, scf
Vwtr: Water vapor volume, scf
Ym: Meter correction factor
SV: Specific molar volume, 379.5 dscf/Lb.mole at 60F, or 385.3 dscf/Lb.mole at 68F
FF: Fuel Flow Rate (SCF/HR)
Fd: Dry Fuel Factor, for natural gas Fd=8710 Dscf/MMBTU at 68F.

APPENDIX B

APPROVALS AND CERTIFICATIONS

APPENDIX B1

SCAQMD AND CARB TESTING APPROVALS

South Coast AQMD
South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 · www.aqmd.gov

May 29, 2019

Mr. John W. Phillips
Almega Environmental
10602 Walker Street
Cypress, CA 90630

Subject: LAP Approval Notice
Reference # 93LA0827

Dear Mr. Phillips:

We completed our review of the renewal application you submitted for approval under the South Coast Air Quality Management District's Laboratory Approval Program (LAP). We are pleased to inform you that your firm is approved for the period beginning June 30, 2019, and ending June 30, 2020 for the following methods, subject to the requirements in the LAP Conditions For Approval Agreement and conditions listed in the attachment to this letter:

SCAQMD Methods 1-4
SCAQMD Method 10.1
SCAQMD Method 100.1
SCAQMD Method 25.1 (Sampling)
SCAQMD Method 25.1 (Analysis)
SCAQMD Method 25.3 (Analysis)
SCAQMD Methods 5.1 and 6.1
SCAQMD Method 7.1
SCAQMD Rule 1121/ 1146.2 Protocols
SCAQMD Rule 1420/1420.1/ 1420.2 – (Lead) Source Sampling
SCAQMD Rule 1420/1420.1/ 1420.2 – (Lead) Ambient Sampling
SCAQMD Rule 462 Testing
ASTM D6522-00/ USEPA CTM-030

Thank you for participating in the LAP. Your cooperation helps us to achieve the goal of the LAP: to maintain high standards of quality in the sampling and analysis of source emissions. You may direct any questions or information to LAP Coordinator, Glenn Kasai. He may be reached by telephone at (909) 396-2271, or via e-mail at gkasai@aqmd.gov.

Sincerely,

D. Sarkar

Dipankar Sarkar
Program Supervisor
Source Test Engineering

GK/gk

190529 LapRenewal.doc

ATTACHMENT

Conditions For Almega Environmental's LAP Approval

1) Almega shall adhere to the following requirements when conducting portable analyzer tests using CTM-030 or ASTM D6522:

    a) Deviations to CTM-030 or ASTM D6522 shall be documented in the Test Critique section of the test report;

    b) The test report shall be formatted and organized in a manner consistent with the example portable analyzer test report, dated September 24, 2011, and the Source Test Manual, Chapter II; and,

    c) NO_2 measurements may be quantified to 10% of the NO_2 span under the following conditions:

        - Calibrations shall be conducted per Sections 7.3 and 7.6 of CTM-030 at the span, mid-span (40-60% of span), low-span (10% of span), and zero level. The low-span calibration shall satisfy the requirements in Section 4.2 of CTM-030;
        - A linearity check shall be conducted once every five days using the low-span calibration gas; and,
        - If the measured NO_2 emission is less than 10% of the NO_2 span, it shall be reported as less than 10% of the span, and added to the NO emission to determine the total NOx concentration.

State of California

Air Resources Board

Approved Independent Contractor

Almega Environmental & Technical Services, Incorporated

This is to certify that the company listed above has been approved by the California Air Resources Board to conduct compliance testing pursuant to California Code of Regulations, title 17, section 91207, through June 30, 2020, for the test methods listed below:

ARB Source Test Methods:
1, 2, 3, 4, 5, 8
100 (CO, CO_2, NO_x, O_2, SO_2)

Catherine Dunwoody, Chief
Monitoring and Laboratory Division

State of California

Air Resources Board

Approved Independent Contractor

Almega Environmental & Technical Services, Incorporated

This is to certify that the company listed above has been approved by the California Air Resources Board to conduct compliance testing pursuant to California Code of Regulations, title 17, section 91207, through June 30, 2020, for the test method listed below:

Visible Emissions Evaluation

Catherine Dunwoody, Chief
Monitoring and Laboratory Division

APPENDIX B2

CERTIFICATION OF NO CONFLICT-OF-INTEREST

Certification of No Conflict-of-Interest

Almega Environmental & Technical Services
10602 Walker Street
Cypress, CA 90630

I certify that I am responsible for the testing operations of Almega and am authorized to sign this certificate on the Company's behalf.

Almega may conduct tests as an independent tester pursuant to SCAQMD Rule 304(k). I further certify that Almega has no conflict-of-interests and is not related or owned in any way to the company being tested.

Company being tested: Metal Melting Facility A .

Facility Location: [redacted]

Facility ID: n/a

Signature:

Name (printed or typed): Charles M. Figueroa

Title: Senior Project Manager

Date: September 4, 2019

APPENDIX C

CARB METHOD 436 – MULTIPLE METAL EMISSIONS

APPENDIX C1

MULTIPLE METAL EMISSIONS – RESULTS AND CALCULATIONS

Location: Baghouse Outlet

TEST RESULTS
CARB 436 (Multiple Metals)

Facility: AQMD Facility A
City: [redacted] CA
Source: Baghouse
Location: Outlet

Test Data	**Units**	**Source Test Results**						**Average**	
Run Number	--		**Run 1**		**Run 2**		**Run 3**		
Test Date	mm/dd/yy		05/21/19		05/21/19		05/22/19		--
Test Time	hh:mm		12:10 - 14:33		15:10 - 17:40		08:30 - 10:48		--
Sampling Data*									
Stack Temperature	°F		85.0		86.2		86.6		**85.9**
Moisture	%		1.3		1.2		1.6		**1.4**
Sample Volume	dscf		95.0		95.0		91.3		**93.8**
Oxygen**	% v/v		20.9		20.9		20.9		**20.9**
Carbon Dioxide**	% v/v		< 0.04		< 0.04		< 0.04		**< 0.04**
Stack Flow Rate	dscfm		46,646		48,131		48,166		**47,648**
CARB Method 436 CONCENTRATION			Total		Total		Total		
Arsenic	ug/dscm	ND	0.372	ND	0.372	ND	0.387	<	**0.377**
	ug/dscf	ND	0.0105	ND	0.0105	ND	0.0109	<	**0.011**
Cadmium	ug/dscm	ND	0.372	ND	0.372	ND	0.387	<	**0.377**
	ug/dscf	ND	0.0105	ND	0.0105	ND	0.0109	<	**0.011**
Chromium	ug/dscm		14.7	RL	0.781	RL	0.812		**5.42**
	ug/dscf		0.416	RL	0.0221	RL	0.0230		**0.154**
Nickel	ug/dscm		2.27	RL	2.01	RL	2.09		**2.12**
	ug/dscf		0.0642	RL	0.0569	RL	0.0591		**0.0601**
CARB Method 436 MASS EMISSION RATE			Total		Total		Total		
Arsenic	lbs/hr	ND	6.49E-05	ND	6.71E-05	ND	6.98E-05	<	**6.72E-05**
Cadmium	lbs/hr	ND	6.49E-05	ND	6.71E-05	ND	6.98E-05	<	**6.72E-05**
Chromium	lbs/hr		2.56E-03	RL	1.41E-04	RL	1.46E-04		**9.51E-04**
Nickel	lbs/hr		3.96E-04	RL	3.62E-04	RL	3.77E-04		**3.78E-04**

Notes:
* Performed during isokinetic sampling (e.g. CARB Method 436).
**SCAQMD Method 10.1 Tedlar bag sample was leaked, ambient level O2/CO2 was used for gas density calculations.
ND or "<" - Not detected, reporting limit reported.

CARB METHOD 436 DATA AND CALCULATIONS

Plant:	AQMD Facility A	Test Date(s):	05/21-22/2019
City:	[redacted], CA	Operator:	CH/NC
Source:	Baghouse	Entered by:	TG
Location:	Outlet	Checked by:	CF

Metals Catch, Mi		**Run 1**	**Run 2**	**Run 3**	Field Blank	Reagent Blank
Fraction		Results	Results	Results	Results	Results
Arsenic	ug	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.00
Cadmium	ug	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.00
Chromium	ug	41.0	2.5	2.1	2.2	1.50
Nickel	ug	7.4	1.8	1.9	3.1	1.30

Reagent Blank		**Run 1**	**Run 2**	**Run 3**	Field Blank	
Fraction		Results	Results	Results	Results	
Arsenic	ug	ND 1.0	ND 1.0	ND 1.0	ND 1.0	
Cadmium	ug	ND 1.0	ND 1.0	ND 1.0	ND 1.0	
Chromium	ug	1.5	1.5	1.50	1.5	
Nickel	ug	1.3	1.3	1.30	1.3	

Reagent Blank Corrected Values		**Run 1**	**Run 2**	**Run 3**	Field Blank	Reporting Limit
Fraction		Results	Results	Results	Results	
Arsenic	ug	ND 1.0	ND 1.0	ND 1.0	ND 1.0	
Cadmium	ug	ND 1.0	ND 1.0	ND 1.0	ND 1.0	
Chromium	ug	39.5	~~1.0~~	~~0.6~~	0.7	2.10
Nickel	ug	6.1	~~0.5~~	~~0.6~~	1.8	5.40

These value should be considered as in the "noise of the sampling method" and will be reported as below the reporting limit
Reporting limit is based on three times the FB values.

CARB METHOD 436 DATA AND CALCULATIONS

Plant:	AQMD Facility A	Test Date(s):	05/21-22/2019
City:	[redacted], CA	Operator:	CH/NC
Source:	Baghouse	Entered by:	TG
Location:	Outlet	Checked by:	CF

Metals Catch, Mi		**Run 1**	**Run 2**	**Run 3**	Field Blank
Fraction		Total	Total	Total	Total
Arsenic	ug	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Cadmium	ug	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Chromium	ug	B 39.5	RL 2.1	RL 2.1	0.7
Nickel	ug	B 6.1	RL 5.4	RL 5.4	1.8
Metals Molecular Weight, MW		**Run 1**	**Run 2**	**Run 3**	
Fraction		Total	Total	Total	
Arsenic	g/g-mole	74.92	74.92	74.92	
Cadmium	g/g-mole	112.41	112.41	112.41	
Chromium	g/g-mole	51.995	51.995	51.995	
Nickel	g/g-mole	58.69	58.69	58.69	
Concentration (ug/dscm), Ci = Mi/VmStd *35.315e-3cf/dscm					
Fraction		Total	Total	Total	
Arsenic	ug/dscm	ND 0.37	ND 0.37	ND 0.39	
Cadmium	ug/dscm	ND 0.3716	ND 0.3719	ND 0.3867	
Chromium	ug/dscm	14.677	RL 0.781	RL 0.812	
Nickel	ug/dscm	2.2666	RL 2.0084	RL 2.088	
Metals Mass Emission Rate (ug/hr), Ei,m Ei,m = Ci*Qsdm*60					
Fraction		Total	Total	Total	
Arsenic	ug/hr	ND 2.94E+04	ND 3.04E+04	ND 3.16E+04	
Cadmium	ug/hr	ND 2.94E+04	ND 3.04E+04	ND 3.16E+04	
Chromium	ug/hr	1.16E+06	RL 6.39E+04	RL 6.65E+04	
Nickel	ug/hr	1.80E+05	RL 1.64E+05	RL 1.71E+05	
Metals Mass Emission Rate (lb/hr), Ei Ei = Ci*Qsdm*60/453600/1000					
Fraction		Total	Total	Total	
Arsenic	lb/hr	ND 6.49E-05	ND 6.71E-05	ND 6.98E-05	
Cadmium	lb/hr	ND 6.49E-05	ND 6.71E-05	ND 6.98E-05	
Chromium	lb/hr	2.56E-03	RL 1.41E-04	RL 1.46E-04	
Nickel	lb/hr	3.96E-04	RL 3.62E-04	RL 3.77E-04	

Flags
ND or "<" - Not detected, reporting limit reported.
Reported at below the reporting limit
NDb - Reagent blank corrected result is less than RL. RL is substituted.

CARB METHOD 436 DATA AND CALCULATIONS

Plant: AQMD Facility A
City: [redacted] CA
Source: Baghouse
Location: Outlet

Test Date(s): 05/21-22/2019
Operator: CH/NC
Entered by: TG
Checked by: CF

			05/21/19	05/21/19	05/22/19
DATA ENTRY	**Symbol**	**units**	**DATA**	**DATA**	**DATA**
Run Number			Run 1	Run 2	Run 3
Stack Dimensions: Round Stack Diameter	Ds	in.			
Rectangular Stack, Length	L	in.			
Width	W	in.			
Nozzle Diameter	Dn	in.	0.528	0.528	0.513
Standard Temperature	Tstd	°F	68	68	68
Universal (molar) Gas Constant	Renglish	in. Hg-cu.ft/ °R-lbmole	21.85	21.85	21.85
Average Stack Temperature (measured)	Fs	°F	85.0	86.2	86.6
Average Meter Temperature (measured)	Fm	°F	82.2	79.2	73.5
Standard Pressure	Pstd	in.Hg	29.92	29.92	29.92
Barometric Pressure	Pbar	in.Hg	29.83	29.83	29.62
Stack Static Pressure	Pg	in.WC	-	-	-
Average Meter Orifice Head (Delta-H)	dH	in.WC	1.97	1.95	1.80
Average RMS Velocity Head (Delta-P)	dP	in.WC	-	-	-
Pitot Coefficient	Cp	—	-	-	-
Net Volume of Gas Metered	Vm	cu.ft.	93.894	93.291	89.431
Dry Gas Meter Calibration Factor (gamma, Y)	Y	—	1.0376	1.0376	1.0376
NET Sampling Time	min	min.	123	123	123
Stack Gas: Oxygen Content *	O2,m	%	20.9	20.9	20.9
Carbon Dioxide Content *	CO2,m	%	0.04	0.04	0.04
Total Impinger Gain	Ww	g	26.0	25.1	31.0
CALCULATED DATA					
Nozzle Area: An = pi/4*dn^2	An	sq.in.	0.2190	0.2190	0.2067
Stack Area (round): As = pi/576*ds^2 (rectangular): As = L*W/144	As	sq.ft.			
Absolute Stack Temperature: Ts = Fs+460	Ts	°R	545.0	546.2	546.6
Absolute Meter Temperature: Tm = Fm+460	Tm	°R	542.2	539.2	533.5
Standard Temperature: Tstdr = Tstd+460	Tstdr	°R	528.0	528.0	528.0
Gas Sample Volume at Standard Conditions: Vm(std) = Y * (Vm/Tm) * (Pbar + dH/13.6 in H2O/in Hg) * (Tstdr/Pstd)	VmStd	cu.ft.	95.040	94.952	91.327
Vol. of Water Vapor, Vw(std) = Ww/453.59 * Renglish/18 * Tstdr / Pstd	VwStd	cu.ft.	1.228	1.185	1.464
Moisture Fraction: Bws = VwStd/(VmStd+VwStd)	Bws	—	0.013	0.012	0.016
Stack Gas MW, Dry Basis: Md = 0.32*O2,m + 0.44*CO2,m + 0.28*(100-O2,m-CO2,m)	Md	g/mole	28.84	28.84	28.84
Stack Gas MW, Wet Basis: Mw = Md*(1-Bws) + 18*Bws	Mw	g/mole	28.70	28.71	28.67
Stack Pressure: Ps = Pbar + Pg/13.6	Ps	in.Hg	-	-	-
Stack Gas Velocity, measured					
vs = 85.49*Cp*√(dP*Ts/Ps/Mw)	vs	ft/s	-	-	-
vm = 0.3048 m/ft*vs	vsm	m/s	-	-	-
Stack Gas Volumetric Flow Rate: Q = 60*vs*As	Q	acfm	-	-	-
Stack Gas Volumetric Flow Rate, corrected:					
Qsd = Q*(1-Bws)*(Ps/Ts)*(Tstdr/Pstd)	Qsd**	dscfm	46,646	48,131	48,166
Qsdm = Qsd/35.315	Qsdm	dscmm	1,320.9	1,362.9	1,363.9
Isokinetic Sampling Rate: I = 144*100*Ts*Vmstd *Pstd/[60*Tstdr*vs*min*An*Ps*(1-Bws)]	I	%	-	-	-

*SCAQMD Method 10.1 Tedlar bag sample was leaked, ambient level O2/CO2 was used for gas density calculations.

**Baghouse outlet flow was assumed to be equal to the inlet. The inlet 1 outside and inlet 2 flows were added and utilized for outlet mass emission calculations.

CARB METHOD 436 DATA AND CALCULATIONS

ISOKINETIC CALCULATION ONLY

Plant: AQMD Facility A
City: [redacted], CA
Source: Baghouse
Location: Outlet

Test Date(s): 05/21-22/2019
Operator: CH/NC
Entered by: TG
Checked by: CF

			05/21/19	05/21/19	05/22/19
DATA ENTRY	**Symbol**	**units**	**DATA**	**DATA**	**DATA**
Run Number			Run 1	Run 2	Run 3
Stack Dimensions: Round Stack Diameter	Ds	in.			
Rectangular Stack, Length	L	in.	154	154	154
Width	W	in.	46	46	46
Nozzle Diameter	Dn	in.	0.528	0.528	0.513
Standard Temperature	Tstd	°F	68	68	68
Universal (molar) Gas Constant	Renglish	in. Hg-cu.ft/ °R-lbmole	21.85	21.85	21.85
Average Stack Temperature (measured)	Fs	°F	85.0	86.2	86.6
Average Meter Temperature (measured)	Fm	°F	82.2	79.2	73.5
Standard Pressure	Pstd	in.Hg	29.92	29.92	29.92
Barometric Pressure	Pbar	in.Hg	29.83	29.83	29.62
Stack Static Pressure	Pg	in.WC	N/A	N/A	N/A
Average Meter Orifice Head (Delta-H)	dH	in.WC	1.97	1.95	1.80
Average RMS Velocity Head (Delta-P)	dP	in.WC	0.0245	0.0245	0.0256
Pitot Coefficient	Cp	—	0.84	0.84	0.84
Net Volume of Gas Metered	Vm	cu.ft.	93.894	93.291	89.431
Dry Gas Meter Calibration Factor (gamma, Y)	Y	—	1.0376	1.0376	1.0376
NET Sampling Time	min	min.	123	123	123
Stack Gas: Oxygen Content *	O2,m	%	20.9	20.9	20.9
Carbon Dioxide Content *	CO2,m	%	0.04	0.04	0.04
Total Impinger Gain	Ww	g	26.0	25.1	31.0
CALCULATED DATA					
Nozzle Area: An = pi/4*dn^2	An	sq.in.	0.2190	0.2190	0.2067
Stack Area (round): As = pi/576*ds^2	As	sq.ft.			
(rectangular): As = L*W/144 (x2)			98.389	98.389	98.389
Absolute Stack Temperature: Ts = Fs+460	Ts	°R	545.0	546.2	546.6
Absolute Meter Temperature: Tm = Fm+460	Tm	°R	542.2	539.2	533.5
Standard Temperature: Tstdr = Tstd+460	Tstdr	°R	528.0	528.0	528.0
Gas Sample Volume at Standard Conditions: Vm(std) = Y * (Vm/Tm) * (Pbar + dH/13.6 in H2O/in Hg) * (Tstdr/Pstd)	VmStd	cu.ft.	95.040	94.952	91.327
Vol. of Water Vapor, Vw(std) = Ww/453.59 * Renglish/18 * Tstdr / Pstd	VwStd	cu.ft.	1.228	1.185	1.464
Moisture Fraction: Bws = VwStd/(VmStd+VwStd)	Bws	—	0.013	0.012	0.016
Stack Gas MW, Dry Basis: Md = 0.32*O2,m + 0.44*CO2,m + 0.28*(100-O2,m-CO2,m)	Md	g/mole	28.84	28.84	28.84
Stack Gas MW, Wet Basis: Mw = Md*(1-Bws) + 18*Bws	Mw	g/mole	28.70	28.71	28.67
Stack Pressure: Ps = Pbar + Pg/13.6	Ps	in.Hg	29.83	29.83	29.62
Stack Gas Velocity, measured					
vs = 85.49*Cp*√(dP*Ts/Ps/Mw)	vs	ft/s	8.97	8.98	9.22
vm = 0.3048 m/ft*vs	vsm	m/s	2.73	2.74	2.81
Stack Gas Volumetric Flow Rate: Q = 60*vs*As	Q	acfm	52,939	52,991	54,418
Stack Gas Volumetric Flow Rate, corrected:		dscfm	50,481	50,445	51,215
Qsd = Q*(1-Bws)*(Ps/Ts)*(Tstdr/Pstd)	Qsd**	dscfm	46,646	48,131	48,166
Qsdm = Qsd/35.315	Qsdm	dscmm	1,320.9	1,362.9	1,363.9
Isokinetic Sampling Rate: I = 144*100*Ts*Vmstd *Pstd/[60*Tstdr*vs*min*An*Ps*(1-Bws)]	I	%	99.0	99.0	99.4
				based on estimated dP	

Flow Rate - Estimated (based on preflow calcuation and back calculated dP)	50,481	50,445	51,215
Flow Rate based on sum of two inlet flows (as measured during test)	46,646	48,131	48,166
Flow - Percent Difference	108%	105%	106%
Corrected isokinetic sampling rate based on actual flows	107%	104%	106%

CARB METHOD 436 DATA AND CALCULATIONS

Plant: AQMD Facility A
City: [redacted], CA
Source: Baghouse
Location: Outlet

dP based on inlet pre flows
Back-calculated for the
this outlet location

Run No.: 1
Test Date: 05/21/19
Times: 12:10 - 14:33

	Stack Temp (°F)		Velocity Head (in.WC)		dH	DGM Temperature (°F)	
point	Fs	sqrt (Fs)	dP	sqrt (dP)	(in.WC)	Fm,in	Fm,out
A-1	72	8.5	0.0245	0.1565	2.01	80	80
2	80	8.9	0.0245	0.1565	1.98	80	80
3	92	9.6	0.0245	0.1565	1.94	80	80
4	84	9.2	0.0245	0.1565	1.97	81	81
5	81	9.0	0.0245	0.1565	1.98	82	82
6	91	9.5	0.0245	0.1565	1.95	83	83
7	100	10.0	0.0245	0.1565	1.92	83	83
8	90	9.5	0.0245	0.1565	1.96	84	84
9	84	9.2	0.0245	0.1565	1.98	84	84
10	82	9.1	0.0245	0.1565	1.99	85	85
11	84	9.2	0.0245	0.1565	1.98	85	85
12	86	9.3	0.0245	0.1565	1.98	86	86
B-1	78	8.8	0.0245	0.1565	1.98	79	79
2	82	9.1	0.0245	0.1565	1.97	79	79
3	87	9.3	0.0245	0.1565	1.95	80	80
4	85	9.2	0.0245	0.1565	1.97	81	81
5	83	9.1	0.0245	0.1565	1.98	82	82
6	86	9.3	0.0245	0.1565	1.97	82	82
7	90	9.5	0.0245	0.1565	1.95	83	83
8	84	9.2	0.0245	0.1565	1.98	84	84
9	86	9.3	0.0245	0.1565	1.97	84	84
Average:	**85.0**		**0.0245**		**1.97**		**82.2**

DGM Reading (cu.ft.):	Final-1:	687.957
	Initial-1:	642.123
	Final-2:	736.394
	Initial-2:	688.334
	Final-3:	
	Initial-3:	
	Final-4:	
	Initial-4:	
	Final-5:	
	Initial-5:	
	Volume:	**93.894**

Impinger Weight (g):	#1 Final:	778.1
	#1 Initial:	776.8
	#2 Final:	632.5
	#2 Initial:	625.0
	#3 Final:	629.2
	#3 Initial:	627.7
	#4 Final:	927.0
	#4 Initial:	911.3
	#5 Final:	
	#5 Initial:	
	#6 Final:	
	#6 Initial:	
	#7 Final:	
	#7 Initial:	
	#8 Final:	
	#8 Initial:	
	Total wt of impingers:	**26.0**

CARB METHOD 436 DATA AND CALCULATIONS

Plant: AQMD Facility A
City: [redacted], CA
Source: Baghouse
Location: Outlet

dP based on inlet pre flows
Back-calculated for the
this outlet location

Run No.: 2
Test Date: 05/21/19
Times: 15:10 - 17:40

	Stack Temp (°F)		Velocity Head (in.WC)		dH	DGM Temperature (°F)	
point	Fs	sqrt (Fs)	dP	sqrt (dP)	(in.WC)	Fm,in	Fm,out
A-1	91	9.5	0.0245	0.1565	1.93	76	76
2	87	9.3	0.0245	0.1565	1.95	78	78
3	84	9.2	0.0245	0.1565	1.96	78	78
4	89	9.4	0.0245	0.1565	1.94	79	79
5	86	9.3	0.0245	0.1565	1.96	80	80
6	83	9.1	0.0245	0.1565	1.97	80	80
7	87	9.3	0.0245	0.1565	1.96	81	81
8	89	9.4	0.0245	0.1565	1.95	82	82
9	85	9.2	0.0245	0.1565	1.97	82	82
B-1	87	9.3	0.0245	0.1565	1.94	76	76
2	89	9.4	0.0245	0.1565	1.93	76	76
3	85	9.2	0.0245	0.1565	1.95	77	77
4	82	9.1	0.0245	0.1565	1.97	78	78
5	87	9.3	0.0245	0.1565	1.95	78	78
6	88	9.4	0.0245	0.1565	1.95	79	79
7	85	9.2	0.0245	0.1565	1.96	80	80
8	82	9.1	0.0245	0.1565	1.97	80	80
9	87	9.3	0.0245	0.1565	1.95	80	80
10	86	9.3	0.0245	0.1565	1.96	81	81
11	82	9.1	0.0245	0.1565	1.98	81	81
12	89	9.4	0.0245	0.1565	1.95	82	82
Average:	**86.2**		**0.0245**		**1.95**		**79.2**

DGM Reading (cu.ft.): Final-1:	784.771	Impinger Weight (g): #1 Final:	730.5
Initial-1:	736.990	#1 Initial:	736.2
Final-2:	830.792	#2 Final:	756.7
Initial-2:	785.282	#2 Initial:	747.5
Final-3:		#3 Final:	628.3
Initial-3:		#3 Initial:	625.9
Final-4:		#4 Final:	871.4
Initial-4:		#4 Initial:	852.2
Final-5:		#5 Final:	
Initial-5:		#5 Initial:	
Volume:	**93.291**	#6 Final:	
		#6 Initial:	
		#7 Final:	
		#7 Initial:	
		#8 Final:	
		#8 Initial:	
		Total wt of impingers:	**25.1**

CARB METHOD 436 DATA AND CALCULATIONS

Plant: AQMD Facility A
City: [redacted], CA
Source: Baghouse
Location: Outlet

dP based on inlet pre flows
Back-calculated for the
this outlet location

Run No.: 3
Test Date: 05/22/19
Times: 08:30 - 10:48

	Stack Temp (°F)		Velocity Head (in.WC)		dH	DGM Temperature (°F)	
point	Fs	sqrt (Fs)	dP	sqrt (dP)	(in.WC)	Fm,in	Fm,out
A-1	76	8.7	0.0256	0.1600	1.81	64	64
2	84	9.2	0.0256	0.1600	1.79	65	65
3	87	9.3	0.0256	0.1600	1.78	66	66
4	89	9.4	0.0256	0.1600	1.78	67	67
5	90	9.5	0.0256	0.1600	1.78	69	69
6	86	9.3	0.0256	0.1600	1.80	71	71
7	92	9.6	0.0256	0.1600	1.79	72	72
8	87	9.3	0.0256	0.1600	1.81	74	74
9	84	9.2	0.0256	0.1600	1.82	75	75
10	89	9.4	0.0256	0.1600	1.81	76	76
11	85	9.2	0.0256	0.1600	1.83	77	77
12	84	9.2	0.0256	0.1600	1.83	77	77
B-1	86	9.3	0.0256	0.1600	1.80	73	73
2	91	9.5	0.0256	0.1600	1.79	74	74
3	88	9.4	0.0256	0.1600	1.80	75	75
4	93	9.6	0.0256	0.1600	1.79	76	76
5	87	9.3	0.0256	0.1600	1.81	77	77
6	84	9.2	0.0256	0.1600	1.82	78	78
7	88	9.4	0.0256	0.1600	1.81	79	79
8	85	9.2	0.0256	0.1600	1.82	79	79
9	85	9.2	0.0256	0.1600	1.82	79	79
Average:	**86.6**		**0.0256**		**1.80**		**73.5**

DGM Reading (cu.ft.): Final-1: 875.022
Initial-1: 831.607
Final-2: 921.550
Initial-2: 875.534
Final-3:
Initial-3:
Final-4:
Initial-4:
Final-5:
Initial-5:
Volume: **89.431**

Impinger Weight (g): #1 Final: 766.0
#1 Initial: 776.0
#2 Final: 638.9
#2 Initial: 625.2
#3 Final: 634.1
#3 Initial: 628.8
#4 Final: 902.0
#4 Initial: 880.0
#5 Final:
#5 Initial:
#6 Final:
#6 Initial:
#7 Final:
#7 Initial:
#8 Final:
#8 Initial:
Total wt of impingers: **31.0**

Location: Inlet 1 (Inside)

TEST RESULTS
CARB 436 (Multiple Metals)

Facility: AQMD Facility A
City: [redacted], CA
Source: Baghouse
Location: Inlet 1 Furnace (Inside)

Test Data	Units	Source Test Results			Average
Run Number	--	**Run 1**	**Run 2**	**Run 3**	
Test Date	mm/dd/yy	05/21/19	05/21/19	05/22/19	**--**
Test Time	hh:mm	12:10 - 14:30	15:10 - 17:40	08:30 - 10:45	**--**
Sampling Data*					
Stack Temperature	°F	123.4	133.6	132.1	**129.7**
Moisture	%	1.4	1.4	1.1	**1.3**
Sample Volume	dscf	74.7	81.3	104.2	**86.7**
Oxygen**	% v/v	20.0	19.9	20.2	**20.0**
Carbon Dioxide**	% v/v	< 0.3	< 0.3	< 0.3	**< 0.3**
Gas Velocity	ft/min	5,549	6,070	5,910	**5,843**
Stack Flow Rate	acfm	3,027	3,311	3,224	**3,187**
Stack Flow Rate	dscfm	2,599	2,795	2,716	**2,703**
CARB Method 436 CONCENTRATION		Total	Total	Total	
Arsenic	ug/dscm	ND 0.47	ND 0.43	0.98	**0.63**
	ug/dscf	ND 0.013	ND 0.012	0.028	**0.018**
Cadmium	ug/dscm	ND 0.473	ND 0.435	0.339	**0.415**
	ug/dscf	ND 0.027	ND 0.025	0.019	**0.024**
Chromium	ug/dscm	103.3	17.2	233	**118**
	ug/dscf	2.93	0.49	6.61	**3.34**
Nickel	ug/dscm	27.3	2.61	43.6	**24.5**
	ug/dscf	0.772	0.074	1.235	**0.694**
CARB Method 436 MASS EMISSION RATE		Total	Total	Total	
Arsenic	lb/hr	ND 4.60E-06	ND 4.55E-06	1.00E-05	**4.86E-06**
Cadmium	lb/hr	ND 4.60E-06	ND 4.55E-06	4.21E-06	**2.93E-06**
Chromium	lb/hr	1.01E-03	1.80E-04	2.37E-03	**1.19E-03**
Nickel	lb/hr	2.66E-04	2.73E-05	4.44E-04	**2.46E-04**

Notes:
* Performed during isokinetic sampling (e.g. CARB Method 436).
** Measured via SCAQMD Method 10.1.
ND or "<" - Not detected, reporting limit reported.

CARB METHOD 436 DATA AND CALCULATIONS

Plant:	AQMD Facility A	Test Date(s):	05/21-22/2019
City:	[redacted], CA	Operator:	CH/NC
Source:	Baghouse	Entered by:	TG
Location:	Inlet 1 (Inside)	Checked by:	CF

Metals Catch, Mi		**Run 1**	**Run 2**	**Run 3**	Field Blank	Reagent Blank
Fraction		Results	Results	Results	Results	Results
Arsenic	ug	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.00
Cadmium	ug	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.00
Chromium	ug	220.0	41.0	690.0	2.2	1.50
Nickel	ug	59.0	7.3	130.0	3.1	1.30

Reagent Blank		**Run 1**	**Run 2**	**Run 3**	Field Blank	
Fraction		Results	Results	Results	Results	
Arsenic	ug	ND 1.0	ND 1.0	ND 1.0	ND 1.0	
Cadmium	ug	ND 1.0	ND 1.0	ND 1.0	ND 1.0	
Chromium	ug	1.5	1.5	1.50	1.5	
Nickel	ug	1.3	1.3	1.30	1.3	

Reagent Blank Corrected Values		**Run 1**	**Run 2**	**Run 3**	Field Blank	Reporting Limit
Fraction		Results	Results	Results	Results	
Arsenic	ug	ND 1.0	ND 1.0	ND 1.0	ND 1.0	
Cadmium	ug	ND 1.0	ND 1.0	ND 1.0	ND 1.0	
Chromium	ug	218.5	39.5	688.5	0.7	2.10
Nickel	ug	57.7	6.0	128.7	1.8	5.40

These value should be considered as in the "noise of the sampling method" and will be reported as below the reporting limit
Reporting limit is based on three times the FB values.

CARB METHOD 436 DATA AND CALCULATIONS

Plant:	AQMD Facility A	Test Date(s):	05/21-22/19
City:	[redacted] CA	Operator:	T. Ta/NC
Source:	Baghouse	Entered by:	TG
Location:	Inlet 1 Furnace (Inside)	Checked by:	CF

Metals Catch, Mi		**Run 1**	**Run 2**	**Run 3**	Field Blank	Reagent Blank
Fraction		Total	Total	Total	Total	Total
Arsenic	ug	ND 1.0	ND 1.0	2.9	ND 1.00	ND 1.00
Cadmium	ug	ND 1.0	ND 1.0	1.0	ND 1.00	ND 1.00
Chromium	ug	B 218.5	B 39.5	B 688.5	2.2	1.50
Nickel	ug	B 57.7	B 6.0	B 128.7	3.1	1.30
Metals Molecular Weight, MW		**Run 1**	**Run 2**	**Run 3**		
Fraction		Total	Total	Total		
Arsenic	g/g-mole	74.92	74.92	74.92		
Cadmium	g/g-mole	112.41	112.41	112.41		
Chromium	g/g-mole	51.995	51.995	51.995		
Nickel	g/g-mole	58.69	58.69	58.69		
Concentration (ug/dscm), Ci = Mi/VmStd *35.315e-3cf/dscm						
Fraction		Total	Total	Total		
Arsenic	ug/dscm	ND 0.47	ND 0.43	0.98		
Cadmium	ug/dscm	ND 0.4728	ND 0.4346	0.3390		
Chromium	ug/dscm	103.300	17.166	233.384		
Nickel	ug/dscm	27.2788	2.6075	43.626		
Metals Mass Emission Rate (ug/hr), Ei,m Ei,m = Ci*Qsdm*60						
Fraction		Total	Total	Total		
Arsenic	ug/hr	ND 2.09E+03	ND 2.06E+03	4.54E+03		
Cadmium	ug/hr	ND 2.09E+03	ND 2.06E+03	1.56E+03		
Chromium	ug/hr	4.56E+05	8.15E+04	1.08E+06		
Nickel	ug/hr	1.20E+05	1.24E+04	2.01E+05		
Metals Mass Emission Rate (lb/hr), Ei Ei = Ci*Qsdm*60/453600/1000						
Fraction		Total	Total	Total		
Arsenic	lb/hr	ND 4.60E-06	ND 4.55E-06	1.00E-05		
Cadmium	lb/hr	ND 4.60E-06	ND 4.55E-06	3.45E-06		
Chromium	lb/hr	1.01E-03	1.80E-04	2.37E-03		
Nickel	lb/hr	2.66E-04	2.73E-05	4.44E-04		

Flags

ND or "<" - Not detected, reporting limit reported.

B - Reagent blank corrected value.

NDb - Reagent blank corrected result is less than RL. RL is substituted.

CARB METHOD 436 DATA AND CALCULATIONS

Plant:	AQMD Facility A	Test Date(s):	05/21-22/19
City:	[redacted], CA	Operator:	T. Ta/NC
Source:	Baghouse	Entered by:	TG
Location:	Inlet 1 Furnace (Inside)	Checked by:	CF

			05/21/19	05/21/19	05/22/19
DATA ENTRY	**Symbol**	**units**	**DATA**	**DATA**	**DATA**
Run Number			Run 1	Run 2	Run 3
Stack Dimensions: Round Stack Diameter	Ds	in.	10.0	10.0	10.0
Rectangular Stack, Length	L	in.			
Width	W	in.			
Nozzle Diameter	Dn	in.	0.155	0.155	0.180
Standard Temperature	Tstd	°F	68	68	68
Universal (molar) Gas Constant	Renglish	in. Hg-cu.ft/ °R-lbmole	21.85	21.85	21.85
Average Stack Temperature (measured)	Fs	°F	123.4	133.6	132.1
Average Meter Temperature (measured)	Fm	°F	94.3	90.8	90.6
Standard Pressure	Pstd	in.Hg	29.92	29.92	29.92
Barometric Pressure	Pbar	in.Hg	29.83	29.83	29.62
Stack Static Pressure	Pg	in.WC	-14.1	-14.1	-14.3
Average Meter Orifice Head (Delta-H)	dH	in.WC	1.35	1.48	2.53
Average RMS Velocity Head (Delta-P)	dP	in.WC	2.35	2.76	2.61
Pitot Coefficient	Cp	—	0.84	0.84	0.84
Net Volume of Gas Metered	Vm	cu.ft.	76.302	82.465	106.146
Dry Gas Meter Calibration Factor (gamma, Y)	Y	—	1.0274	1.0274	1.0274
NET Sampling Time	min	min.	120	120	120
Stack Gas: Oxygen Content *	O2,m	%	20.0	19.9	20.2
Carbon Dioxide Content *	CO2,m	%	< 0.3	< 0.3	< 0.3
Total Impinger Gain	Ww	g	22.4	24.1	23.7
CALCULATED DATA					
Nozzle Area: An = pi/4*dn^2	An	sq.in.	0.0189	0.0189	0.0254
Stack Area (round): As = pi/576*ds^2 (rectangular): As = L*W/144	As	sq.ft.	0.55	0.55	0.55
Absolute Stack Temperature: Ts = Fs+460	Ts	°R	583.4	593.6	592.1
Absolute Meter Temperature: Tm = Fm+460	Tm	°R	554.3	550.8	550.6
Standard Temperature: Tstdr = Tstd+460	Tstdr	°R	528.0	528.0	528.0
Gas Sample Volume at Standard Conditions: Vm(std) = Y * (Vm/Tm) * (Pbar + dH/13.6 in H2O/in Hg) * (Tstdr/Pstd)	VmStd	cu.ft.	74.698	81.263	104.182
Vol. of Water Vapor, Vw(std) = Ww/453.59 * Renglish/18 * Tstdr / Pstd	VwStd	cu.ft.	1.058	1.138	1.119
Moisture Fraction: Bws = VwStd/(VmStd+VwStd)	Bws	—	0.014	0.014	0.011
Stack Gas MW, Dry Basis: Md = 0.32*O2,m + 0.44*CO2,m + 0.28*(100-O2,m-CO2,m)	Md	g/mole	28.85	28.84	28.86
Stack Gas MW, Wet Basis: Mw = Md*(1-Bws) + 18*Bws	Mw	g/mole	28.70	28.69	28.74
Stack Pressure: Ps = Pbar + Pg/13.6	Ps	in.Hg	28.79	28.79	28.57
Stack Gas Velocity, measured					
vs = 85.49*Cp*√(dP*Ts/Ps/Mw)	vs	ft/s	92.48	101.17	98.51
vm = 0.3048 m/ft*vs	vsm	m/s	28.19	30.84	30.02
Stack Gas Volumetric Flow Rate: Q = 60*vs*As	Q	acfm	3,027	3,311	3,224
Stack Gas Volumetric Flow Rate, corrected:					
Qsd = Q*(1-Bws)*(Ps/Ts)*(Tstdr/Pstd)	Qsd	dscfm	2,599	2,795	2,716
Qsdm = Qsd/35.315	Qsdm	dscmm	73.6	79.1	76.9
Isokinetic Sampling Rate: I = 144*100*Ts*Vmstd *Pstd/[60*Tstdr*vs*min*An*Ps*(1-Bws)]	I	%	99.7	100.9	98.7

* O2/CO2 is based on SCAQMD Method 10.1 analysis.

CARB METHOD 436 DATA AND CALCULATIONS

Plant:	AQMD Facility A	Run No.:	1
City:	[redacted], CA	Test Date:	05/21/19
Source:	Baghouse	Times:	12:10 - 14:30
Location:	Inlet 1 Furnace (Inside)		

	Stack Temp (°F)		Velocity Head (in.WC)		dH	DGM Temperature (°F)	
point	Fs	sqrt (Fs)	dP	sqrt (dP)	(in.WC)	Fm,in	Fm,out
A-1	107	10.3	2.50	1.5811	1.36	89	89
2	109	10.4	2.70	1.6432	1.46	89	89
3	100	10.0	2.70	1.6432	1.49	90	90
4	100	10.0	2.60	1.6125	1.44	90	90
5	128	11.3	3.00	1.7321	1.58	92	92
6	144	12.0	3.20	1.7889	1.65	93	93
7	149	12.2	3.50	1.8708	1.79	93	93
8	134	11.6	3.80	1.9494	1.99	94	94
9	113	10.6	3.10	1.7607	1.69	95	95
10	126	11.2	3.50	1.8708	1.87	96	96
11	134	11.6	3.60	1.8974	1.89	96	96
12	128	11.3	3.10	1.7607	1.65	97	97
B-1	145	12.0	3.30	1.8166	1.70	93	93
2	128	11.3	3.40	1.8439	1.80	94	94
3	120	11.0	3.40	1.8439	1.83	95	95
4	146	12.1	2.70	1.6432	1.39	95	95
5	127	11.3	3.10	1.7607	1.65	96	96
6	133	11.5	2.90	1.7029	1.53	97	97
7	128	11.3	1.80	1.3416	1.03	97	97
8	135	11.6	1.10	1.0488	0.62	97	97
9	105	10.2	0.43	0.6557	0.26	97	97
10	118	10.9	0.39	0.62	0.23	97	97
11	108	10.4	0.45	0.67	0.27	96	96
12	107	10.3	0.52	0.72	0.31	95	95
Average:	**123.4**		**2.3491**		**1.35**		**94.3**

DGM Reading (cu.ft.): Final-1:	349.415	Impinger Weight (g): #1 Final:	760.0
Initial-1:	273.113	#1 Initial:	757.2
Final-2:		#2 Final:	604.8
Initial-2:		#2 Initial:	598.7
Final-3:		#3 Final:	660.3
Initial-3:		#3 Initial:	659.5
Final-4:		#4 Final:	872.9
Initial-4:		#4 Initial:	860.2
Final-5:		#5 Final:	
Initial-5:		#5 Initial:	
Volume:	**76.302**	#6 Final:	
		#6 Initial:	
		#7 Final:	
		#7 Initial:	
		#8 Final:	
		#8 Initial:	
		Total wt of impingers:	**22.4**

CARB METHOD 436 DATA AND CALCULATIONS

Plant: AQMD Facility A
City: [redacted], CA
Source: Baghouse
Location: Inlet 1 Furnace (Inside)

Run No.: 2
Test Date: 05/21/19
Times: 15:10 - 17:40

	Stack Temp (°F)		Velocity Head (in.WC)		dH	DGM Temperature (°F)	
point	Fs	sqrt (Fs)	dP	sqrt (dP)	(in.WC)	Fm,in	Fm,out
A-1	157	12.5	2.70	1.6432	1.35	88	88
2	152	12.3	2.80	1.6733	1.41	89	89
3	152	12.3	2.70	1.6432	1.36	90	90
4	150	12.2	2.80	1.6733	1.42	91	91
5	151	12.3	3.30	1.8166	1.67	91	91
6	149	12.2	3.30	1.8166	1.68	92	92
7	155	12.4	3.90	1.9748	1.97	92	92
8	149	12.2	4.10	2.0248	2.09	93	93
9	150	12.2	3.90	1.9748	1.99	93	93
10	135	11.6	4.00	2.0000	2.09	93	93
11	116	10.8	3.40	1.8439	1.83	93	93
12	114	10.7	3.00	1.7321	1.62	93	93
B-1	134	11.6	3.40	1.8439	1.76	87	87
2	133	11.5	3.30	1.8166	1.71	88	88
3	129	11.4	3.30	1.8166	1.73	89	89
4	128	11.3	3.20	1.7889	1.68	89	89
5	127	11.3	2.90	1.7029	1.53	90	90
6	125	11.2	3.00	1.7321	1.59	91	91
7	119	10.9	1.60	1.2649	0.86	92	92
8	128	11.3	2.30	1.5166	1.21	91	91
9	117	10.8	1.80	1.3416	0.97	92	92
10	118	10.9	1.40	1.18	0.75	91	91
11	108	10.4	1.20	1.10	0.65	91	91
12	121	11.0	0.94	0.97	0.50	91	91
Average:	**133.6**		**2.7624**		**1.48**		**90.8**

DGM Reading (cu.ft.): Final-1:	432.385	Impinger Weight (g): #1 Final:	762.8
Initial-1:	349.920	#1 Initial:	763.0
Final-2:		#2 Final:	768.9
Initial-2:		#2 Initial:	760.6
Final-3:		#3 Final:	636.8
Initial-3:		#3 Initial:	635.7
Final-4:		#4 Final:	889.4
Initial-4:		#4 Initial:	874.5
Final-5:		#5 Final:	
Initial-5:		#5 Initial:	
Volume:	**82.465**	#6 Final:	
		#6 Initial:	
		#7 Final:	
		#7 Initial:	
		#8 Final:	
		#8 Initial:	
		Total wt of impingers:	**24.1**

CARB METHOD 436 DATA AND CALCULATIONS

Plant:	AQMD Facility A	Run No.:	3
City:	[redacted], CA	Test Date:	05/22/19
Source:	Baghouse	Times:	08:30 - 10:45
Location:	Inlet 1 Furnace (Inside)		

	Stack Temp (°F)		Velocity Head (in.WC)		dH	DGM Temperature (°F)	
point	Fs	sqrt (Fs)	dP	sqrt (dP)	(in.WC)	Fm,in	Fm,out
A-1	165	12.8	2.50	1.5811	2.21	80	80
2	134	11.6	2.60	1.6125	2.42	82	82
3	171	13.1	2.50	1.5811	2.20	84	84
4	180	13.4	2.60	1.6125	2.27	86	86
5	147	12.1	2.70	1.6432	2.49	87	87
6	131	11.4	3.00	1.7321	2.85	89	89
7	146	12.1	3.10	1.7607	2.87	90	90
8	110	10.5	3.80	1.9494	3.75	91	91
9	110	10.5	3.40	1.8439	3.37	93	93
10	104	10.2	3.00	1.7321	3.00	93	93
11	93	9.6	2.20	1.4832	2.25	93	93
12	126	11.2	2.00	1.4142	1.93	93	93
B-1	119	10.9	3.70	1.9235	3.59	90	90
2	126	11.2	3.50	1.8708	3.36	91	91
3	155	12.4	3.30	1.8166	3.03	92	92
4	164	12.8	3.20	1.7889	2.89	92	92
5	152	12.3	3.00	1.7321	2.77	93	93
6	118	10.9	3.40	1.8439	3.32	93	93
7	124	11.1	2.20	1.4832	2.13	93	93
8	152	12.3	2.30	1.5166	2.12	93	93
9	109	10.4	1.70	1.3038	1.69	94	94
10	119	10.9	1.60	1.26	1.56	94	94
11	124	11.1	1.40	1.18	1.36	94	94
12	114	10.7	1.20	1.10	1.18	94	94
Average:	**132.1**		**2.6094**		**2.53**		**90.6**

DGM Reading (cu.ft.): Final-1:	539.086	Impinger Weight (g): #1 Final:	738.7
Initial-1:	432.940	#1 Initial:	756.7
Final-2:		#2 Final:	615.5
Initial-2:		#2 Initial:	602.5
Final-3:		#3 Final:	665.5
Initial-3:		#3 Initial:	661.4
Final-4:		#4 Final:	886.7
Initial-4:		#4 Initial:	862.1
Final-5:		#5 Final:	
Initial-5:		#5 Initial:	
Volume:	**106.146**	#6 Final:	
		#6 Initial:	
		#7 Final:	
		#7 Initial:	
		#8 Final:	
		#8 Initial:	
		Total wt of impingers:	**23.7**

Location: Inlet 2 (Upstream to Baghouse)

TEST RESULTS
CARB 436 (Multiple Metals)

Facility: AQMD Facility A
City: [redacted] CA
Source: Baghouse
Location: Inlet (Upstream to Baghouse)

Test Data	Units	Source Test Results			Average
Run Number	--	**Run 1**	**Run 2**	**Run 3**	
Test Date	mm/dd/yy	05/21/19	05/21/19	05/22/19	--
Test Time	hh:mm	12:10 - 14:30	15:10 - 17:40	08:30 - 10:40	--
Sampling Data*					
Stack Temperature	°F	90	84	87	**87**
Moisture	%	1.4	1.3	1.2	**1.3**
Sample Volume	dscf	80	85	102	**89**
Oxygen**	% v/v	20.1	20.1	20.2	**20.1**
Carbon Dioxide**	% v/v	< 0.3	< 0.3	< 0.3	**< 0.3**
Gas Velocity	ft/min	5,534	5,695	5,778	**5,669**
Stack Flow Rate	acfm	39,119	40,259	40,843	**40,074**
Stack Flow Rate	dscfm	35,723	37,208	37,320	**36,750**
CARB Method 436 CONCENTRATION		Total	Total	Total	
Arsenic	ug/dscm	ND 0.44	ND 0.42	ND 0.34	< **0.40**
	ug/dscf	ND 0.012	ND 0.012	ND 0.010	< **0.011**
Cadmium	ug/dscm	0.483	ND 0.416	ND 0.345	**0.415**
	ug/dscf	0.014	ND 0.012	ND 0.010	**0.012**
Chromium	ug/dscm	13.4	3.41	20.2	**12.3**
	ug/dscf	0.379	0.097	0.571	**0.349**
Nickel	ug/dscm	9.09	4.87	14.7	**9.56**
	ug/dscf	0.257	0.138	0.417	**0.27**
CARB Method 436 MASS EMISSION RATE		Total	Total	Total	
Arsenic	lb/hr	ND 5.88E-05	ND 5.80E-05	ND 4.82E-05	< **5.50E-05**
Cadmium	lb/hr	6.47E-05	ND 5.80E-05	ND 4.82E-05	**5.69E-05**
Chromium	lb/hr	1.79E-03	4.75E-04	2.82E-03	**1.70E-03**
Nickel	lb/hr	1.22E-03	6.78E-04	2.06E-03	**1.32E-03**

Notes:
* Performed during isokinetic sampling (e.g. CARB Method 436).
** Measured via SCAQMD Method 10.1.
ND or "<" - Not detected, reporting limit reported.

CARB METHOD 436 DATA AND CALCULATIONS

Plant:	AQMD Facility A	Test Date(s):	05/21-22/2019
City:	[redacted], CA	Operator:	CH/NC
Source:	Baghouse	Entered by:	TG
Location:	Inlet 2	Checked by:	CF

Metals Catch, Mi		**Run 1**	**Run 2**	**Run 3**	Field Blank	Reagent Blank
Fraction		Results	Results	Results	Results	Results
Arsenic	ug	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.00
Cadmium	ug	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.00
Chromium	ug	32.0	9.7	60.0	2.2	1.50
Nickel	ug	22.0	13.0	44.0	3.1	1.30

Reagent Blank		**Run 1**	**Run 2**	**Run 3**	Field Blank	
Fraction		Results	Results	Results	Results	
Arsenic	ug	ND 1.0	ND 1.0	ND 1.0	ND 1.0	
Cadmium	ug	ND 1.0	ND 1.0	ND 1.0	ND 1.0	
Chromium	ug	1.5	1.5	1.50	1.5	
Nickel	ug	1.3	1.3	1.30	1.3	

Reagent Blank Corrected Values		**Run 1**	**Run 2**	**Run 3**	Field Blank	Reporting Limit
Fraction		Results	Results	Results	Results	
Arsenic	ug	ND 1.0	ND 1.0	ND 1.0	ND 1.0	
Cadmium	ug	ND 1.0	ND 1.0	ND 1.0	ND 1.0	
Chromium	ug	30.5	8.2	58.5	0.7	2.10
Nickel	ug	20.7	11.7	42.7	1.8	5.40

These value should be considered as in the "noise of the sampling method" and will be reported as below the reporting limit
Reporting limit is based on three times the FB values.

CARB METHOD 436 DATA AND CALCULATIONS

Plant:	AQMD Facility A	Test Date(s):	5/21-22/2019
City:	[redacted] CA	Operator:	MN/NC
Source:	Baghouse	Entered by:	TG
Location:	Inlet (Upstream to Bagh	Checked by:	CF

Metals Catch, Mi		**Run 1**	**Run 2**	**Run 3**	Field Blank	Reagent Blank
Fraction		Total	Total	Total	Total	Total
Arsenic	ug	ND 1.0	ND 1.0	ND 1.0	ND 1.00	ND 1.00
Cadmium	ug	1.1	ND 1.0	ND 1.0	ND 1.00	ND 1.00
Chromium	ug	B 30.5	B 8.2	B 58.5	2.2	1.50
Nickel	ug	B 20.7	B 11.7	B 42.7	3.1	1.30
Metals Molecular Weight, MW		**Run 1**	**Run 2**	**Run 3**		
Fraction		Total	Total	Total		
Arsenic	g/g-mole	74.92	74.92	74.92		
Cadmium	g/g-mole	112.41	112.41	112.41		
Chromium	g/g-mole	51.995	51.995	51.995		
Nickel	g/g-mole	58.69	58.69	58.69		
Concentration (ug/dscm), Ci = Mi/VmStd *35.315e-3cf/dscm						
Fraction		Total	Total	Total		
Arsenic	ug/dscm	ND 0.44	ND 0.42	ND 0.34		
Cadmium	ug/dscm	0.4832	ND 0.4160	ND 0.3447		
Chromium	ug/dscm	13.398	3.411	20.165		
Nickel	ug/dscm	9.0930	4.8668	14.719		
Metals Mass Emission Rate (ug/hr), Ei,m Ei,m = Ci*Qsdm*60						
Fraction		Total	Total	Total		
Arsenic	ug/hr	ND 2.67E+04	ND 2.63E+04	ND 2.19E+04		
Cadmium	ug/hr	2.93E+04	ND 2.63E+04	ND 2.19E+04		
Chromium	ug/hr	8.13E+05	2.16E+05	1.28E+06		
Nickel	ug/hr	5.52E+05	3.08E+05	9.33E+05		
Metals Mass Emission Rate (lb/hr), Ei Ei = Ci*Qsdm*60/453600/1000						
Fraction		Total	Total	Total		
Arsenic	lb/hr	ND 5.88E-05	ND 5.80E-05	ND 4.82E-05		
Cadmium	lb/hr	6.47E-05	ND 5.80E-05	ND 4.82E-05		
Chromium	lb/hr	1.79E-03	4.75E-04	2.82E-03		
Nickel	lb/hr	1.22E-03	6.78E-04	2.06E-03		

Flags

ND or "<" - Not detected, reporting limit reported.

B - Reagent blank corrected value.

NDb - Reagent blank corrected result is less than RL. RL is substituted.

CARB METHOD 436 DATA AND CALCULATIONS

Plant:	AQMD Facility A	Test Date(s):	5/21-22/2019
City:	[redacted] CA	Operator:	MN/NC
Source:	Baghouse	Entered by:	TG
Location:	Inlet (Upstream to Baghouse)	Checked by:	CF

			05/21/19	05/21/19	05/22/19
DATA ENTRY	**Symbol**	**units**	**DATA**	**DATA**	**DATA**
Run Number			Run 1	Run 2	Run 3
Stack Dimensions: Round Stack Diameter	Ds	in.	36.0	36.0	36.0
Rectangular Stack, Length	L	in.			
Width	W	in.			
Nozzle Diameter	Dn	in.	0.155	0.155	0.173
Standard Temperature	Tstd	°F	68	68	68
Universal (molar) Gas Constant	Renglish	in. Hg-cu.ft/ °R-lbmole	21.85	21.85	21.85
Average Stack Temperature (measured)	Fs	°F	90.2	84.3	86.7
Average Meter Temperature (measured)	Fm	°F	90.3	88.3	80.4
Standard Pressure	Pstd	in.Hg	29.92	29.92	29.92
Barometric Pressure	Pbar	in.Hg	29.83	29.83	29.62
Stack Static Pressure	Pg	in.WC	-13.0	-13.0	-13.0
Average Meter Orifice Head (Delta-H)	dH	in.WC	1.59	1.61	2.53
Average RMS Velocity Head (Delta-P)	dP	in.WC	2.48	2.66	2.71
Pitot Coefficient	Cp	—	0.84	0.84	0.84
Net Volume of Gas Metered	Vm	cu.ft.	80.532	84.726	101.253
Dry Gas Meter Calibration Factor (gamma, Y)	Y	—	1.0395	1.0395	1.0395
NET Sampling Time	min	min.	120	120	120
Stack Gas: Oxygen Content *	O2,m	%	20.1	20.1	20.2
Carbon Dioxide Content *	CO2,m	%	< 0.3	< 0.3	< 0.3
Total Impinger Gain	Ww	g	24.1	23.1	27.4
CALCULATED DATA					
Nozzle Area: An = pi/4*dn^2	An	sq.in.	0.0189	0.0189	0.0235
Stack Area (round): As = pi/576*ds^2	As	sq.ft.	7.07	7.07	7.07
(rectangular): As = L*W/144					
Absolute Stack Temperature: Ts = Fs+460	Ts	°R	550.2	544.3	546.7
Absolute Meter Temperature: Tm = Fm+460	Tm	°R	550.3	548.3	540.4
Standard Temperature: Tstdr = Tstd+460	Tstdr	°R	528.0	528.0	528.0
Gas Sample Volume at Standard Conditions: Vm(std) = Y * (Vm/Tm) * (Pbar + dH/13.6 in H2O/in Hg) * (Tstdr/Pstd)	VmStd	cu.ft.	80.394	84.899	102.451
Vol. of Water Vapor, Vw(std) = Ww/453.59 * Renglish/18 * Tstdr / Pstd	VwStd	cu.ft.	1.138	1.091	1.294
Moisture Fraction: Bws = VwStd/(VmStd+VwStd)	Bws	—	0.014	0.013	0.012
Stack Gas MW, Dry Basis: Md = 0.32*O2,m + 0.44*CO2,m + 0.28*(100-O2,m-CO2,m)	Md	g/mole	28.85	28.85	28.86
Stack Gas MW, Wet Basis: Mw = Md*(1-Bws) + 18*Bws	Mw	g/mole	28.70	28.71	28.72
Stack Pressure: Ps = Pbar + Pg/13.6	Ps	in.Hg	28.87	28.87	28.66
Stack Gas Velocity, measured					
vs = 85.49*Cp*√(dP*Ts/Ps/Mw)	vs	ft/s	92.24	94.92	96.30
vm = 0.3048 m/ft*vs	vsm	m/s	28.11	28.93	29.35
Stack Gas Volumetric Flow Rate: Q = 60*vs*As	Q	acfm	39,119	40,259	40,843
Stack Gas Volumetric Flow Rate, corrected:					
Qsd = Q*(1-Bws)*(Ps/Ts)*(Tstdr/Pstd)	Qsd	dscfm	35,723	37,208	37,320
Qsdm = Qsd/35.315	Qsdm	dscmm	1,011.6	1,053.6	1,056.8
Isokinetic Sampling Rate: I = 144*100*Ts*Vmstd *Pstd/[60*Tstdr*vs*min*An*Ps*(1-Bws)]	I	%	101.2	102.6	99.1

* O2/CO2 is based on SCAQMD Method 10.1 analysis.

CARB METHOD 436 DATA AND CALCULATIONS

Plant: AQMD Facility A
City: [redacted], CA
Source: Baghouse
Location: Inlet (Upstream to Baghouse)

Run No.: 1
Test Date: 05/21/19
Times: 12:10 - 14:30

	Stack Temp (°F)		Velocity Head (in.WC)		dH	DGM Temperature (°F)	
point	Fs	sqrt (Fs)	dP	sqrt (dP)	(in.WC)	Fm,in	Fm,out
A-12	92	9.6	2.10	1.4491	1.25		85
11	91	9.5	2.60	1.6125	1.55		87
10	91	9.5	3.20	1.7889	1.90		88
9	93	9.6	2.90	1.7029	1.75		89
8	90	9.5	2.70	1.6432	1.60		90
7	91	9.5	2.65	1.6279	1.60		91
6	90	9.5	2.60	1.6125	1.55		91
5	91	9.5	2.10	1.4491	1.25		92
4	92	9.6	1.95	1.3964	1.15		92
3	88	9.4	1.60	1.2649	0.95		92
2	87	9.3	2.40	1.5492	1.45		92
1	81	9.0	2.80	1.6733	1.65		92
B-12	89	9.4	2.40	1.5492	1.45		89
11	91	9.5	2.90	1.7029	1.75		89
10	90	9.5	3.10	1.7607	1.85		90
9	91	9.5	3.40	1.8439	2.00		91
8	91	9.5	2.80	1.6733	1.65		91
7	91	9.5	2.60	1.6125	1.55		91
6	91	9.5	2.80	1.6733	1.65		91
5	88	9.4	2.05	1.4318	2.05		91
4	89	9.4	2.00	1.4142	2.00		90
3	93	9.6	1.50	1.22	1.50		91
2	92	9.6	2.35	1.53	1.40		91
1	92	9.6	2.70	1.64	1.60		91
Average:	**90.2**		**2.4849**		**1.59**		**90.3**

DGM Reading (cu.ft.): Final-1:	990.560	Impinger Weight (g): #1 Final:	724.3
Initial-1:	910.028	#1 Initial:	733.4
Final-2:		#2 Final:	755.3
Initial-2:		#2 Initial:	742.0
Final-3:		#3 Final:	537.4
Initial-3:		#3 Initial:	534.0
Final-4:		#4 Final:	891.8
Initial-4:		#4 Initial:	875.3
Final-5:		#5 Final:	
Initial-5:		#5 Initial:	
Volume:	**80.532**	#6 Final:	
		#6 Initial:	
		#7 Final:	
		#7 Initial:	
		#8 Final:	
		#8 Initial:	
		Total wt of impingers:	**24.1**

CARB METHOD 436 DATA AND CALCULATIONS

Plant:	AQMD Facility A	Run No.:	2
City:	[redacted], CA	Test Date:	05/21/19
Source:	Baghouse	Times:	15:10 - 17:40
Location:	Inlet (Upstream to Baghouse)		

	Stack Temp (°F)		Velocity Head (in.WC)		dH	DGM Temperature (°F)	
point	Fs	sqrt (Fs)	dP	sqrt (dP)	(in.WC)	Fm,in	Fm,out
A-12	86	9.3	2.20	1.4832	1.30		85
11	86	9.3	2.40	1.5492	1.45		86
10	87	9.3	3.10	1.7607	1.85		87
9	87	9.3	3.00	1.7321	1.80		88
8	87	9.3	2.75	1.6583	1.65		89
7	87	9.3	3.10	1.7607	1.85		89
6	87	9.3	3.10	1.7607	1.85		90
5	86	9.3	2.60	1.6125	1.55		90
4	86	9.3	2.40	1.5492	1.45		91
3	86	9.3	2.80	1.6733	1.65		91
2	86	9.3	2.70	1.6432	1.60		91
1	84	9.2	2.30	1.5166	1.35		91
B-12	82	9.1	2.80	1.6733	1.65		86
11	82	9.1	2.70	1.6432	1.60		86
10	83	9.1	2.90	1.7029	1.75		87
9	82	9.1	2.90	1.7029	1.75		87
8	83	9.1	2.40	1.5492	1.45		88
7	83	9.1	3.00	1.7321	1.80		88
6	83	9.1	2.70	1.6432	1.60		88
5	83	9.1	2.40	1.5492	1.45		88
4	82	9.1	2.55	1.5969	1.50		88
3	82	9.1	2.30	1.52	1.35		88
2	82	9.1	2.65	1.63	1.60		88
1	82	9.1	2.30	1.52	1.70		88
Average:	**84.3**		**2.6614**		**1.61**		**88.3**

DGM Reading (cu.ft.): Final-1:	1075.670	Impinger Weight (g): #1 Final:	630.4
Initial-1:	990.944	#1 Initial:	626.1
Final-2:		#2 Final:	757.0
Initial-2:		#2 Initial:	751.9
Final-3:		#3 Final:	629.5
Initial-3:		#3 Initial:	628.4
Final-4:		#4 Final:	915.6
Initial-4:		#4 Initial:	903.0
Final-5:		#5 Final:	
Initial-5:		#5 Initial:	
Volume:	**84.726**	#6 Final:	
		#6 Initial:	
		#7 Final:	
		#7 Initial:	
		#8 Final:	
		#8 Initial:	
		Total wt of impingers:	**23.1**

CARB METHOD 436 DATA AND CALCULATIONS

Plant:	AQMD Facility A	Run No.:	3
City:	[redacted], CA	Test Date:	05/22/19
Source:	Baghouse	Times:	08:30 - 10:40
Location:	Inlet (Upstream to Baghouse)		

	Stack Temp (°F)		Velocity Head (in.WC)		dH	DGM Temperature (°F)	
point	Fs	sqrt (Fs)	dP	sqrt (dP)	(in.WC)	Fm,in	Fm,out
A-1	83	9.1	2.90	1.7029	2.70		71
2	84	9.2	3.50	1.8708	3.25		73
3	87	9.3	3.40	1.8439	3.15		74
4	88	9.4	3.50	1.8708	3.25		76
5	86	9.3	2.90	1.7029	2.70		77
6	85	9.2	2.70	1.6432	2.50		77
7	84	9.2	2.65	1.6279	2.45		79
8	86	9.3	2.45	1.5652	2.25		80
9	87	9.3	2.00	1.4142	1.85		80
10	82	9.1	2.00	1.4142	1.85		80
11	83	9.1	2.30	1.5166	2.15		81
12	83	9.1	2.20	1.4832	2.05		81
B-1	85	9.2	2.60	1.6125	2.40		79
2	87	9.3	3.40	1.8439	3.15		81
3	89	9.4	3.30	1.8166	3.05		81
4	89	9.4	3.60	1.8974	3.35		83
5	88	9.4	3.00	1.7321	2.75		83
6	87	9.3	2.90	1.7029	2.70		83
7	91	9.5	2.70	1.6432	2.50		84
8	92	9.6	2.20	1.4832	2.05		84
9	91	9.5	1.70	1.3038	1.50		85
10	90	9.5	1.80	1.34	1.65		85
11	87	9.3	2.80	1.67	2.60		86
12	87	9.3	3.20	1.79	2.95		86
Average:	**86.7**		**2.7081**		**2.53**		**80.4**

DGM Reading (cu.ft.): Final-1:	177.210	Impinger Weight (g): #1 Final:	714.4
Initial-1:	75.957	#1 Initial:	735.9
Final-2:		#2 Final:	764.6
Initial-2:		#2 Initial:	744.4
Final-3:		#3 Final:	541.1
Initial-3:		#3 Initial:	535.7
Final-4:		#4 Final:	905.4
Initial-4:		#4 Initial:	882.1
Final-5:		#5 Final:	
Initial-5:		#5 Initial:	
Volume:	**101.253**	#6 Final:	
		#6 Initial:	
		#7 Final:	
		#7 Initial:	
		#8 Final:	
		#8 Initial:	
		Total wt of impingers:	**27.4**

APPENDIX C2

MULTIPLE METAL EMISSIONS – FIELD DATA

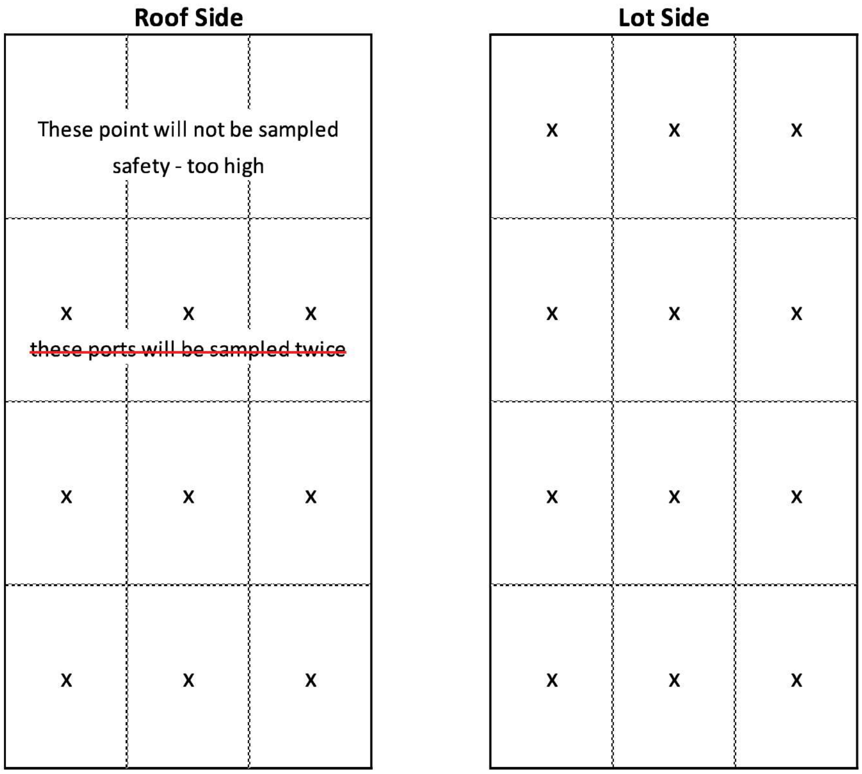
Location: Baghouse Outlet

Sampling Access

The exhaust test location was accessed via a man lift for one side of the exhaust.

For the others side, the facility installed a platform with guardrails that extends from the roof to the exhaust stack.

146 inches divided by 4, and then by 2
36.50 Div 4
18.25 Div 2
54.75 Sum
60 minutes at 5 minutes a point



18.25 inches from top

36.5 inches from the point above
54.75 inches from top

36.5 inches from the point below
54.75 inches from bottom

18.25 inches from bottome

9 Points Roof Side

12 Points Lot Side

Almega ENVIRONMENTAL

ISOKINETIC DATA FORM, TE COOLER & CYCLONIC FLOW

METHO

Almega ENVIRONMENTAL

Run # :	R1A	Pitot ID:	47	Impinger #	Initial	Final	Net		Pitot Leak Check
Date :	5-21-18	Pitot Coeff. :	.84	1	776.8	778.1		Initial :	
Client :	Facility A	Meter Box # :	A-6	2	625.0	632.5		Final :	
Unit :	Outlet	Meter @ Dh :	1.789	3	627.7	629.2			
Operator :	CH	Meter Y :	1.0376	4	911.3	922.0			Meter Box Leak Check
Stack Dia :	Area Source	TC # :	47	5				Rate	"HG
Amb. Press :	29.83	Start Time :	1210	Nozzle Dia	H2O Gain =			Initial : .000	22"
Static Press :	NA	Stop Time :	1433	0.508	Filter :			Final :	

Traverse Points	Time (Minute)	Delta P ("H2O)	Stack Temp. (F)	Set delta H ("H2O)	Meter Volume (acf)	Mtr. Inlet Temp. (F)	Mtr. Outlet Temp. (F)	Oven Temp. (F)	Probe Temp. (F)	Impinger Temp. (F)	Pump Vac. ("HG)	TE Cooler Temp. (F)	Cyclonic Flow ("H2O)
0	0	0.0245	—	—	642.123	—	—	247	246	—	—	NA	
1	5	0.0245	72	2.01	645.962	80	80	250	249	52	5		
2	10	0.0245	80	1.98	649.780	80	80	251	250	52	5		
3	15	0.0245	92	1.94	653.562	80	80	247	250	52	5		
4	20	0.0245	84	1.97	657.368	81	81	249	252	53	5		
5	25	0.0245	81	1.98	661.204	82	82	250	253	53	5		
6	30	0.0245	91	1.95	665.012	83	83	247	251	54	5		
7	35	0.0245	100	1.92	668.776	83	83	250	252	54	5		
8	40	0.0245	90	1.96	672.592	84	84	251	250	54	5		
9	45	0.0245	84	1.98	676.428	84	84	250	253	55	5		
10	50	0.0245	82	1.99	680.277	85	85	251	252	55	5		
11	55	0.0245	84	1.98	684.118	85	85	249	251	55	5		
12	60	0.0245	86	1.98	687.957	86	86	250	247	55	5		
					688.334								
1	7	0.0245	78	1.98	693.681	79	79	251	246	55	5		
2	14	0.0245	82	1.97	699.012	79	79	250	247	55	5		
3	21	0.0245	87	1.95	704.318	80	80	251	249	55	5		
4	28	0.0245	85	1.97	709.653	81	81	250	252	55	5		
5	35	0.0245	83	1.98	715.002	82	82	247	250	55	5		
6	42	0.0245	86	1.97	720.344	82	82	249	253	55	5		
7	49	0.0245	90	1.95	725.668	83	83	251	250	55	5		
8	56	0.0245	84	1.98	731.032	84	84	247	252	55	5		
9	63	0.0245	86	1.97	736.394	84	84	249	250	55	5		
10													
11													
12													

System leak Check .000 Rate 23"

Restart @ 1330

CH

Isokinetic Factor Setup

Estimated Dry Gas Meter Temp:	80
Estimated Stack Temp:	
Estimated Delta P:	
Estimated Moisture Content:	2%
Estimated O2:	20.5
Estimated CO2:	0.05

Equipment Evaluation , OK? Y or N

Ambient Temp.:	
TC Check:	
Pitot Check:	
Tedlar Bag:	
Pitot Exp Date:	
TC Exp Date	

Dry Gas Meter Leak Checks

	1	2	3	4	5	6
DGM Initial:						
Vacuum:						
Leak Rate:						
DGM Final:						

Almega ENVIRONMENTAL

ISOKINETIC DATA FORM, TE COOLER & CYCLONIC FLOW

METHO

Almega ENVIRONMENTAL

Run # : 2
Date : 5-21-2019
Client : Facility A
Unit : Outlet
Operator : CH
Stack Dia : 52
Amb. Press : 29.83
Static Press : NA

Pitot ID: 47
Pitot Coeff. : .84
Meter Box # : A-6
Meter @ Dh : 1.789
Meter Y : 1.0376
TC # : 47
Start Time : 1510
Stop Time : 1740
Nozzle Dia : 0.528

Impinger #	Initial	Final	Net
0.1 HNO3 1	736.2	730.5	
0.1 HNO3 2	747.5	756.7	
3	625.9	628.3	
4	852.2	871.4	
5			

H2O Gain =
Filter :

Pitot Leak Check
Initial : NA NA
Final : NA NA

Meter Box Leak Check

	Rate	"HG
Initial :	.000	24"
Final :	.000	23"

Restart @ 1640

Mid-run Leak Check .000 Rate 23"

Traverse Points	Time (Minute)	Delta P ("H2O)	Stack Temp. (F)	Set delta H ("H2O)	Meter Volume (acf)	Mtr. Inlet Temp. (F)	Mtr. Outlet Temp. (F)	Oven Temp. (F)	Probe Temp. (F)	Impinger Temp. (F)	Pump Vac. ("HG)	TE Cooler Temp. (F)	Cyclonic Flow ("H2O)
0	0	—	—	—	736.990	—	—	—	—	—	—	NA	
1	7	0.0245	91	1.93	742.241	76	76	250	246	54	5		
2	14	0.0245	87	1.95	747.532	78	78	247	251	54	5		
3	21	0.0245	84	1.96	752.841	78	78	250	247	54	5		
4	28	0.0245	89	1.94	758.127	79	79	253	249	54	5		
5	35	0.0245	86	1.96	763.443	80	80	252	251	54	5		
6	42	0.0245	83	1.97	768.782	80	80	250	248	54	5		
7	49	0.0245	87	1.96	774.097	81	81	251	249	55	5		
8	56	0.0245	89	1.95	779.423	82	82	250	247	55	5		
9	63	0.0245	85	1.97	784.771	82	82	251	249	55	5		
					785.282								
1	5	0.0245	87	1.94	789.052	76	76	250	246	55	5		
2	10	0.0245	89	1.93	792.808	76	76	248	249	55	5		
3	15	0.0245	85	1.95	796.592	77	77	250	255	55	5		
4	20	0.0245	82	1.97	800.391	78	78	252	253	55	5		
5	25	0.0245	87	1.95	804.168	78	78	250	252	56	5		
6	30	0.0245	88	1.95	807.952	79	79	251	249	56	5		
7	35	0.0245	85	1.96	811.751	80	80	252	250	56	5		
8	40	0.0245	82	1.97	815.563	80	80	253	247	56	5		
9	45	0.0245	87	1.95	819.361	80	80	251	249	56	5		
10	50	0.0245	86	1.96	823.168	81	81	254	252	56	5		
11	55	0.0245	82	1.98	826.987	81	81	253	249	56	5		
12	60	0.0245	89	1.95	830.772	82	82	250	251	56	5		

Isokinetic Factor Setup

Estimated Dry Gas Meter Temp:
Estimated Stack Temp:
Estimated Delta P:
Estimated Moisture Content: 2%
Estimated O2: 20.5
Estimated CO2: .05

Equipment Evaluation , OK? Y or N

Ambient Temp.:
TC Check:
Pitot Check:
Tedlar Bag:
Pitot Exp Date:
TC Exp Date

Dry Gas Meter Leak Checks

	1	2	3	4	5	6
DGM Initial:						
Vacuum:						
Leak Rate:						
DGM Final:						

Almega ENVIRONMENTAL

ISOKINETIC DATA FORM, TE COOLER & CYCLONIC FLOW

METH **Almega** ENVIRONMENTAL

Run # : 3
Date : 5-22-19
Client : Facility A
Unit : Outlet
Operator : CH
Stack Dia : Area Source
Amb. Press : 29.62
Static Press : NA

Pitot ID: 47
Pitot Coeff. : .84
Meter Box # : A-6
Meter @ Dh : 1.787
Meter Y : 1.0376
TC # : 47
Start Time : 0830
Stop Time : 1048
Nozzle Dia: .513

Impinger #	Initial	Final	Net
1	776.0	760.0	
2	625.2	638.9	
3	628.8	634.1	
4	880.0	902.0	
5			

0.1N HNO3 2

H2O Gain =
Filter :

Pitot Leak Check

Initial :		
Final :		

Meter Box Leak Check

	Rate	"HG
Initial :	.000	22"
Final :	.000	18"

Traverse Points	Time (Minute)	Delta P ("H2O)	Stack Temp. (F)	Set delta H ("H2O)	Meter Volume (acf)	Mtr. Inlet Temp. (F)	Mtr. Outlet Temp. (F)	Oven Temp. (F)	Probe Temp. (F)	Impinger Temp. (F)	Pump Vac. ("HG)	TE Cooler Temp. (F)	Cyclonic Flow ("H2O)
0	0	—	—	—	831.607	—	—	—	—	—	—	NA	—
1	5	.0256	76	1.81	836.211	64	64	246	249	54	5		
2	10	.0256	84	1.79	838.792	65	65	249	252	54	5		
3	15	.0256	87	1.78	842.371	66	66	250	251	54	5		
4	20	.0256	89	1.78	845.953	67	67	247	248	59	5		
5	25	.0256	90	1.78	849.542	69	69	250	253	54	5		
6	30	.0256	86	1.80	853.160	71	71	252	251	54	5		
7	35	.0256	92	1.79	856.763	72	72	253	250	54	5		
8	40	.0256	87	1.81	860.402	74	74	254	252	54	5		
9	45	.0256	84	1.82	864.049	75	75	251	250	54	5		
10	50	.0256	89	1.81	867.682	76	76	252	249	54	5		
11	55	.0256	85	1.83	871.351	77	77	250	251	55	5		
12	60	.0256	84	1.83	875.022	77	77	247	250	55	5		
					875.534								
1	7	.0256	86	1.80	880.621	73	73	246	251	55	5		
2	14	.0256	91	1.79	885.692	74	74	249	252	55	5		
3	21	.0256	88	1.80	890.781	75	75	250	251	55	5		
4	28	.0256	93	1.79	895.862	76	76	251	247	55	5		
5	35	.0256	87	1.81	900.981	77	77	253	250	55	5		
6	42	.0256	84	1.82	906.120	78	78	251	247	55	5		
7	49	.0256	88	1.81	911.253	79	79	253	251	55	5		
8	56	.0256	85	1.82	916.401	79	79	251	249	55	5		
9	63	.0256	85	1.82	921.550	79	79	250	251	55	5		

Hold. hamr leak check 21" .00 ...

Restart @ 0945

Isokinetic Factor Setup

Estimated Dry Gas Meter Temp:
Estimated Stack Temp:
Estimated Delta P:
Estimated Moisture Content: 2%
Estimated O2: 20.9
Estimated CO2: .05

Equipment Evaluation , OK? Y or N

Ambient Temp.:
TC Check:
Pitot Check:
Tedlar Bag:
Pitot Exp Date:
TC Exp Date

Dry Gas Meter Leak Checks

	1	2	3	4	5	6
DGM Initial:						
Vacuum:						
Leak Rate:						
DGM Final:						

Location: Inlet 1 (Inside)

SAMPLING AND VELOCITY TRAVERSE POINT DETERMINATION
SCAQMD METHOD 1.2

CLIENT:	AQMD Facility A
PLANT NAME:	Metal Melting Facility
CITY, STATE:	[redacted] CA
SAMPLING LOCATION	Inlet Furance
TYPE OF TESTING:	Metals & Particulate

NO. OF PORTS AVAILABLE:	2
NO. OF PORTS TO BE USED:	2
PORT INSIDE DIAMETER:	3 inches

DISTANCE FROM FAR WALL TO OUTSIDE OF PORT:	13.50	inches
NIPPLE LENGTH AND/OR WALL THICKNESS:	3.50	inches
DEPTH OF STACK OR DUCT, D:	10.00	inches
STACK OR DUCT WIDTH (IF RECTANGULAR), W:	#N/A	inches

EQUIVALENT DIAMETER

De = 2*(DEPTH)*(WIDTH)/(DEPTH+WIDTH) = 10.00 inches

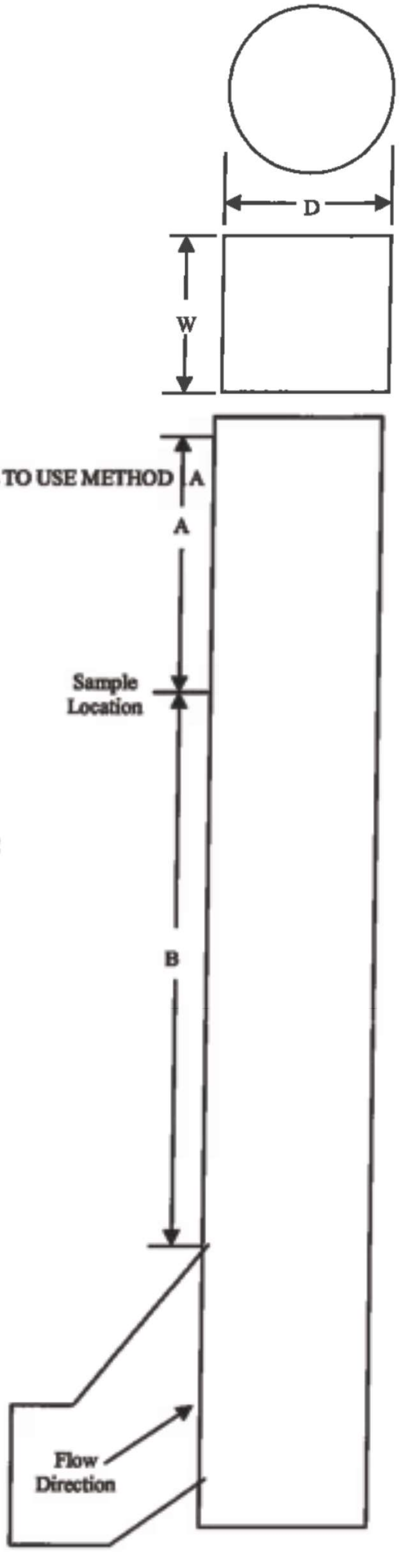
MAKE SURE TO USE METHOD

STACK/DUCT AREA = 0.55 sq.feet 78.5 sq.inches

DISTANCE OF TEST PORT LOCATION:	DOWNSTREAM FROM FLOW DISTURBANCE	UPSTREAM FROM FLOW DISTURBANCE
	B	A
# OF INCHES	25.00	16.50
# OF DIAMETERS	2.50	1.65

MINIMUM NUMBER OF TRAVERSE POINTS: 24

POINT NO.	% OF DUCT DEPTH	DISTANCE FROM INSIDE WALL (in.)	DISTANCE FROM OUTSIDE OF PORT (in.)
1	2.1	0.50	4
2	6.7	0.67	4 1/8
3	11.8	1.18	4 5/8
4	17.7	1.77	5 1/4
5	25.0	2.50	6
6	35.6	3.56	7
7	64.4	6.44	10
8	75.0	7.50	11
9	82.3	8.23	11 3/4
10	88.2	8.82	12 3/8
11	93.3	9.33	12 7/8
12	97.9	9.50	13



DRAWING NOT TO SCALE

Almega Environmental

ISOKINETIC DATA FORM, TE COOLER & CYCLONIC FLOW

METH

Almega Environmental

Run # : 1
Date : 05/21 [redacted] Facility A
Client : T·T
Inside Unit : Inlet ~~FAB~~
Operator : T·TA
Stack Dia : 10.0"
Amb. Press : 29.83
Static Press : -14.1

Pitot ID: 28
Pitot Coeff. : .84
Meter Box # : A-7
TT Meter @ Dh : 1.736
Meter Y : 1.0274
TC # : 28
Start Time : 1210
Stop Time : 1430
Nozzle Dia : .155

Impinger #	Initial	Final	Net
0.1N HNO3 1	757.2	872.9	760.0
2	598.7	604.8	
3	669.5	660.3	
4	860.2	872.9	
5			

H2O Gain =
Filter :

Pitot Leak Check		
Initial :	✓	✓
Final :	✓	✓

Meter Box Leak Check	Rate	"HG
Initial :	0.008	22.0
Final :	0.005	21.0

	Traverse Points	Time (Minute)	Delta P ("H2O)	Stack Temp. (F)	Set delta H ("H2O)	Meter Volume TT (acf)	Mtr. Inlet Temp. (F)	Mtr. Outlet Temp. (F)	Oven Temp. (F)	Probe Temp. (F)	Impinger Temp. (F)	Pump Vac. ("HG)	TE Cooler Temp. (F)	Cyclonic Flow ("H2O)	
	0	0				273.55							Jumpers		
Top	A-1	5	2.50	107	1.36	273.113 276.43	89	89	242	239	56	6.0	243		
	2	10	2.70	109	1.46	279.81	89	89	242	241	50	6.0	243		
	3	15	2.70	100	1.49	283.28	90	90	241	240	47	6.0	242		
	4	20	2.60	100	1.44	286.60	90	90	241	236	49	6.0	243		
	5	25	3.0	128	1.58	290.20	92	92	241	240	52	6.50	243		
	6	30	3.20	144	1.65	293.60	93	93	240	240	52	7.0	243		
	7	35	3.50	149	1.79	297.35	93	93	241	240	53	7.0	242		
	8	40	3.80	134	1.99	301.36	94	94	240	236	51	7.50	243		
	9	45	3.10	113	1.69	305.08	95	95	240	235	52	7.0	243		
	10	50	3.50	126	1.87	308.97	96	96	239	235	54	7.0	244		
	11	55	3.60	134	1.89	312.83	96	96	241	235	54	7.0	243	stop @	1310
	12	60	3.10	128	1.65	316.48	97	97	240	236	55	7.0	243		
Side	B-1	65	3.30	145	1.70	320.19	93	93	241	237	58	7.0	243	start @	1330
	2	70	3.40	128	1.80	323.95	94	94	241	235	55	7.0	242		
	3	75	3.40	120	1.83	327.80	95	95	240	238	54	7.0	242		
	4	80	2.70	146	1.39	331.16	95	95	239	239	55	6.50	243		
	5	85	3.10	127	1.65	334.83	96	96	240	237	54	7.0	243		
	6	90	2.90	133	1.53	338.31	97	97	240	236	53	7.0	243		
	7	95	1.80	128	1.03	341.20	97	97	239	236	52	6.0	243		
	8	100	1.10	135	.62	343.45	97	97	240	239	54	5.0	243		
	9	105	.43	105	.26	344.94	97	97	239	240	54	4.50	243		
	10	110	.39	118	.23	346.30	97	97	240	240	53	4.50	243		
	11	115	.45	108	.27	347.77	96	96	240	338	54	4.50	243		
	12	120	.52	107	.31	349.415	95	95	240						
					1"	In	to	out	12						

Isokinetic Factor Setup
Estimated Dry Gas Meter Temp: 95
Estimated Stack Temp: 88
Estimated Delta P: 3.18
Estimated Moisture Content: 2.0
Estimated O2: 20.5
Estimated CO2: .5

Equipment Evaluation , OK? Y or N
Ambient Temp.:
TC Check:
Pitot Check:
Tedlar Bag:
Pitot Exp Date:
TC Exp Date:

Dry Gas Meter Leak Checks

	1	2	3	4	5	6
DGM Initial:						
Vacuum:						
Leak Rate:						
DGM Final:						

Almega ENVIRONMENTAL

ISOKINETIC DATA FORM, TE COOLER & CYCLONIC FLOW

METH

Almega ENVIRONMENTAL

Run # : 2
Date : 5/21/19
Client : Facility A
Unit : Inlet 1' (Inside)
Operator : T-TA
Stack Dia : 10
Amb. Press : 29.83
Static Press : -14.10

Pitot ID: 28
Pitot Coeff. : .84
Meter Box # : 19-7
Meter @ Dh : 1.736
Meter Y : 1.0274
TC # : 28
Start Time : 1510
Stop Time : 1740

Impinger #	Initial	Final	Net
0-wk#03			
1	763.0	762.8	
2	760.6	768.9	
3	635.7	636.8	
4	874.5	889.4	
5			

Nozzle Dia: .155
H2O Gain =
Filter :

Pitot Leak Check

Initial :	✓	✓
Final :	✓	✓

Meter Box Leak Check

	Rate	"HG
Initial :	0.006	20.0
Final :	0.008	21.0

	Traverse Points	Time (Minute)	Delta P ("H2O)	Stack Temp. (F)	Set delta H ("H2O)	Meter Volume (acf)	Mtr. Inlet Temp. (F)	Mtr. Outlet Temp. (F)	Oven Temp. (F)	Probe Temp. (F)	Impinger Temp. (F)	Pump Vac. ("HG)	TE Cooler Temp. (F)	Cyclonic Flow ("H2O)	
TOP	0	0				349.920							jumper		
	A-1	5	2.70	157	1.35	353.24	88	88	240	235	57	5.0	238		
	2	10	2.80	152	1.41	356.55	89	89	241	239	51	5.0	239		
	3	15	2.70	152	1.36	359.87	90	90	241	237	50	5.0	239		
	4	20	2.80	150	1.42	363.24	91	91	241	238	51	5.0	241		
	5	25	3.30	151	1.67	366.89	91	91	241	240	52	5.50	243		
	6	30	3.30	149	1.68	370.51	92	92	240	240	52	5.50	243		
	7	35	3.90	155	1.97	374.53	92	92	240	238	51	6.0	243		
	8	40	4.10	149	2.09	378.65	93	93	241	235	52	6.0	243		
	9	45	3.90	150	1.99	382.64	93	93	241	234	53	6.0	242		
	10	50	4.0	135	2.09	386.74	93	93	240	236	53	6.0	241		
	11	55	3.40	116	1.83	390.65	93	93	240	237	52	6.0	241		
	12	60	3.0	114	1.62	394.21	93	93	240	237	52	5.50	241	stop@	1610
Side	B-1	65	3.40	[illegible]	1.76	397.92	87	87	238	239	56	5.50	240	start@	1640
	2	70	3.30	133	1.71	401.64	88	88	240	238	52	5.50	242		
	3	75	3.30	129	1.73	405.30	89	89	240	241	52	5.50	242		
	4	80	3.20	128	1.68	408.94	89	89	241	240	53	5.50	243		
	5	85	2.90	127	1.53	412.47	90	90	241	239	53	5.0	243		
	6	90	3.0	125	1.59	416.08	91	91	241	236	54	5.0	243		
	7	95	1.60	119	.86	419.69	92	92	240	237	54	4.50	243		
	8	100	2.30	128	1.21	422.82	91	91	240	240	53	5.0	243		
	9	105	1.80	117	.97	425.60	92	92	241	237	53	4.50	243		
	10	110	1.40	118	.75	428.04	91	91	241	236	54	4.50	242		
	11	115	1.20	108	.65	430.35	91	91	241	237	54	4.0	242		
	12	120	.94	121	.50	432.385	91	91	241	239	54	4.0	242		

1 In to out 12

Isokinetic Factor Setup

Estimated Dry Gas Meter Temp:
Estimated Stack Temp:
Estimated Delta P:
Estimated Moisture Content:
Estimated O2:
Estimated CO2:

Equipment Evaluation , OK? Y or N

Ambient Temp.:
TC Check:
Pitot Check:
Tedlar Bag:
Pitot Exp Date:
TC Exp Date

Dry Gas Meter Leak Checks

	1	2	3	4	5	6
DGM Initial:						
Vacuum:						
Leak Rate:						
DGM Final:						

Almega Environmental

ISOKINETIC DATA FORM, TE COOLER & CYCLONIC FLOW

METH

Almega Environmental

Run # : 3
Date : 05/22/19
Client : Facility A
Unit : Inlet 1 (Inside)
Operator : T.TA
Stack Dia : 10
Amb. Press : 29.62
Static Press : -14.30

Pitot ID: 28
Pitot Coeff. : .84
Meter Box # : A-7
Meter @ Dh : 1.736
Meter Y : 1.0274
TC # : 28
Start Time : 0830
Stop Time : 1045
Nozzle Dia : .180

D-Impinger 2

Impinger #	Initial	Final	Net
1	756.7	738.7	
2	602.5	615.5	
3	661.4	665.5	
4	862.1	886.7	
5			

H2O Gain =
Filter :

	Pitot Leak Check	
Initial :	✓	✓
Final :	✓	✓

Meter Box Leak Check	Rate	"HG
Initial :	0.004	20.0
Final :	0.10	22.0

TOP

Traverse Points	Time (Minute)	Delta P ("H2O)	Stack Temp. (F)	Set delta H ("H2O)	Meter Volume (acf)	Mtr. Inlet Temp. (F)	Mtr. Outlet Temp. (F)	Oven Temp. (F)	Probe Temp. (F)	Impinger Temp. (F)	Pump Vac. ("HG)	TE Cooler Temp. (F)	Cyclonic Flow ("H2O)
0	0				432.940							jumper	
A-1	5	2.50	165	2.21	437.11	80	80	242	237	54	8.50	242	
2	10	2.60	134	2.42	441.49	82	82	241	239	46	9.50	243	
3	15	2.50	171	2.20	445.64	84	84	242	238	50	9.50	242	
4	20	2.60	180	2.27	449.83	86	86	242	238	54	10.0	243	
5	25	2.70	147	2.49	454.26	87	87	241	237	58	10.50	243	
6	30	3.0	131	2.85	458.98	89	89	242	240	57	13.50	242	
7	35	3.1	146	2.87	463.77	90	90	241	238	58	14.0	242	
8	40	3.8	110	3.75	469.21	91	91	240	239	58	16.0	243	
9	45	3.4	110	3.37	474.35	93	93	241	239	57	17.0	243	
10	50	3.0	104	3.0	479.25	93	93	241	236	57	16.0	243	
11	55	2.20	93	2.25	482.45	93	93	241	235	55	13.0	243	
12	60	2.0	126	1.93	487.19	93	93	241	239	53	12.50	243	Stop @ 0930
B-1	65	3.7	119	3.59	492.48	90	90	241	243	56	16.0	243	Start @ 0945
2	70	3.50	126	3.36	497.60	91	91	240	236	49	17.0	242	
3	75	3.30	155	3.03	502.47	92	92	240	235	54	18.0	242	
4	80	3.20	164	2.89	507.28	92	92	240	239	55	18.0	243	
5	85	3.0	152	2.77	511.94	93	93	241	237	54	18.50	243	
6	90	3.40	118	3.32	517.05	93	93	241	239	54	20.0	243	
7	95	2.2	124	2.13	521.20	93	93	241	238	51	16.0	242	
8	100	2.3	152	2.12	525.31	93	93	241	236	50	16.50	242	
9	105	1.70	109	1.69	529.08	94	94	241	237	51	13.50	243	
10	110	1.60	119	1.56	532.62	94	94	241	239	52	13.0	243	
11	115	1.40	124	1.36	535.94	94	94	240	236	51	13.0	243	
12	120	1.20	114	1.18	539.086	94	94	241	239	54	11.50	243	

1" In to out 12

Isokinetic Factor Setup

Estimated Dry Gas Meter Temp:	95
Estimated Stack Temp:	140
Estimated Delta P:	2.73
Estimated Moisture Content:	2
Estimated O2:	20.5
Estimated CO2:	.50

Equipment Evaluation , OK? Y or N

Ambient Temp.:	
TC Check:	
Pitot Check:	
Tedlar Bag:	
Pitot Exp Date:	
TC Exp Date	

Dry Gas Meter Leak Checks

	1	2	3	4	5	6
DGM Initial:						
Vacuum:						
Leak Rate:						
DGM Final:						

Field Blank 436

Almega ENVIRONMENTAL

ISOKINETIC DATA FORM, TE COOLER & CYCLONIC FLOW

METH

Almega ENVIRONMENTAL

Run # : FB
Date : 5/21/19
Client : SCAQMD A [redacted]
Unit : Inlet 1 outside
Operator : MN
Stack Dia : 36
Amb. Press : 29.83
Static Press : -13

Pitot ID: 34
Pitot Coeff. : 0.84
Meter Box # : A-8
Meter @ Dh : 1.834
Meter Y : 1.0395
TC # : 34
Start Time : 840
Stop Time : 840
Nozzle Dia

Impinger #	Initial	Final	Net
1	763.0		
2	757.8		
3	634.0		
4	874.9	437.0	
5			

H2O Gain =
Filter :

Pitot Leak Check

Initial :		
Final :		

Meter Box Leak Check

	Rate	"HG
Initial :		
Final :		

Traverse Points	Time (Minute)	Delta P ("H2O)	Stack Temp. (F)	Set delta H ("H2O)	Meter Volume (acf)	Mtr. Inlet Temp. (F)	Mtr. Outlet Temp. (F)	Oven Temp. (F)	Probe Temp. (F)	Impinger Temp. (F)	Pump Vac. ("HG)	TE Cooler Temp. (F)	Cyclonic Flow ("H2O)

Isokinetic Factor Setup

Estimated Dry Gas Meter Temp:
Estimated Stack Temp:
Estimated Delta P:
Estimated Moisture Content:
Estimated O2:
Estimated CO2:

Equipment Evaluation , OK? Y or N

Ambient Temp.:
TC Check:
Pitot Check:
Tedlar Bag:
Pitot Exp Date:
TC Exp Date

Dry Gas Meter Leak Checks

	1	2	3	4	5	6
DGM Initial:						
Vacuum:						
Leak Rate:						
DGM Final:						

Location: Inlet 1 (Upstream of the Baghouse)

SAMPLING AND VELOCITY TRAVERSE POINT DETERMINATION
SCAQMD METHOD 1.1

CLIENT:	AQMD Facility A
PLANT NAME:	Metal Melting Facility
CITY, STATE:	[redacted], CA
SAMPLING LOCATION	Inlet 3 (Upstream of Baghouse)
TYPE OF TESTING:	Metals/Particulate

NO. OF PORTS AVAILABLE:	1
NO. OF PORTS TO BE USED:	1
PORT INSIDE DIAMETER:	2.5 inches

DISTANCE FROM FAR WALL TO OUTSIDE OF PORT:	38.00	inches
NIPPLE LENGTH AND/OR WALL THICKNESS:	2.00	inches
DEPTH OF STACK OR DUCT, D:	36.00	inches
STACK OR DUCT WIDTH (IF RECTANGULAR), W:	#N/A	inches

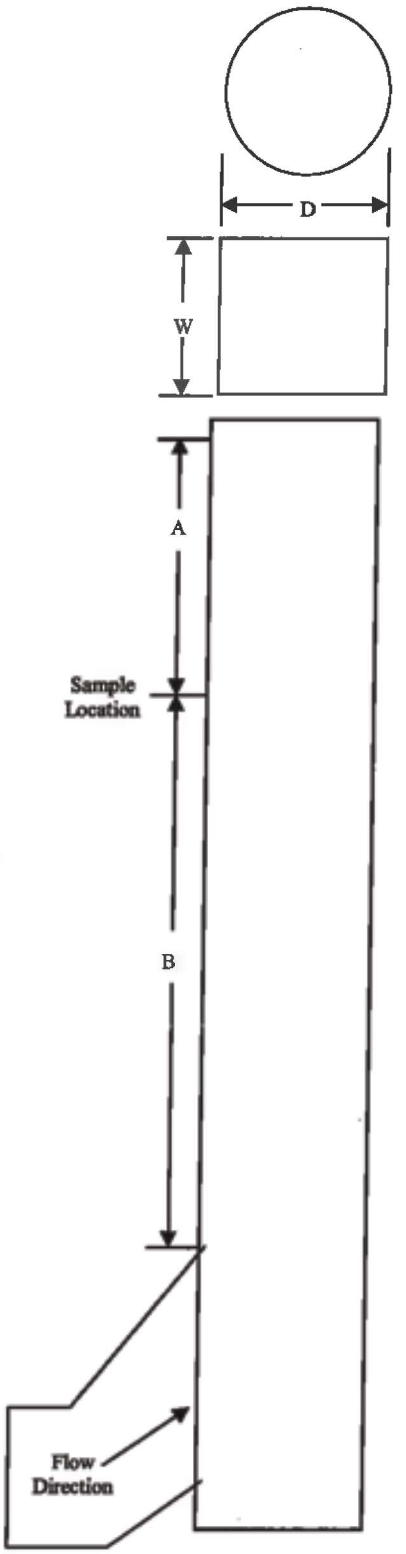
EQUIVALENT DIAMETER
De = 2*(DEPTH)*(WIDTH)/(DEPTH+WIDTH) = 36.00 inches

STACK/DUCT AREA = 7.07 sq.feet 1017.9 sq.inches

DISTANCE OF TEST PORT LOCATION:	DOWNSTREAM FROM FLOW DISTURBANCE	UPSTREAM FROM FLOW DISTURBANCE
	B	A
# OF INCHES	87.00	48.50
# OF DIAMETERS	2.42	1.35

MINIMUM NUMBER OF TRAVERSE POINTS: 24

POINT NO.	% OF DUCT DEPTH	DISTANCE FROM INSIDE WALL (in.)	DISTANCE FROM OUTSIDE OF PORT (in.)
1	2.1	0.76	2 3/4
2	6.7	2.41	4 3/8
3	11.8	4.25	6 1/4
4	17.7	6.37	8 3/8
5	25.0	9.00	11
6	35.6	12.82	14 7/8
7	64.4	23.18	25 1/8
8	75.0	27.00	29
9	82.3	29.63	31 5/8
10	88.2	31.75	33 3/4
11	93.3	33.59	35 5/8
12	97.9	35.24	37 1/4



DRAWING NOT TO SCALE

Almega ENVIRONMENTAL

ISOKINETIC DATA FORM, TE COOLER & CYCLONIC FLOW

METH

Almega ENVIRONMENTAL

Run # :	1	Pitot ID:	34	Impinger #	Initial	Final	Net		Pitot Leak Check
Date :	5/2/19	Pitot Coeff. :	0.84	1	733.4	724.3		Initial :	x x
Client :	Facility A	Meter Box # :	A-8	2	742.0	755.3		Final :	x x
Unit :	Inlet 2 outside	Meter @ Dh :	1.834	3	534.0	537.4			
Operator :	MN	Meter Y :	1.0395	4	875.3	891.9			Meter Box Leak Check
Stack Dia :	36.0	TC # :	34	5				Rate	"HG
Amb. Press :	29.83	Start Time :	1210	Nozzle Dia	H2O Gain =			Initial : 0.000	10
Static Press :	-1.3	Stop Time :	1430	0.155	Filter :			Final : 0.000	12

A

Traverse Points	Time (Minute)	Delta P ("H2O)	Stack Temp. (F)	Set delta H ("H2O)	Meter Volume (acf)	Mtr. Inlet Temp. (F)	Mtr. Outlet Temp. (F)	Oven Temp. (F)	Probe Temp. (F)	Impinger Temp. (F)	Pump Vac. ("HG)	TE Cooler Temp. (F)	Cyclonic Flow ("H2O)
12	0	2.10	93	1.25	910.028	85	NA	249	252	47	9.0	NA	<10
11	5.00	2.60	91	1.55	913.24	87		252	251	44	11.0	NA	<10
10	10.0	3.2	91	1.90	916.89	88		253	253	47	11.0	NA	
9	15.0	2.90	98	1.75	920.63	89		252	252	49	10.0		
8	20.0	2.70	90	1.60	924.330	90		252	252	51	10.0		
7	25.0	2.65	91	1.6	927.85	91		251	252	51	10.0		
6	30.0	2.60	90	1.55	931.37	91		252	252	53	10.0		
5	35.0	2.10	91	1.25	935.02	92		252	252	53	10.0		
4	40.0	1.95	92	1.15	938.06	92		251	252	54	10.0		
3	45.0	1.60	88	0.95	941.05	92		252	251	54	10.0		
2	50.0	1.40	87	~~0~~1.45	943.69	92		252	251	54	8.0 ~~10.0~~		
1	55.0	2.80	81	1.65	947.01	92		251	251	54	10.0		
0	60.0	2.40	89	1.45	950.58	89	NA	252	252	52	10.0		<10
12	65.0	2.90	91	1.75	953.83	89		252	253	49	10.0		
11	70.0	3.20	90	1.85	957.46	90		251	252	51	11.0	NA	
10	75.0	3.40	91	2.00	961.25	91		253	252	52	11.0		
9	80.0	2.80	91	1.65	965.21	91		252	252	53	11.0		
8	85.0	2.60	91	1.55	968.88	91		252	253	53	11.0		
7	90.0	2.80	91	1.65	972.34	91		252	252	55	11.0		
6	95.0	2.05	88	2.05	975.89	91		252	253	56	11.0		
5	100.0	2.00	89	2.00	979.00	90		251	252	57	11.0		
4	105.0	1.50	93	1.50	982.02	91		252	252	56	11.0		
3	110.0	2.35	92	1.4	984.68	91		252	251	56	11.0		
2	115.0	2.70	92	1.6	987.00	91		252	252	56	11.0		
0	120.0				990.56								

Isokinetic Factor Setup

Estimated Dry Gas Meter Temp:

Estimated Stack Temp:

Estimated Delta P:

Estimated Moisture Content:

Estimated O2:

Estimated CO2:

Equipment Evaluation , OK? Y or N

Ambient Temp.:

TC Check:

Pitot Check:

Tedlar Bag:

Pitot Exp Date:

TC Exp Date

Dry Gas Meter Leak Checks

	1	2	3	4	5	6
DGM Initial:						
Vacuum:						
Leak Rate:						
DGM Final:						

Almega ENVIRONMENTAL

ISOKINETIC DATA FORM, TE COOLER & CYCLONIC FLOW

METH

Almega ENVIRONMENTAL

Run # : 2
Date : 5/21/19
Client : Facility A
Unit : Inlet ~~2~~ (Outside)
Operator : MN
Stack Dia : 36.0
Amb. Press : 29.83
Static Press : -13

Pitot ID: 34
Pitot Coeff. : 0.84
Meter Box # : A-8
Meter @ Dh : 1.834
Meter Y : 1.0395
TC # : 34
Start Time : 1510
Stop Time : 1740
Nozzle Dia 0.155

Impinger #	Initial	Final	Net
1	626.1	630.4	
2	751.9	757.0	
3	628.4	629.5	
4	903.0	915.6	
5			

01 HNO3

H2O Gain =
Filter :

Pitot Leak Check		
Initial :	x	x
Final :	x	Y

Meter Box Leak Check	Rate	"HG
Initial :	0.000	10
Final :	0.000	13

1510

Traverse Points	Time (Minute)	Delta P ("H2O)	Stack Temp. (F)	Set delta H ("H2O)	Meter Volume (acf)	Mtr. Inlet Temp. (F) ↔ MN	Mtr. Outlet Temp. (F)	Oven Temp. (F)	Probe Temp. (F)	Impinger Temp. (F)	Pump Vac. ("HG)	TE Cooler Temp. (F)	Cyclonic Flow ("H2O)
12	0	2.20	86	1.30	990.944	85	[illegible]	255	254	57	8.0	NA	<10
11	5.0	2.40	86	1.45	994.110	86		253	251	48	8.0	NA	<10
10	10.0	3.10	87	1.85	997.22	87		255	252	47	8.0		<10
9	15.0	3.00	87	1.80	1001.22	88		251	252	46	9.0		
8	20.0	2.75	87	1.65	1005.00	89		251	253	46	9.0		
7	25.0	3.10	87	~~1.80~~ 1.85	1008.52	89		252	252	45	9.0		
6	30.0	3.10	87	~~1.80~~ 1.85	1012.36	90		253	252	45	9.0		
5	35.0	2.60	86	1.55	1016.17	90		251	252	46	9.0		
4	40.0	2.40	86	1.45	1019.64	91		252	252	47	9.0		
3	45.0	2.80	86	1.65	1023.00	91		251	251	47	9.0		
2	50.0	2.70	86	1.60	1026.51	91		253	254	47	9.0		
1	65.0	2.30	84	1.35	1030.23	91	NA	252	253	48	9.0		
0	60.0	2.80	82	1.65	1033.52	86		251	252	52	9.0		
12	65.0	2.70	82	1.60	1037.08	86		253	251	48	9.0	NA	
11	70.0	2.90	83	1.75	1040.58	87		252	252	48	9.0	NA	<10
10	75.0	2.90	82	1.75	1044.16	87		251	253	48	9.0		
9	80.0	2.40	83	1.45	1048.00	88		252	257	48	9.0		
8	85.0	3.0	83	1.80	1051.35	88		253	253	49	9.0		
7	90.0	2.7	83	1.60	1055.18	88		251	254	49	9.0		
6	95.0	2.4	83	1.45	1058.75	88		253	252	49	9.0		
5	100.0	2.55	82	1.50	1062.11	88		253	252	49	9.0		
4	105.0	2.3	82	1.35	1065.53	88		251	251	49	9.0		
3	110.0	2.65	82	1.60	1068.79	88		252	251	49	9.0		
2	115.0	2.3	82	1.7	1072.35	88		254	254	50	9.0		
1	120.0				1075.67								

1640

Isokinetic Factor Setup

Estimated Dry Gas Meter Temp:	90
Estimated Stack Temp:	85
Estimated Delta P:	3.83
Estimated Moisture Content:	7.0%
Estimated O2:	20.5%
Estimated CO2:	0.5%

Equipment Evaluation , OK? Y or N

Ambient Temp.:	Y
TC Check:	x
Pitot Check:	
Tedlar Bag:	N/A
Pitot Exp Date:	
TC Exp Date	

Dry Gas Meter Leak Checks

	1	2	3	4	5	6
DGM Initial:						
Vacuum:						
Leak Rate:						
DGM Final:						

Almega ENVIRONMENTAL

ISOKINETIC DATA FORM, TE COOLER & CYCLONIC FLOW

METH

Almega ENVIRONMENTAL

Run # :	3	Pitot ID:	34	Impinger #	Initial	Final	Net		Pitot Leak Check	
Date :	5/22/19	Pitot Coeff. :	0.84	1	735.9	714.4		Initial :	✓	✓
Client :	Facility A	Meter Box # :	A-8	2	744.4	764.6		Final :	✓	✓
Unit :	Inlet ~~2~~ (outside)	Meter @ Dh :	1.834	3	535.7	541.1				
Operator :	MN	Meter Y :	1.0395	4	892.1	905.4			Meter Box Leak Check	
Stack Dia :	36.0	TC # :	34	5					Rate	"HG
Amb. Press :	29.62	Start Time :	830	Nozzle Dia 0.173	H2O Gain =			Initial :	0.000	14
Static Press :	-13	Stop Time :	1045	~~0.173~~ .193	Filter :			Final :	0.000	23

Traverse Points	Time (Minute)	Delta P ("H2O)	Stack Temp. (F)	Set delta H ("H2O)	Meter Volume (acf)	Mr. Inlet Temp. (F)	Mr. Outlet Temp. (F)	Oven Temp. (F)	Probe Temp. (F)	Impinger Temp. (F)	Pump Vac. ("HG)	TE Cooler Temp. (F)	Cyclonic Flow ("H2O)
12	0	2.90	83	2.7	75.957	72 MN	NA	254	251	43	12.0	NA	<10
11	5.0	3.50	84	3.25	80.210	73		253	252	45	13.0		
10	10.0	3.40	87	3.15	85.02	74		252	253	53	13.0		
9	15.0	3.50	88	3.25	89.66	76		252	253	56	13.0		
8	20.0	2.90	86	2.70	94.410	77		253	254	59	12.0		
7	25.0	2.70	85	2.50	98.720	77		252	253	59	12.0		
6	30.0	2.65	84	2.45	102.95	79		251	253	58	12.0		
5	35.0	2.45	86	2.25	107.02	80		253	252	56	10.0		
4	40.0	2.00	87	1.85	111.03	80		252	253	55	10.0		
3	45.0	2.00	82	1.85	114.82	80		253	253	55	10.0		
Restart 945 2	50.0	2.30	83	2.15	118.45	81		251	251	53	11.0		
1	55.0	2.20	83	2.05	122.35	81		254	252	54	10.0		
0	60.0	2.60	85	2.4	126.21	79	NA	253	252	52	10.0	NA	<10
12	65.0	3.40	87	3.15	130.35	81		251	253	52	~~15~~ 13.0		
11	70.0	3.30	89	3.05	135.12	81		254	253	54	13.0		
10	75.0	3.60	89	3.35	139.79	83		251	251	56	14.0		
9	80.0	3.00	88	2.75	144.72	83		253	252	52	13.0		
8	85.0	2.90	87	2.70	149.13	83		254	252	50	13.0		
7	90.0	2.70	91	2.50	153.46	84		253	253	49	13.0		
6	95.0	2.2	92	2.05	157.69	84		252	262	49	11.0		
5	100.0	1.7	91	1.60	161.54	85		253	252	48	10.0		
4	105.0	1.8	90	1.65	164.85	85		251	251	48	10.0		
3	110.0	2.8	87	2.6	168.34	86		252	251	49	12.0		
2	115.0	3.2	87	2.95	172.63	86		253	263	49	13.0		
1	120.0				177.21								

Isokinetic Factor Setup

Estimated Dry Gas Meter Temp:	
Estimated Stack Temp:	
Estimated Delta P:	
Estimated Moisture Content:	
Estimated O2:	
Estimated CO2:	

Equipment Evaluation , OK? Y or N

Ambient Temp.:	
TC Check:	
Pitot Check:	
Tedlar Bag:	
Pitot Exp Date:	
TC Exp Date	

Dry Gas Meter Leak Checks

	1	2	3	4	5	6
DGM Initial:						
Vacuum:						
Leak Rate:						
DGM Final:						

APPENDIX C3

MULTIPLE METAL EMISSIONS – LABORATORY DATA

Mehod 436 Lab Data Summary

				Inlet 1 (Inside) 1	Inlet 2 (Outside) Upstream of Baghouse	Outlet	RB	FB
Run 1	Arsenic	As	ug	<1	<1	<1	<1	<1
	Cadmium	Cd	ug	<1	1.1	<1	<1	<1
	Chromium	Cr	ug	220	32	41	1.5	**2.2**
	RB Corrected	**Cr**	**ug**	**218.5**	**30.5**	**39.5**		
	Nickel	Ni	ug	59	22	7.4	1.3	3.1
	RB Corrected	**Ni**	**ug**	**57.7**	**20.7**	**6.1**		
Run 2	Arsenic	As	ug	<1	<1	<1		
	Cadmium	Cd	ug	<1	<1	<1		
	Chromium	Cr	ug	41	9.7	2.5		
	RB Corrected	**Cr**	**ug**	**39.5**	**8.2**	**1.0**		
	Nickel	Ni	ug	7.3	13	1.8		
	RB Corrected	**Ni**	**ug**	**6**	**11.7**	**0.50**		
Run 3	Arsenic	As	ug	2.9	<1	<1		
	Cadmium	Cd	ug	1	<1	<1		
	Chromium	Cr	ug	690	60	2.1		
	RB Corrected	**Cr**	**ug**	**688.5**	**58.5**	**0.6**		
	Nickel	Ni	ug	130	44	1.9		
	RB Corrected	**Ni**	**ug**	**128.7**	**42.7**	**0.6**		

WECK LABORATORIES, INC.

Certificate of Analysis

Almega ENVIRONMENTAL REPORT

Work Orders: 9E30032

Project: 10562/IN(I)/In(O)/Out

Attn: Almega Environmental & Technical Services

Client: Almega Environmental & Technical Services
10602 Walker St
Cypress, CA 90630

Report Date: 6/20/2019
Received Date: 5/29/2019
Turnaround Time: Normal
Phones: (714) 889-4000
Fax: (714) 889-7030
P.O. #: 10562
Billing Code:

EPA-UCMR #CA00211 • HW-DOH # • ISO 17025 #L2457.01 • LACSD #10143 • NELAP-CA #04229CA • NELAP-OR #4047 • NJ-DEP #CA015 • NV-DEP #NAC 445A • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Almega Environmental & Technical Services,

Enclosed are the results of analyses for samples received 5/29/19 with the Chain-of-Custody document. The samples were received in good condition, at 4.7 °C. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Brandon Gee
Operations Manager/Senior PM

Almega Environmental & Technical Services
10602 Walker St
Cypress, CA 90630

Project Number: 10562/IN(I)/In(O)/Out

Project Manager: Almega Environmental & Technical Services

Reported: 06/20/2019 07:57

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
105462 - M436 - C1 - In(O) - FB	Client	9E30032-01	Filter	05/21/19 09:00	
105462 - M436 - C1 - In(I) - R1	Client	9E30032-04	Filter	05/21/19 12:10	
105462 - M436 - C1 - In(O) - R1	Client	9E30032-07	Filter	05/21/19 12:10	
105462 - M436 - C1 - Out - R1	Client	9E30032-10	Filter	05/21/19 12:10	
105462 - M436 - C1 - In(I) - R2	Client	9E30032-13	Filter	05/21/19 15:10	
105462 - M436 - C1 - In(O) - R2	Client	9E30032-16	Filter	05/21/19 15:10	
105462 - M436 - C1 - Out - R2	Client	9E30032-19	Filter	05/21/19 15:10	
105462 - M436 - C1 - In(I) - R3	Client	9E30032-22	Filter	05/22/19 08:30	
105462 - M436 - C1 - In(O) - R3	Client	9E30032-25	Filter	05/22/19 08:30	
105462 - M436 - C1 - Out - R3	Client	9E30032-28	Filter	05/22/19 08:30	
105462-M436-RB-Filter	Client	9E30032-31	Filter	05/22/19 09:30	

Almega Environmental & Technical Services
10602 Walker St
Cypress, CA 90630

Project Number: 10562/IN(I)/In(O)/Out

Project Manager: Almega Environmental & Technical Services

Reported:
06/20/2019 07:57

Sample Results

Sample: 105462 - M436 - C1 - In(O) - FB
9E30032-01 (Filter)
Sampled: 05/21/19 9:00 by Client

Metals (Non-Aqueous) by EPA 6000/7000 Series Methods

Method: EPA 6020 **Batch ID:** W9F0681 **Instr:** ICPMS03 **Prepared:** 06/12/19 16:26 **Analyst:** ALN

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Arsenic, Total	ND	1.0	ug/filter	5	06/17/19 14:16	
Cadmium, Total	ND	1.0	ug/filter	5	06/17/19 14:16	
Chromium, Total	**2.2**	0.20	ug/filter	1	06/17/19 13:28	
Nickel, Total	**3.1**	0.20	ug/filter	1	06/17/19 13:28	

Sample: 105462 - M436 - C1 - In(I) - R1
9E30032-04 (Filter)
Sampled: 05/21/19 12:10 by Client

Metals (Non-Aqueous) by EPA 6000/7000 Series Methods

Method: EPA 6020 **Batch ID:** W9F0681 **Instr:** ICPMS03 **Prepared:** 06/12/19 16:26 **Analyst:** ALN

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Arsenic, Total	ND	1.0	ug/filter	5	06/17/19 14:20	
Cadmium, Total	ND	1.0	ug/filter	5	06/17/19 14:20	
Chromium, Total	**220**	1.0	ug/filter	5	06/17/19 14:20	
Nickel, Total	**59**	1.0	ug/filter	5	06/17/19 14:20	

Sample: 105462 - M436 - C1 - In(O) - R1
9E30032-07 (Filter)
Sampled: 05/21/19 12:10 by Client

Metals (Non-Aqueous) by EPA 6000/7000 Series Methods

Method: EPA 6020 **Batch ID:** W9F0681 **Instr:** ICPMS03 **Prepared:** 06/12/19 16:26 **Analyst:** ALN

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Arsenic, Total	ND	1.0	ug/filter	5	06/17/19 14:22	
Cadmium, Total	**1.1**	1.0	ug/filter	5	06/17/19 14:22	
Chromium, Total	**32**	0.20	ug/filter	1	06/17/19 13:35	
Nickel, Total	**22**	0.20	ug/filter	1	06/17/19 13:35	

Sample: 105462 - M436 - C1 - Out - R1
9E30032-10 (Filter)
Sampled: 05/21/19 12:10 by Client

Metals (Non-Aqueous) by EPA 6000/7000 Series Methods

Method: EPA 6020 **Batch ID:** W9F0681 **Instr:** ICPMS03 **Prepared:** 06/12/19 16:26 **Analyst:** ALN

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Arsenic, Total	ND	1.0	ug/filter	5	06/17/19 14:24	
Cadmium, Total	ND	1.0	ug/filter	5	06/17/19 14:24	
Chromium, Total	**41**	0.20	ug/filter	1	06/17/19 13:37	
Nickel, Total	**7.4**	0.20	ug/filter	1	06/17/19 13:37	

Almega Environmental & Technical Services
10602 Walker St
Cypress, CA 90630

Project Number: 10562/IN(I)/In(O)/Out

Project Manager: Almega Environmental & Technical Services

Reported:
06/20/2019 07:57

Sample Results

(Continued)

Sample: 105462 - M436 - C1 - In(I) - R2 Sampled: 05/21/19 15:10 by Client
9E30032-13 (Filter)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods						
Method: EPA 6020 **Batch ID:** W9F0681	**Instr:** ICPMS03	**Prepared:** 06/12/19 16:26			**Analyst:** ALN	
Arsenic, Total	ND	1.0	ug/filter	5	06/17/19 14:26	
Cadmium, Total	ND	1.0	ug/filter	5	06/17/19 14:26	
Chromium, Total	**41**	0.20	ug/filter	1	06/17/19 13:39	
Nickel, Total	**7.3**	0.20	ug/filter	1	06/17/19 13:39	

Sample: 105462 - M436 - C1 - In(O) - R2 Sampled: 05/21/19 15:10 by Client
9E30032-16 (Filter)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods						
Method: EPA 6020 **Batch ID:** W9F0681	**Instr:** ICPMS03	**Prepared:** 06/12/19 16:26			**Analyst:** ALN	
Arsenic, Total	ND	1.0	ug/filter	5	06/17/19 14:29	
Cadmium, Total	ND	1.0	ug/filter	5	06/17/19 14:29	
Chromium, Total	**9.7**	0.20	ug/filter	1	06/17/19 13:42	
Nickel, Total	**13**	0.20	ug/filter	1	06/17/19 13:42	

Sample: 105462 - M436 - C1 - Out - R2 Sampled: 05/21/19 15:10 by Client
9E30032-19 (Filter)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods						
Method: EPA 6020 **Batch ID:** W9F0681	**Instr:** ICPMS03	**Prepared:** 06/12/19 16:26			**Analyst:** ALN	
Arsenic, Total	ND	1.0	ug/filter	5	06/17/19 14:31	
Cadmium, Total	ND	1.0	ug/filter	5	06/17/19 14:31	
Chromium, Total	**2.5**	0.20	ug/filter	1	06/17/19 13:44	
Nickel, Total	**1.8**	0.20	ug/filter	1	06/17/19 13:44	

Sample: 105462 - M436 - C1 - In(I) - R3 Sampled: 05/22/19 8:30 by Client
9E30032-22 (Filter)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods						
Method: EPA 6020 **Batch ID:** W9F0681	**Instr:** ICPMS03	**Prepared:** 06/12/19 16:26			**Analyst:** ALN	
Arsenic, Total	**2.9**	1.0	ug/filter	5	06/17/19 14:33	
Cadmium, Total	**1.0**	1.0	ug/filter	5	06/17/19 14:33	
Chromium, Total	**690**	1.0	ug/filter	5	06/17/19 14:33	
Nickel, Total	**130**	1.0	ug/filter	5	06/17/19 14:33	

Sample Results

(Continued)

Sample: 105462 - M436 - C1 - In(O) - R3 Sampled: 05/22/19 8:30 by Client

9E30032-25 (Filter)

Metals (Non-Aqueous) by EPA 6000/7000 Series Methods

Method: EPA 6020 **Batch ID:** W9F0681 **Instr:** ICPMS03 **Prepared:** 06/12/19 16:26 **Analyst:** ALN

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Arsenic, Total	ND	1.0	ug/filter	5	06/17/19 15:03	
Cadmium, Total	ND	1.0	ug/filter	5	06/17/19 15:03	
Chromium, Total	**60**	0.20	ug/filter	1	06/17/19 13:48	
Nickel, Total	**44**	0.20	ug/filter	1	06/17/19 13:48	

Sample: 105462 - M436 - C1 - Out - R3 Sampled: 05/22/19 8:30 by Client

9E30032-28 (Filter)

Metals (Non-Aqueous) by EPA 6000/7000 Series Methods

Method: EPA 6020 **Batch ID:** W9F0681 **Instr:** ICPMS03 **Prepared:** 06/12/19 16:26 **Analyst:** ALN

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Arsenic, Total	ND	1.0	ug/filter	5	06/17/19 15:05	
Cadmium, Total	ND	1.0	ug/filter	5	06/17/19 15:05	
Chromium, Total	**2.1**	0.20	ug/filter	1	06/17/19 14:02	
Nickel, Total	**1.9**	0.20	ug/filter	1	06/17/19 14:02	

Sample: 105462-M436-RB-Filter Sampled: 05/22/19 9:30 by Client

9E30032-31 (Filter)

Metals (Non-Aqueous) by EPA 6000/7000 Series Methods

Method: EPA 6020 **Batch ID:** W9F0681 **Instr:** ICPMS03 **Prepared:** 06/12/19 16:26 **Analyst:** ALN

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Arsenic, Total	ND	1.0	ug/filter	5	06/17/19 14:18	
Cadmium, Total	ND	1.0	ug/filter	5	06/17/19 14:18	
Chromium, Total	**1.5**	0.20	ug/filter	1	06/17/19 13:31	
Nickel, Total	**1.3**	0.20	ug/filter	1	06/17/19 13:31	

Almega Environmental & Technical Services
10602 Walker St
Cypress, CA 90630

Project Number: 10562/IN(I)/In(O)/Out

Project Manager: Almega Environmental & Technical Services

Reported:
06/20/2019 07:57

Quality Control Results

Metals (Non-Aqueous) by EPA 6000/7000 Series Methods

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W9F0681 - EPA 6020										
Blank (W9F0681-BLK1)				**Prepared: 06/12/19 Analyzed: 06/17/19**						
Arsenic, Total	ND	0.20	ug/filter							
Cadmium, Total	ND	0.20	ug/filter							
Chromium, Total	ND	0.20	ug/filter							
Nickel, Total	ND	0.20	ug/filter							
LCS (W9F0681-BS1)				**Prepared: 06/12/19 Analyzed: 06/17/19**						
Arsenic, Total	5.11	1.0	ug/filter	5.00		102	80-120			
Cadmium, Total	4.96	1.0	ug/filter	5.00		99	80-120			
Chromium, Total	5.14	0.20	ug/filter	5.00		103	80-120			
Nickel, Total	5.02	0.20	ug/filter	5.00		100	80-120			
LCS Dup (W9F0681-BSD1)				**Prepared: 06/12/19 Analyzed: 06/17/19**						
Arsenic, Total	5.10	1.0	ug/filter	5.00		102	80-120	0.2	20	
Cadmium, Total	5.05	1.0	ug/filter	5.00		101	80-120	2	20	
Chromium, Total	5.09	0.20	ug/filter	5.00		102	80-120	0.8	20	
Nickel, Total	4.90	0.20	ug/filter	5.00		98	80-120	2	20	

Notes and Definitions

Item	Definition
% Rec	Percent Recovery
Dil	Dilution
dry	Sample results reported on a dry weight basis
MDA	Minimum Detectable Activity
MDL	Method Detection Limit
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ) and Detection Limit for Reporting (DLR)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
NR	Not Reportable
RPD	Relative Percent Difference
Source	Sample that was matrix spiked or duplicated.
TIC	Tentatively Identified Compound (TIC) using mass spectrometry. The reported concentration is relative concentration based on the nearest internal standard. If the library search produces no matches at, or above 85%, the compound is reported as unknown.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

An Absence of Total Coliform meets the drinking water standards as established by the California State Water Resources Control Board (SWRCB)

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

22 + 1K

9E30032

~~Page 1 of 2~~ 1 of 5

Almega
ENVIRONMENTAL
CHAIN OF CUSTODY
RECORDS

INVOICE:
CLIENT: AQMD Facility A
JOB #: 10562
ATTN:

REPORT TO:
ALMEGA Environmental & Technical Services
10602 Walker St.
Cypress, CA 90630
(714) 889-4000 Fax (714) 889-7030
lab@almegaenv.com
Contact: Neal Conroy

~~Page 1 of~~ PO# 10562

Turnaround Time
Standard: X Other: ____
Rush: Depends on # of Samples
5 - 10 days ____
3 - 7 days ____

Unit 1: In(I) Unit 2: In(O) Unit 3: Out
Samplers: (Signature)
Project Manager: Neal Conroy

Sample Date	Sample Time	Sample Identification	Description	Type Of Sample: LIQUID	GAS	SOLID	Total # Containers	ANALYSIS REQUESTED: CARB 436	Cr, As, Cd, Ni				Return or Dispose REMARKS
5/21/2019	09:00	10562 - M436 - C1 - In(O) - FB	Filter			x	1	X					~~* Analyze each sample~~
		10562 - M436 - C2 - In(O) - FB	Probe/Nozzle Rinse	x			1	X	✓				~~for all CARB 436 metals~~
		10562 - M436 - C3 - In(O) - FB	Imp 1, 2, 3	x			1	X					~~except for Mercury~~
5/21/2019	12:19-14:30	10562 - M436 - C1 - In(I) - R1	Filter			x	1	X					** Archive all primary
		10562 - M436 - C2 - In(I) - R1	Probe/Nozzle Rinse	x			1	X	✓				analysis aliquots.
		10562 - M436 - C3 - In(I) - R1	Imp 1, 2, 3	x			1	X					
													* combine
5/21/2019	12:10-14:30	10562 - M436 - C1 - In(O) - R1	Filter			x	1	X					per
		10562 - M436 - C2 - In(O) - R1	Probe/Nozzle Rinse	x			1	X	✓				method
		10562 - M436 - C3 - In(O) - R1	Imp 1, 2, 3	x			1	X					4.7 c T-2010

Relinquished by: N Conroy
Date: 5/21/19 Time: 7:15 PM
Received by:
Date: 5/22/19 Time: 8:02
Relinquished by:
Date: 5/28/19 Time: 12:00
Received by:
Date: 5/28/19 Time: 9:30

Relinquished by:
Date: 5/28/19 Time: 10:20
Received by: Jonathan
Date: 5/28/19 Time: 1020
Relinquished by: Jonathan
Date: 6/18/19 Time: 1121
Received by:
Date: 6/18/19 Time: 11:15

2 of 5

9E30032

Almega ENVIRONMENTAL CHAIN OF CUSTODY RECORDS

INVOICE:

CLIENT: AQMD Facility A

JOB #: 10562

ATTN:

REPORT TO:

ALMEGA Environmental & Technical Services
10902 Walker St.
Cypress, CA 90630
(714) 889-4000 Fax (714) 889-7036
lab@almegaenv.com
Contact: Neal Conroy

Page 1 of 2

PO # 10562

Turnaround Time
Standard: X
Other:
Rush: Depends on # of Samples
5 - 10 days
3 - 7 days

Unit 1: In(I)
Unit 2: In(O)
Unit 3: Out

Samplers: (Signature)

Project Manager: Neal Conroy

ANALYSIS REQUESTED

Sample Date	Sample Time	Sample Identification	Description	Type Of Sample LIQUID	Type Of Sample GAS	Type Of Sample SOLID	# of Container	CARB 436	Cr As Ni cd				Return or Dispose REMARKS
5/21/2019	12:10-14:33	10562 - M436 - C1 - Out - R1	Filter			x	1	X	✓				* ~~Analyze with sample~~
		10562 - M436 - C2 - Out - R1	Probe/Nozzle Rinse	x²			1	X					~~(one) CARB 436 metals~~
		10562 - M436 - C3 - Out - R1	Imp 1, 2, 3	⁴x			1	X					~~except for Mercury~~
												4	Combine
													per method
													** Archive all primary
													analysis aliquots.
													4.7°C R020

Relinquished by: N Conroy
Date: 5/21/19 Time 9:15 PM

Received by:
Date: 5/24/19 Time: 8:00

Relinquished by:
Date: 5/28/19 Time: 12:00

Received by:
Date:
Time

Relinquished by:
Date: 5/28/19 Time 10:20

Received by: Jamieson
Date: 6/4/19 Time: 1020

Relinquished by: Jamieson
Date: 6/4/19 Time: 1121

Received by:
Date: 6/18/19 Time: 11:15

9E30032

~~Page 1 of 1~~
3.°5

Almega
ENVIRONMENTAL
CHAIN OF CUSTODY RECORDS

INVOICE:
CLIENT: AQMD Facility A
JOB #: 10562
ATTN:

REPORT TO:
ALMEGA Environmental & Technical Services
10602 Walker St.
Cypress, CA 90630
(714) 889-4000 Fax (714) 889-7030
lab@almegaenv.com
Contact: Neal Conroy

~~Page 1 of 1~~
PO # 10562

Turnaround Time
Standard: X
Other: ____
Rush:
Depends on # of Samples
5 - 10 days ____
3 - 7 days ____

Unit 1: In(I) | Unit 2: In(O) | Unit 3: Out
Samplers: (Signature)
Project Manager: Neal Conroy

Return or Dispose

Sample Date	Sample Time	Sample Identification	Description	Type Of Sample LIQUID	GAS	SOLID	# of Containers	CARB 436	Cr As Ni Cd				REMARKS
5/21/2019	15:10-17:40	10562 - M436 - C1 - In(I) - R2	Filter			x	1	X					~~* Analyze each sample~~
		10562 - M436 - C2 - In(I) - R2	Probe/Nozzle Rinse	x			1	X	✓				~~for all CARB 436 metals~~
		10562 - M436 - C3 - In(I) - R2	Imp 1, 2, 3	x			1	X					~~except for Mercury~~ Cf
5/21/2019	15:10-17:40	10562 - M436 - C1 - In(O) - R2	Filter			x	1	X					** Archive all primary
		10562 - M436 - C2 - In(O) - R2	Probe/Nozzle Rinse	x			1	X	✓				analysis aliquots.
		10562 - M436 - C3 - In(O) - R2	Imp 1, 2, 3	x			1	X					
												+	combine
5/21/2019	15:10-17:40	10562 - M436 - C1 - Out - R2	Filter			x	1	X					per method
		10562 - M436 - C2 - Out - R2	Probe/Nozzle Rinse	x			1	X	✓				
		10562 - M436 - C3 - Out - R2	Imp 1, 2, 3	x			1	X					
													4.7°C 7020

Relinquished by: N Conroy
Date: 5/21/19 Time: 7:15 PM
Received by:
Date: 5/22/19 Time: 8:02
Relinquished by:
Date: 5/28/19 Time: 12:00
Received by:
Date: Time:

Relinquished by:
Date: 5/28/19 Time: 10:20
Received by: Sandhan
Date: 5/28/19 Time: 1:00
Relinquished by: Sandhan
Date: 6/18/19 Time: 1:21
Received by:
Date: 6/18/19 Time: 8:15

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9E30032 H • f5

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CHAIN OF CUSTODY RECORDS

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JOB #: 10562

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Cypress, CA 90630
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lab@almegaenv.com
Contact: Noel Conroy

~~Page 1 of 2~~

PO # 10567

Turnaround Time
Standard: X Other: ____
Rush:
Depends on # of Samples
5 - 10 days ____
3 - 7 days ____

Unit 1: In(I) Unit 2: In(O) Unit 3: Out

Samplers: (Signature)

Project Manager: Noel Conroy

Sample Date	Sample Time	Sample Identification	Description	Type Of Sample: LIQUID	GAS	SOLID	No of Containers	CARB 436	As Cd Ni Cr				Return or Discard REMARKS
5/22/2019	8:30-10:45	10562 - M436 - C1 - In(I) - R3	Filter			x	1	X					~~* Analyze each sample~~
		10562 - M436 - C2 - In(I) - R3	Probe/Nozzle Rinse	x			1	X	✓				~~for all CARB 436 metals~~
		10562 - M436 - C3 - In(I) - R3	Imp 1, 2, 3	x			1	X					~~except for Mercury~~ CG
5/22/2019	8:30-10:45	10562 - M436 - C1 - In(O) - R3	Filter			x	1	X					** Archive all primary
		10562 - M436 - C2 - In(O) - R3	Probe/Nozzle Rinse	x			1	X	✓				analysis aliquots.
		10562 - M436 - C3 - In(O) - R3	Imp 1, 2, 3	x			1	X					
5/22/2019	8:30-12:48	10562 - M436 - C1 - Out - R3	Filter			x	1	X				*	combine per
		10562 - M436 - C2 - Out - R3	Probe/Nozzle Rinse	x			1	X	✓				method
		10562 - M436 - C3 - Out - R3	Imp 1, 2, 3	x			1	X					
													4.3°C TOBO

Relinquished by: N Conroy Date: 5/22/19 Time: 8:15	Received by: Date: 5/23/19 Time: 7:45	Relinquished by: Date: 5/28/19 Time: 12:00	Received by: Date: Time
Relinquished by: Date: 5/28/19 Time: 10:20	Received by: Jonathan Date: 5/31/19 Time: 1100	Relinquished by: Jonathan Date: 6/18/19 Time: 1121	Received by: Date: 6/18/19 Time 11:15

9E30032

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Almega
ENVIRONMENTAL
CHAIN OF CUSTODY
RECORDS

INVOICE:

CLIENT: AQMD Facility A

JOB #: 10562

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lab@almegaenv.com
Contact: Neal Conroy

~~Page 2 of 2~~

PO # 10562

Turnaround Time

Standard: X Other:

Rush:
Depends on # of Samples
5 - 10 days ______
3 - 7 days ______

Return or Dispose

Unit 1: In(I) Unit 2: In(O) Unit 3: Out

Samplers: (Signature)

Project Manager: Neal Conroy

Sample Date	Sample Time	Sample Identification	Description	Type Of Sample: LIQUID	GAS	SOLID	No of Container #	CARB 436	Cr - Ni add As			
5/22/2019	09:30	10562-M436-RB-Filter	Filter			x	1	X	✓			
		10562-M436-RB-HNO3	0.1N HNO3	x			1	X				
		10562-M436-RB-HNO3/H2O2	5% HNO3/10% H2O2	x			1	X				

ANALYSIS REQUESTED

REMARKS

~~* Analyze each sample for all CARB 436 metals except Hg/mercury~~

* combine per method

** Archive all primary analysis aliquots.

4.7°C P2010

Relinquished by: NConroy
Date: 5/22/19 Time: 18:15

Received by:
Date: 5/23/19 Time: 8:45

Relinquished by:
Date: 5/28/19 Time: 12:00

Received by:
Date:
Time

Relinquished by:
Date: 5/28/19 Time: 10:20

Received by: Jianghua
Date: 5/28/19 Time: 1020

Relinquished by: Jianghua
Date: 6/18/19 Time: 1121

Received by:
Date: 6/18/19 Time: 11:15

APPENDIX C4

O_2/CO_2 RESULTS – FIELD & LABORATORY DATA

Almega
ENVIRONMENTAL

LABORATORY REPORT
Carbon Dioxide & Oxygen by TCD
by Modified SCAQMD Method 25.3 (TCA/FID)

Client:	AQMD
Project No.:	c10562
Unit Tested:	Facility A
Sampling Date:	21-May-19
Analyzed Date:	22-May-19
Lab No.:	A 053

Client Sample ID	Lab ID	Almega Sample ID Tank	CO_2 % v/v by TCD	O_2 % v/v by TCD
Facility A				
Tnk11 - Inlet (I) - R1	A 053 - 01	11	ND	20.0
Tnk50 - Inlet (O) - R1	A 053 - 02	50	ND	20.1
Tnk30 - Outlet - R1	A 053 - 03	30	ND	16.4
Detection Limit			0.3	0.3

Suspected leak outlet-R1 not used, default ambient O2/CO2 used.

* NOTE - the BIAS FACTOR (of 1.086) is NOT applied in these results.
ND=Not Detected

TGNMNEO concentration values are reported in ppm (v/v) as Methane (carbon#=1).

The sample cylinder is analyzed for NMNEO, CO, CH_4, CO_2 and C_2H_6. It is then directed to a separation column where all heavy organics (C_3+) separate from the light organics (CO, CO_2, CH_4 and C_2H_6). The light organics are then passed through a reduction catalyst to convert CO and CO_2 to CH_4, and are then directed to a FID for detection and quantification. The heavy organics are backflushed off the holding column, passed through an oxidation catalyst, which convert all organics to CO_2, then through a reduction catalyst to convert CO_2 to CH_4 and then to a FID for detection and quantification.

Reviewed by: DW

CALCULATIONS

Almega ENVIRONMENTAL

Client:	AQMD		Lab No.: A 053
Project No.:	c10562		
Unit Tested:	Facility A		
Sampling Date:	21-May-19		
Date tested:	22-May-19		

Parameter	Symbol	Units	Run #1	Run #2
Sample ID			Tnk11 - Inlet (I) - R1	Tnk50 - Inlet (O) - R1
Lab ID			A 053 - 01	A 053 - 02
Sample Tank				
Tank No			11	50
Sample Tank Volume	V_T	L	12.095	12.050
Barometric Pressure	P_b	mm Hg	763	763
Pre-test Pressure	P_{TI}	mm Hg (abs)	2.00	2.00
Pre-test Temperature	t_{TI}	°C	21	21
Abs. Pre-test Temperature	T_{TI}	°K	294	294
Post-test Pressure	P_{TS}	mm Hg (abs)	476	580
Post-test Temperature	t_{TS}	°C	21	21
Abs. Post-test Temperature	c	°K	294	294
Final Pressure	P_{TF}	mm Hg (abs)	912	914
Abs.Final Temperature	T_{TF}	°K	293	293
Dilution Factor	DF_T		1.93	1.59
Sample Volume	Vs	L	7.408	9.000

Calculations

$V_S=k_1*V_T*(P_{TS}/T_{TS} - P_{TI}/T_{TI})$

$DF=(P_{TF}/T_{TF})/(P_{TS}/T_{TS} - P_{TI}/T_{TI})$

$k_1 = (273+15.56)/760=0.3799$

$C_{SAT}= DF * C_{SA}$

$C_{COT} = DF * C_{CO}$

CALCULATIONS

Client:	AQMD	Lab No.:
Project No.:	c10562	A 053
Unit Tested:	Facility A	
Sampling Date:	21-May-19	
Date tested:	22-May-19	

Parameter	Symbol	Units	Run #3
Sample ID			Tnk30 - Outlet - R1
Lab ID			A 053 - 03
<u>Sample Tank</u>			
Tank No			30
Sample Tank Volume	V_T	L	12.000
Barometric Pressure	P_b	mm Hg	763
Pre-test Pressure	P_{TI}	mm Hg (abs)	2.00
Pre-test Temperature	t_{TI}	°C	21
Abs. Pre-test Temperature	T_{TI}	°K	294
Post-test Pressure	P_{TS}	mm Hg (abs)	72
Post-test Temperature	t_{TS}	°C	21
Abs. Post-test Temperature	T_{TS}	°K	294
Final Pressure	P_{TF}	mm Hg (abs)	920
Abs.Final Temperature	T_{TF}	°K	293
Dilution Factor	DF_T		13.19
Sample Volume	Vs	L	1.085

Calculations

$V_S=k_1*V_T*(P_{TS}/T_{TS} - P_{TI}/T_{TI})$

$DF=(P_{TF}/T_{TF})/(P_{TS}/T_{TS} - P_{TI}/T_{TI})$

$k_1 = (273+15.56)/760=0.3799$

$C_{SAT}= DF * C_{SA}$

$C_{COT} = DF * C_{CO}$

QA/QC SUMMARY
(Repeat Analysis)

Client Project No.:	c10562	Lab No.:	A 053
Sampling Date:	21-May-19	Analyzed Date:	22-May-19

Run #1

Analyte	Sample ID	Area Count #1	Area Count #2	Area % diff (±20%)	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO2*	A 053 - 01	ND	ND	ND	ND	ND	**ND**	ND
O2*	A 053 - 01	1959779	1985721	-1.32	10.3	10.4	**10.3**	-1.32

Run #2

Analyte	Sample ID	Area Count #1	Area Count #2	Area Count #3	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO2*	A 053 - 02	ND	ND	ND	ND	ND	**ND**	ND
O2 *	A 053 - 02	2420149	2398562	0.89	12.7	12.6	**12.6**	0.90

* - by GC/TCD

$Conc_{CO}$ in tank = $MeanConc_{CO} * DF$

$Conc_{CO2}$ in tank = $MeanConc_{CO2} * DF$

$Conc_{O2}$ in tank = $MeanConc_{O2} * DF$

L# A053

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lab@almegaenv.com
Contact:

PO # ______

Turnaround Time
Standard: ✓ Other: ___
Rush:
Depends on # of Samples
5 - 10 days ___
3 - 7 days ___

Job # 10562 Unit # Various Client: AQMD Facility A Location: [redacted]

Samplers: (Signature)

Unit Information:

Project Manager: NEAL CONROY

Sample Date	Sample Time	Sample Identification	Lab Sample #	Type Of Sample LIQUID	GAS	SOLID	No of Container #	ANALYSIS REQUESTED O2/CO2, 1S.10.1					Return or Dispose REMARKS
5/21/19	1216-1316	Tnk11 - Inlet (I) - R1	A053 -01				1	✓					
↓	1210-1310	Tnk50 - Inlet (O) - R1	-02				1	✓					
↓	1215-1315	Tnk30 - Outlet - R1	-03				1	✓					

Relinquished by: NConroy
Date: 5/21/19 Time 19:15

Received by:
Date: 5/22/19 Time: 5:102

Relinquished by:
Date: Time:

Received by:
Date: Time

Relinquished by:
Date: Time

Received by:
Date: Time:

Relinquished by:
Date: Time:

Received by:
Date: Time

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Almega Environmental- Chain of Custody Form

June 2015 v1.0

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ENVIRONMENTAL

Standard Receipt
Sample LOG in Checklist

Project No: c10562 ~~C10470~~

Method: m10.1

Lab ID: A053

Sampling Date: 5/21, 5/22, 5/23

Location: AQMD -A Int:

Date & Time Rc'd: 5/22/19 9:02 5/23/19 8:42 5/24/19 8:15

Location: LAB Int: DW

Arrived By: (circle) FedEx UPS Drop Off (Int) DS Other

Condition of Package(s): (comment): ok ✓✓ Package Type: Box Cooler Other: /

Number of Sample Container(s): 3, 3, 3, 9 Correct Containers (per Method): [✓ Y] N ✓✓

Preservation: (circle) ICE DryICE ICEPacks [✓ None] ✓✓

Sample Conditions:

Sample Temp (C): 21 ✓✓ Ambient Temp (C): 21 ✓✓

Sample Temp (C): Filter Condition: ok

PH: Components Sealed: [✓ Y] N ✓✓

Sample Recovery Completed On: (date & time)

Recovered In: (circle) [✓ Field] Lab Other ✓✓ Silica Gel Condition:

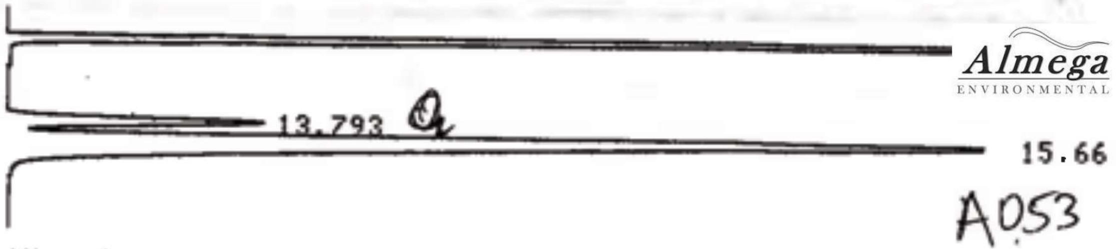
Tedlar Bags -
Condensation: Y N

Comments:

Container(s) Requested: Glass Plastic

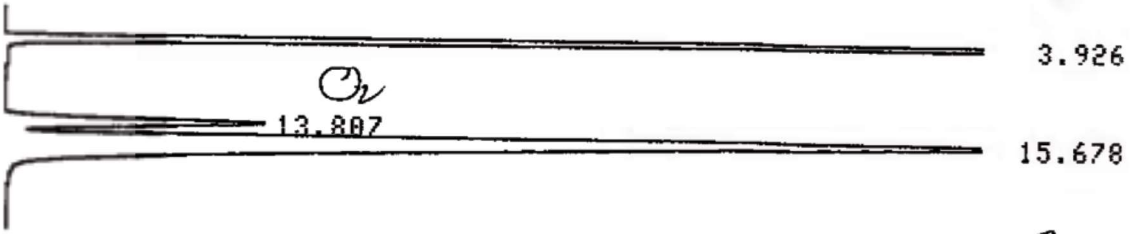
Additional Comments:

CHROMATOGRAM
TEST SAMPLES



A053
-01

```
CHROMATOGRAM   1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1
SAMPLE NO   0                              FILE        0
REPORT NO   135                            METHOD        41

PKNO        TIME         AREA  MK  IDNO       CONC          NAME

   1       3.93     8185348                    35.5692
   2     13.793     1959779                     8.5162
   3      15.66    12867348  V                 55.9147
                  ---------              -------------
          TOTAL    23012474                  100
```



A053
-01

```
CHROMATOGRAM   1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1
SAMPLE NO   0                              FILE        0
REPORT NO   136                            METHOD        41

PKNO        TIME         AREA  MK  IDNO       CONC          NAME




   1      3.926     8169617                    35.2455
   2     13.807     1985721                     8.5668
   3     15.678    13023824  V                 56.1876
                  ---------              -------------
          TOTAL    23179160                  100
```

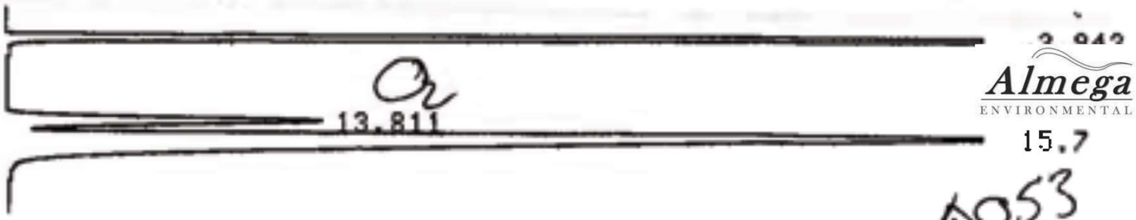
047

223-C

2037-01

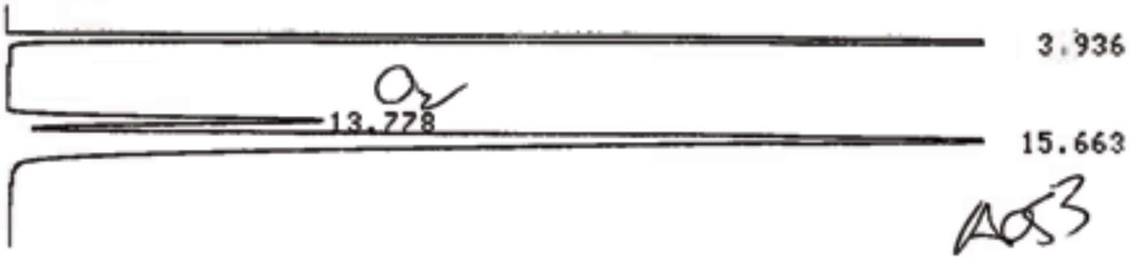
170615

⊕ Shimadzu



A053
-02

```
CHROMATOGRAM   1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                    FILE        0
SAMPLE NO    0                    METHOD        41
REPORT NO    137

PKNO     TIME      AREA  MK  IDNO      CONC        NAME

   1     3.943   8179695               35.2608
   2    13.811   2420149               10.4327
   3    15.7    12597873  V            54.3065
                ---------        ------------
       TOTAL    23197716                100
```

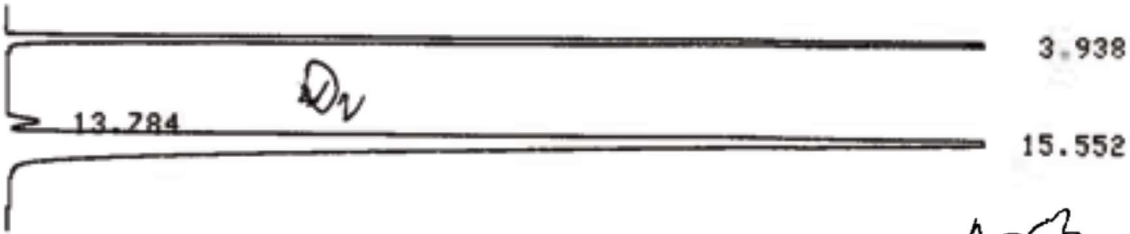


A053
-02
dup

```
CHROMATOGRAM   1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                    FILE        0
SAMPLE NO    0                    METHOD        41
REPORT NO    138

PKNO     TIME      AREA  MK  IDNO      CONC        NAME

   1     3.936   8163036               35.3284
   2    13.778   2398562               10.3806
   3    15.663  12544587  V            54.291
                ---------        ------------
       TOTAL    23106184                100
```

A053
03

```
CHROMATOGRAM   1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                          FILE         0
SAMPLE NO   0                          METHOD         41
REPORT NO   139



PKNO      TIME       AREA  MK  IDNO     CONC        NAME

   1      3.94    7938802                35.2892
   2    13.746     237054                 1.0537
   3    15.508   14320518  V             63.657
                 ---------           ------------
          TOTAL  22496374                100
```



A053
-03
dup

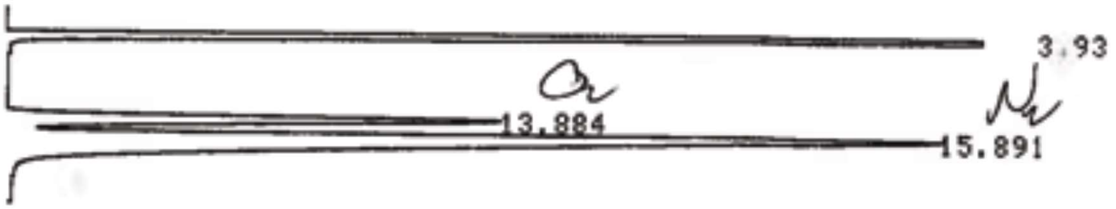
```
CHROMATOGRAM   1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                          FILE         0
SAMPLE NO   0                          METHOD         41
REPORT NO   140

PKNO      TIME       AREA  MK  IDNO     CONC        NAME

   1     3.938    8832626                35.5329
   2    13.784     237504                 1.0506
   3    15.552   14336059  V             63.4165
                 ---------           ------------
          TOTAL  22606188                100
```

043 223-02037-01 170615 ⊕ Shimadzu

QAQC

KZ

044



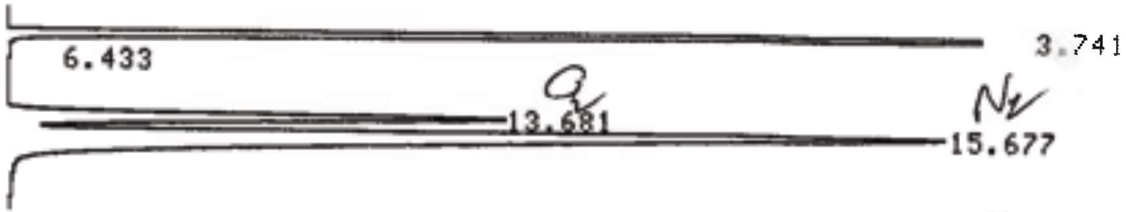
Air

```
CHROMATOGRAM    1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1
SAMPLE NO   0                        FILE        0
REPORT NO   128                      METHOD        41

PKNO      TIME       AREA   MK  IDNO     CONC       NAME

   1      3.93    8306954                  35.2162
   2    13.884    3879077                  16.4448
   3    15.891   11402443   V              48.339
                ---------          -------------
         TOTAL   23588472                100
```

223-02037-01

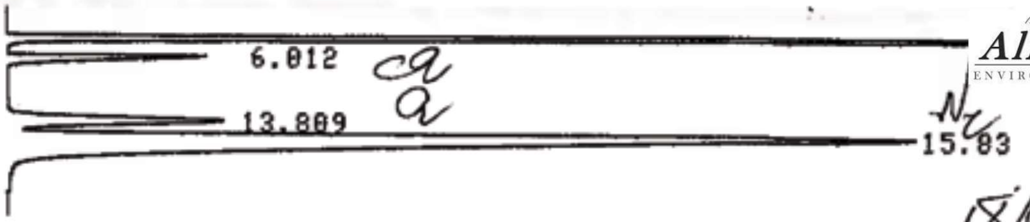
170615

⊕ Shimadzu



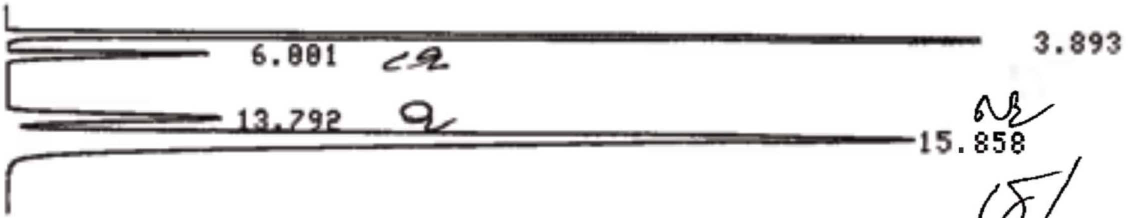
Air

```
CHROMATOGRAM    1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1
SAMPLE NO   0                        FILE        0
REPORT NO   129                      METHOD        41

PKNO      TIME       AREA   MK  IDNO     CONC       NAME

   1     3.741    8290768                  35.221
   2     6.433       7086                   0.0301
   3    13.681    3887198                  16.5137
   4    15.677   11354206   V              48.2352
                ---------          -------------
         TOTAL   23539256                100
```



18/9

```
CHROMATOGRAM   1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                          FILE        0
SAMPLE NO   0                          METHOD        41
REPORT NO   130

PKNO      TIME      AREA  MK  IDNO      CONC        NAME

   1     3.903   6775490                33.5948
   2     6.012    986494                 4.8913
   3    13.809   1654429                 8.2031
   4    15.83   10751828  V             53.3107



               ---------          -------------
       TOTAL   20168240                100
```



18/9

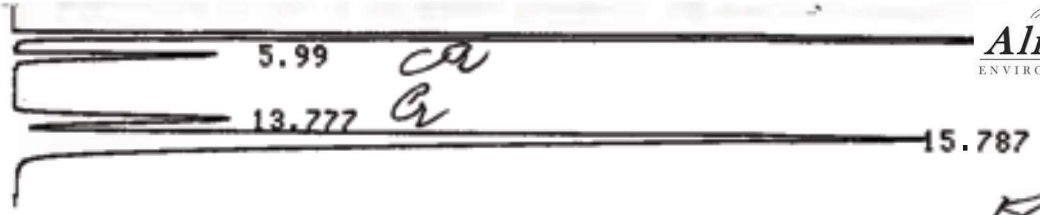
```
CHROMATOGRAM   1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                          FILE        0
SAMPLE NO   0                          METHOD        41
REPORT NO   131

PKNO      TIME      AREA  MK  IDNO      CONC        NAME

   1     3.893   6801136                33.4508
   2     6.001    992409                 4.8811
   3    13.792   1668812                 8.2079
   4    15.858  10869372  V             53.4601
               ---------          -------------
       TOTAL   20331728                100
```

045

223-02037-01

170615

⊕ Shimadzu



18/9

```
CHROMATOGRAM   1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                          FILE        0
SAMPLE NO   0                          METHOD       41
REPORT NO   141

PKNO      TIME        AREA  MK  IDNO      CONC        NAME

   1     3.886   6798158                 33.6424
   2      5.99    993430                  4.9162
   3    13.777   1655096                  8.1907
   4    15.787  10760414  V              53.2507
                ---------          -------------
        TOTAL   20207096                  100
```

TANK PREPARATION

TANK PREPARATIONS

Client:	AQMD	Lab No.:	A 053
Project No.:	c10562		
Unit Tested:	Facility A		
Sampling Date:	21-May-19		
Date pressurized:	22-May-19		

Tank ID	Sample ID	Pre-test pressure mm Hg		Post-test pressure mm Hg	Final Pressure	Comments
		1	2			
11	A 053 - 01	-758	-758	-284	152	Run #1
50	A 053 - 02	-758	-758	-180 *	154	Run #2
30	A 053 - 03	-758	-758	-688	160	Run #3

* - Post -test Pressure is less then 200 mm Hg.

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VOC FIELD DATA SHEET - SCAQMD METHOD 10.1

Facility A
Inlet 1
Inside

Date: 05/21/19
Client: [redacted]
Unit: ~~Inlet Furnace~~
Operator Name: T.TA
Fuel:
Location: [redacted] CA
Inlet 1 · Inside

Test No.: 1
Barometric Pressure (in. Hg): 29.83
Pretest Leak Check:
A: ✓ B:
Post-test Leak check:
A: ✓ B:

SAMPLE A

Tank # 11 Trap # N/A
Control ID:

SAMPLE B

Tank # Trap #
Control ID:

Time 24 Hours	Start Time	Sample A Flow ml/min.	Sample A Vacuum inch Hg	Sample B Flow ml/min.	Sample B Vacuum inch Hg
0	1216	~.10	27.0		
10	1226	↓	24.50		
20	1236		21.0		
30	1246		17.50		
40	1256		13.50		
50	1306 End Time		10.50		
60	1316		8.50		

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VOC FIELD DATA SHEET - SCAQMD METHOD 10.1

Date: 5/21/19
Client: Facility A
Unit: Inlet Outside
Operator Name: MN
Fuel: Stack gas
Location: Inlet outside

Test No.: ____
Barometric Pressure (in. Hg): 29.83
Pretest Leak Check:
A: x B: ____
Post-test Leak check:
A: ✓ B: ____

SAMPLE A SAMPLE B

Time 24 Hours	Start Time	Tank # 50 Trap # 1643 Control ID: ✓		Tank #____ Trap #____ Control ID:	
		Flow ml/min.	Vacuum inch Hg	Flow ml/min.	Vacuum inch Hg
0	1210	3.5	29		
10			25		
20			21		
30			17		
40			14		
50	End Time		12		
60	1310		8		

APPENDIX C5

SCAQMD METHODS 1.1-4.1 – INLET 3 FLOWS

FLOWS DATA AND CALCULATIONS

Plant: AQMD Facility A
City: [redacted] CA
Source: Baghouse
Location: Inlet 3 Flows

Test Date(s): 05/21-23/2019
Operator: NC
Entered by: TG
Checked by: CF

			05/21/19	05/22/19	05/23/19
DATA ENTRY	**Symbol**	**units**	**DATA**	**DATA**	**DATA**
Run Number			Run 1	Run 2	Run 3
Stack Dimensions: Round Stack Diameter	Ds	in.			
Rectangular Stack, Length	L	in.	21	21	21
Width	W	in.	25	25	25
Standard Temperature	Tstd	°F	68	68	68
Average Stack Temperature (measured)	Fs	°F	100.4	72.1	92.7
Standard Pressure	Pstd	in.Hg	29.92	29.92	29.92
Barometric Pressure	Pbar	in.Hg	29.83	29.83	29.62
Stack Static Pressure	Pg	in.WC	5.7	-13.0	-13.0
Average RMS Velocity Head (Delta-P)	dP	in.WC	0.857	0.841	0.912
Pitot Coefficient	Cp	—	0.84	0.84	0.84
Stack Gas: Oxygen Content *	O2,m	%	20.9	20.9	20.9
Carbon Dioxide Content *	CO2,m	%	0.04	0.04	0.04
CALCULATED DATA					
Stack Area (round): As = pi/576*ds^2 (rectangular): As = L*W/144	As	sq.ft.	3.65	3.65	3.65
Absolute Stack Temperature: Ts = Fs+460	Ts	°R	560.4	532.1	552.7
Standard Temperature: Tstdr = Tstd+460	Tstdr	°R	528.0	528.0	528.0
Moisture Fraction: Bws = VwStd/(VmStd+VwStd)	Bws	—	0.020	0.020	0.020
Stack Gas MW, Dry Basis: Md = 0.32*O2,m + 0.44*CO2,m + 0.28*(100-O2,m-CO2,m)	Md	g/mole	28.84	28.84	28.84
Stack Gas MW, Wet Basis: Mw = Md*(1-Bws) + 18*Bws	Mw	g/mole	28.63	28.63	28.63
Stack Pressure: Ps = Pbar + Pg/13.6	Ps	in.Hg	30.25	28.87	28.66
Stack Gas Velocity, measured					
vs = 85.49*Cp*√(dP*Ts/Ps/Mw)	vs	ft/s	53.49	52.84	56.27
vm = 0.3048 m/ft*vs	vsm	m/s	16.30	16.10	17.15
Stack Gas Volumetric Flow Rate: Q = 60*vs*As	Q	acfm	11,701	11,558	12,310
Stack Gas Volumetric Flow Rate, corrected:					
Qsd = Q*(1-Bws)*(Ps/Ts)*(Tstdr/Pstd)	Qsd	dscfm	10,923	10,846	11,041
Qsdm = Qsd/35.315	Qsdm	dscmm	309.3	307.1	312.7

* Ambient level O2/CO2 was used for gas density calculations.

FLOWS DATA AND CALCULATIONS

Plant:	AQMD Facility A	Run No.:	1
City:	[redacted] CA	Test Date:	05/21/19
Source:	Baghouse		
Location:	Inlet 3 Flows		

	Stack Temp (°F)		Velocity Head (in.WC)	
point	Fs	sqrt (Fs)	dP	sqrt (dP)
A-8	100.0	10.0	2.44	1.56
7	99.8	10.0	2.63	1.62
6	99.8	10.0	2.46	1.57
5	99.4	10.0	2.39	1.55
4	99.4	10.0	2.33	1.53
3	99.4	10.0	2.45	1.57
2	99.7	10.0	2.35	1.53
1	100.7	10.0	2.41	1.55
B-8	100.6	10.0	0.63	0.79
7	101.1	10.1	1.02	1.01
6	101.2	10.1	0.97	0.98
5	101.3	10.1	1.12	1.06
4	100.9	10.0	1.11	1.05
3	101.3	10.1	1.01	1.00
2	101.3	10.1	1.07	1.03
1	101.2	10.1	0.860	0.93
C-8	100.3	10.0	0.070	0.26
7	100.5	10.0	0.140	0.37
6	100.3	10.0	0.100	0.32
5	100.2	10.0	0.020	0.14
4	100.4	10.0	0.020	0.14
3	100.5	10.0	0.020	0.14
2	100.6	10.0	0.040	0.20
1	100.4	10.0	0.090	0.30
Average:	**100.4**		**0.8573**	**0.926**

FLOWS DATA AND CALCULATIONS

Plant: AQMD Facility A
City: [redacted], CA
Source: Baghouse
Location: Inlet 3 Flows

Run No.: 2
Test Date: 05/22/19

	Stack Temp (°F)		Velocity Head (in.WC)	
point	Fs	sqrt (Fs)	dP	sqrt (dP)
A-1	72.4	8.5	1.97	1.40
2	72.3	8.5	2.40	1.55
3	72.3	8.5	2.26	1.50
4	71.7	8.5	2.22	1.49
5	76.1	8.7	2.24	1.50
6	69.9	8.4	2.29	1.51
7	69.2	8.3	2.30	1.52
8	68.5	8.3	2.35	1.53
B-1	71.9	8.5	0.74	0.86
2	72.3	8.5	0.97	0.98
3	72.3	8.5	0.95	0.97
4	72.4	8.5	0.94	0.97
5	72.9	8.5	1.21	1.10
6	72.6	8.5	1.20	1.10
7	72.4	8.5	1.12	1.06
8	72.3	8.5	0.84	0.92
C-1	72.9	8.5	0.09	0.30
2	72.6	8.5	0.03	0.17
3	72.5	8.5	0.025	0.16
4	73.3	8.6	0.03	0.17
5	72.3	8.5	0.03	0.17
6	72.1	8.5	0.08	0.28
7	72.1	8.5	0.19	0.44
8	72.2	8.5	0.12	0.35
Average:	**72.1**		**0.8409**	

FLOWS DATA AND CALCULATIONS

Plant:	AQMD Facility A	Run No.:	3
City:	[redacted] CA	Test Date:	05/23/19
Source:	Baghouse		
Location:	Inlet 3 Flows		

	Stack Temp (°F)		Velocity Head (in.WC)	
point	Fs	sqrt (Fs)	dP	sqrt (dP)
A-1	93.4	9.7	2.05	1.43
2	93.8	9.7	2.09	1.45
3	93.7	9.7	2.82	1.68
4	94.2	9.7	2.63	1.62
5	95.1	9.8	2.60	1.61
6	94.9	9.7	2.34	1.53
7	94.9	9.7	2.42	1.56
8	94.4	9.7	2.40	1.55
B-1	94.4	9.7	1.01	1.00
2	94.5	9.7	1.26	1.12
3	93.3	9.7	1.17	1.08
4	92.7	9.6	1.20	1.10
5	92.6	9.6	1.19	1.09
6	92.3	9.6	1.11	1.05
7	92.0	9.6	1.15	1.07
8	91.8	9.6	0.88	0.94
C-1	90.7	9.5	0.16	0.40
2	91.0	9.5	0.11	0.33
3	91.0	9.5	0.05	0.22
4	90.9	9.5	0.04	0.20
5	90.7	9.5	0.03	0.17
6	90.6	9.5	0.03	0.17
7	90.7	9.5	0.08	0.28
8	90.6	9.5	0.06	0.24
Average:	**92.7**		**0.912**	

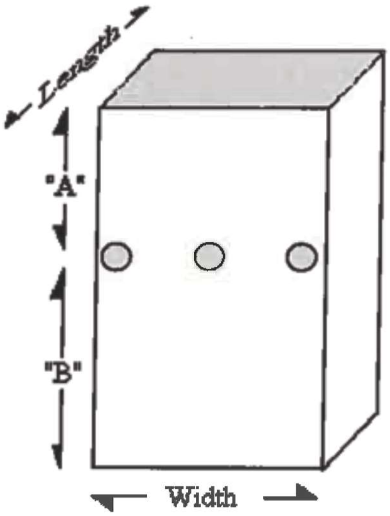
Method 1 Rectangular Stack

Width	Length	"A" Distance	"B" Distance	# of Ports	# of Points	# of Points/Port
25.0	21.0	>12.0	>46.0	3	24	8

Equivalent Diameter =	22.8
"A" Equivalent:	0.53
"B" Equivalent:	2.02

Port Distance
0

	Port Corrected
1	1.31
2	3.94
3	6.56
4	9.19
5	11.81
6	14.44
7	17.06
8	19.69
9	
10	



Traverse Points:	3	4	5	6	8	10
1	1.31	1.31	1.31	1.31	1.31	1.31
2	3.94	3.94	3.94	3.94	3.94	3.94
3	6.56	6.56	6.56	6.56	6.56	6.56
4		9.19	9.19	9.19	9.19	9.19
5			11.81	11.81	11.81	11.81
6				14.44	14.44	14.44
7					17.06	17.06
8					19.69	19.69
9						22.31
10						24.94

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SCAQMD METHODS 2-4

Run # : 1
Date : 5/22/19
Client :
Unit : Inlet 3
Operator :
Stack Dia :
Amb. Press :
Static Press : 5.7

Pitot ID :
Pitot Coeff. :
Meter Box # :
Meter @ Dh :
Meter Y :
TC # :
Start Time :
Stop Time :

Impinger	Initial	Final	Net
Water 1 :			
Water 2 :			
Blank :			
Sil. Gel :			

H2O Gain =

Pressure Type/Range

Pitot Leak Check		
Initial :		
Final :		

Meter Box Leak Check

	Rate	"HG
Initial :		
Final :		

							Sample	Port 1 :		Port 2 : Cyclonic		Pitot ID:	
Time (Minute)	Meter Volume (acf)	Pump Vac (inch Hg)	Meter Temperatures Inlet (F)	Outlet (F)	Set Delta H (Inch H2O)	Impinger Temp. (F)	Point #	Delta P ("H2O)	Stack Temp. (F)	Delta P ("H2O)	Stack Temp. (F)	Cyclonic Flow ("H2O)	TE Cooler Temp. (F)
							1	2.44	100.0		6		
							2	2.63	99.8		6		
							3	2.46	99.8		7		
							4	2.39	99.4		4		
							5	2.33	99.4		3		
							6	2.45	99.4		2		
							7	2.35	99.7		4		
							8	2.41	100.7		3		
							1	0.63	100.6		-2		
							2	1.02	101.1		-1		
							3	0.97	101.2		-2		
							4	1.17	101.3		-4		
							5	1.11	100.9		-2		
							6	1.01	101.3		-1		
							7	1.07	101.3		1		
							8	0.86	101.2		0		
							1	.07	100.3		-10		
							2	.14	100.5		-8		
							3	.10	100.3		10		
							4	.02	100.2		6		
							5	.02	100.4		6		
							6	.02	100.5		6		
							7	.04	100.6		0		
							8	.09	100.4		0		

STATIC
5.7

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NOZZLE CALIBRATION FORM

NOZZLE ID #:

CLIENT:

CALIPER ID:

DATE:

CALIBRATOR:

LOCATION:

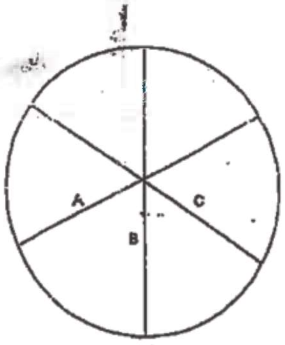
SIGNATURE:

Measured Diameter A: ________________ inch

Measured Diameter B: ________________ inch

Measured Diameter C: ________________ inch

Average: ________________ inch



Inside Diameter

Is the Nozzle Free from Nicks, Dents, or Corrosion?

Yes________

No________

If "No", please describe deviations below:

Nozzle Deviations (if any):

				CYL.
A	8	2.44	100.0	6
	7	2.63	99.8	6
	6	2.46	99.8	7
	5	2.39	99.4	4
	4	2.38	99.4	3
	3	2.45	99.4	2
	2	2.35	99.7	4
	1	2.41	100.7	3
B	8	0.63	100.6	-2
	7	1.02	101.1	-1
	6	0.97	101.2	-2
	5	1.12	101.3	-4
	4	1.11	100.9	-2
	3	1.01	101.3	-1
	2	1.07	101.3	1
	1	0.86	101.2	0
C	8	0.07	100.3	-10
	7	0.14	100.5	-8
	6	0.10	100.3	10
	5	0.02	100.2	0
	4	0.02	100.4	0
	3	0.02	100.5	0
	2	0.04	100.6	0
	1	0.09	100.4	0

SCAQMD METHODS 2-4

Run # :	Run 2	Pitot ID :	
Date :	5/22/19	Pitot Coeff. :	
Client :		Meter Box # :	
Unit :	Inlet 3	Meter @ Dh :	
Operator :		Meter Y :	
Stack Dia :		TC # :	
Amb. Press :		Start Time :	
Static Press :	5.7	Stop Time :	

Impinger	Initial	Final	Net
Water 1 :			
Water 2 :			
Blank :			
Sil. Gel :			

H2O Gain =

Pressure Type/Range

Pitot Leak Check

Initial :		
Final :		

Meter Box Leak Check

	Rate	"HG
Initial :		
Final :		

			Meter Temperatures				Sample	Port 1 :		Port 2 :		Pitot ID:	
Time (Minute)	Meter Volume (acf)	Pump Vac (Inch Hg)	Inlet (F)	Outlet (F)	Set Delta H (Inch H2O)	Impinger Temp. (F)	Point #	Delta P ("H2O)	Stack Temp. (F)	Delta P ("H2O)	Stack Temp. (F)	Cyclonic Flow ("H2O)	TE Cooler Temp. (F)
							1	1.97	72.4				
							2	2.40	72.3				
							3	2.26	72.3				
							4	2.22	71.7				
							5	2.24	70.1				
							6	2.29	69.9				
							7	2.3	69.2				
							8	2.35	68.5				
							1	.74	71.9				
							2	.97	72.3				
							3	.95	72.3				
							4	.94	72.4				
							5	1.21	72.9				
							6	1.2	72.6				
							7	1.12	72.4				
							8	.84	72.3				
							1	.09	72.9				
							2	.03	72.6				
							3	.025	72.5				
							4	.03	73.3				
							5	.03	72.3				
							6	.08	72.1				
							7	.19	72.1				
							8	.12	72.2				

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SCAQMD METHODS 2-4

Run # : 3
Date : 5/23/19
Client :
Unit : Inlet 3
Operator :
Stack Dia :
Amb. Press :
Static Press : 5.7

Pitot ID :
Pitot Coeff. :
Meter Box # :
Meter @ Dh :
Meter Y :
TC # :
Start Time :
Stop Time :

Impinger	Initial	Final	Net
Water 1 :			
Water 2 :			
Blank :			
Sil. Gel :			

H2O Gain =

Pressure Type/Range

Pitot Leak Check

Initial :		
Final :		

Meter Box Leak Check

	Rate	"HG
Initial :		
Final :		

							Sample	Port 1 :		Port 2 :		Pitot ID:	
Time (Minute)	Meter Volume (acf)	Pump Vac (Inch Hg)	Meter Temperatures Inlet (F)	Outlet (F)	Set Delta H (Inch H2O)	Impinger Temp. (F)	Point #	Delta P ("H2O)	Stack Temp. (F)	Delta P ("H2O)	Stack Temp. (F)	Cyclonic Flow ("H2O)	TE Cooler Temp. (F)
							1	2.65	93.4				
							2	2.94	93.8				
							3	2.82	93.7				
							4	2.63	94.2				
							5	2.60	95.1				
							6	2.34	94.5				
							7	2.42	94.9				
							8	2.40	94.4				
							1	1.01	94.4				
							2	1.26	94.5				
							3	1.17	93.7				
							4	1.20	92.7				
							5	1.19	92.6				
							6	1.11	92.3				
							7	1.15	92				
							8	.88	91.8				
							1	.16	90.7				
							2	.11	91				
							3	.05	91				
							4	.04	90.9				
							5	.03	90.7				
							6	.03	90.6				
							7	.08	90.7				
							8	.06	90.6				

APPENDIX C5

PRE–FLOWS FOR
EXHAUST FLOW ISOKINETIC CALCULATIONS

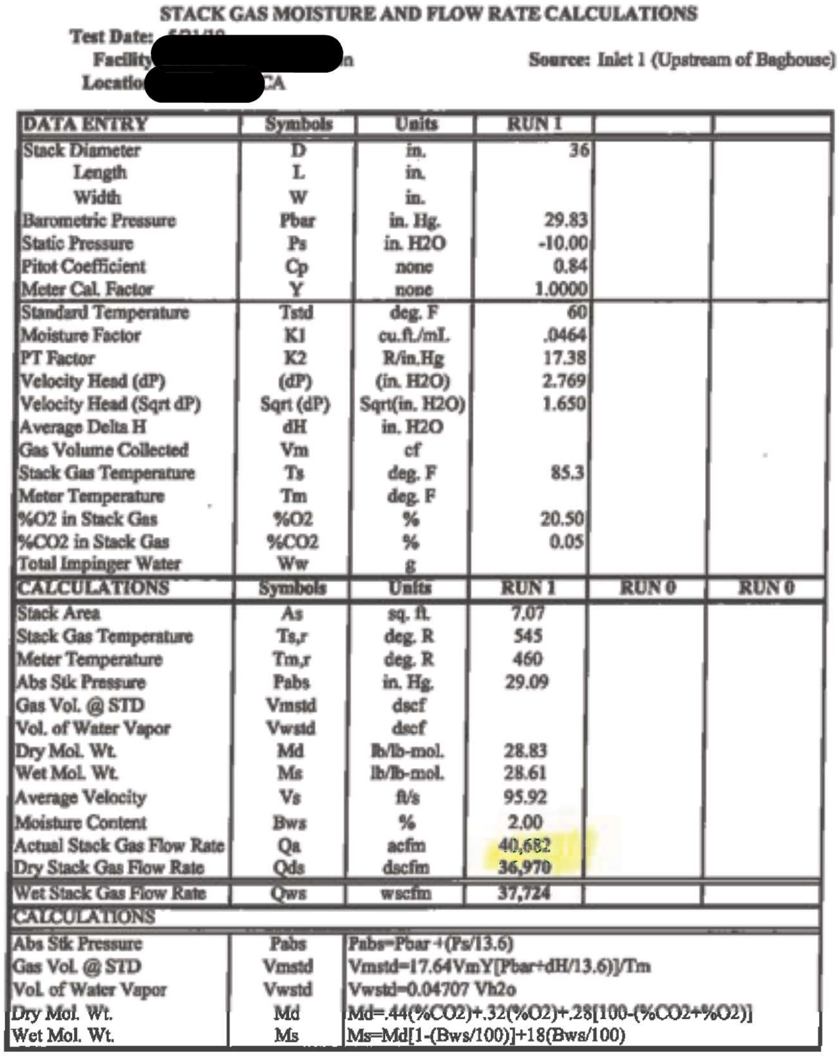
RUN 1

Baghouse Outlet Differential Pressure Calculation

5/21/2019

	Symbol	Unit	Value	Formula
Calculation on Inlet Baghouse Velocity				
Inlet 1 (Upstream of Baghouse)	In 1	acfm	40,682	- -
Inlet 2	In 2	acfm	11,665	- -
Inlet - HEPA Baghouse	In_{Bag}	acfm	52,347	In_{Bag} = In 1 + In 2
Area - HEPA Baghouse *	A_{Bag}	in^2	14168	
Velocity - HEPA Baghouse	Vel_{Bag}	ft/sec	8.867	Vel_{Bag} = $Inlet_{Bag}$ (acfm) * (144 in^2/ft^2) * (min/60 sec) * (1/A_{Bag} in^2)
Calcualtion of Wet Stack Gas Molecular Weight				
Dry Stack Gas Molecular Weight where, O2 = 20.5%; CO2 = 0.05%; CO = 0 ppm; N2 = 79.05 %	MW_{dry}	lb/lb-mole	28.72	MW_{dry} = 0.44*CO_2%+0.32*O_2%+0.28*COppm+0.28*N_2%
Moisture	Moist	% H_20	2	Assumed Saturated Moisture
Dry Mole Fraction	$Mole_{Fract}$	decimal	0.98	$Mole_{Fract}$ = (1-{Moist/100})
Wet Stack Gas Molecular Weight	MW_{wet}	lb/lb-mole	28.506	MW_{wet} = MW_{dry} * $Mole_{Fract}$ + (18 * {Moist/100})
Calculation on Inlet Baghouse Pressure				
Velocity - HEPA Baghouse	VelBag	ft/sec	8.867	see above
Stack Temperature	T_{Stk}	°F	72	- -
Absolute Stack Pressure	P_{Abs}	in Hg	29.83	- -
Wet Stack Gas Molecular Weight	MW_{wet}	lb/lb-mole	28.506	see above
Pitot Correlation Coeffieicent	C_p	- -	0.84	- -
Conversion Factor	C_{fact}	- -	85.49	
Differential Pressure	P_{Delta}	**in H_20**	**0.0245**	P_{Delta} = [Vel_{Bag} * 1/C_p * 1/C_{fact} * 1/{(T_{Stk}+460)/(P_{Abs}*MW_{wet})}^0.5]^2

* See next page.



STACK GAS MOISTURE AND FLOW RATE CALCULATIONS

Test Date: [redacted]
Facility [redacted]n
Locatio[redacted]CA

Source: Inlet 1 (Upstream of Baghouse)

DATA ENTRY	Symbols	Units	RUN 1		
Stack Diameter	D	in.	36		
Length	L	in.			
Width	W	in.			
Barometric Pressure	Pbar	in. Hg.	29.83		
Static Pressure	Ps	in. H2O	-10.00		
Pitot Coefficient	Cp	none	0.84		
Meter Cal. Factor	Y	none	1.0000		
Standard Temperature	Tstd	deg. F	60		
Moisture Factor	K1	cu.ft./mL.	.0464		
PT Factor	K2	R/in.Hg	17.38		
Velocity Head (dP)	(dP)	(in. H2O)	2.769		
Velocity Head (Sqrt dP)	Sqrt (dP)	Sqrt(in. H2O)	1.650		
Average Delta H	dH	in. H2O			
Gas Volume Collected	Vm	cf			
Stack Gas Temperature	Ts	deg. F	85.3		
Meter Temperature	Tm	deg. F			
%O2 in Stack Gas	%O2	%	20.50		
%CO2 in Stack Gas	%CO2	%	0.05		
Total Impinger Water	Ww	g			
CALCULATIONS	**Symbols**	**Units**	**RUN 1**	**RUN 0**	**RUN 0**
Stack Area	As	sq. ft.	7.07		
Stack Gas Temperature	Ts,r	deg. R	545		
Meter Temperature	Tm,r	deg. R	460		
Abs Stk Pressure	Pabs	in. Hg.	29.09		
Gas Vol. @ STD	Vmstd	dscf			
Vol. of Water Vapor	Vwstd	dscf			
Dry Mol. Wt.	Md	lb/lb-mol.	28.83		
Wet Mol. Wt.	Ms	lb/lb-mol.	28.61		
Average Velocity	Vs	ft/s	95.92		
Moisture Content	Bws	%	2.00		
Actual Stack Gas Flow Rate	Qa	acfm	40,682		
Dry Stack Gas Flow Rate	Qds	dscfm	36,970		
Wet Stack Gas Flow Rate	Qws	wscfm	37,724		

CALCULATIONS		
Abs Stk Pressure	Pabs	Pabs=Pbar+(Ps/13.6)
Gas Vol. @ STD	Vmstd	Vmstd=17.64VmY[Pbar+dH/13.6)]/Tm
Vol. of Water Vapor	Vwstd	Vwstd=0.04707 Vh2o
Dry Mol. Wt.	Md	Md=.44(%CO2)+.32(%O2)+.28[100-(%CO2+%O2)]
Wet Mol. Wt.	Ms	Ms=Md[1-(Bws/100)]+18(Bws/100)

STACK GAS MOISTURE AND FLOW RATE CALC

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Facility: [redacted]
Location: [redacted] CA

Source: Inlet 1 (Upstream of Baghouse)

	RUN 1			
Point	dP (in. H2O)	Ts (deg F)	SQRT (dP)	Qda (dscfm)
Avg	2.769	85.3	1.6504	36,970
12	2.40	90	1.5492	34,555
11	3.20	91	1.7889	39,865
10	3.50	92	1.8708	41,654
9	3.60	90	1.8974	42,322
8	3.30	90	1.8166	40,520
7	2.90	90	1.7029	37,985
6	2.40	90	1.5492	34,555
5	2.80	90	1.6733	37,324
4	2.60	89	1.6125	35,999
3	1.80	87	1.3416	30,008
2	1.90	88	1.3784	30,802
1	2.90	88	1.7029	38,054
12	2.6	81	1.6125	36,264
11	3.3	81	1.8166	40,855
10	3.7	81	1.9235	43,261
9	3.5	81	1.8708	42,075
8	3.35	81	1.8303	41,164
7	2.9	81	1.7029	38,299
6	3.1	81	1.7607	39,598
5	2.4	81	1.5492	34,842
4	2.1	81	1.4491	32,591
3	2.1	81	1.4491	32,591
2	3.1	81	1.7607	39,598
1	1	81	1.0000	22,490

	Orifice dH	Meter Temp. Inlet	Meter Temp. Outlet	DGM Volume	Moist. Collect.	
	#DIV/0!	Avg:	#DIV/0!	0.000	0.0	Net:
10						Initial
20						Final
30						Initial
40						Final
50						Initial
60						Final
70						Initial
80						Final
90						

dP (in. H2O)	Ts (deg F)	SQRT (dP)	Qds (dscfm)
		#DIV/0!	

Orifice dH	Meter Temp. Inlet	Meter Temp. Outlet	DGM Volume	Moist. Collect.	
#DIV/0!	Avg:	#DIV/0!	0.000	0.0	Net:
					Initial
					Final
					Initial
					Final
					Initial
					Final
					Initial
					Final

dP (in. H2O)

Orifice dH
#DIV/0!

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SCAQMD METHODS 2-4

Almega ENVIRONMENTAL

Run # : Flow
Date : 5/20/19
Client : ScaqmD A
Unit : Inlet outlet
Operator : MN
Stack Dia :
Amb. Press : 29.8
Static Press : -10

Pitot ID : 3.4
Pitot Coeff. : 0.84
Meter Box # : ~~MB~~A-8
Meter @ Dh :
Meter Y :
TC # :
Start Time :
Stop Time :

Impinger	Initial	Final	Net
Water 1 :			
Water 2 :			
Blank :			
Sil. Gel :			

H2O Gain =

Pressure Type/Range

Pitot Leak Check		
Initial :		
Final :		

Meter Box Leak Check	Rate	"HG
Initial :		
Final :		

							Sample	Port 1 : A		Port 2 : B		Pitot ID:	
Time (Minute)	Meter Volume (acf)	Pump Vac (Inch Hg)	Meter Temperatures Inlet (F)	Outlet (F)	Set Delta H (Inch H2O)	Impinger Temp. (F)	Point #	Delta P ("H2O)	Stack Temp. (F)	Delta P ("H2O)	Stack Temp. (F)	Cyclonic Flow ("H2O)	TE Cooler Temp. (F)
A 12							A 12	2.4	90			-5	
							11	3.2	91			-6	
							10	3.5	92			-7	
							9	3.6	90			-6	
							8	3.3	90			-5	
							7	2.9	90			0	
				5/20/19			6	2.4	90			-7	
							5	2.8	90			+4	
							4	2.6	89			-6	
							3	1.8	87			-3	
							2	1.9	88			-5	
							1	1.9	88			+4	
							12	2.6	81				
				5/21/19			11	3.3	81				
							10	3.7	81				
							9	3.5	81				
							8	3.35	81				
							7	2.9	81				
							6	3.1	81				
							5	2.4	81				
							4	2.1	81				
							3	2.1	81				
							2	3.1	81				
							1	2.5	81				

STACK GAS MOISTURE AND FLOW RATE CALCULATIONS

Test Date: [redacted]
Facility: [redacted]
Location: [redacted] CA

Source: Inlet 2

DATA ENTRY	Symbols	Units	RUN 1		
Stack Diameter	D	in.			
Length	L	in.	21		
Width	W	in.	25		
Barometric Pressure	Pbar	in. Hg.	29.83		
Static Pressure	Ps	in. H2O	5.70		
Pitot Coefficient	Cp	none	0.84		
Meter Cal. Factor	Y	none	1.0000		
Standard Temperature	Tstd	deg. F	60		
Moisture Factor	K1	cu.ft./mL	.0464		
PT Factor	K2	R/in.Hg	17.38		
Velocity Head (dP)	(dP)	(in. H2O)	1.156		
Velocity Head (Sqrt dP)	Sqrt (dP)	Sqrt(in. H2O)	0.926		
Average Delta H	dH	in. H2O			
Gas Volume Collected	Vm	cf			
Stack Gas Temperature	Ts	deg. F	96.7		
Meter Temperature	Tm	deg. F			
%O2 in Stack Gas	%O2	%	20.50		
%CO2 in Stack Gas	%CO2	%	0.05		
Total Impinger Water	Ww	g	0.0		
CALCULATIONS	**Symbols**	**Units**	**RUN 1**		
Stack Area	As	sq. ft.	3.65		
Stack Gas Temperature	Ts,r	deg. R	557		
Meter Temperature	Tm,r	deg. R	460		
Abs Stk Pressure	Pabs	in. Hg.	30.25		
Gas Vol. @ STD	Vmstd	dscf			
Vol. of Water Vapor	Vwstd	dscf			
Dry Mol. Wt.	Md	lb/lb-mol.	28.83		
Wet Mol. Wt.	Ms	lb/lb-mol.	28.61		
Average Velocity	Vs	ft/s	53.33		
Moisture Content	Bws	%	2.00		
Actual Stack Gas Flow Rate	Qa	acfm	11,665		
Dry Stack Gas Flow Rate	Qds	dscfm	10,830		
Wet Stack Gas Flow Rate	Qws	wscfm	11,051		

CALCULATIONS		
Abs Stk Pressure	Pabs	Pabs=Pbar +(Ps/13.6)
Gas Vol. @ STD	Vmstd	Vmstd=17.64VmY[Pbar+dH/13.6)]/Tm
Vol. of Water Vapor	Vwstd	Vwstd=0.04707 Vh2o
Dry Mol. Wt.	Md	Md=.44(%CO2)+.32(%O2)+.28[100-(%CO2+%O2)]
Wet Mol. Wt.	Ms	Ms=Md[1-(Bws/100)]+18(Bws/100)

STACK GAS MOISTURE AND FLOW RATE CALCULATIONS

Facility: [redacted]
Location: [redacted] CA

Source: Inlet 2

Test Date: 5/21/19

Point	dP (in. H2O)	Ts (deg F)	SQRT (dP)	Qds (dscfm)
	RUN 1			
Avg	1.156	96.7	.9259	10,830
8	2.44	100.0	1.5620	18,160
7	2.63	99.8	1.6217	18,857
6	2.46	99.8	1.5684	18,237
5	2.39	99.4	1.5460	17,982
4	2.33	99.4	1.5264	17,755
3	2.45	99.4	1.5652	18,207
2	2.35	99.7	1.5330	17,826
1	2.41	10.7	1.5524	19,685
8	0.63	100.6	.7937	9,223
7	1.02	101.1	1.0100	11,730
6	0.97	101.2	.9849	11,438
5	1.12	101.3	1.0583	12,289
4	1.11	100.9	1.0536	12,238
3	1.01	101.3	1.0050	11,670
2	1.07	101.3	1.0344	12,012
1	0.86	101.2	.9274	10,769
8	0.07	100.3	.2646	3,075
7	0.14	100.5	.3742	4,348
6	0.1	100.3	.3162	3,675
5	0.02	100.2	.1414	1,644
4	0.02	100.4	.1414	1,644
3	0.02	100.5	.1414	1,643
2	0.04	100.6	.2000	2,324
1	0.09	100.4	.3000	3,486

	Orifice dH	Meter Temp. Inlet	Meter Temp. Outlet	DGM Volume	Moist. Collect.	
	#DIV/0!	Avg:	#DIV/0!	0.000	0.0	Net:
10						Initial
20						Final
30						Initial
40						Final
50						Initial
60						Final
70						Initial
80						Final
90						

dP (in. H2O)	Ts (deg F)	SQRT (dP)	Qds (dscfm)
		#DIV/0!	#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!

Orifice dH	Meter Temp. Inlet	Meter Temp. Outlet	DGM Volume	Moist. Collect.	
#DIV/0!	Avg:	#DIV/0!	0.000	0.0	Net:
					Initial
					Final
					Initial
					Final
					Initial
					Final
					Initial
					Final

dP (in. H2O)	Ts (deg F)	SQRT (dP)	Qds (dscfm)
		#DIV/0!	#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!

Orifice dH	Meter Temp. Inlet	Meter Temp. Outlet	DGM Volume	Moist. Collect.	
#DIV/0!	Avg:	#DIV/0!	0.000	0.0	Net:
					Initial
					Final
					Initial
					Final
					Initial
					Final
					Initial
					Final

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APPENDIX C5

PRE–FLOWS FOR
EXHAUST FLOW ISOKINETIC CALCULATIONS

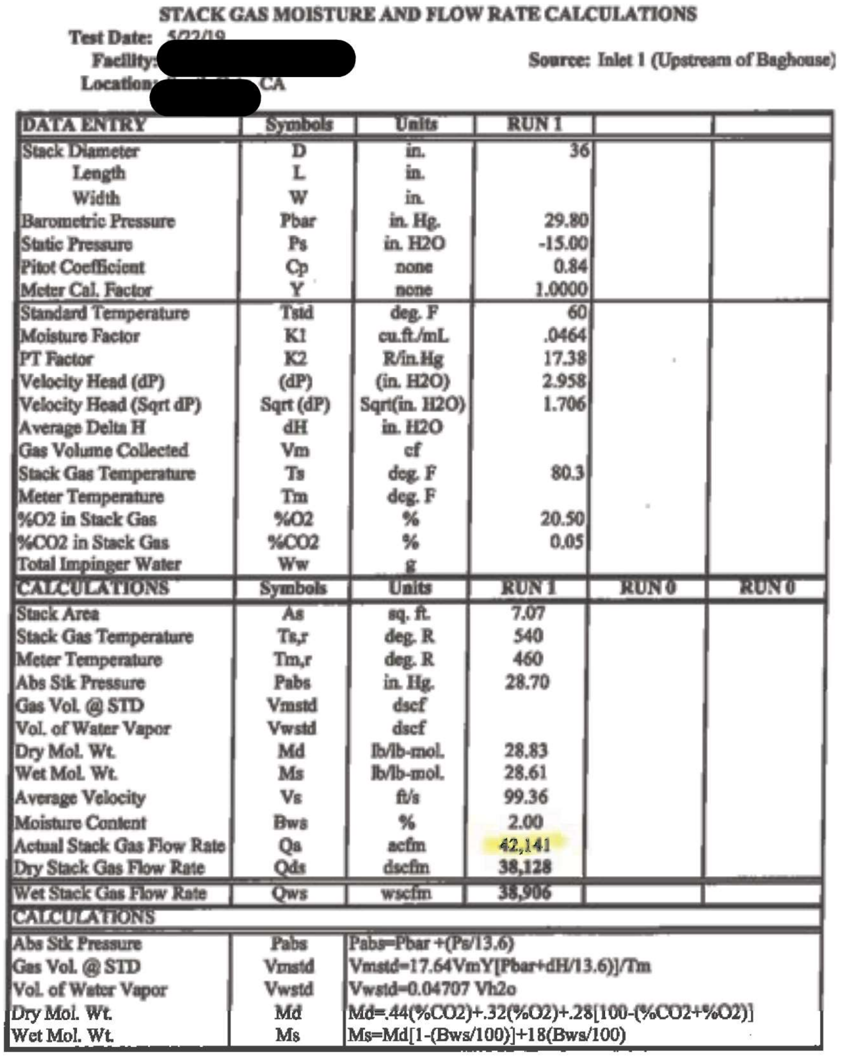
RUN 2

Baghouse Outlet Differential Pressure Calculation

5/22/2019

	Symbol	Unit	Value	Formula
Calculation on Inlet Baghouse Velocity				
Inlet 1 (Upstream of Baghouse)	In 1	acfm	42,141	--
Inlet 2	In 2	acfm	11,301	--
Inlet - HEPA Baghouse	In_{Bag}	acfm	53,442	In_{Bag} = In 1 + In 2
Area - HEPA Baghouse *	A_{Bag}	in^2	14168	
Velocity - HEPA Baghouse	Vel_{Bag}	ft/sec	9.053	$Vel_{Bag} = Inlet_{Bag}$ (acfm) * (144 in^2/ft^2) * (min/60 sec) * (1/A_{Bag} in^2)
Calcualtion of Wet Stack Gas Molecular Weight				
Dry Stack Gas Molecular Weight	MW_{dry}	lb/lb-mole	28.72	$MW_{dry} = 0.44*CO_2\%+0.32*O_2\%+0.28*COppm+0.28*N_2\%$
where, O2 = 20.5%; CO2 = 0.05%; CO = 0 ppm; N2 = 79.05 %				
Moisture	Moist	% H_2O	2	Assumed Saturated Moisture
Dry Mole Fraction	$Mole_{Fract}$	decimal	0.98	$Mole_{Fract}$ = (1-{Moist/100})
Wet Stack Gas Molecular Weight	MW_{wet}	lb/lb-mole	28.506	$MW_{wet} = MW_{dry} * Mole_{Fract}$ + (18 * {Moist/100})
Calculation on Inlet Baghouse Pressure				
Velocity - HEPA Baghouse	VelBag	ft/sec	9.053	see above
Stack Temperature	T_{Stk}	°F	75	--
Absolute Stack Pressure	P_{Abs}	in Hg	29.8	--
Wet Stack Gas Molecular Weight	MW_{wet}	lb/lb-mole	28.506	see above
Pitot Correlation Coeffieicent	C_p	--	0.84	--
Conversion Factor	C_{fact}	--	85.49	
Differential Pressure	**P_{Delta}**	**in H_2O**	**0.0256**	P_{Delta} = [Vel_{Bag} * 1/C_p * 1/C_{fact} * 1/{(T_{Stk}+460)/(P_{Abs}*MW_{wet})}^0.5]^2

* See next page.



STACK GAS MOISTURE AND FLOW RATE CALCULATIONS

Test Date: 5/22/19
Facility: [redacted]
Location: [redacted] CA
Source: Inlet 1 (Upstream of Baghouse)

DATA ENTRY	Symbols	Units	RUN 1		
Stack Diameter	D	in.	36		
Length	L	in.			
Width	W	in.			
Barometric Pressure	Pbar	in. Hg.	29.80		
Static Pressure	Ps	in. H2O	-15.00		
Pitot Coefficient	Cp	none	0.84		
Meter Cal. Factor	Y	none	1.0000		
Standard Temperature	Tstd	deg. F	60		
Moisture Factor	K1	cu.ft./mL	.0464		
PT Factor	K2	R/in.Hg	17.38		
Velocity Head (dP)	(dP)	(in. H2O)	2.958		
Velocity Head (Sqrt dP)	Sqrt (dP)	Sqrt(in. H2O)	1.706		
Average Delta H	dH	in. H2O			
Gas Volume Collected	Vm	cf			
Stack Gas Temperature	Ts	deg. F	80.3		
Meter Temperature	Tm	deg. F			
%O2 in Stack Gas	%O2	%	20.50		
%CO2 in Stack Gas	%CO2	%	0.05		
Total Impinger Water	Ww	g			

CALCULATIONS	Symbols	Units	RUN 1	RUN 0	RUN 0
Stack Area	As	sq. ft.	7.07		
Stack Gas Temperature	Ts,r	deg. R	540		
Meter Temperature	Tm,r	deg. R	460		
Abs Stk Pressure	Pabs	in. Hg.	28.70		
Gas Vol. @ STD	Vmstd	dscf			
Vol. of Water Vapor	Vwstd	dscf			
Dry Mol. Wt.	Md	lb/lb-mol.	28.83		
Wet Mol. Wt.	Ms	lb/lb-mol.	28.61		
Average Velocity	Vs	ft/s	99.36		
Moisture Content	Bws	%	2.00		
Actual Stack Gas Flow Rate	Qa	acfm	42,141		
Dry Stack Gas Flow Rate	Qds	dscfm	38,128		
Wet Stack Gas Flow Rate	Qws	wscfm	38,906		

CALCULATIONS		
Abs Stk Pressure	Pabs	Pabs=Pbar +(Ps/13.6)
Gas Vol. @ STD	Vmstd	Vmstd=17.64VmY[Pbar+dH/13.6)]/Tm
Vol. of Water Vapor	Vwstd	Vwstd=0.04707 Vh2o
Dry Mol. Wt.	Md	Md=.44(%CO2)+.32(%O2)+.28[100-(%CO2+%O2)]
Wet Mol. Wt.	Ms	Ms=Md[1-(Bws/100)]+18(Bws/100)

STACK GAS MOISTURE AND FLOW RATE CALC

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Facility: [redacted]
Location: [redacted] CA

Source: Inlet 1 (Upstream of Baghouse)

	RUN 1			
Point	dP (in. H2O)	Ts (deg F)	SQRT (dP)	Qds (dscfm)
Avg	2.958	80.3	1.7058	38,128
12	3.30	80	1.8166	40,613
11	3.70	80	1.9235	43,004
10	3.80	80	1.9494	43,581
9	3.50	80	1.8708	41,825
8	3.60	80	1.8974	42,419
7	3.30	80	1.8166	40,613
6	3.30	80	1.8166	40,613
5	3.00	80	1.7321	38,723
4	2.40	80	1.5492	34,635
3	1.85	80	1.3601	30,408
2	1.75	80	1.3229	29,575
1	2.00	83	1.4142	31,530
12	3.30	80	1.8166	40,613
11	3.70	80	1.9235	43,004
10	3.80	80	1.9494	43,581
9	3.50	80	1.8708	41,825
8	3.60	80	1.8974	42,419
7	3.30	80	1.8166	40,613
6	3.30	80	1.8166	40,613
5	3.00	80	1.7321	38,723
4	2.40	80	1.5492	34,635
3	1.85	80	1.3601	30,408
2	1.75	80	1.3229	29,575
1	2.00	83	1.4142	31,530

dP (in. H2O)	Ts (deg F)	SQRT (dP)	Qds (dscfm)
		#DIV/0!	

dP (in. H2O)

	Orifice dH	Meter Temp.		DGM Volume	Moist. Collect.	
		Inlet	Outlet			
	#DIV/0!	Avg:	#DIV/0!	0.000	0.0	Net:
10						Initial
20						Final
30						Initial
40						Final
50						Initial
60						Final
70						Initial
80						Final
90						

Orifice dH	Meter Temp.		DGM Volume	Moist. Collect.	
	Inlet	Outlet			
#DIV/0!	Avg:	#DIV/0!	0.000	0.0	Net:
					Initial
					Final
					Initial
					Final
					Initial
					Final
					Initial
					Final

Orifice dH
#DIV/0!

SCAQMD METHODS 2-4

Run # :		Pitot ID :	15	Impinger	Initial	Final	Net		Pitot Leak Check	
Date :	5/22/19	Pitot Coeff. :	0.84	Water 1 :				Initial :		
Client :	Facility A	Meter Box # :		Water 2 :				Final :		
Unit :	IN 10	Meter @ Dh :		Blank :						
Operator :	MN	Meter Y :		Sil. Gel :					Meter Box Leak Check	
Stack Dia :	56	TC # :			H2O Gain =				Rate	"HG
Amb. Press :		Start Time :	710		Pressure Type/Range			Initial :		
Static Press :	-15	Stop Time :						Final :		

							Sample	Port 1 :		Port 2 :		Pitot ID:	
Time (Minute)	Meter Volume (acf)	Pump Vac (Inch Hg)	Meter Temperatures Inlet (F)	Outlet (F)	Set Delta H (Inch H2O)	Impinger Temp. (F)	Point #	Delta P ("H2O)	Stack Temp. (F)	Delta P ("H2O)	Stack Temp. (F)	Cyclonic Flow ("H2O)	TE Cooler Temp. (F)
							12	3.3	80				
							11	3.7	80				
							10	3.8	80				
							9	3.5	80				
							8	3.6	80				
							7	3.3	80				
							6	3.3	80				
							5	3.0	80				
							4	2.4	80				
							3	1.85	80				
							2	1.75	80				
							1	2.00	83				

STACK GAS MOISTURE AND FLOW RATE CALCULATIONS

Test Date: 5/22/19
Facility: [redacted]
Location: [redacted]
Source: Inlet 2

DATA ENTRY	Symbols	Units	RUN 1		
Stack Diameter	D	in.			
Length	L	in.	21		
Width	W	in.	25		
Barometric Pressure	Pbar	in. Hg.	29.80		
Static Pressure	Ps	in. H2O	5.70		
Pitot Coefficient	Cp	none	0.84		
Meter Cal. Factor	Y	none	1.0000		
Standard Temperature	Tstd	deg. F	60		
Moisture Factor	K1	cu.ft./mL	.0464		
PT Factor	K2	R/in.Hg	17.38		
Velocity Head (dP)	(dP)	(in. H2O)	1.108		
Velocity Head (Sqrt dP)	Sqrt (dP)	Sqrt(in. H2O)	0.917		
Average Delta H	dH	in. H2O			
Gas Volume Collected	Vm	cf			
Stack Gas Temperature	Ts	deg. F	72.1		
Meter Temperature	Tm	deg. F			
%O2 in Stack Gas	%O2	%	20.50		
%CO2 in Stack Gas	%CO2	%	0.05		
Total Impinger Water	Ww	g	0.0		
CALCULATIONS	**Symbols**	**Units**	**RUN 1**		
Stack Area	As	sq. ft.	3.65		
Stack Gas Temperature	Ts,r	deg. R	532		
Meter Temperature	Tm,r	deg. R	460		
Abs Stk Pressure	Pabs	in. Hg.	30.22		
Gas Vol. @ STD	Vmstd	dscf			
Vol. of Water Vapor	Vwstd	dscf			
Dry Mol. Wt.	Md	lb/lb-mol.	28.83		
Wet Mol. Wt.	Ms	lb/lb-mol.	28.61		
Average Velocity	Vs	ft/s	51.66		
Moisture Content	Bws	%	2.00		
Actual Stack Gas Flow Rate	Qa	acfm	11,301		
Dry Stack Gas Flow Rate	Qds	dscfm	10,933		
Wet Stack Gas Flow Rate	Qws	wscfm	11,156		

CALCULATIONS

Abs Stk Pressure	Pabs	Pabs=Pbar+(Ps/13.6)
Gas Vol. @ STD	Vmstd	Vmstd=17.64VmY[Pbar+dH/13.6)]/Tm
Vol. of Water Vapor	Vwstd	Vwstd=0.04707 Vh2o
Dry Mol. Wt.	Md	Md=.44(%CO2)+.32(%O2)+.28[100-(%CO2+%O2)]
Wet Mol. Wt.	Ms	Ms=Md[1-(Bws/100)]+18(Bws/100)

STACK GAS MOISTURE AND FLOW RATE CALCULATIONS

Facility: [redacted]
Location: [redacted]

Source: Inlet 2

Test Date: 5/22/19

Point	dP (in. H2O)	Ts (deg F)	SQRT (dP)	Qds (dscfm)
	RUN 1			
Avg	1.108	72.1	.9170	10,933
8	1.97	72.4	1.4036	16,726
7	2.4	72.3	1.5492	18,464
6	2.26	72.3	1.5033	17,917
5	2.22	71.7	1.4900	17,768
4	2.24	76.1	1.4967	17,774
3	2.29	69.9	1.5133	18,076
2	2.3	69.2	1.5166	18,128
1	2.35	68.5	1.5330	18,336
8	0.74	71.9	.8602	10,256
7	0.97	72.3	.9849	11,738
6	0.95	72.3	.9747	11,616
5	0.94	72.4	.9695	11,554
4	1.21	72.9	1.1000	13,103
3	1.2	72.6	1.0954	13,052
2	1.12	72.4	1.0583	12,612
1	0.84	72.3	.9165	10,923
8	0.09	72.9	.3000	3,573
7	0.03	72.6	.1732	2,064
6	0.025	72.5	.1581	1,884
5	0.03	73.3	.1732	2,062
4	0.03	72.3	.1732	2,064
3	0.08	72.1	.2828	3,372
2	0.19	72.1	.4359	5,196
1	0.12	72.2	.3464	4,129

	Orifice dH	Meter Temp. Inlet	Meter Temp. Outlet	DGM Volume	Moist. Collect.	
	#DIV/0!	Avg:	#DIV/0!	0.000	0.0	Net:
10						Initial
20						Final
30						Initial
40						Final
50						Initial
60						Final
70						Initial
80						Final
90						

dP (in. H2O)	Ts (deg F)	SQRT (dP)	Qds (dscfm)
		#DIV/0!	#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!

Orifice dH	Meter Temp. Inlet	Meter Temp. Outlet	DGM Volume	Moist. Collect.	
#DIV/0!	Avg:	#DIV/0!	0.000	0.0	Net:
					Initial
					Final
					Initial
					Final
					Initial
					Final
					Initial
					Final

dP (in. H2O)	Ts (deg F)	SQRT (dP)	Qds (dscfm)
		#DIV/0!	#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!

Orifice dH	Meter Temp. Inlet	Meter Temp. Outlet	DGM Volume	Moist. Collect.	
#DIV/0!	Avg:	#DIV/0!	0.000	0.0	Net:
					Initial
					Final
					Initial
					Final
					Initial
					Final
					Initial
					Final

APPENDIX C5

PRE–FLOWS FOR EXHAUST FLOW ISOKINETIC CALCULATIONS

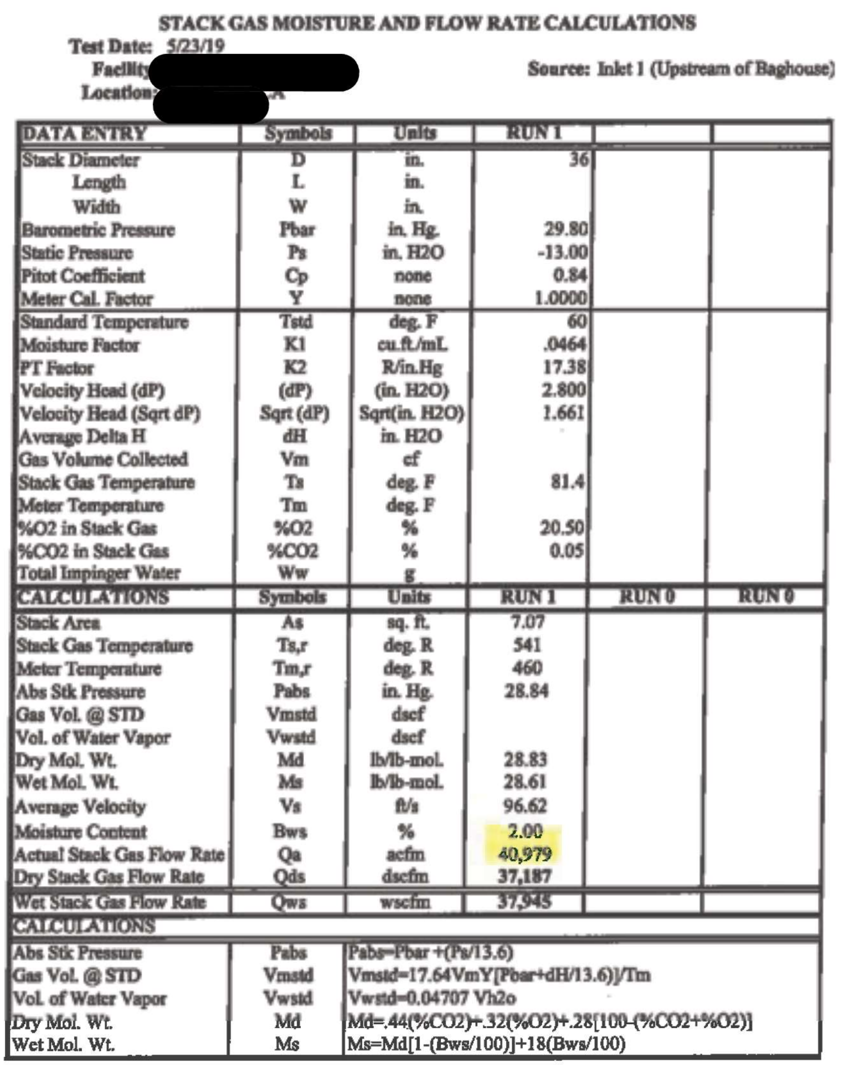
RUN 3

Baghouse Outlet Differential Pressure Calculation

5/23/2019

	Symbol	Unit	Value	Formula
Calculation on Inlet Baghouse Velocity				
Inlet 1 (Upstream of Baghouse)	In 1	acfm	40,979	- -
Inlet 2	In 2	acfm	11,992	- -
Inlet - HEPA Baghouse	In_{Bag}	acfm	52,971	In_{Bag} = In 1 + In 2
Area - HEPA Baghouse *	A_{Bag}	in^2	14168	
Velocity - HEPA Baghouse	Vel_{Bag}	ft/sec	8.973	$Vel_{Bag} = Inlet_{Bag}$ (acfm) * (144 in^2/ft^2) * (min/60 sec) * (1/A_{Bag} in^2)
Calcualtion of Wet Stack Gas Molecular Weight				
Dry Stack Gas Molecular Weight	MW_{dry}	lb/lb-mole	28.72	MW_{dry} = 0.44*CO_2%+0.32*O_2%+0.28*COppm+0.28*N_2%
where, O2 = 20.5%; CO2 = 0.05%; CO = 0 ppm; N2 = 79.05 %				
Moisture	Moist	% H_20	2	Assumed Saturated Moisture
Dry Mole Fraction	$Mole_{Fract}$	decimal	0.98	$Mole_{Fract}$ = (1-{Moist/100})
Wet Stack Gas Molecular Weight	MW_{wet}	lb/lb-mole	28.506	$MW_{wet} = MW_{dry}$ * $Mole_{Fract}$ + (18 * {Moist/100})
Calculation on Inlet Baghouse Pressure				
Velocity - HEPA Baghouse	VelBag	ft/sec	8.973	see above
Stack Temperature	T_{Stk}	°F	75	- -
Absolute Stack Pressure	P_{Abs}	in Hg	29.8	- -
Wet Stack Gas Molecular Weight	MW_{wet}	lb/lb-mole	28.506	see above
Pitot Correlation Coeffieicent	C_p	- -	0.84	- -
Conversion Factor	C_{fact}	- -	85.49	
Differential Pressure	**P_{Delta}**	**in H_20**	**0.0251**	P_{Delta} = [Vel_{Bag} * 1/C_p * 1/C_{fact} * 1/{(T_{Stk}+460)/(P_{Abs}*MW_{wet})}^0.5]^2

* See next page.



STACK GAS MOISTURE AND FLOW RATE CALCULATIONS

Test Date: 5/23/19
Facility [redacted]
Location [redacted]

Source: Inlet 1 (Upstream of Baghouse)

DATA ENTRY	Symbols	Units	RUN 1		
Stack Diameter	D	in.	36		
Length	L	in.			
Width	W	in.			
Barometric Pressure	Pbar	in. Hg.	29.80		
Static Pressure	Ps	in. H2O	-13.00		
Pitot Coefficient	Cp	none	0.84		
Meter Cal. Factor	Y	none	1.0000		
Standard Temperature	Tstd	deg. F	60		
Moisture Factor	K1	cu.ft./mL	.0464		
PT Factor	K2	R/in.Hg	17.38		
Velocity Head (dP)	(dP)	(in. H2O)	2.800		
Velocity Head (Sqrt dP)	Sqrt (dP)	Sqrt(in. H2O)	1.661		
Average Delta H	dH	in. H2O			
Gas Volume Collected	Vm	cf			
Stack Gas Temperature	Ts	deg. F	81.4		
Meter Temperature	Tm	deg. F			
%O2 in Stack Gas	%O2	%	20.50		
%CO2 in Stack Gas	%CO2	%	0.05		
Total Impinger Water	Ww	g			

CALCULATIONS	Symbols	Units	RUN 1	RUN 0	RUN 0
Stack Area	As	sq. ft.	7.07		
Stack Gas Temperature	Ts,r	deg. R	541		
Meter Temperature	Tm,r	deg. R	460		
Abs Stk Pressure	Pabs	in. Hg.	28.84		
Gas Vol. @ STD	Vmstd	dscf			
Vol. of Water Vapor	Vwstd	dscf			
Dry Mol. Wt.	Md	lb/lb-mol.	28.83		
Wet Mol. Wt.	Ms	lb/lb-mol.	28.61		
Average Velocity	Vs	ft/s	96.62		
Moisture Content	Bws	%	2.00		
Actual Stack Gas Flow Rate	Qa	acfm	40,979		
Dry Stack Gas Flow Rate	Qds	dscfm	37,187		
Wet Stack Gas Flow Rate	Qws	wscfm	37,945		

CALCULATIONS		
Abs Stk Pressure	Pabs	Pabs=Pbar +(Ps/13.6)
Gas Vol. @ STD	Vmstd	Vmstd=17.64VmY[Pbar+dH/13.6)]/Tm
Vol. of Water Vapor	Vwstd	Vwstd=0.04707 Vh2o
Dry Mol. Wt.	Md	Md=.44(%CO2)+.32(%O2)+.28[100-(%CO2+%O2)]
Wet Mol. Wt.	Ms	Ms=Md[1-(Bws/100)]+18(Bws/100)

Facility: [redacted]
Location: [redacted] CA

Source: Inlet 1 (Upstream of Baghouse)

	RUN 1			
Point	dP (in. H2O)	Ts (deg F)	SQRT (dP)	Qds (dscfm)
Avg	2.800	81.4	1.6612	37,187
12	3.10	81	1.7607	39,427
11	3.20	81	1.7889	40,058
10	3.35	81	1.8303	40,986
9	3.80	81	1.9494	43,652
8	3.45	81	1.8574	41,593
7	3.30	81	1.8166	40,679
6	3.00	83	1.7321	38,714
5	2.35	84	1.5330	34,233
4	1.85	84	1.3601	30,374
3	1.85	83	1.3601	30,402
2	1.95	80	1.3964	31,299
1	2.40	77	1.5492	34,820
12	3.10	81	1.7607	39,427
11	3.20	81	1.7889	40,058
10	3.35	81	1.8303	40,986
9	3.80	81	1.9494	43,652
8	3.45	81	1.8574	41,593
7	3.30	81	1.8166	40,679
6	3.00	83	1.7321	38,714
5	2.35	84	1.5330	34,233
4	1.85	84	1.3601	30,374
3	1.85	83	1.3601	30,402
2	1.95	80	1.3964	31,299
1	2.40	77	1.5492	34,820

dP (in. H2O)	Ts (deg F)	SQRT (dP)	Qds (dscfm)
		#DIV/0!	

dP (in. H2O)

	Orifice dH	Meter Temp.		DGM Volume	Moist. Collect.	
		Inlet	Outlet			
	#DIV/0!	Avg:	#DIV/0!	0.000	0.0	Net:
10						Initial
20						Final
30						Initial
40						Final
50						Initial
60						Final
70						Initial
80						Final
90						

Orifice dH	Meter Temp.		DGM Volume	Moist. Collect.	
	Inlet	Outlet			
#DIV/0!	Avg:	#DIV/0!	0.000	0.0	Net:
					Initial
					Final
					Initial
					Final
					Initial
					Final
					Initial
					Final

Orifice dH
#DIV/0!

SCAQMD METHODS 2-4

Run # : Flow Run 3
Date : 5/23/19
Client : SCAQMD Fac A
Unit : Inlet (o)
Operator : MN
Stack Dia : 36.0
Amb. Press : 29.
Static Press : -13

Pitot ID : 15
Pitot Coeff. : 0.84
Meter Box # : A-8
Meter @ Dh : 1834
Meter Y : 1.0395
TC # : 15
Start Time : 7:17
Stop Time :

Impinger	Initial	Final	Net
Water 1 :			
Water 2 :			
Blank :			
Sil. Gel :			

H2O Gain =

Pressure Type/Range

Pitot Leak Check

Initial :		
Final :		

Meter Box Leak Check

	Rate	"HG
Initial :		
Final :		

							Sample	Port 1 :		Port 2 :		Pitot ID:	
Time (Minute)	Meter Volume (acf)	Pump Vac (Inch Hg)	Meter Temperatures Inlet (F)	Outlet (F)	Set Delta H (Inch H2O)	Impinger Temp. (F)	Point #	Delta P ("H2O)	Stack Temp. (F)	Delta P ("H2O)	Stack Temp. (F)	Cyclonic Flow ("H2O)	TE Cooler Temp. (F)
							12	3.1	81				
							11	3.2	81				
							10	3.35	81				
							9	3.8	81				
							8	3.45	81				
							7	3.3	81				
							6	3.0	83				
							5	2.35	84				
							4	1.85	84				
							3	1.65	83				
							2	1.95	80				
							1	2.4	77				

STACK GAS MOISTURE AND FLOW RATE CALCULATIONS

Test Date: [redacted]
Facility: [redacted]
Location: [redacted]A
Source: Inlet 2

DATA ENTRY	Symbols	Units	RUN 1		
Stack Diameter	D	in.			
Length	L	in.	21		
Width	W	in.	25		
Barometric Pressure	Pbar	in. Hg.	29.80		
Static Pressure	Ps	in. H2O	5.70		
Pitot Coefficient	Cp	none	0.84		
Meter Cal. Factor	Y	none	1.0000		
Standard Temperature	Tstd	deg. F	60		
Moisture Factor	K1	cu.ft./ml.	.0464		
PT Factor	K2	R/in.Hg	17.38		
Velocity Head (dP)	(dP)	(in. H2O)	1.204		
Velocity Head (Sqrt dP)	Sqrt (dP)	Sqrt(in. H2O)	0.955		
Average Delta H	dH	in. H2O			
Gas Volume Collected	Vm	cf			
Stack Gas Temperature	Ts	deg. F	92.7		
Meter Temperature	Tm	deg. F			
%O2 in Stack Gas	%O2	%	20.50		
%CO2 in Stack Gas	%CO2	%	0.05		
Total Impinger Water	Ww	g	0.0		
CALCULATIONS	**Symbols**	**Units**	**RUN 1**		
Stack Area	As	sq. ft.	3.65		
Stack Gas Temperature	Ts,r	deg. R	553		
Meter Temperature	Tm,r	deg. R	460		
Abs Stk Pressure	Pabs	in. Hg.	30.22		
Gas Vol. @ STD	Vmstd	dscf			
Vol. of Water Vapor	Vwstd	dscf			
Dry Mol. Wt.	Md	lb/lb-mol.	28.83		
Wet Mol. Wt.	Ms	lb/lb-mol.	28.61		
Average Velocity	Vs	ft/s	54.82		
Moisture Content	Bws	%	2.00		
Actual Stack Gas Flow Rate	Qa	acfm	11,992		
Dry Stack Gas Flow Rate	Qds	dscfm	11,160		
Wet Stack Gas Flow Rate	Qws	wscfm	11,388		

CALCULATIONS		
Abs Stk Pressure	Pabs	Pabs=Pbar +(Ps/13.6)
Gas Vol. @ STD	Vmstd	Vmstd=17.64VmY[Pbar+dH/13.6)]/Tm
Vol. of Water Vapor	Vwstd	Vwstd=0.04707 Vh2o
Dry Mol. Wt.	Md	Md=.44(%CO2)+.32(%O2)+.28[100-(%CO2+%O2)]
Wet Mol. Wt.	Ms	Ms=Md[1-(Bws/100)]+18(Bws/100)

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STACK GAS MOISTURE AND FLOW RATE CALCULATIONS

Facility: [redacted]
Location: [redacted] CA

Source: Inlet 2

Test Date: 5/23/19

	RUN 1			
Point	dP (in. H2O)	Ts (deg F)	SQRT (dP)	Qds (dscfm)
Avg	1.204	92.7	.9548	11,160
8	2.05	93.4	1.4318	16,736
7	2.094	93.8	1.4471	16,908
6	2.82	93.7	1.6793	19,624
5	2.63	94.2	1.6217	18,942
4	2.6	95.1	1.6125	18,819
3	2.34	94.9	1.5297	17,856
2	2.42	94.9	1.5556	18,159
1	2.4	94.4	1.5492	18,092
8	1.01	94.4	1.0050	11,737
7	1.26	94.5	1.1225	13,108
6	1.17	93.3	1.0817	12,645
5	1.2	92.7	1.0954	12,813
4	1.19	92.6	1.0909	12,760
3	1.11	92.3	1.0536	12,327
2	1.15	92.0	1.0724	12,551
1	0.88	91.8	.9381	10,981
8	0.16	90.7	.4000	4,687
7	0.11	91.0	.3317	3,885
6	0.05	91.0	.2236	2,619
5	0.04	90.9	.2000	2,343
4	0.03	90.7	.1732	2,030
3	0.03	90.6	.1732	2,030
2	0.08	90.7	.2828	3,314
1	0.06	90.6	.2449	2,870

	Orifice dH	Meter Temp.		DGM Volume	Moist. Collect.	
		Inlet	Outlet			
	#DIV/0!	Avg:	#DIV/0!	0.000	0.0	Net:
10						Initial
20						Final
30						Initial
40						Final
50						Initial
60						Final
70						Initial
80						Final
90						

dP (in. H2O)	Ts (deg F)	SQRT (dP)	Qds (dscfm)
		#DIV/0!	#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!

Orifice dH	Meter Temp.		DGM Volume	Moist. Collect.	
	Inlet	Outlet			
#DIV/0!	Avg:	#DIV/0!	0.000	0.0	Net:
					Initial
					Final
					Initial
					Final
					Initial
					Final
					Initial
					Final

dP (in. H2O)	Ts (deg F)	SQRT (dP)	Qds (dscfm)
		#DIV/0!	#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
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			#DIV/0!
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			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!

Orifice dH	Meter Temp.		DGM Volume	Moist. Collect.	
	Inlet	Outlet			
#DIV/0!	Avg:	#DIV/0!	0.000	0.0	Net:
					Initial
					Final
					Initial
					Final
					Initial
					Final
					Initial
					Final

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APPENDIX D

CARB METHOD 425 – CHROMIUM EMISSIONS (HEX/TOTAL)

APPENDIX D1

CHROMIUM EMISSIONS (HEX/TOTAL) – RESULTS AND CALCULATIONS

Location: Baghouse Outlet

TEST RESULTS

CARB 425 (Hexavalent & Total Chromium)

Facility: AQMD Facility A
City: [redacted], CA
Source: Baghouse
Location: Outlet

TEST DATA	UNITS	TEST RESULTS			AVERAGE
Run Number	-	**Run 1**	**Run 2**	**Run 3**	
Test Date	mm/dd/yy	5/22/19	5/22/19	5/23/19	--
Test Time	hh:mm	11:50 - 14:15	14:38 - 16:53	8:25 - 10:45	--
Sampling Data*					
Stack Temperature	°F	87.2	86.9	86.5	**86.9**
Moisture	%	1.8	1.7	1.7	**1.7**
Sample Volume	dscf	91.2	91.2	90.7	**91.0**
Oxygen**	% v/v	20.9	20.9	20.9	**20.9**
Carbon Dioxide**	% v/v	0.04	0.04	0.04	**0.04**
Stack Flow Rate	acfm	-	-	-	**-**
Stack Flow Rate	dscfm	47,814	48,789	48,995	**48,533**
Total Catch (CARB 425)					
Chromium VI	ug	< 0.0460	< 0.0420	< 0.0720	< **0.0533**
Total Chromium	ug	< 2.000	< 2.000	< 2.000	< **2.00**
Concentration (CARB 425)					
Chromium VI	ug/dscm	< 0.0178	< 0.0163	< 0.0280	< **0.0207**
	ug/dscf	< 0.000504	< 0.000461	< 0.000794	< **0.000586**
Total Chromium	ug/dscm	< 0.7742	< 0.7748	< 0.7786	< **0.776**
	ug/dscf	< 0.0219	< 0.0219	< 0.0220	< **0.022**
Mass Emissions (CARB 425)					
Chromium VI	ug/hr	< 1446	< 1349	< 2333	< **1710**
Chromium VI	mg/hr	< 1.45	< 1.35	< 2.33	< **1.71**
Chromium VI	lb/hr	< 3.2E-06	< 3.0E-06	< 5.1E-06	< **3.77E-06**
Total Chromium	ug/hr	< 62890	< 64226	< 64816	< **63977**
Total Chromium	mg/hr	< 62.89	< 64.23	< 64.82	< **64.0**
Total Chromium	lb/hr	< 1.4E-04	< 1.4E-04	< 1.4E-04	< **1.41E-04**

Notes:
* Performed during isokinetic sampling by CARB 425.
** SCAQMD Method 10.1 sample reported error values, ambient O2/CO2 used for gas density calculations.
"<" Indicates an analytical result of non-detect (ND) and the use of laboratory MRL for emission calculations.

CARB METHOD 425 DATA AND CALCULATIONS

Plant:	AQMD Facility A	Test Date(s):	05/22 to 05/23/19
City:	[redacted], CA	Operator:	CH/NC
Source:	Baghouse	Entered by:	TG
Location:	Outlet	Checked by:	CF

Metals Catch, Mi					
Lab Results	**Units**	**Run 1**	**Run 2**	**Run 3**	Average
Chromium VI	ug	< 0.046	< 0.042	< 0.072	< 0.053
Total Chromium	µg	< 2.00	< 2.00	< 2.00	< 2.00
Chromium VI, Molecular Weight	g/g-mole	51.995	51.995	51.995	- -
Total Chromium, Molecular Weight	g/g-mole	51.995	51.995	51.995	- -
Concentration (ug/dscm), Ci = Mi/VmStd *35.315 cf/dscm					
Chromium VI	ug/dscm	< 0.0178	< 0.0163	< 0.0280	< 0.0207
Total Chromium	ug/dscm	< 0.7742	< 0.775	< 0.779	< 0.776
Metals Mass Emissino Rate (lb/hr), Ei	**Ei = Ci*Qsdm*60/453600/1000**				
Chromium VI	lb/hr	< 3.19E-06	< 2.97E-06	< 5.14E-06	< 3.77E-06
Total Chromium	lb/hr	< 1.39E-04	< 1.42E-04	< 1.43E-04	< 1.41E-04

MV_1 = 24.05 L/g-mole @68°F, 23.68 L/g-mole @60°F

"<" Indicates an analytical result of non-detect (ND) and the use of laboratory MRL for emission calculations.

Lab Data - CARB 425

Facility: AQMD Facility A
Source: Baghouse Outlet

Analytical Results - Cr+6

Run Number:		Run 1		Run 2		Run 3		RB	Cr+6
Rinse C1, ug	ND	0.011	ND	0.010	ND	0.050	ND, MRL	0.010	C1
Impingers C2, ug		0.035		0.032	ND	0.022	ND, MRL	0.020	C2
Total catch, ug	<	**0.046**	<	**0.042**	ND	**0.072**			

When the DL is used for emissions calculations, it and the resulting calculations are flagged with a "<" symbol.

Analytical Results - Total Chromium

Run Number:		Run 1		Run 2		Run 3		RB	Cr
Rinse C1, ug	ND	1.00	ND	1.00	ND	1.000	ND, MRL	1.00	C1
Impingers C2, ug	ND	1.00	ND	1.00	ND	1.000	ND, MRL	1.00	C2
Total catch, ug	ND	**2.00**	ND	**2.00**	ND	**2.00**			

When the DL is used for emissions calculations, it and the resulting calculations are flagged with a "<" symbol.

CARB METHOD 425 DATA AND CALCULATIONS

Plant: AQMD Facility A
City: [redacted] CA
Source: Baghouse
Location: Outlet

Test Date(s): 05/22 to 05/23/19
Operator: CH/NC
Entered by: TG
Checked by: CF

			05/22/19	05/22/19	05/23/19
DATA ENTRY	**symbol**	**units**	**DATA**	**DATA**	**DATA**
Run Number			1	2	3
Stack Dimensions: Round Stack Diameter	Ds	in.			
Rectangular Stack, Length	L	in.			
Width	W	in.			
Nozzle Diameter	Dn	in.	0.513	0.513	0.513
Standard Temperature	Tstd	°F	68	68	68
Universal (molar) Gas Constant	Renglish	in. Hg-cu.ft/ °R-lbmole	21.85	21.85	21.85
Average Stack Temperature (measured)	Fs	°F	87.2	86.9	86.5
Average Meter Temperature (measured)	Fm	°F	83.8	77.5	70.8
Standard Pressure	Pstd	in.Hg	29.92	29.92	29.92
Barometric Pressure	Pbar	in.Hg	29.62	29.62	29.80
Stack Static Pressure	Pg	in.WC	-	-	-
Average Meter Orifice Head (Delta-H)	dH	in.WC	1.83	1.81	1.75
Average RMS Velocity Head (Delta-P)	dP	in.WC	-	-	-
Pitot Coefficient	Cp	—	-	-	-
Net Volume of Gas Metered	Vm	cu.ft.	91.063	89.933	87.853
Dry Gas Meter Calibration Factor (gamma, Y)	Y	—	1.0376	1.0376	1.0376
NET Sampling Time	min	min.	123	123	123
Stack Gas: Oxygen Content*	O2,m	%	20.90	20.90	20.90
Carbon Dioxide Content*	CO2,m	%	0.04	0.04	0.04
Total Impinger Gain	Ww	g	35.4	33.5	32.9
CALCULATED DATA					
Nozzle Area: An = pi/4*dn^2	An	sq.in.	0.2067	0.2067	0.2067
Stack Area (round): As = pi/576*ds^2 (rectangular): As = L*W/144	As	sq.ft.	-	-	-
Absolute Stack Temperature: Ts = Fs+460	Ts	°R	547.2	546.9	546.5
Absolute Meter Temperature: Tm = Fm+460	Tm	°R	543.8	537.5	530.8
Standard Temperature: Tstdr = Tstd+460	Tstdr	°R	528.0	528.0	528.0
Gas Sample Volume at Standard Conditions: Vm(std) = Y * (Vm/Tm) * (Pbar + dH/13.6 in H2O/in Hg) * (Tstdr/Pstd)	VmStd	cu.ft.	91.233	91.158	90.709
Vol. of Water Vapor, Vw(std) = Ww/453.59 * Renglish/18 * Tstdr / Pstd	VwStd	cu.ft.	1.672	1.582	1.554
Moisture Fraction: Bws = VwStd/(VmStd+VwStd)	Bws	—	0.0180	0.017	0.0168
Stack Gas MW, Dry Basis: Md = 0.32*O2,m + 0.44*CO2,m + 0.28*(100-O2,m-CO2,m)	Md	g/mole	28.84	28.84	28.84
Stack Gas MW, Wet Basis: Mw = Md*(1-Bws) + 18*Bws	Mw	g/mole	28.65	28.66	28.66
Stack Pressure: Ps = Pbar + Pg/13.6	Ps	in.Hg	-	-	-
Stack Gas Velocity, measured vs = 85.49*Cp*√(dP*Ts/Ps/Mw)	vs	ft/s	-	-	-
vm = 0.3048 m/ft*vs	vsm	m/s	-	-	-
Stack Gas Volumetric Flow Rate: Q = 60*vs*As	Q	acfm	-	-	-
Stack Gas Volumetric Flow Rate, corrected: Qsd = Q*(1-Bws)*(Ps/Ts)*(Tstdr/Pstd)	Qsd**	dscfm	47,814	48,789	48,995
Qsdm = Qsd/35.315	Qsdm	dscmm	1,353.9	1,381.5	1,387.4
Isokinetic Sampling Rate: I = 144*100*Ts*Vmstd *Pstd/[60*Tstdr*vs*min*An*Ps*(1-Bws)]	I	%	-	-	-

* SCAQMD Method 10.1 sample reported error values, ambient O2/CO2 used for gas density calculations.

**Baghouse outlet flow was assumed to be equal to the inlet. The inlet 1 outside and inlet 2 flows were added utilized the outlet mass emissions calculations.

CARB METHOD 425 DATA AND CALCULATIONS

ISOKINETIC CALCULATION ONLY

Plant: AQMD Facility A
City: [redacted] CA
Source: Baghouse
Location: Outlet

Test Date(s): 05/22 to 05/23/19
Operator: CH/NC
Entered by: TG
Checked by: CF

			05/22/19	05/22/19	05/23/19
DATA ENTRY	**symbol**	**units**	**DATA**	**DATA**	**DATA**
Run Number			1	2	3
Stack Dimensions: Round Stack Diameter	Ds	in.			
Rectangular Stack, Length	L	in.	154	154	154
Width	W	in.	46	46	46
Nozzle Diameter	Dn	in.	0.513	0.513	0.513
Standard Temperature	Tstd	°F	68	68	68
Universal (molar) Gas Constant	Renglish	in. Hg-cu.ft/ °R-lbmole	21.85	21.85	21.85
Average Stack Temperature (measured)	Fs	°F	87.2	86.9	86.5
Average Meter Temperature (measured)	Fm	°F	83.8	77.5	70.8
Standard Pressure	Pstd	in.Hg	29.92	29.92	29.92
Barometric Pressure	Pbar	in.Hg	29.62	29.62	29.80
Stack Static Pressure	Pg	in.WC	N/A	N/A	N/A
Average Meter Orifice Head (Delta-H)	dH	in.WC	1.83	1.81	1.75
Average RMS Velocity Head (Delta-P)	dP	in.WC	0.026	0.026	0.025
Pitot Coefficient	Cp	—	0.84	0.84	0.84
Net Volume of Gas Metered	Vm	cu.ft.	91.063	89.933	87.853
Dry Gas Meter Calibration Factor (gamma, Y)	Y	—	1.0376	1.0376	1.0376
NET Sampling Time	min	min.	123	123	123
Stack Gas: Oxygen Content*	O2,m	%	20.90	20.90	20.90
Carbon Dioxide Content*	CO2,m	%	0.04	0.04	0.04
Total Impinger Gain	Ww	g	35.4	33.5	32.9
CALCULATED DATA					
Nozzle Area: An = pi/4*dn^2	An	sq.in.	0.2067	0.2067	0.2067
Stack Area (round): As = pi/576*ds^2	As	sq.ft.	-	-	-
(rectangular): As = L*W/144			98.389	98.389	98.389
Absolute Stack Temperature: Ts = Fs+460	Ts	°R	547.2	546.9	546.5
Absolute Meter Temperature: Tm = Fm+460	Tm	°R	543.8	537.5	530.8
Standard Temperature: Tstdr = Tstd+460	Tstdr	°R	528.0	528.0	528.0
Gas Sample Volume at Standard Conditions: Vm(std) = Y * (Vm/Tm) * (Pbar + dH/13.6 in H2O/in Hg) * (Tstdr/Pstd)	VmStd	cu.ft.	91.233	91.158	90.709
Vol. of Water Vapor, Vw(std) = Ww/453.59 * Renglish/18 * Tstdr / Pstd	VwStd	cu.ft.	1.672	1.582	1.554
Moisture Fraction: Bws = VwStd/(VmStd+VwStd)	Bws	—	0.0180	0.017	0.0168
Stack Gas MW, Dry Basis: Md = 0.32*O2,m + 0.44*CO2,m + 0.28*(100-O2,m-CO2,m)	Md	g/mole	28.84	28.84	28.84
Stack Gas MW, Wet Basis: Mw = Md*(1-Bws) + 18*Bws	Mw	g/mole	28.65	28.66	28.66
Stack Pressure: Ps = Pbar + Pg/13.6	Ps	in.Hg	29.62	29.62	29.80
Stack Gas Velocity, measured					
vs = 85.49*Cp*√(dP*Ts/Ps/Mw)	vs	ft/s	9.23	9.22	9.10
vm = 0.3048 m/ft*vs	vsm	m/s	2.81	2.81	2.77
Stack Gas Volumetric Flow Rate: Q = 60*vs*As	Q	acfm	54,468	54,447	53,725
Stack Gas Volumetric Flow Rate, corrected:			51,096	51,146	50,828
Qsd = Q*(1-Bws)*(Ps/Ts)*(Tstdr/Pstd)	Qsd**	dscfm	47,814	48,789	48,995
Qsdm = Qsd/35.315	Qsdm	dscmm	1,353.9	1,381.5	1,387.4
Isokinetic Sampling Rate: I = 144*100*Ts*Vmstd *Pstd/[60*Tstdr*vs*min*An*Ps*(1-Bws)]	I	%	99.5	99.3	99.5
				based on estimated dP	

Flow Rate - Estimated (based on preflow calcuation and back calculated dP)	51,096	51,146	50,828
Flow Rate based on sum of two inlet flows (as measured during test)	47,814	48,789	48,995
Flow - Percent Difference	107%	105%	104%
Corrected isokinetic sampling rate based on actual flows	106%	104%	103%

CARB METHOD 425 DATA AND CALCULATIONS

Plant: AQMD Facility A
City: [redacted], CA
Source: Baghouse
Location: Outlet

dP based on inlet pre flows
Back-calculated for the
this outlet location

Run No.: 1
Test Date: 05/22/19
Times: 11:50 - 14:15

	Stack Temp (°F)		Velocity Head (in.WC)		dH	DGM Temperature (°F)	
point	Fs	sqrt (Fs)	dP	sqrt (dP)	(in.WC)	Fm,in	Fm,out
A-1	89	9.4	0.0256	0.160	1.81	79	79
2	87	9.3	0.0256	0.160	1.82	80	80
3	91	9.5	0.0256	0.160	1.81	82	82
4	84	9.2	0.0256	0.160	1.84	83	83
5	89	9.4	0.0256	0.160	1.83	84	84
6	87	9.3	0.0256	0.160	1.84	85	85
7	84	9.2	0.0256	0.160	1.85	86	86
8	90	9.5	0.0256	0.160	1.83	86	86
9	88	9.4	0.0256	0.160	1.84	87	87
B-1	90	9.5	0.0256	0.160	1.81	81	81
2	87	9.3	0.0256	0.160	1.83	82	82
3	84	9.2	0.0256	0.160	1.84	82	82
4	89	9.4	0.0256	0.160	1.82	83	83
5	86	9.3	0.0256	0.160	1.83	83	83
6	92	9.6	0.0256	0.160	1.82	84	84
7	88	9.4	0.0256	0.160	1.83	85	85
8	84	9.2	0.0256	0.160	1.85	85	85
9	81	9.0	0.0256	0.160	1.86	85	85
10	85	9.2	0.0256	0.160	1.85	86	86
11	89	9.4	0.0256	0.160	1.83	86	86
12	87	9.3	0.0256	0.160	1.84	86	86
Average:		**87.2**		**0.0256**	**1.83**		**83.8**

DGM Reading (cu.ft.): Final-1:	971.013	Impinger Weight (g): #1 Final:	764.0
Initial-1:	924.403	#1 Initial:	754.7
Final-2:	1015.763	#2 Final:	734.7
Initial-2:	971.310	#2 Initial:	732.3
Final-3:		#3 Final:	677.3
Initial-3:		#3 Initial:	673.5
Final-4:		#4 Final:	894.0
Initial-4:		#4 Initial:	874.1
Final-5:		#5 Final:	
Initial-5:		#5 Initial:	
NET Volume:	**91.063**	#6 Final:	
		#6 Initial:	
		#7 Final:	
		#7 Initial:	
		#8 Final:	
		#8 Initial:	
		Total wt of impingers:	**35.4**

CARB METHOD 425 DATA AND CALCULATIONS

Plant: AQMD Facility A
City: [redacted], CA
Source: Baghouse
Location: Outlet

dP based on inlet pre flows Back-calculated for the this outlet location

Run No.: 2
Test Date: 05/22/19
Times: 14:38 - 16:53

	Stack Temp (°F)		Velocity Head (in.WC)		dH	DGM Temperature (°F)	
point	Fs	sqrt (Fs)	dP	sqrt (dP)	(in.WC)	Fm,in	Fm,out
A-1	87	9.3	0.0256	0.160	1.81	78	78
2	90	9.5	0.0256	0.160	1.81	79	79
3	85	9.2	0.0256	0.160	1.82	79	79
4	87	9.3	0.0256	0.160	1.82	80	80
5	89	9.4	0.0256	0.160	1.82	81	81
6	84	9.2	0.0256	0.160	1.83	81	81
7	86	9.3	0.0256	0.160	1.82	80	80
8	88	9.4	0.0256	0.160	1.82	80	80
9	85	9.2	0.0256	0.160	1.83	80	80
10	89	9.4	0.0256	0.160	1.81	79	79
11	87	9.3	0.0256	0.160	1.82	79	79
12	85	9.2	0.0256	0.160	1.82	79	79
B-1	89	9.4	0.0256	0.160	1.79	74	74
2	87	9.3	0.0256	0.160	1.80	73	73
3	84	9.2	0.0256	0.160	1.81	74	74
4	88	9.4	0.0256	0.160	1.80	74	74
5	86	9.3	0.0256	0.160	1.81	75	75
6	89	9.4	0.0256	0.160	1.80	75	75
7	85	9.2	0.0256	0.160	1.81	75	75
8	87	9.3	0.0256	0.160	1.81	76	76
9	89	9.4	0.0256	0.160	1.80	76	76
Average:		**86.9**		**0.0256**	**1.81**		**77.5**

DGM Reading (cu.ft.): Final-1:	60.203	Impinger Weight (g): #1 Final:	763.3
Initial-1:	16.118	#1 Initial:	753.1
Final-2:	106.962	#2 Final:	713.9
Initial-2:	61.114	#2 Initial:	710.4
Final-3:		#3 Final:	646.0
Initial-3:		#3 Initial:	643.8
Final-4:		#4 Final:	925.2
Initial-4:		#4 Initial:	907.6
Final-5:		#5 Final:	
Initial-5:		#5 Initial:	
NET Volume:	**89.933**	#6 Final:	
		#6 Initial:	
		#7 Final:	
		#7 Initial:	
		#8 Final:	
		#8 Initial:	
		Total wt of impingers:	**33.5**

CARB METHOD 425 DATA AND CALCULATIONS

Plant: AQMD Facility A
City: [redacted], CA
Source: Baghouse
Location: Outlet

dP based on inlet pre flows
Back-calculated for the
this outlet location

Run No.: 3
Test Date: 05/23/19
Times: 8:25 - 10:45

	Stack Temp (°F)		Velocity Head (in.WC)		dH	DGM Temperature (°F)	
point	Fs	sqrt (Fs)	dP	sqrt (dP)	(in.WC)	Fm,in	Fm,out
A-1	91	9.5	0.0251	0.158	1.72	63	63
2	87	9.3	0.0251	0.158	1.73	64	64
3	84	9.2	0.0251	0.158	1.75	66	66
4	89	9.4	0.0251	0.158	1.73	67	67
5	86	9.3	0.0251	0.158	1.75	68	68
6	83	9.1	0.0251	0.158	1.76	69	69
7	88	9.4	0.0251	0.158	1.75	70	70
8	85	9.2	0.0251	0.158	1.76	70	70
9	89	9.4	0.0251	0.158	1.75	72	72
10	87	9.3	0.0251	0.158	1.76	73	73
11	84	9.2	0.0251	0.158	1.77	73	73
12	86	9.3	0.0251	0.158	1.77	74	74
B-1	79	8.9	0.0251	0.158	1.77	69	69
2	84	9.2	0.0251	0.158	1.76	70	70
3	89	9.4	0.0251	0.158	1.75	71	71
4	87	9.3	0.0251	0.158	1.76	73	73
5	91	9.5	0.0251	0.158	1.75	74	74
6	85	9.2	0.0251	0.158	1.77	75	75
7	89	9.4	0.0251	0.158	1.76	75	75
8	88	9.4	0.0251	0.158	1.76	75	75
9	86	9.3	0.0251	0.158	1.77	75	75
Average:		**86.5**		**0.0251**	**1.75**		**70.8**

DGM Reading (cu.ft.): Final-1:	195.671	Impinger Weight (g): #1 Final:	764.1
Initial-1:	150.511	#1 Initial:	754.2
Final-2:	149.942	#2 Final:	738.8
Initial-2:	107.249	#2 Initial:	735.1
Final-3:		#3 Final:	676.7
Initial-3:		#3 Initial:	674.8
Final-4:		#4 Final:	893.1
Initial-4:		#4 Initial:	875.7
Final-5:		#5 Final:	
Initial-5:		#5 Initial:	
NET Volume:	**87.853**	#6 Final:	
		#6 Initial:	
		#7 Final:	
		#7 Initial:	
		#8 Final:	
		#8 Initial:	
		Total wt of impingers:	**32.9**

Location: Inlet 1 (Inside)

TEST RESULTS

CARB 425 (Hexavalent & Total Chromium)

Facility: AQMD Facility A
City: [redacted], CA
Source: Baghouse
Location: Inlet 1 Furnace (Inside)

TEST DATA	**UNITS**	**TEST RESULTS**			**AVERAGE**
Run Number	-	**Run 1**	**Run 2**	**Run 3**	
Test Date	mm/dd/yy	5/22/19	5/22/19	5/23/19	--
Test Time	hh:mm	11:50 - 14:15	14:38 - 16:53	8:25 - 10:45	--
Sampling Data*					
Stack Temperature	°F	152.3	138.0	128.4	**139.6**
Moisture	%	1.2	1.3	1.5	**1.4**
Sample Volume	dscf	102.7	100.5	105.9	**103.0**
Oxygen**	% v/v	19.9	19.9	20.2	**20.0**
Carbon Dioxide**	% v/v	0.30	0.30	0.30	**0.30**
Gas Velocity	ft/min	6,000.0	5,828.0	5,917.3	**5,915**
Stack Flow Rate	acfm	3,272	3,179	3,227	**3,226**
Stack Flow Rate	dscfm	2,661	2,644	2,743	**2,683**
Total Catch (CARB 425)					
Chromium VI	ug	58.5	3.8	23.5	**28.6**
Total Chromium	ug	281	55	346	**227**
Concentration (CARB 425)					
Chromium VI	ug/dscm	20.12	1.34	7.84	**9.76**
	ug/dscf	0.570	0.038	0.222	**0.276**
Total Chromium	ug/dscm	96.64	19.29	115.44	**77.1**
	ug/dscf	2.74	0.55	3.27	**2.18**
Mass Emissions (CARB 425)					
Chromium VI	ug/hr	90955	6000	36528	**44494**
Chromium VI	mg/hr	91.0	6.00	36.5	**44.5**
Chromium VI	lb/hr	2.01E-04	1.32E-05	8.05E-05	**9.81E-05**
Total Chromium	ug/hr	436895	86678	537974	**353849**
Total Chromium	mg/hr	437	87	538	**354**
Total Chromium	lb/hr	9.63E-04	1.91E-04	1.19E-03	**7.80E-04**

Notes:
* Performed during isokinetic sampling by CARB 425.
** O2/CO2 was measured via SCAQMD Method 10.1 by GC.

CARB METHOD 425 DATA AND CALCULATIONS

Plant: AQMD Facility A
City: [redacted], CA
Source: Baghouse
Location: Inlet 1 Furnace (Inside)

Test Date(s): 05/22 to 05/23/19
Operator: T.Ta/NC
Entered by: TG
Checked by: CF

Lab Results	**Units**	**Run 1**	**Run 2**	**Run 3**	Average
Chromium VI	ug	58.5	3.8	23.5	28.60
Total Chromium	µg	281	54.9	346.1	227.3
Chromium VI, Molecular Weight	g/g-mole	51.995	51.995	51.995	- -
Total Chromium, Molecular Weight	g/g-mole	51.995	51.995	51.995	- -
Concentration (ug/dscm), Ci = Mi/VmStd *35.315 cf/dscm					
Chromium VI	ug/dscm	20.12	1.34	7.84	9.8
Total Chromium	ug/dscm	96.64	19.29	115.44	77
Metals Mass Emissino Rate (lb/hr), Ei Ei = Ci*Qsdm*60/453600/1000					
Chromium VI	lb/hr	2.01E-04	1.32E-05	8.05E-05	9.81E-05
Total Chromium	lb/hr	9.63E-04	1.91E-04	1.19E-03	7.80E-04

MV_1 = 24.05 L/g-mole @68°F, 23.68 L/g-mole @60°F

Lab Data - CARB 425

Facility: AQMD Facility A
Source: Baghouse Inlet 1 Furnace (Inside)

Analytical Results - Cr+6

Run Number:	Run 1	Run 2	Run 3	RB	**Cr+6**
Rinse C1, ug	6.5	1.7	2.5	ND, MRL 0.010	C1
Impingers C2, ug	52	2.1	21	ND, MRL 0.020	C2
Total catch, ug	**58.5**	**3.8**	**23.5**		

Analytical Results - Total Chromium

Run Number:	Run 1	Run 2	Run 3	RB	**Cr**
Rinse C1, ug	11	3.9	6.1	ND, MRL 1.00	C1
Impingers C2, ug	270	51	340	ND, MRL 1.00	C2
Total catch, ug	**281**	**54.9**	**346.1**		

CARB METHOD 425 DATA AND CALCULATIONS

Plant:	AQMD Facility A
City:	[redacted], CA
Source:	Baghouse
Location:	Inlet 1 Furnace (Inside)

Test Date(s):	05/22 to 05/23/19
Operator:	T.Ta/NC
Entered by:	TG
Checked by:	CF

			05/22/19	05/22/19	05/23/19
DATA ENTRY	**symbol**	**units**	**DATA**	**DATA**	**DATA**
Run Number			1	2	3
Stack Dimensions: Round Stack Diameter	Ds	in.	10.00	10.00	10.00
Rectangular Stack, Length	L	in.			
Width	W	in.			
Nozzle Diameter	Dn	in.	0.180	0.180	0.180
Standard Temperature	Tstd	°F	68	68	68
Universal (molar) Gas Constant	Renglish	in. Hg-cu.ft/ °R-lbmole	21.85	21.85	21.85
Average Stack Temperature (measured)	Fs	°F	152.3	138.0	128.4
Average Meter Temperature (measured)	Fm	°F	97.7	93.8	90.0
Standard Pressure	Pstd	in.Hg	29.92	29.92	29.92
Barometric Pressure	Pbar	in.Hg	29.62	29.62	29.81
Stack Static Pressure	Pg	in.WC	-14.30	-14.30	-14.20
Average Meter Orifice Head (Delta-H)	dH	in.WC	2.46	2.41	2.55
Average RMS Velocity Head (Delta-P)	dP	in.WC	2.597	2.508	2.646
Pitot Coefficient	Cp	—	0.84	0.84	0.84
Net Volume of Gas Metered	Vm	cu.ft.	105.990	103.006	107.068
Dry Gas Meter Calibration Factor (gamma, Y)	Y	—	1.0274	1.0274	1.0274
NET Sampling Time	min	min.	120	120	120
Stack Gas: Oxygen Content*	O2,m	%	19.90	19.90	20.20
Carbon Dioxide Content*	CO2,m	%	<0.30	<0.30	<0.30
Total Impinger Gain	Ww	g	27.2	28.6	34.1
CALCULATED DATA					
Nozzle Area: An = pi/4*dn^2	An	sq.in.	0.0254	0.0254	0.0254
Stack Area (round): As = pi/576*ds^2	As	sq.ft.	0.55	0.55	0.55
(rectangular): As = L*W/144					
Absolute Stack Temperature: Ts = Fs+460	Ts	°R	612.3	598.0	588.4
Absolute Meter Temperature: Tm = Fm+460	Tm	°R	557.7	553.8	550.0
Standard Temperature: Tstdr = Tstd+460	Tstdr	°R	528.0	528.0	528.0
Gas Sample Volume at Standard Conditions: Vm(std) = Y * (Vm/Tm) * (Pbar + dH/13.6 in H2O/in Hg) * (Tstdr/Pstd)	VmStd	cu.ft.	102.7	100.5	105.9
Vol. of Water Vapor, Vw(std) = Ww/453.59 * Renglish/18 * Tstdr / Pstd	VwStd	cu.ft.	1.285	1.351	1.610
Moisture Fraction: Bws = VwStd/(VmStd+VwStd)	Bws	—	0.0124	0.013	0.0150
Stack Gas MW, Dry Basis: Md = 0.32*O2,m + 0.44*CO2,m + 0.28*(100-O2,m-CO2,m)	Md	g/mole	28.84	28.84	28.86
Stack Gas MW, Wet Basis: Mw = Md*(1-Bws) + 18*Bws	Mw	g/mole	28.71	28.70	28.69
Stack Pressure: Ps = Pbar + Pg/13.6	Ps	in.Hg	28.57	28.57	28.77
Stack Gas Velocity, measured					
vs = 85.49*Cp*√(dP*Ts/Ps/Mw)	vs	ft/s	100.00	97.13	98.62
vm = 0.3048 m/ft*vs	vsm	m/s	30.48	29.61	30.06
Stack Gas Volumetric Flow Rate: Q = 60*vs*As	Q	acfm	3,272	3,179	3,227
Stack Gas Volumetric Flow Rate, corrected:					
Qsd = Q*(1-Bws)*(Ps/Ts)*(Tstdr/Pstd)	Qsd	dscfm	2,661	2,644	2,743
Qsdm = Qsd/35.315	Qsdm	dscmm	75.4	74.9	77.7
Isokinetic Sampling Rate: I = 144*100*Ts*Vmstd *Pstd/[60*Tstdr*vs*min*An*Ps*(1-Bws)]	I	%	99.3	97.7	99.3

* O2/CO2 was measured via SCAQMD Method 10.1 by GC.

CARB METHOD 425 DATA AND CALCULATIONS

Plant: AQMD Facility A
City: [redacted], CA
Source: Baghouse
Location: Inlet 1 Furnace (Inside)

Run No.: 1
Test Date: 05/22/19
Times: 11:50 - 14:15

	Stack Temp (°F)		Velocity Head (in.WC)		dH	DGM Temperature (°F)	
point	Fs	sqrt (Fs)	dP	sqrt (dP)	(in.WC)	Fm,in	Fm,out
A-1	117	10.8	2.70	1.64	2.63	90	90
2	126	11.2	3.00	1.73	2.88	91	91
3	144	12.0	2.60	1.61	2.43	92	92
4	140	11.8	2.60	1.61	2.45	94	94
5	128	11.3	2.50	1.58	2.41	95	95
6	166	12.9	2.80	1.67	2.54	96	96
7	193	13.9	3.30	1.82	2.87	96	96
8	139	11.8	3.50	1.87	3.33	98	98
9	164	12.8	3.20	1.79	2.92	98	98
10	173	13.2	2.90	1.70	2.62	99	99
11	190	13.8	2.60	1.61	2.29	100	100
12	142	11.9	2.20	1.48	2.09	100	100
B-1	148	12.2	3.30	1.82	3.08	95	95
2	175	13.2	3.20	1.79	2.86	96	96
3	144	12.0	3.20	1.79	3.02	98	98
4	137	11.7	3.30	1.82	3.16	99	99
5	178	13.3	3.10	1.76	2.78	100	100
6	169	13.0	3.40	1.84	3.10	101	101
7	123	11.1	2.00	1.41	1.97	101	101
8	152	12.3	2.10	1.45	1.97	102	102
9	144	12.0	1.90	1.38	1.80	101	101
10	157	12.5	1.70	1.30	1.58	101	101
11	162	12.7	1.30	1.14	1.20	101	101
12	161	12.7	1.10	1.05	1.01	100	100
Average:		**152.3**		**2.5974**	**2.46**		**97.7**

DGM Reading (cu.ft.): Final-1:	645.510	Impinger Weight (g): #1 Final:	755.6
Initial-1:	539.520	#1 Initial:	751.1
Final-2:		#2 Final:	753.2
Initial-2:		#2 Initial:	749.5
Final-3:		#3 Final:	653.8
Initial-3:		#3 Initial:	651.2
Final-4:		#4 Final:	820.9
Initial-4:		#4 Initial:	804.5
Final-5:		#5 Final:	
Initial-5:		#5 Initial:	
NET Volume:	**105.990**	#6 Final:	
		#6 Initial:	
		#7 Final:	
		#7 Initial:	
		#8 Final:	
		#8 Initial:	
		Total wt of impingers:	**27.2**

CARB METHOD 425 DATA AND CALCULATIONS

Plant:	AQMD Facility A	Run No.:	2
City:	[redacted], CA	Test Date:	05/22/19
Source:	Baghouse	Times:	14:38 - 16:53
Location:	Inlet 1 Furnace (Inside)		

	Stack Temp (°F)		Velocity Head (in.WC)		dH	DGM Temperature (°F)	
point	Fs	sqrt (Fs)	dP	sqrt (dP)	(in.WC)	Fm,in	Fm,out
A-1	186	13.6	2.40	1.55	2.09	92	92
2	168	13.0	2.50	1.58	2.25	94	94
3	143	12.0	2.50	1.58	2.35	94	94
4	124	11.1	2.70	1.64	2.63	96	96
5	117	10.8	2.80	1.67	2.76	96	96
6	115	10.7	2.70	1.64	2.67	97	97
7	130	11.4	3.80	1.95	3.38	98	98
8	138	11.7	3.20	1.79	3.05	98	98
9	145	12.0	3.50	1.87	3.30	98	98
10	123	11.1	2.40	1.55	2.35	99	99
11	150	12.2	2.30	1.52	1.98	99	99
12	147	12.1	1.80	1.34	1.69	98	98
B-1	153	12.4	3.50	1.87	3.21	91	91
2	150	12.2	3.40	1.84	3.14	91	91
3	148	12.2	3.30	1.82	3.06	92	92
4	147	12.1	3.30	1.82	3.07	92	92
5	145	12.0	3.40	1.84	3.17	92	92
6	144	12.0	3.40	1.84	3.17	92	92
7	137	11.7	2.10	1.45	1.98	92	92
8	135	11.6	1.90	1.38	1.80	91	91
9	129	11.4	1.50	1.22	1.43	90	90
10	124	11.1	1.30	1.14	1.25	90	90
11	117	10.8	1.20	1.10	1.17	90	90
12	110	10.5	1.00	1.00	0.98	89	89
Average:		**138.0**		**2.5084**	**2.41**		**93.8**

DGM Reading (cu.ft.): Final-1:	749.086	Impinger Weight (g): #1 Final:	770.8
Initial-1:	646.080	#1 Initial:	762.6
Final-2:		#2 Final:	643.5
Initial-2:		#2 Initial:	640.0
Final-3:		#3 Final:	656.6
Initial-3:		#3 Initial:	655.7
Final-4:		#4 Final:	860.0
Initial-4:		#4 Initial:	844.0
Final-5:		#5 Final:	
Initial-5:		#5 Initial:	
NET Volume:	**103.006**	#6 Final:	
		#6 Initial:	
		#7 Final:	
		#7 Initial:	
		#8 Final:	
		#8 Initial:	
		Total wt of impingers:	**28.6**

CARB METHOD 425 DATA AND CALCULATIONS

Plant:	AQMD Facility A	Run No.:	3
City:	[redacted], CA	Test Date:	05/23/19
Source:	Baghouse	Times:	8:25 - 10:45
Location:	Inlet 1 Furnace (Inside)		

	Stack Temp (°F)		Velocity Head (in.WC)		dH	DGM Temperature (°F)	
point	Fs	sqrt (Fs)	dP	sqrt (dP)	(in.WC)	Fm,in	Fm,out
A-1	184	13.6	2.60	1.61	2.24	84	84
2	185	13.6	2.50	1.58	2.16	86	86
3	145	12.0	2.50	1.58	2.14	87	87
4	140	11.8	2.30	1.52	2.15	89	89
5	131	11.4	2.60	1.61	2.47	90	90
6	110	10.5	2.70	1.64	2.67	91	91
7	128	11.3	3.40	1.84	3.26	92	92
8	117	10.8	3.60	1.90	3.53	93	93
9	113	10.6	3.30	1.82	3.25	93	93
10	114	10.7	2.70	1.64	2.66	94	94
11	135	11.6	2.50	1.58	2.37	93	93
12	126	11.2	1.70	1.30	1.64	93	93
B-1	121	11.0	2.80	1.67	2.69	86	86
2	103	10.1	3.40	1.84	3.38	87	87
3	136	11.7	3.50	1.87	3.29	88	88
4	106	10.3	3.30	1.82	3.27	89	89
5	159	12.6	3.20	1.79	2.91	90	90
6	132	11.5	3.40	1.84	3.23	91	91
7	147	12.1	2.70	1.64	2.50	91	91
8	123	11.1	2.40	1.55	2.32	91	91
9	117	10.8	2.20	1.48	2.15	91	91
10	115	10.7	2.10	1.45	2.06	91	91
11	105	10.2	1.70	1.30	1.69	90	90
12	109	10.4	1.30	1.14	1.28	90	90
Average:		**128.4**		**2.6459**	**2.55**		**90.0**

DGM Reading (cu.ft.): Final-1:	858.118	Impinger Weight (g): #1 Final:	758.4
Initial-1:	751.050	#1 Initial:	751.6
Final-2:		#2 Final:	737.4
Initial-2:		#2 Initial:	749.9
Final-3:		#3 Final:	672.9
Initial-3:		#3 Initial:	652.9
Final-4:		#4 Final:	853.4
Initial-4:		#4 Initial:	833.6
Final-5:		#5 Final:	
Initial-5:		#5 Initial:	
NET Volume:	**107.068**	#6 Final:	
		#6 Initial:	
		#7 Final:	
		#7 Initial:	
		#8 Final:	
		#8 Initial:	
		Total wt of impingers:	**34.1**

Location: Inlet 2 (downstream/outside)

TEST RESULTS

CARB 425 (Hexavalent & Total Chromium)

Facility: AQMD Facility A
City: [redacted] CA
Source: Baghouse
Location: Inlet 2 (Upstream to Baghouse)

TEST DATA	**UNITS**	**TEST RESULTS**			**AVERAGE**
Run Number	-	**Run 1**	**Run 2**	**Run 3**	
Test Date	mm/dd/yy	5/22/19	5/22/19	5/23/19	--
Test Time	hh:mm	11:50 - 14:12	14:38 - 16:50	8:25 - 10:42	--
Sampling Data*					
Stack Temperature	°F	91	85	81	**86**
Moisture	%	1.4	1.5	1.5	**1.5**
Sample Volume	dscf	102.2	105.0	105.0	**104.1**
Oxygen**	% v/v	20.2	20.2	19.9	**20.1**
Carbon Dioxide**	% v/v	0.30	0.30	0.30	**0.30**
Gas Velocity	ft/min	5,774.9	5,873.0	5,815.4	**5,821**
Stack Flow Rate	acfm	40,820	41,514	41,106	**41,147**
Stack Flow Rate	dscfm	36,968	37,943	37,953	**37,621**
Total Catch (CARB 425)					
Chromium VI	ug	4.30	0.52	3.04	**2.62**
Total Chromium	ug	13.7	5.1	21.7	**13.5**
Concentration (CARB 425)					
Chromium VI	ug/dscm	1.49	0.17	1.02	**0.89**
	ug/dscf	0.042	0.005	0.029	**0.025**
Total Chromium	ug/dscm	4.73	1.72	7.30	**4.58**
	ug/dscf	0.13	0.05	0.21	**0.13**
Mass Emissions (CARB 425)					
Chromium VI	ug/hr	93299	11274	65907	**56827**
Chromium VI	mg/hr	93.3	11.3	65.9	**56.8**
Chromium VI	lb/hr	2.1E-04	2.5E-05	1.5E-04	**1.25E-04**
Total Chromium	ug/hr	297255	110574	470457	**292762**
Total Chromium	mg/hr	297.26	110.57	470.46	**292.8**
Total Chromium	lb/hr	6.6E-04	2.4E-04	1.0E-03	**6.45E-04**

Notes:
* Performed during isokinetic sampling by CARB 425.
**O2/CO2 was measured via SCAQMD Method 10.1 by GC.

CARB METHOD 425 DATA AND CALCULATIONS

Plant: AQMD Facility A
City: [redacted], CA
Source: Baghouse
Location: Inlet 2 (Upstream to Baghouse)

Test Date(s): 05/22 to 05/23/19
Operator: MN/NC
Entered by: TG
Checked by: CF

Metals Catch, Mi					
Lab Results	**Units**	**Run 1**	**Run 2**	**Run 3**	Average
Chromium VI	ug	4.30	0.52	3.04	2.62
Total Chromium	µg	13.7	5.1	21.7	13.5
Chromium VI, Molecular Weight	g/g-mole	51.995	51.995	51.995	- -
Total Chromium, Molecular Weight	g/g-mole	51.995	51.995	51.995	- -
Concentration (ug/dscm), Ci = Mi/VmStd *35.315 cf/dscm					
Chromium VI	ug/dscm	1.49	0.17	1.02	0.89
Total Chromium	ug/dscm	4.73	1.72	7.30	4.58
Metals Mass Emissino Rate (lb/hr), Ei	**Ei = Ci*Qsdm*60/453600/1000**				
Chromium VI	lb/hr	2.06E-04	2.49E-05	1.45E-04	1.25E-04
Total Chromium	lb/hr	6.55E-04	2.44E-04	1.04E-03	6.45E-04

MV_1 = 24.05 L/g-mole @68°F, 23.68 L/g-mole @60°F

Lab Data - CARB 425

Facility: AQMD Facility A
Source: Baghouse Inlet 2 (Upstream to Baghouse)

Analytical Results - Cr+6

Run Number:	Run 1	Run 2	Run 3	RB	Cr+6
Rinse C1, ug	1.2	0.21	0.94	ND, MRL 0.010	C1
Impingers C2, ug	3.1	0.31	2.10	ND, MRL 0.020	C2
Total catch, ug	**4.3**	**0.52**	**3.04**		

Analytical Results - Total Chromium

Run Number:	Run 1	Run 2	Run 3	RB	Cr
Rinse C1, ug	2.70	1.5	2.7	ND, MRL 1.00	C1
Impingers C2, ug	11.0	3.6	19	ND, MRL 1.00	C2
Total catch, ug	**13.7**	**5.1**	**21.7**		

CARB METHOD 425 DATA AND CALCULATIONS

Plant:	AQMD Facility A	Test Date(s):	05/22 to 05/23/19
City:	[redacted], CA	Operator:	MN/NC
Source:	Baghouse	Entered by:	TG
Location:	Inlet 2 (Upstream to Baghouse)	Checked by:	CF

			05/22/19	05/22/19	05/23/19
DATA ENTRY	**symbol**	**units**	**DATA**	**DATA**	**DATA**
Run Number			1	2	3
Stack Dimensions: Round Stack Diameter	Ds	in.	36.00	36.00	36.00
Rectangular Stack, Length	L	in.			
Width	W	in.			
Nozzle Diameter	Dn	in.	0.173	0.173	0.173
Standard Temperature	Tstd	°F	68	68	68
Universal (molar) Gas Constant	Renglish	in. Hg-cu.ft/ °R-lbmole	21.85	21.85	21.85
Average Stack Temperature (measured)	Fs	°F	90.8	85.1	81.5
Average Meter Temperature (measured)	Fm	°F	92.8	85.6	76.0
Standard Pressure	Pstd	in.Hg	29.92	29.92	29.92
Barometric Pressure	Pbar	in.Hg	29.62	29.62	29.80
Stack Static Pressure	Pg	in.WC	-13.0	-13.0	-14.0
Average Meter Orifice Head (Delta-H)	dH	in.WC	2.53	2.67	2.61
Average RMS Velocity Head (Delta-P)	dP	in.WC	2.683	2.803	2.776
Pitot Coefficient	Cp	—	0.84	0.84	0.84
Net Volume of Gas Metered	Vm	cu.ft.	103.348	104.747	102.330
Dry Gas Meter Calibration Factor (gamma, Y)	Y	—	1.0395	1.0395	1.0395
NET Sampling Time	min	min.	120	120	120
Stack Gas: Oxygen Content*	O2,m	%	20.20	20.20	19.90
Carbon Dioxide Content*	CO2,m	%	<0.3	<0.3	<0.3
Total Impinger Gain	Ww	g	30.3	34.1	34.5
CALCULATED DATA					
Nozzle Area: An = pi/4*dn^2	An	sq.in.	0.0235	0.0235	0.0235
Stack Area (round): As = pi/576*ds^2	As	sq.ft.	7.07	7.07	7.07
(rectangular): As = L*W/144					
Absolute Stack Temperature: Ts = Fs+460	Ts	°R	550.8	545.1	541.5
Absolute Meter Temperature: Tm = Fm+460	Tm	°R	552.8	545.6	536.0
Standard Temperature: Tstdr = Tstd+460	Tstdr	°R	528.0	528.0	528.0
Gas Sample Volume at Standard Conditions: Vm(std) = Y * (Vm/Tm) * (Pbar + dH/13.6 in H2O/in Hg) * (Tstdr/Pstd)	VmStd	cu.ft.	102.228	105.003	105.037
Vol. of Water Vapor, Vw(std) = Ww/453.59 * Renglish/18 * Tstdr / Pstd	VwStd	cu.ft.	1.431	1.610	1.629
Moisture Fraction: Bws = VwStd/(VmStd+VwStd)	Bws	—	0.0138	0.015	0.0153
Stack Gas MW, Dry Basis: Md = 0.32*O2,m + 0.44*CO2,m + 0.28*(100-O2,m-CO2,m)	Md	g/mole	28.86	28.86	28.84
Stack Gas MW, Wet Basis: Mw = Md*(1-Bws) + 18*Bws	Mw	g/mole	28.71	28.69	28.68
Stack Pressure: Ps = Pbar + Pg/13.6	Ps	in.Hg	28.66	28.66	28.77
Stack Gas Velocity, measured					
vs = 85.49*Cp*√(dP*Ts/Ps/Mw)	vs	ft/s	96.25	97.88	96.92
vm = 0.3048 m/ft*vs	vsm	m/s	29.34	29.84	29.54
Stack Gas Volumetric Flow Rate: Q = 60*vs*As	Q	acfm	40,820	41,514	41,106
Stack Gas Volumetric Flow Rate, corrected:					
Qsd = Q*(1-Bws)*(Ps/Ts)*(Tstdr/Pstd)	Qsd	dscfm	36,968	37,943	37,953
Qsdm = Qsd/35.315	Qsdm	dscmm	1,046.8	1,074.4	1,074.7
Isokinetic Sampling Rate: I = 144*100*Ts*Vmstd *Pstd/[60*Tstdr*vs*min*An*Ps*(1-Bws)]	I	%	99.8	99.9	99.9

*O2/CO2 was measured via SCAQMD Method 10.1 by GC.

CARB METHOD 425 DATA AND CALCULATIONS

Plant: AQMD Facility A
City: [redacted], CA
Source: Baghouse
Location: Inlet 2 (Upstream to Baghouse)

Run No.: 1
Test Date: 05/22/19
Times: 11:50 - 14:12

	Stack Temp (°F)		Velocity Head (in.WC)		dH	DGM Temperature (°F)	
point	Fs	sqrt (Fs)	dP	sqrt (dP)	(in.WC)	Fm,in	Fm,out
A-12	87	9.3	2.80	1.67	2.60		84
11	89	9.4	3.50	1.87	3.25		85
10	89	9.4	2.90	1.70	2.70		87
9	90	9.5	3.40	1.84	3.15		89
8	89	9.4	3.20	1.79	2.95		91
7	93	9.6	2.90	1.70	2.70		93
6	93	9.6	2.70	1.64	2.50		94
5	92	9.6	2.40	1.55	2.25		95
4	94	9.7	1.90	1.38	1.75		96
3	94	9.7	1.80	1.34	1.65		96
2	91	9.5	1.80	1.34	1.65		95
1	85	9.2	2.50	1.58	2.30		95
B-12	90	9.5	2.60	1.61	2.40		90
11	92	9.6	2.90	1.70	2.70		92
10	92	9.6	3.40	1.84	3.15		93
9	92	9.6	3.30	1.82	3.05		94
8	95	9.7	3.10	1.76	2.90		95
7	94	9.7	2.80	1.67	2.60		95
6	93	9.6	2.70	1.64	2.50		95
5	96	9.8	2.30	1.52	2.15		95
4	94	9.7	1.80	1.34	1.70		95
3	92	9.6	1.50	1.22	1.40		94
2	83	9.1	3.10	1.76	2.90		94
1	82	9.1	4.00	2.00	3.70		94
Average:		**90.8**		**2.6834**	**2.53**		**92.8**

DGM Reading (cu.ft.): Final-1:	281.562	Impinger Weight (g): #1 Final:	675.0
Initial-1:	178.214	#1 Initial:	667.1
Final-2:		#2 Final:	700.1
Initial-2:		#2 Initial:	696.5
Final-3:		#3 Final:	667.0
Initial-3:		#3 Initial:	666.2
Final-4:		#4 Final:	936.9
Initial-4:		#4 Initial:	918.9
Final-5:		#5 Final:	
Initial-5:		#5 Initial:	
NET Volume:	**103.348**	#6 Final:	
		#6 Initial:	
		#7 Final:	
		#7 Initial:	
		#8 Final:	
		#8 Initial:	
		Total wt of impingers:	**30.3**

CARB METHOD 425 DATA AND CALCULATIONS

Plant: AQMD Facility A
City: [redacted], CA
Source: Baghouse
Location: Inlet 2 (Upstream to Baghouse)

Run No.: 2
Test Date: 05/22/19
Times: 14:38 - 16:50

	Stack Temp (°F)		Velocity Head (in.WC)		dH	DGM Temperature (°F)	
point	Fs	sqrt (Fs)	dP	sqrt (dP)	(in.WC)	Fm,in	Fm,out
A-12	92	9.6	2.60	1.61	2.40		88
11	93	9.6	3.30	1.82	3.05		89
10	92	9.6	3.50	1.87	3.25		90
9	88	9.4	3.20	1.79	2.95		91
8	88	9.4	3.00	1.73	3.75		91
7	88	9.4	2.80	1.67	2.80		90
6	86	9.3	2.70	1.64	2.50		91
5	86	9.3	2.10	1.45	1.95		91
4	88	9.4	1.90	1.38	1.60		90
3	88	9.4	1.80	1.34	1.65		91
2	82	9.1	3.10	1.76	2.90		91
1	82	9.1	3.80	1.95	3.50		90
B-12	82	9.1	2.75	1.66	2.55		82
11	82	9.1	3.40	1.84	3.15		82
10	84	9.2	3.50	1.87	3.25		82
9	84	9.2	3.10	1.76	2.90		81
8	84	9.2	3.10	1.76	2.90		81
7	84	9.2	2.90	1.70	2.70		81
6	84	9.2	2.65	1.63	2.45		81
5	83	9.1	2.00	1.41	1.85		81
4	83	9.1	1.85	1.36	1.70		81
3	80	8.9	1.90	1.38	1.75		80
2	80	8.9	3.20	1.79	2.95		80
1	80	8.9	4.00	2.00	3.70		80
Average:		**85.1**		**2.8033**	**2.67**		**85.6**

DGM Reading (cu.ft.): Final-1:	386.610	Impinger Weight (g): #1 Final:	767.9
Initial-1:	281.863	#1 Initial:	758.6
Final-2:		#2 Final:	766.3
Initial-2:		#2 Initial:	762.6
Final-3:		#3 Final:	644.0
Initial-3:		#3 Initial:	641.6
Final-4:		#4 Final:	791.3
Initial-4:		#4 Initial:	772.6
Final-5:		#5 Final:	
Initial-5:		#5 Initial:	
NET Volume:	**104.747**	#6 Final:	
		#6 Initial:	
		#7 Final:	
		#7 Initial:	
		#8 Final:	
		#8 Initial:	
		Total wt of impingers:	**34.1**

CARB METHOD 425 DATA AND CALCULATIONS

Plant: AQMD Facility A
City: [redacted], CA
Source: Baghouse
Location: Inlet 2 (Upstream to Baghouse)

Run No.: 3
Test Date: 05/23/19
Times: 8:25 - 10:42

	Stack Temp (°F)		Velocity Head (in.WC)		dH	DGM Temperature (°F)	
point	Fs	sqrt (Fs)	dP	sqrt (dP)	(in.WC)	Fm,in	Fm,out
A-12	86	9.3	2.60	1.61	2.40		67
11	86	9.3	2.60	1.61	2.40		68
10	85	9.2	3.40	1.84	3.15		71
9	86	9.3	3.20	1.79	2.95		72
8	84	9.2	3.10	1.76	2.90		73
7	84	9.2	3.10	1.76	2.90		74
6	84	9.2	2.90	1.70	2.70		75
5	84	9.2	2.40	1.55	2.25		76
4	82	9.1	2.20	1.48	2.05		77
3	82	9.1	1.80	1.34	1.65		77
2	76	8.7	2.20	1.48	2.05		78
1	73	8.5	3.80	1.95	3.50		78
B-12	79	8.9	2.40	1.55	2.25		74
11	79	8.9	3.60	1.90	3.45		76
10	82	9.1	3.30	1.82	3.05		78
9	81	9.0	3.50	1.87	3.25		78
8	81	9.0	3.40	1.84	3.15		79
7	83	9.1	3.20	1.79	3.00		79
6	84	9.2	3.20	1.79	3.00		79
5	82	9.1	2.45	1.57	2.25		79
4	82	9.1	2.10	1.45	1.95		79
3	82	9.1	1.70	1.30	1.60		79
2	79	8.9	2.40	1.55	2.25		79
1	71	8.4	2.80	1.67	2.60		79
Average:		**81.5**		**2.7757**	**2.61**		**76.0**

DGM Reading (cu.ft.): Final-1:	489.310	Impinger Weight (g): #1 Final:	678.6
Initial-1:	386.980	#1 Initial:	669.4
Final-2:		#2 Final:	701.2
Initial-2:		#2 Initial:	696.8
Final-3:		#3 Final:	668.7
Initial-3:		#3 Initial:	666.9
Final-4:		#4 Final:	939.2
Initial-4:		#4 Initial:	920.1
Final-5:		#5 Final:	
Initial-5:		#5 Initial:	
NET Volume:	**102.330**	#6 Final:	
		#6 Initial:	
		#7 Final:	
		#7 Initial:	
		#8 Final:	
		#8 Initial:	
		Total wt of impingers:	**34.5**

APPENDIX D2

CHROMIUM EMISSIONS (HEX/TOTAL) – FIELD DATA

Location: Baghouse Outlet

Sampling Access

The exhaust test location was accessed via a man lift for one side of the exhaust.

For the others side, the facility installed a platform with guardrails that extends from the roof to the exhaust stack.

146 inches divided by 4, and then by 2
36.50 Div 4
18.25 Div 2
54.75 Sum
60 minutes at 5 minutes a point

Roof Side

These point will not be sampled safety - too high		
x	x ~~these ports will be sampled twice~~	x
x	x	x
x	x	x

Lot Side

x	x	x	18.25 inches from top
x	x	x	36.5 inches from the point above 54.75 inches from top
x	x	x	36.5 inches from the point below 54.75 inches from bottom
x	x	x	18.25 inches from bottome

9 Points Roof Side

12 Points Lot Side

Imp 1 pH 10
Imp 2 pH 10

Almega ENVIRONMENTAL

ISOKINETIC DATA FORM, TE COOLER & CYCLONIC FLOW

METHOD

Almega ENVIRONMENTAL

Run # : 1
Date : 5/22/19
Client : Facility A
Unit : Outlet
Operator : CH
Stack Dia :
Amb. Press : 29.62
Static Press : NA

Pitot ID: 16
Pitot Coeff. : .84
Meter Box # : A-6
Meter @ Dh : 1.789
Meter Y : 1.0376
TC # : 16
Start Time : 1150
Stop Time : 1415
Nozzle Dia : .513

Klarnet

Impinger #	Initial	Final	Net
1	754.7	734.0	
2	732.3	734.7	
3	673.5	677.3	
4	874.1	894.0	
5			

H2O Gain =
Filter :

Pitot Leak Check

Initial :		
Final :		

Meter Box Leak Check

	Rate	"HG
Initial :	.000	20"
Final :		

Traverse Points	Time (Minute)	Delta P ("H2O)	Stack Temp. (F)	Set delta H ("H2O)	Meter Volume (acf)	Mtr. Inlet Temp. (F)	Mtr. Outlet Temp. (F)	Oven Temp. (F)	Probe Temp. (F)	Impinger Temp. (F)	Pump Vac. ("HG)	TE Cooler Temp. (F)	Cyclonic Flow ("H2O)
0	0	—	—	—	924.403	—	—	—	—	—	—	NA	—
1	7	.0256	89	1.81	929.531	79	79	NA	NA	54	5		
2	14	.0256	87	1.82	934.682	80	80			54	5		
3	21	.0256	91	1.81	939.829	82	82			54	5		
4	28	.0256	84	1.84	945.022	83	83			54	5		
5	35	.0256	89	1.83	950.198	84	84			55	5		
6	42	.0256	87	1.84	955.391	85	85			56	5		
7	49	.0256	84	1.85	960.610	86	86			56	5		
8	56	.0256	90	1.83	965.802	86	86			56	5		
9	63	.0256	88	1.84	971.013	87	87	NA	NA	56	5	NA	
					971.310								
1	5	.0256	90	1.81	974.981	81	81	NA	NA	56	5	NA	
2	10	.0256	87	1.83	978.672	82	82			56	5		
3	15	.0256	84	1.84	982.371	82	82			56	5		
4	20	.0256	89	1.82	986.062	83	83			56	5		
5	25	.0256	86	1.83	989.760	83	83			56	5		
6	30	.0256	92	1.82	993.452	84	84			56	5		
7	35	.0256	88	1.83	997.160	85	85			56	5		
8	40	.0256	84	1.85	1000.881	85	85			56	5		
9	45	.0256	81	1.86	1004.609	85	85			56	5		
10	50	.0256	85	1.85	1008.332	86	86			56	5		
11	55	.0256	89	1.83	1012.041	86	86			56	5		
12	60	.0256	87	1.84	1015.763	86	86	NA	NA	56	5	NA	

Additional Leak Check 19" .000 ACF

[illegible] @ 1312

Isokinetic Factor Setup

Estimated Dry Gas Meter Temp:
Estimated Stack Temp:
Estimated Delta P:
Estimated Moisture Content: 27%
Estimated O2: 20.7
Estimated CO2: .05

Equipment Evaluation , OK? Y or N

Ambient Temp.:
TC Check:
Pitot Check:
Tedlar Bag:
Pitot Exp Date:
TC Exp Date

Dry Gas Meter Leak Checks

	1	2	3	4	5	6
DGM Initial:						
Vacuum:						
Leak Rate:						
DGM Final:						

Imp 1 pH 10
Imp 2 all 10

Almega ENVIRONMENTAL

ISOKINETIC DATA FORM, TE COOLER & CYCLONIC FLOW

METH

Almega ENVIRONMENTAL

Run # :	2	Pitot ID:	16	Impinger #	Initial	Final	Net		Pitot Leak Check
Date :	5/22/19	Pitot Coeff. :	.84	1	753.1	763.3		Initial :	
Client :	Facility A	Meter Box # :	A-6	2	710.4	713.9		Final :	
Unit :	Outlet	Meter @ Dh :	1.789	3	643.8	646.0			
Operator :	CH	Meter Y :	1.0376	4	907.6	925.2		Meter Box Leak Check	
Stack Dia :		TC # :	16	5				Rate	"HG
Amb. Press :	29.62	Start Time :	1438	Nozzle Dia	H2O Gain =			Initial : .000	24"
Static Press :	NA	Stop Time :	1653	.513	Filter :			Final : .000	23"

Sodium bicarb

Traverse Points	Time (Minute)	Delta P ("H2O)	Stack Temp. (F)	Set delta H ("H2O)	Meter Volume (acf)	Mtr. Inlet Temp. (F)	Mtr. Outlet Temp. (F)	Oven Temp. (F)	Probe Temp. (F)	Impinger Temp. (F)	Pump Vac. ("HG)	TE Cooler Temp. (F)	Cyclonic Flow ("H2O)
0	0	—	—	—	016.118	—	—	—	—	—	—	NA	—
1	5	.0256	87	1.81	019.781	78	78	NA	NA	54	5		
2	10	.0256	90	1.81	023.439	79	79			54	5		
3	15	.0256	85	1.82	027.112	79	79			54	5		
4	20	.0256	87	1.82	030.793	80	80			54	5		
5	25	.0256	89	1.82	034.468	81	81			55	5		
6	30	.0256	84	1.83	038.162	81	81			55	5		
7	35	.0256	86	1.82	041.837	80	80			55	5		
8	40	.0256	88	1.82	045.512	80	80			56	5		
9	45	.0256	85	1.83	049.190	80	80			66	5		
10	50	.0256	89	1.81	052.853	79	79			56	5		
11	55	.0256	87	1.82	056.521	79	79			56	5		
12	60	.0256	85	1.82	060.203	77	79	NA	NA	56	5	NA	
					061.114								
1	7	.0256	89	1.79	066.191	74	74	NA	NA	54	5	NA	
2	14	.0256	87	1.80	071.272	73	73			54	5		
3	21	.0256	84	1.81	076.371	74	74			54	5		
4	28	.0256	88	1.80	081.452	74	74			54	5		
5	35	.0256	86	1.81	086.553	75	75			54	5		
6	42	.0256	89	1.80	091.642	75	75			54	5		
7	49	.0256	85	1.81	096.751	75	75			54	5		
8	56	.0256	87	1.81	101.858	76	76			54	5		
9	63	.0256	89	1.80	106.962	76	76	NA	NA	54	5	NA	

[illegible] @ Additional leak check
1450 22" .000 rate Chk ok

Isokinetic Factor Setup

Estimated Dry Gas Meter Temp:	
Estimated Stack Temp:	
Estimated Delta P:	
Estimated Moisture Content:	2%
Estimated O2:	20.9
Estimated CO2:	.05

Equipment Evaluation , OK? Y or N

Ambient Temp.:	
TC Check:	
Pitot Check:	
Tedlar Bag:	
Pitot Exp Date:	
TC Exp Date	

Dry Gas Meter Leak Checks

	1	2	3	4	5	6
DGM Initial:						
Vacuum:						
Leak Rate:						
DGM Final:						

Flows Based of the 2 inlets combined

Imp 1 pH 10
Im - " 10 5

Almega ENVIRONMENTAL

ISOKINETIC DATA FORM, TE COOLER & CYCLONIC FLOW

METH

Almega ENVIRONMENTAL

Run #: 3
Date: 5-23-18
Client: Facility A
Unit: Outlet
Operator: CH
Stack Dia:
Amb. Press: 29.80
Static Press: NA

Pitot ID: 16
Pitot Coeff.: .84
Meter Box #: B-6
Meter @ Dh: 1.789
Meter Y: 1.0376
TC #: 16
Start Time: 0825
Stop Time: 1045
Nozzle Dia: .513

Impinger #	Initial	Final	Net
1	754.2	764.1	
2	735.1	738.8	
3	674.8	676.7	
4	875.7	893.1	
5			

NaHCO3

H2O Gain =
Filter:

Pitot Leak Check

Initial:	NA	NA
Final:	NA	NA

Meter Box Leak Check

	Rate	"HG
Initial:	.000	21"
Final:	.000	23"

Traverse Points	Time (Minute)	Delta P ("H2O)	Stack Temp. (F)	Set delta H ("H2O)	Meter Volume (acf)	Mtr. Inlet Temp. (F)	Mtr. Outlet Temp. (F)	Oven Temp. (F)	Probe Temp. (F)	Impinger Temp. (F)	Pump Vac. ("HG)	TE Cooler Temp. (F)	Cyclonic Flow ("H2O)
0	0	–	–	–	107.249	–	–	NA	NA	–	–	NA	
1	5	.0251	91	1.72	110.751	63	63	↓	↓	54	5	↓	
2	10	.0251	87	1.73	114.272	64	64	↓	↓	54	5	↓	
3	15	.0251	84	1.75	117.823	66	66	↓	↓	54	5	↓	
4	20	.0251	89	1.73	121.358	67	67	↓	↓	54	5	↓	
5	25	.0251	86	1.75	124.912	68	68	↓	↓	54	5	↓	
6	30	.0251	83	1.76	128.481	69	69	↓	↓	54	5	↓	
7	35	.0251	88	1.75	132.042	70	70	↓	↓	54	5	↓	
8	40	.0251	85	1.76	135.612	70	70	↓	↓	54	5	↓	
9	45	.0251	89	1.75	139.183	72	72	↓	↓	55	5	↓	
10	50	.0251	87	1.76	142.758	73	73	↓	↓	55	5	↓	
11	55	.0251	84	1.77	146.353	73	73	↓	↓	55	5		
12	60	.0251	86	1.77	149.942	74	74	NA	NA	55	5	NA	
					150.511								
1	7	.0251	79	1.77	155.521	69	69	NA	NA	54	5	NA	
2	14	.0251	84	1.76	160.523	70	70	↓	↓	54	6	↓	
3	21	.0251	89	1.75	165.512	71	71	↓	↓	54	5	↓	
4	28	.0251	87	1.76	170.529	73	73	↓	↓	54	5	↓	
5	35	.0251	91	1.75	175.532	74	74	↓	↓	54	5	↓	
6	42	.0251	85	1.77	180.573	75	75	↓	↓	54	5	↓	
7	49	.0251	89	1.76	185.602	75	75	↓	↓	54	5	↓	
8	56	.0251	88	1.76	190.630	75	75	↓	↓	54	5	↓	
9	63	.0251	86	1.77	195.671	75	75	NA	NA	55	5	NA	

Additional leak Check .000 Rate 21"

Restart @ 0942

Isokinetic Factor Setup

Estimated Dry Gas Meter Temp:
Estimated Stack Temp:
Estimated Delta P:
Estimated Moisture Content: 2%
Estimated O2: 20.9
Estimated CO2: .05

Equipment Evaluation , OK? Y or N

Ambient Temp.:
TC Check:
Pitot Check:
Tedlar Bag:
Pitot Exp Date:
TC Exp Date:

Dry Gas Meter Leak Checks

	1	2	3	4	5	6
DGM Initial:						
Vacuum:						
Leak Rate:						
DGM Final:						

Location: Inlet 1 (Inside)

SAMPLING AND VELOCITY TRAVERSE POINT DETERMINATION
SCAQMD METHOD 1.2

CLIENT: AQMD Facility A
PLANT NAME: Metal Melting Facility
CITY, STATE: [redacted] CA
SAMPLING LOCATION Inlet Furance
TYPE OF TESTING: Metals & Particulate

NO. OF PORTS AVAILABLE: 2
NO. OF PORTS TO BE USED: 2
PORT INSIDE DIAMETER: 3 inches

DISTANCE FROM FAR WALL TO OUTSIDE OF PORT: 13.50 inches
NIPPLE LENGTH AND/OR WALL THICKNESS: 3.50 inches
DEPTH OF STACK OR DUCT, D: 10.00 inches
STACK OR DUCT WIDTH (IF RECTANGULAR), W: #N/A inches

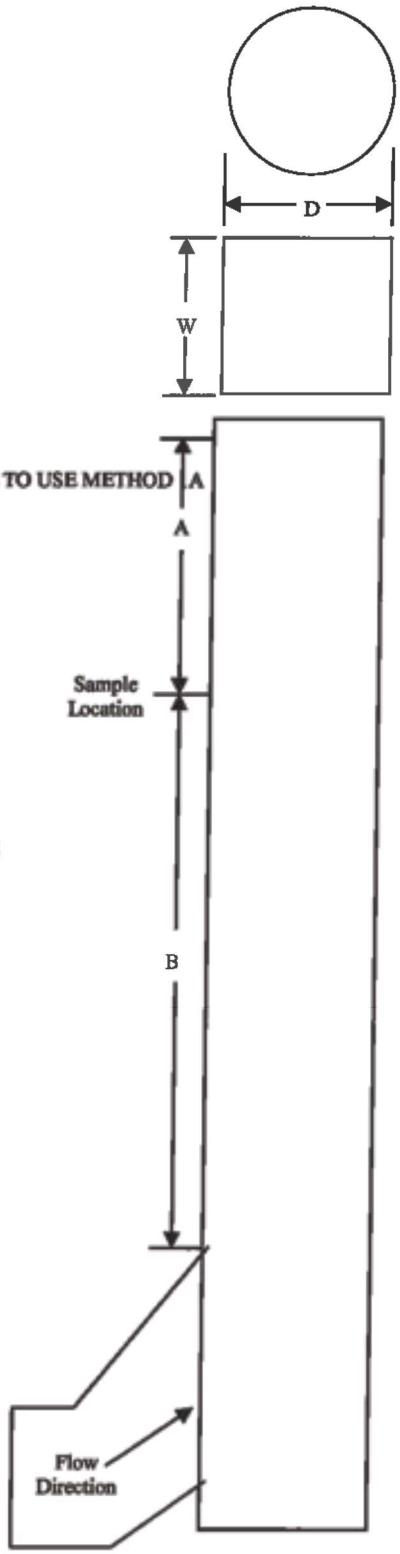
EQUIVALENT DIAMETER
De = 2*(DEPTH)*(WIDTH)/(DEPTH+WIDTH) = 10.00 inches
MAKE SURE TO USE METHOD 1A

STACK/DUCT AREA = 0.55 sq.feet 78.5 sq.inches

DISTANCE OF TEST PORT LOCATION:	DOWNSTREAM FROM FLOW DISTURBANCE	UPSTREAM FROM FLOW DISTURBANCE
	B	A
# OF INCHES	25.00	16.50
# OF DIAMETERS	2.50	1.65

MINIMUM NUMBER OF TRAVERSE POINTS: 24

POINT NO.	% OF DUCT DEPTH	DISTANCE FROM INSIDE WALL (in.)	DISTANCE FROM OUTSIDE OF PORT (in.)
1	2.1	0.50	4
2	6.7	0.67	4 1/8
3	11.8	1.18	4 5/8
4	17.7	1.77	5 1/4
5	25.0	2.50	6
6	35.6	3.56	7
7	64.4	6.44	10
8	75.0	7.50	11
9	82.3	8.23	11 3/4
10	88.2	8.82	12 3/8
11	93.3	9.33	12 7/8
12	97.9	9.50	13



DRAWING NOT TO SCALE

Imp 1 pH 10
Imp 2 " 10

Almega ENVIRONMENTAL

ISOKINETIC DATA FORM, TE COOLER & CYCLONIC FLOW METH

Almega ENVIRONMENTAL

Run # : 1
Date : 5/22/19
Client : Facility A
Unit : Inlet 1' (Inside)
Operator : T. TA
Stack Dia : 10
Amb. Press : 29.62
Static Press : −14.30

85 Pitot ID : A-7
Pitot Coeff. : .84
Meter Box # : A-7
Meter @ Dh : 1.736
Meter Y : 1.0274
TC # : 85
Start Time : 1150
Stop Time : 1412

Impinger #	Initial	Final	Net
TT NaHCO3	751.1	755.6	
2	749.5	753.2	
3	651.2	653.8	
4	805.5	820.9	
5	805.		

Nozzle Dia : .180
H2O Gain =
Filter :

Pitot Leak Check		
Initial :	✓	✓
Final :	✓	✓

Meter Box Leak Check	Rate	"HG
Initial :	0.008	21.0
Final :	0.012	22.0

	Traverse Points	Time (Minute)	Delta P ("H2O)	Stack Temp. (F)	Set delta H ("H2O)	Meter Volume (acf)	Mtr. Inlet Temp. (F)	Mtr. Outlet Temp. (F)	Oven Temp. (F)	Probe Temp. (F)	Impinger Temp. (F)	Pump Vac. ("HG)	TE Cooler Temp. (F)	Cyclonic Flow ("H2O)
	0	0				539.52								
TOP	A-1	5	2.7	117	2.63	544.08	90	90	NA	NA	57	5.50		
	2	10	3.0	126	2.88	548.88	91	91			53	~~5.50~~ 6.0		
	3	15	2.60	144	2.43	553.30	92	92			52	5.50		
	4	20	2.60	140	2.45	557.74	94	94			54	5.50		
	5	25	2.50	128	2.41	562.12	95	95			54	5.50		
	6'	30	2.8	166	2.54	566.60	96	96			55	6.0		
	7T	35	3.30	193	2.87	571.40	96	96			54	6.0		
	8	40	3.50	139	3.33	576.62	98	98			54	7.0		
	9T	45	3.20	184	2.92	581.48	98	98			55	7.0		
	10	50	2.90	173	2.62	586.11	99	99			56	6.50		
	11	55	2.60	190	2.29	590.42	100	100			55	6.0		
	12	60	2.20	142	2.09	594.57	100	100			56	6.0		stop @ 1250
	B-1	65	3.30	148	3.08	599.54	95	95			58	7.0		start @ 1312
	2	70	3.20	175	2.86	604.35	96	96			53	7.0		
	3	75	3.20	144	3.02	609.21	98	98			53	7.0		
	4	80	3.30	137	3.16	614.24	99	99			54	7.50		
	5	85	3.10	178	2.78	619.03	100	100			53	7.0		
	6	90	3.40	169	3.10	624.05	101	101			53	7.0		
	7	95	2.0	123	1.97	628.11	101	101			54	6.50		
	8	100	2.10	152	1.97	632.06	102	102			54	6.50		
	9	105	1.90	144	1.80	635.90	101	101			55	6.0		
	10	110	1.70	157	1.58	639.45	101	101			56	6.0		
	11	115	1.30	162	1.20	642.60	101	101			56	5.50		
	12	120	1.10	161	1.01	645.510	100	100			54	5.0		
						'In to out 12								

Isokinetic Factor Setup

Estimated Dry Gas Meter Temp:
Estimated Stack Temp:
Estimated Delta P:
Estimated Moisture Content:
Estimated O2:
Estimated CO2:

Equipment Evaluation , OK? Y or N

Ambient Temp.:
TC Check:
Pitot Check:
Tedlar Bag:
Pitot Exp Date:
TC Exp Date

Dry Gas Meter Leak Checks

	1	2	3	4	5	6
DGM Initial:						
Vacuum:						
Leak Rate:						
DGM Final:						

Imp 1 pH 10
Imp 2 " 10

Almega ENVIRONMENTAL

ISOKINETIC DATA FORM, TE COOLER & CYCLONIC FLOW

METHO **Almega** ENVIRONMENTAL

Run # : 2
Date : 5/22/19
Client : Facility A
Unit : Inlet 1 (Inside)
Operator : T-TA
Stack Dia : 10.0
Amb. Press : 29.62
Static Press : -14.3

Pitot ID: 85
Pitot Coeff. : .84
Meter Box # : A-7
Meter @ Dh : 1.786
Meter Y : 1.0274
TC # : 85
Start Time : 1439
Stop Time : 1650
Nozzle Dia .180

NaOH

Impinger #	Initial	Final	Net
1	762.6	770.8	
2	640.0	643.5	
3	655.7	656.6	
4	844.0	860.0	
5			

H2O Gain =
Filter :

Pitot Leak Check		
Initial :	✓	✓
Final :	✓	✓

Meter Box Leak Check	Rate	"HG
Initial :	0.010	22.0
Final :	0.009	20.0

	Traverse Points	Time (Minute)	Delta P ("H2O)	Stack Temp. (F)	Set delta H ("H2O)	Meter Volume (acf)	Mtr. Inlet Temp. (F)	Mtr. Outlet Temp. (F)	Oven Temp. (F)	Probe Temp. (F)	Impinger Temp. (F)	Pump Vac. ("HG)	TE Cooler Temp. (F)	Cyclonic Flow ("H2O)	
TOP	0	0				646.08									
Start	A-1	5	2.40	186	2.09	650.20	92	92	NA	NA	5.0	55			
	2	10	2.50	168	2.25	654.41	94	94			5.0	50			
	3	15	2.50	143	2.35	658.74	94	94			5.0	51			
	4	20	2.70	124	2.63	663.35	96	96			6.0	52			
	5	25	2.80	117	2.76	668.07	96	96			6.0	52			
	6	30	2.70	115	2.67	672.74	97	97			6.0	53			
	7	35	3.80	130	3.38	677.72	98	98			7.0	52			
	8	40	3.20	138	3.05	682.70	98	98			7.0	52			
	9	45	3.50	145	3.30	687.80	98	98			8.0	53			
	10	50	2.40	123	2.35	692.22	99	99			8.0	53			
	11	55	2.30	150	1.98	696.03	99	99			7.0	54			
	12	60	1.80	147	1.69	699.74	98	98			6.50	54		stop@	1538
Side	B-1	65	3.50	153	3.21	704.80	91	91			7.50	57		start@	1550
	2	70	3.40	150	3.14	709.74	91	91			7.0	51			
	3	75	3.30	148	3.06	714.68	92	92			7.0	52			
	4	80	3.30	147	3.07	719.65	92	92			7.0	52			
	5	85	3.40	145	3.17	724.63	92	92			7.50	53			
	6	90	3.40	144	3.17	729.69	92	92			7.50	53			
	7	95	2.10	137	1.98	733.74	92	92			6.0	54			
	8	100	1.9	135	1.80	737.50	91	91			6.0	53			
	9	105	1.50	129	1.43	740.94	90	90			5.0	52			
	10	110	1.30	124	1.25	744.10	90	90			5.0	53			
	11	115	1.20	117	1.17	747.18	90	90			5.0	53			
	12	120	1.0	110	.98	749.086	89	89				53			

Isokinetic Factor Setup

Estimated Dry Gas Meter Temp:
Estimated Stack Temp:
Estimated Delta P:
Estimated Moisture Content:
Estimated O2:
Estimated CO2:

Equipment Evaluation , OK? Y or N

Ambient Temp.:
TC Check:
Pitot Check:
Tedlar Bag:
Pitot Exp Date:
TC Exp Date

Dry Gas Meter Leak Checks

	1	2	3	4	5	6
DGM Initial:						
Vacuum:						
Leak Rate:						
DGM Final:						

Imp 1 pH 10
Imp 2 0

Almega ENVIRONMENTAL

ISOKINETIC DATA FORM, TE COOLER & CYCLONIC FLOW

METHOD:

Run # :	3	Pitot ID:	85	Impinger #	Initial	Final	Net		Pitot Leak Check
Date :	05/23/19	Pitot Coeff. :	.84	1	751.6	758.4		Initial :	✓ ✓
Client :	Facility A	Meter Box # :	A-7	2	749.9	737.4		Final :	✓ ✓
Unit :	Inlet 1 (Inside)	Meter @ Dh :	1.736	3	652.9	672.9			
Operator :	T.TR	Meter Y :	1.0274	4	833.6	853.4			Meter Box Leak Check
Stack Dia :	10.0	TC # :	85	5					Rate / "HG
Amb. Press :	~~14~~ 29.80	Start Time :	0825	Nozzle Dia	H2O Gain =			Initial :	0.007 / 19.0
Static Press :	-14.20	Stop Time :	1042	.180	Filter :			Final :	0.012 / 21.0

Number

TT
TOP

Traverse Points	Time (Minute)	Delta P ("H2O)	Stack Temp. (F)	Set delta H ("H2O)	Meter Volume (acf)	Mtr. Inlet Temp. (F)	Mtr. Outlet Temp. (F)	Oven Temp. (F)	Probe Temp. (F)	Impinger Temp. (F)	Pump Vac. ("HG)	TE Cooler Temp. (F)	Cyclonic Flow ("H2O)
A-B	0				751.05								
1 2	5	2.60	184	2.24	755.25	84	84	NA	NA	58	4.50		
2 3	10	2.50	185	2.16	759.41	86	86			54	4.50		
3 4	15	2.50	145	2.14	763.20	87	87			55	5.0		
4 5	20	2.30	140	2.15	767.48	89	89			55	5.0		
5 6	25	2.60	131	2.47	771.94	90	90			56	6.50		
6 7	30	2.70	110	2.67	776.50	91	91			56	8.0		
7 8	35	3.40	128	3.26	781.62	92	92			56	11.0		
8 9	40	3.6	117	3.53	786.90	93	93			57	12.0		
9 10	45	3.30	113	3.25	791.94	93	93			57	10.50		
10 11	50	2.70	114	2.66	796.56	94	94			58	9.50		
11 12	55	2.50	135	2.37	800.84	93	93			56	9.0		stope 0925
12 B-1	60	1.70	126	1.64	804.48	93	93			55	7.0		start@ 0942
B- 1 2	65	2.80	121	2.69	809.10	86	86			56	9.50		
2 3	70	3.40	103	3.38	814.25	87	87			51	10.50		
3 4	75	3.50	136	3.29	819.30	88	88			48	11.0		✓
4 5	80	3.30	106	3.27	824.41	89	89			50	11.0		
5 6	85	3.20	159	2.91	829.18	90	90			51	11.0	T.E	
6 7	90	3.40	132	3.23	834.30	91	91			53	~~11.0~~	12.0	
7 8	95	2.70	147	2.50	838.74	91	91			53	10.5		
8 9	100	2.40	123	2.32	843.08	91	91			53	10.0		
9 10	105	2.20	117	2.15	847.20	91	91			52	10.0		
10 11	110	2.10	115	2.06	851.17	91	91			52	10.0		
11 12	115	1.70	10.5	1.69	854.87	90	90			52	9.0		
12	120	1.30	109	1.28	858.118	90	90			53	8.0		
						'In	to	out 12					

Isokinetic Factor Setup

Estimated Dry Gas Meter Temp:	
Estimated Stack Temp:	
Estimated Delta P:	
Estimated Moisture Content:	
Estimated O2:	
Estimated CO2:	

Equipment Evaluation , OK? Y or N

Ambient Temp.:	
TC Check:	
Pitot Check:	
Tedlar Bag:	
Pitot Exp Date:	
TC Exp Date:	

Dry Gas Meter Leak Checks

	1	2	3	4	5	6
DGM Initial:						
Vacuum:						
Leak Rate:						
DGM Final:						

Location: Inlet 2 (downstream/outside)

SAMPLING AND VELOCITY TRAVERSE POINT DETERMINATION
SCAQMD METHOD 1.1

CLIENT: AQMD Facility A
PLANT NAME: [redacted]ing Facility
CITY, STATE: , CA
SAMPLING LOCATION Inlet 2 (Upstream of Baghouse)
TYPE OF TESTING: Metals/Particulate

NO. OF PORTS AVAILABLE: 1
NO. OF PORTS TO BE USED: 1
PORT INSIDE DIAMETER: 2.5 inches

DISTANCE FROM FAR WALL TO OUTSIDE OF PORT: 38.00 inches
NIPPLE LENGTH AND/OR WALL THICKNESS: 2.00 inches
DEPTH OF STACK OR DUCT, D: 36.00 inches
STACK OR DUCT WIDTH (IF RECTANGULAR), W: #N/A inches

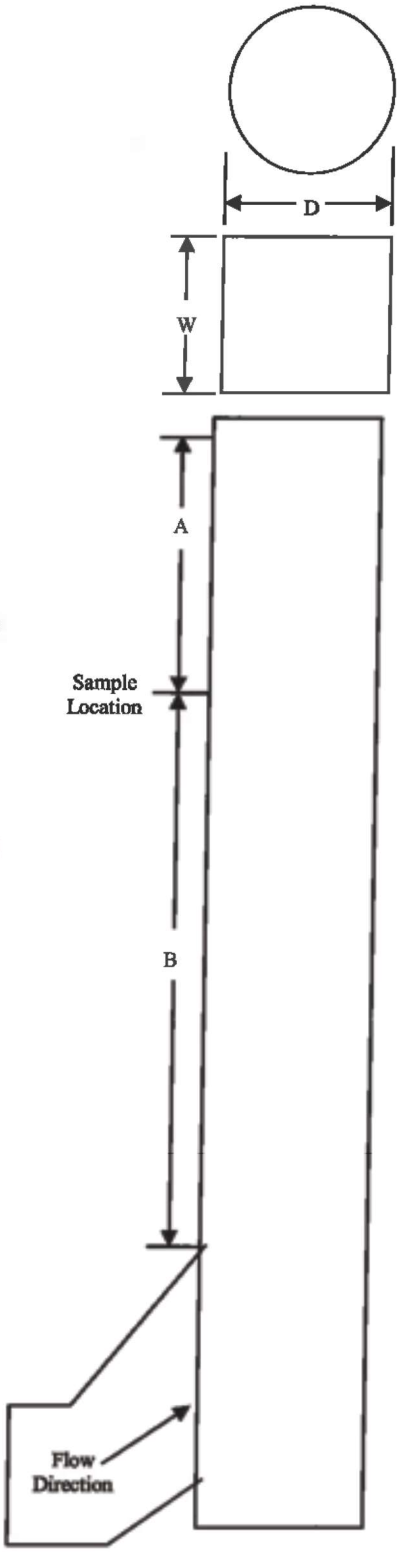
EQUIVALENT DIAMETER
De = 2*(DEPTH)*(WIDTH)/(DEPTH+WIDTH) = 36.00 inches

STACK/DUCT AREA = 7.07 sq.feet 1017.9 sq.inches

DISTANCE OF TEST PORT LOCATION:	DOWNSTREAM FROM FLOW DISTURBANCE	UPSTREAM FROM FLOW DISTURBANCE
	B	A
# OF INCHES	87.00	48.50
# OF DIAMETERS	2.42	1.35

MINIMUM NUMBER OF TRAVERSE POINTS: 24

POINT NO.	% OF DUCT DEPTH	DISTANCE FROM INSIDE WALL (in.)	DISTANCE FROM OUTSIDE OF PORT (in.)
1	2.1	0.76	2 3/4
2	6.7	2.41	4 3/8
3	11.8	4.25	6 1/4
4	17.7	6.37	8 3/8
5	25.0	9.00	11
6	35.6	12.82	14 7/8
7	64.4	23.18	25 1/8
8	75.0	27.00	29
9	82.3	29.63	31 5/8
10	88.2	31.75	33 3/4
11	93.3	33.59	35 5/8
12	97.9	35.24	37 1/4



DRAWING NOT TO SCALE

Imp 1 pH 10
Imp 2 " "

Almega Environmental

ISOKINETIC DATA FORM, TE COOLER & CYCLONIC FLOW

METHO

Almega Environmental

Run #: 1
Date: 5/22/19
Client: Facility A
Unit: Inlet 2 (outside)
Operator: MN
Stack Dia: 36.0
Amb. Press: 29.62
Static Press: -13

Pitot ID: 31
Pitot Coeff.: 0.84
Meter Box #: A-8
Meter @ Dh: 1.834
Meter Y: 1.0395
TC #: 31
Start Time: 1150
Stop Time: 1412

Impinger #	Initial	Final	Net
1	667.1	675.0	
2	696.5	700.1	
3	666.2	667.0	
4	9.189	936.9	
5			

NaHCO3

Nozzle Dia: 0.173
H2O Gain =
Filter:

Pitot Leak Check		
Initial:	✓	✓
Final:	✓	✓

Meter Box Leak Check	Rate	"HG
Initial:	~~28~~0.00	22
Final:	0.000	15

Traverse Points	Time (Minute)	Delta P ("H2O)	Stack Temp. (F)	Set delta H ("H2O)	Meter Volume (acf)	Mtr. Inlet Temp. (F)	Mtr. Outlet Temp. (F)	Oven Temp. (F)	Probe Temp. (F)	Impinger Temp. (F)	Pump Vac. ("HG)	TE Cooler Temp. (F)	Cyclonic Flow ("H2O)
12	0	2.80	87	2.6	178.214	84	NA	NA	NA	49	7.0	NA	<10
11	5.0	3.50	89	3.25	182.62	85				47	9.0		
10	10.0	2.90	89	2.70	187.49	87				52	7.0		
9	15.0	3.40	90	3.15	191.91	89				52	7.0		
8	20.0	3.20	89	2.95	196.67	~~8~~91				51	7.0		
7	25.0	2.90	93	2.70	201.38	93				51	7.0		
6	30.0	2.70	93	2.50	205.92	94				50	7.0		
5	35.0	2.40	92	2.25	210.26	95				51	7.0		
4	40.0	1.90	94	1.75	214.33	96				51	7.0		
3	45.0	1.80	94	1.65	218.00	96				51	7.0		
2	50.0	1.80	91	1.65	221.56	95				52	7.0		
1	55.0	2.50	85	2.30	225.00	95				52	7.0		
0	60.0	2.60	90	2.40	229.15	90				53	7.0		
12	65.0	2.90	92	2.70	233.31	92				49	7.0		
11	70.0	3.40	92	3.15	237.72	93				52	7.0		
10	75.0	3.30	92	3.05	242.61	94				52	7.0		
9	80.0	3.10	95	2.90	247.36	95				53	7.0		
8	85.0	2.8	94	2.60	252.08	95				52	7.0		
7	90.0	2.7	93	2.5	256.51	95				52	7.0		
6	95.0	2.3	96	2.15	260.88	95				51	7.0		
5	100.0	1.80	94	1.70	264.82	95				51	7.0		
4	105.0	1.50	92	1.40	268.34	94				51	7.0		
3	110.0	3.1	83	2.9	271.61	94				51	7.0		
2	115.0	4.0	82	3.7	276.23	94				51	7.0		
1	(120)				281.562								

1312

Isokinetic Factor Setup
Estimated Dry Gas Meter Temp: 90
Estimated Stack Temp: 85
Estimated Delta P: 2.97
Estimated Moisture Content: 2.0
Estimated O2: 10.5
Estimated CO2: 0.5

Equipment Evaluation, OK? Y or N
Ambient Temp.: Y
TC Check: Y
Pitot Check: Y
Tedlar Bag: N/A
Pitot Exp Date:
TC Exp Date

Dry Gas Meter Leak Checks

	1	2	3	4	5	6
DGM Initial:						
Vacuum:						
Leak Rate:						
DGM Final:						

Imp 1 pH 10
Im ... 10

Almega ENVIRONMENTAL

ISOKINETIC DATA FORM, TE COOLER & CYCLONIC FLOW

METH

Almega ENVIRONMENTAL

Run # : 2
Date : 5/22/19
Client : Facility A
Unit : Inlet 2 (Outside)
Operator : MN
Stack Dia : 36.0
Amb. Press : 29.67
Static Press : -13

Pitot ID: 31
Pitot Coeff. : 0.84
Meter Box # : A-8
Meter @ Dh : 1.834
Meter Y : 1.0395
TC # : 31
Start Time : 1438
Stop Time : 1650

Impinger #	Initial	Final	Net
1	758.6	767.9	
2	762.6	766.3	
3	641.6	644.0	
4	772.6	791.3	
5			

NaOH

Nozzle Dia: .173
H2O Gain =
Filter :

Pitot Leak Check
Initial :
Final :

Meter Box Leak Check

	Rate	"HG
Initial :		
Final :		

Traverse Points	Time (Minute)	Delta P ("H2O)	Stack Temp. (F)	Set delta H ("H2O)	Meter Volume (acf)	Mr. Inlet Temp. (F)	Mr. Outlet Temp. (F)	Oven Temp. (F)	Probe Temp. (F)	Impinger Temp. (F)	Pump Vac. ("HG)	TE Cooler Temp. (F)	Cyclonic Flow ("H2O)
12	0	2.60	92	2.40	281.863	88	NA	NA	NA	55	6.0	NA	<10
11	5.0	3.30	93	3.05	286.09	89	NA			50	6.0		<10
10	10.0	3.50	92	3.25	290.83	90				52	6.0		
9	15.0	3.29	88	3.22	295.83	91				54	6.0		
8	20.0	3.00	88	3.75	300.55	91				54	6.0		
7	25.0	2.80	88	2.8	305.07	90				54	6.0		
6	30.0	2.70	86	2.5	309.44	91				54	6.0		
5	35.0	2.10	86	1.95	313.78	91				54	6.0		
4	40.0	1.90	88	1.60	317.56	90				54	6.0		
3	45.0	1.80	88	1.65	321.23	91				54	6.0		
2	50.0	3.10	82	2.90	324.83	91				54	6.0		
1	55.0	3.80	82	3.50	329.35	90				55	6.0		
0	60.0	2.75	82	2.55	334.56	82	NA	NA	NA	48	6.0	NA	
12	65.0	3.40	82	3.15	338.91	82				48	6.0		<10
11	70.0	3.50	84	3.25	343.56	82				48	6.0		
10	75.0	3.10	84	2.90	348.02	81				48	6.0		
9	80.0	3.10	84	2.90	352.96	81				48	6.0		
8	85.0	2.90	84	2.70	357.54	81				49	6.0		
7	90.0	2.65	84	2.45	362.00	81				49	6.0		
6	95.0	2.00	83	1.85	366.25	81				50	6.0		
5	100.0	1.85	83	1.70	369.82	81				50	6.0		
4	105.0	1.90	80	1.75	373.34	80				50	6.0		
3	110.0	3.2	80	2.95	376.95	80				51	6.0		
2	115.0	4.0	80	3.70	381.45	80				51	6.0		
1	120.0				386.61								

restart

1550

Isokinetic Factor Setup
Estimated Dry Gas Meter Temp:
Estimated Stack Temp:
Estimated Delta P:
Estimated Moisture Content:
Estimated O2:
Estimated CO2:

Equipment Evaluation , OK? Y or N
Ambient Temp.:
TC Check:
Pitot Check:
Tedlar Bag:
Pitot Exp Date:
TC Exp Date

Dry Gas Meter Leak Checks

	1	2	3	4	5	6
DGM Initial:						
Vacuum:						
Leak Rate:						
DGM Final:						

Imp 1 pH 10
Imp 2 pH 10

Almega Environmental

ISOKINETIC DATA FORM, TE COOLER & CYCLONIC FLOW

METH

Almega Environmental

Run # : 2
Date : 5-23-19
Client : FacilityA
Unit : Inlet 2 (outside)
Operator : MN
Stack Dia : 26.0
Amb. Press : 29.8
Static Press : -14

Pitot ID: 31
Pitot Coeff. : 0.84
Meter Box # : A-8
Meter @ Dh : 1.834
Meter Y : 1.0395
TC # : 31
Start Time : 825
Stop Time : 1042
Nozzle Dia 0.173

$NaHCO_3$

Impinger #	Initial	Final	Net
1	669.4	678.6	
2	696.8	701.2	
3	666.9	668.7	
4	920.1	939.2	
5			

H2O Gain =
Filter :

Pitot Leak Check

Initial :	x	x
Final :	x	x

Meter Box Leak Check

	Rate	"HG
Initial :	0.000	14
Final :	0.000	18

4
re
quc

Traverse Points	Time (Minute)	Delta P ("H2O)	Stack Temp. (F)	Set delta H ("H2O)	Meter Volume (acf)	Mr. Inlet Temp. (F)	Mr. Outlet Temp. (F)	Oven Temp. (F)	Probe Temp. (F)	Impinger Temp. (F)	Pump Vac. ("HG)	TE Cooler Temp. (F)	Cyclonic Flow ("H2O)
12	0.0	2.60	86	2.4	386.98	NA	67	NA	NA	48	5.0	NA	<10
11	5.0	2.60	86	2.4	391.06		68			48	5.0		
10	10.0	3.40	85	3.15	395.00		71			49	8.0		
9	15.0	3.20	86	2.95	390.7		72			51	8.0		
8	20.0	3.10	84	2.90	404.25		73			54	7.0		
7	25.0	3.10	84	2.90	408.62		74			55	7.0		
6	30.0	2.90	84	2.70	413.18		75			58	6.0		
5	35.0	2.40	84	2.25	417.46		76			58	6.0		
4	40.0	2.20	82	2.05	421.38		77			58	4.0		
3	45.0	1.80	82	1.65	425.18		77			56	4.0		
2	50.0	2.20	76	2.05	428.64		78			56	4.0		
1	55.0	3.80	73	3.50	432.50	↓	78	↓	↓	56	8.0	↓	↓
0	60.0	2.40	79	2.25	437.61	NA	79	NA	NA	54	5.0	NA	<10
12	65.0	3.60	79	3.45	441.63		76			52	8.0		
11	70.0	3.30	82	3.05	446.44		78			54	6.0		
10	75.0	3.50	81	2.95	451.11		78			54	5.0		
9	80.0	3.40	81	3.15	455.92		79			54	5.0		
8	85.0	3.20	83	3.0	460.60		79			54	5.0		
7	90.0	3.20	84	3.0	465.22		79			54	6.0		
6	95.0	2.45	82	2.25	469.79		79			54	5.0		
5	100.0	2.10	82	1.95	473.89		79			55	5.0		
4	105.0	1.70	82	1.60	477.65		79			55	5.0		
3	110.0	2.4	79	2.25	481.00		79			55	5.0		
2	115.0	2.8	71	2.60	485.00	↓	79	↓	↓	55	5.0	↓	↓
1	120.0				489.31								

Isokinetic Factor Setup

Estimated Dry Gas Meter Temp: 90
Estimated Stack Temp: 85
Estimated Delta P: 1.8
Estimated Moisture Content: 2.0%
Estimated O2: 20.5%
Estimated CO2: 0.5%

Equipment Evaluation , OK? Y or N

Ambient Temp.: 85
TC Check: x
Pitot Check: x
Tedlar Bag: N/A
Pitot Exp Date:
TC Exp Date

Dry Gas Meter Leak Checks

	1	2	3	4	5	6
DGM Initial:						
Vacuum:						
Leak Rate:						
DGM Final:						

FIELD BLANK

Almega Environmental

ISOKINETIC DATA FORM, TE COOLER & CYCLONIC FLOW

METH

Almega Environmental

Run # : FB
Date : 5/22/19
Client : Facility 4
Unit : Inlet 2 (Outside)
Operator : MN
Stack Dia : 3.0
Amb. Press : 29.62
Static Press : -13

Pitot ID: 51
Pitot Coeff. : 0.84
Meter Box # : A-8
Meter @ Dh : 1.834
Meter Y : 1.0395
TC # : 31
Start Time : 1100
Stop Time :
Nozzle Dia

Impinger #	Initial	Final	Net
1	757.0		
2	762.5		
3	640.2		
4	772.6		
5			

H2O Gain =
Filter :

Pitot Leak Check

Initial :	x	x
Final :	x	x

Meter Box Leak Check

	Rate	"HG
Initial :	0.001	22
Final :		

Traverse Points	Time (Minute)	Delta P ("H2O)	Stack Temp. (F)	Set delta H ("H2O)	Meter Volume (acf)	Mtr. Inlet Temp. (F)	Mtr. Outlet Temp. (F)	Oven Temp. (F)	Probe Temp. (F)	Impinger Temp. (F)	Pump Vac. ("HG)	TE Cooler Temp. (F)	Cyclonic Flow ("H2O)
	11:30				172.460								

Isokinetic Factor Setup

Estimated Dry Gas Meter Temp:
Estimated Stack Temp:
Estimated Delta P:
Estimated Moisture Content:
Estimated O2:
Estimated CO2:

Equipment Evaluation , OK? Y or N

Ambient Temp.:
TC Check:
Pitot Check:
Tedlar Bag:
Pitot Exp Date:
TC Exp Date

Dry Gas Meter Leak Checks

	1	2	3	4	5	6
DGM Initial:						
Vacuum:						
Leak Rate:						
DGM Final:						

APPENDIX D3

CHROMIUM EMISSIONS (HEX/TOTAL) – LABORATORY DATA

				Hex Chrome			Total Chrome		
				Inlet 1 Inside	Inlet 2 Outside	Outlet	Inlet 1	Inlet 2	Outlet
Run 1	Rinse	C1	ug	6.5	1.2	< 0.011	11	2.7	< 1
	Impingers	C2	ug	52	3.1	0.035	270	11	< 1
	Total		ug	**58.5**	**4.3**	**< 0.046**	**281**	**13.7**	**< 2**
Run 2	Rinse	C1	ug	1.7	0.21	< .010	3.9	1.5	< 1
	Impingers	C2	ug	2.1	0.31	0.032	51	3.6	< 1
	Total		ug	**3.8**	**0.52**	**< 0.042**	**54.9**	**5.1**	**< 2**
Run 3	Rinse	C1	ug	2.5	0.94	< 0.050	6.1	2.7	< 1
	Impingers	C2	ug	21	2.1	< 0.022	340	19	< 1
	Total		ug	**23.5**	**3.04**	**< 0.072**	**346.1**	**21.7**	**< 2**
Run FB	Rinse	C1	ug		< 0.010			**< 1**	
	Impingers	C2	ug		0.022			**< 1**	
	Total		ug		**< 0.032**			**< 2**	

WECK LABORATORIES, INC.

Certificate of Analysis

Almega
ENVIRONMENTAL
REPORT

Work Orders: 9E30014

Report Date: 6/24/2019

Received Date: 5/29/2019

Project: In (I)/In (O)/Out

Turnaround Time: Normal

Phones: (714) 889-4000

Fax: (714) 889-7030

Attn: Almega Environmental & Technical Services

P.O. #: 10562

Client: Almega Environmental & Technical Services
10602 Walker St
Cypress, CA 90630

Billing Code:

**ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH # • ISO 17025 #L2457.01 • LACSD #10143 •
NELAP-CA #04229CA • NELAP-OR #4047 • NJ-DEP #CA015 • NV-DEP #NAC 445A • SCAQMD #93LA1006**

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Almega Environmental & Technical Services,

Enclosed are the results of analyses for samples received 5/29/19 with the Chain-of-Custody document. The samples were received in good condition, at 4.7 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Brandon Gee
Operations Manager/Senior PM

Almega Environmental & Technical Services
10602 Walker St
Cypress, CA 90630

Project Number: In (I)/In (O)/Out

Project Manager: Almega Environmental & Technical Services

Reported:
06/24/2019 14:29

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
10562 - M425 - C1 - In(O) - FB	Client	9E30014-01	Filter	05/22/19 10:30	
10562 - M425 - C2 - In(O) - FB	Client	9E30014-02	Filter	05/22/19 10:30	
10562 - M425 - C1 - In(I) - R1	Client	9E30014-03	Filter	05/22/19 11:50	
10562 - M425 - C2 - In(I) - R1	Client	9E30014-04	Filter	05/22/19 11:50	
10562 - M425 - C1 - In(O) - R1	Client	9E30014-05	Filter	05/22/19 11:50	
10562 - M425 - C2 - In(O) - R1	Client	9E30014-06	Filter	05/22/19 11:50	
10562 - M425 - C1 - Out - R1	Client	9E30014-07	Filter	05/22/19 11:50	
10562 - M425 - C2 - Out - R1	Client	9E30014-08	Filter	05/22/19 11:50	
10562 - M425 - C1 - In(I) - R2	Client	9E30014-09	Filter	05/22/19 14:38	
10562 - M425 - C2 - In(I) - R2	Client	9E30014-10	Filter	05/22/19 14:38	
10562 - M425 - C1 - In(O) - R2	Client	9E30014-11	Filter	05/22/19 14:38	
10562 - M425 - C2 - In(O) - R2	Client	9E30014-12	Filter	05/22/19 14:38	
10562 - M425 - C1 - Out - R2	Client	9E30014-13	Filter	05/22/19 14:38	
10562 - M425 - C2 - Out - R2	Client	9E30014-14	Filter	05/22/19 14:38	
10562 - M425 - C1 - In(I) - R3	Client	9E30014-15	Filter	05/23/19 08:25	
10562 - M425 - C2 - In(I) - R3	Client	9E30014-16	Filter	05/23/19 08:25	
10562 - M425 - C1 - In(O) - R3	Client	9E30014-17	Filter	05/23/19 08:25	
10562 - M425 - C2 - In(O) - R3	Client	9E30014-18	Filter	05/23/19 08:25	
10562 - M425 - C1 - Out - R3	Client	9E30014-19	Filter	05/23/19 08:25	
10562 - M425 - C2 - Out - R3	Client	9E30014-20	Filter	05/23/19 08:25	
AQMD Facility A - M425 - RB	Client	9E30014-21	Filter	05/23/19 11:30	
AQMD Facility A - M425 - RB - Filter	Client	9E30014-22	Filter	05/23/19 11:30	

Analyses Accreditation Summary

Analyte	CAS #	Not By NELAP	By ANAB
CARB 425 in Filter			
Chromium 6+	18540-29-9	✓	

Almega Environmental & Technical Services
10602 Walker St
Cypress, CA 90630

Project Number: In (I)/In (O)/Out

Project Manager: Almega Environmental & Technical Services

Reported:
06/24/2019 14:29

Sample Results

Sample: 10562 - M425 - C1 - In(O) - FB
9E30014-01 (Filter)
Sampled: 05/22/19 10:30 by Client

Metals (Non-Aqueous) by EPA 6000/7000 Series Methods

Method: EPA 6020 **Batch ID:** W9F0440 **Instr:** ICPMS03 **Prepared:** 06/10/19 09:31 **Analyst:** ALN

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Chromium, Total	ND	1.0	ug/filter	5	06/12/19 15:36	M-04

Sample: 10562 - M425 - C1 - In(O) - FB
9E30014-01RE1 (Filter)
Sampled: 05/22/19 10:30 by Client

Hexavalent Chromium by IC

Method: CARB 425 **Batch ID:** W9F0369 **Instr:** LC13 **Prepared:** 06/06/19 11:40 **Analyst:** jna

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Chromium 6+	ND	0.010	ug/filter	1	06/06/19 13:49	O-12

Sample: 10562 - M425 - C2 - In(O) - FB
9E30014-02 (Filter)
Sampled: 05/22/19 10:30 by Client

Metals (Non-Aqueous) by EPA 6000/7000 Series Methods

Method: EPA 6020 **Batch ID:** W9F0440 **Instr:** ICPMS03 **Prepared:** 06/10/19 09:31 **Analyst:** ALN

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Chromium, Total	ND	1.0	ug/filter	5	06/12/19 14:53	M-04

Sample: 10562 - M425 - C2 - In(O) - FB
9E30014-02RE1 (Filter)
Sampled: 05/22/19 10:30 by Client

Hexavalent Chromium by IC

Method: CARB 425 **Batch ID:** W9F0369 **Instr:** LC13 **Prepared:** 06/06/19 11:40 **Analyst:** jna

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Chromium 6+	**0.022**	0.020	ug/filter	1	06/06/19 14:01	O-12

Sample: 10562 - M425 - C1 - In(I) - R1
9E30014-03 (Filter)
Sampled: 05/22/19 11:50 by Client

Hexavalent Chromium by IC

Method: CARB 425 **Batch ID:** W9F0120 **Instr:** LC13 **Prepared:** 06/04/19 11:45 **Analyst:** jna

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Chromium 6+	**6.5**	0.047	ug/filter	5	06/04/19 19:45	

Metals (Non-Aqueous) by EPA 6000/7000 Series Methods

Method: EPA 6020 **Batch ID:** W9F0440 **Instr:** ICPMS03 **Prepared:** 06/10/19 09:31 **Analyst:** ALN

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Chromium, Total	**11**	1.1	ug/filter	5	06/12/19 14:55	

Sample Results

(Continued)

Sample: 10562 - M425 - C2 - In(I) - R1 — Sampled: 05/22/19 11:50 by Client
9E30014-04 (Filter)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Hexavalent Chromium by IC						
Method: CARB 425 — **Batch ID:** W9F0120 — **Instr:** LC13 — **Prepared:** 06/04/19 11:45 — **Analyst:** jna						
Chromium 6+	**52**	0.10	ug/filter	5	06/04/19 19:57	
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods						
Method: EPA 6020 — **Batch ID:** W9F0440 — **Instr:** ICPMS03 — **Prepared:** 06/10/19 09:31 — **Analyst:** ALN						
Chromium, Total	**270**	1.0	ug/filter	5	06/12/19 14:56	

Sample: 10562 - M425 - C1 - In(O) - R1 — Sampled: 05/22/19 11:50 by Client
9E30014-05 (Filter)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Hexavalent Chromium by IC						
Method: CARB 425 — **Batch ID:** W9F0120 — **Instr:** LC13 — **Prepared:** 06/04/19 11:45 — **Analyst:** jna						
Chromium 6+	**1.2**	0.053	ug/filter	5	06/04/19 20:08	
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods						
Method: EPA 6020 — **Batch ID:** W9F0440 — **Instr:** ICPMS03 — **Prepared:** 06/10/19 09:31 — **Analyst:** ALN						
Chromium, Total	**2.7**	1.0	ug/filter	5	06/12/19 14:58	

Sample: 10562 - M425 - C2 - In(O) - R1 — Sampled: 05/22/19 11:50 by Client
9E30014-06 (Filter)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Hexavalent Chromium by IC						
Method: CARB 425 — **Batch ID:** W9F0120 — **Instr:** LC13 — **Prepared:** 06/04/19 11:45 — **Analyst:** jna						
Chromium 6+	**3.1**	0.10	ug/filter	5	06/04/19 20:20	
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods						
Method: EPA 6020 — **Batch ID:** W9F0440 — **Instr:** ICPMS03 — **Prepared:** 06/10/19 09:31 — **Analyst:** ALN						
Chromium, Total	**11**	1.0	ug/filter	5	06/12/19 14:59	

Sample: 10562 - M425 - C1 - Out - R1 — Sampled: 05/22/19 11:50 by Client
9E30014-07 (Filter)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods						
Method: EPA 6020 — **Batch ID:** W9F0440 — **Instr:** ICPMS03 — **Prepared:** 06/10/19 09:31 — **Analyst:** ALN						
Chromium, Total	ND	1.0	ug/filter	5	06/12/19 15:01	M-04

Sample: 10562 - M425 - C1 - Out - R1 — Sampled: 05/22/19 11:50 by Client
9E30014-07RE1 (Filter)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Hexavalent Chromium by IC						
Method: CARB 425 — **Batch ID:** W9F0369 — **Instr:** LC13 — **Prepared:** 06/06/19 11:40 — **Analyst:** jna						
Chromium 6+	ND	0.011	ug/filter	1	06/06/19 14:13	O-12

Sample Results

(Continued)

Sample: 10562 - M425 - C2 - Out - R1 — Sampled: 05/22/19 11:50 by Client
9E30014-08 (Filter)

Metals (Non-Aqueous) by EPA 6000/7000 Series Methods

Method: EPA 6020 **Batch ID:** W9F0440 **Instr:** ICPMS03 **Prepared:** 06/10/19 09:31 **Analyst:** ALN

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Chromium, Total	ND	1.0	ug/filter	5	06/12/19 15:03	M-04

Sample: 10562 - M425 - C2 - Out - R1 — Sampled: 05/22/19 11:50 by Client
9E30014-08RE1 (Filter)

Hexavalent Chromium by IC

Method: CARB 425 **Batch ID:** W9F0369 **Instr:** LC13 **Prepared:** 06/06/19 11:40 **Analyst:** jna

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Chromium 6+	**0.035**	0.020	ug/filter	1	06/06/19 14:25	O-12

Sample: 10562 - M425 - C1 - In(I) - R2 — Sampled: 05/22/19 14:38 by Client
9E30014-09 (Filter)

Hexavalent Chromium by IC

Method: CARB 425 **Batch ID:** W9F0120 **Instr:** LC13 **Prepared:** 06/04/19 11:45 **Analyst:** jna

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Chromium 6+	**1.7**	0.052	ug/filter	5	06/04/19 20:56	

Metals (Non-Aqueous) by EPA 6000/7000 Series Methods

Method: EPA 6020 **Batch ID:** W9F0440 **Instr:** ICPMS03 **Prepared:** 06/10/19 09:31 **Analyst:** ALN

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Chromium, Total	**3.9**	1.0	ug/filter	5	06/12/19 15:04	

Sample: 10562 - M425 - C2 - In(I) - R2 — Sampled: 05/22/19 14:38 by Client
9E30014-10 (Filter)

Hexavalent Chromium by IC

Method: CARB 425 **Batch ID:** W9F0120 **Instr:** LC13 **Prepared:** 06/04/19 11:45 **Analyst:** jna

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Chromium 6+	**2.1**	0.10	ug/filter	5	06/04/19 21:08	

Metals (Non-Aqueous) by EPA 6000/7000 Series Methods

Method: EPA 6020 **Batch ID:** W9F0440 **Instr:** ICPMS03 **Prepared:** 06/10/19 09:31 **Analyst:** ALN

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Chromium, Total	**51**	1.0	ug/filter	5	06/12/19 15:06	

Sample: 10562 - M425 - C1 - In(O) - R2 — Sampled: 05/22/19 14:38 by Client
9E30014-11 (Filter)

Hexavalent Chromium by IC

Method: CARB 425 **Batch ID:** W9F0120 **Instr:** LC13 **Prepared:** 06/04/19 11:45 **Analyst:** jna

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Chromium 6+	**0.21**	0.061	ug/filter	5	06/04/19 21:44	

Metals (Non-Aqueous) by EPA 6000/7000 Series Methods

Method: EPA 6020 **Batch ID:** W9F0440 **Instr:** ICPMS03 **Prepared:** 06/10/19 09:31 **Analyst:** ALN

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Chromium, Total	**1.5**	1.0	ug/filter	5	06/12/19 15:12	

Sample Results

(Continued)

Sample: 10562 - M425 - C2 - In(O) - R2
9E30014-12 (Filter)

Sampled: 05/22/19 14:38 by Client

Hexavalent Chromium by IC

Method: CARB 425 **Batch ID:** W9F0120 **Instr:** LC13 **Prepared:** 06/04/19 11:45 **Analyst:** jna

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Chromium 6+	**0.31**	0.11	ug/filter	5	06/04/19 21:56	

Metals (Non-Aqueous) by EPA 6000/7000 Series Methods

Method: EPA 6020 **Batch ID:** W9F0440 **Instr:** ICPMS03 **Prepared:** 06/10/19 09:31 **Analyst:** ALN

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Chromium, Total	**3.6**	1.0	ug/filter	5	06/12/19 15:14	

Sample: 10562 - M425 - C1 - Out - R2
9E30014-13 (Filter)

Sampled: 05/22/19 14:38 by Client

Metals (Non-Aqueous) by EPA 6000/7000 Series Methods

Method: EPA 6020 **Batch ID:** W9F0440 **Instr:** ICPMS03 **Prepared:** 06/10/19 09:31 **Analyst:** ALN

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Chromium, Total	ND	1.0	ug/filter	5	06/12/19 15:16	M-04

Sample: 10562 - M425 - C1 - Out - R2
9E30014-13RE1 (Filter)

Sampled: 05/22/19 14:38 by Client

Hexavalent Chromium by IC

Method: CARB 425 **Batch ID:** W9F0369 **Instr:** LC13 **Prepared:** 06/06/19 11:40 **Analyst:** jna

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Chromium 6+	ND	0.010	ug/filter	1	06/06/19 14:37	O-12

Sample: 10562 - M425 - C2 - Out - R2
9E30014-14 (Filter)

Sampled: 05/22/19 14:38 by Client

Metals (Non-Aqueous) by EPA 6000/7000 Series Methods

Method: EPA 6020 **Batch ID:** W9F0440 **Instr:** ICPMS03 **Prepared:** 06/10/19 09:31 **Analyst:** ALN

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Chromium, Total	ND	1.0	ug/filter	5	06/12/19 15:17	M-04

Sample: 10562 - M425 - C2 - Out - R2
9E30014-14RE1 (Filter)

Sampled: 05/22/19 14:38 by Client

Hexavalent Chromium by IC

Method: CARB 425 **Batch ID:** W9F0369 **Instr:** LC13 **Prepared:** 06/06/19 11:40 **Analyst:** jna

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Chromium 6+	**0.032**	0.021	ug/filter	1	06/06/19 14:48	O-12

Sample Results

(Continued)

Sample: 10562 - M425 - C1 - In(I) - R3 Sampled: 05/23/19 8:25 by Client
9E30014-15 (Filter)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Hexavalent Chromium by IC						
Method: CARB 425 **Batch ID:** W9F0120 **Instr:** LC13 **Prepared:** 06/04/19 11:45 **Analyst:** jna						
Chromium 6+	**2.5**	0.060	ug/filter	5	06/04/19 22:33	
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods						
Method: EPA 6020 **Batch ID:** W9F0440 **Instr:** ICPMS03 **Prepared:** 06/10/19 09:31 **Analyst:** ALN						
Chromium, Total	**6.1**	1.0	ug/filter	5	06/12/19 15:19	

Sample: 10562 - M425 - C2 - In(I) - R3 Sampled: 05/23/19 8:25 by Client
9E30014-16 (Filter)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Hexavalent Chromium by IC						
Method: CARB 425 **Batch ID:** W9F0120 **Instr:** LC13 **Prepared:** 06/04/19 11:45 **Analyst:** jna						
Chromium 6+	**21**	0.11	ug/filter	5	06/04/19 22:45	
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods						
Method: EPA 6020 **Batch ID:** W9F0440 **Instr:** ICPMS03 **Prepared:** 06/10/19 09:31 **Analyst:** ALN						
Chromium, Total	**340**	1.0	ug/filter	5	06/12/19 15:20	

Sample: 10562 - M425 - C1 - In(O) - R3 Sampled: 05/23/19 8:25 by Client
9E30014-17 (Filter)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Hexavalent Chromium by IC						
Method: CARB 425 **Batch ID:** W9F0120 **Instr:** LC13 **Prepared:** 06/04/19 11:45 **Analyst:** jna						
Chromium 6+	**0.94**	0.047	ug/filter	5	06/04/19 22:57	
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods						
Method: EPA 6020 **Batch ID:** W9F0440 **Instr:** ICPMS03 **Prepared:** 06/10/19 09:31 **Analyst:** ALN						
Chromium, Total	**2.7**	1.1	ug/filter	5	06/12/19 15:22	

Sample: 10562 - M425 - C2 - In(O) - R3 Sampled: 05/23/19 8:25 by Client
9E30014-18 (Filter)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Hexavalent Chromium by IC						
Method: CARB 425 **Batch ID:** W9F0120 **Instr:** LC13 **Prepared:** 06/04/19 11:45 **Analyst:** jna						
Chromium 6+	**2.1**	0.11	ug/filter	5	06/04/19 23:10	
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods						
Method: EPA 6020 **Batch ID:** W9F0440 **Instr:** ICPMS03 **Prepared:** 06/10/19 09:31 **Analyst:** ALN						
Chromium, Total	**19**	1.0	ug/filter	5	06/12/19 15:24	

Sample Results

(Continued)

Sample: 10562 - M425 - C1 - Out - R3 — Sampled: 05/23/19 8:25 by Client
9E30014-19 (Filter)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Hexavalent Chromium by IC						
Method: CARB 425 — **Batch ID:** W9F0120 — **Instr:** LC13 — **Prepared:** 06/04/19 11:45 — **Analyst:** jna						
Chromium 6+	ND	0.050	ug/filter	5	06/04/19 23:22	
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods						
Method: EPA 6020 — **Batch ID:** W9F0440 — **Instr:** ICPMS03 — **Prepared:** 06/10/19 09:31 — **Analyst:** ALN						
Chromium, Total	ND	1.0	ug/filter	5	06/12/19 15:25	M-04

Sample: 10562 - M425 - C2 - Out - R3 — Sampled: 05/23/19 8:25 by Client
9E30014-20 (Filter)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods						
Method: EPA 6020 — **Batch ID:** W9F0440 — **Instr:** ICPMS03 — **Prepared:** 06/10/19 09:31 — **Analyst:** ALN						
Chromium, Total	ND	1.0	ug/filter	5	06/12/19 15:27	M-04

Sample: 10562 - M425 - C2 - Out - R3 — Sampled: 05/23/19 8:25 by Client
9E30014-20RE1 (Filter)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Hexavalent Chromium by IC						
Method: CARB 425 — **Batch ID:** W9F0369 — **Instr:** LC13 — **Prepared:** 06/06/19 11:40 — **Analyst:** jna						
Chromium 6+	ND	0.022	ug/filter	1	06/06/19 15:00	

Sample: AQMD Facility A - M425 - RB — Sampled: 05/23/19 11:30 by Client
9E30014-21 (Filter)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods						
Method: EPA 6020 — **Batch ID:** W9F0444 — **Instr:** ICPMS03 — **Prepared:** 06/10/19 09:39 — **Analyst:** ALN						
Chromium, Total	ND	1.0	ug/filter	5	06/12/19 15:55	M-04

Sample: AQMD Facility A - M425 - RB — Sampled: 05/23/19 11:30 by Client
9E30014-21RE1 (Filter)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Hexavalent Chromium by IC						
Method: CARB 425 — **Batch ID:** W9F0369 — **Instr:** LC13 — **Prepared:** 06/06/19 11:40 — **Analyst:** jna						
Chromium 6+	ND	0.010	ug/filter	1	06/06/19 15:12	

Sample: AQMD Facility A - M425 - RB - Filter — Sampled: 05/23/19 11:30 by Client
9E30014-22 (Filter)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods						
Method: EPA 6020 — **Batch ID:** W9F0444 — **Instr:** ICPMS03 — **Prepared:** 06/10/19 09:39 — **Analyst:** ALN						
Chromium, Total	ND	1.0	ug/filter	5	06/12/19 15:56	M-04

Almega Environmental & Technical Services
10602 Walker St
Cypress, CA 90630

Project Number: In (I)/In (O)/Out

Project Manager: Almega Environmental & Technical Services

Reported:
06/24/2019 14:29

Sample Results

(Continued)

Sample: AQMD Facility A - M425 - RB - Filter
9E30014-22RE1 (Filter)

Sampled: 05/23/19 11:30 by Client

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Hexavalent Chromium by IC						
Method: CARB 425 **Batch ID:** W9F0369 **Instr:** LC13 **Prepared:** 06/06/19 11:40 **Analyst:** jna						
Chromium 6+	ND	0.020	ug/filter	1	06/06/19 15:24	

Quality Control Results

Hexavalent Chromium by IC

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W9F0120 - CARB 425										
Blank (W9F0120-BLK1)				**Prepared & Analyzed: 06/04/19**						
Chromium 6+	ND	0.00010	ug/filter							
LCS (W9F0120-BS1)				**Prepared & Analyzed: 06/04/19**						
Chromium 6+	0.00483	0.00010	ug/filter	0.00500		97	90-110			
Matrix Spike (W9F0120-MS1)	**Source: 9E30014-01**			**Prepared: 06/04/19 Analyzed: 06/05/19**						
Chromium 6+	3.09	0.050	ug/filter	25.0	ND	12	85-117			MS-05
Matrix Spike (W9F0120-MS2)	**Source: 9E30014-02**			**Prepared & Analyzed: 06/04/19**						
Chromium 6+	8.90	0.10	ug/filter	50.0	ND	18	85-117			MS-05
Matrix Spike Dup (W9F0120-MSD1)	**Source: 9E30014-01**			**Prepared: 06/04/19 Analyzed: 06/05/19**						
Chromium 6+	3.33	0.050	ug/filter	25.0	ND	13	85-117	8	20	MS-05
Matrix Spike Dup (W9F0120-MSD2)	**Source: 9E30014-02**			**Prepared & Analyzed: 06/04/19**						
Chromium 6+	7.37	0.10	ug/filter	50.0	ND	15	85-117	19	20	MS-05
Batch: W9F0369 - CARB 425										
Blank (W9F0369-BLK1)				**Prepared & Analyzed: 06/06/19**						
Chromium 6+	ND	0.00010	ug/filter							
LCS (W9F0369-BS1)				**Prepared & Analyzed: 06/06/19**						
Chromium 6+	0.00502	0.00010	ug/filter	0.00500		100	90-110			
Matrix Spike (W9F0369-MS1)	**Source: 9E30014-01RE1**			**Prepared & Analyzed: 06/06/19**						
Chromium 6+	0.962	0.010	ug/filter	5.00	ND	19	85-117			MS-05
Matrix Spike Dup (W9F0369-MSD1)	**Source: 9E30014-01RE1**			**Prepared & Analyzed: 06/06/19**						
Chromium 6+	1.01	0.010	ug/filter	5.00	ND	20	85-117	5	20	MS-05

Almega Environmental & Technical Services
10602 Walker St
Cypress, CA 90630

Project Number: In (I)/In (O)/Out

Project Manager: Almega Environmental & Technical Services

Reported:
06/24/2019 14:29

Quality Control Results

(Continued)

Metals (Non-Aqueous) by EPA 6000/7000 Series Methods

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W9F0440 - EPA 6020										
Blank (W9F0440-BLK1)				**Prepared: 06/10/19**	**Analyzed: 06/12/19**					
Chromium, Total	ND	0.20	ug/filter							
LCS (W9F0440-BS1)				**Prepared: 06/10/19**	**Analyzed: 06/12/19**					
Chromium, Total	5.24	0.20	ug/filter	5.00		105	80-120			
LCS Dup (W9F0440-BSD1)				**Prepared: 06/10/19**	**Analyzed: 06/12/19**					
Chromium, Total	5.36	0.20	ug/filter	5.00		107	80-120	2	20	
Batch: W9F0444 - EPA 6020										
Blank (W9F0444-BLK1)				**Prepared: 06/10/19**	**Analyzed: 06/12/19**					
Chromium, Total	ND	0.20	ug/filter							
LCS (W9F0444-BS1)				**Prepared: 06/10/19**	**Analyzed: 06/12/19**					
Chromium, Total	5.15	0.20	ug/filter	5.00		103	80-120			
LCS Dup (W9F0444-BSD1)				**Prepared: 06/10/19**	**Analyzed: 06/12/19**					
Chromium, Total	5.08	0.20	ug/filter	5.00		102	80-120	1	20	

Notes and Definitions

Item	Definition
M-04	Due to the nature of matrix interferences, sample extract was diluted prior to analysis. The MDL and MRL were raised due to the dilution.
MS-05	The spike recovery and/or RPD were outside acceptance limits for the MS and/or MSD due to possible matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
O-12	The sample was originally analyzed within holding time. However, it was reanalyzed without dilution that exceeded the recommended holding time.
% Rec	Percent Recovery
Dil	Dilution
dry	Sample results reported on a dry weight basis
MDA	Minimum Detectable Activity
MDL	Method Detection Limit
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ) and Detection Limit for Reporting (DLR)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
NR	Not Reportable
RPD	Relative Percent Difference
Source	Sample that was matrix spiked or duplicated.
TIC	Tentatively Identified Compound (TIC) using mass spectrometry. The reported concentration is relative concentration based on the nearest internal standard. If the library search produces no matches at, or above 85%, the compound is reported as unknown.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

An Absence of Total Coliform meets the drinking water standards as established by the California State Water Resources Control Board (SWRCB)

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

1 of 3

22

9E30014

Almega
ENVIRONMENTAL

CHAIN OF CUSTODY RECORDS

INVOICE:
CLIENT: AQMD Facility A
JOB #: 10562
ATTN:

REPORT TO:
ALMEGA Environmental & Technical Services
13602 Walker St.
Cypress, CA 90630
(714) 889-4000 Fax (714) 889-7030
lab@almegaenv.com
Contact: Neal Conroy

Page 1 of 1
PO # 10567

Turnaround Time
Standard: X Other:
Rush:
Depends on # of Samples
5 - 10 days ______
3 - 7 days ______

Unit 1: In(I) Unit 2: In(O) Unit 3: Out
Samplers: (Signature)
Project Manager: Neal Conroy

Return or Dispose

Sample Date	Sample Time	Sample Identification	Description	Type Of Sample LIQUID	GAS	SOLID	# of Containers	ANALYSIS REQUESTED CARB 425					REMARKS
5/22/2019	10:30	10562 - M425 - C1 - In(O) - FB	Probe Rinse (NaBicarb)	x			1	X					* Analyze each sample
		10562 - M425 - C2 - In(O) - FB	Filter/Imps 1, 2	x			1	X					for Hex Chrom and Tot
5/22/2019	11:50-14:12	10562 - M425 - C1 - In(I) - R1	Probe Rinse (NaBicarb)	x			1	X					Chrom
		10562 - M425 - C2 - In(I) - R1	Filter/Imps 1, 2	x			1	X					
5/22/2019	11:50-14:12	10562 - M425 - C1 - In(O) - R1	Probe Rinse (NaBicarb)	x			1	X					** Measure and report
		10562 - M425 - C2 - In(O) - R1	Filter/Imps 1, 2	x			1	X					each sample volume
5/22/2019	11:50-14:15	10562 - M425 - C1 - Out - R1	Probe Rinse (NaBicarb)	x			1	X					
		10562 - M425 - C2 - Out - R1	Filter/Imps 1, 2	x			1	X					*** Archive all primary
													analysis aliquots.
													4.7° T-020

Relinquished by: N Conroy
Date: 5/22/19 Time: 18:15
Received by:
Date: 5/23/19 Time: 0945
Relinquished by:
Date: 5/28/19 Time: 12:00
Received by:
Date: 5/28/19 Time: 9:30

Relinquished by:
Date: 5/28/19 Time: 10:20
Received by: J. Sanglimon
Date: 5/29/19 Time: 1020
Relinquished by:
Date: Time:
Received by:
Date: Time:

Almega
ENVIRONMENTAL

9E300H 2 of 3

Almega ENVIRONMENTAL

CHAIN OF CUSTODY RECORDS

INVOICE:

CLIENT: AQMD Facility A

JOB #: 10562

ATTN:

REPORT TO:

ALMEGA Environmental & Technical Services
10602 Walker St.
Cypress, CA 90630
(714) 889-4000 Fax (714) 889-7030
lab@almegaenv.com
Contact: Neal Conroy

Page 1 of 1

PO # 10562

Turnaround Time

Standard: X Other:

Rush: Depends on # of Samples
5 - 10 days ______
3 - 7 days ______

Return or Dispose

Unit 1: In(I) Unit 2: In(O) Unit 3: Out

Samplers: (Signature)

Project Manager: Neal Conroy

Sample Date	Sample Time	Sample Identification	Description	Type Of Sample			No of Container #	ANALYSIS REQUESTED					REMARKS
				LIQUID	GAS	SOLID		CARB 425					
5/22/2019	14:38-16:50	10562 - M425 - C1 - In(I) - R2	Probe Rinse (NaBicarb)	x			1	X					* Analyze each sample
		10562 - M425 - C2 - In(I) - R2	Filter/Imps 1, 2	x			1	X					for Hex Chrom and Tot
5/22/2019	14:38-16:50	10562 - M425 - C1 - In(O) - R2	Probe Rinse (NaBicarb)	x			1	X					Chrom
		10562 - M425 - C2 - In(O) - R2	Filter/Imps 1, 2	x			1	X					
5/22/2019	14:38-16:53	10562 - M425 - C1 - Out - R2	Probe Rinse (NaBicarb)	x			1	X					** Measure and report
		10562 - M425 - C2 - Out - R2	Filter/Imps 1, 2	x			1	X					each sample volume
													*** Archive all primary
													analysis aliquots.
													47' TORO

Relinquished by: NConroy Date: 5/23/19 Time: 19:15	Received by: Date: 5/23/19 Time: 8:45	Relinquished by: Date: 5/28/19 Time: 12:00	Received by: Date: 5/28/19 Time: 9:15
Relinquished by: Date: 5/28/19 Time: 10:20	Received by: Date: 5/29/19 Time: 1030	Relinquished by: Date: Time:	Received by: Date: Time:

Almega ENVIRONMENTAL

9E30014 3 of 3

Almega
ENVIRONMENTAL

CHAIN OF CUSTODY RECORDS

INVOICE:
CLIENT: AQMD Facility A
JOB #: 10562
ATTN:

REPORT TO:
ALMEGA Environmental & Technical Services
10602 Walker St.
Cypress, CA 90630
(714) 889-4000 Fax (714) 889-7030
lab@almegaenv.com
Contact: Neal Conroy

Page 1 of 1
PO # 10562

Turnaround Time
Standard: X
Other:
Rush:
Depends on # of Samples
5 - 10 days
3 - 7 days

Unit 1: In(I)
Unit 2: In(O)
Unit 3: Out
Samplers: (Signature)
Project Manager: Neal Conroy

Return or Dispose

Sample Date	Sample Time	Sample identification	Description	Type Of Sample			# of Containers	ANALYSIS REQUESTED					REMARKS
				LIQUID	GAS	SOLID		CARB 425					
5/23/2019	8:25-10:42	10562 - M425 - C1 - In(I) - R3	Probe Rinse (NaBicarb)	x			1	X					* Analyze each sample
		10562 - M425 - C2 - In(I) - R3	Filter/Imps 1, 2	x			1	X					for Hex Chrom and Tot
5/23/2019	8:25-10:42	10562 - M425 - C1 - In(O) - R3	Probe Rinse (NaBicarb)	x			1	X					Chrom
		10562 - M425 - C2 - In(O) - R3	Filter/Imps 1, 2	x			1	X					
5/23/2019	8:25-10:45	10562 - M425 - C1 - Out - R3	Probe Rinse (NaBicarb)	x			1	X					** Measure and report
		10562 - M425 - C2 - Out - R3	Filter/Imps 1, 2	x			1	X					each sample volume
5/23/2019	11:30	AQMD Facility A - M425 - RB	Probe Rinse (0.1N NaOH)	x			1	X					
		AQMD Facility A - M425 - RB - Filter	Filter/Imps 1, 2	x			1	X					*** Archive all primary
													analysis aliquots.
													4.9° T-0820

Relinquished by: N Gray
Date: 5/23/19 Time: 15:30
Received by:
Date: 5/24/19 Time: 8:15
Relinquished by:
Date: 5/28/19 Time: 12:00
Received by:
Date: 5/28/19 Time: 9:32

Relinquished by:
Date: 5/28/19 Time 10:20
Received by: Jcunahmn
Date: 5/29/19 Time: 1030
Relinquished by:
Date: Time:
Received by:
Date: Time

Almega
ENVIRONMENTAL

From:	Charles Figueroa <Charles@almegaenv.com>
Sent:	Tuesday, July 02, 2019 12:02 PM
To:	Tulasi@almegaenv.com
Subject:	FW: Samples submitted May 29
Attachments:	Chrome 10562.pdf; Metals 10562.pdf

From: Charles Figueroa <Charles@almegaenv.com>
Sent: Wednesday, May 29, 2019 9:53 AM
To: 'Brandon Gee' <Brandon.Gee@wecklabs.com>
Cc: 'Joe Chau' <Joe.Chau@wecklabs.com>; 'Brian Speaks' <gspeaks@aqmd.gov>; 'doug@almegaenv.com' <doug@almegaenv.com>
Subject: Samples submitted May 29

Brandon,

We are delivering two sets of samples this morning.

This is a test we are doing in conjunction with the AQMD.

One is set of hex chrome samples for CARB Method 425
Most of these instructions should be apparent on the CoC (copy attached).

- Analyze the two submitted fractions separately
- Record the pH of the solutions before analysis (as received)
- Need the lowest reporting limit (avoid dilutions if possible)
- The submitted solution is 0.1 N $NaHCO_3$ (incorrectly stated on the RB description)
- The AQMD would like the opportunity to conduct their own analysis on the samples (if warranted). Please "hold" the samples after analysis (keep cold) to allow a possible re-analysis.
- Hold time is 14 days from 5/22. Please expedite.

The other set is for metals by CARB Method 436
Most of these instructions should be apparent on the CoC (copy attached).

- Combine all three fractions and report a single value
- The Hg option is not applicable to these samples
- The only metals needed on the analysis are: Cr, Ni, As and Cd
- need the lowest reporting limits (avoid dilutions if possible)
- The AQMD would like the opportunity to conduct their own analysis on the samples (if warranted). Please "hold" the samples after analysis to allow a possible re-analysis.

Thanks

Charles M. Figueroa
Almega
P (714) 889-4000

APPENDIX D4

O_2/CO_2 RESULTS – FIELD & LABORATORY DATA

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ENVIRONMENTAL

LABORATORY REPORT
Carbon Dioxide & Oxygen by TCD
by Modified SCAQMD Method 25.3 (TCA/FID)

Client:	AQMD
Project No.:	c10562
Unit Tested:	Facility A
Sampling Date:	22-May-19
Analyzed Date:	28-May-19
Lab No.:	A 053

Client Sample ID	Lab ID	Almega Sample ID Tank	CO_2 % v/v by TCD	O_2 % v/v by TCD
Facility A				
Tnk14 - Inlet (I) - R2	A 053 - 04	14	ND	19.9
Tnk37 - Inlet (O) - R2	A 053 - 05	37	ND	20.2
Tnk42 - Outlet - R2	A 053 - 06	42	ND	21.7
Detection Limit			0.3	0.3

Outlet -R2 not used, lab reporting error

* NOTE - the BIAS FACTOR (of 1.086) is NOT applied in these results.
ND=Not Detected

TGNMNEO concentration values are reported in ppm (v/v) as Methane (carbon#=1).

The sample cylinder is analyzed for NMNEO, CO, CH_4, CO_2 and C_2H_6. It is then directed to a separation column where all heavy organics (C_3+) separate from the light organics (CO, CO_2, CH_4 and C_2H_6). The light organics are then passed through a reduction catalyst to convert CO and CO_2 to CH_4, and are then directed to a FID for detection and quantification. The heavy organics are backflushed off the holding column, passed through an oxidation catalyst, which convert all organics to CO_2, then through a reduction catalyst to convert CO_2 to CH_4 and then to a FID for detection and quantification.

Reviewed by: DW

CALCULATIONS

Almega ENVIRONMENTAL

Client:	AQMD	Lab No.: A 053
Project No.:	c10562	
Unit Tested:	Facility A	
Sampling Date:	22-May-19	
Date tested:	28-May-19	

Parameter	Symbol	Units	Run #1	Run #2
Sample ID			Tnk14 - Inlet (I) - R2	Tnk37 - Inlet (O) - R2
Lab ID			A 053 - 04	A 053 - 05
Sample Tank				
Tank No			14	37
Sample Tank Volume	V_T	L	12.035	12.085
Barometric Pressure	P_b	mm Hg	763	763
Pre-test Pressure	P_{TI}	mm Hg (abs)	2.00	2.00
Pre-test Temperature	t_{TI}	°C	21	21
Abs. Pre-test Temperature	T_{TI}	°K	294	294
Post-test Pressure	P_{TS}	mm Hg (abs)	536	558
Post-test Temperature	t_{TS}	°C	21	21
Abs. Post-test Temperature	c	°K	294	294
Final Pressure	P_{TF}	mm Hg (abs)	926	918
Abs.Final Temperature	T_{TF}	°K	293	293
Dilution Factor	DF_T		1.74	1.66
Sample Volume	Vs	L	8.304	8.682

Calculations

$V_S = k_1 {}^{\circ} V_T * (P_{TS}/T_{TS} - P_{TI}/T_{TI})$

$k_1 = (273+15.56)/760 = 0.3799$

$C_{SAT} = DF * C_{SA}$

$C_{COT} = DF * C_{CO}$

$DF = (P_{TF}/T_{TF})/(P_{TS}/T_{TS} - P_{TI}/T_{TI})$

CALCULATIONS

Client:	AQMD	Lab No.:	
Project No.:	c10562	A 053	
Unit Tested:	Facility A		
Sampling Date:	22-May-19		
Date tested:	28-May-19		

Parameter	Symbol	Units	Run #3
Sample ID			Tnk42 - Outlet - R2
Lab ID			A 053 - 06
<u>Sample Tank</u>			
Tank No			42
Sample Tank Volume	V_T	L	12.010
Barometric Pressure	P_b	mm Hg	763
Pre-test Pressure	P_{TI}	mm Hg (abs)	2.00
Pre-test Temperature	t_{TI}	°C	21
Abs. Pre-test Temperature	T_{TI}	°K	294
Post-test Pressure	P_{TS}	mm Hg (abs)	54
Post-test Temperature	t_{TS}	°C	21
Abs. Post-test Temperature	T_{TS}	°K	294
Final Pressure	P_{TF}	mm Hg (abs)	928
Abs.Final Temperature	T_{TF}	°K	293
Dilution Factor	DF_T		17.91
Sample Volume	Vs	L	0.807

Calculations

$V_S = k_l * V_T * (P_{TS}/T_{TS} - P_{TI}/T_{TI})$

$DF = (P_{TF}/T_{TF})/(P_{TS}/T_{TS} - P_{TI}/T_{TI})$

$k_l = (273+15.56)/760 = 0.3799$

$C_{SAT} = DF * C_{SA}$

$C_{COT} = DF * C_{CO}$

QA/QC SUMMARY
(Repeat Analysis)

Client Project No.: c10562 **Lab No.:** A 053
Sampling Date: 22-May-19 **Analyzed Date:** 28-May-19

Run #1

Analyte	Sample ID	Area Count #1	Area Count #2	Area % diff (±20%)	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO2*	A 053 - 04	ND	ND	ND	ND	ND	**ND**	ND
O2*	A 053 - 04	2218932	2220944	-0.09	11.4	11.4	**11.4**	-0.09

Run #2

Analyte	Sample ID	Area Count #1	Area Count #2	Area Count #3	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO2*	A 053 - 05	ND	ND	ND	ND	ND	**ND**	ND
O2 *	A 053 - 05	2379775	2369627	0.43	12.2	12.2	**12.2**	0.43

* - by GC/TCD

$Conc_{CO}$ in tank = $MeanConc_{CO}$ * DF

$Conc_{CO2}$ in tank = $MeanConc_{CO2}$ * DF

$Conc_{O2}$ in tank = $MeanConc_{O2}$ * DF

QA/QC SUMMARY
(Repeat Analysis)

Client Project No.:	c10562	**Lab No.:**	A 053
Sampling Date:	22-May-19	**Analyzed Date:**	28-May-19

Run #3

Analyte	Sample ID	Area Count #1	Area Count #2	Area Count #3	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO2*	A 053 - 06	ND	ND	ND	ND	ND	**ND**	ND
O2*	A 053 - 06	235691	235545	0.06	1.2	1.2	**1.2**	0.06

* - by GC/TCD

$Conc_{CO}$ in tank = $MeanConc_{CO} * DF$

$Conc_{CO2}$ in tank = $MeanConc_{CO2} * DF$

$Conc_{O2}$ in tank = $MeanConc_{O2} * DF$

SAMPLE INVENTORY REPORT

Method 25.3 Sampling Train

Project No.:	c10562	Lab No.:	A 053
Client:	AQMD	Sampling Date:	22-May-19

Laboratory ID	Client ID	Component ID	
Run #1			
A 053 - 04	Tnk14 - Inlet (I) - R2	Tank #	14
Run #2			
A 053 - 05	Tnk37 - Inlet (O) - R2	Tank #	37
Run #3			
A 053 - 06	Tnk42 - Outlet - R2	Tank #	42

Lot# A053

Page ___ of ___

Almega
ENVIRONMENTAL

CHAIN OF CUSTODY RECORDS

INVOICE TO: ____

ATTN:

REPORT TO:

ALMEGA Environmental & Technical Services
10602 Walker St.
Cypress, CA 90630
(714) 889-4000 Fax (714) 889-7030
lab@almegaenv.com
Contact:

PO # ____

Turnaround Time
Standard: ✓ Other: ____
Rush:
Depends on # of Samples
5 - 10 days ____
3 - 7 days ____

Job # 10562
Unit # Various
Client: AQMD Facility A
Location: [redacted]
Samplers: (Signature)
Unit Information:
Project Manager: N Conroy

Sample Date	Sample Time	Sample Identification	Lab Sample #	Type Of Sample LIQUID	GAS	SOLID	No of Container	ANALYSIS REQUESTED O2/CO2 – M10.1					Return or Dispose REMARKS
5/22/19	8:22 - 9:32	Tnk 14 - Inlet (I) - R2	A053 -04				1	✓					
↓	8:30 - 9:30	Tnk 37 - Inlet (0) - R2	-05				1	✓					
	8:30 - 9:30	Tnk 42 - Outlet - R2	-06				1	✓					

Relinquished by: N Conroy
Date: 5/22/19 Time 1815

Received by:
Date: 5/23/19 Time: 8:42

Relinquished by:
Date: Time:

Received by:
Date: Time

Relinquished by:
Date: Time

Received by:
Date: Time:

Relinquished by:
Date: Time:

Received by:
Date: Time

Almega
ENVIRONMENTAL

Almega Environmental- Chain of Custody Form

June 2015 v1.0

Almega
ENVIRONMENTAL

Standard Receipt
Sample LOG in Checklist

Project No: c10562 ~~[illegible]~~

Lab ID: A053

Method: M10.1

Sampling Date: 5/21, 5/22, 5/23

Location: AQMD -A Int:

Date & Time Rc'd: 5/22/19 9:02 5/23/19 8:42 5/24/19 8:15

Location: LAB Int: DW

Arrived By: (circle) FedEx UPS Drop Off (Int) DS Other

Condition of Package(s): (comment): ok ✓✓ Package Type: Box Cooler Other: /

Number of Sample Container(s): 3, 3, 3, 9 Correct Containers (per Method): [✓ Y] N ✓✓

Preservation: (circle) ICE DryICE ICEPacks [✓ None] ✓✓

Sample Conditions:

Sample Temp (C): 21 ✓✓ Ambient Temp (C): 21 ✓✓

Sample Temp (C): Filter Condition: ok

PH: Components Sealed: [✓ Y] N ✓✓

Sample Recovery Completed On: (date & time)

Recovered In: (circle) [✓ Field] Lab Other ✓✓ Silica Gel Condition:

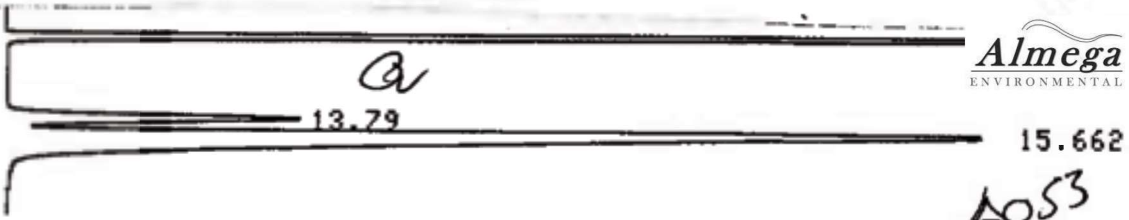
Tedlar Bags -
Condensation: Y N

Comments:

Container(s) Requested: Glass Plastic

Additional Comments:

CHROMATOGRAM
TEST SAMPLES



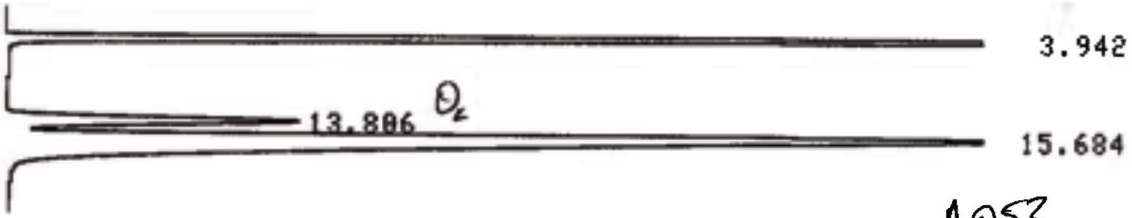
A053
-04

```
CHROMATOGRAM   1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                           FILE        0
SAMPLE NO   0                           METHOD        41
REPORT NO   191

PKNO      TIME      AREA  MK  IDNO     CONC        NAME

   1     3.942   8150701              35.319
   2    13.79    2218932               9.6152
   3    15.662  12707724  V           55.0658
                ---------          ------------
.        TOTAL  23077356              100
```



A053
-04
dup

```
CHROMATOGRAM   1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                           FILE        0
SAMPLE NO   0                           METHOD        41
REPORT NO   192

PKNO      TIME      AREA  MK  IDNO     CONC        NAME

   1     3.942   8173890              35.2532
   2    13.806   2220944               9.5787
   3    15.684  12791430  V           55.1681
                ---------          ------------
         TOTAL  23186262              100
```

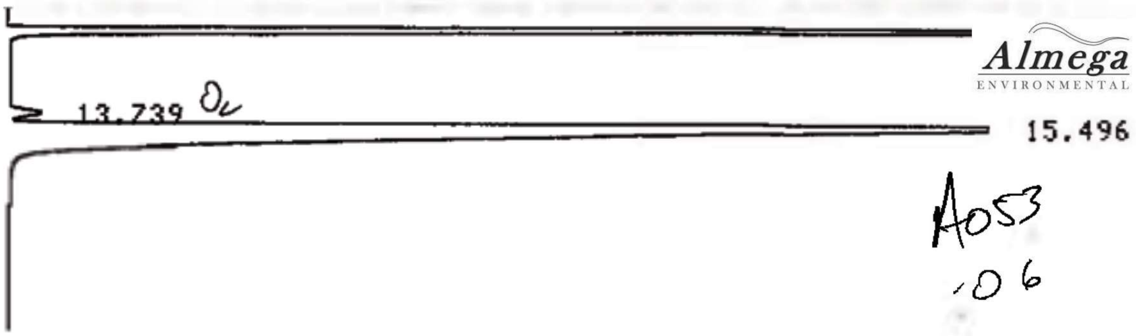
C63 223-02037-01 170615 ⊕ Shimadzu

Almega
ENVIRONMENTAL

-02037-01

1706:5

⊕ Shimadzu



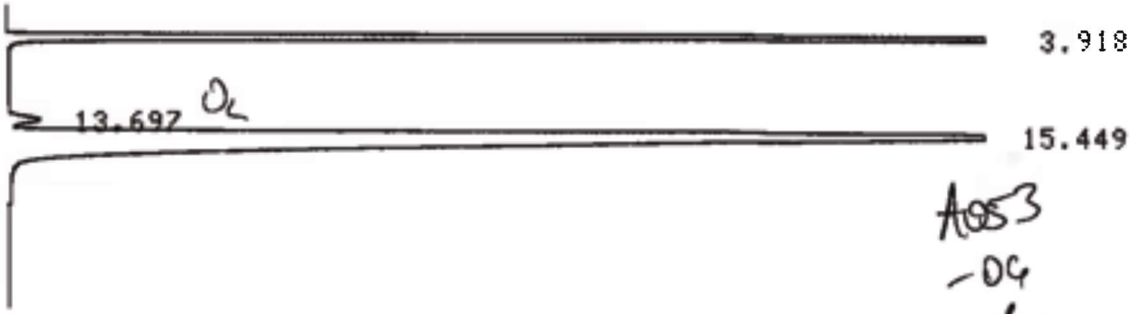
A053
-06

```
CHROMATOGRAM   1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                           FILE        0
SAMPLE NO   0                           METHOD        41
REPORT NO   195

PKNO      TIME       AREA  MK  IDNO      CONC        NAME

   1     3.928    7995585                35.4683
   2    13.739     235691                 1.0455
   3    15.496   14311633  V             63.4862
                 ---------          -------------
        TOTAL    22542908                 100
```



A053
-06

```
CHROMATOGRAM   1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                           FILE        0
SAMPLE NO   0                           METHOD        41
REPORT NO   196

PKNO      TIME       AREA  MK  IDNO      CONC        NAME

   1     3.918    7976595                35.4421
   2    13.697     235545                 1.0466
   3    15.449   14293824  V             63.5113
                 ---------          -------------
        TOTAL    22505962                 100
```

QAQC

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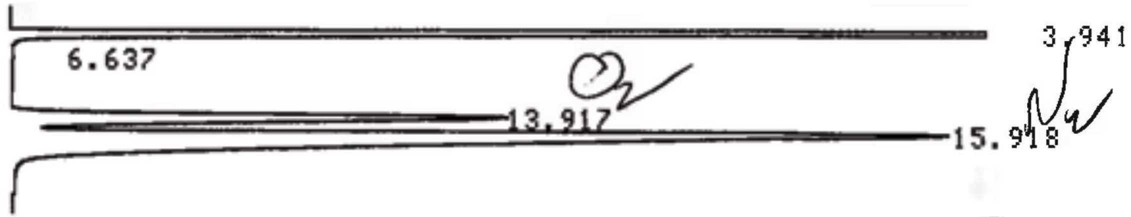
3-02037-01

170615



Cir

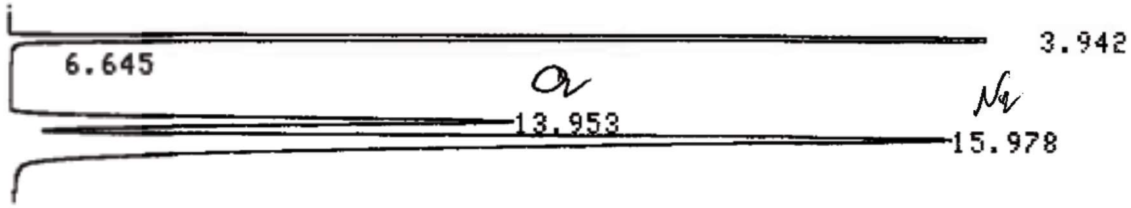
⊕ Shimadzu

```
CHROMATOGRAM   1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                           FILE        0
SAMPLE NO   0                           METHOD         41
REPORT NO   178

PKNO      TIME       AREA  MK  IDNO      CONC        NAME

   1     3.941    8338413                 35.3681
   2     6.637      10629                  0.0451
   3    13.917    3875095                 16.4366
   4    15.918   11351942  V              48.1502
                 ---------           ------------
         TOTAL   23576078                100
```



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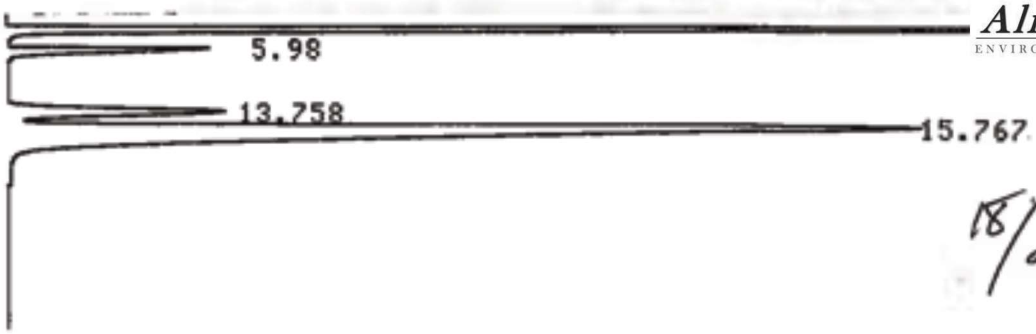
```
CHROMATOGRAM   1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                           FILE        0
SAMPLE NO   0                           METHOD         41
REPORT NO   179

PKNO      TIME       AREA  MK  IDNO      CONC        NAME

   1     3.942    8378934                 34.9693
   2    13.953    3971324                 16.5742
   3    15.978   11610556  V              48.4564
                 ---------           ------------
         TOTAL   23960814                100
```



18/9

```
CHROMATOGRAM    1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                              FILE         0
SAMPLE NO   0                              METHOD         41
REPORT NO   197

PKNO       TIME       AREA  MK  IDNO       CONC         NAME

   1      3.878    6832073                      33.7096
   2      5.98      985018                       4.8601
   3     13.758    1662447                       8.2025
   4     15.767   10787908  V                   53.2278
                 ---------            -------------
        TOTAL    20267444                   100
```

070

223-02037-01

17

TANK PREPARATION

TANK PREPARATIONS

Client:	AQMD	Lab No.:	A 053
Project No.:	c10562		
Unit Tested:	Facility A		
Sampling Date:	22-May-19		
Date pressurized:	23-May-19		

Tank ID	Sample ID	Pre-test pressure mm Hg		Post-test pressure mm Hg	Final Pressure	Comments
		1	2			
14	A 053 - 04	-758	-758	-224	166	Run #1
37	A 053 - 05	-758	-758	-202	158	Run #2
42	A 053 - 06	-758	-758	-706	168	Run #3

* - Post -test Pressure is less then 200 mm Hg.

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VOC FIELD DATA SHEET - SCAQMD METHOD ~~25.1~~ 10.1 T.T

Date: 05/22/19
Client: Facility A
Unit: Inlet No.1 Inside
Operator Name: T TD
Fuel:
Location: Inside

Test No.: 2
Barometric Pressure (in. Hg): 29.62
Pretest Leak Check:
A: ✓ B:
Post-test Leak check:
A: ✓ B:

SAMPLE A

		Tank # 14 Trap # NA Control ID:	
Time 24 Hours	Start Time	Flow ml/min.	Vacuum inch Hg
0	0832	~ .10	28.0
10	0842		24.50
20	0852		21.0
30	0902		18.0
40	0912		15.0
50	0922 End Time		12.0
60	0932		8.0

SAMPLE B

Tank # ___ Trap # ___ Control ID:	
Flow ml/min.	Vacuum inch Hg

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VOC FIELD DATA SHEET - SCAQMD METHOD 10.1

Date: 5-22-19
Test No.: 2
Client: SCAQMD Facility A
Barometric Pressure (in. Hg): 29.62
Unit: Inlet outside (S)
Pretest Leak Check:
Operator Name: MN
A: ✓
B: ___
Fuel: Stack gas
Post-test Leak check:
Location: Inlet outside
A: x
B: ___

SAMPLE A
Tank # ~~34~~ 7 Trap #___
Control ID:

SAMPLE B
Tank #___ Trap #___
Control ID:

Time 24 Hours	Start Time	Sample A Flow ml/min.	Sample A Vacuum inch Hg	Sample B Flow ml/min.	Sample B Vacuum inch Hg
0	830	4.5	28		
10			24		
20			20		
30			16		
40			13		
50	End Time		11		
60	930		8		

APPENDIX E

SCAQMD METHOD 5.1 – PARTICULATE MATTER (PM)

APPENDIX E1

PARTICULATE MATTER (PM) – RESULTS AND CALCULATIONS

Location: Baghouse Outlet

TEST RESULTS
SCAQMD Method 5.1 (Particulate Matter)

Facility: AQMD Facility A

City: [redacted], CA

Source: Baghouse

Location: Outlet

Run Number	1	
Run Date	05/23/19	
Run Start Time	11:20	
Run Stop Time	13:30	
Test Train Parameters		**AVERAGE**
Volume of Dry Gas Sample, SCF*	89.20	89.20
Flue Gas Parameters		
CO2, Percent By Volume, Dry**	0.04	0.04
O2, Percent By Volume, Dry**	20.90	20.90
Temperature, Degrees F	86.7	86.7
Moisture, %	1.86	1.86
Air Flow Rate, ACFM	-	-
Air Flow Rate, Dry SCFM*	47,272	47,272
Total Particulate		
Catch, mg	3.32	3.32
Concentration, Gr/DSCF	0.000574	0.000574
Emission Rate, lb/hr	0.233	0.233

* 60 Degrees F and 29.92 Inches of Mercury

** Ambient O2/CO2 was used in gas density calculations.

ISOKINETIC SAMPLING TRAIN RESULTS - METHOD: METHOD 5.1

Client Name	Facility A	**Operator**		CH/NC
Plant Name	Metal Melting facility	**Project #**		10562
Sampling Location	Outlet	**Standard Temperature, °F**		60

USE IN AVERAGE OF RUN SET? 1 or 0 =>		**1**			**SET AVERAGE**
Run Number		1			
Run Date		05/23/19			
Run Start Time	hh:mm	11:20			
Run Stop Time	hh:mm	13:30			
Meter Calibration Factor	Y	1.0376			
Pitot Tube Coefficient	C_p	0.84			
Actual Nozzle Diameter	in	0.513			
Sample Volume	ft^3	88.41			88.41
Total Sampling Time	min	123			123
Average Meter Temperature	°F	74.7			74.7
Average Stack Temperature	°F	86.7			86.7
Barometric Pressure	in Hg	29.80			29.8
Stack/Duct Static Pressure	in H_2O	0.00			0.00
Absolute Stack/Duct Pressure	in Hg	29.8			29.8
Average Delta H	in H_2O	1.77			1.77
Absolute Meter Pressure	in Hg	29.9			29.9
Avg Differential Pressure (Delta P)	in H_2O	0.025			0.025
Total Water Volume Collected	mL	36.5			36.5
Volume of Water vapor @ STP	SCF	1.692			1.692
Volume Metered @ STP	DSCF	89.200			89.200
Calculated Stack Moisture	% H_20	1.86			1.9
Saturated Stack Moisture	% H_20	4.3			4.3
Reported Stack Moisture Content	% H_20	1.86			1.86
Carbon Dioxide Percentage	% CO_2	0.04			0.04
Oxygen Percentage	% O_2	20.90			20.90
Carbon Monoxide Percentage	% CO	0.000			0.000
Nitrogen Percentage	% N_2	79.1			79.1
Dry Mole Fraction	decimal	0.981			0.981
Dry Gas Molecular Weight	lb/lb-mole	28.84			28.84
Wet Stack Gas Molecular Weight	lb/lb-mole	28.64			28.64
Flue Gas Density	lb/ft^3	0.0743			0.0743
Stack Cross-Sectional Area	in^2	-			
Stack Cross-Sectional Area	ft^2	-			
Percent of Isokinetic Rate	% ISO	99.5			99.5
		Air Flow Rate Results			
Average Stack Gas Velocity	ft/sec	9.11			9.11
Actual Stack Flow/Minute	ACFM	-			-
Dry Standard Stack Flow/Minute*	DSCFM	47,272			47,272

Note: *Sum of 2 inlets flows.

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ISOKINETIC SAMPLING TRAIN DATASHEET - METHOD **METHOD 5.1**

Client Name	Facility A	**Run #**	1		
Plant Name	Metal Melting facility	**Project #**	10562	Run Start	11:20
Plant City, State	[redacted], CA	**Personnel**	CH/NC	Run End	13:30
Test Location	Outlet	**Tester Signature**	Onfile		
Date of Test	05/23/19	**Checked By**	SA		

Isokinetic Factor Setup		**Pressures**		**Sampling Equipment**		**Filter ID & Tares**		**Actuals**
ΔH @ 0.75 SCFM	1.789	**Pbar**	29.80	**Meter Console #**	A-6			**CO_2**
Meter Calibration Factor	1.0376	**Pstatic**	0.00	**Ideal Nozzle Diameter**	0.521			**0.04**
Pitot Tube Coefficient	0.840	**Abs P**	29.80	**Nozzle #**	0.513			**O_2**
Estimated Dry Gas Meter Temp	75	**Tstd, °F**	60	**Actual Nozzle Diameter**	0.513			**20.90**
Estimated Stack Temp or M2 Avg.	85	**Pstd**	29.92	**Probe Lgth/ID #**	16			**CO**
Estimated Delta P or M2 Avg.	0.025	**Estimates**		**Liner Material**	Glass	**XAD ID & Tares**		**0.00**
Estimated Moisture Content	2.00	**CO_2**	0.04	**Filter Box #**	NA			**N_2**
Estimated Dry Molecular Weight	28.85	**O_2**	21.00	**Cold Box ID #**	NA			**79.1**
Estimated Velocity, ft/sec	9.1	**CO**	0.00	**Umbilical ID #**	NA			**H_2O**
K Factor (delta H/delta P)	71.40	**N_2**	**79.0**	**TC ID #s**	16			**36.5**

Equipment & Leak Check Data, OK? Y or N					**Leak Checks**	**1**	**2**	**3**	**4**	**5**	**6**	**Status**
Tambient			**PRE**	**POST**	**DGM initial**	241.572						241.572
Thermocouples			Y	Y	**Vacuum**	22						22
Pitots			Y	Y	**Leak Rate**	0.000						**OK**
Tedlar Bag			NA	NA	**DGM final**	241.926						241.926

Point #	**Clock Time**	**Test Time**	**Dry Gas Meter Reading**	**Velocity Head**	**Desired Orifice ΔH**	**Actual Orifice ΔH**	**Pump Vac.**	**DGM Inlet Temp**	**DGM Outlet Temp**	**Stack Temp**	**Filter Temp**	**Imp. Exit Temp**	**Cond. Exit Temp**
	24 hr	min	ft^3	in H_2O	in H_2O	in H_2O	in Hg	°F	°F	°F	°F	°F	°F
A - 0	11:20	0.0	196.362	0.0251	1.79	1.76	5.0	70	70	84		54	NA
A - 1		7.00	201.361	0.0251	1.79	1.75	5.0	69	69	87		54	
A - 2		14.0	206.342	0.0251	1.79	1.74	5.0	70	70	90		54	
A - 3		21.0	211.313	0.0251	1.79	1.75	5.0	72	72	88		54	
A - 4		28.0	216.310	0.0251	1.79	1.77	5.0	74	74	86		54	
A - 5		35.0	221.343	0.0251	1.79	1.77	5.0	75	75	85		54	
A - 6		42.0	226.378	0.0251	1.79	1.78	5.0	76	76	83		54	
A - 7		49.0	231.445	0.0251	1.79	1.77	5.0	77	77	87		55	
A - 8		56.0	236.501	0.0251	1.79	1.78	5.0	78	78	85		55	
A - 9	12:23	63.0	241.572	0.0251	1.79	1.75	5.0	73	73	90		55	
B - 1	12:30	68.0	245.501	0.0251	1.79	1.76	5.0	74	74	87		55	
B - 2	5 min	73.0	249.092	0.0251	1.79	1.77	5.0	74	74	84		55	
B - 3	per pt.	78.0	252.691	0.0251	1.79	1.76	5.0	74	74	89		55	
B - 4		83.0	256.271	0.0251	1.79	1.77	5.0	75	75	86		55	
B - 5		88.0	259.872	0.0251	1.79	1.77	5.0	76	76	87		55	
B - 6		93.0	263.470	0.0251	1.79	1.76	5.0	76	76	89		55	
B - 7		98.0	267.062	0.0251	1.79	1.78	5.0	77	77	85		55	
B - 8		103.0	270.683	0.0251	1.79	1.79	5.0	77	77	83		55	
B - 9		108.0	274.301	0.0251	1.79	1.77	5.0	77	77	87		55	
B - 10		113.0	277.912	0.0251	1.79	1.76	5.0	77	77	90		55	
B - 11		118.0	281.513	0.0251	1.79	1.77	5.0	78	78	88		55	
B 12	13:30	123.0	285.123										
						MAX =>	5.00						
Average Values		123.0	88.407	0.025	1.792	1.766		74.7		86.7			

Note: Ambient O2/CO2 was used in gas density calculations.

	Water 1	Water 2	Empty	SG
Initial	**738.5**	**720.2**	**628.7**	**837.5**
Final	**752.0**	**723.7**	**631.2**	**854.5**
H2O gain	**13.5**	**3.50**	**2.50**	**17.00**
Total H2O	**36.5**			

Cumul. Percent ISO	**Point Percent ISO**	**Square Root DP**	**Local Stack Velocity**	**Cumulative Meter Volume**	**Point Meter Volume**
%	%	(in H_2O)$^{1/2}$	ft/sec	scf	scf
99.6	99.6	0.158	9.1	5.167	5.167
99.7	99.7	0.158	9.1	10.325	5.158
99.7	99.6	0.158	9.1	15.463	5.138
99.7	99.6	0.158	9.1	20.608	5.145
99.7	99.8	0.158	9.1	25.771	5.163
99.6	99.5	0.158	9.1	30.927	5.156
99.7	99.8	0.158	9.1	36.106	5.179
99.7	99.7	0.158	9.1	41.264	5.158
99.7	99.7	0.158	9.1	46.428	5.164
100.4	109.6	0.158	9.1	50.466	4.038
100.4	99.7	0.158	9.1	54.149	3.684
100.3	99.7	0.158	9.1	57.840	3.692
100.3	99.6	0.158	9.1	61.511	3.673
100.2	99.7	0.158	9.1	65.196	3.687
100.2	99.6	0.158	9.1	68.869	3.677
100.2	99.6	0.158	9.1	72.537	3.671
100.1	99.8	0.158	9.1	76.226	3.694
100.1	99.6	0.158	9.1	79.914	3.691
100.1	99.7	0.158	9.1	83.594	3.684
100.1	99.7	0.158	9.1	87.264	3.673
100.0	99.6	0.158	9.1	90.935	3.676
100.0	99.6	**Final Values**		90.935	3.676
		0.158	9.1		

EXAMPLE CALCULATIONS, RUN 1

ABSOLUTE PRESSURE, INCHES OF MERCURY
Ps = Pbar + Pg/13.6
= 29.80 + 0.00/13.6
= 29.80

VOLUME OF WATER VAPOR, STANDARD CUBIC FEET
Vwstd = 0.002667 * [(Tstd + 460) / Pstd] * Vlc
= 0.002667 * [(60 + 460) / 29.92 * 36.5
= 1.692

SAMPLED VOLUME OF SOURCE GAS, DRY STANDARD CUBIC FEET
Vmstd = [(Tstd + 460)/Pstd] * Y * Vm * (Pbar + Delta-H/13.6) / (460 + tm)
= [(60 + 460)/ 29.92] * 1.0376 * 88.407 * (29.80 + 1.766/13.6) / (460 + 75)
= 89.200

MOISTURE CONTENT, PERCENT BY VOLUME
%H2O = Vwstd / (Vwstd + Vmstd)
= 1.692 / (1.692 + 89.200)
= 1.86

DRY MOLE FRACTION, LB-MOLE/LB-MOLE
Mfd = 1 - %H2O/100
= 1 - 1.86/100
= 0.981

DRY MOLECULAR WEIGHT, LB/LB-MOLE
Md = 44*(%CO2/100) + 32*(%O2/100) + 28*{[100-(%CO2+%O2)]/100}
= 44*(0.0/100) + 32*(20.9/100) + 28*{[100-(0.0+20.9)]/100}
= 28.84

WET MOLECULAR WEIGHT, LB/LB-MOLE
Ms = Md*Mfd + 18.0*%H2O/100
= 28.84*0.981 + 18.0*1.86/100
= 28.64

FUEL FACTOR
Fo = (20.9 - %O2) / %CO2
= (20.9 - 20.9) / 0.0
= 0.000

ISOKINETIC SAMPLING RATE, PERCENT
%I = Pstd/(Tstd + 460) * (100/60) * Vmstd*(ts + 460)/[Ps*vs*Mfd*Theta*(PI*Dia*Dia/576)]
= 29.92/(60 + 460) * (100/60) * 89.200*(87 + 460)/[29.80*9.11*0.981*123.00*(PI*0.513*0.513/576)]
= 99.5

VELOCITY, FEET PER SECOND
vs = 85.49 * Cp * SQRT[Delta-p*(460+ts)/Ps/Ms]
= 85.49 * 0.84 * SQRT[0.0251*(460+87)/29.80/28.64]
= 9.11

TOTAL PARTICULATE CONCENTRATION, GRAINS PER DRY STANDARD CUBIC FOOT
gr/DSCF = (Catch/Conversion) * 7,000 / 453.592 / Vmstd
= (3.32/1000) * 7,000 / 453.592 / 89.200
= 0.00057

TOTAL PARTICULATE EMISSION RATE, POUNDS PER HOUR
lb/hr = 60 * (Catch/Conversion) * Qsd / 453.592 / Vmstd
= 60 * (3.32/1000) * 47272 / 453.592 / 89.200
= 0.233

Location: Inlet 1 (inside)

TEST RESULTS
SCAQMD Method 5.1 (Particulate Matter)

Facility: AQMD Facility A
City: [redacted], CA
Source: Baghouse
Location: Inlet 1 Furnace (Inside)

Run Number	1	
Run Date	05/23/19	
Run Start Time	11:20	
Run Stop Time	13:36	
Test Train Parameters		**AVERAGE**
Volume of Dry Gas Sample, SCF*	101.79	101.79
Flue Gas Parameters		
CO2, Percent By Volume, Dry**	< 0.30	< 0.30
O2, Percent By Volume, Dry**	20.20	20.20
Temperature, Degrees F	128.0	128.0
Moisture, %	1.55	1.55
Air Flow Rate, Wet ACFM	3,142	3,142
Air Flow Rate, Dry SCFM*	2,629	2,629
Total Particulate		
Catch, mg	60.42	60.42
Concentration, Gr/DSCF	0.009160	0.009160
Emission Rate, lb/hr	0.206	0.206

* 60 Degrees F and 29.92 Inches of Mercury
** O2/CO2 was sampled in Tedlar bag and analysed via SCAQMD Method 10.1 by GC.

ISOKINETIC SAMPLING TRAIN RESULTS - METHOD: METHOD 5.1

Client Name	Facility A	**Operator**		T. Ta/NC
Plant Name	Metal Melting facility	**Project #**		10562
Sampling Location	Inlet 1 (Inside)	**Standard Temperature, ^oF**		60

USE IN AVERAGE OF RUN SET? 1 or 0 =>		**1**			**SET AVERAGE**
Run Number		1			
Run Date		05/23/19			
Run Start Time	hh:mm	11:20			
Run Stop Time	hh:mm	13:36			
Meter Calibration Factor	Y	1.0274			
Pitot Tube Coefficient	C_p	0.84			
Actual Nozzle Diameter	in	0.180			
Sample Volume	ft^3	104.91			104.91
Total Sampling Time	min	120			120
Average Meter Temperature	^oF	91.5			91.5
Average Stack Temperature	^oF	128.0			128.0
Barometric Pressure	in Hg	29.80			29.8
Stack/Duct Static Pressure	in H_2O	-14.20			-14.20
Absolute Stack/Duct Pressure	in Hg	28.8			28.8
Average Delta H	in H_2O	2.46			2.46
Absolute Meter Pressure	in Hg	30.0			30.0
Avg Differential Pressure (Delta P)	in H_2O	2.508			2.508
Total Water Volume Collected	mL	34.6			34.6
Volume of Water vapor @ STP	SCF	1.604			1.604
Volume Metered @ STP	DSCF	101.791			101.791
Calculated Stack Moisture	% H_20	1.55			1.6
Saturated Stack Moisture	% H_20	14.9			14.9
Reported Stack Moisture Content	% H_20	1.55			1.55
Carbon Dioxide Percentage	% CO_2	0.30			0.30
Oxygen Percentage	% O_2	20.20			20.20
Carbon Monoxide Percentage	% CO	0.000			0.000
Nitrogen Percentage	% N_2	79.5			79.5
Dry Mole Fraction	decimal	0.984			0.984
Dry Gas Molecular Weight	lb/lb-mole	28.86			28.86
Wet Stack Gas Molecular Weight	lb/lb-mole	28.69			28.69
Flue Gas Density	lb/ft^3	0.0745			0.0745
Stack Cross-Sectional Area	in^2	78.5			78.5
Stack Cross-Sectional Area	ft^2	0.55			0.55
Percent of Isokinetic Rate	% ISO	99.6			99.6
		Air Flow Rate Results			
Average Stack Gas Velocity	ft/sec	96.02			96.02
Actual Stack Flow/Minute	ACFM	3,142			3,142
Dry Standard Stack Flow/Minute	DSCFM	2,629			2,629

ISOKINETIC SAMPLING TRAIN DATASHEET - METHOD **METHOD 5.1**

Client Name	Facility A	**Run #**	1		
Plant Name	Metal Melting facility	**Project #**	10562	Run Start	11:20
Plant City, State	[redacted], CA	**Personnel**	T. Ta/NC	Run End	13:36
Test Location	Inlet 1 (Inside)	**Tester Signature**	Onfile		
Date of Test	05/23/19	**Checked By**	CF		

Isokinetic Factor Setup		**Pressures**		**Sampling Equipment**		**Filter ID & Tares**		**Actuals**
ΔH @ 0.75 SCFM	1.736	**Pbar**	29.80	**Meter Console #**	A-7			**CO_2**
Meter Calibration Factor	1.0274	**Pstatic**	-14.20	**Ideal Nozzle Diameter**	0.162			**0.30**
Pitot Tube Coefficient	0.840	**Abs P**	28.76	**Nozzle #**	0.180			**O_2**
Estimated Dry Gas Meter Temp	85	**Tstd, °F**	60	**Actual Nozzle Diameter**	0.180			**20.20**
Estimated Stack Temp or M2 Avg.	130	**Pstd**	29.92	**Probe Lgth/ID #**	28			**CO**
Estimated Delta P or M2 Avg.	3.000	**Estimates**		**Liner Material**	Glass	**XAD ID & Tares**		**0.00**
Estimated Moisture Content	1.50	**CO_2**	0.04	**Filter Box #**	NA			**N_2**
Estimated Dry Molecular Weight	28.85	**O_2**	21.00	**Cold Box ID #**	NA			**79.5**
Estimated Velocity, ft/sec	105.2	**CO**	0.00	**Umbilical ID #**	NA			**H_20**
K Factor (delta H/delta P)	0.96	**N_2**	**79.0**	**TC ID #s**	28			**34.6**

Point #	Clock Time	Test Time	Dry Gas Meter Reading	Velocity Head	Desired Orifice ΔH	Actual Orifice ΔH	Pump Vac.	DGM Inlet Temp	DGM Outlet Temp	Stack Temp	Filter Temp	Imp. Exit Temp	Cond. Exit Temp
	24 hr	min	ft^3	in H_2O	in H_2O	in H_2O	in Hg	°F	°F	°F	°F	°F	°F
A - 1	11:20	0.0	859.040	2.50	2.40	2.43	4.0	84	84	113		56	NA
A - 2		5.00	863.400	2.60	2.50	2.58	4.0	85	85	102		50	
A - 3		10.0	867.870	2.30	2.21	2.15	3.5	87	87	138		52	
A - 4		15.0	872.000	2.40	2.31	2.33	4.0	88	88	118		53	
A - 5		20.0	876.300	2.50	2.40	2.34	4.0	89	89	140		53	
A - 6		25.0	880.550	2.50	2.40	2.23	4.0	90	90	170		52	
A - 7		30.0	884.790	3.30	3.17	3.09	5.0	90	90	141		52	
A - 8		35.0	889.740	3.40	3.27	3.07	5.0	92	92	164		53	
A - 9		40.0	894.700	3.00	2.88	2.86	5.0	93	93	132		54	
A - 10		45.0	899.540	2.40	2.31	2.28	4.5	93	93	134		53	
A - 11		50.0	903.800	2.10	2.02	2.01	4.0	93	93	131		53	
A - 12	12:20	55.0	907.740	1.50	1.44	1.45	4.0	94	94	125		53	
B - 1	12:36	60.0	911.160	3.40	3.27	3.21	5.0	89	89	134		57	
B - 2		65.0	916.200	3.60	3.46	3.38	5.0	90	90	139		48	
B - 3		70.0	921.300	3.50	3.37	3.42	5.5	91	91	116		50	
B - 4		75.0	926.540	3.60	3.46	3.38	5.5	92	92	141		50	
B - 5		80.0	931.700	3.40	3.27	3.25	5.5	93	93	132		51	
B - 6		85.0	936.810	3.50	3.37	3.43	5.5	94	94	117		52	
B - 7		90.0	942.040	2.20	2.12	2.09	4.5	95	95	138		52	
B - 8		95.0	946.120	2.40	2.31	2.34	4.5	95	95	121		52	
B - 9		100.0	950.400	2.00	1.92	2.02	4.0	95	95	102		52	
B 10		105.0	954.480	1.60	1.54	1.62	4.0	95	95	100		53	
B 11		110.0	958.100	1.10	1.06	1.08	3.5	95	95	120		52	
B 12	13:36	115.0	961.120	0.98	0.94	0.98	3.5	94	94	104		52	
		120.0	963.947										
						MAX =>	5.50						
Average Values		120.0	104.907	2.508	2.475	2.459		91.5		128.0			

Note: O2/CO2 was sampled in Tedlar bag and analysed via SCAQMD Method 10.1 by GC.

	Water 1	Water 2	Empty	SG
Initial	**743.5**	**621.4**	**634.5**	**871.4**
Final	**754.7**	**625.1**	**636.8**	**888.8**
H2O gain	**11.2**	**3.70**	**2.30**	**17.40**
Total H2O	**34.6**			

Cumul. Percent ISO	Point Percent ISO	Square Root DP	Local Stack Velocity	Cumulative Meter Volume	Point Meter Volume
%	%	(in H_2O)$^{1/2}$	ft/sec	scf	scf
99.6	99.6	1.581	94.6	4.354	4.354
99.3	99.0	1.612	95.6	8.812	4.458
99.5	99.8	1.517	92.7	12.911	4.099
99.6	99.9	1.549	93.1	17.173	4.262
99.4	98.4	1.581	96.8	21.377	4.205
99.6	100.4	1.581	99.2	25.563	4.186
99.6	99.8	1.817	111.4	30.463	4.898
99.6	100.0	1.844	115.2	35.355	4.890
99.8	101.0	1.732	105.4	40.118	4.760
99.7	99.4	1.549	94.4	44.300	4.184
99.6	98.0	1.449	88.1	48.163	3.867
99.5	99.8	1.225	74.1	51.498	3.346
99.5	99.7	1.844	112.4	56.493	4.997
99.4	98.4	1.897	116.1	61.542	5.050
99.5	100.3	1.871	112.3	66.722	5.179
99.5	99.3	1.897	116.3	71.813	5.091
99.6	100.2	1.844	112.2	76.846	5.031
99.6	99.7	1.871	112.4	81.991	5.142
99.6	99.4	1.483	90.7	85.976	3.991
99.5	98.4	1.549	93.4	90.162	4.189
99.5	101.0	1.414	83.8	94.148	3.990
99.5	99.9	1.265	74.8	97.676	3.537
99.5	102.2	1.049	63.2	100.608	2.947
99.5	100.1	0.990	58.8	103.357	2.763
99.5	100.1	**Final Values**		103.357	2.763
		1.584	96.1		

EXAMPLE CALCULATIONS, RUN 1

ABSOLUTE PRESSURE, INCHES OF MERCURY

Ps = Pbar + Pg/13.6
= 29.80 + -14.20/13.6
= 28.76

VOLUME OF WATER VAPOR, STANDARD CUBIC FEET

Vwstd = 0.002667 * [(Tstd + 460) / Pstd] * Vlc
= 0.002667 * [(60 + 460) / 29.92 * 34.6
= 1.604

SAMPLED VOLUME OF SOURCE GAS, DRY STANDARD CUBIC FEET

Vmstd = [(Tstd + 460)/Pstd] * Y * Vm * (Pbar + Delta-H/13.6) / (460 + tm)
= [(60 + 460)/ 29.92] * 1.0274 * 104.907 * (29.80 + 2.459/13.6) / (460 + 92)
= 101.791

MOISTURE CONTENT, PERCENT BY VOLUME

%H2O = Vwstd / (Vwstd + Vmstd)
= 1.604 / (1.604 + 101.791)
= 1.55

DRY MOLE FRACTION, LB-MOLE/LB-MOLE

Mfd = 1 - %H2O/100
= 1 - 1.55/100
= 0.984

DRY MOLECULAR WEIGHT, LB/LB-MOLE

Md = 44*(%CO2/100) + 32*(%O2/100) + 28*{[100-(%CO2+%O2)]/100}
= 44*(0.3/100) + 32*(20.2/100) + 28*{[100-(0.3+20.2)]/100}
= 28.86

WET MOLECULAR WEIGHT, LB/LB-MOLE

Ms = Md*Mfd + 18.0*%H2O/100
= 28.86*0.984 + 18.0*1.55/100
= 28.69

FUEL FACTOR

Fo = (20.9 - %O2) / %CO2
= (20.9 - 20.2) / 0.3
= 2.333

ISOKINETIC SAMPLING RATE, PERCENT

%I = Pstd/(Tstd + 460) * (100/60) * Vmstd*(ts + 460)/[Ps*vs*Mfd*Theta*(PI*Dia*Dia/576)]
= 29.92/(60 + 460) * (100/60) * 101.791*(128 + 460)/[28.76*96.02*0.984*120.00*(PI*0.180*0.180/576)]
= 99.6

VELOCITY, FEET PER SECOND

vs = 85.49 * Cp * SQRT[Delta-p*(460+ts)/Ps/Ms]
= 85.49 * 0.84 * SQRT[2.5085*(460+128)/28.76/28.69]
= 96.02

VOLUMETRIC FLOW RATE, ACTUAL CUBIC FEET PER MINUTE

Qaw = (60/144) * vs * A
= (60/144) * 96.02 * 79
= 3142

VOLUMETRIC FLOW RATE, DRY STANDARD CUBIC FEET PER MINUTE

Qsd = (60/144) * Mfd * vs * A * (Tstd + 460)/(ts + 460) * (Ps/Pstd)
= (60/144) * 0.984 * 96.02 * 79 * (60 + 460)/(128 + 460) * (28.76/29.92)
= 2629

EXAMPLE CALCULATIONS, RUN 1

TOTAL PARTICULATE CONCENTRATION, GRAINS PER DRY STANDARD CUBIC FOOT
gr/DSCF = (Catch/Conversion) * 7,000 / 453.592 / Vmstd
= (60.42/1000) * 7,000 / 453.592 / 101.791
= 0.00916

TOTAL PARTICULATE CONCENTRATION, GRAINS PER DRY STANDARD CUBIC FOOT @ 12% CO2
Gr@12%CO2 = gr/DSCF * 12 / %CO2
= 0.00916 * 12 / 0.3
= 0.36641

TOTAL PARTICULATE CONCENTRATION, GRAINS PER DRY STANDARD CUBIC FOOT @ 7% O2
Gr@7%O2 = gr/DSCF * (20.9-7) / (20.9-%O2)
= 0.00916 * (20.9-7) / (20.9-20.20)
= 0.23424

TOTAL PARTICULATE EMISSION RATE, POUNDS PER HOUR
lb/hr = 60 * (Catch/Conversion) * Qsd / 453.592 / Vmstd
= 60 * (60.42/1000) * 2629 / 453.592 / 101.791
= 0.206

Location: Inlet 2 (downstream/outside)

TEST RESULTS
SCAQMD Method 5.1 (Particulate Matter)

Facility: AQMD Facility A

City: [redacted], CA

Source: Baghouse

Location: Inlet 1 (Upstream to Baghouse)

Run Number	1	
Run Date	05/23/19	
Run Start Time	11:20	
Run Stop Time	13:36	
Test Train Parameters		**AVERAGE**
Volume of Dry Gas Sample, SCF*	100.62	100.62
Flue Gas Parameters		
CO2, Percent By Volume, Dry**	< 0.30	< 0.30
O2, Percent By Volume, Dry**	19.90	19.90
Temperature, Degrees F	83.7	83.7
Moisture, %	1.84	1.84
Air Flow Rate, Wet ACFM	40,129	40,129
Air Flow Rate, Dry SCFM*	36,230	36,230
Total Particulate		
Catch, mg	16.27	16.27
Concentration, Gr/DSCF	0.002495	0.002495
Emission Rate, lb/hr	0.775	0.775

* 60 Degrees F and 29.92 Inches of Mercury

** O2/CO2 was sampled in Tedlar bag and analysed via SCAQMD Method 10.1 by GC.

ISOKINETIC SAMPLING TRAIN RESULTS - METHOD: METHOD 5.1

Client Name	Facility A	**Operator**		MN
Plant Name	Metal Melting facility	**Project #**		10562
Sampling Location	Inlet 2 (downstream)	**Standard Temperature, °F**		60

USE IN AVERAGE OF RUN SET? 1 or 0 =>		**1**			**SET AVERAGE**
Run Number		1			
Run Date		05/23/19			
Run Start Time	hh:mm	11:20			
Run Stop Time	hh:mm	13:36			
Meter Calibration Factor	Y	1.0395			
Pitot Tube Coefficient	C_p	0.84			
Actual Nozzle Diameter	in	0.173			
Sample Volume	ft^3	100.88			100.88
Total Sampling Time	min	120			120
Average Meter Temperature	°F	82.8			82.8
Average Stack Temperature	°F	83.7			83.7
Barometric Pressure	in Hg	29.80			29.8
Stack/Duct Static Pressure	in H_2O	-14.00			-14.00
Absolute Stack/Duct Pressure	in Hg	28.8			28.8
Average Delta H	in H_2O	2.46			2.46
Absolute Meter Pressure	in Hg	30.0			30.0
Avg Differential Pressure (Delta P)	in H_2O	2.632			2.632
Total Water Volume Collected	mL	40.6			40.6
Volume of Water vapor @ STP	SCF	1.882			1.882
Volume Metered @ STP	DSCF	100.620			100.620
Calculated Stack Moisture	% H_20	1.84			1.8
Saturated Stack Moisture	% H_20	4.0			4.0
Reported Stack Moisture Content	% H_20	1.84			1.84
Carbon Dioxide Percentage	% CO_2	0.30			0.30
Oxygen Percentage	% O_2	19.90			19.90
Carbon Monoxide Percentage	% CO	0.000			0.000
Nitrogen Percentage	% N_2	79.8			79.8
Dry Mole Fraction	decimal	0.982			0.982
Dry Gas Molecular Weight	lb/lb-mole	28.84			28.84
Wet Stack Gas Molecular Weight	lb/lb-mole	28.64			28.64
Flue Gas Density	lb/ft^3	0.0743			0.0743
Stack Cross-Sectional Area	in^2	1017.9			1017.9
Stack Cross-Sectional Area	ft^2	7.07			7.07
Percent of Isokinetic Rate	% ISO	100.3			100.3
Air Flow Rate Results					
Average Stack Gas Velocity	ft/sec	94.62			94.62
Actual Stack Flow/Minute	ACFM	40,129			40,129
Dry Standard Stack Flow/Minute	DSCFM	36,230			36,230

ISOKINETIC SAMPLING TRAIN DATASHEET - METHOD

METHOD 5.1

Client Name	Facility A	**Run #**	1		
Plant Name	Metal Melting facility	**Project #**	10562	Run Start	11:20
Plant City, State	[redacted], CA	**Personnel**	MN	Run End	13:36
Test Location	Inlet 2 (downstream)	**Tester Signature**			
Date of Test	05/23/19	**Checked By**	CF		

Isokinetic Factor Setup		**Pressures**		**Sampling Equipment**		**Filter ID & Tares**		**Actuals**
ΔH @ 0.75 SCFM	1.834	**Pbar**	29.80	**Meter Console #**	A-8			**CO_2**
Meter Calibration Factor	1.0395	**Pstatic**	-14.00	**Ideal Nozzle Diameter**	0.163			**0.30**
Pitot Tube Coefficient	0.840	**Abs P**	28.77	**Nozzle #**	0.173			**O_2**
Estimated Dry Gas Meter Temp	80	**Tstd, °F**	60	**Actual Nozzle Diameter**	0.173			**19.90**
Estimated Stack Temp or M2 Avg.	82	**Pstd**	29.92	**Probe Lgth/ID #**	34			**CO**
Estimated Delta P or M2 Avg.	2.65	**Estimates**		**Liner Material**	Glass	**XAD ID & Tares**		**0.00**
Estimated Moisture Content	2.00	**CO_2**	0.04	**Filter Box #**	NA			**N_2**
Estimated Dry Molecular Weight	28.85	**O_2**	21.00	**Cold Box ID #**	NA			**79.8**
Estimated Velocity, ft/sec	94.8	**CO**	0.00	**Umbilical ID #**	NA			**H_20**
K Factor (delta H/delta P)	0.93	**N_2**	**79.0**	**TC ID #s**	34			**40.6**

Point #	**Clock Time**	**Test Time**	**Dry Gas Meter Reading**	**Velocity Head**	**Desired Orifice ΔH**	**Actual Orifice ΔH**	**Pump Vac.**	**DGM Inlet Temp**	**DGM Outlet Temp**	**Stack Temp**	**Filter Temp**	**Imp. Exit Temp**	**Cond. Exit Temp**
	24 hr	min	ft^3	in H_2O	in H_2O	in H_2O	in Hg	°F	°F	°F	°F	°F	°F
A - 12	11:20	0.0	489.538	2.40	2.23	2.25	5.0		75	81		52	NA
A - 11		5.00	493.656	3.00	2.78	2.80	5.0		77	81		47	
A - 10		10.0	498.000	3.40	3.15	3.15	5.0		79	83		50	
A - 9		15.0	502.750	3.20	2.97	2.95	5.0		80	82		51	
A - 8		20.0	507.310	2.90	2.69	2.70	5.0		80	85		52	
A - 7		25.0	511.670	2.80	2.60	2.50	5.0		82	88		52	
A - 6		30.0	516.000	2.80	2.60	2.60	5.0		83	85		52	
A - 5		35.0	520.360	2.30	2.13	2.15	5.0		84	87		52	
A - 4		40.0	524.310	1.80	1.67	1.65	4.0		84	86		52	
A - 3		45.0	527.740	1.80	1.67	1.65	4.0		84	81		52	
A - 2		50.0	531.240	1.90	1.76	1.75	4.0		85	84		52	
A - 1	12:20	55.0	534.820	2.50	2.32	2.30	4.0		84	82		52	
B - 12	12:36	60.0	538.940	3.30	3.06	3.05	5.0		82	84		52	
B - 11		65.0	543.660	3.20	2.97	2.95	5.0		83	86		49	
B - 10		70.0	548.310	3.00	2.78	2.80	5.0		83	83		49	
B - 9		75.0	552.740	3.00	2.78	2.80	5.0		84	85		49	
B - 8		80.0	557.210	2.90	2.69	2.70	5.0		84	84		50	
B - 7		85.0	561.640	2.90	2.69	2.70	5.0		84	83		50	
B - 6		90.0	566.080	2.90	2.69	2.70	5.0		86	86		50	
B - 5		95.0	570.510	2.40	2.23	2.25	5.0		85	87		51	
B - 4		100.0	574.630	1.75	1.62	1.60	5.0		85	84		51	
B 3		105.0	578.040	2.00	1.86	1.85	5.0		85	85		51	
B 2		110.0	581.690	2.70	2.50	2.50	5.0		85	82		52	
B 1	13:36	115.0	585.960	2.90	2.69	2.70	5.0		85	74		52	
		120.0	590.420										
						MAX =>	5.00						
Average Values		120.0	100.882	2.632	2.464	2.460		82.8		83.7			

Note: O2/CO2 was sampled in Tedlar bag and analysed via SCAQMD Method 10.1 by GC.

	Water 1	Water 2	Empty	SG
Initial	**754.1**	**765.0**	**626.8**	**869.4**
Final	**771.5**	**768.4**	**629.2**	**886.8**
H2O gain	**17.4**	**3.40**	**2.40**	**17.40**
Total H2O	**40.6**			

Cumul. Percent ISO	Point Percent ISO	Square Root DP	Local Stack Velocity	Cumulative Meter Volume	Point Meter Volume
%	%	(in $H_2O)^{1/2}$	ft/sec	scf	scf
104.2	104.2	1.549	90.2	4.229	4.229
101.0	98.1	1.732	100.8	8.681	4.451
100.9	100.7	1.844	107.5	13.535	4.853
100.5	99.3	1.789	104.2	18.183	4.648
100.4	99.9	1.703	99.5	22.624	4.441
100.4	100.8	1.673	98.0	27.016	4.392
100.5	101.1	1.673	97.7	31.431	4.416
100.6	101.0	1.517	88.8	35.415	3.989
100.4	98.9	1.342	78.4	38.866	3.459
100.4	100.4	1.342	78.1	42.390	3.530
100.3	100.1	1.378	80.4	45.990	3.605
100.4	100.6	1.581	92.1	50.152	4.162
100.4	101.0	1.817	106.0	54.946	4.794
100.5	101.0	1.789	104.6	59.660	4.713
100.4	99.1	1.732	101.0	64.149	4.489
100.4	100.0	1.732	101.2	68.671	4.521
100.4	100.7	1.703	99.4	73.151	4.479
100.4	100.8	1.703	99.3	77.641	4.490
100.4	100.5	1.703	99.6	82.105	4.463
100.5	102.9	1.549	90.7	86.258	4.154
100.5	99.3	1.323	77.2	89.685	3.432
100.4	99.6	1.414	82.6	93.358	3.676
100.4	100.2	1.643	95.7	97.666	4.308
100.4	100.3	1.703	98.5	102.168	4.502
100.4	100.3	**Final Values**		102.168	4.502
		1.622	94.6		

EXAMPLE CALCULATIONS, RUN 1

ABSOLUTE PRESSURE, INCHES OF MERCURY
Ps = Pbar + Pg/13.6
= 29.80 + -14.00/13.6
= 28.77

VOLUME OF WATER VAPOR, STANDARD CUBIC FEET
Vwstd = 0.002667 * [(Tstd + 460) / Pstd] * Vlc
= 0.002667 * [(60 + 460) / 29.92 * 40.6
= 1.882

SAMPLED VOLUME OF SOURCE GAS, DRY STANDARD CUBIC FEET
Vmstd = [(Tstd + 460)/Pstd] * Y * Vm * (Pbar + Delta-H/13.6) / (460 + tm)
= [(60 + 460)/ 29.92] * 1.0395 * 100.882 * (29.80 + 2.460/13.6) / (460 + 83)
= 100.620

MOISTURE CONTENT, PERCENT BY VOLUME
%H2O = Vwstd / (Vwstd + Vmstd)
= 1.882 / (1.882 + 100.620)
= 1.84

DRY MOLE FRACTION, LB-MOLE/LB-MOLE
Mfd = 1 - %H2O/100
= 1 - 1.84/100
= 0.982

DRY MOLECULAR WEIGHT, LB/LB-MOLE
Md = 44*(%CO2/100) + 32*(%O2/100) + 28*{[100-(%CO2+%O2)]/100}
= 44*(0.3/100) + 32*(19.9/100) + 28*{[100-(0.3+19.9)]/100}
= 28.84

WET MOLECULAR WEIGHT, LB/LB-MOLE
Ms = Md*Mfd + 18.0*%H2O/100
= 28.84*0.982 + 18.0*1.84/100
= 28.64

FUEL FACTOR
Fo = (20.9 - %O2) / %CO2
= (20.9 - 19.9) / 0.3
= 3.333

ISOKINETIC SAMPLING RATE, PERCENT
%I = Pstd/(Tstd + 460) * (100/60) * Vmstd*(ts + 460)/[Ps*vs*Mfd*Theta*(PI*Dia*Dia/576)]
= 29.92/(60 + 460) * (100/60) * 100.620*(84 + 460)/[28.77*94.62*0.982*120.00*(PI*0.173*0.173/576)]
= 100.3

VELOCITY, FEET PER SECOND
vs = 85.49 * Cp * SQRT[Delta-p*(460+ts)/Ps/Ms]
= 85.49 * 0.84 * SQRT[2.6317*(460+84)/28.77/28.64]
= 94.62

VOLUMETRIC FLOW RATE, ACTUAL CUBIC FEET PER MINUTE
Qaw = (60/144) * vs * A
= (60/144) * 94.62 * 1018
= 40129

VOLUMETRIC FLOW RATE, DRY STANDARD CUBIC FEET PER MINUTE
Qsd = (60/144) * Mfd * vs * A * (Tstd + 460)/(ts + 460) * (Ps/Pstd)
= (60/144) * 0.982 * 94.62 * 1018 * (60 + 460)/(84 + 460) * (28.77/29.92)
= 36230

EXAMPLE CALCULATIONS, RUN 1

TOTAL PARTICULATE CONCENTRATION, GRAINS PER DRY STANDARD CUBIC FOOT

gr/DSCF = (Catch/Conversion) * 7,000 / 453.592 / Vmstd
= (16.27/1000) * 7,000 / 453.592 / 100.620
= 0.00250

TOTAL PARTICULATE CONCENTRATION, GRAINS PER DRY STANDARD CUBIC FOOT @ 12% CO2

Gr@12%CO2 = gr/DSCF * 12 / %CO2
= 0.00250 * 12 / 0.3
= 0.09981

TOTAL PARTICULATE CONCENTRATION, GRAINS PER DRY STANDARD CUBIC FOOT @ 7% O2

Gr@7%O2 = gr/DSCF * (20.9-7) / (20.9-%O2)
= 0.00250 * (20.9-7) / (20.9-19.90)
= 0.04467

TOTAL PARTICULATE EMISSION RATE, POUNDS PER HOUR

lb/hr = 60 * (Catch/Conversion) * Qsd / 453.592 / Vmstd
= 60 * (16.27/1000) * 36230 / 453.592 / 100.620
= 0.775

APPENDIX E2

PARTICULATE MATTER (PM) – FIELD DATA

Location: Baghouse Outlet

Sampling Access

The exhaust test location was accessed via a man lift for one side of the exhaust.

For the others side, the facility installed a platform with guardrails that extends from the root to the exhaust stack.

146 inches divided by 4, and then by 2
36.50 Div 4
18.25 Div 2
54.75 Sum
60 minutes at 5 minutes a point

Roof Side

These point will not be sampled safety - too high		
x	x	x
~~these ports will be sampled twice~~		
x	x	x
x	x	x

Lot Side

x	x	x	18.25 inches from top
x	x	x	36.5 inches from the point ~~above~~ 54.75 inches from top
x	x	x	36.5 inches from the point below 54.75 inches from bottom
x	x	x	18.25 inches from bottome

9 Points Roof Side

12 Points Lot Side

Flows Determined by
Combined 2 inlet Stacks

Almega ENVIRONMENTAL

ISOKINETIC DATA FORM, TE COOLER & CYCLONIC FLOW

METH

Almega ENVIRONMENTAL

Run # : 1
Date : 5-23-19
Client : Facility A
Unit : Outlet 1
Operator : CH
Stack Dia :
Amb. Press : 29.80
Static Press : NA

Pitot ID: 47
Pitot Coeff. : .84
Meter Box # : A-6
Meter @ Dh : 1.789
Meter Y : 1.0376
TC # : 47
Start Time : 1120
Stop Time : 1376
Nozzle Dia : .513

Impinger #	Initial	Final	Net
1	738.5	752.0	
2	720.2	723.9	
3	628.7	631.2	
4	837.5	854.5	
5			

3 L water

H2O Gain =
Filter : 009438

Pitot Leak Check		
Initial :	NA	NA
Final :	NA	NA

Meter Box Leak Check	Rate	"HG
Initial :	.000	22"
Final :	.000	20"

Traverse Points	Time (Minute)	Delta P ("H2O)	Stack Temp. (F)	Set delta H ("H2O)	Meter Volume (acf)	Mtr. Inlet Temp. (F)	Mtr. Outlet Temp. (F)	Oven Temp. (F)	Probe Temp. (F)	Impinger Temp. (F)	Pump Vac. ("HG)	TE Cooler Temp. (F)	Cyclonic Flow ("H2O)
0	0	—	—	—	196.362	—	—	NA	NA	—	—	NA	
1	7	.0251	84	1.76	201.361	70	70	↓	↓	54	5	↓	
2	14	.0251	87	1.75	206.342	69	69			54	5		
3	21	.0251	90	1.74	211.313	70	70			54	5		
4	28	.0251	88	1.75	216.310	72	72			54	5		
5	35	.0251	86	1.77	221.343	74	74			54	5		
6	42	.0251	85	1.77	226.378	75	75			54	5		
7	49	.0251	83	1.78	231.445	76	76			54	5		
8	56	.0251	87	1.77	236.501	77	77			55	5		
9	63	.0251	85	1.78	241.572	78	78	NA	NA	55	5	NA	
					241.926								
1	5	.0251	90	1.75	245.501	73	73	NA	NA	55	5	NA	
2	10	.0251	87	1.76	249.082	74	74	↓	↓	55	5	↓	
3	15	.0251	84	1.77	252.691	74	74			55	5		
4	20	.0251	89	1.76	256.271	74	74			55	5		
5	25	.0251	86	1.77	259.872	75	75			55	5		
6	30	.0251	87	1.77	263.470	76	76			55	5		
7	35	.0251	89	1.76	267.062	76	76			55	5		
8	40	.0251	85	1.78	270.683	77	77			55	5		
9	45	.0251	83	1.77	274.301	77	77			55	5		
10	50	.0251	87	1.77	277.912	77	77			55	5		
11	55	.0251	90	1.76	281.513	77	77			55	5		
12	60	.0251	88	1.77	285.123	78	78	NA	NA	55	5	NA	

Additional 16pt Check
Restart @ 1236

Isokinetic Factor Setup

Estimated Dry Gas Meter Temp:	
Estimated Stack Temp:	
Estimated Delta P:	
Estimated Moisture Content:	2%
Estimated O2:	20.7
Estimated CO2:	.05

Equipment Evaluation , OK? Y or N

Ambient Temp.:	
TC Check:	
Pitot Check:	
Tedlar Bag:	
Pitot Exp Date:	
TC Exp Date:	

Dry Gas Meter Leak Checks

	1	2	3	4	5	6
DGM Initial:						
Vacuum:						
Leak Rate:						
DGM Final:						

Location: Inlet 1 (Inside)

SAMPLING AND VELOCITY TRAVERSE POINT DETERMINATION
SCAQMD METHOD 1.2

CLIENT: AQMD Facility A
PLANT NAME: Metal Melting Facility
CITY, STATE: [redacted], CA
SAMPLING LOCATION Inlet Furance
TYPE OF TESTING: Metals & Particulate

NO. OF PORTS AVAILABLE: 2
NO. OF PORTS TO BE USED: 2
PORT INSIDE DIAMETER: 3 inches

DISTANCE FROM FAR WALL TO OUTSIDE OF PORT: 13.50 inches
NIPPLE LENGTH AND/OR WALL THICKNESS: 3.50 inches
DEPTH OF STACK OR DUCT, D: 10.00 inches
STACK OR DUCT WIDTH (IF RECTANGULAR), W: #N/A inches

EQUIVALENT DIAMETER
De = 2*(DEPTH)*(WIDTH)/(DEPTH+WIDTH) = 10.00 inches

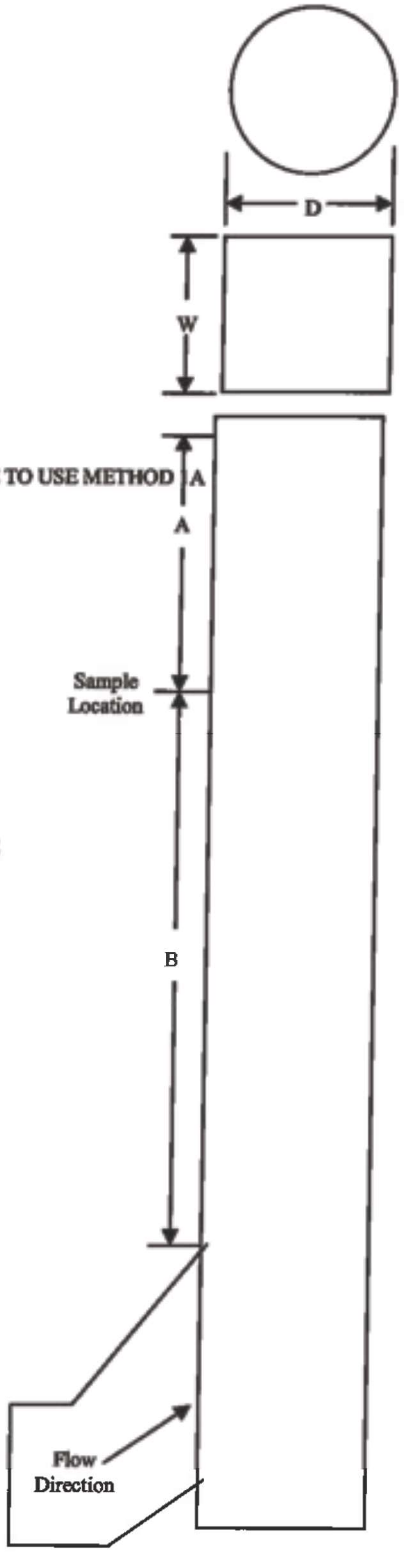
MAKE SURE TO USE METHOD A

STACK/DUCT AREA = 0.55 sq.feet 78.5 sq.inches

DISTANCE OF TEST PORT LOCATION:	DOWNSTREAM FROM FLOW DISTURBANCE	UPSTREAM FROM FLOW DISTURBANCE
	B	A
# OF INCHES	25.00	16.50
# OF DIAMETERS	2.50	1.65

MINIMUM NUMBER OF TRAVERSE POINTS: 24

POINT NO.	% OF DUCT DEPTH	DISTANCE FROM INSIDE WALL (in.)	DISTANCE FROM OUTSIDE OF PORT (in.)
1	2.1	0.50	4
2	6.7	0.67	4 1/8
3	11.8	1.18	4 5/8
4	17.7	1.77	5 1/4
5	25.0	2.50	6
6	35.6	3.56	7
7	64.4	6.44	10
8	75.0	7.50	11
9	82.3	8.23	11 3/4
10	88.2	8.82	12 3/8
11	93.3	9.33	12 7/8
12	97.9	9.50	13



DRAWING NOT TO SCALE

Almega ENVIRONMENTAL

ISOKINETIC DATA FORM, TE COOLER & CYCLONIC FLOW

METH

Almega ENVIRONMENTAL

Run # : 1
Date : 05/23/19
Client : Facility A
Unit : Inlet 1 (Inside)
Operator : T.TH
Stack Dia : 10.0
Amb. Press : 29.8
Static Press : -14.2

Pitot ID: 28
Pitot Coeff. : .84
Meter Box # : A-7
Meter @ Dh : 1.736
Meter Y : 1.0274
TC # : 29
Start Time : 1120
Stop Time : 1336
Nozzle Dia .180

Impinger #	Initial	Final	Net
1	743.5	754.7	
2	621.4	625.1	
3	634.5	636.8	
4	873.5	888.8	
5	1.4		

DI water

H2O Gain =
Filter : 009434

Pitot Leak Check		
Initial :	✓	✓
Final :	✓	✓

Meter Box Leak Check	Rate	"HG
Initial :	0.006	20.0
Final :	0.009	21.0

Traverse Points	Time (Minute)	Delta P ("H2O)	Stack Temp. (F)	Set delta H ("H2O)	Meter Volume (acf)	Mr. Inlet Temp. (F)	Mr. Outlet Temp. (F)	Oven Temp. (F)	Probe Temp. (F)	Impinger Temp. (F)	Pump Vac. ("HG)	TE Cooler Temp. (F)	Cyclonic Flow ("H2O)
0	0				859.04								
Top A-1	5	2.50	113	2.43	863.40	84	84	NA	NA	56	4.0		
2	10	2.6	102	2.58	867.87	85	85			50	4.0		
3	15	2.30	138	2.15	872.0	87	87			52	3.50		
4	20	2.40	118	2.33	876.30	88	88			53	4.0		
5	25	2.50	140	2.34	880.55	89	89			53	4.0		
6	30	2.50	170	2.23	884.79	90	90			52	4.0		
7	35	3.30	141	3.09	889.74	90	90			52	5.0		
8	40	3.40	164	3.07	894.70	92	92			53	5.0		
9	45	3.0	132	2.86	899.54	93	93			54	5.0		
10	50	2.40	134	2.28	903.80	93	93			53	4.50		
11	55	2.10	131	2.01	907.74	93	93			53	4.0		
12	60	1.50	125	1.45	911.16	94	94			53	4.0		stope 1220
Side B-1	65	3.40	134	3.21	916.20	89	89			57	5.0		starte 1236
2	70	3.60	139	3.38	921.30	90	90			48	5.0		
3	75	3.50	116	3.42	926.54	91	91			50	5.50		
4	80	3.60	141	3.38	931.70	92	92			50	5.50		
5	85	3.40	132	3.25	936.81	93	93			51	5.50		
6	90	3.50	117	3.43	942.04	94	94			52	5.50		
7	95	2.20	138	2.09	946.12	95	95			52	4.50		
8	100	2.40	121	2.34	950.40	95	95			52	4.50		
9	105	2.0	102	2.02	954.48	95	95			52	4.0		
10	110	1.60	100	1.62	958.10	95	95			53	4.0		
11	115	1.10	120	1.08	961.12	95	95			52	3.50		
12	120	.98	104	.98	963.947	94	94			52	3.50		
					' In	to	out	12					

Isokinetic Factor Setup

Estimated Dry Gas Meter Temp:
Estimated Stack Temp:
Estimated Delta P:
Estimated Moisture Content:
Estimated O2:
Estimated CO2:

Equipment Evaluation , OK? Y or N

Ambient Temp.:
TC Check:
Pitot Check:
Tedlar Bag:
Pitot Exp Date:
TC Exp Date

Dry Gas Meter Leak Checks

	1	2	3	4	5	6
DGM Initial:						
Vacuum:						
Leak Rate:						
DGM Final:						

Location: Inlet 2 (downstream/outside)

SAMPLING AND VELOCITY TRAVERSE POINT DETERMINATION
SCAQMD METHOD 1.1

CLIENT: AQMD Facility A
PLANT NAME: Metal Melting Facility
CITY, STATE: [redacted], CA
SAMPLING LOCATION Inlet 2 (Upstream of Baghouse)
TYPE OF TESTING: Metals/Particulate

NO. OF PORTS AVAILABLE: 1
NO. OF PORTS TO BE USED: 1
PORT INSIDE DIAMETER: 2.5 inches

DISTANCE FROM FAR WALL TO OUTSIDE OF PORT: 38.00 inches
NIPPLE LENGTH AND/OR WALL THICKNESS: 2.00 inches
DEPTH OF STACK OR DUCT, D: 36.00 inches
STACK OR DUCT WIDTH (IF RECTANGULAR), W: #N/A inches

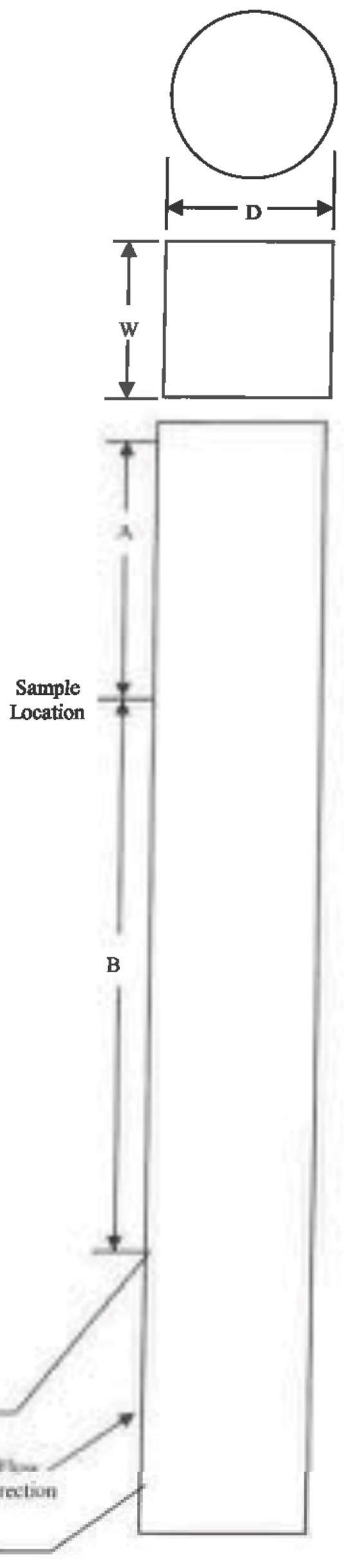
EQUIVALENT DIAMETER
De = 2*(DEPTH)*(WIDTH)/(DEPTH+WIDTH) = 36.00 inches

STACK/DUCT AREA = 7.07 sq.feet 1017.9 sq.inches

DISTANCE OF TEST PORT LOCATION:	DOWNSTREAM FROM FLOW DISTURBANCE	UPSTREAM FROM FLOW DISTURBANCE
	B	A
# OF INCHES	87.00	48.50
# OF DIAMETERS	2.42	1.35

MINIMUM NUMBER OF TRAVERSE POINTS: 24

POINT NO.	% OF DUCT DEPTH	DISTANCE FROM INSIDE WALL (in.)	DISTANCE FROM OUTSIDE OF PORT (in.)
1	2.1	0.76	2 3/4
2	6.7	2.41	4 3/8
3	11.8	4.25	6 1/4
4	17.7	6.37	8 3/8
5	25.0	9.00	11
6	35.6	12.82	14 7/8
7	64.4	23.18	25 1/8
8	75.0	27.00	29
9	82.3	29.63	31 5/8
10	88.2	31.75	33 3/4
11	93.3	33.59	35 5/8
12	97.9	35.24	37 1/4



DRAWING NOT TO SCALE

Almega ENVIRONMENTAL

ISOKINETIC DATA FORM, TE COOLER & CYCLONIC FLOW

METH(

Almega ENVIRONMENTAL

Run # : 1
Date : 5-23-19
Client : Facility A
Unit : Inlet 2 (Outside)
Operator : MN
Stack Dia : 36.0
Amb. Press : 29.8
Static Press : -14

Pitot ID: 34
Pitot Coeff. : 0.84
Meter Box # : A-8
Meter @ Dh : 1.834
Meter Y : 1.0395
TC # : 34
Start Time : 1120
Stop Time : 1336

Impinger #	Initial	Final	Net
1	754.1	771.7	
2	765.0	768.4	
3	626.8	629.2	
4	869.4	886.8	
5			

DI water/4

Nozzle Dia 0.193
H2O Gain =
Filter: 009437

Pitot Leak Check

Initial :	10	10
Final :	20	10

Meter Box Leak Check

	Rate	"HG
Initial :	0.000	20
Final :	0.000	21

Traverse Points	Time (Minute)	Delta P ("H2O)	Stack Temp. (F)	Set delta H ("H2O)	Meter Volume (acf)	Mtr. Inlet Temp. (F)	Mtr. Outlet Temp. (F)	Oven Temp. (F)	Probe Temp. (F)	Impinger Temp. (F)	Pump Vac. ("HG)	TE Cooler Temp. (F)	Cyclonic Flow ("H2O)
12	0.0	2.40	81	2.25	489.58	NA	75	NA	NA	52	5.0	NA	40
11	5.0	3.00	81	2.80	493.56		77			47	5.0		<10
10	10.0	3.40	83	3.15	498.00		79			50	5.0		
9	15.0	3.20	82	2.95	502.75		80			51	5.0		
8	20.0	2.90	85	2.70	507.31		80			52	5.0		
7	25.0	2.80	88	2.50	511.67		82			52	5.0		
6	30.0	2.80	85	2.60	516.00		83			52	5.0		
5	35.0	2.30	87	2.15	520.36		84			52	5.0		
4	40.0	1.80	86	1.65	524.31		84			52	4.0		
3	45.0	1.80	81	1.65	527.74		84			52	4.0		
2	50.0	1.90	84	1.75	531.24		85			52	4.0		
1	55.0	2.50	82	2.30	534.82	↓	84	↓	↓	62	4.0	↓	↓
0	60.0	3.30	84	3.05	538.94	NA	82	NA	NA	52	5.0	NA	<10
12	65.0	3.20	86	2.95	543.660		83			49	5.0		
11	70.0	3.00	83	2.80	548.31		83			49	5.0		
10	75.0	3.00	85	2.80	552.74		84			49	5.0		
9	80.0	2.90	84	2.70	557.21		84			50	5.0		
8	85.0	2.90	~~84~~ 83	2.76	561.64		~~84~~ 84			50	5.0		
7	90.0	2.90	86	2.7	566.08		86			50	5.0		
6	95.0	2.40	87	2.25	570.51		85			51	5.0		
5	100.0	1.75	84	1.60	574.63		85			51	5.0		
4	105.0	2.00	85	1.85	578.04		85			51	5.0		
3	110.0	2.70	82	2.50	581.69		85			52	5.0		
2	115.0	2.90	74	2.70	585.96	↓	85	↓	↓	52	5.0	↓	↓
1	120.0				590.42								
0													

Isokinetic Factor Setup

Estimated Dry Gas Meter Temp:
Estimated Stack Temp:
Estimated Delta P:
Estimated Moisture Content:
Estimated O2:
Estimated CO2:

Equipment Evaluation , OK? Y or N

Ambient Temp.:
TC Check:
Pitot Check:
Tedlar Bag:
Pitot Exp Date:
TC Exp Date

Dry Gas Meter Leak Checks

	1	2	3	4	5	6
DGM Initial:						
Vacuum:						
Leak Rate:						
DGM Final:						

Field Blank

Almega Environmental

ISOKINETIC DATA FORM, TE COOLER & CYCLONIC FLOW

METH

Almega Environmental

Run # : Field Blank
Date : 5/23/19
Client :
Unit : Inlet 2 (Outside)
Operator :
Stack Dia :
Amb. Press :
Static Press :

Pitot ID:
Pitot Coeff. :
Meter Box # :
Meter @ Dh :
Meter Y :
TC # :
Start Time :
Stop Time :

Impinger #	Initial	Final	Net
1			
2			
3			
4			
5			

Nozzle Dia:
H2O Gain =
Filter : 009441

Pitot Leak Check
Initial :
Final :

Meter Box Leak Check

	Rate	"HG
Initial :		
Final :		

Traverse Points	Time (Minute)	Delta P ("H2O)	Stack Temp. (F)	Set delta H ("H2O)	Meter Volume (acf)	Mtr. Inlet Temp. (F)	Mtr. Outlet Temp. (F)	Oven Temp. (F)	Probe Temp. (F)	Impinger Temp. (F)	Pump Vac. ("HG)	TE Cooler Temp. (F)	Cyclonic Flow ("H2O)
	11:00												

Isokinetic Factor Setup

Estimated Dry Gas Meter Temp:
Estimated Stack Temp:
Estimated Delta P:
Estimated Moisture Content:
Estimated O2:
Estimated CO2:

Equipment Evaluation , OK? Y or N

Ambient Temp.:
TC Check:
Pitot Check:
Tedlar Bag:
Pitot Exp Date:
TC Exp Date

Dry Gas Meter Leak Checks

	1	2	3	4	5	6
DGM Initial:						
Vacuum:						
Leak Rate:						
DGM Final:						

APPENDIX E3

PARTICULATE MATTER (PM) – LABORATORY DATA

LABORATORY REPORT

SCAQMD M5.1

Lab Report No.	A 053	Project No.:	c10562
Client Name:	AQMD	Date Sampled:	23-May-19
Unit Tested:	Facility A	Analyst:	DW

Client ID	Run #1	Run #2	Run #3	Field Blank
Container No 1 (Filter)	1	1	1	1
Client ID No.:	10562-M5.1-C1-In(I)-R1	10562-M5.1-C1-In(O)-R1	10562-M5.1-C1-Out-R1	10562-M5.1-C1-In(O)-FB
Lab ID No.:	A 053 - R1 - C1	A 053 - R2 - C1	A 053 - R3 - C1	A 053 - FB - C1
Filter ID #	9434	9437	9438	9441
Filter wt., total , mg (m_{FT})	12.35	0.60	0.40	0.00
Filter Acid, mg	ND	NA	NA	NA
Filter SO4, mg	ND	NA	NA	NA
Filter wt, net ,mg (m_{FN})	**12.35**	**0.60**	**0.40**	**0.00**
Container No 2 (Impinger) -Water org	2	2	2	2
Client ID No.:	10562-M5.1-C2-In(I)-R1	10562-M5.1-C2-In(O)-R1	10562-M5.1-C2-Out-R1	10562-M5.1-C2-In(O)-FB
Lab ID No.:	A 053 - R1 - C2 org	A 053 - R2 - C2 org	A 053 - R3 - C2 org	A 053 - FB - C2 org
Volume, ml (V_{MA})	100	100	100	100
Impinger Catch, total, mg (m_{BHT})	0.35	0.30	0.85	0.00
Methylen Chloride Blank, mg (W_M)	0.03	0.03	0.03	0.03
Impinger Catch, net, mg (m_{BHN}) ($m_{BHN}=m_{BHT}-W_M$)	**0.32**	**0.27**	**0.82**	**0.00**
Container No 2 (Impinger) -Water sr	2	2	2	2
Client ID No.:	10562-M5.1-C2-In(I)-R1	10562-M5.1-C2-In(O)-R1	10562-M5.1-C2-Out-R1	10562-M5.1-C2-In(O)-FB
Lab ID No.:	A 053 - R1 - C2 sr	A 053 - R2 - C2 sr	A 053 - R3 - C2 sr	A 053 - FB - C2 sr
Volume, L (V_{BW})	495	415	465	457
Impinger Catch, total, mg (m_{BIT})	47.75	15.40	2.10	0.05
DI Water Blank, mg (W_W)	0.00	0.00	0.00	0.00
Impinger Acid, mg (m_{HIA})	ND	ND	ND	ND
Impinger SO4, mg (m_{HAS})	ND	ND	ND	ND
Impinger Catch, net, mg (m_{BHIN}) ($m_{BIN}=m_{BIT}-W_W$)	**47.75**	**15.40**	**2.10**	**0.05**
Total Particulate mass, net, mg (m_T)	**60.45**	**16.30**	**3.35**	**0.05**
Blank correction weight of PM, mg (m_{TB})	**60.42**	**16.27**	**3.32**	**0.05**

$m_T = m_{FN} + m_{FHIN} + m_{BHIN}$

Checked by:	Inlet 1 (Inside)	Inlet 2 (Upstream B.H.)	B. H. Outlet

SUMMARY
SCAQMD M5.1

Laboratory:	Almega	Project No.:	c10562
Project:	AQMD	Filter, Beaker Wt. Log Page(s):	#34-35, ##21-22
Unit Tested:	Facility A		
Lab. ID No.:	A 053		

Sample Number	Lab ID	Tare Wt. (avg. g)	Final Wt. (avg. g)	Net Change (mg)	Volume ml	Blank mg	Comments
10562-M5.1-C1-In(I)-R1	A 053 - R1 - C1	0.3727	0.3851	12.45	-		Inlet - In
10562-M5.1-C2-In(I)-R1	A 053 - R1 - C2 org	27.5299	27.5302	0.35	100	0.03	Inlet - In
10562-M5.1-C2-In(I)-R1	A 053 - R1 - C2 sr	28.0260	28.0737	47.75	495	0.00	Inlet - In
10562-M5.1-C1-In(O)-R1	A 053 - R2 - C1	0.3722	0.3729	0.70	-		Inlet - Out
10562-M5.1-C2-In(O)-R1	A 053 - R2 - C2 org	27.8769	27.8772	0.30	100	0.03	Inlet - Out
10562-M5.1-C2-In(O)-R1	A 053 - R2 - C2 sr	29.4475	29.4629	15.40	415	0.00	Inlet - Out
10562-M5.1-C1-Out-R1	A 053 - R3 - C1	0.3710	0.3715	0.55	-		Outlet
10562-M15.1-C2-Out-R1	A 053 - R3 - C2 org	27.8941	27.8950	0.85	100	0.03	Outlet
10562-M5.1-C2-Out-R1	A 053 - R3 - C2 sr	27.8207	27.8228	2.10	465	0.00	Outlet
10562-M5.1-C1-In(O)-FB	A 053 - FB - C1	0.3730	0.3730	0.00	-		Field Blank
10562-M15.1-C2-In(O)-FB	A 053 - FB - C2 org	29.6511	29.6511	0.00	100	0.03	Field Blank
10562-M5.1-C2-In(O)-FB	A 053 - FB - C2 sr	29.6182	29.6182	0.05	457	0.00	Field Blank
Reagent Blank		28.6642	28.6641	-0.05	500		DI Water
Reagent Blank		28.7205	28.7207	0.15	500		Methylene Chloride

CALCULATIONS

$C_A = m_A/(V_A * \rho_A)$

Where:

C_A - Blank Concentration

m_A - Mass of residue of after evaporation, mg

V_A - Volume of blank, ml

ρ_A - Density, g/ml

$W_A = C_A * V_{WA} * \rho_A$

Where:

W_A - Weight of residue, mg

V_{WA} - Volume of liquid use, ml

Reagent Blank

Methylene Chloride

Density of methylene chloride ρM, g/ml =	1.3550
Methylene Chloride blank volume V_M, ml =	500
Methylene Chloride blank concentration C_M, mg/g =	0.0002

MeCl Lot No. 186645 Fisher Scientific Optima

DI Water

Density of Water ρW, g/ml =	0.998
Water blank volume VW, ml =	500
Water blank concentration C_W, mg/g =	0.0000

DI Water System - Pure Water Tech

SULFURIC ACID & SULFUR OXIDES - LABORATORY DATA SHEET

Client:	AQMD	Project #:	c10562	Checked by:	DW
Site Location:	NA	Unit Tested:	Facility A		
Analyst:	DW	Date Analyzed:	19-Jun-19		

Sample No.	Sample			Sample Titration			Acid, as H_2SO_4*$2H_2O$ mg	Sulfate, as H_2SO_4*$2H_2O$ mg
	Total, V (mL)	Aliquot, A (mL)	Factor, F = V/A	T1 (mL)	T2 (mL)	Avg, V (mL)		
ANALYSIS FOR ACID								
A 053 - R1 - C1	50	10	5	0.00	0.00	0.00	ND	
A 053 - R1 - C2 sr	50	10	5	0.00	0.00	0.00	ND	
A 053 - R2 - C2 sr	50	10	5	0.00	0.00	0.00	ND	
A 053 - R3 - C2 sr	50	10	5	0.00	0.00	0.00	ND	
A 053 - FB - C2 sr	50	10	5	0.00	0.00	0.00	ND	
ANALYSIS FOR SULFATE								
A 053 - R1 - C1	50	10	5	0.00	0.00	0.00		ND
A 053 - R1 - C2 sr	50	10	5	0.00	0.00	0.00		ND
A 053 - R2 - C2 sr	50	10	5	0.00	0.00	0.00		ND
A 053 - R3 - C2 sr	50	10	5	0.00	0.00	0.00		ND
A 053 - FB - C2 sr	50	10	5	0.00	0.00	0.00		ND

No.	Sodium Hydroxide Titration			Barium Chloride Titration		
	KHP (mg)	Volume, Vs (mL)	Normality, Ns	Aliquot, VI (10 mL)	Volume, VT (mL)	Normality, NB
Blank	-	0.00	-	-	0.02	
1			0.00000	4	3.98	0.01013
2			0.00000	4	4.00	0.01008
Avg.			0.10000			0.01010

Detection Limit

Sulfate,as H_2SO_4*$2H_2O$, mg	0.01
Acid,as H_2SO_4*$2H_2O$, mg	0.13

Sulfuric Acid Concentraton 0.01000N
Ricca Lot 4610D98 Exp Sept 2019
Sodium Hydroxide Solution 0.100 N
BDH Lot 18J1156571 Exp Sept 2021

CALCULATIONS: $N_S = (\text{mg KHP}/203.44)/(Vs\text{-}V_{SB})$

$N_B = (V_1 \text{ x} N_{H2SO4})/(V_T\text{-}V_{TB})$

Sulfate
as SO_4, mg=$(V_S\text{-}V_B) \times N_B \times 134.11/2 \times F$

Acid
as SO_4, mg=$(V_S\text{-}V_B) \times N_S \times 134.11/2 \times F$

Lot# A053

Almega
ENVIRONMENTAL

CHAIN OF CUSTODY RECORDS

INVOICE:

CLIENT: AQMD Facility A

JOB #: 10562

ATTN:

REPORT TO: Page 1 of 1

ALMEGA Environmental & Technical Services
10602 Walker St.
Cypress, CA 90630
(714) 889-4000 Fax (714) 889-7030
lab@almegaenv.com
Contact: Neal Conroy

PO # ____________

Turnaround Time

Standard: X Other: ______

Rush:
Depends on # of Samples
5 - 10 days ______
3 - 7 days ______

Unit 1: In(I) Unit 2: In(O) Unit 3: Out

Samplers: (Signature)

Project Manager: Neal Conroy

Return or Dispose

Sample Date	Sample Time	Sample Identification	Description	Type Of Sample LIQUID	Type Of Sample GAS	Type Of Sample SOLID	No of Containers	SCAQMD 5.1	Organic Analysis	Acid/ Sulfate			REMARKS
5/23/2019	11:00	10562 - M5.1 - C1 - In(O) - FB	Filter			x	1	X		X			A053 - FB - C1
		10562 - M5.1 - C2 - In(O) - FB	P/N Rinses/Imps 1, 2	x			1	X	X	X			-C2
5/23/2019	11:20-13:36	10562 - M5.1 - C1 - In(I) - R1	Filter			x	1	X		X			R1- C1
		10562 - M5.1 - C2 - In(I) - R1	P/N Rinses/Imps 1, 2	x			1	X	X	X			-C2
5/23/2019	11:20-13:36	10562 - M5.1 - C1 - In(O) - R1	Filter			x	1	X		X			R2 - C1
		10562 - M5.1 - C2 - In(O) - R1	P/N Rinses/Imps 1, 2	x			1	X	X	X			-C2
5/23/2019	11:20-13:36	10562 - M5.1 - C1 - Out - R1	Filter			x	1	X		X			R3 - C1
		10562 - M5.1 - C2 - Out - R1	P/N Rinses/Imps 1, 2	x			1	X	X	X			-C2
5/23/2019	14:00	10562 - M5.1 - RB	DI Water	x			1	X	X	X			-RB

Relinquished by:
Date: 5/23/19 Time 15:30
Received by:
Date: 5/24/19 Time: 8:15
Relinquished by:
Date: Time:
Received by:
Date: Time

Relinquished by:
Date: Time
Received by:
Date: Time:
Relinquished by:
Date: Time:
Received by:
Date: Time

Almega
ENVIRONMENTAL

Standard Receipt
Sample LOG in Checklist

Project No: c10562 ~~C10470~~

Lab ID: A053

Method: M10.1

Sampling Date: 5/21, 5/22, 5/23

Location: AQMD -A Int:

Date & Time Rc'd: 5/22/19 9:02 5/23/19 8:42 5/24/19 8:15

Location: LAB Int: DW

Arrived By: (circle) FedEx UPS Drop Off (Int) DS Other

Condition of Package(s): (comment): OK ✓✓

Package Type: Box Cooler Other: /

Number of Sample Container(s): 3, 3, 3, 9

Correct Containers (per Method): [✓ Y] N ✓✓

Preservation: (circle) ICE DryICE ICEPacks [✓ None] ✓✓

Sample Conditions:

Sample Temp (C): 21 ✓✓

Ambient Temp (C): 21 ✓✓

Sample Temp (C):

Filter Condition: OK

PH:

Components Sealed: [✓ Y] N ✓✓

Sample Recovery Completed On: (date & time)

Recovered In: (circle) [✓ Field] Lab Other ✓✓

Silica Gel Condition:

Tedlar Bags -
Condensation: Y N

Comments:

Container(s) Requested: Glass Plastic

Additional Comments:

Beakers Weight Record

Laboratory: Almega
Project: AQMD
Project No.: c10562
Unit Tested: Facility A
Lab. ID No.: A 053

x Pretest

(page__of__)
Balanced ID: A&D ER-182A
Serial No.: 4702866
Last Calibration: 5-Jan-18
Beaker Weight Log Page(s): ##21 - 22

Sample Number	Lab ID	Beaker ID	Beaker Weights (g)							D Wt. (mg)	Volume ml	Comments
			Date/Time	By	Wt. 1	Date/Time	By	Wt. 2	Average			
10562-M5.1-C2-In(I)-R1	A 053 - R1 - C2 org	1748	6/3/19 11:00	DW	27.5298	6/4/19 11:00	DW	27.5299	27.5299	0.10	100	Inlet - In
10562-M5.1-C2-In(I)-R1	A 053 - R1 - C2 sr	1752	6/3/19 11:00	DW	28.0259	6/4/19 11:00	DW	28.0260	28.0260	0.10	495	Inlet - In
10562-M5.1-C2-In(O)-R1	A 053 - R2 - C2 org	1749	6/3/19 11:00	DW	27.8769	6/4/19 11:00	DW	27.8769	27.8769	0.00	100	Inlet - Out
10562-M5.1-C2-In(O)-R1	A 053 - R2 - C2 sr	1753	6/3/19 11:00	DW	29.4474	6/4/19 11:00	DW	29.4476	29.4475	0.20	415	Inlet - Out
10562-M5.1-C2-Out-R1	A 053 - R3 - C2 org	1750	6/3/19 11:00	DW	27.8941	6/4/19 11:00	DW	27.8941	27.8941	0.00	100	Outlet
10562-M5.1-C2-Out-R1	A 053 - R3 - C2 sr	1754	6/3/19 11:00	DW	27.8206	6/4/19 11:00	DW	27.8207	27.8207	0.10	465	Outlet
10562-M5.1-C2-In(O)-FB	A 053 - FB - C2 org	7756	6/3/19 11:00	DW	29.6512	6/4/19 11:00	DW	29.6510	29.6511	0.20	100	Field Blank
10562-M5.1-C2-In(O)-FB	A 053 - FB - C2 sr	1751	6/3/19 11:00	DW	29.6181	6/4/19 11:00	DW	29.6182	29.6182	0.10	457	Field Blank
Reagent Blank		4321	5/24/19 17:00	DW	28.6641	5/31/19 17:00	DW	28.6642	28.6642	0.10	500	DI Water
Reagent Blank		7965	11/1/18 11:00	DW	28.7206	11/2/18 11:00	DW	28.7204	28.7205	0.20	500	Methylene Chloride
10562-M5.1-RB		1757	6/4/19 11:00	DW	27.6165	6/6/19 11:00	DW	27.6166	27.6166	0.10	500	Reagent Blank

Beakers Weight Record

____x____ Post-test

(page__of__)

Laboratory: Almega
Project: AQMD
Project No.: c10562
Unit Tested: Facility A
Lab. ID No.: A 053

Balanced ID: A&D ER-182A
Serial No.: 4702866
Last Calibration: 5-Jun-18
Beaker Weight Log Page(s): ##21 - 22

Sample Number	Lab ID	Beaker ID	Beaker Weights (g)							D Wt. (mg)	Volume ml	Comments
			Date/Time	By	Wt. 1	Date/Time	By	Wt. 2	Average			
10562-M5.1-C2-In(I)-R1	A 053 - R1 - C2 org	1748	6/12/19 14:00	DW	27.5301	6/13/19 10:00	DW	27.5303	27.5302	-0.20	100	Inlet - In
10562-M5.1-C2-In(I)-R1	A 053 - R1 - C2 sr	1752	6/12/19 14:00	DW	28.0735	6/13/19 10:00	DW	28.0739	28.0737	-0.40	495	Inlet - In
10562-M5.1-C2-In(O)-R1	A 053 - R2 - C2 org	1749	6/12/19 14:00	DW	27.8771	6/13/19 10:00	DW	27.8773	27.8772	-0.20	100	Inlet - Out
10562-M5.1-C2-In(O)-R1	A 053 - R2 - C2 sr	1753	6/12/19 14:00	DW	29.4628	6/13/19 10:00	DW	29.4630	29.4629	-0.20	415	Inlet - Out
10562-M5.1-C2-Out-R1	A 053 - R3 - C2 org	1750	6/12/19 14:00	DW	27.8949	6/13/19 10:00	DW	27.8950	27.8950	-0.10	100	Outlet
10562-M5.1-C2-Out-R1	A 053 - R3 - C2 sr	1754	6/12/19 14:00	DW	27.8226	6/13/19 10:00	DW	27.8229	27.8228	-0.30	465	Outlet
10562-M5.1-C2-In(O)-FB	A 053 - FB - C2 org	7756	6/12/19 14:00	DW	29.6510	6/13/19 10:00	DW	29.6512	29.6511	-0.20	100	Field Blank
10562-M5.1-C2-In(O)-FB	A 053 - FB - C2 sr	1751	6/12/19 14:00	DW	29.6181	6/13/19 10:00	DW	29.6183	29.6182	-0.20	457	Field Blank
Reagent Blank		4321	6/10/19 11:00	DW	28.6641	6/11/19 14:00	DW	28.6641	28.6641	0.00	500	DI Water
Reagent Blank		7965	11/15/18 11:00	DW	28.7207	11/16/18 12:00	DW	28.7206	28.7207	0.10	500	Methylene Chloride
10562-M5.1-RB		1757	6/12/19 14:00	DW	27.6167	6/13/19 10:00	DW	27.6168	27.6168	-0.10	500	Reagent Blank

Filter Weight Record

x Pretest (page__of__)

Laboratory: Almega
Project: AQMD
Project No.: c10562
Unit Tested: Facility A
Lab. ID No.: A 053

Balanced ID: A&D ER-182A
Serial No.: 4702866
Last Calibration: 5-Jun-18
Filter Weight Log Page(s): ##34 - 35

Client Sample No.	Lab ID	Filter ID	Filter Weights (g)							D Wt. (mg)	Comments
			Date/Time	By	Wt. 1	Date/Time	By	Wt. 2	Average		
10562-M5.1-C1-In(I)-R1	A 053 - R1 - C1	9434	5/16/19 11:00	DW	0.3727	5/17/19 11:00	DW	0.3726	0.3727	0.10	Inlet - In
10562-M5.1-C1-In(O)-R1	A 053 - R2 - C1	9437	5/16/19 11:00	DW	0.3723	5/17/19 11:00	DW	0.3721	0.3722	0.20	Inlet - Out
10562-M5.1-C1-Out-R1	A 053 - R3 - C1	9438	5/16/19 11:00	DW	0.3710	5/17/19 11:00	DW	0.3709	0.3710	0.10	Outlet
10562-M5.1-C1-In(O)-FB	A 053 - FB - C1	9441	5/16/19 11:00	DW	0.3730	5/17/19 11:00	DW	0.3730	0.3730	0.00	Field Blank

Filter Weight Record

____x____ Post-test (page__of__)

Laboratory: Almega
Project: AQMD
Project No.: c10562
Unit Tested: Facility A
Lab. ID No.: A 053

Balanced ID: A&D ER-182A
Serial No.: 4702866
Last Calibration: 5-Jun-18
Filter Weight Log Page(s): ##34 - 35

Client Sample No.	Lab ID	Filter ID	Filter Weights (g)							D Wt. (mg)	Comments
			Date/Time	By	Wt. 1	Date/Time	By	Wt. 2	Average		
10562-M5.1-C1-In(I)-R1	A 053 - R1 - C1	9434		DW	0.3851		DW		0.3851	385.10	Inlet - In
10562-M5.1-C1-In(O)-R1	A 053 - R2 - C1	9437	1/0/00 0:00	DW	0.3729	1/0/00 0:00	DW		0.3729	372.90	Inlet - Out
10562-M5.1-C1-Out-R1	A 053 - R3 - C1	9438	1/0/00 0:00	DW	0.3715	1/0/00 0:00	DW		0.3715	371.50	Outlet
10562-M5.1-C1-In(O)-FB	A 053 - FB - C1	9441	1/0/00 0:00	DW	0.3730	1/0/00 0:00	DW		0.3730	373.00	Field Blank

TITRATION

Almega
ENVIRONMENTAL

c10562 m5.1
Acids A/5

Page: # 16

No	Sample ID	Date	Sample Volume		DF	mL used	Note
			ml (S)	aliquot (A)	(S/A)		
1	A053 R1-C1	6/19	50	10	5	0.00	0.1 N NaOH
2	Dup		"	"	"	0.00	↓
3	R1-CLSR		"	"	"	0.00	
4	Dup		"	"	"	0.00	
5	R2-CLSR		"	"	"	0.00	
6	Dup		"	"	"	0.00	
7	R3-CLSR		"	"	"	0.00	
8	Dup		"	"	"	0.00	
9	R3-CL-SR		"	"	"	0.00	
10	Dup		"	"	"	0.00	
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							

DF = Dilution Factor

Comments *0.1N NaOH Lot #1851156571 Exp. Sept 2021-BDH

TITRATION

Almega ENVIRONMENTAL

C10562 mS.1

Sulfides A/S

Page: # 17

No	Sample ID	Date	Sample Volume		DF	mL	Note	
			ml (S)	aliquot (A)	(S/A)	used		
1	0.01N H2SO4	6/19	4	4	1	3.98	0.01 N BaCl2	
2	Dup		"	"	"	4.08		
3	IPA Blk		100	100	1	0.00		
4	Dup		"	"	"	0.00		
5	A053 R1-C1		50	10	5	0.08		9454
6	Dup		"	"	"	0.08		
7	R1-C2-SR		"	"	"	0.08		1752
8	Dup		"	"	"	0.00		
9	R2-C2-SR		"	"	"	0.08		175
10	Dup		"	"	"	0.00		
11	R3-C2-SR		"	"	"	0.00		175
12	Dup		"	"	"	0.00		
13	FB-C2-SR		"	"	"	0.00		175
14	Dup		"	"	"	0.00		
15								
16								
17								
18								
19								
20								
21								

DF = Dilution Factor

Comments * 0.01N Sulfuric Acid Lot#1610D98 Exp. Sept. 2019 - Ricca

APPENDIX E4

O_2/CO_2 RESULTS – FIELD & LABORATORY DATA

Almega
ENVIRONMENTAL

LABORATORY REPORT

Carbon Dioxide & Oxygen by TCD
by Modified SCAQMD Method 25.3 (TCA/FID)

Client: AQMD
Project No.: c10562
Unit Tested: Facility A
Sampling Date: 23-May-19
Analyzed Date: 29-May-19
Lab No.: A 053

Client Sample ID	Lab ID	Almega Sample ID Tank	CO_2 % v/v by TCD	O_2 % v/v by TCD
Facility A				
Tnk18 - Inlet (I) - R3	A 053 - 07	18	ND	20.2
Tnk5 - Inlet (O) - R3	A 053 - 08	5	ND	19.9
Tnk6 - Outlet - R3	A 053 - 09	6	ND	12.1
Detection Limit			0.3	0.3

Outlet-R3 Error values, not used

* NOTE - the BIAS FACTOR (of 1.086) is NOT applied in these results.
ND=Not Detected

TGNMNEO concentration values are reported in ppm (v/v) as Methane (carbon#=1).

The sample cylinder is analyzed for NMNEO, CO, CH_4, CO_2 and C_2H_6. It is then directed to a separation column where all heavy organics (C_3+) separate from the light organics (CO, CO_2, CH_4 and C_2H_6). The light organics are then passed through a reduction catalyst to convert CO and CO_2 to CH_4, and are then directed to a FID for detection and quantification. The heavy organics are backflushed off the holding column, passed through an oxidation catalyst, which convert all organics to CO_2, then through a reduction catalyst to convert CO_2 to CH_4 and then to a FID for detection and quantification.

Reviewed by: DW

CALCULATIONS

Client:	AQMD	Lab No.: A 053
Project No.:	c10562	
Unit Tested:	Facility A	
Sampling Date:	23-May-19	
Date tested:	29-May-19	

Parameter	Symbol	Units	Run #1	Run #2
Sample ID			Tnk18 - Inlet (I) - R3	Tnk5 - Inlet (O) - R3
Lab ID			A 053 - 07	A 053 - 08
<u>Sample Tank</u>				
Tank No			18	5
Sample Tank Volume	V_T	L	12.001	12.090
Barometric Pressure	P_b	mm Hg	763	763
Pre-test Pressure	P_{TI}	mm Hg (abs)	2.00	2.00
Pre-test Temperature	t_{TI}	°C	21	21
Abs. Pre-test Temperature	T_{TI}	°K	294	294
Post-test Pressure	P_{TS}	mm Hg (abs)	530	572
Post-test Temperature	t_{TS}	°C	21	21
Abs. Post-test Temperature	c	°K	294	294
Final Pressure	P_{TF}	mm Hg (abs)	930	926
Abs.Final Temperature	T_{TF}	°K	293	293
Dilution Factor	DF_T		1.77	1.63
Sample Volume	Vs	L	8.188	8.905

Calculations

$V_S=k_1*V_T{}^{\circ}(P_{TS}/T_{TS} - P_{TI}/T_{TI})$

$k_1 = (273+15.56)/760=0.3799$

$C_{SAT}= DF * C_{SA}$

$C_{COT} = DF * C_{CO}$

$DF=(P_{TF}/T_{TF})/(P_{TS}/T_{TS} - P_{TI}/T_{TI})$

CALCULATIONS

Almega
ENVIRONMENTAL

Client:	AQMD	Lab No.:
Project No.:	c10562	A 053
Unit Tested:	Facility A	
Sampling Date:	23-May-19	
Date tested:	29-May-19	

Parameter	Symbol	Units	Run #3
Sample ID			Tnk6 - Outlet - R3
Lab ID			A 053 - 09
<u>Sample Tank</u>			
Tank No			6
Sample Tank Volume	V_T	L	12.305
Barometric Pressure	P_b	mm Hg	763
Pre-test Pressure	P_{TI}	mm Hg (abs)	2.00
Pre-test Temperature	t_{TI}	°C	21
Abs. Pre-test Temperature	T_{TI}	°K	294
Post-test Pressure	P_{TS}	mm Hg (abs)	96
Post-test Temperature	t_{TS}	°C	21
Abs. Post-test Temperature	T_{TS}	°K	294
Final Pressure	P_{TF}	mm Hg (abs)	932
Abs.Final Temperature	T_{TF}	°K	293
Dilution Factor	DF_T		9.95
Sample Volume	Vs	L	1.495

Calculations

$V_S = k_1 * V_T * (P_{TS}/T_{TS} - P_{TI}/T_{TI})$

$DF = (P_{TF}/T_{TF})/(P_{TS}/T_{TS} - P_{TI}/T_{TI})$

$k_1 = (273+15.56)/760 = 0.3799$

$C_{SAT} = DF * C_{SA}$

$C_{COT} = DF * C_{CO}$

QA/QC SUMMARY
(Repeat Analysis)

Client Project No.:	c10562	**Lab No.:**	A 053
Sampling Date:	23-May-19	**Analyzed Date:**	29-May-19

Run #1

Analyte	Sample ID	Area Count #1	Area Count #2	Area % diff (±20%)	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO2*	A 053 - 07	ND	ND	ND	ND	ND	**ND**	ND
O2*	A 053 - 07	2218932	2220944	-0.09	11.4	11.4	**11.4**	-0.09

Run #2

Analyte	Sample ID	Area Count #1	Area Count #2	Area Count #3	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO2*	A 053 - 08	ND	ND	ND	ND	ND	**ND**	ND
O2 *	A 053 - 08	2379775	2369627	0.43	12.3	12.2	**12.2**	0.43

* - by GC/TCD

$Conc_{CO}$ in tank = $MeanConc_{CO}$ * DF

$Conc_{CO2}$ in tank = $MeanConc_{CO2}$ * DF

$Conc_{O2}$ in tank = $MeanConc_{O2}$ * DF

Col# A053

Page ___ of ___

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CHAIN OF CUSTODY
RECORDS

INVOICE TO:
ATTN:

REPORT TO:
ALMEGA Environmental & Technical Services
10602 Walker St.
Cypress, CA 90630
(714) 889-4000 Fax (714) 889-7030
lab@almegaenv.com
Contact:

PO #

Turnaround Time
Standard: ✓ Other:
Rush:
Depends on # of Samples
5 - 10 days
3 - 7 days

Job # 10562
Unit # Various
Client: AQMD Facility
Location:
Samplers: (Signature)
Unit Information:
Project Manager:

Sample Date	Sample Time	Sample Identification	Lab Sample #	Type Of Sample LIQUID	GAS	SOLID	No of Container #	ANALYSIS REQUESTED 9/VOC-M10.1				Return or Dispose REMARKS
5/23/19	8:29-9:29	Tnk 18-Inlet (I)-R3	A053-07				1	✓				
↓	8:30-9:30	Tnk 5-Inlet (O)-R3	-08				1	✓				
	8:30-9:30	Tnk 6-Outlet-R3	-09				1	✓				

Relinquished by:
Date: 5/23/19 Time 15:30

Received by:
Date: 5/24/19 Time: 8:15

Relinquished by:
Date: Time:

Received by:
Date: Time

Relinquished by:
Date: Time

Received by:
Date: Time:

Relinquished by:
Date: Time:

Received by:
Date: Time

Almega Environmental- Chain of Custody Form

June 2015 v1.0

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Standard Receipt
Sample LOG in Checklist

Project No: C10562 ~~C10470~~

Method: m10.1

Lab ID: A053

Sampling Date: 5/21, 5/22, 5/23

Location: AQMD -A Int:

Date & Time Rc'd: 5/22/19 8:02 5/23/19 8:42 5/24/19 8:15

Location: LAB Int: DW

Arrived By: (circle) FedEx UPS Drop Off (Int) DS Other

Condition of Package(s): (comment): ok ✓✓ Package Type: Box Cooler Other: /

Number of Sample Container(s): 3, 3, 3, 9 Correct Containers (per Method): [✓ Y] N ✓✓

Preservation: (circle) ICE DryICE ICEPacks [✓ None] ✓✓

Sample Conditions:

Sample Temp (C): 21 ✓✓ Ambient Temp (C): 21 ✓✓

Sample Temp (C): Filter Condition: ok

PH: Components Sealed: [✓ Y] N ✓✓

Sample Recovery Completed On: (date & time)

Recovered In: (circle) [✓ Field] Lab Other ✓✓ Silica Gel Condition:

Tedlar Bags -
Condensation: Y N

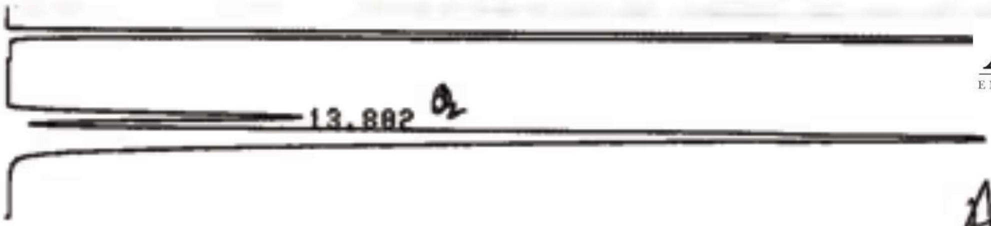
Comments:

Container(s) Requested: Glass Plastic

Additional Comments:

CHROMATOGRAM

TEST SAMPLES



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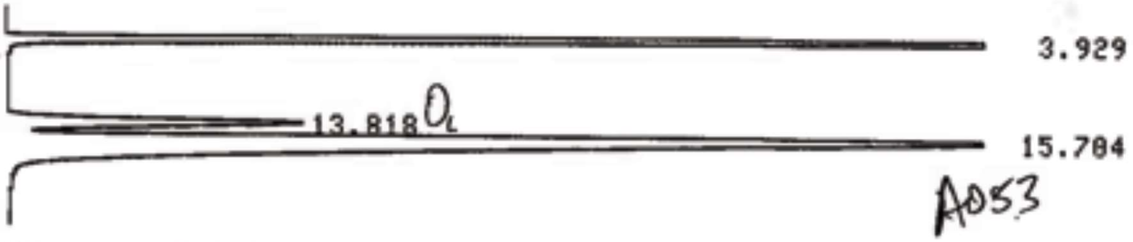
A053
-07

```
CHROMATOGRAM   1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                         FILE        0
SAMPLE NO   0                         METHOD        41
REPORT NO   204

PKNO      TIME       AREA  MK  IDNO      CONC          NAME

   1      3.92    8232470                   35.4617
   2    13.802    2234336                    9.6245
   3    15.684   12748326  V                54.9139
                 ---------            -------------
        TOTAL    23215130                 100
```



A053
-07
lyp

```
CHROMATOGRAM   1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                         FILE        0
SAMPLE NO   0                         METHOD        41
REPORT NO   205

PKNO      TIME       AREA  MK  IDNO      CONC          NAME

   1     3.929    8213154                   35.2316
   2    13.818    2257186                    9.6825
   3    15.704   12841576  V                55.0859
                 ---------            -------------
        TOTAL    23311914                 100
```

073

223-02C37-01

17

0615

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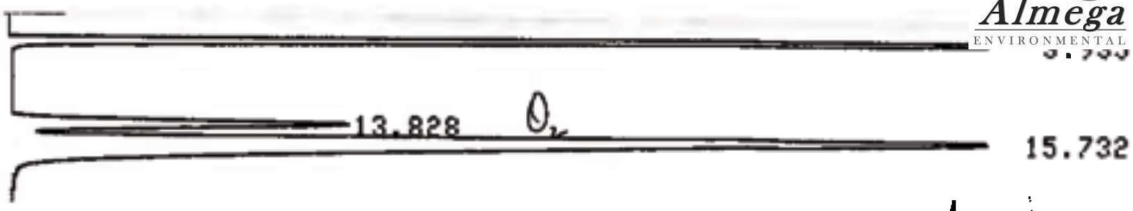


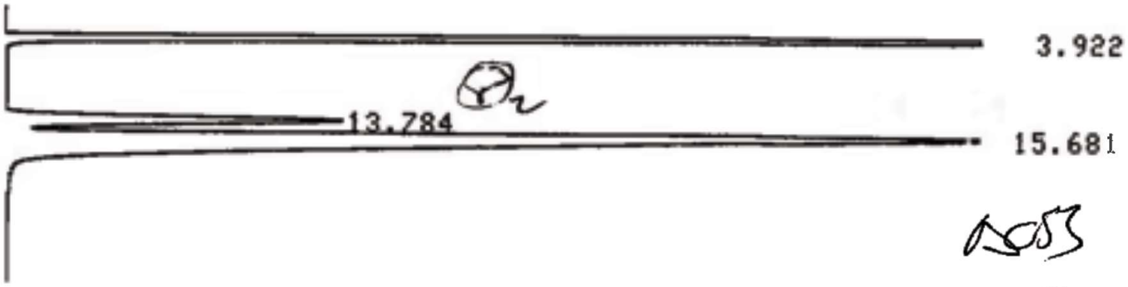
A053
-08

```
CHROMATOGRAM   1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                         FILE        0
SAMPLE NO   0                         METHOD        41
REPORT NO   206

PKNO       TIME       AREA  MK  IDNO       CONC         NAME

   1      3.935   8255851                   35.3486
   2     13.828   2598140                   11.1243
   3     15.732  12501518   V               53.5271
                ---------              -------------
        TOTAL   23355508                  100
```



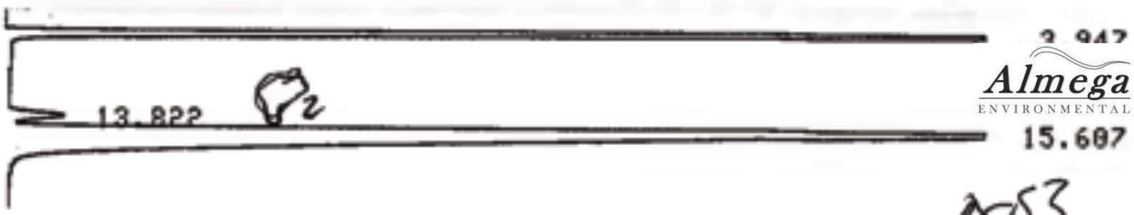
A053
-08

```
CHROMATOGRAM   1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                         FILE        0
SAMPLE NO   0                         METHOD        41
REPORT NO   207

PKNO       TIME       AREA  MK  IDNO       CONC         NAME

   1      3.922   8256490                   35.437
   2     13.784   2575298                   11.0532
   3     15.681  12467265   V               53.5097
                ---------              -------------
        TOTAL   23299052                  100
```



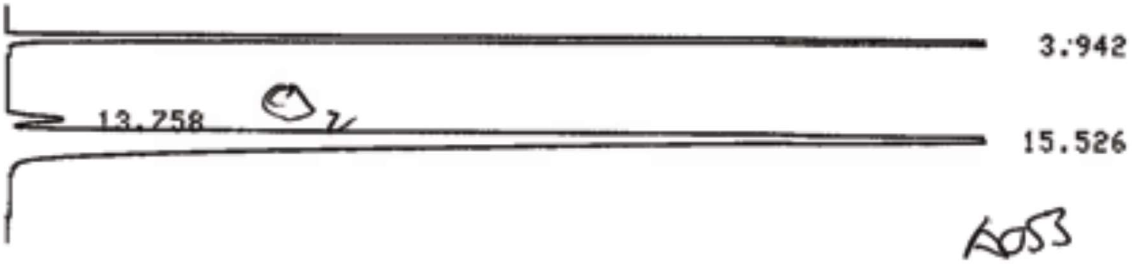
A053
-09

```
CHROMATOGRAM   1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                                FILE        0
SAMPLE NO   0                                METHOD         41
REPORT NO   208

PKNO      TIME       AREA  MK  IDNO      CONC         NAME

  1      3.947    8020342                 35.0678
  2     13.822     421778                  1.8442
  3     15.607   14428865  V              63.0881
                 ---------           -------------
        TOTAL    22870984                100
```



A053
-09
dup

```
CHROMATOGRAM   1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                                FILE        0
SAMPLE NO   0                                METHOD         41
REPORT NO   209

PKNO      TIME       AREA  MK  IDNO      CONC         NAME

  1      3.942    7996030                 35.3035
  2     13.758     415744                  1.8356
  3     15.526   14237596  V              62.8609
                 ---------           -------------
        TOTAL    22649368                100
```

074

223-02037-01

170615

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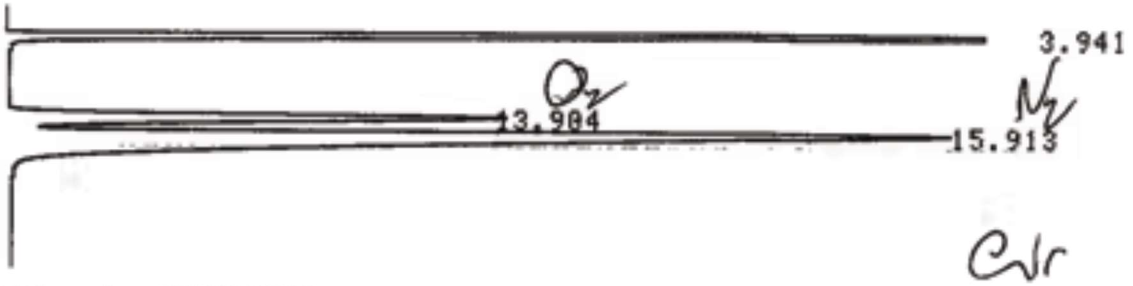
QAQC

0615

⊕ Shimadzu

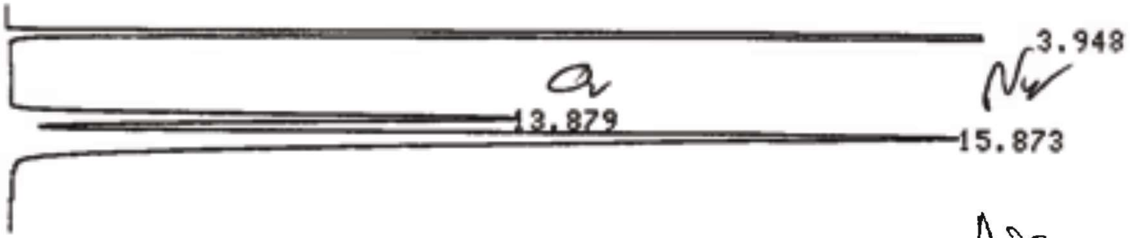


```
CHROMATOGRAM    1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                       FILE         0
SAMPLE NO    0                       METHOD          41
REPORT NO    198

PKNO      TIME       AREA  MK  IDNO     CONC        NAME

   1      3.941    8343072                35.1993
   2     13.904    3912339                16.5061
   3     15.913   11446985  V             48.2946
                 ---------            -------------
         TOTAL    23702396                100
```



```
CHROMATOGRAM    1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                       FILE         0
SAMPLE NO    0                       METHOD          41
REPORT NO    199

PKNO      TIME       AREA  MK  IDNO     CONC        NAME

   1      3.948    8409960                35.213
   2     13.879    3932295                16.4648
   3     15.873   11540828  V             48.3222
                 ---------            -------------
         TOTAL    23883082                100
```

C7

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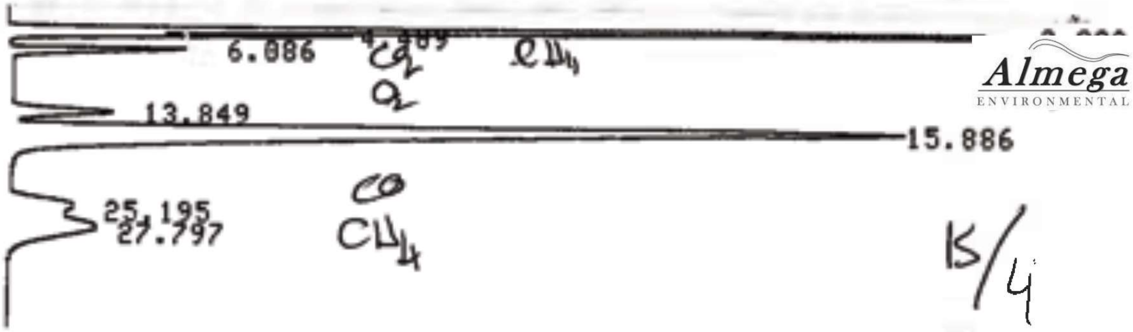
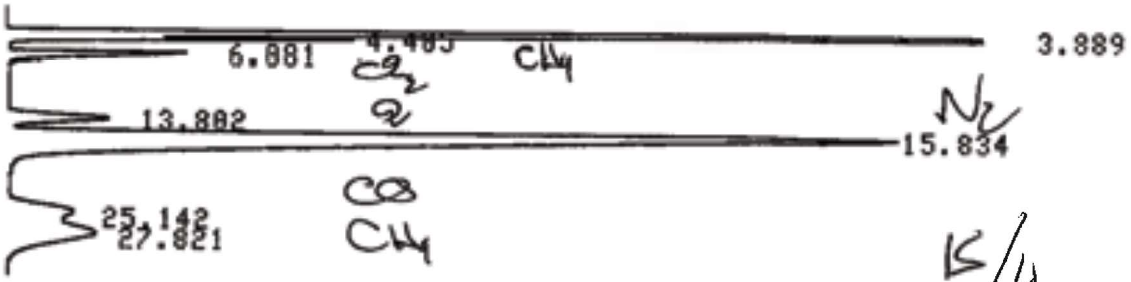


```
CHROMATOGRAM   1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                                 FILE         0
SAMPLE NO   0                                 METHOD         41
REPORT NO   200

PKNO      TIME       AREA  MK  IDNO      CONC          NAME

   1     3.892    6547774                 29.3922
   2     4.409     952775  V               4.2769
   3     6.086     816942                  3.6672
   4    13.849     777322                  3.4893
   5    15.886   10445339  V              46.888
   6    25.195     952478                  4.2756
   7    27.797    1784598  V               8.0109
                 ---------          -------------
        TOTAL    22277224                100
```



```
CHROMATOGRAM   1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                                 FILE         0
SAMPLE NO   0                                 METHOD         41
REPORT NO   201

PKNO      TIME       AREA  MK  IDNO      CONC          NAME

   1     3.889    6502749                 29.1142
   2     4.405     954814  V               4.2749
   3     6.081     821659                  3.6787
   4    13.802     775880                  3.4738
   5    15.834   10525073  V              47.123
   6    25.142     959386  V               4.2954
   7    27.821    1795744  V               8.0399
                 ---------          -------------
        TOTAL    22335302                100
```

223-02037-01

170615

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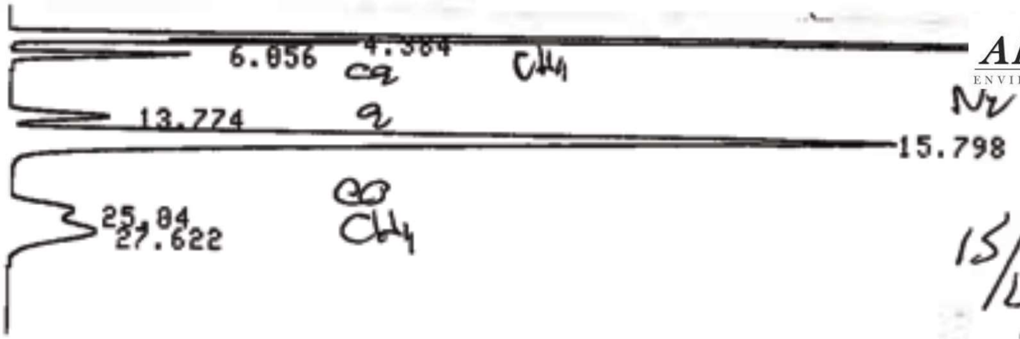


15/4

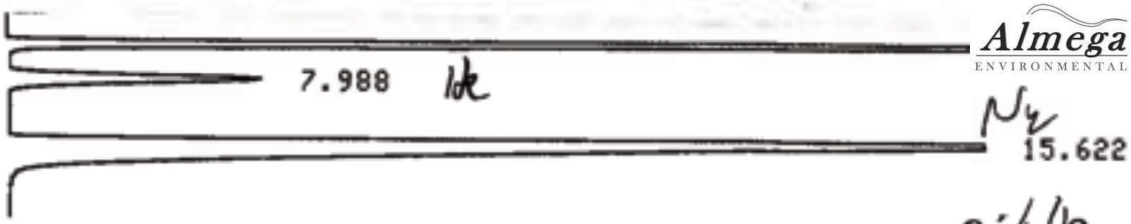
```
CHROMATOGRAM   1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                        FILE        0
SAMPLE NO   0                        METHOD        41
REPORT NO   254

PKNO      TIME      AREA  MK  IDNO      CONC        NAME

   1      3.87    6544913                  29.6233
   2     4.384     958693  V                4.3392
   3     6.056     828544                   3.7501
   4    13.774     768741                   3.4794
   5    15.798   10277015  V               46.5154
   6     25.04     951905  V                4.3085
   7    27.622    1763976  V                7.984
                ---------           -------------
         TOTAL   22093780                100
```

60



2% He

072

223-02037-01

170615

```
CHROMATOGRAM   1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                           FILE        0
SAMPLE NO    0                           METHOD        41
REPORT NO    202

PKNO       TIME       AREA  MK  IDNO      CONC        NAME

   1      3.935    8910973                 34.7446
   2      7.988    2220694                  8.6587
   3     15.622   14515404                 56.5967
                 ---------          -------------
        TOTAL     25647072                    100
```

2% He

⊕ Shimadzu

```
CHROMATOGRAM   1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                           FILE        0
SAMPLE NO    0                           METHOD        41
REPORT NO    203

PKNO       TIME       AREA  MK  IDNO      CONC        NAME

   1      3.933    8895068                 34.9909
   2      7.985    2204612                  8.6724
   3     15.543   14321374                 56.3367
                 ---------          -------------
        TOTAL     25421052                    100
```

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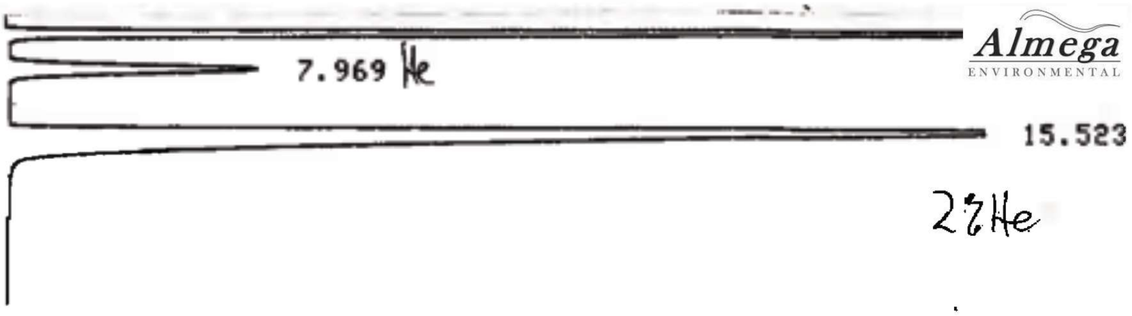

15 ⊕ Shimadzu

```
CHROMATOGRAM   1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                           FILE        0
SAMPLE NO   0                           METHOD        41
REPORT NO   253

PKNO      TIME       AREA  MK  IDNO      CONC        NAME

   1     3.916    8930439                 35.1677
   2     7.969    2199025                  8.6597
   3    15.523   14264424                 56.1727
                 ---------            -------------
         TOTAL    25393888                 100
```

TANK PREPARATION

TANK PREPARATIONS

Client:	AQMD	Lab No.:	A 053
Project No.:	c10562		
Unit Tested:	Facility A		
Sampling Date:	23-May-19		
Date pressurized:	24-May-19		

Tank ID	Sample ID	Pre-test pressure mm Hg		Post-test pressure mm Hg	Final Pressure	Comments
		1	2			
18	A 053 - 07	-758	-758	-230	170	Run #1
5	A 053 - 08	-758	-758	-188 *	166	Run #2
6	A 053 - 09	-758	-758	-664	172	Run #3

* - Post -test Pressure is less then 200 mm Hg.

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VOC FIELD DATA SHEET - SCAQMD METHOD ~~25.1~~ 10.1

Date: 05/23/19
Client: Facility A
Unit: Inlet No.1 .
Operator Name: T.TA
Fuel: ______
Location: Inside

Test No.: 3
Barometric Pressure (in. Hg): 29.80
Pretest Leak Check:
A: ✓ B: ______
Post-test Leak check:
A: ✓ B: ______

SAMPLE A SAMPLE B

		Tank # 18 Trap # NA Control ID:		Tank # ____ Trap # ____ Control ID:	
Time 24 Hours	Start Time	Flow ml/min.	Vacuum inch Hg	Flow ml/min.	Vacuum inch Hg
0	0829	~.10	28.50		
10	0839		25.50		
20	0849		21.50		
30	0859		18.0		
40	0909		15.0		
50	0919 End Time		12.0		
60	0929		8.50		

VOC FIELD DATA SHEET - SCAQMD METHOD 10.1

Date: 6-23-19
Test No.: 3
Client: SCAQMD Facility A
Barometric Pressure (in. Hg): 29.8
Unit: Inlet Bag-house
Pretest Leak Check:
Operator Name: MN
A: xo
B:
Fuel: Stack gas
Post-test Leak check:
Location: Inlet outside
A: -b
B:

		SAMPLE A		SAMPLE B	
		Tank # 5 Trap #____ Control ID:		Tank #____ Trap #____ Control ID:	
Time 24 Hours	Start Time	Flow ml/min.	Vacuum inch Hg	Flow ml/min.	Vacuum inch Hg
0	825		29		
10			25		
20			21		
30			17		
40			14		
50	End Time		11		
60			9		

APPENDIX F

COLLECTION/CAPTURE EFFICIENCY TEST

From: Charles Figueroa <Charles@almegaenv.com>
Sent: Monday, July 01, 2019 3:15 PM
To: Tulasi@almegaenv.com
Subject: FW: Facility A Capture Efficiency
Attachments: IMG_0097.JPG; IMG_0102.JPG; IMG_0105.JPG

Capture documentation

From: Brian Speaks <gspeaks@aqmd.gov>
Sent: Thursday, May 23, 2019 11:55 AM
To: Charles Figueroa <Charles@almegaenv.com>; 'Neal' <neal@almegaenv.com>
Cc: Bill Welch <bwelch@aqmd.gov>
Subject: Facility A Capture Efficiency

Charles,

As previously discussed we verified the capture efficiency of the control system for the electric furnace at Facility A currently undergoing testing.

Measured velocities around the perimeter of the furnace lid with the furnace off were between 1360 – 1937 feet per minute with a lid opening of roughly 1-3". Velocities with the furnace off were between 511-600 feet per minute with a lid opening of roughly 4-6".

A smoke test was performed while the furnace was in full operation with a lid opening of 1-3" which was the typical operating position for normal periods. The lid was observed to be open more than this for short periods while the furnace was being de-slagged (2-4 minutes on average), for periods when charged with large scrap (less than 10 minutes), or when charge with finer material (1-2 minutes on average).

A few pictures have been included for reference, a video of the smoke test was also recorded but I am unable to send as it exceeds our email file size limits. Did you guys end up having to postpone testing today for the last 2 runs due to rain?

Thanks,
G. Brian Speaks
Air Quality Engineer
gspeaks@aqmd.gov
909.396.3212

[redacted]

[redacted]

[redacted]

APPENDIX G

QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC)

APPENDIX G1

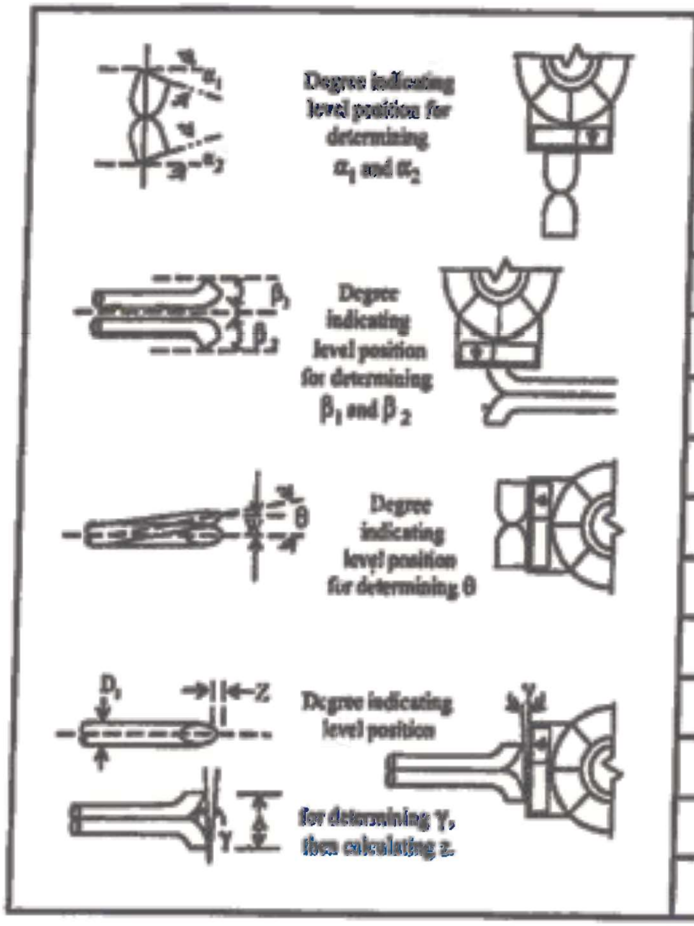
TEST EQUIPMENT CALIBRATION DATA

TYPE S PITOT TUBE SEMIANNUAL INSPECTION SHEET

CAL DATE: 1/4/2019

NEXT DUE DATE: 7/4/2019

PITOT ID: 47



Parameter	Values	Allowable Range
Level and Perpendicular?	Yes OR No	Yes
Obstruction?	Yes OR No	No
Damaged?	Yes OR No	No
$\alpha1$	0	$-10^\circ \le \alpha1 \le +10^\circ$
$\alpha2$	0	$-10^\circ \le \alpha2 \le +10^\circ$
$\beta1$	2	$-5^\circ \le \beta1 \le +5^\circ$
$\beta2$	1	$-5^\circ \le \beta2 \le +5^\circ$
γ	-2	NA
θ	1	NA
$Z = A (\tan \gamma)$	0.032	≤ 0.125 in.
$W = A (\tan \theta)$	0.016	≤ 0.031 in.
Dt	0.364	$0.188 \le Dt \le 0.375$
A	0.925	NA
A/2/(Dt)	1.27	$1.05 \le PA/Dt \le 1.5$

Certification:

I certify that this pitot tube meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube calibration factor Cp of 0.84.

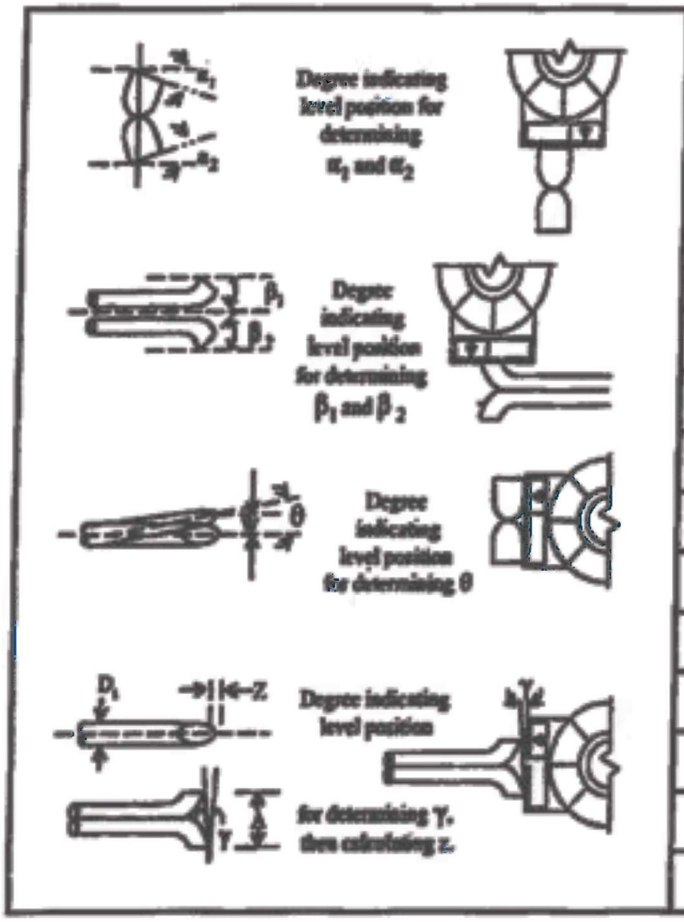
Certified By: James Odulio **Date:** 1/4/2019

TYPE S PITOT TUBE SEMIANNUAL INSPECTION SHEET

CAL DATE: 1/4/2019

NEXT DUE DATE: 7/5/2019

PITOT ID: 16



Parameter	Values	Allowable Range
Level and Perpendicular?	Yes OR No	Yes
Obstruction?	Yes OR No	No
Damaged?	Yes OR No	No
α1	1	–10° ≤ α1 ≤ +10°
α2	-1	–10° ≤ α2 ≤ +10°
β1	-1	–5° ≤ β1 ≤ +5°
β2	-3	–5° ≤ β2 ≤ +5°
γ	-1	NA
θ	-1	NA
Z = A (tan γ)	-0.019	≤ 0.125 in.
W = A (tan θ)	-0.019	≤ 0.031 in.
Dt	0.37	0.188 ≤ Dt ≤ 0.375
A	1.113	NA
A/2(Dt)	1.50	1.05 ≤ PA/Dt ≤ 1.5

Certification:

I certify that this pitot tube meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube calibration factor Cp of 0.84.

Certified By: Morgan Nguyen **Date:** 1/4/2019

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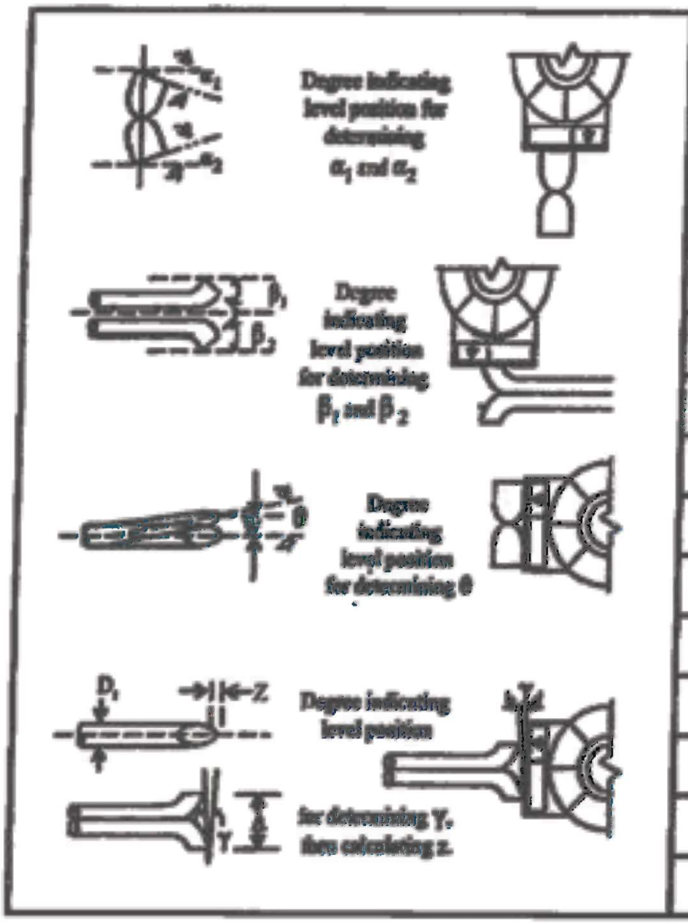
TYPE S PITOT TUBE SEMIANNUAL INSPECTION SHEET

CAL DATE: 1/4/2019

NEXT DUE DATE: 7/5/2019

PITOT ID: 34



Parameter	Values	Allowable Range
Level and Perpendicular?	Yes OR No	Yes
Obstruction?	Yes OR No	No
Damaged?	Yes OR No	No
α1	-4	$-10° \leq \alpha 1 \leq +10°$
α2	-1	$-10° \leq \alpha 2 \leq +10°$
β1	-1	$-5° \leq \beta 1 \leq +5°$
β2	-1	$-5° \leq \beta 2 \leq +5°$
γ	1	NA
θ	-1	NA
Z = A (tan γ)	0.01 in.	≤0.125 in.
W = A (tan θ)	-0.016	≤0.031 in.
Dt	0.372	$0.188 \leq Dt \leq 0.375$
A	0.933	NA
A/2/(Dt)	1.25	$1.05 \leq PA/Dt \leq 1.5$

Certification:

I certify that this pitot tube meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube calibration factor Cp of 0.84.

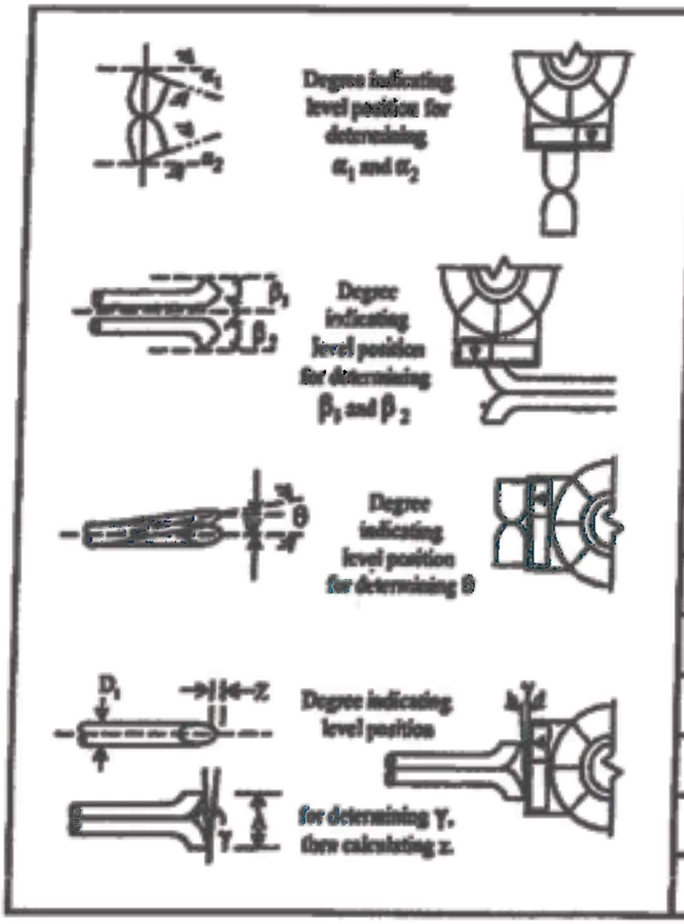
Certified By: James Odulio **Date:** 1/4/2019

TYPE S PITOT TUBE SEMIANNUAL INSPECTION SHEET

CAL DATE: 1/4/2019

NEXT DUE DATE: 7/5/2019

PITOT ID: 31



Parameter	Values	Allowable Range
Level and Perpendicular?	Yes OR No	Yes
Obstruction?	Yes OR No	No
Damaged?	Yes OR No	No
α1	-3	$-10° \leq α1 \leq +10°$
α2	-3	$-10° \leq α2 \leq +10°$
β1	-2	$-5° \leq β1 \leq +5°$
β2	-2	$-5° \leq β2 \leq +5°$
γ	-3	NA
θ	0	NA
Z = A (tan γ)	-0.049	≤0.125 in.
W = A (tan θ)	0.000	≤0.031 in.
Dt	0.369	$0.188 \leq Dt \leq 0.375$
A	0.943	NA
A/2/(Dt)	1.28	$1.05 \leq PA/Dt \leq 1.5$

Certification:

I certify that this pitot tube meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube calibration factor Cp of 0.84.

Certified By: James Odulio **Date:** 1/4/2019

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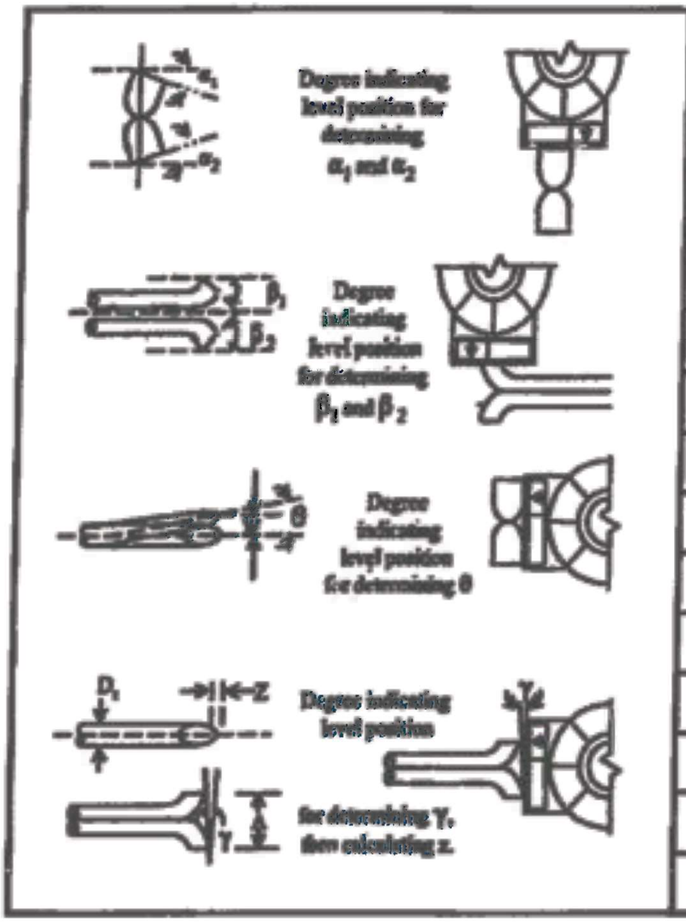
TYPE S PITOT TUBE SEMIANNUAL INSPECTION SHEET

CAL DATE: 1/4/2019

NEXT DUE DATE: 7/5/2019

PITOT ID: 85



Parameter	Values	Allowable Range
Level and Perpendicular?	Yes OR No	Yes
Obstruction?	Yes OR No	No
Damaged?	Yes OR No	No
$\alpha 1$	-1	$-10^{\circ} \leq \alpha 1 \leq +10^{\circ}$
$\alpha 2$	-2	$-10^{\circ} \leq \alpha 2 \leq +10^{\circ}$
$\beta 1$	4	$-5^{\circ} \leq \beta 1 \leq +5^{\circ}$
$\beta 2$	5	$-5^{\circ} \leq \beta 2 \leq +5^{\circ}$
γ	-3	NA
θ	1	NA
$Z = A (\tan \gamma)$	-0.047	≤ 0.125 in.
$W = A (\tan \theta)$	0.016	≤ 0.031 in.
Dt	0.37	$0.188 \leq Dt \leq 0.375$
A	0.899	NA
A/2/(Dt)	1.21	$1.05 \leq PA/Dt \leq 1.5$

Certification:

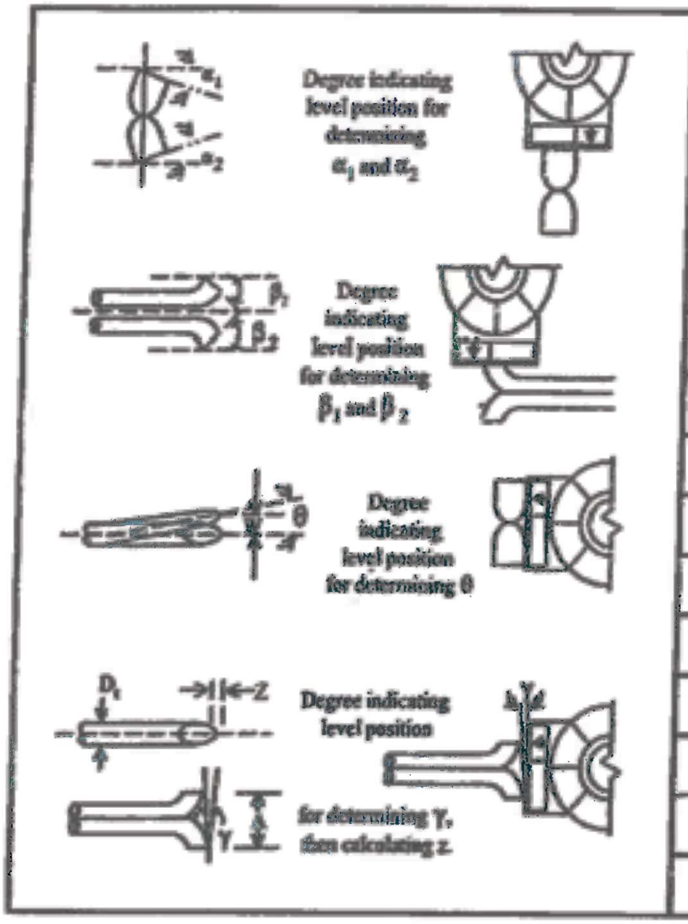
I certify that this pitot tube meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube calibration factor Cp of 0.84.

Certified By: Morgan Nguyen **Date:** 1/4/2019

Almega ENVIRONMENTAL

TYPE S PITOT TUBE SEMIANNUAL INSPECTION SHEET

CAL DATE: 01-04-2019
NEXT DUE DATE: 7-5-2019
PITOT ID: 28



Parameter	Values	Allowable Range
Level and Perpendicular?	Yes OR No	Yes
Obstruction?	Yes OR No	No
Damaged?	Yes OR No	No
α1	4	−10° ≤ α1 ≤ +10°
α2	3	−10° ≤ α2 ≤ +10°
β1	0	−5° ≤ β1 ≤ +5°
β2	0	−5° ≤ β2 ≤ +5°
γ	1	NA
θ	1	NA
Z = A (tan γ)	0.000	≤ 0.125 in.
W = A (tan θ)	0.000	≤ 0.031 in.
Dt	0.369	0.188 ≤ Dt ≤ 0.375
A	0.928	NA
A/2/(Dt)	#DIV/0!	1.05 ≤ PA/Dt ≤ 1.5

Certification:

I certify that this pitot tube meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube calibration factor Cp of 0.84.

Certified By: Morgan Nguyen **Date:** 01-04-19

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ALMEGA ENVIRONMENTAL AND TECHNICAL SERVICES
10602 WALKER STREET
CYPRESS, CA 90630

STACK TEMPERATURE SENSOR SEMI-ANNUAL CALIBRATION

TEMPERATURE SENSOR I.D:	16	REF. DIGITAL NIST TRACEABLE THERMOMETEI : 1, 2 & 3
READ OUT I.D:	VA710	ICE BATH: YES
PITOT TUBE I.D:	16	BOILING WATER: YES
PITOT TUBE LENGTH:	100"	HOT OIL: YES
DATE:	1/3/2019	CALIBRATED BY: JO/MN

ICE BATH

S/N: 23NU22 Due Date 12/28/2019	REF.DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE	FIELD METER TEMPERATURE (°F)	ABSOLUTE DIFFERENCE TEMPERATURE (°F)	DIFFERENCE (%)
	32.5	32.4	0.1	0.3
	32.3	32.3	0.0	0.0
	32.4	32.5	0.1	0.3

BOILING WATER

S/N: 160764579 Due Date 11/13/2019	REF. DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE	FIELD METER TEMPERATURE (°F)	ABSOLUTE DIFFERENCE TEMPERATURE (°F)	DIFFERENCE (%)
	215.2	215.0	0.2	0.1
	215.0	215.6	0.6	0.3
	215.0	214.1	0.9	0.4

HOT OIL

S/N: 160764568 Due Date 11/13/2019	REF.DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE	FIELD METER TEMPERATURE (°F)	ABSOLUTE DIFFERENCE TEMPERATURE (°F)	DIFFERENCE (%)
	515.3	515.0	0.3	0.1
	514.2	516.1	1.9	0.4
	516.3	518.3	2.0	0.4

NOTE:
MAXIMUM TOLERANCE BETWEEN ANY TWO MEASUREMENT IS 1.5%.
TAKE READING EVERY ONE MINUTE.

REF. T1 ICE BATH THERMOMETER: -58 - 572 (F)
REF. T2 BOILING WATER THERMOMETER: -58 - 572 (F)
REF. T3 HOT OIL THERMOMETER: -58 - 572 (F)

ALMEGA ENVIRONMENTAL AND TECHNICAL SERVICES
10602 WALKER STREET
CYPRESS, CA 90630

STACK TEMPERATURE SENSOR SEMI-ANNUAL CALIBRATION

TEMPERATURE SENSOR I.D:	28	REF. DIGITAL NIST TRACEABLE THERMOMETEI : 1, 2 & 3
READ OUT I.D:	VA710	ICE BATH: YES
PITOT TUBE I.D:	28	BOILING WATER: YES
PITOT TUBE LENGTH:	37"	HOT OIL: YES
DATE:	1/3/2019	CALIBRATED BY: JO/MN

	ICE BATH			
S/N: 23NU22 Due Date 12/28/2019	REF.DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE	FIELD METER TEMPERATURE (°F)	ABSOLUTE DIFFERENCE TEMPERATURE (°F)	DIFFERENCE (%)
	31.5	31.7	0.2	0.6
	31.5	31.8	0.3	1.0
	31.6	31.3	0.3	0.9

	BOILING WATER			
S/N: 160764579 Due Date 11/13/2019	REF. DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE	FIELD METER TEMPERATURE (°F)	ABSOLUTE DIFFERENCE TEMPERATURE (°F)	DIFFERENCE (%)
	215.1	214.8	0.3	0.1
	215.0	213.1	1.9	0.9
	215.0	214.2	0.8	0.4

	HOT OIL			
S/N: 160764568 Due Date 11/13/2019	REF.DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE	FIELD METER TEMPERATURE (°F)	ABSOLUTE DIFFERENCE TEMPERATURE (°F)	DIFFERENCE (%)
	520.0	520.1	0.1	0.0
	523.1	524.6	1.5	0.3
	522.6	520.1	2.5	0.5

NOTE:
MAXIMUM TOLERANCE BETWEEN ANY TWO MEASUREMENT IS 1.5%.
TAKE READING EVERY ONE MINUTE.

REF. T1 ICE BATH THERMOMETER: -58 - 572 (F)
REF. T2 BOILING WATER THERMOMETER: -58 - 572 (F)
REF. T3 HOT OIL THERMOMETER: -58 - 572 (F)

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CYPRESS, CA 90630

STACK TEMPERATURE SENSOR SEMI-ANNUAL CALIBRATION

TEMPERATURE SENSOR I.D:	31	REF. DIGITAL NIST TRACEABLE THERMOMETER: 1, 2 & 3
READ OUT I.D:	VA710	ICE BATH: YES
PITOT TUBE I.D:	31	BOILING WATER: YES
PITOT TUBE LENGTH:	49"	HOT OIL: YES
DATE:	1/2/2019	CALIBRATED BY: JO/MN

	ICE BATH			
S/N: 23NU22 Due Date 12/28/2019	REF.DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE	FIELD METER TEMPERATURE (°F)	ABSOLUTE DIFFERENCE TEMPERATURE (°F)	DIFFERENCE (%)
	31.8	31.6	0.2	0.6
	31.9	31.6	0.3	0.9
	31.8	31.6	0.2	0.6

	BOILING WATER			
S/N: 160764579 Due Date 11/13/2019	REF. DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE	FIELD METER TEMPERATURE (°F)	ABSOLUTE DIFFERENCE TEMPERATURE (°F)	DIFFERENCE (%)
	215.2	215.1	0.1	0.0
	215.0	215.2	0.2	0.1
	215.0	214.8	0.2	0.1

	HOT OIL			
S/N: 160764568 Due Date 11/13/2019	REF.DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE	FIELD METER TEMPERATURE (°F)	ABSOLUTE DIFFERENCE TEMPERATURE (°F)	DIFFERENCE (%)
	500.3	497.3	3.0	0.6
	502.7	503.9	1.2	0.2
	504.6	507.3	2.7	0.5

NOTE:
MAXIMUM TOLERANCE BETWEEN ANY TWO MEASUREMENT IS 1.5%.
TAKE READING EVERY ONE MINUTE.

REF. T1 ICE BATH THERMOMETER: -58 - 572 (F)
REF. T2 BOILING WATER THERMOMETER: -58 - 572 (F)
REF. T3 HOT OIL THERMOMETER: -58 - 572 (F)

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CYPRESS, CA 90630

STACK TEMPERATURE SENSOR SEMI-ANNUAL CALIBRATION

TEMPERATURE SENSOR I.D:	34	REF. DIGITAL NIST TRACEABLE THERMOMETEI : 1, 2 & 3
READ OUT I.D:	VA710	ICE BATH: YES
PITOT TUBE I.D:	34	BOILING WATER: YES
PITOT TUBE LENGTH:	49"	HOT OIL: YES
DATE:	1/3/2019	CALIBRATED BY: JO/MN

	ICE BATH			
S/N: 23NU22 Due Date 12/28/2019	REF.DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE	FIELD METER TEMPERATURE (^{O}F)	ABSOLUTE DIFFERENCE TEMPERATURE (^{O}F)	DIFFERENCE (%)
	31.6	31.4	0.2	0.6
	31.8	32.0	0.2	0.6
	31.7	31.9	0.2	0.6

	BOILING WATER			
S/N: 160764579 Due Date 11/13/2019	REF. DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE	FIELD METER TEMPERATURE (^{O}F)	ABSOLUTE DIFFERENCE TEMPERATURE (^{O}F)	DIFFERENCE (%)
	215.1	214.9	0.2	0.1
	215.0	214.2	0.8	0.4
	215.0	215.4	0.4	0.2

	HOT OIL			
S/N: 160764566 Due Date 11/13/2019	REF.DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE	FIELD METER TEMPERATURE (^{O}F)	ABSOLUTE DIFFERENCE TEMPERATURE (^{O}F)	DIFFERENCE (%)
	524.8	524.9	0.1	0.0
	526.1	527.4	1.3	0.2
	525.6	526.3	0.7	0.1

NOTE:
MAXIMUM TOLERANCE BETWEEN ANY TWO MEASUREMENT IS 1.5%.
TAKE READING EVERY ONE MINUTE.

REF. T1 ICE BATH THERMOMETER: -58 - 572 (F)
REF. T2 BOILING WATER THERMOMETER: -58 - 572 (F)
REF. T3 HOT OIL THERMOMETER: -58 - 572 (F)

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CYPRESS, CA 90630

STACK TEMPERATURE SENSOR SEMI-ANNUAL CALIBRATION

TEMPERATURE SENSOR I.D:	47	REF. DIGITAL NIST TRACEABLE THERMOMETEI: 1, 2 & 3
READ OUT I.D:	VA710	ICE BATH: YES
PITOT TUBE I.D:	47	BOILING WATER: YES
PITOT TUBE LENGTH:	88"	HOT OIL: YES
DATE:	1/3/2019	CALIBRATED BY: JO/MN

ICE BATH

S/N: 23NU22 Due Date 12/28/2019	REF.DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE	FIELD METER TEMPERATURE (°F)	ABSOLUTE DIFFERENCE TEMPERATURE (°F)	DIFFERENCE (%)
	31.5	31.2	0.3	1.0
	31.5	31.4	0.1	0.3
	31.6	31.9	0.3	0.9

BOILING WATER

S/N: 160764579 Due Date 11/13/2019	REF. DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE	FIELD METER TEMPERATURE (°F)	ABSOLUTE DIFFERENCE TEMPERATURE (°F)	DIFFERENCE (%)
	215.0	215.1	0.1	0.0
	215.0	215.0	0.0	0.0
	215.0	214.3	0.7	0.3

HOT OIL

S/N: 160764568 Due Date 11/13/2019	REF.DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE	FIELD METER TEMPERATURE (°F)	ABSOLUTE DIFFERENCE TEMPERATURE (°F)	DIFFERENCE (%)
	521.9	521.8	0.1	0.0
	520.3	520.9	0.6	0.1
	522.6	523.9	1.3	0.2

NOTE:
MAXIMUM TOLERANCE BETWEEN ANY TWO MEASUREMENT IS 1.5%.
TAKE READING EVERY ONE MINUTE.

REF. T1 ICE BATH THERMOMETER: -58 - 572 (F)
REF. T2 BOILING WATER THERMOMETER: -58 - 572 (F)
REF. T3 HOT OIL THERMOMETER: -58 - 572 (F)

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10602 WALKER STREET
CYPRESS, CA 90630

STACK TEMPERATURE SENSOR SEMI-ANNUAL CALIBRATION

TEMPERATURE SENSOR I.D:	85	REF. DIGITAL NIST TRACEABLE THERMOMETEI : 1, 2 & 3
READ OUT I.D:	VA710	ICE BATH: YES
PITOT TUBE I.D:	85	BOILING WATER: YES
PITOT TUBE LENGTH:	37"	HOT OIL: YES
DATE:	1/2/2019	CALIBRATED BY: JOHN

	ICE BATH			
S/N: 23NU22 Due Date 12/28/2019	REF.DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE	FIELD METER TEMPERATURE (°F)	ABSOLUTE DIFFERENCE TEMPERATURE (°F)	DIFFERENCE (%)
	31.7	31.5	0.2	0.6
	31.8	32.1	0.3	0.9
	31.8	31.5	0.3	0.9

	BOILING WATER			
S/N: 160764579 Due Date 11/13/2019	REF. DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE	FIELD METER TEMPERATURE (°F)	ABSOLUTE DIFFERENCE TEMPERATURE (°F)	DIFFERENCE (%)
	215.2	216.7	1.5	0.7
	215.0	214.2	0.8	0.4
	215.0	214.8	0.2	0.1

	HOT OIL			
S/N: 160764568 Due Date 11/13/2019	REF.DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE	FIELD METER TEMPERATURE (°F)	ABSOLUTE DIFFERENCE TEMPERATURE (°F)	DIFFERENCE (%)
	493.8	490.9	2.9	0.6
	494.4	491.2	3.2	0.6
	494.9	493.1	1.8	0.4

NOTE:
MAXIMUM TOLERANCE BETWEEN ANY TWO MEASUREMENT IS 1.5%.
TAKE READING EVERY ONE MINUTE.

REF. T1 ICE BATH THERMOMETER: -58 - 572 (F)
REF. T2 BOILING WATER THERMOMETER: -58 - 572 (F)
REF. T3 HOT OIL THERMOMETER: -58 - 572 (F)

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10602 WALKER STREET
CYPRESS, CA 90630

STACK TEMPERATURE SENSOR BI-MONTHLY CALIBRATION

TEMPERATURE SENSOR I.D:	47	REF. DIGITAL NIST TRACEABLE THERMOMETER ID: 1, 2 & 3
READ OUT I.D:	VA-710	ICE BATH YES
PITOT TUBE I.D:	47	BOILING WATER: YES
PITOT TUBE LENGTH:	88"	HOT OIL: YES
DATE:	4/26/2019	CALIBRATED BY: EO/JO

	ICE BATH			
S/N: 160764570 Due Date 11/13/2019	REF. DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE (°F)	FIELD METER TEMPERATURE (°F)	ABSOLUTE DIFFERENCE TEMPERATURE (°F)	% DIFFERENCE (%)
	32.2	32.1	0.1	0.3

	BOILING WATER			
S/N: 160764579 Due Date 11/13/2019	REF. DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE (°F)	FIELD METER TEMPERATURE (°F)	ABSOLUTE DIFFERENCE TEMPERATURE (°F)	% DIFFERENCE (%)
	212.0	212.0	0.0	0.0

	HOT OIL			
S/N: 160764557 Due Date 11/13/2019	REF. DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE (°F)	FIELD METER TEMPERATURE (°F)	ABSOLUTE DIFFERENCE TEMPERATURE (°F)	% DIFFERENCE (%)
	485.0	487.0	2.0	0.4

NOTE:
MAXIMUM TOLERANCE BETWEEN ANY TWO MEASUREMENT IS 1.5%.
TAKE READING EVERY ONE MINUTE.

REF. T1 ICE BATH THERMOMETER: -58 - 572 (F)
REF. T2 BOILING WATER THERMOMETER: -58 - 572 (F)
REF. T3 HOT OIL THERMOMETER: -58 - 572 (F)

ALMEGA ENVIRONMENTAL AND TECHNICAL SERVICES
10602 WALKER STREET
CYPRESS, CA 90630

STACK TEMPERATURE SENSOR BI-MONTHLY CALIBRATION

TEMPERATURE SENSOR I.D:	85	REF. DIGITAL NIST TRACEABLE THERMOMETER ID: 1, 2 & 3
READ OUT I.D:	VA-710	ICE BATH YES
PITOT TUBE I.D:	85	BOILING WATER: YES
PITOT TUBE LENGTH:	37"	HOT OIL: YES
DATE:	4/26/2019	CALIBRATED BY: JO/LB

ICE BATH

S/N: 160764570 Due Date 11/13/2019	REF. DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE (°F)	FIELD METER TEMPERATURE (°F)	ABSOLUTE DIFFERENCE TEMPERATURE (°F)	% DIFFERENCE (%)
	35.1	35.3	0.2	0.6

BOILING WATER

S/N: 160764579 Due Date 11/13/2019	REF. DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE (°F)	FIELD METER TEMPERATURE (°F)	ABSOLUTE DIFFERENCE TEMPERATURE (°F)	% DIFFERENCE (%)
	212.1	211.9	0.2	0.1

HOT OIL

S/N: 160764557 Due Date 11/13/2019	REF. DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE (°F)	FIELD METER TEMPERATURE (°F)	ABSOLUTE DIFFERENCE TEMPERATURE (°F)	% DIFFERENCE (%)
	511.6	513.3	1.7	0.3

NOTE:
MAXIMUM TOLERANCE BETWEEN ANY TWO MEASUREMENT IS 1.5%.
TAKE READING EVERY ONE MINUTE.

REF. T1 ICE BATH THERMOMETER: -58 - 572 (F)
REF. T2 BOILING WATER THERMOMETER: -58 - 572 (F)
REF. T3 HOT OIL THERMOMETER: -58 - 572 (F)

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10602 WALKER STREET
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STACK TEMPERATURE SENSOR BI-MONTHLY CALIBRATION

TEMPERATURE SENSOR I.D:	28	REF. DIGITAL NIST TRACEABLE THERMOMETER ID: 1, 2 & 3
READ OUT I.D:	VA-710	ICE BATH YES
PITOT TUBE I.D:	28	BOILING WATER: YES
PITOT TUBE LENGTH:	37"	HOT OIL: YES
DATE:	4/26/2019	CALIBRATED BY: JO/LB

	ICE BATH			
S/N: 160764570 Due Date 11/13/2019	REF. DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE (°F)	FIELD METER TEMPERATURE (°F)	ABSOLUTE DIFFERENCE TEMPERATURE (°F)	% DIFFERENCE (%)
	34.9	34.8	0.1	0.3

	BOILING WATER			
S/N: 160764579 Due Date 11/13/2019	REF. DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE (°F)	FIELD METER TEMPERATURE (°F)	ABSOLUTE DIFFERENCE TEMPERATURE (°F)	% DIFFERENCE (%)
	211.7	212.1	0.4	0.2

	HOT OIL			
S/N: 160764557 Due Date 11/13/2019	REF. DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE (°F)	FIELD METER TEMPERATURE (°F)	ABSOLUTE DIFFERENCE TEMPERATURE (°F)	% DIFFERENCE (%)
	510.9	512.7	1.8	0.4

NOTE:
MAXIMUM TOLERANCE BETWEEN ANY TWO MEASUREMENT IS 1.5%.
TAKE READING EVERY ONE MINUTE.

REF. T1 ICE BATH THERMOMETER: -58 - 572 (F)
REF. T2 BOILING WATER THERMOMETER: -58 - 572 (F)
REF. T3 HOT OIL THERMOMETER: -58 - 572 (F)

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CYPRESS, CA 90630

STACK TEMPERATURE SENSOR BI-MONTHLY CALIBRATION

TEMPERATURE SENSOR I.D:	16	REF. DIGITAL NIST TRACEABLE THERMOMETER ID: 1, 2 & 3
READ OUT I.D:	VA-710	ICE BATH YES
PITOT TUBE I.D:	16	BOILING WATER: YES
PITOT TUBE LENGTH:	100"	HOT OIL: YES
DATE:	4/26/2019	CALIBRATED BY: EO/JO

ICE BATH

S/N: 160764570 Due Date 11/13/2019	REF. DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE (^{O}F)	FIELD METER TEMPERATURE (^{O}F)	ABSOLUTE DIFFERENCE TEMPERATURE (^{O}F)	% DIFFERENCE (%)
	31.2	31.3	0.1	0.3

BOILING WATER

S/N: 160764579 Due Date 11/13/2019	REF. DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE (^{O}F)	FIELD METER TEMPERATURE (^{O}F)	ABSOLUTE DIFFERENCE TEMPERATURE (^{O}F)	% DIFFERENCE (%)
	212.0	213.0	1.0	0.5

HOT OIL

S/N: 160764557 Due Date 11/13/2019	REF. DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE (^{O}F)	FIELD METER TEMPERATURE (^{O}F)	ABSOLUTE DIFFERENCE TEMPERATURE (^{O}F)	% DIFFERENCE (%)
	462.0	467.0	5.0	1.1

NOTE:
MAXIMUM TOLERANCE BETWEEN ANY TWO MEASUREMENT IS 1.5%.
TAKE READING EVERY ONE MINUTE.

REF. T1 ICE BATH THERMOMETER: -58 - 572 (F)
REF. T2 BOILING WATER THERMOMETER: -58 - 572 (F)
REF. T3 HOT OIL THERMOMETER: -58 - 572 (F)

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STACK TEMPERATURE SENSOR BI-MONTHLY CALIBRATION

TEMPERATURE SENSOR I.D:	34	REF. DIGITAL NIST TRACEABLE THERMOMETER ID: 1, 2 & 3
READ OUT I.D:	VA-710	ICE BATH YES
PITOT TUBE I.D:	34	BOILING WATER: YES
PITOT TUBE LENGTH:	49"	HOT OIL: YES
DATE:	4/26/2019	CALIBRATED BY: EO/WB EO

	ICE BATH			
S/N: 160764570 Due Date 11/13/2019	REF. DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE (°F)	FIELD METER TEMPERATURE (°F)	ABSOLUTE DIFFERENCE TEMPERATURE (°F)	% DIFFERENCE (%)
	32.2	32.3	0.1	0.3

	BOILING WATER			
S/N: 160764579 Due Date 11/13/2019	REF. DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE (°F)	FIELD METER TEMPERATURE (°F)	ABSOLUTE DIFFERENCE TEMPERATURE (°F)	% DIFFERENCE (%)
	213.1	212.8	0.3	0.1

	HOT OIL			
S/N: 160764557 Due Date 11/13/2019	REF. DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE (°F)	FIELD METER TEMPERATURE (°F)	ABSOLUTE DIFFERENCE TEMPERATURE (°F)	% DIFFERENCE (%)
	486.0	488.0	2.0	0.4

NOTE:
MAXIMUM TOLERANCE BETWEEN ANY TWO MEASUREMENT IS 1.5%.
TAKE READING EVERY ONE MINUTE.

REF. T1 ICE BATH THERMOMETER: -58 - 572 (F)
REF. T2 BOILING WATER THERMOMETER: -58 - 572 (F)
REF. T3 HOT OIL THERMOMETER: -58 - 572 (F)

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CYPRESS, CA 90630

STACK TEMPERATURE SENSOR BI-MONTHLY CALIBRATION

TEMPERATURE SENSOR I.D:	31	REF. DIGITAL NIST TRACEABLE THERMOMETER ID: 1, 2 & 3
READ OUT I.D:	VA-710	ICE BATH YES
PITOT TUBE I.D:	31	BOILING WATER: YES
PITOT TUBE LENGTH:	37"	HOT OIL: YES
DATE:	4/26/2019	CALIBRATED BY: EO/WB EO

	ICE BATH			
S/N: 160764570 Due Date 11/13/2019	REF. DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE (°F)	FIELD METER TEMPERATURE (°F)	ABSOLUTE DIFFERENCE TEMPERATURE (°F)	% DIFFERENCE (%)
	31.1	30.9	0.2	0.6

	BOILING WATER			
S/N: 160764579 Due Date 11/13/2019	REF. DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE (°F)	FIELD METER TEMPERATURE (°F)	ABSOLUTE DIFFERENCE TEMPERATURE (°F)	% DIFFERENCE (%)
	212.7	214.1	1.4	0.7

	HOT OIL			
S/N: 160764557 Due Date 11/13/2019	REF. DIGITAL NIST TRACEABLE THERMOMETER TEMPERATURE (°F)	FIELD METER TEMPERATURE (°F)	ABSOLUTE DIFFERENCE TEMPERATURE (°F)	% DIFFERENCE (%)
	468.0	471.0	3.0	0.6

NOTE:
MAXIMUM TOLERANCE BETWEEN ANY TWO MEASUREMENT IS 1.5%.
TAKE READING EVERY ONE MINUTE.

REF. T1 ICE BATH THERMOMETER: -58 - 572 (F)
REF. T2 BOILING WATER THERMOMETER: -58 - 572 (F)
REF. T3 HOT OIL THERMOMETER: -58 - 572 (F)

Semi-Annual Field Dry Gas Meter Calibration* Calibration Date: 3/19/2019

Orifice Series: 33-73
Serial Number: AE_1/AE_2
Cal Type: Semi-Annual

Calibrated by: L. Barrow
(signature):
Reviewed by:

DRY GAS METER CALIBRATION FACTOR	ORIFICE CALIBRATION FACTOR
Y	dH@
Yds = 1.0376	dH@ = 1.789

DRY GAS METER READINGS								QUALITY CONTROL CHECKS			
DGM INLET		DGM OUTLET		Meter Reading		Orifice Reading					
Initial (°F)	Final (°F)	Initial (°F)	Final (°F)	Initial (cu.ft.)	Final (cu.ft.)	Initial (in.H2O)	Final (in.H2O)	$(Y_{its,max} - Y_{its,min}) <$ 0.010 **	$0.98 < (Y_{its}/Y_{ds})$ 1.02	Average Coeff (Y) (0.95<Y<1.05)	$dH@_{avg}$ < (dH@ ± 0.15)
N/A	N/A	62.0	63.0	323.972	329.639	0.130	0.130				
		63.0	64.0	329.639	335.123	0.130	0.130	0.0033	0.985	1.022	1.776
		64.0	65.0	335.123	340.724	0.130	0.130	PASS	PASS	PASS	PASS
N/A	N/A	67.0	68.0	341.902	347.625	0.730	0.730				
		68.0	69.0	347.625	353.359	0.730	0.730	0.0004	1.008	1.044	1.682
		69.0	70.0	353.359	359.096	0.730	0.730	PASS	PASS	PASS	PASS
N/A	N/A	71.0	72.0	361.057	366.286	1.900	1.900				
		72.0	73.0	366.286	371.518	1.900	1.900	0.0019	1.008	1.046	1.794
		73.0	74.0	371.518	376.752	1.900	1.900	PASS	PASS	PASS	PASS
N/A	N/A	74.0	75.0	377.762	383.958	3.800	3.800				
		75.0	76.0	383.958	390.181	3.800	3.800	0.0036	1.001	1.039	1.906
		76.0	77.0	390.181	396.388	3.800	3.800	PASS	PASS	PASS	PASS

DGM ID: A-6
Serial #: 20162696
Model# XC-522-D
Calibration Interval:
Semi-Annual: X
Bi-monthly:
Other:

Standard Temperature (deg.F)
Tstd = 60

Barometric Pressure (in.Hg)
Initial: 29.89
Final: 29.89
$P_{bar,avg}$: 29.89

Orifice Series No.	Run Time (min)	CRITICAL ORIFICE			Corrected		DRY GAS METER			Corrected		CALCULATIONS	
		Orifice K-factor	Tested Vacuum (in.Hg)	Ambient Temp. (°F)	Flowrate Q/m (SCFM)	Volume (cu.ft.)	Orifice dH (in.H2O)	AVG Temp. (°F)	NET Volume (cu.ft.)	Flowrate Q/m (SCFM)	Volume (SCF)	Coefficient Y_{its} $(0.95 < Y_{its} < 1.05)$	Orifice dH@ (in.H2O)
33	28	0.1549	27.50	63.0	0.2028	5.670	0.130	62.50	5.667	0.198	5.540	1.0235	1.777
33	28	0.1549	27.50	64.0	0.202	5.665	0.130	63.50	5.584	0.198	5.546	1.0214	1.777
33	28	0.1549	27.50	64.0	0.202	5.665	0.130	64.50	5.601	0.198	5.553	1.0203	1.773
52	12	0.3769	24.50	66.0	0.491	5.898	0.730	67.50	5.723	0.471	5.660	1.0437	1.684
52	12	0.3769	24.50	66.0	0.491	5.896	0.730	68.50	5.734	0.471	5.650	1.0436	1.681
52	12	0.3769	24.50	67.0	0.491	5.891	0.730	69.50	5.737	0.470	5.642	1.0441	1.681
63	7	0.5690	21.00	67.0	0.767	5.370	1.900	71.50	5.229	0.734	5.138	1.0452	1.795
63	7	0.5690	21.00	68.0	0.766	5.365	1.900	72.50	5.232	0.733	5.131	1.0456	1.795
63	7	0.5690	21.00	68.0	0.766	5.365	1.900	73.50	5.234	0.732	5.123	1.0471	1.791
73	6	0.8109	16.00	69.0	1.054	6.325	3.800	74.50	6.206	1.015	6.092	1.0383	1.908
73	6	0.8109	16.00	69.0	1.054	6.325	3.800	75.50	6.223	1.016	6.097	1.0374	1.904
73	6	0.8109	16.00	70.0	1.053	6.318	3.800	76.50	6.207	1.012	6.070	1.0410	1.904

* Critical Orifice used.

Note: This Apex Meter Box, Console Model # XC-522-D does not have a temperature sensor at the inlet. Hence, DGM inlet columns are intentially left blank.

Semi-Annual Field Dry Gas Meter Calibration* Calibration Date: 3/18/2019

Orifice Series: 33-73
Serial Number: AE_1/AE_2
Cal Type: Semi-Annual

Calibrated by: E. Ortiz
(signature):
Reviewed by:

DRY GAS METER CALIBRATION FACTOR Y	ORIFICE CALIBRATION FACTOR dH@
Yds = 1.0274	dH@ = 1.736

DRY GAS METER READINGS								QUALITY CONTROL CHECKS			
DGM INLET		DGM OUTLET		Meter Reading		Orifice Reading					
Initial (°F)	Final (°F)	Initial (°F)	Final (°F)	Initial (cu.ft.)	Final (cu.ft.)	Initial (in.H2O)	Final (in H2O)	$(Y_{bu,max} - Y_{bu,min}) <$ 0.010 **	$0.98 < (Y_{bu}/Y_{bu})$ 1.02	Average Coeff (Y) (0.95<Y<1.05)	$dH@_{avg}$ < (dH@ ± 0.15)
N/A	N/A	66.0	67.0	735.078	740.651	0.120	0.120	0.0016 PASS	1.000 PASS	1.027 PASS	1.639 PASS
		67.0	68.0	740.651	746.229	0.120	0.120				
		68.0	69.0	746.229	751.809	0.120	0.120				
N/A	N/A	69.0	70.0	751.809	757.544	0.730	0.730	0.0019 PASS	1.016 PASS	1.044 PASS	1.688 PASS
		70.0	71.0	757.544	763.274	0.730	0.730				
		71.0	71.0	763.274	769.007	0.730	0.730				
N/A	N/A	73.0	73.0	769.126	774.450	1.900	1.900	0.0057 PASS	0.996 PASS	1.023 PASS	1.805 PASS
		73.0	74.0	774.450	779.778	1.900	1.900				
		74.0	75.0	779.775	785.145	1.900	1.900				
N/A	N/A	75.0	76.0	804.278	810.604	3.600	3.600	0.0056 PASS	0.989 PASS	1.016 PASS	1.812 PASS
		76.0	78.0	810.604	816.951	3.600	3.600				
		78.0	78.0	816.951	823.329	3.600	3.600				

DGM ID: A-7
Serial #: 20152518
Model# XC-522-D

Calibration Interval:
Semi-Annual: X
Bi-monthly:
Other:

Standard Temperature (deg.F)
Tstd = 60

Barometric Pressure (in.Hg)
Initial: 29.88
Final: 29.88
$Pbar_{avg}$: 29.88

Orifice Series No	Run Time (min)	CRITICAL ORIFICE					DRY GAS METER					CALCULATIONS	
		Orifice K-factor	Tested Vacuum (in.Hg)	Ambient Temp (°F)	Corrected		Orifice dH (in.H2O)	AVG Temp. (°F)	NET Volume (cu.ft.)	Corrected		Coefficient Y_{bu} $(0.95 < Y_{bu} < 1.05)$	Orifice dH@ (in.H2O)
					Flowrate Q/m (SCFM)	Volume (cu.ft.)				Flowrate Q/m (SCFM)	Volume (SCF)		
33	28	0.1549	26.00	67.0	0.2017	5.647	0.120	66.50	5.573	0.196	5.502	1.0284	1.641
33	28	0.1549	26.00	67.0	0.202	5.647	0.120	67.50	5.578	0.196	5.496	1.0274	1.636
33	28	0.1549	26.00	68.0	0.201	5.642	0.120	68.50	5.580	0.196	5.488	1.0280	1.636
52	12	0.3769	24.00	69.0	0.490	5.877	0.730	69.50	5.735	0.470	5.638	1.0425	1.688
52	12	0.3769	24.00	70.0	0.489	5.872	0.730	70.50	5.730	0.469	5.623	1.0443	1.688
52	12	0.3769	24.00	71.0	0.489	5.868	0.730	71.00	5.733	0.468	5.620	1.0438	1.689
63	7	0.5890	20.00	72.0	0.763	5.343	1.900	73.00	5.322	0.745	5.213	1.0250	1.807
63	7	0.5890	20.00	72.0	0.763	5.343	1.900	73.50	5.328	0.745	5.214	1.0248	1.806
63	7	0.5890	20.00	72.0	0.763	5.343	1.900	74.50	5.367	0.749	5.242	1.0192	1.802
73	6	0.8109	16.00	72.0	1.051	6.305	3.600	75.50	6.326	1.032	6.193	1.0181	1.813
73	6	0.8109	16.00	73.0	1.050	6.299	3.600	77.00	6.347	1.033	6.196	1.0166	1.812
73	6	0.8109	16.00	74.0	1.049	6.293	3.600	78.00	6.376	1.036	6.215	1.0126	1.812

* Critical Orifice used.

Note: This Apex Meter Box, Console Model # XC-522-D does not have a temperature sensor at the inlet. Hence, DGM inlet columns are intentially left blank.

Semi-Annual Field Dry Gas Meter Calibration*

Calibration Date: 4/26/2019

Orifice Series: 33-73

Serial Number: AE_1/AE_2

Cal Type: Semi-Annual

Calibrated by: L. Barrow

(signature):

Reviewed by:

DRY GAS METER CALIBRATION FACTOR	ORIFICE CALIBRATION FACTOR
Y	dH@
Yds = 1.0395	dH@ = 1.819

DRY GAS METER READINGS								QUALITY CONTROL CHECKS			
DGM INLET		DGM OUTLET		Meter Reading		Orifice Reading					
Initial (°F)	Final (°F)	Initial (°F)	Final (°F)	Initial (cu.ft.)	Final (cu.ft.)	Initial (in.H2O)	Final (in.H2O)	$(Y_{i,max} - Y_{i,min}) <$ 0.010 **	0.98 < (Y_{i}/Y_{avg}) 1.02	Average Coeff (Y) (0.95<Y<1.05)	$dH@_{avg}$ < (dH@ ± 0.15)
N/A	N/A	67.0	67.0	359.554	365.083	0.140	0.140				
		67.0	67.0	365.083	370.604	0.140	0.140	0.0007	0.996	1.038	1.906
		67.0	68.0	370.604	376.129	0.140	0.140	PASS	PASS	PASS	PASS
N/A	N/A	68.0	68.0	376.148	381.862	0.760	0.760				
		68.0	68.0	381.862	387.575	0.760	0.760	0.0018	1.007	1.047	1.752
		68.0	69.0	387.575	393.278	0.760	0.760	PASS	PASS	PASS	PASS
N/A	N/A	69.0	69.0	393.276	398.498	1.900	1.900				
		69.0	69.0	398.498	403.739	1.900	1.900	0.0042	1.001	1.041	1.803
		69.0	70.0	403.739	408.966	1.900	1.900	PASS	PASS	PASS	PASS
N/A	N/A	70.0	70.0	410.470	416.679	3.600	3.600				
		70.0	71.0	416.679	422.871	3.600	3.600	0.0036	0.993	1.033	1.816
		71.0	71.0	422.871	429.077	3.600	3.600	PASS	PASS	PASS	PASS

DGM ID: A-6

Serial #: 1612035

Model#: XC-522

Calibration Interval:

Semi-Annual: x

Bi-monthly:

Other:

Standard Temperature (deg.F)

Tstd = 60

Barometric Pressure (in.Hg)

Initial: 29.89

Final: 29.89

$Pbar_{avg}$: 29.89

Orifice Series No.	Run Time (min)	CRITICAL ORIFICE					DRY GAS METER					CALCULATIONS	
					Corrected					Corrected			
		Orifice K-factor	Tested Vacuum (in.Hg)	Ambient Temp. (°F)	Flowrate Q'm (SCFM)	Volume (cu.ft.)	Orifice dH (in.H2O)	AVG Temp. (°F)	NET Volume (cu.ft.)	Flowrate Q'm (SCFM)	Volume (SCF)	Coefficient Y_{i} (0.95 < Y_{i} < 1.05)	Orifice $dH@_i$ (in.H2O)
33	28	0.1549	26.50	66.0	0.2021	5.660	0.140	67.00	5.529	0.195	5.466	1.0376	1.906
33 -	28	0.1549	26.50	66.0	0.202	5.654	0.140	67.00	5.521	0.195	5.447	1.0380	1.908
33	28	0.1549	26.50	66.0	0.202	5.654	0.140	67.50	5.525	0.195	5.446	1.0382	1.906
52	12	0.3769	23.00	66.0	0.491	5.896	0.760	68.00	5.713	0.470	5.636	1.0464	1.752
52	12	0.3769	23.00	66.0	0.491	5.896	0.760	68.00	5.713	0.470	5.635	1.0464	1.752
52	12	0.3769	23.00	67.0	0.491	5.891	0.760	68.50	5.703	0.468	5.620	1.0482	1.753
63	7	0.5890	20.50	67.0	0.767	5.370	1.900	69.00	5.220	0.736	5.153	1.0421	1.803
63	7	0.5890	20.50	67.0	0.767	5.370	1.900	69.00	5.241	0.739	5.174	1.0379	1.803
63	7	0.5890	20.50	67.0	0.767	5.370	1.900	69.50	5.227	0.736	5.155	1.0416	1.802
73	6	0.8109	18.00	68.0	1.055	6.331	3.600	70.00	6.209	1.024	6.143	1.0306	1.818
73	6	0.8109	18.00	68.0	1.055	6.331	3.600	70.50	6.192	1.020	6.121	1.0343	1.816
73	6	0.8109	18.00	68.0	1.055	6.331	3.600	71.00	6.206	1.021	6.129	1.0329	1.814

* Critical Orifice used.

Note: This Apex Meter Box, Console Model # XC-522 does not have a temperature sensor at the inlet. Hence, DGM inlet columns are intentially left blank.

Bi-Monthly Field Dry Gas Meter Calibration*

Orifice Series: 52,63
Serial Number: AE_1/AE_2
Cal Type: Bi-Monthly

Calibration Date: 5/7/2019
Calibrated by: Will Bryant
(signature):
Reviewed by:

SEMI TO BI CHECK		DRY GAS METER CALIBRATION FACTOR Y	ORIFICE CALIBRATION FACTOR dH@
(+2% of Y)	(-2% of Y)		
1.0584	1.0188	Yds = 1.0433	dH@ = 1.774
PASS			

DRY GAS METER READINGS								QUALITY CONTROL CHECKS			
DGM INLET		DGM OUTLET		Meter Reading		Orifice Reading					
Initial (°F)	Final (°F)	Initial (°F)	Final (°F)	Initial (cu.ft.)	Final (cu.ft.)	Initial (in.H2O)	Final (in.H2O)	$(Y_{fm,max} - Y_{fm,min}) <$ 0.010 **	0.98 < (Y_{fm_i}/Y_{fm}) 1.02	Average Coeff. $Y_{fm,i}$	$dH@_{avg}$ < (dH@ ± 0.15)
N/A	N/A	71.0	72.0	607.271	613.034	0.750	0.750				
		72.0	73.0	613.034	618.791	0.750	0.750	0.0030	0.998	1.041	1.718
		73.0	73.0	618.791	624.567	0.750	0.750	PASS	PASS	PASS	PASS
N/A	N/A	74.0	74.0	625.645	630.886	1.950	1.950				
		74.0	75.0	630.886	636.118	1.950	1.950	0.0020	1.002	1.045	1.832
		75.0	76.0	636.118	641.370	1.950	1.950	PASS	PASS	PASS	PASS

DGM ID: A-6
Serial #: 20162566
Semi A Yfm: 1.0376

Calibration Interval:
Bi-monthly: x

Standard Temperature (deg.F)
Tstd = 60

Barometric Pressure (in.Hg)
Pbar: 30.09

Orifice Series No.	Run Time (min)	CRITICAL ORIFICE					DRY GAS METER					CALCULATIONS	
					Corrected					Corrected			
		Orifice K-factor	Tested Vacuum (in.Hg)	Ambient Temp. (°F)	Flowrate Q'm (SCFM)	Volume (cu.ft.)	Orifice dH (in.H2O)	AVG Temp. (°F)	NET Volume (cu.ft.)	Flowrate Q'm (SCFM)	Volume (SCF)	Coefficient $Y_{fm,i}$ $(0.95 < Y_{fm,i} < 1.05)$	Orifice dH@ (in.H2O)
52	12	0.3769	24.5	70.0	0.493	5.914	0.750	71.50	5.763	0.474	5.685	1.0403	1.719
52	12	0.3769	24.5	70.0	0.493	5.914	0.750	72.50	5.757	0.472	5.668	1.0433	1.715
52	12	0.3769	24.5	70.0	0.493	5.914	0.750	73.00	5.776	0.473	5.682	1.0409	1.714
63	7	0.5890	22.0	70.0	0.770	5.391	1.950	74.00	5.241	0.737	5.161	1.0448	1.832
63	7	0.5890	22.0	71.0	0.769	5.388	1.950	74.50	5.232	0.735	5.147	1.0464	1.833
63	7	0.5890	22.0	71.0	0.769	5.388	1.950	75.50	5.252	0.737	5.157	1.0444	1.830

* Critical Orifice used.

Note: This Apex Meter Box, Console Model # XC-522-D does not have a temperature sensor at the inlet. Hence, DGM inlet columns are left intentionally blank.

Bi-Monthly Field Dry Gas Meter Calibration*

Orifice Series: 52,63
Serial Number: AE_1/AE_2
Cal Type: Bi-Monthly

Calibration Date: 5/7/2019
Calibrated by: Will Bryant
(signature): W Bryant
Reviewed by:

SEMI TO BI CHECK		DRY GAS METER CALIBRATION FACTOR Y	ORIFICE CALIBRATION FACTOR dH@
(+2% of Y)	(-2% of Y)	Yds = 1.0430	dH@ = 1.746
1.0479	1.0069		
PASS			

DRY GAS METER READINGS								QUALITY CONTROL CHECKS			
DGM INLET		DGM OUTLET		Meter Reading		Orifice Reading					
Initial (°F)	Final (°F)	Initial (°F)	Final (°F)	Initial (cu.ft.)	Final (cu.ft.)	Initial (in.H2O)	Final (in.H2O)	$(Y_{bi,max} - Y_{bi,min}) <$ 0.010 **	0.98 < $(Y_{bi,i}/Y_{bi})$ 1.02	Average Coeff. $Y_{bi,i}$	$dH@_{avg}$ < (dH@ ± 0.15)
N/A	N/A	73.0	74.0	237.519	243.282	0.750	0.750	0.0005 PASS	1.000 PASS	1.043 PASS	1.713 PASS
		74.0	75.0	243.282	249.055	0.750	0.750				
		75.0	78.0	249.055	254.840	0.750	0.750				
N/A	N/A	76.0	76.0	255.290	260.550	1.900	1.900	0.0020 PASS	1.000 PASS	1.043 PASS	1.780 PASS
		76.0	77.0	260.550	265.821	1.900	1.900				
		77.0	78.0	265.821	271.106	1.900	1.900				

DGM ID: A-7
Serial #: 20162816
Semi A Yfm: 1.0274

Calibration Interval:
Bi-monthly: x

Standard Temperature (deg.F)
Tstd = 60

Barometric Pressure (in.Hg)
Pbar: 30.08

Orifice Series No.	Run Time (min)	CRITICAL ORIFICE					DRY GAS METER					CALCULATIONS	
					Corrected					Corrected			
		Orifice K-factor	Tested Vacuum (in.Hg)	Ambient Temp. (°F)	Flowrate Q'm (SCFM)	Volume (cu.ft.)	Orifice dH (in.H2O)	AVG Temp. (°F)	NET Volume (cu.ft.)	Flowrate Q'm (SCFM)	Volume (SCF)	Coefficient $Y_{bi,i}$ (0.95 < $Y_{bi,i}$ < 1.05)	Orifice $dH@_i$ (in.H2O)
52	12	0.3769	23.5	71.0	0.492	5.906	0.750	73.50	5.764	0.472	5.662	1.0431	1.716
52	12	0.3769	23.5	71.0	0.492	5.906	0.750	74.50	5.772	0.472	5.659	1.0435	1.713
52	12	0.3769	23.5	71.0	0.492	5.906	0.750	75.50	5.786	0.472	5.662	1.0430	1.710
63	7	0.5890	21.0	71.0	0.769	5.384	1.900	76.00	5.260	0.737	5.157	1.0439	1.782
63	7	0.5890	21.0	71.0	0.769	5.384	1.900	76.50	5.271	0.738	5.163	1.0427	1.780
63	7	0.5890	21.0	71.0	0.769	5.384	1.900	77.50	5.285	0.738	5.167	1.0419	1.777

* Critical Orifice used.

Note: This Apex Meter Box, Console Model # XC-522-D does not have a temperature sensor at the inlet. Hence, DGM inlet columns are left intentionally blank.

NOZZLE CALIBRATION FORM

NOZZLE ID #:

CLIENT [redacted]

CALIPER ID: Husky

DATE: 05/21/19

CALIBRATOR: T.TH

LOCATION: Inlet Furnace

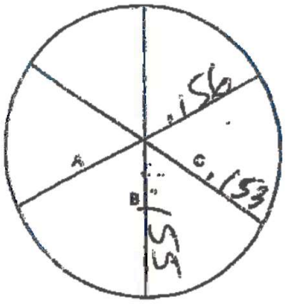
SIGNATURE:

Measured Diameter A: .156 inch

Measured Diameter B: .155 inch

Measured Diameter C: .153 inch

Average: .155 inch



Inside Diameter

Is the Nozzle Free from Nicks, Dents, or Corrosion?

Yes________

No ✓

If "No", please describe deviations below:

Nozzle Deviations (if any):

NOZZLE CALIBRATION FORM

NOZZLE ID #: Inlet 1 (Inside)

CLIENT:

CALIPER ID:

DATE: 5/22/19

CALIBRATOR:

LOCATION:

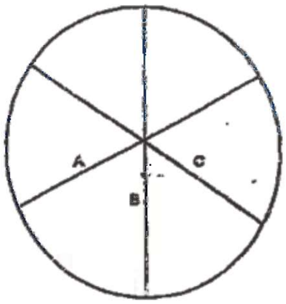
SIGNATURE:

Measured Diameter A: 0.182 inch

Measured Diameter B: 0.179 inch

Measured Diameter C: 0.180 inch

Average: 0.180 inch



Inside Diameter

Is the Nozzle Free from Nicks, Dents, or Corrosion?

Yes______

No______

If "No", please describe deviations below:

Nozzle Deviations (if any):

NOZZLE CALIBRATION FORM

NOZZLE ID #: Inlet 1 (outside)

CLIENT: Facility A

CALIPER ID:

DATE: 5/22/19

CALIBRATOR:

LOCATION:

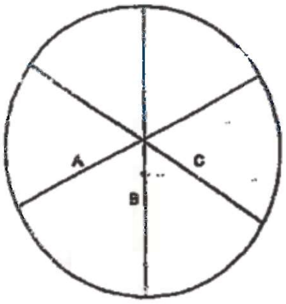
SIGNATURE:

Measured Diameter A: 0.172 inch

Measured Diameter B: 0.175 inch

Measured Diameter C: 0.173 inch

Average: 0.173 inch



Inside Diameter

Is the Nozzle Free from Nicks, Dents, or Corrosion?

Yes________

No________

If "No", please describe deviations below:

Nozzle Deviations (if any):

NOZZLE CALIBRATION FORM

NOZZLE ID #: 0.512

CLIENT: AQMD

CALIPER ID: Trailer 1

DATE: 5-21-19

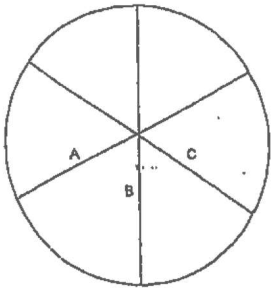
CALIBRATOR: C.H

SIGNATURE:

Measured Diameter A: 0.512 inch

Measured Diameter B: 0.513 inch

Measured Diameter C: 0.514 inch



Inside Diameter

Is the Nozzle Free from Nicks, Dents, or Corrosion?

Yes ✓

No

If "No", please describe deviations below:

Nozzle Deviations (if any):

Almega
ENVIRONMENTAL

Almega
ENVIRONMENTAL

NOZZLE CALIBRATION FORM

NOZZLE ID #: Outlet

CLIENT:

CALIPER ID:

DATE: 9/21/19

CALIBRATOR:

LOCATION:

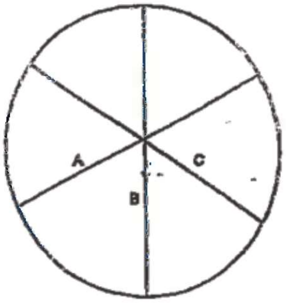
SIGNATURE:

Measured Diameter A: 0.528 inch

Measured Diameter B: 0.528 inch

Measured Diameter C: 0.527 inch

Average: 0.528 inch



Inside Diameter

Is the Nozzle Free from Nicks, Dents, or Corrosion?

Yes________

No________

If "No", please describe deviations below:

Nozzle Deviations (if any):

NOZZLE CALIBRATION FORM

NOZZLE ID #: Inlet 1 (Outside) CLIENT: Facility A

CALIPER ID: DATE: 5/21/19

CALIBRATOR: LOCATION: Inlet 1 (Outside)

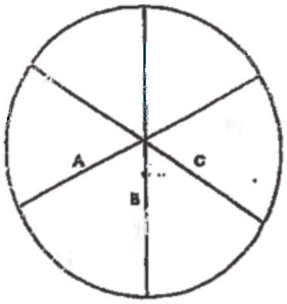
SIGNATURE:

Measured Diameter A: 0.155 inch

Measured Diameter B: 0.156 inch

Measured Diameter C: 0.154 inch

Average: 0.155 inch



Inside Diameter

Is the Nozzle Free from Nicks, Dents, or Corrosion?

Yes________

No________

If "No", please describe deviations below:

Nozzle Deviations **(if any):**

Almega ENVIRONMENTAL

Almega ENVIRONMENTAL

NOZZLE CALIBRATION FORM

NOZZLE ID #: Inlet 1 (Inside)

CLIENT: Facility A

CALIPER ID:

DATE: 5/23

CALIBRATOR:

LOCATION:

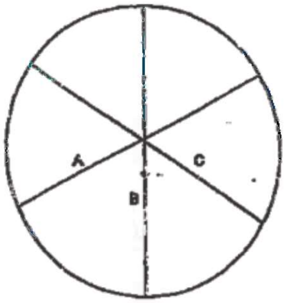
SIGNATURE:

Measured Diameter A: 0.186 inch

Measured Diameter B: 0.188 inch

Measured Diameter C: 0.187 inch

Average: 0.187 inch



Inside Diameter

Is the Nozzle Free from Nicks, Dents, or Corrosion?

Yes________

No________

If "No", please describe deviations below:

Nozzle Deviations (if any):

APPENDIX H

FACILITY PROCESS DATA

Facility Process Data

Charge During CARB Method 436 Metals Testing

Date	Test	Furnace #	Materials	Weight (lbs)
5/21/2019	Metals Run 1	#2 Furnace	AMS 4881	200
		#3 Furnace	AMS 4881	600
		#7 Furnace	SS316	2250
5/21/2019	Metals Run 2	#2 Furnace	AMS 4881	600
		#3 Furnace	AMS 4881	600
		#7 Furnace	SS316	2250
5/22/2019	Metals Run 2	#2 Furnace	AMS 4881	440
		#3 Furnace	AMS 4881	500
		#7 Furnace	SS316	1800

Charge During CARB Method 425 Chromium Testing

Date	Test	Furnace #	Materials	Weight (lbs)
5/22/2019	Chromium R1	#2 Furnace	AMS 4881	600
		#3 Furnace	AMS 4881	600
		#7 Furnace	SS316	2250
5/22/2019	Chromium R2	#2 Furnace	AMS 4881	600
		#3 Furnace	AMS 4881	600
		#7 Furnace	SS316	2250
5/23/2019	Chromium R3	#2 Furnace	AMS 4881	440
		#3 Furnace	AMS 4881	500
		#7 Furnace	SS316	1800

Charge During SCAQMD Method 5.1 PM Testing

Date	Test	Furnace #	Materials	Weight (lbs)
5/23/2019	PM Testing	#2 Furnace	AMS 4881	560
		#3 Furnace	AMS 4881	650
		#7 Furnace	SS316	2250

From: Charles Figueroa <Charles@almegaenv.com>
Sent: Monday, July 01, 2019 3:09 PM
To: Tulasi@almegaenv.com
Subject: FW: Facility A - facility Data

From: [redacted]
Sent: Friday, May 31, 2019 9:08 AM
To: 'Charles Figueroa' <Charles@almegaenv.com>
Subject: RE: Facility A - facility Data

Testing data
Metals R1- #2 furnace AMS4881
200#'s 5 x 40# pours
#3 furnace AMS 4881
600#'s 12 x 50# pours
#7 furnace 316ss
2250#'s 5 x 450# pours
Metals R2- #2 furnace AMS 4881
600# 15 x 40# pours
#3 furnace AMS 4881
600# 12 x 50# pours
#7 furnace 316ss
2250#'s 5 x 450# pours
Metals R3- #2 furnace AMS 4881
440#'s 11 x 40# pours
#3 furnace AMS 4881
500#'s 10 x 50# pours
#7 furnace 316ss
1800#'s 4 x 450# pours
Chromium R1- #2 furnace AMS 4881
600#'s 15 x 40 # pours
#3 furnace AMS 4881
600#'s 12 x 50# pours
#7 furnace 316ss
2250# 5 450# pours
Chromium R2- #2 furnace AMS 4881
600#'s 15 x 40# pours
#3 furnace AMS 4881
600# 15 x 50# pours
#7 furnace 316ss
2250# 5 450# pours
Chromium R3- #2 furnace AMS 4881
440#'S 11 X 40 # POURS
#3 furnace AMS 4881
500#'s 10 x 50# pours
#7 furnace 316ss

1800#'s 4 450# pours
PM R1 -#2 furnace AMS 4881
560#'s 16 x 35# Pours
#3 furnace AMS 4881
650# 10 x 65# pours
#7 furnace 316ss
2250#'s 5 x 450# pours
AMS 4881 11% al, .5% mn, 4% fe, 5% ni balance cu
All furnaces started at full capacity and metal was back charged to maintain that level of capacity after every pour.
AMS 4881 was back charged with pre-alloyed ingot. 316ss was back charged with clean turnings of known chemistry (recycled)
None of the data points constituted 1 heat. AMS4881 2000# heat size and 316 is a 10,000# heat size.
Let me know if you need something more

[redacted]

From: Charles Figueroa <Charles@almegaenv.com>
Sent: Thursday, May 30, 2019 10:01 AM
To: [redacted]
Cc: 'Brian Speaks' <gspeaks@aqmd.gov>
Subject: RE: Facility A - facility Data

All production that was going to the control device...

From: [redacted]
Sent: Thursday, May 30, 2019 9:58 AM
To: 'Charles Figueroa' <Charles@almegaenv.com>
Subject: RE: Facility A - facility Data

Does production include non-stainless or just production?

From: Charles Figueroa <Charles@almegaenv.com>
Sent: Tuesday, May 28, 2019 1:10 PM
To: [redacted]
Cc: 'Brian Speaks' <gspeaks@aqmd.gov>
Subject: Facility A - facility Data

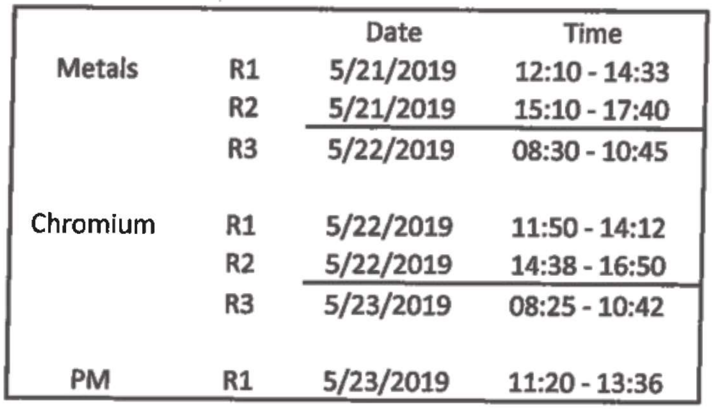
[redacted]

We successfully collected the required samples last week.

Please provide facility data in regards to the production during the following test times.
Specifically we are looking for:

- List all processes operated during each test run
- Specific material processed during each test run
- Material condition (new, re-run, recycled, etc.)
- Number of heats performed
- Total material charged (lbs)

Test Times



		Date	Time
Metals	R1	5/21/2019	12:10 - 14:33
	R2	5/21/2019	15:10 - 17:40
	R3	5/22/2019	08:30 - 10:45
Chromium	R1	5/22/2019	11:50 - 14:12
	R2	5/22/2019	14:38 - 16:50
	R3	5/23/2019	08:25 - 10:42
PM	R1	5/23/2019	11:20 - 13:36

Thanks

Charles M. Figueroa

Almega

P (714) 889-4000

C (714) 809-9681

Charles@almegaenv.com

From: Charles Figueroa <Charles@almegaenv.com>
Sent: Monday, July 01, 2019 3:09 PM
To: Tulasi@almegaenv.com
Subject: FW: Facility A - facility Data

From: [redacted]
Sent: Thursday, June 06, 2019 12:09 PM
To: 'Charles Figueroa' <Charles@almegaenv.com>
Subject: RE: Facility A - facility Data

Charles
Pouring temps for 316-2925 ,ams 4881 2425f
Chem for 4881 is proprietary but general chem should be fine for general purpose.
Heat size is how much can go in to a heat before we change a heat number, each drum of back charge
Material is about 5-600#.
Furnace is about 21 x 36"= 3500 #'s prox

From: Charles Figueroa <Charles@almegaenv.com>
Sent: Thursday, June 06, 2019 11:26 AM
To: [redacted]
Cc: 'Tulasi Gyawali' <tulasi@almegaenv.com>
Subject: FW: Facility A - facility Data

[redacted]

The following additional information regarding the production during the testing has been requested from the District. This is as follows:

1. Melt temperatures for the two materials, While I was observing, the stainless melt was in the 2800 – 3000 degree F range I would like to confirm what is normal/typical for this as well as the hold temperature for the AMS 4881 melt.

2. I have include a copy of the 316SS analysis Don provided for the melt taking place on the first day of testing. I would also like to see if we could include a similar report for the AMS4881 as it is a bit more formal than the description below.

3. I am a bit unclear on what he is referring to as stainless being a 10,000# heat size, does that make sense to you? 55 gallons of stainless steel = 3672 lb based on density of 0.289lb/in3, it didn't seem like the furnace held 2.5 of those drums worth of material but I may be wrong. Do you have the dimensions or volume of the furnace ?

Thanks

Charles M. Figueroa

STAINLESS CHEMICAL ANALYSIS

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
316-1-19557	BSCA316-2	5/21/2019 11:38:22 AM	5334		

	[illegible]	Mn %	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Average	0.041	0.92	1.15	0.028	0.011	19.5	9.57
Std. Deviation	0.00	0.00	0.00	0.00	0.00	0.00	0.00
%RSD	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Average	2.43	0.354	0.00	0.239	0.003	0.001	0.072
Std. Deviation	0.00	0.00	0.00	0.00	0.00	0.00	0.00
%RSD	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Average	0.056	0.015	0.00	0.00	0.001	0.00	66.2
Std. Deviation	0.00	0.00	0.00	0.00	0.00	0.00	0.00
%RSD	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	[illegible]
Average	0.00
Std. Deviation	0.00
%RSD	0.00

CORRESPONDS TO
MOLTEN SAMPLE
COLLECTED @ FACILITY

5/21/2019 12:14:37 PM

Page 1 of 1

FROM MELT.
Fu

STAINLESS CHEMICAL ANALYSIS

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
316-1-19557	BSCA316-2	5/21/2019 8:44:18AM	5334	66003

[illegible]
ASTM-A-743-13ACF8M

	[illegible]	Mn %	[illegible]	[illegible]	[illegible]	[illegible]	Ni %
Average	0.039	0.94	1.18	0.030	0.009	19.6	9.56
Std. Deviation	0.001	0.00	0.029	0.000	0.001	0.0574	0.0113
%RSD	3.17	0.00	2.51	0.46	15.15	0.29	0.12

	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Average	2.38	0.339	0.00	0.233	0.002	0.001	0.077
Std. Deviation	0.0071	0.002	0.00	0.002	0.000	0.001	0.001
%RSD	0.30	0.51	0.00	0.74	3.81	75.56	1.42

	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Average	0.056	0.016	0.00	0.00	0.001	0.00	66.1
Std. Deviation	0.002	0.000	0.00	0.00	0.000	0.00	0.009
%RSD	3.51	2.50	0.00	0.00	0.86	0.00	0.01

[illegible]	[illegible]
Average	0.00
Std. Deviation	0.00
%RSD	0.00

3400# ✓

5/21/2019 8:44:25 AM

Page 1 of 1

FROM MELT
TRA TO
Fi Almega →
ENVIRONMENTAL
FOR TEST

STAINLESS CHEMICAL ANALYSIS

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
316-1-19557	BSCA316-2	5/21/2019 11:38:22 AM	5334		

	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Average	0.041	0.92	1.15	0.028	0.011	19.5	9.57
Std. Deviation	0.00	0.00	0.00	0.00	0.00	0.00	0.00
%RSD	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Average	2.43	0.354	0.00	0.239	0.003	0.001	0.072
Std. Deviation	0.00	0.00	0.00	0.00	0.00	0.00	0.00
%RSD	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Average	0.056	0.015	0.00	0.00	0.001	0.00	66.2
Std. Deviation	0.00	0.00	0.00	0.00	0.00	0.00	0.00
%RSD	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	[illegible]
Average	0.00
Std. Deviation	0.00
%RSD	0.00

3400#✓

5/21/19

		Baghouse in H_2O	HEPA in H_2O	Pre-Filter in H_2O
Run 1 Ⓐ	12:10	2.5	~~.20~~ .10 – .30	.15 - .30
	12:25	2.5	.20 – .30	.15 – .30
	12:40	2.5	.20 – .30	.15 – 30
	12:55	2.5	.15 – .30	.15 - 30
	13:10	2.5	.15 - 30	.15 – 30
Ⓑ	13:30	2.5	.15 – .30	.15 – .30
	13:45	2.5	.20 – .30	.15 – .30
	14:00	2.5	.15 – .25	.15 – .26
	14:15	2.5	.15 – .25	.15 – .24
	14:30	2.5	.15 – .25	.15 - .26
Run 2 Ⓐ	15:10	2.5	.15 – .25	.15 – .30
	15:25	2.5	.15 – .30	.15 – .30
	15:40	2.5	.15 – .30	.15 – .26
	15:55	2.5	.15 – .30	.15 – .26
	16:10	2.5	.20 – 30	.15 – .26
	16:40	2.5	.15 – .25	.15 – 30
	16:55	2.5	.15 – .30	.15 – 30
	17:10	2.5	.15 – .25	.15 – .25
	17:25	2.5	.15 – .25	.15 – .25
	17:40	2.5	.15 – 30	.15 – .30

5/23/19

		Baghouse in H2O	HEPA in H2O	Pre **Almega** ENVIRONMENTAL in H2O
Cr Run 3	Ⓐ 8:25	2.0	.12 , .30	0.15-.30
	8:40	2.0	.10-.30	.15-32
	8:55	2.0	.10-.30	.10-30
	9:10	2.0	.10-.30	.10-.30
	9:25	2.0	.15-.30	.12-.30
	9:40	2.0	.15-.30	.12-.30
	Ⓑ 9:45	2.0	.15-.30	.12-.30
	10:00	2.0	.15-.35	.15-.32
	10:15	2.0	.15-.35	.15-.30
	10:30	2.0		
	10:45	2.0		
PM Run 1	Ⓐ 11:20	2.0	.15-30	.15-.32
	11:35	2.0	.15-30	.15-28
	11:50	2.0	.15-30	.15-.26
	12:05	2.0	.15-35	.15-.32
	12:20	2.0	.15-.30	.15-.30
	Ⓑ 12:36	2.0	.15-.35	.10-.26
	12:51	2.0	.15-.35	.10-.26
	13:06	2.1	.15-.30	.10-26
	13:21	2.1	.15-.30	.15-.30
	13:36	2.1	.15-.30	.15-.30

5/22/19

Almega
ENVIRONMENTAL

Run 1

	Baghouse inH2O	HEPA inH2O	Pre Filter (in H2O)
Ⓐ 8:45	2.2	.1-.25	.15-.25
9:00	2.2	.1-.25	.15-.30
9:15	2.2	.1-25	.15-25
9:30	2.2	.1-.25	.15-.30
Ⓑ 9:45	2.2	.1-.30	.15-.24
10:00	2.2	.1-.30	.1-.28
10:15	2.2	.1-:30	.1-.28
10:30	2.2	,1-30	.1-.28
	2.3	.1-25	.12-,24

APPENDIX I

SCAQMD SOURCE TEST PLAN

South Coast
Air Quality Management District
South Coast
AQMD
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 · www.aqmd.gov

SOURCE TEST PLAN
TO BE CONDUCTED AT

METAL MELTING FACILITY A

METAL MELTING FACILITY B

METAL MELTING FACILITY C

TO DETERMINE PARTICULATE MATTER (PM), ARSENIC, CADMIUM, NICKEL, CHROMIUM, AND HEXAVALENT CHROMIUM (Cr^{+6}) EMISSIONS FROM CHROMIUM ALLOY MELTING OPERATIONS

ISSUED:	November 21, 2018
REVISED:	March 27, 2019

REVIEWED BY:

Michael Garibay
Acting Source Testing Manager

SOURCE TEST ENGINEERING BRANCH

SCIENCE & TECHNOLOGY ADVANCEMENT

Cleaning the air that we breathe...™

TABLE OF CONTENTS

INTRODUCTION

Ambient monitoring in the city of Paramount in 2016 and 2017 indicated the presence of elevated levels of hexavalent chromium. During an investigation of the emission sources, the SCAQMD identified hexavalent chromium emissions were being generated by sources including heat treating and forging facilities. Screening source tests were performed on heat treating and forging furnaces processing metals or using materials that contained chromium at several facilities. Results showed elevated hexavalent chromium levels in the outlet of the furnaces which were operated between 1,725 to 2100°F. These temperatures are lower than those experienced during metal melting operations.

An internal review was initiated for previously conducted source tests at metal melting facilities. Most of the source tests on file only tested for elemental chromium and did not perform the separate test required to determine hexavalent chromium emissions as they were not suspected from this process. SCAQMD staff was able to identify one metal melting facility which was tested for both total chromium and hexavalent chromium using CARB Method 425. Review of this test indicated that conversion of chromium to hexavalent chromium did occur and result in emissions of hexavalent chromium during the melting operation.

SCAQMD staff initiated the rule development process to amend Rule 1407 to address toxic air contaminant emissions from ferrous metal melting operations and update existing requirements for non-ferrous metal melting operations currently regulated under the rule. Through working group meetings with industry stakeholders it was requested that the rule be separated in to two rules for ferrous and non-ferrous metal melting. After additional input and working group meetings SCAQMD staff decided to bifurcate the rule and reclassify characterization in to non-chromium alloy (Rule 1407) and chromium alloy (Rule 1407.1) metal melting.

Additional data from melting operations of metals with a chromium content greater than 0.5% is needed to quantify the conversion rate of chromium to hexavalent chromium and quantify toxic air contaminant emissions from these facilities to aid in the rulemaking process.

Three facilities have agreed to allow source testing for the purposes of collecting this data. Testing will be performed by a third party source test contractor. The purpose of this test plan is to allow for the source test contractors to provide bids as part of the RFP process, while eliminating the need for multiple contractors to visit the facilities who have volunteered as host sites for the source testing. Testing contractors must be SCAQMD Laboratory Approval Program certified for SCAQMD Methods 1-5 to be able to participate in the RFP process and testing upon award of contract.

During the source testing at each facility, control system inlet and outlet emissions and associated emission rates will be determined for the following:

- Particulate Matter (PM)
- Total Chromium (Cr)
- Hexavalent Chromium (Cr^{+6})
- Arsenic (As)
- Cadmium (Cd)
- Nickel (Ni)

Testing will be performed according to SCAQMD Method 5.1, CARB Method 425, and CARB Method 436. Flow rates will be determined according to SCAQMD Methods 1-4, with the use of EPA Method 5D for the outlet of the HEPA filters at one of the three facilities.

EQUIPMENT AND PROCESS DESCRIPTION

Pursuant to the agreement with the participants to keep the names of the host facilities anonymous, they will be identified as Facilities A, B, and C. [redacted]

Metal Melting Facility A

Metal melting Facility A uses electric induction furnaces for the processing of materials including Brass, Zinc, Steel, Stainless Steel, Iron, Aluminum, Cobalt, and Nickel. The facility has eight electric induction furnaces in three sizes as follows:

800 lb material capacity with a power rating of 250 kW
3,000 lb material capacity with a power rating of 350 kW
4,500 lb material capacity with a power rating of 1,000 kW (shared power supply)

[redacted] A heat cycle (or "heat") begins when the metal is placed in the electric induction furnace. Electrical current is applied and the material becomes molten. Testing will be performed during heats of 316 stainless steel. The stainless steel materials are typically melted in one of the 4,500 lb furnaces. Typical temperatures are in the 3000°F range. During the melting process emissions are captured by an exhaust system which mounts to the furnace lid and utilizes a slot design. Suction is provided by the blower which is part of the baghouse and HEPA system. The HEPA filters are mounted in an enclosure above the baghouse and exhaust through two rectangular openings on either side of the enclosure. Because the exhaust does not exit through an exhaust stack special consideration must be given for the outlet testing.

[redacted] A typical heat lasts for approximately 2 hours. Each furnace has individual exhaust ducting allowing for testing during a specific heat before being combined in to a common exhaust header. The baghouse and HEPA filter system controls emissions from the eight electric induction furnaces, five casting machines, one Hawley system, four mold spray and coating stations, [redacted]

A complete list of process operating parameters to be obtained for the period during testing as well as results reporting requirements is located in **Appendix A**. A basic process flow diagram has been included in **Appendix B**.

Metal Melting Facility B

Metal melting facility B uses electric induction furnaces for the processing of primarily stainless steel. The facility has two 300 lb capacity electric induction furnaces but typically only uses one at a time. The facility makes small precision parts primarily through an investment casting process.

The furnace is loaded with 17-4 PH stainless steel and the heat begins. Electrical current is applied and the material becomes molten. Typical temperatures are in the 3000°F range during the melting process. Castings are placed in an oven which serves the purpose of removing the wax core from the casting while simultaneously preheating the casting to 1600-1800°F to prevent thermal shock during the pouring process. The molten metal from the furnace is poured in to a ladle before being poured in to the casting mold.

Emissions from the furnace are collected by a hood placed directly above each furnace. The hoods have blast gates installed which can be closed during emissions testing to prevent room air dilution from the adjacent non-operational unit. The facility has agreed to install a hood extension on the furnace in use to ensure that all furnace emissions will be captured during the source test operation. Hood emissions are currently routed through a baghouse. The facility is currently in the process of a control system upgrade to install a HEPA filtration downstream of the baghouse for improved emission control. It is anticipated that the HEPA system will be completed around January of 2019.

The facility does approximately 6 heats a day. Each heat follows a repeating cycle of roughly one hour on during the melt followed by a period of roughly one hour with the furnace off.

A complete list of process operating parameters to be obtained for the period during testing as well as results reporting requirements is located in **Appendix A**. A basic process flow diagram has been included in **Appendix B**.

Metal Melting Facility C

Metal melting facility C uses electric induction furnaces for the processing of white iron, cast iron, ductile iron, and stainless steel. The facility has four electric induction furnaces in sizes as follows:

7,000 lb material capacity with a power rating of 1,500 kW
6,000 lb material capacity with a power rating of 1,500 kW
4,000 lb material capacity with a power rating of 1,000 kW
2,000 lb material capacity with a power rating of 400 kW

90% of facility operations involve melting of the various irons and approximately 10% percent of operations are stainless steel melts. Raw materials for iron melts are frequently re-runs while the stainless melts tend to be new certified material. The stainless steel processed at the facility is CF8M, CF3M, CF8, and CF3. The facility normally runs 2 furnaces at a time, most frequently the 7,000 lb and 6,000 lb furnaces. Stainless steels are only processed in either the 4,000 lb or 2,000 lb furnace. The furnaces are loaded with the applicable material and the heat begins. Electrical current is applied and the material becomes molten. Typical temperatures are in the 2400-2700°F range during iron melting operations and in the 3000°F range during stainless steel melting operations. Material from the furnace is poured in to pre-heated ladles for transport by forklift to the casting area. All casting at the facility is green sand casting. The casting area is in a separate location within the building.

During the melting process emissions are captured by an exhaust system which mounts to the furnace and utilizes a slot design. Suction is provided by the blower which is part of the baghouse and HEPA system. Each furnace has a closable damper installed which allows for isolation from the system when a furnace is not in use. In the exhaust header there is one non closable exhaust hood which pulls room air in to the system. The HEPA filters are installed between the baghouse and the exhaust stack. The exhaust stack outlet in its current configuration undergoes multiple small angular changes prior to exit to the atmosphere. The facility has agreed to modify the outlet such that a straight run of duct will be provided downstream of the exhaust muffler to meet the requirements of at least two duct diameters downstream and one half of a diameter upstream of any flow disturbances.

The facility does approximately 4-5 heats a day. The iron heats performed in the 7,000 lb and 6,000 lb furnaces take 1.5 – 2 hours. The stainless heats performed in the smaller 4,000 lb and 2,000 lb furnaces take up to 3 hours.

A complete list of process operating parameters to be obtained for the period during testing as well as results reporting requirements is located in **Appendix A**. A basic process flow diagram has been included in **Appendix B**.

SAMPLING AND ANALYTICAL PROCEDURES

Two hour test runs at each location within the system will be performed based on the reference methods described below at the locations specified in Table 1. Refer to **Appendix B** for Facility photos depicting equipment, sample locations, and testing logistical notes.

Sampling times may need to be adjusted on the test days to match the facility's batch time for melting and pouring. It is anticipated these times will end up being close to the proposed two hours per run. Material samples will be collected by the facility and/or ~~source test contractor~~SCAQMD at each facility corresponding to each heat which occurs during emissions testing. Samples should include all raw materials, molten material, final product, slag, dross, and baghouse catch. If any such samples are un-available at the time of testing, it should be noted in the final test report. The materials shall be properly identified and delivered to the SCAQMD for materials composition testing. Additionally, if the facility has performed in-house analysis for each or any sample(s) it should be provided to the SCAQMD. Results of material analysis conducted by SCAQMD will be provided to the contractor conducting testing (where applicable). Analysis of Weck Laboratory detection limits are satisfactory for meeting the objectives of the contract and the proposed rulemaking efforts. SCAQMD method reporting limits (MRL) will be adjusted to match Weck Laboratory for consistency.

Table 1: Sampling Details

Facility	Sample Location	Test Method	Number of Runs	Sample Ports	Sample Port Access
A	Inlet Header, For 4.5k lb. Furnace for Stainless Melting	SCAQMD Method 5.1	1	To Be Installed by Facility	Accessed by a removable floor grate from ground level.
		CARB Method 425	3		
		CARB Method 436	3		
A	Inlet Header, Upstream of Baghouse	SCAQMD Method 5.1	1	In Place	Can be reached with a ladder.
		CARB Method 425	3		
		CARB Method 436	3		
A	Exhaust Outlet, Downstream of Baghouse/HEPA Filters	SCAQMD Method 5.1	1	No Ports, Use EPA Method 5D	Accessible by facility owned man lift.
		CARB Method 425	3		
		CARB Method 436	3		

Facility	Sample Location		Number of Runs	Sample Ports	Sample Port Access
B	Inlet Header, Upstream of Baghouse	SCAQMD Method 5.1	1	To Be Installed by Facility	Accessible from ground level.
		CARB Method 425	3		
		CARB Method 436	3		
B	Exhaust Outlet, Downstream of Baghouse/HEPA Filters	SCAQMD Method 5.1	1	To Be Installed by Facility	Will be accessible by a facility provided man lift.
		CARB Method 425	3		
		CARB Method 436	3		

Facility	Sample Location		Number of Runs	Sample Ports	Sample Port Access
C	Inlet Header, Common to 6k, 4k and 2k lb. Furnaces for Stainless Melting	SCAQMD Method 5.1	1	To Be Installed by Facility	Accessible from raised floor.
		CARB Method 425	3		
		CARB Method 436	3		
C	Inlet Header, Common to all Furnaces, Upstream of Baghouse	SCAQMD Method 5.1	1	To Be Installed by Facility	Accessible from facility provided man lift or scaffolding.
		CARB Method 425	3		
		CARB Method 436	3		
C	Exhaust Outlet, Downstream of Baghouse/HEPA Filters	SCAQMD Method 5.1	1	To Be Installed by Facility	Accessible from facility provided man lift.
		CARB Method 425	3		
		CARB Method 436	3		

Gas Flow Rate

The gas velocity will be measured at the inlet duct and outlet duct* in accordance with SCAQMD Methods 1.1 and 2.1. This will be done using an S type Pitot tube, a differential pressure manometer, and a type "K" thermocouple with a digital potentiometer a diagram of this arrangement is presented in Figure 1 below as well as in the appropriate test method. The apparatus will be leak checked both before and after use by introducing a pressure head of at least 80 percent of full scale and blocking the flow at the Pitot tip. An observation of the resulting non diminishing pressure for at least 15 seconds at the manometer should be verified to confirm the absence of leaks in the system.

The velocity measurement location is at least two diameters downstream and one half diameter upstream of any flow disturbances. The sample traverse at each facility will be in accordance with SCAQMD Method 1.1. Traverse sampling is necessary for the determination of stack gas velocity. The number of traverse points must be determined in accordance with SCAQMD Method 1.1 for stacks with diameters greater than 12 inches.

The inlet and outlet* volumetric flow rate is calculated from the duct cross sectional area and average gas velocity. The absence of cyclonic flow conditions must be verified. The flow rate must be corrected to standard conditions using the measured duct temperatures and velocity pressures along with the barometric pressure measured with a calibrated aneroid barometer. The exhaust flow rate must also corrected to dry conditions using the moisture content as determined by SCAQMD Method 4.1 weight gain from the SCAQMD Method 5.1, CARB Method 425, and CARB Method 436 sample trains described in the following sections.

*Facility A does not have an exhaust stack, the HEPA filters are mounted in an enclosure directly on top of the baghouse. Exhaust exits from two rectangular openings in a horizontal direction on either side of the HEPA enclosure (see Figure 2 below for details). Due to the anticipated low velocity pressure exiting the baghouse/HEPA system EPA Method 5D must be used which allows for the velocity and exhaust flow to be determined at the inlet to the baghouse and then applied over the entire area of the exhaust. Isokinetic sampling rates and sampling probe nozzle size will need to be based on these calculations. If it turns out that the velocities can be measured at this location by pitot tube, then isokinetic rate can be set by the measured velocity heads.

Figure 1: Gas Velocity Measurement Apparatus

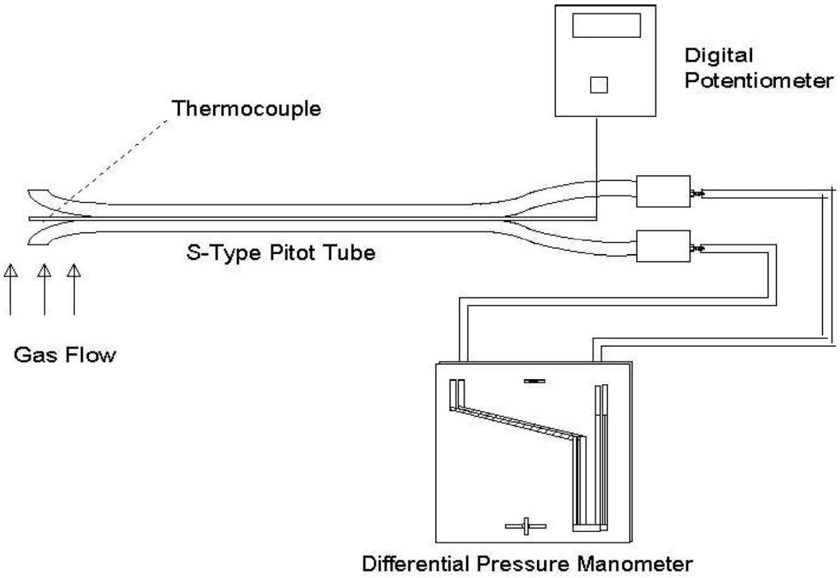
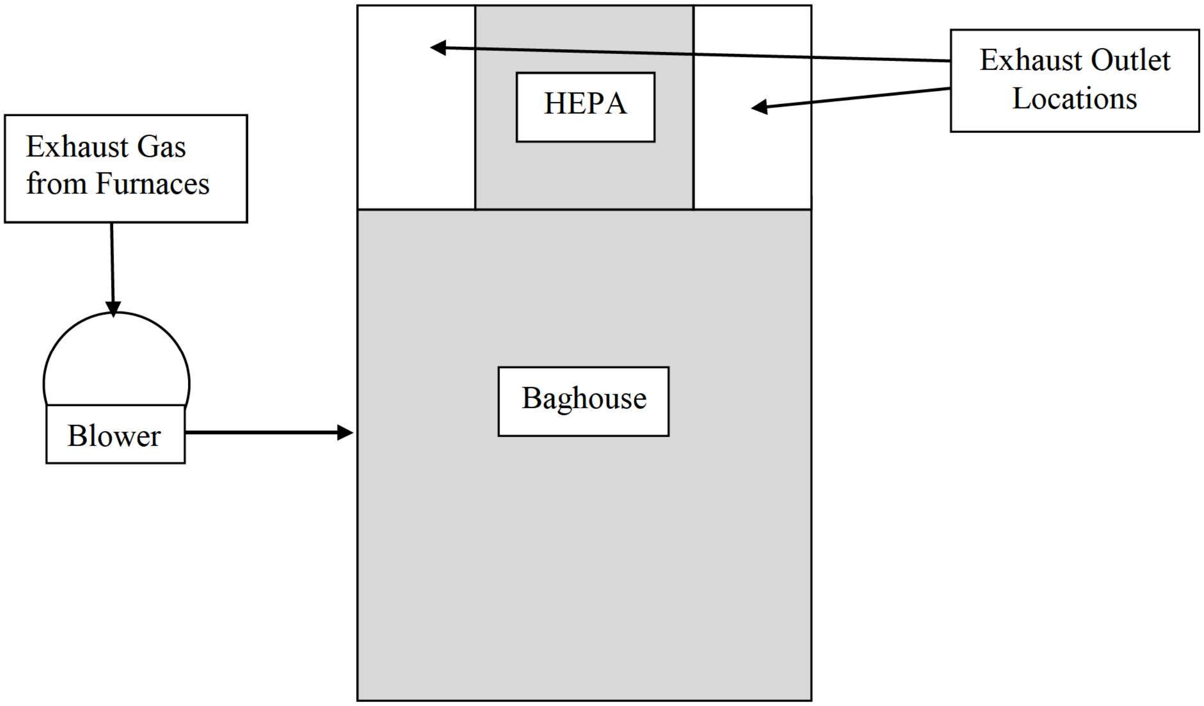


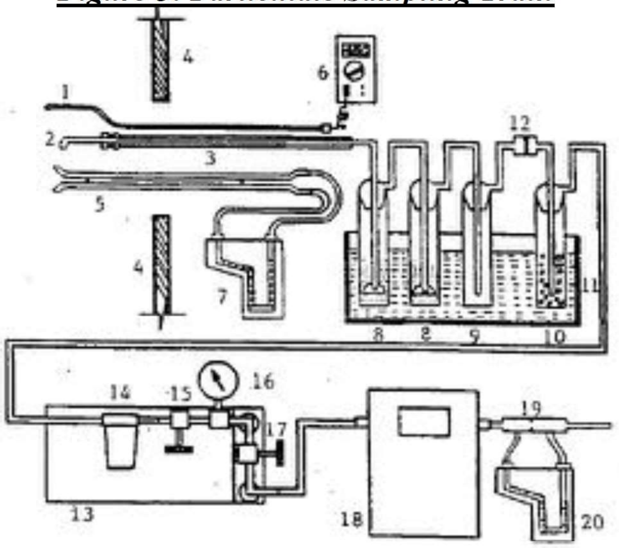
Figure 2: Facility A Exhaust Diagram (EPA Method 5D Required)



Particulate Matter Sampling

Samples are collected using SCAQMD Method 5.1. Particulate matter is withdrawn isokinetically from the source through a sample train by a metering system. Particulate matter is collected in impingers containing deionized water and on a backup filter. The impingers are contained in an ice bath to maintain a sampled gas Temperature of approximately 60°F. The filter is not heated. A diagram of the test apparatus is pictured in Figure 3 below. Total particulate matter mass is defined as the sum of the mass collected in the impingers and the probe, and on the filter after removal of combined water, plus extractable organic matter and sulfuric acid. Samples are analyzed for water gain, PM, acids, sulfates, and organics. For the purposes of this testing, the analysis should include the organic and acid/sulfate traditional analysis. ~~Following analysis, samples shall be retained and made available for 3rd party inspection.~~This is requested with the understanding that portions of the analytical method are destructive and do not allow for samples to be split. A photograph of residue "inspection" of each sample should be taken prior to analysis. The SCAQMD will reserve the right to physically inspect the samples as necessary, while giving the Contractor ample notice. Although not required by ~~the~~ SCAQMD Method 5.1, optional field blank runs may be performed and analyzed.

Figure 3: Particulate Sampling Train



1. Temperature Sensor
2. Nozzle
3. Glass Lined Stainless Steel Probe
4. S-type Pitot Tube
5. Stack Wall
6. Temperature Sensor Meter
7. Pitot Tube Inclined Manometer
8. Impinger with 100 ml H_2O
9. Empty Bubbler
10. Bubbler with Silica Gel
11. Ice Bath
12. Filter
13. Sealed Pump (Leak Free)
14. Filter for Pump
15. Metering Valve
16. Vacuum Gauge
17. By-pass Valve
18. Temperature Compensated Dry Gas Meter
19. Orifice
20. Orifice Inclined Manometer

Hexavalent Chrome Sampling

CARB Method 425 applies to the determination of hexavalent chromium (Cr^{+6}) and total chromium (Cr) emissions from stationary sources. Emissions are collected from the source in an a sampling train consisting of a glass probe and nozzle connected by non-reactive tubing to the first of two Greenburg-Smith impingers each containing 100 ml of 0.1N sodium bicarbonate ($NaHCO_3$), an empty bubbler, a Teflon filter, and a bubbler containing tared silica gel desiccant (see Figure 4).

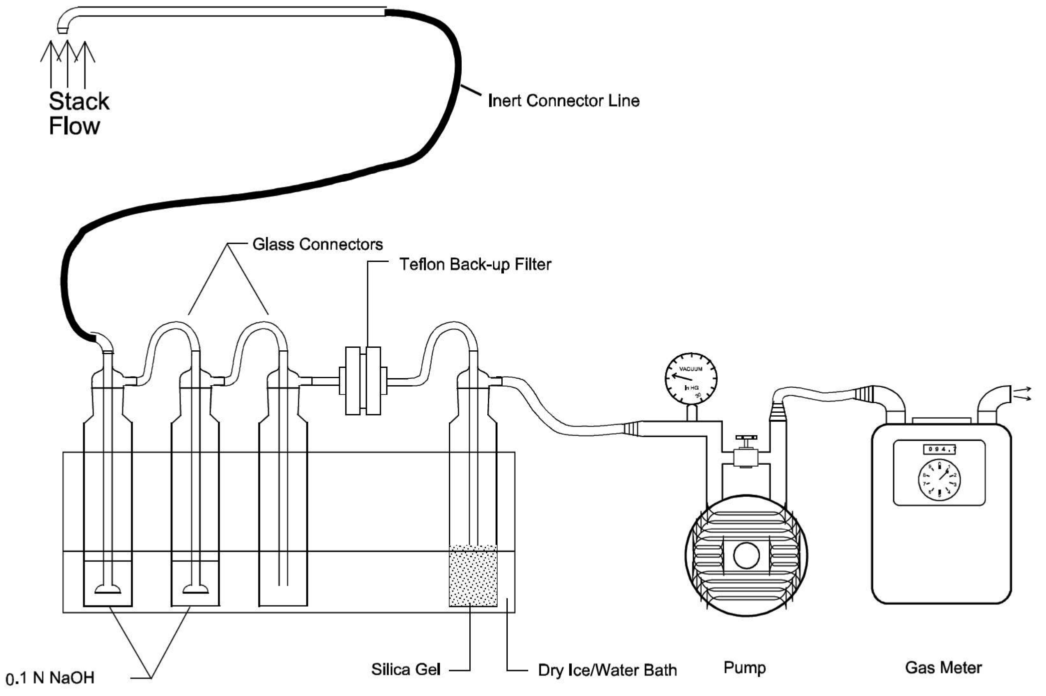
The same batch of 0.1N $NaHCO_3$ solution shall be used for field blanks, impinger sampling, sample recovery, preparation, extraction, and analysis. One batch of solution should be prepared for each facility. Substituting $NaHCO_3$ for NaOH is an approved Alternative Test Method as outlined in Sections 10 and 21 of CARB Method 425.

The impinger assembly must be connected to a vacuum pump and a calibrated dry gas meter. The sampling apparatus shall be checked for leaks both before and after sampling by blocking the flow at the probe tip. An observation of the resulting decrease in flow at the meter should be less than 0.02 cfm or four percent of the sampling rate indicated an acceptable leak rate. The impinger train must be contained within an ice bath to condense water and other condensable matter present in the sample stream.

The impinger train will be returned to the laboratory for recovery. The pH of the recovered solution must be verified as being greater than 8.0 as specified in CARB Method 425. Hexavalent chromium collected in the nozzle, probe, and impingers will be determined using ion chromatography with post column reactor (IC/PCR). The probe and line rinse shall be separated and itemized by weight separately from the rest of the analysis. For each facility a minimum of one field blank run shall be analyzed. Each blank sample train shall be brought onto the test site, assembled, leak checked, and analyzed as above for quality control purposes. No sampling should occur on the blank train.

Following testing, CARB Method 425 samples must be recovered within 24 hours. Samples should be split with remaining aliquots after primary analysis to be held for possible 3^{rd} party analysis. Holding time for Method 425 following recovery is 14 days if stored at < 4° C.

Figure 4: CARB Method 425 Sample Train



Multiple Metals Sampling

CARB Method 436 applies to the determination of aluminum (Al), antimony (Sb), arsenic (As), barium (Ba), beryllium (Be), cadmium (Cd), chromium (Cr), cobalt (Co), copper (Cu), lead (Pb), manganese (Mn), mercury (Hg), nickel (Ni), phosphorus (P), selenium (Se), silver (Ag), thallium (Tl), vanadium (Vn), and zinc (Zn) stack emissions from stationary sources. For this source test the metals of specific interest are Cr, As, Cd, and Ni. Sampling is conducted using a modified CARB Method 5 sample train. The stack sample is withdrawn isokinetically from the source, with particulate emissions collected in the heated probe and on a heated filter maintained in the temperature range of 248 ± 25°F and gaseous emissions collected in a series of chilled impingers containing an aqueous solution of dilute nitric acid combined with dilute hydrogen peroxide in two impingers (analyzed for metals). If necessary for sampling the vertical port on horizontal ducts, the addition of flexible Teflon tubing between the heated probe and heated filter, or sampling train sections may be allowed; depending on sampling location.

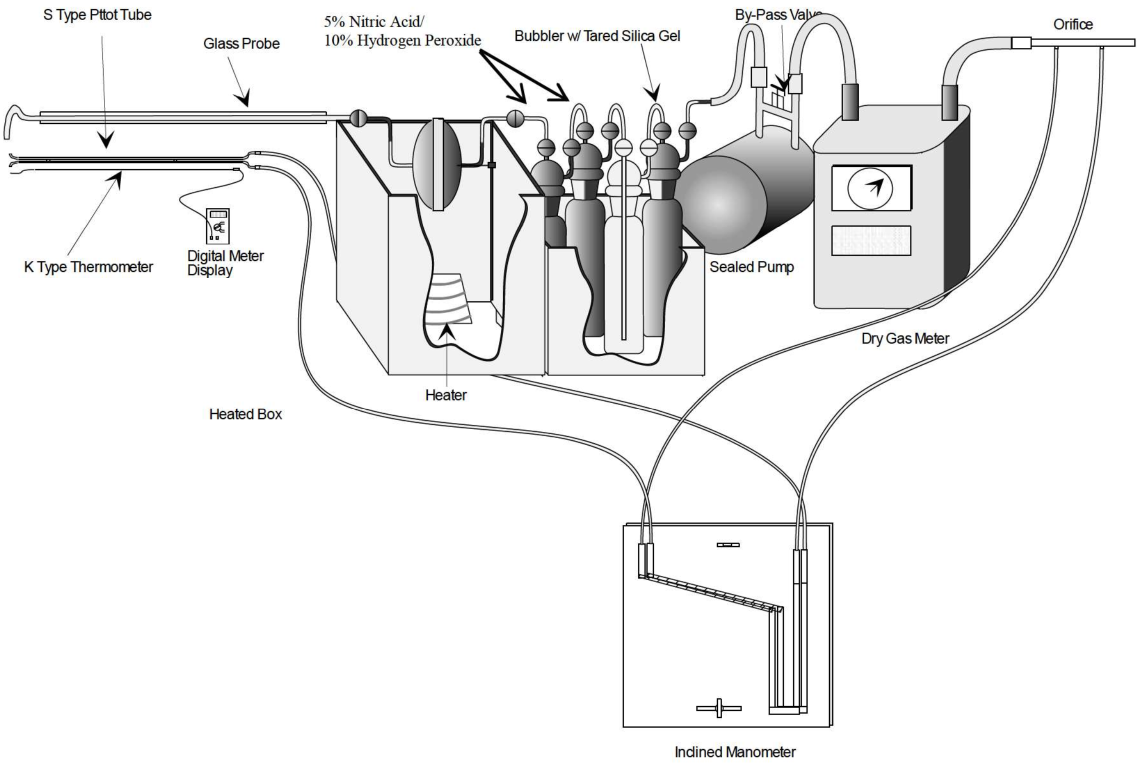
The same batch of 5% HNO_3/10% H_2O_2 solution shall be used for field blanks, impinger sampling, sample recovery, preparation, extraction, and analysis. One batch of solution should be prepared for each facility.

For each facility a minimum of one field blank run shall be analyzed. Each blank sample train shall be brought onto the test site, assembled, leak checked, and analyzed for quality control purposes. No sampling should occur on the blank train.

Sampling train (see Figure 5) components are recovered into separate front and back half fractions and acid digested using conventional Parr^{R} Bomb or microwave digestion techniques to dissolve inorganics and to remove organic constituents that may create analytical interferences.

Following testing Method 436 samples must be recovered as soon as practical. Samples should be split with remaining aliquots after primary analysis to be held for possible 3rd party analysis. Holding time for Method 436 following recovery is 60 days.

Figure 5: CARB Method 436 Sample Train



After digestion, portions of the probe, filter and nitric acid/hydrogen peroxide digestion solutions are combined into a single front half composite and analyzed for Cr, As, Cd, and Ni. Refer to the test method document for additional details.

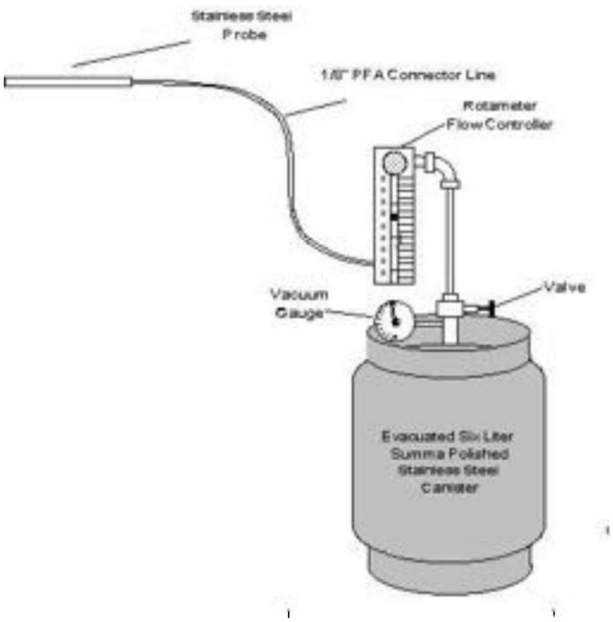
Capture Efficiency

During source testing capture efficiency testing will be performed by SCAQMD personnel (not required for contractor to perform this testing) to determine the efficiency of the collection system. A hot-wire anemometer, vane anemometer, or other device capable of directly measuring air velocity, will quantitatively measure the air velocity at the slots or hood, as applicable, of the furnace emissions collection system. Additionally, a qualitative test shall be performed and photo or video recorded using smoke tubes or smoke sticks. Documentation of these measurements will be provided to the test contractor following measurement.

Integrated Gas Sampling

An integrated gas sample will be taken at each sample location and analyzed for CO, CO_2, and O_2. The sampling procedure shall be according to SCAQMD Method 10.1. The sampling apparatus should consist of a stainless steel probe, a Teflon line, and a 6-liter summa canister (see Figure 6 below for details).

Figure 5: Integrated Gas Sample



Samples will be analyzed for carbon monoxide, carbon dioxide, and oxygen. The gasses should be separated by gas chromatography. Determination shall be by a gas chromatograph with a nickel catalyzed methanizer and flame ionization detector (GC/Ni-FID) for carbon dioxide. Carbon monoxide must be combusted to carbon dioxide and analyzed by SCAQMD Method 25.1. Oxygen will be analyzed by thermal conductivity.

QUALITY ASSURANCE

All applicable pieces of source test and process equipment used directly or indirectly for measurement of source test emission data must be calibrated, and the calibrations included in the final report (this includes gas meters, Pitot tubes, pressure gages, nozzles, temperature devices, calibration gases, fuel usage meters, totalizers, etc.).

All raw data field data sheets, as well as recorder strip charts, must accompany the test report. Additionally, all gas cylinders used to calibrate the analyzers must be certified, and a copy of the gas certificates shall be submitted with the report.

Where laboratory instrument analysis is required, instrument raw stripcharts, calibrations and standards, and limit of detection must be included in the source test report. This also includes equipment transfer and "chain-of-custody" form clearly describing all equipment and laboratory ID numbers, dates and times, required analysis, and the signature/initials of persons involved in transfers.

The terms “non-detect” or “non-detectable” are no longer used for emission reporting purposes. Instead, non-detectable results are reported with respect to the limit of detection of the analytical instrument or method (e.g. report “<10 ppm”, if detection limit is 10 parts per million). Non-detectable emission results must have supporting documentation to show that acceptable sample volume was collected pursuant to rule or permit limits and analytical method limit of detection.

Equipment used by the source testing contractors must adhere to the Chapter III calibration and maintenance requirements of the District Source Test Manual.

All source testing firms used in monitoring emissions or analyzing samples shall be District LAP contractors in good standing, and must perform testing in accordance with District procedures, as clarified in this evaluation.

FINAL TEST REPORT

The final Source Test Report must include the following information:

1) Signed “Statement of Non-Conflict as an Independent Laboratory” (District Rule 304(k)) and CARB Lab Approval or District Lab Approval Program (LAP) document (if applicable).

2) A brief opening statement identifying the Facility I.D., the equipment A/N, P/O, or Device I.D. and the reason(s) for testing (applicable rules permit conditions, etc.). Include a copy of the Permit-to-Construct, Permit-to-Operate, or Facility Permit. Also identify the test dates, the personnel on hand for the test, names, titles and phone numbers of responsible test firm and facility personnel.

3) A summary of the Source Test results, and properly formatted source test data. Results shall be reported

4) A brief process description. Indicate equipment operation during testing; as well as any other information which may influence the final report.

5) A “self-critique” of anything that transpired during the test which you feel is useful in the interpretation of the test results.

6) A simple schematic diagram of the process, showing the sampling location, with respect to the upstream and downstream flow disturbances. Also include a cross- sectional

diagram of the stack or duct at the sampling location, depicting the sampling points with respect to compass direction.

7) The sampling and analytical procedures. Be specific about all aspects of sampling and analysis. Include diagrams of test equipment and methods.

8) Complete raw field data, including production data indicative of the testing interval, lab analyses, and the test results (show all calculations).

9) Current calibration data regarding all sampling and measuring equipment utilized during testing. This also includes all laboratory calibrations. (see District Source Testing Manual, Chapter III or "Quality Assurance Handbook For Air Pollution Measurement Systems", Vol. III, U.S. EPA-600/4-77-0276).

10) All calculations concerning intermediate process, emission, and/or flow information must be shown and included in the final report. This also applies to calculations concerning laboratory analyses.

APPENDICIES

APPENDIX A

Process Operating Parameters and
Results Reporting Requirements

The following process operating parameters shall be recorded during testing at each location in addition to those specifically required by the applicable source test method:

1) Start and End time of each sample run. Note if the sample run must be stopped and restarted due to insufficient sample volume during a single heat.
2) Ambient Temperature shall be monitored and recorded before and after each test (°F).
3) Ambient Relative Humidity shall be monitored and recorded before and after each test (%).
4) Ambient Barometric Pressure shall be monitored and recorded before and after each test (in. Hg).
5) Total sampling time for each run (min.).
6) Specific material processed during each test run, this should be supported by positive material identification or certification documents.
7) Material condition (new/re-run/recycled/etc.).
8) Number of heats performed during sampling.
9) Total material charged during sampling (lbs.).
10) Average baghouse pressure differential during sampling (in. H_2O).
11) Average HEPA filter pressure differential during sampling (in. H_2O).
12) Stack temperature at sample location shall be monitored and recorded every 15 minutes during sampling (°F).
13) Description of all sources venting to the APCS during testing.
14) Velocity measurements at capture hood or furnace control system slots (fpm).

Test results summary shall at a minimum document the following:

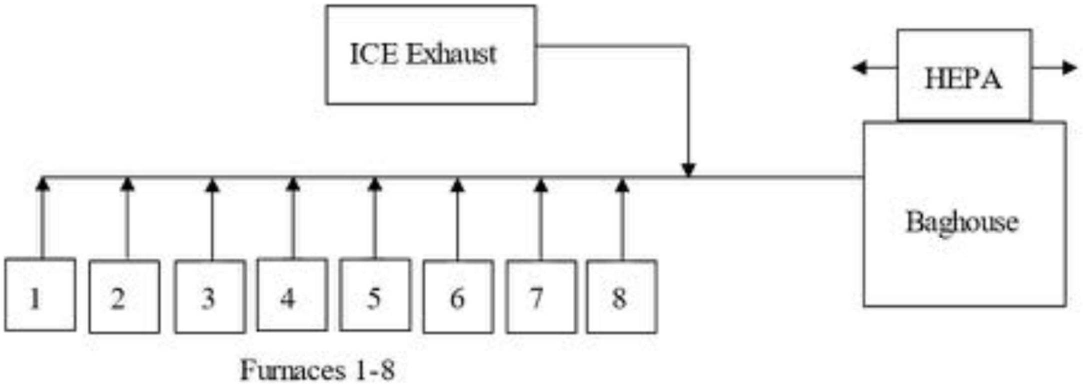
1. Summary of Process and Test Conditions
2. Summary of Results for Particulate Emissions
    a) Sample Time
    b) Exhaust Flow Rate (acfm)
    c) Exhaust Flow Rate (dscfm)
    d) Emissions (grains/dscf)
    e) Mass Emissions (lbs/hr)
3. Summary of Results for Chromium and Hexavalent Chromium
    a) Sample Time
    b) Exhaust Flow Rate (acfm)
    c) Exhaust Flow Rate (dscfm)
    d) Emissions (µg/dscm)
    e) Emissions (µg/dscf)
    f) Mass Emissions (lbs/hr)
4. Summary of Results for Multiple Metals Testing
    a) Sample Time
    b) Exhaust Flow Rate (acfm)

c) Exhaust Flow Rate (dscfm)
d) Emissions (µg/dscm)
e) Emissions (µg/dscf)
f) Mass Emissions (lbs/hr)

APPENDIX B

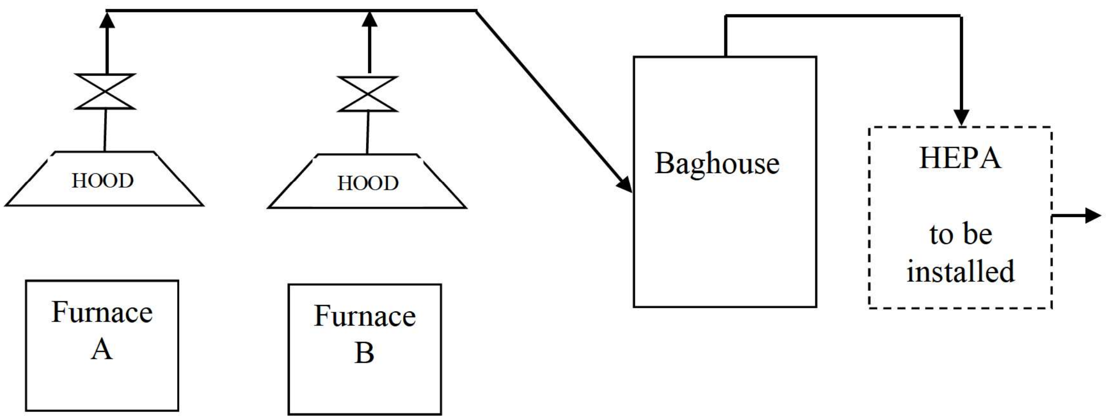
Facility Process Flow Diagrams & Photos
(Confidential Do Not Distribute)

Figure 6: Facility A - Basic Process Flow Diagram



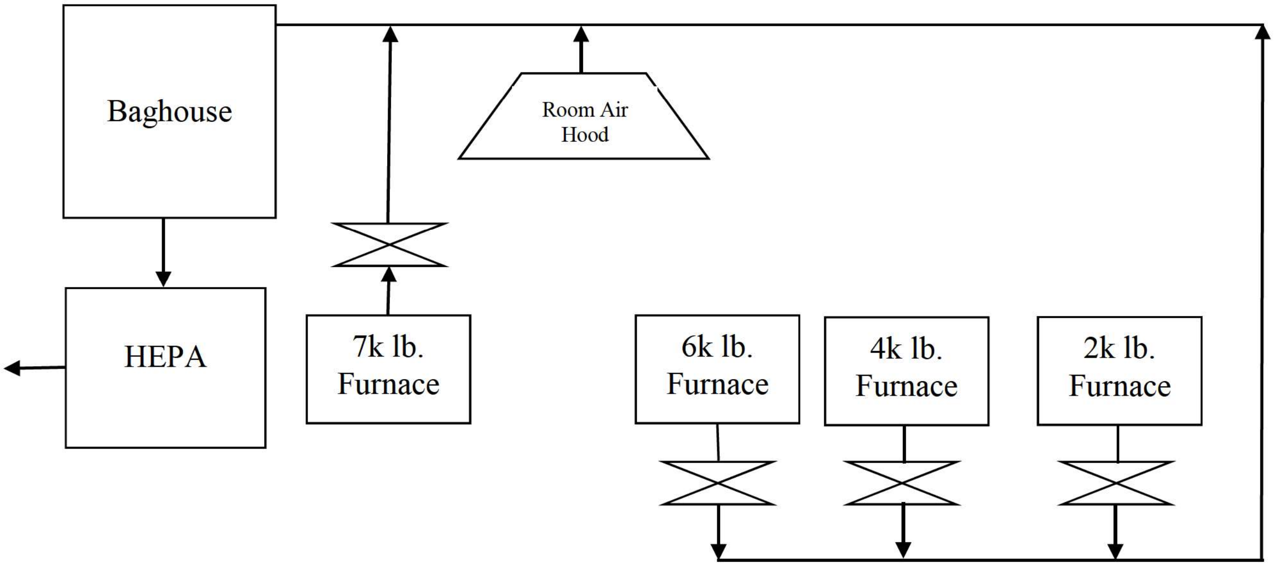
[redacted]

Figure 8: Facility B – Basic Process Flow Diagram



[redacted]

Figure 8: Facility C – Basic Process Flow Diagram



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APPENDIX J

SCAQMD CHECKLIST FOR SOURCE TEST REPORTS, FORM STR.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

ENGINEERING FORM STR
CHECK LIST FOR SOURCE TEST REPORTS

Please check off all the following items to verify that the information is provided in the source test report, and then send the checklist along with the source test report.

[X] Brief description of the equipment tested.

[X] Brief process description, including maximum and normal operating temperatures, pressures, through-put, etc.

[X] Operating conditions under which test was performed.

[X] Process schematic diagram showing the ports and sampling locations, including the dimensions of the ducts/stacks at the sampling locations, along with upstream and downstream locations, and distances of flow disturbances, (e.g. elbows, tees, fans, dampers) from the sampling locations (upstream and downstream).

[X] Field and laboratory data forms, strip charts and analyses.

[X] Brief description of sampling and analytical methods for each gaseous and particulate constituent measured.

[X] Calculations for volumetric flow rates and emission rates.

[X] Description of calibration and quality assurance procedures.

[X] Determination that the testing laboratory qualifies as an "independent testing laboratory" under Rule 304 (no conflict of interest).