



SunCoke Energy

SunCoke Energy, Inc.

3210 Watling St.
MC 2-990
East Chicago, IN 46312
219-378-3900 Phone
219-378-4590 Fax

June 23, 2022

Indiana Department of Environmental Management
Compliance and Enforcement Branch, Office of Air Quality
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251

RE: Consent Decree, *United States, et. al. v. Indiana Harbor Coke Company, et. al.*
Indiana Harbor Coke Company, LLC (TV Permit T089-41059-00382)
Lead Emission Compliance Test Report

To Whom It May Concern:

The United States, the State of Indiana, Indiana Harbor Coke Company (IHCC), Suncoke Energy Inc. (Suncoke), and Cokenergy, LLC (Cokenergy) are parties to a Consent Decree (CD) lodged in federal court on January 25, 2018 with an effective date of October 25, 2018.

Pursuant to the CD, IHCC is submitting an Emission Compliance Test Report for Lead performed on Emergency Vent Stack B-3. The compliance testing occurred on Wednesday, May 4, 2022 through Thursday, May 5, 2022. The test protocol was submitted to your office on Thursday, March 24, 2022. All results demonstrated compliance with lead emissions limits and are attached.

If you have any questions, please contact me at (219) 895-5976 or nestrada@suncoke.com.

Respectfully submitted,

Nancy Estrada
Environmental Manager
Enclosure

**INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR QUALITY**

**PART 70 OPERATING PERMIT
CERTIFICATION**

Source Name: Indiana Harbor Coke Company L.P., a contractor of ArcelorMittal
Source Address: 3210 Watling Street, East Chicago, Indiana 46312
Part 70 Permit Renewal No.: T089-41059-00382

This certification shall be included when submitting monitoring, testing reports/results or other documents as required by this permit.

Please check what document is being certified:

- ☐ Annual Compliance Certification Letter
- ☒ Test Results for air emissions testing, Lead
- ☐ Quarterly Report
- ☐ Notification (specify)
- ☐ Affidavit (specify)
- ☐ Other (specify)

I certify that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

Signature:

Printed Name: Stephen Brown

Title/Position: General Manager

Phone: (219) 378-3956

Date: June 23, 2022

Emission Test Report for Vent Stack B-3

**Test Dates:
May 4-5, 2022**

**Prepared for:
Indiana Harbor Operations
East Chicago, Indiana**



**Prepared by:
AECOM
Raleigh, NC**

EMISSION TEST REPORT FOR
VENT STACK B-3

TEST DATES:
MAY 4-5, 2022

Prepared for:

Indiana Harbor Operations
3210 Watling Street
East Chicago, Indiana 46312

Prepared by:

AECOM
5438 Wade Park Blvd
Suite 200
Raleigh, NC 27607

June 2022

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ACRONYMS

CFR	Code of Federal Regulations
CO ₂	Carbon Dioxide
dscf	dry standard cubic feet
EPA	U.S. Environmental Protection Agency
gr	grains
HRSG	Heat Recovery Steam Generator
IDEM	Indiana Department of Environmental Management
IHO	Indiana Harbor Operations
O ₂	Oxygen
PM	Particulate Matter
VE	Visible Emission
wc	water column

TEST CERTIFICATION SHEET

Emission Test Report for Vent Stack B-3 at Indiana Harbor Operations

Team Leader/Project Manager

I was the project manager for the testing and preparation of this report and certify that the data, information, and results in this report are accurate and true as described by the methods and procedures cited herein.

Data collected under the supervision of others is included in this report and is presumed to have been gathered in accordance with recognized standards.

AECOM

A handwritten signature in black ink, appearing to read "Gerald S. Workman".

Gerald S. Workman

Project Manager

1.0 INTRODUCTION

AECOM performed air emissions tests on Vent Stack B-3 at Indiana Harbor Operations (IHO), East Chicago, Indiana, in May 2022. The purpose of these tests was to demonstrate compliance with the emission limit for lead (Pb) as listed in the plant's Title V operating permit (T089-41059-00382) issued by the Indiana Department of Environmental Management (IDEM) on September 10, 2019. All tests were performed as described in the test protocol submitted to IDEM on March 24, 2022.

The stack testing was coordinated by Nancy Estrada (IHO) and performed by AECOM. The test team was led by Fred Sanguedolce and included Willie Lea.

The emission limits and test results are summarized in Table 1. Four test runs were conducted; two during coke production (within two hours of pushing the ovens) and two during non-production (coking) time.

Table 2. Summary of Emission Limits and Test Results

Emission Unit	Pollutant	Emission Limit	Pb Emissions	Comply With Limit?
Vent Stacks (part of ES201)	Lead	0.19 lb/hr	0.050 lb/hr	Yes

More detailed test results are presented in the report text along with a description of the test procedures. The appendices contain supporting information: Appendix A contains process data; Appendix B contains the vent stack emission calculations and data; Appendix C contains the analytical report; and Appendix D contains equipment calibration information.

2.0 PROCESS DESCRIPTION

IHO utilizes SunCoke Energy's heat recovery type of oven to manufacture metallurgical coke. In coke production, the volatile fraction of the coal is driven off in a reducing atmosphere. Coke is essentially the remaining carbon and ash. Each oven is designed to carbonize up to 45 wet tons of coal. Flue gases are produced from the volatilization of coal - referred to as coal carbonization or "coking." The emissions from coking are discharged into a common afterburner tunnel that contains a heat recovery steam generator (HRSG) for every 16.75 ovens (16 HRSGs for 268 ovens). After passing through the HRSGs, the exhaust gases are treated by a semi-dry scrubber and baghouse system before being exhausted through the main stack. The HRSGs produce steam that goes to Cleveland Cliffs for generating electricity by Cokenergy.

There are 16 identically-configured bypass vent stacks for the 268 ovens – each is immediately upstream of one of the 16 HRSGs. During normal facility operations the vent stack lids remain closed. In the event of a process upset or outage of an HRSG that does not allow flue gases to be sent to the main stack, the corresponding vent stack lid will open to allow the oven exhaust gases from approximately 16.75 ovens to exhaust to atmosphere through the bypass vent stack. HRSG B-3 was temporarily taken out of service so that Vent Stack B-3 (part of emission unit ES201) could be opened during the vent stack tests.

The length of the coking cycle is approximately 48 hours. Coke is pushed out of an oven at the end of the cycle and coal is then charged back into the oven to start the process over again. Roughly half the ovens are pushed and charged each day - the "production" cycle (pushing and charging) occurs every day. The production cycle is divided into two periods where roughly every fourth oven is charged in each of two passes. Two test runs were performed during the "coking" part of the cycle and two were performed during or immediately after production to ensure that the tests included different parts of the coke-making cycle.

3.0 TEST RESULTS

The test results for each emission source tested are presented in this section.

3.1 Vent Stack B-3

The lead results from the bypass vent stack emissions test are summarized in Table 2. The emission limit for lead is applicable to the combined emissions from the 16 bypass vent stacks at IHO and the main stack at Cokenergy. Lead emissions were under the allowable limits. No sampling or analytical issues were noted in these tests.

Table 2. Lead Results from Vent Stack B-3

Parameters	Run 1	Run 2	Run 3	Run 4	Average
Date	5/4/22	5/4/22	5/5/22	5/5/22	
Run times	20:20 - 22:02	22:15 - 00:15	11:20 – 12:46	13:25 - 14:49	
Relation to production cycle	Production	Production	Coking	Coking	
Sample time (minutes)	72.0	72.0	72.0	72.0	
Volume sampled (dscf)	42.354	43.638	44.300	46.055	44.087
Moisture content (% Vol.)	11.18	11.65	11.43	11.07	11.33
O ₂ (%)	10.4	9.8	11.9	11.0	10.8
CO ₂ (%)	7.0	7.4	6.0	6.6	6.8
Stack gas temperature (°F)	1562.4	1566.6	1575.7	1537.8	1560.6
Stack velocity (ft/min)	3,225	3,292	3,394	3,459	3,342
Gas flow rate (ACFM)	162,098	165,473	170,600	173,861	168,008
Gas flow rate (SCFM)	41,768	42,564	43,523	45,135	43,249
Gas flow rate (DSCFM)	37,097	37,607	38,550	40,138	38,348
Percent isokinetic	104.1	105.8	104.8	104.6	104.8
Lead concentration (gr/dscf)	0.000234	0.000211	0.000080	0.000093	0.000154
Lead mass rate (lb/hr)	0.074	0.068	0.026	0.032	0.050

3.2 Compliance Limit for Lead Emissions from Coking Stacks

Some of the IHO emission limits (PM concentration, lead and VOCs) apply to the combined emissions from the Heat Recovery Coal Carbonization main stack (Stack 201) and the 16 vent stacks. Compliance with these limits is determined through a weighted average of the gases exhausted from the vent stacks and main stack. Main Stack 201 was tested for lead emissions in December 2019. Results from the 2019 test were used with the results of the current Vent Stack lead emissions test to establish compliance with the combined limit. Results of the weighting calculation are shown in Table 3 and demonstrate compliance with the 0.19 lb/hr combined limit.

Table 3. Weighted Lead Results from Coking

Emission Unit	Main Stack (Stack 201)		Vent Stack (B-3)		Weighted Emissions	Permit Limit	In Compliance?
	Measured Emissions^a	Fraction	Measured Emissions	Fraction			
Lead	0.014 lb/hr	81%	0.050 lb/hr	19%	0.0208 lb/hr	0.19 lb/hr	Yes

^a These results are from the testing conducted on the Cokenergy main stack in December 2019.

4.0 SAMPLING METHODOLOGY

The sampling methods used during the tests are summarized in Table 3.

Table 3. Test Method Summary

Parameter	Test Method
Traverse point layout	EPA Reference Method 1
Gas flowrate	EPA Reference Method 2
Gas molecular weight	EPA Reference Method 3
Lead	EPA Method 12

Each test method used for the testing was based on methodology from Title 40 of Code of Federal Regulations Part 60 (40 CFR 60), Appendix A and 40 CFR 51, Appendix M. A description of the sampling is provided below.

4.1 EPA Reference Methods 1 and 2 - Volumetric Flow Rate

U.S. Environmental Protection Agency (EPA) Methods 1 and 2 were used to determine the sampling traverse layout and stack gas volumetric flow rate at the sampling location. The traverse point layout was determined using the procedures in EPA Reference Method 1. An integrated velocity traverse was conducted at discrete points during each test run for the vent stack. An S-type pitot tube and an inclined manometer were used to measure the velocity pressure. A type “K” thermocouple was used to measure the stack gas temperature at each traverse point. The absence of cyclonic flow was verified using the procedures in EPA Reference Method 1. The actual and standard volumetric flow rates were determined using the calculations in EPA Reference Method 2.

4.2 EPA Reference Method 3 - Stack Gas Molecular Weight

The stack gas oxygen (O₂) and carbon dioxide (CO₂) concentrations were determined in accordance with EPA Reference Method 3A, using gas analyzers. The resulting O₂ and CO₂ concentrations were used to calculate the molecular weight of the stack gas.

4.3 EPA Reference Method 12 – Lead

The lead sampling at the vent stack was performed using an USEPA Method 12 sampling train by extracting a sample of the stack exhaust gas stream through a one-piece quartz nozzle and liner encased in an air-cooled probe. The air-cooled probe was needed to cool the vent stack flue gases from $>1,800^{\circ}\text{F}$ to $<275^{\circ}\text{F}$. The probe was attached to a heated glass filter holder containing a quartz filter. The outlet of the filter holder was connected to a series of ball-joint impingers. The first impinger was a modified Greenburg-Smith containing 100 mL of a 0.1N nitric acid (HNO_3) solution. The second impinger was a Greenburg-Smith also containing 100 mL of a 0.1N HNO_3 solution. The third impinger was an empty modified Greenburg-Smith. The fourth impinger contained approximately 200 grams of indicating silica gel.

At the conclusion of each Method 12 test run, the sample train was recovered by washing the nozzle/probe assembly three times with 0.1N HNO_3 , removing the filter to a Petri dish, and washing the front half of the filter holder with 0.1N HNO_3 . The impinger train was then disassembled and each impinger weighed to determine the moisture gained during the sample run. The liquid contents of impingers one and two were transferred into a sample container. Impingers 1, 2, and 3 were rinsed with 0.1N HNO_3 .

The sample filters, the 0.1N HNO_3 impinger and rinse solutions, a blank filter, and a reagent blank of the 0.1N HNO_3 solution were sent to the laboratory. The filter and liquid samples were processed as described in Method 12. The extracts from each test run (and the blanks) were composited for analysis by inductively coupled plasma mass spectrometry.

Appendix A
PROCESS DATA

B3 Ovens (34-50) as of 5/5/2022 @ 15:00 HRS				
BATTERY	OVEN	REF	CHARGED	CURRENT WEIGHT (TONS)
B	1	B01	5/4/22 10:58 PM	39.1
B	5	B05	5/4/22 10:49 PM	39.6
B	9	B09	5/4/22 10:41 PM	39
B	13	B13	5/4/22 10:32 PM	39.5
B	17	B17	5/4/22 10:12 PM	39.6
B	21	B21	5/4/22 9:48 PM	39.5
B	25	B25	5/4/22 9:40 PM	39.6
B	29	B29	5/4/22 9:32 PM	39.1
B	33	B33	5/4/22 9:23 PM	39.6
B	34	B34	5/5/22 4:29 AM	39
B	35	B35	5/4/22 3:40 AM	40.6
B	36	B36	5/3/22 8:19 PM	38.9
B	37	B37	5/4/22 11:28 PM	37.5
B	38	B38	5/5/22 4:21 AM	40.9
B	39	B39	5/4/22 3:32 AM	38.1
B	40	B40	5/3/22 8:09 PM	39.5
B	41	B41	5/4/22 8:43 PM	40.1
B	42	B42	5/5/22 4:13 AM	38.1
B	43	B43	5/4/22 3:24 AM	42.2
B	44	B44	5/3/22 8:01 PM	39
B	45	B45	5/4/22 8:34 PM	39.6
B	46	B46	5/5/22 4:05 AM	42
B	47	B47	5/4/22 3:17 AM	41.1
B	48	B48	5/3/22 7:53 PM	39
B	49	B49	5/4/22 10:01 PM	37.5
B	50	B50	5/5/22 3:58 AM	38.9
B	53	B53	5/4/22 9:12 PM	40.1
B	57	B57	5/4/22 9:04 PM	39
B	61	B61	5/4/22 8:55 PM	39.6
B	65	B65	5/4/22 11:17 PM	38.5

Date:	Wed, May 04, 2022			Coal Moisture 9.42// VM 26.00									
	Total Ovens			34									
	AVG. WT.			39.6									
heduplun:	Column2	Column3	Plan	Column4	Column5	Previous	Column6						
	BAT	INDEX	OVEN	CHARGE WEIGHT	FRONT LEVELER	REAR LEVELER	CHARGE WEIGHT	PREVIOUS PUSH TIME	BLOCK TIME	RUN	DECARB DATE		
1	B	45	B45	39.5	10.13	6.13	38.9	5/2/22 8:17 PM	8:30 PM	65-1	0		
2	B	41	B41	40.0	20.00	16.00	39.5	5/2/22 8:25 PM		65-1	0		
3	B	61	B61	39.5	10.13	6.13	39.0	5/2/22 7:44 PM		65-1	0		
4	B	57	B57	39.0	17.25	13.25	39.5	5/2/22 7:52 PM		65-1	0		
5	B	53	B53	40.0	18.25	14.25	40.4	5/2/22 8:01 PM		65-1	0		
6	B	33	B33	39.5	17.88	13.88	40.0	5/2/22 8:45 PM		65-1	0		
7	B	29	B29	39.0	19.25	15.25	39.4	5/2/22 8:53 PM		65-1	0		
8	B	25	B25	39.5	19.13	15.13	39.4	5/2/22 9:03 PM		65-1	0		
9	B	21	B21	39.5	10.13	6.13	38.9	5/2/22 9:12 PM		65-1	0		
10	B	49	B49	37.5	17.63	13.63	39.0	5/2/22 8:09 PM		65-1	0		
11	B	17	B17	39.5	19.38	15.38	39.5	5/2/22 9:20 PM		65-1	0		
12	B	13	B13	39.5	19.88	15.88	39.5	5/2/22 9:28 PM		65-1	0		
13	B	9	B09	39.0	16.00	12.00	39.4	5/2/22 9:37 PM		65-1	0		
14	B	5	B05	39.5	18.88	14.88	39.5	5/2/22 9:45 PM		65-1	0		
15	B	1	B01	39.0	18.75	14.75	39.0	5/2/22 9:54 PM		65-1	0		
16	B	65	B65	40.0	20.75	16.75	41.4	5/2/22 7:35 PM		65-1	DECARBED 11/24/2021		
17	B	37	B37	37.5	18.38	14.38	39.0	5/2/22 8:36 PM		65-1	0		
18	B	66	B66	41.5	14.13	10.13	41.5	5/3/22 2:48 AM	2:30 AM	66-2	DECARBED 9/16/2021		
19	B	62	B62	41.0	12.25	8.25	41.0	5/3/22 2:56 AM		66-2	DECARBED 3/31/2022		
20	B	58	B58	39.5	18.88	14.88	39.4	5/3/22 3:04 AM		66-2	0		
21	B	54	B54	39.0	19.75	15.75	39.0	5/3/22 3:12 AM		66-2	0		
22	B	50	B50	39.0	19.00	15.00	38.9	5/3/22 3:20 AM		66-2	0		
23	B	46	B46	42.0	14.00	10.00	41.9	5/3/22 3:28 AM		66-2	DECARBED 3/17/2022		
24	B	42	B42	38.0	20.75	16.75	37.9	5/3/22 3:36 AM		66-2	0		
25	B	38	B38	41.0	12.25	8.25	40.9	5/3/22 3:44 AM		66-2	DECARBED 3/31/2022		
26	B	34	B34	39.0	19.25	15.25	38.9	5/3/22 3:52 AM		66-2	0		
27	B	30	B30	39.0	20.00	16.00	38.9	5/3/22 4:02 AM		66-2	0		
28	B	26	B26	39.0	19.25	15.25	39.0	5/3/22 4:10 AM		66-2	0		
29	B	22	B22	42.0	13.75	9.75	41.9	5/3/22 4:18 AM		66-2	DECARBED 3/31/2022		
30	B	18	B18	39.0	20.00	16.00	38.9	5/3/22 4:26 AM		66-2	0		
31	B	14	B14	40.0	20.00	16.00	39.9	5/3/22 4:36 AM		66-2	0		
32	B	10	B10	40.0	12.75	8.75	39.9	5/3/22 4:44 AM		66-2	DECARBED 3/17/2022		
33	B	6	B06	40.5	16.38	12.38	40.4	5/3/22 4:54 AM		66-2	0		
34	B	2	B02	39.5	17.38	13.38	39.4	5/3/22 5:03 AM		66-2	0		
35													
36													
37													
38													
39													
40													
41													
42													
43													
44													
45													

IHCC Main Baghouse Stack Testing DP Readings 5/4/22					
Name	Nancy Estrada				
Run/Test #	(1) Production				
Start Time/End Time	15 min intervals	Module #1	Module #2	Module #3	Module #4
8:30 pm	0:00	5.0	4.5	5.0	5.5
8:45 pm	0:15	5.0	5.0	5.0	5.5
9:00 pm	0:30	5.1	5.0	5.0	5.2
9:15 pm	0:45	5.1	5.0	5.0	5.2
9:30 pm	1:00	5.1	5.0	5.0	5.2
9:45 pm	1:15	5.1	5.0	5.0	5.2
10:00 pm	1:30	5.1	5.0	5.0	5.2
END TEST TIME: 10:02 pm	1:45				
	2:00				
Run/Test #	(2) Production				
10:50 pm	0:00	5.1	5.0	5.0	5.2
11:05 pm	0:15	5.1	5.0	5.0	5.2
11:20 pm	0:30	5.1	5.0	5.0	5.2
11:35 pm	0:45	5.2	5.0	5.1	5.2
11:50 pm	1:00	5.2	5.0	5.0	5.2
12:05 am	1:15	5.1	5.0	5.1	5.2
END TEST TIME: 12:15 am	1:30				
	1:45				
	2:00				

Appendix B
VENT STACK EMISSION CALCULATIONS AND DATA

Suncoke/Indiana Harbor
 HRCC Oven Vent B-3
 Method 12
 Emission Calculations

Full Load

Pollutant: **Lead**

Run	Date	Time	Total Pb Catch (µg)	Sample Volume (dscf)	Pb Emissions (lb/hr)
1	5/4/2022	20:30 - 22:02	641	42.354	0.074
2	5/4/2022	22:50 - 00:15	598	43.638	0.068
3	5/5/2022	11:20 - 12:49	229	44.300	0.026
4	5/5/2022	13:25 - 14:49	277	46.055	0.032
Reagent Blank			0.197		
AVERAGE			436	44.087	0.050



Emissions Test Run Summary

Facility: Suncoke/Indiana Harbor					
Location: HRCC Oven Vent B-4					
Condition: Full Load					
Sample Type: Method 12					
Was the run used?	Yes	Yes	Yes	Yes	
Run Number:	1	2	3	4	
Date:	4-May-22	4-May-22	5-May-22	5-May-22	Average
Total Sampling Time (min)	72.0	72.0	72.0	72.0	72.0
Corrected Barometric Pressure (in Hg)	29.54	29.55	29.44	29.40	29.48
Absolute Stack Pressure (in Hg)	29.53	29.54	29.43	29.39	29.47
Stack Static Pressure (in H ₂ O)	-0.14	-0.14	-0.14	-0.14	-0.14
Average Stack Temperature (°F)	1562.4	1566.6	1575.7	1537.8	1560.6
Stack Area (sq in)	7238	7238	7238	7238	7238
Actual Meter Volume (cu ft)	42.212	43.741	44.960	46.469	44.346
Average Meter Pressure (in H ₂ O)	1.01	1.05	1.10	1.19	1.09
Average Meter Temperature (°F)	53.0	56.2	60.8	57.2	56.8
Moisture Collected (g)	113.1	122.0	121.2	121.6	119.5
Carbon Dioxide Concentration (%V)	7.0	7.4	6.0	6.6	6.8
Oxygen Concentration (%V)	10.4	9.8	11.9	11.0	10.8
Nitrogen Concentration (%V)	82.6	82.8	82.1	82.4	82.5
Dry Gas Meter Factor (γ _g)	0.9850	0.9850	0.9850	0.9850	0.9850
Nozzle Diameter (in)	0.375	0.375	0.375	0.375	0.375
Pitot Constant	0.84	0.84	0.84	0.84	0.84
Average Sampling Rate (dscfm)	0.588	0.606	0.615	0.640	0.612
Standard Metered Volume (dscf)	42.354	43.638	44.300	46.055	44.087
Standard Metered Volume (dscm)	1.199	1.236	1.254	1.304	1.248
Stack Moisture (%V)	11.18	11.65	11.43	11.07	11.33
Saturated Moisture (%V)	101.3	101.3	101.7	101.8	101.5
Mole Fraction Dry Stack Gas	0.888	0.884	0.886	0.889	0.887
Dry Molecular Weight	29.54	29.58	29.44	29.50	29.51
Wet Molecular Weight	28.25	28.23	28.13	28.22	28.21
Average SQRT of Delta P	0.481	0.490	0.502	0.517	0.498
Stack Gas Velocity (fps)	53.75	54.87	56.57	57.65	55.71
Stack Gas Velocity (mpm)	16.4	16.7	17.2	17.6	17.0
Volumetric Flow Rate (acfm)	162,098	165,473	170,600	173,861	168,008
Volumetric Flow Rate (acmm)	4,591	4,686	4,831	4,924	4,758
Volumetric Flow Rate (dscfm)	37,097	37,607	38,550	40,138	38,348
Volumetric Flow Rate (dscmm)	1051	1065	1092	1137	1086
Percent Isokinetic	104.1	105.8	104.8	104.6	104.8
Post Test Meter QA (γ _{qa})	0.9474	0.9338	0.9390	0.9409	0.9403

Run Used: Yes

Enter data in unshaded areas.

Sample Type	Method 12
Client/Plant	Suncoke/Indiana Harbor
Project Number	60682449
Sampling Location	HRCC Oven Vent B-4
Condition	Full Load
Meter Box Number	SC-M1543
Meter Factor (γ_d)	0.9850
Minutes per Point	3.0
Barometric Pressure	29.54

O2/CO2 Method 3A

CO2 Percent	O2 Percent
Replicate 1	7.0
Replicate 2	10.4
Replicate 3	
Average	7.0

N2 Percent

82.6

Date	5/4/2022
Operator	FJS/WEL
Run Number	1
K Factor	4.34
Meter ΔH	1.7630
Pitot Constant	0.84
Port Height (ft)	0
Static Pressure (Ps)	-0.14
Stack Geometry (R or C)?	C
Stack Diameter (in)	96.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	0.374
Nozzle ID 2 (in)	0.375
Nozzle ID 3 (in)	0.375
Nozzle ID (in)	0.375

Impinger Weights (g)

	Initial	Final	Net Gain
Impinger 1	765.2	866.3	101.1
Impinger 2	705.3	707.4	2.1
Impinger 3	646.3	646.7	0.4
Impinger 4	929.7	939.2	9.5
Impinger 5			0
Impinger 6			0
Impinger 7			0
Impinger 8			0
Moisture Collected (g)			113.1

Saturated Percent Moisture

101.33

Standard

Calculated Percent Moisture

11.18

Volume (dscf)

Isokinetic %

104.1

42.354

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft ³)	Velocity Head (ΔP) (in H ₂ O)	Orifice Pressure Diff (ΔH) (in H ₂ O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm Out (F)
A1	0	20:30:00	444.576	0.28	1.26	1447	48
A2	3	20:33:00	446.210	0.27	1.21	1460	49
A3	6	20:36:00	448.200	0.27	1.21	1453	49
A4	9	20:39:00	450.350	0.25	1.12	1490	49
A5	12	20:42:00	452.260	0.22	0.98	1515	50
A6	15	20:45:00	454.050	0.21	0.93	1543	51
STOP	18	20:48:00	455.726				
B1	18	20:55:00	455.726	0.27	1.19	1605	52
B2	21	20:58:00	457.552	0.29	1.27	1655	52
B3	24	21:01:00	459.515	0.28	1.22	1647	53
B4	27	21:04:00	461.600	0.24	1.04	1638	53
B5	30	21:07:00	463.400	0.22	0.95	1632	53
B6	33	21:10:00	465.135	0.20	0.86	1611	53
STOP	36	21:13:00	466.753				
C1	36	21:23:00	466.753	0.27	1.15	1576	53
C2	39	21:26:00	468.591	0.26	1.11	1602	54
C3	42	21:29:00	470.405	0.24	1.02	1595	54
C4	45	21:32:00	472.235	0.22	0.94	1587	54
C5	48	21:35:00	473.945	0.18	0.77	1575	54
C6	51	21:38:00	475.500	0.15	0.64	1552	55
STOP	54	21:41:00	476.997				
D1	54	21:44:00	476.997	0.25	1.07	1558	55
D2	57	21:47:00	478.810	0.26	1.11	1567	56
D3	60	21:50:00	480.520	0.24	1.00	1563	56
D4	63	21:53:00	482.161	0.20	0.85	1556	57
D5	66	21:56:00	483.798	0.17	0.73	1542	56
D6	69	21:59:00	485.339	0.15	0.64	1529	57
STOP	72	22:02:00	486.788				

Run Used: Yes

Enter data in unshaded areas.

Sample Type	Method 12
Client/Plant	Suncoke/Indiana Harbor
Project Number	60682449
Sampling Location	HRCC Oven Vent B-4
Condition	Full Load
Meter Box Number	SC-M1543
Meter Factor (γ_d)	0.9850
Minutes per Point	3.0
Barometric Pressure	29.44

O2/CO2 Method 3A

	CO2 Percent	O2 Percent
Replicate 1	6.0	11.9
Replicate 2		
Replicate 3		
Average	6.0	11.9

Date	5/5/2022
Operator	FJS/WEL
Run Number	3
K Factor	4.34
Meter ΔH	1.7630
Pitot Constant	0.84
Port Height (ft)	0
Static Pressure (Ps)	-0.14
Stack Geometry (R or C)?	C
Stack Diameter (in)	96.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	0.374
Nozzle ID 2 (in)	0.375
Nozzle ID 3 (in)	0.375
Nozzle ID (in)	0.375
N2 Percent	82.1

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	712.4	818.9	106.5
Impinger 2	612.4	615.9	3.5
Impinger 3	637.1	638.3	1.2
Impinger 4	908.7	918.7	10
Impinger 5			0
Impinger 6			0
Impinger 7			0
Impinger 8			0
Moisture Collected (g)			121.2

Saturated Percent Moisture	101.67	Standard
Calculated Percent Moisture	11.43	Volume (dscf)
Isokinetic %	104.8	44.3

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft³)	Velocity Head (ΔP) (in H2O)	Orifice Pressure Diff (ΔH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm Out (F)
A1	0	11:20:00	531.096	0.32	1.43	1598	60
A2	3	11:23:00	533.150	0.31	1.35	1600	60
A3	6	11:26:00	535.300	0.28	1.20	1597	60
A4	9	11:29:00	537.291	0.24	1.04	1587	60
A5	12	11:32:00	539.118	0.22	0.96	1579	61
A6	15	11:35:00	540.898	0.19	0.83	1564	61
STOP	18	11:38:00	542.540				
B1	18	11:42:00	542.540	0.28	1.20	1565	61
B2	21	11:45:00	544.532	0.31	1.35	1589	62
B3	24	11:48:00	546.628	0.28	1.20	1586	62
B4	27	11:51:00	548.617	0.24	1.00	1580	62
B5	30	11:54:00	550.452	0.20	0.88	1571	62
B6	33	11:57:00	552.165	0.18	0.79	1559	61
STOP	36	12:00:00	553.787				
C1	36	12:10:00	553.787	0.30	1.30	1573	59
C2	39	12:13:00	555.845	0.30	1.30	1582	60
C3	42	12:16:00	557.860	0.27	1.15	1580	60
C4	45	12:19:00	559.831	0.25	1.10	1577	60
C5	48	12:22:00	561.621	0.21	0.90	1566	60
C6	51	12:25:00	563.369	0.18	0.78	1549	60
STOP	54	12:28:00	564.808				
D1	54	12:31:00	564.808	0.29	1.25	1567	60
D2	57	12:34:00	566.765	0.29	1.25	1577	61
D3	60	12:37:00	568.691	0.27	1.20	1575	61
D4	63	12:40:00	570.635	0.24	1.00	1572	62
D5	66	12:43:00	572.465	0.23	1.00	1565	62
D6	69	12:46:00	574.289	0.22	0.97	1559	62
STOP	72	12:49:00	576.056				

Run Used: Yes

Enter data in unshaded areas.

Sample Type	Method 12
Client/Plant	Suncoke/Indiana Harbor
Project Number	60682449
Sampling Location	HRCC Oven Vent B-4
Condition	Full Load
Meter Box Number	SC-M1543
Meter Factor (γ_s)	0.9850
Minutes per Point	3.0
Barometric Pressure	29.40

O2/CO2 Method 3A		
	CO2 Percent	O2 Percent
Replicate 1	6.6	11.0
Replicate 2		
Replicate 3		
Average	6.6	11.0

Date	5/5/2022
Operator	FJS/WEL
Run Number	4
K Factor	4.34
Meter ΔH_g	1.7630
Pitot Constant	0.84
Port Height (ft)	0
Static Pressure (Ps)	-0.14
Stack Geometry (R or C)?	C
Stack Diameter (in)	96.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	0.374
Nozzle ID 2 (in)	0.375
Nozzle ID 3 (in)	0.375
Nozzle ID (in)	0.375

Impinger Weights (g)			
	Initial	Final	Net
Impinger 1	777.7	887.5	109.8
Impinger 2	767.2	769.4	2.2
Impinger 3	655.2	655.7	0.5
Impinger 4	938.3	947.4	9.1
Impinger 5			0
Impinger 6			0
Impinger 7			0
Impinger 8			0
Moisture Collected (g)			121.6

Saturated Percent Moisture	101.81	Standard
Calculated Percent Moisture	11.07	Volume (dscf)
Isokinetic %	104.6	46.1

Traverse Point	Sampling Time	Clock Time	Dry Gas Meter Reading	Velocity Head	Orifice Pressure Diff	Stack Temp	Dry Gas Meter Temperature
Location	(min)	(24 hr)	Vm (ft ³)	(in H2O)	(in H2O)	Ts (F)	Tm Out (F)
D1	0	13:25:00	576.281	0.31	1.35	1557	59
D2	3	13:28:00	578.315	0.29	1.25	1562	59
D3	6	13:31:00	580.305	0.27	1.20	1561	59
D4	9	13:34:00	582.310	0.25	1.10	1555	59
D5	12	13:37:00	584.233	0.23	1.00	1550	59
D6	15	13:40:00	586.039	0.20	0.88	1541	59
STOP	18	13:43:00	587.746				
C1	18	13:45:00	587.746	0.26	1.15	1541	59
C2	21	13:48:00	589.653	0.29	1.30	1553	59
C3	24	13:51:00	591.665	0.27	1.20	1551	59
C4	27	13:54:00	593.624	0.25	1.10	1547	59
C5	30	13:57:00	595.472	0.22	0.98	1539	59
C6	33	14:00:00	597.260	0.20	0.89	1531	58
STOP	36	14:03:00	598.955				
B1	36	14:08:00	598.955	0.30	1.30	1528	55
B2	39	14:11:00	600.983	0.31	1.40	1537	55
B3	42	14:14:00	603.031	0.29	1.30	1534	56
B4	45	14:17:00	605.065	0.27	1.20	1530	56
B5	48	14:20:00	607.032	0.25	1.10	1528	55
B6	51	14:23:00	608.901	0.23	1.00	1522	56
STOP	54	14:26:00	610.711				
A1	54	14:31:00	610.711	0.31	1.40	1524	54
A2	57	14:34:00	612.763	0.32	1.40	1531	55
A3	60	14:37:00	614.800	0.31	1.40	1529	55
A4	63	14:40:00	616.875	0.30	1.30	1525	56
A5	66	14:43:00	618.905	0.28	1.25	1519	56
A6	69	14:46:00	620.898	0.24	1.05	1513	56
STOP	72	14:49:00	622.750				

Velocity/Temperature Traverse EPA Method 2

Project	IHO - SunCoke
Project Number	60602449
Facility	Indiana Harbor
Source	Vent Stack B

Operator	FJS/WL
Date	05/04/2022
Time	19:35-19:41

Console (or Temperature Readout) ID		SC-m1543
DGMCF	0.985	ΔH@ 1.763
Barometer ID		
200303893		
Barometric Pressure (" Hg)		
29.56		
Elevation (Relative to Barometer) (ft)		
0.0		
Static Pressure (" wc)		
- 0.14		

Pitot Tube No.	1604120	
PTCF	0.84	
Pitot Tube Leak Check ("H ₂ O@ "H ₂ O)		
Initial (-)	0.0	@ 5.3
Initial (+)	0.0	@ 5.7
Final (-)	0.0	@ 5.3
Final (+)	0.0	@ 4.9

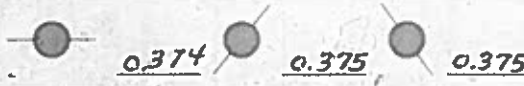
Traverse Point ¹	Velocity Head (ΔP) (in. wc)	Temperature (°F)
A 1	0.30	1440
2	0.27	1445
3	0.28	1447
4	0.26	1447
5	0.24	1447
6	0.20	1450
AVG	0.26	1446

Traverse Point	Velocity Head (ΔP) (in. wc)	Temperature (°F)

1 - Traverse Point Locations are defined on FDS-03a or FDS-03B, using information found on FDS-03F.

FDS-03E: Velocity/Temperature
Per EM SOP-012
Issued: October 2020
Document reviewed biennially

(FJS)

Sample Type EPA Method 12 for Lead		Date 05/04/2022	Barometer ID 29.54	Page 1 of 1
Project Name SunCoke		Cond Coke Production Run 1	Bar. Press. ("Hg) 2005038432	Train Leak Rate (cfm @ "Hg)
Project Number 60682449		Console ID SC-M1543	Stat. Press. ("H ₂ O) -0.14	Initial 0.000 @ 15.0
Facility Indiana Harbor		DGMCF 0.985	Probe ID 1604120	Final 0.001 @ 23.0
Source Vent Stack B-		ΔH@ 1.763 K _t	PTCF 0.84	Pitot Tube Leak Check ("H ₂ O @ "H ₂ O)
Operator FJS/WL		Filter No. E3-86-04	Meter Elevation (ft) (relative to Barometer) 0.0	Initial (-) 0.0 @ 5.2
Duct Dimension(s) 96 in (8 ft)		Nozzle Dia (in) 0.375		Initial (+) 0.0 @ 5.7
Nozzle Calibration 		Caliper Used ID CAL-M1504		Final (-) 0.0 @ 4.0
		Calibration Exp Date 5/12/2023		Final (+) 0.0 @ 3.8

Post-Test Stack TC Check	Reference Thermometer ID	Ref Thermometer Exp Date	Thermometer and TC agree within 2°F	Y / N	Post-Test: Are Pitots Damaged?	Y / N
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Point	Clock Time	DGM Reading (ft ³)	ΔP (in. H ₂ O)	ΔH (in. H ₂ O)	Temperature (°F)					Vacuum (in. Hg)
					Stack	Probe Target	Filter Target	Imp Exit Target <68	DGM Outlet	
A 1	20:30	444.576	0.28	1.26	1447	N/A	254	43	48	5.0
2	20:33	446.210	0.27	1.21	1460		254	41	49	6.0
3	20:36	448.200	0.27	1.21	1453		257	40	49	7.0
4	20:39	450.350	0.25	1.12	1490		255	40	49	7.0
5	20:42	452.260	0.22	0.98	1515		255	42	50	7.0
6	20:45	454.050	0.21	0.93	1543	↓	253	44	51	6.5
---	20:48	455.726	Port Change							
B 1	20:55	455.726	0.27	1.19	1605	N/A	258	47	52	7.5
2	20:58	457.552	0.29	1.27	1655		256	46	52	13.0
3	21:01	459.515	0.28	1.22	1647		256	46	53	15.0
4	21:04	461.600	0.24	1.04	1638		252	47	53	13.0
5	21:07	463.400	0.22	0.95	1632		255	48	53	12.0
6	21:10	465.135	0.20	0.86	1611	↓	253	48	53	10.0
---	21:13	466.753	Port Change							
C 1	21:23	466.753	0.27	1.15	1576	N/A	250	49	53	10.5
2	21:26	468.591	0.26	1.11	1602		243	48	54	14.0
3	21:29	470.405	0.24	1.02	1595		242	46	54	15.0
4	21:32	472.235	0.22	0.94	1587		259	45	54	16.5
5	21:35	473.945	0.18	0.77	1575		253	45	54	10.0
6	21:38	475.500	0.15	0.64	1552	↓	255	45	55	8.0
---	21:41	476.997	Port Change							
D 1	21:44	476.997	0.25	1.07	1558	N/A	245	46	55	12.5
2	21:47	478.810	0.26	1.11	1567		253	45	56	22.0
3	21:50	480.520	0.24	1.0	1563		260	45	56	22.0
4	21:53	482.161	0.20	0.85	1556		251	46	57	22.0
5	21:56	483.798	0.17	0.73	1542		248	46	56	11.0
6	21:59	485.339	0.15	0.64	1529	↓	259	46	57	8.0
---	22:02	486.788	End of Run							

Notes: **O₂ = 10.4%**
CO₂ = 7.0%

Project Name	IHO Suncoke		
Project Number	60682449		
Date	05/04/2022		
Source	Vent Stack B		

Inorganic Lead EPA Method 12

Condition No.	COKE PRODUCTION		
Run No.	1		
Balance ID	BAL-m1702		
Recovered by	FJS		

Moisture Determination

Imp No.	Contents	Vol (mL)	Configuration	Initial Wt (g)	Final Wt (g)
1	0.1 N HNO ₃	100	Mod	765.2	866.3
2	0.1 N HNO ₃	100	G/S	705.3	707.4
3	empty	--	Mod	646.3	646.7
4	Silica Gel	~ 300g	Mod	929.7	939.2
5					

3,046.5 3,159.6

113.1g

Sample Log

Sample ID Number	Sample Container	Description
-M12-PNR	250 mL	Probe and Nozzle Rinse
-M12-Filt	Petri Dish	Filter
-M12-Imp Catch	950 mL	Imp. Catch and rinses

Sample Recovery Checklist

- ☒ Rinse and brush probe and nozzle with 0.1 N Nitric Acid into PNR sample bottle.
- ☒ Separate filter holder and place filter in clean pre-rinsed glass petri dish. Complete filter sample label.
- ☒ Rinse front half of filter holder with 0.1 N Nitric Acid into PNR bottle. Complete probe and nozzle rinse (PNR) sample label.
- ☒ Disassemble sample train, wipe off excess water and weigh each impinger. Record the final weights in the Moisture Determination section of this data
- ☒ Note condition of the silica gel impinger. 50 % spent
- ☒ Transfer the liquid from the impingers into the Imp. Catch jar. Pour approximately 30 mL of 0.1 N Nitric Acid into each of the first three impingers and pour out of the impinger exit arm into the Imp. Catch jar. Rinse each piece of connecting glassware twice with 0.1 N Nitric Acid into the Imp. Catch jar.
- ☐ Log samples into logbook and store appropriately.

Notes	BAL-m1702 500g - 500.0g Cal'd 3/8/2022
	0.1N HNO ₃ 02/04/2021

Sample Type	EPA Method 12 for Lead	Date	05/04/2022	Barometer ID	200303893	Page	1 of 1
Project Name	SunCoke	Cond COKE PRODUCTION	Run	2	Bar. Press. ("Hg)	29.55	
Project Number	60682449	Console ID	SC-m1543	Stat. Press. ("H ₂ O)	-0.14		
Facility	Indiana Harbor	DGMCF	0.985	Probe ID	1604120		
Source	Vent Stack B-	ΔH@	1.763	K _r	4.34	PTCF	0.84
Operator	FJS/WL	Filter No.	E3-86-05	Meter Elevation (ft) (relative to Barometer)	0.0		
Duct Dimension(s)	96.12 (8ft)	Nozzle Dia (in)	0.375	Caliper Used	ID	CAL-m1504	
Nozzle Calibration				Calibration Exp Date	5/12/2023		
Train Leak Rate (cfm @ "Hg)				Initial	0.002 @ 15.0		
Final				0.001 @ 22.5			
Pitot Tube Leak Check ("H ₂ O @ "H ₂ O)				Initial (-)	0.0 @ 4.0		
Initial (+)				0.0 @ 3.8			
Final (-)				0.0 @ 5.8			
Final (+)				0.0 @ 3.7			

Post-Test Stack TC Check	Reference Thermometer ID	Ref Thermometer Exp Date	Thermometer and TC agree within 2°F	Y / N	Post-Test: Are Pitots Damaged?	Y / N
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Point	Clock Time	DGM Reading (ft ³)	ΔP (in. H ₂ O)	ΔH (in. H ₂ O)	Temperature (°F)					Vacuum (in. Hg)
					Stack	Probe Target	Filter Target	Imp Exit Target <68	DGM Outlet	
D ¹	22:50	487.065	0.28	1.24	1551	N/A	261	50	54	6.0
2	22:53	489.106	0.26	1.12	1554		246	47	54	6.0
3	22:56	490.899	0.24	1.04	1552		242	45	54	6.0
4	22:59	492.725	0.22	0.95	1546		256	44	55	6.0
5	23:02	494.525	0.19	0.82	1540		252	43	55	5.0
6	23:05	496.155	0.17	0.74	1524	↓	260	44	55	4.0
---	23:09	497.698	Port Change							
C ¹	23:11	497.698	0.25	1.08	1528	N/A	244	43	55	7.0
2	23:14	499.602	0.26	1.13	1541		258	42	55	7.0
3	23:17	501.466	0.24	1.04	1539		252	42	55	7.0
4	23:20	503.390	0.21	0.91	1533		245	42	56	5.5
5	23:23	505.041	0.20	0.87	1528		254	42	56	6.0
6	23:26	506.772	0.17	0.74	1518	↓	250	42	56	4.5
---	23:29	508.287	Port Change							
B ¹	23:35	508.287	0.28	1.22	1571	N/A	253	42	56	7.0
2	23:38	510.235	0.30	1.30	1597		252	40	57	9.5
3	23:41	512.271	0.25	1.09	1603		254	39	57	8.0
4	23:44	514.147	0.24	1.04	1604		252	39	57	8.0
5	23:47	515.965	0.23	1.0	1600		251	39	57	8.0
6	23:50	517.774	0.21	0.91	1595	↓	254	39	57	7.0
---	23:53	519.484	Port Change							
A ¹	23:57	519.484	0.28	1.21	1596	N/A	242	41	57	9.0
2	24:00	521.417	0.31	1.34	1605		251	38	58	14.0
3	00:03	523.418	0.28	1.21	1602		250	38	58	21.0
4	00:06	525.333	0.27	1.16	1598		253	38	58	21.5
5	00:09	527.248	0.24	1.03	1590		261	38	58	12.0
6	00:12	529.089	0.22	0.95	1583	↓	259	38	59	9.0
---	00:15	530.806	End of Run							

Notes:	O ₂ = 9.8%	SDS-12: General Isokinetic Sampling
	CO ₂ = 7.4%	Issued: July 2021
		Document reviewed biennially

Project Name	IHO Suncoke
Project Number	60682449
Date	05/05/2022
Source	Vent Stack B

Inorganic Lead EPA Method 12

Condition No.	COKE PRODUCTION
Run No.	2
Balance ID	BAL-m1702
Recovered by	FJS

Moisture Determination

Imp No.	Contents	Vol (ml)	Configuration	Initial Wt (g)	Final Wt (g)
1	0.1 N HNO ₃	100	Mod	769.2	879.3 866.3
2	0.1 N HNO ₃	100	G/S	704.4	706.4 707.4
3	empty	--	Mod	641.6	642.5 646.7
4	Silica Gel	~ 300g	Mod	926.9	935.9 939.2
5					3,164.1

Sample Log

Sample ID Number	Sample Container	Description
-M12-PNR	250 mL	Probe and Nozzle Rinse
-M12-Filt	Petri Dish	Filter
-M12-Imp Catch	950 mL	Imp. Catch and rinses

Sample Recovery Checklist

- ☒ Rinse and brush probe and nozzle with 0.1 N Nitric Acid into PNR sample bottle.
- ☒ Separate filter holder and place filter in clean pre-rinsed glass petri dish.
- ☒ Complete filter sample label.
- ☒ Rinse front half of filter holder with 0.1 N Nitric Acid into PNR bottle.
- ☒ Complete probe and nozzle rinse (PNR) sample label.
- ☒ Disassemble sample train, wipe off excess water and weigh each impinger.
- ☒ Record the final weights in the Moisture Determination section of this data
- ☒ Note condition of the silica gel impinger. 50 % spent
- ☒ Transfer the liquid from the impingers into the Imp. Catch jar. Pour approximately 30 mL of 0.1 N Nitric Acid into each of the first three impingers and pour out of the impinger exit arm into the Imp. Catch jar. Rinse each piece of connecting glassware twice with 0.1 N Nitric Acid into the Imp. Catch Jar.

Log samples into logbook and store appropriately.

Notes	Balance Calibration - BAL-m1702 05/05/2022
	500g wt = 500.0g URS Set Weights

Sample Type	EPA Method 12 for Lead	Date	05/05/2022	Barometer ID	200303893	Page	1	of	1
Project Name	SunCoke	Cond	NP	Run	3	Bar. Press. ("Hg)	29.44	Train Leak Rate (cfm @ "Hg)	
Project Number	60682449	Console ID	SC-M1543	Stat. Press. ("H ₂ O)	-0.14	Initial	0.002	@	20.0
Facility	Indiana Harbor	DGMCF	0.985	Probe ID	1604120	Final	0.000	@	11.0
Source	Vent Stack B-	ΔH@	1.763	K _t	4.34	PTCF	0.84	Pitot Tube Leak Check ("H ₂ O@ "H ₂ O)	
Operator	FJS/WL	Filter No.	E3-8606	Meter Elevation (ft) (relative to Barometer)	0.0	Initial (-)	0.0	@	4.2
Duct Dimension(s)	96 in (8 ft)	Nozzle Dia (in)	0.375	Caliper Used	0.374	Initial (+)	0.0	@	4.1
Nozzle Calibration			ID	CAL-M1504	Final (-)	0.0	@	4.7	
			Calibration Exp Date	5/12/2023	Final (+)	0.0	@	4.9	

Post-Test Stack TC Check	Reference Thermometer ID	Ref Thermometer Exp Date	Thermometer and TC agree within 2°F	Y / N	Post-Test: Are Pitots Damaged?	Y / N
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Point	Clock Time	DGM Reading (ft ³)	ΔP (in. H ₂ O)	ΔH (in. H ₂ O)	Temperature (°F)					Vacuum (in. Hg)
					Stack	Probe Target	Filter Target	Imp Exit Target <68	DGM Outlet	
A 1	11:20	531.096	0.32	1.43	1598	N/A	255	46	60	7.0
2	11:23	533.150	0.31	1.35	1600		259	42	60	8.5
3	11:26	535.300	0.28	1.20	1597		254	40	60	8.0
4	11:29	537.291	0.24	1.04	1587		253	39	60	6.5
5	11:32	539.118	0.22	0.96	1579		252	39	61	6.0
6	11:35	540.898	0.19	0.83	1564	↓	253	39	61	5.0
---	11:38	542.540	Port Change							
B 1	11:42	542.540	0.28	1.20	1565	N/A	256	43	61	7.0
2	11:45	544.532	0.31	1.35	1589		255	39	62	9.5
3	11:48	546.628	0.28	1.20	1586		256	38	62	8.0
4	11:51	548.617	0.24	1.0	1580		255	39	62	7.0
5	11:54	550.452	0.20	0.88	1571		252	40	62	6.0
6	11:57	552.165	0.18	0.79	1559	↓	252	40	61	5.0
---	12:00	553.787	Port Change							
C 1	12:10	553.787	0.30	1.3	1573	N/A	254	42	59	8.0
2	12:13	555.845	0.30	1.3	1582		258	41	60	8.0
3	12:16	557.860	0.27	1.15	1580		254	40	60	8.0
4	12:19	559.831	0.25	1.1	1577		248	40	60	7.0
5	12:22	561.621	0.21	0.9	1566		250	41	60	6.5
6	12:25	563.369	0.18	0.78 (FIS) 0.55 (FIS)	1549 (FIS) 1279 (FIS)	↓	252	41	60	6.0
---	12:28	564.808	Port Change							
D 1	12:31	564.808	0.29	1.25	1567	N/A	261	45	60	8.0
2	12:34	566.765	0.29	1.25	1577		250	42	61	8.0
3	12:37	568.691	0.27	1.2	1575		251	42	61	8.0
4	12:40	570.635	0.24	1.0	1572		250	41	62	7.0
5	12:43	572.465	0.23	1.0	1565		254	41	62	7.0
6	12:45	574.289	0.22	0.97	1559	↓	256	41	62	7.0
---	12:48	576.056	End of Run							

Notes: O₂ = 11.9%

CO₂ = 6.0%

Project Name	IHO Suncoke
Project Number	60682449
Date	05/05/2022
Source	Vent Stack B

Inorganic Lead EPA Method 12

Condition No.	Non-Production / Baghouse Off
Run No.	3
Balance ID	BAL-m1702
Recovered by	FJS

Moisture Determination

Imp No.	Contents	Vol (mL)	Configuration	Initial Wt (g)	Final Wt (g)
1	0.1 N HNO ₃	100	Mod	712.4	818.9
2	0.1 N HNO ₃	100	G/S	612.4	615.9
3	empty	-	Mod	637.1	638.3
4	Silica Gel	~ 300g	Mod	908.7	918.7
5					

2,870.6

2,991.8

121.2g

Sample Log

Sample ID Number	Sample Container	Description
-M12-PNR	250 mL	Probe and Nozzle Rinse
-M12-Filt	Petri Dish	Filter
-M12-Imp Catch	950 mL	Imp. Catch and rinses

Sample Recovery Checklist

- ☒ Rinse and brush probe and nozzle with 0.1 N Nitric Acid into PNR sample bottle.
- ☒ Separate filter holder and place filter in clean pre-rinsed glass petri dish. Complete filter sample label.
- ☒ Rinse front half of filter holder with 0.1 N Nitric Acid into PNR bottle. Complete probe and nozzle rinse (PNR) sample label.
- ☒ Disassemble sample train, wipe off excess water and weigh each impinger. Record the final weights in the Moisture Determination section of this data
- ☒ Note condition of the silica gel impinger. 50 % spent
- ☒ Transfer the liquid from the impingers into the Imp. Catch jar. Pour approximately 30 mL of 0.1 N Nitric Acid into each of the first three impingers and pour out of the impinger exit arm into the Imp. Catch jar. Rinse each piece of connecting glassware twice with 0.1 N Nitric Acid into the Imp. Catch jar.

Log samples into logbook and store appropriately.

Notes

RDS-13M: Inorganic Lead by EPA Method 12
Per EM SOP-015
Issued: December 2021
Document reviewed biennially

Sample Type	EPA Method 12 for Lead	Date	05/05/2022	Barometer ID	200303893	Page	1 of 1
Project Name	SunCoke	Cond	NP	Run	4	Train Leak Rate (cfm @ "Hg)	
Project Number	60682449	Console ID	SC-M1543	Bar. Press. ("Hg)	29.40	Initial 0.002 @ 15.0	
Facility	Indiana Harbor	DGMCF	0.985	Stat. Press. ("H ₂ O)	-0.14	Final 0.000 @ 9.5	
Source	Vent Stack B-	ΔH@	1.763	K _t	4.43	Pitot Tube Leak Check ("H ₂ O@ "H ₂ O)	
Operator	FJ5/WL	Filter No.	E3-86-07	Meter Elevation (ft) (relative to Barometer)	0.0	Initial (-) 0.0 @ 4.7	
Duct Dimension(s)	96in(8ft)	Nozzle Dia (in)	0.375	Caliper Used	ID CAL-M1504	Initial (+) 0.0 @ 4.9	
Nozzle Calibration				Calibration Exp Date	5/12/2023	Final (-) 0.0 @ 4.2	
						Final (+) 0.0 @ 5.1	

Post-Test Stack TC Check	Reference Thermometer ID	Ref Thermometer Exp Date	Thermometer and TC agree within 2°F	Y / N	Post-Test: Are Pitots Damaged?	Y / N
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Point	Clock Time	DGM Reading (ft ³)	ΔP (in. H ₂ O)	ΔH (in. H ₂ O)	Temperature (°F)					Vacuum (in. Hg)
					Stack	Probe Target	Filter Target	Imp Exit Target <68	DGM Outlet	
D ¹	13:25	576.281	0.31	1.35	1557	N/A	261	42	59	7.0
2	13:28	578.315	0.29	1.25	1562		263	40	59	6.0
3	13:31	580.305	0.27	1.2	1561		261	40	59	6.5
4	13:34	582.310	0.25	1.1	1555		256	39	59	5.5
5	13:37	584.233	0.23	1.0	1550		251	37	59	5.0
6	13:40	586.039	0.20	0.88	1541		260	37	59	4.5
---	13:43	587.746	Port Change							
C ¹	13:45	587.746	0.26	1.15	1541	N/A	250	39	59	6.0
2	13:48	589.653	0.29	1.3	1553		256	38	59	7.0
3	13:51	591.665	0.27	1.2	1551		251	38	59	6.0
4	13:54	593.624	0.25	1.1	1547		250	38	59	5.5
5	13:57	595.472	0.22	0.98	1539		254	38	59	5.0
6	14:00	597.260	0.20	0.89	1531		250	38	58	5.0
---	14:03	598.955	Port Change							
B ¹	14:08	598.955	0.30	1.3	1528	N/A	255	40	55	6.0
2	14:11	600.983	0.31	1.4	1537		255	39	55	7.0
3	14:14	603.031	0.29	1.3	1534		256	38	56	7.0
4	14:17	605.065	0.27	1.2	1530		251	38	56	6.5
5	14:20	607.032	0.25	1.1	1528		251	38	55	6.0
6	14:23	608.901	0.23	1.0	1522		253	38	56	6.0
---	14:26	610.711	Port Change							
A ¹	14:31	610.711	0.31	1.4	1524	N/A	254	41	54	7.0
2	14:34	612.763	0.32	1.4	1531		253	39	55	7.0
3	14:37	614.800	0.31	1.4	1529		251	38	55	8.0
4	14:40	616.875	0.30	1.3	1525		250	38	56	7.5
5	14:43	618.905	0.28	1.25	1519		249	38	56	7.0
6	14:46	620.898	0.24	1.05	1513		250	39	56	6.0
---	14:49	622.750	End of Run							

Notes: O₂ = 11.0%
CO₂ = 6.6%

SDS-12: General Isokinetic Sampling
Issued: July 2021
Document reviewed biennially

Project Name	IHO Suncoke
Project Number	60682449
Date	05/05/2022
Source	Vent Stack B

ИХО

Project Number	60682449
----------------	----------

Date 05/05/2022

Source *Vent Stack B*

Imp No.	Contents	Vol (ml)	Configuration	Initial Wt (g)	Final Wt (g)
1	0.1 N HNO ₃	100	Mod	777.7	887.5
2	0.1 N HNO ₃	100	G/S	767.2	769.4
3	empty	--	Mod	655.2	655.7
4	Silica Gel	~ 300g	Mod	938.3	947.4
5					

3,138.4 3,260.0

121.69

Sample ID Number	Sample Container	Description
-M12-PNR	250 mL	Probe and Nozzle Rinse
-M12-Filt	Petri Dish	Filter
-M12-Imp Catch	950 mL	Imp. Catch and rinses

Condition No.	NEW PRODUCTION	BAEHOUSE
Run No.	4	
Balance ID	BAL-m1702	
Recovered by	FJS	

Condition

No. NEW FREEDOM

五

Balance ID AAL - m1702

Recovered by	FJS

✓	Rinse and brush probe and nozzle with 0.1 N Nitric Acid into PNR sample bottle.
✓	Separate filter holder and place filter in clean pre-rinsed glass petri dish. Complete filter sample label.
✓	Rinse front half of filter holder with 0.1 N Nitric Acid into PNR bottle. Complete probe and nozzle rinse (PNR) sample label.
✓	Disassemble sample train, wipe off excess water and weigh each impinger. Record the final weights in the Moisture Determination section of this data
✓	Note condition of the silica gel impinger. 50% spent
✓	Transfer the liquid from the impingers into the Imp. Catch jar. Pour approximately 30 mL of 0.1 N Nitric Acid into each of the first three impingers and pour out of the impinger exit arm into the Imp. Catch jar. Rinse each piece of connecting glassware twice with 0.1 N Nitric Acid into the Imp. Catch Jar.

Log samples into logbook and store appropriately.

Notes

RDS-13M: Inorganic Lead by EPA Method 12
Per EM SOP-015
Issued: December 2021
Document reviewed biennially

Zero Check
N₂

O₂
0.00

CO₂
0.00

5/5/2022

Conc. 10.99

Conc. ^{10.10}
~~10.10~~

Conc. 19.95

Conc 28.79

19.7

30.9

Run # 1 O₂%

CO₂%

10.4%

~~07.0~~ 07.0%

Run # 2 9.8%

07.4%

Run # 3 11.9%

06.0%

Run # 4 11.0%

06.6%

Appendix C
ANALYTICAL REPORT

AECOM

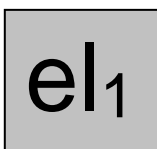
1600 Perimeter Park Drive, Suite 400
Morrisville, NC 27560

Project ID: 60682449 SunCoke, Indiana Harbor, IN

Lead

EPA Method 12 Analysis

Analytical Report
38576



Element One, Inc.
6319-D Carolina Beach Rd., Wilmington, NC 28412
910-793-0128 FAX: 910-792-6853 e1lab@e1lab.com

The following data for Analytical Report 38576
has been reviewed for completeness, accuracy,
adherence to method protocol,
and compliance with quality assurance guidelines.

Review by:

A handwritten signature in black ink, appearing to read 'Daphne', with a long horizontal stroke extending to the right.

Daphne Woodman, B.S. Chemist
May 18, 2022

Report Reviewed and Finalized by:

A handwritten signature in black ink, appearing to read 'Ken Smith', with a long horizontal stroke extending to the right.

Ken Smith, Laboratory Director
May 18, 2022

SUMMARY OF RESULTS

Summary of Analysis

SCIH-B4-STK - Summary of Method 12 Lead Analysis

Element	Run 1 e38576-1 Total µg	Run 2 e38576-2 Total µg	Run 3 e38576-3 Total µg	Run 4 e38576-4 Total µg	Run 2 Spike e38576-3 Recovery
Lead, Average	641	598	229	277	101%
Triplicate RSD	1.5%	0.4%	1.2%	1.7%	

Blanks - Summary of Method 12 Lead Analysis

Element	HNO ₃ Blank e38576-5 Total µg	Filter Blank 1 e38576-6 Total µg	Filter Blank 2 e38576-7 Total µg
Lead, Average	0.197	< 0.1	< 0.1
Triplicate RSD	1.4%	6.6%	0.8%

ANALYTICAL NARRATIVE

Element One Analytical Narrative

Client:	AECOM	Element One #:	38576
Client ID:	60682449, SunCoke, Indiana Harbor, IN	Analyst:	DBW
Method:	M12	Date Received:	05/11/22
Analytes:	Pb	Date Analyzed:	05/17/22

Summary of Analysis

The Method 12 samples were prepared and analyzed according to method protocol. After digestion, the samples were brought to a final volume of 100 mL with ultra-pure DI water. The digested samples were then analyzed for lead on a PerkinElmer Nexlon 350X ICP-MS.

Detection Limit

The ICP-MS instrument reporting limit was 1.0µg/L for lead.

Analysis QA/QC

The spike recovery data and triplicate analyses relative standard deviations, RSD, are summarized with the results. All QA/QC data was within the criteria of the method.

Additional Comments

The reported results have not been corrected for any blank or spike recovery values. The reported results relate only to the items tested or calibrated.

SAMPLE CUSTODY

Chain-of-Custody Record/Lab Work Request

38576

Page 1 of 1

Client	SunCoke, Indiana Harbor, IN		
Work Order Number	60682449	Phone Number	919-461-1289
Contact Person	Jerry Workman	Turn Around Time	Standard

[illegible]

Notes:	M12 - Lead analysis per EPA Method 12
--------	---------------------------------------

Relinquished By	Received By	Date	Time	Lab Use Only	
Willie Lea	Loa B. Brown	5/11/22	1000	Shipper	Air Bill #
				Opened By	Date/Time
				Temp °C	Condition
				Custody Seals: Yes	No None N/A

Laboratory Comments:

Samples received in good condition - No empty container.
Per Pat via phone, combined analysis - LRB 5.10.22
Per Pat via email, 5 day TAT - 5.10.22 LRB

ANALYTICAL DATA

Analytical Calculations

Method 12 Lead-

$$\text{Lead Results } (\mu\text{g}) = \text{ICP Results } (\mu\text{g/L}) * \text{Dilution} * \text{Final Volume (L)}$$

Where-

ICP Results= Raw sample concentration (ppb)--*ICP-Data Sheet*

Dilution= $\frac{\text{Diluted Volume}}{\text{Aliquot}}$ --*ICP-MS Run Sheet*

Final Volume (FV)--*Sample Submission*

Spike Recovery-

$$\text{Spike (\%)} = \frac{(\text{Spiked Result } (\mu\text{g/L}) - \text{Sample Result } (\mu\text{g/L}))}{\text{Spike Amount } (\mu\text{g/L})} \times 100$$

Where-

Spike Result = Raw sample concentration (ppb)--*ICP-Data Sheet*

Sample Result = Raw sample concentration (ppb)--*ICP-Data Sheet*

Spike Amount--*ICP-MS Spike Table*



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

OCT 06 2008

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

Mr. Ken Smith
Element One, Inc.
5022-C Wrightsville Avenue
Wilmington, NC 28403

Dear Mr. Smith:

I am writing in response to your letter dated September 9, 2008, asking for approval of modifications to Method 12 for lead (40 CFR Part 60, Appendix A-5), Methods 103 and 104 for beryllium, and Methods 108, 108A and 108B for arsenic (40 CFR Part 61, Appendix B). You are proposing to modify these methods to use inductively coupled plasma-mass spectrometer (ICP-MS) in place of atomic absorption spectrometry (AAS) for sample analysis. These samples have been collected in fulfillment of the requirements of 40 CFR Parts 60, 61, and 63.

Because ICP-MS is identified in Method 29 (40 CFR Part 60, Appendix A-8) as an option in place of AAS for analysis of lead, beryllium and arsenic, we hereby approve your request, provided you follow the procedures for ICP-MS analysis described in Method 6020 (EPA Office of Solid Waste, publication SW-846), or its newer version, Method 6020A.

In a subsequent email you requested similar approval to use ICP-MS in place of AAS for analysis of Method 306 (40 CFR Part 63, Appendix A) samples for total chromium. This request is also approved for analysis performed per Method 6020 or 6020A, since ICP-MS is also identified in Method 29 as an option for chromium analyses.

Because we believe that these modifications are acceptable for general use, this approval to modify Methods 12, 103, 104, 108, 108A, 108B and 306 will be posted on our web site (at <http://www.epa.gov/ttn/emc/tmethods.html#CatB>) as being broadly applicable.

If you need further assistance, please contact Bill Grimley at (919) 541-1065.

Sincerely,

A handwritten signature in cursive script that reads "Connie Oldham".

Conniesue B. Oldham, Ph.D., Group Leader
Air Measurements and Quality Group

Internet Address (URL) • <http://www.epa.gov>
Recycled/Recyclable • Printed with Vegetable Oil Based Inks on Recycled Paper (Minimum 25% Postconsumer)

elementOne

AIR TESTING SAMPLE SUBMISSION FORM

Lab ID 38576

Combined Analysis
RUSH--- 5 DAY TAT

Analysis Due Date 05.16.22

QA/QC/Report Due Date 05.17.22

Client AECOM NC
Project No 60682449Date Rec 05.11.22
Time Rec 1000

HNO ₃ Lot: 1121590	Volume Marked <input checked="" type="radio"/> Yes / No	pH < 2.0 <input checked="" type="radio"/> Yes / No	Ref. Method 12
H ₂ O ₂ Lot: 217628	Volume Loss Yes / <input checked="" type="radio"/> No / ?	(if >2 note below)	

Sample Identification

SCIH-B4-STK		Reagent Blanks			
1	M12-R1	5	HNO ₃		
2	M12-R2	6	Filter 1		
3	M12-R3	7	Filter 2		
	M12-R3 Spike				
4	M12-R4				
Analyses Requested:		Samples 1-7 Pb - Combine all fractions for Total Pb			

Runs/ FB	Filter (C1)	Probe Rinse (C2)	Impinger Catch (C4)	Combined Sample	Comments
	ID	BV	BV	FV	
LRB	---	---	100	100	
LRB+	---	---	↓	↓	
1	N/A	118	435	↓	
2	N/A	112	535	↓	
3.S	N/A	90	550	↓	
4	N/A	84	575	↓	

Reagent Blank

Lab ID	Fraction	BV, ml	FV, ml	
5	HNO ₃	200	100	COOKED DOWN 200ml
6	Filter 1	NA	↓	
7	Filter 2	NA	↓	

Lab Communications

LRB+ Spiked w/0.2 ml 25 ppm Std A (021422-A)

PR#1, 2: particularly dark coloration - photos taken.

Runs: Received Filter, PR, HNO₃ Imp; RB: Rec HNO₃, (2) Filters—05.11.22 LLB

SS Page 1 of 1

5/11/2022 2:54:48 PM

SS by SSPrep By / Date RMH 5/13/22

Prep By / Date

Labeled By / Date RMH 5/11/22ID Verification By / Date DBL 5/11/22

elementOne

 Certification: NJ NELAP NC009
 38576 AECOM M12 Report Packet
 Page 12 of 20

Sample/Batch Report

Capl
5/17/22

User Name: R2D2
Computer Name: PESERVICE-PC
Sample File: C:\Users\Public\Documents\PerkinElmer Syngistix\CPMS\Sample\b7.sam
Report Date/Time: Tuesday, May 17, 2022 12:02:22

A/S Loc.	Batch ID	Sample ID	Description	Sample Type	Init. Quant.	Prep. Vol.	Aliquot Vol.	Diluted Vol.	Solids Ratio
	7	QC Std 2		Sample					
101		LRB		Sample					
102	s	LRB SPK		Spike - 1 of 2					
103	x10	38576-1		Sample					
104		38576-2		Sample					
105		38576-3		Sample					
106	s	38576-3		Spike - 1 of 6					
107		38576-4		Sample					
108		38576-5		Sample					
109		38576-6		Sample					
110		38576-7		Sample					
111	FH	LRB		Sample					
112	FHs	LRB SPK		Spike - 1 of 12					
113		38587-1 FH		Sample					
114		38587-2 FH		Sample					
115		38587-3 FH		Sample					
116	s	38587-3 FH		Spike - 1 of 16					
117		38587-5		Sample					
118	BH	LRB		Sample					
119	BHs	LRB SPK		Spike - 1 of 19					
120		38587-1 BH		Sample					
121		38587-2 BH		Sample					
122		38587-3 BH		Sample					
123	s	38587-3 BH		Spike - 1 of 23					
124		38587-4		Sample					
125	x50	38576-1		Sample					
126	x50	38576-2		Sample					
127	x50	38576-3		Sample					
128	x50s	38576-3		Spike - 1 of 28					
129	x50	38576-4		Sample					
130		38576-5		Sample					
131		38576-6		Sample					
132	x10	38587-1 FH		Sample					
133	x10	38587-2 FH		Sample					
134	x5	38587-3 FH		Sample					
135	x5s	38587-3 FH		Spike - 1 of 35					
136		38587-5		Sample					
137	x5	38587-1 BH		Sample					
138	x5	38587-2 BH		Sample					
139	x5	38587-3 BH		Sample					
140	x5s	38587-3 BH		Spike - 1 of 40					
141		38587-4		Sample					
142	x10	38587-3 BH		Sample					
143	x10s	38587-3 BH		Spike - 1 of 43					
144	x50	38587-3 BH		Sample					
145	x50s	38587-3 BH		Spike - 1 of 45					

Dataset Report

Day
5/17/22

User Name: R2D2

Computer Name: PESERVICE-PC

Dataset File Path: C:\Users\Public\Documents\PerkinElmer Syngistix\CPMS\DataSet\051722-2a\

Report Date/Time: Tuesday, May 17, 2022 12:02:09

The Dataset

Time	Sample ID	Batch ID	Read Type	Description	Init. Quant	Prep. Vol.	Aliquot Vol.	Diluted Vol.
09:36:12 Tue 17-May-22	Blank			Blank				
09:38:13 Tue 17-May-22	Standard 1			Standard #1				
09:40:14 Tue 17-May-22	Standard 2			Standard #2				
09:42:15 Tue 17-May-22	Standard 3			Standard #3				
09:44:16 Tue 17-May-22	Standard 4			Standard #4				
09:46:17 Tue 17-May-22	Standard 5			Standard #5				
09:48:19 Tue 17-May-22	QC Std 1			QC Std #1				
09:50:20 Tue 17-May-22	QC Std 2			QC Std #2				
09:52:21 Tue 17-May-22	QC Std 3			QC Std #3				
09:54:21 Tue 17-May-22	QC Std 4			QC Std #4				
09:56:23 Tue 17-May-22	QC Std 5			QC Std #5				
09:58:24 Tue 17-May-22	QC Std 2			Sample				
10:00:25 Tue 17-May-22	LRB			Sample				
10:02:26 Tue 17-May-22	LRB SPK	s		Spike - 1 of 13				
10:06:12 Tue 17-May-22	38576-1	x10		Sample				
10:08:14 Tue 17-May-22	38576-2			Sample				
10:10:15 Tue 17-May-22	38576-3			Sample				
10:12:16 Tue 17-May-22	38576-3	s		Spike - 1 of 17				
10:14:17 Tue 17-May-22	38576-4			Sample				
10:18:21 Tue 17-May-22	38576-5			Sample				
10:20:22 Tue 17-May-22	38576-6			Sample				
10:22:23 Tue 17-May-22	38576-7			Sample				
10:24:25 Tue 17-May-22	QC Std 1			QC Std #1				
10:26:26 Tue 17-May-22	QC Std 4			QC Std #4				
10:30:56 Tue 17-May-22	LRB	FH		Sample				
10:32:57 Tue 17-May-22	LRB SPK	FHs		Spike - 1 of 25				
10:34:58 Tue 17-May-22	38587-1 FH			Sample				
10:36:59 Tue 17-May-22	38587-2 FH			Sample				
10:39:00 Tue 17-May-22	38587-3 FH			Sample				
10:41:01 Tue 17-May-22	38587-3 FH	s		Spike - 1 of 29				
10:43:02 Tue 17-May-22	38587-5			Sample				
10:45:04 Tue 17-May-22	LRB	BH		Sample				
10:47:05 Tue 17-May-22	LRB SPK	BHs		Spike - 1 of 32				
10:49:06 Tue 17-May-22	38587-1 BH			Sample				
10:51:08 Tue 17-May-22	QC Std 1			QC Std #1				
10:53:09 Tue 17-May-22	QC Std 4			QC Std #4				
10:55:11 Tue 17-May-22	38587-2 BH			Sample				
10:57:13 Tue 17-May-22	38587-3 BH			Sample				
10:59:14 Tue 17-May-22	38587-3 BH	s		Spike - 1 of 38				
11:01:15 Tue 17-May-22	38587-4			Sample				
11:03:16 Tue 17-May-22	38576-1	x50		Sample				
11:05:17 Tue 17-May-22	38576-2	x50		Sample				
11:07:18 Tue 17-May-22	38576-3	x50		Sample				
11:09:19 Tue 17-May-22	38576-3	x50s		Spike - 1 of 43				
11:11:21 Tue 17-May-22	38576-4	x50		Sample				
11:13:22 Tue 17-May-22	38576-5			Sample				
11:15:24 Tue 17-May-22	QC Std 1			QC Std #1				
11:17:25 Tue 17-May-22	QC Std 4			QC Std #4				
11:19:27 Tue 17-May-22	38576-6			Sample				

11:21:28 Tue 17-May-22	38587-1 FH	x10	Sample
11:23:29 Tue 17-May-22	38587-2 FH	x10	Sample
11:25:30 Tue 17-May-22	38587-3 FH	x5	Sample
11:27:31 Tue 17-May-22	38587-3 FH	x5s	Spike - 1 of 52
11:29:32 Tue 17-May-22	38587-5		Sample
11:31:33 Tue 17-May-22	38587-1 BH	x5	Sample
11:33:35 Tue 17-May-22	38587-2 BH	x5	Sample
11:35:36 Tue 17-May-22	38587-3 BH	x5	Sample
11:37:37 Tue 17-May-22	38587-3 BH	x5s	Spike - 1 of 57
11:39:39 Tue 17-May-22	QC Std 1		QC Std #1
11:41:40 Tue 17-May-22	QC Std 4		QC Std #4
11:43:41 Tue 17-May-22	38587-4		Sample
11:45:42 Tue 17-May-22	38587-3 BH	x10	Sample
11:47:44 Tue 17-May-22	38587-3 BH	x10s	Spike - 1 of 62
11:54:32 Tue 17-May-22	38587-3 BH	x50	Sample
11:56:33 Tue 17-May-22	38587-3 BH	x50s	Spike - 1 of 64
11:58:35 Tue 17-May-22	QC Std 1		QC Std #1
12:00:37 Tue 17-May-22	QC Std 4		QC Std #4

Method 6020 & 200.8 Metals Summary Report

Sample ID: Blank

Sample Date/Time: Tuesday, May 17, 2022 09:36:12

Sample Description:

Number of Replicates: 3

Batch ID:

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\CPMS\DataSet\051722-2a\Blank.001

Sample Prep Volume (mL):

Initial Sample Quantity (mg):

Aliquot Volume (mL):

Diluted To Volume (mL):

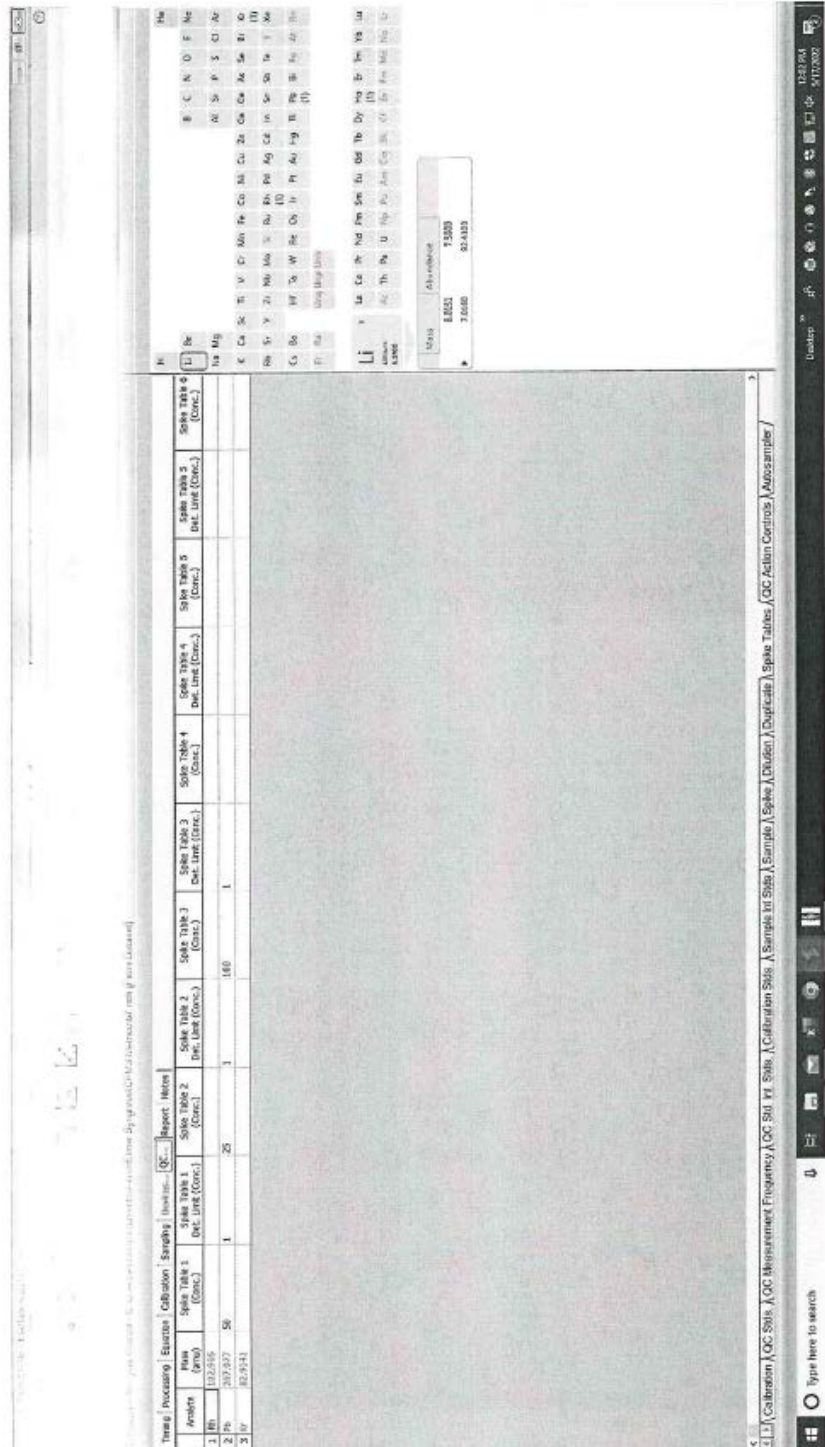
Autosampler Position: 1

Calibration

Analyte	Curve Type	Slope	Correlation Coefficient	Intercept
Rh	Linear Thru Zero			
Ho	Linear Thru Zero			
Pb	Linear Thru Ze0.049		0.999689	0.00
Kr	Linear Thru Zero			

A/S Loc.	Dilution	Sample ID	Client	Type	Weight (g)	Prep Vol (ml)
7		QC Std 2		Sample		
101		LRB		Sample		100
102	s	LRB SPK		Spike - 1 of 2		100
103	x10	38576-1		Sample		100
104		38576-2		Sample		100
105		38576-3		Sample		100
106	s	38576-3		Spike - 1 of 6		100
107		38576-4		Sample		100
108		38576-5		Sample		100
109		38576-6		Sample		100
110		38576-7		Sample		100
111	FH	LRB		Sample		100
112	FHs	LRB SPK		Spike - 1 of 12		100
113		38587-1 FH		Sample		100
114		38587-2 FH		Sample		100
115		38587-3 FH		Sample		100
116	s	38587-3 FH		Spike - 1 of 16		100
117		38587-5		Sample		100
118	BH	LRB		Sample		100
119	BHs	LRB SPK		Spike - 1 of 19		100
120		38587-1 BH		Sample		100
121		38587-2 BH		Sample		100
122		38587-3 BH		Sample		100
123	s	38587-3 BH		Spike - 1 of 23		100
124		38587-4		Sample		100
125	x50	38576-1		Sample		100
126	x50	38576-2		Sample		100
127	x50	38576-3		Sample		100
128	x50s	38576-3		Spike - 1 of 28		100
129	x50	38576-4		Sample		100
130		38576-5		Sample		100
131		38576-6		Sample		100
132	x10	38587-1 FH		Sample		100
133	x10	38587-2 FH		Sample		100
134	x5	38587-3 FH		Sample		100
135	x5s	38587-3 FH		Spike - 1 of 35		100
136		38587-5		Sample		100
137	x5	38587-1 BH		Sample		100
138	x5	38587-2 BH		Sample		100
139	x5	38587-3 BH		Sample		100
140	x5s	38587-3 BH		Spike - 1 of 40		100
141		38587-4		Sample		100
142	x10	38587-3 BH		Sample		100
143	x10s	38587-3 BH		Spike - 1 of 43		100
144	x50	38587-3 BH		Sample		100
145	x50s	38587-3 BH		Spike - 1 of 45		100
Spikes are post at 0.02mL of 25ppm spiking solution lot 021422-A in a final volume of 10mL						
Submitted for QC by:		Date/Time:		QC Review By:		Date/Time:
DBW		5/17/22 12:05		DBW		5/18/22 16:26
Re-Test Required:		No: <input checked="" type="checkbox"/>	Yes: <input type="checkbox"/>	Comments:		

T:\Jobs\Jobs - Active\38576 AECOM Suncoke M12 4R, RB\051722-2a ICP-MS Run Sheet.xls



ICP-MS Standards and QC Standards Values Table

Element or Test	Mass	Symbol	Std.#1 ppb	Std.#2 ppb	Std.#3 ppb	Std.#4 ppb	Std.#5 ppb	Std.#6 ppb	QC #1	QC #2	QC #3	QC #4	QC #5	QC #6 A	QC #7 AB	QC #8 .25
<i>Lithium</i>	6	<i>Li</i>														
Lithium	7	Li	1	50	100	200	250		0	1	125	100	50			
Beryllium	9	Be	1	50	100	200	250	0.25	0	1	125	100	50			0.25
Boron	10	B	5	50	100	200	250		0	5	125	100	50			
Boron	11	B	5	50	100	200	250		0	5	125	100	50			
Sodium	23	Na	21	500	1100	2200	2750		0	21	1250	1100	250	25000	0	
Magnesium	24	Mg	21	500	1100	2200	2750		0	21	1250	1100	250	10000	0	
Magnesium	25	Mg	21	500	1100	2200	2750		0	21	1250	1100	250			
Aluminum	27	Al	1	50	100	200	250		0	1	125	100	50	10000	0	
Phosphorus	31	P	20	500	1000	2000	2500		0	20	1250	1000	200	10000	0	
Potassium	39	K	21	500	1100	2200	2750		0	21	1250	1100	200	10000	0	
Calcium	44	Ca	50	500	1100	2200	2750		0	21	1250	1100	250	30000	0	
<i>Scandium</i>	45	<i>Sc</i>														
Titanium	47	Ti	1	50	100	200	250		0	1	125	100	50	200	0	
Titanium	49	Ti	1	50	100	200	250		0	1	125	100	50	200	0	
Vanadium	51	V	1	50	100	200	250		0	1	125	100	50	0	200	
Vanadium	51	V	1	50	100	200	250		0	1	125	100	50	0	200	
Chromium	52	Cr	1	50	100	200	250		0	1	125	100	50	0	200	
Chromium	53	Cr	1	50	100	200	250		0	1	125	100	50			
Iron	54	Fe	21	500	1100	2200	2750		0	21	1250	1100	250	25000	0	
Manganese	55	Mn	1	50	100	200	250		0	1	125	100	50	0	200	
Iron	57	Fe	21	500	1100	2200	2750		0	21	1250	1100	250	25000	0	
Cobalt	59	Co	1	50	100	200	250		0	1	125	100	50	0	200	
Nickel	60	Ni	1	50	100	200	250		0	1	125	100	50	0	200	
Copper	63	Cu	1	50	100	200	250		0	1	125	100	50	0	200	
Copper	65	Cu	1	50	100	200	250		0	1	125	100	50	0	200	
Zinc	66	Zn	1	50	100	200	250		0	1	125	100	50	0	100	
Zinc	67	Zn	1	50	100	200	250		0	1	125	100	50			
Zinc	68	Zn	1	50	100	200	250		0	1	125	100	50			
Germanium	72	Ge	1	50	100	200	250		0	1	125	100	50			
Arsenic	75	As	1	50	100	200	250		0	1	125	100	50	0	100	
Selenium	77	Se	1	50	100	200	250		0	1	125	100	50			
Selenium	82	Se	1	50	100	200	250		0	1	125	100	50	0	100	
Strontium	88	Sr	1	50	100	200	250		0	1	125	100	50			
Molybdenum	95	Mo	1	50	100	200	250		0	1	125	100	50	200	0	
Molybdenum	97	Mo	1	50	100	200	250		0	1	125	100	50	200	0	
Molybdenum	98	Mo	1	50	100	200	250		0	1	125	100	50	200	0	
<i>Rhodium</i>	103	<i>Rh</i>														
Silver	107	Ag	1	50	100	200	250		0	1	125	100	50	0	200	
Silver	109	Ag	1	50	100	200	250		0	1	125	100	50			
Cadmium	111	Cd	1	50	100	200	250		0	1	125	100	50	0	100	
Cadmium	114	Cd	1	50	100	200	250		0	1	125	100	50			
Tin	118	Sn	1	50	100	200	250		0	1	125	100	50			
Antimony	121	Sb	1	50	100	200	250		0	1	125	100	50			
Antimony	123	Sb	1	50	100	200	250		0	1	125	100	50			
Tellurium	128	Te	1	50	100	200	250		0	1	125	100	50			
Cesium	133	Cs	1	50	100	200	250		0	1	125	100	50			
Barium	135	Ba	1	50	100	200	250		0	1	125	100	50			
Barium	137	Ba	1	50	100	200	250		0	1	125	100	50			
Lanthanum	139	La	1	50	100	200	250		0	1	125	100	50			
Tantalum	159	Ta	1	50	100	200	250		0	1	125	100	50			
<i>Holmium</i>	165	<i>Ho</i>														
Platinum	195	Pt	1	50	100	200	250		0	1	125	100	50			
Gold	181	Au	1	50	100	200	250		0	1	125	100	50			
Thallium	205	Tl	1	50	100	200	250		0	1	125	100	50			
Lead	208	Pb	1	50	100	200	250		0	1	125	100	50			
Bismuth	209	Bi	1	50	100	200	250		0	1	125	100	50			
Thorium	232	Th	1	50	100	200	250		0	1	125	100	50			
Uranium	238	U	1	50	100	200	250		0	1	125	100	50			
<i>Krypton</i>	83	<i>Kr</i>														

PerkinElmer Nexlon 350X ICP-MS

Method 6020 Multi Metals Summary Report

Sample ID: Blank
Sample Date/Time: Tuesday, May 17, 2022 09:36:12
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens.	Mean Conc.	Mean	Report Unit
	Rh	103	901219.2			ppb
>	Ho	165	1310294.1			ppb
-	Pb	208	7360.7			ppb
	Kr	83	70.8			ppb

Replicates
Concentration

Concentration

Concentration

Method 6020 Multi Metals Summary Report

Sample ID: Standard 1
Sample Date/Time: Tuesday, May 17, 2022 09:38:13
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens.	Mean Conc.	Mean	Report Unit
	Rh	103	881098.7			ppb
>	Ho	165	1305189.9			ppb
-	Pb	208	66024.7	0.90994		ppb
	Kr	83	75			ppb

Replicates
Concentration

0.914831

Concentration

0.917269

Concentration

0.897724

Method 6020 Multi Metals Summary Report

Sample ID: Standard 2
Sample Date/Time: Tuesday, May 17, 2022 09:40:14
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens.	Mean Conc.	Mean	Report Unit
	Rh	103	903485			ppb
>	Ho	165	1323792.2			ppb
-	Pb	208	3215464.9	49.03181		ppb
	Kr	83	79.5			ppb

Replicates
Concentration

49.390459

Concentration

48.961497

Concentration

48.743471

PerkinElmer Nexlon 350X ICP-MS

Method 6020 Multi Metals Summary Report

Sample ID: Standard 3
Sample Date/Time: Tuesday, May 17, 2022 09:42:15
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens.	Mean Conc.	Mean	Report Unit
	Rh	103	901851.5			ppb
>	Ho	165	1332308.2			ppb
-	Pb	208	6600800.9	100.12445		ppb
	Kr	83	77.3			ppb

Replicates
Concentration

99.506064

Concentration

99.728677

Concentration

101.1386

Method 6020 Multi Metals Summary Report

Sample ID: Standard 4
Sample Date/Time: Tuesday, May 17, 2022 09:44:16
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens.	Mean Conc.	Mean	Report Unit
	Rh	103	874200.2			ppb
>	Ho	165	1310505.7			ppb
-	Pb	208	13391453.8	206.63405		ppb
	Kr	83	84			ppb

Replicates
Concentration

207.718914

Concentration

206.826526

Concentration

205.356701

Method 6020 Multi Metals Summary Report

Sample ID: Standard 5
Sample Date/Time: Tuesday, May 17, 2022 09:46:17
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens.	Mean Conc.	Mean	Report Unit
	Rh	103	891069.2			ppb
>	Ho	165	1342538.9			ppb
-	Pb	208	16254190.2	244.83698		ppb
	Kr	83	83			ppb

Replicates
Concentration

244.288604

Concentration

243.634352

Concentration

246.58799

PerkinElmer Nexlon 350X ICP-MS

Method 6020 Multi Metals Summary Report

Sample ID: QC Std 1
Sample Date/Time: Tuesday, May 17, 2022 09:48:19
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens.	Mean Conc.	Mean	Report Unit
	Rh	103	877550.7			ppb
>	Ho	165	1269907.3			ppb
-	Pb	208	15113.5	0.12706		ppb
	Kr	83	69.7			ppb

Replicates
Concentration

0.097117

Concentration

0.132211

Concentration

0.151856

Method 6020 Multi Metals Summary Report

Sample ID: QC Std 2
Sample Date/Time: Tuesday, May 17, 2022 09:50:20
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens.	Mean Conc.	Mean	Report Unit
	Rh	103	897584			ppb
>	Ho	165	1295448.6			ppb
-	Pb	208	64335.5	0.89105		ppb
	Kr	83	65.3			ppb

Replicates
Concentration

0.888377

Concentration

0.884655

Concentration

0.900113

Method 6020 Multi Metals Summary Report

Sample ID: QC Std 3
Sample Date/Time: Tuesday, May 17, 2022 09:52:21
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens.	Mean Conc.	Mean	Report Unit
	Rh	103	870992.2			ppb
>	Ho	165	1285114.4			ppb
-	Pb	208	7678428.3	120.78118		ppb
	Kr	83	78.7			ppb

Replicates
Concentration

118.558777

Concentration

122.402294

Concentration

121.382472

PerkinElmer Nexlon 350X ICP-MS

Method 6020 Multi Metals Summary Report

Sample ID: QC Std 4
Sample Date/Time: Tuesday, May 17, 2022 09:54:21
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens.	Mean Conc.	Mean	Report Unit
	Rh	103	893739			ppb
>	Ho	165	1311526			ppb
-	Pb	208	6599731.6	101.69602		ppb
	Kr	83	78.8			ppb

Replicates
Concentration

101.94776

Concentration

101.387415

Concentration

101.752897

Method 6020 Multi Metals Summary Report

Sample ID: QC Std 5
Sample Date/Time: Tuesday, May 17, 2022 09:56:23
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens.	Mean Conc.	Mean	Report Unit
	Rh	103	893418.7			ppb
>	Ho	165	1293738.8			ppb
-	Pb	208	3100368.4	48.37058		ppb
	Kr	83	70			ppb

Replicates
Concentration

48.368422

Concentration

48.266582

Concentration

48.476728

Method 6020 Multi Metals Summary Report

Sample ID: QC Std 2
Sample Date/Time: Tuesday, May 17, 2022 09:58:24
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens.	Mean Conc.	Mean	Report Unit
	Rh	103	885368			ppb
>	Ho	165	1282950			ppb
-	Pb	208	67433.1	0.94969		ppb
	Kr	83	69			ppb

Replicates
Concentration

0.943114

Concentration

0.94766

Concentration

0.958285

PerkinElmer Nexlon 350X ICP-MS

Method 6020 Multi Metals Summary Report

Sample ID: LRB
Sample Date/Time: Tuesday, May 17, 2022 10:00:25
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens.	Mean Conc.	Mean	Report Unit
	Rh	103	688364.9			ppb
>	Ho	165	1023356.1			ppb
-	Pb	208	9840.7	0.08093		ppb
	Kr	83	49.2			ppb

Replicates
Concentration

0.07344

Concentration

0.082765

Concentration

0.086573

Method 6020 Multi Metals Summary Report

Sample ID: LRB SPK
Sample Date/Time: Tuesday, May 17, 2022 10:02:26
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens.	Mean Conc.	Mean	Report Unit
	Rh	103	680474.8			ppb
>	Ho	165	995499.8			ppb
-	Pb	208	2171865.2	44.03563		ppb
	Kr	83	49.7			ppb

Replicates
Concentration

43.088018

Concentration

45.159774

Concentration

43.859105

Method 6020 Multi Metals Summary Report

Sample ID: 38576-7
Sample Date/Time: Tuesday, May 17, 2022 10:22:23
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens.	Mean Conc.	Mean	Report Unit
	Rh	103	618943.6			ppb
>	Ho	165	889229.9			ppb
-	Pb	208	13895.1	0.20248		ppb
	Kr	83	74.5			ppb

Replicates
Concentration

0.200692

Concentration

0.203203

Concentration

0.203546

PerkinElmer Nexlon 350X ICP-MS

Method 6020 Multi Metals Summary Report

Sample ID: QC Std 1
Sample Date/Time: Tuesday, May 17, 2022 10:24:25
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens.	Mean Conc.	Mean	Report Unit
	Rh	103	854282.2			ppb
>	Ho	165	1143746.4			ppb
-	Pb	208	8174.1	0.02974		ppb
	Kr	83	81			ppb

Replicates
Concentration

-0.04387

Concentration

-0.04201

Concentration

0.175088

Method 6020 Multi Metals Summary Report

Sample ID: QC Std 4
Sample Date/Time: Tuesday, May 17, 2022 10:26:26
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens.	Mean Conc.	Mean	Report Unit
	Rh	103	876364.4			ppb
>	Ho	165	1182902.3			ppb
-	Pb	208	5891239.3	100.6529		ppb
	Kr	83	88.2			ppb

Replicates
Concentration

101.524339

Concentration

100.03436

Concentration

100.400002

Method 6020 Multi Metals Summary Report

Sample ID: QC Std 1
Sample Date/Time: Tuesday, May 17, 2022 10:51:08
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens.	Mean Conc.	Mean	Report Unit
	Rh	103	861836.9			ppb
>	Ho	165	1129141.4			ppb
-	Pb	208	9121.8	0.04971		ppb
	Kr	83	77.7			ppb

Replicates
Concentration

0.039121

Concentration

0.049105

Concentration

0.060892

PerkinElmer Nexlon 350X ICP-MS

Method 6020 Multi Metals Summary Report

Sample ID: QC Std 4
Sample Date/Time: Tuesday, May 17, 2022 10:53:09
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens.	Mean Conc.	Mean	Report Unit
	Rh	103	879076.7			ppb
>	Ho	165	1191278.2			ppb
-	Pb	208	5821913.7	98.76898		ppb
	Kr	83	82.7			ppb

Replicates
Concentration

97.623633

Concentration

100.402593

Concentration

98.280705

Method 6020 Multi Metals Summary Report

Sample ID: 38576-1
Sample Date/Time: Tuesday, May 17, 2022 11:03:16
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens.	Mean Conc.	Mean	Report Unit
	Rh	103	855299.3			ppb
>	Ho	165	1134138.9			ppb
-	Pb	208	7197979.8	128.29285		ppb
	Kr	83	74.5			ppb

Replicates
Concentration

126.165255

Concentration

128.752551

Concentration

129.96075

Method 6020 Multi Metals Summary Report

Sample ID: 38576-2
Sample Date/Time: Tuesday, May 17, 2022 11:05:17
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens.	Mean Conc.	Mean	Report Unit
	Rh	103	861386.7			ppb
>	Ho	165	1139896.4			ppb
-	Pb	208	6740592.3	119.52204		ppb
	Kr	83	71.7			ppb

Replicates
Concentration

119.251625

Concentration

120.129045

Concentration

119.185453

PerkinElmer Nexlon 350X ICP-MS

Method 6020 Multi Metals Summary Report

Sample ID: 38576-3
Sample Date/Time: Tuesday, May 17, 2022 11:07:18
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens.	Mean Conc.	Mean	Report Unit
	Rh	103	869314			ppb
>	Ho	165	1144879.5			ppb
-	Pb	208	2599995.1	45.83233		ppb
	Kr	83	74.7			ppb

Replicates
Concentration

45.419749

Concentration

45.594229

Concentration

46.482998

Method 6020 Multi Metals Summary Report

Sample ID: 38576-3
Sample Date/Time: Tuesday, May 17, 2022 11:09:19
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens.	Mean Conc.	Mean	Report Unit
	Rh	103	882388.8			ppb
>	Ho	165	1181324.8			ppb
-	Pb	208	5640575.5	96.49237		ppb
	Kr	83	67.7			ppb

Replicates
Concentration

95.793153

Concentration

97.270386

Concentration

96.413566

Method 6020 Multi Metals Summary Report

Sample ID: 38576-4
Sample Date/Time: Tuesday, May 17, 2022 11:11:21
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens.	Mean Conc.	Mean	Report Unit
	Rh	103	891203.4			ppb
>	Ho	165	1194790.1			ppb
-	Pb	208	3281249.1	55.45839		ppb
	Kr	83	70.2			ppb

Replicates
Concentration

54.697316

Concentration

56.513334

Concentration

55.164513

PerkinElmer Nexlon 350X ICP-MS

Method 6020 Multi Metals Summary Report

Sample ID: 38576-5
Sample Date/Time: Tuesday, May 17, 2022 11:13:22
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens.	Mean Conc.	Mean	Report Unit
	Rh	103	653311.1			ppb
>	Ho	165	919554.5			ppb
-	Pb	208	94722.3	1.97037		ppb
	Kr	83	51.5			ppb

Replicates
Concentration

1.940521

Concentration

1.976763

Concentration

1.993822

Method 6020 Multi Metals Summary Report

Sample ID: QC Std 1
Sample Date/Time: Tuesday, May 17, 2022 11:15:24
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens.	Mean Conc.	Mean	Report Unit
	Rh	103	869228			ppb
>	Ho	165	1143082			ppb
-	Pb	208	4518.4	-0.03367		ppb
	Kr	83	76.3			ppb

Replicates
Concentration

-0.038605

Concentration

-0.033456

Concentration

-0.028938

Method 6020 Multi Metals Summary Report

Sample ID: QC Std 4
Sample Date/Time: Tuesday, May 17, 2022 11:17:25
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens.	Mean Conc.	Mean	Report Unit
	Rh	103	881740.9			ppb
>	Ho	165	1171707.9			ppb
-	Pb	208	5754242.1	99.24715		ppb
	Kr	83	85.3			ppb

Replicates
Concentration

99.67765

Concentration

99.772358

Concentration

98.291445

PerkinElmer Nexlon 350X ICP-MS

Method 6020 Multi Metals Summary Report

Sample ID: 38576-6
Sample Date/Time: Tuesday, May 17, 2022 11:19:27
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens.	Mean Conc.	Mean	Report Unit
	Rh	103	644552.2			ppb
>	Ho	165	923908.5			ppb
-	Pb	208	21609		0.35987	ppb
	Kr	83	52			ppb

Replicates
Concentration

0.33471

Concentration

0.362964

Concentration

0.381938

Method 6020 Multi Metals Summary Report

Sample ID: QC Std 1
Sample Date/Time: Tuesday, May 17, 2022 11:39:39
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens.	Mean Conc.	Mean	Report Unit
	Rh	103	844542			ppb
>	Ho	165	1112837.7			ppb
-	Pb	208	9625.9		0.06128	ppb
	Kr	83	70.3			ppb

Replicates
Concentration

0.039957

Concentration

0.068955

Concentration

0.074924

Method 6020 Multi Metals Summary Report

Sample ID: QC Std 4
Sample Date/Time: Tuesday, May 17, 2022 11:41:40
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens.	Mean Conc.	Mean	Report Unit
	Rh	103	873580.9			ppb
>	Ho	165	1151932.9			ppb
-	Pb	208	5672606.4		99.51504	ppb
	Kr	83	82			ppb

Replicates
Concentration

98.938773

Concentration

100.301323

Concentration

99.305016

Appendix D
CALIBRATION INFORMATION

5 Point Console Dry Gas Meter Calibration

Console ID	SC-M1543
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		Initials	Date
Calibrated by		JTM	10/16/21
Reviewed by			
Console Sticker	Prepared		
	Reviewed		
	Affixed		
MCL-33 Prepared			

Console Calibration Expiration Date
16-Oct-2022

Orifice ID:	N-30		N-23		N-19		N-16		N-11	
Orifice K':	0.8124		0.6263		0.5018		0.4305		0.3067	
Dry Gas Meter	Run #1a	Run #1b	Run #2a	Run #2b	Run #3a	Run #3b	Run #4a	Run #4b	Run #5a	Run #5b
Initial Reading, (ft ³)	849.753	865.284	820.728	837.080	797.165	811.274	777.035	787.877	762.532	770.936
Final Reading, (ft ³)	865.284	881.934	837.080	849.753	811.274	820.728	787.877	797.165	770.936	777.035
Difference, (ft ³)	15.531	16.650	16.352	12.673	14.109	9.454	10.842	9.288	8.404	6.099
Initial Meter Temp., (°F)	72	79	72	75	70	72	68	70	67	68
Final Meter Temp., (°F)	79	81	75	76	72	72	70	70	68	68
Average Meter Temp., (°F)	75.5	80.0	73.5	75.5	71.0	72.0	69.0	70.0	67.5	68.0
Test Time (min.)	14.5	15.5	19.75	15.25	21.25	14.25	19	16.25	20.75	15
Orifice Manometer Reading, ("H ₂ O)	3.60	3.60	2.10	2.10	1.30	1.30	0.92	0.92	0.47	0.47
Barometric Pressure, ("Hg)	29.34		29.36		29.37		29.39		29.41	
Ambient Temperature, (°F)	71.7		71.4		70.8		70.5		70.5	
Pump Vacuum, ("Hg)	19	19	21	21	23	23	24	24	25	25
Standard Volume of the Meter, (V _{mstd})	15.146	16.102	15.958	12.321	13.811	9.237	10.650	9.106	8.275	6.000
Standard Volume of Critical Orifice, (V _{crstd})	14.989	16.022	15.754	12.165	13.593	9.116	10.437	8.927	8.126	5.874
Flow Rate (cfm)	1.045	1.039	0.808	0.808	0.650	0.648	0.561	0.560	0.399	0.400
DGM Calibration Factor, (Y)	0.990	0.995	0.987	0.987	0.984	0.987	0.980	0.980	0.982	0.979
Average DGM Calibration Factor (Y)	0.992		0.987		0.986		0.980		0.981	
Delta H@, ("H ₂ O)	1.866	1.850	1.822	1.815	1.756	1.752	1.689	1.686	1.700	1.698
Average ΔH@, ("H ₂ O)	1.858		1.819		1.754		1.688		1.699	

Current Average Y	0.985
All Individual Y within 2% of mean?	TRUE
Average Delta H@	1.763
All individual ΔH@ within 0.20"H ₂ O of mean	TRUE

CDS-04S DGM 5 point against orifice

Per EM SOP-002

Issued: August 2020

Document reviewed biennially

S-Type Pitot Tube Inspection

Probe ID
Air Cooled Probe 1

Caliper	ID	CAL-M150B4
	Calibration Exp Date	5-12-23

Angle Finder	ID	Johnson
	Calibration Exp Date	N/A

Calibrated by	Initials	WL
	Date	10/6/2021
Reviewed by	Initials	EST
	Date	10-6-21

General Pitot Tube Alignment			$A = \underline{.86}''$ $D_1 = \underline{.375}''$ $0.188 \leq D_1 \leq 0.375''?$ <u>Y</u> (y/n) $1.05 \leq A/D_1 \leq 1.50?$ <u>Y</u> (y/n)
			$\alpha_1 = \underline{0.22}^\circ$ $\alpha_2 = \underline{1.78}^\circ$ $\alpha_1 \leq 10^\circ?$ <u>Y</u> (y/n) $\alpha_2 \leq 10^\circ?$ <u>Y</u> (y/n)
			$\beta_1 = \underline{0.19}$ $\beta_2 = \underline{1.63}$ $\beta_1 \leq 5^\circ?$ <u>Y</u> (y/n) $\beta_2 \leq 5^\circ?$ <u>Y</u> (y/n)
Misalignment			$\gamma = \underline{.36}^\circ$ $\theta = \underline{.12}^\circ$ $Z = A \tan(\gamma) = \underline{.0054}$ $W = A \tan(\theta) = \underline{.0018}$ $Z \leq 0.125''?$ <u>Y</u> (y/n) $W \leq 0.031''?$ <u>Y</u> (y/n)
			$Z = A \tan(\gamma) = \underline{.0054}$ $W = A \tan(\theta) = \underline{.0018}$ $Z \leq 0.125''?$ <u>Y</u> (y/n) $W \leq 0.031''?$ <u>Y</u> (y/n)
Acceptability for Use (Circle Selection)	If all answers are "Y", this pitot tube is available for use, and may be assigned a correction factor of 0.84		
	If all answers except the first (D_1) are "Y", this pitot tube is available for use, but needs to be calibrated using a wind tunnel.		
	Any other situation, the pitot tube must be removed from service.		

Stack Thermocouple Calibration

Thermometer (or Readout/TC)	ID	TM-2101
	Calibration Exp Date	3-26-23
Temperature Readout	ID	FLUKE 51 K/J Thermometer
	Calibration Exp Date	N/A

Calibrated by	Initials	WL
	Date	10/6/2021
Reviewed by	Initials	EST
	Date	10-6-21

Reference Thermometer	Thermocouple Readout	Compare Readings	Function Check
$T_F \underline{76.7}^\circ F$ $T_{abs, RT} \underline{536.7}^\circ R$	$T_F \underline{78.1}^\circ F$ $T_{abs, TC} \underline{538.1}^\circ R$	$\frac{T_{abs, TC}}{T_{abs, RT}} = \underline{1.003}$ Between 0.985 and 1.015? <u>0/N</u>	$3^\circ F$ change in readout upon external temperature stimulus? <u>0/N</u>

$$^1 T_{abs, (^\circ R)} = T_F (^\circ F) + 460$$

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Airgas USA, LLC

Airgas Specialty Gases

630 United Drive

Durham, NC 27713

919-544-3773 Fax: 919-544-3774

<http://www.airgas.com>

Part Number: E03NI51E15A0001
Cylinder Number: CC413517
Laboratory: ASG - Durham - NC
PGVP Number: B22016
Gas Code: CO2,O2,BALN

Reference Number: 122-124574246-1
Cylinder Volume: 168.4 CF
Cylinder Pressure: 2015 PSIG
Valve Outlet: 590
Certification Date: Sep 08, 2016

Expiration Date: Sep 08, 2024

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

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

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
OXYGEN	20.00 %	19.95 %	G1	+/- 0.3% NIST Traceable	09/06/2016
CARBON DIOXIDE	29.00 %	28.79 %	G1	+/- 0.7% NIST Traceable	09/08/2016
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	12062003	CC367399	22.883 % OXYGEN/NITROGEN	+/- 0.2%	Apr 24, 2018
NTRM	13060810	CC415934	24.04 % CARBON DIOXIDE/NITROGEN	+/- 0.6%	May 16, 2019

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Horiba VIA510 CO2 2L6YXWY0	Nondispersive Infrared (NDIR)	Aug 17, 2016
Horiba MPA510 O2 41499150042	Paramagnetic	Aug 17, 2016

Triad Data Available Upon Request

**Approved for Release**

CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Part Number:	E03NI79E15A0088	Reference Number:	122-402110633-1
Cylinder Number:	CC359583	Cylinder Volume:	151.0 CF
Laboratory:	124 - Durham (SAP) - NC	Cylinder Pressure:	2015 PSIG
PGVP Number:	B22021	Valve Outlet:	590
Gas Code:	CO2,O2,BALN	Certification Date:	May 11, 2021

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

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

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON DIOXIDE	10.00 %	10.10 %	G1	+/- 0.8% NIST Traceable	05/11/2021
OXYGEN	11.00 %	10.99 %	G1	+/- 0.4% NIST Traceable	05/11/2021
NITROGEN	Balance				

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	13060638	CC414571	13.359 % CARBON DIOXIDE/NITROGEN	+/- 0.6%	May 14, 2025
NTRM	10010616	K014963	9.967 % OXYGEN/NITROGEN	+/- 0.3%	Apr 19, 2022

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Horiba VA-5001 CO2 BF89GV17	Nondispersive Infrared (NDIR)	Apr 29, 2021
Siemens Oxymat 61 M3299 O2	Paramagnetic	Apr 28, 2021

Triad Data Available Upon Request



Signature on file
Approved for Release

CERTIFICATE OF ANALYSIS

Grade of Product: CERTIFIED STANDARD-SPEC

Part Number:	X06NI85C15W0000	Reference Number:	304-402409253-1
Cylinder Number:	CC501488	Cylinder Volume:	54.1 CF
Laboratory:	124 - Gasco - FL	Cylinder Pressure:	750 PSIG
Analysis Date:	Apr 21, 2022	Valve Outlet:	330
Lot Number:	304-402409253-1		

Product composition verified by direct comparison to calibration standards traceable to N.I.S.T. weights and/or N.I.S.T. Gas Mixture reference materials.

ANALYTICAL RESULTS

Component	Req Conc	Actual Concentration (Mole %)	Analytical Uncertainty
HYDROGEN SULFIDE	25.00 PPM	27.25 PPM	+/-5%
CARBON MONOXIDE	50.00 PPM	50.70 PPM	+5%
ISOBUTYLENE	100.0 PPM	98.01 PPM	+/-5%
METHANE	2.500 %	2.500 %	+/-5%
OXYGEN	12.00 %	12.48 %	+/-5%
NITROGEN	Balance		



Signature on file

Approved for Release



PRECISION WEIGHING

1949 Evans Road
Cary, NC 27513
Phone: (919) 678-0077 * Fax: (919) 678-0075



Rick Young

Richard Young

The instruments listed below have been serviced and calibrated to factory specifications by the above technical representatives. Service includes tests and adjustments on each instrument to assure their performance is within original specifications. Each weight set is traceable to N.I.S.T. The reference numbers of the test weights used are: RY1, RY2.

Customer: AECOM

Date: 3/8/2022 & 3/16/2022

Page:1

Item	Department	Bldg	Responsible Person	Type	Serial Number	Remarks
1	Lab	Main	Sarah Pearcy	R200D	10703891	Sartorius
2	"	"	"	EP6101	N21711203675	Ohaus
3	"	"	"	GD503	22251153	Sartorius
4	"	"	"	SP2001	7130380452	Ohaus
5	"	"	"	SP2001	7132122503	Ohaus
6	"	"	"	SP2001	7124420565	Ohaus
7	"	"	"	Scout SPX	B633890326	Ohaus
8	"	"	"	Scout SPX	B633896536	Ohaus
9	"	"	"	MYWEIGH i5500	i5500-1	MYWEIGH

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