EMISSIONS TEST REPORT

TUCSON IRON AND METAL

COMPLIANCE AND RELATIVE ACCURACY TESTING ON THE CONTRABAND INCINERATION SYSTEM

Air Quality Permit: 127

Prepared for:

Tucson Iron and Metal
4484 East Tennessee Street
Tucson, AZ 85714

Prepared by:

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Project Number: TIM220419
Test Dates: September 9-10, 2020
Report Issued: October 30, 2020

STAC STACK TESTING ACCREDITATION COUNCIL

ACCREDITED TO ASTM D7036 ONLY CERT #4675.01

BISON ENGINEERING, INC.

EXECUTIVE SUMMARY

Tucson Iron and Metal contracted Bison Engineering, Inc. to perform emissions testing at their facility in Tucson, Arizona. Testing was performed on the Contraband Incinerator exhaust stack to demonstrate compliance with Pima County Department of Environmental Quality Air Quality Permit 127 and Title 40 Code of Federal Regulations Part 60, Subpart EEEE. This report presents emissions test data, describes the methods employed and details the quality assurance measures taken to ensure accurate data. Table 1 summarizes the test results.

Table 1: Results Summary

Tucson Iron and Metal Contraband Incinerator Results Summary September 9 and 10, 2020				
Parameter	**Units**	**Test Result**	**Permit Limit**	**PASS / FAIL**
Cd	µg/dscm	0.3	18	PASS
CO	ppmvd	14	40	PASS
Dioxins/Furans	ng/dscm	132	33	FAIL
HCl	ppmvd	9	15	PASS
Pb	µg/dscm	10	226	PASS
Hg	µg/dscm	3	74	PASS
Opacity	%	0	10	PASS
NO_x	ppmvd	91	103	PASS
PM	gr/dscf	0.005	0.013	PASS
SO_2	ppmvd	0.07	3.1	PASS
O_2 RA	% difference	0.2	<1.0	PASS
CO RA	ppmvd	0.5	<5	PASS
CO RA	ppmvd @ 7% O_2	4	<5	PASS
All emission limits are corrected to 7% O_2, dry basis at standard conditions, with the exception of opacity, which is based on observation.				

Cd- cadmium
CO- carbon monoxide
HCl- hydrogen chloride
Pb- lead
Hg- mercury
NO_x- oxides of nitrogen
PM- filterable particulate matter
SO_2- sulfur dioxide
RA- relative accuracy
µg/dscm- micrograms per dry standard cubic meter
ppmvd- parts per million by volume, dry
ng/dscm- nanograms per dry standard cubic meter
%- percent
gr/dscf- grains per dry standard cubic foot
O_2- oxygen

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CERTIFICATION FROM RESPONSIBLE OFFICIAL

I have reviewed the information being submitted in its entirety. Based on information and belief formed after reasonable inquiry, I certify that the statements and information contained in this submittal are true, accurate, and complete.

Signature

30-Oct-2020
Date

Gary Kippur
Name (printed)

Vice President
Title

The Kippur Corporation
Company

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REVIEW AND CERTIFICATION

All work, calculations, other activities, and tasks performed and documented in this report were carried out under my direction and supervision. This test project conforms to the requirements of Bison Engineering, Inc.'s quality manual and American Society for Testing and Materials (ASTM) D7036-04.

Project Manager: Robert Rogge, QSTI

Title: Staff Engineer

Signature: [signature]

Date: 10-26-2020

I have reviewed all testing details, calculations, results, conclusions and other appropriate written material contained herein, and hereby certify that the presented material is authentic and accurate.

Reviewer: Lynn Dunnington

Title: Environmental Analyst

Signature: Lynn Dunington

Date: 10/26/20

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1.0 INTRODUCTION

1.1 Project Summary and Objectives

Tucson Iron & Metal (TIM) retained Bison Engineering, Inc. (Bison) to perform emissions testing on the Contraband Incinerator exhaust stack at their facility in Tucson, Arizona. A pre-test protocol was submitted to Pima County Department of Environmental Quality (PDEQ) dated June 19, 2020. Testing was performed pursuant to PDEQ Air Quality Permit 127 and Title 40 Code of Federal Regulations (CFR) Part 60, Subpart EEEE. Bison employed U.S. Environmental Protection Agency (EPA) test methods as described in Title 40 CFR Part 60, Appendix A. The pollutants measured include particulate matter (PM), hydrogen chloride (HCl), lead (Pb), cadmium (Cd), mercury (Hg), sulfur dioxide (SO_2), oxides of nitrogen (NO_x), carbon monoxide (CO), total mass basis dioxins and furans, and visible emissions. Moisture, stack gas flow, oxygen (O_2) and carbon dioxide (CO_2) were also measured. A relative accuracy test audit (RATA) was performed on the continuous emissions monitoring system (CEMS) for O_2 and CO. Table 2 summarizes the test methods used during the test campaign.

Table 2: Project Matrix

Tucson Iron and Metal Project Matrix September 9 and 10, 2020			
Source	**EPA Method**	**Parameter**	**Test Plan and Comments**
Contraband Incinerator	1	Measurement Location	Completed once prior to testing
	2	Flow	1-hour test runs concurrent with isokinetic sampling
	3A	O_2/CO_2	Three 1-hour test runs concurrent with isokinetic testing, twelve 21-minute test runs concurrent with gaseous testing.
	4	Moisture	1-hour test runs concurrent with isokinetic sampling
	5	PM	Concurrent with M29
	6C	SO_2	Three 1-hour test runs. Method 9 was conducted during Methods 5 and 29.
	7E	NO_x	
	9	Opacity	
	10	CO	Twelve 21-minute test runs
	23	Dioxins/Furans	Three 1-hour test runs per method, plus one 1-hour conditioning run for M26A only
	26A	HCl	
	29	Cd, Pb, Hg	
	205	Calibration Gases	Used to create a known and verified set of calibration gases.
	PS 3	O_2 RA	Calculation using reference method test results and plant CEMS data
	PS 4A	CO RA	

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1.2 Project Contacts

Facility:	**Tucson Iron and Metal**
Address:	4484 East Tennessee Street
	Tucson, AZ 85714
Contact:	Gary Kippur
Phone:	Office (520) 884-1554
Email:	gary@tucsoniron.net

Consultant:	**Bison Engineering, Inc.**
Address:	4251 S. Station Master Dr.
	Tucson, AZ 85714
Contact:	Robert Rogge
Phone:	Office (520) 749-2176
Email:	rrogge@bison-eng.com

State Authority:	**Pima County Department of Environmental Quality**
Address:	33 N. Stone Ave, Suite 700
	Tucson, AZ 85701
Contact:	Jacqueline Ronstadt
Phone:	Office (520) 724-7400
Email:	jacqueline.ronstadt@pima.gov

Contract Laboratory: Chester LabNet (HCl, Metals with Hg)

Address:	12242 SW Garden Place
	Tigard, OR 97223-8246
Contact:	Paul Duda
Phone:	(503) 624-2183
Website:	www.chesterlab.net

Contract Laboratory: ALS Environmental- Houston HRMS

Address:	10450 Stancliff Rd, Suite 210
	Houston, TX
Contact:	Corey Grandits
Phone:	(281) 530-5656

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1.3 Testing Personnel

The Bison on-site testing team was led by Robert Rogge, Qualified Source Testing Individual (QSTI), Staff Engineer. Robert was assisted during field testing by Angel Medina, Qualified Individual (QI), Environmental Scientist, L. Connor Everly, QI, Environmental Scientist, and Jennifer Kessler, Environmental Scientist. Robert served as project manager. Jennifer processed the test data and authored this report. Lynn Dunnington, Environmental Analyst, performed a final quality assurance review of the data and test report.

Gary Kippur, owner, was the primary contact for TIM. Gary was present on-site for the duration of the testing. TIM staff members were responsible for monitoring process parameters during testing.

PDEQ representatives were present on-site for a portion of the test campaign.

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2.0 SOURCE DESCRIPTION

2.1 Facility Description

TIM owns and operates a metal recycling facility that serves the greater Tucson area. In addition to recycling, the facility operates a contraband incineration unit that destroys contraband collected by law enforcement.

2.2 Emission Source Description

The contraband incinerator burns less than 35 tons per day and is classified as an Other Solid Waste Incinerator (OSWI). Materials destroyed by the incinerator are limited to marijuana, cocaine, methamphetamine, pharmaceuticals, wood, paper, burlap or fabric, and associated wrapping materials.

Incinerator process off-gases are controlled by an afterburner and the use of good combustion practices. A trona or sodium carbonate sorbent injection system provides additional control of SO_2 and HCl emissions. A baghouse is installed on the exhaust to control emissions of PM and opacity.

The contraband fed into the OSWI unit is primarily combustible carbonaceous vegetative material. Upon thermal oxidation, the materials are broken down into CO_2 and water along with minor amounts of other products of combustion (POC) such as NO_x, PM, volatile organic compounds (VOC), HCl and SO_2. Narcotics and plastic wrapping materials may contain mineral and/or chlorinated compounds, which contribute to ash, HCl and SO_2 formation. Occasionally upon incineration, sulfur compounds such as grease or oil coatings on the packaging are emitted as PM and SO_2. TIM utilizes sorbent injection following the afterburner for the control of SO_2 and HCl. The contraband feed rate of no more than 2,000 pounds per hour (lb/hr) of marijuana and 30 lb/hr of narcotics restricts the available amount of chemical constituents that result in POC from the combustion process. The afterburner that follows the primary combustion chamber maintains a minimum temperature of 1,400 degrees Fahrenheit (°F) whenever introducing contraband. This temperature is sufficient to ensure complete combustion of any partial combustion products remaining in the effluent from the primary combustion chamber.

The induction blower configuration of the baghouse system (with fresh air makeup vents built into the incinerator exhaust ductwork) is balanced to allow the exhaust ductwork system to operate under negative pressure. Fresh air drawn into the exhaust duct allows the cooling of the hot incinerator exhaust before its introduction into the baghouse, protecting the filter fabric from thermal degradation. Pressure drop across the filter media is monitored for proper particulate emissions control efficiency in the baghouse.

TIM's OSWI typically operates two to three days per week on a schedule coordinated with Customs and Border Protection or other law enforcement agency under contract with the company.

The Contraband Incinerator exhaust stack is approximately 35 feet tall and 44 inches inner diameter. Two test ports were accessed via the top of the baghouse. While on-site, Bison verified the exhaust stack meets EPA Method 1 specifications; detailed Method 1 information is included in the appendices to this report.

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3.0 EMISSION TEST RESULTS

3.1 Summary of Results

The tables below summarize the Contraband Incinerator test results. All results are corrected to 7% O_2. Additional supporting material, including raw data, plant data, example calculations and calibration records, can be found in the appendices to this report. Methods 3A, 23 and 29 were performed on September 9, 2020. Methods 3A, 26A, 6C, 7E, and 10 were completed on September 10, 2020. The RATA was also conducted on September 10 using data obtained from Methods 3A and 10. A conditioning run for Method 26A was performed September 10 from 7:50 to 8:50, collecting 47.2 dscf of sample, or approximately 0.7 cubic feet per minute, as required by PDEQ Air Quality Permit 127.

Table 3: Method 23 Results

Tucson Iron and Metal Contraband Incinerator Method 23 Test Results September 9, 2020						
Parameter	**Units**	**Run 1**	**Run 2**	**Run 3**	**Average**	**Limit**
Run Start Time		11:10	13:10	15:18		
Run End Time		12:15	14:16	16:26		
Run Duration	minutes	60	60	60	60	
Dioxins/Furans	ng/dscm	83	196	116	132	33

Test results are corrected to 7% O_2.

Table 4: Method 26A Results

Tucson Iron and Metal Contraband Incinerator Method 26A Test Results September 10, 2020						
Parameter	**Units**	**Run 1**	**Run 2**	**Run 3**	**Average**	**Limit**
Run Start Time		9:10	11:15	13:04		
Run End Time		10:14	12:18	14:14		
Run Duration	minutes	60	60	60	60	
HCl	ppmvd	3	8	15	9	15

Test results are corrected to 7% O_2.

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Table 5: Method 5 and Method 29 Results

Tucson Iron and Metal Contraband Incinerator Method 5 and 29 Test Results September 9, 2020						
Parameter	**Units**	**Run 1**	**Run 2**	**Run 3**	**Average**	**Limit**
Run Start Time		11:10	13:11	15:19		
Run End Time		12:15	14:17	16:27		
Run Duration	minutes	60	60	60	60	
PM	gr/dscf	0.004	0.006	0.005	0.005	0.013
Pb	µg/dscm	9	9	11	10	226
Cd	µg/dscm	0.2	0.2	0.5	0.3	18
Hg	µg/dscm	2	4	3	3	74

Test results are corrected to 7% O_2.

Table 6: Method 9 Results

Tucson Iron and Metal Contraband Incinerator Method 9 Observation Results September 9, 2020						
Parameter	**Units**	**Run 1**	**Run 2**	**Run 3**	**Average**	**Limit**
Run Start Time		11:24	13:10	15:18		
Run End Time		12:24	14:10	16:18		
Run Duration	minutes	60	60	60	60	
Opacity	% attenuation	0	0	0	0	<10

Table 7: Gaseous Testing Results

Tucson Iron and Metal Contraband Incinerator Method 3A, 6C, 7E, and 10 Test Results September 10, 2020						
Parameter	**Units**	**Run 1**	**Run 2**	**Run 3**	**Average**	**Limit**
Run Start Time		9:10	11:15	13:04		
Run End Time		10:12	12:17	14:06		
Run Duration	minutes	63	63	63	63	
CO	ppmvd	3.14	1.36	1.62	2.04	
	ppmvd @ 7% O_2	22	9	12	14	40
NO_x	ppmvd	11.03	14.37	14.31	13.24	
	ppmvd @ 7% O_2	76	97	102	91	103
SO_2	ppmvd	0.03	0.0	0.0	0.01	
	ppmvd @ 7% O_2	0.20	0.00	0.00	0.07	3.1

Table 8: O_2 RATA Results

Tucson Iron and Metal Contraband Incinerator O_2 RATA Results Performance Specification 3 September 10, 2020				
Test Run	**Bison RM % vd**	**CEMS % vd**	**Difference (RM - CEMS)**	**Used in RA calculations (1=used, 0=omitted)**
1	18.8	18.4	0.4	1
2	18.8	18.4	0.4	1
3	19.1	18.6	0.5	0
4	18.7	18.3	0.4	0
5	18.8	18.3	0.5	0
6	18.9	18.5	0.4	1
7	18.8	18.7	0.1	1
8	19.1	19.1	0.0	1
9	18.9	18.9	0.0	1
10	19.1	19.1	0.0	1
11	19.2	19.1	0.1	1
12	18.7	18.7	0.0	1
Avg./Totals	**18.9**	**18.8**	**0.2**	**9**
Results with Respect to RA Limit (≤1.0% O_2) *			**0.2 % O_2**	**PASS**
*CEMS RA must be ≤1.0% of the absolute difference between the RM's test data and the CEMS data.				

Table 9: CO ppmvd RATA Results

Tucson Iron and Metal Contraband Incinerator CO ppmvd RATA Results Performance Specification 4A September 10, 2020				
Test Run	**Bison RM ppmvd**	**CEMS ppmvd**	**Difference (RM - CEMS)**	**Used in RA calculations (1=used, 0=omitted)**
1	2.4	1.9	0.5	0
2	2.8	2.2	0.6	0
3	4.2	3.7	0.5	0
4	1.5	0.9	0.6	1
5	1.2	0.7	0.5	1
6	1.4	0.9	0.5	1
7	1.8	1.3	0.5	1
8	1.6	1.1	0.5	1
9	1.5	1.0	0.5	1
10	1.4	0.9	0.5	1
11	1.9	1.3	0.6	1
12	1.4	0.9	0.5	1
Avg./Totals	**1.5**	**1.0**	**0.5**	**9**
Standard Deviation			0.030	
Confidence Coefficient			0.023	
Results with Respect to RA Limit (≤5 ppmvd)*			**0.5 ppmvd**	**PASS**
* The RA of the CEMS must be within 5 ppmv when the RA is calculated as the absolute average difference between the RM and CEMS plus the 2.5% confidence coefficient.				

Table 10: CO @ 7% O_2 RATA Results

Tucson Iron and Metal Contraband Incinerator CO ppmvd @ 7% O_2 RATA Results Performance Specification 4A September 10, 2020				
Test Run	**Bison RM ppmvd @ 7% O_2**	**CEMS ppmvd @ 7% O_2**	**Difference (RM - CEMS)**	**Used in RA calculations (1=used, 0=omitted)**
1	15.6	10.4	5.2	0
2	18.5	12.7	5.8	0
3	32.0	22.9	9.1	0
4	9.4	5.1	4.3	1
5	8.0	3.6	4.4	1
6	10.1	4.9	5.2	1
7	11.5	8.7	2.8	1
8	12.6	8.3	4.3	1
9	10.5	7.2	3.3	1
10	10.7	7.0	3.7	1
11	14.9	10.8	4.1	1
12	9.1	6.0	3.1	1
Avg./Totals	**10.7**	**6.8**	**3.9**	**9**
Standard Deviation			0.756	
Confidence Coefficient			0.581	
Results with Respect to RA Limit (≤5 ppmvd) *			**4 ppmvd**	**PASS**
*The RA of the CEMS must be within 5 ppmv when the RA is calculated as the absolute average difference between the RM and CEMS plus the 2.5% confidence coefficient.				

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3.2 Operating Conditions

Representatives of TIM recorded details of plant operations during testing. TIM personnel compiled the raw process data and provided it to Bison for use in this report. Process data is presented in the report appendices.

3.3 Field Observations

Testing was performed as outlined in the test protocol dated June 19, 2020. No adverse or unusual environmental conditions were noted that are known to have influenced the outcome of these tests.

After Method 23 run 2, the nozzle was changed to better achieve the delta H required for isokinetic sampling. The probe liner broke while replacing the nozzle, so a new liner was used for Method 23 run 3. Both the probe liner and nozzle from run 2 was rinsed to the best of the tester's ability. Bison does not believe these changes affected the test results.

During shipping, some sample leaked from the potassium permanganate ($KMNO_4$) portion of the Method 29 samples. $KMNO_4$ gives off vapor and samples containing it are required to be vented to prevent total loss. This venting typically results in the loss of some sample during transit. Bison does not believe the sample loss affected Hg results.

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4.0 EMISSION TEST METHODS AND PROCEDURES

4.1 Testing Methods and Procedures

Bison testing personnel performed the following EPA methods as described in Title 40 CFR 60, Appendix A.

EPA Reference Method 1, "Sample and Velocity Traverses for Stationary Sources." The objective of Method 1 is to determine a suitable location for testing and to determine the velocity and/or sample points for the source. The results of Method 1 sampling location and sample or velocity point measurement locations are included in the appendices.

EPA Reference Method 2, "Determination of Stack Gas Velocity and Volumetric Flow Rate (Type-S Pitot Tube)." The objective of Method 2 is to determine volumetric flow. The average velocity, temperature, static pressure, and source area are used to calculate volumetric flow for the source. This method is incorporated within the performance of Methods 23, 26A and 29.

EPA Reference Method 3A, "Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedure)." The objective of Method 3A is to determine the O_2 and CO_2 concentrations in the stack gas stream.

EPA Reference Method 4, "Determination of Moisture Content in the Stack Gases." The objective of Method 4 is to determine the moisture content of a gas stream. This method is incorporated within the performance of Methods 23, 26A, and 29.

EPA Reference Method 5, "Determination of Particulate Emissions from Stationary Sources" (Methods 2 & 4 Inclusive). The objective of Method 5 is to determine the filterable PM from a source. Method 5 is an isokinetic sampling method for determination of PM. The exhaust gas stream is sampled along a cross-section of the stack and PM is captured within the nozzle, probe, filter-bell and quartz fiber filter. Method 5 was incorporated within Method 29.

EPA Reference Method 6C, "Determination of Sulfur Dioxide Emissions from Stationary Sources (Instrumental Analyzer Procedure)." The objective of Method 6C is to determine the SO_2 concentration from the source.

EPA Reference Method 7E, "Determination of Nitrogen Oxides Emissions from Stationary Sources (Instrumental Analyzer Procedure)." The objective of Method 7E is to determine the NOx concentration from the source.

EPA Reference Method 9, "Visual Determination of the Opacity of Emissions from Stationary Sources." The objective of Method 9 is to quantify the visible opacity of the source plume and was performed by a certified observer during Method 5/29 testing.

EPA Reference Method 10, "Determination of Carbon Monoxide Emissions from Stationary Sources (Instrumental Analyzer Procedure).". The objective of Method 10 is to determine the concentration of CO in the stack gas stream. Figure 1 gives a schematic of Bison's typical equipment configuration used for instrumental gaseous sampling.

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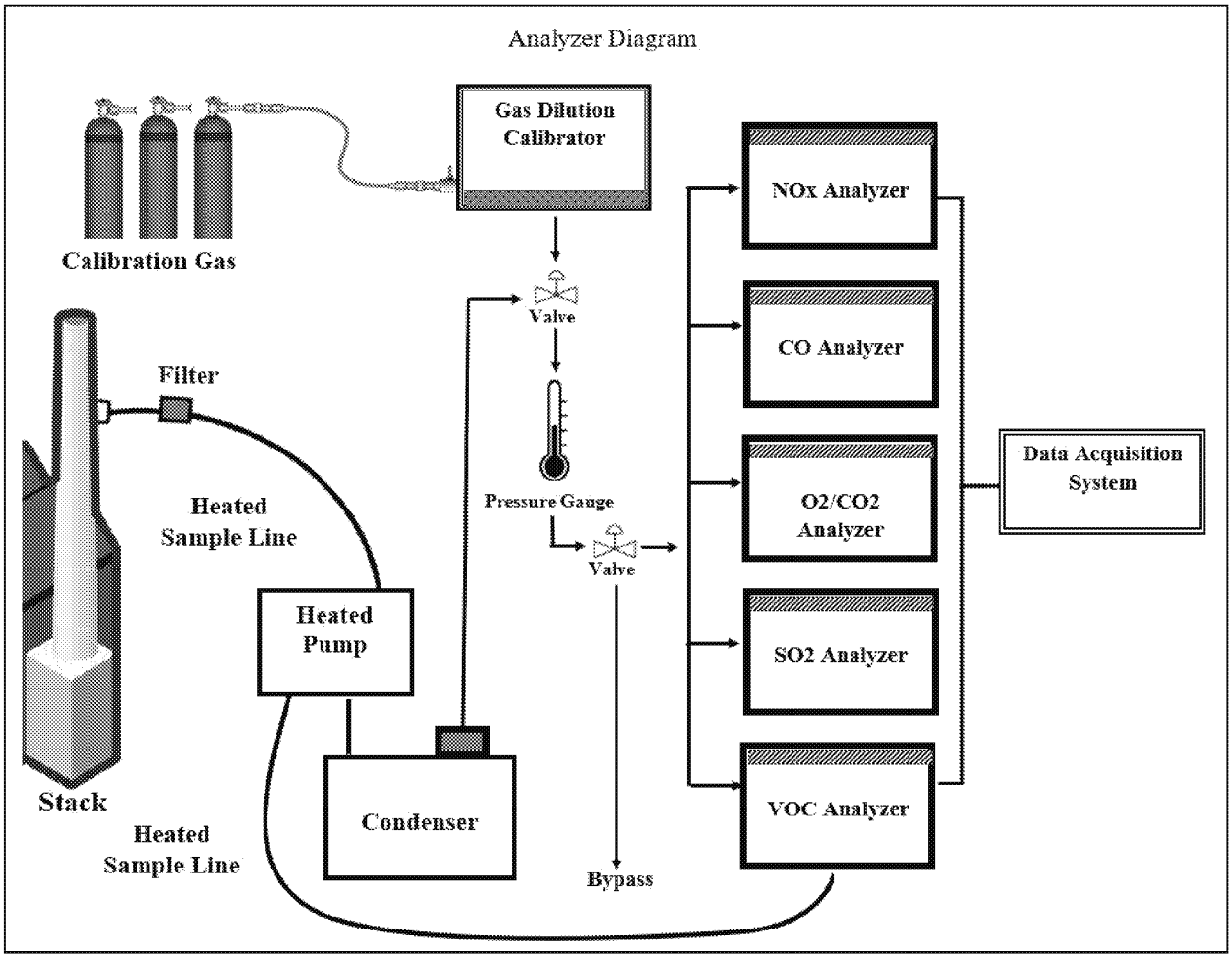
Figure 1: Typical Instrumental Analyzer Setup



EPA Reference Method 23, "Determination of Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans from Stationary Sources." The objective of Method 23 is to determine the PCDD/PCDF emissions from a stationary source. Method 23 is an isokinetic sampling method similar to Method 5. The sample is collected in the probe, on a glass fiber filter and on a packed column of absorbent material. The PCDD/PCDF are extracted from the sample, separated by high resolution gas chromatography, and measured by high resolution mass spectrometry. Figure 2 depicts an example of the Method 23 sample train.

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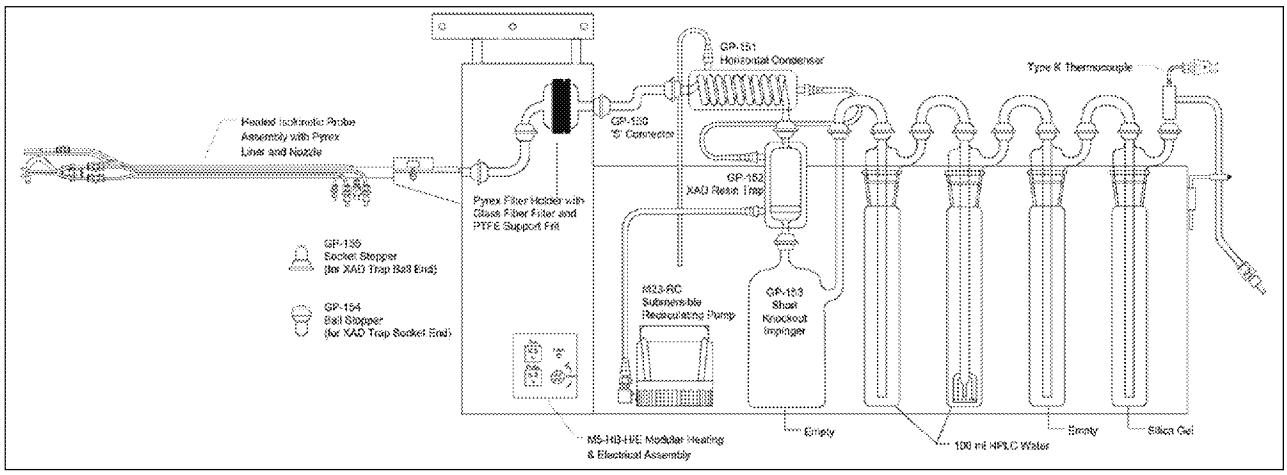
Figure 2: Example Method 23 Sample Train



EPA Reference Method 26A, "Determination of Hydrogen Halide and Halogen Emissions from Stationary Sources Isokinetic Method." The objective of Method 26A is to isokinetically sample a source for determination of HCl. Permit 127 has the following additional requirements:

The probe and filter must be conditioned prior to sampling using the procedure described in condition 54.g.i(a) through (c), as stated below:

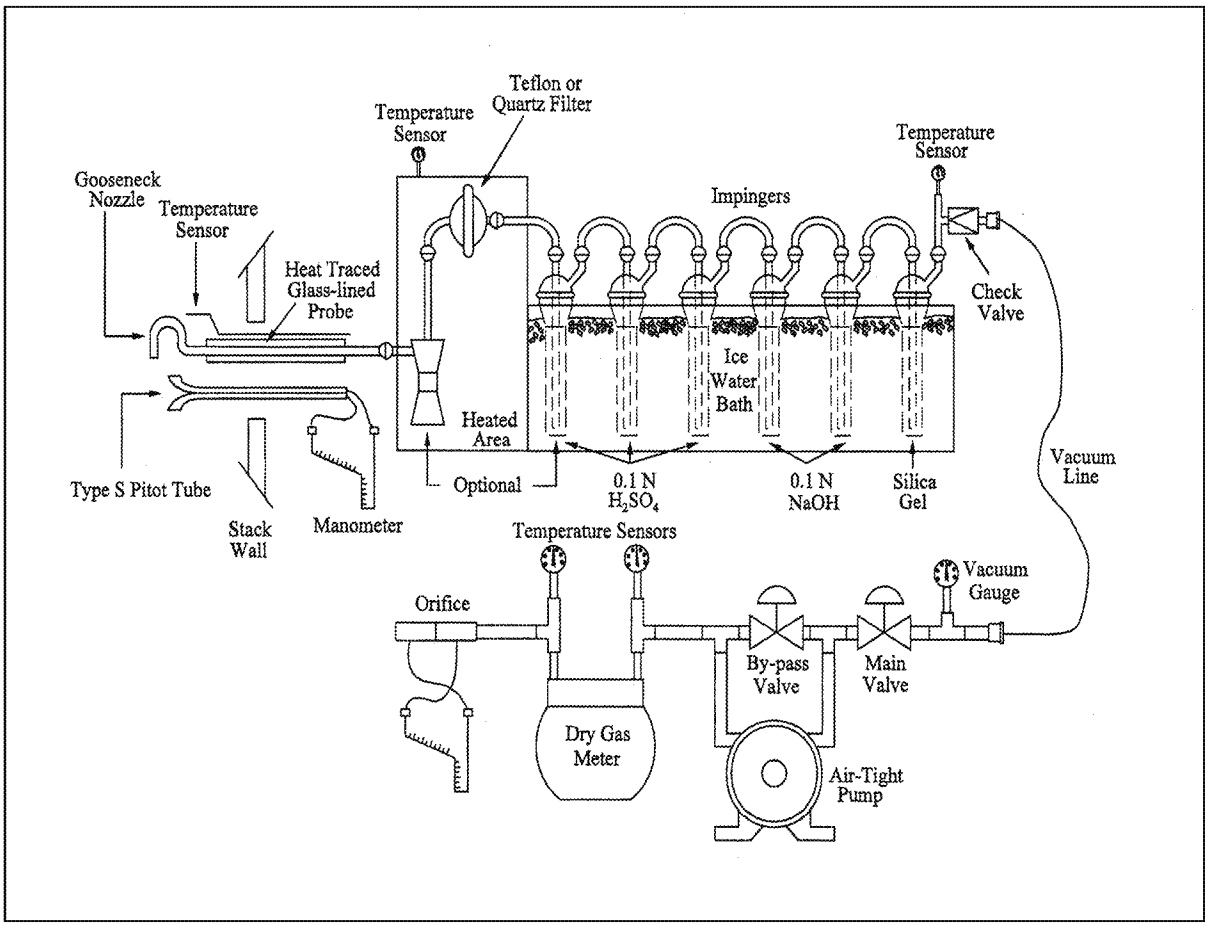
a. Assemble the sampling train(s) and conduct a conditioning run by collecting between 14 liters per minute (0.5 cubic feet per minute) and 30 liters per minute (1.0 cubic feet per minute) of gas over a one-hour period. Follow the sampling procedures outlined in section 8.1.5 of Method 26A of appendix A of 40 CFR 60. For the conditioning run, water can be used as the impinger solution.

b. Remove the impingers from the sampling train and replace with a fresh impinger train for the sampling run, leaving the probe and filter (and cyclone, if used) in position. Do not recover the filter or rinse the probe before the first run. Thoroughly rinse the impingers used in the preconditioning run with deionized water and discard these rinses.

c. The probe and filter assembly are conditioned by the stack gas and are not recovered or cleaned until the end of testing.

Figure 3 below shows an example of the Method 26A sample train.

Figure 3: Example Method 26A Sample Train



EPA Reference Method 29, "Determination of Metals Emissions from Stationary Sources" (Methods 2 & 4 Inclusive). The objective of Method 29 is to determine particulate matter and metals emissions from a source. Method 29 is an isokinetic sampling method. The exhaust gas stream is sampled along a cross-section of the stack and metal emissions are captured within the front-half and back-half of the sampling system. The front-half includes the nozzle, probe, filter-bell, and glass fiber filter. The back-half consists of the impinger solutions. The front-half and back-half samples are sent to a contract lab for analysis. Method 29 incorporates Method 2 "velocity measurements" and Method 4 "moisture measurements", and Method 5 "particulate emissions". Figure 4 details the Method 29 sampling set up.

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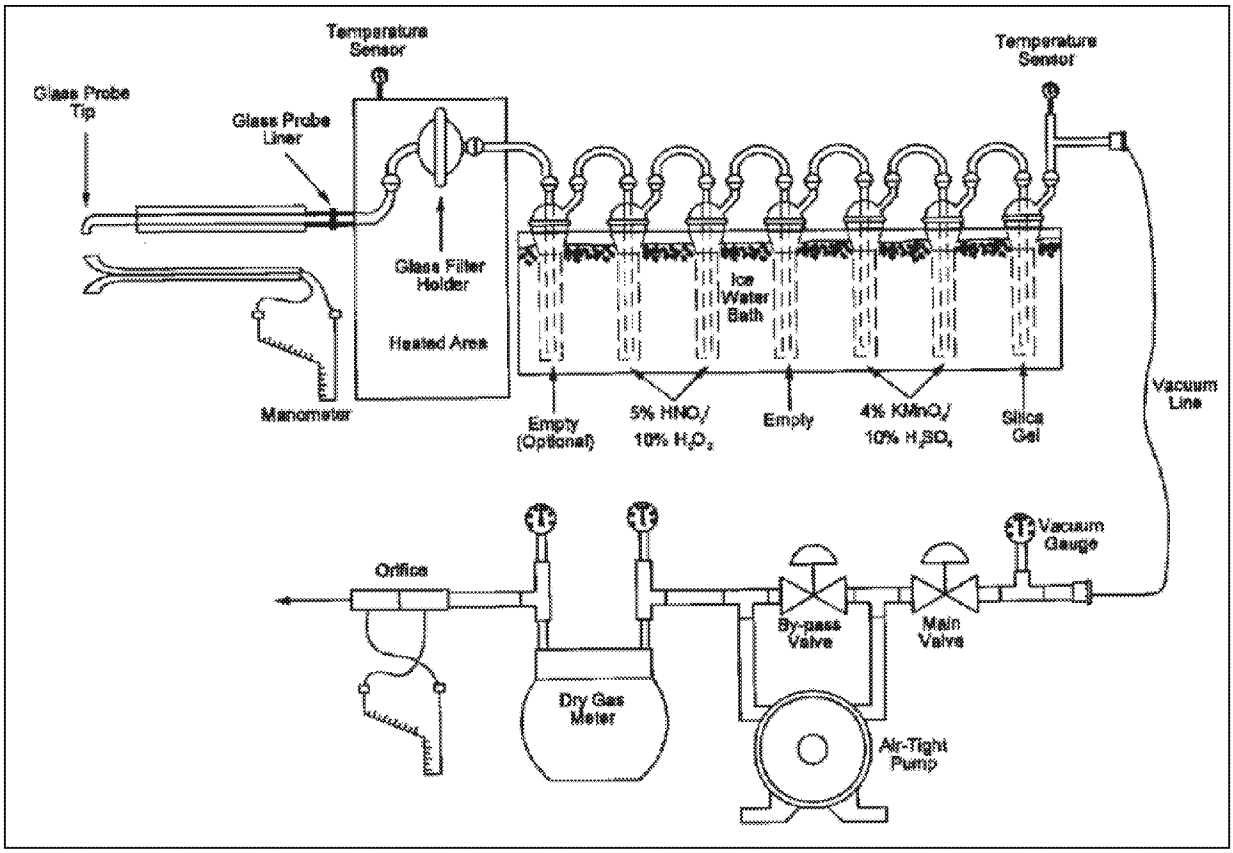
Figure 4: Example Method 29 Sample Train



EPA Reference Method 205, "Verification of Gas Dilution Systems for Field Instrument Calibrations." The objective of Method 205 is to produce a known and verified set of calibration gases that are used in instrumental analysis emission testing.

Performance Specification 3, "Specifications and Test Procedures for O_2 and CO_2 Continuous Emissions Monitoring Systems in Stationary Sources." PS3 specifies the test procedures and RATA requirements for O_2 and CO_2 CEMS.

Performance Specification 4a, "Specifications and Test Procedures for Carbon Monoxide Continuous Emissions Monitoring Systems in Stationary Sources." PS4a specifies the test procedures and RATA requirements for CO CEMS.

4.2 Sample Handling and Analytical Procedures

All analytical procedures complied with EPA methodology. Method 5, Method 26A, and Method 29 samples were sent to Chester LabNet in Tigard, Oregon. Method 23 samples were sent to ALS Environmental in Houston, Texas.

APPENDIX A: METHOD 23 TEST DATA

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BISON ENGINEERING, INC.

COMPANY	**Tucson Iron and Metal**
FACILITY	**Metal Recycling Facility**
LOCATION	**Tucson, AZ**
SOURCE	**Contraband Incinerator**
DATE	**09/09/20**
METHOD	**M23**
POLLUTANT	**Dioxins and Furans**

EPA Method 1
Stack Parameters and Traverse Points

Client: Tucson Iron and Metal
Location: Tucson, AZ
Source: Contraband Incinerator
Facility: Metal Recycling Facility

Type of Testing: P (P for Particulate; V for Velocity/Nonparticulate)
Type of Duct: C (C for circular; R for rectangular)

Number of ports available: 2
Number of ports to be used: 2
Port diameter: 4 inches

Circular ID (Rectangular Depth): 44.00 inches
Port depth and/or wall thickness: 4.00 inches
Stack width (Rectangular only): inches

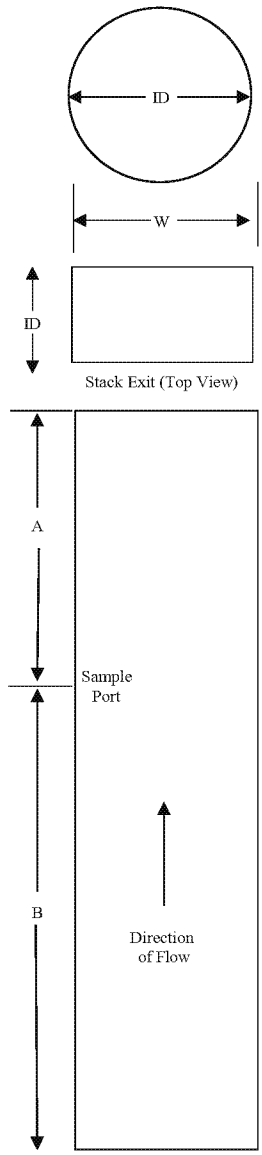
Equivalent Diameter
If rectangluar = $\frac{2*Depth*Width}{Depth + Width}$ = 44.00 inches (If circular = duct ID)
Stack/duct area = 10.559 sq.feet 1520.5 sq.inches

Sample Port Location:	Downstream from flow disturbance from process B	Upstream from flow disturbance toward exit A
Number of Inches:	264.00	156.00
Number of Diameters:	6.00	3.55

Minimum Number of Traverse Points: 20

Points	% of diameter	Distance from inside wall (in.)	Distance including port (in.)
1	2.6	1.14	5 1/8
2	8.2	3.61	7 5/8
3	14.6	6.42	10 3/8
4	22.6	9.94	14
5	34.2	15.05	19
6	65.8	28.95	33
7	77.4	34.06	38
8	85.4	37.58	41 5/8
9	91.8	40.39	44 3/8
10	97.4	42.86	46 7/8

Reference Diagram



Drawing NOT to scale and NOT an acurate representation of stack.

EPA Method 23
Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans
Results Summary

Client: Tucson Iron and Metal
Source: Contraband Incinerator
Location: Tucson, AZ

Run			1	2	3	
Date			9/9/2020	9/9/2020	9/9/2020	
Run Start Time			11:10	13:10	15:18	
Run End Time			12:15	14:16	16:26	
Duration, min.			60	60	60	Average
Barometric Pressure, "Hg			27.18	27.18	27.18	27.18
Nozzle Dia., in.			0.2908	0.2908	0.2690	0.2835
Isokinetic Average, %			100.4	96.8	99.0	98.7
Sample Volume, dscf			43.885	42.314	41.392	42.530
Sample Volume, dscm			1.243	1.198	1.172	1.204
Stack Diameter, in.			44.00	44.00	44.00	44.00
Stack Area, sq.ft.			10.559	10.559	10.559	10.559
CO_2 % vd			2.22	1.95	1.73	1.97
O_2 % vd			18.18	18.58	18.95	18.57
Static Press., "H_2O			0.31	0.31	0.31	0.31
H_2O % v			3.21	3.66	2.11	2.99
Wet Molecular Weight, lb/lb-mole			28.72	28.66	28.80	28.73
Velocity, FPS			39.39	40.73	45.33	41.82
ADCFM			24,154.0	24,859.7	28,112.4	25,708.7
ACFM			24,955.1	25,804.1	28,718.4	26,492.5
DSCFM			16,693.4	16,690.8	18,632.4	17,338.9
Stack Temperature, °F			234.6	255.0	264.3	251.3
TEQ* Dioxins/Furans	TEF** Adjusted Totals	pg	20,260	39,103	19,096	26,153
		ng	20	39	19	26
	O_2 Corrected Totals***	ng	104	234	136	158
		ng/dscm	83	196	116	132

*Toxic equivalent
**2,3,7,8-TCDD Toxic Equivalence Factors, 2005 WHO.
***Corrected to 7 % O_2

Isokinetic Field Data
Field Data and Calculations
Emissions and Gas Stream Characteristics

Client:	Tucson Iron and Metal	Run:	1
Location:	Tucson, AZ	Start Time:	11:10
Source:	Contraband Incinerator	End Time:	12:15
Method:	23	Date:	9/9/2020

Sampling Data				Traverse Data			
Time min.	Meter ft^3	**ΔH** "H_2O	Meter T_m °F	Traverse Point	Dp "H_2O	Stack T_s °F	**√Dp**
	931.368						
3.0	933.990	2.50	88	1	0.40	237	0.6325
6.0	936.680	2.50	88	2	0.39	235	0.6245
9.0	939.320	2.50	86	3	0.39	235	0.6245
12.0	942.000	2.30	85	4	0.36	235	0.6000
15.0	944.620	2.20	85	5	0.35	235	0.5916
18.0	947.210	2.10	85	6	0.33	230	0.5745
21.0	949.850	2.20	84	7	0.35	234	0.5916
24.0	952.360	2.00	85	8	0.31	232	0.5568
27.0	954.610	1.60	85	9	0.25	228	0.5000
30.0	956.871	1.70	84	10	0.27	229	0.5196
33.0	959.040	1.60	85	11	0.25	231	0.5000
36.0	961.510	2.00	85	12	0.32	232	0.5657
39.0	963.880	1.90	85	13	0.30	233	0.5477
42.0	966.500	2.30	84	14	0.37	232	0.6083
45.0	969.230	2.60	84	15	0.41	235	0.6403
48.0	972.100	2.70	84	16	0.43	237	0.6557
51.0	974.650	2.30	84	17	0.36	237	0.6000
54.0	977.370	2.40	84	18	0.38	240	0.6164
57.0	979.940	2.10	85	19	0.33	242	0.5745
60.0	982.080	1.60	85	20	0.26	242	0.5099

Client:	Tucson Iron and Metal	Run:	1
Source:	Contraband Incinerator	Date:	09/09/20

Field Data Input Continued

Moisture Data			Stack Dimensional Data:		
Total Test Time	60.0	min	Circular		
Sample Time Interval	3.0	min	Diameter	44.000	in
Meter Volume, V_m	50.712	dcf	Rectangular		
Water Volume	30.9	ml (g)	Width		in
Nozzle Diameter, N_z	0.2908	in.	Length		in
Nozzle Area	0.000461	sq.ft.	Stack Area	10.559	sq.ft.

Traverse Data			Molecular Weight:		
Barometric Pressure, P_b	27.18	"Hg	CO_2 Average	2.22	%vd
Static Pressure	0.31	"H_2O	O_2 Average	18.18	%vd
Pitot Factor, cp	0.84				
Meter Cal Factor	0.9780	Y			

Field Data Averages

Meter			Stack		
ΔH	2.155	"H_2O	$\sqrt{Dp}$	0.5817	"H_2O
Temperature, T_m	85.0	°F	Temperature, T_s	234.6	°F
Temperature, T_m	545.0	°A (°R)	Temperature, T_s	694.6	°A (R)
Pressure Meter, P_m	27.338	"Hg	Pressure Stack, P_s	27.203	"Hg

Field Data Calculations

Meter Box Capture			EPA Method 2 Stack Gas Flowrate:		
Standard Volume, $V_{m(std)}$	43.885	dscf	Velocity, V_s	39.39	fps
	1.243	dscm	Volume (actual)	24,955.1	acfm
Actual Volume, $V_{m(actual)}$	65.631	awcf		24,154.0	adcfm
Gas Stream Moisture			Volume (standard)	1,034,821.9	wscf/hr
Moisture Vapor, $Vw_{(std)}$	1.454	scf		1,001,604.1	dscf/hr
Moisture, B_{ws}	0.0321			16,693.4	dscf/min
Moisture EPA M4	3.21	%v			
EPA Method 3 Gas Density					
Dry, M_d	29.08	lb/lb-mole			
Wet, M_s	28.72	lb/lb-mole			
Percent Isokinetic	100.4	%			

Isokinetic Field Data
Field Data and Calculations
Particulate Emissions and Gas Stream Characteristics

Client:	Tucson Iron and Metal	Run:	2
Location:	Tucson, AZ	Start Time:	13:10
Source:	Contraband Incinerator	End Time:	14:16
Method:	23	Date:	09/09/20

Sampling Data				Traverse Data			
Time min.	Meter ft^3	**ΔH** "H_2O	Meter T_m °F	Traverse Point	Dp "H_2O	Stack T_s °F	**√Dp**
	982.549						
3.0	985.280	2.80	85	1	0.45	245	0.6708
6.0	987.990	3.00	85	2	0.48	247	0.6928
9.0	990.850	3.00	85	3	0.49	247	0.7000
12.0	993.470	2.50	86	4	0.40	251	0.6325
15.0	996.070	2.50	86	5	0.41	250	0.6403
18.0	998.590	2.30	86	6	0.37	251	0.6083
21.0	1000.780	1.70	86	7	0.28	250	0.5292
24.0	1002.950	1.80	86	8	0.29	254	0.5385
27.0	1005.260	1.90	86	9	0.31	254	0.5568
30.0	1007.450	1.70	86	10	0.27	255	0.5196
33.0	1010.240	2.80	86	11	0.45	258	0.6708
36.0	1012.810	2.40	86	12	0.39	258	0.6245
39.0	1015.200	2.00	87	13	0.33	258	0.5745
42.0	1017.650	2.00	88	14	0.33	260	0.5745
45.0	1020.010	1.90	88	15	0.31	260	0.5568
48.0	1022.350	1.80	88	16	0.30	260	0.5477
51.0	1024.650	1.90	88	17	0.31	260	0.5568
54.0	1026.890	1.70	88	18	0.28	260	0.5292
57.0	1029.230	1.80	88	19	0.30	261	0.5477
60.0	1031.585	2.00	88	20	0.33	260	0.5745

Client:	Tucson Iron and Metal	Run:	2
Source:	Contraband Incinerator	Date:	09/09/20

Field Data Input Continued

Moisture Data			Stack Dimensional Data:		
Total Test Time	60.0	min	Circular		
Sample Time Interval	3.0	min	Diameter	44.000	in
Meter Volume, V_m	49.036	dcf	Rectangular		
Water Volume	34.2	ml (g)	Width		in
Nozzle Diameter, N_z	0.2908	in.	Length		in
Nozzle Area	0.000461	sq.ft.	Stack Area	10.559	sq.ft.

Traverse Data			Molecular Weight:		
Barometric Pressure, P_b	27.18	"Hg	CO_2 Average	1.95	%vd
Static Pressure	0.31	"H_2O	O_2 Average	18.58	%vd
Pitot Factor, cp	0.84				
Meter Cal Factor	0.9780	Y			

Field Data Averages

Meter			Stack		
ΔH	2.175	"H_2O	√Dp	0.5923	"H_2O
Temperature, T_m	86.6	°F	Temperature, T_s	255.0	°F
Temperature, T_m	546.6	°A (°R)	Temperature, T_s	715.0	°A (R)
Pressure Meter, P_m	27.340	"Hg	Pressure Stack, P_s	27.203	"Hg

Field Data Calculations

Meter Box Capture			EPA Method 2 Stack Gas Flowrate:		
Standard Volume, $V_{m(std)}$	42.314	dscf	Velocity, V_s	40.73	fps
	1.198	dscm	Volume (actual)	25,804.1	acfm
Actual Volume, $V_{m(actual)}$	65.443	awcf		24,859.7	adcfm
Gas Stream Moisture			Volume (standard)	1,039,495.9	wscf/hr
Moisture Vapor, $Vw_{(std)}$	1.609	scf		1,001,450.4	dscf/hr
Moisture, B_{ws}	0.0366			16,690.8	dscf/min
Moisture EPA M4	3.66	%v			
EPA Method 3 Gas Density					
Dry, M_d	29.06	lb/lb-mole			
Wet, M_s	28.66	lb/lb-mole			
Percent Isokinetic	96.8	%			

Isokinetic Field Data
Field Data and Calculations
Particulate Emissions and Gas Stream Characteristics

Client:	Tucson Iron and Metal	Run:	3
Location:	Tucson, AZ	Start Time:	15:18
Source:	Contraband Incinerator	End Time:	16:26
Method:	23	Date:	09/09/20

Sampling Data				Traverse Data			
Time min.	Meter ft^3	ΔH "H_2O	Meter T_m °F	Traverse Point	Dp "H_2O	Stack T_s °F	$\sqrt{Dp}$
	33.322						
3.0	35.930	2.10	89	1	0.45	264	0.6708
6.0	38.470	2.20	89	2	0.49	263	0.7000
9.0	40.980	2.00	89	3	0.45	264	0.6708
12.0	43.510	2.10	88	4	0.48	267	0.6928
15.0	45.990	2.00	88	5	0.44	266	0.6633
18.0	48.610	2.40	88	6	0.53	266	0.7280
21.0	51.010	1.90	88	7	0.43	266	0.6557
24.0	53.470	2.20	88	8	0.49	266	0.7000
27.0	56.020	2.10	88	9	0.46	263	0.6782
30.0	58.444	1.90	89	10	0.42	263	0.6481
33.0	60.610	1.60	88	11	0.35	263	0.5916
36.0	62.810	1.70	88	12	0.37	262	0.6083
39.0	65.300	2.20	88	13	0.49	264	0.7000
42.0	67.770	2.00	88	14	0.45	266	0.6708
45.0	70.250	2.00	87	15	0.44	265	0.6633
48.0	72.650	1.80	87	16	0.41	265	0.6403
51.0	74.840	1.70	88	17	0.38	265	0.6164
54.0	77.030	1.60	88	18	0.35	263	0.5916
57.0	79.230	1.70	88	19	0.38	262	0.6164
60.0	81.451	1.70	88	20	0.39	262	0.6245

Client:	Tucson Iron and Metal	Run:	3
Source:	Contraband Incinerator	Date:	09/09/20

Field Data Input Continued

Moisture Data			Stack Dimensional Data:		
Total Test Time	60.0	min	Circular		
Sample Time Interval	3.0	min	Diameter	44.000	in
Meter Volume, V_m	48.129	dcf	Rectangular		
Water Volume	19.0	ml (g)	Width		in
Nozzle Diameter, N_z*	0.2690	in.	Length		in
Nozzle Area	0.000395	sq.ft.	Stack Area	10.559	sq.ft.

*Nozzle changed to better achieve delta H.

Traverse Data			Molecular Weight:		
Barometric Pressure, P_b	27.18	"Hg	CO_2 Average	1.73	%vd
Static Pressure	0.31	"H_2O	O_2 Average	18.95	%vd
Pitot Factor, cp	0.84				
Meter Cal Factor	0.9780	Y			

Field Data Averages

Meter			Stack		
ΔH	1.945	"H_2O	√Dp	0.6565	"H_2O
Temperature, T_m	88.1	°F	Temperature, T_s	264.3	°F
Temperature, T_m	548.1	°A (°R)	Temperature, T_s	724.3	°A (R)
Pressure Meter, P_m	27.323	"Hg	Pressure Stack, P_s	27.203	"Hg

Field Data Calculations

Meter Box Capture			EPA Method 2 Stack Gas Flowrate:		
Standard Volume, $V_{m(std)}$	41.392	dscf	Velocity, V_s	45.33	fps
	1.172	dscm	Volume (actual)	28,718.4	acfm
Actual Volume, $V_{m(actual)}$	63.823	awcf		28,112.4	adcfm
Gas Stream Moisture			Volume (standard)	1,142,040.9	wscf/hr
Moisture Vapor, $Vw_{(std)}$	0.894	scf		1,117,943.8	dscf/hr
Moisture, B_{ws}	0.0211			18,632.4	dscf/min
Moisture EPA M4	2.11	%v			
EPA Method 3 Gas Density					
Dry, M_d	29.03	lb/lb-mole			
Wet, M_s	28.80	lb/lb-mole			
Percent Isokinetic	99.0	%			

EPA Method 23
Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans
Laboratory Results

Client: Tucson Iron and Metal
Location: Tucson, AZ
Source: Contraband Incinerator
Run: 1

Run 1 O_2: 18.18 %
O_2 corrected to: 7.00 %

		Laboratory Results (pg)			Calculated/Adjusted Results		
	Analyte Name	TEF*	Run 1	Adjusted Result	ng	O_2 Corrected ng	O_2 Corrected ng/dscm
	2,3,7,8-TCDD	1	1090	1090	1.09	5.57	4.48
	1,2,3,7,8-PeCDD	1	3520	3520	3.52	17.99	14.47
	1,2,3,4,7,8-HxCDD	0.1	1580	158	0.16	0.81	0.65
	1,2,3,6,7,8-HxCDD	0.1	2630	263	0.26	1.34	1.08
	1,2,3,7,8,9-HxCDD	0.1	1330	133	0.13	0.68	0.55
	1,2,3,4,6,7,8-HpCDD	0.01	9940	99.4	0.10	0.51	0.41
	OCDD	0.0003	31000	9.30	0.01	0.05	0.04
K	2,3,7,8-TCDF	0.1	783	78.3	0.08	0.40	0.32
	1,2,3,7,8-PeCDF	0.03	13800	414	0.41	2.12	1.70
	2,3,4,7,8-PeCDF	0.3	29600	8880	8.88	45.38	36.51
	1,2,3,4,7,8-HxCDF	0.1	18500	1850	1.85	9.45	7.61
	1,2,3,6,7,8-HxCDF	0.1	17900	1790	1.79	9.15	7.36
	1,2,3,7,8,9-HxCDF	0.1	2140	214	0.21	1.09	0.88
	2,3,4,6,7,8-HxCDF	0.1	14600	1460	1.46	7.46	6.00
	1,2,3,4,6,7,8-HpCDF	0.01	28200	282	0.28	1.44	1.16
	1,2,3,4,7,8,9-HpCDF	0.01	1130	11.3	0.01	0.06	0.05
	OCDF	0.0003	26000	7.80	0.01	0.04	0.03
			Totals:	20260	20.26	103.54	83.29

*2,3,7,8-TCDD Toxic Equivalence Factors, 2005 WHO.
Method 23, Section 9.9: any values reported as nondetected shall be counted as zero for the purpose of calculating total concentrations.

EPA Method 23
Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans
Laboratory Results

Client: Tucson Iron and Metal
Location: Tucson, AZ
Source: Contraband Incinerator
Run: 2

Run 2 O_2: 18.58 %
O_2 corrected to: 7.0 %

	Laboratory Results (pg)			Calculated/Adjusted Results		
Analyte Name	TEF*	Run 2	Adjusted Result	ng	O_2 Corrected ng	O_2 Corrected ng/dscm
2,3,7,8-TCDD	1	2270	2270	2.27	13.60	11.35
1,2,3,7,8-PeCDD	1	7490	7490	7.49	44.88	37.46
1,2,3,4,7,8-HxCDD	0.1	3810	381	0.38	2.28	1.91
1,2,3,6,7,8-HxCDD	0.1	5310	531	0.53	3.18	2.66
1,2,3,7,8,9-HxCDD	0.1	3560	356	0.36	2.13	1.78
1,2,3,4,6,7,8-HpCDD	0.01	10500	105	0.11	0.63	0.53
OCDD	0.0003	4570	1.37	0.00	0.01	0.01
2,3,7,8-TCDF	0.1	2100	210	0.21	1.26	1.05
1,2,3,7,8-PeCDF	0.03	22100	663	0.66	3.97	3.32
2,3,4,7,8-PeCDF	0.3	46500	13950	13.95	83.58	69.77
1,2,3,4,7,8-HxCDF	0.1	38300	3830	3.83	22.95	19.15
1,2,3,6,7,8-HxCDF	0.1	36700	3670	3.67	21.99	18.35
1,2,3,7,8,9-HxCDF	0.1	3310	331	0.33	1.98	1.66
2,3,4,6,7,8-HxCDF	0.1	43100	4310	4.31	25.82	21.55
1,2,3,4,6,7,8-HpCDF	0.01	90200	902	0.90	5.40	4.51
1,2,3,4,7,8,9-HpCDF	0.01	9900	99.0	0.10	0.59	0.50
OCDF	0.0003	12400	3.72	0.00	0.02	0.02
		Totals:	39103	39.10	234.28	195.56

*2,3,7,8-TCDD Toxic Equivalence Factors, 2005 WHO TEFs.
Method 23, Section 9.9: any values reported as nondetected shall be counted as zero for the purpose of calculating total concentrations

EPA Method 23
Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans
Laboratory Results

Client: Tucson Iron and Metal
Location: Tucson, AZ
Source: Contraband Incinerator
Run: 3

Run 3 O_2: 18.95 %
O_2 corrected to: 7.0 %

		Laboratory Results (pg)		Calculated/Adjusted Results		
Analyte Name	TEF*	Run 3	Adjusted Result	ng	O_2 Corrected ng	O_2 Corrected ng/dscm
2,3,7,8-TCDD	1	1000	1000	1.00	7.13	6.08
1,2,3,7,8-PeCDD	1	3500	3500	3.50	24.95	21.29
1,2,3,4,7,8-HxCDD	0.1	2000	200	0.20	1.43	1.22
1,2,3,6,7,8-HxCDD	0.1	2790	279	0.28	1.99	1.70
1,2,3,7,8,9-HxCDD	0.1	1670	167	0.17	1.19	1.02
1,2,3,4,6,7,8-HpCDD	0.01	6190	61.9	0.06	0.44	0.38
OCDD	0.0003	3130	0.939	0.00	0.01	0.01
2,3,7,8-TCDF	0.1	6320	632	0.63	4.51	3.84
1,2,3,7,8-PeCDF	0.03	9880	296	0.30	2.11	1.80
2,3,4,7,8-PeCDF	0.3	22800	6840	6.84	48.76	41.60
1,2,3,4,7,8-HxCDF	0.1	17100	1710	1.71	12.19	10.40
1,2,3,6,7,8-HxCDF	0.1	18100	1810	1.81	12.90	11.01
1,2,3,7,8,9-HxCDF	0.1	3270	327	0.33	2.33	1.99
2,3,4,6,7,8-HxCDF	0.1	18100	1810	1.81	12.90	11.01
1,2,3,4,6,7,8-HpCDF	0.01	43200	432	0.43	3.08	2.63
1,2,3,4,7,8,9-HpCDF	0.01	2710	27.1	0.03	0.19	0.16
OCDF	0.0003	7920	2.38	0.00	0.02	0.01
		Totals:	19096	19.10	136.12	116.14

*2,3,7,8-TCDD Toxic Equivalence Factors, 2005 WHO TEFs.
Method 23, Section 9.9: any values reported as nondetected shall be counted as zero for the purpose of calculating total concentrations

Pre Traverse Flow Information

Client: Tucson Iron and Metal
Location: Tucson, AZ
Source: Contraband Incinerator

Stack Temp: 220

Traverse Point	Velocity ΔP ("H_2O)	Null Angle
1	0.44	5.0
2	0.51	2.0
3	0.38	2.0
4	0.52	3.0
5	0.46	2.0
6	0.37	3.0
7	0.36	4.0
8	0.39	3.0
9	0.35	11.0
10	0.24	11.0
11	0.49	4.0
12	0.31	2.0
13	0.28	2.0
14	0.41	6.0
15	0.39	4.0
16	0.47	3.0
17	0.45	3.0
18	0.47	7.0
19	0.41	6.0
20	0.43	5.0
Average:	0.41	4.4

Flow is found to be:
Non-cyclonic x
Cyclonic

Isokinetic Field Data
Field Data Entry

Client:	**Tucson Iron and Metal**		**Run:**	**1**
Location:	**Tucson, AZ**		**Start Time:**	**11:10**
Source:	**Contraband Incinerator**	**Environmental Conditions/Test Notes:**	**End Time:**	**12:15**
EPA Method:	**M23**	Sunny and Hot	**Date:**	**9/9/2020**
Box Operator:	**RR**			
Technician(s):	**AM**			

Stack Dimensional Data:

Circular		
Diameter	44.000	in
Rectangular		
Width		in
Length		in
Stack Area	10.559	sq.ft.

Equipment:

Meterbox ID	Box 8	Probe ID	T-5-1	Liner type	Glass
Y factor	0.9780	Nozzle ID	9	Nozzle size	0.2908 inches
ΔH@	1.93	Hot box ID	B2	Nozzle area	0.000461 sq.ft.
		Pitot Cp	0.84	Probe heat	250 F
		Pitot ID	T-PT-5	Filter heat	250 F

Source Information:

Barometric Pressure	27.18 "Hg	O_2	19.00 %
Static Pressure	0.31 "H_2O	CO_2	2.00 %
Ave. ΔP	0.41 "H_2O	Rec. Nz.	0.262 inches
Stack Temperature	220 F		
Assumed moisture	3 %		
Assumed meter temp.	87 F		
Total number of points	20		
Time per point	3		
Total run time	60		

Leak Checks:

	Pre-test	Post-test
Pitot	x	x
Train leak rate, dcf	0.001	0.002
Leak check vacuum, "Hg	24	20

Nozzle check for roundness:

1	2	3	
0.291	0.290	0.292	inches
	Caliper ID#	TMC-3	

Post Test Calculations:

Sample volume	50.712 dcf	Ave. ΔP	0.341 "H_2O
Wet mol. weight	28.72 M_s (actual)	Ave. √ΔP	0.5817 "H_2O
Actual H_2O	3.21 %	Ave. ΔH	2.155 "H_2O
Std. meter vol.	43.885 dscf	Ave. T_s	234.6 °F
Isokinetic Average	100.4 %	Ave. T_m	85 °F

Moisture/Lab:

Filter M23-Filter 1 #

	Initial	Final	Gain
Impingers, g	2462.8	2479.0	16.2
Silica gel, g	921.8	936.5	14.7
		Total water gain:	30.9

Traverse Point	Time (min.)	Meter Volume (dcf) 931.368	Velocity ΔP ("H_2O)	Stack Temp. (°F)	Meter Temp. (°F)	Calc. ΔH	Run ΔH	Vacuum ("Hg)	Filter Box (°F)	Condenser Temp (≤68°F)	XAD Filter Temp <68°F	Assumed %I
1	3.0	933.990	0.40	237	88	2.53	2.50	13	249	67	49.000	95.1
2	6.0	936.680	0.39	235	88	2.47	2.50	16	251	55	48.000	98.7
3	9.0	939.320	0.39	235	86	2.46	2.50	16	242	59	49.000	97.2
4	12.0	942.000	0.36	235	85	2.27	2.30	15	250	60	48.000	102.8
5	15.0	944.620	0.35	235	85	2.21	2.20	16	251	63	49.000	101.9
6	18.0	947.210	0.33	230	85	2.10	2.10	15	251	64	49.000	103.3
7	21.0	949.850	0.35	234	84	2.21	2.20	15	250	65	49.000	102.8
8	24.0	952.360	0.31	232	85	1.96	2.00	14	250	66	49.000	103.4
9	27.0	954.610	0.25	228	85	1.59	1.60	13	251	66	49.000	102.9
10	30.0	956.871	0.27	229	84	1.71	1.70	11	249	67	49.000	99.7
11	33.0	959.040	0.25	231	85	1.59	1.60	12	251	65	47.000	99.4
12	36.0	961.510	0.32	232	85	2.03	2.00	14	250	65	47.000	100.2
13	39.0	963.880	0.30	233	85	1.90	1.90	14	249	62	47.000	99.3
14	42.0	966.500	0.37	232	84	2.34	2.30	14	251	64	47.000	99.1
15	45.0	969.230	0.41	235	84	2.58	2.60	14	252	63	49.000	98.4
16	48.0	972.100	0.43	237	84	2.70	2.70	17	250	64	50.000	101.2
17	51.0	974.650	0.36	237	84	2.26	2.30	16	250	64	51.000	98.1
18	54.0	977.370	0.38	240	84	2.38	2.40	16	250	64	52.000	102.1
19	57.0	979.940	0.33	242	85	2.06	2.10	15	249	64	52.000	103.4
20	60.0	982.080	0.26	242	85	1.62	1.60	10	250	64	53.000	96.9

Isokinetic Field Data
Field Data Entry

Client:	**Tucson Iron and Metal**		**Run:**	**2**
Location:	**Tucson, AZ**		**Start Time:**	**13:10**
Source:	**Contraband Incinerator**	**Environmental Conditions/Test Notes:**	**End Time:**	**14:16**
EPA Method:	**M23**	Sunny and Hot	**Date:**	**9/9/2020**
Box Operator:	**RR**			
Technician(s):	**AM**			

Stack Dimensional Data:

Circular	
Diameter	44.000 in
Rectangular	
Width	in
Length	in
Stack Area	10.559 sq.ft.

Equipment:

Meterbox ID	Box 8	Probe ID	T-5-1	Liner type:	Glass
Y factor	0.9780	Nozzle ID	9	Nozzle size:	0.2908 inches
ΔH@	1.93	Hot box ID	B2	Nozzle area:	0.000461 sq.ft.
		Pitot Cp	0.84	Probe heat:	250 F
		Pitot ID	T-PT-5	Filter heat:	250 F

Source Information:

Barometric Pressure	27.18 "Hg	O_2	19.0 %
Static Pressure	0.31 "H_2O	CO_2	2.0 %
Ave. ΔP	0.41 "H_2O	Rec. Nz.	0.263 inches
Stack Temperature	220 F		
Assumed moisture	3.21 %		
Assumed meter temp.	85 F		
Total number of points	20		
Time per point	3		
Total run time	60		

Leak Checks:

	Pre-test	Post-test
Pitot:	x	x
Train leak rate, dcf:	0.004	0.005
Leak check vacuum, "Hg:	15	20

Nozzle check for roundness:

1	2	3
0.291	0.290	0.292 inches
	Caliper ID#	TMC-3

Post Test Calculations:

Sample volume	49.036 dcf	Ave. ΔP	0.354 "H_2O
Wet mol. weight	28.67 M_s (actual)	Ave. √ΔP	0.5923 "H_2O
Actual H_2O	3.66 %	Ave. ΔH	2.175 "H_2O
Std. meter vol.	42.314 dscf	Ave. T_s	255 °F
Isokinetic Average	96.8 %	Ave. T_m	86.6 °F

Moisture/Lab:

Filter M23-Filter 2 #

	Initial	Final	Gain
Impingers, g	2377.9	2397.8	19.9
Silica gel, g	953.1	967.4	14.3
		Total water gain:	34.2

Traverse Point	Time (min.)	Meter Volume (dcf) 982.549	Velocity ΔP ("H_2O)	Stack Temp. (°F)	Meter Temp. (°F)	Calc. ΔH	Run ΔH	Vacuum ("Hg)	Filter Box (°F)	Condenser Temp (≤68°F)	XAD Filter Temp <68°F	Assumed %I
1	3.0	985.280	0.45	245	85	2.79	2.80	16	250	66	65.000	94.7
2	6.0	987.990	0.48	247	85	2.97	3.00	16	250	65	60.000	91.1
3	9.0	990.850	0.49	247	85	3.03	3.00	17	250	66	57.000	95.2
4	12.0	993.470	0.40	251	86	2.46	2.50	15	250	64	57.000	96.5
5	15.0	996.070	0.41	250	86	2.53	2.50	16	251	66	57.000	94.5
6	18.0	998.590	0.37	251	86	2.28	2.30	16	250	65	57.000	96.4
7	21.0	1000.780	0.28	250	86	1.73	1.70	15	251	65	57.000	96.1
8	24.0	1002.950	0.29	254	86	1.78	1.80	15	250	66	57.000	93.9
9	27.0	1005.260	0.31	254	86	1.90	1.90	15	253	64	57.000	96.7
10	30.0	1007.450	0.27	255	86	1.65	1.70	15	251	64	57.000	98.2
11	33.0	1010.240	0.45	258	86	2.74	2.80	16	251	68	55.000	97.4
12	36.0	1012.810	0.39	258	86	2.38	2.40	16	251	65	56.000	96.3
13	39.0	1015.200	0.33	258	87	2.02	2.00	16	250	66	56.000	97.0
14	42.0	1017.650	0.33	260	88	2.01	2.00	16	251	66	57.000	99.4
15	45.0	1020.010	0.31	260	88	1.89	1.90	16	250	67	57.000	98.8
16	48.0	1022.350	0.30	260	88	1.83	1.80	16	250	67	57.000	99.6
17	51.0	1024.650	0.31	260	88	1.89	1.90	16	250	67	57.000	96.3
18	54.0	1026.890	0.28	260	88	1.71	1.70	16	250	67	57.000	98.6
19	57.0	1029.230	0.30	261	88	1.83	1.80	15	251	67	57.000	99.6
20	60.0	1031.585	0.33	260	88	2.01	2.00	15	250	67	57.000	95.6

Isokinetic Field Data
Field Data Entry

Client:	**Tucson Iron and Metal**		**Run:**	**3**
Location:	**Tucson, AZ**		**Start Time:**	**15:18**
Source:	**Contraband Incinerator**	**Environmental Conditions/Test Notes:**	**End Time:**	**16:26**
EPA Method:	**M23**	Sunny and Hot	**Date:**	**9/9/2020**
Box Operator:	**RR**			
Technician(s):	**AM**			

Stack Dimensional Data:

Circular	
Diameter	44.000 in
Rectangular	
Width	in
Length	in
Stack Area	10.559 sq.ft.

Equipment:

Meterbox ID	Box 8	Probe ID	T-6-1	Liner type:	Glass
Y factor	0.9780	Nozzle ID	26	Nozzle size:	0.2690 inches
ΔH@	1.93	Hot box ID	B2	Nozzle area:	0.000395 sq.ft.
		Pitot Cp	0.84	Probe heat:	250 F
		Pitot ID	T-PT-14	Filter heat:	250 F

Source Information:

Barometric Pressure	27.18 "Hg	O_2	19.0 %
Static Pressure	0.31 "H_2O	CO_2	2.0 %
Ave. ΔP	0.41 "H_2O	Rec. Nz.	0.263 inches
Stack Temperature	220 F		
Assumed moisture	3.66 %		
Assumed meter temp.	86.6 F		
Total number of points	20		
Time per point	3		
Total run time	60		

Leak Checks:

	Pre-test	Post-test
Pitot:	x	x
Train leak rate, dcf:	0.003	0.004
Leak check vacuum, "Hg:	18	20

Nozzle check for roundness:

1	2	3	
0.269	0.269	0.269	inches

Caliper ID# TMC-3

Changed nozzle size to better achieve Run delta H

Post Test Calculations:

Sample volume	48.129 dcf	Ave. ΔP	0.433 "H_2O
Wet mol. weight	28.85 M_s (actual)	Ave. √ΔP	0.6565 "H_2O
Actual H_2O	2.11 %	Ave. ΔH	1.945 "H_2O
Std. meter vol.	41.392 dscf	Ave. T_s	264.3 °F
Isokinetic Average	99.1 %	Ave. T_m	88.1 °F

Moisture/Lab:

Filter M23-Filter 3 #

	Initial	Final	Gain
Impingers, g	2480.1	2490.2	10.1
Silica gel, g	937.1	946.0	8.9
Total water gain:			19.0

Traverse Point	Time (min.)	Meter Volume (dcf) 33.322	Velocity ΔP ("H_2O)	Stack Temp. (°F)	Meter Temp. (°F)	Calc. ΔH	Run ΔH	Vacuum ("Hg)	Filter Box (°F)	Condenser Temp (≤68°F)	XAD Filter Temp <68°F	Assumed %I
1	3.0	35.930	0.45	264	89	1.99	2.10	11	254	66	52.000	106.3
2	6.0	38.470	0.49	263	89	2.17	2.20	11	250	65	50.000	99.2
3	9.0	40.980	0.45	264	89	1.99	2.00	11	254	62	49.000	102.3
4	12.0	43.510	0.48	267	88	2.11	2.10	11	249	63	51.000	100.3
5	15.0	45.990	0.44	266	88	1.93	2.00	12	249	64	51.000	102.6
6	18.0	48.610	0.53	266	88	2.33	2.40	12	249	64	51.000	98.8
7	21.0	51.010	0.43	266	88	1.89	1.90	12	247	66	52.000	100.4
8	24.0	53.470	0.49	266	88	2.15	2.20	12	248	66	52.000	96.5
9	27.0	56.020	0.46	263	88	2.03	2.10	12	250	66	52.000	103.0
10	30.0	58.444	0.42	263	89	1.86	1.90	12	254	66	53.000	102.2
11	33.0	60.610	0.35	263	88	1.55	1.60	11	246	67	62.000	100.1
12	36.0	62.810	0.37	262	88	1.64	1.70	11	256	66	60.000	98.9
13	39.0	65.300	0.49	264	88	2.16	2.20	11	256	66	60.000	97.5
14	42.0	67.770	0.45	266	88	1.98	2.00	11	256	64	53.000	101.0
15	45.0	70.250	0.44	265	87	1.93	2.00	11	253	62	53.000	102.7
16	48.0	72.650	0.41	265	87	1.80	1.80	11	255	61	51.000	102.9
17	51.0	74.840	0.38	265	88	1.67	1.70	11	250	61	51.000	97.3
18	54.0	77.030	0.35	263	88	1.55	1.60	10	251	62	50.000	101.2
19	57.0	79.230	0.38	262	88	1.68	1.70	10	251	62	50.000	97.6
20	60.0	81.451	0.39	262	88	1.72	1.70	10	251	62	50.000	97.2

EPA Methods 1-4, 23
Example Calculations

Client:	Tucson Iron and Metal	Run:	1
Location:	Tucson, AZ	Start Time:	11:10
Source:	Contraband Incinerator	End Time:	12:15
Method:	23	Date:	9/9/2020

EPA Methods 1-4:

1) $P_m = Pb + (\Delta H/13.6) =$ 27.338 "Hg

where Pb: 27.18 "Hg
ΔH: 2.155 "H_2O

2) $Ps = Pb + (\text{Static Press.}/13.6) =$ 27.203 "Hg

where Pb: 27.18 "Hg
Static Press.: 0.31 "H_2O

3) $V_m(std) = V_m(17.64)(Y)\left(\frac{Pm}{Tm}\right) =$ 43.885 dscf

where Vm: 50.712 dcf
Y: 0.9780
Pm: 27.338 "Hg
Tm: 545.0 °A

4) $V_w(std) = (0.04706)(H_2O) =$ 1.454 scf

where H_2O: 30.90 g

5) $Bws = \left(\frac{Vw(std)}{Vw(std)+Vm(std)}\right) =$ 0.0321

where Vw(std): 1.454 scf
Vm(std): 43.885 dscf

6) % H_2O = Bws x 100 = 3.21 %v

7) $V_m(actual) = \left(\frac{Y \times Vm}{(1-Bws)}\right)\left(\frac{Ts}{Tm}\right)\left(\frac{Pm}{Ps}\right) =$ 65.631 awcf

where Y: 0.9780
Vm: 50.7120 dcf
Bws: 0.0321
Ts: 694.6 °A
Tm: 545.0 °A
Pm: 27.338 "Hg
Ps: 27.203 "Hg

8) $M_d = 0.44(CO_2) + 0.32(O_2) + 0.28(N_2 + CO) =$ 29.08 lb/lb-mole

where CO_2: 2.22 %vd
O_2 18.18 %vd
N_2+CO= (100-(O_2+CO_2): 79.60 %vd

9) $M_s = M_d(1 - Bws) + (18 \times Bws) =$ 28.72 lb/lb-mole

where M_d: 29.08 lb/lb-mole
Bws: 0.0321

10) Stack Area(cir.) = 3.1416 (stack diameter/24)^2 = 10.559 sq. ft.

where Stack ID: 44 inches

11) Velocity, $V_s = 85.49(Cp)(\text{Ave. Sqrt } \Delta P)\left(\sqrt{\frac{Ts}{(Ps \times Ms)}}\right) =$ 39.39 fps

where Cp: 0.84
Ave. Sqrt ΔP: 0.5817
Ts: 694.6 °A
Ps: 27.203 "Hg
Ms: 28.72 lb/lb-mole

12) ACFM = (V_s)(stack area)(60 sec/min) = 24,955.1 ACFM

where V_s: 39.39 ft/sec
Stack Area: 10.559 sq. ft

13) ADCFM = (ACFM)(1-Bws) = 24,154.0 ADCFM

where ACFM: 24,955.1
Bws: 0.0321

14) $Qsw = 3600(V_s)(\text{stack area})\left(\frac{528°A}{Ts}\right)\left(\frac{Ps}{29.92\text{ "Hg}}\right) =$ 1,034,821.9 wscf/hr

where V_s: 39.39 ft/sec
Stack Area: 10.5590 sq. ft.
Ts: 694.6 °A
Ps: 27.203 "Hg

15) Qsd = (wscf/hr)(1-Bws) = 1,001,604.1 dscf/hr

where wscf/hr: 1,034,821.9
Bws: 0.0321

16) DSCFM= (dscf/hr)/60 mins/hr = 16,693.4 DSCFM

where dscf/hr: 1,001,604.1

17) Nozzle Area = 3.1416 (Nozzle Size/24)^2 = 0.000461 sq. ft.

where Nozzle Size: 0.2908 inches

18) Isokinetic % = $\left(\frac{0.0945(Ts)(Vm(std))}{Ps(V_s)(nozzle\ area)(sampling\ time)(1-Bws)}\right)$ = 100.4 %

where Ts:	694.6	°A
Vm(Std):	43.885	dscf
Ps:	27.203	"Hg
Vs	39.39	ft/sec
Nozzle Area:	0.000461	sq. ft.
Sampling Time:	60	min.
Bws:	0.0321	

EPA Method 23:
Ex. Run 1 OCDD

19) TEF Adjusted Result = TEF value* lab result pg = 9.30 pg

where TEF:	0.0003	pg
Run 1 result:	31000.00	pg

20) ng = result pg * 0.001 = 0.01 ng

where pg:	9.30	pg

21) O_2 corrected ng = ng*(20.9-O2 correction)/(20.9-Run O2) = 0.05 ng

where ng:	9.30E-03	ng
O_2 Correction:	7.0	%
Run 1 O_2:	18.18	%

22) ng/dscm = O_2 corrected ng/sample volume = 0.04 ng/dscm

where O_2 corrected ng:	4.75E-02	ng
Sample volume:	1.243	dscm

APPENDIX B: METHOD 5, 9, AND 29 TEST DATA

ED_005878_00000073-00042

BISON ENGINEERING, INC.

COMPANY	Tucson Iron and Metal
FACILITY	Metal Recycling Facility
LOCATION	Tucson, AZ
SOURCE	Contraband Incinerator
DATE	09/09/20
METHOD	M5/29
POLLUTANT	Particulate and Metals

Isokinetic Field Data
Field Data Entry

Client:	Tucson Iron and Metal		Run: 1
Location:	Tucson, AZ		Start Time: 11:10
Source:	Contraband Incinerator	Environmental Conditions/Test Notes:	End Time: 12:15
EPA Method:	M5/29	Sunny and Hot	Date: 9/9/2020
Box Operator:	RR		
Technician(s):	AM		

Stack Dimensional Data:

Circular		
Diameter	44.000	in
Rectangular		
Width		in
Length		in
Stack Area	10.559	sq.ft.

Equipment:

Meterbox ID	SB-2	Probe ID	B5C	Liner type	Glass
Y factor	0.9599	Nozzle ID	13	Nozzle size	0.3077 inches
ΔH@	1.8682	Hot box ID	HB1	Nozzle area	0.000516 sq.ft.
		Pitot Cp	0.84	Probe heat	250 F
		Pitot ID	B5C	Filter heat	250 F

Source Information:

Barometric Pressure	27.18 "Hg	O_2	19.00 %
Static Pressure	0.31 "H_2O	CO_2	2.00 %
Ave. ΔP	0.41 "H_2O	Rec. Nz.	0.264 inches
Stack Temperature	220 F		
Assumed moisture	3 %		
Assumed meter temp.	80 F		
Total number of points	20		
Time per point	3		
Total run time	60		

Leak Checks:

	Pre-test	Post-test
Pitot	x	x
Train leak rate, dcf	0.000	0.000
Leak check vacuum, "Hg	25	16

Nozzle check for roundness:

1	2	3	
0.309	0.308	0.306	inches
	Caliper ID#	TMC-3	

Post Test Calculations:

Sample volume	54.455 dcf	Ave. ΔP	0.3 "H_2O
Wet mol. weight	28.7 M_s (actual)	Ave. √ΔP	0.5438 "H_2O
Actual H_2O	3.41 %	Ave. ΔH	2.345 "H_2O
Std. meter vol.	46.800 dscf	Ave. T_s	233.1 °F
Isokinetic Average	102.4 %	Ave. T_m	78.9 °F

Moisture/Lab:

Filter	20-U140 #		
	Initial	Final	Gain
Impingers, g	4148.6	4178.6	30.0
Silica gel, g	834.5	839.6	5.1
		Total water gain:	35.1

Traverse Point	Time (min.)	Meter Volume (dcf) 302.435	Velocity ΔP ("H_2O)	Stack Temp. (°F)	Meter Temp. (°F)	Calc. ΔH	Run ΔH	Vacuum ("Hg)	Filter Box (°F)	Condenser Temp (≤68°F)	Assumed %I
1	3.0	304.684	0.21	237	73	1.57	1.61	2.5	262	51	101.2
2	6.0	306.873	0.20	235	72	1.49	1.55	2.5	259	55	101.0
3	9.0	309.201	0.22	236	73	1.64	1.69	2.5	249	54	102.3
4	12.0	311.435	0.21	232	74	1.58	1.63	2.5	256	55	100.0
5	15.0	314.320	0.35	231	75	2.64	2.70	3.5	256	55	100.1
6	18.0	317.085	0.32	231	75	2.42	2.49	3	251	53	100.3
7	21.0	320.035	0.35	230	75	2.65	2.73	3	251	54	102.3
8	24.0	322.964	0.35	230	78	2.66	2.74	3.5	253	53	101.0
9	27.0	325.875	0.34	227	79	2.60	2.68	3	250	52	101.4
10	30.0	328.862	0.36	227	79	2.76	2.84	3.5	249	53	101.2
11	33.0	331.910	0.36	227	80	2.76	2.84	3.5	245	53	103.0
12	36.0	334.900	0.35	227	80	2.68	2.80	3.5	247	55	102.5
13	39.0	337.810	0.33	231	80	2.52	2.60	3	258	53	103.0
14	42.0	340.780	0.36	232	82	2.75	2.80	3	260	53	100.4
15	45.0	343.760	0.35	232	82	2.68	2.80	3	260	53	102.1
16	48.0	347.100	0.41	236	83	3.12	3.20	4	262	53	106.0
17	51.0	349.810	0.30	239	84	2.28	2.30	4	256	52	100.3
18	54.0	352.230	0.22	239	84	1.67	1.70	4	263	53	104.5
19	57.0	354.530	0.21	240	85	1.60	1.60	4	256	56	101.5
20	60.0	356.890	0.20	242	84	1.51	1.60	3	249	57	107.0

Isokinetic Field Data
Field Data Entry

Client:	Tucson Iron and Metal		Run:	2
Location:	Tucson, AZ		Start Time:	13:11
Source:	Contraband Incinerator	Environmental Conditions/Test Notes:	End Time:	14:17
EPA Method:	M5/29	Sunny and Hot	Date:	9/9/2020
Box Operator:	RR			
Technician(s):	AM			

Stack Dimensional Data:

Circular		
Diameter	44.000	in
Rectangular		
Width		in
Length		in
Stack Area	10.559	sq.ft.

Equipment:

Meterbox ID	SB-2	Probe ID	B5C	Liner type:	Glass
Y factor	0.9599	Nozzle ID	13	Nozzle size:	0.3077 inches
ΔH@	1.8682	Hot box ID	HB1	Nozzle area:	0.000516 sq.ft.
		Pitot Cp	0.84	Probe heat:	250 F
		Pitot ID	B5C	Filter heat:	250 F

Source Information:

Barometric Pressure	27.18	"Hg	O_2	19.0 %
Static Pressure	0.31	"H_2O	CO_2	2.0 %
Ave. ΔP	0.41	"H_2O	Rec. Nz.	0.264 inches
Stack Temperature	220	F		
Assumed moisture	3.41	%		
Assumed meter temp.	78.9	F		
Total number of points	20			
Time per point	3			
Total run time	60			

Leak Checks:

	Pre-test	Post-test
Pitot:	x	x
Train leak rate, dcf:	0.000	0.000
Leak check vacuum, "Hg:	15	20

Nozzle check for roundness:

1	2	3	
0.309	0.308	0.306	inches
	Caliper ID#	TMC-3	

Post Test Calculations:

Sample volume	58.814	dcf	Ave. ΔP	0.37 "H_2O
Wet mol. weight	28.56	M_s (actual)	Ave. √ΔP	0.6005 "H_2O
Actual H_2O	4.71	%	Ave. ΔH	2.825 "H_2O
Std. meter vol.	50.230	dscf	Ave. T_s	256 °F
Isokinetic Average	102.3	%	Ave. T_m	83 °F

Moisture/Lab:

Filter	20-U141 #		
	Initial	Final	Gain
Impingers, g	4061.2	4099.6	38.4
Silica gel, g	854.0	868.4	14.4
		Total water gain:	52.8

Traverse Point	Time (min.)	Meter Volume (dcf) 357.166	Velocity ΔP ("H_2O)	Stack Temp. (°F)	Meter Temp. (°F)	Calc. ΔH	Run ΔH	Vacuum ("Hg)	Filter Box (°F)	Condenser Temp (≤68°F)	Assumed % I
1	3.0	360.040	0.37	245	81	2.75	2.90	8	254	66	97.2
2	6.0	363.110	0.44	249	81	3.25	3.40	8	253	64	95.6
3	9.0	366.500	0.50	256	82	3.67	3.80	10	250	64	99.5
4	12.0	370.010	0.48	254	82	3.53	3.70	10	250	63	105.0
5	15.0	373.440	0.49	253	82	3.61	3.70	10	251	63	101.4
6	18.0	376.650	0.42	252	82	3.10	3.20	9	253	61	102.3
7	21.0	379.990	0.49	250	82	3.62	3.80	10	253	60	98.6
8	24.0	383.580	0.55	255	82	4.04	4.20	10	258	60	100.5
9	27.0	386.900	0.44	256	82	3.23	3.40	9	255	60	103.8
10	30.0	389.962	0.38	256	82	2.79	2.90	9	255	61	102.8
11	33.0	393.200	0.43	258	82	3.14	3.30	9	251	61	102.5
12	36.0	396.460	0.40	258	82	2.93	3.10	9	252	60	106.9
13	39.0	399.400	0.35	259	83	2.56	2.70	9	251	61	102.8
14	42.0	402.310	0.35	260	83	2.56	2.60	8	248	63	101.8
15	45.0	404.880	0.27	260	83	1.97	2.00	7	255	64	102.2
16	48.0	407.140	0.21	260	84	1.54	1.60	5	251	65	101.6
17	51.0	409.210	0.20	260	85	1.47	1.50	5	256	65	95.2
18	54.0	411.300	0.19	259	86	1.40	1.40	5	255	62	98.3
19	57.0	413.550	0.20	260	87	1.47	1.50	5	252	60	103.1
20	60.0	415.980	0.24	260	87	1.77	1.80	5	250	58	101.7

Isokinetic Field Data
Field Data Entry

Client:	Tucson Iron and Metal		Run:	3
Location:	Tucson, AZ		Start Time:	15:19
Source:	Contraband Incinerator	Environmental Conditions/Test Notes:	End Time:	**16:27**
EPA Method:	M5/29	Sunny and Hot	Date:	9/9/2020
Box Operator:	RR			
Technician(s):	AM			

Stack Dimensional Data:

Circular		
Diameter	44.000	in
Rectangular		
Width		in
Length		in
Stack Area	10.559	sq.ft.

Equipment:

Meterbox ID	SB-2	Probe ID	B5C	Liner type:	Glass	
Y factor	0.9599	Nozzle ID	13	Nozzle size:	0.3077	inches
ΔH@	1.8682	Hot box ID	HB1	Nozzle area:	0.000516	sq.ft.
		Pitot Cp	0.84	Probe heat:	250	F
		Pitot ID	B5C	Filter heat:	250	F

Source Information:

Barometric Pressure	27.18	"Hg	O_2	19.0 %
Static Pressure	0.31	"H_2O	CO_2	2.0 %
Ave. ΔP	0.41	"H_2O	Rec. Nz.	0.265 inches
Stack Temperature	220	F		
Assumed moisture	4.71	%		
Assumed meter temp.	83	F		
Total number of points	20			
Time per point	3			
Total run time	60			

Leak Checks:

	Pre-test	Post-test
Pitot:	x	x
Train leak rate, dcf:	0.001	0.001
Leak check vacuum, "Hg:	20	18

Nozzle check for roundness:

1	2	3	
0.309	0.308	0.306	inches
	Caliper ID#	TMC-3	

Post Test Calculations:

Sample volume	66.190	dcf	Ave. ΔP	0.461	"H_2O
Wet mol. weight	28.56	M_s (actual)	Ave. √ΔP	0.6742	"H_2O
Actual H_2O	4.72	%	Ave. ΔH	3.47	"H_2O
Std. meter vol.	56.336	dscf	Ave. T_s	263	°F
Isokinetic Average	102.7	%	Ave. T_m	85.8	°F

Moisture/Lab:

Filter	20-U142 #		
	Initial	Final	Gain
Impingers, g	4114.8	4157.0	42.2
Silica gel, g	853.5	870.6	17.1
		Total water gain:	59.3

Traverse Point	Time (min.)	Meter Volume (dcf) 416.095	Velocity ΔP ("H_2O)	Stack Temp. (°F)	Meter Temp. (°F)	Calc. ΔH	Run ΔH	Vacuum ("Hg)	Filter Box (°F)	Condenser Temp (≤68°F)	Assumed % I
1	3.0	418.990	0.35	244	83	2.56	2.70	6	255	64	101.3
2	6.0	421.890	0.34	258	83	2.44	2.60	6	257	52	104.0
3	9.0	424.810	0.35	263	83	2.49	2.60	6	260	54	103.5
4	12.0	427.970	0.43	265	85	3.06	3.20	6	255	60	101.0
5	15.0	431.910	0.64	266	86	4.56	4.80	9	247	60	103.6
6	18.0	435.730	0.61	269	88	4.35	4.60	10	253	60	102.6
7	21.0	439.540	0.59	266	88	4.22	4.40	10	259	60	103.8
8	24.0	443.250	0.56	266	88	4.01	4.20	10	258	58	103.7
9	27.0	446.710	0.51	266	87	3.64	3.80	8	256	56	101.4
10	30.0	450.147	0.49	266	86	3.49	3.70	8	254	59	103.0
11	33.0	453.590	0.50	266	86	3.56	3.80	7	249	66	102.1
12	36.0	457.200	0.55	266	86	3.92	4.10	8	255	60	102.2
13	39.0	460.880	0.56	266	86	3.99	4.20	8	248	60	103.3
14	42.0	464.180	0.44	265	84	3.13	3.30	7	250	61	104.5
15	45.0	467.310	0.43	263	85	3.07	3.20	7	259	60	99.9
16	48.0	470.660	0.46	263	86	3.29	3.50	7	255	60	103.3
17	51.0	473.990	0.46	263	86	3.29	3.50	7	251	61	102.7
18	54.0	476.810	0.33	259	85	2.37	2.50	6	253	60	102.3
19	57.0	479.590	0.31	260	87	2.23	2.40	5	260	61	103.7
20	60.0	482.285	0.30	260	87	2.16	2.30	5	261	61	102.2

Isokinetic Field Data
Field Data and Calculations
Gas Stream Characteristics

Client:	Tucson Iron and Metal	Run:	1
Location:	Tucson, AZ	Start Time:	11:10
Source:	Contraband Incinerator	End Time:	12:15
Method:	29	Date:	9/9/2020

Sampling Data				Traverse Data			
Time min.	Meter ft^3	**ΔH** "H_2O	Meter T_m °F	Traverse Point	Dp "H_2O	Stack T_s °F	**√Dp**
	302.435						
3.0	304.684	1.61	73	1	0.21	237	0.4583
6.0	306.873	1.55	72	2	0.20	235	0.4472
9.0	309.201	1.69	73	3	0.22	236	0.4690
12.0	311.435	1.63	74	4	0.21	232	0.4583
15.0	314.320	2.70	75	5	0.35	231	0.5916
18.0	317.085	2.49	75	6	0.32	231	0.5657
21.0	320.035	2.73	75	7	0.35	230	0.5916
24.0	322.964	2.74	78	8	0.35	230	0.5916
27.0	325.875	2.68	79	9	0.34	227	0.5831
30.0	328.862	2.84	79	10	0.36	227	0.6000
33.0	331.910	2.84	80	11	0.36	227	0.6000
36.0	334.900	2.80	80	12	0.35	227	0.5916
39.0	337.810	2.60	80	13	0.33	231	0.5745
42.0	340.780	2.80	82	14	0.36	232	0.6000
45.0	343.760	2.80	82	15	0.35	232	0.5916
48.0	347.100	3.20	83	16	0.41	236	0.6403
51.0	349.810	2.30	84	17	0.30	239	0.5477
54.0	352.230	1.70	84	18	0.22	239	0.4690
57.0	354.530	1.60	85	19	0.21	240	0.4583
60.0	356.890	1.60	84	20	0.20	242	0.4472

Client:	Tucson Iron and Metal	Run:	1
Source:	Contraband Incinerator	Date:	09/09/20

Field Data Input Continued

Moisture Data			Stack Dimensional Data:		
Total Test Time	60	min	Circular		
Sample Time Interval	3.0	min	Diameter	44.000	in
Meter Volume, V_m	54.455	dcf	Rectangular		
Water Volume	35.1	ml (g)	Width		in
Nozzle Diameter, N_z	0.3077	in.	Length		in
Nozzle Area	0.000516	sq.ft.	Stack Area	10.559	sq.ft.

Traverse Data			Molecular Weight (from gaseous master):		
Barometric Pressure, P_b	27.18	"Hg	CO_2 Average	2.22	%vd
Static Pressure	0.31	"H_2O	O_2 Average	18.18	%vd
Pitot Factor, cp	0.84				
Meter Cal Factor	0.9599	Y			

Field Data Averages

Meter			Stack		
ΔH	2.345	"H_2O	$\sqrt{Dp}$	0.5438	"H_2O
Temperature, T_m	78.9	^oF	Temperature, T_s	233.1	^oF
Temperature, T_m	538.9	^oA (^oR)	Temperature, T_s	693.1	^oA (^oR)
Pressure Meter, P_m	27.352	"Hg	Pressure Stack, P_s	27.203	"Hg

Field Data Calculations

Meter Box Capture			EPA Method 2 Stack Gas Flowrate:		
Standard Volume, $V_{m(std)}$	46.800	dscf	Velocity, V_s	36.79	fps
	1.325	dscm	Volume (actual)	23,307.9	awcfm
Actual Volume, $V_{m(actual)}$	69.983	awcf		22,513.1	adcfm
Gas Stream Moisture			Volume (standard)	968,608.6	wscf/hr
Moisture Vapor, $Vw_{(std)}$	1.652	scf		935,579.0	dscf/hr
Moisture, B_{ws}	0.0341			15,593.0	dscf/min
Moisture EPA M4	3.41	%v			
EPA Method 3 Gas Density					
Dry, M_d	29.08	lb/lb-mole			
Wet, M_s	28.70	lb/lb-mole			
Percent Isokinetic	102.4	%			

Isokinetic Field Data
Field Data and Calculations
Gas Stream Characteristics

Client:	Tucson Iron and Metal	Run:	2
Location:	Tucson, AZ	Start Time:	13:11
Source:	Contraband Incinerator	End Time:	14:17
Method:	29	Date:	09/09/20

Sampling Data				Traverse Data			
Time min.	Meter ft^3	ΔH "H_2O	Meter T_m °F	Traverse Point	Dp "H_2O	Stack T_s °F	$\sqrt{Dp}$
	357.166						
3.0	360.040	2.90	81	1	0.37	245	0.6083
6.0	363.110	3.40	81	2	0.44	249	0.6633
9.0	366.500	3.80	82	3	0.50	256	0.7071
12.0	370.010	3.70	82	4	0.48	254	0.6928
15.0	373.440	3.70	82	5	0.49	253	0.7000
18.0	376.650	3.20	82	6	0.42	252	0.6481
21.0	379.990	3.80	82	7	0.49	250	0.7000
24.0	383.580	4.20	82	8	0.55	255	0.7416
27.0	386.900	3.40	82	9	0.44	256	0.6633
30.0	389.962	2.90	82	10	0.38	256	0.6164
33.0	393.200	3.30	82	11	0.43	258	0.6557
36.0	396.460	3.10	82	12	0.40	258	0.6325
39.0	399.400	2.70	83	13	0.35	259	0.5916
42.0	402.310	2.60	83	14	0.35	260	0.5916
45.0	404.880	2.00	83	15	0.27	260	0.5196
48.0	407.140	1.60	84	16	0.21	260	0.4583
51.0	409.210	1.50	85	17	0.20	260	0.4472
54.0	411.300	1.40	86	18	0.19	259	0.4359
57.0	413.550	1.50	87	19	0.20	260	0.4472
60.0	415.980	1.80	87	20	0.24	260	0.4899

Client:	Tucson Iron and Metal	Run:	2
Source:	Contraband Incinerator	Date:	09/09/20

Field Data Input Continued

Moisture Data			Stack Dimensional Data:		
Total Test Time	60	min	Circular		
Sample Time Interval	3.0	min	Diameter	44.000	in
Meter Volume, V_m	58.814	dcf	Rectangular		
Water Volume	52.8	ml (g)	Width		in
Nozzle Diameter, N_z	0.3077	in.	Length		in
Nozzle Area	0.000516	sq.ft.	Stack Area	10.559	sq.ft.

Traverse Data			Molecular Weight (from gaseous master):		
Barometric Pressure, P_b	27.18	"Hg	CO_2 Average	1.95	%vd
Static Pressure	0.31	"H_2O	O_2 Average	18.58	%vd
Pitot Factor, cp	0.84				
Meter Cal Factor	0.9599	Y			

Field Data Averages

Meter			Stack		
ΔH	2.825	"H_2O	$\sqrt{Dp}$	0.6005	"H_2O
Temperature, T_m	83.0	^oF	Temperature, T_s	256.0	^oF
Temperature, T_m	543.0	^oA (^oR)	Temperature, T_s	716.0	^oA (^oR)
Pressure Meter, P_m	27.388	"Hg	Pressure Stack, P_s	27.203	"Hg

Field Data Calculations

Meter Box Capture			EPA Method 2 Stack Gas Flowrate:		
Standard Volume, $V_{m(std)}$	50.230	dscf	Velocity, V_s	41.41	fps
	1.422	dscm	Volume (actual)	26,234.9	awcfm
Actual Volume, $V_{m(actual)}$	78.653	awcf		24,999.2	adcfm
Gas Stream Moisture			Volume (standard)	1,055,374.6	wscf/hr
Moisture Vapor, $Vw_{(std)}$	2.485	scf		1,005,666.5	dscf/hr
Moisture, B_{ws}	0.0471			16,761.1	dscf/min
Moisture EPA M4	4.71	%v			
EPA Method 3 Gas Density					
Dry, M_d	29.06	lb/lb-mole			
Wet, M_s	28.54	lb/lb-mole			
Percent Isokinetic	102.3	%			

Isokinetic Field Data
Field Data and Calculations
Gas Stream Characteristics

Client:	Tucson Iron and Metal	Run:	3
Location:	Tucson, AZ	Start Time:	15:19
Source:	Contraband Incinerator	End Time:	16:27
Method:	29	Date:	09/09/20

Sampling Data				Traverse Data			
Time min.	Meter ft^3	ΔH "H_2O	Meter T_m °F	Traverse Point	Dp "H_2O	Stack T_s °F	√**Dp**
	416.095						
3.0	418.990	2.70	83	1	0.35	244	0.5916
6.0	421.890	2.60	83	2	0.34	258	0.5831
9.0	424.810	2.60	83	3	0.35	263	0.5916
12.0	427.970	3.20	85	4	0.43	265	0.6557
15.0	431.910	4.80	86	5	0.64	266	0.8000
18.0	435.730	4.60	88	6	0.61	269	0.7810
21.0	439.540	4.40	88	7	0.59	266	0.7681
24.0	443.250	4.20	88	8	0.56	266	0.7483
27.0	446.710	3.80	87	9	0.51	266	0.7141
30.0	450.147	3.70	86	10	0.49	266	0.7000
33.0	453.590	3.80	86	11	0.50	266	0.7071
36.0	457.200	4.10	86	12	0.55	266	0.7416
39.0	460.880	4.20	86	13	0.56	266	0.7483
42.0	464.180	3.30	84	14	0.44	265	0.6633
45.0	467.310	3.20	85	15	0.43	263	0.6557
48.0	470.660	3.50	86	16	0.46	263	0.6782
51.0	473.990	3.50	86	17	0.46	263	0.6782
54.0	476.810	2.50	85	18	0.33	259	0.5745
57.0	479.590	2.40	87	19	0.31	260	0.5568
60.0	482.285	2.30	87	20	0.30	260	0.5477

Client:	Tucson Iron and Metal	Run:	3
Source:	Contraband Incinerator	Date:	09/09/20

Field Data Input Continued

Moisture Data			Stack Dimensional Data:		
Total Test Time	60	min	Circular		
Sample Time Interval	3.0	min	Diameter	44.000	in
Meter Volume, V_m	66.190	dcf	Rectangular		
Water Volume	59.3	ml (g)	Width		in
Nozzle Diameter, N_z	0.3077	in.	Length		in
Nozzle Area	0.000516	sq.ft.	Stack Area	10.559	sq.ft.

Traverse Data			Molecular Weight (from gaseous master):		
Barometric Pressure, P_b	27.18	"Hg	CO_2 Average	1.73	%vd
Static Pressure	0.31	"H_2O	O_2 Average	18.95	%vd
Pitot Factor, cp	0.84				
Meter Cal Factor	0.9599	Y			

Field Data Averages

Meter			Stack		
ΔH	3.470	"H_2O	√Dp	0.6742	"H_2O
Temperature, T_m	85.8	°F	Temperature, T_s	263.0	°F
Temperature, T_m	545.8	°A (°R)	Temperature, T_s	723.0	°A (°R)
Pressure Meter, P_m	27.435	"Hg	Pressure Stack, P_s	27.203	"Hg

Field Data Calculations

Meter Box Capture			EPA Method 2 Stack Gas Flowrate:		
Standard Volume, $V_{m(std)}$	56.336	dscf	Velocity, V_s	46.75	fps
	1.595	dscm	Volume (actual)	29,618.0	awcfm
Actual Volume, $V_{m(actual)}$	89.086	awcf		28,220.0	adcfm
Gas Stream Moisture			Volume (standard)	1,179,934.1	wscf/hr
Moisture Vapor, $Vw_{(std)}$	2.791	scf		1,124,241.2	dscf/hr
Moisture, B_{ws}	0.0472			18,737.4	dscf/min
Moisture EPA M4	4.72	%v			
EPA Method 3 Gas Density					
Dry, M_d	29.03	lb/lb-mole			
Wet, M_s	28.51	lb/lb-mole			
Percent Isokinetic	102.6	%			

Laboratory Data

Client: Tucson Iron and Metal
Location: Tucson, AZ
Source: Contraband Incinerator
Method: 29

Run: 1

Client ID:		Filter + Front Half		Back Half			
Analyte	<	Result	<	Result	FH MDL	BH MDL	Units
Cadmium		1.080	<	MDL	0.100	0.048	µg/sample
Lead	<	MDL		1.140	1.250	0.595	µg/sample
Lab ID:		20-S1819		20-S1820			
Sample Vol:		250		100			mL

Run: 2

Client ID:		Filter + Front Half		Back Half			
Analyte	<	Result	<	Result	FH MDL	BH MDL	Units
Cadmium		0.986	<	MDL	0.100	0.045	µg/sample
Lead	<	MDL		0.963	1.250	0.565	µg/sample
Lab ID:		20-S1824		20-S1825			
Sample Vol:		250		100			mL

Run: 3

Client ID:		Filter + Front Half		Back Half			
Analyte	<	Result	<	Result	FH MDL	BH MDL	Units
Cadmium		1.130	<	MDL	0.100	0.046	µg/sample
Lead	<	MDL		1.130	1.250	0.570	µg/sample
Lab ID:		20-S1829		20-S1830			
Sample Vol:		250		100			mL

Blank Results

Client: Tucson Iron and Metal
Location: Tucson, AZ
Source: Contraband Incinerator
Method: 29

Client ID:		Filter	MDL		BH Capture Soln.	MDL		FH/BH Rinse	MDL
			Filter MDL		5% HNO_3/ 10% H_2O_2	5% HNO_3/ 10% H_2O_2 MDL		0.1 N HNO_3	0.1 N HNO_3 MDL
Analyte	<	µg/sample	µg/sample	<	µg/sample	µg/sample	<	µg/sample	µg/sample
Cadmium		1.070	0.100	<	MDL	0.045	<	MDL	0.100
Lead	<	MDL	1.250	<	MDL	0.565	<	MDL	1.250
Lab ID:		20-S1836			20-S1837			20-S1835	
Sample Vol, ml:					100			250	

Method 29 Metals Blank Calculations — Run: 1
Tucson Iron and Metal — Date: 09/09/20
Contraband Incinerator

Species	I Sample* FH Wash+Filter		II Blank* FH Wash, µg		III Blank* FH Filter, µg		IV Sample* BH Cap.Sol.		V Blank* BH Cap.Sol.		VI BH Blank* Corrected Cap.Sol.		VII BH Blank* Corrected Wash, µg		VIII Allowable BH Blank, µg	Species
Volume(ml)	100		100		N/A		100		µg/mL		200		100			
Cd	1.080	<	0.0400		1.070	<	0.048	<	0.0005	<	0.090	<	0.0400		0.000	Cadmium
Pb	< 1.250	<	0.5000	<	1.250		1.140	<	0.0057	<	1.130	<	0.5000		0.000	Lead
Lab:	20-S1819		20-S1835		20-S1836		20-S1820		20-S1837							
Content:	0.1NHNO_3		0.1NHNO_3		0.1NHNO_3		5%HNO_3/		5%HNO_3/		5%HNO_3/		0.1NHNO_3			
	FH Filter & Probe Rinse						10%H_2O_2		10%H_2O_2		10%H_2O_2					
	100ml 0.1N HNO_3 rinse						BH Imps 1&2									
			Same as BH				100ml .1N HNO_3 rinse						Same as FH			
			Blank Wash				200ml 5%HNO_3/10%H_2O_2 reagent						Blank Wash			

Blanks are prorated to reflect 100ml for HNO_3 and 200ml for HNO_3/H_2O_2

Species	X Allowable FH Blank, µg	XI FH Blank Corrected µg		XII 5% of FH Sample, µg	XIII Lessor of XI or XII	XIV Greater of A or XIII		XV FH Net Sample, µg	Species
Cd	1.070	1.070		0.054	0.054	11.63		0.010	Cadmium
Pb	0.000	0.000	<	0.063	0.000	11.63	<	1.250	Lead

Allowable FH Blank Calculation:
A = (area of filter, sq. in.)*(1.4 µg/sq.in.)= µg A= 11.63 µg
if A>blank>0, use blank derived
if blank > A, use greater of A or 5% of sample µg or FH blank whichever is lessor.

Species	XVI Allowable BH Blank, µg	XVII Blank BH Total		XVIII 5% of BH sample, µg	XIX Lessor of XVII or XVIII	XX Greater of 1µg or XIX		XXI BH Net Sample, µg		XXII FH Net Sample, µg		XXIII FH+BH Total Net Sample, µg	Species
Cd	0.000	0.000	<	0.002	0.000	1.000	<	0.048		0.010	<	0.058	Cadmium
Pb	0.000	0.000		0.057	0.000	1.000		1.140	<	1.250	<	2.390	Lead

Allowable BH Blank Calculation:
if 1.00µg >blank>0, use blank derived
if blank >1.00µg , use greater of 1.00 or 5% of sample ug or BH blank whichever is lessor

* Blank Rules:
"<" indicates value is below the minimum detection limit (MDL)
If Blank is a "<" value it is treated as zero.
If Sample is a "<" it used for emission rate calculations but the final answer contains a "<" to demonstrate the value is unknown

Method 29 Metals Blank Calculations — Run: 2
Tucson Iron and Metal — Date: 09/09/20
Contraband Incinerator

	I		II		III		IV		V		VI		VII		VIII	
	Sample*		Blank*		Blank*		Sample*		Blank*		BH Blank*		BH Blank*		Allowable	
	FH		FH		FH		BH		BH		Corrected		Corrected		BH	
Species	Wash+Filter		Wash, µg		Filter, µg		Cap.Sol.		Cap.Sol.		Cap.Sol.		Wash, µg		Blank, µg	Species
Volume(ml)	100		100		N/A		100		µg/mL		200		100			
Cd	0.986	<	0.0400		1.070	<	0.045	<	0.0005	<	0.090	<	0.0400		0.000	Cadmium
Pb	< 1.250	<	0.5000	<	1.250		0.963	<	0.0057	<	1.130	<	0.5000		0.000	Lead
Lab:	20-S1824		20-S1835		20-S1836		20-S1825		20-S1837							
Content:	0.1NHNO_3		0.1NHNO_3		0.1NHNO_3		5%HNO_3/		5%HNO_3/		5%HNO_3/		0.1NHNO_3			
	FH Filter & Probe Rinse						10%H_2O_2		10%H_2O_2		10%H_2O_2					
	100ml 0.1N HNO_3 rinse						BH Imps 1&2									
			Same as BH				100ml .1N HNO_3 rinse						Same as FH			
			Blank Wash				200ml 5%HNO_3/10%H_2O_2 reagent						Blank Wash			

Blanks are prorated to reflect 100ml for HNO_3 and 200ml for HNO_3/H_2O_2

	X		XI		XII		XIII		XIV		XV	
	Allowable		FH Blank		5% of FH		Lessor of		Greater of		FH	
	FH		Corrected		Sample, *µg*		XI or XII		A or XIII		Net	
Species	Blank, *µg*		*µg*								Sample, *µg*	Species
Cd	1.070		1.070		0.049		0.049		11.63		-0.084	Cadmium
Pb	0.000		0.000	<	0.063		0.000		11.63	<	1.250	Lead

Allowable FH Blank Calculation:
A = (area of filter, sq. in.)*(1.4 µg/sq.in.)= *µg* A= 11.63 *µg*
if A>blank>0, use blank derived
if blank > A, use greater of A or 5% of sample µg or FH blank whichever is lessor.

	XVI		XVII		XVIII		XIX		XX		XXI		XXII		XXIII	
	Allowable		Blank BH		5% of BH		Lessor of		Greater of		BH		FH		FH+BH	
	BH		Total		sample, *µg*		XVII or XVIII		1*µg* or XIX		Net		Net		Total Net	
Species	Blank, *µg*										Sample, *µg*		Sample, *µg*		Sample, *µg*	Species
Cd	0.000		0.000	<	0.002		0.000		1.000	<	0.045		0.000	<	0.045	Cadmium
Pb	0.000		0.000		0.048		0.000		1.000		0.963	<	1.250	<	2.213	Lead

Allowable BH Blank Calculation:
if 1.00*µg* >blank>0, use blank derived
if blank >1.00*µg* , use greater of 1.00 or 5% of sample ug or BH blank whichever is lessor

* Blank Rules:
"<" indicates value is below the minimum detection limit (MDL)
If Blank is a "<" value it is treated as zero.
If Sample is a "<" it used for emission rate calculations but the final answer contains a "<" to demonstrate the value is unknown

Method 29 Metals Blank Calculations — Run: 3
Tucson Iron and Metal — Date: 09/09/20
Contraband Incinerator

Species	I Sample* FH Wash+Filter	II Blank* FH Wash, µg	III Blank* FH Filter, µg	IV Sample* BH Cap.Sol.	V Blank* BH Cap.Sol.	VI BH Blank* Corrected Cap.Sol.	VII BH Blank* Corrected Wash, µg	VIII Allowable BH Blank, µg	Species
Volume(ml)	100	100	N/A	100	µg/mL	200	100		
Cd	1.130	< 0.0400	1.070	< 0.046	< 0.0005	< 0.090	< 0.0400	0.000	Cadmium
Pb	< 1.250	< 0.5000	< 1.250	1.130	< 0.0057	< 1.130	< 0.5000	0.000	Lead
Lab:	20-S1829	20-S1835	20-S1836	20-S1830	20-S1837				
Content:	0.1NHNO_3	0.1NHNO_3	0.1NHNO_3	5%HNO_3/	5%HNO_3/	5%HNO_3/	0.1NHNO_3		
	FH Filter & Probe Rinse			10%H_2O_2	10%H_2O_2	10%H_2O_2			
	100ml 0.1N HNO_3 rinse			BH Imps 1&2					
		Same as BH		100ml .1N HNO_3 rinse			Same as FH		
		Blank Wash		200ml 5%HNO_3/10%H_2O_2 reagent			Blank Wash		

Blanks are prorated to reflect 100ml for HNO_3 and 200ml for HNO_3/H_2O_2

Species	X Allowable FH Blank, µg	XI FH Blank Corrected µg	XII 5% of FH Sample, µg	XIII Lessor of XI or XII	XIV Greater of A or XIII	XV FH Net Sample, µg	Species
Cd	1.070	1.070	0.057	0.057	11.63	0.060	Cadmium
Pb	0.000	0.000	< 0.063	0.000	11.63	< 1.250	Lead

Allowable FH Blank Calculation:
A = (area of filter, sq. in.)*(1.4 µg/sq.in.)= µg A= 11.63 µg
if A>blank>0, use blank derived
if blank > A, use greater of A or 5% of sample µg or FH blank whichever is lessor.

Species	XVI Allowable BH Blank, µg	XVII Blank BH Total	XVIII 5% of BH sample, µg	XIX Lessor of XVII or XVIII	XX Greater of 1µg or XIX	XXI BH Net Sample, µg	XXII FH Net Sample, µg	XXIII FH+BH Total Net Sample, µg	Species
Cd	0.000	0.000	< 0.002	0.000	1.000	< 0.046	0.060	< 0.106	Cadmium
Pb	0.000	0.000	0.057	0.000	1.000	1.130	< 1.250	< 2.380	Lead

Allowable BH Blank Calculation:
if 1.00µg >blank>0, use blank derived
if blank >1.00µg , use greater of 1.00 or 5% of sample ug or BH blank whichever is lessor

* Blank Rules:
"<" indicates value is below the minimum detection limit (MDL)
If Blank is a "<" value it is treated as zero.
If Sample is a "<" it used for emission rate calculations but the final answer contains a "<" to demonstrate the value is unknown

Laboratory Data- Mercury

Client: Tucson Iron and Metal
Location: Tucson, AZ
Source: Contraband Incinerator
Method: 29

Run 1		Cont. 1-3 Filter+Front Half		Cont. 4 BH HNO_3/H_2O_2		Cont. 5a Empty 0.1 HNO3		Cont. 5b $KMnO_4/H_2SO_4$		Cont. 5c 8N HCl			Back Half
		Result	MDL	Result	MDL	Result	MDL	Result	MDL	Result	MDL		Total
		µg/sample		µg/sample		µg/sample		µg/sample		µg/sample			µg/sample
Hg		0.0250	0.0219	0.1500	0.0276	< 0.00788	0.00788	0.412	0.0328	0.0280	0.0196	<	0.598
Lab ID:		20-S1819		20-S1820		20-S1821		20-S1822		20-S1823			
Sample Vol:		250		100		100		100		100			
Sample with MDL		0.025		0.150		< 0.008		0.412		0.028		<	0.598
Sample without MDL		0.025		0.150		0.000		0.412		0.028			0.590

Run 2		Cont. 1-3 Filter+Front Half		Cont. 4 BH HNO_3/H_2O_2		Cont. 5a Empty 0.1 HNO3		Cont. 5b $KMnO_4/H_2SO_4$		Cont. 5c 8N HCl			Back Half
		Result	MDL	Result	MDL	Result	MDL	Result	MDL	Result	MDL		Total
		µg/sample		µg/sample		µg/sample		µg/sample		µg/sample			µg/sample
Hg	<	0.0219	0.0219	0.194	0.0271	< 0.00805	0.00805	0.650	0.0298	0.0388	0.0194	<	0.8909
Lab ID:		20-S1824		20-S1825		20-S1826		20-S1827					
Sample Vol:		250		100		100		100		100			
Sample with MDL	<	0.022		0.194		< 0.008		0.650		0.039		<	0.891
Sample without MDL		0.000		0.194		0.000		0.650		0.039			0.883

Run 3		Cont. 1-3 Filter+Front Half		Cont. 4 BH HNO_3/H_2O_2		Cont. 5a Empty 0.1 HNO3		Cont. 5b $KMnO_4/H_2SO_4$		Cont. 5c 8N HCl			Back Half
		Result	MDL	Result	MDL	Result	MDL	Result	MDL	Result	MDL		Total
		µg/sample		µg/sample		µg/sample		µg/sample		µg/sample			µg/sample
Hg	<	0.0219	0.0219	0.2730	0.0258	< 0.00718	0.00718	0.283	0.0215	< 0.0186	0.0186	<	0.5818
Lab ID:		20-S1829		20-S1830		20-S1831		20-S1832		20-S1833			
Sample Vol:		250		100		100		100		100			
Sample with MDL	<	0.022		0.273		< 0.007		0.283		< 0.019		<	0.582
Sample without MDL		0.000		0.273		0.000		0.283		0.000			0.556

If Sample is a "<" it used for emission rate calculations but the final answer contains a "<" to demonstrate the value is unknown

Source: Contraband Incinerator
Date: 9/9/2020
Method 29 Hg Blanks

FH Blanks

Analyte	Cont. 8a 0.1 N HNO_3 µg/sample	MDL	Cont. 12 Filter µg/sample	MDL	Cont. 7 Acetone µg/sample	MDL
Hg	< 0.0219	0.0219	< 0.0219	0.0219	< 0.0219	0.0219
Lab ID:	20-S1835		20-S1836		20-S1834	
Blank Vol (mL):	250		250		250	
Sample (mL):	250		250		250	
Hg Corrected (with MDL):	< 0.0219		< 0.0219		< 0.0219	

BH Blanks

Analyte	Cont. 8a 0.1 N HNO_3 µg/sample	MDL	Cont. 9 5% HNO_3/ 10% H_2O_2 µg/sample	MDL	Cont. 10 $KMnO_4$ µg/sample	MDL	Cont. 11 HCl µg/sample	MDL	Cont. 8b H_2O µg/sample	MDL
Hg	< 0.0219	0.0219	0.0276	0.0276	< 0.00831	0.00831	< 0.0194	0.0194	< 0.00858	0.00858
Lab ID:	20-S1835		20-S1837		20-S1839		20-S1840		20-S1838	
Blank Vol (mL):	100		100		100		100		100	
Sample (mL):	100		100		100		100		100	
Hg Corrected (with MDL):	< 0.0219		0.0276		< 0.0083		< 0.0194		< 0.0086	

Total FH blank = FH Washes + Filter Blank (corrected) (FH washes include an NH_3 rinse and an acetone rinse)
Total BH blank = BH rinse + BH H_2O + BH $KMnO_4$ + BH HCl (corrected)

Total FH blank = 0.0000 µg/sample
Total BH blank = 0.0276 µg/sample

"<" indicates value is below the minimum detection limit (MDL) or includes a sample fraction that is below the MDL
If Blank is a "<" value it is treated as zero.
If Sample is a "<" it used for emission rate calculations but the final answer contains a "<" to demonstrate the value is unknown

Method 29 Hg Results with Blank Calculations

Date: 9/9/2020

Client: Tucson Iron and Metal

Location: Tucson, AZ

Source: Contraband Incinerator

	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
	Sample* FH Wash+Filter	Blank* FH Wash	Sample* BH Cap.Sol.	Blank* BH Cap.Sol.	Total Blank Results II+IV	5% of Total Sample	Lessor of V and VI	Greater of VII and 0.6	Allowable Blank	Total Sample	Total Net Hg
	µg/sample	µg/sample	µg/sample	µg/sample	µg/sample	µg/sample	µg/sample	µg/sample	µg/sample	µg/sample	µg/sample
Run 1											
Total	0.025	0.000	< 0.598	0.028	0.028	< 0.031	0.028	0.600	< 0.028	< 0.623	< 0.595
Run 2											
Total	< 0.022	0.000	< 0.891	0.028	0.028	< 0.046	0.028	0.600	< 0.028	< 0.913	< 0.885
Run 3											
Total	< 0.022	0.000	< 0.582	0.028	0.028	< 0.030	0.028	0.600	< 0.028	< 0.604	< 0.576

Allowable Blank Calculation:

If the total measured blank values is < 0.6 µg, use the total to correct the sample value

If the total measured blank values is > 0.6 µg, use the greater of either 0.6

or the lesser of the total measured blank values or 5% of the the sample value

"<" indicates value is below the minimum detection limit (MDL) or includes a sample fraction that is less than MDL

If Blank is a "<" value it is treated as zero.

EPA Method 5
Filterable Particulate Matter
Laboratory Gravimetric Data

Client: Tucson Iron and Metal
Location: Tucson, AZ
Source: Contraband Incinerator

Run	Sample Description	ml,#	Initial (grams)	Final (grams)	Net Gain	Blank Correction	Corrected Gain (grams)
1	Probe Rinse (Acetone FH)	72	122.97585	122.97826	0.00241	0.00019	0.00222
	Filter		0.45745	0.45752	0.00007		0.00007
						Filterable PM (mg)	2.29
						Total PM (mg)	2.29
2	Probe Rinse (Acetone FH)	72	124.06094	124.06413	0.00319	0.00019	0.00300
	Filter		0.47156	0.47082	-0.00074		0.00000
						Filterable PM (mg)	3.00
						Total PM (mg)	3.00
3	Probe Rinse (Acetone FH)	79	121.48185	121.48457	0.00272	0.00021	0.00251
	Filter		0.47109	0.46813	-0.00296		0.00000
						Filterable PM (mg)	2.51
						Total PM (mg)	2.51
	Acetone Blank	97	123.83305	123.83331	0.00026	2.68E-06	g/ml

EPA Method 5
Filterable Particulate Matter
Results Summary

Client: Tucson Iron and Metal
Source: Contraband Incinerator
Location: Tucson, AZ

Run			1	2	3	
Date			9/9/2020	9/9/2020	9/9/2020	
Run Start Time			11:10	13:11	15:19	
Run End Time			12:15	14:17	16:27	
Duration, min.			60	60	60	Average
Barometric Pressure, "Hg			27.18	27.18	27.18	27.18
Nozzle Dia., in.			0.3077	0.3077	0.3077	0.3077
Isokinetic Average, %			102.4	102.3	102.6	102.4
Sample Volume, dscf			46.800	50.230	56.336	51.122
Sample Volume, dscm			1.325	1.422	1.595	1.447
Stack Diameter, in.			44.00	44.00	44.00	44.00
Stack Area, sq.ft.			10.559	10.559	10.559	10.559
CO_2 %vd			2.22	1.95	1.73	1.97
O_2 %vd			18.18	18.58	18.95	18.57
Static Press., "H_2O			0.31	0.31	0.31	0.31
H_2O %v			3.41	4.71	4.72	4.28
Wet Molecular Weight, lb/lb-mole			28.70	28.54	28.51	28.58
Velocity, FPS			36.79	41.41	46.75	41.65
ADCFM			22,513.1	24,999.2	28,220.0	25,244.1
ACFM			23,307.9	26,234.9	29,618.0	26,386.9
DSCFM			15,593.0	16,761.1	18,737.4	17,030.5
Stack Temperature, °F			233.1	256.0	263.0	250.7
Filterable Particulate	Concentration, C_s	gr/dscf	0.001	0.001	0.001	0.001
		gr/dscf @ 7% O_2	0.004	0.006	0.005	0.005

Tucson Iron and Metal
Contraband Incinerator
Metals Results Summary
Date: 9/9/2020

Run 1															
	FH Net				BH Net				Total						
Species		µg		µg/dscm		µg		µg/dscm		µg		µg/dscm		µg/dscm @ 7% O_2	
Cadmium		0.010		0.008	<	0.048	<	0.036	<	0.058	<	0.044	<	0.2	Cd
Lead	<	1.250	<	0.943		1.140		0.860	<	2.390	<	1.804	<	9	Pb
Mercury*		0.025		0.019	<	0.598	<	0.451	<	0.623	<	0.470	<	2	Hg
Mercury, blank corrected results									<	0.595	<	0.449	<	2	Hg

Run 2															
	FH Net				BH Net				Total						
Species		µg		µg/dscm		µg		µg/dscm		µg		µg/dscm		µg/dscm @ 7% O_2	
Cadmium		0.000		0.000	<	0.045	<	0.032	<	0.045	<	0.032	<	0.2	Cd
Lead	<	1.250	<	0.879		0.963		0.677	<	2.213	<	1.556	<	9	Pb
Mercury*	<	0.022	<	0.015	<	0.891	<	0.626	<	0.913	<	0.642	<	4	Hg
Mercury, blank corrected results									<	0.885	<	0.622	<	4	Hg

Run 3															
	FH Net				BH Net				Total						
Species		µg		µg/dscm		µg		µg/dscm		µg		µg/dscm		µg/dscm @ 7% O_2	
Cadmium		0.060		0.038	<	0.046	<	0.029	<	0.106	<	0.066	<	0.5	Cd
Lead	<	1.250	<	0.784		1.130		0.708	<	2.380	<	1.492	<	11	Pb
Mercury*	<	0.022	<	0.014	<	0.582	<	0.365	<	0.604	<	0.378	<	3	Hg
Mercury, blank corrected results									<	0.576	<	0.361	<	3	Hg

Average Runs 1-3															
	FH Net				BH Net				Total						
Species		µg		µg/dscm		µg		µg/dscm		µg		µg/dscm		µg/dscm @ 7% O_2	
Cadmium		0.023		0.015	<	0.046	<	0.032	<	0.070	<	0.047	<	0.3	Cd
Lead	<	1.250	<	0.869		1.078		0.749	<	2.328	<	1.617	<	10	Pb
Mercury*	<	0.023	<	0.016	<	0.690	<	0.481	<	0.713	<	0.497	<	3	Hg
Mercury, blank corrected results									<	0.686	<	0.478	<	3	Hg

*Hg values shown are not blank corrected.
'<' denotes results which were calculated using the minimum detection limit for front half or back half results that were non-detect.

EPA Methods 1-4, 5
Example Calculations

Client:	Tucson Iron and Metal	Run:	1
Location:	Tucson, AZ	Start Time:	11:10
Source:	Contraband Incinerator	End Time:	12:15
Method:	5	Date:	9/9/2020

EPA Methods 1-4:

1) $P_m = Pb + (\Delta H/13.6) =$ 27.352 "Hg
where Pb: 27.18 "Hg
ΔH: 2.345 "H_2O

2) Ps = Pb + (Static Press./13.6) = 27.203 "Hg
where Pb: 27.18 "Hg
Static Press.: 0.31 "H_2O

3) $V_m(std) = V_m(17.64)(Y)\left(\frac{Pm}{Tm}\right) =$ 46.800 dscf
where Vm: 54.455 dcf
Y: 0.9599
Pm: 27.352 "Hg
Tm: 538.9 °A

4) $V_w(std) = (0.04706)(H_2O) =$ 1.652 scf
where H_2O: 35.10 g

5) $Bws = \left(\frac{Vw(std)}{Vw(std)+Vm(std)}\right) =$ 0.0341

where Vw(std): 1.652 scf
Vm(std): 46.800 dscf

6) % H_2O = Bws x 100 = 3.41 %v

7) $V_m(actual) = \left(\frac{Y \times Vm}{(1-Bws)}\right)\left(\frac{Ts}{Tm}\right)\left(\frac{Pm}{Ps}\right) =$ 69.983 awcf
where Y: 0.9599
Vm: 54.4550 dcf
Bws: 0.0341
Ts: 693.1 °A
Tm: 538.9 °A
Pm: 27.352 "Hg
Ps: 27.203 "Hg

8) $M_d = 0.44(CO_2) + 0.32(O_2) + 0.28(N_2 + CO) =$ 29.08 lb/lb-mole
where CO_2: 2.22 %vd
O_2 18.18 %vd
N_2+CO= (100-(O_2+CO_2): 79.60 %vd

9) $M_s = M_d(1 - Bws) + (18 \times Bws) =$ 28.70 lb/lb-mole
where M_d: 29.08 lb/lb-mole
Bws: 0.0341

10) Stack Area(cir.) = 3.1416 (stack diameter/24)^2 = 10.559 sq. ft.
where Stack ID: 44 inches

11) Velocity, $V_s = 85.49(Cp)(\text{Ave. Sqrt } \Delta P)\left(\sqrt{\frac{Ts}{(Ps \times Ms)}}\right) =$ 36.79 fps
where Cp: 0.84
Ave. Sqrt ΔP: 0.5438
Ts: 693.1 °A
Ps: 27.203 "Hg
Ms: 28.70 lb/lb-mole

12) ACFM = (V_s)(stack area)(60 sec/min) = 23,307.9 ACFM
where V_s: 36.79 ft/sec
Stack Area: 10.559 sq. ft

13) ADCFM = (ACFM)(1-Bws) = 22,513.1 ADCFM
where ACFM: 23,307.9
Bws: 0.0341

14) $Qsw = 3600(V_s)(\text{stack area})\left(\frac{528°A}{Ts}\right)\left(\frac{Ps}{29.92\text{ "Hg}}\right) =$ 968,608.6 wscf/hr
where V_s: 36.79 ft/sec
Stack Area: 10.5590 sq. ft.
Ts: 693.1 °A
Ps: 27.203 "Hg

15) Qsd = (wscf/hr)(1-Bws) = 935,579.0 dscf/hr
where wscf/hr: 968,608.6
Bws: 0.0341

16) DSCFM= (dscf/hr)/60 mins/hr = 15,593.0 DSCFM
where dscf/hr: 935,579.0

17) Nozzle Area = 3.1416 (Nozzle Size/24)^2 = 0.000516 sq. ft.
where Nozzle Size: 0.3077 inches

18) Isokinetic % = $\left(\frac{0.0945(Ts)(Vm(std))}{Ps(V_s)(nozzle\ area)(sampling\ time)(1-Bws)}\right)$ = 102.4 %

where Ts:	693.1	°A
Vm(Std):	46.800	dscf
Ps:	27.203	"Hg
Vs	36.79	ft/sec
Nozzle Area:	0.000516	sq. ft.
Sampling Time:	60	min.
Bws:	0.0341	

EPA Method 5:

19) Filterable PM = filter gain + probe rinse gain = 0.00229 grams

where Filter Gain:	0.00007	grams
Probe Rinse:	0.00222	grams

20) Cs = (Sample grams/Vm(Std))(15.43grains/gram) = 0.001 gr/dscf

where Sample:	0.00229	grams
Vm(std)	46.800	dscf

21) Cs = (Sample grams*1,000,000 µg/gram)/Vm(std) = 1,726 µg/dscm

where Sample:	0.00229	grams
Vm(std)	1.325	dscm

EPA Methods 1-4, 29
Example Calculations

Client:	Tucson Iron and Metal	Run:	1
Location:	Tucson, AZ	Start Time:	11:10
Source:	Contraband Incinerator	End Time:	12:15
Method:	1-4, 29	Date:	9/9/2020

EPA Methods 1-4:

1) $P_m = Pb + (\Delta H/13.6) =$ 27.352 "Hg

where Pb: 27.18 "Hg
ΔH: 2.345 "H_2O

2) $Ps = Pb + (\text{Static Press.}/13.6) =$ 27.203 "Hg

where Pb: 27.18 "Hg
Static Press.: 0.31 "H_2O

3) $V_m(std) = V_m(17.64)(Y)\left(\frac{Pm}{Tm}\right) =$ 46.800 dscf

where Vm: 54.455 dcf
Y: 0.9599
Pm: 27.352 "Hg
Tm: 538.9 °A

4) $V_w(std) = (0.04706)(H_2O) =$ 1.652 scf

where H_2O: 35.10 g

5) $Bws = \left(\frac{Vw(std)}{Vw(std)+Vm(std)}\right) =$ 0.0341

where Vw(std): 1.652 scf
Vm(std): 46.800 dscf

6) % H_2O = Bws x 100 = 3.41 %v

7) $V_m(actual) = \left(\frac{Y \times Vm}{(1-Bws)}\right)\left(\frac{Ts}{Tm}\right)\left(\frac{Pm}{Ps}\right) =$ 69.983 awcf

where Y: 0.9599
Vm: 54.4550 dcf
Bws: 0.0341
Ts: 693.1 °A
Tm: 538.9 °A
Pm: 27.352 "Hg
Ps: 27.203 "Hg

8) $M_d = 0.44(CO_2) + 0.32(O_2) + 0.28(N_2 + CO) =$ 29.08 lb/lb-mole

where CO_2: 2.22 %vd
O_2 18.18 %vd
N_2+CO= (100-(O_2+CO_2): 79.60 %vd

9) $M_s = M_d(1 - Bws) + (18 \times Bws) =$ 28.70 lb/lb-mole
where M_d: 29.08 lb/lb-mole
Bws: 0.0341

10) Stack Area(cir.) = 3.1416 (stack diameter/24)^2 = 10.559 sq. ft.
where Stack ID: 44 inches

11) Velocity, $V_s = 85.49(Cp)(\text{Ave. Sqrt } \Delta P)\left(\sqrt{\frac{Ts}{(Ps \times Ms)}}\right) =$ 36.79 fps
where Cp: 0.84
Ave. Sqrt ΔP: 0.5438
Ts: 693.1 °A
Ps: 27.203 "Hg
Ms: 28.70 lb/lb-mole

12) AWCFM = (V_s)(stack area)(60 sec/min) = 23,307.9 AWCFM
where V_s: 36.79 ft/sec
Stack Area: 10.559 sq. ft

13) ADCFM = (AWCFM)(1-Bws) = 22,513.1 ADCFM
where AWCFM: 23,307.9
Bws: 0.0341

14) $Qsw = 3600(V_s)(\text{stack area})\left(\frac{528°A}{Ts}\right)\left(\frac{Ps}{29.92\text{ "Hg}}\right) =$ 968,608.6 wscf/hr
where V_s: 36.79 ft/sec
Stack Area: 10.5590 sq. ft.
Ts: 693.1 °A
Ps: 27.203 "Hg

15) Qsd = (wscf/hr)(1-Bws) = 935,579.0 dscf/hr
where wscf/hr: 968,608.6
Bws: 0.0341

16) DSCFM= (dscf/hr)/60 mins/hr = 15,593.0 DSCFM
where dscf/hr: 935,579.0

17) Nozzle Area = 3.1416 (Nozzle Size/24)^2 = 0.000516 sq. ft.
where Nozzle Size: 0.3077 inches

18) Isokinetic % = $\left(\frac{0.0945(Ts)(Vm(std))}{Ps(V_s)(nozzle\ area)(sampling\ time)(1-Bws)}\right)$ = 102.4 %

where Ts:	693.1	°A
Vm(Std):	46.800	dscf
Ps:	27.203	"Hg
Vs	36.79	ft/sec
Nozzle Area:	0.000516	sq. ft.
Sampling Time:	60	min.
Bws:	0.0341	

EPA Method 29:
Cadmium

19) Cd Laboratory Results (blank corrected)

Front half (FH):		0.010	µg/sample
Back half (BH):	<	0.048	µg/sample
Total (FH + BH):	<	0.058	µg/sample

20) Cs = µg/Vm(std) = 0.044 µg/dscm

where Run 1 Total:	0.058	µg/sample
Vm(std):	1.325	dscm

21) Oxygen Correction = Cs*(20.9-7)/(20.9-O_2) = 0.2 µg/dscm @ 7% O_2

where Cs:	0.044	µg/dscm
O_2 (from Run 1):	18.18	%vd

BISON ENGINEERING VISIBLE EMISSIONS OBSERVATION FORM - EPA Method 9

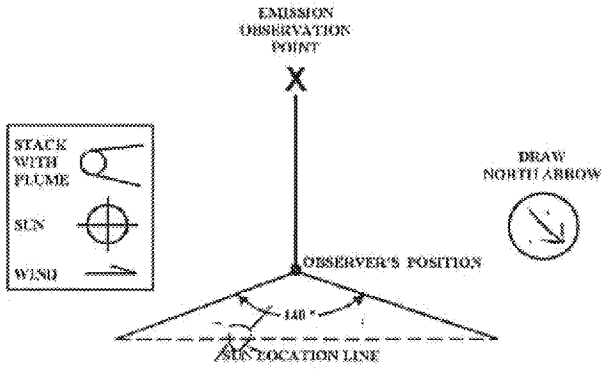
Run 1

COMPANY NAME: Tucson Iron + Metals	OBSERVATION DATE: 9/9/20
PLANT LOCATION: Tucson, Az	START TIME: 11:24
Method used (circle): 9 203A 203B other:	END TIME: 12:24
PROCESS EQUIPMENT: Contraband Incinerator	Unit #: OPERATING MODE:
CONTROL EQUIPMENT:	OPERATING MODE:
DESCRIBE EMISSION POINT: Vertical Stack	
HEIGHT OF EMISSION POINT: ~35 ft	Height Relative To Observer: START ~35' END ~35'
Distance To Emission Point: START ~75 ft END ~75 ft	Direction To Emission Point: START SW END SW
Vertical Angle To Observation PT: START END	Direction to Observation Point: START END
Describe Emissions: None Visible	START END
Emission Color: No color	START END
If Water Droplet Plume (circle): Attached Detached N/A	
Point In The Plume At Which Opacity Was Determined: No visible plume	START END
Describe Plume Background	START END
Blue sky with white clouds	
Background Color START: Blue/white END	Sky Condition START: Partly Cloudy END
Wind Speed START: 0-15 mph END	Wind Direction START: NNW END

Sec / Min	0	15	30	45
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
Total	0		Σ= 0 /24	
7	0	0	0	0
8	0	0	0	0
9	0	0	0	0
10	0	0	0	0
11	0	0	0	0
12	0	0	0	0
Total	0		Σ= 0 /24	
13	0	0	0	0
14	0	0	0	0
15	0	0	0	0
16	0	0	0	0
17	0	0	0	0
18	0	0	0	0
Total	0		Σ= 0 /24	
19	0	0	0	0
20	0	0	0	0
21	0	0	0	0
22	0	0	0	0
23	0	0	0	0
24	0	0	0	0
Total	0		Σ= 0 /24	
25	0	0	0	0
26	0	0	0	0
27	0	0	0	0
28	0	0	0	0
29	0	0	0	0
30	0	0	0	0
Total	0		Σ= 0 /24	

Sec / Min	0	15	30	45
31	0	0	0	0
32	0	0	0	0
33	0	0	0	0
34	0	0	0	0
35	0	0	0	0
36	0	0	0	0
Total	0		Σ= 0 /24	
37	0	0	0	0
38	0	0	0	0
39	0	0	0	0
40	0	0	0	0
41	0	0	0	0
42	0	0	0	0
Total	0		Σ= 0 /24	
43	0	0	0	0
44	0	0	0	0
45	0	0	0	0
46	0	0	0	0
47	0	0	0	0
48	0	0	0	0
Total	0		Σ= 0 /24	
49	0	0	0	0
50	0	0	0	0
51	0	0	0	0
52	0	0	0	0
53	0	0	0	0
54	0	0	0	0
Total	0		Σ= 0 /24	
55	0	0	0	0
56	0	0	0	0
57	0	0	0	0
58	0	0	0	0
59	0	0	0	0
60	0	0	0	0
Total			Σ= /24	

SOURCE LAYOUT SKETCH



OBSERVER'S NAME (Print): Jennifer Kessler	
OBSERVER'S SIGNATURE:	Date: 9/9/20
ORGANIZATION: Bison Engineering	
CERTIFIED BY: Compliance Assurance Assoc	Date: 8/28/20
Xbar =	Average % Attenuation: 0%
Additional Information: Observations completed during MS/29 testing.	

BISON ENGINEERING, INC.

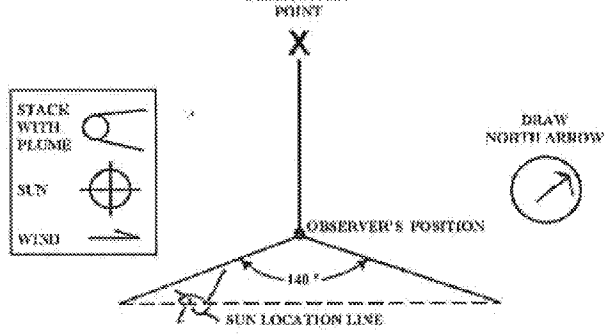
BISON ENGINEERING VISIBLE EMISSIONS OBSERVATION FORM - EPA Method 9

Run 2

COMPANY NAME: Tucson Iron + Metals	OBSERVATION DATE: 9/9/20
PLANT LOCATION: Tucson, Az.	START TIME: 13:10
Method used (circle): 9 203A 203B other:	END TIME: 14:10
PROCESS EQUIPMENT: Contraband Incinerator	Unit # ____
OPERATING MODE: Normal	
CONTROL EQUIPMENT:	
OPERATING MODE:	
DESCRIBE EMISSION POINT: Vertical Stack	
HEIGHT OF EMISSION POINT: ~35 ft	Height Relative To Observer: START ~35' END ~35'
Distance To Emission Point: START ~75' END ~75'	Direction To Emission Point: START NW END NW
Vertical Angle To Observation PT: START END	Direction to Observation Point: START END
Describe Emissions: No visible emissions	START END
Emission Color: No color	START END
If Water Droplet Plume (circle): Attached Detached (N/A)	
Point In The Plume At Which Opacity Was Determined: No visible plume	START END
Describe Plume Background: Blue sky w/ white clouds	START END
Background Color: Blue/White	START END
Sky Condition: Partly cloudy	START END
Wind Speed: 10-14 mph	START END
Wind Direction: NW	START END

Sec / Min	0	15	30	45	Sec / Min	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
Total	0		Σ= 0 /24		Total	0		Σ= 0 /24	
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
Total	0		Σ= 0 /24		Total	0		Σ= 0 /24	
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
Total	0		Σ= 0 /24		Total	0		Σ= 0 /24	
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
Total	0		Σ= 0 /24		Total	0		Σ= 0 /24	
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0
Total	0		Σ= 0 /24		Total	0		Σ= 0 /24	

SOURCE LAYOUT SKETCH



OBSERVER'S NAME (Print): Jennifer Kessler	
OBSERVER'S SIGNATURE: Jennifer Kessler	Date: 9/9/20
ORGANIZATION: Bison Engineering	
CERTIFIED BY: Compliance Assurance Assoc	Date: 8/28/20

Xbar = Average % Attenuation 0%

Additional Information

BISON ENGINEERING, INC.

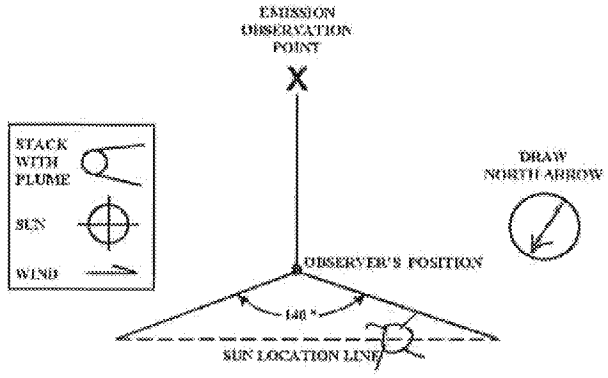
BISON ENGINEERING VISIBLE EMISSIONS OBSERVATION FORM - EPA Method 9

Run 3

COMPANY NAME: Tucson Iron + Metals	OBSERVATION DATE: 9/9/20
PLANT LOCATION: Tucson, Az	START TIME: 15:18
Method used (circle): 9 203A 203B other:	END TIME: 16:18
PROCESS EQUIPMENT: Contraband Incinerator — Unit #	OPERATING MODE: Normal
CONTROL EQUIPMENT:	OPERATING MODE:
DESCRIBE EMISSION POINT: Vertical Stack	
HEIGHT OF EMISSION POINT: ~35 ft	Height Relative To Observer: START ~35' END ~35'
Distance To Emission Point: START ~70' END ~70'	Direction To Emission Point: START SE END SE
Vertical Angle To Observation PT: START END	Direction to Observation Point: START END
Describe Emissions: None Visible — START END	
Emission Color: No color — START END	If Water Droplet Plume (circle): Attached Detached N/A
Point In The Plume At Which Opacity Was Determined: No visible plume — START END	
Describe Plume Background: Clear Blue Sky — START END	
Background Color: Blue — START END	Sky Condition: Clear — START END
Wind Speed: 14-22 mph — START END	Wind Direction: WNW — START END

Sec / Min	0	15	30	45	Sec / Min	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
Total	0		Σ= 0 /24		Total	0		Σ= 0 /24	
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
Total	0		Σ= 0 /24		Total	0		Σ= 0 /24	
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
Total	0		Σ= 0 /24		Total	0		Σ= 0 /24	
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
Total	0		Σ= 0 /24		Total	0		Σ= 0 /24	
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0
Total	0		Σ= 0 /24		Total	0		Σ= 0 /24	

SOURCE LAYOUT SKETCH



OBSERVER'S NAME (Print): Jennifer Kessler	
OBSERVER'S SIGNATURE: [signature]	Date: 9/9/20
ORGANIZATION: Bison Engineering, Inc	
CERTIFIED BY: Compliance Assurance	Date: 8/28/20
Xbar =	Average % Attenuation: 0%
Additional Information	

BISON ENGINEERING, INC.

APPENDIX C: METHOD 26A TEST DATA

ED_005878_00000073-00073

BISON ENGINEERING, INC.

COMPANY	Tucson Iron and Metal
FACILITY	Metal Recycling Facility
LOCATION	Tucson, AZ
SOURCE	Contraband Incinerator
DATE	09/10/20
METHOD	M26A
POLLUTANT	HCl

Bison Engineering, Inc.

Client: AMCEP Metals
Facility: Tucson Iron and Metal
Location: Tucson, AZ
Source: Contraband Incinerator
Date: 9/10/2020

M26A Conditioning Run		
Run Number	#	
Start Time	hh:mm	7:50
End Time	hh:mm	8:50
Meter Box Identification	#	SB-2
Meter "Y" Factor	Factor	0.9599
Barometric Pressure (Bp)	"Hg	27.37
Barometric Pressure (Pm)	in Hg	27.52
Sample Time	min	60
Average Meter Temperature	°F	71
Average Condenser Temperature	°F	55
Meter Volume Start	dcf	482.352
Meter Volume End	dcf	536.194
Meter Volume	dcf	53.842
Corrected Meter Volume	dscf	47.274
Average Delta H	in H_2O	2.000

EPA Method 26A
Results Summary

Client: Tucson Iron and Metal
Location: Tucson, AZ
Source: Contraband Incinerator

Run			1	2	3	
Date			9/10/2020	9/10/2020	9/10/2020	
Run Start Time			9:10	11:15	13:04	
Run End Time			10:14	12:18	14:14	
Duration, min.			60	60	60	Average
Barometric Pressure, "Hg			27.37	27.37	27.37	27.37
Nozzle Dia., in.			0.2690	0.2690	0.3080	0.2820
Isokinetic Average, %			99.2	100.8	99.4	99.8
Sample Volume, dscf			37.776	34.752	40.803	37.777
Sample Volume, dscm			1.070	0.984	1.155	1.070
Stack Diameter, in.			44.00	44.00	44.00	44.00
Stack Area, sq.ft.			10.559	10.559	10.559	10.559
CO_2, % vd			1.60	1.61	1.52	1.58
O_2, % vd			18.88	18.83	18.93	18.88
Static Press., "H_2O			0.31	0.31	0.31	0.31
H_2O, % v			1.80	2.16	1.81	1.92
Wet Molecular Weight, lb/lb-mole			28.81	28.77	28.80	28.79
Velocity, FPS			38.95	36.15	32.78	35.96
ADCFM			24,232.2	22,407.8	20,391.5	22,343.8
ACFM			24,676.4	22,902.5	20,767.4	22,782.1
DSCFM			16,981.7	15,369.0	13,986.1	15,445.6
Stack Temperature, °F			229.8	244.8	244.8	239.8
HCl	Concentration, C_s	gr/dscf	3.28E-04	7.95E-04	1.38E-03	8.33E-04
		µg/dscm	749.37	1,819.84	3,150.47	1,906.56
		ppmvd	0.5	1.2	2.1	1.3
		ppmvd @ 7% O_2	3	8	15	9
	Mass	lb/hr	0.05	0.10	0.16	0.11

"<" represents MDL value

Isokinetic Field Data
Field Data and Calculations
Emissions and Gas Stream Characteristics

Client:	Tucson Iron and Metal	Run:	1
Location:	Tucson, AZ	Start Time:	9:10
Source:	Contraband Incinerator	End Time:	10:14
Method:	26A	Date:	9/10/2020

Sampling Data				Traverse Data			
Time min.	Meter ft^3	**ΔH** "H_2O	Meter T_m °F	Traverse Point	Dp "H_2O	Stack T_s °F	**√Dp**
	536.278						
3	538.530	1.60	76	1	0.35	227	0.5916
6	540.520	1.30	77	2	0.29	228	0.5385
9	542.340	1.00	77	3	0.22	224	0.4690
12	544.070	0.92	77	4	0.20	225	0.4472
15	545.790	0.92	77	5	0.20	226	0.4472
18	547.700	1.10	77	6	0.24	227	0.4899
21	549.640	1.20	77	7	0.26	227	0.5099
24	551.740	1.40	77	8	0.31	227	0.5568
27	553.970	1.60	77	9	0.35	229	0.5916
30	556.095	1.50	77	10	0.32	229	0.5657
33	558.080	1.30	76	11	0.29	229	0.5385
36	559.950	1.10	76	12	0.25	230	0.5000
39	561.790	1.10	76	13	0.23	230	0.4796
42	563.800	1.40	76	14	0.31	231	0.5568
45	566.490	2.60	75	15	0.57	232	0.7550
48	569.050	2.30	76	16	0.50	234	0.7071
51	571.650	2.20	76	17	0.48	234	0.6928
54	574.210	2.10	76	18	0.46	235	0.6782
57	577.070	2.70	76	19	0.59	235	0.7681
60	579.815	2.40	76	20	0.52	236	0.7211

Client:	Tucson Iron and Metal	Run:	1
Source:	Contraband Incinerator	Date:	09/10/20

Field Data Input Continued

Moisture Data			Stack Dimensional Data:		
Total Test Time	60.0	min	Circular		
Sample Time Interval	3.0	min	Diameter	44.000	in
Meter Volume, V_m	43.537	dcf	Rectangular		
Water Volume	14.7	ml (g)	Width		in
Nozzle Diameter, N_z	0.2690	in.	Length		in
Nozzle Area	0.000395	sq.ft.	Stack Area	10.559	sq.ft.

Traverse Data			Molecular Weight:		
Barometric Pressure, P_b	27.37	"Hg	CO_2 Average	1.60	%vd
Static Pressure	0.31	"H_2O	O_2 Average	18.88	%vd
Pitot Factor, cp	0.84				
Meter Cal Factor	0.9599	Y			

Field Data Averages

Meter			Stack		
ΔH	1.587	"H_2O	√Dp	0.5802	"H_2O
Temperature, T_m	76.4	°F	Temperature, T_s	229.8	°F
Temperature, T_m	536.4	°A (°R)	Temperature, T_s	689.8	°A (R)
Pressure Meter, P_m	27.487	"Hg	Pressure Stack, P_s	27.393	"Hg

Field Data Calculations

Meter Box Capture			EPA Method 2 Stack Gas Flowrate:		
Standard Volume, $V_{m(std)}$	37.776	dscf	Velocity, V_s	38.95	fps
	1.070	dscm	Volume (actual)	24,676.4	acfm
Actual Volume, $V_{m(actual)}$	54.916	awcf		24,232.2	adcfm
Gas Stream Moisture			Volume (standard)	1,037,579.8	wscf/hr
Moisture Vapor, $Vw_{(std)}$	0.692	scf		1,018,903.4	dscf/hr
Moisture, B_{ws}	0.0180			16,981.7	dscf/min
Moisture EPA M4	1.80	%v			
EPA Method 3 Gas Density			Volume/Mole, V/M	549.762	
Dry, M_d	29.01	lb/lb-mole			
Wet, M_s	28.81	lb/lb-mole			
Percent Isokinetic	99.2	%			

Laboratory Results

HCl	801.8	µg/sample			
HCl	8.02E-04	grams	MW HCl	36.46	g/mole
Emissions:					
Concentration HCl, C_s	3.28E-04	gr/dscf			
	749.37	µg/dscm			
	0.5	ppmvd			
Mass Emissions HCl	0.05	lb/hr			

Isokinetic Field Data
Field Data and Calculations
Emissions and Gas Stream Characteristics

Client:	Tucson Iron and Metal	Run:	2
Location:	Tucson, AZ	Start Time:	11:15
Source:	Contraband Incinerator	End Time:	12:18
Method:	26A	Date:	09/10/20

Sampling Data				Traverse Data			
Time min.	Meter ft^3	**ΔH** "H_2O	Meter T_m °F	Traverse Point	Dp "H_2O	Stack T_s °F	**√Dp**
	580.023						
3	582.240	1.60	70	1	0.35	249	0.5916
6	584.300	1.40	70	2	0.31	248	0.5568
9	586.290	1.40	69	3	0.30	246	0.5477
12	588.090	1.00	69	4	0.22	246	0.4690
15	589.770	0.90	70	5	0.20	246	0.4472
18	591.340	0.90	70	6	0.19	245	0.4359
21	592.870	0.81	70	7	0.18	245	0.4243
24	594.370	0.81	70	8	0.18	245	0.4243
27	596.050	0.90	70	9	0.20	245	0.4472
30	597.701	0.90	70	10	0.20	245	0.4472
33	599.910	1.60	70	11	0.36	242	0.6000
36	602.070	1.50	70	12	0.33	245	0.5745
39	604.010	1.30	71	13	0.29	246	0.5385
42	605.870	1.10	71	14	0.25	245	0.5000
45	607.890	0.81	71	15	0.28	245	0.5292
48	609.430	0.72	72	16	0.16	247	0.4000
51	611.980	0.86	72	17	0.45	242	0.6708
54	614.610	0.86	72	18	0.49	242	0.7000
57	617.150	0.64	72	19	0.44	241	0.6633
60	619.699	0.86	72	20	0.46	241	0.6782

Client:	Tucson Iron and Metal	Run:	2
Source:	Contraband Incinerator	Date:	09/10/20

Field Data Input Continued

Moisture Data			Stack Dimensional Data:		
Total Test Time	60.0	min	Circular		
Sample Time Interval	3.0	min	Diameter	44.000	in
Meter Volume, V_m	39.676	dcf	Rectangular		
Water Volume	16.3	ml (g)	Width		in
Nozzle Diameter, N_z	0.2690	in.	Length		in
Nozzle Area	0.000395	sq.ft.	Stack Area	10.559	sq.ft.

Traverse Data			Molecular Weight:		
Barometric Pressure, P_b	27.37	"Hg	CO_2 Average	1.61	%vd
Static Pressure	0.31	"H_2O	O_2 Average	18.83	%vd
Pitot Factor, cp	0.84				
Meter Cal Factor	0.9599	Y			

Field Data Averages

Meter			Stack		
ΔH	1.044	"H_2O	√Dp	0.5323	"H_2O
Temperature, T_m	70.6	°F	Temperature, T_s	244.8	°F
Temperature, T_m	530.6	°A (°R)	Temperature, T_s	704.8	°A (R)
Pressure Meter, P_m	27.447	"Hg	Pressure Stack, P_s	27.393	"Hg

Field Data Calculations

Meter Box Capture			EPA Method 2 Stack Gas Flowrate:		
Standard Volume, $V_{m(std)}$	34.752	dscf	Velocity, V_s	36.15	fps
	0.984	dscm	Volume (actual)	22,902.5	acfm
Actual Volume, $V_{m(actual)}$	51.807	awcf		22,407.8	adcfm
Gas Stream Moisture			Volume (standard)	942,496.2	wscf/hr
Moisture Vapor, $Vw_{(std)}$	0.767	scf		922,138.3	dscf/hr
Moisture, B_{ws}	0.0216			15,369.0	dscf/min
Moisture EPA M4	2.16	%v			
EPA Method 3 Gas Density			Volume/Mole, V/M	561.717	
Dry, M_d	29.01	lb/lb-mole			
Wet, M_s	28.77	lb/lb-mole			
Percent Isokinetic	100.8	%			

Laboratory Results

HCl	1790.7	µg/sample			
HCl	1.79E-03	grams	MW HCl	36.46	g/mole
Emissions:					
Concentration HCl, C_s	7.95E-04	gr/dscf			
	1,819.84	µg/dscm			
	1.2	ppmvd			
Mass Emissions HCl	0.10	lb/hr			

Isokinetic Field Data
Field Data and Calculations
Emissions and Gas Stream Characteristics

Client:	Tucson Iron and Metal	Run:	3
Location:	Tucson, AZ	Start Time:	13:04
Source:	Contraband Incinerator	End Time:	14:14
Method:	26A	Date:	09/10/20

Sampling Data				Traverse Data			
Time min.	Meter ft^3	**ΔH** "H_2O	Meter T_m °F	Traverse Point	Dp "H_2O	Stack T_s °F	**√Dp**
	620.095						
3	622.620	2.15	72	1	0.28	245	0.5292
6	625.282	2.30	72	2	0.30	245	0.5477
9	628.012	2.50	72	3	0.32	247	0.5657
12	630.700	2.30	72	4	0.30	246	0.5477
15	632.405	0.93	73	5	0.12	243	0.3464
18	634.485	1.40	73	6	0.18	242	0.4243
21	636.573	1.40	74	7	0.19	242	0.4359
24	638.974	1.90	74	8	0.25	244	0.5000
27	641.326	1.80	74	9	0.24	245	0.4899
30	643.987	2.40	74	10	0.31	244	0.5568
33	646.470	2.10	74	11	0.27	245	0.5196
36	649.080	2.30	74	12	0.30	244	0.5477
39	651.757	2.30	74	13	0.30	245	0.5477
42	654.435	2.30	75	14	0.30	245	0.5477
45	657.020	2.10	75	15	0.27	246	0.5196
48	659.185	1.50	76	16	0.20	245	0.4472
51	661.220	1.40	76	17	0.18	245	0.4243
54	663.276	1.35	76	18	0.17	246	0.4123
57	665.135	1.15	76	19	0.15	246	0.3873
60	666.890	1.00	76	20	0.13	246	0.3606

Client:	Tucson Iron and Metal	Run:	3
Source:	Contraband Incinerator	Date:	09/10/20

Field Data Input Continued

Moisture Data			Stack Dimensional Data:		
Total Test Time	60.0	min	Circular		
Sample Time Interval	3.0	min	Diameter	44.000	in
Meter Volume, V_m	46.795	dcf	Rectangular		
Water Volume	16.0	ml (g)	Width		in
Nozzle Diameter, N_z	0.3080	in.	Length		in
Nozzle Area	0.000517	sq.ft.	Stack Area	10.559	sq.ft.

Traverse Data			Molecular Weight:		
Barometric Pressure, P_b	27.37	"Hg	CO_2 Average	1.52	%vd
Static Pressure	0.31	"H_2O	O_2 Average	18.93	%vd
Pitot Factor, cp	0.84				
Meter Cal Factor	0.9599	Y			

Field Data Averages

Meter			Stack		
ΔH	1.829	"H_2O	√Dp	0.4829	"H_2O
Temperature, T_m	74.1	°F	Temperature, T_s	244.8	°F
Temperature, T_m	534.1	°A (°R)	Temperature, T_s	704.8	°A (R)
Pressure Meter, P_m	27.504	"Hg	Pressure Stack, P_s	27.393	"Hg

Field Data Calculations

Meter Box Capture			EPA Method 2 Stack Gas Flowrate:		
Standard Volume, $V_{m(std)}$	40.803	dscf	Velocity, V_s	32.78	fps
	1.155	dscm	Volume (actual)	20,767.4	acfm
Actual Volume, $V_{m(actual)}$	60.612	awcf		20,391.5	adcfm
Gas Stream Moisture			Volume (standard)	854,634.2	wscf/hr
Moisture Vapor, $Vw_{(std)}$	0.753	scf		839,165.3	dscf/hr
Moisture, B_{ws}	0.0181			13,986.1	dscf/min
Moisture EPA M4	1.81	%v			
EPA Method 3 Gas Density			Volume/Mole, V/M	561.717	
Dry, M_d	29.00	lb/lb-mole			
Wet, M_s	28.80	lb/lb-mole			
Percent Isokinetic	99.4	%			

Laboratory Results

HCl	3638.8	µg/sample			
HCl	3.64E-03	grams	MW HCl	36.46	g/mole
Emissions:					
Concentration HCl, C_s	1.38E-03	gr/dscf			
	3,150.47	µg/dscm			
	2.1	ppmvd			
Mass Emissions HCl	0.16	lb/hr			

EPA Method 26A
Laboratory Results
HCl

Client: Tucson Iron and Metal
Location: Tucson, AZ
Source: Contraband Incinerator

Lab ID	Sample ID	Sample Date	<	Result (µg/sample)	MDL (µg/sample)	Sample Vol. (ml)	Blank Correction (ug)	Blank Corrected Results (µg/sample)
20-S1810	Run 1	9/10/2020		840	2.85	277	38.18	801.8
20-S1811	Run 2	9/10/2020		1830.0	2.93	285	39.28	1790.7
20-S1812	Run 3	9/10/2020		3680	3.07	299	41.21	3638.8
20-S1813	0.1N H_2SO_4 Blank	9/10/2020		25.9	5.82	283	0.092	µg/ml
20-S1814	H_20 Blank	9/10/2020		2.94	0.653	63.5	0.046	µg/ml

*A "<" sign designates a result less than the minimum detection limit (MDL). If sample results are below MDL, the MDL value is used for calculations.
If blank value(s) are below MDL, no blank correction is performed.

Isokinetic Field Data
Field Data Entry

Client:	Tucson Iron and Metal		Run:	1
Location:	Tucson, AZ		Start Time:	9:10
Source:	Contraband Incinerator	Environmental Conditions/Test Notes:	End Time:	10:14
EPA Method:	M26A	Hot and Sunny	Date:	9/10/2020
Box Operator:	RR			
Technician(s):	CE			

Stack Dimensional Data:

Circular		
Diameter	44.000	in
Rectangular		
Width		in
Length		in
Stack Area	10.559	sq.ft.

Equipment:

Meterbox ID	SB-2	Probe ID	T-6-1	Liner type	Glass	
Y factor	0.9599	Nozzle ID	0.269	Nozzle size	0.2690	inches
ΔH@	1.8682	Hot box ID	B2	Nozzle area	0.000395	sq.ft.
		Pitot Cp	0.84	Probe heat	250	F
		Pitot ID	T-PT-14	Filter heat	250	F

Source Information:

Barometric Pressure	27.37	"Hg	O_2	19.00 %
Static Pressure	0.31	"H_2O	CO_2	2.00 %
Ave. ΔP	0.31	"H_2O	Rec. Nz.	0.287 inches
Stack Temperature	250	F		
Assumed moisture	3	%		
Assumed meter temp.	75	F		
Total number of points	20			
Time per point	3			
Total run time	60			

Leak Checks:

	Pre-test	Post-test
Pitot	x	x
Train leak rate, dcf	0.000	0.000
Leak check vacuum, "Hg	20	15

Nozzle check for roundness:

1	2	3	
0.269	0.269	0.269	inches
	Caliper ID#	TMC-3	

Post Test Calculations:

Sample volume	43.537	dcf	Ave. ΔP	0.347	"H_2O
Wet mol. weight	28.88	M_s (actual)	Ave. √ΔP	0.5802	"H_2O
Actual H_2O	1.80	%	Ave. ΔH	1.587	"H_2O
Std. meter vol.	37.776	dscf	Ave. T_s	229.8	°F
Isokinetic Average	99.3	%	Ave. T_m	76.4	°F

Moisture/Lab:

Filter	M26A #		
	Initial	Final	Gain
Impingers, g	1378.2	1388.0	9.8
Silica gel, g	840.0	844.9	4.9
		Total water gain:	14.7

Traverse Point	Time (min.)	Meter Volume (dcf) 536.278	Velocity ΔP ("H_2O)	Stack Temp. (°F)	Meter Temp. (°F)	Calc. ΔH	Run ΔH	Vacuum ("Hg)	Filter Box (°F)	Condenser Temp (≤68°F)
1	3.0	538.530	0.35	227	76	1.56	1.60	3	253	53
2	6.0	540.520	0.29	228	77	1.29	1.30	3	255	54
3	9.0	542.340	0.22	224	77	0.98	1.00	3	249	54
4	12.0	544.070	0.20	225	77	0.89	0.92	2	253	55
5	15.0	545.790	0.20	226	77	0.89	0.92	2	249	56
6	18.0	547.700	0.24	227	77	1.07	1.10	2	251	56
7	21.0	549.640	0.26	227	77	1.16	1.20	2	251	57
8	24.0	551.740	0.31	227	77	1.38	1.40	3	252	57
9	27.0	553.970	0.35	229	77	1.55	1.60	3	252	57
10	30.0	556.095	0.32	229	77	1.42	1.50	3	252	59
11	33.0	558.080	0.29	229	76	1.29	1.30	3	251	61
12	36.0	559.950	0.25	230	76	1.11	1.10	2	253	59
13	39.0	561.790	0.23	230	76	1.02	1.10	2	251	59
14	42.0	563.800	0.31	231	76	1.37	1.40	2	248	59
15	45.0	566.490	0.57	232	75	2.51	2.60	5	252	60
16	48.0	569.050	0.50	234	76	2.20	2.30	4	251	58
17	51.0	571.650	0.48	234	76	2.11	2.20	3	250	61
18	54.0	574.210	0.46	235	76	2.02	2.10	3	253	61
19	57.0	577.070	0.59	235	76	2.59	2.70	4	251	62
20	60.0	579.815	0.52	236	76	2.28	2.40	4	251	62

Isokinetic Field Data
Field Data Entry

Client:	Tucson Iron and Metal		Run:	2
Location:	Tucson, AZ		Start Time:	11:15
Source:	Contraband Incinerator	Environmental Conditions/Test Notes:	End Time:	**12:18**
EPA Method:	M26A	Hot and Sunny	Date:	9/10/2020
Box Operator:	RR			
Technician(s):	CE			

Stack Dimensional Data:

Circular		
Diameter	44.000	in
Rectangular		
Width		in
Length		in
Stack Area	10.559	sq.ft.

Equipment:

Meterbox ID	SB-2	Probe ID	T-6-1	Liner type:	Glass		
Y factor	0.9599	Nozzle ID	0.269	Nozzle size:	0.2690	inches	
ΔH@	1.8682	Hot box ID	B2	Nozzle area:	0.000395	sq.ft.	
		Pitot Cp	0.84	Probe heat:	250	F	
		Pitot ID	T-PT-14	Filter heat:	250	F	

Source Information:

Barometric Pressure	27.37	"Hg	O_2	19.0	%
Static Pressure	0.31	"H_2O	CO_2	2.0	%
Ave. ΔP	0.41	"H_2O	Rec. Nz.	0.266	inches
Stack Temperature	250	F			
Assumed moisture	1.8	%			
Assumed meter temp.	76.4	F			
Total number of points	20				
Time per point	3				
Total run time	60				

Leak Checks:	Pre-test	Post-test
Pitot:	x	x
Train leak rate, dcf:	0.000	0.000
Leak check vacuum, "Hg:	15	10

Nozzle check for roundness:

1	2	3	
0.269	0.269	0.269	inches
	Caliper ID#	TMC-3	

Post Test Calculations:

Sample volume	39.676	dcf	Ave. ΔP	0.292	"H_2O
Wet mol. weight	28.84	M_s (actual)	Ave. √ΔP	0.5323	"H_2O
Actual H_2O	2.16	%	Ave. ΔH	1.044	"H_2O
Std. meter vol.	34.752	dscf	Ave. T_s	244.8	°F
Isokinetic Average	100.9	%	Ave. T_m	70.6	°F

Moisture/Lab:

Filter	M26A #		
	Initial	Final	Gain
Impingers, g	1416.5	1428.1	11.6
Silica gel, g	858.1	862.8	4.7
		Total water gain:	16.3

Traverse Point	Time (min.)	Meter Volume (dcf) 580.023	Velocity **ΔP** ("H_2O)	Stack Temp. (°F)	Meter Temp. (°F)	Calc. **ΔH**	**Run ΔH**	Vacuum ("Hg)	Filter Box (°F)	Condenser Temp **(≤68°F)**
1	3.0	582.240	0.35	249	70	1.52	1.60	2	248	57
2	6.0	584.300	0.31	248	70	1.35	1.40	2	247	50
3	9.0	586.290	0.30	246	69	1.31	1.40	2	255	50
4	12.0	588.090	0.22	246	69	0.96	1.00	2	251	50
5	15.0	589.770	0.20	246	70	0.87	0.90	2	253	48
6	18.0	591.340	0.19	245	70	0.83	0.90	2	249	48
7	21.0	592.870	0.18	245	70	0.79	0.81	2	250	48
8	24.0	594.370	0.18	245	70	0.79	0.81	2	247	49
9	27.0	596.050	0.20	245	70	0.87	0.90	2	249	47
10	30.0	597.701	0.20	245	70	0.87	0.90	2	253	50
11	33.0	599.910	0.36	242	70	1.58	1.60	2	250	50
12	36.0	602.070	0.33	245	70	1.44	1.50	2	254	49
13	39.0	604.010	0.29	246	71	1.27	1.30	2	252	48
14	42.0	605.870	0.25	245	71	1.10	1.10	2	246	48
15	45.0	607.890	0.28	245	71	1.23	0.81	2	255	48
16	48.0	609.430	0.16	247	72	0.70	0.72	2	248	48
17	51.0	611.980	0.45	242	72	1.98	0.86	2	254	48
18	54.0	614.610	0.49	242	72	2.16	0.86	2	250	50
19	57.0	617.150	0.44	241	72	1.94	0.64	2	254	48
20	60.0	619.699	0.46	241	72	2.03	0.86	2	257	47

Isokinetic Field Data
Field Data Entry

Client:	Tucson Iron and Metal		Run:	3
Location:	Tucson, AZ		Start Time:	13:04
Source:	Contraband Incinerator	Environmental Conditions/Test Notes:	End Time:	14:14
EPA Method:	M26A	Hot and Sunny	Date:	9/10/2020
Box Operator:	RR			
Technician(s):	CE			

Stack Dimensional Data:

Circular		
Diameter	44.000	in
Rectangular		
Width		in
Length		in
Stack Area	10.559	sq.ft.

Equipment:

Meterbox ID	SB-2	Probe ID	T-6-1	Liner type:	Glass	
Y factor	0.9599	Nozzle ID	0.269	Nozzle size:	0.3080	inches
ΔH@	1.8682	Hot box ID	B2	Nozzle area:	0.000517	sq.ft.
		Pitot Cp	0.84	Probe heat:	250	F
		Pitot ID	T-PT-14	Filter heat:	250	F

Source Information:

Barometric Pressure	27.37	"Hg	O_2	19.0 %
Static Pressure	0.31	"H_2O	CO_2	2.0 %
Ave. ΔP	0.41	"H_2O	Rec. Nz.	0.268 inches
Stack Temperature	250	F		
Assumed moisture	2.16	%		
Assumed meter temp.	70.6	F		
Total number of points	20			
Time per point	3			
Total run time	60			

Leak Checks:

	Pre-test	Post-test
Pitot:	x	x
Train leak rate, dcf:	0.000	0.000
Leak check vacuum, "Hg:	17	7

Nozzle check for roundness:

1	2	3	
0.309	0.308	0.307	inches
	Caliper ID#	TMC-3	

Post Test Calculations:

Sample volume	46.795	dcf	Ave. ΔP	0.238	"H_2O
Wet mol. weight	28.88	M_s (actual)	Ave. √ΔP	0.4829	"H_2O
Actual H_2O	1.81	%	Ave. ΔH	1.829	"H_2O
Std. meter vol.	40.803	dscf	Ave. T_s	244.8	°F
Isokinetic Average	99.5	%	Ave. T_m	74.1	°F

Moisture/Lab:

Filter	M26A #		
	Initial	Final	Gain
Impingers, g	1388.4	1400.4	12.0
Silica gel, g	845.0	849.0	4.0
		Total water gain:	16.0

Traverse Point	Time (min.)	Meter Volume (dcf) 620.095	Velocity **ΔP** ("H_2O)	Stack Temp. (°F)	Meter Temp. (°F)	Calc. **ΔH**	**Run ΔH**	Vacuum ("Hg)	Filter Box (°F)	Condenser Temp **(≤68°F)**
1	3.0	622.620	0.28	245	72	2.10	2.15	4	249	65
2	6.0	625.282	0.30	245	72	2.25	2.30	4	248	52
3	9.0	628.012	0.32	247	72	2.39	2.50	4.5	253	52
4	12.0	630.700	0.30	246	72	2.25	2.30	4	254	49
5	15.0	632.405	0.12	243	73	0.90	0.93	2	253	50
6	18.0	634.485	0.18	242	73	1.36	1.40	2.5	250	49
7	21.0	636.573	0.19	242	74	1.44	1.40	2.5	247	48
8	24.0	638.974	0.25	244	74	1.88	1.90	3	252	49
9	27.0	641.326	0.24	245	74	1.81	1.80	3	249	48
10	30.0	643.987	0.31	244	74	2.34	2.40	4	249	48
11	33.0	646.470	0.27	245	74	2.03	2.10	4	251	49
12	36.0	649.080	0.30	244	74	2.26	2.30	4.5	253	50
13	39.0	651.757	0.30	245	74	2.26	2.30	4.5	248	49
14	42.0	654.435	0.30	245	75	2.26	2.30	4.5	251	50
15	45.0	657.020	0.27	246	75	2.03	2.10	4.5	250	51
16	48.0	659.185	0.20	245	76	1.51	1.50	3	252	50
17	51.0	661.220	0.18	245	76	1.36	1.40	3	248	50
18	54.0	663.276	0.17	246	76	1.28	1.35	3	253	49
19	57.0	665.135	0.15	246	76	1.13	1.15	2.5	248	50
20	60.0	666.890	0.13	246	76	0.98	1.00	2	252	51

EPA Methods 1-4, 26A
Example Calculations

Client:	Tucson Iron and Metal	Run:	1
Location:	Tucson, AZ	Start Time:	9:10
Source:	Contraband Incinerator	End Time:	10:14
Method:	26A	Date:	9/10/2020

EPA Methods 1-4:

1) $P_m = Pb + (\Delta H/13.6) =$ 27.487 "Hg

where Pb: 27.37 "Hg
ΔH: 1.587 "H_2O

2) $Ps = Pb + (\text{Static Press.}/13.6) =$ 27.393 "Hg

where Pb: 27.37 "Hg
Static Press.: 0.31 "H_2O

3) $V_m(std) = V_m(17.64)(Y)\left(\frac{Pm}{Tm}\right) =$ 37.776 dscf

where Vm: 43.537 dcf
Y: 0.9599
Pm: 27.487 "Hg
Tm: 536.4 °A

4) $V_w(std) = (0.04706)(H_2O) =$ 0.692 scf

where H_2O: 14.70 g

5) $Bws = \left(\frac{Vw(std)}{Vw(std)+Vm(std)}\right) =$ 0.0180

where Vw(std): 0.692 scf
Vm(std): 37.776 dscf

6) % H_2O = Bws x 100 = 1.80 %v

7) $V_m(actual) = \left(\frac{Y \times Vm}{(1-Bws)}\right)\left(\frac{Ts}{Tm}\right)\left(\frac{Pm}{Ps}\right) =$ 54.916 awcf

where Y: 0.9599
Vm: 43.5370 dcf
Bws: 0.0180
Ts: 689.8 °A
Tm: 536.4 °A
Pm: 27.487 "Hg
Ps: 27.393 "Hg

8) $M_d = 0.44(CO_2) + 0.32(O_2) + 0.28(N_2 + CO) =$ 29.01 lb/lb-mole

where CO_2: 1.60 %vd
O_2 18.88 %vd
N_2+CO= (100-(O_2+CO_2): 79.52 %vd

9) $M_s = M_d(1 - Bws) + (18 \times Bws) =$ 28.81 lb/lb-mole
where M_d: 29.01 lb/lb-mole
Bws: 0.0180

10) Stack Area(cir.) = 3.1416 (stack diameter/24)^2 = 10.559 sq. ft.
where Stack ID: 44 inches

Stack Area(rect.) = stack width/12 x stack length/12 = NA sq. ft.
where Stack Width: 0.000 inches
Stack Length: 0.000 inches

11) Velocity, $V_s = 85.49(Cp)(\text{Ave. Sqrt } \Delta P)\left(\sqrt{\frac{Ts}{(Ps \times Ms)}}\right) =$ 38.95 fps
where Cp: 0.84
Ave. Sqrt ΔP: 0.5802
Ts: 689.8 °A
Ps: 27.393 "Hg
Ms: 28.81 lb/lb-mole

12) ACFM = (V_s)(stack area)(60 sec/min) = 24,676.4 ACFM
where V_s: 38.95 ft/sec
Stack Area: 10.559 sq. ft

13) ADCFM = (ACFM)(1-Bws) = 24,232.2 ADCFM
where ACFM: 24,676.4
Bws: 0.0180

14) $Qsw = 3600(V_s)(\text{stack area})\left(\frac{528°A}{Ts}\right)\left(\frac{Ps}{29.92\text{ "Hg}}\right) =$ 1,037,579.8 wscf/hr
where V_s: 38.95 ft/sec
Stack Area: 10.5590 sq. ft.
Ts: 689.8 °A
Ps: 27.393 "Hg

15) Qsd = (wscf/hr)(1-Bws) = 1,018,903.4 dscf/hr
where wscf/hr: 1,037,579.8
Bws: 0.0180

16) DSCFM= (dscf/hr)/60 mins/hr = 16,981.7 DSCFM
where dscf/hr: 1,018,903.4

17) Nozzle Area = 3.1416 (Nozzle Size/24)^2 = 0.000395 sq. ft.
where Nozzle Size: 0.2690 inches

18) Isokinetic % = $\left(\frac{0.0945(Ts)(Vm(std))}{Ps(V_s)(nozzle\ area)(sampling\ time)(1-Bws)}\right)$ = 99.2 %

where Ts:	689.8	°A
Vm(Std):	37.776	dscf
Ps:	27.393	"Hg
Vs	38.95	ft/sec
Nozzle Area:	0.000395	sq. ft.
Sampling Time:	60	min.
Bws:	0.0180	

EPA Method 26A:

19) HCl laboratory results (blank corrected) 801.8 µg/sample

20) HCl = (µg/sample)/1,000,000 = 8.02E-04 grams/sample

21) Cs = (Sample grams/Vm(Std))(15.43grains/gram) = 3.28E-04 gr/dscf

where Sample:	0.00080	grams
Vm(std)	37.776	dscf

22) Cs = (Sample grams*1,000,000 µg/gram)/Vm(std) = 749.37 µg/dscm

where Sample:	0.00080	grams
Vm(std)	1.070	dscm

23) Volume/Mole = $\left(\frac{359\ (Ts)\ (29.92"Hg)}{492\ (Ps)}\right)$ = 549.762 Vol./Mole

where Ts:	689.8	°A
Ps:	27.393	"Hg

24) ppmvd = $\left(\frac{\frac{lb}{hr} x \frac{Vol.}{Mole}}{(MW\ x\ 0.00006\ x\ ADCFM)}\right)$ = 0.5 ppmvd

where MW:	36.46	g/mol
lb/hr:	0.05	
Vol./Mole:	549.762	
ADCFM:	24232.2	

25) Mass Emission Rate = (Cs)(Stack flow)/7000gr/lb = 0.05 lb/hr

where Cs:	3.28E-04	gr/dscf
Stack Flow:	1,018,903.4	dscf/hr

APPENDIX D: GASEOUS AND RATA TEST DATA

ED_005878_00000073-00090

BISON ENGINEERING GASEOUS TESTING SUMMARY

Company	**Tucson Iron and Metal**	Source	**Contraband Incinerator**
Facility	**Metal Recycling Facility**	Date	**September 9, 2020**
Location	**Tucson, AZ**		
Environmental Conditions	Sunny and Hot		

Run	1	2	3	
Date	9/9/2020	9/9/2020	9/9/2020	
Run Start Time	11:10	13:10	15:18	
Run End Time	12:15	14:16	16:26	Average
CO_2 %vd	2.22	1.95	1.73	1.97
O_2 %vd	18.18	18.58	18.95	18.57

*Negative concentrations are reported as zero.

Bison Engineering, Inc.
Method 3A Oxygen
Calibration Error, System Bias and System Drift

Company:	**Tucson Iron and Metal**	Source	**Contraband Incinerator**	Instrument Make:	**Servomex**
Facility:	**Metal Recycling Facility**	Date	**September 9, 2020**	Instrument Model:	**1440**
Location:	**Tucson, AZ**			Instrument Serial #:	**14202/3280**

			Initial Values			***Final Values***								
		Analyzer Cal. Response	**System Cal Response**	**Pre test System Cal. Bias % of span**	**pass/fail**	**System Cal Response**	**Post test System Cal. Bias % of span**	**pass/fail**	**System Drift % of span**	**pass/fail**	**Analyzer Span**	**Raw Avg Gas Conc**	**Corrected Gas Conc**	**Instrument Cal. Reference Gas**
Run 1	zero	-0.01	0.09	0.50	pass	0.07	0.40	pass	-0.10	pass				
	upscale	10.03	9.95	-0.40	pass	9.95	-0.40	pass	0.00	pass	19.96	18.02	18.18	10
Run 2	zero	-0.01	0.09	0.50	pass	0.07	0.40	pass	-0.10	pass				
	upscale	10.03	9.95	-0.40	pass	9.95	-0.40	pass	0.00	pass	19.96	18.42	18.58	10
Run 3	zero	-0.01	0.09	0.50	pass	0.07	0.40	pass	-0.10	pass				
	upscale	10.03	9.95	-0.40	pass	9.95	-0.40	pass	0.00	pass	19.96	18.78	18.95	10
				< 5%*			**< 5%***		**< 3%***					

ANALYZER CAL. ERROR	**Zero**	**Mid**	**High**
Calibration gas standards	0	10	19.96
Cal gas analyzer response	-0.01	10.03	19.98
Analyzer Cal. Error	-0.05	0.15	0.10
Analyzer Cal. Error < 2%*	pass	pass	pass

Note: All units are in %
***Or < 0.5 % absolute difference**

Bison Engineering, Inc.
Method 3A CO2
Calibration Error, System Bias and System Drift

Company:	Tucson Iron and Metal	Source	Contraband Incinerator	Instrument Make:	Servomex
Facility:	Metal Recycling Facility	Date	September 9, 2020	Instrument Model:	1440
Location:	Tucson, AZ			Instrument Serial #:	14202/3280

			Initial Values			Final Values								
		Analyzer Cal. Response	System Cal Response	Pre test System Cal. Bias % of span	pass/fail	System Cal Response	Post test System Cal. Bias % of span	pass/fail	System Drift % of span	pass/fail	Analyzer Span	Raw Avg Gas Conc	Corrected Gas Conc	Instrument Cal. Reference Gas
Run 1	zero	0.00	0.01	0.05	pass	0.02	0.10	pass	0.05	pass				
	upscale	10.14	9.96	-0.91	pass	10.01	-0.65	pass	0.25	pass	19.86	2.23	2.22	10
Run 2	zero	0.00	0.01	0.05	pass	0.02	0.10	pass	0.05	pass				
	upscale	10.14	9.96	-0.91	pass	10.01	-0.65	pass	0.25	pass	19.86	1.96	1.95	10
Run 3	zero	0.00	0.01	0.05	pass	0.02	0.10	pass	0.05	pass				
	upscale	10.14	9.96	-0.91	pass	10.01	-0.65	pass	0.25	pass	19.86	1.74	1.73	10
				< 5%*			< 5%*		< 3%*					

ANALYZER CAL. ERROR	Zero	Mid	High
Calibration gas standards	0	10	19.86
Cal gas analyzer response	0.00	10.14	20.13
Analyzer Cal. Error	0.00	0.70	1.36
Analyzer Cal. Error < 2%*	pass	pass	pass

Note: All units are in %
***Or < 0.5 % absolute difference**

Stratification Check

Company Tucson Iron and Metal

Location Tucson, AZ **Date** 9/9/2020

Source Contraband Incinerator **Stack Dimensions** 44 inches

3 POINT METHOD

% of diameter		Pt location	CO2%	Diff (+/- 5%)	Pass/Fail
16.7%	1	7.35	2.17	-4.41%	PASS
50.0%	2	22.00	2.33	2.64%	PASS
83.3%	3	36.65	2.31	1.76%	PASS
		AVERAGE:	2.27		

EPA Method 3A,
Example Calculations

Client:	Tucson Iron and Metal	Run:	1
Location:	Tucson, AZ	Start Time:	11:10
Source:	Contraband Incinerator	End Time:	12:15
Method:	3A	Date:	9/9/2020

EPA Method 3A (O_2):

Analyzer Calibration Error (Mid)

1) $ACE = \left(\frac{C_{Dir} - CV}{CS}\right) \times 100 =$ 0.15 %v

where C_{Dir}: 10.03 %
C_V: 10.00 %
CS: 19.96 %

System Bias (Upscale)

2) $SB = \left(\frac{C_S - CDir}{CS}\right) \times 100 =$ -0.40 %v

where C_{Dir}: 10.03 %
C_S: 9.95 %
CS: 19.96 %

Drift Assessment (Upscale)

3) $D = | SB_{Final} - SB_i | =$ 0.00 %v

where SB_{Final}: -0.40 %
SB_i: -0.40 %

Effluent Gas Concentration

4) $C_{Gas} = (C_{Avg} - C_O) \left(\frac{C_{MA}}{C_M - CO}\right) =$ 18.18 %v

where C_{Avg}: 18.02 %
C_O: 0.08 %
C_{MA}: 10.00 %
C_M: 9.95 %

EPA Method 3A,
Example Calculations

Client:	Tucson Iron and Metal	Run:	1
Location:	Tucson, AZ	Start Time:	11:10
Source:	Contraband Incinerator	End Time:	12:15
Method:	3A	Date:	9/9/2020

EPA Method 3A (CO_2):

Analyzer Calibration Error (Mid)

1) $ACE = \left(\frac{C_{Dir} - CV}{CS}\right) \times 100 =$ 0.70 %v

where C_{Dir}: 10.14 %
C_V: 10.00 %
CS: 19.86 %

System Bias (Upscale)

2) $SB = \left(\frac{C_S - CDir}{CS}\right) \times 100 =$ -0.91 %v

where C_{Dir}: 10.14 %
C_S: 9.96 %
CS: 19.86 %

Drift Assessment (Upscale)

3) $D = | SB_{Final} - SB_i | =$ 0.25 %v

where SB_{Final}: -0.65 %
SB_i: -0.91 %

Effluent Gas Concentration

4) $C_{Gas} = (C_{Avg} - C_O)\left(\frac{C_{MA}}{C_M - CO}\right) =$ 2.22 %v

where C_{Avg}: 2.23 %
C_O: 0.02 %
C_{MA}: 10.00 %
C_M: 9.99 %

Tucson Iron and Metal
Contraband Incinerator
Calibration and Run Data

Date	Time	O2 [%]	CO2 [%]	Notes	
9/8/2020	10:16:55	1.27	0.01		
9/8/2020	10:17:55	1.35	0.01		
9/8/2020	10:18:55	0.43	0.00		
				Method 205	
9/8/2020	10:19:55	0.00	-0.01	Analzyer Zero	
9/8/2020	10:20:55	2.97	4.84		
9/8/2020	10:21:55	20.43	20.99		
9/8/2020	10:22:55	20.25	21.05		
9/8/2020	10:23:55	19.99	21.07	O2 Analyzer Span	
9/8/2020	10:24:55	16.50	15.92		
9/8/2020	10:25:55	10.10	10.70		
9/8/2020	10:26:55	10.08	10.69	O2 Analyzer Mid	
9/8/2020	10:27:55	10.08	10.67		
9/8/2020	10:28:55	6.84	6.18		
				Dilution System Check	
9/8/2020	10:29:55	4.91	5.14		
9/8/2020	10:30:55	4.94	5.14		5
9/8/2020	10:31:55	7.77	8.80		
9/8/2020	10:32:55	9.95	10.48		10
9/8/2020	10:33:55	8.11	7.88		
9/8/2020	10:34:55	4.94	5.15		5
9/8/2020	10:35:55	8.14	9.19		
9/8/2020	10:36:55	9.95	10.48		10
9/8/2020	10:37:55	6.38	6.03		
9/8/2020	10:38:55	4.95	5.16		5
9/8/2020	10:39:55	8.42	9.50		
9/8/2020	10:40:55	9.94	10.48		10
9/8/2020	10:41:55	7.79	6.94		
				Cylinder Audit	
9/8/2020	10:42:55	0.08	0.04		
9/8/2020	10:43:55	0.03	0.02		0
9/8/2020	10:44:55	4.03	5.55		
9/8/2020	10:45:55	10.03	10.65		10
9/8/2020	10:46:55	4.66	3.66		
9/8/2020	10:47:55	0.03	0.02		0
9/8/2020	10:48:55	3.87	5.40		
9/8/2020	10:49:55	10.02	10.65		10
9/8/2020	10:50:55	6.00	5.09		

Tucson Iron and Metal
Contraband Incinerator
Calibration and Run Data

Date	Time	O2 [%]	CO2 [%]	Notes	
9/8/2020	10:51:55	0.04	0.02		0
9/8/2020	10:52:55	5.80	7.45		
9/8/2020	10:53:55	10.03	10.66		10
				Method 3A 9/9/2020	
9/9/2020	8:22:34	21.03	0.18		
9/9/2020	8:23:34	21.03	0.18		
9/9/2020	8:24:34	21.03	0.18		
9/9/2020	8:25:34	21.03	0.18		
9/9/2020	8:26:34	21.03	0.18		
9/9/2020	8:27:34	21.03	0.17		
9/9/2020	8:28:34	21.03	0.17		
9/9/2020	8:29:34	21.03	0.18		
9/9/2020	8:30:34	21.03	0.17		
9/9/2020	8:31:34	21.03	0.17		
9/9/2020	8:32:34	21.03	0.17		
9/9/2020	8:33:34	21.03	0.17		
9/9/2020	8:34:34	21.03	0.17		
9/9/2020	8:37:00	16.49	0.14		
9/9/2020	8:38:00	0.16	0.01		
9/9/2020	8:39:00	-0.01	0.00	Analyzer Zero	
9/9/2020	8:40:00	10.60	11.95		
9/9/2020	8:41:00	19.98	20.13	O2/CO2 Analyzer Span	
9/9/2020	8:42:00	20.01	19.88		
9/9/2020	8:43:00	15.39	13.93		
9/9/2020	8:44:00	10.04	10.14		
9/9/2020	8:45:00	10.03	10.14	O2/CO2 Analyzer Mid	
9/9/2020	8:46:00	10.02	10.09		
9/9/2020	8:47:00	10.02	10.05		
9/9/2020	8:48:00	10.27	7.75		
9/9/2020	8:49:00	12.23	0.10		
9/9/2020	8:50:00	1.48	0.06		
9/9/2020	8:51:00	1.26	0.05		
9/9/2020	8:52:00	1.24	0.04		
9/9/2020	8:53:00	1.56	0.04		
9/9/2020	8:54:00	1.28	0.04		
9/9/2020	8:55:00	1.04	0.03		
9/9/2020	8:56:00	0.06	0.02		
9/9/2020	8:57:00	0.66	0.04		
9/9/2020	8:58:00	0.12	0.02		
9/9/2020	8:59:00	0.09	0.01	System Zero	

Tucson Iron and Metal
Contraband Incinerator
Calibration and Run Data

Date	Time	O2 [%]	CO2 [%]	Notes	
9/9/2020	9:00:00	0.56	0.09		
9/9/2020	9:01:00	9.13	8.16		
9/9/2020	9:02:00	9.95	9.96	O2/CO2 System Upscale	
9/9/2020	9:03:00	11.59	7.60		
9/9/2020	9:04:00	20.26	0.34		
9/9/2020	9:05:00	20.87	0.08		
9/9/2020	9:06:00	20.88	0.07	Waiting for testing to begin.	
9/9/2020	11:10:00	17.92	2.33	Begin Run 1	
9/9/2020	11:11:00	17.86	2.37		
9/9/2020	11:12:00	17.90	2.32		
9/9/2020	11:13:00	18.11	2.14		
9/9/2020	11:14:00	18.33	1.96		
9/9/2020	11:15:00	18.56	1.78		
9/9/2020	11:16:00	18.59	1.77		
9/9/2020	11:17:00	18.64	1.72		
9/9/2020	11:18:00	18.64	1.74		
9/9/2020	11:19:00	18.40	1.95		
9/9/2020	11:20:00	18.24	2.08		
9/9/2020	11:21:00	18.24	2.06		
9/9/2020	11:22:00	18.08	2.17		
9/9/2020	11:23:00	17.98	2.23		
9/9/2020	11:24:00	18.05	2.14		
9/9/2020	11:25:00	18.29	1.98		
9/9/2020	11:26:00	18.28	2.00		
9/9/2020	11:27:00	18.21	2.07		
9/9/2020	11:28:00	18.08	2.17		S1= 2.17
9/9/2020	11:29:00	18.09	2.15		
9/9/2020	11:30:00	18.09	2.17		
9/9/2020	11:31:00	18.06	2.18		
9/9/2020	11:32:00	18.07	2.18		
9/9/2020	11:33:00	18.01	2.24		
9/9/2020	11:34:00	17.99	2.23		
9/9/2020	11:35:00	17.96	2.27		
9/9/2020	11:36:00	17.89	2.32		S2= 2.33
9/9/2020	11:37:00	17.86	2.34		
9/9/2020	11:38:00	17.87	2.34		
9/9/2020	11:39:00	17.87	2.31		
9/9/2020	11:40:00	17.98	2.21		
9/9/2020	11:41:00	18.03	2.17		
9/9/2020	11:42:00	18.07	2.16		

Tucson Iron and Metal
Contraband Incinerator
Calibration and Run Data

Date	Time	O2 [%]	CO2 [%]	Notes
9/9/2020	11:43:00	17.94	2.29	S3= 2.31
9/9/2020	11:44:00	17.87	2.33	
9/9/2020	11:45:00	17.87	2.31	
9/9/2020	11:46:00	17.93	2.29	
9/9/2020	11:47:00	17.87	2.36	
9/9/2020	11:48:00	17.93	2.29	
9/9/2020	11:49:00	17.93	2.30	
9/9/2020	11:50:00	17.84	2.36	
9/9/2020	11:51:00	17.72	2.44	
9/9/2020	11:52:00	17.74	2.43	
9/9/2020	11:53:00	17.77	2.45	
9/9/2020	11:54:00	17.81	2.43	
9/9/2020	11:55:00	17.87	2.40	
9/9/2020	11:56:00	17.87	2.42	
9/9/2020	11:57:00	18.18	2.17	
9/9/2020	11:58:00	17.91	2.36	
9/9/2020	11:59:00	17.99	2.27	
9/9/2020	12:00:00	18.04	2.25	
9/9/2020	12:01:00	17.95	2.32	
9/9/2020	12:02:00	17.91	2.33	
9/9/2020	12:03:00	18.01	2.26	
9/9/2020	12:04:00	17.94	2.31	
9/9/2020	12:05:00	18.00	2.25	
9/9/2020	12:06:00	18.06	2.23	
9/9/2020	12:07:00	18.04	2.24	
9/9/2020	12:08:00	17.93	2.34	
9/9/2020	12:09:00	17.92	2.33	
9/9/2020	12:10:00	17.82	2.43	
9/9/2020	12:11:00	17.84	2.40	
9/9/2020	12:12:00	17.90	2.37	

Tucson Iron and Metal
Contraband Incinerator
Calibration and Run Data

Date	Time	O2 [%]	CO2 [%]	Notes
9/9/2020	12:13:00	17.91	2.36	
9/9/2020	12:14:00	17.82	2.44	
9/9/2020	12:15:00	17.86	2.41	End Run 1
		18.02	2.23	Averages
				Break for train turn around
9/9/2020	13:10:00	18.30	2.06	Begin Run 2
9/9/2020	13:11:00	18.29	2.05	
9/9/2020	13:12:00	18.25	2.09	
9/9/2020	13:13:00	18.22	2.10	
9/9/2020	13:14:00	18.19	2.11	
9/9/2020	13:15:00	18.31	2.02	
9/9/2020	13:16:00	18.29	2.05	
9/9/2020	13:17:00	18.29	2.07	
9/9/2020	13:18:00	18.18	2.15	
9/9/2020	13:19:00	18.25	2.10	
9/9/2020	13:20:00	18.14	2.19	
9/9/2020	13:21:00	18.17	2.14	
9/9/2020	13:22:00	18.32	2.01	
9/9/2020	13:23:00	18.40	1.97	
9/9/2020	13:24:00	18.51	1.89	
9/9/2020	13:25:00	18.49	1.91	
9/9/2020	13:26:00	18.62	1.81	
9/9/2020	13:27:00	18.61	1.84	
9/9/2020	13:28:00	18.63	1.79	
9/9/2020	13:29:00	18.63	1.82	
9/9/2020	13:30:00	18.58	1.83	
9/9/2020	13:31:00	18.47	1.94	
9/9/2020	13:32:00	18.41	1.98	
9/9/2020	13:33:00	18.39	1.99	
9/9/2020	13:34:00	18.39	1.97	
9/9/2020	13:35:00	18.51	1.89	
9/9/2020	13:36:00	18.45	1.96	
9/9/2020	13:37:00	18.40	1.99	
9/9/2020	13:38:00	18.31	2.07	
9/9/2020	13:39:00	18.36	2.02	
9/9/2020	13:40:00	18.46	1.93	
9/9/2020	13:41:00	18.50	1.93	
9/9/2020	13:42:00	18.35	2.06	
9/9/2020	13:43:00	18.35	2.05	
9/9/2020	13:44:00	18.42	1.96	

Tucson Iron and Metal
Contraband Incinerator
Calibration and Run Data

Date	Time	O2 [%]	CO2 [%]	Notes
9/9/2020	13:45:00	18.53	1.87	
9/9/2020	13:46:00	18.51	1.92	
9/9/2020	13:47:00	18.42	1.97	
9/9/2020	13:48:00	18.46	1.94	
9/9/2020	13:49:00	18.49	1.92	
9/9/2020	13:50:00	18.46	1.96	
9/9/2020	13:51:00	18.38	2.01	
9/9/2020	13:52:00	18.38	2.01	
9/9/2020	13:53:00	18.51	1.86	
9/9/2020	13:54:00	18.80	1.61	
9/9/2020	13:55:00	18.78	1.65	
9/9/2020	13:56:00	18.89	1.55	
9/9/2020	13:57:00	18.91	1.55	
9/9/2020	13:58:00	18.77	1.67	
9/9/2020	13:59:00	18.80	1.64	
9/9/2020	14:00:00	18.73	1.72	
9/9/2020	14:01:00	18.64	1.78	
9/9/2020	14:02:00	18.56	1.84	
9/9/2020	14:03:00	18.45	1.93	
9/9/2020	14:04:00	18.32	2.06	
9/9/2020	14:05:00	18.23	2.14	
9/9/2020	14:06:00	18.09	2.25	
9/9/2020	14:07:00	18.06	2.26	
9/9/2020	14:08:00	18.14	2.16	
9/9/2020	14:09:00	18.41	1.94	
9/9/2020	14:10:00	18.43	1.95	
9/9/2020	14:11:00	18.52	1.87	
9/9/2020	14:12:00	18.49	1.90	
9/9/2020	14:13:00	18.36	2.05	
9/9/2020	14:14:00	18.14	2.22	
9/9/2020	14:15:00	18.16	2.19	
9/9/2020	14:16:00	18.15	2.22	End Run 2
		18.42	1.96	Averages
				Break for train turn around
9/9/2020	15:18:00	18.63	1.74	Begin Run 3
9/9/2020	15:19:00	18.65	1.78	
9/9/2020	15:20:00	18.43	1.96	
9/9/2020	15:21:00	18.29	2.05	
9/9/2020	15:22:00	18.52	1.83	
9/9/2020	15:23:00	18.66	1.72	

Tucson Iron and Metal
Contraband Incinerator
Calibration and Run Data

Date	Time	O2 [%]	CO2 [%]	Notes
9/9/2020	15:24:00	18.74	1.64	
9/9/2020	15:25:00	18.81	1.58	
9/9/2020	15:26:00	18.85	1.58	
9/9/2020	15:27:00	18.72	1.71	
9/9/2020	15:28:00	18.55	1.84	
9/9/2020	15:29:00	18.54	1.86	
9/9/2020	15:30:00	18.40	1.98	
9/9/2020	15:31:00	18.45	1.92	
9/9/2020	15:32:00	18.61	1.78	
9/9/2020	15:33:00	18.67	1.75	
9/9/2020	15:34:00	18.64	1.77	
9/9/2020	15:35:00	18.84	1.57	
9/9/2020	15:36:00	19.03	1.42	
9/9/2020	15:37:00	19.15	1.28	
9/9/2020	15:38:00	19.21	1.29	
9/9/2020	15:39:00	19.00	1.49	
9/9/2020	15:40:00	19.03	1.49	
9/9/2020	15:41:00	18.95	1.58	
9/9/2020	15:42:00	18.92	1.64	
9/9/2020	15:43:00	18.59	1.95	
9/9/2020	15:44:00	18.49	2.02	
9/9/2020	15:45:00	18.57	1.95	
9/9/2020	15:46:00	18.62	1.93	
9/9/2020	15:47:00	18.56	1.98	
9/9/2020	15:48:00	18.67	1.88	
9/9/2020	15:49:00	18.71	1.82	
9/9/2020	15:50:00	18.91	1.64	
9/9/2020	15:51:00	18.88	1.68	
9/9/2020	15:52:00	18.90	1.68	
9/9/2020	15:53:00	18.82	1.77	
9/9/2020	15:54:00	18.75	1.83	
9/9/2020	15:55:00	18.68	1.91	
9/9/2020	15:56:00	18.68	1.90	
9/9/2020	15:57:00	18.67	1.91	
9/9/2020	15:58:00	18.62	1.96	
9/9/2020	15:59:00	18.56	2.02	
9/9/2020	16:00:00	18.51	2.06	
9/9/2020	16:01:00	18.55	2.03	
9/9/2020	16:02:00	18.55	2.03	
9/9/2020	16:03:00	18.53	2.04	
9/9/2020	16:04:00	18.56	2.02	

Tucson Iron and Metal
Contraband Incinerator
Calibration and Run Data

Date	Time	O2 [%]	CO2 [%]	Notes
9/9/2020	16:05:00	18.59	1.99	
9/9/2020	16:06:00	18.69	1.88	
9/9/2020	16:07:00	18.70	1.89	
9/9/2020	16:08:00	18.56	2.02	
9/9/2020	16:09:00	18.61	1.95	
9/9/2020	16:10:00	18.67	1.92	
9/9/2020	16:11:00	18.71	1.88	
9/9/2020	16:12:00	18.75	1.83	
9/9/2020	16:13:00	18.81	1.76	
9/9/2020	16:14:00	18.91	1.67	
9/9/2020	16:15:00	19.00	1.58	
9/9/2020	16:16:00	19.07	1.51	
9/9/2020	16:17:00	19.14	1.43	
9/9/2020	16:18:00	19.24	1.33	
9/9/2020	16:19:00	19.31	1.25	
9/9/2020	16:20:00	19.33	1.24	
9/9/2020	16:21:00	19.28	1.31	
9/9/2020	16:22:00	19.24	1.33	
9/9/2020	16:23:00	19.18	1.42	
9/9/2020	16:24:00	19.10	1.45	
9/9/2020	16:25:00	19.05	1.55	
9/9/2020	16:26:00	18.95	1.63	End Run 3
		18.78	1.74	Averages
9/9/2020	16:27:00	18.91	1.66	
9/9/2020	16:28:00	18.92	1.66	
9/9/2020	16:29:00	18.92	1.67	
9/9/2020	16:30:00	18.93	1.65	
9/9/2020	16:31:00	19.06	1.51	
9/9/2020	16:32:00	19.14	1.43	
9/9/2020	16:33:00	19.17	1.40	
9/9/2020	16:34:00	19.14	1.45	
9/9/2020	16:35:00	19.16	1.40	
9/9/2020	16:36:00	19.25	1.33	
9/9/2020	16:37:00	19.11	1.51	
9/9/2020	16:38:00	18.92	1.70	
9/9/2020	16:39:00	18.80	1.80	
9/9/2020	16:40:00	18.76	1.80	
9/9/2020	16:41:00	18.80	1.76	
9/9/2020	16:42:00	18.85	1.72	
9/9/2020	16:43:00	18.81	1.76	

Tucson Iron and Metal
Contraband Incinerator
Calibration and Run Data

Date	Time	O2 [%]	CO2 [%]	Notes
9/9/2020	16:44:00	17.08	1.53	
9/9/2020	16:45:00	2.29	0.17	
9/9/2020	16:46:00	0.12	0.03	
9/9/2020	16:47:00	0.07	0.02	System Zero
9/9/2020	16:48:00	1.22	0.75	
9/9/2020	16:49:00	9.14	8.94	
9/9/2020	16:50:00	9.94	9.97	
9/9/2020	16:51:00	9.95	10.01	O2/CO2 System Upscale

Bison Engineering, Inc.
RATA Summary

Client: AMCEP Metals
Facility: Tucson Iron and Metal
Location: Tucson, Arizona
Source: Contraband Incinerator
Test Date: 9/10/2020

Run		1	2	3	4	5	6	7	8	9	10	11	12	Average
Date		9/10/2020	9/10/2020	9/10/2020	9/10/2020	9/10/2020	9/10/2020	9/10/2020	9/10/2020	9/10/2020	9/10/2020	9/10/2020	9/10/2020	
Start Time		9:10	9:31	9:52	11:15	11:36	11:57	13:04	13:25	13:46	14:30	14:51	15:12	
End Time		9:30	9:51	10:12	11:35	11:56	12:17	13:24	13:45	14:06	14:50	15:11	15:32	
Barometric Pressure, "Hg		26.72	26.72	26.72	26.72	26.72	26.72	26.72	26.72	26.72	26.72	26.72	26.72	26.72
Static Pressure, "H_2O		-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04
CO_2, % vd		1.67	1.66	1.48	1.70	1.63	1.51	1.66	1.35	1.54	1.35	1.28	1.67	1.54
O_2, % vd		18.77	18.81	19.06	18.75	18.81	18.94	18.77	19.11	18.91	19.10	19.18	18.73	18.91
Dry Molecular Weight, lb/lb-mole		29.02	29.02	29.00	29.02	29.01	29.00	29.02	28.98	29.00	28.98	28.97	29.02	29.00
NOx	ppm	12.51	10.09	10.49	13.56	14.69	14.86	14.09	14.56	14.28	14.16	14.69	13.62	13.47
NOx	ppm @7% O2	81.51	67.00	79.11	87.59	97.59	105.27	92.07	113.22	99.84	109.03	118.41	87.43	94.84
SO_2	ppm	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.01
SO_2	ppm @7% O2	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.01	0.01	0.20
CO	ppm	2.39	2.78	4.24	1.46	1.20	1.43	1.76	1.61	1.50	1.39	1.85	1.42	1.92
CO	ppm @7% O2	15.61	18.47	31.95	9.41	7.97	10.11	11.52	12.56	10.46	10.68	14.93	9.09	13.56

Any negative values due to analyzer drift are reported as zero.

Compliance Summary

Pollutant	Units	Runs 1-3	Runs 4-6	Runs 7-9	Average
NOx	ppm	11.03	14.37	14.31	13.24
NOx	ppm @7% O2	76	97	102	91
SO_2	ppm	0.03	0.00	0.00	0.01
SO_2	ppm @7% O2	0.20	0.00	0.00	0.07
CO	ppm	3.14	1.36	1.62	2.04
CO	ppm @7% O2	22	9	12	14

Compliance results are based on the average of three, 21-minute RATA runs.

EPA Method 205

Client: AMCEP Metals
Facility: Tucson Iron and Metal
Location: Tucson, Arizona
Source: Contraband Incinerator
Test date: 9/10/2020

Leak Check was performed on gaseous sampling line? Yes

Method 205 Verification of Gas Dilution System for Field Instrument Calibrations

Analyzer Calibration Error	Zero	Mid	High	
Cylinder #		10	20	
Calibration Gas Standard	0	10.02	19.96	
Calibration Gas Analyzer Response	0.00	10.08	19.99	
Analyzer Calibration Error	0.00	0.30	0.15	
Analyzer Calibration Error <2%	Pass	PASS	PASS	PASS

High Level	First	Second	Third	Average
(10% oxygen dilution system)	9.95	9.95	9.94	9.95
% difference from average recorded value	0.0%	0.0%	-0.1%	
Pass or Fail +/- 2%	Pass	Pass	Pass	
% difference from target of 10% O_2	-0.5%	-0.5%	-0.6%	-0.5%
Pass or Fail +/- 2% from target value				PASS

Mid Level	First	Second	Third	Average
(5% oxygen dilution system)	4.94	4.94	4.95	4.94
% difference from average recorded value	-0.1%	-0.1%	0.1%	
Pass or Fail +/- 2%	Pass	Pass	Pass	
% difference from target of 5% O_2	-1.2%	-1.2%	-1.0%	-1.1%
Pass or Fail +/- 2% from target value				PASS

Independent Mid Level Check	First	Second	Third	Average
(10% oxygen independent tank check)	10.03	10.02	10.03	10.03
Percent difference from tank value				0.07%
Pass or Fail < 2%				PASS
Tank Value	10.02			
Cylinder #	CC505870			

Bison Engineering, Inc.
Method 3A Oxygen
Calibration Error, System Bias and System Drift

Client: AMCEP Metals
Facility: Tucson Iron and Metal
Location: Tucson, Arizona
Source: Contraband Incinerator
Test Date: 9/10/2020

Analyzer Calibration Error	Zero	Mid	High
Calibration gas standards	0.00	10.02	19.96
Calibration gas analyzer response	-0.12	10.01	19.99
Analyzer Calibration Error	-0.60	-0.07	0.14
Analyzer Calibration Error < 2%	pass	pass	pass

			Initial Values			Final Values									
		Analyzer Cal. Response	System Cal. Response	Pre test System Cal. Bias % of span	pass/fail	System Cal Response	Post test System Cal. Bias % of span	pass/fail	System Drift % of span	pass/fail	Analyzer Span	Average Gas Conc	Effluent Gas conc % d	% w	Instrument Cal. Reference Gas
Run 1	zero	-0.12	-0.19	-0.34	pass	-0.10	0.11	pass	0.45	pass					
	upscale	10.01	9.93	-0.41	pass	9.92	-0.43	pass	-0.03	pass	19.96	18.71	18.77	NA	10.02
Run 2	zero	-0.12	-0.19	-0.34	pass	-0.10	0.11	pass	0.45	pass					
	upscale	10.01	9.93	-0.41	pass	9.92	-0.43	pass	-0.03	pass	19.96	18.75	18.81	NA	10.02
Run 3	zero	-0.12	-0.19	-0.34	pass	-0.10	0.11	pass	0.45	pass					
	upscale	10.01	9.93	-0.41	pass	9.92	-0.43	pass	-0.03	pass	19.96	19.00	19.06	NA	10.02
Run 4	zero	-0.12	-0.10	0.11	pass	-0.08	0.19	pass	0.08	pass					
	upscale	10.01	9.92	-0.43	pass	9.92	-0.43	pass	0.00	pass	19.96	18.64	18.75	NA	10.02
Run 5	zero	-0.12	-0.10	0.11	pass	-0.08	0.19	pass	0.08	pass					
	upscale	10.01	9.92	-0.43	pass	9.92	-0.43	pass	0.00	pass	19.96	18.70	18.81	NA	10.02
Run 6	zero	-0.12	-0.10	0.11	pass	-0.08	0.19	pass	0.08	pass					
	upscale	10.01	9.92	-0.43	pass	9.92	-0.43	pass	0.00	pass	19.96	18.83	18.94	NA	10.02
Run 7	zero	-0.12	-0.08	0.19	pass	-0.07	0.24	pass	0.05	pass					
	upscale	10.01	9.92	-0.43	pass	9.92	-0.45	pass	-0.02	pass	19.96	18.65	18.77	NA	10.02
Run 8	zero	-0.12	-0.08	0.19	pass	-0.07	0.24	pass	0.05	pass					
	upscale	10.01	9.92	-0.43	pass	9.92	-0.45	pass	-0.02	pass	19.96	18.99	19.11	NA	10.02
Run 9	zero	-0.12	-0.08	0.19	pass	-0.07	0.24	pass	0.05	pass					
	upscale	10.01	9.92	-0.43	pass	9.92	-0.45	pass	-0.02	pass	19.96	18.79	18.91	NA	10.02
Run 10	zero	-0.12	-0.07	0.24	pass	-0.09	0.14	pass	-0.10	pass					
	upscale	10.01	9.92	-0.45	pass	9.90	-0.52	pass	-0.08	pass	19.96	18.96	19.10	NA	10.02
Run 11	zero	-0.12	-0.07	0.24	pass	-0.09	0.14	pass	-0.10	pass					
	upscale	10.01	9.92	-0.45	pass	9.90	-0.52	pass	-0.08	pass	19.96	19.04	19.18	NA	10.02
Run 12	zero	-0.12	-0.07	0.24	pass	-0.09	0.14	pass	-0.10	pass					
	upscale	10.01	9.92	-0.45	pass	9.90	-0.52	pass	-0.08	pass	19.96	18.60	18.73	NA	10.02
				< 5% *			< 5%		< 3% *			Average	18.91	NA	

Note: All units are in %
*or <0.5 % absolute difference

Instrument Make:	Servomex
Instrument Model:	1440
Instrument Serial #:	14202/3280

Bison Engineering, Inc.
Method 3A Carbon Dioxide
Calibration Error, System Bias and System Drift

Client: AMCEP Metals
Facility: Tucson Iron and Metal
Location: Tucson, Arizona
Source: Contraband Incinerator
Test Date: 9/10/2020

Analyzer Calibration Error	Zero	Mid	High
Calibration gas standards	0.0	9.96	19.86
Calibration gas analyzer response	0.0	10.09	19.86
Analyzer Calibration Error	-0.01	0.65	0.01
Analyzer Calibration Error < 2%	pass	pass	pass

			Initial Values			Final Values									
		Analyzer Cal. Response	System Cal Response	Pre test System Cal. Bias % of span	pass/fail	System Cal Response	Post test System Cal. Bias % of span	pass/fail	System Drift % of span	pass/fail	Analyzer Span	Average Gas Conc	Effluent Gas conc % d	% w	Instrument Cal. Reference Gas
Run 1	zero	0.00	-0.02	-0.07	pass	0.00	0.01	pass	0.08	pass					
	upscale	10.09	9.98	-0.57	pass	10.03	-0.31	pass	0.26	pass	19.86	1.67	1.67	NA	9.96
Run 2	zero	0.00	-0.02	-0.07	pass	0.00	0.01	pass	0.08	pass					
	upscale	10.09	9.98	-0.57	pass	10.03	-0.31	pass	0.26	pass	19.86	1.66	1.66	NA	9.96
Run 3	zero	0.00	-0.02	-0.07	pass	0.00	0.01	pass	0.08	pass					
	upscale	10.09	9.98	-0.57	pass	10.03	-0.31	pass	0.26	pass	19.86	1.48	1.48	NA	9.96
Run 4	zero	0.00	0.00	0.01	pass	0.00	0.02	pass	0.01	pass					
	upscale	10.09	10.03	-0.31	pass	10.02	-0.37	pass	-0.06	pass	19.86	1.71	1.70	NA	9.96
Run 5	zero	0.00	0.00	0.01	pass	0.00	0.02	pass	0.01	pass					
	upscale	10.09	10.03	-0.31	pass	10.02	-0.37	pass	-0.06	pass	19.86	1.64	1.63	NA	9.96
Run 6	zero	0.00	0.00	0.01	pass	0.00	0.02	pass	0.01	pass					
	upscale	10.09	10.03	-0.31	pass	10.02	-0.37	pass	-0.06	pass	19.86	1.52	1.51	NA	9.96
Run 7	zero	0.00	0.00	0.02	pass	0.00	0.02	pass	0.01	pass					
	upscale	10.09	10.02	-0.37	pass	10.01	-0.41	pass	-0.05	pass	19.86	1.67	1.66	NA	9.96
Run 8	zero	0.00	0.00	0.02	pass	0.00	0.02	pass	0.01	pass					
	upscale	10.09	10.02	-0.37	pass	10.01	-0.41	pass	-0.05	pass	19.86	1.36	1.35	NA	9.96
Run 9	zero	0.00	0.00	0.02	pass	0.00	0.02	pass	0.01	pass					
	upscale	10.09	10.02	-0.37	pass	10.01	-0.41	pass	-0.05	pass	19.86	1.55	1.54	NA	9.96
Run 10	zero	0.00	0.00	0.02	pass	0.00	0.01	pass	-0.02	pass					
	upscale	10.09	10.01	-0.41	pass	10.02	-0.36	pass	0.06	pass	19.86	1.36	1.35	NA	9.96
Run 11	zero	0.00	0.00	0.02	pass	0.00	0.01	pass	-0.02	pass					
	upscale	10.09	10.01	-0.41	pass	10.02	-0.36	pass	0.06	pass	19.86	1.29	1.28	NA	9.96
Run 12	zero	0.00	0.00	0.02	pass	0.00	0.01	pass	-0.02	pass					
	upscale	10.09	10.01	-0.41	pass	10.02	-0.36	pass	0.06	pass	19.86	1.68	1.67	NA	9.96
				< 5% *			< 5%		< 3% *			Average	1.54	NA	

Note: All units are in %
*or <0.5 % absolute difference

Instrument Make:	Servomex
Instrument Model:	1440
Instrument Serial #:	14202/3280

EPA Method 3A,
Example Calculations

Client:	AMCEP Metals	Run:	1
Facility:	Tucson Iron and Metal	Start Time:	9:10
Location:	Tucson, Arizona	End Time:	9:30
Source:	Contraband Incinerator	Date:	9/10/2020

EPA Method 3A (O_2):

Analyzer Calibration Error (Mid)

1) $ACE = \left(\frac{C_{Dir} - CV}{CS}\right) \times 100 =$ -0.07 %v

where C_{Dir}: 10.01 %v
C_V: 10.02 %v
CS: 19.96 %v

System Bias (Upscale)

2) $SB = \left(\frac{C_S - CDir}{CS}\right) \times 100 =$ -0.41 %v

where C_{Dir}: 10.01 %v
C_S: 9.93 %v
CS: 19.96 %v

Drift Assessment (Upscale)

3) $D = | SB_{Final} - SB_i | =$ 0.03 %v

where SB_{Final}: -0.43 %v
SB_i: -0.41 %v

Effluent Gas Concentration

4) $C_{Gas} = (C_{Avg} - C_O) \left(\frac{C_{MA}}{C_M - CO}\right) =$ 18.77 %v

where C_{Avg}: 18.71 %v
C_O: -0.14 %v
C_{MA}: 10.02 %v
C_M: 9.92 %v

EPA Method 3A,
Example Calculations

Client:	AMCEP Metals	Run:	1
Facility:	Tucson Iron and Metal	Start Time:	9:10
Location:	Tucson, Arizona	End Time:	9:30
Source:	Contraband Incinerator	Date:	9/10/2020

EPA Method 3A (CO_2):

Analyzer Calibration Error (Mid)

1) $ACE = \left(\frac{C_{Dir} - CV}{CS}\right) \times 100 =$ 0.65 %v

where C_{Dir}: 10.09 %v

C_V: 9.96 %v

CS: 19.86 %v

System Bias (Upscale)

2) $SB = \left(\frac{C_S - CDir}{CS}\right) \times 100 =$ -0.57 %v

where C_{Dir}: 10.09 %v

C_S: 9.98 %v

CS: 19.86 %v

Drift Assessment (Upscale)

3) $D = | SB_{Final} - SB_i | =$ 0.26 %v

where SB_{Final}: -0.31 %v

SB_i: -0.57 %v

Effluent Gas Concentration

4) $C_{Gas} = (C_{Avg} - C_O) \left(\frac{C_{MA}}{C_M - CO}\right) =$ 1.67 %v

where C_{Avg}: 1.67 %v

C_O: -0.01 %v

C_{MA}: 9.96 %v

C_M: 10.00 %v

Bison Engineering, Inc.
Method 6C Sulfur Dioxide
Calibration Error, System Bias and System Drift

SO_2 molecular weight = 64 SO_2 lb/scf= 1.66E-07

Client: AMCEP Metals
Facility: Tucson Iron and Metal
Location: Tucson, Arizona
Source: Contraband Incinerator
Test Date: 9/10/2020

Analyzer Calibration Error	Zero	Low	High
Calibration gas standards	0.0	25.25	50.50
Calibration gas analyzer response	0.1	25.04	50.65
Analyzer Calibration Error	0.21	-0.42	0.29
Analyzer Calibration Error < 2%	pass	pass	pass

			Initial Values			Final Values									
		Analyzer Cal. Response	System Cal Response	Pre test System Cal. Bias % of span	pass/fail	System Cal Response	Post test System Cal. Bias % of span	pass/fail	System Drift % of span	pass/fail	Analyzer Span	Average Gas Conc	Effluent Gas conc % d	% w	Instrument Cal. Reference Gas
Run 1	zero	0.11	0.11	0.01	pass	0.11	0.01	pass	-0.01	pass					
	upscale	25.04	25.13	0.18	pass	24.60	-0.87	pass	-1.05	pass	50.50	0.20	0.09	NA	25.250
Run 2	zero	0.11	0.11	0.01	pass	0.11	0.01	pass	-0.01	pass					
	upscale	25.04	25.13	0.18	pass	24.60	-0.87	pass	-1.05	pass	50.50	0.11	0.00	NA	25.250
Run 3	zero	0.11	0.11	0.01	pass	0.11	0.01	pass	-0.01	pass					
	upscale	25.04	25.13	0.18	pass	24.60	-0.87	pass	-1.05	pass	50.50	0.11	0.00	NA	25.250
Run 4	zero	0.11	0.11	0.01	pass	0.11	0.01	pass	0.00	pass					
	upscale	25.04	24.60	-0.87	pass	24.04	-1.98	pass	-1.11	pass	50.50	0.11	0.00	NA	25.250
Run 5	zero	0.11	0.11	0.01	pass	0.11	0.01	pass	0.00	pass					
	upscale	25.04	24.60	-0.87	pass	24.04	-1.98	pass	-1.11	pass	50.50	0.11	0.00	NA	25.250
Run 6	zero	0.11	0.11	0.01	pass	0.11	0.01	pass	0.00	pass					
	upscale	25.04	24.60	-0.87	pass	24.04	-1.98	pass	-1.11	pass	50.50	0.11	0.00	NA	25.250
Run 7	zero	0.11	0.11	0.01	pass	0.11	0.01	pass	0.00	pass					
	upscale	25.04	24.04	-1.98	pass	23.72	-2.61	pass	-0.62	pass	50.50	0.11	0.00	NA	25.250
Run 8	zero	0.11	0.11	0.01	pass	0.11	0.01	pass	0.00	pass					
	upscale	25.04	24.04	-1.98	pass	23.72	-2.61	pass	-0.62	pass	50.50	0.11	0.00	NA	25.250
Run 9	zero	0.11	0.11	0.01	pass	0.11	0.01	pass	0.00	pass					
	upscale	25.04	24.04	-1.98	pass	23.72	-2.61	pass	-0.62	pass	50.50	0.11	0.00	NA	25.250
Run 10	zero	0.11	0.11	0.01	pass	0.11	0.01	pass	0.00	pass					
	upscale	25.04	23.72	-2.61	pass	23.76	-2.53	pass	0.08	pass	50.50	0.13	0.02	NA	25.250
Run 11	zero	0.11	0.11	0.01	pass	0.11	0.01	pass	0.00	pass					
	upscale	25.04	23.72	-2.61	pass	23.76	-2.53	pass	0.08	pass	50.50	0.11	0.00	NA	25.250
Run 12	zero	0.11	0.11	0.01	pass	0.11	0.01	pass	0.00	pass					
	upscale	25.04	23.72	-2.61	pass	23.76	-2.53	pass	0.08	pass	50.50	0.11	0.00	NA	25.250
				< 5% *			< 5%		< 3% *			Average	0.01	NA	

Note: All units are in ppm
*or <0.5 ppm absolute difference

Instrument Make:	Bovar
Instrument Model:	t005
Instrument Serial #:	981-XNGVV

EPA Method 6C,
Example Calculations

Client:	AMCEP Metals	Run:	1
Facility:	Tucson Iron and Metal	Start Time:	9:10
Location:	Tucson, Arizona	End Time:	9:30
Source:	Contraband Incinerator	Date:	9/10/2020

EPA Method 6C:

Analyzer Calibration Error (Mid)

1) $ACE = \left(\frac{C_{Dir} - CV}{CS}\right) \times 100 =$ -0.42 ppmv

where C_{Dir}: 25.04 ppmv
C_V: 25.25 ppmv
CS: 50.50 ppmv

System Bias (Upscale)

2) $SB = \left(\frac{C_S - CDir}{CS}\right) \times 100 =$ 0.18 ppmv

where C_{Dir}: 25.04 ppmv
C_S: 25.13 ppmv
CS: 50.50 ppmv

Drift Assessment (Upscale)

3) $D = | SB_{Final} - SB_i | =$ 1.05 ppmv

where SB_{Final}: -0.87 ppmv
SB_i: 0.18 ppmv

Effluent Gas Concentration

4) $C_{Gas} = (C_{Avg} - C_O) \left(\frac{C_{MA}}{C_M - CO}\right) =$ 0.09 ppmv

where C_{Avg}: 0.20 ppmv
C_O: 0.11 ppmv
C_{MA}: 25.25 ppmv
C_M: 24.87 ppmv

O_2 Correction

SO_2 2) $C_{@\%O2} = \left(\frac{20.9 - \%O2}{20.9 - \text{Measured } O2}\right) \times C =$ 0.60 ppmv

where $\%O_2$: 7.00 %
Measured O_2: 18.77 %
C: 0.09 ppmv

Bison Engineering, Inc.
Method 7E Nitrogen Oxides
Calibration Error, System Bias and System Drift

NOx molecular weight = 46 NOx lb/scf= 1.194E-07

Client: AMCEP Metals
Facility: Tucson Iron and Metal
Location: Tucson, Arizona
Source: Contraband Incinerator
Test Date: 9/10/2020

Analyzer Calibration Error	Zero	Low	High
Calibration gas standards	0.00	49.60	99.20
Cal gas analyzer response	-0.01	48.95	99.01
Analyzer Calibration Error	-0.01	-0.66	-0.19
Analyzer Calibration Error < 2%	pass	pass	pass

			Initial Values			Final Values									
		Analyzer Cal. Response	System Cal Response	Pre test System Cal. Bias % of span	Pre test System Cal. Bias pass/fail	System Cal Response	Post test System Cal. Bias % of span	Post test System Cal. Bias pass/fail	System Drift % of span	System Drift pass/fail	Analyzer Span	Average Gas Conc	Effluent Gas conc ppmvd	Effluent Gas conc ppmvw	Instrument Cal. Reference
Run 1	zero	-0.01	-0.04	-0.03	pass	-0.10	-0.08	pass	-0.06	pass					Gas
	upscale	48.95	48.26	-0.70	pass	49.23	0.29	pass	0.99	pass	99.20	12.24	12.51	NA	49.6
Run 2	zero	-0.01	-0.04	-0.03	pass	-0.10	-0.08	pass	-0.06	pass					
	upscale	48.95	48.26	-0.70	pass	49.23	0.29	pass	0.99	pass	99.20	9.86	10.09	NA	49.6
Run 3	zero	-0.01	-0.04	-0.03	pass	-0.10	-0.08	pass	-0.06	pass					
	upscale	48.95	48.26	-0.70	pass	49.23	0.29	pass	0.99	pass	99.20	10.26	10.49	NA	49.6
Run 4	zero	-0.01	-0.10	-0.08	pass	-0.16	-0.15	pass	-0.06	pass					
	upscale	48.95	49.23	0.29	pass	49.17	0.22	pass	-0.07	pass	99.20	13.36	13.56	NA	49.6
Run 5	zero	-0.01	-0.10	-0.08	pass	-0.16	-0.15	pass	-0.06	pass					
	upscale	48.95	49.23	0.29	pass	49.17	0.22	pass	-0.07	pass	99.20	14.48	14.69	NA	49.6
Run 6	zero	-0.01	-0.10	-0.08	pass	-0.16	-0.15	pass	-0.06	pass					
	upscale	48.95	49.23	0.29	pass	49.17	0.22	pass	-0.07	pass	99.20	14.65	14.86	NA	49.6
Run 7	zero	-0.01	-0.16	-0.15	pass	-0.11	-0.10	pass	0.05	pass					
	upscale	48.95	49.17	0.22	pass	49.20	0.25	pass	0.03	pass	99.20	13.88	14.09	NA	49.6
Run 8	zero	-0.01	-0.16	-0.15	pass	-0.11	-0.10	pass	0.05	pass					
	upscale	48.95	49.17	0.22	pass	49.20	0.25	pass	0.03	pass	99.20	14.34	14.56	NA	49.6
Run 9	zero	-0.01	-0.16	-0.15	pass	-0.11	-0.10	pass	0.05	pass					
	upscale	48.95	49.17	0.22	pass	49.20	0.25	pass	0.03	pass	99.20	14.06	14.28	NA	49.6
Run 10	zero	-0.01	-0.11	-0.10	pass	-0.06	-0.05	pass	0.05	pass					
	upscale	48.95	49.20	0.25	pass	49.21	0.27	pass	0.02	pass	99.20	13.98	14.16	NA	49.6
Run 11	zero	-0.01	-0.11	-0.10	pass	-0.06	-0.05	pass	0.05	pass					
	upscale	48.95	49.20	0.25	pass	49.21	0.27	pass	0.02	pass	99.20	14.51	14.69	NA	49.6
Run 12	zero	-0.01	-0.11	-0.10	pass	-0.06	-0.05	pass	0.05	pass					
	upscale	48.95	49.20	0.25	pass	49.21	0.27	pass	0.02	pass	99.20	13.45	13.62	NA	49.6
				< 5%			< 5%		< 3% *						

Note: All units are in ppm
*or <0.5 ppm absolute difference

Instrument Make:	T002/CAI
Instrument Model:	400CID
Instrument Serial #:	U04011

NO_2 to NO Converter Efficiency				
Target	Value	% Reading	Pass/Fail	Cylinder #
51.26	46.39	90.50%	PASS	CC507609

EPA Method 7E,
Example Calculations

Client:	AMCEP Metals	Run:	1
Facility:	Tucson Iron and Metal	Start Time:	9:10
Location:	Tucson, Arizona	End Time:	9:30
Source:	Contraband Incinerator	Date:	9/10/2020

EPA Method 7E:

Analyzer Calibration Error (Mid)

1) $ACE = \left(\frac{C_{Dir} - CV}{CS}\right) x\ 100 =$ -0.66 ppmv

where C_{Dir}: 48.95 ppmv
C_V: 49.60 ppmv
CS: 99.20 ppmv

System Bias (Upscale)

2) $SB = \left(\frac{C_S - CDir}{CS}\right) x\ 100 =$ -0.70 ppmv

where C_{Dir}: 48.95 ppmv
C_S: 48.26 ppmv
CS: 99.20 ppmv

Drift Assessment (Upscale)

3) $D = | SB_{Final} - SB_i | =$ 0.99 ppmv

where SB_{Final}: 0.29 ppmv
SB_i: -0.70 ppmv

Effluent Gas Concentration

4) $C_{Gas} = (C_{Avg} - C_O) \left(\frac{C_{MA}}{C_M - CO}\right) =$ 12.51 ppmv

where C_{Avg}: 12.24 ppmv
C_O: -0.07 ppmv
C_{MA}: 49.60 ppmv
C_M: 48.74 ppmv

NO_2 - NO Conversion Efficiency

5) $Eff_{NOx} = \left(\frac{C_{Dir}}{C_V}\right) x\ 100 =$ 50.1 ppmv

where C_{Dir}: 10.00 ppmv
C_V: 19.96 ppmv

O_2 Correction

NO_x 2) $C_{@\%O2} = \left(\frac{20.9 - \%O2}{20.9 - \text{Measured } O2}\right) x\ C =$ 81.51 ppmv

where $\%O_2$: 7.00 %
Measured O_2: 18.77 %
C: 12.506 ppmv

Bison Engineering, Inc.
Method 10 Carbon Monoxide
Calibration Error, System Bias and System Drift

CO molecular weight = 28 CO lbs/scf= 7.26E-08

Client: AMCEP Metals
Facility: Tucson Iron and Metal
Location: Tucson, Arizona
Source: Contraband Incinerator
Test Date: 9/10/2020

Analyzer Calibration Error	Zero	Low	High
Calibration gas standards	0.00	50.05	100.10
Cal gas analyzer response	-0.07	50.34	100.43
Analyzer Cal. Error	-0.06	0.29	0.33
Analyzer Cal. Error < 2%	pass	pass	pass

			Initial Values			Final Values									
		Analyzer Cal. Response	System Cal Response	Pre test System Cal. Bias % of span	pass/fail	System Cal Response	Post test System Cal. Bias % of span	pass/fail	System Drift % of span	pass/fail	Analyzer Span	Avg Gas Conc	Effluent Gas conc ppmvd	ppmvw	Instrument Cal. Reference
Run 1	zero	-0.07	-0.08	-0.01	pass	-0.23	-0.17	pass	-0.15	pass					Gas
	upscale	50.34	50.15	-0.18	pass	50.52	0.18	pass	0.36	pass	100.10	2.26	2.39	NA	50.05
Run 2	zero	-0.07	-0.08	-0.01	pass	-0.23	-0.17	pass	-0.15	pass					
	upscale	50.34	50.15	-0.18	pass	50.52	0.18	pass	0.36	pass	100.10	2.65	2.78	NA	50.05
Run 3	zero	-0.07	-0.08	-0.01	pass	-0.23	-0.17	pass	-0.15	pass					
	upscale	50.34	50.15	-0.18	pass	50.52	0.18	pass	0.36	pass	100.10	4.12	4.24	NA	50.05
Run 4	zero	-0.07	-0.23	-0.17	pass	-0.14	-0.07	pass	0.10	pass					
	upscale	50.34	50.52	0.18	pass	50.40	0.06	pass	-0.12	pass	100.10	1.29	1.46	NA	50.05
Run 5	zero	-0.07	-0.23	-0.17	pass	-0.14	-0.07	pass	0.10	pass					
	upscale	50.34	50.52	0.18	pass	50.40	0.06	pass	-0.12	pass	100.10	1.03	1.20	NA	50.05
Run 6	zero	-0.07	-0.23	-0.17	pass	-0.14	-0.07	pass	0.10	pass					
	upscale	50.34	50.52	0.18	pass	50.40	0.06	pass	-0.12	pass	100.10	1.26	1.43	NA	50.05
Run 7	zero	-0.07	-0.14	-0.07	pass	-0.10	-0.03	pass	0.04	pass					
	upscale	50.34	50.40	0.06	pass	50.14	-0.20	pass	-0.26	pass	100.10	1.66	1.76	NA	50.05
Run 8	zero	-0.07	-0.14	-0.07	pass	-0.10	-0.03	pass	0.04	pass					
	upscale	50.34	50.40	0.06	pass	50.14	-0.20	pass	-0.26	pass	100.10	1.51	1.61	NA	50.05
Run 9	zero	-0.07	-0.14	-0.07	pass	-0.10	-0.03	pass	0.04	pass					
	upscale	50.34	50.40	0.06	pass	50.14	-0.20	pass	-0.26	pass	100.10	1.39	1.50	NA	50.05
Run 10	zero	-0.07	-0.14	-0.07	pass	-0.10	-0.03	pass	0.04	pass					
	upscale	50.34	50.14	-0.20	pass	50.56	0.22	pass	0.42	pass	100.10	1.28	1.39	NA	50.05
Run 11	zero	-0.07	-0.10	-0.03	pass	-0.10	-0.03	pass	0.00	pass					
	upscale	50.34	50.14	-0.20	pass	50.56	0.22	pass	0.42	pass	100.10	1.77	1.85	NA	50.05
Run 12	zero	-0.07	-0.10	-0.03	pass	-0.10	-0.03	pass	0.00	pass					
	upscale	50.34	50.14	-0.20	pass	50.56	0.22	pass	0.42	pass	100.10	1.33	1.42	NA	50.05
				< 5%			< 5%		< 3%*						

Note: All units are in ppm
*or <0.5 ppm absolute difference

Instrument Make:	Servomex
Instrument Model:	1440
Instrument Serial #:	01440D1/3855

EPA Method 10,
Example Calculations

Client:	AMCEP Metals	Run:	1
Facility:	Tucson Iron and Metal	Start Time:	9:10
Location:	Tucson, Arizona	End Time:	9:30
Source:	Contraband Incinerator	Date:	9/10/2020

EPA Method 10:

Analyzer Calibration Error (Mid)

1) $ACE = \left(\frac{C_{Dir} - CV}{CS}\right) \times 100 =$ 0.29 ppmv

where C_{Dir}: 50.34 ppmv
C_V: 50.05 ppmv
CS: 100.10 ppmv

System Bias (Upscale)

2) $SB = \left(\frac{C_S - CDir}{CS}\right) \times 100 =$ -0.18 ppmv

where C_{Dir}: 50.34 ppmv
C_S: 50.15 ppmv
CS: 100.10 ppmv

Drift Assessment (Upscale)

3) $D = | SB_{Final} - SB_i | =$ 0.36 ppmv

where SB_{Final}: 0.18 ppmv
SB_i: -0.18 ppmv

Effluent Gas Concentration

4) $C_{Gas} = (C_{Avg} - C_O) \left(\frac{C_{MA}}{C_M - CO}\right) =$ 2.39 ppmv

where C_{Avg}: 2.26 ppmv
C_O: -0.16 ppmv
C_{MA}: 50.05 ppmv
C_M: 50.34 ppmv

O_2 Correction

CO 2) $C_{@\%O2} = \left(\frac{20.9 - \%O2}{20.9 - \text{Measured } O2}\right) \times C =$ 15.61 ppmv

where $\%O_2$: 7.00 %
Measured O_2: 18.77 %
C: 2.39 ppmv

Performance Specification 3
O_2 % vd

Client: AMCEP Metals
Facility: Tucson Iron and Metal
Location: Tucson, Arizona
Source: Contraband Incinerator
Test Date: 09/10/20

1 = Used for RA calculations
0 = Excluded from RA calculations

Run	Time (MST) Start	Time (MST) End	Ref. Method	CEMS	Difference	Used in RATA
			% vd			
1	9:10	9:30	18.8	18.4	0.4	1
2	9:31	9:51	18.8	18.4	0.4	1
3	9:52	10:12	19.1	18.6	0.5	0
4	11:15	11:35	18.7	18.3	0.4	0
5	11:36	11:56	18.8	18.3	0.5	0
6	11:57	12:17	18.9	18.5	0.4	1
7	13:04	13:24	18.8	18.7	0.1	1
8	13:25	13:45	19.1	19.1	0.0	1
9	13:46	14:06	18.9	18.9	0.0	1
10	14:30	14:50	19.1	19.1	0.0	1
11	14:51	15:11	19.2	19.1	0.1	1
12	15:12	15:32	18.7	18.7	0.0	1
		Averages:	18.9	18.8	0.2	9

Absolute Difference: 0.2 % O_2

Performance Specification 3:
The Relative Accuracy (RA) of the CEMS is acceptable if the absolute value of the average RM-CEMS is less than 1.0% O_2.

Performance Specification 4a
CO ppmvd

Client: AMCEP Metals
Facility: Tucson Iron and Metal
Location: Tucson, Arizona
Source: Contraband Incinerator
Test Date: 09/10/20

1 = Used for RA calculations
0 = Excluded from RA calculations

Run	Time (MST) Start	End	Ref. Method	CEMS	Difference	Used in RATA
			ppmvd			
1	9:10	9:30	2.4	1.9	0.5	0
2	9:31	9:51	2.8	2.2	0.6	0
3	9:52	10:12	4.2	3.7	0.5	0
4	11:15	11:35	1.5	0.9	0.6	1
5	11:36	11:56	1.2	0.7	0.5	1
6	11:57	12:17	1.4	0.9	0.5	1
7	13:04	13:24	1.8	1.3	0.5	1
8	13:25	13:45	1.6	1.1	0.5	1
9	13:46	14:06	1.5	1.0	0.5	1
10	14:30	14:50	1.4	0.9	0.5	1
11	14:51	15:11	1.9	1.3	0.6	1
12	15:12	15:32	1.4	0.9	0.5	1
		Averages:	1.5	1.0	0.5	9

Standard Deviation	0.030
T-value	2.306
Confidence Coefficient	0.023

Relative Accuracy	35.4%	% RM
	NA	% ES
	0.5	≤ 5 ppmv

Performance Specification 4a:
The Relative Accuracy (RA) of the CEMS must be no greater than 10% when the average Reference Method (RM) is used to calculate RA, no greater than 5% when the applicable emissions standard (ES) is used to calculate RA, or within 5 ppmv when the RA is calculated as the absolute average difference between the RM and CEMS plus the 2.5% CC.

RATA Example Calculations:

1. Standard Deviation (S_d)
where sum di: 0.513
n: 9

$$S_d = \left[\frac{\sum_{i-1}^{n} di^2 - \frac{[\sum_{i-1}^{n} di]^2}{n}}{n-1}\right]^{1/2} = 0.030$$ Eq. 2-4

2. Confidence Coefficient (CC)
where $t_{0.975}$: 2.306
S_d: 0.030
n: 9

$$CC = t_{0.975}\frac{S_d}{\sqrt{n}} = 0.023$$ Eq. 2-5

3. Relative Accuracy (RA) based on RM
where ave. d: 0.513
CC: 0.023
Ave. RM: 1.513

$$RA = \frac{[|\bar{d}| + |CC|]}{\overline{RM}} x100 = 35.4\%$$ Eq. 2-6

4. Relative Accuracy (RA) based on ES
where ave. d: 0.513
CC: 0.023
Emission Standard: NA

$$RA = \frac{[|\bar{d}| + |CC|]}{ES} x100 = NA$$ Eq. 2-6

Performance Specification 4a
CO ppmvd @ 7 % O_2

Client: AMCEP Metals
Facility: Tucson Iron and Metal
Location: Tucson, Arizona
Source: Contraband Incinerator
Test Date: 09/10/20

1 = Used for RA calculations
0 = Excluded from RA calculations

Run	Time (MST) Start	End	Ref. Method	CEMS	Difference	Used in RATA
			ppmvd @ % O_2			
1	9:10	9:30	15.6	10.4	5.2	0
2	9:31	9:51	18.5	12.7	5.8	0
3	9:52	10:12	32.0	22.9	9.1	0
4	11:15	11:35	9.4	5.1	4.3	1
5	11:36	11:56	8.0	3.6	4.4	1
6	11:57	12:17	10.1	4.9	5.2	1
7	13:04	13:24	11.5	8.7	2.8	1
8	13:25	13:45	12.6	8.3	4.3	1
9	13:46	14:06	10.5	7.2	3.3	1
10	14:30	14:50	10.7	7.0	3.7	1
11	14:51	15:11	14.9	10.8	4.1	1
12	15:12	15:32	9.1	6.0	3.1	1
		Averages:	10.7	6.8	3.9	9

Standard Deviation	0.756
T-value	2.306
Confidence Coefficient	0.581

Relative Accuracy:	41.7%	% RM
	11.2%	% ES
	4	≤ 5 ppmv

Performance Specification 4a:
The Relative Accuracy (RA) of the CEMS must be no greater than 10% when the average Reference Method (RM) is used to calculate RA, no greater than 5% when the applicable emissions standard (ES) is used to calculate RA, or within 5 ppmv when the RA is calculated as the absolute average difference between the RM and CEMS plus the 2.5% CC.

RATA Example Calculations:

1. Standard Deviation (S_d)
where sum di: 3.903
n: 9

$$S_d = \left[\frac{\sum_{i-1}^{n} di^2 - \frac{[\sum_{i-1}^{n} di]^2}{n}}{n-1}\right]^{1/2} = 0.756$$ Eq. 2-4

2. Confidence Coefficient (CC)
where $t_{0.975}$: 2.306
S_d: 0.756
n: 9

$$CC = t_{0.975}\frac{S_d}{\sqrt{n}} = 0.581$$ Eq. 2-5

3. Relative Accuracy (RA) based on RM
where ave. d: 3.903
CC: 0.581
Ave. RM: 10.748

$$RA = \frac{[|\bar{d}| + |CC|]}{\overline{RM}} x100 = 41.7\%$$ Eq. 2-6

4. Relative Accuracy (RA) based on ES
where ave. d: 3.903
CC: 0.581
Emission Standard: 40

$$RA = \frac{[|\bar{d}| + |CC|]}{ES} x100 = 11.2\%$$ Eq. 2-6

Tucson Iron and Metal
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Date	Time	NOx [PPM]	CO [PPM]	SO2 [PPM]	O2 [%]	CO2 [%]	Notes
9/10/2020	6:52:34	-0.46	-0.52	30.42	15.09	0.08	
9/10/2020	6:53:34	-0.45	-0.82	30.75	0.08	0.00	
9/10/2020	6:54:34	0.01	-0.60	30.49	-0.04	0.00	
9/10/2020	6:55:34	0.02	-0.18	17.10	-0.06	0.01	
9/10/2020	6:56:34	0.09	-0.02	4.02	-0.08	0.00	
9/10/2020	6:57:34	-0.09	-0.16	0.14	-0.09	0.00	
9/10/2020	6:58:34	-0.03	-0.14	0.10	-0.10	0.00	
9/10/2020	6:59:34	-0.09	0.01	0.10	-0.11	0.00	
9/10/2020	7:00:34	-0.01	-0.07	0.11	-0.12	0.00	Analyzer Zero
9/10/2020	7:01:34	-0.08	-0.06	0.11	-0.12	0.00	
9/10/2020	7:02:34	0.10	-0.69	0.15	13.73	16.58	
9/10/2020	7:03:34	-0.02	-0.76	0.18	20.05	20.43	
9/10/2020	7:04:34	0.00	-0.77	0.13	19.99	19.87	
9/10/2020	7:05:34	-0.01	-0.82	0.11	19.98	19.89	
9/10/2020	7:06:34	0.04	-0.79	0.11	19.99	19.90	
9/10/2020	7:07:34	-0.06	-0.79	0.11	19.98	19.87	
9/10/2020	7:08:34	0.06	-0.79	0.09	19.99	19.86	O2/CO2 Analyzer Span
9/10/2020	7:09:34	0.03	-0.39	0.16	13.34	11.64	
9/10/2020	7:10:34	0.10	-0.57	0.11	10.01	10.10	
9/10/2020	7:11:34	-0.04	-0.61	0.10	10.01	10.09	O2/CO2 Analyzer Mid
9/10/2020	7:12:34	-0.06	-0.59	0.20	10.00	10.09	
9/10/2020	7:13:34	0.07	0.73	0.27	10.01	9.70	
9/10/2020	7:14:34	-0.02	70.60	0.41	1.27	0.11	
9/10/2020	7:15:34	0.00	91.20	0.16	-0.08	0.04	
9/10/2020	7:16:34	0.04	103.96	0.26	-0.10	0.03	
9/10/2020	7:17:34	0.03	101.24	0.22	-0.11	0.02	
9/10/2020	7:18:34	-0.02	100.43	0.30	-0.12	0.01	CO Analyzer Span
9/10/2020	7:19:34	0.25	66.64	0.27	-0.12	0.02	
9/10/2020	7:20:34	-0.02	50.29	0.30	-0.13	0.01	
9/10/2020	7:21:34	-0.09	50.33	0.30	-0.14	0.01	
9/10/2020	7:22:34	-0.01	50.34	0.36	-0.14	0.01	CO Analyzer Mid
9/10/2020	7:23:34	0.05	20.09	0.50	-0.14	0.01	
9/10/2020	7:24:34	39.16	1.92	0.68	-0.05	0.05	
9/10/2020	7:25:34	98.40	0.23	0.59	-0.14	0.01	
9/10/2020	7:26:34	98.78	0.01	0.51	-0.15	0.01	
9/10/2020	7:27:34	99.01	-0.13	0.58	-0.15	0.00	NOx Analyzer Span
9/10/2020	7:28:34	48.30	0.03	0.51	-0.15	0.01	
9/10/2020	7:29:34	48.95	-0.05	0.42	-0.16	0.00	NOx Analyzer Mid
9/10/2020	7:30:34	48.91	-0.13	0.57	-0.16	0.00	
9/10/2020	7:31:34	6.96	0.00	0.60	-0.15	0.01	
9/10/2020	7:32:34	8.49	0.00	7.17	-0.10	0.01	
9/10/2020	7:33:34	1.19	0.07	36.94	-0.16	0.00	
9/10/2020	7:34:34	0.32	-0.12	42.77	-0.16	0.00	
9/10/2020	7:35:34	0.29	-0.02	48.79	-0.16	0.00	
9/10/2020	7:36:34	0.29	0.11	50.65	-0.16	0.00	SO2 Analyzer Span
9/10/2020	7:37:34	0.31	0.09	44.87	-0.16	0.00	
9/10/2020	7:38:34	0.18	-0.20	23.89	-0.16	-0.01	
9/10/2020	7:39:34	0.13	-0.09	25.04	-0.17	0.00	SO2 Analyzer Mid
9/10/2020	7:40:34	51.14	-0.14	17.93	-0.16	0.00	
9/10/2020	7:41:34	2.25	0.33	1.41	-0.15	0.00	
9/10/2020	7:42:34	-0.03	0.20	1.48	-0.15	0.01	
9/10/2020	7:43:34	0.14	0.20	1.69	-0.15	0.02	
9/10/2020	7:44:34	35.47	0.07	2.19	-0.07	0.01	
9/10/2020	7:45:34	45.19	-0.03	1.68	-0.06	-0.01	
9/10/2020	7:46:34	45.58	-0.10	1.56	-0.06	-0.01	
9/10/2020	7:47:34	45.58	-0.15	1.70	-0.06	-0.02	

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Date	Time	NOx [PPM]	CO [PPM]	SO2 [PPM]	O2 [%]	CO2 [%]	Notes
9/10/2020	7:48:34	45.75	-0.08	1.50	-0.06	-0.02	
9/10/2020	7:49:34	45.78	-0.16	1.41	-0.07	-0.02	
9/10/2020	7:50:34	45.91	-0.13	1.46	-0.06	-0.02	
9/10/2020	7:51:34	45.82	-0.03	1.57	-0.07	-0.02	
9/10/2020	7:52:34	45.95	-0.07	1.40	-0.07	-0.02	
9/10/2020	7:53:34	45.92	-0.04	1.45	-0.07	-0.02	
9/10/2020	7:54:34	45.98	0.00	1.32	-0.07	-0.02	
9/10/2020	7:55:34	46.04	-0.15	1.34	-0.07	-0.02	
9/10/2020	7:56:34	46.02	-0.05	1.45	-0.07	-0.02	
9/10/2020	7:57:34	45.96	-0.10	1.40	-0.07	-0.02	
9/10/2020	7:58:34	46.39	-0.11	1.67	-0.07	-0.02	NO2 Converter Check
9/10/2020	7:59:34	39.68	-0.13	1.53	-0.07	-0.02	
9/10/2020	8:00:34	8.02	0.18	1.37	4.77	0.63	
9/10/2020	8:01:34	1.97	0.37	0.82	7.18	0.54	
9/10/2020	8:02:34	0.32	-0.10	0.73	0.08	0.01	
9/10/2020	8:03:34	0.20	0.05	0.80	-0.03	0.00	
9/10/2020	8:04:34	0.39	0.02	0.74	-0.02	0.01	
9/10/2020	8:05:34	1.15	-0.16	0.76	7.48	6.05	
9/10/2020	8:06:34	0.18	-0.51	1.02	9.90	9.90	
9/10/2020	8:07:34	0.18	-0.60	0.87	9.93	9.98	O2/CO2 System Upscale
9/10/2020	8:08:34	1.22	0.04	0.84	10.54	8.61	
9/10/2020	8:09:34	0.42	33.67	0.74	3.03	0.89	
9/10/2020	8:10:34	0.14	49.79	0.60	0.03	0.05	
9/10/2020	8:11:34	0.10	49.99	0.72	-0.03	0.03	
9/10/2020	8:12:34	0.08	50.15	0.76	-0.03	0.02	CO System Upscale
9/10/2020	8:13:34	11.46	43.14	0.79	1.87	0.28	
9/10/2020	8:14:34	46.54	5.10	0.74	0.69	0.06	
9/10/2020	8:15:34	48.26	0.04	0.92	-0.04	0.01	NOx System Upscale
9/10/2020	8:16:34	38.56	0.07	0.92	1.22	0.21	
9/10/2020	8:17:34	2.80	0.10	0.86	1.19	0.09	
9/10/2020	8:18:34	0.32	0.19	0.92	-0.03	0.01	
9/10/2020	8:19:34	1.44	-0.05	0.68	1.45	0.19	
9/10/2020	8:20:34	1.22	0.04	8.01	0.04	0.01	
9/10/2020	8:21:34	1.19	-0.15	30.68	-0.06	0.00	
9/10/2020	8:22:34	2.36	-0.01	43.76	1.66	0.22	
9/10/2020	8:23:34	0.60	-0.03	24.06	1.03	0.06	
9/10/2020	8:24:34	7.57	2.26	14.15	9.63	1.31	
9/10/2020	8:25:34	9.36	6.48	7.79	18.12	1.89	
9/10/2020	8:26:34	1.09	2.80	4.72	20.21	0.33	
9/10/2020	8:27:34	1.99	2.39	3.45	20.43	0.36	
9/10/2020	8:28:34	0.11	0.43	2.32	20.85	0.05	
9/10/2020	8:29:34	0.25	-0.02	1.66	20.87	0.04	
9/10/2020	8:30:34	0.17	0.13	1.41	20.87	0.06	
9/10/2020	8:31:34	2.27	0.39	1.50	20.75	0.24	
9/10/2020	8:32:34	6.13	2.90	3.33	14.27	1.14	
9/10/2020	8:33:34	0.15	0.15	17.79	0.20	0.01	
9/10/2020	8:34:34	0.11	0.06	20.74	-0.03	0.00	
9/10/2020	8:35:34	0.07	-0.12	21.70	-0.05	0.00	
9/10/2020	8:36:34	0.14	-0.23	22.21	-0.07	-0.01	
9/10/2020	8:37:34	0.20	-0.23	22.59	-0.08	-0.01	
9/10/2020	8:38:34	0.21	-0.14	22.89	-0.09	-0.01	
9/10/2020	8:39:34	0.10	-0.10	23.10	-0.10	0.00	
9/10/2020	8:40:34	0.15	-0.08	30.02	-0.05	0.00	
9/10/2020	8:41:34	0.13	-0.08	28.39	-0.03	0.00	
9/10/2020	8:42:34	0.13	-0.12	23.56	-0.11	0.00	
9/10/2020	8:43:34	0.13	-0.09	23.84	-0.11	0.00	

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Date	Time	NOx [PPM]	CO [PPM]	SO2 [PPM]	O2 [%]	CO2 [%]	Notes
9/10/2020	8:44:34	2.17	0.06	24.71	1.33	0.22	
9/10/2020	8:45:34	6.42	1.47	12.55	17.16	1.13	
9/10/2020	8:46:34	12.48	3.09	5.75	18.30	1.91	
9/10/2020	8:47:34	1.20	0.84	16.57	4.70	0.29	
9/10/2020	8:48:34	0.14	-0.11	23.74	-0.14	0.00	
9/10/2020	8:49:34	0.11	0.00	24.31	-0.15	0.00	
9/10/2020	8:50:34	0.11	-0.02	24.58	-0.16	-0.01	
9/10/2020	8:51:34	0.09	0.08	24.75	-0.17	-0.01	
9/10/2020	8:52:34	0.15	0.00	24.95	-0.17	0.00	
9/10/2020	8:53:34	-0.03	-0.06	25.13	-0.18	-0.01	SO2 System Upscale
9/10/2020	8:54:34	0.00	-0.11	17.52	-0.18	-0.01	
9/10/2020	8:55:34	-0.14	-0.14	2.31	-0.18	-0.01	
9/10/2020	8:56:34	0.06	-0.17	1.59	-0.18	-0.01	
9/10/2020	8:57:34	0.13	0.00	0.99	-0.19	-0.02	
9/10/2020	8:58:34	-0.04	-0.08	0.11	-0.19	-0.02	System Zero
9/10/2020	8:59:34	2.79	0.12	0.65	1.02	0.26	
9/10/2020	9:00:34	12.71	2.37	3.34	16.41	2.01	
9/10/2020	9:01:34	11.35	3.55	2.23	18.12	2.07	
9/10/2020	9:02:34	10.18	3.66	1.54	18.26	1.95	
9/10/2020	9:03:34	9.31	3.18	1.14	18.38	1.87	
9/10/2020	9:04:34	8.85	2.16	0.89	18.55	1.76	
9/10/2020	9:05:34	8.72	2.98	0.73	18.51	1.82	
9/10/2020	9:06:34	9.56	1.70	0.57	18.61	1.73	
9/10/2020	9:07:34	9.27	2.47	0.59	18.56	1.80	
9/10/2020	9:08:34	8.24	1.76	0.39	18.65	1.70	
9/10/2020	9:09:34	10.71	0.94	0.37	18.60	1.77	
9/10/2020	9:10:34	15.94	0.89	0.27	18.51	1.84	Start Run 1
9/10/2020	9:11:34	18.79	0.73	0.29	18.44	1.93	
9/10/2020	9:12:34	19.11	5.18	0.27	18.42	1.95	
9/10/2020	9:13:34	11.67	7.02	0.11	18.53	1.81	
9/10/2020	9:14:34	10.11	1.39	0.20	18.76	1.58	
9/10/2020	9:15:34	10.90	1.49	0.25	18.92	1.47	
9/10/2020	9:16:34	10.61	1.93	0.25	18.83	1.56	
9/10/2020	9:17:34	10.21	2.27	0.33	18.85	1.56	
9/10/2020	9:18:34	9.32	2.95	0.23	18.75	1.64	
9/10/2020	9:19:34	9.02	1.88	0.23	18.71	1.71	
9/10/2020	9:20:34	13.61	1.67	0.17	18.45	1.93	
9/10/2020	9:21:34	17.51	1.37	0.18	18.30	2.04	
9/10/2020	9:22:34	10.94	2.41	0.11	18.44	1.91	
9/10/2020	9:23:34	9.72	2.74	0.22	18.63	1.76	
9/10/2020	9:24:34	10.30	2.90	0.14	18.78	1.62	
9/10/2020	9:25:34	12.54	1.82	0.13	18.93	1.47	
9/10/2020	9:26:34	11.65	1.64	0.16	18.98	1.42	
9/10/2020	9:27:34	10.81	1.50	0.25	18.85	1.54	
9/10/2020	9:28:34	12.12	1.56	0.28	18.92	1.48	
9/10/2020	9:29:34	11.48	1.82	0.12	18.97	1.43	
9/10/2020	9:30:34	10.69	2.29	0.10	18.92	1.52	End Run 1
		12.24	2.26	0.20	18.71	1.67	Averages
9/10/2020	9:31:34	8.99	2.33	0.11	18.63	1.75	Start Run 2
9/10/2020	9:32:34	8.73	1.74	0.11	18.63	1.76	
9/10/2020	9:33:34	10.50	2.13	0.09	18.49	1.87	
9/10/2020	9:34:34	10.98	1.96	0.11	18.44	1.89	
9/10/2020	9:35:34	9.45	1.79	0.11	18.63	1.73	
9/10/2020	9:36:34	9.93	1.96	0.11	18.71	1.69	

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Date	Time	NOx [PPM]	CO [PPM]	SO2 [PPM]	O2 [%]	CO2 [%]	Notes
9/10/2020	9:37:34	11.18	1.86	0.11	18.85	1.57	
9/10/2020	9:38:34	9.39	2.44	0.11	18.66	1.79	
9/10/2020	9:39:34	9.44	2.81	0.11	18.53	1.86	
9/10/2020	9:40:34	8.43	3.31	0.11	18.60	1.80	
9/10/2020	9:41:34	9.21	3.41	0.11	18.63	1.75	
9/10/2020	9:42:34	10.05	2.42	0.11	18.81	1.60	
9/10/2020	9:43:34	9.61	2.83	0.11	18.77	1.63	
9/10/2020	9:44:34	10.32	2.05	0.11	18.86	1.55	
9/10/2020	9:45:34	10.50	2.58	0.11	19.00	1.43	
9/10/2020	9:46:34	9.68	2.72	0.11	18.82	1.62	
9/10/2020	9:47:34	10.85	4.06	0.11	18.76	1.66	
9/10/2020	9:48:34	9.53	4.64	0.11	18.75	1.65	
9/10/2020	9:49:34	11.20	2.60	0.11	19.04	1.41	
9/10/2020	9:50:34	10.11	2.90	0.11	19.09	1.39	
9/10/2020	9:51:34	9.06	3.05	0.12	19.01	1.47	End Run 2
		9.86	2.65	0.11	18.75	1.66	Averages
9/10/2020	9:52:34	10.19	3.53	0.11	19.12	1.35	Start Run 3
9/10/2020	9:53:34	8.42	4.58	0.11	18.93	1.57	
9/10/2020	9:54:34	8.39	4.56	0.11	18.95	1.50	
9/10/2020	9:55:34	7.95	5.90	0.11	18.86	1.64	
9/10/2020	9:56:34	9.42	5.01	0.11	18.91	1.58	
9/10/2020	9:57:34	10.00	2.79	0.11	18.74	1.68	
9/10/2020	9:58:34	8.30	3.04	0.11	18.82	1.63	
9/10/2020	9:59:34	10.05	3.16	0.11	18.94	1.51	
9/10/2020	10:00:34	9.87	3.18	0.11	19.02	1.47	
9/10/2020	10:01:34	11.24	2.95	0.11	19.04	1.43	
9/10/2020	10:02:34	11.34	3.98	0.11	19.12	1.38	
9/10/2020	10:03:34	10.39	3.36	0.11	18.98	1.52	
9/10/2020	10:04:34	10.64	3.60	0.11	18.93	1.53	
9/10/2020	10:05:34	12.53	4.06	0.11	19.18	1.30	
9/10/2020	10:06:34	11.15	4.24	0.11	19.14	1.36	
9/10/2020	10:07:34	10.07	4.40	0.11	19.07	1.43	
9/10/2020	10:08:34	11.13	5.23	0.11	19.10	1.38	
9/10/2020	10:09:34	10.44	5.49	0.11	19.13	1.38	
9/10/2020	10:10:34	10.76	4.67	0.11	19.01	1.47	
9/10/2020	10:11:34	11.73	4.82	0.11	19.07	1.42	
9/10/2020	10:12:34	11.36	3.91	0.11	19.04	1.46	End Run 3
		10.26	4.12	0.11	19.00	1.48	Averages
9/10/2020	10:13:34	10.25	4.04	0.11	18.93	1.54	
9/10/2020	10:14:34	10.81	3.49	0.11	18.94	1.56	
9/10/2020	10:15:34	12.69	3.43	0.11	19.00	1.48	
9/10/2020	10:16:34	1.48	1.51	0.11	5.88	0.27	
9/10/2020	10:17:34	-0.08	-0.10	0.11	-0.07	0.00	
9/10/2020	10:18:34	-0.10	-0.23	0.11	-0.10	0.00	System Zero
9/10/2020	10:19:34	0.05	-0.35	1.29	4.65	5.89	
9/10/2020	10:20:34	-0.02	-0.69	0.11	9.92	10.03	O2/CO2 System Upscale
9/10/2020	10:21:34	0.14	4.83	0.11	8.17	7.10	
9/10/2020	10:22:34	0.07	47.24	0.11	-0.05	0.04	
9/10/2020	10:23:34	-0.03	50.52	0.11	-0.13	0.02	CO System Upscale
9/10/2020	10:24:34	31.06	32.78	0.11	-0.10	0.02	
9/10/2020	10:25:34	49.23	0.05	0.11	-0.15	0.01	NOx System Upscale
9/10/2020	10:26:34	20.23	-0.10	5.14	-0.05	0.02	
9/10/2020	10:27:34	0.04	-0.10	20.37	-0.16	0.00	
9/10/2020	10:28:34	0.08	-0.18	22.05	-0.17	0.00	

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Date	Time	NOx [PPM]	CO [PPM]	SO2 [PPM]	O2 [%]	CO2 [%]	Notes
9/10/2020	10:29:34	0.02	-0.08	22.34	-0.17	0.00	
9/10/2020	10:30:34	0.18	-0.06	22.74	-0.17	0.00	
9/10/2020	10:31:34	0.00	-0.08	22.87	-0.17	0.00	
9/10/2020	10:32:34	0.02	-0.06	23.02	-0.18	0.00	
9/10/2020	10:33:34	0.09	-0.08	23.35	-0.18	0.00	
9/10/2020	10:34:34	0.05	-0.17	23.33	-0.18	0.00	
9/10/2020	10:35:34	-0.01	-0.11	23.36	-0.19	0.00	
9/10/2020	10:36:34	0.04	-0.08	23.40	-0.18	0.00	
9/10/2020	10:37:34	-0.04	-0.20	23.37	-0.19	0.00	
9/10/2020	10:38:34	0.12	-0.16	23.45	-0.19	0.00	
9/10/2020	10:39:34	0.05	-0.01	23.44	-0.19	0.00	
9/10/2020	10:40:34	-0.07	-0.06	23.53	-0.19	0.00	
9/10/2020	10:41:34	0.04	-0.12	23.62	-0.19	0.00	
9/10/2020	10:42:34	-0.02	-0.04	23.51	-0.19	0.00	
9/10/2020	10:43:34	-0.01	-0.03	23.64	-0.19	-0.01	
9/10/2020	10:44:34	-0.07	0.11	23.70	-0.19	0.00	
9/10/2020	10:45:34	-0.01	-0.22	23.67	-0.19	-0.01	
9/10/2020	10:46:34	0.43	-0.11	80.83	-0.18	-0.01	
9/10/2020	10:47:34	0.04	-0.04	24.60	-0.19	-0.01	SO2 System Upscale
9/10/2020	10:48:34	4.92	0.39	23.14	2.91	0.36	
9/10/2020	10:49:34	13.96	3.30	9.09	18.00	1.56	
9/10/2020	10:50:34	11.85	2.80	3.27	18.56	1.82	
9/10/2020	10:51:34	13.04	2.28	1.88	18.41	1.91	
9/10/2020	10:52:34	15.35	2.39	1.12	18.72	1.63	
9/10/2020	10:53:34	13.81	2.62	0.84	18.73	1.65	
9/10/2020	10:54:34	13.80	1.79	0.30	18.63	1.72	
9/10/2020	10:55:34	15.23	1.79	0.24	18.74	1.64	
9/10/2020	10:56:34	12.99	2.02	0.13	18.68	1.71	
9/10/2020	10:57:34	14.50	2.04	0.10	18.72	1.65	
9/10/2020	10:58:34	13.76	2.03	0.10	18.72	1.67	
9/10/2020	10:59:34	12.76	2.15	0.10	18.66	1.72	
9/10/2020	11:00:34	13.33	1.94	0.11	18.67	1.70	
9/10/2020	11:01:34	12.90	2.04	0.11	18.59	1.78	
9/10/2020	11:02:34	15.96	2.24	0.11	18.89	1.49	
9/10/2020	11:03:34	11.37	3.04	0.11	18.76	1.66	
9/10/2020	11:04:34	10.79	2.12	0.11	18.61	1.79	
9/10/2020	11:05:34	11.11	3.67	0.11	18.44	1.92	
9/10/2020	11:06:34	12.48	2.58	0.11	18.36	1.98	
9/10/2020	11:07:34	11.55	2.88	0.11	18.40	1.93	
9/10/2020	11:08:34	11.39	2.50	0.11	18.44	1.92	
9/10/2020	11:09:34	11.82	1.42	0.11	18.39	1.94	
9/10/2020	11:10:34	12.90	1.40	0.11	18.58	1.77	
9/10/2020	11:11:34	15.18	1.50	0.11	18.91	1.49	
9/10/2020	11:12:34	12.45	1.50	0.11	18.70	1.72	
9/10/2020	11:13:34	11.87	1.54	0.11	18.69	1.70	
9/10/2020	11:14:34	12.51	1.47	0.11	18.67	1.71	
9/10/2020	11:15:34	11.82	1.90	0.11	18.61	1.79	Start Run 4
9/10/2020	11:16:34	12.28	1.64	0.11	18.63	1.77	
9/10/2020	11:17:34	12.02	1.73	0.11	18.50	1.86	
9/10/2020	11:18:34	13.48	1.57	0.11	18.72	1.66	
9/10/2020	11:19:34	14.38	1.32	0.11	18.76	1.60	
9/10/2020	11:20:34	15.10	1.63	0.11	18.95	1.44	
9/10/2020	11:21:34	16.21	2.14	0.11	19.02	1.37	
9/10/2020	11:22:34	14.33	1.70	0.11	18.99	1.43	
9/10/2020	11:23:34	13.98	1.23	0.11	18.80	1.53	

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Date	Time	NOx [PPM]	CO [PPM]	SO2 [PPM]	O2 [%]	CO2 [%]	Notes
9/10/2020	11:24:34	14.86	1.10	0.11	18.84	1.55	
9/10/2020	11:25:34	16.09	0.79	0.11	18.77	1.58	
9/10/2020	11:26:34	12.57	1.05	0.11	18.72	1.65	
9/10/2020	11:27:34	12.88	1.13	0.11	18.69	1.66	
9/10/2020	11:28:34	12.57	1.18	0.11	18.44	1.91	
9/10/2020	11:29:34	11.76	1.00	0.11	18.36	1.91	
9/10/2020	11:30:34	11.10	0.91	0.11	18.45	1.84	
9/10/2020	11:31:34	10.91	0.89	0.11	18.55	1.77	
9/10/2020	11:32:34	11.74	0.90	0.11	18.46	1.87	
9/10/2020	11:33:34	14.49	1.39	0.11	18.20	2.07	
9/10/2020	11:34:34	14.52	1.11	0.11	18.43	1.83	
9/10/2020	11:35:34	13.40	0.81	0.11	18.53	1.76	End Run 4
		13.36	1.29	0.11	18.64	1.71	Averages
9/10/2020	11:36:34	15.89	1.11	0.11	18.72	1.58	Start Run 5
9/10/2020	11:37:34	16.78	1.11	0.11	18.81	1.53	
9/10/2020	11:38:34	14.79	1.24	0.11	18.83	1.55	
9/10/2020	11:39:34	13.91	1.28	0.11	18.62	1.70	
9/10/2020	11:40:34	15.74	1.04	0.11	18.79	1.54	
9/10/2020	11:41:34	16.79	1.11	0.11	18.99	1.37	
9/10/2020	11:42:34	12.78	1.05	0.11	18.74	1.65	
9/10/2020	11:43:34	12.54	1.05	0.11	18.53	1.79	
9/10/2020	11:44:34	13.40	1.07	0.11	18.58	1.74	
9/10/2020	11:45:34	11.50	0.83	0.11	18.50	1.84	
9/10/2020	11:46:34	11.20	0.75	0.11	18.35	1.93	
9/10/2020	11:47:34	11.37	0.66	0.11	18.41	1.88	
9/10/2020	11:48:34	12.38	0.85	0.11	18.56	1.72	
9/10/2020	11:49:34	13.59	1.05	0.11	18.74	1.60	
9/10/2020	11:50:34	15.80	1.08	0.11	18.77	1.57	
9/10/2020	11:51:34	15.82	0.78	0.11	18.75	1.61	
9/10/2020	11:52:34	16.97	1.04	0.11	18.80	1.54	
9/10/2020	11:53:34	17.59	1.11	0.11	18.90	1.45	
9/10/2020	11:54:34	16.09	1.10	0.11	18.89	1.49	
9/10/2020	11:55:34	13.48	1.19	0.11	18.62	1.71	
9/10/2020	11:56:34	15.72	1.16	0.11	18.77	1.57	End Run 5
		14.48	1.03	0.11	18.70	1.64	Averages
9/10/2020	11:57:34	17.27	1.18	0.11	18.82	1.53	Start Run 6
9/10/2020	11:58:34	16.67	1.02	0.11	18.83	1.53	
9/10/2020	11:59:34	16.23	1.11	0.11	18.85	1.50	
9/10/2020	12:00:34	17.17	1.24	0.11	18.84	1.53	
9/10/2020	12:01:34	17.13	0.91	0.11	18.90	1.46	
9/10/2020	12:02:34	16.72	1.18	0.11	18.99	1.37	
9/10/2020	12:03:34	17.21	1.24	0.11	19.00	1.38	
9/10/2020	12:04:34	16.92	1.28	0.11	19.03	1.33	
9/10/2020	12:05:34	15.01	1.40	0.11	19.05	1.35	
9/10/2020	12:06:34	12.81	1.45	0.11	18.88	1.52	
9/10/2020	12:07:34	14.22	1.40	0.11	18.86	1.51	
9/10/2020	12:08:34	16.78	1.17	0.11	19.00	1.38	
9/10/2020	12:09:34	12.92	1.25	0.11	18.74	1.66	
9/10/2020	12:10:34	9.79	1.58	0.11	18.56	1.78	
9/10/2020	12:11:34	10.02	1.43	0.11	18.53	1.78	
9/10/2020	12:12:34	12.74	1.15	0.11	18.68	1.64	
9/10/2020	12:13:34	14.48	1.26	0.11	18.84	1.50	
9/10/2020	12:14:34	11.07	1.65	0.11	18.68	1.66	
9/10/2020	12:15:34	13.20	1.23	0.11	18.64	1.65	

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Date	Time	NOx [PPM]	CO [PPM]	SO2 [PPM]	O2 [%]	CO2 [%]	Notes
9/10/2020	12:16:34	14.10	1.15	0.11	18.76	1.56	
9/10/2020	12:17:34	15.17	1.10	0.11	18.94	1.40	End Run 6
		14.65	1.26	0.11	18.83	1.52	Averages
9/10/2020	12:18:34	14.09	0.91	0.11	18.82	1.54	
9/10/2020	12:19:34	14.11	1.10	0.12	18.78	1.56	
9/10/2020	12:20:34	15.60	1.12	0.11	18.92	1.42	
9/10/2020	12:21:34	9.82	1.19	0.44	15.49	0.95	
9/10/2020	12:22:34	-0.04	0.01	0.15	0.06	0.01	
9/10/2020	12:23:34	-0.16	-0.14	0.11	-0.08	0.00	Analyzer Zero
9/10/2020	12:24:34	0.04	-0.38	1.63	4.31	5.52	
9/10/2020	12:25:34	-0.07	-0.57	0.16	9.92	10.02	O2/CO2 System Upscale
9/10/2020	12:26:34	0.19	10.44	0.13	6.82	5.50	
9/10/2020	12:27:34	-0.02	49.09	0.11	-0.09	0.04	
9/10/2020	12:28:34	-0.08	50.40	0.11	-0.13	0.02	CO System Upscale
9/10/2020	12:29:34	30.83	32.37	0.10	-0.10	0.03	
9/10/2020	12:30:34	49.17	0.20	0.12	-0.14	0.01	NOx System Upscale
9/10/2020	12:31:34	22.50	-0.05	38.60	-0.02	0.02	
9/10/2020	12:32:34	0.89	-0.03	57.68	-0.10	0.01	
9/10/2020	12:33:34	0.10	0.01	23.71	-0.16	0.00	
9/10/2020	12:34:34	0.14	-0.15	47.94	-0.17	0.00	
9/10/2020	12:35:34	0.33	-0.20	81.28	-0.17	0.00	
9/10/2020	12:36:34	0.06	0.00	25.12	-0.17	0.00	
9/10/2020	12:37:34	-0.02	-0.14	24.04	-0.17	0.00	SO2 System Upscale
9/10/2020	12:38:34	1.76	-0.10	23.91	0.04	0.06	
9/10/2020	12:39:34	12.25	1.13	12.13	15.68	1.40	
9/10/2020	12:40:34	14.61	1.14	3.68	18.78	1.48	
9/10/2020	12:41:34	13.54	1.05	1.89	18.68	1.60	
9/10/2020	12:42:34	13.94	1.12	0.97	18.69	1.59	
9/10/2020	12:43:34	13.38	0.96	0.44	18.60	1.67	
9/10/2020	12:44:34	12.28	0.92	0.37	18.65	1.63	
9/10/2020	12:45:34	14.81	1.53	0.20	18.96	1.35	
9/10/2020	12:46:34	12.61	2.14	0.11	18.95	1.43	
9/10/2020	12:47:34	13.13	1.94	0.12	18.80	1.55	
9/10/2020	12:48:34	14.17	1.79	0.11	18.74	1.59	
9/10/2020	12:49:34	16.05	1.77	0.12	18.92	1.44	
9/10/2020	12:50:34	16.32	1.75	0.11	18.91	1.44	
9/10/2020	12:51:34	16.28	1.90	0.11	19.02	1.36	
9/10/2020	12:52:34	15.79	2.28	0.11	19.11	1.26	
9/10/2020	12:53:34	13.19	1.99	0.11	18.93	1.46	
9/10/2020	12:54:34	14.70	1.70	0.10	18.89	1.46	
9/10/2020	12:55:34	15.39	2.06	0.11	18.96	1.40	
9/10/2020	12:56:34	15.50	2.42	0.11	19.06	1.32	
9/10/2020	12:57:34	16.03	2.35	0.11	19.03	1.32	
9/10/2020	12:58:34	15.73	3.07	0.11	19.16	1.23	
9/10/2020	12:59:34	15.97	2.58	0.11	19.11	1.27	
9/10/2020	13:00:34	13.56	3.03	0.11	19.10	1.31	
9/10/2020	13:01:34	14.94	2.48	0.11	19.08	1.29	
9/10/2020	13:02:34	15.75	3.25	0.11	19.16	1.23	
9/10/2020	13:03:34	15.71	3.01	0.11	19.13	1.27	
9/10/2020	13:04:34	14.41	2.22	0.11	18.97	1.43	Start Run 7
9/10/2020	13:05:34	13.17	1.80	0.11	18.84	1.53	
9/10/2020	13:06:34	11.72	1.59	0.11	18.67	1.68	
9/10/2020	13:07:34	10.80	1.50	0.11	18.53	1.79	
9/10/2020	13:08:34	13.16	1.15	0.11	18.65	1.66	

Tucson Iron and Metal
Contraband Incinerator
Calibration and Run Data

Date	Time	NOx [PPM]	CO [PPM]	SO2 [PPM]	O2 [%]	CO2 [%]	Notes
9/10/2020	13:09:34	12.73	0.98	0.11	18.75	1.61	
9/10/2020	13:10:34	14.83	1.07	0.11	18.80	1.55	
9/10/2020	13:11:34	14.81	1.25	0.11	18.83	1.52	
9/10/2020	13:12:34	15.40	1.56	0.11	19.02	1.35	
9/10/2020	13:13:34	15.52	1.36	0.11	18.95	1.43	
9/10/2020	13:14:34	15.88	1.27	0.11	18.95	1.42	
9/10/2020	13:15:34	11.81	1.02	0.11	18.55	1.75	
9/10/2020	13:16:34	11.92	0.56	0.11	18.37	1.87	
9/10/2020	13:17:34	15.01	0.80	0.11	18.18	2.03	
9/10/2020	13:18:34	11.62	0.87	0.11	18.21	1.98	
9/10/2020	13:19:34	15.39	0.87	0.11	18.19	2.01	
9/10/2020	13:20:34	17.30	7.82	0.12	18.34	1.95	
9/10/2020	13:21:34	14.75	3.21	0.11	18.61	1.71	
9/10/2020	13:22:34	16.42	1.18	0.11	18.78	1.54	
9/10/2020	13:23:34	14.20	1.36	0.11	18.88	1.50	
9/10/2020	13:24:34	10.70	1.49	0.11	18.58	1.73	End Run 7
		13.88	1.66	0.11	18.65	1.67	Averages
9/10/2020	13:25:34	12.52	1.21	0.11	18.58	1.73	Start Run 8
9/10/2020	13:26:34	12.95	0.99	0.11	18.78	1.55	
9/10/2020	13:27:34	12.84	1.14	0.11	18.73	1.60	
9/10/2020	13:28:34	15.23	1.03	0.11	18.87	1.47	
9/10/2020	13:29:34	15.36	1.14	0.11	18.86	1.47	
9/10/2020	13:30:34	16.46	1.50	0.11	19.07	1.28	
9/10/2020	13:31:34	16.26	1.60	0.11	19.14	1.21	
9/10/2020	13:32:34	14.14	1.96	0.11	19.19	1.20	
9/10/2020	13:33:34	12.99	1.44	0.11	18.92	1.43	
9/10/2020	13:34:34	13.08	1.21	0.11	18.85	1.50	
9/10/2020	13:35:34	14.76	1.18	0.11	18.94	1.38	
9/10/2020	13:36:34	14.70	1.26	0.11	19.04	1.30	
9/10/2020	13:37:34	14.90	1.64	0.11	19.15	1.21	
9/10/2020	13:38:34	15.50	1.64	0.11	19.11	1.25	
9/10/2020	13:39:34	15.09	1.61	0.11	19.12	1.24	
9/10/2020	13:40:34	15.61	1.70	0.11	19.12	1.23	
9/10/2020	13:41:34	14.48	2.21	0.11	19.25	1.11	
9/10/2020	13:42:34	13.83	2.14	0.11	19.15	1.21	
9/10/2020	13:43:34	14.00	1.89	0.11	19.12	1.25	
9/10/2020	13:44:34	13.58	1.88	0.12	19.02	1.36	
9/10/2020	13:45:34	12.81	1.38	0.11	18.71	1.62	End Run 8
		14.34	1.51	0.11	18.99	1.36	Averages
9/10/2020	13:46:34	12.64	1.41	0.11	18.78	1.57	Start Run 9
9/10/2020	13:47:34	11.84	1.36	0.11	18.72	1.60	
9/10/2020	13:48:34	14.35	1.49	0.11	18.93	1.42	
9/10/2020	13:49:34	12.04	1.65	0.10	18.83	1.56	
9/10/2020	13:50:34	11.52	1.56	0.11	18.44	1.86	
9/10/2020	13:51:34	14.57	1.18	0.11	18.65	1.65	
9/10/2020	13:52:34	14.88	1.23	0.10	18.76	1.59	
9/10/2020	13:53:34	15.92	1.11	0.11	18.78	1.57	
9/10/2020	13:54:34	13.81	0.83	0.11	18.64	1.68	
9/10/2020	13:55:34	11.75	1.18	0.10	18.52	1.81	
9/10/2020	13:56:34	11.38	0.90	0.11	18.44	1.85	
9/10/2020	13:57:34	12.79	0.92	0.11	18.45	1.85	
9/10/2020	13:58:34	15.98	1.33	0.11	18.77	1.54	
9/10/2020	13:59:34	16.76	1.97	0.11	19.10	1.27	
9/10/2020	14:00:34	16.82	2.67	0.11	19.28	1.12	

Tucson Iron and Metal
Contraband Incinerator
Calibration and Run Data

Date	Time	NOx [PPM]	CO [PPM]	SO2 [PPM]	O2 [%]	CO2 [%]	Notes
9/10/2020	14:01:34	16.70	2.61	0.11	19.27	1.13	
9/10/2020	14:02:34	15.88	1.47	0.11	19.04	1.35	
9/10/2020	14:03:34	12.01	1.13	0.11	18.73	1.62	
9/10/2020	14:04:34	13.59	1.00	0.11	18.72	1.60	
9/10/2020	14:05:34	14.52	0.99	0.11	18.83	1.49	
9/10/2020	14:06:34	15.47	1.11	0.11	18.93	1.42	End Run 9
		14.06	1.39	0.11	18.79	1.55	Averages
9/10/2020	14:07:34	14.57	1.22	0.11	18.88	1.47	
9/10/2020	14:08:34	13.57	1.05	0.11	18.79	1.56	
9/10/2020	14:09:34	16.40	1.24	0.11	18.88	1.43	
9/10/2020	14:10:34	13.87	1.14	0.27	18.89	1.23	
9/10/2020	14:11:34	-0.02	0.21	0.44	1.23	0.01	
9/10/2020	14:12:34	-0.11	-0.10	0.11	-0.07	0.00	System Zero
9/10/2020	14:13:34	0.11	-0.10	0.82	0.29	0.84	
9/10/2020	14:14:34	0.08	-0.54	0.91	9.38	9.96	
9/10/2020	14:15:34	0.02	-0.57	0.11	9.92	10.01	O2/CO2 System Upscale
9/10/2020	14:16:34	0.02	5.68	0.11	7.99	6.91	
9/10/2020	14:17:34	0.01	47.74	0.11	-0.05	0.05	
9/10/2020	14:18:34	-0.15	50.14	0.11	-0.12	0.02	CO Sytem Upscale
9/10/2020	14:19:34	28.41	34.28	0.11	-0.10	0.02	
9/10/2020	14:20:34	49.20	0.24	0.11	-0.14	0.01	NOx System Upscale
9/10/2020	14:21:34	49.10	-0.23	0.11	-0.15	0.01	
9/10/2020	14:22:34	15.18	-0.02	53.34	-0.03	0.02	
9/10/2020	14:23:34	0.59	0.05	82.51	-0.15	0.00	
9/10/2020	14:24:34	-0.04	-0.08	24.91	-0.16	0.00	
9/10/2020	14:25:34	-0.02	-0.04	23.72	-0.17	0.01	SO2 System Upscale
9/10/2020	14:26:34	0.15	-0.08	23.59	-0.17	0.01	
9/10/2020	14:27:34	11.59	0.44	14.54	9.89	0.99	
9/10/2020	14:28:34	16.88	0.97	3.13	18.68	1.52	
9/10/2020	14:29:34	15.50	0.95	1.16	18.85	1.42	
9/10/2020	14:30:34	16.65	1.08	0.45	18.89	1.40	Start Run 10
9/10/2020	14:31:34	16.43	1.17	0.11	19.05	1.24	
9/10/2020	14:32:34	15.66	1.28	0.11	19.09	1.22	
9/10/2020	14:33:34	15.95	1.77	0.11	19.18	1.13	
9/10/2020	14:34:34	14.66	1.52	0.11	19.12	1.22	
9/10/2020	14:35:34	15.17	1.41	0.11	19.09	1.22	
9/10/2020	14:36:34	15.16	1.48	0.11	19.10	1.24	
9/10/2020	14:37:34	14.48	1.44	0.12	19.03	1.29	
9/10/2020	14:38:34	13.68	1.41	0.11	19.10	1.23	
9/10/2020	14:39:34	13.96	1.48	0.11	19.15	1.18	
9/10/2020	14:40:34	12.06	1.31	0.11	18.97	1.39	
9/10/2020	14:41:34	11.53	1.17	0.11	18.81	1.50	
9/10/2020	14:42:34	12.15	1.40	0.11	18.89	1.45	
9/10/2020	14:43:34	10.98	1.27	0.11	18.78	1.54	
9/10/2020	14:44:34	11.22	1.07	0.10	18.76	1.55	
9/10/2020	14:45:34	13.82	1.12	0.11	18.76	1.53	
9/10/2020	14:46:34	16.10	1.12	0.11	18.99	1.33	
9/10/2020	14:47:34	13.94	1.17	0.11	18.94	1.41	
9/10/2020	14:48:34	13.01	0.81	0.11	18.71	1.60	
9/10/2020	14:49:34	12.00	1.13	0.11	18.75	1.54	
9/10/2020	14:50:34	14.91	1.25	0.11	18.98	1.33	End Run 10
		13.98	1.28	0.13	18.96	1.36	Averages
9/10/2020	14:51:34	15.85	1.28	0.11	18.99	1.35	Start Run 11

Tucson Iron and Metal
Contraband Incinerator
Calibration and Run Data

Date	Time	NOx [PPM]	CO [PPM]	SO2 [PPM]	O2 [%]	CO2 [%]	Notes
9/10/2020	14:52:34	15.65	1.38	0.11	19.01	1.31	
9/10/2020	14:53:34	15.54	1.38	0.12	19.02	1.31	
9/10/2020	14:54:34	15.47	1.46	0.11	19.08	1.26	
9/10/2020	14:55:34	13.69	1.48	0.11	19.03	1.32	
9/10/2020	14:56:34	15.26	1.68	0.11	19.05	1.28	
9/10/2020	14:57:34	15.10	1.67	0.11	19.12	1.22	
9/10/2020	14:58:34	15.07	1.63	0.11	19.05	1.28	
9/10/2020	14:59:34	15.39	1.59	0.11	19.16	1.17	
9/10/2020	15:00:34	15.24	1.96	0.11	19.18	1.14	
9/10/2020	15:01:34	15.95	2.96	0.11	19.31	1.03	
9/10/2020	15:02:34	16.19	2.63	0.11	19.30	1.05	
9/10/2020	15:03:34	15.34	2.51	0.11	19.27	1.09	
9/10/2020	15:04:34	13.86	2.09	0.11	19.10	1.24	
9/10/2020	15:05:34	15.00	1.63	0.11	19.05	1.29	
9/10/2020	15:06:34	13.19	1.88	0.12	18.99	1.36	
9/10/2020	15:07:34	14.42	1.73	0.11	19.01	1.31	
9/10/2020	15:08:34	12.39	2.05	0.12	18.94	1.42	
9/10/2020	15:09:34	11.82	1.46	0.11	18.76	1.55	
9/10/2020	15:10:34	12.17	1.37	0.11	18.74	1.57	
9/10/2020	15:11:34	12.05	1.36	0.11	18.72	1.59	End Run 11
		14.51	1.77	0.11	19.04	1.29	Averages
9/10/2020	15:12:34	12.64	1.27	0.11	18.76	1.55	Start Run 12
9/10/2020	15:13:34	10.65	1.68	0.11	18.61	1.68	
9/10/2020	15:14:34	12.36	1.26	0.11	18.77	1.53	
9/10/2020	15:15:34	10.41	1.86	0.11	18.65	1.65	
9/10/2020	15:16:34	10.60	1.37	0.10	18.63	1.67	
9/10/2020	15:17:34	12.78	1.11	0.11	18.70	1.58	
9/10/2020	15:18:34	15.56	1.31	0.10	18.93	1.38	
9/10/2020	15:19:34	12.19	1.41	0.12	18.90	1.44	
9/10/2020	15:20:34	15.21	1.28	0.11	18.93	1.39	
9/10/2020	15:21:34	12.77	1.50	0.12	18.81	1.53	
9/10/2020	15:22:34	10.37	1.93	0.11	18.56	1.75	
9/10/2020	15:23:34	9.39	1.57	0.10	18.52	1.74	
9/10/2020	15:24:34	10.32	1.33	0.11	18.54	1.77	
9/10/2020	15:25:34	16.37	1.45	0.11	18.25	2.01	
9/10/2020	15:26:34	19.51	1.33	0.12	18.13	2.10	
9/10/2020	15:27:34	15.54	1.45	0.11	18.28	1.95	
9/10/2020	15:28:34	14.09	1.07	0.11	18.42	1.79	
9/10/2020	15:29:34	14.90	1.08	0.11	18.62	1.68	
9/10/2020	15:30:34	14.81	0.77	0.11	18.30	1.94	
9/10/2020	15:31:34	16.21	0.91	0.11	18.61	1.63	
9/10/2020	15:32:34	15.80	0.94	0.11	18.74	1.57	End Run 12
		13.45	1.33	0.11	18.60	1.68	Averages
9/10/2020	15:33:34	5.87	0.45	0.86	10.53	0.70	
9/10/2020	15:34:34	-0.09	-0.04	0.15	-0.05	0.01	
9/10/2020	15:35:34	-0.06	-0.10	0.11	-0.09	0.00	System Zero
9/10/2020	15:36:34	-0.09	0.06	0.89	0.45	1.38	
9/10/2020	15:37:34	0.08	-0.50	0.74	9.56	9.97	
9/10/2020	15:38:34	0.03	-0.61	0.11	9.90	10.02	O2/CO2 System Upscale
9/10/2020	15:39:34	0.04	12.23	0.14	6.24	5.13	
9/10/2020	15:40:34	-0.18	49.52	0.11	-0.11	0.04	
9/10/2020	15:41:34	-0.07	50.56	0.11	-0.13	0.02	CO System Upscale
9/10/2020	15:42:34	28.11	35.65	0.11	-0.06	0.02	
9/10/2020	15:43:34	49.21	0.49	0.11	-0.15	0.01	NOx System Upscale

Tucson Iron and Metal
Contraband Incinerator
Calibration and Run Data

Date	Time	NOx [PPM]	CO [PPM]	SO2 [PPM]	O2 [%]	CO2 [%]	Notes
9/10/2020	15:44:34	30.41	0.07	24.55	0.36	0.04	
9/10/2020	15:45:34	1.51	-0.06	89.37	0.01	0.05	
9/10/2020	15:46:34	0.19	-0.03	26.34	0.39	0.02	
9/10/2020	15:47:34	0.13	-0.05	23.76	-0.17	0.00	SO2 System Upscale
9/10/2020	15:48:34	0.11	0.04	23.16	0.27	0.01	
9/10/2020	15:49:34	-0.11	0.02	4.73	19.19	0.05	
9/10/2020	15:50:34	-0.07	0.08	0.80	20.82	0.05	

APPENDIX E: LABORATORY REPORTS

ED_005878_00000073-00132

October 14, 2020 Service Request No:E2000846

Conner Everly
Bison Engineering, Incorporated
4251 S Station Master Dr
Tucson, AZ 85715

Laboratory Results for: Tucson Iron & Metals

Dear Conner,

Enclosed are the results of the sample(s) submitted to our laboratory September 11, 2020
For your reference, these analyses have been assigned our service request number **E2000846.**

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current TNI standards, where applicable, and except as noted in the laboratory case narrative provided. All results are intended to be considered in their entirety, and ALS Environmental is not responsible for use of less than the final complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report. In accordance to the TNI 2009 Standard, a statement on the estimated uncertainty of measurement of any quantitative analysis will be supplied upon request.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Corey Grandits
Project Manager

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ALS Group USA, Corp.
dba ALS Environmental

Certificate of Analysis

ALS Environmental - Houston HRMS
10450 Stancliff Rd, Suite 210, Houston TX 77099
Phone (713)266-1599 Fax (713)266-0130
www.alsglobal.com

RIGHT SOLUTIONS | RIGHT PARTNER

ALS Environmental

Client:	Bison Eng	**Service Request No.:**	E2000846
Project:	Tuscon Iron & Metals	**Date Received:**	09/11/20
Sample Matrix:	Aie		

CASE NARRATIVE

All analyses were performed in adherence to the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt

Four samples were received for analysis at ALS Environmental in Houston on 09/11/20.

The samples were received in good condition and are consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

Data Validation Notes and Discussion

Precision and Accuracy:

EQ2000440: Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in lieu of a MS/MSD for this extraction batch. 1,2,3,6,7,8-HxCDD, 1,2,3,4,6,7,8-HpCDF DLCS recoveries marginally were above control limits; LCS recovery passed. 2,3,4,6,7,8-HxCDF & OCDF LCS recoveries marginally were above control limits; DLCS recoveries passed. 1,2,3,4,7,8,9-HpCDF & 2,3,4,7,8-PeCDF recoveries in the LCS and LCSD were above the upper control limit, associated samples in this batch should be considered potentially bias high for these compounds.

B flags – Method Blanks

The Method Blank EQ2000440-01 contained low levels of target compounds above the EDL however below the Method Reporting Limit (MRL). The associated compounds in the samples are flagged with 'B' flags where the sample result is less than ten times the level detected in the method blank.

Y flags – Labeled Standards

Quantification of the native 2,3,7,8-substituted congeners is based on isotopic dilution, which automatically corrects for variation in extraction efficiency and provides accurate values even with poor recovery. Samples that had recoveries of labeled standards outside the acceptance limits are qualified with 'Y' flags on the Labeled Compound summary pages. In all cases, the signal-to-noise ratios are greater than 10:1 and detection limits were below the Method Reporting Limits.

K flags

EMPC - When the ion abundance ratios associated with a particular compound are outside the QC limits, samples are flagged with a 'K' flag. A 'K' flag indicates an estimated maximum possible concentration for the associated compound.

2378-TCDF

Samples analyzed on the DB-5MSUI column were analyzed under conditions where sufficient separation between 2,3,7,8-TCDF and its closest eluter was achieved. Confirmation of this result was not required.

Detection Limits

Detection limits are calculated for each analyte in each sample by measuring the height of the noise level for each quantitation ion for the associated labeled standard. The concentration equivalent to 2.5 times the height of the noise is then calculated using the appropriate response factor and the weight of the sample. The calculated concentration equals the detection limit.

E Flags

The proper procedure for handling analytes that are outside of calibration range via isotopic dilution is to re-extract and re-analyze a smaller aliquot of sample. Since these are airs and the entire media is consumed during the initial extraction, there is not sample to re-extract at a lower amount.

The TEQ Summary results for each sample have been calculated by ALS/Houston to include:

- WHO-2005 TEFs, The 2005 World Health Organization Reevaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-Like Compounds (M. Van den Berg et al., Toxicological Sciences 93(2):223-241, 2006)
- 2378-TCDF from the DB-225 column, when confirmation required
- Non-detected compounds are not included in the 'Total'

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS group USA Corp dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

Client: Bison Engineering, Incorporated **Service Request:**E2000846
Project: Tucson Iron & Metals/TIM220419

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
E2000846-001	TIM220419 M23 R1 903-25-003	9/9/2020	0000
E2000846-002	TIM220419 M23 R2 903-25-001	9/9/2020	0000
E2000846-003	TIM220419 M23 R3 903-25-004	9/9/2020	0000
E2000846-004	903-25-002	9/9/2020	0000

Service Request Summary

Folder #: **E2000846**
Client Name: Bison Engineering, Incorporated
Project Name: Tucson Iron & Metals
Project Number: TIM220419

Report To:

Bison Engineering, Incorporated
4251 S Station Master Dr
Tucson, AZ 85715
USA
Phone Number: 406-442-5768
Cell Number:
Fax Number:
E-mail:

Project Chemist: Corey Grandits
Originating Lab: HOUSTON
Logged By: CGRANDITS
Date Received: 09/11/20
Internal Due Date: 10/7/2020
QAP: LAB QAP
Qualifier Set: Lab Standard
Formset: Lab Standard
Merged?: Y
Report to MDL?: Y
P.O. Number:
EDD: No EDD Specified

15 -N/A N/A
Location: EHRMS-WIC 8A, EHRMS-WIC 2B
Pressure Gas:

Lab Samp No.	Client Samp No	Matrix	Collected	HOUSTON PCDD PCDF/23
E2000846-001	TIM220419 M23 R1 903-25-003	Air	09/09/20 0000	II
E2000846-002	TIM220419 M23 R2 903-25-001	Air	09/09/20 0000	II
E2000846-003	TIM220419 M23 R3 903-25-004	Air	09/09/20 0000	II
E2000846-004	903-25-002	Air	09/09/20 0000	II

Service Request Summary

Folder #:	**E2000846**	Project Chemist:	Corey Grandits	15 -N/A N/A	
Client Name:	Bison Engineering, Incorporated	Originating Lab:	HOUSTON	**Location:**	EHRMS-WIC 8A, EHRMS-WIC 2B
Project Name:	Tucson Iron & Metals	Logged By:	CGRANDITS	**Pressure Gas:**	
Project Number:	TIM220419	Date Received:	09/11/20		
		Internal Due Date:	10/7/2020		
Report To:		QAP:	LAB QAP		
	Bison Engineering, Incorporated 4251 S Station Master Dr Tucson, AZ 85715 USA	Qualifier Set:	Lab Standard		
		Formset:	Lab Standard		
		Merged?:	Y		
Phone Number:	406-442-5768	Report to MDL?:	Y		
Cell Number:		P.O. Number:			
Fax Number:		EDD:	No EDD Specified		
E-mail:					

Data Qualifiers

Lab Standard

+	Possible Tedlar bag artifact.
A	TIC is a suspected aldol-condensation product
B	Analyte found in the associated method blank as well as in the sample.
BC	Reported results are not blank corrected.
BH	The back section of the tube yielded higher results than the front.
BT	Results indicated possible breakthrough; back section >=10% front section.
C	Result identification confirmed.
D	Compound identified in an analysis at a secondary dilution factor
D	Spike was diluted out
DE	Reported results are corrected for desorption efficiency.
E	Estimated value. Concentration above calibration range
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
H1	Sample analysis performed past holding time. See case narrative.
H2	Initial analysis within holding time. Reanalysis for the required dilution was past holding time.
H3	Sample was received and analyzed past holding time.
H4	Sample was extracted past required extraction holding time, but analyzed within analysis holding time. See case narrative.
I	Internal standard not within the specified limits. See case narrative.
J	Estimated Value. Concentration found below MRL.
K	A deflection in the QC ion may indicate interference with the quantitation of this ion. The concentration of this analyte should be considered as an estimate.
K	Analyte was detected above the method reporting limit prior to normalization.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
L1	Laboratory control sample recovery outside the specified limits; results may be biased high.
L2	Laboratory control sample recovery outside the specified limits; results may be biased low.
L3	Laboratory control sample recovery outside the specified limits.
M	Matrix interference; results may be biased high.
M	The duplicate injection precision not met.
M1	Matrix interference due to coelution with a non-target compound; results may be biased high.
N	Presumptive evidence of a compound for TICs that have been identified based on a mass spectral library search.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.

Data Qualifiers

Lab Standard

P	Indicates chlorodiphenyl ether interference present at the retention time of the target compound.
P	Pesticide/Aroclor target analyte > 40% difference for detected concentrations between GC columns
Q	Indicates as estimated value because the P and P + 2 theoretical abundance ratio does not meet method criteria.
R	Duplicate Precision not met.
R1	Duplicate precision not within the specified limits; however, the results are below the MRL and considered estimated.
S	Surrogate recovery not within specified limits.
S	The reported value was determined by the Method of Standard Additions (MSA).
T	Analyte is a tentatively identified compound, result is estimated.
U	Compound was analyzed for, but was not detected (ND).
V1	The continuing calibration verification standard was outside (biased high) the specified limits for this compound.
V2	The continuing calibration verification standard was outside (biased low) the specified limits for this compound.
W	Result quantified, but the corresponding peak was detected outside the generated retention time window.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
X	See case narrative.
Y	Recovery outside limits
Y	The chromatogram resembles a petroleum product but does not match the calibration standard.
Z	The chromatogram does not resemble a petroleum product.
i	The MRL/MDL has been elevated due to a matrix interference.

Acronyms

Cal	Calibration
Conc	CONCentration
Dioxin(s)	Polychlorinated dibenzo-p-dioxin(s)
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
Flags	Data qualifiers
Furan(s)	Polychlorinated dibenzofuran(s)
g	Grams
ICAL	Initial CALibration
ID	IDentifier
Ions	Masses monitored for the analyte during data acquisition
L	Liter (s)
LCS	Laboratory Control Sample
DLCS	Duplicate Laboratory Control Sample
MB	Method Blank
MCL	Method Calibration Limit
MDL	Method Detection Limit
mL	Milliliters
MS	Matrix Spiked sample
DMS	Duplicate Matrix Spiked sample
NO	Number of peaks meeting all identification criteria
PCDD(s)	Polychlorinated dibenzo-p-dioxin(s)
PCDF(s)	Polychlorinated dibenzofuran(s)
ppb	Parts per billion
ppm	Parts per million
ppq	Parts per quadrillion
ppt	Parts per trillion
QA	Quality Assurance
QC	Quality Control
Ratio	Ratio of areas from monitored ions for an analyte
% Rec.	Percent recovery
RPD	Relative Percent Difference
RRF	Relative Response Factor
RT	Retention Time
SDG	Sample Delivery Group
S/N	Signal-to-noise ratio
TEF	Toxicity Equivalence Factor
TEQ	Toxicity Equivalence Quotient

ALS Environmental

State Certifications, Accreditations, and Licenses

Agency	Number	Expire Date
American Association for Laboratory Accreditation	2897.01 2020	11/30/2021
Arizona Department of Health Services	AZ0793-2020	5/27/2021
Arkansas Department of Environmental Quality	20-030-0	3/26/2021
California Department of Health Services	2919-2020	4/30/2021
Department of Defense	A2LA 2897.01	11/30/2021
Florida Department of Health	E87611-2020	6/30/2021
Hawaii Department of Health	2020	4/30/2021
Illinois Environmental Protection Agency	2000322020-4	5/9/2021
Kansas Department of Health and Environment	E-10352-2020	7/31/2021
Louisiana Department of Environmental Quality	03087-2020	6/30/2021
Louisiana Department of Health and Hospitals	LA028-2020	12/31/2020
Maine Department of Health and Human Services	2020016	6/5/2022
Maryland Department of the Environment	343-2020	6/30/2021
Michigan Depratment of Environmental Quality	9971-2020	4/30/2021
Minnesota Department of Health	1785988	12/31/2020
Nebraska Department of Health and Human Services	NE-OS-25-13 (2020)	4/30/2021
Nevada Department of Concervation and Natural Resources	TX026932021-1	7/31/2021
New Hampshire Environmental Laboratory Accreditation Program	209420	4/24/2021
New Jersey Department of Environmental Protection	TX008	6/30/2021
New York Department of Health	11707	3/31/2021
Oklahoma Department of Environmental Quality	2020-123	8/31/2021
Pennsylvania Department of Environmental Protection	014	6/30/2021
Tennessee Department of Environment and Concervation	04016-2020	4/30/2021
Texas Commision on Environmental Quality	T104704231-20-26	4/30/2021
United States Department of Agriculture	P330-19-00299	10/10/2022
Washington Department of Health	C819	11/14/2020

ALS ENVIRONMENTAL – Houston
Data Processing/Form Production and Peer Review Signatures

SR# Unique ID E200084b DB-5MSUI SPB-Octyl

First Level - Data Processing - to be filled by person generating the forms

Date: 10/13/20 Analyst: YC Samples: 001-004

Second Level - Data Review – to be filled by person doing peer review

Date: 10/13/20 Analyst: VW Samples: 001-004

HS-HRMSREVIEW R1.0

PEER REVIEW PAGE2015

Chain of Custody

ALS Environmental - Houston HRMS
10450 Stancliff Rd, Suite 210, Houston TX 77099
Phone (713)266-1599 Fax (713)266-0130
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Chain of Custody Form

Page ____ of ____

COC ID: 48465

Houston, TX +1 281 530 5656
Middletown, PA +1 717 944 5541
Spring City, PA +1 610 948 4903
Salt Lake City, UT +1 801 266 7700
South Charleston, WV +1 304 356 3168
York, PA +1 717 505 5280

ALS Project Manager: | ALS Work Order #:

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order		Project Name	Tucson Iron + Metals	A	Method 23 Dioxins/Fiurans
Work Order		Project Number	TIM220419	B	Method 23 Dioxins/Fiurans Blank
Company Name	Bison Engineering, Inc.	Bill To Company	Bison Engineering	C	
Send Report To	Connor Everly	Invoice Attn	Kay Johnson	D	
Address	4251 S. Station Master Dr. Tucson, AZ 85715	Address	3143 E. Lyndale	E	
				F	
City/State/Zip	Tucson, AZ 85715	City/State/Zip	Helena MT 59601	G	
Phone	520.749.2167	Phone	406.442.5768	H	
Fax		Fax		I	
e-Mail Address	ceverly@bison-eng.com	e-Mail Address	BisonAP@bison-eng.com	J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	TIM220419 M23 R1 903-25-003	9/9/20					✓										
2	TIM220419 M23 R2 903-25-001	9/9/20					✓										
3	TIM220419 M23 R3 903-25-004	9/9/20					✓										
4	~~[illegible]~~ 903-25-002							✓									
5																	
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign: Jennifer Kessler [signature]

Shipment Method: Fed-Ex

Turnaround Time in Business Days (BD): ☒ 10 BD ☐ 5 BD ☐ 3 BD ☐ 2 BD ☐ 1 BD ☐ Other _____

Results Due Date:

Relinquished by:	Date:	Time:	Received by:
[signature]	9/10/20	11:45am	[signature]
Relinquished by:	Date:	Time:	Received by (Laboratory): 9/11/2020 09:40.
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):

Notes:

Cooler ID	Cooler Temp
	0/C.
Rad.	0.40
	#31
	[illegible]

QC Package: (Check One Box Below)
☐ Level II Std QC
☐ Level III Std QC/Raw Date
☐ Level IV SW846/CLP
☐ Other _____
☐ TRRP Checklist
☐ TRRP Level IV

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
3. The Chain of Custody is a legal document. All information must be completed accurately.

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Chain of Custody

ALS Environmental - Tucson
ADDRESS 4208 S Santa Rita Ave, Tucson, AZ 85714
PHONE +1 520 573 1061
ALS Group USA, Corp.

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REPORTING			
Company Name:	Bison Engineering INC.		
Contact Name:	Connor Everly		
Address:	4251 S Station Master Dr		
City, State ZIP:	TUCSON AZ, 85714		
Email:	CEverly@Bison-Eng.Com	Phone:	520.749.2167
CC Report to:	MSeverson@Bison-Eng.Com		
Project Name:	Tucson Iron + Metals Incinerator		
Project Number:	TIM220419		
Sampler's Name:	Connor Everly		

INVOICING			
AP Contact:	Kay Johnson		
Company:	Bison Engineering, Inc		
Address:	3143 E. Lyndale Helena MT 59601		
Email:	BisonAP@bison-eng.com	Phone:	406-442-5768
PO Number:	TIM220419		

SAMPLE RECEIPT

Temperature (°C):		Temp Blank Present		
Received Intact:	Yes	No	N/A	Wet Ice / Blue Ice
Cooler Custody Seals:	Yes	No	N/A	Total Containers:
Sample Custody Seals:	Yes	No	N/A	

REQUESTED ANALYSIS

Sample Identification	Matrix	Date Sampled	Time Sampled	Lab ID	No. of Containers	Method 23 Dioxins/Fiurans	Comments
M23-FH-Pt1-1		9/9/20			1	X	Acetone + methyl chloride
M23-FH-Pt2-1	Toluene	9/9/20			1	X	toluene
M23-FH-Pt1-2	Acetone + Methylene	9/9/20			1	X	Acetone + methylene chloride
M23-FH-Pt2-2	Toluene	9/9/20			1	X	toluene
M23-FH-Pt1-3		9/9/20			1	X	Acetone + methylene chloride
M23-FH-Pt2-3	Toluene	9/9/20			1	X	toluene
M23-FILTER-1	Filter	9/9/20			1	X	~~[illegible]~~ 9/9/ JMK
M23-FILTER-2	Filter	9/9/20			1	X	Filter
M23-FILTER-3	Filter	9/9/20			1	X	Filter
M23-FH-Pt1-Blank		9/9/20			1	X	~~[illegible]~~ Acetone/ methylene chl
M23-FH-Pt2-Blank	toluene	9/9/20			1	X	toluene

TAT (circle)

same* next BD*
2BD* 3-4BD*
5BD* 6BD*
routine** (approx.12)

* Please call for availability. Rush charges will apply.

**TAT depends on complexity of samples and analysis.

RELINQUISHED BY			RECEIVED BY		
Print Name	Signature	Date/Time	Print Name	Signature	Date/Time
L. Connor Everly	[signature]	9/10/20 07:55	Jennifer Kessler	[signature]	9/10/20 07:55
			J. MAKAN	J. MAKAN	9/18/20 09:45

TIM220419

2020 Tucson Iron and Metal Contraband Incinerator Compliance and RATA

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Revised: 9/4/2020

ED_005878_00000073-00147

ALS Environmental

Cooler Receipt Form

Project Chemist: CG

Client/Project: BIGUN

Thermometer ID: 1241

Date/Time Received: 9/11/20 Initials: PG

Date/Time Logged in: 9/11/20 Initials: CG

1. Method of delivery: ○ US Mail ☑ Fed Ex ○ UPS ○ DHL ○ Courier ○ Client
2. Samples received in: ☑ Cooler ○ Box ○ Envelope ○ Other
3. Were custody seals on coolers? ○ Yes ○ No
   Were they intact? ○ Yes ○ No ○ N/A
   Were they signed and dated? ○ Yes ○ No ○ N/A
   If yes, how many and where?
4. Packing Material: ○ Inserts ☑ Baggies ☑ Bubble Wrap ☑ Gel Packs ○ Wet Ice ○ Sleeves ○ Other
5. Foreign or Regulated Soil? ○ Yes ○ No Location of Sampling:

Cooler Tracking Number	COC ID	Date Opened	Time Opened	Opened By	Temp. °C	Temp Blank?
–		9/11/20	0940	PG	0.4	☒
						☐
						☐
						☐

6. Were custody papers properly filled out (ink, signed, dated, etc)? ☑ Yes ○ No
7. Did all bottles arrive in good condition (not broken, no signs of leakage)? ☑ Yes ○ No
8. Were all sample labels complete (i.e., sample ID, analysis, preservation, etc)? ☑ Yes ○ No
9. Were appropriate bottles/containers and volumes received for the requested tests? ☑ Yes ○ No
10. Did sample labels and tags agree with custody documents? ☑ Yes ○ No

Notes, Discrepancies, & Resolutions:

Service request Label:

10450 Stancliff Rd., Suite 210
Houston, TX 77099
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F: +1 713 266 1599
www.alsglobal.com

SAMPLE ACCEPTANCE POLICY

This policy outlines the criteria samples must meet to be accepted by ALS Environmental - Houston HRMS.

Cooler Custody Seals (desirable, mandatory if specified in SAP):

- ✓ Intact on outside of cooler, signed and dated

Chain-of-Custody (COC) documentation (mandatory):

The following is required on each COC:

- ✓ Sample ID, the location, date and time of collection, collector's name, preservation type, sample type, and any other special remarks concerning the sampleThe COC must be completed in ink.
- ✓ Signature and date of relinquishing party.

In the absence of a COC at sample receipt, the COC will be requested from the client.

Sample Integrity (mandatory):

Samples are inspected upon arrival to ensure that sample integrity was not compromised during transfer to the laboratory.

- ✓ Sample containers must arrive in good condition (not broken or leaking).
- ✓ Samples must be labeled appropriately, including Sample IDs, and requested test using durable labels and indelible ink.
- ✓ The correct type of sample bottle must be used for the method requested.
- ✓ An appropriate sample volume, or weight, must be received.
- ✓ Sample IDs and number of containers must reconcile with the COC.
- ✓ Samples must be received within the method defined holding time.

Temperature Requirement (varies by sample matrix):

- ✓ Aqueous and Non-aqueous samples must be shipped and stored cold, at 0 to 6°C.
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10°C.
- ✓ Air samples are shipped and stored cold, at 0 to 6°C
- ✓ The sample temperature must be recorded on the COC

All cooler inspections are documented on the Cooler Receipt Form (CRF). A separate CRF is completed for each service request. Any samples not meeting the above criteria are noted on the CRF and the Project Manager notified. The Project Manager must resolve any sample integrity issues with the client prior to proceeding with the analysis. Such resolutions are documented in writing and filed with the project folder. Data associated with samples received outside of this acceptance policy will be qualified on the case narrative of the final report

Preparation Information Benchsheets

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Preparation Information Benchsheet

Prep Run#: 365992 **Prep WorkFlow:** OrgExtDioxA(30) **Status:** Prepped
Team: Semivoa GCMS/TWOODS **Prep Method:** Method **Prep Date/Time:** 9/21/20 11:40

#	Lab Code	Client ID	B#	Method /Test	pH	Cl	Matrix	Amt. Ext.	Sample Description
1	E2000846-001	TIM220419 M23 R1 903-25-003	.01	23/PCDD PCDF			Air	0.5000Sample	426 84 004
2	E2000846-002	TIM220419 M23 R2 903-25-001	.01	23/PCDD PCDF			Air	0.5000Sample	426 84 003
3	E2000846-003	TIM220419 M23 R3 903-25-004	.01	23/PCDD PCDF			Air	0.5000Sample	426 84 002
4	E2000846-004	903-25-002	.01	23/PCDD PCDF			Air	0.5000Sample	426 84 004
5	E2000875-001	Molden DFY #1	.01	23/PCDD PCDF			Air	0.5000Sample	
6	E2000876-001	2380 Horno De Fundicion	.01	23/PCDD PCDF			Air	0.5000Sample	
7	E2000877-001	2389 Horno De Fundicion 612	.01	23/PCDD PCDF			Air	0.5000Sample	
8	EQ2000440-01	MB		23/PCDD PCDF			Air	0.5000Sample	
9	EQ2000440-02	LCS		23/PCDD PCDF			Air	0.5000Sample	
10	EQ2000440-03	DLCS		23/PCDD PCDF			Air	0.5000Sample	

Spiking Solutions

Name: 23/TO-9A Internal Working Solution Inventory ID 209794 Logbook Ref: 209794 db 052620 00-200ng/ml Expires On: 11/22/2020

E2000846-001	40.00µL	E2000846-002	40.00µL	E2000846-003	40.00µL	E2000846-004	40.00µL	E2000875-001	40.00µL	E2000876-001	40.00µL
E2000877-001	40.00µL	EQ2000440-01	40.00µL	EQ2000440-02	40.00µL	EQ2000440-03	40.00µL				

Name: 1613B Matrix Working Standard Inventory ID 212382 Logbook Ref: tw 212382 2-20ng/ml Expires On: 02/24/2021

E2000846-001	100.00µL	E2000846-002	100.00µL	E2000846-003	100.00µL	E2000846-004	100.00µL	E2000875-001	100.00µL	E2000876-001	100.00µL
E2000877-001	100.00µL	EQ2000440-01	100.00µL	EQ2000440-02	100.00µL	EQ2000440-03	100.00µL				

Name: 23/TO-9A Alternate Working Solution Inventory ID 212398 Logbook Ref: tw 09/10/20 100ng/ml Expires On: 02/24/2021

E2000846-001	20.00µL	E2000846-002	20.00µL	E2000846-003	20.00µL	E2000846-004	20.00µL	E2000875-001	20.00µL	E2000876-001	20.00µL
E2000877-001	20.00µL	EQ2000440-01	20.00µL	EQ2000440-02	20.00µL	EQ2000440-03	20.00µL				

Name: 23/TO-9A Surrogate Working Solution Inventory ID 212532 Logbook Ref: TW 09/16/20 100NG/ML Expires On: 02/24/2021

E2000846-001	40.00µL	E2000846-002	40.00µL	E2000846-003	40.00µL	E2000846-004	40.00µL	E2000875-001	40.00µL	E2000876-001	40.00µL
E2000877-001	40.00µL	EQ2000440-01	40.00µL	EQ2000440-02	40.00µL	EQ2000440-03	40.00µL				

Preparation Information Benchsheet

Prep Run#: 365992 **Prep WorkFlow:** OrgExtDioxA(30) **Status:** Prepped
Team: Semivoa GCMS/TWOODS **Prep Method:** Method **Prep Date/Time:** 9/21/20 11:40

Preparation Steps

Step:	Extraction	Step:	Acid Clean	Step:	Silica Gel Clean	Step:	Final Volume
Started:	9/21/20 11:40	Started:	9/23/20 14:00	Started:	9/24/20 13:00	Started:	9/25/20 10:00
Finished:	9/22/20 09:00	Finished:	9/23/20 15:00	Finished:	9/24/20 16:00	Finished:	9/25/20 13:00
By:	TWOODS	By:	TWOODS	By:	TWOODS	By:	TWOODS
Comments		Comments		Comments		Comments	

Comments:

Reviewed By: KN Date: 10/2/2020

Chain of Custody

Relinquished By: Date:

Received By: Date:

Extracts Examined
Yes No

Analytical Results

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ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Bison Engineering, Incorporated	**Service Request:**	E2000846
Project:	Tucson Iron & Metals/TIM220419	**Date Collected:**	09/09/20 00:00
Sample Matrix:	Air	**Date Received:**	09/11/20 09:40
Sample Name:	TIM220419 M23 R1 903-25-003	**Units:**	pg
Lab Code:	E2000846-001	**Basis:**	NA

Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from Stationary Sources

Analysis Method:	23	**Date Analyzed:**	10/09/20 13:24
Prep Method:	Method	**Date Extracted:**	9/21/20
Sample Amount:	0.5000Sample	**Instrument Name:**	E-HRMS-07
		GC Column:	DB-5MSUI
Data File Name:	P530110	**Blank File Name:**	P530109
ICAL Date:	09/03/20	**Cal Ver. File Name:**	P530106

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	1090		5.65	10.0	0.76	1.001	1
1,2,3,7,8-PeCDD	3520		40.4	50.0	1.55	1.001	1
1,2,3,4,7,8-HxCDD	1580		19.6	50.0	1.38	0.998	1
1,2,3,6,7,8-HxCDD	2630		20.2	50.0	1.23	1.000	1
1,2,3,7,8,9-HxCDD	1330		18.9	50.0	1.28	1.007	1
1,2,3,4,6,7,8-HpCDD	9940		86.0	86.0	1.01	1.000	1
OCDD	31000		12.2	100	0.89	1.000	1
2,3,7,8-TCDF	783	**K**	251	251	0.53	1.001	1
1,2,3,7,8-PeCDF	13800		593	593	1.48	1.001	1
2,3,4,7,8-PeCDF	29600		632	632	1.50	1.028	1
1,2,3,4,7,8-HxCDF	18500		233	233	1.19	0.997	1
1,2,3,6,7,8-HxCDF	17900		231	231	1.19	1.000	1
1,2,3,7,8,9-HxCDF	2140		269	269	1.22	1.037	1
2,3,4,6,7,8-HxCDF	14600		247	247	1.20	1.014	1
1,2,3,4,6,7,8-HpCDF	28200		80.8	80.8	1.01	1.000	1
1,2,3,4,7,8,9-HpCDF	1130		96.0	96.0	1.05	1.035	1
OCDF	26000		5.40	100	0.87	1.005	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Bison Engineering, Incorporated	**Service Request:**	E2000846
Project:	Tucson Iron & Metals/TIM220419	**Date Collected:**	09/09/20 00:00
Sample Matrix:	Air	**Date Received:**	09/11/20 09:40
Sample Name:	TIM220419 M23 R1 903-25-003	**Units:**	pg
Lab Code:	E2000846-001	**Basis:**	NA

Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from Stationary Sources

Analysis Method:	23	**Date Analyzed:**	10/09/20 13:24
Prep Method:	Method	**Date Extracted:**	9/21/20
Sample Amount:	0.5000Sample	**Instrument Name:**	E-HRMS-07
		GC Column:	DB-5MSUI
Data File Name:	P530110	**Blank File Name:**	P530109
ICAL Date:	09/03/20	**Cal Ver. File Name:**	P530106

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
Total Tetra-Dioxins	203000		5.65	10.0	0.78		1
Total Penta-Dioxins	108000		40.4	50.0	1.56		1
Total Hexa-Dioxins	45400		19.5	50.0	1.24		1
Total Hepta-Dioxins	17600		86.0	86.0	1.02		1
Total Tetra-Furans	495000		251	251	0.74		1
Total Penta-Furans	302000		1.26	50.0			1
Total Hexa-Furans	189000		244	244	1.22		1
Total Hepta-Furans	52600		87.7	87.7	1.01		1

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Analytical Report

Client:	Bison Engineering, Incorporated	**Service Request:**	E2000846
Project:	Tucson Iron & Metals/TIM220419	**Date Collected:**	09/09/20 00:00
Sample Matrix:	Air	**Date Received:**	09/11/20 09:40
Sample Name:	TIM220419 M23 R1 903-25-003	**Units:**	Percent
Lab Code:	E2000846-001	**Basis:**	NA

Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from Stationary Sources

Analysis Method:	23	**Date Analyzed:**	10/09/20 13:24
Prep Method:	Method	**Date Extracted:**	9/21/20
Sample Amount:	0.5000Sample	**Instrument Name:**	E-HRMS-07
		GC Column:	DB-5MSUI
Data File Name:	P530110	**Blank File Name:**	P530109
ICAL Date:	09/03/20	**Cal Ver. File Name:**	P530106

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	% Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	2000	925.663	46		40-130	0.80	1.022
13C-1,2,3,7,8-PeCDD	2000	1008.110	50		40-130	1.60	1.182
13C-1,2,3,6,7,8-HxCDD	2000	995.039	50		40-130	1.27	0.993
13C-1,2,3,4,6,7,8-HpCDD	2000	863.617	43		25-130	1.06	1.063
13C-OCDD	4000	1092.154	27		25-130	0.90	1.136
13C-2,3,7,8-TCDF	2000	996.208	50		40-130	0.78	0.993
13C-1,2,3,7,8-PeCDF	2000	982.695	49		40-130	1.58	1.141
13C-1,2,3,6,7,8-HxCDF	2000	1063.517	53		40-130	0.52	0.972
13C-1,2,3,4,6,7,8-HpCDF	2000	809.818	40		25-130	0.45	1.039
37Cl-2,3,7,8-TCDD	2000	2343.687	117		70-130	NA	1.001
13C-1,2,3,4,7,8-HxCDD	2000	1977.378	99		70-130	1.29	0.997
13C-2,3,4,7,8-PeCDF	2000	2031.662	102		70-130	1.58	1.028
13C-1,2,3,4,7,8-HxCDF	2000	2031.932	102		70-130	0.52	0.997
13C-1,2,3,4,7,8,9-HpCDF	2000	1417.471	71		70-130	0.42	1.035
13C-1,2,3,7,8,9-HxCDF	2000	679.977	34	Y	40-130	0.50	1.007

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Bison Engineering, Incorporated	**Service Request:**	E2000846
Project:	Tucson Iron & Metals/TIM220419	**Date Collected:**	09/09/20 00:00
Sample Matrix:	Air	**Date Received:**	09/11/20 09:40
Sample Name:	TIM220419 M23 R1 903-25-003	**Units:**	pg
Lab Code:	E2000846-001	**Basis:**	NA

Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from Stationary Sources

Analysis Method: 23

Prep Method: Method

Toxicity Equivalency Quotient

Analyte Name	Result	DL	MRL	Dilution Factor	TEF	TEF - Adjusted Concentration
2,3,7,8-TCDD	**1090**	5.65	10.0	1	1	1090
1,2,3,7,8-PeCDD	**3520**	40.4	50.0	1	1	3520
1,2,3,4,7,8-HxCDD	**1580**	19.6	50.0	1	0.1	158
1,2,3,6,7,8-HxCDD	**2630**	20.2	50.0	1	0.1	263
1,2,3,7,8,9-HxCDD	**1330**	18.9	50.0	1	0.1	133
1,2,3,4,6,7,8-HpCDD	**9940**	86.0	86.0	1	0.01	99.4
OCDD	**31000**	12.2	100	1	0.0003	9.30
2,3,7,8-TCDF	**783**	251	251	1	0.1	78.3
1,2,3,7,8-PeCDF	**13800**	593	593	1	0.03	414
2,3,4,7,8-PeCDF	**29600**	632	632	1	0.3	8880
1,2,3,4,7,8-HxCDF	**18500**	233	233	1	0.1	1850
1,2,3,6,7,8-HxCDF	**17900**	231	231	1	0.1	1790
1,2,3,7,8,9-HxCDF	**2140**	269	269	1	0.1	214
2,3,4,6,7,8-HxCDF	**14600**	247	247	1	0.1	1460
1,2,3,4,6,7,8-HpCDF	**28200**	80.8	80.8	1	0.01	282
1,2,3,4,7,8,9-HpCDF	**1130**	96.0	96.0	1	0.01	11.3
OCDF	**26000**	5.40	100	1	0.0003	7.80
		Total TEQ				20300

2005 WHO TEFs, ND = 0

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Analytical Report

Client:	Bison Engineering, Incorporated	**Service Request:**	E2000846
Project:	Tucson Iron & Metals/TIM220419	**Date Collected:**	09/09/20 00:00
Sample Matrix:	Air	**Date Received:**	09/11/20 09:40
Sample Name:	TIM220419 M23 R2 903-25-001	**Units:**	pg
Lab Code:	E2000846-002	**Basis:**	NA

Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from Stationary Sources

Analysis Method:	23	**Date Analyzed:**	10/09/20 14:12
Prep Method:	Method	**Date Extracted:**	9/21/20
Sample Amount:	0.5000Sample	**Instrument Name:**	E-HRMS-07
		GC Column:	DB-5MSUI
Data File Name:	P530111	**Blank File Name:**	P530109
ICAL Date:	09/03/20	**Cal Ver. File Name:**	P530106

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	2270		6.95	10.0	0.75	1.001	1
1,2,3,7,8-PeCDD	7490		36.3	50.0	1.56	1.000	1
1,2,3,4,7,8-HxCDD	3810		45.1	50.0	1.26	0.998	1
1,2,3,6,7,8-HxCDD	5310		46.5	50.0	1.24	1.000	1
1,2,3,7,8,9-HxCDD	3560		43.5	50.0	1.24	1.006	1
1,2,3,4,6,7,8-HpCDD	10500		34.4	50.0	1.04	1.000	1
OCDD	4570		21.1	100	0.88	1.000	1
2,3,7,8-TCDF	2100		152	152	0.73	1.001	1
1,2,3,7,8-PeCDF	22100		1100	1100	1.49	1.001	1
2,3,4,7,8-PeCDF	46500		1170	1170	1.50	1.029	1
1,2,3,4,7,8-HxCDF	38300		438	438	1.15	0.997	1
1,2,3,6,7,8-HxCDF	36700		433	433	1.19	1.000	1
1,2,3,7,8,9-HxCDF	3310		505	505	1.23	1.037	1
2,3,4,6,7,8-HxCDF	43100		465	465	1.21	1.017	1
1,2,3,4,6,7,8-HpCDF	90200	E	321	321	1.02	1.000	1
1,2,3,4,7,8,9-HpCDF	9900		381	381	1.03	1.035	1
OCDF	12400		5.69	100	0.86	1.005	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Bison Engineering, Incorporated	**Service Request:**	E2000846
Project:	Tucson Iron & Metals/TIM220419	**Date Collected:**	09/09/20 00:00
Sample Matrix:	Air	**Date Received:**	09/11/20 09:40
Sample Name:	TIM220419 M23 R2 903-25-001	**Units:**	pg
Lab Code:	E2000846-002	**Basis:**	NA

Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from Stationary Sources

Analysis Method:	23	**Date Analyzed:**	10/09/20 14:12
Prep Method:	Method	**Date Extracted:**	9/21/20
Sample Amount:	0.5000Sample	**Instrument Name:**	E-HRMS-07
		GC Column:	DB-5MSUI
Data File Name:	P530111	**Blank File Name:**	P530109
ICAL Date:	09/03/20	**Cal Ver. File Name:**	P530106

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
Total Tetra-Dioxins	145000		6.95	10.0	0.78		1
Total Penta-Dioxins	120000		36.3	50.0	1.56		1
Total Hexa-Dioxins	95200		45.0	50.0	1.25		1
Total Hepta-Dioxins	25100		34.4	50.0	1.03		1
Total Tetra-Furans	400000		152	152	0.73		1
Total Penta-Furans	398000		1.26	50.0			1
Total Hexa-Furans	345000		459	459	1.21		1
Total Hepta-Furans	164000		348	348	1.02		1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Bison Engineering, Incorporated	**Service Request:**	E2000846
Project:	Tucson Iron & Metals/TIM220419	**Date Collected:**	09/09/20 00:00
Sample Matrix:	Air	**Date Received:**	09/11/20 09:40
Sample Name:	TIM220419 M23 R2 903-25-001	**Units:**	Percent
Lab Code:	E2000846-002	**Basis:**	NA

Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from Stationary Sources

Analysis Method:	23	**Date Analyzed:**	10/09/20 14:12
Prep Method:	Method	**Date Extracted:**	9/21/20
Sample Amount:	0.5000Sample	**Instrument Name:**	E-HRMS-07
		GC Column:	DB-5MSUI
Data File Name:	P530111	**Blank File Name:**	P530109
ICAL Date:	09/03/20	**Cal Ver. File Name:**	P530106

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	% Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	2000	1056.044	53		40-130	0.79	1.022
13C-1,2,3,7,8-PeCDD	2000	1037.282	52		40-130	1.61	1.182
13C-1,2,3,6,7,8-HxCDD	2000	986.031	49		40-130	1.29	0.994
13C-1,2,3,4,6,7,8-HpCDD	2000	794.052	40		25-130	1.05	1.059
13C-OCDD	4000	973.239	24	Y	25-130	0.90	1.131
13C-2,3,7,8-TCDF	2000	1060.549	53		40-130	0.78	0.994
13C-1,2,3,7,8-PeCDF	2000	1075.634	54		40-130	1.59	1.140
13C-1,2,3,6,7,8-HxCDF	2000	892.868	45		40-130	0.52	0.971
13C-1,2,3,4,6,7,8-HpCDF	2000	448.229	22	Y	25-130	0.43	1.035
37Cl-2,3,7,8-TCDD	2000	2298.940	115		70-130	NA	1.001
13C-1,2,3,4,7,8-HxCDD	2000	1833.462	92		70-130	1.29	0.997
13C-2,3,4,7,8-PeCDF	2000	1894.490	95		70-130	1.57	1.029
13C-1,2,3,4,7,8-HxCDF	2000	2213.722	111		70-130	0.52	0.997
13C-1,2,3,4,7,8,9-HpCDF	2000	2830.270	142	Y	70-130	0.42	1.035
13C-1,2,3,7,8,9-HxCDF	2000	399.938	20	Y	40-130	0.50	1.007

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Analytical Report

Client:	Bison Engineering, Incorporated	**Service Request:**	E2000846
Project:	Tucson Iron & Metals/TIM220419	**Date Collected:**	09/09/20 00:00
Sample Matrix:	Air	**Date Received:**	09/11/20 09:40
Sample Name:	TIM220419 M23 R2 903-25-001	**Units:**	pg
Lab Code:	E2000846-002	**Basis:**	NA

Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from Stationary Sources

Analysis Method: 23

Prep Method: Method

Toxicity Equivalency Quotient

Analyte Name	Result	DL	MRL	Dilution Factor	TEF	TEF - Adjusted Concentration
2,3,7,8-TCDD	**2270**	6.95	10.0	1	1	2270
1,2,3,7,8-PeCDD	**7490**	36.3	50.0	1	1	7490
1,2,3,4,7,8-HxCDD	**3810**	45.1	50.0	1	0.1	381
1,2,3,6,7,8-HxCDD	**5310**	46.5	50.0	1	0.1	531
1,2,3,7,8,9-HxCDD	**3560**	43.5	50.0	1	0.1	356
1,2,3,4,6,7,8-HpCDD	**10500**	34.4	50.0	1	0.01	105
OCDD	**4570**	21.1	100	1	0.0003	1.37
2,3,7,8-TCDF	**2100**	152	152	1	0.1	210
1,2,3,7,8-PeCDF	**22100**	1100	1100	1	0.03	663
2,3,4,7,8-PeCDF	**46500**	1170	1170	1	0.3	14000
1,2,3,4,7,8-HxCDF	**38300**	438	438	1	0.1	3830
1,2,3,6,7,8-HxCDF	**36700**	433	433	1	0.1	3670
1,2,3,7,8,9-HxCDF	**3310**	505	505	1	0.1	331
2,3,4,6,7,8-HxCDF	**43100**	465	465	1	0.1	4310
1,2,3,4,6,7,8-HpCDF	**90200**	321	321	1	0.01	902
1,2,3,4,7,8,9-HpCDF	**9900**	381	381	1	0.01	99.0
OCDF	**12400**	5.69	100	1	0.0003	3.72
		Total TEQ				39200

2005 WHO TEFs, ND = 0

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Bison Engineering, Incorporated	**Service Request:**	E2000846
Project:	Tucson Iron & Metals/TIM220419	**Date Collected:**	09/09/20 00:00
Sample Matrix:	Air	**Date Received:**	09/11/20 09:40
Sample Name:	TIM220419 M23 R3 903-25-004	**Units:**	pg
Lab Code:	E2000846-003	**Basis:**	NA

Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from Stationary Sources

Analysis Method:	23	**Date Analyzed:**	10/09/20 15:00
Prep Method:	Method	**Date Extracted:**	9/21/20
Sample Amount:	0.5000Sample	**Instrument Name:**	E-HRMS-07
		GC Column:	DB-5MSUI
Data File Name:	P530112	**Blank File Name:**	P530109
ICAL Date:	09/03/20	**Cal Ver. File Name:**	P530106

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	1000		7.63	10.0	0.81	1.001	1
1,2,3,7,8-PeCDD	3500		10.2	50.0	1.49	1.000	1
1,2,3,4,7,8-HxCDD	2000		14.9	50.0	1.30	0.998	1
1,2,3,6,7,8-HxCDD	2790		15.3	50.0	1.17	1.000	1
1,2,3,7,8,9-HxCDD	1670		14.3	50.0	1.24	1.007	1
1,2,3,4,6,7,8-HpCDD	6190		7.85	50.0	1.01	1.000	1
OCDD	3130		20.3	100	0.88	1.000	1
2,3,7,8-TCDF	6320		75.7	75.7	0.74	1.001	1
1,2,3,7,8-PeCDF	9880		101	101	1.55	1.001	1
2,3,4,7,8-PeCDF	22800		107	107	1.54	1.029	1
1,2,3,4,7,8-HxCDF	17100		140	140	1.15	0.998	1
1,2,3,6,7,8-HxCDF	18100		138	138	1.19	1.000	1
1,2,3,7,8,9-HxCDF	3270		161	161	1.21	1.036	1
2,3,4,6,7,8-HxCDF	18100		149	149	1.21	1.014	1
1,2,3,4,6,7,8-HpCDF	43200		89.7	89.7	1.02	1.000	1
1,2,3,4,7,8,9-HpCDF	2710		107	107	1.01	1.036	1
OCDF	7920		8.97	100	0.87	1.005	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Bison Engineering, Incorporated	**Service Request:**	E2000846
Project:	Tucson Iron & Metals/TIM220419	**Date Collected:**	09/09/20 00:00
Sample Matrix:	Air	**Date Received:**	09/11/20 09:40
Sample Name:	TIM220419 M23 R3 903-25-004	**Units:**	pg
Lab Code:	E2000846-003	**Basis:**	NA

Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from Stationary Sources

Analysis Method:	23	**Date Analyzed:**	10/09/20 15:00
Prep Method:	Method	**Date Extracted:**	9/21/20
Sample Amount:	0.5000Sample	**Instrument Name:**	E-HRMS-07
		GC Column:	DB-5MSUI
Data File Name:	P530112	**Blank File Name:**	P530109
ICAL Date:	09/03/20	**Cal Ver. File Name:**	P530106

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
Total Tetra-Dioxins	64500		7.63	10.0	0.78		1
Total Penta-Dioxins	59300		10.2	50.0	1.56		1
Total Hexa-Dioxins	46800		14.8	50.0	1.24		1
Total Hepta-Dioxins	14700		7.85	50.0	1.03		1
Total Tetra-Furans	318000		75.7	75.7	0.74		1
Total Penta-Furans	246000		1.26	50.0			1
Total Hexa-Furans	157000		147	147	1.20		1
Total Hepta-Furans	66800		97.4	97.4	1.02		1

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Analytical Report

Client:	Bison Engineering, Incorporated	**Service Request:**	E2000846
Project:	Tucson Iron & Metals/TIM220419	**Date Collected:**	09/09/20 00:00
Sample Matrix:	Air	**Date Received:**	09/11/20 09:40
Sample Name:	TIM220419 M23 R3 903-25-004	**Units:**	Percent
Lab Code:	E2000846-003	**Basis:**	NA

Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from Stationary Sources

Analysis Method:	23	**Date Analyzed:**	10/09/20 15:00
Prep Method:	Method	**Date Extracted:**	9/21/20
Sample Amount:	0.5000Sample	**Instrument Name:**	E-HRMS-07
		GC Column:	DB-5MSUI
Data File Name:	P530112	**Blank File Name:**	P530109
ICAL Date:	09/03/20	**Cal Ver. File Name:**	P530106

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	% Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	2000	879.740	44		40-130	0.79	1.021
13C-1,2,3,7,8-PeCDD	2000	1079.892	54		40-130	1.62	1.185
13C-1,2,3,6,7,8-HxCDD	2000	926.958	46		40-130	1.32	0.993
13C-1,2,3,4,6,7,8-HpCDD	2000	781.478	39		25-130	1.06	1.065
13C-OCDD	4000	1002.435	25		25-130	0.93	1.138
13C-2,3,7,8-TCDF	2000	894.688	45		40-130	0.79	0.992
13C-1,2,3,7,8-PeCDF	2000	1100.134	55		40-130	1.59	1.143
13C-1,2,3,6,7,8-HxCDF	2000	992.935	50		40-130	0.52	0.973
13C-1,2,3,4,6,7,8-HpCDF	2000	726.951	36		25-130	0.44	1.040
37Cl-2,3,7,8-TCDD	2000	2051.332	103		70-130	NA	1.001
13C-1,2,3,4,7,8-HxCDD	2000	1761.729	88		70-130	1.25	0.998
13C-2,3,4,7,8-PeCDF	2000	1754.085	88		70-130	1.63	1.028
13C-1,2,3,4,7,8-HxCDF	2000	1803.656	90		70-130	0.52	0.997
13C-1,2,3,4,7,8,9-HpCDF	2000	1443.448	72		70-130	0.44	1.036
13C-1,2,3,7,8,9-HxCDF	2000	843.199	42		40-130	0.52	1.008

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Bison Engineering, Incorporated	**Service Request:**	E2000846
Project:	Tucson Iron & Metals/TIM220419	**Date Collected:**	09/09/20 00:00
Sample Matrix:	Air	**Date Received:**	09/11/20 09:40
Sample Name:	TIM220419 M23 R3 903-25-004	**Units:**	pg
Lab Code:	E2000846-003	**Basis:**	NA

Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from Stationary Sources

Analysis Method: 23

Prep Method: Method

Toxicity Equivalency Quotient

Analyte Name	Result	DL	MRL	Dilution Factor	TEF	TEF - Adjusted Concentration
2,3,7,8-TCDD	**1000**	7.63	10.0	1	1	1000
1,2,3,7,8-PeCDD	**3500**	10.2	50.0	1	1	3500
1,2,3,4,7,8-HxCDD	**2000**	14.9	50.0	1	0.1	200
1,2,3,6,7,8-HxCDD	**2790**	15.3	50.0	1	0.1	279
1,2,3,7,8,9-HxCDD	**1670**	14.3	50.0	1	0.1	167
1,2,3,4,6,7,8-HpCDD	**6190**	7.85	50.0	1	0.01	61.9
OCDD	**3130**	20.3	100	1	0.0003	0.939
2,3,7,8-TCDF	**6320**	75.7	75.7	1	0.1	632
1,2,3,7,8-PeCDF	**9880**	101	101	1	0.03	296
2,3,4,7,8-PeCDF	**22800**	107	107	1	0.3	6840
1,2,3,4,7,8-HxCDF	**17100**	140	140	1	0.1	1710
1,2,3,6,7,8-HxCDF	**18100**	138	138	1	0.1	1810
1,2,3,7,8,9-HxCDF	**3270**	161	161	1	0.1	327
2,3,4,6,7,8-HxCDF	**18100**	149	149	1	0.1	1810
1,2,3,4,6,7,8-HpCDF	**43200**	89.7	89.7	1	0.01	432
1,2,3,4,7,8,9-HpCDF	**2710**	107	107	1	0.01	27.1
OCDF	**7920**	8.97	100	1	0.0003	2.38
		Total TEQ				19100

2005 WHO TEFs, ND = 0

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Bison Engineering, Incorporated	**Service Request:**	E2000846
Project:	Tucson Iron & Metals/TIM220419	**Date Collected:**	09/09/20 00:00
Sample Matrix:	Air	**Date Received:**	09/11/20 09:40
Sample Name:	903-25-002	**Units:**	pg
Lab Code:	E2000846-004	**Basis:**	NA

Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from Stationary Sources

Analysis Method:	23	**Date Analyzed:**	10/09/20 16:04
Prep Method:	Method	**Date Extracted:**	9/21/20
Sample Amount:	0.5000Sample	**Instrument Name:**	E-HRMS-07
		GC Column:	DB-5MSUI
Data File Name:	P530113	**Blank File Name:**	P530109
ICAL Date:	09/03/20	**Cal Ver. File Name:**	P530106

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	ND	U	2.92	10.0			1
1,2,3,7,8-PeCDD	10.9**BJ**		1.69	50.0	1.44	1.000	1
1,2,3,4,7,8-HxCDD	7.47**BJK**		2.16	50.0	1.03	0.998	1
1,2,3,6,7,8-HxCDD	19.2**BJ**		2.23	50.0	1.29	1.000	1
1,2,3,7,8,9-HxCDD	9.77**BJ**		2.09	50.0	1.22	1.006	1
1,2,3,4,6,7,8-HpCDD	543		2.14	50.0	1.07	1.000	1
OCDD	325**B**		5.26	100	0.99	1.000	1
2,3,7,8-TCDF	10.4		2.81	10.0	0.70	1.001	1
1,2,3,7,8-PeCDF	17.7**BJ**		3.89	50.0	1.70	1.001	1
2,3,4,7,8-PeCDF	46.8**BJ**		4.15	50.0	1.37	1.029	1
1,2,3,4,7,8-HxCDF	39.1**BJ**		2.04	50.0	1.18	0.998	1
1,2,3,6,7,8-HxCDF	40.1**BJ**		2.02	50.0	1.19	1.000	1
1,2,3,7,8,9-HxCDF	12.3**BJ**		2.35	50.0	1.13	1.036	1
2,3,4,6,7,8-HxCDF	50.9**B**		2.17	50.0	1.19	1.015	1
1,2,3,4,6,7,8-HpCDF	106		2.14	50.0	1.02	1.000	1
1,2,3,4,7,8,9-HpCDF	13.6**BJ**		2.54	50.0	1.17	1.036	1
OCDF	61.6**BJ**		2.34	100	0.81	1.005	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Bison Engineering, Incorporated	**Service Request:**	E2000846
Project:	Tucson Iron & Metals/TIM220419	**Date Collected:**	09/09/20 00:00
Sample Matrix:	Air	**Date Received:**	09/11/20 09:40
Sample Name:	903-25-002	**Units:**	pg
Lab Code:	E2000846-004	**Basis:**	NA

Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from Stationary Sources

Analysis Method:	23	**Date Analyzed:**	10/09/20 16:04
Prep Method:	Method	**Date Extracted:**	9/21/20
Sample Amount:	0.5000Sample	**Instrument Name:**	E-HRMS-07
		GC Column:	DB-5MSUI
Data File Name:	P530113	**Blank File Name:**	P530109
ICAL Date:	09/03/20	**Cal Ver. File Name:**	P530106

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
Total Tetra-Dioxins	19.7		2.92	10.0	0.74		1
Total Penta-Dioxins	57.5		1.69	50.0	1.45		1
Total Hexa-Dioxins	153		2.16	50.0	1.13		1
Total Hepta-Dioxins	614		2.14	50.0	1.08		1
Total Tetra-Furans	247		2.81	10.0	0.83		1
Total Penta-Furans	445		1.26	50.0			1
Total Hexa-Furans	364		2.14	50.0	1.15		1
Total Hepta-Furans	190		2.32	50.0	1.02		1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Bison Engineering, Incorporated	**Service Request:**	E2000846
Project:	Tucson Iron & Metals/TIM220419	**Date Collected:**	09/09/20 00:00
Sample Matrix:	Air	**Date Received:**	09/11/20 09:40
Sample Name:	903-25-002	**Units:**	Percent
Lab Code:	E2000846-004	**Basis:**	NA

Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from Stationary Sources

Analysis Method:	23	**Date Analyzed:**	10/09/20 16:04
Prep Method:	Method	**Date Extracted:**	9/21/20
Sample Amount:	0.5000Sample	**Instrument Name:**	E-HRMS-07
		GC Column:	DB-5MSUI
Data File Name:	P530113	**Blank File Name:**	P530109
ICAL Date:	09/03/20	**Cal Ver. File Name:**	P530106

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	% Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	2000	1290.802	65		40-130	0.78	1.021
13C-1,2,3,7,8-PeCDD	2000	1382.474	69		40-130	1.59	1.186
13C-1,2,3,6,7,8-HxCDD	2000	1385.471	69		40-130	1.29	0.994
13C-1,2,3,4,6,7,8-HpCDD	2000	1171.300	59		25-130	1.05	1.066
13C-OCDD	4000	1581.307	40		25-130	0.90	1.139
13C-2,3,7,8-TCDF	2000	1303.761	65		40-130	0.78	0.992
13C-1,2,3,7,8-PeCDF	2000	1408.345	70		40-130	1.56	1.143
13C-1,2,3,6,7,8-HxCDF	2000	1483.229	74		40-130	0.50	0.974
13C-1,2,3,4,6,7,8-HpCDF	2000	1111.305	56		25-130	0.43	1.041
37Cl-2,3,7,8-TCDD	2000	1593.798	80		70-130	NA	1.000
13C-1,2,3,4,7,8-HxCDD	2000	1331.195	67	Y	70-130	1.30	0.997
13C-2,3,4,7,8-PeCDF	2000	1339.332	67	Y	70-130	1.58	1.028
13C-1,2,3,4,7,8-HxCDF	2000	1404.223	70		70-130	0.51	0.997
13C-1,2,3,4,7,8,9-HpCDF	2000	1539.952	77		70-130	0.44	1.036
13C-1,2,3,7,8,9-HxCDF	2000	1102.831	55		40-130	0.52	1.008

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Analytical Report

Client:	Bison Engineering, Incorporated	**Service Request:**	E2000846
Project:	Tucson Iron & Metals/TIM220419	**Date Collected:**	09/09/20 00:00
Sample Matrix:	Air	**Date Received:**	09/11/20 09:40
Sample Name:	903-25-002	**Units:**	pg
Lab Code:	E2000846-004	**Basis:**	NA

Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from Stationary Sources

Analysis Method: 23

Prep Method: Method

Toxicity Equivalency Quotient

Analyte Name	Result	DL	MRL	Dilution Factor	TEF	TEF - Adjusted Concentration
2,3,7,8-TCDD	ND	2.92	10.0	1	1	
1,2,3,7,8-PeCDD	**10.9**	1.69	50.0	1	1	10.9
1,2,3,4,7,8-HxCDD	**7.47**	2.16	50.0	1	0.1	0.747
1,2,3,6,7,8-HxCDD	**19.2**	2.23	50.0	1	0.1	1.92
1,2,3,7,8,9-HxCDD	**9.77**	2.09	50.0	1	0.1	0.977
1,2,3,4,6,7,8-HpCDD	**543**	2.14	50.0	1	0.01	5.43
OCDD	**325**	5.26	100	1	0.0003	0.0975
2,3,7,8-TCDF	**10.4**	2.81	10.0	1	0.1	1.04
1,2,3,7,8-PeCDF	**17.7**	3.89	50.0	1	0.03	0.531
2,3,4,7,8-PeCDF	**46.8**	4.15	50.0	1	0.3	14.0
1,2,3,4,7,8-HxCDF	**39.1**	2.04	50.0	1	0.1	3.91
1,2,3,6,7,8-HxCDF	**40.1**	2.02	50.0	1	0.1	4.01
1,2,3,7,8,9-HxCDF	**12.3**	2.35	50.0	1	0.1	1.23
2,3,4,6,7,8-HxCDF	**50.9**	2.17	50.0	1	0.1	5.09
1,2,3,4,6,7,8-HpCDF	**106**	2.14	50.0	1	0.01	1.06
1,2,3,4,7,8,9-HpCDF	**13.6**	2.54	50.0	1	0.01	0.136
OCDF	**61.6**	2.34	100	1	0.0003	0.0185
		Total TEQ				51.1

2005 WHO TEFs, ND = 0

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Analytical Report

Client:	Bison Engineering, Incorporated	**Service Request:**	E2000846
Project:	Tucson Iron & Metals/TIM220419	**Date Collected:**	NA
Sample Matrix:	Air	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	pg
Lab Code:	EQ2000440-01	**Basis:**	NA

Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from Stationary Sources

Analysis Method:	23	**Date Analyzed:**	10/09/20 12:36
Prep Method:	Method	**Date Extracted:**	9/21/20
Sample Amount:	0.5000Sample	**Instrument Name:**	E-HRMS-07
		GC Column:	DB-5MSUI
Data File Name:	P530109	**Blank File Name:**	P530109
ICAL Date:	09/03/20	**Cal Ver. File Name:**	P530106

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	ND	U	9.71	10.0			1
1,2,3,7,8-PeCDD	4.61**JK**		3.27	50.0	1.18	1.000	1
1,2,3,4,7,8-HxCDD	7.26**J**		2.50	50.0	1.14	0.998	1
1,2,3,6,7,8-HxCDD	5.17**JK**		2.58	50.0	1.81	1.000	1
1,2,3,7,8,9-HxCDD	6.09**JK**		2.41	50.0	0.95	1.006	1
1,2,3,4,6,7,8-HpCDD	19.1**J**		0.946	50.0	1.20	1.000	1
OCDD	38.3**J**		1.99	100	0.87	1.001	1
2,3,7,8-TCDF	ND	U	8.47	10.0			1
1,2,3,7,8-PeCDF	8.37**JK**		3.57	50.0	1.00	1.001	1
2,3,4,7,8-PeCDF	10.7**JK**		3.80	50.0	1.28	1.029	1
1,2,3,4,7,8-HxCDF	5.68**J**		1.68	50.0	1.07	0.997	1
1,2,3,6,7,8-HxCDF	5.69**JK**		1.66	50.0	1.63	1.000	1
1,2,3,7,8,9-HxCDF	6.89**J**		1.93	50.0	1.24	1.036	1
2,3,4,6,7,8-HxCDF	6.51**J**		1.78	50.0	1.26	1.015	1
1,2,3,4,6,7,8-HpCDF	6.93**JK**		0.772	50.0	1.21	1.000	1
1,2,3,4,7,8,9-HpCDF	7.77**J**		0.918	50.0	1.02	1.036	1
OCDF	10.9**JK**		2.77	100	1.31	1.006	1

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Analytical Report

Client:	Bison Engineering, Incorporated	**Service Request:**	E2000846
Project:	Tucson Iron & Metals/TIM220419	**Date Collected:**	NA
Sample Matrix:	Air	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	pg
Lab Code:	EQ2000440-01	**Basis:**	NA

Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from Stationary Sources

Analysis Method:	23	**Date Analyzed:**	10/09/20 12:36
Prep Method:	Method	**Date Extracted:**	9/21/20
Sample Amount:	0.5000Sample	**Instrument Name:**	E-HRMS-07
		GC Column:	DB-5MSUI
Data File Name:	P530109	**Blank File Name:**	P530109
ICAL Date:	09/03/20	**Cal Ver. File Name:**	P530106

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
Total Tetra-Dioxins	ND	U	9.71	10.0			1
Total Penta-Dioxins	ND	U	3.27	50.0			1
Total Hexa-Dioxins	7.26**J**		2.49	50.0	1.14		1
Total Hepta-Dioxins	ND	U	0.946	50.0			1
Total Tetra-Furans	ND	U	8.47	10.0			1
Total Penta-Furans	8.30**J**		1.26	50.0			1
Total Hexa-Furans	25.2**J**		1.75	50.0	1.14		1
Total Hepta-Furans	7.77**J**		0.840	50.0	1.02		1

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Analytical Report

Client:	Bison Engineering, Incorporated	**Service Request:**	E2000846
Project:	Tucson Iron & Metals/TIM220419	**Date Collected:**	NA
Sample Matrix:	Air	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	Percent
Lab Code:	EQ2000440-01	**Basis:**	NA

Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from Stationary Sources

Analysis Method:	23	**Date Analyzed:**	10/09/20 12:36
Prep Method:	Method	**Date Extracted:**	9/21/20
Sample Amount:	0.5000Sample	**Instrument Name:**	E-HRMS-07
		GC Column:	DB-5MSUI
Data File Name:	P530109	**Blank File Name:**	P530109
ICAL Date:	09/03/20	**Cal Ver. File Name:**	P530106

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	% Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	2000	442.871	22	Y	40-130	0.80	1.021
13C-1,2,3,7,8-PeCDD	2000	681.647	34	Y	40-130	1.63	1.186
13C-1,2,3,6,7,8-HxCDD	2000	818.462	41		40-130	1.27	0.994
13C-1,2,3,4,6,7,8-HpCDD	2000	768.476	38		25-130	1.07	1.066
13C-OCDD	4000	1082.125	27		25-130	0.91	1.138
13C-2,3,7,8-TCDF	2000	428.990	21	Y	40-130	0.76	0.992
13C-1,2,3,7,8-PeCDF	2000	614.054	31	Y	40-130	1.57	1.143
13C-1,2,3,6,7,8-HxCDF	2000	844.621	42		40-130	0.53	0.974
13C-1,2,3,4,6,7,8-HpCDF	2000	699.971	35		25-130	0.44	1.041
37Cl-2,3,7,8-TCDD	2000	2330.965	117		70-130	NA	1.000
13C-1,2,3,4,7,8-HxCDD	2000	1849.116	92		70-130	1.29	0.997
13C-2,3,4,7,8-PeCDF	2000	2118.611	106		70-130	1.57	1.028
13C-1,2,3,4,7,8-HxCDF	2000	1896.021	95		70-130	0.51	0.997
13C-1,2,3,4,7,8,9-HpCDF	2000	2159.076	108		70-130	0.43	1.036
13C-1,2,3,7,8,9-HxCDF	2000	1080.152	54		40-130	0.51	1.008

Accuracy & Precision

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QA/QC Report

Client:	Bison Engineering, Incorporated	**Service Request:**	E2000846
Project:	Tucson Iron & Metals/TIM220419	**Date Analyzed:**	10/09/20
Sample Matrix:	Air	**Date Extracted:**	09/21/20

Duplicate Lab Control Sample Summary
Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from Stationary Sources

Analysis Method:	23	**Units:**	pg
Prep Method:	Method	**Basis:**	NA
		Analysis Lot:	699094

	Lab Control Sample EQ2000440-02			Duplicate Lab Control Sample EQ2000440-03					
Analyte Name	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
1,2,3,4,6,7,8-HpCDD	2160	2000	108	2220	2000	111	70-130	3	20
1,2,3,4,7,8-HxCDD	2410	2000	121	2350	2000	118	70-130	3	20
1,2,3,6,7,8-HxCDD	2590	2000	129	2630	2000	132 *	70-130	2	20
1,2,3,7,8,9-HxCDD	2420	2000	121	2450	2000	122	70-130	<1	20
1,2,3,7,8-PeCDD	2490	2000	124	2440	2000	122	70-130	2	20
2,3,7,8-TCDD	482	400	120	489	400	122	70-130	1	20
OCDD	4580	4000	115	4510	4000	113	70-130	2	20
1,2,3,4,6,7,8-HpCDF	2600	2000	130	2660	2000	133 *	70-130	2	20
1,2,3,4,7,8,9-HpCDF	3010	2000	150 *	2670	2000	133 *	70-130	12	20
1,2,3,4,7,8-HxCDF	2450	2000	123	2450	2000	122	70-130	<1	20
1,2,3,6,7,8-HxCDF	2600	2000	130	2530	2000	126	70-130	3	20
1,2,3,7,8,9-HxCDF	2520	2000	126	2280	2000	114	70-130	10	20
1,2,3,7,8-PeCDF	2410	2000	121	2410	2000	121	70-130	<1	20
2,3,4,6,7,8-HxCDF	2610	2000	131 *	2530	2000	126	70-130	3	20
2,3,4,7,8-PeCDF	2720	2000	136 *	2650	2000	133 *	70-130	3	20
2,3,7,8-TCDF	482	400	121	489	400	122	70-130	1	20
OCDF	5290	4000	132 *	5050	4000	126	70-130	5	20

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Bison Engineering, Incorporated	**Service Request:**	E2000846
Project:	Tucson Iron & Metals/TIM220419	**Date Collected:**	NA
Sample Matrix:	Air	**Date Received:**	NA
Sample Name:	Lab Control Sample	**Units:**	pg
Lab Code:	EQ2000440-02	**Basis:**	NA

Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from Stationary Sources

Analysis Method:	23	**Date Analyzed:**	10/09/20 19:17
Prep Method:	Method	**Date Extracted:**	9/21/20
Sample Amount:	0.5000Sample	**Instrument Name:**	E-HRMS-07
		GC Column:	DB-5MSUI
Data File Name:	P530117	**Blank File Name:**	P530109
ICAL Date:	09/03/20	**Cal Ver. File Name:**	P530106

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	482		5.51	10.0	0.78	1.001	1
1,2,3,7,8-PeCDD	2490		3.22	50.0	1.62	1.000	1
1,2,3,4,7,8-HxCDD	2410		2.91	50.0	1.28	0.998	1
1,2,3,6,7,8-HxCDD	2590		3.00	50.0	1.27	1.000	1
1,2,3,7,8,9-HxCDD	2420		2.81	50.0	1.24	1.007	1
1,2,3,4,6,7,8-HpCDD	2160		3.44	50.0	1.05	1.000	1
OCDD	4580		3.04	100	0.89	1.000	1
2,3,7,8-TCDF	482		3.77	10.0	0.71	1.000	1
1,2,3,7,8-PeCDF	2410		6.33	50.0	1.48	1.000	1
2,3,4,7,8-PeCDF	2720		6.74	50.0	1.48	1.028	1
1,2,3,4,7,8-HxCDF	2450		2.69	50.0	1.23	0.997	1
1,2,3,6,7,8-HxCDF	2600		2.66	50.0	1.20	1.000	1
1,2,3,7,8,9-HxCDF	2520		3.10	50.0	1.22	1.035	1
2,3,4,6,7,8-HxCDF	2610		2.85	50.0	1.18	1.014	1
1,2,3,4,6,7,8-HpCDF	2600		3.80	50.0	0.99	1.000	1
1,2,3,4,7,8,9-HpCDF	3010		4.51	50.0	0.99	1.036	1
OCDF	5290		3.09	100	0.87	1.005	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Bison Engineering, Incorporated	**Service Request:**	E2000846
Project:	Tucson Iron & Metals/TIM220419	**Date Collected:**	NA
Sample Matrix:	Air	**Date Received:**	NA
Sample Name:	Lab Control Sample	**Units:**	pg
Lab Code:	EQ2000440-02	**Basis:**	NA

Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from Stationary Sources

Analysis Method:	23	**Date Analyzed:**	10/09/20 19:17
Prep Method:	Method	**Date Extracted:**	9/21/20
Sample Amount:	0.5000Sample	**Instrument Name:**	E-HRMS-07
		GC Column:	DB-5MSUI
Data File Name:	P530117	**Blank File Name:**	P530109
ICAL Date:	09/03/20	**Cal Ver. File Name:**	P530106

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
Total Tetra-Dioxins	496		5.51	10.0	0.75		1
Total Penta-Dioxins	2500		3.22	50.0	1.60		1
Total Hexa-Dioxins	7420		2.90	50.0	1.28		1
Total Hepta-Dioxins	2160		3.44	50.0	1.05		1
Total Tetra-Furans	499		3.77	10.0	0.66		1
Total Penta-Furans	5150		1.26	50.0			1
Total Hexa-Furans	10200		2.81	50.0	1.23		1
Total Hepta-Furans	5610		4.12	50.0	0.99		1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Bison Engineering, Incorporated	**Service Request:**	E2000846
Project:	Tucson Iron & Metals/TIM220419	**Date Collected:**	NA
Sample Matrix:	Air	**Date Received:**	NA
Sample Name:	Lab Control Sample	**Units:**	Percent
Lab Code:	EQ2000440-02	**Basis:**	NA

Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from Stationary Sources

Analysis Method:	23	**Date Analyzed:**	10/09/20 19:17
Prep Method:	Method	**Date Extracted:**	9/21/20
Sample Amount:	0.5000Sample	**Instrument Name:**	E-HRMS-07
		GC Column:	DB-5MSUI
Data File Name:	P530117	**Blank File Name:**	P530109
ICAL Date:	09/03/20	**Cal Ver. File Name:**	P530106

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	% Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	2000	582.626	29	Y	40-130	0.79	1.021
13C-1,2,3,7,8-PeCDD	2000	788.221	39	Y	40-130	1.64	1.186
13C-1,2,3,6,7,8-HxCDD	2000	870.010	44		40-130	1.28	0.994
13C-1,2,3,4,6,7,8-HpCDD	2000	738.407	37		25-130	1.05	1.066
13C-OCDD	4000	939.269	23	Y	25-130	0.90	1.139
13C-2,3,7,8-TCDF	2000	605.265	30	Y	40-130	0.79	0.993
13C-1,2,3,7,8-PeCDF	2000	726.973	36	Y	40-130	1.56	1.144
13C-1,2,3,6,7,8-HxCDF	2000	861.546	43		40-130	0.51	0.974
13C-1,2,3,4,6,7,8-HpCDF	2000	658.022	33		25-130	0.44	1.042
37Cl-2,3,7,8-TCDD	2000	2346.604	117		70-130	NA	1.001
13C-1,2,3,4,7,8-HxCDD	2000	1910.009	96		70-130	1.30	0.998
13C-2,3,4,7,8-PeCDF	2000	2180.647	109		70-130	1.57	1.028
13C-1,2,3,4,7,8-HxCDF	2000	2062.400	103		70-130	0.52	0.997
13C-1,2,3,4,7,8,9-HpCDF	2000	2380.115	119		70-130	0.44	1.036
13C-1,2,3,7,8,9-HxCDF	2000	960.772	48		40-130	0.51	1.008

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Bison Engineering, Incorporated	**Service Request:**	E2000846
Project:	Tucson Iron & Metals/TIM220419	**Date Collected:**	NA
Sample Matrix:	Air	**Date Received:**	NA
Sample Name:	Duplicate Lab Control Sample	**Units:**	pg
Lab Code:	EQ2000440-03	**Basis:**	NA

Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from Stationary Sources

Analysis Method:	23	**Date Analyzed:**	10/09/20 20:05
Prep Method:	Method	**Date Extracted:**	9/21/20
Sample Amount:	0.5000Sample	**Instrument Name:**	E-HRMS-07
		GC Column:	DB-5MSUI
Data File Name:	P530118	**Blank File Name:**	P530109
ICAL Date:	09/03/20	**Cal Ver. File Name:**	P530106

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	489		2.68	10.0	0.76	1.001	1
1,2,3,7,8-PeCDD	2440		1.58	50.0	1.56	1.000	1
1,2,3,4,7,8-HxCDD	2350		1.23	50.0	1.26	0.998	1
1,2,3,6,7,8-HxCDD	2630		1.27	50.0	1.26	1.000	1
1,2,3,7,8,9-HxCDD	2450		1.18	50.0	1.27	1.006	1
1,2,3,4,6,7,8-HpCDD	2220		1.64	50.0	1.03	1.000	1
OCDD	4510		2.00	100	0.88	1.000	1
2,3,7,8-TCDF	489		1.87	10.0	0.70	1.001	1
1,2,3,7,8-PeCDF	2410		1.67	50.0	1.53	1.001	1
2,3,4,7,8-PeCDF	2650		1.78	50.0	1.49	1.029	1
1,2,3,4,7,8-HxCDF	2450		0.994	50.0	1.21	0.998	1
1,2,3,6,7,8-HxCDF	2530		0.982	50.0	1.24	1.001	1
1,2,3,7,8,9-HxCDF	2280		1.15	50.0	1.21	1.035	1
2,3,4,6,7,8-HxCDF	2530		1.06	50.0	1.20	1.014	1
1,2,3,4,6,7,8-HpCDF	2660		4.63	50.0	1.02	1.000	1
1,2,3,4,7,8,9-HpCDF	2670		5.50	50.0	1.00	1.036	1
OCDF	5050		0.892	100	0.88	1.005	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Bison Engineering, Incorporated	**Service Request:**	E2000846
Project:	Tucson Iron & Metals/TIM220419	**Date Collected:**	NA
Sample Matrix:	Air	**Date Received:**	NA
Sample Name:	Duplicate Lab Control Sample	**Units:**	pg
Lab Code:	EQ2000440-03	**Basis:**	NA

Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from Stationary Sources

Analysis Method:	23	**Date Analyzed:**	10/09/20 20:05
Prep Method:	Method	**Date Extracted:**	9/21/20
Sample Amount:	0.5000Sample	**Instrument Name:**	E-HRMS-07
		GC Column:	DB-5MSUI
Data File Name:	P530118	**Blank File Name:**	P530109
ICAL Date:	09/03/20	**Cal Ver. File Name:**	P530106

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
Total Tetra-Dioxins	550		2.68	10.0	0.85		1
Total Penta-Dioxins	2480		1.58	50.0	1.55		1
Total Hexa-Dioxins	7430		1.22	50.0	1.26		1
Total Hepta-Dioxins	2240		1.64	50.0	0.96		1
Total Tetra-Furans	574		1.87	10.0	0.84		1
Total Penta-Furans	5130		1.26	50.0			1
Total Hexa-Furans	9800		1.04	50.0	1.13		1
Total Hepta-Furans	5330		5.03	50.0	1.02		1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Bison Engineering, Incorporated	**Service Request:**	E2000846
Project:	Tucson Iron & Metals/TIM220419	**Date Collected:**	NA
Sample Matrix:	Air	**Date Received:**	NA
Sample Name:	Duplicate Lab Control Sample	**Units:**	Percent
Lab Code:	EQ2000440-03	**Basis:**	NA

Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from Stationary Sources

Analysis Method:	23	**Date Analyzed:**	10/09/20 20:05
Prep Method:	Method	**Date Extracted:**	9/21/20
Sample Amount:	0.5000Sample	**Instrument Name:**	E-HRMS-07
		GC Column:	DB-5MSUI
Data File Name:	P530118	**Blank File Name:**	P530109
ICAL Date:	09/03/20	**Cal Ver. File Name:**	P530106

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	% Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	2000	674.600	34	Y	40-130	0.79	1.021
13C-1,2,3,7,8-PeCDD	2000	876.661	44		40-130	1.58	1.186
13C-1,2,3,6,7,8-HxCDD	2000	986.548	49		40-130	1.28	0.994
13C-1,2,3,4,6,7,8-HpCDD	2000	819.632	41		25-130	1.08	1.066
13C-OCDD	4000	1056.553	26		25-130	0.90	1.139
13C-2,3,7,8-TCDF	2000	698.465	35	Y	40-130	0.79	0.992
13C-1,2,3,7,8-PeCDF	2000	827.295	41		40-130	1.57	1.143
13C-1,2,3,6,7,8-HxCDF	2000	1004.732	50		40-130	0.53	0.974
13C-1,2,3,4,6,7,8-HpCDF	2000	776.503	39		25-130	0.44	1.041
37Cl-2,3,7,8-TCDD	2000	2345.224	117		70-130	NA	1.001
13C-1,2,3,4,7,8-HxCDD	2000	1850.180	93		70-130	1.29	0.997
13C-2,3,4,7,8-PeCDF	2000	2079.321	104		70-130	1.59	1.028
13C-1,2,3,4,7,8-HxCDF	2000	2035.454	102		70-130	0.52	0.997
13C-1,2,3,4,7,8,9-HpCDF	2000	2085.449	104		70-130	0.43	1.036
13C-1,2,3,7,8,9-HxCDF	2000	977.490	49		40-130	0.51	1.008

BISON ENGINEERING

PROJECT: TIM220419

CLIENT # B020
REPORT # 20-390

SUBMITTED BY:
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Case Narrative

Date: October 14, 2020

General Information

Client:	Bison Engineering
Client Number:	B020
Report Number:	20-390
Sample Description:	Impinger Trains
Sample Numbers:	20-U140 – 20-U143, 20-S1810 – 20-S1845

Analysis

Analytes:	HCl, Particulate Mass, Cd, Pb, Hg
Analytical Protocols:	EPA Method 26A (1/14/19 version) EPA Method 5 (8/2/17 version) EPA Method 29 (8/2/17 version)
Analytical Notes:	The method 26 H2SO4 blank, 20-S1813, was analyzed with a twofold dilution to resolve the Cl peak from some matrix interference. The detection limit for that sample was raised by a factor of two to account for the dilution. No problems were encountered with any other samples. The results have not been blank corrected.
QA/QC Review:	All of the data have been reviewed by the analysts performing the analyses and the project manager. All of the quality control and sample-specific information in this package is complete and meets or exceeds the minimum requirements for acceptability.
Comments:	If you have any questions or concerns regarding this analysis, please feel free to contact the project manager.
Disclaimer:	This report shall not be reproduced, except in full, without the written approval of the laboratory. The results only represent that of the samples as received into the laboratory. All data are reported to the detection limit. Results <5x DL must be considered to have a higher degree of uncertainty associated with them. Due to the statistical process of detection limit determination, data in this report should not be used for statistical analysis as the data has been censored in such a manner as to bias statistical analyses high.

Paul Duda 10/14/20

Project Manager Date
Paul Duda

Client: B020 - Bison Engineering
Report Number: 20-390

Lab ID: 20-S1810
Client ID: M26-H2SO4-1
Site: Tucson Iron & Metals
Sample Date: 9/10/20
Sample Volume: 277. mL

Analyte	mg/L Conc.	mg/L DL	µg/sample Conc.	µg/sample DL
HCl	3.03	0.010	840.	2.85

Lab ID: 20-S1811
Client ID: M26-H2SO4-2
Site: Tucson Iron & Metals
Sample Date: 9/10/20
Sample Volume: 285. mL

Analyte	mg/L Conc.	mg/L DL	µg/sample Conc.	µg/sample DL
HCl	6.42	0.010	1,830	2.93

Lab ID: 20-S1812
Client ID: M26-H2SO4-3
Site: Tucson Iron & Metals
Sample Date: 9/10/20
Sample Volume: 299. mL

Analyte	mg/L Conc.	mg/L DL	µg/sample Conc.	µg/sample DL
HCl	12.3	0.010	3,680	3.07

Lab ID: 20-S1813
Client ID: H2SO4 Blank
Site: Tucson Iron & Metals
Sample Date: 9/10/20
Sample Volume: 283. mL

Analyte	mg/L Conc.	mg/L DL	µg/sample Conc.	µg/sample DL
HCl	0.091	0.021	25.9	5.82

Lab ID: 20-S1814
Client ID: H2O Blank
Site: Tucson Iron & Metals
Sample Date: 9/10/20
Sample Volume: 63.5 mL

Analyte	mg/L Conc.	mg/L DL	µg/sample Conc.	µg/sample DL
HCl	0.046	0.010	2.94	0.653

Client: B020 - Bison Engineering
Report Number: 20-390

Lab ID: 20-S1845
Client ID: M26 Audit 082720W

Analyte	mg/L Conc.	DL
HCl	79.8	0.010

Bison Engineering
Project: TIM220419 Tucson Iron and Metals
Method 5 Data - Report # 20-390

Sample ID	Client ID	Sample Date	Sample Volume (mL)	Net Weight (mg) Acetone Probe Rinse	Filter	Comments
Lab_Blk				**0.17**		
Meth_Blk				**0.00**		
20-U140	M5-FH-1 Filter	9/9/20			**0.07**	
20-S1815	M5-FH-1 Acetone	9/9/20	72	**2.41**		
20-U141	M5-FH-2 Filter	9/9/20			**-0.74**	
20-S1816	M5-FH-2 Acetone	9/9/20	72	**3.19**		
20-U142	M5-FH-3 Filter	9/9/20			**-2.96**	
20-S1817	M5-FH-3 Acetone	9/9/20	79	**2.72**		
20-U143	Filter Blank	9/9/20			**-0.05**	
20-S1818	Acetone Blank	9/9/20	97	**0.26**		

Client: B020 - Bison Engineering
Report Number: 20-390

Lab ID: 20-S1819
Client ID: M29 R1 Cont. 1 2 & 3
Source: Tuscon Iron & Metals
Sample Date: 9/ 9/20

Analyte	Result	DL	Units
Cadmium, ICP	1.08	0.100	µg/sample
Lead, ICP	< DL	1.25	µg/sample
Mercury, CVAA	0.0250	0.0219	µg/sample

Lab ID: 20-S1820
Client ID: M29 R1 Cont. 4
Source: Tuscon Iron & Metals
Sample Date: 9/ 9/20

Analyte	Result	DL	Units
Cadmium, ICP	< DL	0.048	µg/sample
Lead, ICP	1.14	0.595	µg/sample
Mercury, CVAA	0.150	0.0276	µg/sample

Lab ID: 20-S1821
Client ID: M29 R1 Cont. 5a
Source: Tuscon Iron & Metals
Sample Date: 9/ 9/20

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.00788	µg/sample

Lab ID: 20-S1822
Client ID: M29 R1 Cont. 5b
Source: Tuscon Iron & Metals
Sample Date: 9/ 9/20
Comments: Leaked in transit, lost ~ 10 mL

Analyte	Result	DL	Units
Mercury, CVAA	0.412	0.0328	µg/sample

Lab ID: 20-S1823
Client ID: M29 R1 Cont. 5c
Source: Tuscon Iron & Metals
Sample Date: 9/ 9/20

Analyte	Result	DL	Units
Mercury, CVAA	0.0280	0.0196	µg/sample

Lab ID: 20-S1824
Client ID: M29 R2 Cont. 1 2 & 3
Source: Tuscon Iron & Metals
Sample Date: 9/ 9/20

Analyte	Result	DL	Units
Cadmium, ICP	0.986	0.100	µg/sample
Lead, ICP	< DL	1.25	µg/sample
Mercury, CVAA	< DL	0.0219	µg/sample

Lab ID: 20-S1825
Client ID: M29 R2 Cont. 4
Source: Tuscon Iron & Metals
Sample Date: 9/ 9/20

Analyte	Result	DL	Units
Cadmium, ICP	< DL	0.045	µg/sample
Lead, ICP	0.963	0.565	µg/sample
Mercury, CVAA	0.194	0.0271	µg/sample

Lab ID: 20-S1826
Client ID: M29 R2 Cont. 5a
Source: Tuscon Iron & Metals
Sample Date: 9/ 9/20

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.00805	µg/sample

Lab ID: 20-S1827
Client ID: M29 R2 Cont. 5b
Source: Tuscon Iron & Metals
Sample Date: 9/ 9/20
Comments: Leaked in transit, lost ~ 100 mL

Analyte	Result	DL	Units
Mercury, CVAA	0.650	0.0298	µg/sample

Lab ID: 20-S1828
Client ID: M29 R2 Cont. 5c
Source: Tuscon Iron & Metals
Sample Date: 9/ 9/20

Analyte	Result	DL	Units
Mercury, CVAA	0.0388	0.0194	µg/sample

Client: B020 - Bison Engineering
Report Number: 20-390

Lab ID: 20-S1829
Client ID: M29 R3 Cont. 1 2 & 3
Source: Tuscon Iron & Metals
Sample Date: 9/ 9/20

Analyte	Result	DL	Units
Cadmium, ICP	1.13	0.100	µg/sample
Lead, ICP	< DL	1.25	µg/sample
Mercury, CVAA	< DL	0.0219	µg/sample

Lab ID: 20-S1830
Client ID: M29 R3 Cont. 4
Source: Tuscon Iron & Metals
Sample Date: 9/ 9/20

Analyte	Result	DL	Units
Cadmium, ICP	< DL	0.046	µg/sample
Lead, ICP	1.13	0.570	µg/sample
Mercury, CVAA	0.273	0.0258	µg/sample

Lab ID: 20-S1831
Client ID: M29 R3 Cont. 5a
Source: Tuscon Iron & Metals
Sample Date: 9/ 9/20

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.00718	µg/sample

Lab ID: 20-S1832
Client ID: M29 R3 Cont. 5b
Source: Tuscon Iron & Metals
Sample Date: 9/ 9/20
Comments: Leaked in transit, lost ~ 200 mL

Analyte	Result	DL	Units
Mercury, CVAA	0.283	0.0215	µg/sample

Lab ID: 20-S1833
Client ID: M29 R3 Cont. 5c
Source: Tuscon Iron & Metals
Sample Date: 9/ 9/20

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.0186	µg/sample

Lab ID: 20-S1834
Client ID: Cont 7 Acetone Blank
Source: Tuscon Iron & Metals
Sample Date: 9/ 9/20

Analyte	Result	DL	Units
Cadmium, ICP	< DL	0.100	µg/sample
Lead, ICP	< DL	1.25	µg/sample
Mercury, CVAA	< DL	0.0219	µg/sample

Lab ID: 20-S1835
Client ID: Cont 8a 0.1N HNO3 Blank
Source: Tuscon Iron & Metals
Sample Date: 9/ 9/20

Analyte	Result	DL	Units
Cadmium, ICP	< DL	0.100	µg/sample
Lead, ICP	< DL	1.25	µg/sample
Mercury, CVAA	< DL	0.0219	µg/sample

Lab ID: 20-S1836
Client ID: Cont 12 Filter Blank
Source: Tuscon Iron & Metals
Sample Date: 9/ 9/20

Analyte	Result	DL	Units
Cadmium, ICP	1.07	0.100	µg/sample
Lead, ICP	< DL	1.25	µg/sample
Mercury, CVAA	< DL	0.0219	µg/sample

Lab ID: 20-S1837
Client ID: Cont 9 H2O2/HNO3 Blank
Source: Tuscon Iron & Metals
Sample Date: 9/ 9/20

Analyte	Result	DL	Units
Cadmium, ICP	< DL	0.045	µg/sample
Lead, ICP	< DL	0.565	µg/sample
Mercury, CVAA	0.0276	0.0276	µg/sample

Lab ID: 20-S1838
Client ID: Cont 8b H2O Blank
Source: Tuscon Iron & Metals
Sample Date: 9/ 9/20

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.00858	µg/sample

Lab ID: 20-S1839
Client ID: Cont 10 KMnO4 Blank
Source: Tuscon Iron & Metals
Sample Date: 9/ 9/20

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.00831	µg/sample

Lab ID: 20-S1840
Client ID: Cont 11 HCl Blank
Source: Tuscon Iron & Metals
Sample Date: 9/ 9/20

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.0194	µg/sample

Lab ID: 20-S1841
Client ID: M29 Metals Filter Audit 082720W

Analyte	Result	DL	Units
Cadmium, ICP	39.9	0.100	µg/sample
Lead, ICP	34.2	1.25	µg/sample

Lab ID: 20-S1842
Client ID: M29 Metals Impinger Audit 082720W

Analyte	Result	DL	Units
Cadmium, ICP	2.23	0.00013	µg/mL
Lead, ICP	1.65	0.00167	µg/mL

Lab ID: 20-S1843
Client ID: M29 Hg Filter Audit 082720W

Analyte	Result	DL	Units
Mercury, CVAA	2.17	0.0219	µg/sample

Lab ID: 20-S1844
Client ID: M29 Hg Impinger Audit 082720W

Analyte	Result	DL	Units
Mercury, CVAA	0.825	0.0070	µg/L

QA/QC Report

Client Name: Bison Engineering
Project Number: B020
Analytical Technique: Ion Chromatography
Sample Description: EPA M26A
Report Number: 20-390

Blank Data

Analyte	Sample ID	Measured Conc. mg/L	DL Conc. mg/L
Cl	ICB	< DL	0.010
Cl	CCB	< DL	0.010
Cl	CCB	< DL	0.010
Cl	ICB	< DL	0.010
Cl	CCB	< DL	0.010

ICB: Initial Calibration Blank CCB: Continuing Calibration Blank
Method Blank is in control if Method Blank results are <10% of sample results

Calibration QC

Analyte	Sample ID	Standard Conc. mg/L	Measured Conc. mg/L	Percent Recovery
Cl	ICV	0.500	0.541	108.2
Cl	LL-LCS	0.030	0.030	100.0
Cl	CCV	0.500	0.549	109.8
Cl	CCV	0.500	0.548	109.6
Cl	ICV	0.500	0.539	107.8
Cl	CCV	0.500	0.545	109.0

ICV: Initial Calibration Verification CCV: Continuing Calibration Verification
Calibration Verification Limits: 90% - 110% Recovery
LL-LCS Limits: 50% - 150% Recovery
LL-LCS results are not significant if sample results are >10x LL-LCS concentration

Duplicate Data

All samples analyzed in duplicate. The reported concentrations are the average of the two measurements.

Matrix Spike Analysis

Analyte	Sample ID	Sample Conc. mg/L	Spike Conc. mg/L	Spike Amount mg/L	Percent Recovery
Cl	20-S1810	2.95	8.52	5.00	111.

Spike Limit: 75% - 125% Recovery
*: per EPA CLP protocol, control limits do not apply if spike concentration is less than 25% of the sample concentration

LCS Limit: 80% - 120% Recovery

ION CHROMATOGRAPHY RAW DATA

Available upon request

All masses in grams (g)		M5 Acetone:		Bison 20-390				
Sx ID	Tare	Tare QC	Tare - QC	Gross	Gross QC	Gross - QC	*net (g)	net (mg)
date/init:	9/25/20 TP	9/26/20 TP		9/29/20 JD	10/1/20 TP		(total mass liq)	
time:	12:54	13:07		17:16	15:28			
Ambient								
Rel. Humidity	36.8%	38.9%		35.1%	39.9%			
Temp (C/F)	22.6C / 72.7F	22.8C / 73.0F		22.6C / 72.7F	21.6C / 70.9F			
Desiccator								
Rel. Humidity	2.0%	0.6%		0.5%	1.1%			
Temp (C/F)	22.3C / 72.1F	22.9C / 73.2F		22.7C / 72.9F	21.4C / 70.5F			
0.30000g QC	0.30002	0.30000		0.30005	0.30002			
3.00000g QC	2.99998	2.99995		3.00006	3.00000			
100.00000g QC	100.00001	100.00000		100.00005	100.00007			
Lab Blank	101.17505	101.17482	0.00023	101.17522	101.17537	-0.00015	0.00017	0.17
Method Blank	124.40642	124.40596	0.00046	124.40642	124.40684	-0.00042	0.00000	0.00
20-S1815	122.97585	122.97560	0.00025	122.97826	122.97833	-0.00007	0.00241	2.41
20-S1816	124.06094	124.06070	0.00024	124.06413	124.06441	-0.00028	0.00319	3.19
20-S1817	121.48185	121.48159	0.00026	121.48457	121.48468	-0.00011	0.00272	2.72
20-S1818	123.83305	123.83306	-0.00001	123.83331	123.83374	-0.00043	0.00026	0.26
*net mass = gross - tare (g)								
100g weight: S/N 14091 certified value: 100.00004 (99.99994 - 100.00014)								
Data collected electronically by proprietary BERT II software.								

All masses in grams (g)			M5 filter:	Bison 20-390				
Sx ID	Tare	Tare QC	Tare - QC	Gross	Gross QC	Gross - QC	Net Mass*	Net Mass
date/init:	3/12/20 TP	3/13/20 TP		10/1/20 TP	10/2/20 TP			(mg)
time:	13:44	09:21		15:41	08:22			
			Ambient					
Rel. Humidity	37.8%	35.6%		39.4%	39.9%			
Temp (C/F)	21.6C / 70.9F	21.2C / 70.2F		21.9C / 71.4F	21.3C / 70.3F			
			Desiccator					
Rel. Humidity	1.7%	1.7%		0.2%	0.2%			
Temp (C/F)	21.8C / 71.2F	21.5C / 70.7F		21.9C / 71.4F	21.4C / 70.5F			
0.30000g QC	0.29999	0.30001		0.30000	0.30001			
0.50000g QC	0.50001	0.50003		0.49999	0.50001			
3.00000g QC	3.00000	3.00003		2.99995	2.99998			
20-U140	0.45745	0.45731	0.00014	0.45752	0.45745	0.00007	0.00007	0.07
20-U141	0.47156	0.47162	-0.00006	0.47082	0.47076	0.00006	-0.00074	-0.74
20-U142	0.47109	0.47114	-0.00005	0.46813	0.46797	0.00016	-0.00296	-2.96
20-U143	0.47046	0.47045	0.00001	0.47041	0.47047	-0.00006	-0.00005	-0.05
*net mass = gross - tare (g)								
Quartz tissue filters								
Data collected electronically by proprietary BERT II software.								

QA/QC Report

Client Name: Bison Engineering
Project Number: B020
Analytical Technique: ICP - Optima 8300
Sample Description: EPA Method 29
Report Number: 20-390

Blank Data

Analyte	Sample ID	Measured Conc. µg/L	DL Conc. µg/L
Cd	ICB	< DL	0.400
Cd	MB_FH	< DL	0.400
Cd	CCB	< DL	0.400
Cd	MB_BH	< DL	0.400
Cd	CCB	< DL	0.400
Cd	CCB	< DL	0.400
Cd	ICB	< DL	0.400
Cd	CCB	< DL	0.400
Pb	ICB	< DL	5.00
Pb	MB_FH	< DL	5.00
Pb	CCB	< DL	5.00
Pb	MB_BH	< DL	5.00
Pb	CCB	< DL	5.00
Pb	CCB	< DL	5.00
Pb	ICB	< DL	5.00
Pb	CCB	< DL	5.00

*: Sample Media Blank (SM_Blk) concentration in µg/filter
ICB: Initial Calibration Blank CCB: Continuing Calibration Blank
Method Blank is in control if Method Blank results are <10% of sample results

Calibration QC

Analyte	Sample ID	Standard Conc. µg/L	Measured Conc. µg/L	Percent Recovery
Cd	ICV	2500	2410	96.6
Cd	LL-CCV	2.00	1.64	82.2
Cd	LL-LCS	1.50	1.14	75.7
Cd	CCV	2500	2400	95.9
Cd	LL-LCS	1.50	1.31	87.3
Cd	CCV	2500	2400	96.0
Cd	CCV	2500	2400	96.2
Cd	ICV	2500	2290	91.6
Cd	LL-CCV	2.00	1.71	85.3
Cd	CCV	2500	2380	95.2
Pb	ICV	2500	2400	96.2
Pb	LL-CCV	25.0	24.6	98.2
Pb	LL-LCS	15.0	13.2	87.8
Pb	CCV	2500	2360	94.6
Pb	LL-LCS	15.0	14.3	95.4
Pb	CCV	2500	2400	96.2
Pb	CCV	2500	2420	96.6
Pb	ICV	2500	2280	91.0
Pb	LL-CCV	25.0	23.4	93.6
Pb	CCV	2500	2380	95.0

ICV: Initial Calibration Verification CCV: Continuing Calibration Verification
Calibration Verification Limits: 90% - 110% Recovery
LL-CCV (Low Level CCV) Limits: 60% - 140% Recovery
LL-LCS Limits: 50% - 150% Recovery
LL-LCS results are not significant if sample results are >10x LL-LCS concentration

QA/QC Report

Client Name: Bison Engineering
Project Number: B020
Analytical Technique: ICP - Optima 8300
Sample Description: EPA Method 29
Report Number: 20-390

==========

Replicate Data

Analyte	Sample ID	Sample Conc. µg/L	Replicate Conc. µg/L	RPD
Cd	20-S1819	4.320	4.333	0.30
Cd	20-S1820	< 0.4	< 0.4	N/C #
Pb	20-S1819	< 5	< 5	N/C #
Pb	20-S1820	9.559	8.496	11.8 #

N/C: RPD is not calculated when sample or replicate is below detection limit
Replicate Limit: 20% RPD
#: per EPA CLP protocol, control limits do not apply if sample and/or replicate concentration is less than 5x the detection limit

Laboratory Control Sample/Post Digestion Spike Analysis

Analyte	Sample ID	Sample Conc. µg/L	Spike Conc. µg/L	Spike Amount µg/L	Percent Recovery
Cd	LCS	< 0.4	2408.	2500.	96.3
Cd	LCS	< 0.4	2358.	2500.	94.3
Cd	20-S1824	3.946	2179.	2500.	87.0
Cd	LCS	< 0.4	2281.	2500.	91.2
Cd	LCS	< 0.4	2167.	2500.	86.7
Cd	20-S1825	< 0.4	2273.	2500.	90.9
Pb	LCS	< 5	2356.	2500.	94.2
Pb	LCS	< 5	2307.	2500.	92.3
Pb	20-S1824	< 5	2088.	2500.	83.5
Pb	LCS	< 5	2256.	2500.	90.2
Pb	LCS	< 5	2153.	2500.	86.1
Pb	20-S1825	8.518	2273.	2500.	90.6

LCS Limit: 80% - 120% Recovery Spike Limit: 75% - 125% Recovery
*: per EPA CLP protocol, control limits do not apply if spike concentration is less than 25% of the sample concentration

Laboratory Control Sample Duplicate Data

Analyte	Sample ID	Spike Conc. µg/L	Duplicate Conc. µg/L	RPD
Cd	LCS-DUP	2410	2360	2.10
Cd	LCS-DUP	2280	2170	5.13
Pb	LCS-DUP	2360	2310	2.10
Pb	LCS-DUP	2260	2150	4.67

Duplicate Limit: 20% RPD

ICP RAW DATA

Available upon request

QA/QC Report

Client Name: Bison Engineering
Project Number: B020
Analytical Technique: CVAA
Sample Description: EPA Method 29 Cont. 1-3, 5c
Report Number: 20-390

Blank Data

Analyte	Sample ID	Measured Conc. µg	DL Conc. µg
Hg	ICB	< DL	0.007
Hg	Meth_Blk	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007

ICB: Initial Calibration Blank CCB: Continuing Calibration Blank
Method Blank is in control if Method Blank results are <10% of sample results

Calibration QC

Analyte	Sample ID	Standard Conc. µg	Measured Conc. µg	Percent Recovery
Hg	ICV	5.00	5.02	100.4
Hg	LL-LCS	0.020	0.020	100.0
Hg	LL-LCS	0.020	0.020	100.0
Hg	CCV	5.00	5.02	100.4
Hg	CCV	5.00	4.99	99.8
Hg	CCV	5.00	5.01	100.2
Hg	CCV	5.00	5.01	100.3

ICV: Initial Calibration Verification CCV: Continuing Calibration Verification
Calibration Verification Limits: 90% - 100% Recovery
LL-LCS Limits: 50% - 150% Recovery
LL-LCS results are not significant if sample results are >10x LL-LCS concentration

Duplicate Data

All samples analyzed in duplicate. The reported concentrations are the average of the two measurements.

Laboratory Control Sample/Matrix Spike Analysis

Analyte	Sample ID	Sample Conc. µg/L	Spike Conc. µg/L	Spike Amount µg/L	Percent Recovery
Hg	LCS	< 0.007	5.10	5.00	102.
Hg	LCS	< 0.007	5.15	5.00	103.
Hg	20-S1819	0.008	5.00	5.00	99.9
Hg	20-S1823	0.010	4.97	5.00	99.3

LCS Limit: 80% - 120% Recovery Spike Limit: 75% - 125% Recovery
*: per EPA CLP protocol, control limits do not apply if spike concentration is less than 25% of the sample concentration

Laboratory Control Sample Duplicate Data

Analyte	Sample ID	Spike Conc. µg/L	Duplicate Conc. µg/L	RPD
Hg	LCS-DUP	5.10	5.15	1.00

Duplicate Limit: 20% RPD

QA/QC Report

Client Name: Bison Engineering
Project Number: B020
Analytical Technique: CVAA
Sample Description: EPA Method 29 Cont. 4, 5a, 5b
Report Number: 20-390

Blank Data

Analyte	Sample ID	Measured Conc. µg	DL Conc. µg
Hg	ICB	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007

ICB: Initial Calibration Blank CCB: Continuing Calibration Blank
Method Blank is in control if Method Blank results are <10% of sample results

Calibration QC

Analyte	Sample ID	Standard Conc. µg	Measured Conc. µg	Percent Recovery
Hg	ICV	5.00	4.99	99.8
Hg	LL-LCS	0.020	0.019	95.0
Hg	CCV	5.00	5.04	100.8
Hg	CCV	5.00	5.04	100.7
Hg	CCV	5.00	5.04	100.7
Hg	CCV	5.00	5.04	100.7

ICV: Initial Calibration Verification CCV: Continuing Calibration Verification
Calibration Verification Limits: 90% - 100% Recovery
LL-LCS Limits: 50% - 150% Recovery
LL-LCS results are not significant if sample results are >10x LL-LCS concentration

Duplicate Data

All samples analyzed in duplicate. The reported concentrations are the average of the two measurements.

Laboratory Control Sample/Matrix Spike Analysis

Analyte	Sample ID	Sample Conc. µg/L	Spike Conc. µg/L	Spike Amount µg/L	Percent Recovery
Hg	20-S1820	0.038	5.04	5.00	100.
Hg	20-S1821	< 0.007	5.02	5.00	100.
Hg	20-S1822	0.088	5.17	5.00	102.

LCS Limit: 80% - 120% Recovery Spike Limit: 75% - 125% Recovery
*: per EPA CLP protocol, control limits do not apply if spike concentration is less than 25% of the sample concentration

CVAA RAW DATA

Available upon request

CHESTER LABNET

SOURCE SAMPLE RECEIPT CHECKLIST

Client	Bison Engineering	Date	9/18/20
# Runs	3+ Blanks	Report #	20-390

Custody Seals Inspected, If Present	None	
Chain-of-Custody Form Inspected	✓	
CoC present with samples?	✓	*
CoC indicate analytical methodology to be used? (eg M29 etc)	M26,M5/29	!!
CoC indicate if compliance testing? (esp. M26)	Not stated	!!
M26 samples have Thiosulfate added in field?	N/A	!!
M29 indicate FH/BH separate or combined?	Separate (H g)	!!
Has Form Been Signed?	✓	
Have Date and Time Custody Released Been Noted on Form?	✓	
All Sample Containers Inspected	✓	
Does Number of Samples Match Number on CoC Form?	✓	!!
Do All Sample ID Numbers Match Those on the CoC Form?	✓	!!
Did client mark sample volumes prior to shipment?	✓	*
If required by method, did client vent samples prior to shipment?	✓	
Are the Sample Containers Intact?	✓	!!
Are signs of leakage present?	Yes	*
Chain-of-Custody Form Signed and Dated by CLN	✓	
Corrective Actions		
Client Contacted Due to Mismatching Sample ID Numbers	9/18/20	
Client Contacted Due to Broken Sample Container(s)		
Client Contacted Due to Leaking Sample Container(s)	✓	
Client contacted for verification of methodology?	9/18/20	
Corrective Actions Documented?		
Corrective Actions Accomplished?		

Items marked !! shall be addressed ***prior to any analytical work being started****.*
*Items marked * shall be* ***noted in case narrative*** *upon reporting of results to client.*

Signed [signature]

Notes KMnO4 fraction leaked R1 ~ 10 ml
R2 ~ 100 ml R3 ~ 200 mL

Company Name: Bison Engineering	
Contact: Connor Everly	Phone: 520-749-2167
E-Mail Address: ceverly@bison-eng.com	Fax:
Report Address: 4251 S. Station Master Dr.	
City: Tucson	State: AZ / Zip: 85714
Billing Address: 3143 E. Lyndale	
City: Helena	State: MT / Zip: 59601
PO #:	Project: TIM 220419

CHESTER LabNet
12242 SW Garden Place
Tigard, OR 97223
(503) 624-2183
Fax (503) 624-2653
cln@chesterlab.net

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Turn Around Time
☐ Standard
☒ Rush 10 days (Specify)

LabNet ID	Field Sample ID	Site	Sample Date	Volume ~~(m³)~~ g	Particle Size	EPA 26A										Remarks
20-51810	M26-H_2SO_4-1	Tucson	9/10/20	278												
20-51811	M26-H_2SO_4-2	Iron +	9/10/20	290												
20-51812	M26-H_2SO_4-3	Metals	9/10/20	300												
20-51813	H_2SO_4-Blank	↓	9/10/20	286												
20-51814	H_2O Blank		9/10/20	66												
20-51845	M26 Audit	082720W														EPA Audit

Relinquished By: (Signature) Date/Time	Received By: (Signature) Date/Time
[signature] 9/10/20 16:35	[signature] 9/10/20 16:35
[signature] 9/10/20 17:00	

Notes: HCl analysis only, please.
Volume less weight of jar (282g)

Company Name	Bison Engineering Inc.
Contact	C. Everly
Phone	520.749.2167
E-Mail Address	C Everly@Bison-Eng.com
Fax	
Report Address	4251 S. Station Master Dr.
City	Tucson
State	AZ
Zip	85714
Billing Address	3143 E Lyndale
City	Helena
State	MT
Zip	59601
PO #	
Project	TIMZ204119

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CHAIN-OF-CUSTODY RECORD

Turn Around Time
☐ Standard
☒ Rush 10 Days (Specify)

LabNet ID	Field Sample ID	Site	Sample Date	Volume (m³/g)	Particle Size	EPA 29	Cadmium	Lead	Mercury	EPA 6						Remarks
S1835	0.1N HNO_3 Reagent Blank	Tucson	9/9/20	298		X										
S1840	8N HCL Blank	IRON - METALS	9/9/20	226		X										
S1837	5% HNO_3 10% H_2O_2 Blank		9/9/20	208		X										
S1839	4% KMnO4 10% H_2SO_4 Blank		9/9/20	112		X										
S1836	Filter Blank		9/9/20			X										
2051819	M29-FH Rinse-1		9/9/20	90		X										
~~S1820~~ 1820	M29 5% HNO_3 10% H_2SO_4 -1		9/9/20	322		X										
1821	M29-Empty-1		9/9/20	90		X										
1822	M29-KMNO4-1		9/9/20	426		X										
1823	M29 8N HCL-1		9/9/20	228		X										
	M29-Filter-1		9/9/20			X				X						PM analysis + Mg9
S1835	D.I H_2O Blank		9/9/20	100ml		X										Water blank - 100 mL

Relinquished By: (Signature) Date/Time	Received By: (Signature) Date/Time
9/10/20 11:14	9/10/20 11:14
9/10/20 14:02	

Notes:
Filters shipped w/ MS-29 Front half rinse

2051841 M29 Metals Filter Audit 082720
2051842 M29 Impinger Audit 082720
2051843 M29 Hg Filter Audit 0827
2051844 M29 Hg Impinger Audit 0827

Company Name: Bison Engineering Inc.		
Contact: C. Everly	Phone: 520-749-2167	
E-Mail Address: CEverly@Bison-Eng.com	Fax:	
Report Address: 4251 S. Station Master Dr.		
City: Tucson	State: AZ	Zip: 85714
Billing Address: 3143 E. Lyndale		
City: Helena	State: MT	Zip: 59601
PO #:	Project: TIM220419	

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CHAIN-OF-CUSTODY RECORD

Turn Around Time
☐ Standard
☒ Rush 10 Days (Specify)

LabNet ID	Field Sample ID	Site	Sample Date	Volume (mg)	Particle Size	EPA 29	EPA 5								Remarks
2051824	M29-FHRinse-2	Tucson Iron + Metals	9/9/20	108		X									
51825	M29-SiHNO3/H2O2-2		9/9/20	326		X									
51826	M29-Empty-2		9/9/20	98		X									
51827	M29-KMnO4-2		9/9/20	458		X									
51828	M29-8NHCl-2		9/9/20	222		X									
	M29-Filter-2		9/9/20	N/A		X	X								PM analysis + M29
51829	M29-FHRinse-3		9/9/2020	~100mL		X									
51830	M29-SiHNO3/H2O2-3		9/9/2020	~325mL		X									
51831	M29-Empty-3		9/9/2020	~100mL		X									
51832	M29-KMnO4-3		9/9/20	428		X									
51833	M29-8NHCl-3		9/9/20	212		X									
	M29-Filter-3		9/9/20	N/A		X	X								PM analysis + M29

Relinquished By: (Signature) Date/Time	Received By: (Signature) Date/Time
9/10/20 11:14	9/10/20 11:14
9/10/20 14:02	

Notes:
Filters shipped w/ MS Front half rinse

51834 M29-Acetone blank 9/9/20 100mL ☒ Blank-Reagent

Company Name	Bison Engineering inc.
Contact	C. Everly
Phone	(520)749-2167
E-Mail Address	Ceverly@Bison-eng.com
Fax	
Report Address	4251 S. Station Master Drive
City	Tucson
State	AZ
Zip	85715
Billing Address	3143 E. Lyndale
City	Helena
State	MT
Zip	59601
PO #	
Project	TIM220419

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CHAIN-OF-CUSTODY RECORD

Turn Around Time
☐ Standard
☒ Rush 10 Days
Specify

LabNet ID	Field Sample ID	Site	Sample Date	Volume (~~m³~~) g	Particle Size	Method 5										Remarks
20-51815	MS-FH-1	Tucson Iron + Metals	9/9/20	52		X										20 U140
51816	MS-FH-2		9/9/20	58		X										20 U141
51817	MS-FH-3		9/9/20	64		X										20 U142
51818	Blank															20U143

Filter 10

Relinquished By: (Signature) Date/Time	Received By: (Signature) Date/Time
[signature] 9/10/20 11:14	[signature] 9/10/20 11:15
Relinquished By: (Signature) Date/Time	Received By: (Signature) Date/Time
	[signature] 9/17/20 15:50

Notes: Sample volume in grams, less weight of Jar (280g)

all filters shipped w/ m5 rinses.

APPENDIX F: PLANT OPERATING RECORDS

ED_005878_00000073-00206

MINUTE EMISSIONS

COMPANY: AMCEP
LOCATION: Tucson AZ.
SOURCE: Contraband Incinerator
CEMS ID: 1234567
DATE CREATED: 09/10/2020 @ 10:27

PERIOD: 09/10/2020 09:10 - 09/10/2020 09:30

DATE-TIME	PROCESS CODE	SOURCE ON (MINS)	DRY O2 (%)	DRY CO (PPM)	CO2 (%)	CO @ 7% (PPM)	AFTERBURNER TEMPERATURE (DEG F)	DUST COLLECTOR DP (IN H2O)	MOISTURE (PPM)	DAS DOWN (MINS)
09/10/2020 09:10	8	1	18.1	0.5	0.0	2.6	1615.5	2.6	0	0
09/10/2020 09:11	8	1	18.1	6.3	0.0	32.4	1579.1	2.6	0	0
09/10/2020 09:12	8	1	18.2	5.3	0.0	27.2	1550.5	2.6	0	0
09/10/2020 09:13	8	1	18.6	1.7	0.0	10.2	1522.6	2.6	0	0
09/10/2020 09:14	8	1	18.6	1.4	0.0	8.1	1505.2	2.6	0	0
09/10/2020 09:15	8	1	18.5	1.2	0.0	7.2	1490.1	2.6	0	0
09/10/2020 09:16	8	1	18.4	1.4	0.0	8.0	1481.8	2.6	0	0
09/10/2020 09:17	8	1	18.4	1.9	0.0	10.8	1487.3	2.7	0	0
09/10/2020 09:18	8	1	18.2	2.0	0.0	10.3	1522.4	2.7	0	0
09/10/2020 09:19	8	1	18.0	1.8	0.0	8.6	1568.1	3.0	0	0
09/10/2020 09:20	8	1	18.0	1.2	0.0	5.8	1562.0	3.1	0	0
09/10/2020 09:21	8	1	18.2	1.2	0.0	6.1	1531.3	3.1	0	0
09/10/2020 09:22	8	1	18.3	1.6	0.0	8.8	1510.0	2.8	0	0
09/10/2020 09:23	8	1	18.5	2.2	0.0	13.1	1509.7	2.7	0	0
09/10/2020 09:24	8	1	18.6	2.1	0.0	12.6	1510.5	2.7	0	0
09/10/2020 09:25	8	1	18.6	1.6	0.0	9.7	1511.1	2.7	0	0
09/10/2020 09:26	8	1	18.5	1.2	0.0	6.9	1511.7	2.7	0	0
09/10/2020 09:27	8	1	18.6	1.1	0.0	6.6	1507.4	2.7	0	0
09/10/2020 09:28	8	1	18.6	1.1	0.0	6.9	1506.2	2.8	0	0
09/10/2020 09:29	8	1	18.4	1.4	0.0	7.6	1513.3	2.8	0	0
09/10/2020 09:30	8	1	18.3	1.8	0.0	9.3	1520.0	2.8	0	0

DATE-TIME	PROCESS CODE	SOURCE ON (MINS)	DRY O2 (%)	DRY CO (PPM)	CO2 (%)	CO @ 7% (PPM)	AFTERBURNER TEMPERATURE (DEG F)	DUST COLLECTOR DP (IN H2O)	MOISTURE (PPM)	DAS DOWN (MINS)
AVERAGE			18.4	1.9	0.0	10.4	1524.6	2.7	0	
TOTAL		21								0
MIN VALUE			18.0	0.5	0.0	2.6	1481.8	2.6	0	
MIN TIME			09:19	09:10	09:10	09:10	09:16	09:10	09:10	
MIN DATE			09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	
MAX VALUE			18.6	6.3	0.0	32.4	1615.5	3.1	0	
MAX TIME			09:28	09:11	09:30	09:11	09:10	09:21	09:30	
MAX DATE			09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	

MINUTE EMISSIONS

COMPANY: AMCEP
LOCATION: Tucson AZ.
SOURCE: Contraband Incinerator
CEMS ID: 1234567
DATE CREATED: 09/10/2020 @ 10:27

PERIOD: 09/10/2020 09:31 - 09/10/2020 09:51

DATE-TIME	PROCESS CODE	SOURCE ON (MINS)	DRY O2 (%)	DRY CO (PPM)	CO2 (%)	CO @ 7% (PPM)	AFTERBURNER TEMPERATURE (DEG F)	DUST COLLECTOR DP (IN H2O)	MOISTURE (PPM)	DAS DOWN (MINS)
09/10/2020 09:31	8	1	18.2	1.7	0.0	8.6	1531.8	2.8	0	0
09/10/2020 09:32	8	1	18.1	1.5	0.0	7.4	1546.8	2.9	0	0
09/10/2020 09:33	8	1	18.2	1.5	0.0	7.5	1540.2	3.0	0	0
09/10/2020 09:34	8	1	18.3	1.6	0.0	8.6	1530.2	3.0	0	0
09/10/2020 09:35	8	1	18.4	1.6	0.0	8.9	1522.5	3.0	0	0
09/10/2020 09:36	8	1	18.5	1.6	0.0	8.9	1523.1	3.0	0	0
09/10/2020 09:37	8	1	18.2	1.6	0.0	8.2	1530.7	3.0	0	0
09/10/2020 09:38	8	1	18.2	1.9	0.0	10.1	1533.3	3.0	0	0
09/10/2020 09:39	8	1	18.2	2.3	0.0	11.9	1535.2	3.1	0	0
09/10/2020 09:40	8	1	18.3	2.8	0.0	15.0	1528.5	3.1	0	0
09/10/2020 09:41	8	1	18.4	2.7	0.0	15.3	1524.2	3.2	0	0
09/10/2020 09:42	8	1	18.5	2.3	0.0	13.5	1518.0	3.2	0	0
09/10/2020 09:43	8	1	18.6	2.0	0.0	12.0	1510.9	3.2	0	0
09/10/2020 09:44	8	1	18.6	2.0	0.0	11.8	1509.3	3.2	0	0
09/10/2020 09:45	8	1	18.5	2.0	0.0	11.7	1504.6	3.2	0	0
09/10/2020 09:46	8	1	18.3	2.6	0.0	13.8	1498.4	3.2	0	0
09/10/2020 09:47	8	1	18.5	3.5	0.0	20.8	1497.7	3.3	0	0
09/10/2020 09:48	8	1	18.7	3.6	0.0	23.0	1496.4	3.4	0	0
09/10/2020 09:49	8	1	18.7	2.8	0.0	17.5	1491.2	3.4	0	0
09/10/2020 09:50	8	1	18.7	2.4	0.0	14.8	1481.9	3.4	0	0
09/10/2020 09:51	8	1	18.7	2.7	0.0	17.4	1477.0	3.5	0	0

DATE-TIME	PROCESS CODE	SOURCE ON (MINS)	DRY O2 (%)	DRY CO (PPM)	CO2 (%)	CO @ 7% (PPM)	AFTERBURNER TEMPERATURE (DEG F)	DUST COLLECTOR DP (IN H2O)	MOISTURE (PPM)	DAS DOWN (MINS)
AVERAGE			18.4	2.2	0.0	12.7	1515.8	3.1	0	
TOTAL		21								0
MIN VALUE			18.1	1.5	0.0	7.4	1477.0	2.8	0	
MIN TIME			09:32	09:32	09:31	09:32	09:51	09:31	09:31	
MIN DATE			09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	
MAX VALUE			18.7	3.6	0.0	23.0	1546.8	3.5	0	
MAX TIME			09:51	09:48	09:51	09:48	09:32	09:51	09:51	
MAX DATE			09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	

MINUTE EMISSIONS

COMPANY: AMCEP
LOCATION: Tucson AZ.
SOURCE: Contraband Incinerator
CEMS ID: 1234567
DATE CREATED: 09/10/2020 @ 10:26

PERIOD: 09/10/2020 09:52 - 09/10/2020 10:12

DATE-TIME	PROCESS CODE	SOURCE ON (MINS)	DRY O2 (%)	DRY CO (PPM)	CO2 (%)	CO @ 7% (PPM)	AFTERBURNER TEMPERATURE (DEG F)	DUST COLLECTOR DP (IN H2O)	MOISTURE (PPM)	DAS DOWN (MINS)
09/10/2020 09:52	8	1	18.5	3.2	0.0	18.4	1475.9	3.6	0	0
09/10/2020 09:53	8	1	18.7	3.8	0.0	23.4	1473.0	3.6	0	0
09/10/2020 09:54	8	1	18.5	4.5	0.0	26.2	1488.5	3.7	0	0
09/10/2020 09:55	8	1	18.4	5.0	0.0	27.8	1512.1	3.7	0	0
09/10/2020 09:56	8	1	18.5	4.4	0.0	25.2	1507.4	3.7	0	0
09/10/2020 09:57	8	1	18.5	3.1	0.0	18.3	1502.5	3.7	0	0
09/10/2020 09:58	8	1	18.7	2.7	0.0	16.7	1494.5	3.7	0	0
09/10/2020 09:59	8	1	18.6	2.7	0.0	16.7	1489.1	3.8	0	0
09/10/2020 10:00	8	1	18.7	2.7	0.0	17.1	1481.3	3.8	0	0
09/10/2020 10:01	8	1	18.7	3.0	0.0	19.1	1481.1	3.8	0	0
09/10/2020 10:02	8	1	18.6	3.3	0.0	19.5	1485.4	3.8	0	0
09/10/2020 10:03	8	1	18.7	3.3	0.0	20.8	1481.2	3.8	0	0
09/10/2020 10:04	8	1	18.8	3.2	0.0	21.3	1476.9	3.8	0	0
09/10/2020 10:05	8	1	18.7	3.5	0.0	22.5	1473.6	3.9	0	0
09/10/2020 10:06	8	1	18.7	3.7	0.0	23.3	1468.8	3.9	0	0
09/10/2020 10:07	8	1	18.7	4.1	0.0	26.4	1463.1	3.9	0	0
09/10/2020 10:08	8	1	18.7	4.7	0.0	29.1	1464.8	3.9	0	0
09/10/2020 10:09	8	1	18.6	4.9	0.0	30.4	1466.7	3.8	0	0
09/10/2020 10:10	8	1	18.7	4.6	0.0	29.4	1468.1	3.8	0	0
09/10/2020 10:11	8	1	18.6	4.2	0.0	25.7	1473.6	3.9	0	0
09/10/2020 10:12	8	1	18.6	3.9	0.0	23.7	1475.8	4.0	0	0

DATE-TIME	PROCESS CODE	SOURCE ON (MINS)	DRY O2 (%)	DRY CO (PPM)	CO2 (%)	CO @ 7% (PPM)	AFTERBURNER TEMPERATURE (DEG F)	DUST COLLECTOR DP (IN H2O)	MOISTURE (PPM)	DAS DOWN (MINS)
AVERAGE			18.6	3.7	0.0	22.9	1481.1	3.8	0	
TOTAL		21								0
MIN VALUE			18.4	2.7	0.0	16.7	1463.1	3.6	0	
MIN TIME			09:55	09:58	09:52	09:58	10:07	09:52	09:52	
MIN DATE			09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	
MAX VALUE			18.8	5.0	0.0	30.4	1512.1	4.0	0	
MAX TIME			10:04	09:55	10:12	10:09	09:55	10:12	10:12	
MAX DATE			09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	

MINUTE EMISSIONS

COMPANY: AMCEP
LOCATION: Tucson AZ.
SOURCE: Contraband Incinerator
CEMS ID: 1234567
DATE CREATED: 09/10/2020 @ 12:48

PERIOD: 09/10/2020 11:15 - 09/10/2020 11:35

DATE-TIME	PROCESS CODE	SOURCE ON (MINS)	DRY O2 (%)	DRY CO (PPM)	CO2 (%)	CO @ 7% (PPM)	AFTERBURNER TEMPERATURE (DEG F)	DUST COLLECTOR DP (IN H2O)	MOISTURE (PPM)	DAS DOWN (MINS)
09/10/2020 11:15	8	1	18.2	1.3	0.0	6.7	1561.9	3.9	0	0
09/10/2020 11:16	8	1	18.2	1.4	0.0	7.2	1558.9	3.9	0	0
09/10/2020 11:17	8	1	18.4	1.2	0.0	6.8	1555.1	3.9	0	0
09/10/2020 11:18	8	1	18.5	1.2	0.0	6.7	1545.1	3.9	0	0
09/10/2020 11:19	8	1	18.6	1.1	0.0	6.8	1537.5	3.8	0	0
09/10/2020 11:20	8	1	18.7	1.4	0.0	8.7	1541.9	3.7	0	0
09/10/2020 11:21	8	1	18.4	1.6	0.0	8.9	1551.9	3.7	0	0
09/10/2020 11:22	8	1	18.5	1.4	0.0	8.2	1558.5	3.7	0	0
09/10/2020 11:23	8	1	18.3	1.1	0.0	5.8	1567.9	3.7	0	0
09/10/2020 11:24	8	1	18.4	0.8	0.0	4.5	1570.9	3.7	0	0
09/10/2020 11:25	8	1	18.3	0.7	0.0	3.6	1570.5	3.7	0	0
09/10/2020 11:26	8	1	18.3	0.6	0.0	3.2	1582.3	3.7	0	0
09/10/2020 11:27	8	1	17.9	0.7	0.0	3.1	1592.7	3.7	0	0
09/10/2020 11:28	8	1	18.1	0.7	0.0	3.5	1591.5	3.7	0	0
09/10/2020 11:29	8	1	18.1	0.6	0.0	3.3	1586.2	3.7	0	0
09/10/2020 11:30	8	1	18.2	0.6	0.0	3.0	1590.3	3.7	0	0
09/10/2020 11:31	8	1	17.9	0.5	0.0	2.4	1608.5	3.7	0	0
09/10/2020 11:32	8	1	17.9	0.6	0.0	2.8	1604.9	3.7	0	0
09/10/2020 11:33	8	1	18.2	0.8	0.0	4.0	1598.3	3.7	0	0
09/10/2020 11:34	8	1	18.2	0.8	0.0	4.1	1588.3	3.7	0	0
09/10/2020 11:35	8	1	18.5	0.6	0.0	3.6	1581.5	3.7	0	0

DATE-TIME	PROCESS CODE	SOURCE ON (MINS)	DRY O2 (%)	DRY CO (PPM)	CO2 (%)	CO @ 7% (PPM)	AFTERBURNER TEMPERATURE (DEG F)	DUST COLLECTOR DP (IN H2O)	MOISTURE (PPM)	DAS DOWN (MINS)
AVERAGE			18.3	0.9	0.0	5.1	1573.6	3.7	0	
TOTAL		21								0
MIN VALUE			17.9	0.5	0.0	2.4	1537.5	3.7	0	
MIN TIME			11:27	11:31	11:15	11:31	11:19	11:20	11:15	
MIN DATE			09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	
MAX VALUE			18.7	1.6	0.0	8.9	1608.5	3.9	0	
MAX TIME			11:20	11:21	11:35	11:21	11:31	11:18	11:35	
MAX DATE			09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	

MINUTE EMISSIONS

COMPANY: AMCEP
LOCATION: Tucson AZ.
SOURCE: Contraband Incinerator
CEMS ID: 1234567
DATE CREATED: 09/10/2020 @ 12:48

PERIOD: 09/10/2020 11:36 - 09/10/2020 11:56

DATE-TIME	PROCESS CODE	SOURCE ON (MINS)	DRY O2 (%)	DRY CO (PPM)	CO2 (%)	CO @ 7% (PPM)	AFTERBURNER TEMPERATURE (DEG F)	DUST COLLECTOR DP (IN H2O)	MOISTURE (PPM)	DAS DOWN (MINS)
09/10/2020 11:36	8	1	18.5	0.7	0.0	3.9	1575.6	3.7	0	0
09/10/2020 11:37	8	1	18.3	0.8	0.0	4.3	1575.1	3.7	0	0
09/10/2020 11:38	8	1	18.3	0.9	0.0	4.8	1571.8	3.7	0	0
09/10/2020 11:39	8	1	18.5	0.8	0.0	4.8	1567.8	3.7	0	0
09/10/2020 11:40	8	1	18.6	0.8	0.0	4.9	1567.1	3.7	0	0
09/10/2020 11:41	8	1	18.2	0.8	0.0	4.1	1576.0	3.7	0	0
09/10/2020 11:42	8	1	18.2	0.8	0.0	3.8	1583.2	3.7	0	0
09/10/2020 11:43	8	1	18.2	0.6	0.0	3.3	1586.8	3.7	0	0
09/10/2020 11:44	8	1	18.0	0.6	0.0	2.7	1595.8	3.7	0	0
09/10/2020 11:45	8	1	18.1	0.5	0.0	2.4	1602.3	3.7	0	0
09/10/2020 11:46	8	1	18.1	0.4	0.0	2.0	1599.9	3.7	0	0
09/10/2020 11:47	8	1	18.3	0.5	0.0	2.7	1588.9	3.7	0	0
09/10/2020 11:48	8	1	18.3	0.5	0.0	3.0	1582.5	3.7	0	0
09/10/2020 11:49	8	1	18.5	0.6	0.0	3.5	1581.1	3.7	0	0
09/10/2020 11:50	8	1	18.4	0.6	0.0	3.3	1578.5	3.7	0	0
09/10/2020 11:51	8	1	18.5	0.6	0.0	3.5	1576.5	3.7	0	0
09/10/2020 11:52	8	1	18.6	0.6	0.0	3.6	1574.8	3.7	0	0
09/10/2020 11:53	8	1	18.4	0.7	0.0	3.8	1576.6	3.8	0	0
09/10/2020 11:54	8	1	18.3	0.7	0.0	3.8	1575.7	3.8	0	0
09/10/2020 11:55	8	1	18.5	0.7	0.0	4.1	1573.7	3.8	0	0
09/10/2020 11:56	8	1	18.5	0.7	0.0	4.1	1571.8	3.8	0	0

DATE-TIME	PROCESS CODE	SOURCE ON (MINS)	DRY O2 (%)	DRY CO (PPM)	CO2 (%)	CO @ 7% (PPM)	AFTERBURNER TEMPERATURE (DEG F)	DUST COLLECTOR DP (IN H2O)	MOISTURE (PPM)	DAS DOWN (MINS)
AVERAGE			18.3	0.7	0.0	3.6	1580.1	3.7	0	
TOTAL		21								0
MIN VALUE			18.0	0.4	0.0	2.0	1567.1	3.7	0	
MIN TIME			11:44	11:46	11:36	11:46	11:40	11:36	11:36	
MIN DATE			09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	
MAX VALUE			18.6	0.9	0.0	4.9	1602.3	3.8	0	
MAX TIME			11:52	11:38	11:56	11:40	11:45	11:56	11:56	
MAX DATE			09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	

MINUTE EMISSIONS

COMPANY: AMCEP
LOCATION: Tucson AZ.
SOURCE: Contraband Incinerator
CEMS ID: 1234567
DATE CREATED: 09/10/2020 @ 12:49

PERIOD: 09/10/2020 11:57 - 09/10/2020 12:17

DATE-TIME	PROCESS CODE	SOURCE ON (MINS)	DRY O2 (%)	DRY CO (PPM)	CO2 (%)	CO @ 7% (PPM)	AFTERBURNER TEMPERATURE (DEG F)	DUST COLLECTOR DP (IN H2O)	MOISTURE (PPM)	DAS DOWN (MINS)
09/10/2020 11:57	8	1	18.5	0.7	0.0	4.1	1568.8	3.8	0	0
09/10/2020 11:58	8	1	18.5	0.7	0.0	4.1	1569.5	3.8	0	0
09/10/2020 11:59	8	1	18.5	0.7	0.0	4.1	1570.7	3.8	0	0
09/10/2020 12:00	8	1	18.6	0.7	0.0	4.2	1566.8	3.8	0	0
09/10/2020 12:01	8	1	18.7	0.7	0.0	4.4	1562.6	3.8	0	0
09/10/2020 12:02	8	1	18.6	0.8	0.0	4.6	1557.1	3.8	0	0
09/10/2020 12:03	8	1	18.7	0.9	0.0	5.6	1550.2	3.8	0	0
09/10/2020 12:04	8	1	18.6	1.0	0.0	6.0	1548.8	3.8	0	0
09/10/2020 12:05	8	1	18.5	1.0	0.0	5.9	1549.3	3.8	0	0
09/10/2020 12:06	8	1	18.6	1.0	0.0	5.8	1546.5	3.8	0	0
09/10/2020 12:07	8	1	18.6	0.9	0.0	5.4	1550.1	3.8	0	0
09/10/2020 12:08	8	1	18.2	0.9	0.0	4.6	1552.7	3.8	0	0
09/10/2020 12:09	8	1	18.2	0.9	0.0	4.5	1556.3	3.8	0	0
09/10/2020 12:10	8	1	18.2	1.0	0.0	5.2	1557.2	3.8	0	0
09/10/2020 12:11	8	1	18.4	1.0	0.0	5.6	1555.7	3.8	0	0
09/10/2020 12:12	8	1	18.5	0.9	0.0	5.2	1556.3	3.8	0	0
09/10/2020 12:13	8	1	18.2	0.9	0.0	4.6	1560.9	3.8	0	0
09/10/2020 12:14	8	1	18.3	0.9	0.0	5.0	1562.8	3.8	0	0
09/10/2020 12:15	8	1	18.5	0.9	0.0	5.1	1561.9	3.8	0	0
09/10/2020 12:16	8	1	18.6	0.7	0.0	4.3	1562.1	3.8	0	0
09/10/2020 12:17	8	1	18.4	0.7	0.0	4.2	1563.4	3.8	0	0

DATE-TIME	PROCESS CODE	SOURCE ON (MINS)	DRY O2 (%)	DRY CO (PPM)	CO2 (%)	CO @ 7% (PPM)	AFTERBURNER TEMPERATURE (DEG F)	DUST COLLECTOR DP (IN H2O)	MOISTURE (PPM)	DAS DOWN (MINS)
AVERAGE			18.5	0.9	0.0	4.9	1558.6	3.8	0	
TOTAL		21								0
MIN VALUE			18.2	0.7	0.0	4.1	1546.5	3.8	0	
MIN TIME			12:08	11:57	11:57	11:57	12:06	11:57	11:57	
MIN DATE			09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	
MAX VALUE			18.7	1.0	0.0	6.0	1570.7	3.8	0	
MAX TIME			12:03	12:11	12:17	12:04	11:59	12:17	12:17	
MAX DATE			09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	

MINUTE EMISSIONS

COMPANY: AMCEP
LOCATION: Tucson AZ.
SOURCE: Contraband Incinerator
CEMS ID: 1234567
DATE CREATED: 09/10/2020 @ 13:30

PERIOD: 09/10/2020 13:04 - 09/10/2020 13:24

DATE-TIME	PROCESS CODE	SOURCE ON (MINS)	DRY O2 (%)	DRY CO (PPM)	CO2 (%)	CO @ 7% (PPM)	AFTERBURNER TEMPERATURE (DEG F)	DUST COLLECTOR DP (IN H2O)	MOISTURE (PPM)	DAS DOWN (MINS)
09/10/2020 13:04	8	1	18.8	1.9	0.0	12.9	1526.5	4.3	0	0
09/10/2020 13:05	8	1	18.7	1.4	0.0	9.0	1541.6	4.3	0	0
09/10/2020 13:06	8	1	18.6	1.1	0.0	7.0	1553.5	4.3	0	0
09/10/2020 13:07	8	1	18.8	1.0	0.0	6.6	1555.7	4.3	0	0
09/10/2020 13:08	8	1	18.8	0.8	0.0	5.4	1555.0	4.3	0	0
09/10/2020 13:09	8	1	18.9	0.7	0.0	5.0	1549.9	4.3	0	0
09/10/2020 13:10	8	1	19.0	0.8	0.0	6.2	1545.5	4.3	0	0
09/10/2020 13:11	8	1	19.1	1.0	0.0	7.4	1545.5	4.2	0	0
09/10/2020 13:12	8	1	19.1	1.0	0.0	7.6	1550.9	3.5	0	0
09/10/2020 13:13	8	1	18.9	1.0	0.0	6.9	1575.6	3.5	0	0
09/10/2020 13:14	8	1	18.5	0.8	0.0	4.7	1599.5	3.5	0	0
09/10/2020 13:15	8	1	18.3	0.5	0.0	2.9	1626.5	3.5	0	0
09/10/2020 13:16	8	1	18.2	0.4	0.0	2.1	1635.0	3.5	0	0
09/10/2020 13:17	8	1	18.3	0.4	0.0	2.1	1649.1	4.0	0	0
09/10/2020 13:18	8	1	18.2	0.6	0.0	3.1	1633.3	4.6	0	0
09/10/2020 13:19	8	1	18.6	8.4	0.0	51.0	1595.4	4.3	0	0
09/10/2020 13:20	8	1	18.7	2.1	0.0	13.5	1580.8	4.3	0	0
09/10/2020 13:21	8	1	19.0	1.3	0.0	9.6	1570.3	4.4	0	0
09/10/2020 13:22	8	1	18.8	1.0	0.0	6.8	1571.1	4.4	0	0
09/10/2020 13:23	8	1	18.7	1.0	0.0	6.2	1573.2	4.4	0	0
09/10/2020 13:24	8	1	18.7	1.0	0.0	6.4	1571.3	4.4	0	0

DATE-TIME	PROCESS CODE	SOURCE ON (MINS)	DRY O2 (%)	DRY CO (PPM)	CO2 (%)	CO @ 7% (PPM)	AFTERBURNER TEMPERATURE (DEG F)	DUST COLLECTOR DP (IN H2O)	MOISTURE (PPM)	DAS DOWN (MINS)
AVERAGE			18.7	1.3	0.0	8.7	1576.4	4.1	0	
TOTAL		21								0
MIN VALUE			18.2	0.4	0.0	2.1	1526.5	3.5	0	
MIN TIME			13:16	13:16	13:04	13:16	13:04	13:12	13:04	
MIN DATE			09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	
MAX VALUE			19.1	8.4	0.0	51.0	1649.1	4.6	0	
MAX TIME			13:12	13:19	13:24	13:19	13:17	13:18	13:24	
MAX DATE			09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	

MINUTE EMISSIONS

COMPANY: AMCEP
LOCATION: Tucson AZ.
SOURCE: Contraband Incinerator
CEMS ID: 1234567
DATE CREATED: 09/10/2020 @ 13:59

PERIOD: 09/10/2020 13:25 - 09/10/2020 13:45

DATE-TIME	PROCESS CODE	SOURCE ON (MINS)	DRY O2 (%)	DRY CO (PPM)	CO2 (%)	CO @ 7% (PPM)	AFTERBURNER TEMPERATURE (DEG F)	DUST COLLECTOR DP (IN H2O)	MOISTURE (PPM)	DAS DOWN (MINS)
09/10/2020 13:25	8	1	18.8	0.8	0.0	5.3	1568.8	4.4	0	0
09/10/2020 13:26	8	1	18.9	0.7	0.0	4.8	1567.4	4.4	0	0
09/10/2020 13:27	8	1	18.9	0.7	0.0	4.6	1563.8	4.4	0	0
09/10/2020 13:28	8	1	19.1	0.6	0.0	4.6	1557.8	4.4	0	0
09/10/2020 13:29	8	1	19.2	0.7	0.0	5.9	1553.4	4.4	0	0
09/10/2020 13:30	8	1	19.3	0.9	0.0	7.7	1547.7	4.4	0	0
09/10/2020 13:31	8	1	19.1	1.2	0.0	9.2	1549.1	4.4	0	0
09/10/2020 13:32	8	1	19.0	1.3	0.0	9.6	1550.6	4.4	0	0
09/10/2020 13:33	8	1	19.0	1.1	0.0	8.3	1551.2	4.4	0	0
09/10/2020 13:34	8	1	19.1	0.9	0.0	6.6	1549.1	4.4	0	0
09/10/2020 13:35	8	1	19.2	0.8	0.0	6.6	1542.8	4.4	0	0
09/10/2020 13:36	8	1	19.2	1.0	0.0	8.0	1541.4	4.4	0	0
09/10/2020 13:37	8	1	19.2	1.1	0.0	9.0	1538.0	4.4	0	0
09/10/2020 13:38	8	1	19.2	1.2	0.0	9.6	1536.3	4.4	0	0
09/10/2020 13:39	8	1	19.3	1.1	0.0	9.6	1530.6	4.4	0	0
09/10/2020 13:40	8	1	19.3	1.4	0.0	11.6	1526.9	4.4	0	0
09/10/2020 13:41	8	1	19.2	1.6	0.0	13.4	1524.1	4.4	0	0
09/10/2020 13:42	8	1	19.2	1.7	0.0	14.1	1524.1	4.4	0	0
09/10/2020 13:43	8	1	18.9	1.5	0.0	11.0	1531.2	4.4	0	0
09/10/2020 13:44	8	1	18.8	1.3	0.0	8.7	1536.3	4.4	0	0
09/10/2020 13:45	8	1	18.8	1.1	0.0	7.1	1539.8	4.4	0	0

DATE-TIME	PROCESS CODE	SOURCE ON (MINS)	DRY O2 (%)	DRY CO (PPM)	CO2 (%)	CO @ 7% (PPM)	AFTERBURNER TEMPERATURE (DEG F)	DUST COLLECTOR DP (IN H2O)	MOISTURE (PPM)	DAS DOWN (MINS)
AVERAGE			19.1	1.1	0.0	8.3	1544.3	4.4	0	
TOTAL		21								0
MIN VALUE			18.8	0.6	0.0	4.6	1524.1	4.4	0	
MIN TIME			13:25	13:28	13:25	13:27	13:41	13:25	13:25	
MIN DATE			09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	
MAX VALUE			19.3	1.7	0.0	14.1	1568.8	4.4	0	
MAX TIME			13:40	13:42	13:45	13:42	13:25	13:45	13:45	
MAX DATE			09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	

MINUTE EMISSIONS

COMPANY: AMCEP
LOCATION: Tucson AZ.
SOURCE: Contraband Incinerator
CEMS ID: 1234567
DATE CREATED: 09/10/2020 @ 14:08

PERIOD: 09/10/2020 13:46 - 09/10/2020 14:06

DATE-TIME	PROCESS CODE	SOURCE ON (MINS)	DRY O2 (%)	DRY CO (PPM)	CO2 (%)	CO @ 7% (PPM)	AFTERBURNER TEMPERATURE (DEG F)	DUST COLLECTOR DP (IN H2O)	MOISTURE (PPM)	DAS DOWN (MINS)
09/10/2020 13:46	8	1	18.9	0.9	0.0	6.5	1538.1	4.4	0	0
09/10/2020 13:47	8	1	19.1	1.0	0.0	7.5	1536.1	4.4	0	0
09/10/2020 13:48	8	1	18.7	1.1	0.0	6.9	1546.0	4.4	0	0
09/10/2020 13:49	8	1	18.6	1.2	0.0	7.2	1553.9	4.5	0	0
09/10/2020 13:50	8	1	18.8	1.0	0.0	6.8	1554.8	4.5	0	0
09/10/2020 13:51	8	1	18.8	0.9	0.0	5.7	1555.7	4.5	0	0
09/10/2020 13:52	8	1	18.8	0.7	0.0	4.7	1559.9	4.5	0	0
09/10/2020 13:53	8	1	18.7	0.7	0.0	4.4	1566.0	4.5	0	0
09/10/2020 13:54	8	1	18.5	0.7	0.0	4.1	1574.4	4.5	0	0
09/10/2020 13:55	8	1	18.6	0.7	0.0	4.2	1581.8	4.8	0	0
09/10/2020 13:56	8	1	18.6	0.7	0.0	4.3	1569.6	5.1	0	0
09/10/2020 13:57	8	1	19.1	0.7	0.0	5.5	1545.9	5.1	0	0
09/10/2020 13:58	8	1	19.3	1.0	0.0	8.5	1526.8	5.0	0	0
09/10/2020 13:59	8	1	19.4	1.6	0.0	14.9	1520.1	4.5	0	0
09/10/2020 14:00	8	1	19.2	2.1	0.0	17.9	1531.2	4.5	0	0
09/10/2020 14:01	8	1	19.0	1.9	0.0	14.3	1543.6	4.5	0	0
09/10/2020 14:02	8	1	18.7	1.3	0.0	8.2	1551.6	4.5	0	0
09/10/2020 14:03	8	1	18.8	0.8	0.0	5.2	1558.4	4.5	0	0
09/10/2020 14:04	8	1	19.0	0.6	0.0	4.5	1559.6	4.5	0	0
09/10/2020 14:05	8	1	19.0	0.6	0.0	4.4	1558.7	4.5	0	0
09/10/2020 14:06	8	1	19.0	0.7	0.0	4.7	1556.6	4.6	0	0

DATE-TIME	PROCESS CODE	SOURCE ON (MINS)	DRY O2 (%)	DRY CO (PPM)	CO2 (%)	CO @ 7% (PPM)	AFTERBURNER TEMPERATURE (DEG F)	DUST COLLECTOR DP (IN H2O)	MOISTURE (PPM)	DAS DOWN (MINS)
AVERAGE			18.9	1.0	0.0	7.2	1551.8	4.6	0	
TOTAL		21								0
MIN VALUE			18.5	0.6	0.0	4.1	1520.1	4.4	0	
MIN TIME			13:54	14:04	13:46	13:54	13:59	13:46	13:46	
MIN DATE			09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	
MAX VALUE			19.4	2.1	0.0	17.9	1581.8	5.1	0	
MAX TIME			13:59	14:00	14:06	14:00	13:55	13:57	14:06	
MAX DATE			09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	

MINUTE EMISSIONS

COMPANY: AMCEP
LOCATION: Tucson AZ.
SOURCE: Contraband Incinerator
CEMS ID: 1234567
DATE CREATED: 09/10/2020 @ 14:54

PERIOD: 09/10/2020 14:30 - 09/10/2020 14:50

DATE-TIME	PROCESS CODE	SOURCE ON (MINS)	DRY O2 (%)	DRY CO (PPM)	CO2 (%)	CO @ 7% (PPM)	AFTERBURNER TEMPERATURE (DEG F)	DUST COLLECTOR DP (IN H2O)	MOISTURE (PPM)	DAS DOWN (MINS)
09/10/2020 14:30	8	1	19.2	0.7	0.0	5.6	1552.6	4.6	0	0
09/10/2020 14:31	8	1	19.2	0.8	0.0	6.6	1545.8	4.6	0	0
09/10/2020 14:32	8	1	19.3	1.0	0.0	8.2	1541.7	4.6	0	0
09/10/2020 14:33	8	1	19.2	1.1	0.0	8.8	1539.9	4.6	0	0
09/10/2020 14:34	8	1	19.2	1.1	0.0	9.3	1537.9	4.6	0	0
09/10/2020 14:35	8	1	19.1	1.0	0.0	8.2	1540.6	4.6	0	0
09/10/2020 14:36	8	1	19.2	1.0	0.0	8.0	1537.3	4.6	0	0
09/10/2020 14:37	8	1	19.2	1.0	0.0	8.2	1532.0	4.6	0	0
09/10/2020 14:38	8	1	19.2	1.1	0.0	9.0	1530.2	4.6	0	0
09/10/2020 14:39	8	1	18.9	1.1	0.0	7.7	1530.3	4.6	0	0
09/10/2020 14:40	8	1	19.0	1.0	0.0	7.8	1530.0	4.6	0	0
09/10/2020 14:41	8	1	19.0	0.9	0.0	6.6	1531.9	4.6	0	0
09/10/2020 14:42	8	1	18.8	0.9	0.0	6.1	1535.0	4.6	0	0
09/10/2020 14:43	8	1	18.8	0.9	0.0	6.1	1540.4	4.6	0	0
09/10/2020 14:44	8	1	19.0	0.8	0.0	6.1	1542.3	4.6	0	0
09/10/2020 14:45	8	1	19.1	0.8	0.0	6.3	1541.3	4.6	0	0
09/10/2020 14:46	8	1	18.9	0.8	0.0	5.6	1545.4	4.6	0	0
09/10/2020 14:47	8	1	18.8	0.8	0.0	5.1	1543.9	4.6	0	0
09/10/2020 14:48	8	1	19.0	0.7	0.0	5.1	1537.9	4.7	0	0
09/10/2020 14:49	8	1	19.1	0.7	0.0	5.7	1536.9	4.7	0	0
09/10/2020 14:50	8	1	19.1	0.9	0.0	6.7	1540.2	4.7	0	0

DATE-TIME	PROCESS CODE	SOURCE ON (MINS)	DRY O2 (%)	DRY CO (PPM)	CO2 (%)	CO @ 7% (PPM)	AFTERBURNER TEMPERATURE (DEG F)	DUST COLLECTOR DP (IN H2O)	MOISTURE (PPM)	DAS DOWN (MINS)
AVERAGE			19.1	0.9	0.0	7.0	1538.7	4.6	0	
TOTAL		21								0
MIN VALUE			18.8	0.7	0.0	5.1	1530.0	4.6	0	
MIN TIME			14:42	14:30	14:30	14:47	14:40	14:30	14:30	
MIN DATE			09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	
MAX VALUE			19.3	1.1	0.0	9.3	1552.6	4.7	0	
MAX TIME			14:32	14:39	14:50	14:34	14:30	14:50	14:50	
MAX DATE			09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	

MINUTE EMISSIONS

COMPANY: AMCEP
LOCATION: Tucson AZ.
SOURCE: Contraband Incinerator
CEMS ID: 1234567
DATE CREATED: 09/10/2020 @ 15:44

PERIOD: 09/10/2020 14:51 - 09/10/2020 15:11

DATE-TIME	PROCESS CODE	SOURCE ON (MINS)	DRY O2 (%)	DRY CO (PPM)	CO2 (%)	CO @ 7% (PPM)	AFTERBURNER TEMPERATURE (DEG F)	DUST COLLECTOR DP (IN H2O)	MOISTURE (PPM)	DAS DOWN (MINS)
09/10/2020 14:51	8	1	19.1	0.9	0.0	7.0	1540.2	4.7	0	0
09/10/2020 14:52	8	1	19.2	0.9	0.0	7.2	1537.7	4.7	0	0
09/10/2020 14:53	8	1	19.2	0.9	0.0	7.4	1533.9	4.7	0	0
09/10/2020 14:54	8	1	19.1	1.0	0.0	7.8	1529.8	4.7	0	0
09/10/2020 14:55	8	1	19.2	1.1	0.0	9.0	1526.7	4.7	0	0
09/10/2020 14:56	8	1	19.2	1.2	0.0	9.7	1529.4	4.7	0	0
09/10/2020 14:57	8	1	19.2	1.3	0.0	10.3	1528.4	4.7	0	0
09/10/2020 14:58	8	1	19.2	1.2	0.0	10.0	1523.8	4.7	0	0
09/10/2020 14:59	8	1	19.4	1.3	0.0	11.8	1516.1	4.7	0	0
09/10/2020 15:00	8	1	19.4	1.7	0.0	16.5	1515.4	4.7	0	0
09/10/2020 15:01	8	1	19.5	2.1	0.0	20.5	1514.3	4.7	0	0
09/10/2020 15:02	8	1	19.2	2.2	0.0	18.2	1511.5	4.7	0	0
09/10/2020 15:03	8	1	19.2	1.9	0.0	15.3	1512.3	4.7	0	0
09/10/2020 15:04	8	1	19.2	1.6	0.0	13.2	1512.4	4.7	0	0
09/10/2020 15:05	8	1	19.1	1.5	0.0	11.0	1513.2	4.7	0	0
09/10/2020 15:06	8	1	19.2	1.3	0.0	10.8	1512.6	4.7	0	0
09/10/2020 15:07	8	1	18.9	1.4	0.0	9.6	1514.9	4.7	0	0
09/10/2020 15:08	8	1	18.8	1.3	0.0	8.8	1518.3	4.7	0	0
09/10/2020 15:09	8	1	18.8	1.2	0.0	8.1	1526.1	4.7	0	0
09/10/2020 15:10	8	1	18.8	1.1	0.0	7.1	1532.2	4.7	0	0
09/10/2020 15:11	8	1	18.8	1.0	0.0	6.6	1538.6	4.7	0	0

DATE-TIME	PROCESS CODE	SOURCE ON (MINS)	DRY O2 (%)	DRY CO (PPM)	CO2 (%)	CO @ 7% (PPM)	AFTERBURNER TEMPERATURE (DEG F)	DUST COLLECTOR DP (IN H2O)	MOISTURE (PPM)	DAS DOWN (MINS)
AVERAGE			19.1	1.3	0.0	10.8	1523.2	4.7	0	
TOTAL		21								0
MIN VALUE			18.8	0.9	0.0	6.6	1511.5	4.7	0	
MIN TIME			15:08	14:51	14:51	15:11	15:02	14:51	14:51	
MIN DATE			09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	
MAX VALUE			19.5	2.2	0.0	20.5	1540.2	4.7	0	
MAX TIME			15:01	15:02	15:11	15:01	14:51	15:11	15:11	
MAX DATE			09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	

MINUTE EMISSIONS

COMPANY: AMCEP
LOCATION: Tucson AZ.
SOURCE: Contraband Incinerator
CEMS ID: 1234567
DATE CREATED: 09/10/2020 @ 15:37

PERIOD: 09/10/2020 15:12 - 09/10/2020 15:32

DATE-TIME	PROCESS CODE	SOURCE ON (MINS)	DRY O2 (%)	DRY CO (PPM)	CO2 (%)	CO @ 7% (PPM)	AFTERBURNER TEMPERATURE (DEG F)	DUST COLLECTOR DP (IN H2O)	MOISTURE (PPM)	DAS DOWN (MINS)
09/10/2020 15:12	8	1	18.8	1.0	0.0	6.8	1540.2	4.7	0	0
09/10/2020 15:13	8	1	18.8	1.0	0.0	7.0	1537.5	4.7	0	0
09/10/2020 15:14	8	1	18.7	1.1	0.0	7.3	1536.5	4.7	0	0
09/10/2020 15:15	8	1	18.7	1.1	0.0	7.0	1535.9	4.7	0	0
09/10/2020 15:16	8	1	18.9	1.1	0.0	7.4	1534.1	4.7	0	0
09/10/2020 15:17	8	1	19.1	0.9	0.0	6.9	1527.6	4.7	0	0
09/10/2020 15:18	8	1	19.0	1.0	0.0	7.2	1524.6	4.7	0	0
09/10/2020 15:19	8	1	19.1	1.0	0.0	7.6	1526.3	4.7	0	0
09/10/2020 15:20	8	1	18.8	1.0	0.0	6.5	1534.8	4.7	0	0
09/10/2020 15:21	8	1	18.6	1.1	0.0	6.7	1540.3	4.7	0	0
09/10/2020 15:22	8	1	18.7	1.2	0.0	7.5	1545.9	4.7	0	0
09/10/2020 15:23	8	1	18.5	1.2	0.0	6.8	1571.5	4.7	0	0
09/10/2020 15:24	8	1	18.2	1.0	0.0	5.2	1605.6	4.7	0	0
09/10/2020 15:25	8	1	18.3	0.9	0.0	4.9	1608.4	4.8	0	0
09/10/2020 15:26	8	1	18.4	1.0	0.0	5.6	1602.0	4.8	0	0
09/10/2020 15:27	8	1	18.7	0.9	0.0	5.8	1592.7	4.8	0	0
09/10/2020 15:28	8	1	18.5	0.7	0.0	4.3	1604.9	4.8	0	0
09/10/2020 15:29	8	1	18.5	0.6	0.0	3.4	1602.4	4.8	0	0
09/10/2020 15:30	8	1	18.9	0.6	0.0	4.2	1592.6	4.8	0	0
09/10/2020 15:31	8	1	18.8	0.5	0.0	3.6	1585.1	4.8	0	0
09/10/2020 15:32	8	1	19.0	0.5	0.0	3.8	1576.7	4.8	0	0

DATE-TIME	PROCESS CODE	SOURCE ON (MINS)	DRY O2 (%)	DRY CO (PPM)	CO2 (%)	CO @ 7% (PPM)	AFTERBURNER TEMPERATURE (DEG F)	DUST COLLECTOR DP (IN H2O)	MOISTURE (PPM)	DAS DOWN (MINS)
AVERAGE			18.7	0.9	0.0	6.0	1563.1	4.7	0	
TOTAL		21								0
MIN VALUE			18.2	0.5	0.0	3.4	1524.6	4.7	0	
MIN TIME			15:24	15:31	15:12	15:29	15:18	15:12	15:12	
MIN DATE			09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	
MAX VALUE			19.1	1.2	0.0	7.6	1608.4	4.8	0	
MAX TIME			15:19	15:23	15:32	15:19	15:25	15:32	15:32	
MAX DATE			09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	09/10/2020	

APPENDIX G: CALIBRATIONS AND CERTIFICATIONS

ED_005878_00000073-00219

METERBOX CALIBRATION FORM

USING CALIBRATED CRITICAL ORIFICES

5-POINT ENGLISH UNITS

Meter Console Information		Calibration Conditions			
Box Number	8 (SB-4)	Date	Time	8.7.2020	8:22
Console Serial Number		Barometric Pressure		27.34	in Hg
DGM Model Number	Itron	Theoretical Critical Vacuum[1]		12.90	in Hg
DGM Serial Number	028-040611-1	Calibration Technician		LCE	

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

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

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

Calibration Data

Run Time	Metering Console					Critical Orifice				
Elapsed	DGM Orifice ΔH	Volume Initial	Volume Final	Outlet Temp Initial	Outlet Temp Final	Serial Number	Coefficient	Amb Temp Initial	Amb Temp Final	Actual Vacuum
(Θ)	(P_m)	(V_{mi})	(V_{mf})	(t_{mi})	(t_{mf})		K'	(t_{amb})	(t_{amb})	
min	in H_2O	cubic feet	cubic feet	°F	°F		see above2	°F	°F	in Hg
10.0	0.30	882.580	885.700	83	85	SX-40	0.2307	82	83	21
10.0	0.59	885.700	890.200	85	85	SX-48	0.3304	83	83	19
10.0	1.05	890.200	896.225	85	86	SX-55	0.4429	83	84	18
10.0	1.70	896.225	904.077	86	86	SX-63	0.5791	84	84	15
10.0	3.20	904.077	914.672	86	87	SX-73	0.7993	84	84	12

Results

Standardized Data				Dry Gas Meter				
				Calibration Factor		Flowrate	ΔH @	
Dry Gas Meter		Critical Orifice		Value	Variation	Std & Corr	0.75 SCFM	Variation
($V_{m(std)}$)	($Q_{m(std)}$)	($Vcr_{(std)}$)	($Q_{cr(std)}$)	(Y)	(ΔY)	($Q_{m(std)(corr)}$)	(ΔH@)	(ΔΔH@)
cubic feet	cfm	cubic feet	cfm			cfm	in H2O	
2.769	0.277	2.708	0.271	0.978	0.000	0.271	2.046	0.116
3.990	0.399	3.877	0.388	0.972	-0.006	0.388	1.962	0.032
5.344	0.534	5.195	0.519	0.972	-0.006	0.519	1.948	0.018
6.970	0.697	6.790	0.679	0.974	-0.004	0.679	1.851	-0.079
9.434	0.943	9.368	0.937	0.993	0.015	0.937	1.843	-0.087
				0.978	Y Average		1.930	ΔH@ Average

AVERAGE Y= 0.978

AVERAGE ΔH= 1.930

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.02.
Note: For Calibration Factor H, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.20.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR Title 40, Part 60, Appendix A-3, Method 5, 16.2.3

Signature Louis Connor Everly Date 8.7.2020

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METERBOX CALIBRATION FORM

USING CALIBRATED CRITICAL ORIFICES

5-POINT ENGLISH UNITS

Meter Console Information		Calibration Conditions			
Box Number	8 (SB-4)	Date	Time	14-Sep-20	11:00
Console Serial Number		Barometric Pressure		27.45	in Hg
DGM Model Number	Itron	Theoretical Critical Vacuum[1]		12.96	in Hg
DGM Serial Number	028-040611-1	Calibration Technician		LCE	

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

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

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

Calibration Data

Run Time	Metering Console					Critical Orifice				
Elapsed	DGM Orifice ΔH	Volume Initial	Volume Final	Outlet Temp Initial	Outlet Temp Final	Serial Number	Coefficient	Amb Temp Initial	Amb Temp Final	Actual Vacuum
(Θ)	(P_m)	(V_{mi})	(V_{mf})	(t_{mi})	(t_{mf})		K'	(t_{amb})	(t_{amb})	
min	in H_2O	cubic feet	cubic feet	°F	°F		see above2	°F	°F	in Hg
10.0	0.29	113.727	116.850	82	83	SX-40	0.2307	79	80	23
10.0	0.59	84.685	89.161	79	80	SX-48	0.3304	77	77	22
10.0	1.05	89.161	95.150	80	80	SX-55	0.4429	77	78	20
10.0	1.70	95.150	102.980	81	82	SX-63	0.5791	78	79	19
10.0	3.30	102.980	113.727	82	82	SX-73	0.7993	79	79	16

Results

Standardized Data				Dry Gas Meter				
				Calibration Factor		Flowrate	ΔH @	
Dry Gas Meter		Critical Orifice		Value	Variation	Std & Corr	0.75 SCFM	Variation
($V_{m(std)}$)	($Q_{m(std)}$)	($Vcr_{(std)}$)	($Q_{cr(std)}$)	(Y)	(ΔY)	($Q_{m(std)(corr)}$)	(ΔH@)	(ΔΔH@)
cubic feet	cfm	cubic feet	cfm			cfm	in H2O	
2.791	0.279	2.726	0.273	0.977	0.003	0.273	1.964	0.047
4.025	0.403	3.914	0.391	0.972	-0.002	0.391	1.953	0.035
5.388	0.539	5.243	0.524	0.973	-0.001	0.524	1.939	0.022
7.036	0.704	6.852	0.685	0.974	0.000	0.685	1.840	-0.078
9.690	0.969	9.451	0.945	0.975	0.001	0.945	1.892	-0.026
Pre-test Y	0.978	% Deviation	PASS	0.974	Y Average		1.918	ΔH@ Average

AVERAGE Y= 0.974

AVERAGE ΔH= 1.918

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.02.
Note: For Calibration Factor H, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.20.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR Title 40, Part 60, Appendix A-3, Method 5, 16.2.3

Signature Louis Connor Everly Date 9.14.2020

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

Meter Console Information	
Box Number	SB-2
Console Serial Number	MODEL 522
DGM Model Number	MS-4
DGM Serial Number	1503533

Calibration Conditions			
Date	Time	4.24.2020	0:00
Barometric Pressure		27.3	in Hg
Theoretical Critical Vacuum[1]		12.9	in Hg
Calibration Technician		LCE	

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

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

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

Calibration Data

Run Time	Metering Console					Critical Orifice				
Elapsed	DGM Orifice ΔH	Volume Initial	Volume Final	Outlet Temp Initial	Outlet Temp Final	Serial Number	Coefficient	Amb Temp Initial	Amb Temp Final	Actual Vacuum
(Θ)	(P_m)	(V_{mi})	(V_{mf})	(t_{mi})	(t_{mf})		K'	(t_{amb})	(t_{amb})	
min	in H_2O	cubic feet	cubic feet	°F	°F		see above2	°F	°F	in Hg
10.0	0.28	246.179	249.355	85	86	SX-40	0.2307	84	85	20
10.0	0.56	249.355	253.929	86	86	SX-48	0.3304	85	85	19
10.0	1.00	253.929	260.041	86	87	SX-55	0.4429	85	85	18
10.0	1.70	260.041	268.024	87	88	SX-63	0.5791	85	86	17
10.0	3.20	268.024	278.966	88	89	SX-73	0.7993	86	86	15

Results

Standardized Data				Dry Gas Meter				
				Calibration Factor		Flowrate	ΔH @	
Dry Gas Meter		Critical Orifice		Value	Variation	Std & Corr	0.75 SCFM	Variation
($V_{m(std)}$)	($Q_{m(std)}$)	($Vcr_{(std)}$)	($Q_{cr(std)}$)	(Y)	(ΔY)	($Q_{m(std)(corr)}$)	(ΔH@)	(ΔΔH@)
cubic feet	cfm	cubic feet	cfm			cfm	in H2O	
2.807	0.281	2.700	0.270	0.962	0.002	0.270	1.913	0.045
4.042	0.404	3.865	0.386	0.956	-0.004	0.386	1.868	0.000
5.403	0.540	5.179	0.518	0.959	-0.001	0.518	1.860	-0.008
7.057	0.706	6.769	0.677	0.959	-0.001	0.677	1.855	-0.013
9.694	0.969	9.339	0.934	0.963	0.004	0.934	1.845	-0.023
				0.9599	Y Average		1.868	ΔH@ Average

AVERAGE Y= 0.9599

AVERAGE H= 1.8682

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.02.
Note: For Calibration Factor H, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.20.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR Title 40, Part 60, Appendix A-3, Method 5, 16.2.3

Signature _____ LCE Date _____ 4/24/2020

METERBOX CALIBRATION FORM

USING CALIBRATED CRITICAL ORIFICES

5-POINT ENGLISH UNITS

Meter Console Information		Calibration Conditions			
Box Number	SB-2	Date	Time	14-Sep-20	11:10
Console Serial Number	MODEL 522	Barometric Pressure		27.45	in Hg
DGM Model Number	MS-4	Theoretical Critical Vacuum[1]		12.96	in Hg
DGM Serial Number	1503533	Calibration Technician		LCE	

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

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

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

Calibration Data

Run Time	Metering Console					Critical Orifice				
Elapsed	DGM Orifice ΔH	Volume Initial	Volume Final	Outlet Temp Initial	Outlet Temp Final	Serial Number	Coefficient	Amb Temp Initial	Amb Temp Final	Actual Vacuum
(Θ)	(P_m)	(V_{mi})	(V_{mf})	(t_{mi})	(t_{mf})		K'	(t_{amb})	(t_{amb})	
min	in H_2O	cubic feet	cubic feet	°F	°F		see above2	°F	°F	in Hg
10.0	0.27	667.048	670.137	72	72	SX-40	0.2307	77	77	23
10.0	0.55	670.137	674.641	72	72	SX-48	0.3304	78	78	22
10.0	0.97	674.641	680.652	72	73	SX-55	0.4429	78	79	20
10.0	1.70	680.652	688.495	73	72	SX-63	0.5791	79	80	19
10.0	3.10	688.495	699.223	72	72	SX-73	0.7993	80	80	17

Results

Standardized Data				Dry Gas Meter				
				Calibration Factor		Flowrate	ΔH @	
Dry Gas Meter		Critical Orifice		Value	Variation	Std & Corr	0.75 SCFM	Variation
($V_{m(std)}$)	($Q_{m(std)}$)	($Vcr_{(std)}$)	($Q_{cr(std)}$)	(Y)	(ΔY)	($Q_{m(std)(corr)}$)	(ΔH@)	(ΔΔH@)
cubic feet	cfm	cubic feet	cfm			cfm	in H2O	
2.815	0.281	2.732	0.273	0.971	0.012	0.273	1.857	0.015
4.107	0.411	3.911	0.391	0.952	-0.006	0.391	1.849	0.007
5.482	0.548	5.240	0.524	0.956	-0.003	0.524	1.819	-0.023
7.167	0.717	6.846	0.685	0.955	-0.003	0.685	1.874	0.032
9.849	0.985	9.444	0.944	0.959	0.000	0.944	1.812	-0.031
Pre-test Y	0.9599	% Deviation	PASS	0.959	Y Average		1.842	ΔH@ Average

AVERAGE Y= 0.959

AVERAGE ΔH= 1.842

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.02.
Note: For Calibration Factor H, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.20.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR Title 40, Part 60, Appendix A-3, Method 5, 16.2.3

Signature Louis Connor Everly Date 9.14.2020

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BISON ENGINEERING, INC.

Field Barometer
Calibration Form

Project #: TIM220419

IN OFFICE PRE-TEST CALIBRATION

Reference Standard Used:

Standard ID	Serial number	Adjusted on:	Calibration due:
Tucson Mercury Barometer	TUC01	9/3/2020	Must be properly adjusted prior to every use

Field Barometer Verification:
Barometer ID: TTB-2

Reference Value (in Hg)	Observed (in Hg)	Correction*	Tolerance (+/- 0.1 in Hg)**
27.43	27.37	-0.06	PASS

*Correction is the difference between the observed and reference values
**EPA Method 5, Section 6.1.2 and EPA Method 2, Section 6.5.

Technician: LCE

Date: 9/3/2020

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Version: 7/30/2019

BISON ENGINEERING, INC.

Field Balance and Weights Calibration Form

Project #: TIM220419

IN OFFICE PRE-TEST CHECKS

Date: 9/3/2020

Performed by: LCE

Environmental conditions in the lab:

Temperature °F	Pressure "Hg
84	27.36

Reference Standard(s) Used:

Standard ID	Serial number(s)	Calibrated on:	Calibration due:
Troemner	4000021445	7/23/2020	7/23/2021

Verification of Field Balance Against Reference Standard Weights:

Balance ID: WSS-1

Nominal Value (g)	Observed (g)	Correction*	Tolerance (+/- 0.5g)**
200	200.0	0.0	PASS
500	500.0	0.0	PASS
1000	1000.1	0.1	PASS
2000	2000.3	0.3	PASS

Verification of Field Standard Weights :

Weights ID: Working standard

Nominal Value (g)	Observed (g)	Correction*	Tolerance (+/- 0.5g)**
200	200.0	0.0	PASS
500	500.0	0.0	PASS
1000	1000.3	0.3	PASS
2000	2000.4	0.4	PASS

*Correction is the difference between the observed and nominal mass values

**EPA Method 5, Section 6.3.4

Page 1 of 2

ONSITE BALANCE VERIFICATION

Date: 9/9/2020
Performed by: JMK

Environmental conditions onsite:

Temperature °F	Pressure "Hg
83	27.18

Field Balance Verification:
Balance ID: WSS-1
Weights ID: Working Standard

Nominal Value (g)	Observed (g)	Correction*	PASS/FAIL Tolerance (+/- 0.5g)
500	500.0	0.0	PASS
200	200.1	0.1	PASS
200	200.1	0.1	PASS
50	49.9	0.1	PASS

*Correction is the difference between the observed and nominal mass values

Technician: JMK

Date: 9.9.2020

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Version: 7/30/2019 Page 2 of 2

BISON ENGINEERING, INC.

Field Caliper
Calibration Form

Project #: TIM220419

IN OFFICE PRE-TEST CHECKS

Date: 9/3/2020
Performed by: LCE

Reference Standard Used:

Standard ID	Serial number	Calibrated on:	Calibration due:
Mitutoyo	B17354393	7/1/2020	7/1/2021

Caliper Verification:
Field Caliper ID: TMC-3
Inside Diameter

Reference Value (inches)	Observed (inches)	Correction*	Tolerance (+/- 0.0050 inch)
0.250	0.255	0.005	PASS

*Correction is the difference between the observed and reference values

Outside Diameter

Reference Value (inches)	Observed (inches)	Correction*	Tolerance (+/- 0.0050 inch)
0.520	0.518	-0.003	PASS

*Correction is the difference between the observed and reference values

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Version: 7/30/2019

BISON ENGINEERING, INC.

Thermocouple
Calibration Form

Project #: TIM220419

POST-TEST CHECKS

Reference Standard Used:

Standard ID	Serial number(s)	Calibrated on:	Calibration due:
Omega	T289858	6/11/2020	6/11/2021

Temperature Meter Mode:

Thermocouple ID	Continuity (x = pass)	Observed Temp (°F)	Reference Temp (°F)	Correction*	Tolerance (+/- 2°F)**
Stack Temp (B5C)	x	84.1	83.2	0.9	PASS
Stack Temp (T-6-1)	x	85.1		1.9	PASS
Probe Liner (B5C)	x	84.2		1.0	PASS
Probe Liner (T-6-1)	x	84.3		1.1	PASS
Hot Box (HB-2)	x	83.1		0.1	PASS
Hot Box (HB-1)	x	83.2		0.0	PASS
Condenser (GN7)	x	83.1		0.1	PASS
Condenser (8473)	x	83.3		0.1	PASS
Condenser (1966)	x	83.3		0.1	PASS
DGM Outlet (SB-4/Box 8)	x	82.1		1.1	PASS
DGM Outlet (SB-2)	x	83.4		0.2	PASS
DGM Inlet (SB-4/Box 8)	x	82.3		0.9	PASS

Calibration Output Mode:

Switch the Omega from 'Meter Input' to 'Calibration Output' mode. Test the meter box temperature readout by sending a voltage output equivalent to a temperature similar to stack temperature.

Meter Box ID	Reference Temp Output (°F)	Meter Box Readout (°F)	Correction*	Tolerance (+/- 2°F)**
SB-4 (Box 8)	83.5	83.0	0.5	PASS
SB-2		83.0	0.5	PASS

*Correction is the difference between the observed and reference values
**Alt-011 6/21/94 Alternative Method 2 Thermocouple Calibration Procedure:
Continuity Check - confirm the thermocouple is reading at the tip by subjecting it to a change in temperature (e.g. removing it from the stack, or touching it with a your hand).
Single-point temperature check at ambient temperature, or any temperature, within the range specified by the manufacturer.

Technician: LCE

Date: 9/14/2020

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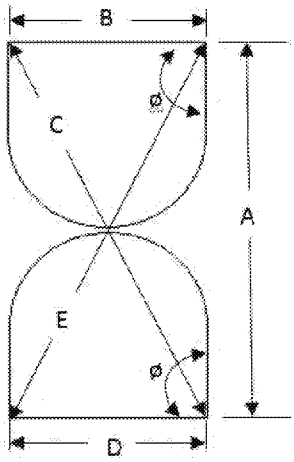
Version: 7/30/2019

S-Type Pitot Tube Geometric Calibration

Pitot ID: T-PT-9

Date of Geometric Calibration (< 6 months): 9/3/2020



A	1.0085
B	0.385
C	1.0475
D	0.381
E	1.0505

$$\frac{a^2 + b^2 - c^2}{2ab} = \cos \emptyset$$

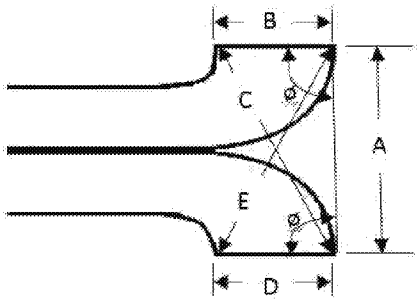
$$\frac{a^2 + d^2 - e^2}{2ad} = \cos \emptyset$$

ø	84.97

$(80° < \emptyset < 100°)$

ø	85.62

$(80° < \emptyset < 100°)$



A	1.0035
B	0.378
C	1.088
D	0.393
E	1.095

$$\frac{a^2 + b^2 - c^2}{2ab} = \cos \emptyset$$

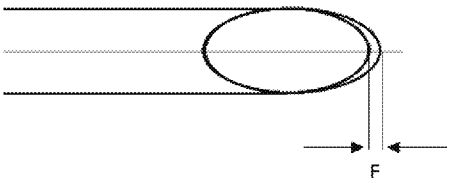
$$\frac{a^2 + d^2 - e^2}{2ad} = \cos \emptyset$$

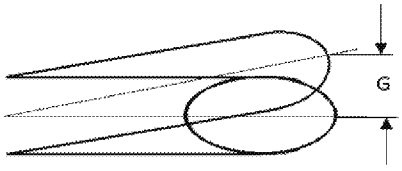
ø	92.56

$(85° < \emptyset < 95°)$

ø	92.73

$(85° < \emptyset < 95°)$





F=	0.02

(F < 0.125)

G=	0.00

(G < 0.032)

Results of the Post-Test Pitot Inspection (mark with x below):

No change x

Damaged _____

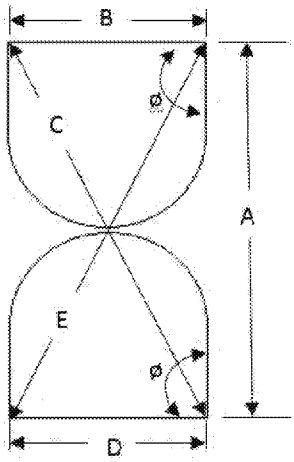
New Calibration _____

Technician: LCE **Date:** 9/14/2020

S-Type Pitot Tube Geometric Calibration

Pitot ID: T-PT-5

Date of Geometric Calibration (< 6 months): 9/3/2020



A	0.9235
B	0.379
C	0.9845
D	0.3885
E	0.974

$$\frac{a^2 + b^2 - c^2}{2ab} = \cos \emptyset$$

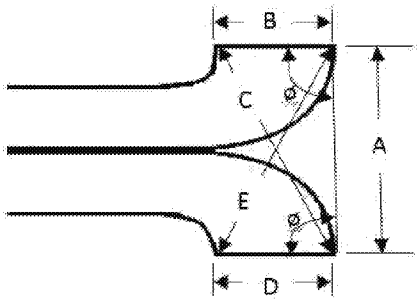
$$\frac{a^2 + d^2 - e^2}{2ad} = \cos \emptyset$$

ø	87.77

$(80° < \emptyset < 100°)$

ø	85.60

$(80° < \emptyset < 100°)$



A	0.9215
B	0.4065
C	1.0235
D	0.4105
E	1.0196

$$\frac{a^2 + b^2 - c^2}{2ab} = \cos \emptyset$$

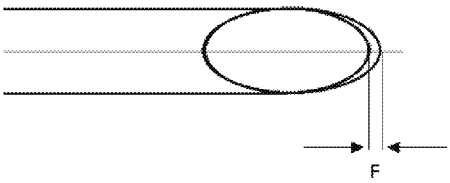
$$\frac{a^2 + d^2 - e^2}{2ad} = \cos \emptyset$$

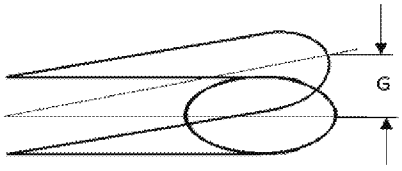
ø	92.54

$(85° < \emptyset < 95°)$

ø	91.66

$(85° < \emptyset < 95°)$





F=	0.01

(F < 0.125)

G=	0.00

(G < 0.032)

Results of the Post-Test Pitot Inspection (mark with x below):

No change x

Damaged _____

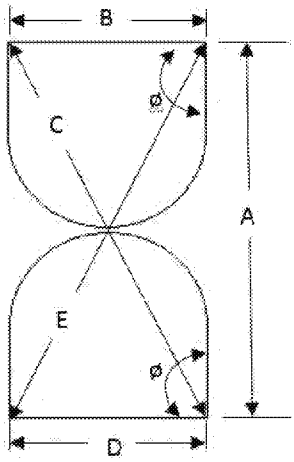
New Calibration _____

Technician: LCE **Date:** 9/14/2020

S-Type Pitot Tube Geometric Calibration

Pitot ID: T-PT-14

Date of Geometric Calibration (< 6 months): 9/3/2020



A	0.9035
B	0.3765
C	0.9745
D	0.3745
E	0.9765

$$\frac{a^2 + b^2 - c^2}{2ab} = \cos \emptyset$$

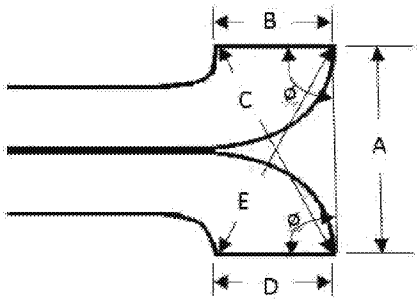
$$\frac{a^2 + d^2 - e^2}{2ad} = \cos \emptyset$$

ø	89.29

$(80° < \emptyset < 100°)$

ø	89.75

$(80° < \emptyset < 100°)$



A	0.906
B	0.4653
C	1.0545
D	0.4675
E	1.0521

$$\frac{a^2 + b^2 - c^2}{2ab} = \cos \emptyset$$

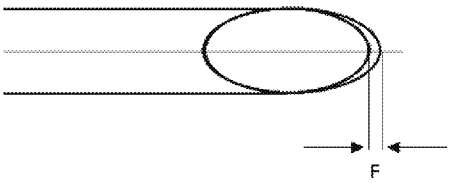
$$\frac{a^2 + d^2 - e^2}{2ad} = \cos \emptyset$$

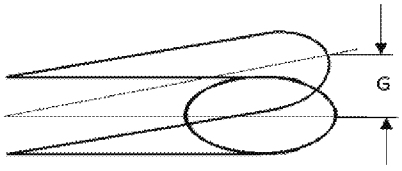
ø	95.08

$(85° < \emptyset < 95°)$

ø	94.57

$(85° < \emptyset < 95°)$





F=	0.00

(F < 0.125)

G=	0.00

(G < 0.032)

Results of the Post-Test Pitot Inspection (mark with x below):

No change x

Damaged _____

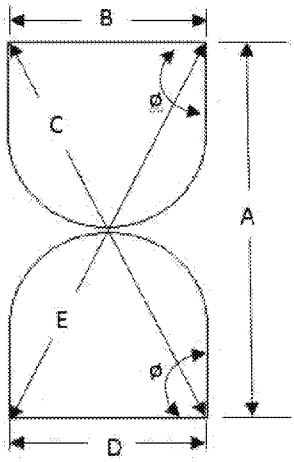
New Calibration _____

Technician: LCE **Date:** 9/14/2020

S-Type Pitot Tube Geometric Calibration

Pitot ID: B5C

Date of Geometric Calibration (< 6 months): 9/4/2020



A	0.839
B	0.307
C	0.904
D	0.302
E	0.921

$$\frac{a^2 + b^2 - c^2}{2ab} = \cos \emptyset$$

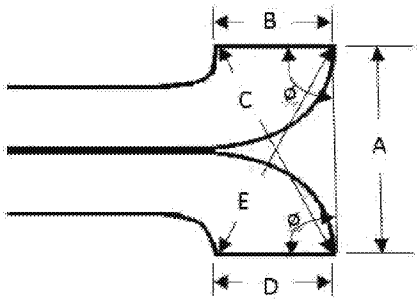
$$\frac{a^2 + d^2 - e^2}{2ad} = \cos \emptyset$$

ø	92.12

$(80° < \emptyset < 100°)$

ø	96.02

$(80° < \emptyset < 100°)$



A	0.847
B	0.472
C	1.004
D	0.463
E	0.992

$$\frac{a^2 + b^2 - c^2}{2ab} = \cos \emptyset$$

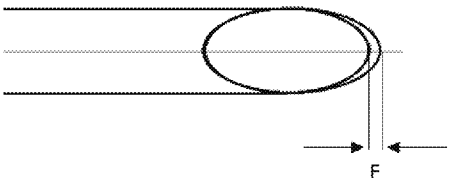
$$\frac{a^2 + d^2 - e^2}{2ad} = \cos \emptyset$$

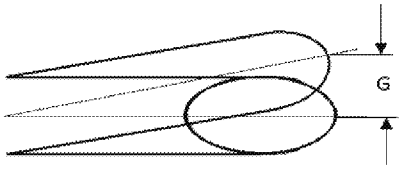
ø	94.87

$(85° < \emptyset < 95°)$

ø	93.82

$(85° < \emptyset < 95°)$





F=	0.00

(F < 0.125)

G=	0.00

(G < 0.032)

Results of the Post-Test Pitot Inspection (mark with x below):

No change x

Damaged _____

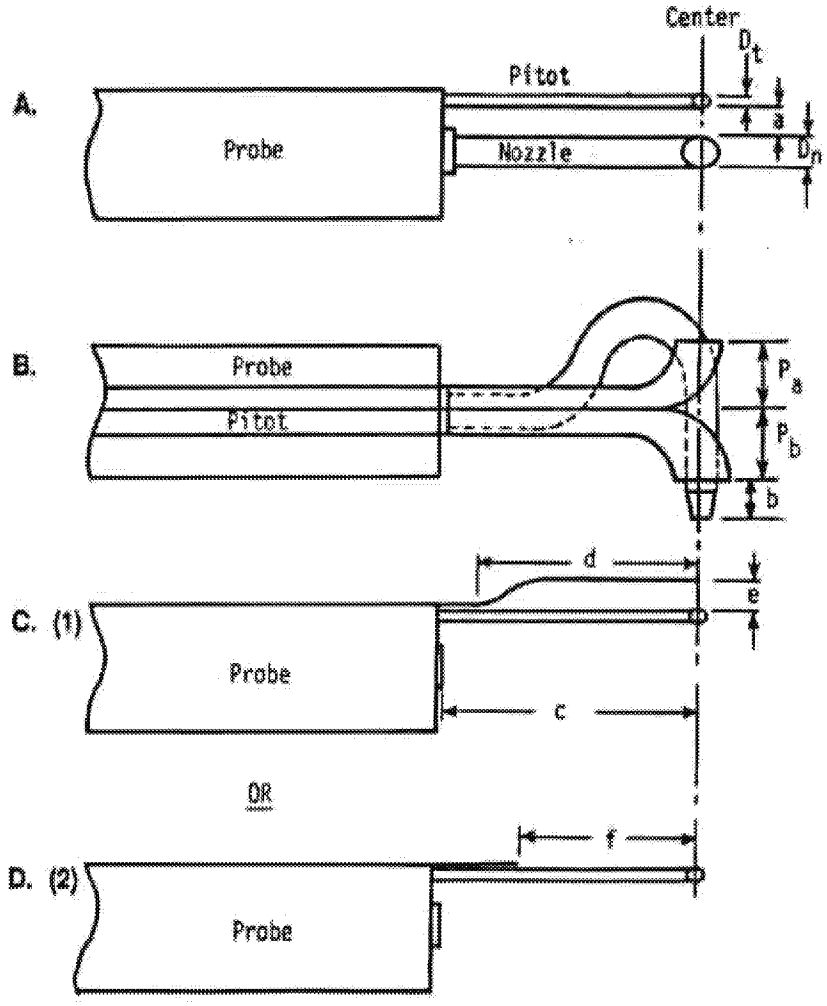
New Calibration _____

Technician: LCE **Date:** 9/14/2020

Probe Calibration

Probe ID: T-5-1

Date of calibration (< 6 months): 9/3/2020



Measure (Inch)

Dt:	3/8	Dt = 0.187 to 0.375
Dn:	1/2	Dn = 0.5
a:	8/9	a ≥ 0.750

Pa:	1/3	Pa = Pb
Pb:	1/3	
b:	3/7	B ≥ 0

c:	4	c ≥ 3.0
d:	5	d ≥ 3.0
e:	1 1/4	e ≥ 0.750

or

f:		f ≥ 2.0

Results of the Post-Test Probe Inspection (mark with x below):

No change x

Damaged _____

New Calibration _____

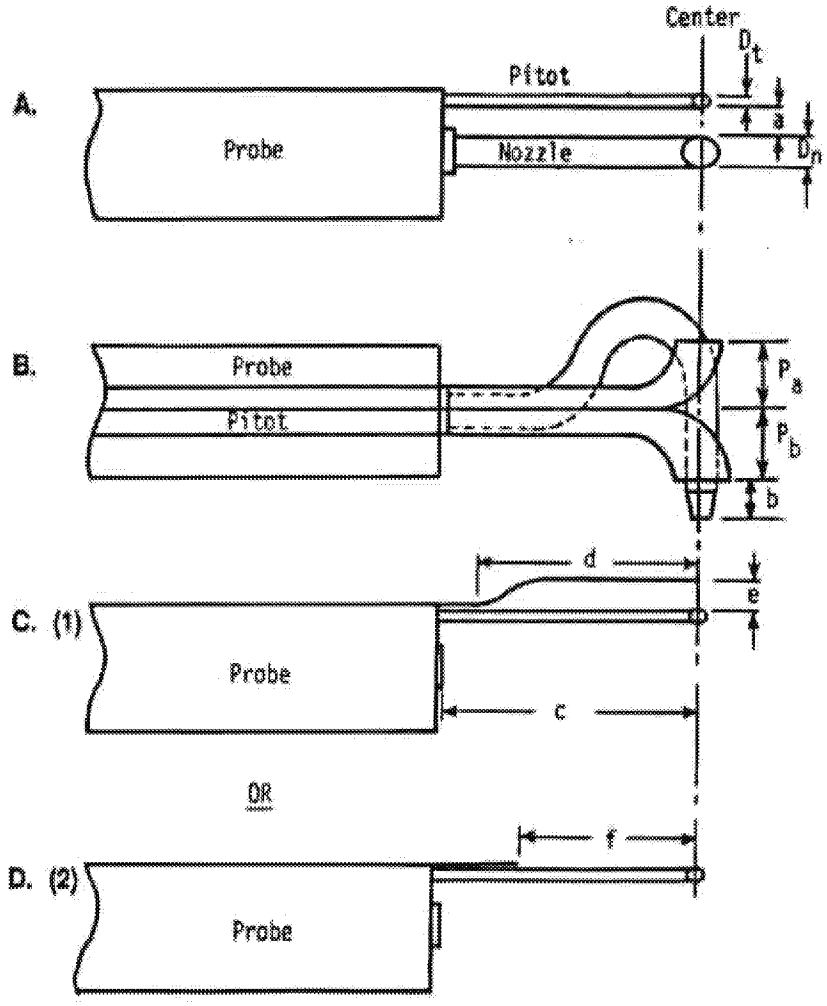
Technician: LCE **Date:** 9/4/2020

Y:\SOURCE\Calibrations\BLANK CALIBRATION FORMS\Calibration Form Combined
Version: 7/30/2019

Probe Calibration

Probe ID: T-6-1

Date of calibration (< 6 months): 9/3/2020



		Measure (Inch)
Dt:	3/8	Dt = 0.187 to 0.375
Dn:	1/2	Dn = 0.5
a:	4/5	a ≥ 0.750
Pa:	1/2	Pa = Pb
Pb:	1/2	
b:	1/3	B ≥ 0
c:	4 4/9	c ≥ 3.0
d:	5 3/5	d ≥ 3.0
e:	1	e ≥ 0.750
or		
f:		f ≥ 2.0

Results of the Post-Test Probe Inspection (mark with x below):

No change x

Damaged _____

New Calibration _____

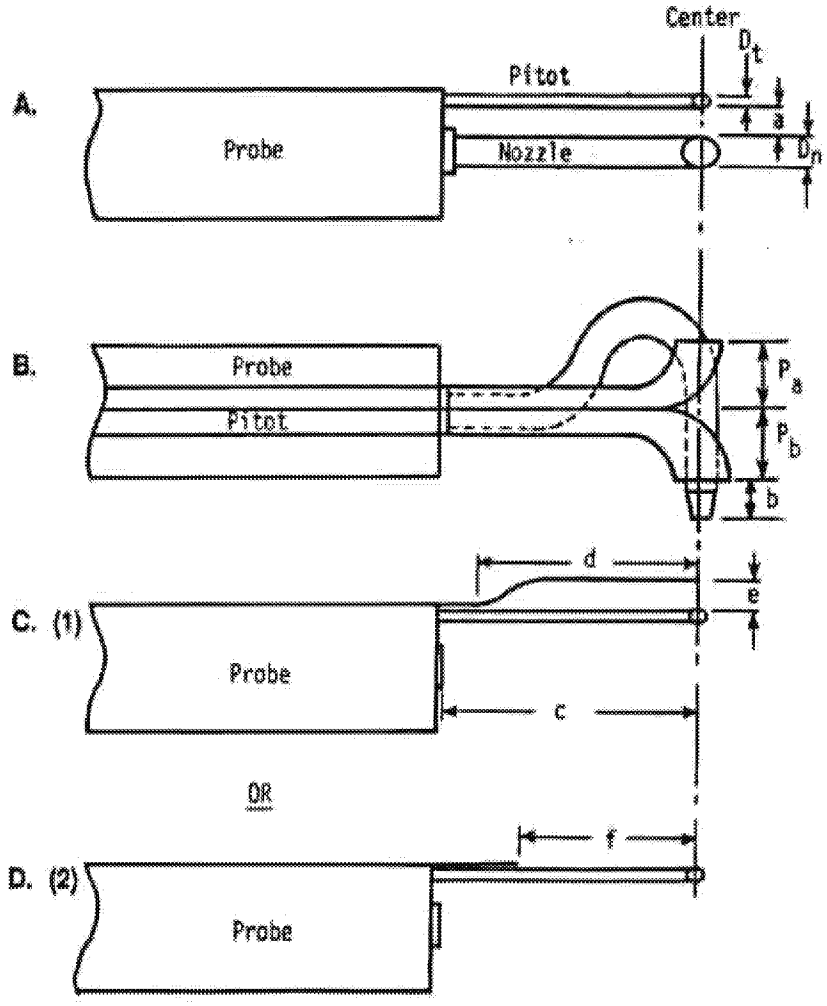
Technician: LCE **Date:** 9/14/2020

Y:\SOURCE\Calibrations\BLANK CALIBRATION FORMS\Calibration Form Combined
Version: 7/30/2019

Probe Calibration

Probe ID: B5C

Date of calibration (< 6 months): 9/4/2020



		Measure (Inch)
Dt:	3/8	Dt = 0.187 to 0.375
Dn:	1/2	Dn = 0.5
a:	4/5	a ≥ 0.750
Pa:	4/9	Pa = Pb
Pb:	4/9	
b:	1/3	B ≥ 0
c:	3	c ≥ 3.0
d:	5 5/7	d ≥ 3.0
e:	1 5/9	e ≥ 0.750
or		
f:		f ≥ 2.0

Results of the Post-Test Probe Inspection (mark with x below):

No change x

Damaged _____

New Calibration _____

Technician: LCE **Date:** 9/14/2020

Y:\SOURCE\Calibrations\BLANK CALIBRATION FORMS\Calibration Form Combined
Version: 7/30/2019

PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Tel: (323) 585-2154 Fax:(714) 542-6689
PGVPID: F22017

DocNumber: 000116474

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PRAXAIR PKG PHOENIX AZ HS
3918 W LINCOLN ST
PHOENIX AZ 85009-

Praxair Order Number: 70406861
Customer P. O. Number:
Customer Reference Number:

Fill Date: 10/25/2017
Part Number: NI NO100E-AS
Lot Number: 70086729603
Cylinder Style & Outlet: AS CGA 660
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

Certified Concentration:

Expiration Date:	11/6/2025		NIST Traceable
Cylinder Number:	CC301466		Analytical Uncertainty:
99.2	ppm	NITRIC OXIDE	± 0.5 %
	Balance	NITROGEN	

NOx = 99.4 ppm

NOx for Reference Only

Certification Information: *Certification Date:* 11/6/2017 *Term:* 96 Months *Expiration Date:* 11/6/2025

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Do Not Use this Standard if Pressure is less than 100 PSIG.

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1. Component: NITRIC OXIDE

Requested Concentration:	100 ppm
Certified Concentration:	99.2 ppm
Instrument Used:	Thermo Electron 42i S/N 072502432C
Analytical Method	Chemiluminescence
Last Multipoint Calibration	10/18/2017

Reference Standard Type	NTRM
Ref. Std. Cylinder # :	CC335728
Ref. Std. Conc	100.4 ppm
Ref. Std. Traceable to SRM # :	1684b
SRM Sample #	44-T-83
SRM Cylinder # :	FF9258

First Analysis Data: Date: 10/30/2017

Z:	0	R:	100.4	C:	99.2	Conc:	99.233
R:	100.3	Z:	0	C:	99.3	Conc:	99.333
Z:	0	C:	99.5	R:	100.4	Conc:	99.533

UOM: ppm Mean Test Assay: 99.366 ppm

Second Analysis Data: Date: 11/6/2017

Z:	0	R:	100.4	C:	99.1	Conc:	99.166
R:	100.4	Z:	0	C:	98.8	Conc:	98.866
Z:	0	C:	98.7	R:	100.2	Conc:	98.766

UOM: ppm Mean Test Assay: 98.932 ppm

Analyzed by: Leeanna Rodriguez

Certified by: Nelson Ma

Information contained herein has been prepared at your request by qualified experts within Praxair Distribution, Inc. While we believe that the information is accurate within the limits of the analytical methods employed and is complete to the extent of the specific analyses performed, we make no warranty or representation as to the suitability of the use of the information for any purpose. The information is furnished with the understanding that any use of the information is at the sole discretion and risk of the user. In no event shall the liability of Praxair Distribution, Inc., arising out of the use of the information contained herein exceed the fee established for providing such information.

PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Tel: (323) 585-2154 Fax:(714) 542-6689
PGVPID: F22016

DocNumber: 000089984

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PRAXAIR WHSE PHOENIX HUB
3918 W LINCOLN ST
PHOENIX AZ 850095

Praxair Order Number: 33701257
Customer P. O. Number: 05924608
Customer Reference Number:

Fill Date: 1/29/2016
Part Number: NI CO100E-AS
Lot Number: 109602904
Cylinder Style & Order: AS CGA 350
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

Certified Concentration:

Expiration Date:	2/8/2024		NIST Traceable
Cylinder Number:	CC76070		Analytical Uncertainty:
100.1	ppm	CARBON MONOXIDE	± 0.9 %
	Balance	NITROGEN	

Certification Information: *Certification Date:* 2/8/2016 *Term:* 96 Months *Expiration Date:* 2/8/2024

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Do Not Use this Standard if Pressure is less than 100 PSIG.

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1. Component: CARBON MONOXIDE

Requested Concentration: 100 ppm
Certified Concentration: 100.1 ppm
Instrument Used: Horiba VIA-510, S/N 577172043
Analytical Method: NDIR
Last Multipoint Calibration: 1/13/2016

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC137479
Ref. Std. Conc: 202.9 ppm
Ref. Std. Traceable to SRM # : 2638a
SRM Sample # : 57-E-28
SRM Cylinder # : FF23380

First Analysis Data: Date: 2/8/2016

Z:	0	R:	202.9	C:	100	Conc:	100.1
R:	202.9	Z:	0	C:	100.2	Conc:	100.3
Z:	0	C:	99.9	R:	202.3	Conc:	99.999

UOM: ppm Mean Test Assay: 100.13 ppm

Second Analysis Data: Date:

Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0

UOM: ppm Mean Test Assay: 0 ppm

Analyzed by: Jose V. Vasquez

Certified by: Ping Yu

Information contained herein has been prepared at your request by qualified experts within Praxair Distribution, Inc. While we believe that the information is accurate within the limits of the analytical methods employed and is complete to the extent of the specific analyses performed, we make no warranty or representation as to the suitability of the use of the information for any purpose. The information is offered with the understanding that any use of the information is at the sole discretion and risk of the user. In no event shall the liability of Praxair Distribution, Inc., arising out of the use of the information contained herein exceed the fee established for providing such information.

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DocNumber: 223484

Praxair Distribution, Inc.
5700 S. Alameda Street
Los Angeles CA 90058
Tel: 323-585-2154
Fax: 714-542-6689
PGVP ID: F22018

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information

PRAXAIR PKG PHOENIX AZ HS
3918 W LINCOLN ST
PHOENIX AZ 85009-5414

Certificate Modification Date: 08/31/2018
Praxair Order Number: 70710116
Part Number: NI SD100E-AS

Fill Date: 08/24/2018
Lot Number: 70086823608
Cylinder Style & Outlet: AS CGA 660
Cylinder Pressure and Volume: 2000 psig 142 ft3

Certified Concentration

Expiration Date:	09/05/2026	NIST Traceable
Cylinder Number:	ALM-012079	Expanded Uncertainty
101 ppm	Sulfur dioxide	± 1 %
Balance	Nitrogen	

ProSpec EZ Cert

Certification Information:

Certification Date: 09/05/2018 *Term:* 96 Months *Expiration Date:* 09/05/2026

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1.
Do Not Use this Standard if Pressure is less than 100 PSIG.

Analytical Data:

(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)

1. ***Component:*** **Sulfur dioxide**

Requested Concentration: 100 ppm
Certified Concentration: 101 ppm
Instrument Used: Horiba VIA-510, 5203551011
Analytical Method: NDIR
Last Multipoint Calibration: 08/14/2018

Reference Standard: Type / Cylinder #: NTRM / SA16843
Concentration / Uncertainty: 95.17 ppm ±1%
Expiration Date: 03/30/2020
Traceable to: SRM # / Sample # / Cylinder #: NTRM#SA16843 / 120702 / NTRM#SA16843
SRM Concentration / Uncertainty: 95.17 PPM / ±1.00 PPM
SRM Expiration Date: 03/30/2020

First Analysis Data: **Date** 08/29/2018

Z:	0	R:	95.2	C:	100.6	Conc:	101
R:	95	Z:	0	C:	100.7	Conc:	101
Z:	0	C:	100.5	R:	94.9	Conc:	101

UOM: ppm **Mean Test Assay:** 101 ppm

Second Analysis Data: **Date** 09/05/2018

Z:	0	R:	95.2	C:	100.8	Conc:	101
R:	95.3	Z:	0	C:	100.6	Conc:	100
Z:	0	C:	100.7	R:	95.3	Conc:	101

UOM: ppm **Mean Test Assay:** 101 ppm

Analyzed By **Quinn Halles**

Certified By **Leeanna Rodriguez**

Information contained herein has been prepared at your request by qualified experts within Praxair Distribution, Inc. While we believe that the information is accurate within the limits of the analytical methods employed and is complete to the extent of the specific analyses performed, we make no warranty or representation as to the suitability of the use of the information for any purpose. The information is offered with the understanding that any use of the information is at the sole discretion and risk of the user. In no event shall the liability of Praxair Distribution, Inc., arising out of the use of the information contained herein exceed the fee established for providing such information.

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DocNumber: 301951

Praxair Distribution, Inc.
5700 S. Alameda Street
Los Angeles CA 90058
Tel: 323-585-2154
Fax: 714-542-6689
PGVP ID: F22020

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information

PRAXAIR PKG PHOENIX AZ HS
3918 W LINCOLN ST
PHOENIX AZ 85009-5414

Certificate Issuance Date: 03/13/2020
Praxair Order Number: 71272082
Part Number: EV NICDOXE103AS
Customer PO Number: 79261417

Fill Date: 03/05/2020
Lot Number: 70086006502
Cylinder Style & Outlet: AS CGA 590
Cylinder Pressure and Volume: 2000 psig 140 ft3

Certified Concentration

ProSpec EZ Cert

Expiration Date:	03/13/2028	NIST Traceable
Cylinder Number:	CC505870	Expanded Uncertainty
9.96 %	Carbon dioxide	± 0.5 %
10.02 %	Oxygen	± 0.5 %
Balance	Nitrogen	

Certification Information:

Certification Date: 03/13/2020 *Term:* 96 Months *Expiration Date:* 03/13/2028

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1.

Do Not Use this Standard if Pressure is less than 100 PSIG

CO2 responses have been corrected for Oxygen IR Broadening effect. O2 responses have been corrected for CO2 interference.

Analytical Data:

(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)

1. ***Component:*** **Carbon dioxide**

Requested Concentration: 10 %
Certified Concentration: 9.96 %
Instrument Used: Horiba VIA-510 S/N 20C194WK
Analytical Method: NDIR
Last Multipoint Calibration: 02/24/2020

Reference Standard: Type / Cylinder #: GMIS / CC79405
Concentration / Uncertainty: 16.02 % ±0.277%
Expiration Date: 07/10/2022
Traceable to: SRM # / Sample # / Cylinder #: SRM 1675b / 6-F-51 / CAL014538
SRM Concentration / Uncertainty: 13.963% / ±0.034%
SRM Expiration Date: 05/16/2022

First Analysis Data:							Date	03/13/2020
Z:	0	R:	16.02	C:	9.96		Conc:	9.96
R:	16.02	Z:	0	C:	9.96		Conc:	9.96
Z:	0	C:	9.96	R:	16.02		Conc:	9.96
UOM:	%					Mean Test Assay:		9.96 %

Second Analysis Data:							Date	
Z:	0	R:	0	C:	0		Conc:	0
R:	0	Z:	0	C:	0		Conc:	0
Z:	0	C:	0	R:	0		Conc:	0
UOM:	%					Mean Test Assay:		%

2. ***Component:*** **Oxygen**

Requested Concentration: 10 %
Certified Concentration: 10.02 %
Instrument Used: OXYMAT 5E
Analytical Method: Paramagnetic
Last Multipoint Calibration: 02/24/2020

Reference Standard: Type / Cylinder #: NTRM / DT0010287
Concentration / Uncertainty: 9.875 % ±0.4%
Expiration Date: 11/18/2022
Traceable to: SRM # / Sample # / Cylinder #: NTRM / 170701 / NTRM DT0010287
SRM Concentration / Uncertainty: 9.875 % / ±0.040%
SRM Expiration Date: 11/18/2022

First Analysis Data:							Date	03/13/2020
Z:	0	R:	9.88	C:	10.04		Conc:	10.03
R:	9.9	Z:	0	C:	10.03		Conc:	10.02
Z:	0	C:	10.03	R:	9.88		Conc:	10.02
UOM:	%					Mean Test Assay:		10.02 %

Second Analysis Data:							Date	
Z:	0	R:	0	C:	0		Conc:	0
R:	0	Z:	0	C:	0		Conc:	0
Z:	0	C:	0	R:	0		Conc:	0
UOM:	%					Mean Test Assay:		%

Analyzed By Jenna Lockman

Certified By Jose Vasquez

Information contained herein has been prepared at your request by qualified experts within Praxair Distribution, Inc. While we believe that the information is accurate within the limits of the analytical methods employed and is complete to the extent of the specific analyses performed, we make no warranty or representation as to the suitability of the use of the information for any purpose. The information is offered with the understanding that any use of the information is at the sole discretion and risk of the user. In no event shall the liability of Praxair Distribution, Inc., arising out of the use of the information contained herein exceed the fee established for providing such information.

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DocNumber: 301952

Praxair Distribution, Inc.
5700 S. Alameda Street
Los Angeles CA 90058
Tel: 323-585-2154
Fax: 714-542-6689
PGVP ID: F22020

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information

PRAXAIR PKG PHOENIX AZ HS
3918 W LINCOLN ST
PHOENIX AZ 85009-5414

Certificate Issuance Date: 03/13/2020
Praxair Order Number: 71272082
Part Number: NI CD20O15E-AS
Customer PO Number: 79261417

Fill Date: 03/05/2020
Lot Number: 70086006503
Cylinder Style & Outlet: AS CGA 590
Cylinder Pressure and Volume: 2000 psig 140 ft3

Certified Concentration

ProSpec EZ Cert

Expiration Date:	03/13/2028	NIST Traceable
Cylinder Number:	DT0029914	Expanded Uncertainty
19.86 %	Carbon dioxide	± 0.4 %
19.96 %	Oxygen	± 0.2 %
Balance	Nitrogen	

Certification Information:

Certification Date: 03/13/2020 Term: 96 Months Expiration Date: 03/13/2028

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1.

Do Not Use this Standard if Pressure is less than 100 PSIG.

CO2 responses have been corrected for Oxygen IR Broadening effect. O2 responses have been corrected for CO2 interference.

Analytical Data:

(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)

1. **Component:** Carbon dioxide

Requested Concentration: 20 %
Certified Concentration: 19.86 %
Instrument Used: Horiba VIA-510 S/N 20C194WK
Analytical Method: NDIR
Last Multipoint Calibration: 02/24/2020

First Analysis Data:				Date	03/13/2020
Z: 0	R: 19.92	C: 19.86		Conc:	19.85
R: 19.94	Z: 0	C: 19.88		Conc:	19.87
Z: 0	C: 19.88	R: 19.94		Conc:	19.87
UOM: %		Mean Test Assay:			19.86 %

Reference Standard: Type / Cylinder #: GMIS / CC188344
Concentration / Uncertainty: 19.92 % ±0.296%
Expiration Date: 02/20/2028
Traceable to: SRM # / Sample # / Cylinder #: RGM#CC28033 / N/A / RGM#CC28033
SRM Concentration / Uncertainty: 19.67% / ±0.04%
SRM Expiration Date: 07/15/2021

Second Analysis Data:				Date	
Z: 0	R: 0	C: 0		Conc:	0
R: 0	Z: 0	C: 0		Conc:	0
Z: 0	C: 0	R: 0		Conc:	0
UOM: %		Mean Test Assay:			%

2. **Component:** Oxygen

Requested Concentration: 20 %
Certified Concentration: 19.96 %
Instrument Used: OXYMAT 5E
Analytical Method: Paramagnetic
Last Multipoint Calibration: 02/24/2020

First Analysis Data:				Date	03/13/2020
Z: 0	R: 20.88	C: 19.97		Conc:	19.97
R: 20.88	Z: 0	C: 19.97		Conc:	19.97
Z: 0	C: 19.93	R: 20.86		Conc:	19.93
UOM: %		Mean Test Assay:			19.96 %

Reference Standard: Type / Cylinder #: GMIS / CC707388
Concentration / Uncertainty: 20.87 % ±0.108%
Expiration Date: 12/14/2026
Traceable to: SRM # / Sample # / Cylinder #: SRM 2658a / 71-E-19 / FF22331
SRM Concentration / Uncertainty: 20.863% / ±0.021%
SRM Expiration Date: 08/23/2021

Second Analysis Data:				Date	
Z: 0	R: 0	C: 0		Conc:	0
R: 0	Z: 0	C: 0		Conc:	0
Z: 0	C: 0	R: 0		Conc:	0
UOM: %		Mean Test Assay:			%

Analyzed By Jenna Lockman

Certified By Jose Vasquez

Information contained herein has been prepared at your request by qualified experts within Praxair Distribution, Inc. While we believe that the information is accurate within the limits of the analytical methods employed and is complete to the extent of the specific analyses performed, we make no warranty or representation as to the suitability of the use of the information for any purpose. The information is offered with the understanding that any use of the information is at the sole discretion and risk of the user. In no event shall the liability of Praxair Distribution, Inc., arising out of the use of the information contained herein exceed the fee established for providing such information.

COMPLIANCE ASSURANCE ASSOCIATES INC.

Helping Industry Comply with Environmental Regulations

This is to acknowledge that

Jennifer M Bruce Kessler

BIL200828-14981

Certificate verification is available at compliance-assurance.com/certs.php using the last name and 14981

successfully participated in Visible Emissions Evaluation field training and certification and pursuant to US EPA 40 CFR 60 Appendix A, Reference Method 9, as amended, is certified to evaluate Visible Emissions for a period of six (6) months from the date of this certification.

Anthony Ferro - Field Manager	Billings, MT	08/28/2020
	Location	Date

Compliance Assurance Associates, Inc. 682 Orvil Smith Rd, Harvest, AL, 35749. 901-381-9960. compliance-assurance.com

STAC STACK TESTING ACCREDITATION COUNCIL

A2LA American Association for Laboratory Accreditation

Accredited Air Emission Testing Body

A2LA has accredited

BISON ENGINEERING, INC.

In recognition of the successful completion of the joint A2LA and Stack Testing Accreditation Council (STAC) evaluation process, this laboratory is accredited to perform testing activities in compliance with ASTM D7036:2004 - Standard Practice for Competence of Air Emission Testing Bodies.

Presented this 15th day of January 2020.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 4675.01
Valid to November 30, 2021

This accreditation program is not included under the A2LA ILAC Mutual Recognition Arrangement.

This is the last page of the report.

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