Coke Oven Information Collection Request Test Report

ArcelorMittal Burns Harbor, LLC
#2 Coke Battery Pushing Emission Control
Baghouse Stack
Burns Harbor, Indiana
Project No. M162810A
August 16 through September 1, 2016

mostardi platt

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Project No. M162810A

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1.0 EXECUTIVE SUMMARY

MOSTARDI PLATT conducted an Information Collection Request (ICR) emissions test program for ArcelorMittal Burns Harbor, LLC on the #2 Coke Battery Pushing Emission Control (PEC) Baghouse Stack on August 16 through September 1, 2016 at the ArcelorMittal Burns Harbor, LLC facility in Burns Harbor, Indiana. This report summarizes the results of the test program and test methods used.

The test sets, test dates, and test parameters are summarized below.

TEST INFORMATION			
Test Sets	**Test Dates**	**Test Methods**	**Test Parameter**
1, 2, and 3	8/16-9/1/16	USEPA Method 3A	Oxygen (O2) and Carbon Dioxide (CO_2)
1	8/16-19/16	USEPA Methods 5 and 29	Filterable Particulate Matter (FPM), Total Suspended Metals (TSM) including Antimony (Sb), Arsenic (As), Beryllium (Be), Cadmium (Cd), Total Chromium (Cr), Cobalt (Co), Lead (Pb), Manganese (Mn), Mercury (Hg), Nickel (Ni), and Selenium (Se)
	8/16-19/16	USEPA Methods 5 and 202	FPM, Condensable Particulate Matter (CPM), and Total Particulate Matter (TPM)
	8/16-19/16	USEPA Method 10	Carbon Monoxide (CO)
2	8/30-9/1/16	USEPA Method 16	Hydrogen Sulfide (H_2S)
	8/30-9/1/16	USEPA SW 846 Method 0031	Volatile Organic Hazardous Air Pollutants (VOHAP) including Acrylonitrile, Benzene, Bromoform, Bromomethane, Carbon Disulfide, Carbon Tetrachloride, Chlorobenzene, Chloroethane, Chloroform, Chloromethane, 1,2-Dichloroethane, 1,1 -Dichloroethane, 1,2-Dichloropropane, Ethylbenzene, Iodomethane, Methylene Chloride, Styrene, 1,1,2,2-Tetrachloroethane, Tetrachloroethane, Toluene, 1,1,1-Trichloroethane, 1,1,2 Trichloroethane, Trichloroethane, Vinyl Chloride, mp-Xylene, and o-Xylene
	8/30-9/1/16	USEPA Method 6C	Sulfur Dioxide (SO_2)
	8/30-9/1/16	USEPA Method 316	Formaldehyde (HCHO)
	8/30-9/1/16	USEPA Method 320	Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), Hydrogen Cyanide (HCN)
3	8/23-25/16	USEPA SW 846 Method 0010 and USEPA Method 23 combined	Dioxin/Furan (D/F) and Semi-Volatile Organic Compounds (SVOC) including Acenaphthene, Acenaphthylene, Anthracene, Benz(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz(a,h)anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Perylene, and Pyrene
	8/23-25/16	Modified USEPA Method 315	Toluene Soluble Organics (TSO)

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The purpose of the test program was to determine emissions during normal operating conditions in order to satisfy the Section 114 ICR letter. Sampling was conducted during periods of actual pushing when the capture system fan and control device were engaged. Each run (2 minutes) started at the beginning of a push and finished at the end of a push. In order to collect the required volume for each test method according to the ICR, sampling was conducted during an integral number of pushes.

Selected results of the test program are summarized below. A complete summary of emission test results follows the narrative portion of this report.

TEST RESULTS				
Test Set	**Test Method**	**Test Parameter**	**Emission Rates**	
1	USEPA Method 5/29	FPM (M5/29 train)	2.40E+00 mg/dscm	1.71E+00 lb/hr
		Sb	≤ 3.10E-04 mg/dscm	≤ 2.22 E-04lb/hr
		As	≤ 3.00E-04 mg/dscm	≤ 2.16E-04 lb/hr
		Be	≤ 7.67E-05 mg/dscm	≤ 5.4E-05 lb/hr
		Cd	≤ 1.77E-04 mg/dscm	≤ 1.27E-04 lb/hr
		Cr	8.07E-04 mg/dscm	5.74E-04 lb/hr
		Co	≤ 1.07E-04 mg/dscm	≤ 7.5E-05 lb/hr
		Pb	7.53E-04 mg/dscm	5.42E-04 lb/hr
		Mn	≤ 1.44E-03 mg/dscm	≤ 1.02E-03 lb/hr
		Hg	≤ 1.73E-04 mg/dscm	≤ 1.25E-04 lb/hr
		Ni	1.01E-03 mg/dscm	7.20E-04 lb/hr
		Se	≤ 4.76E-03 mg/dscm	≤ 3.43E-03 lb/hr
	USEPA Method 5/202	FPM	8.23E-01 mg/dscm	5.89E-01 lb/hr
		CPM	8.62E-01 mg/dscm	6.19E-01 lb/hr
		TPM	1.76E+00 mg/dscm	1.21E+00 lb/hr
	USEPA Method 3A	CO_2	1.1%	
		O_2	20.0%	
	USEPA Method 10	CO	50.2 ppmvd	4.16 E+01 lb/hr

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TEST RESULTS				
Test Set	**Test Method**	**Test Parameter**	**Emission Rates**	
2	USEPA Method 16	H_2S	≤ 5.0E-01 ppmvd	≤ 4.83E-01 lb/hr
	SW 846 Method 0031	Acrylonitrile	≤ 7.12E-03 mg/dscm	≤ 4.67E-03 lb/hr
		Benzene	≤ 9.32E-02 mg/dscm	≤ 6.12E-02 lb/hr
		Bromoform	≤ 1.17E-03 mg/dscm	≤ 7.68E-04 lb/hr
		Bromomethane	≤ 4.36E-03 mg/dscm	≤ 2.86E-03 lb/hr
		Carbon Disulfide	≤ 5.26E-03 mg/dscm	≤ 3.45E-03 lb/hr
		Carbon Tetrachloride	≤ 1.45E-03 mg/dscm	≤ 9.50E-04 lb/hr
		Chlorobenzene	≤ 1.14E-03 mg/dscm	≤ 7.46E-04 lb/hr
		Chloroethane	≤ 1.61E-03 mg/dscm	≤ 1.06E-03 lb/hr
		Chloroform	≤ 1.03E-03 mg/dscm	≤ 6.74E-04 lb/hr
		Chloromethane	≤ 3.84E-03 mg/dscm	≤ 2.52E-03 lb/hr
		1,2-Dichloroethane	≤ 9.34E-04 mg/dscm	≤ 6.13E-04 lb/hr
		1,1–Dichloroethylene	≤ 1.14E-03 mg/dscm	≤ 7.46E-04 lb/hr
		1,2-Dichloropropane	≤ 1.14E-03 mg/dscm	≤ 7.46E-04 lb/hr
		Ethylbenzene	≤ 1.50E-03 mg/dscm	≤ 9.84E-04 lb/hr
		Iodomethane	≤ 1.77E-03 mg/dscm	≤ 1.16E-03 lb/hr
		Methylene Chloride*	See Data Quality Reference	See Data Quality Reference
	SW 846 Method 0031	Styrene	≤ 2.19E-03 mg/dscm	≤ 1.43E-03 lb/hr
		Tetrachloroethylene	≤ 1.56E-03 mg/dscm	≤ 1.03E-03 lb/hr
		Toluene	≤ 1.44E-02 mg/dscm	≤ 9.48E-03 lb/hr
		1,1,1-Trichloroethane	≤ 1.29E-03 mg/dscm	≤ 8.45E-04 lb/hr
		1,1,2 Trichloroethane	≤ 1.39E-03 mg/dscm	≤ 9.12E-04 lb/hr
		Trichloroethylene	≤ 1.14E-03 mg/dscm	≤ 7.46E-04 lb/hr
		1,1,2,2-Tetrachloroethane	≤ 1.87E-03 mg/dscm	≤ 1.23E-03 lb/hr
		Vinyl Chloride	≤ 1.12E-03 mg/dscm	≤ 7.35E-04 lb/hr
		m/p - Xylene	≤ 4.54E-03 mg/dscm	≤ 2.98E-03 lb/hr
		o – Xylene	≤ 1.75E-03 mg/dscm	≤ 1.15E-03 lb/hr
	USEPA Method 316	HCHO	≤ 2.91E-03 mg/dscm	≤ 1.9E-03 lb/hr
	USEPA Method 3A	CO_2	1.0%	
		O_2	19.8%	
	USEPA Method 6C	SO_2	35.0 ppmvd	6.15E+01 lb/hr
	USEPA Method 320	HCl	2.21E+00 mg/dscm	1.46E+00 lb/hr
		HF	4.17E-01 mg/dscm	2.75E-01 lb/hr
		HCN	9.33E-01 mg/dscm	6.15E-01 lb/hr

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TEST RESULTS				
Test Set	**Test Method**	**Test Parameter**	**Emission Rates**	
3	USEPA SW 846 Method 0010 and USEPA Method 23 combined	D/F	≤ 2.38E-05 ug/dscm	≤ 1.77E-09 lb/hr
		Acenaphthene	≤ 1.17E+00 ug/dscm	≤ 8.20E-04 lb/hr
		Acenaphthylene	≤ 1.17E+00 ug/dscm	≤ 8.20E-04 lb/hr
		Anthracene	≤ 1.17E+00 ug/dscm	≤ 8.20E-04 lb/hr
		Benzo(a)anthracene	≤ 1.17E+00 ug/dscm	≤ 8.20E-04 lb/hr
		Benzo(a)pyrene	≤ 1.17E+00 ug/dscm	≤ 8.20E-04 lb/hr
		Benzo(b)fluoranthene	≤ 1.17E+00 ug/dscm	≤ 8.20E-04 lb/hr
		Benzo(g,h,i)perylene	≤ 1.17E+00 ug/dscm	≤ 8.20E-04 lb/hr
		Benzo(k)fluoranthene	≤ 1.17E+00 ug/dscm	≤ 8.20E-04 lb/hr
		Chrysene	≤ 1.17E+00 ug/dscm	≤ 8.20E-04 lb/hr
		Dibenz(a,h)anthracene	≤ 1.17E+00 ug/dscm	≤ 8.20E-04 lb/hr
		Fluoranthene	≤ 1.17E+00 ug/dscm	≤ 8.20E-04 lb/hr
		Fluorene	≤ 1.17E+00 ug/dscm	≤ 8.20E-04 lb/hr
		Indeno(1,2,3-cd)pyrene	≤ 1.17E+00 ug/dscm	≤ 8.20E-04 lb/hr
		Naphthalene	1.78E+01 ug/dscm	1.26E-02 lb/hr
		Phenanthrene	≤ 1.17E+00 ug/dscm	≤ 8.20E-04 lb/hr
		Perylene	≤ 1.17E+00 ug/dscm	≤ 8.20E-04 lb/hr
		Pyrene	≤ 1.17E+00 ug/dscm	≤ 8.20E-04 lb/hr
	Modified USEPA Method 315	TSO**	See Data Quality Reference	See Data Quality Reference
	USEPA Method 3A	CO_2	1.1 %	
	USEPA Method 3A	O_2	19.8 %	

*SW 846 Method 0031 Data Quality Reference: Methylene chloride ($MeCl_2$) results for all condensate samples were much higher than anticipated. It is believed that cross contamination occurred between the Method 23/0010 $MeCl_2$ samples and the Method 0031 condensate samples as these samples were transported to Maxxam Analytics, Inc. in the same batch. In addition, the methylene chloride which was used in the field recovery of Method 23/0010, was in close proximity to where the Method 0031 condensate samples were recovered. Consequently, the Method 0031 condensate data is not representative of actual emissions from the source

**Modified USEPA Method 315 Data Quality Reference: The reported Modified Method 315 (TSO) results in Section 3.0 do not fully account for the magnitude of the documented blank contamination value. Please see Section 2.0 and Maxxam Analytics' Modified Method 315 (TSO) White Paper dated March 10, 2017 found in Appendix A that states, "The toluene filter extractable blank 90% upper confidence interval of 11.18 mg of residue is 43 times the Method 315 acceptable methylene chloride blank value of 0.26 mg of residue. This suggests the use of toluene extraction solvent to be the cause of the high bias residue results."

"The toluene laboratory processed blank of 8.5 mg of residue is more than 17 times the methylene chloride laboratory processed blank of ≤0.5 mg of residue. This again, would suggest the use of the toluene extraction solvent to be the cause of the high bias residue results."

The Stationary Source Audit Sample Program audit samples were obtained from ERA and submitted to Maxxam Analytical. The results of the audit samples were compared to the assigned value by ERA and found to be acceptable. The audit sample results and evaluation are appended to this report.

The identifications of individuals associated with the test program are summarized below.

TEST PERSONNEL INFORMATION		
Location	**Address**	**Contact**
Test Facility	ArcelorMittal Burns Harbor, LLC 250 West U.S. Highway 12 Burns Harbor, Indiana 46304	Mr. Jeff May Sr. Environmental Engineer (219) 787-4964 (phone)
Testing Company Representative	Mostardi Platt 888 Industrial Drive Elmhurst, Illinois 60126	Mr. Stuart L. Burton Senior Project Manager (630) 993-2100 (phone) sburton@mp-mail.com

The test crew consisted of Messrs. B. Marlow, B. Garcia, C. Eldridge, D. Dixon, J. Rogers, B. Matzat, B. Hendricks, and S. Burton of Mostardi Platt.

2.0 TEST METHODOLOGY

Emission testing was conducted following the methods specified in 40 CFR, Part 60, Appendix A, 40 CFR, Part 51, Appendix M, 40 CFR, Part 63, Appendix A, and USEPA SW 846. Schematics of the test section diagram and sampling trains used are included in Appendix B and C, respectively. Calculation nomenclature and example calculations are found in Appendix D. Sample analysis data are included in Appendix E. Copies of reference method test data and field data sheets for each test run are included in Appendix F and G, respectively.

The following methodologies were used during the test program:

Method 1 Traverse Point Determination

Test measurement points were selected in accordance with Method 1. The characteristics of the measurement locations are summarized below.

TEST POINT INFORMATION						
Location	**Stack Diameter**	**Stack Area**	**Upstream Diameters**	**Downstream Diameters**	**Test Parameter**	**Number of Sampling Points**
#2 Coke Battery PEC Baghouse Stack	9.0 Feet	63.617 Square Feet	>0.5	>2.0	FPM, TPM, TSP, HCHO, D/F, SVOCS, TSO	24

An absence of cyclonic flow test was performed and the test location met the less than 20 degree requirement. The absence of cyclonic flow test is found in Appendix G. A single point was used for VOHAP, HCl, HF, HCN, and H_2S.

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Gaseous Sampling

Stack CO_2, O_2, CO, and SO_2 were sampled using three points. The points were located 17%, 50%, and 83% of the stack diameter. Test points were moved after each “push” cycle was complete.

Method 2 Volumetric Flowrate Determination

Gas velocity was measured in accordance with Method 2, for purposes of calculating stack gas volumetric flow rate and emission rates on a lb/hr basis. An S-type pitot tube, differential pressure gauge, thermocouple and temperature readout were used to determine gas velocity at each sample point. All of the equipment used was calibrated in accordance with the specifications of the Method. Calibration data are presented in Appendix H.

Method 3A Oxygen (O_2)/Carbon Dioxide (CO_2) Determination

Stack gas molecular weight was determined in accordance with Method 3A. A Servomex analyzer was used to determine stack gas oxygen and carbon dioxide content and, by difference, nitrogen content. All of the equipment used was calibrated in accordance with the specifications of the Method. Calibration data are presented in Appendix H. Gas cylinder certifications are included in Appendix I.

Method 5 Filterable Particulate Matter Determination

Stack gas filterable particulate matter concentrations and emission rates were determined in accordance with Method 5. An Environmental Supply Company, Inc. sampling train was used to sample stack gas at an isokinetic rate, as specified in the Method. Particulate matter in the sample probe was recovered using an acetone wash. The probe wash and filter catch were analyzed by Mostardi Platt personnel in accordance with Method 5. Laboratory analysis data are found in Appendix E. Calibration data are presented in Appendix H.

Method 6C Sulfur Dioxide (SO_2) Determination

Stack gas sulfur dioxide concentrations and emission rates were determined in accordance with USEPA Method 6C, 40CFR60, Appendix A. A Thermo Scientific sulfur dioxide analyzer was used to determine sulfur dioxide concentrations, in the manner specified in the Method.

Stack gas was delivered to the analyzer via a Teflon® sampling line, heated to a minimum temperature of 250ºF. Excess moisture in the stack gas was removed using a refrigerated condenser. The entire system was calibrated in accordance with the Method, using certified calibration gases introduced at the probe, before and after each test run.

Calibration data are presented in Appendix H. Copies of the gas cylinder certifications are found in Appendix I.

Method 10 Carbon Monoxide (CO) Determination

Stack gas carbon monoxide concentrations and emission rates were determined in accordance with USEPA Method 10, 40CFR60, Appendix A. A Thermo Scientific carbon monoxide analyzer was used to determine carbon monoxide concentrations, in the manner specified in the Method.

Stack gas was delivered to the analyzer via a Teflon® sampling line, heated to a minimum temperature of 250ºF. Excess moisture in the stack gas was removed using a refrigerated

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condenser. The entire system was calibrated in accordance with the Method, using certified calibration gases introduced at the probe, before and after each test run.

Calibration data are presented in Appendix H. Copies of the gas cylinder certifications are found in Appendix I.

Method 16 Hydrogen Sulfide (H_2S) Determination

Stack gas H_2S emissions were determined in accordance with Method 16. An in line SRI Instruments Model 8610C Gas Chromatograph was used to sample stack gas, in the manner specified in the Method. Analyses of the samples collected were conducted by Mostardi Platt. All of the equipment used was calibrated in accordance with the specifications of the Method. Calibration data are presented in Appendix H. Copies of the gas cylinder certifications are found in Appendix I.

Method 0010 Semi-Volatile Organics Determination and Method 23 Dioxin and Furan Determination

The SW-846-0010 sample train is a comprehensive sampling system based upon the design of units normally employed for sampling under Method 5, 40CFR60. The modified system consisted of a glass-lined probe, a high-efficiency glass fiber filter stage, a sorbent module, and four impingers. The XAD Resin sorbent module, one of the modifications to the basic system, permits trapping of volatile organic vapors, was mounted vertically atop the first impinger of the train. This impinger was empty and was used to collect the condensate that percolates through the sorbent resin module. Stack gas dioxin and furan concentrations and emission rates were determined in accordance with Method 23, 40 CFR, Part 60, Appendix A in conjunction with the USEPA SW 846 Method 0010 sampling train. A diagram of this system is appended.

The glass-lined probe was wrapped with heating wire and a stainless steel jacket and heated to a gas temperature of 250°F ± 25°F. The filter holder was equipped with a very coarse, fritted glass filter support and a tared glass fiber filter. The filter medium was a Pall Corporation type A/E glass microfibre filters exhibiting a ≥ 99.98% efficiency on 0.3 micron DOP smoke particles. The filter holder was contained in an electrically heated box, thermostatically maintained at a temperature of 250°F ± 25°F, which is sufficient to prevent water condensation in this portion of the train.

Downstream of the heated filter, the sampled gas passed through a water-cooled condenser and then to a sorbent module that was filled with 40 grams of XAD Resin sorbent. XAD Resin is a porous polymer resin capable of absorbing a broad range of organic species. A diagram of the sorbent module is appended. Before the sampled gas reached the sorbent resin, it was cooled to a temperature of ≤68°F. This condensed the water vapor in the sampled stream and, in turn, some organic vapor became entrained in the condensate. For this reason, the condensate was allowed to percolate through the resin bed prior to being discharged into a collection vessel. At the downstream side of the sorbent module, four impingers were connected in series and immersed in an ice bath. The first impinger, connected to the outlet of the sorbent module, was modified to have a very short stem so that the sampled gas would not bubble through the collected condensate. The second impinger was a modified version of a Greenburg-Smith design; initially, it was filled with 100 mls of deionized water. The third impinger was a Greenburg-Smith impinger with a tip. It was also filled with 100 mls of deionized water. The fourth impinger was filled with silica gel to absorb any remaining moisture.

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The XAD-2 resin modules were prepared and packed by Maxxam Analytics, Inc. After sampling, the modules were then capped and shipped to the field for sample collection. Laboratory analysis data are found in Appendix E. Calibration data are presented in Appendix H.

Method 29 Trace Metals Determination

Stack gas metals concentrations and emission rates were determined in accordance with Method 29 as part of a Method 5/29 sample train. An Environmental Supply Company, Inc. sampling train was used to sample stack gas, in the manner specified in the Method. Analyses of the samples collected were conducted by Maxxam Analytics of Mississauga, Ontario. Samples were analyzed for the following metals, using Inductively Coupled Argon Plasma emission spectroscopy (ICP): Antimony, Arsenic, Beryllium, Cadmium, Chromium, Cobalt, Lead, Manganese, Nickel, and Selenium. Samples were analyzed for Mercury using Cold Vapor Atomic Absorption Spectroscopy (CVAAS). All of the equipment used was calibrated in accordance with the specifications of the Method. Laboratory sample analysis is found in Appendix E. Field data sheets are included in Appendix G. Calibration data are presented in Appendix H.

Method 202 Condensable Particulate Matter Determination

Stack gas CPM concentrations and emission rates were determined in accordance with the Method 202, 40CFR51, Appendix M, in conjunction with Method 5 filterable particulate sampling.

The condensable particulate matter (CPM) was collected in impingers after filterable particulate material was collected using Method 5. The organic and aqueous fractions were then taken to dryness and weighed. The total of all fractions represents the CPM. Compared to the December 17, 1991 promulgated Method 202, this Method includes the addition of a condenser, followed by a water dropout impinger immediately after the final heated filter. One modified Greenburg Smith impinger and an ambient temperature filter follow the water dropout impinger. A schematic of the sampling train configured with these updates is found in the Appendix.

CPM was collected in the water dropout, modified Greenburg Smith impinger and ambient filter portion of the sampling train as described in this Method. The impinger contents were purged with nitrogen (N_2) immediately after sample collection to remove dissolved sulfur dioxide (SO_2) gases from the impingers. The impinger solution was then extracted with DI water, acetone, and hexane. The organic and aqueous fractions were dried and the residues weighed. The total of the aqueous, organic, and ambient filter fractions represents the CPM. Laboratory analysis data are found in Appendix E. All of the equipment used was calibrated in accordance with the specifications of the Method. Calibration data are presented in Appendix H.

Method 0031 Volatile Organics Determination

Volatile organic concentration and emission rates were determined utilizing SW-846-0031 methodology. The SW-846-0031 sample train is designed as follows: heated sample probe with purge system, condenser coil, two tenax traps, a condensate knockout, a second condenser coil, an anasorb trap, and a second condensate knockout, followed by a silica gel impinger to remove any remaining moisture from the stack gas. A diagram of this system is appended.

The glass-lined probe was wrapped with heating wire and a stainless steel jacket and heated to a temperature of 266°F ± 41°F.

Downstream of the probe, the sampled gas passed through a water-cooled condenser and then through two tenax traps. Condensed water vapor was then collected in a condensate trap before

passing through the second water-cooled condenser followed by the anasorb trap. Finally, any remaining moisture was collected in the second condensate trap.

All sorbent traps were prepared and packed by Maxxam Analytics, Inc. After sampling, the modules were then capped and shipped to Maxxam Analytics, Inc. for sample analysis.

The condensate knockout catch was collected and rinsed with DI water and stored in 40ml vials. These vials were filled close to the top to eliminate head space and prevent volatilization of the samples. Four pairs of traps were analyzed for each test run along with the condensate knockout.

Methylene chloride ($MeCl_2$) results for all condensate samples were much higher than anticipated. It is believed that cross contamination occurred between the Method 23/0010 $MeCl_2$ samples and the Method 0031 condensate samples as these samples were transported to Maxxam Analytics, Inc. in the same batch. In addition, the methylene chloride which was used in the field recovery of Method 23/0010, was in close proximity to where the Method 0031 condensate samples were recovered. Consequently, the Method 0031 condensate data is not representative of actual emissions from the source.

Laboratory analysis data are found in Appendix E. Calibration data are presented in Appendix H.

Modified Method 315 - Toluene Soluble Organics (TSO) Determination

Method 315 (Particulate and Methylene Chloride Extractable Matter (MCEM) from Selected Sources at Primary Aluminum Production Facilities) with USEPA required deviations was required to be conducted per the Coke ICR request. It should be noted the source tested was not a Primary Aluminum Production Facility. The USEPA required deviation from the standard method was substituting the use of Toluene for extraction instead of Methylene Chloride to determine emissions of Toluene Soluble Organics (TSO). Stack gas TSO concentration and emission rates were determined in accordance with the Modified Method 315. Probe temperature was maintained at 248F +/- 25F. An Environmental Supply Company, Inc. sampling train was used to sample stack gas, in the manner specified in the Method.

Analyses of the samples collected were conducted by Maxxam Analytics of Mississauga, Ontario. Method 315 has defined maximum allowed blank values for Methylene Chloride, as Methylene Chloride specifications have very low concentrations of “Residue After Evaporation.” USEPA required use of Toluene for extraction and although a high purity ACR Reagent grade Toluene was used for analysis, the residue after evaporation specification is multiple times higher than typical Methylene Chloride specifications. Maxxam Analytics’ Modified Method 315 report does use their default Method 315 term “DCM” (Methylene Chloride) for their TSO (Toluene Soluble Organics) results. Maxxam Analytics does not have the ability to change the report nomenclature per their regulations with being an accredited laboratory. The use of the term DCM in the Maxxam Analytics’ report should be viewed as TSO.

Toluene blank concentrations were greater than allowed by the method for Methylene Chloride and Mostardi Platt evaluated how best to subtract a representative Toluene blank. The Modified method blanks of the Toluene were high and had values that were up to 65% of the reported sample results. Mostardi Platt used Maxxam's Toluene Method Blank from the Modified Method 315 testing instead of the highest allowed blank from the Methodology of 315. This was done to show the magnitude of contamination in the Toluene used in the M315 recovery. The Toluene Filter Extraction Blank and Toluene Laboratory Processed Blank that went through the filtration apparatus, are extremely elevated and therefore adds significant high bias to the results that

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technically justifies considering the overall Method 315 results, with the non-standard Toluene extraction solvent, to be suspect at a minimum and likely invalid. The reported Modified Method 315 (TSO) results do not fully account for the magnitude of the documented blank contamination value.

Please see Maxxam Analytics' Modified Method 315 (TSO) White Paper dated March 10, 2017 provided in Appendix A that states, "The toluene filter extractable blank 90% upper confidence interval of 11.18 mg of residue is 43 times the Method 315 acceptable methylene chloride blank value of 0.26 mg of residue. This suggests the use of toluene extraction solvent to be the cause of the high bias residue results."

"The toluene laboratory processed blank of 8.5 mg of residue is more than 17 times the methylene chloride laboratory processed blank of ≤0.5 mg of residue. This again, would suggest the use of the toluene extraction solvent to be the cause of the high bias residue results."

An example calculation is found in Appendix D. All of the equipment used was calibrated in accordance with the specifications of the Method. Calibration data are presented in Appendix H. Copies of the gas cylinder certifications are found in Appendix I.

Method 316 Formaldehyde (HCHO) Determination

Stack gas HCHO concentrations and emission rates were determined in accordance with Method 316. Probe temperature was maintained at 248ºF +/- 25ºF. A filter bypass was utilized followed by four impingers, the first two were loaded with 100 mls of DI water each, followed by an empty third impinger, and silica gel was loaded in the fourth impinger to remove any remaining moisture. After sampling, DI water was then used to recover all sample surfaces. The first and second impinger contents were recovered separately to check for breakthrough of HCHO during sampling. Analysis of both sample fractions collected was conducted by Maxxam Analytics of Mississauga, Ontario. Laboratory data are found in Appendix E.

Method 320 Fourier Transform Infrared (FTIR) Detector Multi-Gas Determination

HCl, HF, and HCN samples were collected using Extractive Fourier transform infrared (FTIR) spectrometry following US EPA Method 320. FTIR data were collected using an MKS MultiGas 2030 FTIR spectrometer. A heated transfer line was used to collect the sample and deliver it to the FTIR, where data were collected at 0.5cm-1 resolution. Each spectrum was derived from the co-addition of 64 scans, with a new data point generated approximately every one minute.

Spiking was performed prior to each test run to verify the ability of the sampling system to quantitatively deliver a sample containing the requested analytes from the base of the probe to the FTIR. Analyte spiking assures the ability of the FTIR to quantify data in the presence of effluent gas.

Reference method data are found in Appendix F. All of the equipment used was calibrated in accordance with the specifications of the Method.

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3.0 TEST RESULTS SUMMARIES

Test Set 1

ArcelorMittal Burns Harbor LLC Burns Harbor, Indiana #2 Battery PEC Stack Carbon Monoxide Summary								
Test No.	Date	Start Time	End Time	CO, ppm (dry)	O_2, % (dry)	CO_2, % (dry)	Flow dscfm	CO, lb/hr
1	08/16/16	07:17	16:19	50.3	20.0	1.1	192,816	42.3
2	08/17/16	09:12	17:54	49.7	19.9	1.2	190,462	41.3
3	08/18/16	07:17	17:58	50.6	20.0	1.1	187,036	41.3
Average				**50.2**	**20.0**	**1.1**	**190,105**	**41.6**

Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Test Location: #2 Battery PEC Stack
Test Method: 5/29

Source Condition	**Normal**	**Normal**	**Normal**	
Date	**8/16/16**	**8/17/16**	**8/18/16**	
Start Time	**7:15**	**8:48**	**7:16**	
End Time	**17:25**	**18:45**	**19:08**	
	Run 1	**Run 2**	**Run 3**	**Average**
Stack Conditions				
Average Gas Temperature, °F	154.9	157.9	150.5	154.4
Flue Gas Moisture, percent by volume	3.5%	3.4%	3.7%	3.5%
Average Flue Pressure, in. Hg	29.50	29.35	29.28	29.38
Gas Sample Volume, dscf	120.143	117.269	112.672	116.695
Average Gas Velocity, ft/sec	61.851	61.642	60.115	61.203
Gas Volumetric Flow Rate, acfm	236,087	235,290	229,462	233,613
Gas Volumetric Flow Rate, dscfm	192,816	190,462	187,036	190,105
Gas Volumetric Flow Rate, scfm	199,899	197,262	194,198	197,120
Average %CO_2 by volume, dry basis	1.1	1.2	1.0	1.1
Average %O_2 by volume, dry basis	20.0	19.9	20.0	20.0
Isokinetic Variance	105.5	104.2	102.0	103.9
Filterable Particulate Matter (Method 5)				
grams collected	0.0094	0.0059	0.0085	0.0079
grains/acf	0.0010	0.0006	0.0009	0.0008
grains/dscf	0.0012	0.0008	0.0012	0.0011
mg/dscm	2.76E+00	1.78E+00	2.66E+00	2.40E+00
lb/hr	2.00E+00	1.27E+00	1.87E+00	1.71E+00

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Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Test Location: #2 Battery PEC Stack
Test Method: 5/29

Source Condition	Normal	Normal	Normal	
Date	8/16/16	8/17/16	8/18/16	
Start Time	7:15	8:48	7:16	
End Time	17:25	18:45	19:08	
	Run 1	Run 2	Run 3	Average
Stack Conditions				
Average Gas Temperature, °F	154.9	157.9	150.5	154.4
Flue Gas Moisture, percent by volume	3.5%	3.4%	3.7%	3.5%
Average Flue Pressure, in. Hg	29.50	29.35	29.28	29.38
Gas Sample Volume, dscf	120.143	117.269	112.672	116.695
Average Gas Velocity, ft/sec	61.851	61.642	60.115	61.203
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Gas Volumetric Flow Rate, dscfm	192,816	190,462	187,036	190,105
Gas Volumetric Flow Rate, scfm	199,899	197,262	194,198	197,120
Average %CO_2 by volume, dry basis	1.1	1.2	1.0	1.1
Average %O_2 by volume, dry basis	20.0	19.9	20.0	20.0
Isokinetic Variance	105.5	104.2	102.0	103.9
Antimony (Sb) Emissions				
ug of sample collected	≤ 1.09	≤ 1.00	≤ 1.00	≤ 1.03
ppb	≤ 0.06	≤ 0.06	≤ 0.06	≤ 0.06
mg/dscm	≤ 3.20E-04	≤ 3.00E-04	≤ 3.10E-04	≤ 3.10E-04
lb/hr	≤ 2.31E-04	≤ 2.15E-04	≤ 2.20E-04	≤ 2.22E-04
Arsenic (As) Emissions				
ug of sample collected	≤ 1.00	≤ 1.00	≤ 1.00	≤ 1.00
ppb	≤ 0.09	≤ 0.10	≤ 0.10	≤ 0.10
mg/dscm	≤ 2.90E-04	≤ 3.00E-04	≤ 3.10E-04	≤ 3.00E-04
lb/hr	≤ 2.12E-04	≤ 2.15E-04	≤ 2.20E-04	≤ 2.16E-04
Beryllium (Be) Emissions				
ug of sample collected	≤ 0.25	≤ 0.25	≤ 0.25	≤ 0.25
ppb	≤ 0.20	≤ 0.20	≤ 0.21	≤ 0.20
mg/dscm	≤ 7.00E-05	≤ 8.00E-05	≤ 8.00E-05	≤ 7.67E-05
lb/hr	≤ 5.30E-05	≤ 5.40E-05	≤ 5.50E-05	≤ 5.40E-05
Cadmium (Cd) Emissions				
ug of sample collected	0.96	0.45	≤ 0.37	≤ 0.59
ppb	0.06	0.03	≤ 0.03	≤ 0.04
mg/dscm	2.80E-04	1.30E-04	≤ 1.20E-04	≤ 1.77E-04
lb/hr	2.04E-04	9.60E-05	≤ 8.20E-05	≤ 1.27E-04
Chromium (Cr) Emissions				
ug of sample collected	2.50	2.75	2.73	2.66
ppb	0.34	0.38	0.40	0.37
mg/dscm	7.30E-04	8.30E-04	8.60E-04	8.07E-04
lb/hr	5.31E-04	5.91E-04	5.99E-04	5.74E-04

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Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Test Location: #2 Battery PEC Stack
Test Method: 5/29

Source Condition	Normal	Normal	Normal	
Date	8/16/16	8/17/16	8/18/16	
Start Time	7:15	8:48	7:16	
End Time	17:25	18:45	19:08	
	Run 1	Run 2	Run 3	Average
Stack Conditions				
Average Gas Temperature, °F	154.9	157.9	150.5	154.4
Flue Gas Moisture, percent by volume	3.5%	3.4%	3.7%	3.5%
Average Flue Pressure, in. Hg	29.50	29.35	29.28	29.38
Gas Sample Volume, dscf	120.143	117.269	112.672	116.695
Average Gas Velocity, ft/sec	61.851	61.642	60.115	61.203
Gas Volumetric Flow Rate, acfm	236,087	235,290	229,462	233,613
Gas Volumetric Flow Rate, dscfm	192,816	190,462	187,036	190,105
Gas Volumetric Flow Rate, scfm	199,899	197,262	194,198	197,120
Average %CO_2 by volume, dry basis	1.1	1.2	1.0	1.1
Average %O_2 by volume, dry basis	20.0	19.9	20.0	20.0
Isokinetic Variance	105.5	104.2	102.0	103.9
Cobalt (Co) Emissions				
ug of sample collected	≤ 0.37	≤ 0.28	≤ 0.39	≤ 0.35
ppb	≤ 0.05	≤ 0.04	≤ 0.05	≤ 0.04
mg/dscm	≤ 1.10E-04	≤ 9.00E-05	≤ 1.20E-04	≤ 1.07E-04
lb/hr	≤ 7.90E-05	≤ 6.10E-05	≤ 8.50E-05	≤ 7.50E-05
Lead (Pb) Emissions				
ug of sample collected	4.23	2.07	1.29	2.53
ppb	0.14	0.07	0.05	0.09
mg/dscm	1.24E-03	6.20E-04	4.00E-04	7.53E-04
lb/hr	8.98E-04	4.45E-04	2.83E-04	5.42E-04
Manganese (Mn) Emissions				
ug of sample collected	≤ 2.54	≤ 5.05	6.54	≤ 4.71
ppb	≤ 0.33	≤ 0.67	0.90	≤ 0.63
mg/dscm	≤ 7.50E-04	≤ 1.52E-03	2.05E-03	≤ 1.44E-03
lb/hr	≤ 5.39E-04	≤ 1.09E-03	1.44E-03	≤ 1.02E-03
Nickel (Ni) Emissions				
ug of sample collected	2.94	3.10	3.96	3.33
ppb	0.35	0.38	0.51	0.41
mg/dscm	8.60E-04	9.30E-04	1.24E-03	1.01E-03
lb/hr	6.24E-04	6.66E-04	8.70E-04	7.20E-04
Selenium (Se) Emissions				
ug of sample collected	≤ 42.70	≤ 3.19	≤ 2.50	≤ 16.13
ppb	≤ 3.82	≤ 0.29	≤ 0.24	≤ 1.45
mg/dscm	≤ 1.26E-02	≤ 9.60E-04	≤ 7.80E-04	≤ 4.76E-03
lb/hr	≤ 9.07E-03	≤ 6.85E-04	≤ 5.49E-04	≤ 3.43E-03

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Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Test Location: #2 Battery PEC Stack
Test Method: 5/29

Source Condition	Normal	Normal	Normal	
Date	8/16/16	8/17/16	8/18/16	
Start Time	7:15	8:48	7:16	
End Time	17:25	18:45	19:08	
	Run 1	Run 2	Run 3	Average
Stack Conditions				
Average Gas Temperature, °F	154.9	157.9	150.5	154.4
Flue Gas Moisture, percent by volume	3.5%	3.4%	3.7%	3.5%
Average Flue Pressure, in. Hg	29.50	29.35	29.28	29.38
Gas Sample Volume, dscf	120.143	117.269	112.672	116.695
Average Gas Velocity, ft/sec	61.851	61.642	60.115	61.203
Gas Volumetric Flow Rate, acfm	236,087	235,290	229,462	233,613
Gas Volumetric Flow Rate, dscfm	192,816	190,462	187,036	190,105
Gas Volumetric Flow Rate, scfm	199,899	197,262	194,198	197,120
Average %CO_2 by volume, dry basis	1.1	1.2	1.0	1.1
Average %O_2 by volume, dry basis	20.0	19.9	20.0	20.0
Isokinetic Variance	105.5	104.2	102.0	103.9
Mercury (Hg) Emissions				
ug of sample collected	≤ 0.79	≤ 0.50	≤ 0.46	≤ 0.58
ppb	≤ 0.03	≤ 0.02	≤ 0.02	≤ 0.02
mg/dscm	≤ 2.30E-04	≤ 1.50E-04	≤ 1.40E-04	≤ 1.73E-04
lb/hr	≤ 1.68E-04	≤ 1.07E-04	≤ 1.01E-04	≤ 1.25E-04

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Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Test Location: #2 Battery PEC Stack
Test Method: 5/202

Source Condition	Normal	Normal	Normal	
Date	8/16/16	8/17/16	8/18/16	
Start Time	7:15	8:48	7:16	
End Time	17:25	18:45	19:08	
	Run 1	Run 2	Run 3	Average
Stack Conditions				
Average Gas Temperature, °F	155.0	158.4	151.2	154.9
Flue Gas Moisture, percent by volume	3.3%	3.3%	3.6%	3.4%
Average Flue Pressure, in. Hg	29.50	29.32	29.28	29.37
Gas Sample Volume, dscf	85.005	86.841	86.342	86.063
Average Gas Velocity, ft/sec	60.259	62.835	62.068	61.721
Gas Volumetric Flow Rate, acfm	230,010	239,844	236,915	235,590
Gas Volumetric Flow Rate, dscfm	188,247	193,975	193,110	191,777
Gas Volumetric Flow Rate, scfm	194,714	200,666	200,252	198,544
Average %CO_2 by volume, dry basis	1.1	1.2	1.1	1.1
Average %O_2 by volume, dry basis	20.0	19.9	20.0	20.0
Isokinetic Variance	105.6	104.7	104.6	105.0
Filterable Particulate Matter (Method 5)				
grams collected	0.0030	0.0016	0.0014	0.0020
grains/acf	0.0004	0.0002	0.0002	0.0003
grains/dscf	0.0005	0.0003	0.0003	0.0004
mg/dscm	1.25E+00	6.51E-01	5.73E-01	8.23E-01
lb/hr	8.79E-01	4.73E-01	4.14E-01	5.89E-01
Condensable Particulate Matter (Method 202)				
grams collected	0.0023	0.0026	0.0014	0.0021
grains/acf	0.0003	0.0004	0.0002	0.0003
grains/dscf	0.0004	0.0005	0.0003	0.0004
mg/dscm	9.56E-01	1.06E+00	5.73E-01	8.62E-01
lb/hr	6.74E-01	7.68E-01	4.14E-01	6.19E-01
Total Particulate Matter (5/202)				
grams collected	0.0053	0.0042	0.0028	0.0041
grains/acf	0.0007	0.0006	0.0004	0.0006
grains/dscf	0.0009	0.0008	0.0006	0.0008
mg/dscm	2.32E+00	1.77E+00	1.19E+00	1.76E+00
lb/hr	1.55E+00	1.24E+00	8.28E-01	1.21E+00

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Test Set 2

ArcelorMittal Burns Harbor LLC Burns Harbor, Indiana #2 Battery PEC Stack Sulfur Dioxide Summary								
Test No.	**Date**	**Start Time**	**End Time**	**SO_2, ppm (dry)**	**O_2, % (dry)**	**CO_2, % (dry)**	**Flow dscfm**	**SO_2, lb/hr**
1	08/30/16	07:14	17:18	32.4	19.9	0.9	172,941	55.9
2	08/31/16	06:28	16:42	36.3	19.8	1.1	176,058	63.7
3	09/01/16	08:55	18:22	36.4	19.8	1.1	178,701	64.9
Average				**35.0**	**19.8**	**1.0**	**175,900**	**61.5**

Arcelor Mittal Burns Harbor LLC

Burns Harbor, Indiana

#2 Battery PEC Stack

Hydrogen Sulfide

Run	Date	Start Time	End Time	H_2S (ppm)	SCFM	H_2S (lb/hr)
1	8/30/2016	10:37	17:16	< 5.00E-01	179,868	< 4.77E-01
2	8/31/2016	7:33	16:40	< 5.00E-01	182,531	< 4.84E-01
3	9/1/2016	8:53	18:20	< 5.00E-01	184,434	< 4.89E-01
Test average				**< 5.00E-01**	**182,278**	**< 4.83E-01**

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SPECIATED VOLATILE ORGANIC HAP TEST RESULTS SUMMARY
Total Average Run 1-3
Arcelor Mittal Burns Harbor LLC
Burns Harbor, Indiana
 # 2 Battery PEC Stack
August 30, 2016

Analytes	Sample Catch (ug)		Concentration (mg/dscm)		Flowrate, dscfm	Emissions lb/hr	
Chloromethane	≤	0.30	≤	3.84E-03	175,900	≤	2.52E-03
Vinyl Chloride	≤	0.09	≤	1.12E-03	175,900	≤	7.35E-04
Bromomethane	≤	0.35	≤	4.36E-03	175,900	≤	2.86E-03
Chloroethane	≤	0.13	≤	1.61E-03	175,900	≤	1.06E-03
1,1-Dichloroethylene	≤	0.09	≤	1.14E-03	175,900	≤	7.46E-04
Iodomethane	≤	0.14	≤	1.77E-03	175,900	≤	1.16E-03
Carbon Disulfide	≤	0.42	≤	5.26E-03	175,900	≤	3.45E-03
Methylene Chloride(Dichloromethane)*	≤	198.04	≤	2.50E+00	175,900	≤	1.64E+00
Chloroform	≤	0.08	≤	1.03E-03	175,900	≤	6.74E-04
1,2-Dichloroethane	≤	0.07	≤	9.34E-04	175,900	≤	6.13E-04
1,1,1-Trichloroethane	≤	0.10	≤	1.29E-03	175,900	≤	8.45E-04
Carbon Tetrachloride	≤	0.11	≤	1.45E-03	175,900	≤	9.50E-04
Benzene	≤	7.38	≤	9.32E-02	175,900	≤	6.12E-02
1,1,2-Trichloroethane	≤	0.11	≤	1.39E-03	175,900	≤	9.12E-04
1,2-Dichloropropane	≤	0.09	≤	1.14E-03	175,900	≤	7.46E-04
Trichloroethylene	≤	0.09	≤	1.14E-03	175,900	≤	7.46E-04
Toluene	≤	1.14	≤	1.44E-02	175,900	≤	9.48E-03
Tetrachloroethylene	≤	0.12	≤	1.56E-03	175,900	≤	1.03E-03
Chlorobenzene	≤	0.09	≤	1.14E-03	175,900	≤	7.46E-04
Ethylbenzene	≤	0.12	≤	1.50E-03	175,900	≤	9.84E-04
m / p-Xylene	≤	0.36	≤	4.54E-03	175,900	≤	2.98E-03
Styrene	≤	0.17	≤	2.19E-03	175,900	≤	1.43E-03
o-Xylene	≤	0.14	≤	1.75E-03	175,900	≤	1.15E-03
Bromoform	≤	0.09	≤	1.17E-03	175,900	≤	7.68E-04
1,1,2,2-Tetrachloroethane	≤	0.15	≤	1.87E-03	175,900	≤	1.23E-03
Acrylonitrile	≤	0.56	≤	7.12E-03	175,900	≤	4.67E-03
Total Volatile Organic HAP		**210.54**		**2.66E+00**			**1.75E+00**
TEQ Total							

*Methylene chloride (MeCl2) results for all condensate samples were much higher than anticipated. It is believed that cross contamination occurred between the Method 23/0010 MeCl2 samples and the Method 0031 condensate samples as these samples were transported to Maxxam Analytics, Inc. in the same batch. In addition, the methylene chloride which was used in the field recovery of Method 23/0010, was in close proximity to where the Method 0031 condensate samples were recovered. Consequently, the Method 0031 condensate data is not representative of actual emissions from the source.

SPECIATED VOLATILE ORGANIC HAP TEST RESULTS SUMMARY
Run 1
Arcelor Mittal Burns Harbor LLC
Burns Harbor, Indiana
 # 2 Battery PEC Stack
August 30, 2016

Analytes	Sample Catch (ug)		Concentration (mg/dscm)		Flowrate, dscfm	Emissions lb/hr		Blank (ug)
Chloromethane	≤	0.27	≤	3.49E-03	172,941	≤	2.26E-03	0.00
Vinyl Chloride	≤	0.09	≤	1.12E-03	172,941	≤	7.25E-04	0.00
Bromomethane	≤	0.34	≤	4.31E-03	172,941	≤	2.79E-03	0.00
Chloroethane	≤	0.13	≤	1.60E-03	172,941	≤	1.04E-03	0.00
1,1-Dichloroethylene	≤	0.09	≤	1.16E-03	172,941	≤	7.52E-04	0.00
Iodomethane	≤	0.19	≤	2.45E-03	172,941	≤	1.59E-03	0.00
Carbon Disulfide	≤	0.32	≤	4.07E-03	172,941	≤	2.64E-03	0.00
Methylene Chloride(Dichloromethane)*	≤	90.88	≤	1.15E+00	172,941	≤	7.48E-01	0.00
Chloroform	≤	0.08	≤	1.04E-03	172,941	≤	6.76E-04	0.00
1,2-Dichloroethane	≤	0.08	≤	9.57E-04	172,941	≤	6.20E-04	0.00
1,1,1-Trichloroethane	≤	0.10	≤	1.31E-03	172,941	≤	8.50E-04	0.00
Carbon Tetrachloride	≤	0.13	≤	1.59E-03	172,941	≤	1.03E-03	0.00
Benzene	≤	5.55	≤	7.06E-02	172,941	≤	4.57E-02	0.00
1,1,2-Trichloroethane	≤	0.11	≤	1.41E-03	172,941	≤	9.16E-04	0.00
1,2-Dichloropropane	≤	0.09	≤	1.16E-03	172,941	≤	7.52E-04	0.00
Trichloroethylene	≤	0.09	≤	1.16E-03	172,941	≤	7.52E-04	0.00
Toluene	≤	0.91	≤	1.16E-02	172,941	≤	7.49E-03	0.00
Tetrachloroethylene	≤	0.14	≤	1.73E-03	172,941	≤	1.12E-03	0.00
Chlorobenzene	≤	0.09	≤	1.16E-03	172,941	≤	7.52E-04	0.00
Ethylbenzene	≤	0.11	≤	1.40E-03	172,941	≤	9.08E-04	0.00
m / p-Xylene	≤	0.28	≤	3.57E-03	172,941	≤	2.32E-03	0.00
Styrene	≤	0.15	≤	1.90E-03	172,941	≤	1.23E-03	0.00
o-Xylene	≤	0.12	≤	1.54E-03	172,941	≤	9.99E-04	0.00
Bromoform	≤	0.09	≤	1.17E-03	172,941	≤	7.58E-04	0.00
1,1,2,2-Tetrachloroethane	≤	0.15	≤	1.86E-03	172,941	≤	1.20E-03	0.00
Acrylonitrile	≤	0.55	≤	7.01E-03	172,941	≤	4.54E-03	0.00
Total Volatile Organic HAP				**1.29E+00**			**8.33E-01**	
TEQ Total								
* Suspected contamination due to onsite methyene chloride used in M23/0010 sampling recovery								
Sample volume (Vmstd, liters)		78.69						
Average % CO_2 by volume, dry		1.00						
Average % O_2 by volume, dry		19.90						

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SPECIATED VOLATILE ORGANIC HAP TEST RESULTS SUMMARY
Run 2
Arcelor Mittal Burns Harbor LLC
Burns Harbor, Indiana
 # 2 Battery PEC Stack
August 31, 2016

Analytes	Sample Catch (ug)		Concentration (mg/dscm)		Flowrate, dscfm		Emissions lb/hr	Blank (ug)
Chloromethane	≤	0.31	≤	3.85E-03	176,058	≤	2.54E-03	0.00
Vinyl Chloride	≤	0.09	≤	1.11E-03	176,058	≤	7.30E-04	0.00
Bromomethane	≤	0.33	≤	4.21E-03	176,058	≤	2.78E-03	0.00
Chloroethane	≤	0.13	≤	1.59E-03	176,058	≤	1.05E-03	0.00
1,1-Dichloroethylene	≤	0.09	≤	1.10E-03	176,058	≤	7.24E-04	0.00
Iodomethane	≤	0.11	≤	1.41E-03	176,058	≤	9.29E-04	0.00
Carbon Disulfide	≤	0.69	≤	8.67E-03	176,058	≤	5.72E-03	0.00
Methylene Chloride(Dichloromethane)*	≤	232.28	≤	2.93E+00	176,058	≤	1.93E+00	0.00
Chloroform	≤	0.08	≤	1.01E-03	176,058	≤	6.63E-04	0.00
1,2-Dichloroethane	≤	0.07	≤	8.96E-04	176,058	≤	5.91E-04	0.00
1,1,1-Trichloroethane	≤	0.10	≤	1.25E-03	176,058	≤	8.24E-04	0.00
Carbon Tetrachloride	≤	0.11	≤	1.35E-03	176,058	≤	8.91E-04	0.00
Benzene	≤	12.87	≤	1.62E-01	176,058	≤	1.07E-01	0.00
1,1,2-Trichloroethane	≤	0.11	≤	1.35E-03	176,058	≤	8.91E-04	0.00
1,2-Dichloropropane	≤	0.09	≤	1.10E-03	176,058	≤	7.24E-04	0.00
Trichloroethylene	≤	0.09	≤	1.10E-03	176,058	≤	7.24E-04	0.00
Toluene		1.97		2.49E-02	176,058		1.64E-02	0.00
Tetrachloroethylene	≤	0.12	≤	1.45E-03	176,058	≤	9.57E-04	0.00
Chlorobenzene	≤	0.09	≤	1.10E-03	176,058	≤	7.24E-04	0.00
Ethylbenzene	≤	0.14	≤	1.75E-03	176,058	≤	1.16E-03	0.00
m / p-Xylene	≤	0.53	≤	6.71E-03	176,058	≤	4.43E-03	0.00
Styrene	≤	0.27	≤	3.39E-03	176,058	≤	2.24E-03	0.00
o-Xylene	≤	0.17	≤	2.17E-03	176,058	≤	1.43E-03	0.00
Bromoform	≤	0.09	≤	1.16E-03	176,058	≤	7.63E-04	0.00
1,1,2,2-Tetrachloroethane	≤	0.15	≤	1.85E-03	176,058	≤	1.22E-03	0.00
Acrylonitrile	≤	0.57	≤	7.16E-03	176,058	≤	4.72E-03	0.00
Total Volatile Organic HAP				**3.18E+00**	176,058		**2.09E+00**	
TEQ Total								
* Suspected contamination due to onsite methyene chloride used in M23/0010 sampling recovery								
Sample volume (Vmstd, liters)		79.24						
Average % CO_2 by volume, dry		1.10						
Average % O_2 by volume, dry		19.80						

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SPECIATED VOLATILE ORGANIC HAP TEST RESULTS SUMMARY
Run 3
Arcelor Mittal Burns Harbor LLC
Burns Harbor, Indiana
 # 2 Battery PEC Stack
September 1, 2016

Analytes	Sample Catch (ug)		Concentration (mg/dscm)		Flowrate, dscfm	Emissions lb/hr		Blank (ug)
Chloromethane	≤	0.33	≤	4.18E-03	178,702	≤	2.80E-03	0.00
Vinyl Chloride	≤	0.09	≤	1.13E-03	178,702	≤	7.57E-04	0.00
Bromomethane	≤	0.36	≤	4.57E-03	178,702	≤	3.06E-03	0.00
Chloroethane	≤	0.13	≤	1.64E-03	178,702	≤	1.10E-03	0.00
1,1-Dichloroethylene	≤	0.09	≤	1.15E-03	178,702	≤	7.70E-04	0.00
Iodomethane	≤	0.12	≤	1.46E-03	178,702	≤	9.77E-04	0.00
Carbon Disulfide	≤	0.24	≤	3.03E-03	178,702	≤	2.03E-03	0.00
Methylene Chloride(Dichloromethane)*	≤	270.98	≤	3.41E+00	178,702	≤	2.28E+00	0.00
Chloroform	≤	0.08	≤	1.03E-03	178,702	≤	6.90E-04	0.00
1,2-Dichloroethane	≤	0.08	≤	9.48E-04	178,702	≤	6.35E-04	0.00
1,1,1-Trichloroethane	≤	0.10	≤	1.30E-03	178,702	≤	8.71E-04	0.00
Carbon Tetrachloride	≤	0.11	≤	1.40E-03	178,702	≤	9.38E-04	0.00
Benzene	≤	3.70	≤	4.66E-02	178,702	≤	3.12E-02	0.00
1,1,2-Trichloroethane	≤	0.11	≤	1.40E-03	178,702	≤	9.38E-04	0.00
1,2-Dichloropropane	≤	0.09	≤	1.15E-03	178,702	≤	7.70E-04	0.00
Trichloroethylene	≤	0.09	≤	1.15E-03	178,702	≤	7.70E-04	0.00
Toluene		0.54		6.84E-03	178,702		4.58E-03	0.00
Tetrachloroethylene	≤	0.12	≤	1.50E-03	178,702	≤	1.01E-03	0.00
Chlorobenzene	≤	0.09	≤	1.15E-03	178,702	≤	7.70E-04	0.00
Ethylbenzene	≤	0.11	≤	1.34E-03	178,702	≤	8.96E-04	0.00
m / p-Xylene	≤	0.26	≤	3.33E-03	178,702	≤	2.23E-03	0.00
Styrene	≤	0.10	≤	1.26E-03	178,702	≤	8.46E-04	0.00
o-Xylene	≤	0.12	≤	1.54E-03	178,702	≤	1.03E-03	0.00
Bromoform	≤	0.09	≤	1.18E-03	178,702	≤	7.91E-04	0.00
1,1,2,2-Tetrachloroethane	≤	0.15	≤	1.90E-03	178,702	≤	1.27E-03	0.00
Acrylonitrile	≤	0.57	≤	7.19E-03	178,702	≤	4.81E-03	0.00
Total Volatile Organic HAP				**3.51E+00**			**2.35E+00**	
TEQ Total								
* Suspected contamination due to onsite methyene chloride used in M23/0010 sampling recovery								
Sample volume (Vmstd, liters)		79.40						
Average % CO_2 by volume, dry		1.10						
Average % O_2 by volume, dry		19.80						

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Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Test Location: #2 Battery PEC Stack
Test Method: 316

Source Condition	Normal	Normal	Normal	
Date	8/30/16	8/31/16	9/1/16	
Start Time	7:13	6:40	8:53	
End Time	17:18	16:42	19:10	
	Run 1	Run 2	Run 3	Average
Stack Conditions				
Average Gas Temperature, °F	149.6	151.3	144.3	148.4
Flue Gas Moisture, percent by volume	3.9%	3.5%	3.1%	3.5%
Average Flue Pressure, in. Hg	29.37	29.22	29.37	29.32
Gas Sample Volume, dscf	95.607	96.334	98.227	96.723
Average Gas Velocity, ft/sec	55.429	56.701	56.341	56.157
Gas Volumetric Flow Rate, acfm	211,575	216,429	215,055	214,353
Gas Volumetric Flow Rate, dscfm	172,941	176,058	178,701	175,900
Gas Volumetric Flow Rate, scfm	179,868	182,531	184,434	182,278
Average %CO_2 by volume, dry basis	1.0	1.1	1.1	1.1
Average %O_2 by volume, dry basis	19.9	19.8	19.8	19.8
Isokinetic Variance	102.6	101.5	102.0	102.0
Formaldehyde Emissions				
ug of sample collected	≤ 7.60	≤ 8.30	≤ 8.00	≤ 7.97
ppm	≤ 0.0022	≤ 0.0024	≤ 0.0023	≤ 0.0023
mg/dscm	≤ 2.81E-03	≤ 3.04E-03	≤ 2.88E-03	≤ 2.91E-03
lb/hr	≤ 1.80E-03	≤ 2.00E-03	≤ 1.90E-03	≤ 1.90E-03

Arcelor Mittal Burns Harbor LLC

Burns Harbor, Indiana

#2 Battery PEC Stack

HCl, HCN, and HF Summary by FTIR

Run	Date	Start Time	End Time	HCl (mg/dscm)	HCN (mg/dscm)	HF (mg/dscm)	DSCFM	HCl (lb/hr)	HCN (lb/hr)	HF (lb/hr)
1	8/30/2016	7:13	17:18	1.025E+00	8.639E-01	3.921E-01	172,941	6.639E-01	5.596E-01	2.540E-01
2	8/31/2016	6:29	16:43	2.264E+00	1.034E+00	4.049E-01	176,058	1.493E+00	6.822E-01	2.670E-01
3	9/1/2016	8:54	18:23	3.336E+00	8.998E-01	4.545E-01	178,702	2.233E+00	6.023E-01	3.042E-01
Test average				**2.209E+00**	**9.327E-01**	**4.172E-01**	**175,900**	**1.463E+00**	**6.147E-01**	**2.751E-01**

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Test Set 3

ArcelorMittal Burns Harbor LLC Burns Harbor, Indiana #2 Battery PEC Stack Gaseous Summary					
Test No.	**Date**	**Start Time**	**End Time**	**O_2, % (dry)**	**CO_2, % (dry)**
1	08/23/16	07:14	17:38	19.9	1.0
2	08/24/16	07:26	19:33	19.7	1.1
3	08/25/16	09:35	20:41	19.8	1.3
Average				**19.8**	**1.1**

Company: ArcelorMittal Burns Harbor LLC
Plant: Burns Harbor, Indiana
Test Location: #2 Battery PEC Stack
Test Method: 0010/23

Source Condition	**Normal**	**Normal**	**Normal**	
Date	**8/23/16**	**8/24/16**	**8/25/16**	
Start Time	**7:13**	**7:25**	**9:34**	
End Time	**19:25**	**19:56**	**20:55**	
	Run 1	**Run 2**	**Run 3**	**Average**
Stack Conditions				
Average Gas Temperature, °F	155.5	151.9	155.8	154.4
Flue Gas Moisture, percent by volume	2.3%	3.3%	2.6%	2.7%
Average Flue Pressure, in. Hg	29.38	29.22	29.18	29.26
Gas Sample Volume, dscf	152.149	151.029	149.609	150.929
Average Gas Velocity, ft/sec	61.705	61.776	56.424	59.968
Gas Volumetric Flow Rate, acfm	235,532	235,802	215,374	228,903
Gas Volumetric Flow Rate, dscfm	193,818	192,138	175,398	187,118
Gas Volumetric Flow Rate, scfm	198,366	198,693	180,081	192,380
Average %CO_2 by volume, dry basis	1.0	1.1	1.3	1.1
Average %O_2 by volume, dry basis	19.9	19.7	19.8	19.8
Isokinetic Variance	102.9	103.0	104.2	103.4
PCDD/PCDF Emissions				
ug/dscm	≤ 4.88E-05	≤ 1.12E-05	≤ 1.14E-05	≤ 2.38E-05
lb/hr (TEQ Equivalent)	≤ 1.95E-09	≤ 1.85E-09	≤ 1.53E-09	≤ 1.77E-09

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PCDD/PCDF TEST RESULTS SUMMARY
Average Test Results
ArcelorMittal Burns Harbor LLC
Burns Harbor, Indiana
#2 Battery PEC Stack
August 23-25, 2016

		Concentration		Emissions	TEQ Factor Results						
Analytes		**(ug/dcsm)**		**(ug/hr)**	**TEQ Factor**		**(ug/dscm)**		**(ug/hr)**		**(lb/hr)**
2378-TCDD	<	7.10E-07	<	0.23	1.0	<	7.10E-07	<	0.23	<	4.98E-10
12378-PeCDD	<	8.19E-07	<	0.26	1.0	<	8.19E-07	<	0.26	<	5.74E-10
123478-HxCDD	<	7.50E-07	<	0.24	0.1	<	7.50E-08	<	0.02	<	5.22E-11
123678-HxCDD	<	8.66E-07	<	0.28	0.1	<	8.66E-08	<	0.03	<	6.07E-11
123789-HxCDD	<	8.19E-07	<	0.26	0.1	<	8.19E-08	<	0.03	<	5.74E-11
1234678-HpCDD	<	1.67E-06	<	0.54	0.01	<	1.67E-08	<	0.01	<	1.19E-11
OCDD		5.29E-06		1.71	0.0003		1.59E-09		0.00		1.13E-12
2378-TCDF	<	1.23E-06	<	0.39	0.1	<	1.23E-07	<	0.04	<	8.71E-11
12378-PeCDF	<	8.18E-07	<	0.26	0.03	<	2.46E-08	<	0.01	<	1.73E-11
23478-PeCDF	<	8.18E-07	<	0.26	0.3	<	2.46E-07	<	0.08	<	1.73E-10
123478-HxCDF	<	1.02E-06	<	0.33	0.1	<	1.02E-07	<	0.03	<	7.24E-11
123678-HxCDF	<	6.86E-07	<	0.22	0.1	<	6.86E-08	<	0.02	<	4.83E-11
234678-HxCDF	<	7.48E-07	<	0.24	0.1	<	7.48E-08	<	0.02	<	5.27E-11
123789-HxCDF	<	7.72E-07	<	0.25	0.1	<	7.72E-08	<	0.02	<	5.43E-11
1234678-HpCDF	<	1.23E-06	<	0.40	0.01	<	1.23E-08	<	0.00	<	8.76E-12
1234789-HpCDF	<	7.18E-07	<	0.23	0.01	<	7.18E-09	<	0.00	<	5.03E-12
OCDF	<	6.86E-07	<	0.22	0.0003	<	2.06E-10	<	0.00	<	1.45E-13
Total TCDD	<	1.44E-06	<	0.46							
Total PeCDD	<	2.01E-06	<	0.65							
Total HxCDD	<	2.85E-06	<	0.91							
Total HpCDD	<	3.05E-06	<	0.99							
Total TCDF	<	3.28E-06	<	1.07							
Total PeCDF	<	1.91E-06	<	0.62							
Total HxCDF	<	2.02E-06	<	0.66							
Total HpCDF	<	1.27E-06	<	0.41							
Total PCDD/PCDF	<	2.38E-05	<	7.71							
TEQ Total						<	2.53E-06	<	0.80	<	1.77E-09

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SPECIATED SEMI-VOLATILE ORGANIC COMPOUNDS TEST RESULTS SUMMARY
Arcelor Mittal Burns Harbor LLC
Burns Harbor, Indiana
 # 2 Battery PEC Stack
August 23 through 25, 2016

Analytes		Concentration (ug/dscm)	Flowrate, dscfm		Emissions lb/hr
Acenaphthene	<	1.17E+00	187,118	<	8.20E-04
Acenaphthylene	<	1.17E+00	187,118	<	8.20E-04
Anthracene	<	1.17E+00	187,118	<	8.20E-04
Benzo (a) anthracene	<	1.17E+00	187,118	<	8.20E-04
Benzo (a) pyrene	<	1.17E+00	187,118	<	8.20E-04
Benzo (b) fluoranthene	<	1.17E+00	187,118	<	8.20E-04
Benzo (g,h,i) perylene	<	1.17E+00	187,118	<	8.20E-04
Benzo (k) fluoranthene	<	1.17E+00	187,118	<	8.20E-04
Chrysene	<	1.17E+00	187,118	<	8.20E-04
Dibenz (a,h) anthracene	<	1.17E+00	187,118	<	8.20E-04
Fluoranthene	<	1.17E+00	187,118	<	8.20E-04
Fluorene	<	1.17E+00	187,118	<	8.20E-04
Indeno (1,2,3-cd) pyrene	<	1.17E+00	187,118	<	8.20E-04
Naphthalene		1.78E+01	187,118		1.26E-02
Phenanthrene	<	1.17E+00	187,118	<	8.20E-04
Perylene	<	1.17E+00	187,118	<	8.20E-04
Pyrene	<	1.17E+00	187,118	<	8.20E-04
Total Semi-Volatile Organic Compounds - Test Average	<	**3.65E+01**		<	**2.57E-02**

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Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Test Location: #2 Battery PEC Stack
Test Method: 315

Source Condition	Normal	Normal	Normal	
Date	8/23/16	8/24/16	8/25/16	
Start Time	7:13	7:25	9:34	
End Time	17:19	17:58	19:27	
	Run 1	Run 2	Run 3	Average
Stack Conditions				
Average Gas Temperature, °F	154.6	150.9	157.2	154.2
Flue Gas Moisture, percent by volume	2.7%	3.7%	3.5%	3.3%
Average Flue Pressure, in. Hg	29.38	29.22	29.18	29.26
Gas Sample Volume, dscf	81.216	79.394	72.537	77.716
Average Gas Velocity, ft/sec	61.526	60.372	55.541	59.146
Gas Volumetric Flow Rate, acfm	234,847	230,443	212,002	225,764
Gas Volumetric Flow Rate, dscfm	192,750	187,236	170,745	183,577
Gas Volumetric Flow Rate, scfm	198,082	194,489	176,865	189,812
Average %CO_2 by volume, dry basis	1.0	1.1	1.3	1.1
Average %O_2 by volume, dry basis	19.9	19.7	19.8	19.8
Isokinetic Variance	101.2	101.8	102.0	101.7
Front Half TSO				
grams collected	≤ 0.0063	≤ 0.0031	≤ 0.0076	≤ 0.0057
mg/dscm	≤ 2.74E+00	≤ 1.38E+00	≤ 3.70E+00	≤ 2.61E+00
grains/acf	≤ 0.0010	≤ 0.0005	≤ 0.0013	≤ 0.0009
grains/dscf	≤ 0.0012	≤ 0.0006	≤ 0.0016	≤ 0.0011
lb/hr	≤ 1.98E+00	≤ 9.67E-01	≤ 2.37E+00	≤ 1.77E+00
Back Half TSO				
grams collected	≤ 0.0078	≤ 0.0084	≤ 0.0085	≤ 0.0082
mg/dscm	≤ 3.39E+00	≤ 3.74E+00	≤ 4.14E+00	≤ 3.76E+00
grains/acf	≤ 0.0012	≤ 0.0013	≤ 0.0015	≤ 0.0013
grains/dscf	≤ 0.0015	≤ 0.0016	≤ 0.0018	≤ 0.0016
lb/hr	≤ 2.45E+00	≤ 2.62E+00	≤ 2.65E+00	≤ 2.57E+00
Total TSO*				
grams collected	≤ 0.0141	≤ 0.0115	≤ 0.0161	≤ 0.0139
mg/dscm	≤ 6.13E+00	≤ 5.12E+00	≤ 7.84E+00	≤ 6.36E+00
grains/acf	≤ 0.0022	≤ 0.0018	≤ 0.0028	≤ 0.0023
grains/dscf	≤ 0.0027	≤ 0.0022	≤ 0.0034	≤ 0.0028
lb/hr	≤ 4.43E+00	≤ 3.59E+00	≤ 5.01E+00	≤ 4.34E+00

*These reported Modified Method 315 (TSO) results do not fully account for the magnitude of the documented blank contamination value. Please see Section 2.0 and Maxxam Analytics' Modified Method 315 (TSO) White Paper dated March 10, 2017 provided in Appendix A that states, "The toluene filter extractable blank 90% upper confidence interval of 11.18 mg of residue is 43 times the Method 315 acceptable methylene chloride blank value of 0.26 mg of residue. This suggests the use of toluene extraction solvent to be the cause of the high bias residue results."

"The toluene laboratory processed blank of 8.5 mg of residue is more than 17 times the methylene chloride laboratory processed blank of ≤0.5 mg of residue. This again, would suggest the use of the toluene extraction solvent to be the cause of the high bias residue results." Please see Appendix E for sample calculations in laboratory weight sheet.

4.0 CERTIFICATION

MOSTARDI PLATT is pleased to have been of service to ArcelorMittal Burns Harbor, LLC. If you have any questions regarding this test report, please do not hesitate to contact us at 630-993-2100.

CERTIFICATION

As project manager, I hereby certify that this test report represents a true and accurate summary of emissions test results and the methodologies employed to obtain those results, and the test program was performed in accordance with the methods specified in this test report.

MOSTARDI PLATT

_____ Program Manager
Stuart L. Burton

_____ Quality Assurance
Scott W. Banach

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APPENDICES

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Appendix A – Maxxam Analytics' White Paper

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Maxxam
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March 10, 2017

Scott Banach
Mostardi-Platt

Re: Coke ICR Modified Method 315 Blanks - Methylene Chloride Modified to Toluene

Dear Scott;

The Coke industry received a Clean Air Act Section 114 Information Collection Request (Coke ICR) on April 4, 2016 from US EPA to conduct emissions testing at facilities across the US. The emissions testing required to be conducted by this Coke ICR included a Method 315 (Particulate and Methylene Chloride Extractable Matter (MCEM)), except that USEPA specifically required that the standard method extraction solvent of methylene chloride be substituted with the use of toluene to determine emissions of Toluene Soluble Organics (TSO).

Based on a review of the field and lab results, the Method 315 TSO results added uncertainty due to USEPA's required deviation of switching from methylene chloride to toluene. Information was requested from Maxxam to clearly describe how TSO concentrations were derived including properly labeled references of each number with units used in the calculations, all assumptions and estimations used in the calculations and details on the determination of all blank values. The ultimate objective is to enable a third party to review the results, documentation and calculations to independently verify the results, the blanks and the blank corrected results.

1. Toluene Filter Extractable Blanks

Per our ongoing discussions between during January - March, 2017 Maxxam performed analysis of five (5) filter blanks according to EPA Method 315 section 11.2.1.2, using toluene as the extraction solvent instead of methylene chloride, as required by USEPA's modification of the standard Method 315. An example of an unused probe filter used for this blank determination is shown in Figure 1. In total, 130 ml of toluene was used to extract and rinse each filter during the extraction procedure.

After the toluene was used to extract and rinse each filter, the toluene was passed through an Ahlin filter, glass wool and a fixed porous glass frit as shown in Figure 2, Filtration Apparatus.
These five toluene filter extractable blank results were 5.80, 10.5, 9.10, 13.8 and 7.20 mg of residue. The mean blank result was 9.28 mg of residue. Based on USEPA's SW-846 Chapter 9 statistical analysis, the 90% upper confidence interval of these blanks was determined to be 11.18 mg of residue, as illustrated in the table below. The upper confidence interval would be the conservative value to represent the impact of the background contamination of the unused probe filter, laboratory toluene and filtration apparatus.

Maxxam
A Bureau Veritas Group Company

	Method 315 Toluene Filter Extractable Blanks				
Sample	*Blank Result*	*Units*	*Statistic*	*Value*	*Sq Rt*
1	5.8	mg	Population	5.00	2.24
2	10.5	mg	Mean	9.28	
3	9.1	mg	Std Dev	2.77	
4	13.8	mg	Std Error	1.24	
5	7.2	mg	t value	1.53	
	90 % Upper Confidence Interval			**11.18**	mg

EPA Method 315 states that a methylene chloride blank value less than 1.5 ppm, by weight, residue is acceptable. Using the sample volume above, 130 ml sample x 1.33 g/ml methylene chloride density x 1000 mg/g conversion = 172,900 mg, the acceptable residue would be 1.5×10^{-6} x 172,900 mg sample = 0.26 mg of residue.

The toluene filter extractable blank 90% upper confidence interval of 11.18 mg of residue is 43 times the Method 315 acceptable methylene chloride blank value of 0.26 mg of residue. This suggests the use of the toluene extraction solvent to be the cause of the high bias residue results.

2. Laboratory Processed Blanks – Toluene (non-standard) vs Methylene Chloride (standard)

Maxxam also conducted a toluene laboratory processed blank that had a value of 8.5 mg of residue. This blank did not involve an unused probe filter, but did include 100 ml of toluene that was processed using the same filtration apparatus procedure as used for the toluene filter extractable blank and included the Ahlin filter, glass wool and a fixed porous glass frit as shown in Figure 2. The 8.5 mg of residue detected in the toluene laboratory processed blank indicates background contamination from the toluene and filtration Apparatus. The filtration apparatus glassware used to filter the samples was washed and solvent rinsed with methanol prior to the extraction and filtration.

Prior to the USEPA modification of Method 315 for the Coke ICR, methylene chloride was the standard extraction solvent used. Based on historical Method 315 analysis conducted by Maxxam using methylene chloride, all the laboratory processed blanks were reported to be <0.5 mg of residue in 2008, 2010 and 2016.

The toluene laboratory processed blank of 8.5 mg of residue is more than 17 times the methylene chloride laboratory processed blank of <0.5 mg of residue. This again, would suggest the use of the toluene extraction solvent to be the cause of the high bias residue results.

Maxxam
A Bureau Veritas Group Company

3. Technical Laboratory Findings

This laboratory evaluation concludes that the use of toluene instead of methylene chloride as the extraction solvent of the filter and probe rinse has resulted in significantly elevated toluene filter extraction blanks and toluene laboratory processed blank results that cannot be related to the sampled sources and must be considered when attempting to report the actual Method 315 values.

Please feel free to contact me if you have further questions or concerns.

Thank you,

Susan Bigg
Sr. QA Manager
905-817-5700 ext 4049

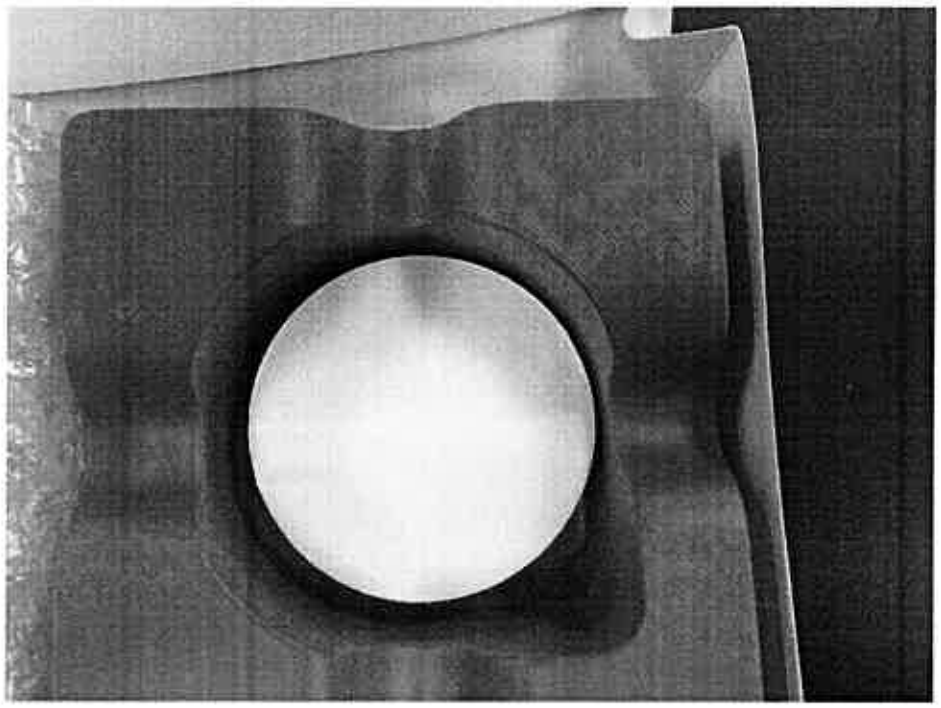

Figure 1 Method 315 Filter

GE Whatman Grade QM-A Quartz Microfiber Air Sampling Filter, 82 mm circle

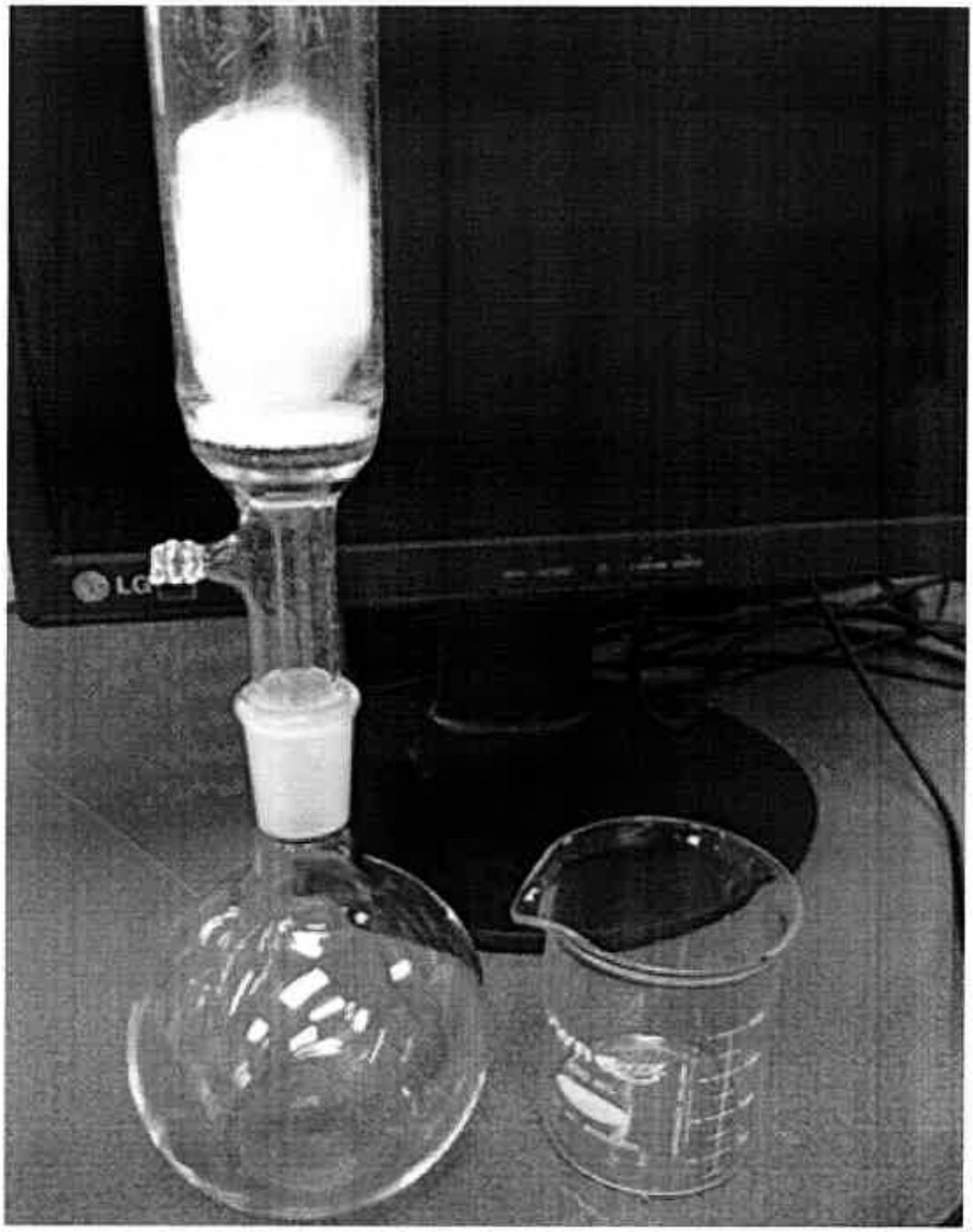

Figure 2 Filtration Apparatus

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Filtration Apparatus includes an Ahlin filter, glass wool and a fixed porous glass frit

Appendix B - Test Section Diagram

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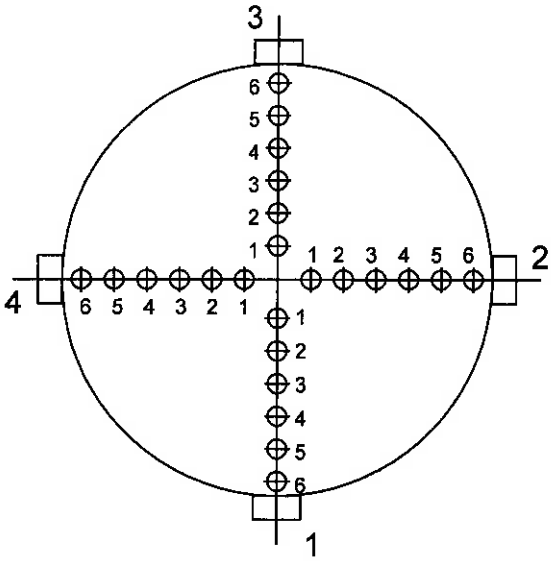
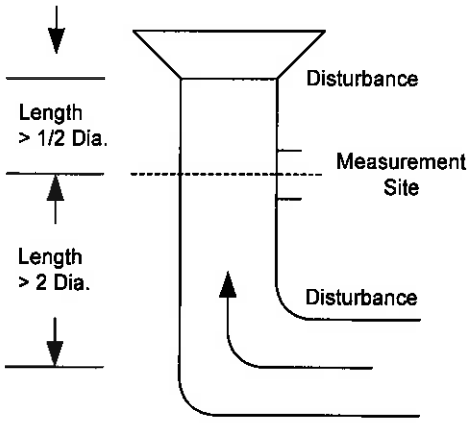
EQUAL AREA TRAVERSE FOR ROUND DUCTS





Job:	Arcelor Mittal Burns Harbor LLC
Date:	August 16th- September 1st 2016
Test Location:	#2 Battery PEC Stack
Duct Diameter:	9 Feet
Duct Area:	63.617 Square Feet
No. Points Across Diameter:	12
No. of Ports:	4
Port Length:	6.5 inches

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Appendix C - Sample Train Diagrams

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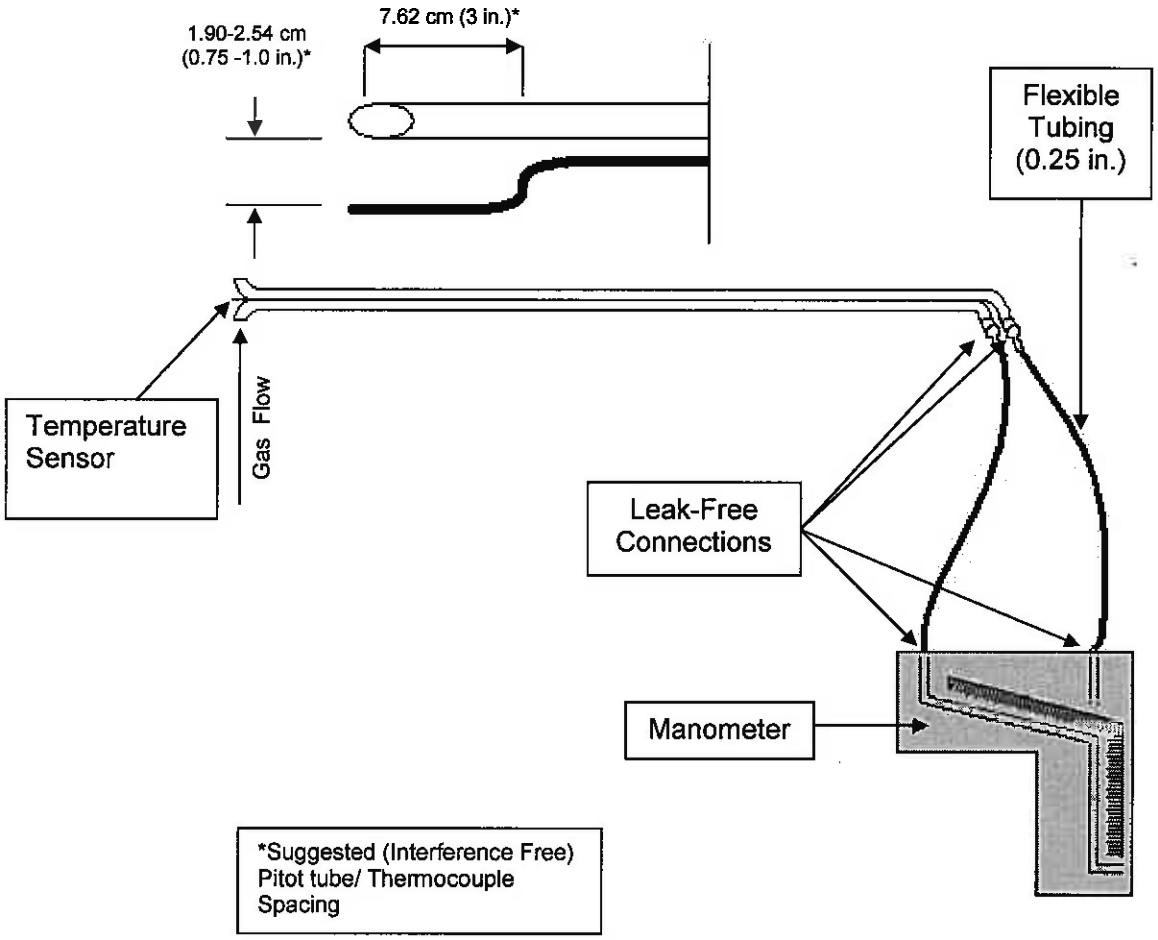
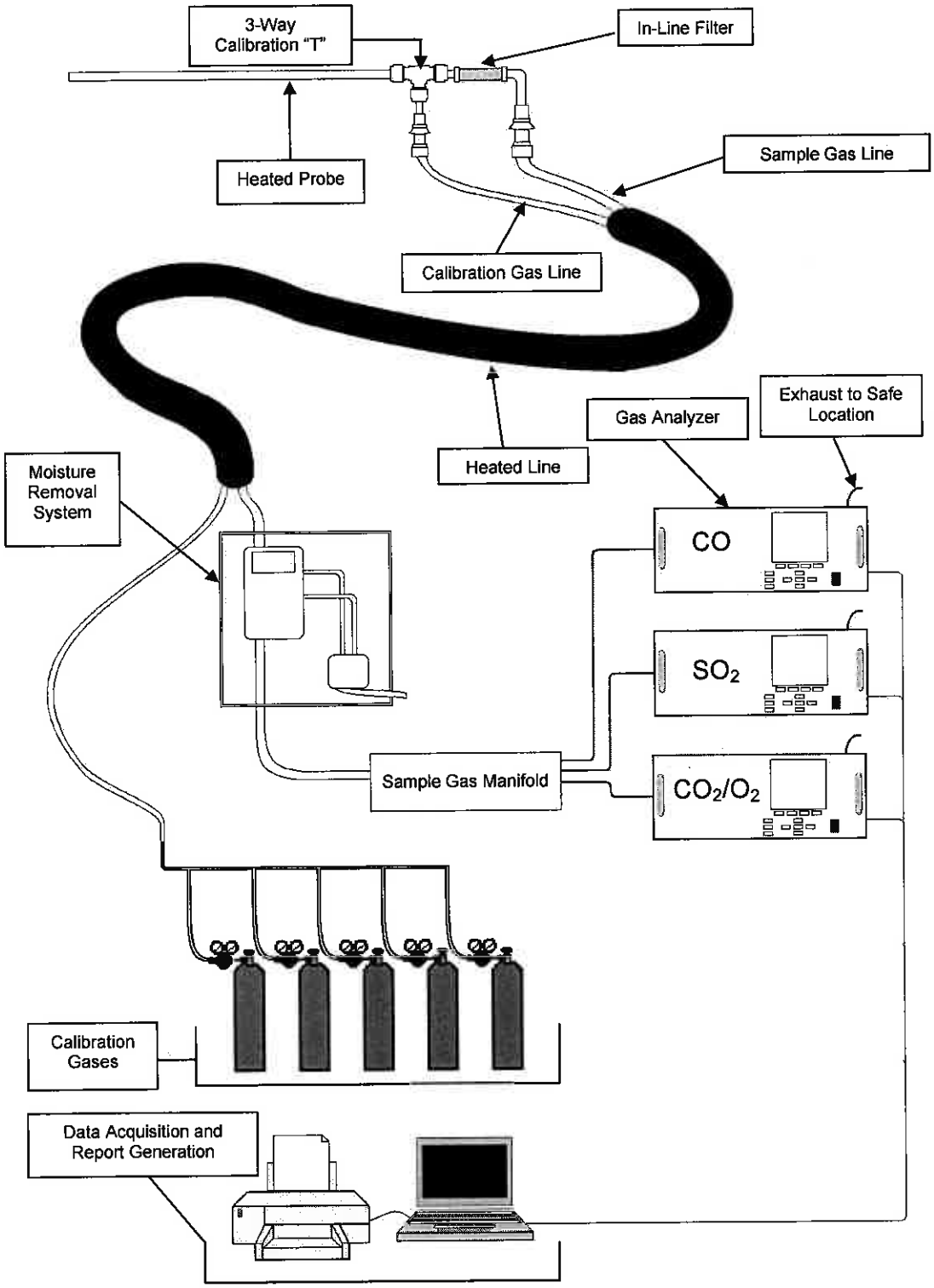
USEPA Method 2- Type S Pitot Tube Manometer Assembly

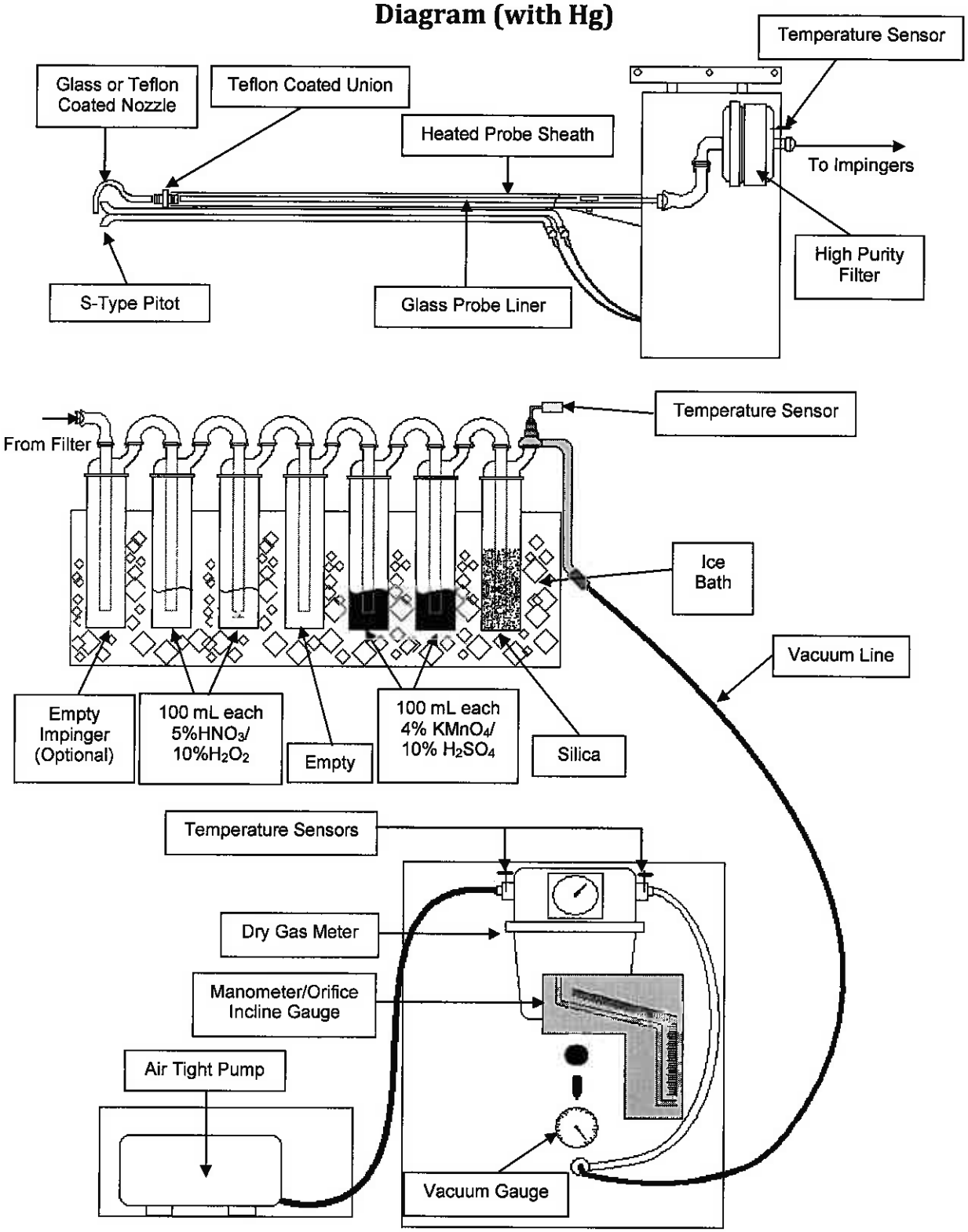


USEPA Methods 3A, 6C, and 10 Extractive Gaseous Sampling Diagram



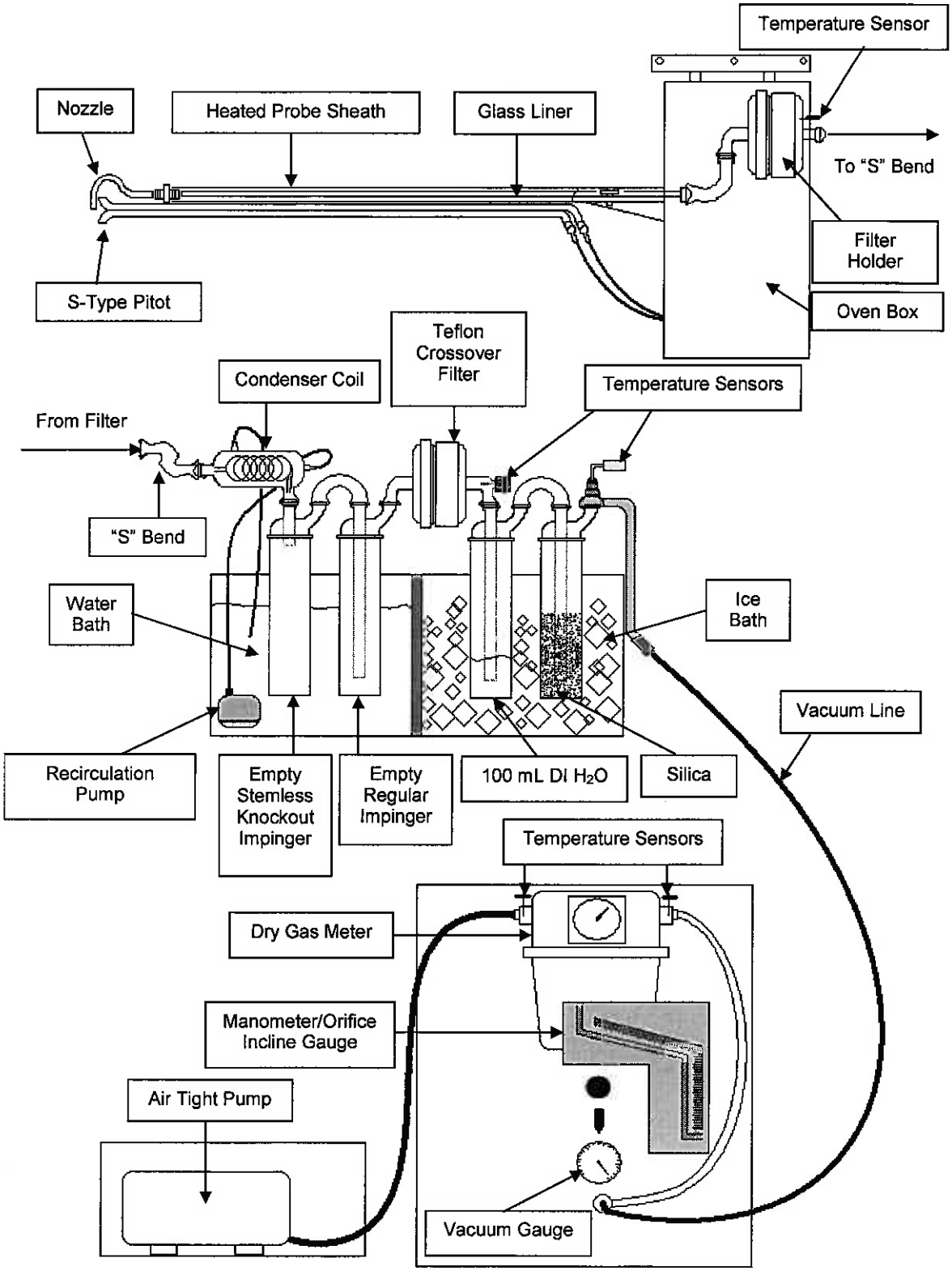
ATD-007 Extractive3A 6C and 10 Rev. 1.2 3/31/2016

USEPA Method 5/29- Particulate Matter/Metals Sample Train Diagram (with Hg)



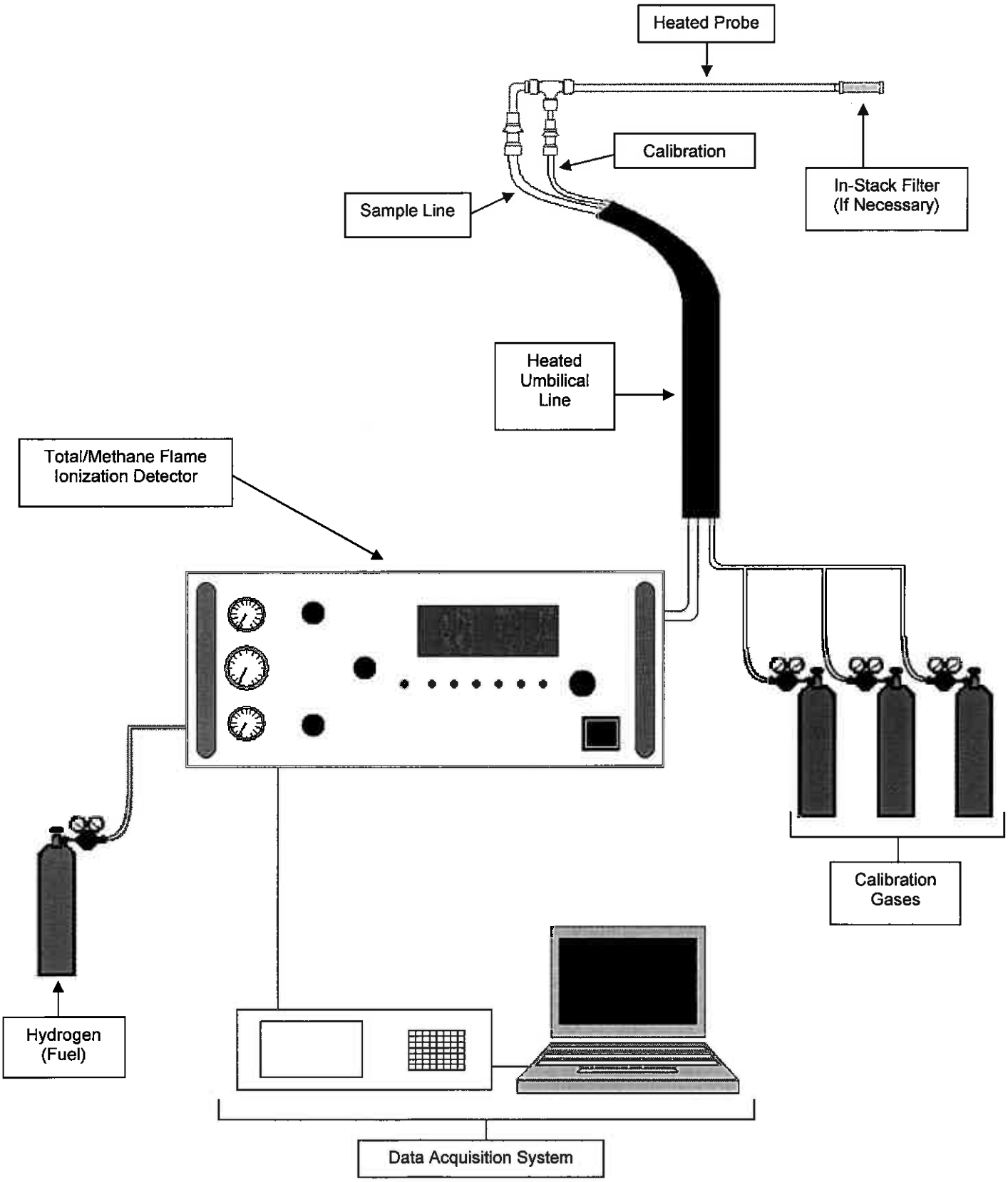
ATD-040 USEPA Method 5/29 (with Hg) Rev. 1.1 8/17/2015

USEPA Method 5/202- Condensable Particulate Matter



ATD-042 USEPA Method 5/202 Rev. 1.1 8/17/2015

USEPA Method 16 – Hydrogen Sulfide (H_2S) Sample Train



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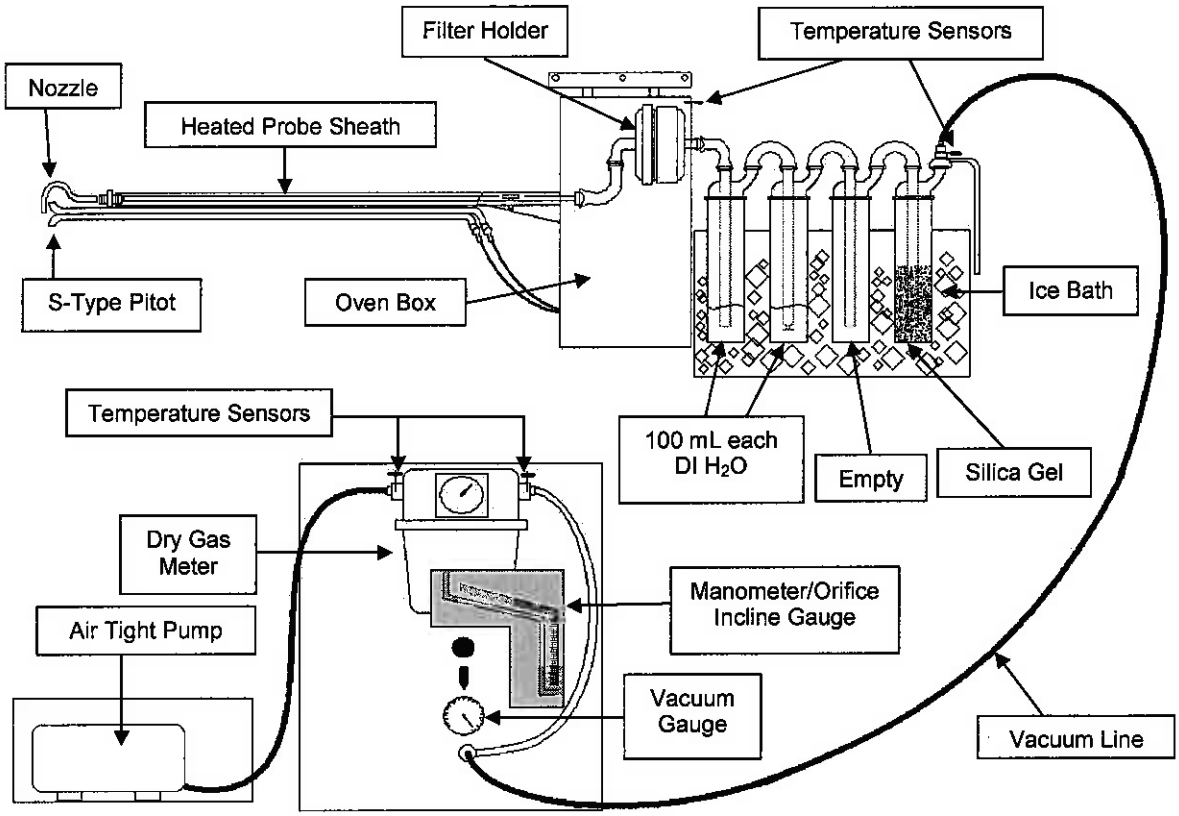
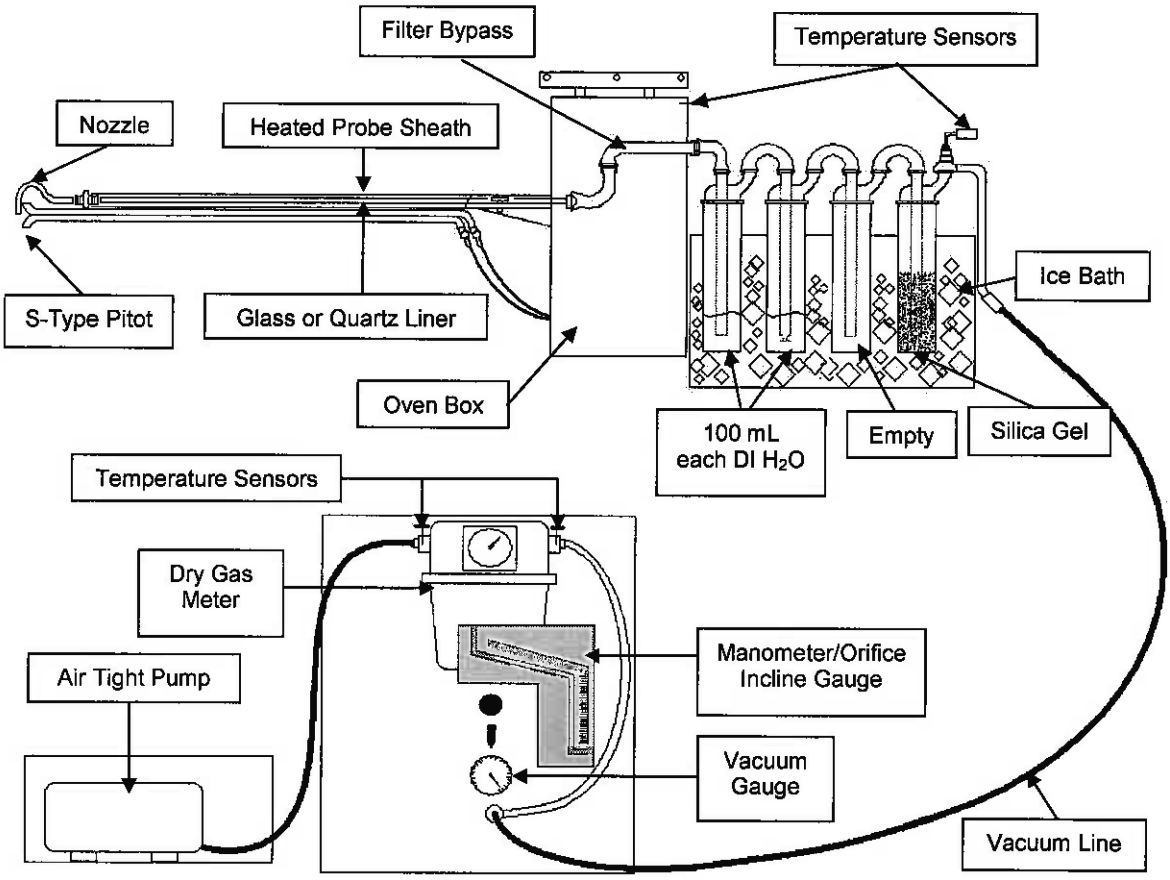
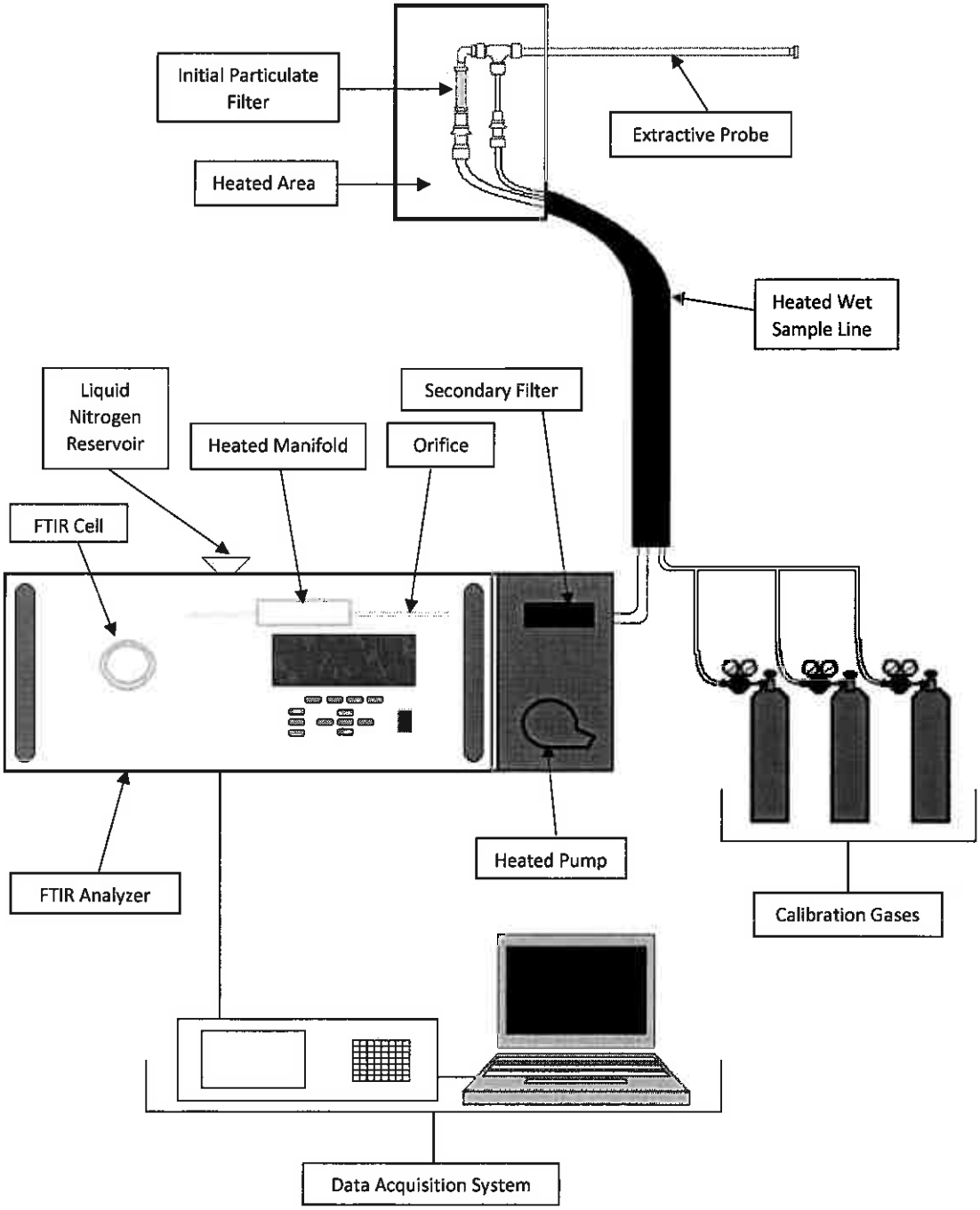
USEPA Method 315- Toluene Extractable Matter Sample Train Diagram



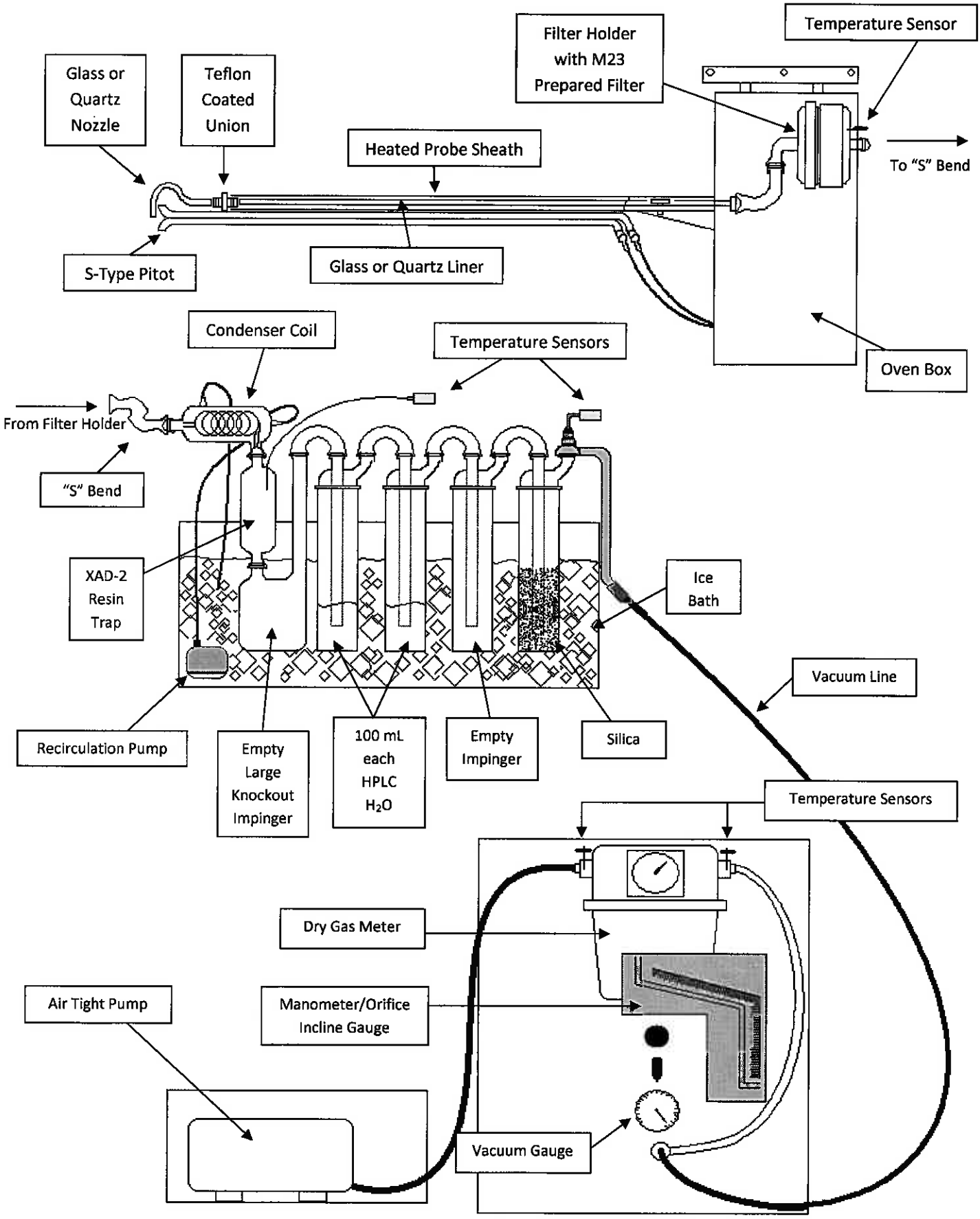
USEPA Method 316- Formaldehyde Sample Train Diagram



USEPA Method 320 – Vapor Phase Organic and Inorganic Emissions by Extractive Fourier Transform Infrared (FTIR) Spectroscopy Sample Train Diagram



Method 0010/23 - Determination of PCDD/PCDF and Semi-Volatile Organic Compounds



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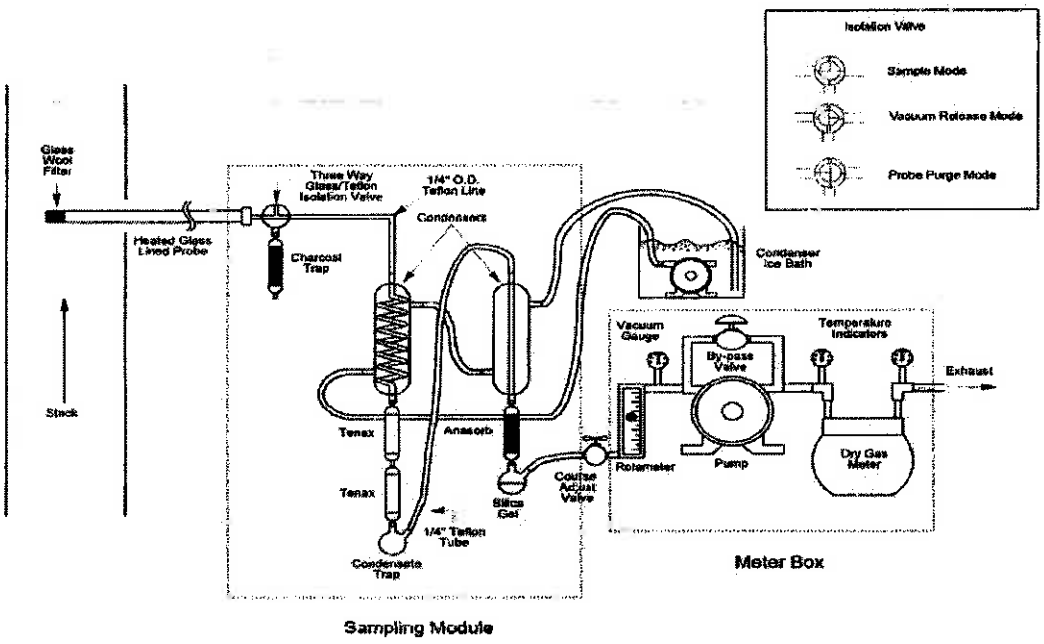
USEPA Method 0031 – VOHAP Sample Train Diagram



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Appendix D - Calculation Nomenclature and Formulas

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Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Project #: M162810

Test Location: #2 Battery PEC Stack
Date: 8/16/16

Sample Calculations

CO ppmvd

$$(50.1 \text{ ppm} - 0.1 \text{ ppm}) \times \frac{251.5 \text{ ppm}}{253.3 \text{ ppm} - 0.1 \text{ ppm}} = 49.7 \text{ ppm}$$

CO2 % (dry)

$$(1.08\ \% - 0.06\ \%) \times \frac{10.23\ \%}{10.06\ \% - 0.06\ \%} = 1.00\ \%$$

O2 % (dry)

$$(19.78\ \% - -0.02\ \%) \times \frac{12.08\ \%}{11.90\ \% - -0.02\ \%} = 20.10\ \%$$

$$C_{gas} = (C - C_o) \times \frac{C_{ma}}{C_m - C_o}$$

where:
C_{gas} = Effluent gas concentration, dry basis, ppm or %
C = Average gas concentration indicated by gas analyzer, dry basis, ppm or %
C_o = Average of initial and final system calibration bias check responses for the zero gas, ppm or %
C_m = Average of initital and final system calibration bias check responses for the upscale calibration gas, ppm or %
C_{ma} = Actual concentration of the upscale calibration gas, ppm or %

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Client:	**ArcelorMittal Burns Harbor LLC**
Facility:	**Burns Harbor, Indiana**
Test Location:	**#2 Battery PEC Stack**
Run:	**1**
Date:	**8/16/2016**
Method:	**5/29**
Source Condition:	**Normal**

Dry Molecular Weight

$$Md = 0.44 \times (\%CO_2) + 0.32 \times (\%O_2) + 0.28 \times \%N_2$$

$\%CO_2$ = 1.1 $\%O_2$ = 20.0 $\%N_2$ = 78.9

Md = 28.976

Wet Molecular Weight

$$Ms = Md \times (1-Bws) + (18.0 \times Bws)$$

Md = 28.976 Bws = 0.035

Ms = 28.587

Meter Volume at Standard Conditions

$$Vm(std) = 17.647 \times Y \times Vm \times \frac{(Pbar + DH/13.6)}{Tm}$$

Y = 0.998 Vm = 122.226 Pbar = 29.54

DH = 4.87 Tm = 535.7

Vm(std) = 120.143

Volume of Water Vapor Condensed

$$Vw(std) = 0.0471 \times (\text{net } H_2O \text{ gain})$$

Net H_2O = 93.7

Vw(std) = 4.413

Moisture Content

$$Bws = \frac{Vwc(std)}{Vwc(std) + Vm(std)}$$

Vw(std) = 4.413 Vm(std) = 120.143

Bws = 0.035 0.034474793

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Client:	**ArcelorMittal Burns Harbor LLC**
Facility:	**Burns Harbor, Indiana**
Test Location:	**#2 Battery PEC Stack**
Run:	**1**
Date:	**8/16/2016**
Method:	**5/29**
Source Condition:	**Normal**

Average Duct Velocity

$$Vs = 85.49 \times Cp \times \text{Sqrt DP (avg)} \times (Ts\ (avg) / (Ps \times Ms))^{1/2}$$

Cp = 0.840 Ts (avg) = 614.9 Sqrt DP (avg): 1.009
Ps = 29.50 Ms = 28.587

Vs = 61.851

Volumetric Flow Rate (Actual Basis)

$$Q = Vs \times A \times 60$$

Vs = 61.851 A = 63.617

Q = 236,087

Volumetric Flow Rate (Standard Basis)

$$Qstd = 17.647 \times Q \times \frac{Ps}{Ts\ (avg)}$$

Q = 236,087 Ps = 29.50 Ts (avg) = 614.9

Qstd = 199,899

Volumetric Flow Rate (Standard Dry Basis)

$$Qstd(dry) = Qstd \times (1-Bws)$$

Qstd = 199,899 Bws = 0.035

Qstd(dry) = 192,816

Isokinetic Variation:

$$\%ISO = \frac{0.0945 \times Ts \times Vm(std)}{Vs \times \theta \times An \times Ps \times (1-Bws)}$$

Ts = 614.9 Vm(std) = 120.143 Vs = 61.851
An = 0.0003917 θ = 96 Ps = 29.50
Bws = 0.035

%ISO = 105.5

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Client:	**ArcelorMittal Burns Harbor LLC**
Facility:	**Burns Harbor, Indiana**
Test Location:	**#2 Battery PEC Stack**
Run:	**1**
Date:	**8/16/2016**
Method:	**5/29**
Source Condition:	**Normal**

PM Concentration:
This example represents the filterable fraction. For other fractions, use the obtained mn for that particulate fraction.

$$Co = \frac{m_n \times 15.43}{Vm(std)}$$

m_n (g) = 0.0094 Vm(std) = 120.143

Co = 0.0012 gr/dscf

PM Emission Rate:

$$\text{Emission Rate lb/hr} = \frac{Co}{7{,}000} \times Qstd(dry) \times 60$$

Co = 0.0012 Qstd(dry) = 192,816

Emission Rate lb/hr = 1.995 lb/hr

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Client:	**ArcelorMittal Burns Harbor LLC**
Facility:	**Burns Harbor, Indiana**
Test Location:	**#2 Battery PEC Stack**
Run:	**1**
Date:	**8/16/2016**
Method:	**5/29**
Source Condition:	**Normal**

Antimony (Sb) Concentration:

$$\mu g/m^3 = \frac{\mu g \text{ of Antimony (Sb)}}{Vm(std) \times 0.02832\ m^3/ft^3}$$

µg= 1.09 **Vm(std) =** 120.143

µg/m³= 0.0003

Antimony (Sb) Emission Rate:

$$\text{lb of Antimony (Sb)} = \frac{\mu g \text{ of sample} \times 10^{-6}\ grams/\mu g}{453.6\ grams/lb}$$

lb of Antimony (Sb) = 2.40E-09 **dscfm =** 192,816

$$\text{Emission Rate lb/hr} = \frac{\text{lb of Antimony (Sb)}}{Vm(std)} \times dscfm \times 60\ min/hr$$

Emission Rate lb/hr = 2.31E-04

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Client:	**ArcelorMittal Burns Harbor LLC**
Facility:	**Burns Harbor, Indiana**
Test Location:	**#2 Battery PEC Stack**
Run:	**1**
Date:	**8/16/2016**
Method:	**5/202**
Source Condition:	**Normal**

Dry Molecular Weight

$$Md = 0.44 \times (\%CO_2) + 0.32 \times (\%O_2) + 0.28 \times \%N_2$$

$\%CO_2$ = 1.1 $\%O_2$ = 20.0 $\%N_2$ = 78.9

Md = 28.976

Wet Molecular Weight

$$Ms = Md \times (1-Bws) + (18.0 \times Bws)$$

Md = 28.976 Bws = 0.033

Ms = 28.611

Meter Volume at Standard Conditions

$$Vm(std) = 17.647 \times Y \times Vm \times \frac{(Pbar + DH/13.6)}{Tm}$$

Y = 0.994 Vm = 87.430 Pbar = 29.54

DH = 2.36 Tm = 536.1

Vm(std) = 85.005

Volume of Water Vapor Condensed

$$Vw(std) = 0.0471 \times (\text{net } H_2O \text{ gain})$$

Net H_2O = 62.0

Vw(std) = 2.920

Moisture Content

$$Bws = \frac{Vwc(std)}{Vwc(std) + Vm(std)}$$

Vw(std) = 2.920 Vm(std) = 85.005

Bws = 0.033 0.033344444

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Client:	ArcelorMittal Burns Harbor LLC
Facility:	Burns Harbor, Indiana
Test Location:	#2 Battery PEC Stack
Run:	1
Date:	8/16/2016
Method:	5/202
Source Condition:	Normal

Average Duct Velocity

$$Vs = 85.49 \times Cp \times \text{Sqrt DP (avg)} \times (Ts\ (avg) / (Ps \times Ms))^{1/2}$$

Cp = 0.840 Ts (avg) = 615.0 Sqrt DP (avg): 0.983
Ps = 29.50 Ms = 28.611

Vs = 60.259

Volumetric Flow Rate (Actual Basis)

$$Q = Vs \times A \times 60$$

Vs = 60.259 A = 63.617

Q = 230,010

Volumetric Flow Rate (Standard Basis)

$$Qstd = 17.647 \times Q \times \frac{Ps}{Ts\ (avg)}$$

Q = 230,010 Ps = 29.50 Ts (avg) = 615.0

Qstd = 194,714

Volumetric Flow Rate (Standard Dry Basis)

$$Qstd(dry) = Qstd \times (1-Bws)$$

Qstd = 194,714 Bws = 0.033

Qstd(dry) = 188,247

Isokinetic Variation:

$$\%ISO = \frac{0.0945 \times Ts \times Vm(std)}{Vs \times \theta \times An \times Ps \times (1-Bws)}$$

Ts = 615.0 Vm(std) = 85.005 Vs = 60.259
An = 0.0002835 θ = 96 Ps = 29.50
Bws = 0.033

%ISO = 105.6

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Client:	**ArcelorMittal Burns Harbor LLC**
Facility:	**Burns Harbor, Indiana**
Test Location:	**#2 Battery PEC Stack**
Run:	**1**
Date:	**8/16/2016**
Method:	**5/202**
Source Condition:	**Normal**

PM Concentration:

This example represents the filterable fraction. For other fractions, use the obtained mn for that particulate fraction.

$$Co = \frac{m_n \times 15.43}{Vm(std)}$$

m_n (g) = 0.0030 Vm(std) = 85.005

Co = 0.0005 gr/dscf

PM Emission Rate:

$$\text{Emission Rate lb/hr} = \frac{Co}{7{,}000} \times Qstd(dry) \times 60$$

Co = 0.0005 Qstd(dry) = 188,247

Emission Rate lb/hr = 0.879 lb/hr

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Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Project #: M162810

Test Location: #2 Battery PEC Stack
Date: 9/1/16

Sample Calculations

SO2 ppmvd

$$(34.8 \text{ ppm} - 0.8 \text{ ppm}) \times \frac{51.9 \text{ ppm}}{52.1 \text{ ppm} - 0.8 \text{ ppm}} = 34.5 \text{ ppm}$$

CO2 % (dry)

$$(1.02\ \% - 0.02\ \%) \times \frac{10.18\ \%}{10.13\ \% - 0.02\ \%} = 1.00\ \%$$

O2 % (dry)

$$(19.82\ \% - 0.04\ \%) \times \frac{12.08\ \%}{12.05\ \% - 0.04\ \%} = 19.90\ \%$$

$$C_{gas} = (C - C_o) \times \frac{C_{ma}}{C_m - C_o}$$

where:
C_{gas} = Effluent gas concentration, dry basis, ppm or %
C = Average gas concentration indicated by gas analyzer, dry basis, ppm or %
C_o = Average of initial and final system calibration bias check responses for the zero gas, ppm or %
C_m = Average of initital and final system calibration bias check responses for the upscale calibration gas, ppm or %
C_{ma} = Actual concentration of the upscale calibration gas, ppm or %

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Client:	ArcelorMittal Burns Harbor LLC
Facility:	Burns Harbor, Indiana
Test Location:	#2 Battery PEC Stack
Run:	1
Date:	8/30/2016
Method:	316
Source Condition:	Normal

Dry Molecular Weight

$$Md = 0.44 \times (\%CO_2) + 0.32 \times (\%O_2) + 0.28 \times \%N_2$$

$\%CO_2$ = 1.0 $\%O_2$ = 19.9 $\%N_2$ = 79.1

Md = 28.956

Wet Molecular Weight

$$Ms = Md \times (1-Bws) + (18.0 \times Bws)$$

Md = 28.956 Bws = 0.039

Ms = 28.534

Meter Volume at Standard Conditions

$$Vm(std) = 17.647 \times Y \times Vm \times \frac{(Pbar + DH/13.6)}{Tm}$$

Y = 1.001 Vm = 98.073 Pbar = 29.4

DH = 2.5 Tm = 76.9

Vm(std) = 95.607

Volume of Water Vapor Condensed

$$Vw(std) = 0.0471 \times (\text{net } H_2O \text{ gain})$$

Net H_2O = 81.3

Vw(std) = 3.829

Moisture Content

$$Bws = \frac{Vwc(std)}{Vwc(std) + Vm(std)}$$

Vw(std) = 3.829 Vm(std) = 95.607

Bws = 0.039

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Client:	**ArcelorMittal Burns Harbor LLC**
Facility:	**Burns Harbor, Indiana**
Test Location:	**#2 Battery PEC Stack**
Run:	**1**
Date:	**8/30/2016**
Method:	**316**
Source Condition:	**Normal**

Average Duct Velocity

$$Vs = 85.49 \times Cp \times \text{Sqrt DP (avg)} \times (Ts\ (avg) / (Ps \times Ms))^{1/2}$$

Cp =	0.840	Ts (avg) =	609.6	Sqrt DP (avg):	0.905
Ps =	29.37	Ms =	28.534		
Vs =	55.429				

Volumetric Flow Rate (Actual Basis)

$$Q = Vs \times A \times 60$$

Vs =	55.429	A =	63.617
Q =	211,575		

Volumetric Flow Rate (Standard Basis)

$$Qstd = 17.647 \times Q \times \frac{Ps}{Ts\ (avg)}$$

Q =	211,575	Ps =	29.37	Ts (avg) =	609.6
Qstd =	179,868				

Volumetric Flow Rate (Standard Dry Basis)

$$Qstd(dry) = Qstd \times (1-Bws)$$

Qstd =	179,868	Bws =	0.039
Qstd(dry) =	172,941		

Isokinetic Variation:

$$\%ISO = \frac{0.0945 \times Ts \times Vm(std)}{Vs \times \theta \times An \times Ps \times (1-Bws)}$$

Ts =	609.6	Vm(std) =	95.607	Vs =	55.429
An =	0.0002761	θ =	96	Ps =	29.37
Bws =	0.039				
%ISO =	102.6				

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Client:	**ArcelorMittal Burns Harbor LLC**
Facility:	**Burns Harbor, Indiana**
Test Location:	**#2 Battery PEC Stack**
Run:	**1**
Date:	**8/30/2016**
Method:	**316**
Source Condition:	**Normal**

Formaldehye Concentration:

$$mg/m^3 = \frac{\text{mg of Formaldehye}}{Vm(std) \times 0.02832\ m^3/ft^3}$$

mg= 0.0076 **Vm(std) =** 95.607

mg/m^3= 0.00281

Formaldehye Emission Rate:

$$\text{lb of Formaldehye} = \frac{\mu g \text{ of sample} \times 10^{-6} \text{ grams}/\mu g}{453.6 \text{ grams/lb}}$$

$$\text{Emission Rate lb/hr} = \frac{\text{lb of Formaldehye}}{Vm(std)} \times \text{dscfm} \times 60 \text{ min/hr}$$

lb of Formaldehye = 1.68E-11 **dscfm =** 172,941

Emission Rate lb/hr = 0.0018

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Client:	**ArcelorMittal Burns Harbor LLC**
Facility:	**Burns Harbor, Indiana**
Test Location:	**#2 Battery PEC Stack**
Run:	**1**
Date:	**8/23/2016**
Method:	**315**
Source Condition:	**Normal**

Dry Molecular Weight

$$Md = 0.44 \times (\%CO_2) + 0.32 \times (\%O_2) + 0.28 \times \%N_2$$

$\%CO_2$ = 1.0 $\%O_2$ = 19.9 $\%N_2$ = 79.1

Md = 28.956

Wet Molecular Weight

$$Ms = Md \times (1-Bws) + (18.0 \times Bws)$$

Md = 28.956 Bws = 0.027

Ms = 28.661

Meter Volume at Standard Conditions

$$Vm(std) = 17.647 \times Y \times Vm \times \frac{(Pbar + DH/13.6)}{Tm}$$

Y = 1.001 Vm = 83.705 Pbar = 29.45

DH = 1.80 Tm = 538.6

Vm(std) = 81.216

Volume of Water Vapor Condensed

$$Vw(std) = 0.0471 \times (\text{net } H_2O \text{ gain})$$

Net H_2O = 47.7

Vw(std) = 2.247

Moisture Content

$$Bws = \frac{Vwc(std)}{Vwc(std) + Vm(std)}$$

Vw(std) = 2.247 Vm(std) = 81.216

Bws = 0.027 0.03729422

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Client:	**ArcelorMittal Burns Harbor LLC**
Facility:	**Burns Harbor, Indiana**
Test Location:	**#2 Battery PEC Stack**
Run:	**1**
Date:	**8/23/2016**
Method:	**315**
Source Condition:	**Normal**

Average Duct Velocity

$$Vs = 85.49 \times Cp \times \text{Sqrt DP (avg)} \times (Ts\ (avg) / (Ps \times Ms))^{1/2}$$

Cp = 0.840 Ts (avg) = 614.6 Sqrt DP (avg): 1.003
Ps = 29.38 Ms = 28.661

Vs = 61.526

Volumetric Flow Rate (Actual Basis)

$$Q = Vs \times A \times 60$$

Vs = 61.526 A = 63.617

Q = 234,847

Volumetric Flow Rate (Standard Basis)

$$Qstd = 17.647 \times Q \times \frac{Ps}{Ts\ (avg)}$$

Q = 234,847 Ps = 29.38 Ts (avg) = 614.6

Qstd = 198,082

Volumetric Flow Rate (Standard Dry Basis)

$$Qstd(dry) = Qstd \times (1-Bws)$$

Qstd = 198,082 Bws = 0.027

Qstd(dry) = 192,750

Isokinetic Variation:

$$\%ISO = \frac{0.0945 \times Ts \times Vm(std)}{Vs \times \theta \times An \times Ps \times (1-Bws)}$$

Ts = 614.6 Vm(std) = 81.216 Vs = 61.526
An = 0.0002761 θ = 96 Ps = 29.38
Bws = 0.027

%ISO = 101.2

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Client:	ArcelorMittal Burns Harbor LLC
Facility:	Burns Harbor, Indiana
Test Location:	#2 Battery PEC Stack
Run:	1
Date:	8/23/2016
Method:	315
Source Condition:	Normal

TSO Concentration:

$$Co = \frac{m_n \times 15.43}{Vm(std)}$$

Blanks were subtracted from the front half DCM Extractable Material, and back half DCM Extractive Material

Run 1

	Final Weight (grams)		Blank Weight (grams)			Final Weight Minus Blank (grams)
Filter Toluene Extractable Material	0.0072	Front Half DCM Extractable Material COC # 001 Page 3/9	0.0112	Method Blank Front Half DCM Extractable Material Page 8/9	≤	0.0003
Toluene Extractable Material	0.0087	Acetone Rinse DCM Extractable Material COC #002 Page 3/9	(65 ml/225 ml) x 9.5/1000=0.0027	Acetone Rinse DCM Extractable Material COC #010-011 Page 3/9	≤	0.0060
Total Front Half Weight					≤	0.0063
DI Water	<0.0005		0.0005 Non detect used in calculation		≤	0.0005
DI/Acetone/Toluene Wash	0.0097	Back Half DCM Extractable Material + Back Half DCM Extracable Material in Rinse COC #003 Page 4/9	(91 g/.85g/ml)/225 mls x (5.0 mg/1000 mg/g)=0.0024	Acetone Rinse DCM Extractable Material COC #010-011 Page 3/9 and weight of solvent for sample COC #003	≤	0.0073
Back Half TSO Weight					≤	0.0078
Total TSO Weight					≤	0.0141

m_n (g) = 0.0141 Vm(std) = 81.216

Co = 0.0027 gr/dscf

TSO Emission Rate:

$$\text{Emission Rate lb/hr} = \frac{Co}{7{,}000} \times Qstd(dry) \times 60$$

Co = 0.0027 Qstd(dry) = 192.750

Emission Rate lb/hr = 4.43E+00 lb/hr

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Client:	**ArcelorMittal Burns Harbor LLC**
Facility:	**Burns Harbor, Indiana**
Test Location:	**#2 Battery PEC Stack**
Run:	**1**
Date:	**8/23/2016**
Method:	**0010/23**
Source Condition:	**Normal**

Dry Molecular Weight

$$Md = 0.44 \times (\%CO_2) + 0.32 \times (\%O_2) + 0.28 \times \%N_2$$

$\%CO_2$ = 1.00 $\%O_2$ = 19.9 $\%N_2$ = 79.1

Md = 28.956

Wet Molecular Weight

$$Ms = Md \times (1-Bws) + (18.0 \times Bws)$$

Md = 28.956 Bws = 0.023

Ms = 28.705

Meter Volume at Standard Conditions

$$Vm(std) = 17.647 \times Y \times Vm \times \frac{(Pbar + DH/13.6)}{Tm}$$

Y = 0.998 Vm = 155.470 Pbar = 29.45

DH = 5.72 Tm = 537.6

Vm(std) = 152.149

Volume of Water Vapor Condensed

$$Vw(std) = 0.0471 \times (\text{net } H_2O \text{ gain})$$

Net H_2O = 75.8

Vw(std) = 3.570

Moisture Content

$$Bws = \frac{Vwc(std)}{Vwc(std) + Vm(std)}$$

Vw(std) = 3.570 Vm(std) = 152.149

Bws = 0.023

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Client:	**ArcelorMittal Burns Harbor LLC**
Facility:	**Burns Harbor, Indiana**
Test Location:	**#2 Battery PEC Stack**
Run:	**1**
Date:	**8/23/2016**
Method:	**0010/23**
Source Condition:	**Normal**

Average Duct Velocity

$$Vs = 85.49 \times Cp \times \text{Sqrt DP (avg)} \times (Ts\ (avg)/(Ps \times Ms))^{1/2}$$

Cp = 0.840 Ts (avg) = 615.5 Sqrt DP (avg): 1.006
Ps = 29.38 Ms = 28.70

Vs = 61.705

Volumetric Flow Rate (Actual Basis)

$$Q = Vs \times A \times 60$$

Vs = 61.705 A = 63.617

Q = 235532

Volumetric Flow Rate (Standard Basis)

$$Qstd = 17.647 \times Q \times \frac{Ps}{Ts\ (avg)}$$

Q = 235,532 Ps = 29.38 Ts (avg) = 615.5

Qstd = 198,366

Volumetric Flow Rate (Standard Dry Basis)

$$Qstd(dry) = Qstd \times (1-Bws)$$

Qstd = 198,366 Bws = 0.023

Qstd(dry) = 193,818

Isokinetic Variation:

$$\%ISO = \frac{0.0945 \times Ts \times Vm(std)}{Vs \times \theta \times An \times Ps \times (1-Bws)}$$

Ts = 615.5 Vm(std) = 152.149 Vs = 61.705
An = 0.0004337 θ = 112.0 Ps = 29.38
Bws = 0.023

%ISO = 102.9

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Client:	**ArcelorMittal Burns Harbor LLC**
Facility:	**Burns Harbor, Indiana**
Test Location:	**#2 Battery PEC Stack**
Run:	**1**
Date:	**8/23/2016**
Method:	**0010/23**
Source Condition:	**Normal**

PCDD/PCDF Concentration:

$$mg/m^3 = \frac{\text{mg of PCDD/PCDF}}{Vm(std) \times 0.02832\ m^3/ft^3}$$

mg= 2.10E-07 **Vm(std) =** 152.149

mg/m^3= 4.88E-08 **O_2% =** 19.9

PCDD/PCDF Emission Rate:

$$\text{lb of PCDD/PCDF} = \frac{\text{ng of sample} \times 10^{-9}\ \text{grams}/\mu g}{453.6\ \text{grams/lb}}$$

$$\text{Emission Rate lb/hr} = \frac{\text{lb of PCDD/PCDF}}{Vm(std)} \times \text{dscfm} \times 60\ \text{min/hr}$$

lb of PCDD/PCDF = 4.63E-13 **dscfm =** 193,818

Emission Rate lb/hr = 5.389E-06

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Isokinetic Calculation Formulas

1. $V_{w(std)} = V_{lc}\left(\frac{\rho_w}{M_w}\right)\left(\frac{RT_{std}}{P_{std}}\right) = K_2 V_{lc}$

2. $V_{m(std)} = V_m Y \left(\frac{T_{std}}{T_m}\right)\left(\frac{(P_{bar} + (\frac{\Delta H}{13.6}))}{P_{std}}\right) = K_1 V_m Y \frac{(P_{bar} + (\frac{\Delta H}{13.6}))}{T_m}$

3. $B_{ws} = \frac{V_{w(std)}}{(V_{m(std)} + V_{w(std)})}$

4. $M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2)$

5. $M_s = M_d(1 - B_{ws}) + 18.0(B_{ws})$

6. $C_a = \frac{m_a}{V_a \rho_a}$

7. $W_a = C_a V_{aw} \rho_a$

8. $C_{acf} = 15.43 K_i \left(\frac{m_n P_s}{V_{w(std)} + V_{m(std)}\ T_s}\right)$

9. $C_S = (15.43\ \text{grains/gram})\,(m_n / V_{m(std)})$

10. $v_s = K_p C_p \sqrt{\frac{\Delta P\, T_s}{P_s M_s}}$

11. $Q_{acfm} = v_s A(60_{sec/min})$

12. $Q_{sd} = (3600_{sec/hr})(1 - B_{ws})\, v_s \left(\frac{T_{std} P_s}{T_s P_{std}}\right) A$

13. $E\ (\text{emission rate, lbs/hr}) = Q_{std}(C_s / 7000\ \text{grains/lb})$

14. $IKV = \frac{T_s V_{m(std)} P_{std}}{T_{std} v_s \theta A_n P_s 60(1 - B_{ws})} = K_4 \frac{T_s V_{m(std)}}{P_s v_s A_n \theta (1 - B_{ws})}$

15. $\%EA = \left(\frac{\%O_2 - (0.5\,\%CO)}{0.264\,\%N_2 - (\%O_2 - 0.5\,\%CO)}\right) \times 100$

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Isokinetic Nomenclature

A = Cross-sectional area of stack or duct, square feet
A_n = Cross-sectional area of nozzle, square feet
B_{ws} = Water vapor in gas stream, by volume
C_a = Acetone blank residue concentration, g/g
C_{acf} = Concentration of particulate matter in gas stream at actual conditions, gr/acf
C_p = Pitot tube coefficient
C_s = Concentration of particulate matter in gas stream, dry basis, corrected to standard conditions, gr/dscf
IKV = Isokinetic sampling variance, must be 90.0 % ≤ IKV ≤ 110.0%
M_d = Dry molecular weight of gas, lb/lb-mole
M_s = Molecular weight of gas, wet basis, lb/lb-mole
M_w = Molecular weight of water, 18.0 lb/lb-mole
m_a = Mass of residue of acetone after evaporation, grams
P_{bar} = Barometric pressure at testing site, inches mercury
P_g = Static pressure of gas, inches mercury (inches water/13.6)
P_s = Absolute pressure of gas, inches mercury = $P_{bar} + P_g$
P_{std} = Standard absolute pressure, 29.92 inches mercury
Q_{acfm} = Actual volumetric gas flow rate, acfm
Q_{sd} = Dry volumetric gas flow rate corrected to standard conditions, dscfh
R = Ideal gas constant, 21.85 inches mercury cubic foot/°R-lb-mole
T_m = Dry gas meter temperature, °R
T_s = Gas temperature, °R
T_{std} = Absolute temperature, 528°R
V_a = Volume of acetone blank, ml
V_{aw} = Volume of acetone used in wash, ml
W_a = Weight of residue in acetone wash, grams
m_n = Total amount of particulate matter collected, grams
V_{1c} = Total volume of liquid collected in impingers and silica gel, ml
V_m = Volume of gas sample as measured by dry gas meter, dcf
$V_{m(std)}$ = Volume of gas sample measured by dry gas meter, corrected to standard conditions, dscf
v_s = Gas velocity, ft/sec
$V_{w(std)}$ = Volume of water vapor in gas sample, corrected to standard conditions, scf
Y = Dry gas meter calibration factor
ΔH = Average pressure differential across the orifice meter, inches water
Δp = Velocity head of gas, inches water
ρ_a = Density of acetone, 0.7855 g/ml (average)
ρ_w = Density of water, 0.002201 lb/ml
θ = Total sampling time, minutes
K_1 = 17.647 °R/in. Hg
K_2 = 0.04707 ft^3/ml
K_4 = 0.09450/100 = 0.000945
K_p = Pitot tube constant, $85.49 \frac{ft}{sec}\left[\frac{(lb/lb\text{-}mole)(in.\ Hg)}{(°R)(in.\ H_2O)}\right]^{1/2}$
%EA = Percent excess air
$\%CO_2$ = Percent carbon dioxide by volume, dry basis
$\%O_2$ = Percent oxygen by volume, dry basis
%CO = Percent carbon monoxide by volume, dry basis
$\%N_2$ = Percent nitrogen by volume, dry basis
0.264 = Ratio of O_2 to N_2 in air, v/v
28 = Molecular weight of N_2 or CO
32 = Molecular weight of O_2
44 = Molecular weight of CO_2
13.6 = Specific gravity of mercury (Hg)

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Trace Metal (Including Mercury) Sample Calculations

Concentration

$$\frac{\mu g}{m^3} = \frac{\mu g\ of\ trace\ metal}{dscf\ volume\ sampled \times 0.02832 \frac{m^3}{ft^3}}$$

Emission Rate

$$\frac{\mu g\ of\ sample \times \frac{1 \times 10^{-6} grams}{\mu g}}{453.6\ gr/lb} = lbs\ of\ trace\ metal$$

$$\frac{lbs\ of\ trace\ metal}{V_m(std)sample} \times dscfm \times 60 \frac{min}{hr} = lbs\ of\ trace\ metal/hr$$

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Volumetric Air Flow Calculations

$$Vm\ (std) = 17.647 \times Vm \times \left[\frac{\left(P_{bar} + \left[\frac{DH}{13.6}\right]\right)}{(460 + Tm)}\right] \times Y$$

$$Vw\ (std) = 0.0471 \times Vlc$$

$$Bws = \left[\frac{Vw\ (std)}{Vw\ (std) + Vm\ (std)}\right]$$

$$Md = (0.44 \times \%CO_2) + (0.32 \times \%O_2) + [0.28 \times (100 - \%CO_2 - \%O_2)]$$

$$Ms = Md \times (1 - Bws) + (18 \times Bws)$$

$$Vs = \sqrt{\frac{(Ts + 460)}{Ms \times Ps}} \times \sqrt{DP} \times Cp \times 85.49$$

$$Acfm = Vs \times Area\ (of\ stack\ or\ duct) \times 60$$

$$Scfm = Acfm \times 17.647 \times \left[\frac{Ps}{(460 + Ts)}\right]$$

$$Scfh = Scfm \times 60 \frac{min}{hr}$$

$$Dscfm = Scfm \times (1 - Bws)$$

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Volumetric Flow Nomenclature

A = Cross-sectional area of stack or duct, ft2
Bws = Water vapor in gas stream, proportion by volume
Cp = Pitot tube coefficient, dimensionless
Md = Dry molecular weight of gas, lb/lb-mole
Ms = Molecular weight of gas, wet basis, lb/lb-mole
Mw = Molecular weight of water, 18.0 lb/lb-mole
Pbar = Barometric pressure at testing site, in. Hg
Pg = Static pressure of gas, in. Hg (in. H2O/13.6)
DH= Static pressure of gas, in.H2O
Ps = Absolute pressure of gas, in. Hg = Pbar + Pg
Pstd = Standard absolute pressure, 29.92 in. Hg
Acfm = Actual volumetric gas flow rate
Scfm= Volumetric gas flow rate, corrected to standard conditions
Dscfm = Standard volumetric flow rate, corrected to dry conditions
R = Ideal gas constant, 21.85 in. Hg-ft3/°R-lb-mole
Ts = Average stack gas temperature, °F
Tm = Average dry gas meter temperature, oF
Tstd = Standard absolute temperature, 528°R
vs = Gas velocity, ft/sec
Vm(std)= Volume of gas sampled, corrected to standard conditions, scf
Vw(std) = Volume of water vapor in gas sample, corrected to standard conditions, scf
Vlc= Volume of liquid collected
Y = Dry gas meter calibration factor
Δp = Velocity head of gas, in. H2O
K1 = 17.647 °R/in. Hg
%EA = Percent excess air
%CO2 = Percent carbon dioxide by volume, dry basis
%O2 = Percent oxygen by volume, dry basis
%N2 = Percent nitrogen by volume, dry basis
0.264 = Ratio of O2 to N2 in air, v/v
0.28 = Molecular weight of N2 or CO, divided by 100
0.32 = Molecular weight of O2 divided by 100
0.44 = Molecular weight of CO2 divided by 100
13.6 = Specific gravity of mercury (Hg)

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Derivation of Factors Used in Carbon Monoxide and Sulfur Dioxide Calculations

Factors for calculating from lb/dscf to parts per million:

Using 22.414 liters of gas per gram-mole at 0°C and 1 atmosphere pressure,

One pound-mole of gas is contained in 359.04765 ft^3 at 32°F and 29.92 in. Hg, or 385.31943 ft^3 at 68°F and 29.92 in. Hg.

$$ppm = \frac{M\ lb/lb\text{-}mole}{385.31943\ dscf/lb\text{-}mole \times 10^6} = 2.595294\ \times\ 10^{-9}\ M\ lb/dscf$$

Where M = pollutant molecular weight; SO2 = 64.0628 lb/lb-mole; and NO_2 = 46.0055 lb/lb-mole

$$Factor\ for\ ppm\ SO_2 = \frac{1}{64.06 \times 2.59552 \times 10^{-9}} = 6.0151 \times 10^6\ dscf/lb$$

Use 6.0151×10^6

$$Factor\ for\ ppm\ NO_x = \frac{1}{46.0055 \times 2.5952494 \times 10^{-9}} = 8.3755 \times 10^6\ dscf/lb$$

Use 8.3755×10^6

Factors for calculating concentration as pounds per dry standard cubic feet:

$$Factor\ for\ C_{SO_2} = \frac{64.0628\ grams/gram\text{-}mole}{2\frac{gram-equivalent}{gram\text{-}mole} \times 1000\frac{gram\text{-}milliquivalents}{gram\text{-}equivalent} \times 453.592\frac{grams}{lb}}$$

$$= 7.061721 \times 10^{-5}\ lb/g\text{-}meq$$

Use 7.0617×10^{-5}

$$Factor\ for\ C_{NO_2}\ as\ NO_2 = \frac{28316.84\ ml/scf}{4.53592 \times 10^8\ \mu g/lb} = 6.242801 \times 10^{-5}\frac{lb/scf}{\mu g/ml}$$

Use 6.2428×10^{-5}

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ppm Conversion Calculations and Factors

ppm to lbs/scf

(ppm X) x (conversion factor X) = X lbs/scf

lbs/scf to lbs/hr

Dry ppm's with dry flow, and wet ppm's with wet flow.

(X lbs/scf) x (airflow scf/min) x (60 min/hr) = X lbs/hr

lbs/scf to lbs/mmBtu

Dry ppm's with dry diluent, and wet ppm's with wet diluent.

CO_2 – (X lbs/scf) x (F_c) x (100/CO_2) = X lbs/mmBtu

O_2 – (X lbs/scf) x (F_d) x (20.9/(20.9-O_2)) = X lbs/mmBtu

Conversion Factors

NO_x – 1.19396×10^{-7}

SO_2 – 1.6625×10^{-7}

CO – 7.2664×10^{-8}

CH_4 – 4.1637×10^{-8}

C_3H_8 – 1.1419×10^{-7}

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Calculations for Formaldehyde

Concentration

$$\frac{lbs\ HCHO}{dscf} = \frac{mg\ HCHO\ in\ sample}{4.536 \times 10^5 \times dscf}$$

Where:

4.536×10^5 = mg/lb
dscf = volume of gas sampled

Parts Per Million

$$ppm\ HCHO = \frac{lbs\ HCHO}{dscf} \div \frac{30.03}{385 \times 10^6}$$

Where:

385 = Volume of 1 lb mole of gas at 68°F and 29.92 in. Hg
10^6 = Conversion of ppm v/v

Emission Rate

$$lbs\ HCHO/dscf \times dscfm \times 60\,min/hr = lbs/hr\ HCHO$$

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Appendix E - Laboratory Sample Analysis

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Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Project Number: M162810
Test Location: #2 Battery PEC Stack

Test Method: 5/29
Filterable Analysis Date: 8/24/2016
Condensable Analysis Date:

Filter Drying Temp °F: 220
Analyst: BWH
Analyst:

Description		Sample Date	ID#	vol. (ml)	Initial Weight (grams)	Final Weight (grams)	Net Weight Gain (grams)
Filterable Particulate							
Test No. 1		8/16/2016					
Source Condition:	Normal						
M5 Filter			10086		0.4598	0.4608	0.0010
Acetone Wash (Teflon			617	25 ml	20.8236	20.8321	0.0085
Acetone Blank							0.0001
Total Front Half Weight							**0.0094**
Filterable Particulate							
Test No. 2		8/17/2016					
Source Condition:	Normal						
M5 Filter			10060		0.4567	0.4574	0.0007
Acetone Wash (Teflon			618	27 ml	20.8477	20.8530	0.0053
Acetone Blank							0.0001
Total Front Half Weight							**0.0059**
Filterable Particulate							
Test No. 3		8/18/2016					
Source Condition:	Normal						
M5 Filter			10061		0.4571	0.4585	0.0014
Acetone Wash (Teflon			619	24 ml	20.8613	20.8685	0.0072
Acetone Blank							0.0001
Total Front Half Weight							**0.0085**
Reagent Blank Summary							
Acetone Wash (Teflon			620	100 ml	20.8601	20.8605	0.0004

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Chain-of-Custody Form

Project Number: M162810	Date Results Required: Standard
Client: ArcelorMittal Burns Harbor	TAT Required: Standard
Plant/Test Location: Burns Harbor Coke Plant	Project Supervisor: Stuart Burton
P.O. # for Lab Work:	

Sample Number	Sample Date	Sample Point Identification	# of Coils	Sub Lab	Analysis Required	Volume, mls
012	8/16/16	No 2 PEC Stack-T1-Filter, Acetone PW, Nitric Rinse	3	MAX	M5*/29**	63
013	8/16/16	No 2 PEC Stack-T1-HNO3-H2O2 Imps and Rinse	1	MAX	M29**	372
014	8/16/16	No.2 PEC Stack-T1-KMnO4 Imps & HCl Rinse, Imp 3 HNO3 Rinse	3	MAX	M29- Hg	430-KMnO4 166-HCl 98 Imp 3
015	8/17/16	No.2 PEC Stack-T2-Filter, Acetone PW, Nitric Rinse	3	MAX	M5*/29**	28
016	8/17/16	No 2 PEC Stack-T2-HNO3/H2O2 Imps and Rinse	1	MAX	M29*	334
017	8/17/16	No 2 PEC Stack-T2-KMnO4 Imps & HCl Rinse, Imp 3 HNO3 Rinse	3	MAX	M29- Hg	386 203 46
018	8/18/16	No.2 PEC Stack-T3-Filter, Acetone PW, Nitric Rinse	3	MAX	M5*/29**	40
019	8/18/16	No.2 PEC Stack-T3-HNO3-H2O2 Imps and Rinse	1	MAX	M29*	345
020	8/18/16	No 2 PEC Stack-T3-KMnO4 Imps & HCl Rinse, Imp 3 HNO3 Rinse	3	MAX	M29- Hg	360 193 26
021	8/16/16	Acetone Reagent Blank	1	MAX	M5*/29**	<100
022	8/16/16	Filter Reagent Blank	3	MAX	M29*	———
023	8/16/16	0.1N HNO3 Reagent Blank	1	MAX	M29*	290
024	8/16/16	HNO3/H2O2 Reagent Blank	1	MAX	M29*	392
025	8/16/16	Acidic KMnO4 and HCl Reagent Blank	2	MAX	M29- Hg	118 207
026	8/16/16	CI Reagent Blank	1	MAX	M29**	91
027	8/16/16	M29 Audit sample		MAX		

Delivered to Lab by:	Date/Time:	Received by:	Date/Time:	Processed by:	Date/Time:
[illegible]	8/24/16	TAYOM [illegible]	8/18/16 23:55		

Laboratory Notes: *M5 analysis was performed at the Mostardi Platt laboratory before sending

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to sub-lab for metals analysis

**Target TSM are: Antimony, Arsenic, Beryllium, Cadmium, Total Chromium, Cobalt, Lead, Manganese, Mercury, Nickel, and Selenium.

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Your Project #: M162810
Site#: ARCELORMITTAL BURNS HARBOR
Site Location: BURNS HARBOR COKE PLANT

Attention:Data Reporting

Mostardi Platt
888 Industrial Rd
Elmhurst, IL
USA 60126-1121

Report Date: 2016/09/16
Report #: R4170464
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6I5767
Received: 2016/08/30, 13:39

Sample Matrix: Stack Sampling Train
Samples Received: 7

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Mercury 3C in HCl Rinse	4	2016/09/12	2016/09/12	BRL SOP-00104	EPA M29/M0060 m
Mercury 2B in HNO3/H2O2 Imp.	5	2016/09/08	2016/09/12	BRL SOP-00104	EPA M29/M0060 m
Mercury 3A in HNO3 Rinse	4	2016/09/08	2016/09/08	BRL SOP-00104	EPA M29/M0060 m
Mercury 3B in KMnO4/H2SO4 Imp.	4	2016/09/07	2016/09/09	BRL SOP-00104	EPA M29/M0060 m
Mercury 1B in Filter + Rinse (M29)	4	2016/09/12	2016/09/12	BRL SOP-00104	EPA 29 m
Metals B.H. in H2O2/HNO3 Imp.(6020A)	5	2016/09/09	2016/09/13	BRL SOP-00103 / BRL SOP-00102	EPA M29/CARB 436 m
Metals F.H. in Filter + Rinses (6020A)	5	2016/09/12	2016/09/15	BRL SOP-00103/ BRL SOP-00102	EPA M29/CARB 436 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Clayton Johnson
Project Manager - Air Toxics, Source Evaluation
16 Sep 2016 16:01:51 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total Cover Pages : 1

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

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Maxxam Job #: B6I5767
Report Date: 2016/09/16

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Client Project #: M162810
Site Location: BURNS HARBOR COKE PLANT

MERCURY BY COLD VAPOUR AA (STACK SAMPLING TRAIN)

Maxxam ID		CZI107		CZI118	CZI118		CZI203	CZI203			
Sampling Date		2016/08/16		2016/08/16	2016/08/16		2016/08/17	2016/08/17			
	UNITS	M29- BLANK	RDL	M29- R1	M29- R1 Lab-Dup	RDL	M29- R2	M29- R2 Lab-Dup	RDL	QC Batch	MDL
1B Mercury (Hg)	ug	<0.015	0.015	<0.015	<0.015	0.015	<0.015	N/A	0.015	4656399	0.02
2B Mercury (Hg)	ug	<0.15	0.15	<0.19	N/A	0.19	0.24	0.27	0.17	4652438	0.002
3A Mercury (Hg)	ug	<0.005	0.005	<0.0051	<0.0051	0.0051	<0.0023	N/A	0.0023	4651861	0.006
3B Mercury (Hg)	ug	<0.02	0.02	<0.023	<0.023	0.023	<0.023	N/A	0.023	4650435	0.01
3C Mercury (Hg)	ug	<0.013	0.013	0.560	N/A	0.013	0.217	N/A	0.013	4656196	0.01

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

Maxxam ID		CZI204	CZI204		CZI356			
Sampling Date		2016/08/18	2016/08/18		2016/08/16			
	UNITS	M29- R3	M29- R3 Lab-Dup	RDL	AUDIT- 072816K-1428	RDL	QC Batch	MDL
1B Mercury (Hg)	ug	<0.015	N/A	0.015	N/A	0.015	4656399	0.02
2B Mercury (Hg)	ug	<0.17	N/A	0.17	9.31 (1)	0.05	4652438	0.002
3A Mercury (Hg)	ug	<0.0015	N/A	0.0015	N/A	N/A	4651861	0.006
3B Mercury (Hg)	ug	<0.02	N/A	0.02	N/A	N/A	4650435	0.01
3C Mercury (Hg)	ug	0.254	0.257	0.013	N/A	N/A	4656196	0.01

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable
(1) Reported in ug/L

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Report Date: 2016/09/16

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Client Project #: M162810
Site Location: BURNS HARBOR COKE PLANT

ELEMENTS BY ICP/MS (STACK SAMPLING TRAIN)

Maxxam ID		CZI107	CZI118	CZI118	CZI203	CZI204	CZI357			
Sampling Date		2016/08/16	2016/08/16	2016/08/16	2016/08/17	2016/08/18	2016/08/16			
	UNITS	M29- BLANK	M29- R1	M29- R1 Lab-Dup	M29- R2	M29- R3	AUDIT- 072816K-1426	RDL	QC Batch	MDL
Front Half Antimony (Sb)	ug	<0.80	<0.80	<0.80	<0.80	<0.80	N/A	0.80	4656407	0.080
Front Half Arsenic (As)	ug	<0.80	<0.80	<0.80	<0.80	<0.80	N/A	0.80	4656407	0.080
Front Half Beryllium (Be)	ug	<0.20	<0.20	<0.20	<0.20	<0.20	N/A	0.20	4656407	0.040
Front Half Cadmium (Cd)	ug	<0.20	0.39	0.40	0.30	<0.20	N/A	0.20	4656407	0.040
Front Half Chromium (Cr)	ug	1.43	2.14	2.07	2.59	2.95	N/A	0.60	4656407	0.10
Front Half Cobalt (Co)	ug	<0.20	<0.20	<0.20	<0.20	<0.20	N/A	0.20	4656407	0.020
Front Half Lead (Pb)	ug	<0.40	0.62	0.62	0.61	0.63	N/A	0.40	4656407	0.040
Front Half Manganese (Mn)	ug	1.9	2.0	1.9	2.7	5.3	N/A	1.5	4656407	0.10
Front Half Nickel (Ni)	ug	<1.0	1.7	1.7	2.2	3.5	N/A	1.0	4656407	0.20
Front Half Selenium (Se)	ug	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	2.0	4656407	0.50
Back Half Antimony (Sb)	ug	<0.20	0.29	0.27	<0.20	<0.20	N/A	0.20	4654623	0.040
Back Half Arsenic (As)	ug	<0.20	<0.20	<0.20	<0.20	<0.20	0.84	0.20	4654623	0.040
Back Half Beryllium (Be)	ug	<0.050	<0.050	<0.050	<0.050	<0.050	0.057	0.050	4654623	0.050
Back Half Cadmium (Cd)	ug	<0.050	0.573	0.581	0.146	0.174	0.492	0.050	4654623	0.030
Back Half Chromium (Cr)	ug	0.72	2.51	2.56	2.31	1.93	0.54	0.15	4654623	0.070
Back Half Cobalt (Co)	ug	<0.050	0.174	0.174	0.084	0.185	0.211	0.050	4654623	0.010
Back Half Lead (Pb)	ug	0.28	3.89	3.94	1.74	0.94	1.40	0.10	4654623	0.040
Back Half Manganese (Mn)	ug	1.91	2.95	2.97	5.46	5.05	0.27	0.25	4654623	0.060
Back Half Nickel (Ni)	ug	0.99	2.23	2.27	1.89	1.45	1.32	0.25	4654623	0.060
Back Half Selenium (Se)	ug	<0.50	40.7	41.3	1.19	<0.50	0.91	0.50	4654623	0.20

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

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ELEMENTS BY ICP/MS (STACK SAMPLING TRAIN)

Maxxam ID		CZI361			
Sampling Date		2016/08/16			
	UNITS	AUDIT- 072816K-1425	RDL	QC Batch	MDL
Front Half Antimony (Sb)	ug	36.9	0.80	4656407	0.080
Front Half Arsenic (As)	ug	34.9	0.80	4656407	0.080
Front Half Beryllium (Be)	ug	25.8	0.20	4656407	0.040
Front Half Cadmium (Cd)	ug	28.3	0.20	4656407	0.040
Front Half Chromium (Cr)	ug	34.1	0.60	4656407	0.10
Front Half Cobalt (Co)	ug	23.9	0.20	4656407	0.020
Front Half Lead (Pb)	ug	62.3	0.40	4656407	0.040
Front Half Manganese (Mn)	ug	21.8	1.5	4656407	0.10
Front Half Nickel (Ni)	ug	34.7	1.0	4656407	0.20
Front Half Selenium (Se)	ug	45.6	2.0	4656407	0.50

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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TEST SUMMARY

Maxxam ID: CZI107
Sample ID: M29- BLANK
Matrix: Stack Sampling Train

Collected: 2016/08/16
Shipped:
Received: 2016/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 3C in HCl Rinse	CV/AA	4656196	2016/09/12	2016/09/12	Ron Morrison
Mercury 2B in HNO3/H2O2 Imp.	CV/AA	4652438	2016/09/08	2016/09/12	Ron Morrison
Mercury 3A in HNO3 Rinse	CV/AA	4651861	2016/09/08	2016/09/08	Ron Morrison
Mercury 3B in KMnO4/H2SO4 Imp.	CV/AA	4650435	2016/09/07	2016/09/09	Ron Morrison
Mercury 1B in Filter + Rinse (M29)	CV/AA	4656399	2016/09/12	2016/09/12	Ron Morrison
Metals B.H. in H2O2/HNO3 Imp.(6020A)	ICP1/MS	4654623	2016/09/09	2016/09/13	Prempal Bhatti
Metals F.H. in Filter + Rinses (6020A)	ICP1/MS	4656407	2016/09/12	2016/09/15	Prempal Bhatti

Maxxam ID: CZI118
Sample ID: M29- R1
Matrix: Stack Sampling Train

Collected: 2016/08/16
Shipped:
Received: 2016/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 3C in HCl Rinse	CV/AA	4656196	2016/09/12	2016/09/12	Ron Morrison
Mercury 2B in HNO3/H2O2 Imp.	CV/AA	4652438	2016/09/08	2016/09/12	Ron Morrison
Mercury 3A in HNO3 Rinse	CV/AA	4651861	2016/09/08	2016/09/08	Ron Morrison
Mercury 3B in KMnO4/H2SO4 Imp.	CV/AA	4650435	2016/09/07	2016/09/09	Ron Morrison
Mercury 1B in Filter + Rinse (M29)	CV/AA	4656399	2016/09/12	2016/09/12	Ron Morrison
Metals B.H. in H2O2/HNO3 Imp.(6020A)	ICP1/MS	4654623	2016/09/09	2016/09/13	Prempal Bhatti
Metals F.H. in Filter + Rinses (6020A)	ICP1/MS	4656407	2016/09/12	2016/09/15	Prempal Bhatti

Maxxam ID: CZI118 Dup
Sample ID: M29- R1
Matrix: Stack Sampling Train

Collected: 2016/08/16
Shipped:
Received: 2016/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 3A in HNO3 Rinse	CV/AA	4651861	2016/09/08	2016/09/08	Ron Morrison
Mercury 3B in KMnO4/H2SO4 Imp.	CV/AA	4650435	2016/09/07	2016/09/09	Ron Morrison
Mercury 1B in Filter + Rinse (M29)	CV/AA	4656399	2016/09/12	2016/09/12	Ron Morrison
Metals B.H. in H2O2/HNO3 Imp.(6020A)	ICP1/MS	4654623	2016/09/14	2016/09/13	Prempal Bhatti
Metals F.H. in Filter + Rinses (6020A)	ICP1/MS	4656407	2016/09/16	2016/09/15	Prempal Bhatti

Maxxam ID: CZI203
Sample ID: M29- R2
Matrix: Stack Sampling Train

Collected: 2016/08/17
Shipped:
Received: 2016/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 3C in HCl Rinse	CV/AA	4656196	2016/09/12	2016/09/12	Ron Morrison
Mercury 2B in HNO3/H2O2 Imp.	CV/AA	4652438	2016/09/08	2016/09/12	Ron Morrison
Mercury 3A in HNO3 Rinse	CV/AA	4651861	2016/09/08	2016/09/08	Ron Morrison
Mercury 3B in KMnO4/H2SO4 Imp.	CV/AA	4650435	2016/09/07	2016/09/09	Ron Morrison
Mercury 1B in Filter + Rinse (M29)	CV/AA	4656399	2016/09/12	2016/09/12	Ron Morrison
Metals B.H. in H2O2/HNO3 Imp.(6020A)	ICP1/MS	4654623	2016/09/09	2016/09/13	Prempal Bhatti
Metals F.H. in Filter + Rinses (6020A)	ICP1/MS	4656407	2016/09/12	2016/09/15	Prempal Bhatti

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TEST SUMMARY

Maxxam ID: CZI203 Dup
Sample ID: M29- R2
Matrix: Stack Sampling Train

Collected: 2016/08/17
Shipped:
Received: 2016/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 2B in HNO3/H2O2 Imp.	CV/AA	4652438	2016/09/08	2016/09/12	Ron Morrison

Maxxam ID: CZI204
Sample ID: M29- R3
Matrix: Stack Sampling Train

Collected: 2016/08/18
Shipped:
Received: 2016/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 3C in HCl Rinse	CV/AA	4656196	2016/09/12	2016/09/12	Ron Morrison
Mercury 2B in HNO3/H2O2 Imp.	CV/AA	4652438	2016/09/08	2016/09/12	Ron Morrison
Mercury 3A in HNO3 Rinse	CV/AA	4651861	2016/09/08	2016/09/08	Ron Morrison
Mercury 3B in KMnO4/H2SO4 Imp.	CV/AA	4650435	2016/09/07	2016/09/09	Ron Morrison
Mercury 1B in Filter + Rinse (M29)	CV/AA	4656399	2016/09/12	2016/09/12	Ron Morrison
Metals B.H. in H2O2/HNO3 Imp.(6020A)	ICP1/MS	4654623	2016/09/09	2016/09/13	Prempal Bhatti
Metals F.H. in Filter + Rinses (6020A)	ICP1/MS	4656407	2016/09/12	2016/09/15	Prempal Bhatti

Maxxam ID: CZI204 Dup
Sample ID: M29- R3
Matrix: Stack Sampling Train

Collected: 2016/08/18
Shipped:
Received: 2016/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 3C in HCl Rinse	CV/AA	4656196	2016/09/12	2016/09/12	Ron Morrison

Maxxam ID: CZI356
Sample ID: AUDIT- 072816K- 1428
Matrix: Stack Sampling Train

Collected: 2016/08/16
Shipped:
Received: 2016/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 2B in HNO3/H2O2 Imp.	CV/AA	4652438	2016/09/08	2016/09/12	Ron Morrison

Maxxam ID: CZI357
Sample ID: AUDIT- 072816K- 1426
Matrix: Stack Sampling Train

Collected: 2016/08/16
Shipped:
Received: 2016/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals B.H. in H2O2/HNO3 Imp.(6020A)	ICP1/MS	4654623	2016/09/09	2016/09/13	Prempal Bhatti

Maxxam ID: CZI361
Sample ID: AUDIT- 072816K- 1425
Matrix: Stack Sampling Train

Collected: 2016/08/16
Shipped:
Received: 2016/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals F.H. in Filter + Rinses (6020A)	ICP1/MS	4656407	2016/09/12	2016/09/15	Prempal Bhatti

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GENERAL COMMENTS

ELEMENTS BY ICP/MS (STACK SAMPLING TRAIN)

Metals F.H. in Filter + Rinses (6020A): Post digestion duplicate and spike were done on sample CZI118.
Metals B.H. in H2O2/HNO3 Imp.(6020A): Post digestion duplicate and spike were done on sample CZI118.
Result for CZI357 reported in ug/ml.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4650435	RON	Reagent Blank	3B Mercury (Hg)	2016/09/09	<0.013		ug	
4650435	RON	Matrix Spike(CZI118)	3B Mercury (Hg)	2016/09/09		102	%	85 - 115
4650435	RON	Matrix Spike DUP(CZI118)	3B Mercury (Hg)	2016/09/09		101	%	85 - 115
4650435	RON	MS/MSD RPD	3B Mercury (Hg)	2016/09/09	0.79		%	20
4650435	RON	Spiked Blank	3B Mercury (Hg)	2016/09/09		103	%	90 - 110
4650435	RON	Spiked Blank DUP	3B Mercury (Hg)	2016/09/09		103	%	90 - 110
4650435	RON	RPD	3B Mercury (Hg)	2016/09/09	0.19		%	20
4650435	RON	Method Blank	3B Mercury (Hg)	2016/09/09	<0.013		ug	
4650435	RON	RPD - Sample/Sample Dup	3B Mercury (Hg)	2016/09/09	NC		%	20
4651861	RON	Matrix Spike(CZI118)	3A Mercury (Hg)	2016/09/08		103	%	85 - 115
4651861	RON	Matrix Spike DUP(CZI118)	3A Mercury (Hg)	2016/09/08		102	%	85 - 115
4651861	RON	MS/MSD RPD	3A Mercury (Hg)	2016/09/08	0.58		%	20
4651861	RON	Spiked Blank	3A Mercury (Hg)	2016/09/08		103	%	90 - 110
4651861	RON	Spiked Blank DUP	3A Mercury (Hg)	2016/09/08		102	%	90 - 110
4651861	RON	RPD	3A Mercury (Hg)	2016/09/08	1.5		%	20
4651861	RON	Method Blank	3A Mercury (Hg)	2016/09/08	<0.005		ug	
4651861	RON	RPD - Sample/Sample Dup	3A Mercury (Hg)	2016/09/08	NC		%	20
4652438	RON	Matrix Spike(CZI203)	2B Mercury (Hg)	2016/09/12		98	%	85 - 115
4652438	RON	Matrix Spike DUP(CZI203)	2B Mercury (Hg)	2016/09/12		97	%	85 - 115
4652438	RON	MS/MSD RPD	2B Mercury (Hg)	2016/09/12	1.3		%	20
4652438	RON	Spiked Blank	2B Mercury (Hg)	2016/09/12		96	%	90 - 110
4652438	RON	Spiked Blank DUP	2B Mercury (Hg)	2016/09/12		97	%	90 - 110
4652438	RON	RPD	2B Mercury (Hg)	2016/09/12	0.52		%	20
4652438	RON	Method Blank	2B Mercury (Hg)	2016/09/12	<0.015		ug	
4652438	RON	RPD - Sample/Sample Dup	2B Mercury (Hg)	2016/09/12	NC		%	20
4654623	PBA	Matrix Spike(CZI118)	Back Half Antimony (Sb)	2016/09/13		96	%	70 - 130
			Back Half Arsenic (As)	2016/09/13		97	%	70 - 130
			Back Half Beryllium (Be)	2016/09/13		97	%	70 - 130
			Back Half Cadmium (Cd)	2016/09/13		94	%	70 - 130
			Back Half Chromium (Cr)	2016/09/13		98	%	70 - 130
			Back Half Cobalt (Co)	2016/09/13		100	%	70 - 130
			Back Half Lead (Pb)	2016/09/13		102	%	70 - 130
			Back Half Manganese (Mn)	2016/09/13		98	%	70 - 130
			Back Half Nickel (Ni)	2016/09/13		100	%	70 - 130
			Back Half Selenium (Se)	2016/09/13		92	%	70 - 130
4654623	PBA	Matrix Spike DUP(CZI118)	Back Half Antimony (Sb)	2016/09/13		97	%	70 - 130
			Back Half Arsenic (As)	2016/09/13		95	%	70 - 130
			Back Half Beryllium (Be)	2016/09/13		97	%	70 - 130
			Back Half Cadmium (Cd)	2016/09/13		94	%	70 - 130
			Back Half Chromium (Cr)	2016/09/13		97	%	70 - 130
			Back Half Cobalt (Co)	2016/09/13		99	%	70 - 130
			Back Half Lead (Pb)	2016/09/13		102	%	70 - 130
			Back Half Manganese (Mn)	2016/09/13		97	%	70 - 130
			Back Half Nickel (Ni)	2016/09/13		98	%	70 - 130
			Back Half Selenium (Se)	2016/09/13		91	%	70 - 130
4654623	PBA	MS/MSD RPD	Back Half Antimony (Sb)	2016/09/13	1.0		%	20
			Back Half Arsenic (As)	2016/09/13	2.1		%	20
			Back Half Beryllium (Be)	2016/09/13	0		%	20
			Back Half Cadmium (Cd)	2016/09/13	0		%	20
			Back Half Chromium (Cr)	2016/09/13	1.0		%	20
			Back Half Cobalt (Co)	2016/09/13	1.0		%	20
			Back Half Lead (Pb)	2016/09/13	0		%	20
			Back Half Manganese (Mn)	2016/09/13	1.0		%	20

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Back Half Nickel (Ni)	2016/09/13	2.0		%	20
			Back Half Selenium (Se)	2016/09/13	1.1		%	20
4654623	PBA	Spiked Blank	Back Half Antimony (Sb)	2016/09/13		100	%	85 - 115
			Back Half Arsenic (As)	2016/09/13		100	%	85 - 115
			Back Half Beryllium (Be)	2016/09/13		99	%	85 - 115
			Back Half Cadmium (Cd)	2016/09/13		100	%	85 - 115
			Back Half Chromium (Cr)	2016/09/13		103	%	85 - 115
			Back Half Cobalt (Co)	2016/09/13		102	%	85 - 115
			Back Half Lead (Pb)	2016/09/13		104	%	85 - 115
			Back Half Manganese (Mn)	2016/09/13		102	%	85 - 115
			Back Half Nickel (Ni)	2016/09/13		103	%	85 - 115
			Back Half Selenium (Se)	2016/09/13		94	%	85 - 115
4654623	PBA	Spiked Blank DUP	Back Half Antimony (Sb)	2016/09/13		101	%	85 - 115
			Back Half Arsenic (As)	2016/09/13		99	%	85 - 115
			Back Half Beryllium (Be)	2016/09/13		100	%	85 - 115
			Back Half Cadmium (Cd)	2016/09/13		99	%	85 - 115
			Back Half Chromium (Cr)	2016/09/13		104	%	85 - 115
			Back Half Cobalt (Co)	2016/09/13		102	%	85 - 115
			Back Half Lead (Pb)	2016/09/13		103	%	85 - 115
			Back Half Manganese (Mn)	2016/09/13		103	%	85 - 115
			Back Half Nickel (Ni)	2016/09/13		103	%	85 - 115
			Back Half Selenium (Se)	2016/09/13		95	%	85 - 115
4654623	PBA	RPD	Back Half Antimony (Sb)	2016/09/13	1.3		%	20
			Back Half Arsenic (As)	2016/09/13	0.77		%	20
			Back Half Beryllium (Be)	2016/09/13	1.6		%	20
			Back Half Cadmium (Cd)	2016/09/13	1.5		%	20
			Back Half Chromium (Cr)	2016/09/13	1.3		%	20
			Back Half Cobalt (Co)	2016/09/13	0.80		%	20
			Back Half Lead (Pb)	2016/09/13	1.5		%	20
			Back Half Manganese (Mn)	2016/09/13	0.89		%	20
			Back Half Nickel (Ni)	2016/09/13	0.41		%	20
			Back Half Selenium (Se)	2016/09/13	0.87		%	20
4654623	PBA	Method Blank	Back Half Antimony (Sb)	2016/09/13	<0.20		ug	
			Back Half Arsenic (As)	2016/09/13	<0.20		ug	
			Back Half Beryllium (Be)	2016/09/13	<0.050		ug	
			Back Half Cadmium (Cd)	2016/09/13	<0.050		ug	
			Back Half Chromium (Cr)	2016/09/13	<0.15		ug	
			Back Half Cobalt (Co)	2016/09/13	<0.050		ug	
			Back Half Lead (Pb)	2016/09/13	<0.10		ug	
			Back Half Manganese (Mn)	2016/09/13	<0.25		ug	
			Back Half Nickel (Ni)	2016/09/13	<0.25		ug	
			Back Half Selenium (Se)	2016/09/13	<0.50		ug	
4654623	PBA	RPD - Sample/Sample Dup	Back Half Antimony (Sb)	2016/09/13	NC		%	20
			Back Half Arsenic (As)	2016/09/13	NC		%	20
			Back Half Beryllium (Be)	2016/09/13	NC		%	20
			Back Half Cadmium (Cd)	2016/09/13	1.3		%	20
			Back Half Chromium (Cr)	2016/09/13	1.7		%	20
			Back Half Cobalt (Co)	2016/09/13	NC		%	20
			Back Half Lead (Pb)	2016/09/13	1.3		%	20
			Back Half Manganese (Mn)	2016/09/13	0.51		%	20
			Back Half Nickel (Ni)	2016/09/13	1.4		%	20
			Back Half Selenium (Se)	2016/09/13	1.5		%	20
4656196	RON	Reagent Blank	3C Mercury (Hg)	2016/09/12	<0.013		ug	

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Maxxam Job #: B6I5767
Report Date: 2016/09/16

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Client Project #: M162810
Site Location: BURNS HARBOR COKE PLANT

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4656196	RON	Matrix Spike(CZI204)	3C Mercury (Hg)	2016/09/12		91	%	85 - 115
4656196	RON	Matrix Spike DUP(CZI204)	3C Mercury (Hg)	2016/09/12		91	%	85 - 115
4656196	RON	MS/MSD RPD	3C Mercury (Hg)	2016/09/12	0.11		%	20
4656196	RON	Spiked Blank	3C Mercury (Hg)	2016/09/12		98	%	90 - 110
4656196	RON	Spiked Blank DUP	3C Mercury (Hg)	2016/09/12		99	%	90 - 110
4656196	RON	RPD	3C Mercury (Hg)	2016/09/12	0.91		%	20
4656196	RON	Method Blank	3C Mercury (Hg)	2016/09/12	<0.013		ug	
4656196	RON	RPD - Sample/Sample Dup	3C Mercury (Hg)	2016/09/12	1.2		%	20
4656399	RON	Reagent Blank	1B Mercury (Hg)	2016/09/12	<0.015		ug	
4656399	RON	Matrix Spike(CZI118)	1B Mercury (Hg)	2016/09/12		101	%	85 - 115
4656399	RON	Matrix Spike DUP(CZI118)	1B Mercury (Hg)	2016/09/12		100	%	85 - 115
4656399	RON	MS/MSD RPD	1B Mercury (Hg)	2016/09/12	0.40		%	20
4656399	RON	Spiked Blank	1B Mercury (Hg)	2016/09/12		94	%	90 - 110
4656399	RON	Spiked Blank DUP	1B Mercury (Hg)	2016/09/12		97	%	90 - 110
4656399	RON	RPD	1B Mercury (Hg)	2016/09/12	3.8		%	20
4656399	RON	Method Blank	1B Mercury (Hg)	2016/09/12	<0.015		ug	
4656399	RON	RPD - Sample/Sample Dup	1B Mercury (Hg)	2016/09/12	NC		%	20
4656407	PBA	Matrix Spike(CZI118)	Front Half Antimony (Sb)	2016/09/15		102	%	70 - 130
			Front Half Arsenic (As)	2016/09/15		97	%	70 - 130
			Front Half Beryllium (Be)	2016/09/15		96	%	70 - 130
			Front Half Cadmium (Cd)	2016/09/15		101	%	70 - 130
			Front Half Chromium (Cr)	2016/09/15		95	%	70 - 130
			Front Half Cobalt (Co)	2016/09/15		95	%	70 - 130
			Front Half Lead (Pb)	2016/09/15		96	%	70 - 130
			Front Half Manganese (Mn)	2016/09/15		97	%	70 - 130
			Front Half Nickel (Ni)	2016/09/15		95	%	70 - 130
			Front Half Selenium (Se)	2016/09/15		97	%	70 - 130
4656407	PBA	Matrix Spike DUP(CZI118)	Front Half Antimony (Sb)	2016/09/15		99	%	70 - 130
			Front Half Arsenic (As)	2016/09/15		97	%	70 - 130
			Front Half Beryllium (Be)	2016/09/15		95	%	70 - 130
			Front Half Cadmium (Cd)	2016/09/15		98	%	70 - 130
			Front Half Chromium (Cr)	2016/09/15		97	%	70 - 130
			Front Half Cobalt (Co)	2016/09/15		98	%	70 - 130
			Front Half Lead (Pb)	2016/09/15		97	%	70 - 130
			Front Half Manganese (Mn)	2016/09/15		99	%	70 - 130
			Front Half Nickel (Ni)	2016/09/15		97	%	70 - 130
			Front Half Selenium (Se)	2016/09/15		98	%	70 - 130
4656407	PBA	MS/MSD RPD	Front Half Antimony (Sb)	2016/09/15	3.0		%	20
			Front Half Arsenic (As)	2016/09/15	0		%	20
			Front Half Beryllium (Be)	2016/09/15	1.0		%	20
			Front Half Cadmium (Cd)	2016/09/15	3.0		%	20
			Front Half Chromium (Cr)	2016/09/15	2.1		%	20
			Front Half Cobalt (Co)	2016/09/15	3.1		%	20
			Front Half Lead (Pb)	2016/09/15	1.0		%	20
			Front Half Manganese (Mn)	2016/09/15	2.0		%	20
			Front Half Nickel (Ni)	2016/09/15	2.1		%	20
			Front Half Selenium (Se)	2016/09/15	1.0		%	20
4656407	PBA	Spiked Blank	Front Half Antimony (Sb)	2016/09/15		99	%	85 - 115
			Front Half Arsenic (As)	2016/09/15		102	%	85 - 115
			Front Half Beryllium (Be)	2016/09/15		101	%	85 - 115
			Front Half Cadmium (Cd)	2016/09/15		101	%	85 - 115
			Front Half Chromium (Cr)	2016/09/15		100	%	85 - 115
			Front Half Cobalt (Co)	2016/09/15		99	%	85 - 115

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Maxxam Job #: B6I5767
Report Date: 2016/09/16

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Client Project #: M162810
Site Location: BURNS HARBOR COKE PLANT

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Front Half Lead (Pb)	2016/09/15		100	%	85 - 115
			Front Half Manganese (Mn)	2016/09/15		100	%	85 - 115
			Front Half Nickel (Ni)	2016/09/15		101	%	85 - 115
			Front Half Selenium (Se)	2016/09/15		102	%	85 - 115
4656407	PBA	Spiked Blank DUP	Front Half Antimony (Sb)	2016/09/15		98	%	85 - 115
			Front Half Arsenic (As)	2016/09/15		98	%	85 - 115
			Front Half Beryllium (Be)	2016/09/15		99	%	85 - 115
			Front Half Cadmium (Cd)	2016/09/15		100	%	85 - 115
			Front Half Chromium (Cr)	2016/09/15		97	%	85 - 115
			Front Half Cobalt (Co)	2016/09/15		96	%	85 - 115
			Front Half Lead (Pb)	2016/09/15		98	%	85 - 115
			Front Half Manganese (Mn)	2016/09/15		97	%	85 - 115
			Front Half Nickel (Ni)	2016/09/15		97	%	85 - 115
			Front Half Selenium (Se)	2016/09/15		98	%	85 - 115
4656407	PBA	RPD	Front Half Antimony (Sb)	2016/09/15	0.66		%	20
			Front Half Arsenic (As)	2016/09/15	4.4		%	20
			Front Half Beryllium (Be)	2016/09/15	2.3		%	20
			Front Half Cadmium (Cd)	2016/09/15	0.96		%	20
			Front Half Chromium (Cr)	2016/09/15	3.3		%	20
			Front Half Cobalt (Co)	2016/09/15	3.2		%	20
			Front Half Lead (Pb)	2016/09/15	1.9		%	20
			Front Half Manganese (Mn)	2016/09/15	2.9		%	20
			Front Half Nickel (Ni)	2016/09/15	3.8		%	20
			Front Half Selenium (Se)	2016/09/15	3.3		%	20
4656407	PBA	Method Blank	Front Half Antimony (Sb)	2016/09/15	<0.80		ug	
			Front Half Arsenic (As)	2016/09/15	<0.80		ug	
			Front Half Beryllium (Be)	2016/09/15	<0.20		ug	
			Front Half Cadmium (Cd)	2016/09/15	<0.20		ug	
			Front Half Chromium (Cr)	2016/09/15	<0.60		ug	
			Front Half Cobalt (Co)	2016/09/15	<0.20		ug	
			Front Half Lead (Pb)	2016/09/15	<0.40		ug	
			Front Half Manganese (Mn)	2016/09/15	<1.5		ug	
			Front Half Nickel (Ni)	2016/09/15	<1.0		ug	
			Front Half Selenium (Se)	2016/09/15	<2.0		ug	
4656407	PBA	RPD - Sample/Sample Dup	Front Half Antimony (Sb)	2016/09/15	NC		%	20
			Front Half Arsenic (As)	2016/09/15	NC		%	20
			Front Half Beryllium (Be)	2016/09/15	NC		%	20
			Front Half Cadmium (Cd)	2016/09/15	NC		%	20
			Front Half Chromium (Cr)	2016/09/15	NC		%	20
			Front Half Cobalt (Co)	2016/09/15	NC		%	20
			Front Half Lead (Pb)	2016/09/15	NC		%	20
			Front Half Manganese (Mn)	2016/09/15	NC		%	20
			Front Half Nickel (Ni)	2016/09/15	NC		%	20

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Maxxam Job #: B6I5767
Report Date: 2016/09/16

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Client Project #: M162810
Site Location: BURNS HARBOR COKE PLANT

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Front Half Selenium (Se)	2016/09/15	NC		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Reagent Blank: A blank matrix containing all reagents used in the analytical procedure. Used to determine any analytical contamination.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

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Maxxam Job #: B6I5767
Report Date: 2016/09/16

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Client Project #: M162810
Site Location: BURNS HARBOR COKE PLANT

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Frank Mo, B.Sc., Inorganic Lab. Manager

Ralph Siebert, Operations Manager - Inorganic Analyses

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Client:	**ArcelorMittal Burns Harbor LLC**
Facility:	**Burns Harbor, Indiana**
Project Number:	**M162810**
Test Location:	**#2 Battery PEC Stack**

Test Method:	**5/202**	**Filter Drying Temp °F:**	**220**
Filterable Analysis Date:	**8/24/2016**	**Analyst:**	**BWH**
Condensable Analysis Date:	**8/29/2016**	**Analyst:**	**JMG**

Description	Sample Date	ID#	vol. (ml)	Initial Weight (grams)	Final Weight (grams)	Net Weight Gain (grams)
Filterable Particulate						
Test No. 1	8/16/2016					
Source Condition: Normal						
M5 Filter		9444		0.4409	0.4411	0.0002
Acetone Wash (M5 Pans)		8164	40 ml	5.2038	5.2068	0.0030
Acetone Blank						0.0002
Total Front Half Weight						**0.0030**
Condensable Particulate						
Acetone/Hexane Wash		8228	200 ml	2.5926	2.5935	0.0009
DI Wash		8040	327 ml	5.2310	5.2340	0.0030
NH_4OH Correction			0.2 ml			0.0003
Field Blank						0.0013
Total Back Half Weight						**0.0023**
Total Particulate Weight						**0.0053**
Filterable Particulate						
Test No. 2	8/17/2016					
Source Condition: Normal						
M5 Filter		9954		0.4552	0.4553	0.0001
Acetone Wash (M5 Pans)		8165	35 ml	5.2007	5.2023	0.0016
Acetone Blank						0.0001
Total Front Half Weight						**0.0016**
Condensable Particulate						
Acetone/Hexane Wash		8229	240 ml	2.5965	2.5976	0.0011
DI Wash		8041	307 ml	5.2246	5.2279	0.0033
NH_4OH Correction			0.3 ml			0.0005
Field Blank						0.0013
Total Back Half Weight						**0.0026**
Total Particulate Weight						**0.0042**
Filterable Particulate						
Test No. 3	8/18/2016					
Source Condition: Normal						
M5 Filter		9443		0.4441	0.4442	0.0001
Acetone Wash (M5 Pans)		8166	35 ml	5.1913	5.1927	0.0014
Acetone Blank						0.0001
Total Front Half Weight						**0.0014**
Condensable Particulate						
Acetone/Hexane Wash		8230	210 ml	2.6002	2.6011	0.0009
DI Wash		8042	256 ml	5.2030	5.2053	0.0023
NH_4OH Correction			0.3 ml			0.0005
Field Blank						0.0013
Total Back Half Weight						**0.0014**
Total Particulate Weight						**0.0028**
Field Train Blank Summary						
Acetone/Hexane Wash		8231	165 ml	2.6034	2.6038	0.0004
DI Wash		8043	220 ml	5.2097	5.2106	0.0009
NH_4OH Correction			0 ml			0.0000
Total Field Train Blank						0.0013
Normality of NH_4OH						0.0954
Reagent Blank Summary						
Acetone Wash (M5 Pans)		8167	100 ml	5.2018	5.2022	0.0004

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66K1223

Chain-of-Custody Form

Project Number: M162810	Date Results Required: Standard
Client: ArcelorMittal Burns Harbor	TAT Required: Standard
Plant/Test Location: Burns Harbor/Underfire Stack	Project Supervisor: CST

Sample Number	Sample Date	Sample Point Identification	# of Cont s	Sub Lab	Analysis Required	Volume, mls
001	9/7/16	Underfire Stack-T1-DI Imps and Rinses	2	Max	M316	[illegible]
002	9/7/16	Underfire Stack-T2-DI Imps and Rinses	2	Max	M316	[illegible]
003	9/8/16	Underfire Stack-T3-DI Imps and Rinses	2	Max	M316	[illegible]
004	9/8/16	DI Blank	1	Max	M316	177.5
005	9/7/16	Underfire Stack-T1A-Sorbent Tubes	3	Max	0031	—
006	9/7/16	Underfire Stack-T1B-Sorbent Tubes	3	Max	0031	—
007	9/7/16	Underfire Stack-T1C-Sorbent Tubes	3	Max	0031	—
008	9/7/16	Underfire Stack-T1D-Sorbent Tubes	3	Max	0031	—
009	9/7/16	Underfire Stack-T1E-Sorbent Tubes	3	Max	0031	—
010	9/7/16	Underfire Stack-T1F-Sorbent Tubes	3	Max	0031	—
011	9/7/16	Underfire Stack-T1-Condensate rinse	1	Max	0031	[illegible]
012	9/7/16	Underfire Stack-T2A-Sorbent Tubes	3	Max	0031	—
013	9/7/16	Underfire Stack-T2B-Sorbent Tubes	3	Max	0031	—
014	9/7/16	Underfire Stack-T2C-Sorbent Tubes	3	Max	0031	—
015	9/7/16	Underfire Stack-T2D-Sorbent Tubes	3	Max	0031	—
016	9/7/16	Underfire Stack-T2E-Sorbent Tubes	3	Max	0031	—
017	9/7/16	Underfire Stack-T2F-Sorbent Tubes	3	Max	0031	—
018	9/7/16	Underfire Stack-T2-Condensate rinse	1	Max	0031	[illegible]
019	9/8/16	Underfire Stack-T3A-Sorbent Tubes	3	Max	0031	
020	9/8/16	Underfire Stack-T3B-Sorbent Tubes	3	Max	0031	

Delivered to Lab by: Date/Time:	Received by: Date/Time:	Processed by: Date/Time:
	[illegible] 2016.09.17 [illegible]	

Laboratory Notes: [illegible]

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Chain-of-Custody Form

Project Number: M162810	Rate Results Required Standard
Client: ArcelorMittal Burns Harbor	TAT Required Standard
Plant/Test Location: Burns Harbor/Underfire Stack	Project Supervisor CST

Sample Number	Sample Date	Sample Point Identification	# of Cuts	Sub Lab	Analysis Required	Volume, mls
021	9/8/16	Underfire Stack-T3C-Sorbent Tubes	3	Max	0031	—
022	9/8/16	Underfire Stack-T3D-Sorbent Tubes	3	Max	0031	—
023	9/8/16	Underfire Stack-T3E Sorbent Tubes	3	Max	0031	—
024	9/8/16	Underfire Stack-T3F-Sorbent Tubes	3	Max	0031	—
025	9/8/16	Underfire Stack-T3-Condensate rinse	3	Max	0031	[illegible]
026						
027						
028						
029						
030						

Delivered to Lab by:	Date/Time:	Received by:	Date/Time:	Processed by:	Date/Time:
		[illegible]	[illegible] 16:30		

Laboratory Notes:

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Your Project #: M162810
Site#: BURNS HARBOR COKE PLANT
Site Location: ARCELORMITTAL BURNS HARBOR

Attention:Data Reporting

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Elmhurst, IL
USA 60126-1121

Your C.O.C. #: 004, 001, 002, 003, 005, 006, 007, 008, 010, 011, 012, 013, 015, 016, 017, 018, 009, 014, 0191

Report Date: 2016/11/16
Report #: R4248672
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B6J2137
Received: 2016/09/08, 14:30

Sample Matrix: Stack Sampling Train
Samples Received: 19

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Formaldehyde (M316)	4	2016/09/09	2016/09/09	BRL SOP-00113	EPA 316 m
VOST Condensate (8260Cmod)	3	N/A	2016/09/10	CAM SOP-00226	EPA 8260C m
VOST EPA5041A, 8260C for 0030, 0031	4	N/A	2016/09/09	BRL SOP-00302	EPA5041A, 8260C
VOST EPA5041A, 8260C for 0030, 0031	8	N/A	2016/09/10	BRL SOP-00302	EPA5041A, 8260C
Final Volume of Impinger	4	N/A	2016/09/09		

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods. Results relate to samples tested.
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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

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Your Project #: M162810
Site#: BURNS HARBOR COKE PLANT
Site Location: ARCELORMITTAL BURNS HARBOR

Attention:Data Reporting

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888 Industrial Rd
Elmhurst, IL
USA 60126-1121

Your C.O.C. #: 004, 001, 002, 003, 005, 006, 007, 008, 010, 011, 012, 013, 015, 016, 017, 018, 009, 014, 0191

Report Date: 2016/11/16
Report #: R4248672
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B6J2137
Received: 2016/09/08, 14:30

Encryption Key

Clayton Johnson
Project Manager - Air Toxics, Source Evaluation
16 Nov 2016 15:54:34

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769

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Maxxam Job #: B6J2137
Report Date: 2016/11/16

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Client Project #: M162810
Site Location: ARCELORMITTAL BURNS HARBOR

RESULTS OF ANALYSES OF STACK SAMPLING TRAIN

Maxxam ID		DAN034			DAN036	DAN036			DAN037			
Sampling Date		2016/08/30			2016/08/30	2016/08/30			2016/08/31			
COC Number		004			001	001			002			
	UNITS	M316- DI BLANK	RDL	MDL	M316- R1	M316- R1 Lab-Dup	RDL	MDL	M316- R2	RDL	MDL	QC Batch
Formaldehyde	ug	<8.3	8.3	5	<7.6	<7.6	7.6	4.6	<8.3	8.3	5	4653858
Impinger Volume	ml	330	1	1	302	N/A	1	1	330	1	1	4653871

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

Maxxam ID		DAN038			
Sampling Date		2016/09/01			
COC Number		003			
	UNITS	M316- R3	RDL	MDL	QC Batch
Formaldehyde	ug	<8	8	4.8	4653858
Impinger Volume	ml	318	1	1	4653871

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Site Location: ARCELORMITTAL BURNS HARBOR

VOLATILE ORGANICS BY GC/MS (STACK SAMPLING TRAIN)

Maxxam ID		DAN055	DAN061	DAN062			
Sampling Date		2016/08/30	2016/08/30	2016/08/30			
COC Number		005	006	007			
	UNITS	VOST- T1A-2A/B/C	VOST- T1B-13A/B/C	VOST- T1C-1A/B/C	RDL	MDL	QC Batch
Chloromethane	ug	0.017	0.037	<0.015	0.015	0.015	4653954
Vinyl Chloride	ug	<0.013	<0.013	<0.013	0.013	0.013	4653954
Bromomethane	ug	0.023	<0.015	<0.015	0.015	0.015	4653954
Chloroethane	ug	<0.0090	<0.0090	<0.0090	0.0090	0.0090	4653954
1,1-Dichloroethylene	ug	<0.011	<0.011	<0.011	0.011	0.011	4653954
Iodomethane	ug	0.092	<0.015	<0.015	0.015	0.015	4653954
Carbon Disulfide	ug	0.102	0.048	0.058	0.026	0.026	4653954
Methylene Chloride(Dichloromethane)	ug	0.268	<0.019	0.276	0.019	0.020	4653954
Chloroform	ug	<0.011	<0.011	0.013	0.011	0.011	4653954
1,2-Dichloroethane	ug	<0.0070	<0.0070	<0.0070	0.0070	0.0070	4653954
1,1,1-Trichloroethane	ug	<0.014	<0.014	<0.014	0.014	0.014	4653954
Carbon Tetrachloride	ug	0.022	<0.016	0.024	0.016	0.016	4653954
Benzene	ug	1.59	1.03	0.886	0.0090	0.0090	4653954
1,1,2-Trichloroethane	ug	<0.016	<0.016	<0.016	0.016	0.016	4653954
1,2-Dichloropropane	ug	<0.011	<0.011	<0.011	0.011	0.011	4653954
Trichloroethylene	ug	<0.011	<0.011	<0.011	0.011	0.011	4653954
Toluene	ug	0.245	0.131	0.131	0.014	0.014	4653954
Tetrachloroethylene	ug	0.035	<0.018	<0.018	0.018	0.018	4653954
Chlorobenzene	ug	<0.011	<0.011	<0.011	0.011	0.011	4653954
Ethylbenzene	ug	0.020	<0.014	<0.014	0.014	0.014	4653954
m / p-Xylene	ug	0.078	0.038	0.039	0.015	0.015	4653954
Styrene	ug	0.027	0.015	<0.012	0.012	0.012	4653954
o-Xylene	ug	0.022	<0.015	<0.015	0.015	0.015	4653954
Bromoform	ug	<0.014	<0.014	<0.014	0.014	0.014	4653954
1,1,2,2-Tetrachloroethane	ug	<0.014	<0.014	<0.014	0.014	0.014	4653954
Acrylonitrile	ug	<0.025	<0.025	<0.025	0.025	0.025	4653954
Surrogate Recovery (%)							
Bromofluorobenzene	%	92	98	90	N/A	N/A	4653954
D10-Ethylbenzene (FS)	%	0 (1)	114	0 (1)	N/A	N/A	4653954
D4-1,2-Dichloroethane	%	99	105	118	N/A	N/A	4653954
D8-Toluene	%	100	103	99	N/A	N/A	4653954

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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VOLATILE ORGANICS BY GC/MS (STACK SAMPLING TRAIN)

Maxxam ID		DAN063		DAN064	DAN065			
Sampling Date		2016/08/30		2016/08/31	2016/08/31			
COC Number		008		010	011			
	UNITS	**VOST- T1D-15A/B/C**	**QC Batch**	**VOST- T2A-11A/B/C**	**VOST- T2B-14A/B/C**	**RDL**	**MDL**	**QC Batch**
Chloromethane	ug	0.025	4653954	0.053	0.019	0.015	0.015	4655567
Vinyl Chloride	ug	<0.013	4653954	<0.013	<0.013	0.013	0.013	4655567
Bromomethane	ug	<0.015	4653954	0.022	<0.015	0.015	0.015	4655567
Chloroethane	ug	<0.0090	4653954	<0.0090	<0.0090	0.0090	0.0090	4655567
1,1-Dichloroethylene	ug	<0.011	4653954	<0.011	<0.011	0.011	0.011	4655567
Iodomethane	ug	<0.015	4653954	<0.015	<0.015	0.015	0.015	4655567
Carbon Disulfide	ug	0.065	4653954	0.180	0.118	0.026	0.026	4655567
Methylene Chloride(Dichloromethane)	ug	<0.019	4653954	<0.019	<0.019	0.019	0.020	4655567
Chloroform	ug	<0.011	4653954	<0.011	<0.011	0.011	0.011	4655567
1,2-Dichloroethane	ug	<0.0070	4653954	<0.0070	<0.0070	0.0070	0.0070	4655567
1,1,1-Trichloroethane	ug	<0.014	4653954	<0.014	<0.014	0.014	0.014	4655567
Carbon Tetrachloride	ug	<0.016	4653954	<0.016	<0.016	0.016	0.016	4655567
Benzene	ug	2.00	4653954	4.38	2.37	0.0090	0.0090	4655567
1,1,2-Trichloroethane	ug	<0.016	4653954	<0.016	<0.016	0.016	0.016	4655567
1,2-Dichloropropane	ug	<0.011	4653954	<0.011	<0.011	0.011	0.011	4655567
Trichloroethylene	ug	<0.011	4653954	<0.011	<0.011	0.011	0.011	4655567
Toluene	ug	0.356	4653954	0.531	0.286	0.014	0.014	4655567
Tetrachloroethylene	ug	<0.018	4653954	<0.018	<0.018	0.018	0.018	4655567
Chlorobenzene	ug	<0.011	4653954	<0.011	<0.011	0.011	0.011	4655567
Ethylbenzene	ug	0.015	4653954	0.024	0.016	0.014	0.014	4655567
m / p-Xylene	ug	0.079	4653954	0.146	0.098	0.015	0.015	4655567
Styrene	ug	0.048	4653954	0.059	0.029	0.012	0.012	4655567
o-Xylene	ug	0.022	4653954	0.039	0.025	0.015	0.015	4655567
Bromoform	ug	<0.014	4653954	<0.014	<0.014	0.014	0.014	4655567
1,1,2,2-Tetrachloroethane	ug	<0.014	4653954	<0.014	<0.014	0.014	0.014	4655567
Acrylonitrile	ug	<0.025	4653954	0.034	<0.025	0.025	0.025	4655567
Surrogate Recovery (%)								
Bromofluorobenzene	%	92	4653954	98	97	N/A	N/A	4655567
D10-Ethylbenzene (FS)	%	109	4653954	111	113	N/A	N/A	4655567
D4-1,2-Dichloroethane	%	106	4653954	117	119	N/A	N/A	4655567
D8-Toluene	%	107	4653954	102	101	N/A	N/A	4655567

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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VOLATILE ORGANICS BY GC/MS (STACK SAMPLING TRAIN)

Maxxam ID		DAN066	DAN067	DAN068			
Sampling Date		2016/08/31	2016/08/31	2016/09/01			
COC Number		012	013	015			
	UNITS	VOST- T2C-17A/B/C	VOST- T2D-12A/B/C	VOST- T3A-16A/B/C	RDL	MDL	QC Batch
Chloromethane	ug	0.020	0.037	0.055	0.015	0.015	4655567
Vinyl Chloride	ug	<0.013	<0.013	<0.013	0.013	0.013	4655567
Bromomethane	ug	<0.015	<0.015	0.025	0.015	0.015	4655567
Chloroethane	ug	<0.0090	<0.0090	<0.0090	0.0090	0.0090	4655567
1,1-Dichloroethylene	ug	<0.011	<0.011	<0.011	0.011	0.011	4655567
Iodomethane	ug	<0.015	<0.015	<0.015	0.015	0.015	4655567
Carbon Disulfide	ug	0.176	0.170	0.050	0.026	0.026	4655567
Methylene Chloride(Dichloromethane)	ug	<0.019	<0.019	<0.019	0.019	0.020	4655567
Chloroform	ug	<0.011	<0.011	<0.011	0.011	0.011	4655567
1,2-Dichloroethane	ug	<0.0070	<0.0070	<0.0070	0.0070	0.0070	4655567
1,1,1-Trichloroethane	ug	<0.014	<0.014	<0.014	0.014	0.014	4655567
Carbon Tetrachloride	ug	<0.016	<0.016	<0.016	0.016	0.016	4655567
Benzene	ug	2.79	3.29	1.41	0.0090	0.0090	4655567
1,1,2-Trichloroethane	ug	<0.016	<0.016	<0.016	0.016	0.016	4655567
1,2-Dichloropropane	ug	<0.011	<0.011	<0.011	0.011	0.011	4655567
Trichloroethylene	ug	<0.011	<0.011	<0.011	0.011	0.011	4655567
Toluene	ug	0.398	0.652	0.107	0.014	0.014	4655567
Tetrachloroethylene	ug	<0.018	<0.018	<0.018	0.018	0.018	4655567
Chlorobenzene	ug	<0.011	<0.011	<0.011	0.011	0.011	4655567
Ethylbenzene	ug	0.022	0.034	<0.014	0.014	0.014	4655567
m / p-Xylene	ug	0.123	0.122	0.030	0.015	0.015	4655567
Styrene	ug	0.042	0.096	<0.012	0.012	0.012	4655567
o-Xylene	ug	0.032	0.033	<0.015	0.015	0.015	4655567
Bromoform	ug	<0.014	<0.014	<0.014	0.014	0.014	4655567
1,1,2,2-Tetrachloroethane	ug	<0.014	<0.014	<0.014	0.014	0.014	4655567
Acrylonitrile	ug	0.036	0.027	<0.025	0.025	0.025	4655567
Surrogate Recovery (%)							
Bromofluorobenzene	%	98	81	94	N/A	N/A	4655567
D10-Ethylbenzene (FS)	%	110	100	110	N/A	N/A	4655567
D4-1,2-Dichloroethane	%	118	113	114	N/A	N/A	4655567
D8-Toluene	%	100	120	101	N/A	N/A	4655567

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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VOLATILE ORGANICS BY GC/MS (STACK SAMPLING TRAIN)

Maxxam ID		DAN069	DAN070	DAN071			
Sampling Date		2016/09/01	2016/09/01	2016/09/01			
COC Number		016	017	018			
	UNITS	VOST- T3B-8A/B/C	VOST- T3C-7A/B/C	VOST- T3D-6A/B/C	RDL	MDL	QC Batch
Chloromethane	ug	0.043	0.025	0.020	0.015	0.015	4655567
Vinyl Chloride	ug	<0.013	<0.013	<0.013	0.013	0.013	4655567
Bromomethane	ug	0.021	0.018	<0.015	0.015	0.015	4655567
Chloroethane	ug	<0.0090	<0.0090	<0.0090	0.0090	0.0090	4655567
1,1-Dichloroethylene	ug	<0.011	<0.011	<0.011	0.011	0.011	4655567
Iodomethane	ug	<0.015	<0.015	<0.015	0.015	0.015	4655567
Carbon Disulfide	ug	0.055	0.033	0.055	0.026	0.026	4655567
Methylene Chloride(Dichloromethane)	ug	<0.019	<0.019	<0.019	0.019	0.020	4655567
Chloroform	ug	<0.011	<0.011	<0.011	0.011	0.011	4655567
1,2-Dichloroethane	ug	<0.0070	<0.0070	<0.0070	0.0070	0.0070	4655567
1,1,1-Trichloroethane	ug	<0.014	<0.014	<0.014	0.014	0.014	4655567
Carbon Tetrachloride	ug	<0.016	<0.016	<0.016	0.016	0.016	4655567
Benzene	ug	1.09	0.298	0.858	0.0090	0.0090	4655567
1,1,2-Trichloroethane	ug	<0.016	<0.016	<0.016	0.016	0.016	4655567
1,2-Dichloropropane	ug	<0.011	<0.011	<0.011	0.011	0.011	4655567
Trichloroethylene	ug	<0.011	<0.011	<0.011	0.011	0.011	4655567
Toluene	ug	0.159	0.069	0.122	0.014	0.014	4655567
Tetrachloroethylene	ug	<0.018	<0.018	<0.018	0.018	0.018	4655567
Chlorobenzene	ug	<0.011	<0.011	<0.011	0.011	0.011	4655567
Ethylbenzene	ug	<0.014	0.017	<0.014	0.014	0.014	4655567
m / p-Xylene	ug	0.043	0.080	0.064	0.015	0.015	4655567
Styrene	ug	0.017	<0.012	<0.012	0.012	0.012	4655567
o-Xylene	ug	<0.015	0.026	0.019	0.015	0.015	4655567
Bromoform	ug	<0.014	<0.014	<0.014	0.014	0.014	4655567
1,1,2,2-Tetrachloroethane	ug	<0.014	<0.014	<0.014	0.014	0.014	4655567
Acrylonitrile	ug	<0.025	<0.025	<0.025	0.025	0.025	4655567
Surrogate Recovery (%)							
Bromofluorobenzene	%	97	95	94	N/A	N/A	4655567
D10-Ethylbenzene (FS)	%	109	104	118	N/A	N/A	4655567
D4-1,2-Dichloroethane	%	119	119	119	N/A	N/A	4655567
D8-Toluene	%	102	101	132 (1)	N/A	N/A	4655567

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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VOLATILE ORGANICS BY GC/MS (STACK SAMPLING TRAIN)

Maxxam ID		DAN085			DAN095			
Sampling Date		2016/08/30			2016/08/31			
COC Number		009			014			
	UNITS	VOST- T1-COND	RDL	MDL	VOST- T2-COND	RDL	MDL	QC Batch
Chloromethane	ug/L	<4.2	4.2	4.2	<4.1	4.1	4.1	4655438
Vinyl Chloride	ug/L	<0.84	0.84	0.84	<0.83	0.83	0.83	4655438
Bromomethane	ug/L	<6.3	6.3	6.3	<6.2	6.2	6.2	4655438
Chloroethane	ug/L	<2.1	2.1	2.1	<2.1	2.1	2.1	4655438
1,1-Dichloroethylene	ug/L	<1.1	1.1	1.1	<1.0	1.0	1.0	4655438
Iodomethane	ug/L	<1.3	1.3	1.3	<1.2	1.2	1.2	4655438
Carbon Disulfide	ug/L	<1.1	1.1	1.1	<1.0	1.0	1.0	4655438
Methylene Chloride(Dichloromethane)	ug/L	2100	210	210	5400	210	210	4655438
Chloroform	ug/L	<0.84	0.84	0.84	<0.83	0.83	0.83	4655438
1,2-Dichloroethane	ug/L	<1.1	1.1	1.1	<1.0	1.0	1.0	4655438
1,1,1-Trichloroethane	ug/L	<1.1	1.1	1.1	<1.0	1.0	1.0	4655438
Carbon Tetrachloride	ug/L	<1.1	1.1	1.1	<1.0	1.0	1.0	4655438
Benzene	ug/L	<1.1	1.1	1.1	<1.0	1.0	1.0	4655438
1,1,2-Trichloroethane	ug/L	<1.1	1.1	1.1	<1.0	1.0	1.0	4655438
1,2-Dichloropropane	ug/L	<1.1	1.1	1.1	<1.0	1.0	1.0	4655438
Trichloroethylene	ug/L	<1.1	1.1	1.1	<1.0	1.0	1.0	4655438
Toluene	ug/L	<1.1	1.1	1.1	2.5	1.0	1.0	4655438
Tetrachloroethylene	ug/L	<1.1	1.1	1.1	<1.0	1.0	1.0	4655438
Chlorobenzene	ug/L	<1.1	1.1	1.1	<1.0	1.0	1.0	4655438
Ethylbenzene	ug/L	<1.1	1.1	1.1	<1.0	1.0	1.0	4655438
p+m-Xylene	ug/L	<1.1	1.1	1.1	<1.0	1.0	1.0	4655438
Styrene	ug/L	<1.1	1.1	1.1	<1.0	1.0	1.0	4655438
o-Xylene	ug/L	<1.1	1.1	1.1	<1.0	1.0	1.0	4655438
Bromoform	ug/L	<0.84	0.84	0.84	<0.83	0.83	0.83	4655438
1,1,2,2-Tetrachloroethane	ug/L	<2.1	2.1	2.1	<2.1	2.1	2.1	4655438
Surrogate Recovery (%)								
4-Bromofluorobenzene	%	98	N/A	N/A	96	N/A	N/A	4655438
D4-1,2-Dichloroethane	%	109	N/A	N/A	109	N/A	N/A	4655438
D8-Toluene	%	101	N/A	N/A	101	N/A	N/A	4655438

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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VOLATILE ORGANICS BY GC/MS (STACK SAMPLING TRAIN)

Maxxam ID		DAN096			
Sampling Date		2016/09/01			
COC Number		0191			
	UNITS	VOST- T3-COND	RDL	MDL	QC Batch
Chloromethane	ug/L	<4.4	4.4	4.4	4655438
Vinyl Chloride	ug/L	<0.88	0.88	0.88	4655438
Bromomethane	ug/L	<6.6	6.6	6.6	4655438
Chloroethane	ug/L	<2.2	2.2	2.2	4655438
1,1-Dichloroethylene	ug/L	<1.1	1.1	1.1	4655438
Iodomethane	ug/L	<1.3	1.3	1.3	4655438
Carbon Disulfide	ug/L	<1.1	1.1	1.1	4655438
Methylene Chloride(Dichloromethane)	ug/L	6300	220	220	4655438
Chloroform	ug/L	<0.88	0.88	0.88	4655438
1,2-Dichloroethane	ug/L	<1.1	1.1	1.1	4655438
1,1,1-Trichloroethane	ug/L	<1.1	1.1	1.1	4655438
Carbon Tetrachloride	ug/L	<1.1	1.1	1.1	4655438
Benzene	ug/L	<1.1	1.1	1.1	4655438
1,1,2-Trichloroethane	ug/L	<1.1	1.1	1.1	4655438
1,2-Dichloropropane	ug/L	<1.1	1.1	1.1	4655438
Trichloroethylene	ug/L	<1.1	1.1	1.1	4655438
Toluene	ug/L	2.0	1.1	1.1	4655438
Tetrachloroethylene	ug/L	<1.1	1.1	1.1	4655438
Chlorobenzene	ug/L	<1.1	1.1	1.1	4655438
Ethylbenzene	ug/L	<1.1	1.1	1.1	4655438
p+m-Xylene	ug/L	<1.1	1.1	1.1	4655438
Styrene	ug/L	<1.1	1.1	1.1	4655438
o-Xylene	ug/L	<1.1	1.1	1.1	4655438
Bromoform	ug/L	<0.88	0.88	0.88	4655438
1,1,2,2-Tetrachloroethane	ug/L	<2.2	2.2	2.2	4655438
Surrogate Recovery (%)					
4-Bromofluorobenzene	%	99	N/A	N/A	4655438
D4-1,2-Dichloroethane	%	110	N/A	N/A	4655438
D8-Toluene	%	102	N/A	N/A	4655438

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Report Date: 2016/11/16

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Site Location: ARCELORMITTAL BURNS HARBOR

TEST SUMMARY

Maxxam ID: DAN034 **Collected:** 2016/08/30
Sample ID: M316- DI BLANK **Shipped:**
Matrix: Stack Sampling Train **Received:** 2016/09/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Formaldehyde (M316)	/SPEC	4653858	2016/09/09	2016/09/09	Manoj Gera
Final Volume of Impinger		4653871	N/A	2016/09/09	Frank Mo

Maxxam ID: DAN036 **Collected:** 2016/08/30
Sample ID: M316- R1 **Shipped:**
Matrix: Stack Sampling Train **Received:** 2016/09/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Formaldehyde (M316)	/SPEC	4653858	2016/09/09	2016/09/09	Manoj Gera
Final Volume of Impinger		4653871	N/A	2016/09/09	Frank Mo

Maxxam ID: DAN036 Dup **Collected:** 2016/08/30
Sample ID: M316- R1 **Shipped:**
Matrix: Stack Sampling Train **Received:** 2016/09/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Formaldehyde (M316)	/SPEC	4653858	2016/09/09	2016/09/09	Manoj Gera

Maxxam ID: DAN037 **Collected:** 2016/08/31
Sample ID: M316- R2 **Shipped:**
Matrix: Stack Sampling Train **Received:** 2016/09/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Formaldehyde (M316)	/SPEC	4653858	2016/09/09	2016/09/09	Manoj Gera
Final Volume of Impinger		4653871	N/A	2016/09/09	Frank Mo

Maxxam ID: DAN038 **Collected:** 2016/09/01
Sample ID: M316- R3 **Shipped:**
Matrix: Stack Sampling Train **Received:** 2016/09/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Formaldehyde (M316)	/SPEC	4653858	2016/09/09	2016/09/09	Manoj Gera
Final Volume of Impinger		4653871	N/A	2016/09/09	Frank Mo

Maxxam ID: DAN055 **Collected:** 2016/08/30
Sample ID: VOST- T1A- 2A/B/C **Shipped:**
Matrix: Stack Sampling Train **Received:** 2016/09/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	4653954	N/A	2016/09/10	Yujie Yan

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TEST SUMMARY

Maxxam ID: DAN061
Sample ID: VOST- T1B- 13A/B/C
Matrix: Stack Sampling Train
Collected: 2016/08/30
Shipped:
Received: 2016/09/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	4653954	N/A	2016/09/09	Yujie Yan

Maxxam ID: DAN062
Sample ID: VOST- T1C- 1A/B/C
Matrix: Stack Sampling Train
Collected: 2016/08/30
Shipped:
Received: 2016/09/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	4653954	N/A	2016/09/09	Yujie Yan

Maxxam ID: DAN063
Sample ID: VOST- T1D- 15A/B/C
Matrix: Stack Sampling Train
Collected: 2016/08/30
Shipped:
Received: 2016/09/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	4653954	N/A	2016/09/09	Yujie Yan

Maxxam ID: DAN064
Sample ID: VOST- T2A- 11A/B/C
Matrix: Stack Sampling Train
Collected: 2016/08/31
Shipped:
Received: 2016/09/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	4655567	N/A	2016/09/09	Yujie Yan

Maxxam ID: DAN065
Sample ID: VOST- T2B- 14A/B/C
Matrix: Stack Sampling Train
Collected: 2016/08/31
Shipped:
Received: 2016/09/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	4655567	N/A	2016/09/10	Yujie Yan

Maxxam ID: DAN066
Sample ID: VOST- T2C- 17A/B/C
Matrix: Stack Sampling Train
Collected: 2016/08/31
Shipped:
Received: 2016/09/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	4655567	N/A	2016/09/10	Yujie Yan

Maxxam ID: DAN067
Sample ID: VOST- T2D- 12A/B/C
Matrix: Stack Sampling Train
Collected: 2016/08/31
Shipped:
Received: 2016/09/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	4655567	N/A	2016/09/10	Yujie Yan

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TEST SUMMARY

Maxxam ID: DAN068
Sample ID: VOST- T3A- 16A/B/C
Matrix: Stack Sampling Train

Collected: 2016/09/01
Shipped:
Received: 2016/09/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	4655567	N/A	2016/09/10	Yujie Yan

Maxxam ID: DAN069
Sample ID: VOST- T3B- 8A/B/C
Matrix: Stack Sampling Train

Collected: 2016/09/01
Shipped:
Received: 2016/09/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	4655567	N/A	2016/09/10	Yujie Yan

Maxxam ID: DAN070
Sample ID: VOST- T3C- 7A/B/C
Matrix: Stack Sampling Train

Collected: 2016/09/01
Shipped:
Received: 2016/09/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	4655567	N/A	2016/09/10	Yujie Yan

Maxxam ID: DAN071
Sample ID: VOST- T3D- 6A/B/C
Matrix: Stack Sampling Train

Collected: 2016/09/01
Shipped:
Received: 2016/09/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	4655567	N/A	2016/09/10	Yujie Yan

Maxxam ID: DAN085
Sample ID: VOST- T1- COND
Matrix: Stack Sampling Train

Collected: 2016/08/30
Shipped:
Received: 2016/09/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST Condensate (8260Cmod)	P&T/MS	4655438	N/A	2016/09/10	Yujie Yan

Maxxam ID: DAN095
Sample ID: VOST- T2- COND
Matrix: Stack Sampling Train

Collected: 2016/08/31
Shipped:
Received: 2016/09/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST Condensate (8260Cmod)	P&T/MS	4655438	N/A	2016/09/10	Yujie Yan

Maxxam ID: DAN096
Sample ID: VOST- T3- COND
Matrix: Stack Sampling Train

Collected: 2016/09/01
Shipped:
Received: 2016/09/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST Condensate (8260Cmod)	P&T/MS	4655438	N/A	2016/09/10	Yujie Yan

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GENERAL COMMENTS

VOST analysis:
In initial calibration std., Carbon disulfide, Dichloromethane and Acrylonitrile exceeded the acceptance limit of 20%. Carbon Disulfide was 23%, Dichloromethane was 29% and Acrylonitrile was 21%.

Sample DAN055 [VOST- T1A- 2A/B/C] : Client used unconditioned tubes. These were not spiked with the field spike.
Benzene is over the calibration range. Data should be considered an estimate only.

Sample DAN061 [VOST- T1B- 13A/B/C] : Benzene is over the calibration range. Data should be considered an estimate only.

Sample DAN062 [VOST- T1C- 1A/B/C] : Client used unconditioned tubes. These were not spiked with the field spike.

Sample DAN063 [VOST- T1D- 15A/B/C] : Benzene is over the calibration range. Data should be considered an estimate only.

Sample DAN064 [VOST- T2A- 11A/B/C] : Benzene is over the calibration range. Data should be considered an estimate only.

Sample DAN065 [VOST- T2B- 14A/B/C] : Benzene is over the calibration range. Data should be considered an estimate only.

Sample DAN066 [VOST- T2C- 17A/B/C] : Benzene is over the calibration range. Data should be considered an estimate only.

Sample DAN067 [VOST- T2D- 12A/B/C] : Benzene is over the calibration range. Data should be considered an estimate only.

Sample DAN068 [VOST- T3A- 16A/B/C] : Benzene is over the calibration range. Data should be considered an estimate only.

Sample DAN069 [VOST- T3B- 8A/B/C] : Benzene is over the calibration range. Data should be considered an estimate only.

Sample DAN071 [VOST- T3D- 6A/B/C] : D8-toluene surrogate recovery exceeded the acceptance limit of 121% due to matrix interference.

Sample DAN085 [VOST- T1- COND] : The sample vial was received containing 41mL of sample. The volume was topped up to 43mL using Volatile-free reagent water. Dichloromethane was analyzed at 210X dilution. Detection limit were adjusted accordingly.
Acrylonitrile < 10.5ug/L

Sample DAN095 [VOST- T2- COND] : The sample vial was received containing 41.6mL of sample. The volume was topped up to 43mL using Volatile-free reagent water. Dichloromethane was analyzed at 207X dilution. Detection limit were adjusted accordingly.
Acrylonitrile < 10.35ug/L

Sample DAN096 [VOST- T3- COND] : The sample vial was received containing 39.3mL of sample. The volume was topped up to 43mL using Volatile-free reagent water. Results may be biased low due to the presence of headspace upon sample receipt. Dichloromethane was analyzed at 219Xdilution. Detection limit were adjusted accordingly.
Acrylonitrile < 10.95ug/L

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4653858	MGE	Matrix Spike(DAN036)	Formaldehyde	2016/09/09		91	%	80 - 120
4653858	MGE	Spiked Blank	Formaldehyde	2016/09/09		105	%	91 - 107
4653858	MGE	Method Blank	Formaldehyde	2016/09/09	<8.3		ug	
4653858	MGE	RPD - Sample/Sample Dup	Formaldehyde	2016/09/09	NC		%	20
4653954	YYA	Spiked Blank	Bromofluorobenzene	2016/09/09		99	%	43 - 131
			D10-Ethylbenzene (FS)	2016/09/09		101	%	47 - 157
			D4-1,2-Dichloroethane	2016/09/09		100	%	64 - 133
			D8-Toluene	2016/09/09		101	%	68 - 121
			Chloromethane	2016/09/09		99	%	50 - 150
			Vinyl Chloride	2016/09/09		99	%	50 - 150
			Bromomethane	2016/09/09		91	%	50 - 150
			Chloroethane	2016/09/09		96	%	50 - 150
			1,1-Dichloroethylene	2016/09/09		104	%	50 - 150
			Iodomethane	2016/09/09		102	%	N/A
			Carbon Disulfide	2016/09/09		105	%	50 - 150
			Methylene Chloride(Dichloromethane)	2016/09/09		104	%	50 - 150
			Chloroform	2016/09/09		97	%	50 - 150
			1,2-Dichloroethane	2016/09/09		100	%	50 - 150
			1,1,1-Trichloroethane	2016/09/09		98	%	50 - 150
			Carbon Tetrachloride	2016/09/09		98	%	50 - 150
			Benzene	2016/09/09		96	%	50 - 150
			1,1,2-Trichloroethane	2016/09/09		100	%	50 - 150
			1,2-Dichloropropane	2016/09/09		97	%	50 - 150
			Trichloroethylene	2016/09/09		98	%	50 - 150
			Toluene	2016/09/09		97	%	50 - 150
			Tetrachloroethylene	2016/09/09		97	%	50 - 150
			Chlorobenzene	2016/09/09		99	%	50 - 150
			Ethylbenzene	2016/09/09		98	%	50 - 150
			m / p-Xylene	2016/09/09		99	%	50 - 150
			Styrene	2016/09/09		97	%	50 - 150
			o-Xylene	2016/09/09		99	%	50 - 150
			Bromoform	2016/09/09		100	%	50 - 150
			1,1,2,2-Tetrachloroethane	2016/09/09		96	%	50 - 150
			Acrylonitrile	2016/09/09		105	%	N/A
4653954	YYA	Method Blank	Bromofluorobenzene	2016/09/09		100	%	43 - 131
			D10-Ethylbenzene (FS)	2016/09/09		97	%	47 - 157
			D4-1,2-Dichloroethane	2016/09/09		114	%	64 - 133
			D8-Toluene	2016/09/09		102	%	68 - 121
			Chloromethane	2016/09/09	<0.015		ug	
			Vinyl Chloride	2016/09/09	<0.013		ug	
			Bromomethane	2016/09/09	<0.015		ug	
			Chloroethane	2016/09/09	<0.0090		ug	
			1,1-Dichloroethylene	2016/09/09	<0.011		ug	
			Iodomethane	2016/09/09	<0.015		ug	
			Carbon Disulfide	2016/09/09	<0.026		ug	
			Methylene Chloride(Dichloromethane)	2016/09/09	<0.019		ug	
			Chloroform	2016/09/09	<0.011		ug	
			1,2-Dichloroethane	2016/09/09	<0.0070		ug	
			1,1,1-Trichloroethane	2016/09/09	<0.014		ug	
			Carbon Tetrachloride	2016/09/09	<0.016		ug	
			Benzene	2016/09/09	<0.0090		ug	
			1,1,2-Trichloroethane	2016/09/09	<0.016		ug	
			1,2-Dichloropropane	2016/09/09	<0.011		ug	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Trichloroethylene	2016/09/09	<0.011		ug	
			Toluene	2016/09/09	<0.014		ug	
			Tetrachloroethylene	2016/09/09	<0.018		ug	
			Chlorobenzene	2016/09/09	<0.011		ug	
			Ethylbenzene	2016/09/09	<0.014		ug	
			m / p-Xylene	2016/09/09	<0.015		ug	
			Styrene	2016/09/09	<0.012		ug	
			o-Xylene	2016/09/09	<0.015		ug	
			Bromoform	2016/09/09	<0.014		ug	
			1,1,2,2-Tetrachloroethane	2016/09/09	<0.014		ug	
			Acrylonitrile	2016/09/09	<0.025		ug	
4655438	YYA	Spiked Blank	4-Bromofluorobenzene	2016/09/10		94	%	70 - 130
			D4-1,2-Dichloroethane	2016/09/10		105	%	70 - 130
			D8-Toluene	2016/09/10		106	%	70 - 130
			Chloromethane	2016/09/10		81	%	60 - 140
			Vinyl Chloride	2016/09/10		109	%	70 - 130
			Bromomethane	2016/09/10		69	%	60 - 140
			Chloroethane	2016/09/10		105	%	70 - 130
			1,1-Dichloroethylene	2016/09/10		117	%	70 - 130
			Methylene Chloride(Dichloromethane)	2016/09/10		102	%	70 - 130
			Chloroform	2016/09/10		111	%	70 - 130
			1,2-Dichloroethane	2016/09/10		106	%	70 - 130
			1,1,1-Trichloroethane	2016/09/10		115	%	70 - 130
			Carbon Tetrachloride	2016/09/10		125	%	70 - 130
			Benzene	2016/09/10		107	%	70 - 130
			1,1,2-Trichloroethane	2016/09/10		105	%	70 - 130
			1,2-Dichloropropane	2016/09/10		102	%	70 - 130
			Trichloroethylene	2016/09/10		106	%	70 - 130
			Toluene	2016/09/10		106	%	70 - 130
			Tetrachloroethylene	2016/09/10		105	%	70 - 130
			Chlorobenzene	2016/09/10		101	%	70 - 130
			Ethylbenzene	2016/09/10		106	%	70 - 130
			p+m-Xylene	2016/09/10		102	%	70 - 130
			Styrene	2016/09/10		97	%	70 - 130
			o-Xylene	2016/09/10		100	%	70 - 130
			Bromoform	2016/09/10		92	%	70 - 130
			1,1,2,2-Tetrachloroethane	2016/09/10		97	%	70 - 130
4655438	YYA	Method Blank	4-Bromofluorobenzene	2016/09/10		86	%	70 - 130
			D4-1,2-Dichloroethane	2016/09/10		100	%	70 - 130
			D8-Toluene	2016/09/10		106	%	70 - 130
			Chloromethane	2016/09/10	<2.0		ug/L	
			Vinyl Chloride	2016/09/10	<0.40		ug/L	
			Bromomethane	2016/09/10	<3.0		ug/L	
			Chloroethane	2016/09/10	<1.0		ug/L	
			1,1-Dichloroethylene	2016/09/10	<0.50		ug/L	
			Iodomethane	2016/09/10	<0.60		ug/L	
			Carbon Disulfide	2016/09/10	<0.50		ug/L	
			Methylene Chloride(Dichloromethane)	2016/09/10	<1.0		ug/L	
			Chloroform	2016/09/10	<0.40		ug/L	
			1,2-Dichloroethane	2016/09/10	<0.50		ug/L	
			1,1,1-Trichloroethane	2016/09/10	<0.50		ug/L	
			Carbon Tetrachloride	2016/09/10	<0.50		ug/L	
			Benzene	2016/09/10	<0.50		ug/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,1,2-Trichloroethane	2016/09/10	<0.50		ug/L	
			1,2-Dichloropropane	2016/09/10	<0.50		ug/L	
			Trichloroethylene	2016/09/10	<0.50		ug/L	
			Toluene	2016/09/10	<0.50		ug/L	
			Tetrachloroethylene	2016/09/10	<0.50		ug/L	
			Chlorobenzene	2016/09/10	<0.50		ug/L	
			Ethylbenzene	2016/09/10	<0.50		ug/L	
			p+m-Xylene	2016/09/10	<0.50		ug/L	
			Styrene	2016/09/10	<0.50		ug/L	
			o-Xylene	2016/09/10	<0.50		ug/L	
			Bromoform	2016/09/10	<0.40		ug/L	
			1,1,2,2-Tetrachloroethane	2016/09/10	<1.0		ug/L	
4655567	YYA	Spiked Blank	Bromofluorobenzene	2016/09/10		99	%	43 - 131
			D10-Ethylbenzene (FS)	2016/09/10		104	%	47 - 157
			D4-1,2-Dichloroethane	2016/09/10		103	%	64 - 133
			D8-Toluene	2016/09/10		101	%	68 - 121
			Chloromethane	2016/09/10		106	%	50 - 150
			Vinyl Chloride	2016/09/10		104	%	50 - 150
			Bromomethane	2016/09/10		99	%	50 - 150
			Chloroethane	2016/09/10		102	%	50 - 150
			1,1-Dichloroethylene	2016/09/10		114	%	50 - 150
			Iodomethane	2016/09/10		115	%	N/A
			Carbon Disulfide	2016/09/10		119	%	50 - 150
			Methylene Chloride(Dichloromethane)	2016/09/10		125	%	50 - 150
			Chloroform	2016/09/10		98	%	50 - 150
			1,2-Dichloroethane	2016/09/10		103	%	50 - 150
			1,1,1-Trichloroethane	2016/09/10		99	%	50 - 150
			Carbon Tetrachloride	2016/09/10		99	%	50 - 150
			Benzene	2016/09/10		95	%	50 - 150
			1,1,2-Trichloroethane	2016/09/10		95	%	50 - 150
			1,2-Dichloropropane	2016/09/10		95	%	50 - 150
			Trichloroethylene	2016/09/10		99	%	50 - 150
			Toluene	2016/09/10		95	%	50 - 150
			Tetrachloroethylene	2016/09/10		98	%	50 - 150
			Chlorobenzene	2016/09/10		97	%	50 - 150
			Ethylbenzene	2016/09/10		97	%	50 - 150
			m / p-Xylene	2016/09/10		99	%	50 - 150
			Styrene	2016/09/10		95	%	50 - 150
			o-Xylene	2016/09/10		98	%	50 - 150
			Bromoform	2016/09/10		96	%	50 - 150
			1,1,2,2-Tetrachloroethane	2016/09/10		85	%	50 - 150
			Acrylonitrile	2016/09/10		101	%	N/A
4655567	YYA	Method Blank	Bromofluorobenzene	2016/09/10		101	%	43 - 131
			D10-Ethylbenzene (FS)	2016/09/10		103	%	47 - 157
			D4-1,2-Dichloroethane	2016/09/10		116	%	64 - 133
			D8-Toluene	2016/09/10		103	%	68 - 121
			Chloromethane	2016/09/10	<0.015		ug	
			Vinyl Chloride	2016/09/10	<0.013		ug	
			Bromomethane	2016/09/10	<0.015		ug	
			Chloroethane	2016/09/10	<0.0090		ug	
			1,1-Dichloroethylene	2016/09/10	<0.011		ug	
			Iodomethane	2016/09/10	<0.015		ug	
			Carbon Disulfide	2016/09/10	<0.026		ug	

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Maxxam Job #: B6J2137
Report Date: 2016/11/16

Mostardi Platt
Client Project #: M162810
Site Location: ARCELORMITTAL BURNS HARBOR

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Methylene Chloride(Dichloromethane)	2016/09/10	<0.019		ug	
			Chloroform	2016/09/10	<0.011		ug	
			1,2-Dichloroethane	2016/09/10	<0.0070		ug	
			1,1,1-Trichloroethane	2016/09/10	<0.014		ug	
			Carbon Tetrachloride	2016/09/10	<0.016		ug	
			Benzene	2016/09/10	<0.0090		ug	
			1,1,2-Trichloroethane	2016/09/10	<0.016		ug	
			1,2-Dichloropropane	2016/09/10	<0.011		ug	
			Trichloroethylene	2016/09/10	<0.011		ug	
			Toluene	2016/09/10	<0.014		ug	
			Tetrachloroethylene	2016/09/10	<0.018		ug	
			Chlorobenzene	2016/09/10	<0.011		ug	
			Ethylbenzene	2016/09/10	<0.014		ug	
			m / p-Xylene	2016/09/10	<0.015		ug	
			Styrene	2016/09/10	<0.012		ug	
			o-Xylene	2016/09/10	<0.015		ug	
			Bromoform	2016/09/10	<0.014		ug	
			1,1,2,2-Tetrachloroethane	2016/09/10	<0.014		ug	
			Acrylonitrile	2016/09/10	<0.025		ug	

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Frank Mo, B.Sc., Inorganic Lab. Manager

Maureen Smith, Supervisor, Volatiles

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SPECIATED VOLATILE ORGANIC HAP TEST RESULTS SUMMARY
Run 1
Arcelor Mittal Burns Harbor LLC
Burns Harbor, Indiana
 # 2 Battery PEC Stack
August 30, 2016

Analytes	Sample Catch (ug)		Concentration (mg/dscm)		Flowrate, dscfm	Emissions lb/hr		Blank (ug)
Chloromethane	≤	0.27	≤	3.49E-03	172,941	≤	2.26E-03	0.00
Vinyl Chloride	≤	0.09	≤	1.12E-03	172,941	≤	7.25E-04	0.00
Bromomethane	≤	0.34	≤	4.31E-03	172,941	≤	2.79E-03	0.00
Chloroethane	≤	0.13	≤	1.60E-03	172,941	≤	1.04E-03	0.00
1,1-Dichloroethylene	≤	0.09	≤	1.16E-03	172,941	≤	7.52E-04	0.00
Iodomethane	≤	0.19	≤	2.45E-03	172,941	≤	1.59E-03	0.00
Carbon Disulfide	≤	0.32	≤	4.07E-03	172,941	≤	2.64E-03	0.00
Methylene Chloride(Dichloromethane)	≤	90.88	≤	1.15E+00	172,941	≤	7.48E-01	0.00
Chloroform	≤	0.08	≤	1.04E-03	172,941	≤	6.76E-04	0.00
1,2-Dichloroethane	≤	0.08	≤	9.57E-04	172,941	≤	6.20E-04	0.00
1,1,1-Trichloroethane	≤	0.10	≤	1.31E-03	172,941	≤	8.50E-04	0.00
Carbon Tetrachloride	≤	0.13	≤	1.59E-03	172,941	≤	1.03E-03	0.00
Benzene	≤	5.55	≤	7.06E-02	172,941	≤	4.57E-02	0.00
1,1,2-Trichloroethane	≤	0.11	≤	1.41E-03	172,941	≤	9.16E-04	0.00
1,2-Dichloropropane	≤	0.09	≤	1.16E-03	172,941	≤	7.52E-04	0.00
Trichloroethylene	≤	0.09	≤	1.16E-03	172,941	≤	7.52E-04	0.00
Toluene	≤	0.91	≤	1.16E-02	172,941	≤	7.49E-03	0.00
Tetrachloroethylene	≤	0.14	≤	1.73E-03	172,941	≤	1.12E-03	0.00
Chlorobenzene	≤	0.09	≤	1.16E-03	172,941	≤	7.52E-04	0.00
Ethylbenzene	≤	0.11	≤	1.40E-03	172,941	≤	9.08E-04	0.00
m / p-Xylene	≤	0.28	≤	3.57E-03	172,941	≤	2.32E-03	0.00
Styrene	≤	0.15	≤	1.90E-03	172,941	≤	1.23E-03	0.00
o-Xylene	≤	0.12	≤	1.54E-03	172,941	≤	9.99E-04	0.00
Bromoform	≤	0.09	≤	1.17E-03	172,941	≤	7.58E-04	0.00
1,1,2,2-Tetrachloroethane	≤	0.15	≤	1.86E-03	172,941	≤	1.20E-03	0.00
Acrylonitrile	≤	0.55	≤	7.01E-03	172,941	≤	4.54E-03	0.00
Total Volatile Organic HAP				**1.29E+00**			**8.33E-01**	
TEQ Total								
Sample volume (Vmstd, liters)		78.69						
Average % CO_2 by volume, dry		1.00						
Average % O_2 by volume, dry		19.90						

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SPECIATED VOLATILE ORGANIC HAP TEST RESULTS SUMMARY
Run 2
Arcelor Mittal Burns Harbor LLC
Burns Harbor, Indiana
 # 2 Battery PEC Stack
August 31, 2016

Analytes	Sample Catch (ug)		Concentration (mg/dscm)		Flowrate, dscfm		Emissions lb/hr	Blank (ug)
Chloromethane	≤	0.31	≤	3.85E-03	176,058	≤	2.54E-03	0.00
Vinyl Chloride	≤	0.09	≤	1.11E-03	176,058	≤	7.30E-04	0.00
Bromomethane	≤	0.33	≤	4.21E-03	176,058	≤	2.78E-03	0.00
Chloroethane	≤	0.13	≤	1.59E-03	176,058	≤	1.05E-03	0.00
1,1-Dichloroethylene	≤	0.09	≤	1.10E-03	176,058	≤	7.24E-04	0.00
Iodomethane	≤	0.11	≤	1.41E-03	176,058	≤	9.29E-04	0.00
Carbon Disulfide	≤	0.69	≤	8.67E-03	176,058	≤	5.72E-03	0.00
Methylene Chloride(Dichloromethane)	≤	232.28	≤	2.93E+00	176,058	≤	1.93E+00	0.00
Chloroform	≤	0.08	≤	1.01E-03	176,058	≤	6.63E-04	0.00
1,2-Dichloroethane	≤	0.07	≤	8.96E-04	176,058	≤	5.91E-04	0.00
1,1,1-Trichloroethane	≤	0.10	≤	1.25E-03	176,058	≤	8.24E-04	0.00
Carbon Tetrachloride	≤	0.11	≤	1.35E-03	176,058	≤	8.91E-04	0.00
Benzene	≤	12.87	≤	1.62E-01	176,058	≤	1.07E-01	0.00
1,1,2-Trichloroethane	≤	0.11	≤	1.35E-03	176,058	≤	8.91E-04	0.00
1,2-Dichloropropane	≤	0.09	≤	1.10E-03	176,058	≤	7.24E-04	0.00
Trichloroethylene	≤	0.09	≤	1.10E-03	176,058	≤	7.24E-04	0.00
Toluene		1.97		2.49E-02	176,058		1.64E-02	0.00
Tetrachloroethylene	≤	0.12	≤	1.45E-03	176,058	≤	9.57E-04	0.00
Chlorobenzene	≤	0.09	≤	1.10E-03	176,058	≤	7.24E-04	0.00
Ethylbenzene	≤	0.14	≤	1.75E-03	176,058	≤	1.16E-03	0.00
m / p-Xylene	≤	0.53	≤	6.71E-03	176,058	≤	4.43E-03	0.00
Styrene	≤	0.27	≤	3.39E-03	176,058	≤	2.24E-03	0.00
o-Xylene	≤	0.17	≤	2.17E-03	176,058	≤	1.43E-03	0.00
Bromoform	≤	0.09	≤	1.16E-03	176,058	≤	7.63E-04	0.00
1,1,2,2-Tetrachloroethane	≤	0.15	≤	1.85E-03	176,058	≤	1.22E-03	0.00
Acrylonitrile	≤	0.57	≤	7.16E-03	176,058	≤	4.72E-03	0.00
Total Volatile Organic HAP				**3.18E+00**	176,058		**2.09E+00**	
TEQ Total								
Sample volume (Vmstd, liters)		79.24						
Average % CO_2 by volume, dry		1.10						
Average % O_2 by volume, dry		19.80						

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SPECIATED VOLATILE ORGANIC HAP TEST RESULTS SUMMARY
Run 3
Arcelor Mittal Burns Harbor LLC
Burns Harbor, Indiana
 # 2 Battery PEC Stack
September 1, 2016

Analytes	Sample Catch (ug)		Concentration (mg/dscm)		Flowrate, dscfm	Emissions lb/hr		Blank (ug)
Chloromethane	≤	0.33	≤	4.18E-03	178,702	≤	2.80E-03	0.00
Vinyl Chloride	≤	0.09	≤	1.13E-03	178,702	≤	7.57E-04	0.00
Bromomethane	≤	0.36	≤	4.57E-03	178,702	≤	3.06E-03	0.00
Chloroethane	≤	0.13	≤	1.64E-03	178,702	≤	1.10E-03	0.00
1,1-Dichloroethylene	≤	0.09	≤	1.15E-03	178,702	≤	7.70E-04	0.00
Iodomethane	≤	0.12	≤	1.46E-03	178,702	≤	9.77E-04	0.00
Carbon Disulfide	≤	0.24	≤	3.03E-03	178,702	≤	2.03E-03	0.00
Methylene Chloride(Dichloromethane)	≤	270.98	≤	3.41E+00	178,702	≤	2.28E+00	0.00
Chloroform	≤	0.08	≤	1.03E-03	178,702	≤	6.90E-04	0.00
1,2-Dichloroethane	≤	0.08	≤	9.48E-04	178,702	≤	6.35E-04	0.00
1,1,1-Trichloroethane	≤	0.10	≤	1.30E-03	178,702	≤	8.71E-04	0.00
Carbon Tetrachloride	≤	0.11	≤	1.40E-03	178,702	≤	9.38E-04	0.00
Benzene	≤	3.70	≤	4.66E-02	178,702	≤	3.12E-02	0.00
1,1,2-Trichloroethane	≤	0.11	≤	1.40E-03	178,702	≤	9.38E-04	0.00
1,2-Dichloropropane	≤	0.09	≤	1.15E-03	178,702	≤	7.70E-04	0.00
Trichloroethylene	≤	0.09	≤	1.15E-03	178,702	≤	7.70E-04	0.00
Toluene		0.54		6.84E-03	178,702		4.58E-03	0.00
Tetrachloroethylene	≤	0.12	≤	1.50E-03	178,702	≤	1.01E-03	0.00
Chlorobenzene	≤	0.09	≤	1.15E-03	178,702	≤	7.70E-04	0.00
Ethylbenzene	≤	0.11	≤	1.34E-03	178,702	≤	8.96E-04	0.00
m / p-Xylene	≤	0.26	≤	3.33E-03	178,702	≤	2.23E-03	0.00
Styrene	≤	0.10	≤	1.26E-03	178,702	≤	8.46E-04	0.00
o-Xylene	≤	0.12	≤	1.54E-03	178,702	≤	1.03E-03	0.00
Bromoform	≤	0.09	≤	1.18E-03	178,702	≤	7.91E-04	0.00
1,1,2,2-Tetrachloroethane	≤	0.15	≤	1.90E-03	178,702	≤	1.27E-03	0.00
Acrylonitrile	≤	0.57	≤	7.19E-03	178,702	≤	4.81E-03	0.00
Total Volatile Organic HAP				**3.51E+00**			**2.35E+00**	
TEQ Total								
Sample volume (Vmstd, liters)		79.40						
Average % CO_2 by volume, dry		1.10						
Average % O_2 by volume, dry		19.80						

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Chain-of-Custody Form

Project Number: M162810	Date Results Required: Standard
Client: Arcelor/Mittal Burns Harbor	TAT Required: Standard
Plant/Test Location: Burns Harbor Coke Plant	Project Supervisor: Stuart Burton
P.O. # for Lab Work	

Sample Number	Sample Date	Sample Point Identification	# of Cents	Sub Lab	Analysis Required	Volume Info
012	8/23/16	No 2 PEC Stack-T1- Filter and adsorbent module	2	MAX	0010 and 23	
013	8/23/16	No 2 PEC Stack- T1- Acetone washes	1	MAX	0010 and 23	
014	8/23/16	No 2 PEC Stack-T1- Methylene Chloride rinses	1	MAX	0010 and 23	
015	8/23/16	No 2 PEC Stack-T1- Toluene rinses	1	MAX	0010 and 23	
016	8/23/16	No 2 PEC Stack-T1- Impinger contents	2	MAX	Hold	
017	8/24/16	No 2 PEC Stack-T2- Filter and adsorbent module	2	MAX	0010 and 23	
018	8/24/16	No 2 PEC Stack- T2- Acetone washes	1	MAX	0010 and 23	
019	8/24/16	No.2 PEC Stack-T2- Methylene Chloride rinses	1	MAX	0010 and 23	
020	8/24/16	No.2 PEC Stack-T2- Toluene rinses	1	MAX	0010 and 23	
021	8/24/16	No 2 PEC Stack-T2- Impinger contents	2	MAX	Hold	
022	8/25/16	No.2 PEC Stack-T3- Filter and adsorbent module	2	MAX	0010 and 23	
023	8/25/16	No.2 PEC Stack- T3- Acetone washes	1	MAX	0010 and 23	
024	8/25/16	No.2 PEC Stack-T3- Methylene Chloride rinses	1	MAX	0010 and 23	
025	8/25/16	No.2 PEC Stack-T3- Toluene rinses	1	MAX	0010 and 23	
026	8/25/16	No 2 PEC Stack-T3- Impinger contents	2	MAX	Hold	
027	8/23/16	Acetone blank	1	MAX	0010 and 23	
028	8/23/16	Toluene blank	1	MAX	0010 and 23	
029	8/23/16	Methylene Chloride blank	1	MAX	0010 and 23	

Delivered to Lab by:	Date/Time:	Received by:	Date/Time:	Processed by:	Date/Time:
	8/26/16				

Laboratory Notes: Target SVOC are: Acenaphthene, Acenaphthylene, Anthracene, Benz(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz(a,h)anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Perylene, and Pyrene.

D/F results will also report individual congeners and individual toxic equivalents (TEQ). Analysis will be performed by SW 846 8270D for SVOC and by SW 846 8290A using a high resolution GC/MS.

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Your Project #: M162810
Site Location: BURNS HARBOR COKE PLANT

Attention:Data Reporting
Mostardi Platt
888 Industrial Rd
Elmhurst, IL
USA 60126-1121

Your C.O.C. #: 012-016, 017-021, 022-026, 027-029

Report Date: 2016/10/21
Report #: R4218890
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6I9454
Received: 2016/08/31, 18:00

Sample Matrix: Stack Sampling Train
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
SVOCs in MM5 SamplingTrain (EPA0010)	2	2016/09/11	2016/09/27	BRL SOP-00200	EPA 8270D/M0010 m
SVOCs in MM5 SamplingTrain (EPA0010)	2	2016/09/11	2016/09/28	BRL SOP-00200	EPA 8270D/M0010 m
Dioxins/Furans in Air (Method 23)	4	2016/09/11	2016/10/09	BRL SOP-00404	EPA M23/23A m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Clayton Johnson
Project Manager - Air Toxics, Source Evaluation
21 Oct 2016 17:26:03 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769

==========

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Maxxam Job #: B6I9454
Report Date: 2016/10/21

Mostardi Platt
Client Project #: M162810
Site Location: BURNS HARBOR COKE PLANT

EPA M23 DIOXINS AND FURANS (STACK SAMPLING TRAIN)

Maxxam ID		CZY868							
Sampling Date		2016/08/23							
COC Number		012-016				TOXIC EQUIVALENCY		# of	
	UNITS	M23- R1	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	<2.8	2.8	30	6.0	1.00	2.80	N/A	4688092
1,2,3,7,8-Penta CDD *	pg	<3.6	3.6	30	6.0	1.00	3.60	N/A	4688092
1,2,3,4,7,8-Hexa CDD *	pg	<2.3	2.3	30	6.0	0.100	0.230	N/A	4688092
1,2,3,6,7,8-Hexa CDD *	pg	3.8	2.3	30	6.0	0.100	0.380	N/A	4688092
1,2,3,7,8,9-Hexa CDD *	pg	3.8	2.1	30	6.0	0.100	0.380	N/A	4688092
1,2,3,4,6,7,8-Hepta CDD *	pg	15.6	2.2	30	9.0	0.0100	0.156	N/A	4688092
1,2,3,4,6,7,8,9-Octa CDD *	pg	41.4	2.6	300	9.0	0.000300	0.0124	N/A	4688092
Total Tetra CDD *	pg	9.3	2.8	30	N/A	N/A	N/A	2	4688092
Total Penta CDD *	pg	18.3	3.6	30	N/A	N/A	N/A	2	4688092
Total Hexa CDD *	pg	20.4	2.2	30	N/A	N/A	N/A	3	4688092
Total Hepta CDD *	pg	33.3	2.2	30	N/A	N/A	N/A	2	4688092
2,3,7,8-Tetra CDF **	pg	8.8	3.1	30	6.0	0.100	0.880	N/A	4688092
1,2,3,7,8-Penta CDF **	pg	<3.7	3.7	30	6.0	0.0300	0.111	N/A	4688092
2,3,4,7,8-Penta CDF **	pg	<3.7	3.7	30	6.0	0.300	1.11	N/A	4688092
1,2,3,4,7,8-Hexa CDF **	pg	7.4 (1)	3.3	30	6.0	0.100	0.740	N/A	4688092
1,2,3,6,7,8-Hexa CDF **	pg	3.3	3.1	30	6.0	0.100	0.330	N/A	4688092
2,3,4,6,7,8-Hexa CDF **	pg	<3.5	3.5	30	6.0	0.100	0.350	N/A	4688092
1,2,3,7,8,9-Hexa CDF **	pg	<3.6	3.6	30	6.0	0.100	0.360	N/A	4688092
1,2,3,4,6,7,8-Hepta CDF **	pg	10.5	2.5	30	9.0	0.0100	0.105	N/A	4688092
1,2,3,4,7,8,9-Hepta CDF **	pg	<2.9	2.9	30	6.0	0.0100	0.0290	N/A	4688092
1,2,3,4,6,7,8,9-Octa CDF **	pg	<3.7	3.7	300	15	0.000300	0.00111	N/A	4688092
Total Tetra CDF **	pg	35.3	3.1	30	N/A	N/A	N/A	6	4688092
Total Penta CDF **	pg	17.8	3.7	30	N/A	N/A	N/A	3	4688092
Total Hexa CDF **	pg	20.2	3.4	30	N/A	N/A	N/A	3	4688092
Total Hepta CDF **	pg	10.5	2.7	30	N/A	N/A	N/A	1	4688092
TOTAL TOXIC EQUIVALENCY	pg	N/A	N/A	N/A	N/A	N/A	11.6	N/A	N/A
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	91	N/A	N/A	N/A	N/A	N/A	N/A	4688092

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

(1) EMPC / Ratio - Isotopic ratio adjusted to meet theoretical

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Maxxam Job #: B6I9454
Report Date: 2016/10/21

Mostardi Platt
Client Project #: M162810
Site Location: BURNS HARBOR COKE PLANT

EPA M23 DIOXINS AND FURANS (STACK SAMPLING TRAIN)

Maxxam ID		CZY868							
Sampling Date		2016/08/23							
COC Number		012-016				TOXIC EQUIVALENCY		# of	
	UNITS	M23- R1	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	69	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-123478 HexaCDD *	%	111	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-123478 HexaCDF **	%	92	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-1234789 HeptaCDF **	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-123678 HexaCDD *	%	93	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-123678 HexaCDF **	%	77	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-12378 PentaCDD *	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-12378 PentaCDF **	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-123789 HexaCDF **	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-23478 PentaCDF **	%	79	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-2378 TetraCDD *	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-2378 TetraCDF **	%	78	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-Octachlorodibenzo-p-Dioxin	%	72	N/A	N/A	N/A	N/A	N/A	N/A	4688092
Cl37-2378 TetraCDD *	%	103	N/A	N/A	N/A	N/A	N/A	N/A	4688092

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
** CDF = Chloro Dibenzo-p-Furan
N/A = Not Applicable
* CDD = Chloro Dibenzo-p-Dioxin

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Report Date: 2016/10/21

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Client Project #: M162810
Site Location: BURNS HARBOR COKE PLANT

EPA M23 DIOXINS AND FURANS (STACK SAMPLING TRAIN)

Maxxam ID		CZY879							
Sampling Date		2016/08/24							
COC Number		017-021				TOXIC EQUIVALENCY		# of	
	UNITS	M23- R2	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	<3.5	3.5	30	6.0	1.00	3.50	N/A	4688092
1,2,3,7,8-Penta CDD *	pg	<3.4	3.4	30	6.0	1.00	3.40	N/A	4688092
1,2,3,4,7,8-Hexa CDD *	pg	<3.6	3.6	30	6.0	0.100	0.360	N/A	4688092
1,2,3,6,7,8-Hexa CDD *	pg	<3.6	3.6	30	6.0	0.100	0.360	N/A	4688092
1,2,3,7,8,9-Hexa CDD *	pg	<3.3	3.3	30	6.0	0.100	0.330	N/A	4688092
1,2,3,4,6,7,8-Hepta CDD *	pg	<2.8	2.8	30	9.0	0.0100	0.0280	N/A	4688092
1,2,3,4,6,7,8,9-Octa CDD *	pg	13.0	3.2	300	9.0	0.000300	0.00390	N/A	4688092
Total Tetra CDD *	pg	<4.3 (1)	4.3	30	N/A	N/A	N/A	0	4688092
Total Penta CDD *	pg	<3.9 (1)	3.9	30	N/A	N/A	N/A	0	4688092
Total Hexa CDD *	pg	<7.7 (1)	7.7	30	N/A	N/A	N/A	0	4688092
Total Hepta CDD *	pg	<2.8	2.8	30	N/A	N/A	N/A	0	4688092
2,3,7,8-Tetra CDF **	pg	<3.3	3.3	30	6.0	0.100	0.330	N/A	4688092
1,2,3,7,8-Penta CDF **	pg	<3.9	3.9	30	6.0	0.0300	0.117	N/A	4688092
2,3,4,7,8-Penta CDF **	pg	<3.9	3.9	30	6.0	0.300	1.17	N/A	4688092
1,2,3,4,7,8-Hexa CDF **	pg	<3.2	3.2	30	6.0	0.100	0.320	N/A	4688092
1,2,3,6,7,8-Hexa CDF **	pg	<3.1	3.1	30	6.0	0.100	0.310	N/A	4688092
2,3,4,6,7,8-Hexa CDF **	pg	<3.4	3.4	30	6.0	0.100	0.340	N/A	4688092
1,2,3,7,8,9-Hexa CDF **	pg	<3.5	3.5	30	6.0	0.100	0.350	N/A	4688092
1,2,3,4,6,7,8-Hepta CDF **	pg	<2.8	2.8	30	9.0	0.0100	0.0280	N/A	4688092
1,2,3,4,7,8,9-Hepta CDF **	pg	<3.3	3.3	30	6.0	0.0100	0.0330	N/A	4688092
1,2,3,4,6,7,8,9-Octa CDF **	pg	<2.6	2.6	300	15	0.000300	0.000780	N/A	4688092
Total Tetra CDF **	pg	<3.3	3.3	30	N/A	N/A	N/A	0	4688092
Total Penta CDF **	pg	<3.9	3.9	30	N/A	N/A	N/A	0	4688092
Total Hexa CDF **	pg	<3.3	3.3	30	N/A	N/A	N/A	0	4688092
Total Hepta CDF **	pg	<3.1	3.1	30	N/A	N/A	N/A	0	4688092
TOTAL TOXIC EQUIVALENCY	pg	N/A	N/A	N/A	N/A	N/A	11.0	N/A	N/A
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	93	N/A	N/A	N/A	N/A	N/A	N/A	4688092

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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EPA M23 DIOXINS AND FURANS (STACK SAMPLING TRAIN)

Maxxam ID		CZY879							
Sampling Date		2016/08/24							
COC Number		017-021				TOXIC EQUIVALENCY		# of	
	UNITS	M23- R2	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	71	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-123478 HexaCDD *	%	120	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-123478 HexaCDF **	%	100	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-1234789 HeptaCDF **	%	97	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-123678 HexaCDD *	%	89	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-123678 HexaCDF **	%	80	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-12378 PentaCDD *	%	87	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-12378 PentaCDF **	%	86	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-123789 HexaCDF **	%	75	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-23478 PentaCDF **	%	86	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-2378 TetraCDD *	%	79	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-2378 TetraCDF **	%	73	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-Octachlorodibenzo-p-Dioxin	%	75	N/A	N/A	N/A	N/A	N/A	N/A	4688092
Cl37-2378 TetraCDD *	%	103	N/A	N/A	N/A	N/A	N/A	N/A	4688092

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
** CDF = Chloro Dibenzo-p-Furan
N/A = Not Applicable
* CDD = Chloro Dibenzo-p-Dioxin

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Client Project #: M162810
Site Location: BURNS HARBOR COKE PLANT

EPA M23 DIOXINS AND FURANS (STACK SAMPLING TRAIN)

Maxxam ID		CZY887							
Sampling Date		2016/08/25							
COC Number		022-026				TOXIC EQUIVALENCY		# of	
	UNITS	M23- R3	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	<2.8	2.8	30	6.0	1.00	2.80	N/A	4688092
1,2,3,7,8-Penta CDD *	pg	<3.5	3.5	30	6.0	1.00	3.50	N/A	4688092
1,2,3,4,7,8-Hexa CDD *	pg	<3.7	3.7	30	6.0	0.100	0.370	N/A	4688092
1,2,3,6,7,8-Hexa CDD *	pg	<3.7	3.7	30	6.0	0.100	0.370	N/A	4688092
1,2,3,7,8,9-Hexa CDD *	pg	<3.4	3.4	30	6.0	0.100	0.340	N/A	4688092
1,2,3,4,6,7,8-Hepta CDD *	pg	<3.1	3.1	30	9.0	0.0100	0.0310	N/A	4688092
1,2,3,4,6,7,8,9-Octa CDD *	pg	13.7	3.8	300	9.0	0.000300	0.00411	N/A	4688092
Total Tetra CDD *	pg	<4.9 (1)	4.9	30	N/A	N/A	N/A	0	4688092
Total Penta CDD *	pg	<3.7 (1)	3.7	30	N/A	N/A	N/A	0	4688092
Total Hexa CDD *	pg	<8.5 (1)	8.5	30	N/A	N/A	N/A	0	4688092
Total Hepta CDD *	pg	3.2	3.1	30	N/A	N/A	N/A	1	4688092
2,3,7,8-Tetra CDF **	pg	<3.7	3.7	30	6.0	0.100	0.370	N/A	4688092
1,2,3,7,8-Penta CDF **	pg	<2.9	2.9	30	6.0	0.0300	0.0870	N/A	4688092
2,3,4,7,8-Penta CDF **	pg	<2.9	2.9	30	6.0	0.300	0.870	N/A	4688092
1,2,3,4,7,8-Hexa CDF **	pg	<2.5	2.5	30	6.0	0.100	0.250	N/A	4688092
1,2,3,6,7,8-Hexa CDF **	pg	<2.4	2.4	30	6.0	0.100	0.240	N/A	4688092
2,3,4,6,7,8-Hexa CDF **	pg	<2.7	2.7	30	6.0	0.100	0.270	N/A	4688092
1,2,3,7,8,9-Hexa CDF **	pg	<2.8	2.8	30	6.0	0.100	0.280	N/A	4688092
1,2,3,4,6,7,8-Hepta CDF **	pg	<2.5	2.5	30	9.0	0.0100	0.0250	N/A	4688092
1,2,3,4,7,8,9-Hepta CDF **	pg	<3.0	3.0	30	6.0	0.0100	0.0300	N/A	4688092
1,2,3,4,6,7,8,9-Octa CDF **	pg	<2.5	2.5	300	15	0.000300	0.000750	N/A	4688092
Total Tetra CDF **	pg	<3.7	3.7	30	N/A	N/A	N/A	0	4688092
Total Penta CDF **	pg	<2.9	2.9	30	N/A	N/A	N/A	0	4688092
Total Hexa CDF **	pg	<2.6	2.6	30	N/A	N/A	N/A	0	4688092
Total Hepta CDF **	pg	<2.7	2.7	30	N/A	N/A	N/A	0	4688092
TOTAL TOXIC EQUIVALENCY	pg	N/A	N/A	N/A	N/A	N/A	9.84	N/A	N/A
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	98	N/A	N/A	N/A	N/A	N/A	N/A	4688092

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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EPA M23 DIOXINS AND FURANS (STACK SAMPLING TRAIN)

Maxxam ID		CZY887							
Sampling Date		2016/08/25							
COC Number		022-026				TOXIC EQUIVALENCY		# of	
	UNITS	M23- R3	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	74	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-123478 HexaCDD *	%	117	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-123478 HexaCDF **	%	102	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-1234789 HeptaCDF **	%	98	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-123678 HexaCDD *	%	94	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-123678 HexaCDF **	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-12378 PentaCDD *	%	99	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-12378 PentaCDF **	%	93	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-123789 HexaCDF **	%	85	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-23478 PentaCDF **	%	89	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-2378 TetraCDD *	%	84	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-2378 TetraCDF **	%	77	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-Octachlorodibenzo-p-Dioxin	%	76	N/A	N/A	N/A	N/A	N/A	N/A	4688092
Cl37-2378 TetraCDD *	%	102	N/A	N/A	N/A	N/A	N/A	N/A	4688092

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
** CDF = Chloro Dibenzo-p-Furan
N/A = Not Applicable
* CDD = Chloro Dibenzo-p-Dioxin

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EPA M23 DIOXINS AND FURANS (STACK SAMPLING TRAIN)

Maxxam ID		CZY895							
Sampling Date		2016/08/23							
COC Number		027-029				TOXIC EQUIVALENCY		# of	
	UNITS	M23- BLANK	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	<3.7	3.7	30	6.0	1.00	3.70	N/A	4688092
1,2,3,7,8-Penta CDD *	pg	<3.0	3.0	30	6.0	1.00	3.00	N/A	4688092
1,2,3,4,7,8-Hexa CDD *	pg	<2.5	2.5	30	6.0	0.100	0.250	N/A	4688092
1,2,3,6,7,8-Hexa CDD *	pg	<2.5	2.5	30	6.0	0.100	0.250	N/A	4688092
1,2,3,7,8,9-Hexa CDD *	pg	<2.3	2.3	30	6.0	0.100	0.230	N/A	4688092
1,2,3,4,6,7,8-Hepta CDD *	pg	<3.4	3.4	30	9.0	0.0100	0.0340	N/A	4688092
1,2,3,4,6,7,8,9-Octa CDD *	pg	9.8	2.9	300	9.0	0.000300	0.00294	N/A	4688092
Total Tetra CDD *	pg	<4.9 (1)	4.9	30	N/A	N/A	N/A	0	4688092
Total Penta CDD *	pg	<3.6 (1)	3.6	30	N/A	N/A	N/A	0	4688092
Total Hexa CDD *	pg	<7.2 (1)	7.2	30	N/A	N/A	N/A	0	4688092
Total Hepta CDD *	pg	<3.4	3.4	30	N/A	N/A	N/A	0	4688092
2,3,7,8-Tetra CDF **	pg	<2.8	2.8	30	6.0	0.100	0.280	N/A	4688092
1,2,3,7,8-Penta CDF **	pg	<2.8	2.8	30	6.0	0.0300	0.0840	N/A	4688092
2,3,4,7,8-Penta CDF **	pg	<2.8	2.8	30	6.0	0.300	0.840	N/A	4688092
1,2,3,4,7,8-Hexa CDF **	pg	<3.1	3.1	30	6.0	0.100	0.310	N/A	4688092
1,2,3,6,7,8-Hexa CDF **	pg	<2.9	2.9	30	6.0	0.100	0.290	N/A	4688092
2,3,4,6,7,8-Hexa CDF **	pg	<3.2	3.2	30	6.0	0.100	0.320	N/A	4688092
1,2,3,7,8,9-Hexa CDF **	pg	<3.4	3.4	30	6.0	0.100	0.340	N/A	4688092
1,2,3,4,6,7,8-Hepta CDF **	pg	<2.3	2.3	30	9.0	0.0100	0.0230	N/A	4688092
1,2,3,4,7,8,9-Hepta CDF **	pg	<2.7	2.7	30	6.0	0.0100	0.0270	N/A	4688092
1,2,3,4,6,7,8,9-Octa CDF **	pg	3.7 (2)	2.6	300	15	0.000300	0.00111	N/A	4688092
Total Tetra CDF **	pg	<2.8	2.8	30	N/A	N/A	N/A	0	4688092
Total Penta CDF **	pg	<2.8	2.8	30	N/A	N/A	N/A	0	4688092
Total Hexa CDF **	pg	<3.1	3.1	30	N/A	N/A	N/A	0	4688092
Total Hepta CDF **	pg	<2.5	2.5	30	N/A	N/A	N/A	0	4688092
TOTAL TOXIC EQUIVALENCY	pg	N/A	N/A	N/A	N/A	N/A	9.98	N/A	N/A

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.
(2) EMPC / Ratio - Isotopic ratio adjusted to meet theoretical

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Report Date: 2016/10/21

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Client Project #: M162810
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EPA M23 DIOXINS AND FURANS (STACK SAMPLING TRAIN)

Maxxam ID		CZY895							
Sampling Date		2016/08/23							
COC Number		027-029				TOXIC EQUIVALENCY		# of	
	UNITS	M23- BLANK	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	94	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-1234678 HeptaCDF **	%	73	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-123678 HexaCDD *	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-123678 HexaCDF **	%	72	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-12378 PentaCDD *	%	72	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-12378 PentaCDF **	%	75	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-123789 HexaCDF **	%	73	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-2378 TetraCDD *	%	65	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-2378 TetraCDF **	%	64	N/A	N/A	N/A	N/A	N/A	N/A	4688092
C13-Octachlorodibenzo-p-Dioxin	%	75	N/A	N/A	N/A	N/A	N/A	N/A	4688092

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan

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SEMI-VOLATILE ORGANICS BY GC-MS (STACK SAMPLING TRAIN)

Maxxam ID		CZY868	CZY879	CZY887	CZY895			
Sampling Date		2016/08/23	2016/08/24	2016/08/25	2016/08/23			
COC Number		012-016	017-021	022-026	027-029			
	UNITS	M23- R1	M23- R2	M23- R3	M23- BLANK	RDL	MDL	QC Batch
Acenaphthene	ug	<5	<5	<5	<5	5	0.7	4655904
Acenaphthylene	ug	<5	<5	<5	<5	5	1	4655904
Anthracene	ug	<5	<5	<5	<5	5	1	4655904
Benzo(a)anthracene	ug	<5	<5	<5	<5	5	1	4655904
Benzo(a)pyrene	ug	<5	<5	<5	<5	5	1	4655904
Benzo(b)fluoranthene	ug	<5	<5	<5	<5	5	1	4655904
Benzo(g,h,i)perylene	ug	<5	<5	<5	<5	5	1	4655904
Benzo(k)fluoranthene	ug	<5	<5	<5	<5	5	1	4655904
Chrysene	ug	<5	<5	<5	<5	5	1	4655904
Dibenz(a,h)anthracene	ug	<5	<5	<5	<5	5	1	4655904
Fluoranthene	ug	<5	<5	<5	<5	5	1	4655904
Fluorene	ug	<5	<5	<5	<5	5	1	4655904
Indeno(1,2,3-cd)pyrene	ug	<5	<5	<5	<5	5	0.8	4655904
Naphthalene	ug	101	75	52	<5	5	0.8	4655904
Phenanthrene	ug	<5	<5	<5	<5	5	1	4655904
Pyrene	ug	<5	<5	<5	<5	5	1	4655904
Surrogate Recovery (%)								
2,4,6-Tribromophenol	%	127 (1)	117	124 (1)	129 (1)	N/A	N/A	4655904
2,6-Dibromo-4-fluorophenol (FS)	%	93	94	97	N/A	N/A	N/A	4655904
2-Fluorobiphenyl	%	108	106	107	120 (1)	N/A	N/A	4655904
2-Fluorophenol	%	103	114	111	130	N/A	N/A	4655904
D10-Pyrene (FS)	%	126	115	120	N/A	N/A	N/A	4655904
D14-Terphenyl	%	124	115	123	125	N/A	N/A	4655904
D5-Nitrobenzene	%	101	97	100	113	N/A	N/A	4655904
D5-Phenol	%	113	113	115 (1)	126 (1)	N/A	N/A	4655904

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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TEST SUMMARY

Maxxam ID: CZY868
Sample ID: M23- R1
Matrix: Stack Sampling Train

Collected: 2016/08/23
Shipped:
Received: 2016/08/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
SVOCs in MM5 SamplingTrain (EPA0010)	GC/MS	4655904	2016/09/11	2016/09/27	Lidija Tomic
Dioxins/Furans in Air (Method 23)	HRMS/MS	4688092	2016/09/11	2016/10/09	Owen Cosby

Maxxam ID: CZY879
Sample ID: M23- R2
Matrix: Stack Sampling Train

Collected: 2016/08/24
Shipped:
Received: 2016/08/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
SVOCs in MM5 SamplingTrain (EPA0010)	GC/MS	4655904	2016/09/11	2016/09/27	Lidija Tomic
Dioxins/Furans in Air (Method 23)	HRMS/MS	4688092	2016/09/11	2016/10/09	Owen Cosby

Maxxam ID: CZY887
Sample ID: M23- R3
Matrix: Stack Sampling Train

Collected: 2016/08/25
Shipped:
Received: 2016/08/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
SVOCs in MM5 SamplingTrain (EPA0010)	GC/MS	4655904	2016/09/11	2016/09/28	Lidija Tomic
Dioxins/Furans in Air (Method 23)	HRMS/MS	4688092	2016/09/11	2016/10/09	Owen Cosby

Maxxam ID: CZY895
Sample ID: M23- BLANK
Matrix: Stack Sampling Train

Collected: 2016/08/23
Shipped:
Received: 2016/08/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
SVOCs in MM5 SamplingTrain (EPA0010)	GC/MS	4655904	2016/09/11	2016/09/28	Lidija Tomic
Dioxins/Furans in Air (Method 23)	HRMS/MS	4688092	2016/09/11	2016/10/09	Owen Cosby

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GENERAL COMMENTS

Compound Perylene has not been subjected to Maxxam's standard validation procedure for this matrix. The analysis was performed with the client consent, however results should be viewed with discretion. Recovery of perylene is based on the method spike.
Recovery in Spike = 96.45%
Recovery in Spike Dup = 106.65%
No Perylene was found in the samples. An estimated mdl is 5 ug

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4655904	LTO	Spiked Blank	2,4,6-Tribromophenol	2016/09/26		119	%	24 - 121
			2-Fluorobiphenyl	2016/09/26		113	%	30 - 115
			2-Fluorophenol	2016/09/26		102	%	30 - 130
			Acenaphthene	2016/09/26		113	%	40 - 125
			Acenaphthylene	2016/09/26		110	%	40 - 125
			Anthracene	2016/09/26		114	%	40 - 125
			Benzo(a)anthracene	2016/09/26		118	%	40 - 125
			Benzo(a)pyrene	2016/09/26		116	%	40 - 125
			Benzo(b)fluoranthene	2016/09/26		120	%	40 - 125
			Benzo(g,h,i)perylene	2016/09/26		117	%	40 - 125
			Benzo(k)fluoranthene	2016/09/26		124	%	40 - 125
			Chrysene	2016/09/26		128 (1)	%	40 - 125
			D14-Terphenyl	2016/09/26		119	%	18 - 137
			D5-Nitrobenzene	2016/09/26		107	%	23 - 120
			D5-Phenol	2016/09/26		111	%	24 - 113
			Dibenz(a,h)anthracene	2016/09/26		116	%	40 - 125
			Fluoranthene	2016/09/26		124	%	40 - 125
			Fluorene	2016/09/26		111	%	40 - 125
			Indeno(1,2,3-cd)pyrene	2016/09/26		118	%	40 - 125
			Naphthalene	2016/09/26		108	%	40 - 125
			Phenanthrene	2016/09/26		118	%	40 - 125
			Pyrene	2016/09/26		116	%	40 - 125
4655904	LTO	Spiked Blank DUP	2,4,6-Tribromophenol	2016/09/26		113	%	24 - 121
			2-Fluorobiphenyl	2016/09/26		111	%	30 - 115
			2-Fluorophenol	2016/09/26		100	%	30 - 130
			Acenaphthene	2016/09/26		112	%	40 - 125
			Acenaphthylene	2016/09/26		114	%	40 - 125
			Anthracene	2016/09/26		108	%	40 - 125
			Benzo(a)anthracene	2016/09/26		113	%	40 - 125
			Benzo(a)pyrene	2016/09/26		118	%	40 - 125
			Benzo(b)fluoranthene	2016/09/26		120	%	40 - 125
			Benzo(g,h,i)perylene	2016/09/26		115	%	40 - 125
			Benzo(k)fluoranthene	2016/09/26		122	%	40 - 125
			Chrysene	2016/09/26		127 (1)	%	40 - 125
			D14-Terphenyl	2016/09/26		114	%	18 - 137
			D5-Nitrobenzene	2016/09/26		107	%	23 - 120
			D5-Phenol	2016/09/26		109	%	24 - 113
			Dibenz(a,h)anthracene	2016/09/26		115	%	40 - 125
			Fluoranthene	2016/09/26		113	%	40 - 125
			Fluorene	2016/09/26		109	%	40 - 125
			Indeno(1,2,3-cd)pyrene	2016/09/26		116	%	40 - 125
			Naphthalene	2016/09/26		106	%	40 - 125
			Phenanthrene	2016/09/26		111	%	40 - 125
			Pyrene	2016/09/26		116	%	40 - 125
4655904	LTO	Spiked Blank DUP 2	2,4,6-Tribromophenol	2016/09/27		66	%	24 - 121
			2-Fluorobiphenyl	2016/09/27		95	%	30 - 115
			2-Fluorophenol	2016/09/27		54	%	30 - 130
			D14-Terphenyl	2016/09/27		92	%	18 - 137
			D5-Nitrobenzene	2016/09/27		89	%	23 - 120
			D5-Phenol	2016/09/27		73	%	24 - 113
4655904	LTO	Spiked Blank DUP 3	2,4,6-Tribromophenol	2016/09/27		75	%	24 - 121
			2-Fluorobiphenyl	2016/09/27		87	%	30 - 115
			2-Fluorophenol	2016/09/27		28 (1)	%	30 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			D14-Terphenyl	2016/09/27		92	%	18 - 137
			D5-Nitrobenzene	2016/09/27		68	%	23 - 120
			D5-Phenol	2016/09/27		47	%	24 - 113
4655904	LTO	RPD	Acenaphthene	2016/09/26	0.48		%	50
			Acenaphthylene	2016/09/26	3.4		%	50
			Anthracene	2016/09/26	5.2		%	50
			Benzo(a)anthracene	2016/09/26	5.0		%	50
			Benzo(a)pyrene	2016/09/26	2.1		%	50
			Benzo(b)fluoranthene	2016/09/26	0.43		%	50
			Benzo(g,h,i)perylene	2016/09/26	1.4		%	50
			Benzo(k)fluoranthene	2016/09/26	2.1		%	50
			Chrysene	2016/09/26	0.87		%	50
			Dibenz(a,h)anthracene	2016/09/26	1.6		%	50
			Fluoranthene	2016/09/26	9.3		%	50
			Fluorene	2016/09/26	2.0		%	50
			Indeno(1,2,3-cd)pyrene	2016/09/26	1.3		%	50
			Naphthalene	2016/09/26	1.2		%	50
			Phenanthrene	2016/09/26	5.7		%	50
			Pyrene	2016/09/26	0.42		%	50
4655904	LTO	Method Blank	2,4,6-Tribromophenol	2016/09/27		72	%	24 - 121
			2-Fluorobiphenyl	2016/09/27		116 (1)		30 - 115
			2-Fluorophenol	2016/09/27		77	%	30 - 130
			Acenaphthene	2016/09/27	<5		ug	
			Acenaphthylene	2016/09/27	<5		ug	
			Anthracene	2016/09/27	<5		ug	
			Benzo(a)anthracene	2016/09/27	<5		ug	
			Benzo(a)pyrene	2016/09/27	<5		ug	
			Benzo(b)fluoranthene	2016/09/27	<5		ug	
			Benzo(g,h,i)perylene	2016/09/27	<5		ug	
			Benzo(k)fluoranthene	2016/09/27	<5		ug	
			Chrysene	2016/09/27	<5		ug	
			D14-Terphenyl	2016/09/27		117	%	18 - 137
			D5-Nitrobenzene	2016/09/27		110	%	23 - 120
			D5-Phenol	2016/09/27		95	%	24 - 113
			Dibenz(a,h)anthracene	2016/09/27	<5		ug	
			Fluoranthene	2016/09/27	<5		ug	
			Fluorene	2016/09/27	<5		ug	
			Indeno(1,2,3-cd)pyrene	2016/09/27	<5		ug	
			Naphthalene	2016/09/27	<5		ug	
			Phenanthrene	2016/09/27	<5		ug	
			Pyrene	2016/09/27	<5		ug	
4688092	OBC	Spiked Blank	C13-1234678 HeptaCDD	2016/10/08		94	%	25 - 130
			C13-1234678 HeptaCDF	2016/10/08		73	%	25 - 130
			C13-123678 HexaCDD	2016/10/08		93	%	40 - 130
			C13-123678 HexaCDF	2016/10/08		75	%	40 - 130
			C13-12378 PentaCDD	2016/10/08		101	%	40 - 130
			C13-12378 PentaCDF	2016/10/08		94	%	40 - 130
			C13-123789 HexaCDF	2016/10/08		78	%	40 - 130
			C13-2378 TetraCDD	2016/10/08		80	%	40 - 130
			C13-2378 TetraCDF	2016/10/08		76	%	40 - 130
			C13-Octachlorodibenzo-p-Dioxin	2016/10/08		76	%	25 - 130
			2,3,7,8-Tetra CDD	2016/10/08		102	%	80 - 140
			1,2,3,7,8-Penta CDD	2016/10/08		91	%	80 - 140

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8-Hexa CDD	2016/10/08		91	%	80 - 140
			1,2,3,6,7,8-Hexa CDD	2016/10/08		92	%	80 - 140
			1,2,3,7,8,9-Hexa CDD	2016/10/08		100	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDD	2016/10/08		81	%	80 - 140
			1,2,3,4,6,7,8,9-Octa CDD	2016/10/08		97	%	80 - 140
			2,3,7,8-Tetra CDF	2016/10/08		106	%	80 - 140
			1,2,3,7,8-Penta CDF	2016/10/08		97	%	80 - 140
			2,3,4,7,8-Penta CDF	2016/10/08		109	%	80 - 140
			1,2,3,4,7,8-Hexa CDF	2016/10/08		103	%	80 - 140
			1,2,3,6,7,8-Hexa CDF	2016/10/08		103	%	80 - 140
			2,3,4,6,7,8-Hexa CDF	2016/10/08		108	%	80 - 140
			1,2,3,7,8,9-Hexa CDF	2016/10/08		113	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDF	2016/10/08		98	%	80 - 140
			1,2,3,4,7,8,9-Hepta CDF	2016/10/08		94	%	80 - 140
			1,2,3,4,6,7,8,9-Octa CDF	2016/10/08		92	%	80 - 140
4688092	OBC	Spiked Blank DUP	C13-1234678 HeptaCDD	2016/10/08		102	%	25 - 130
			C13-1234678 HeptaCDF	2016/10/08		77	%	25 - 130
			C13-123678 HexaCDD	2016/10/08		98	%	40 - 130
			C13-123678 HexaCDF	2016/10/08		79	%	40 - 130
			C13-12378 PentaCDD	2016/10/08		96	%	40 - 130
			C13-12378 PentaCDF	2016/10/08		94	%	40 - 130
			C13-123789 HexaCDF	2016/10/08		82	%	40 - 130
			C13-2378 TetraCDD	2016/10/08		87	%	40 - 130
			C13-2378 TetraCDF	2016/10/08		85	%	40 - 130
			C13-Octachlorodibenzo-p-Dioxin	2016/10/08		82	%	25 - 130
			2,3,7,8-Tetra CDD	2016/10/08		100	%	80 - 140
			1,2,3,7,8-Penta CDD	2016/10/08		91	%	80 - 140
			1,2,3,4,7,8-Hexa CDD	2016/10/08		94	%	80 - 140
			1,2,3,6,7,8-Hexa CDD	2016/10/08		95	%	80 - 140
			1,2,3,7,8,9-Hexa CDD	2016/10/08		102	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDD	2016/10/08		86	%	80 - 140
			1,2,3,4,6,7,8,9-Octa CDD	2016/10/08		96	%	80 - 140
			2,3,7,8-Tetra CDF	2016/10/08		102	%	80 - 140
			1,2,3,7,8-Penta CDF	2016/10/08		96	%	80 - 140
			2,3,4,7,8-Penta CDF	2016/10/08		101	%	80 - 140
			1,2,3,4,7,8-Hexa CDF	2016/10/08		103	%	80 - 140
			1,2,3,6,7,8-Hexa CDF	2016/10/08		104	%	80 - 140
			2,3,4,6,7,8-Hexa CDF	2016/10/08		110	%	80 - 140
			1,2,3,7,8,9-Hexa CDF	2016/10/08		111	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDF	2016/10/08		98	%	80 - 140
			1,2,3,4,7,8,9-Hepta CDF	2016/10/08		101	%	80 - 140
			1,2,3,4,6,7,8,9-Octa CDF	2016/10/08		91	%	80 - 140
4688092	OBC	RPD	2,3,7,8-Tetra CDD	2016/10/08	NC		%	20
			1,2,3,7,8-Penta CDD	2016/10/08	NC		%	20
			1,2,3,4,7,8-Hexa CDD	2016/10/08	NC		%	20
			1,2,3,6,7,8-Hexa CDD	2016/10/08	NC		%	20
			1,2,3,7,8,9-Hexa CDD	2016/10/08	NC		%	20
			1,2,3,4,6,7,8-Hepta CDD	2016/10/08	NC		%	20
			1,2,3,4,6,7,8,9-Octa CDD	2016/10/08	NC		%	20
			2,3,7,8-Tetra CDF	2016/10/08	NC		%	20
			1,2,3,7,8-Penta CDF	2016/10/08	NC		%	20
			2,3,4,7,8-Penta CDF	2016/10/08	NC		%	20
			1,2,3,4,7,8-Hexa CDF	2016/10/08	NC		%	20

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Maxxam Job #: B6I9454
Report Date: 2016/10/21

Mostardi Platt
Client Project #: M162810
Site Location: BURNS HARBOR COKE PLANT

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,6,7,8-Hexa CDF	2016/10/08	NC		%	20
			2,3,4,6,7,8-Hexa CDF	2016/10/08	NC		%	20
			1,2,3,7,8,9-Hexa CDF	2016/10/08	NC		%	20
			1,2,3,4,6,7,8-Hepta CDF	2016/10/08	NC		%	20
			1,2,3,4,7,8,9-Hepta CDF	2016/10/08	NC		%	20
			1,2,3,4,6,7,8,9-Octa CDF	2016/10/08	NC		%	20
4688092	OBC	Method Blank	C13-1234678 HeptaCDD	2016/10/09		92	%	25 - 130
			C13-1234678 HeptaCDF	2016/10/09		70	%	25 - 130
			C13-123678 HexaCDD	2016/10/09		91	%	40 - 130
			C13-123678 HexaCDF	2016/10/09		71	%	40 - 130
			C13-12378 PentaCDD	2016/10/09		94	%	40 - 130
			C13-12378 PentaCDF	2016/10/09		90	%	40 - 130
			C13-123789 HexaCDF	2016/10/09		76	%	40 - 130
			C13-2378 TetraCDD	2016/10/09		82	%	40 - 130
			C13-2378 TetraCDF	2016/10/09		80	%	40 - 130
			C13-Octachlorodibenzo-p-Dioxin	2016/10/09		72	%	25 - 130
			2,3,7,8-Tetra CDD	2016/10/09	<2.9, EDL=2.9		pg	
			1,2,3,7,8-Penta CDD	2016/10/09	<3.4, EDL=3.4		pg	
			1,2,3,4,7,8-Hexa CDD	2016/10/09	<2.5, EDL=2.5		pg	
			1,2,3,6,7,8-Hexa CDD	2016/10/09	<2.6, EDL=2.6		pg	
			1,2,3,7,8,9-Hexa CDD	2016/10/09	<2.3, EDL=2.3		pg	
			1,2,3,4,6,7,8-Hepta CDD	2016/10/09	3.1, EDL=2.8		pg	
			1,2,3,4,6,7,8,9-Octa CDD	2016/10/09	13.0, EDL=3.3		pg	
			Total Tetra CDD	2016/10/09	<4.4, EDL=4.4 (2)		pg	
			Total Penta CDD	2016/10/09	<3.7, EDL=3.7 (2)		pg	
			Total Hexa CDD	2016/10/09	<6.4, EDL=6.4 (2)		pg	
			Total Hepta CDD	2016/10/09	3.1, EDL=2.8		pg	
			2,3,7,8-Tetra CDF	2016/10/09	<3.3, EDL=3.3		pg	
			1,2,3,7,8-Penta CDF	2016/10/09	<3.5, EDL=3.5		pg	
			2,3,4,7,8-Penta CDF	2016/10/09	<3.5, EDL=3.5		pg	
			1,2,3,4,7,8-Hexa CDF	2016/10/09	<3.4, EDL=3.4		pg	
			1,2,3,6,7,8-Hexa CDF	2016/10/09	<3.3, EDL=3.3		pg	
			2,3,4,6,7,8-Hexa CDF	2016/10/09	<3.6, EDL=3.6		pg	

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Maxxam Job #: B6I9454
Report Date: 2016/10/21

Mostardi Platt
Client Project #: M162810
Site Location: BURNS HARBOR COKE PLANT

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,7,8,9-Hexa CDF	2016/10/09	<3.8, EDL=3.8		pg	
			1,2,3,4,6,7,8-Hepta CDF	2016/10/09	2.8, EDL=2.5		pg	
			1,2,3,4,7,8,9-Hepta CDF	2016/10/09	<3.0, EDL=3.0		pg	
			1,2,3,4,6,7,8,9-Octa CDF	2016/10/09	4.2, EDL=3.3		pg	
			Total Tetra CDF	2016/10/09	<3.3, EDL=3.3		pg	
			Total Penta CDF	2016/10/09	<3.5, EDL=3.5		pg	
			Total Hexa CDF	2016/10/09	<3.5, EDL=3.5		pg	
			Total Hepta CDF	2016/10/09	2.8, EDL=2.7		pg	

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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Maxxam Job #: B6I9454
Report Date: 2016/10/21

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Client Project #: M162810
Site Location: BURNS HARBOR COKE PLANT

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Karen Nicol

Karen Nicol, Supervisor, Semi-Volatiles

Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Chain-of-Custody Form

Project Number: M162810	Data Results Required: Standards*
Client: ArcelorMittal Burns Harbor	TAT Required: Standard
Plant/Test Location: Burns Harbor Coke Plant	Project supervisor: Stuart Burton
P.O. # for Lab Work:	

Sample Number	Sample Date	Sample Point Identification	# of Cont's	Sub Lab	Analysis Required	Volume, mls
001	8/23/16	No.2 PEC Stack-T1- Filter and probe rinses	3	MAX	*M315	
002	8/23/16	No.2 PEC Stack- T1- DI Imps and rinse	1	MAX	*M315	
003	8/23/16	No.2 PEC Stack-T1- Imps acetone and toluene rinses	2	MAX	*M315	
004	8/24/16	No.2 PEC Stack-T2- Filter and probe rinses	3	MAX	*M315	
005	8/24/16	No.2 PEC Stack- T2- DI Imps and rinse	1	MAX	*M315	
006	8/24/16	No.2 PEC Stack-T2- Imps acetone and toluene rinses	2	MAX	*M315	
007	8/25/16	No.2 PEC Stack-T3- Filter and probe rinses	3	MAX	*M315	
008	8/25/16	No.2 PEC Stack-T3- DI Imps and rinse	1	MAX	*M315	
009	8/25/16	No.2 PEC Stack-T3- Imps acetone and toluene rinses	2	MAX	*M315	
010	8/23/16	Acetone blank	1	MAX	*M315	
011	8/23/16	Toluene blank	1	MAX	*M315	

Delivered to Lab by:	Date/Time:	Received by:	Date/Time:	Processed by:	Date/Time:
	8/30/16				

Laboratory Notes:

*Toluene is used instead of Methylene Chloride as solvent for extraction.

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Your Project #: M162810
Site#: BURNS HARBOR
Site Location: BURNS HARBOR COKE PLANT

Attention:Data Reporting

Mostardi Platt
888 Industrial Rd
Elmhurst, IL
USA 60126-1121

Your C.O.C. #: 001, 004, 007, 010-011, 002-003, 005-006, 008-009

Report Date: 2017/01/18
Report #: R4329225
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B6I9787
Received: 2016/08/30, 18:00

Sample Matrix: Stack Sampling Train
Samples Received: 10

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Particulates/Acetone Rinse (M5/315/M201)	4	2016/09/09	2016/09/12	BRL SOP-00109	EPA 5/315 m
Particulates B. H. Water Imp. (M315)	3	2016/09/12	2016/09/19	BRL SOP-00109	EPA 315
Particulates/Filter (M5/315/NJATM1/M201)	3	N/A	2016/09/19	BRL SOP-00109	EPA 5/315/NJATM1 m
Final Volume of Acetone Probe Rinse	4	N/A	2016/09/19	BRL SOP-00109	
Final Volume of Impinger	3	N/A	2017/01/09		
Weight of Solvent from Impingers	3	N/A	2017/01/09		

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods. Results relate to samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

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Your Project #: M162810
Site#: BURNS HARBOR
Site Location: BURNS HARBOR COKE PLANT

Attention:Data Reporting

Mostardi Platt
888 Industrial Rd
Elmhurst, IL
USA 60126-1121

Your C.O.C. #: 001, 004, 007, 010-011, 002-003, 005-006, 008-009

Report Date: 2017/01/18
Report #: R4329225
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B6I9787
Received: 2016/08/30, 18:00

Encryption Key

Clayton Johnson
Project Manager - Air Toxics, Source Evaluation
18 Jan 2017 18:13:42

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769

==========

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Maxxam Job #: B6I9787
Report Date: 2017/01/18

Mostardi Platt
Client Project #: M162810
Site Location: BURNS HARBOR COKE PLANT

RESULTS OF ANALYSES OF STACK SAMPLING TRAIN

Maxxam ID		DAA662	DAA663	DAA664			
Sampling Date		2016/08/23	2016/08/24	2016/08/25			
COC Number		001	004	007			
	UNITS	M315 - FILT R1	M315 - FILT R2	M315 - FILT R3	RDL	MDL	QC Batch
Front Half DCM Extractable Material	mg	7.20	5.40	13.5	0.50	N/A	4654057
Front Half Particulate Weight on Filter	mg	<0.30	0.40	0.30	0.30	0.060	4654057

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam ID		DAA673	DAA675			
Sampling Date		2016/08/23	2016/08/23			
COC Number		010-011	001			
	UNITS	M315- BLANK ACE/TOL	M315- R1 ACE/TOLUENE	RDL	MDL	QC Batch
Acetone Rinse DCM Extractable Material	mg	9.5	8.7	0.5	N/A	4654059
Acetone Rinse Particulate Weight in Acetone Rinse	mg	4.0	3.4	0.5	0.1	4654059
Acetone Rinse Volume	ml	150 (1)	17 (1)	1	1	4667004

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Results reported are in grams

Maxxam ID		DAA676	DAA677			
Sampling Date		2016/08/24	2016/08/25			
COC Number		004	007			
	UNITS	M315- R2 ACE/TOLUENE	M315- R3 ACE/TOLUENE	RDL	MDL	QC Batch
Acetone Rinse DCM Extractable Material	mg	5.5	8.0	0.5	N/A	4654059
Acetone Rinse Particulate Weight in Acetone Rinse	mg	4.9	2.8	0.5	0.1	4654059
Acetone Rinse Volume	ml	24 (1)	26 (1)	1	1	4667004

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Results reported are in grams

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Report Date: 2017/01/18

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Site Location: BURNS HARBOR COKE PLANT

RESULTS OF ANALYSES OF STACK SAMPLING TRAIN

Maxxam ID		DAA684	DAA691	DAA692			
Sampling Date		2016/08/23	2016/08/24	2016/08/25			
COC Number		002-003	005-006	008-009			
	UNITS	M315- R1 BH IMP	M315- R2 BH IMP	M315- R3 BH IMP	RDL	MDL	QC Batch
Back Half DCM Extractable Material	mg	<0.5	<0.5	0.6	0.5	N/A	4657107
Back Half DCM Extractable Material in Rinse	mg	9.7	10.4	10.1	0.5	N/A	4657107
Impinger Volume	ml	311	347	348	1	1	4818651
Weight of Solvent	g	91	96	86	0.1	N/A	4818660

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Report Date: 2017/01/18

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Site Location: BURNS HARBOR COKE PLANT

TEST SUMMARY

Maxxam ID: DAA662
Sample ID: M315 - FILT R1
Matrix: Stack Sampling Train

Collected: 2016/08/23
Shipped:
Received: 2016/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Particulates/Filter (M5/315/NJATM1/M201)	BAL	4654057	N/A	2016/09/19	Brenda Moore

Maxxam ID: DAA663
Sample ID: M315 - FILT R2
Matrix: Stack Sampling Train

Collected: 2016/08/24
Shipped:
Received: 2016/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Particulates/Filter (M5/315/NJATM1/M201)	BAL	4654057	N/A	2016/09/19	Brenda Moore

Maxxam ID: DAA664
Sample ID: M315 - FILT R3
Matrix: Stack Sampling Train

Collected: 2016/08/25
Shipped:
Received: 2016/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Particulates/Filter (M5/315/NJATM1/M201)	BAL	4654057	N/A	2016/09/19	Brenda Moore

Maxxam ID: DAA673
Sample ID: M315- BLANK ACE/TOL
Matrix: Stack Sampling Train

Collected: 2016/08/23
Shipped:
Received: 2016/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Particulates/Acetone Rinse (M5/315/M201)	BAL	4654059	2016/09/09	2016/09/12	Brenda Moore
Final Volume of Acetone Probe Rinse		4667004	N/A	2016/09/19	Brenda Moore

Maxxam ID: DAA675
Sample ID: M315- R1 ACE/TOLUENE
Matrix: Stack Sampling Train

Collected: 2016/08/23
Shipped:
Received: 2016/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Particulates/Acetone Rinse (M5/315/M201)	BAL	4654059	2016/09/09	2016/09/12	Brenda Moore
Final Volume of Acetone Probe Rinse		4667004	N/A	2016/09/19	Brenda Moore

Maxxam ID: DAA676
Sample ID: M315- R2 ACE/TOLUENE
Matrix: Stack Sampling Train

Collected: 2016/08/24
Shipped:
Received: 2016/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Particulates/Acetone Rinse (M5/315/M201)	BAL	4654059	2016/09/09	2016/09/12	Brenda Moore
Final Volume of Acetone Probe Rinse		4667004	N/A	2016/09/19	Brenda Moore

Maxxam ID: DAA677
Sample ID: M315- R3 ACE/TOLUENE
Matrix: Stack Sampling Train

Collected: 2016/08/25
Shipped:
Received: 2016/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Particulates/Acetone Rinse (M5/315/M201)	BAL	4654059	2016/09/09	2016/09/12	Brenda Moore

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TEST SUMMARY

Maxxam ID: DAA677
Sample ID: M315- R3 ACE/TOLUENE
Matrix: Stack Sampling Train

Collected: 2016/08/25
Shipped:
Received: 2016/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Final Volume of Acetone Probe Rinse		4667004	N/A	2016/09/19	Brenda Moore

Maxxam ID: DAA684
Sample ID: M315- R1 BH IMP
Matrix: Stack Sampling Train

Collected: 2016/08/23
Shipped:
Received: 2016/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Particulates B. H. Water Imp. (M315)	BAL	4657107	2016/09/12	2016/09/19	Brenda Moore
Final Volume of Impinger		4818651	N/A	2017/01/09	Brenda Moore
Weight of Solvent from Impingers		4818660	N/A	2017/01/09	Brenda Moore

Maxxam ID: DAA691
Sample ID: M315- R2 BH IMP
Matrix: Stack Sampling Train

Collected: 2016/08/24
Shipped:
Received: 2016/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Particulates B. H. Water Imp. (M315)	BAL	4657107	2016/09/12	2016/09/19	Brenda Moore
Final Volume of Impinger		4818651	N/A	2017/01/09	Brenda Moore
Weight of Solvent from Impingers		4818660	N/A	2017/01/09	Brenda Moore

Maxxam ID: DAA692
Sample ID: M315- R3 BH IMP
Matrix: Stack Sampling Train

Collected: 2016/08/25
Shipped:
Received: 2016/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Particulates B. H. Water Imp. (M315)	BAL	4657107	2016/09/12	2016/09/19	Brenda Moore
Final Volume of Impinger		4818651	N/A	2017/01/09	Brenda Moore
Weight of Solvent from Impingers		4818660	N/A	2017/01/09	Brenda Moore

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Report Date: 2017/01/18

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Client Project #: M162810
Site Location: BURNS HARBOR COKE PLANT

GENERAL COMMENTS

Report revised to include the weight of toluene received at the lab.

RESULTS OF ANALYSES OF STACK SAMPLING TRAIN

Particulates/Filter (M5/315/NJATM1/M201): M315: Extraction was performed using toluene instead of DCM as per client request
Particulates/Acetone Rinse (M5/315/M201): M315: Extraction was performed using toluene instead of DCM as per client request
Particulates B. H. Water Imp. (M315): M315: Extraction was performed using toluene instead of DCM as per client request

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4654057	BLM	Method Blank	Front Half DCM Extractable Material	2016/09/20	5.00, RDL=0.50		mg	
4654059	BLM	Method Blank	Acetone Rinse DCM Extractable Material	2016/09/12	5.8, RDL=0.5		mg	
			Acetone Rinse Particulate Weight in Acetone	2016/09/12	<0.5		mg	
4657107	BLM	Method Blank	Back Half DCM Extractable Material	2016/09/19	<0.5		mg	
			Back Half DCM Extractable Material in Rinse	2016/09/19	<0.5		mg	

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Frank Mo, B.Sc., Inorganic Lab. Manager

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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PCDD/PCDF TEST RESULTS SUMMARY
Run 1
ArcelorMittal Burns Harbor LLC
Burns Harbor, Indiana
#2 Battery PEC Stack
August 23, 2016

		Sample Catch						Concentration		Emissions	TEQ Factor Results						
Analytes		(pg)		(pg-Blank)		(ug)		(ug/dscm)		(ug/hr)	TEQ Factor		(ug/dscm)		(ug/hr)		(lb/hr)
2378-TCDD	<	2.80	<	2.80	<	2.80E-06	<	6.50E-07	<	0.21	1.0	<	6.50E-07	<	0.21	<	4.72E-10
12378-PeCDD	<	3.60	<	3.60	<	3.60E-06	<	8.36E-07	<	0.28	1.0	<	8.36E-07	<	0.28	<	6.07E-10
123478-HxCDD	<	2.30	<	2.30	<	2.30E-06	<	5.34E-07	<	0.18	0.1	<	5.34E-08	<	0.02	<	3.88E-11
123678-HxCDD		3.80		3.80		3.80E-06		8.82E-07		0.29	0.1		8.82E-08		0.03		6.40E-11
123789-HxCDD		3.80		3.80		3.80E-06		8.82E-07		0.29	0.1		8.82E-08		0.03		6.40E-11
1234678-HpCDD		15.60		15.60		1.56E-05		3.62E-06		1.19	0.01		3.62E-08		0.01		2.63E-11
OCDD		41.40		41.40		4.14E-05		9.61E-06		3.16	0.0003		2.88E-09		0.0009		2.09E-12
2378 -TCDF		8.80		8.80		8.80E-06		2.04E-06		0.67	0.1		2.04E-07		0.07		1.48E-10
12378-PeCDF	<	3.70	<	3.70	<	3.70E-06	<	8.59E-07	<	0.28	0.03	<	2.58E-08	<	0.01	<	1.87E-11
23478-PeCDF	<	3.70	<	3.70	<	3.70E-06	<	8.59E-07	<	0.28	0.3	<	2.58E-07	<	0.08	<	1.87E-10
123478-HxCDF		7.40		7.40		7.40E-06		1.72E-06		0.57	0.1		1.72E-07		0.06		1.25E-10
123678-HxCDF		3.30		3.30		3.30E-06		7.66E-07		0.25	0.1		7.66E-08		0.03		5.56E-11
234678-HxCDF	<	3.50	<	3.50	<	3.50E-06	<	8.12E-07	<	0.27	0.1	<	8.12E-08	<	0.03	<	5.90E-11
123789-HxCDF	<	3.60	<	3.60	<	3.60E-06	<	8.36E-07	<	0.28	0.1	<	8.36E-08	<	0.03	<	6.07E-11
1234678-HpCDF		10.50		10.50		1.05E-05		2.44E-06		0.80	0.01		2.44E-08		0.01		1.77E-11
1234789-HpCDF	<	2.90	<	2.90	<	2.90E-06	<	6.73E-07	<	0.22	0.01	<	6.73E-09	<	0.0022	<	4.89E-12
OCDF	<	3.70	<	3.70	<	3.70E-06	<	8.59E-07	<	0.28	0.0003	<	2.58E-10	<	0.0001	<	1.87E-13
Total TCDD		9.30		9.30		9.30E-06		2.16E-06		0.71							
Total PeCDD		18.30		18.30		1.83E-05		4.25E-06		1.40							
Total HxCDD		20.40		20.40		2.04E-05		4.73E-06		1.56							
Total HpCDD		33.30		33.30		3.33E-05		7.73E-06		2.55							
Total TCDF		35.30		35.30		3.53E-05		8.19E-06		2.70							
Total PeCDF		17.80		17.80		1.78E-05		4.13E-06		1.36							
Total HxCDF		20.20		20.20		2.02E-05		4.69E-06		1.54							
Total HpCDF		10.50		10.50		1.05E-05		2.44E-06		0.80							
Total PCDD/PCDF			<	210.20	<	2.10E-04	<	4.88E-05	<	16.07							
TEQ Total												<	2.69E-06	<	0.88	<	1.95E-09

Sample volume (Vmstd, dscf)	152.15
Volumetric Air Flow (DSCFM)	193,818.05
Average % CO_2 by volume, dry	1.00
Average % O_2 by volume, dry	19.90

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PCDD/PCDF TEST RESULTS SUMMARY
Run 2
ArcelorMittal Burns Harbor LLC
Burns Harbor, Indiana
#2 Battery PEC Stack
August 24, 2016

		Sample Catch						Concentration		Emissions	TEQ Factor Results						
Analytes		(pg)		(pg-Blank)		(ug)		(ug/dcsm)		(ug/hr)	TEQ Factor		(ug/dscm)		(ug/hr)		(lb/hr)
2378-TCDD	<	3.50	<	3.50	<	3.50E-06	<	8.18E-07	<	0.27	1.0	<	8.18E-07	<	0.27	<	5.89E-10
12378-PeCDD	<	3.40	<	3.40	<	3.40E-06	<	7.95E-07	<	0.26	1.0	<	7.95E-07	<	0.26	<	5.72E-10
123478-HxCDD	<	3.60	<	3.60	<	3.60E-06	<	8.42E-07	<	0.27	0.1	<	8.42E-08	<	0.03	<	6.06E-11
123678-HxCDD	<	3.60	<	3.60	<	3.60E-06	<	8.42E-07	<	0.27	0.1	<	8.42E-08	<	0.03	<	6.06E-11
123789-HxCDD	<	3.30	<	3.30	<	3.30E-06	<	7.72E-07	<	0.25	0.1	<	7.72E-08	<	0.03	<	5.55E-11
1234678-HpCDD	<	2.80	<	2.80	<	2.80E-06	<	6.55E-07	<	0.21	0.01	<	6.55E-09	<	0.00	<	4.71E-12
OCDD		13.00		13.00		1.30E-05		3.04E-06		0.99	0.0003		9.12E-10		0.00		6.56E-13
2378 -TCDF	<	3.30	<	3.30	<	3.30E-06	<	7.72E-07	<	0.25	0.1	<	7.72E-08	<	0.03	<	5.55E-11
12378-PeCDF	<	3.90	<	3.90	<	3.90E-06	<	9.12E-07	<	0.30	0.03	<	2.74E-08	<	0.01	<	1.97E-11
23478-PeCDF	<	3.90	<	3.90	<	3.90E-06	<	9.12E-07	<	0.30	0.3	<	2.74E-07	<	0.09	<	1.97E-10
123478-HxCDF	<	3.20	<	3.20	<	3.20E-06	<	7.48E-07	<	0.24	0.1	<	7.48E-08	<	0.02	<	5.38E-11
123678-HxCDF	<	3.10	<	3.10	<	3.10E-06	<	7.25E-07	<	0.24	0.1	<	7.25E-08	<	0.02	<	5.22E-11
234678-HxCDF	<	3.40	<	3.40	<	3.40E-06	<	7.95E-07	<	0.26	0.1	<	7.95E-08	<	0.03	<	5.72E-11
123789-HxCDF	<	3.50	<	3.50	<	3.50E-06	<	8.18E-07	<	0.27	0.1	<	8.18E-08	<	0.03	<	5.89E-11
1234678-HpCDF	<	2.80	<	2.80	<	2.80E-06	<	6.55E-07	<	0.21	0.01	<	6.55E-09	<	0.00	<	4.71E-12
1234789-HpCDF	<	3.30	<	3.30	<	3.30E-06	<	7.72E-07	<	0.25	0.01	<	7.72E-09	<	0.00	<	5.55E-12
OCDF	<	2.60	<	2.60	<	2.60E-06	<	6.08E-07	<	0.20	0.0003	<	1.82E-10	<	0.00	<	1.31E-13
Total TCDD	<	4.30	<	4.30	<	4.30E-06	<	1.01E-06	<	0.33							
Total PeCDD	<	3.90	<	3.90	<	3.90E-06	<	9.12E-07	<	0.30							
Total HxCDD	<	7.70	<	7.70	<	7.70E-06	<	1.80E-06	<	0.59							
Total HpCDD	<	2.80	<	2.80	<	2.80E-06	<	6.55E-07	<	0.21							
Total TCDF	<	3.30	<	3.30	<	3.30E-06	<	7.72E-07	<	0.25							
Total PeCDF	<	3.90	<	3.90	<	3.90E-06	<	9.12E-07	<	0.30							
Total HxCDF	<	3.30	<	3.30	<	3.30E-06	<	7.72E-07	<	0.25							
Total HpCDF	<	3.10	<	3.10	<	3.10E-06	<	7.25E-07	<	0.24							
Total PCDD/PCDF			<	47.90	<	4.79E-05	<	1.12E-05	<	3.66							
TEQ Total												<	2.57E-06	<	0.84	<	1.85E-09

Sample volume (Vmstd, dscf)	151.03
Volumetric Air Flow (DSCFM)	192,137.75
Average % CO_2 by volume, dry	1.10
Average % O_2 by volume, dry	19.70

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PCDD/PCDF TEST RESULTS SUMMARY
Run 3
ArcelorMittal Burns Harbor LLC
Burns Harbor, Indiana
#2 Battery PEC Stack
August 25, 2016

		Sample Catch						Concentration		Emissions	TEQ Factor Results						
Analytes		(pg)		(pg-Blank)		(ug)		(ug/dcsm)		(ug/hr)	TEQ Factor		(ug/dscm)		(ug/hr)		(lb/hr)
2378-TCDD	<	2.80	<	2.80	<	2.80E-06	<	6.61E-07	<	0.20	1.0	<	6.61E-07	<	0.20	<	4.34E-10
12378-PeCDD	<	3.50	<	3.50	<	3.50E-06	<	8.26E-07	<	0.25	1.0	<	8.26E-07	<	0.25	<	5.43E-10
123478-HxCDD	<	3.70	<	3.70	<	3.70E-06	<	8.73E-07	<	0.26	0.1	<	8.73E-08	<	0.03	<	5.74E-11
123678-HxCDD	<	3.70	<	3.70	<	3.70E-06	<	8.73E-07	<	0.26	0.1	<	8.73E-08	<	0.03	<	5.74E-11
123789-HxCDD	<	3.40	<	3.40	<	3.40E-06	<	8.03E-07	<	0.24	0.1	<	8.03E-08	<	0.02	<	5.27E-11
1234678-HpCDD	<	3.10	<	3.10	<	3.10E-06	<	7.32E-07	<	0.22	0.01	<	7.32E-09	<	0.00	<	4.81E-12
OCDD		13.70		13.70		1.37E-05		3.23E-06		0.96	0.0003		9.70E-10		0.00		6.37E-13
2378 -TCDF	<	3.70	<	3.70	<	3.70E-06	<	8.73E-07	<	0.26	0.1	<	8.73E-08	<	0.03	<	5.74E-11
12378-PeCDF	<	2.90	<	2.90	<	2.90E-06	<	6.85E-07	<	0.20	0.03	<	2.05E-08	<	0.01	<	1.35E-11
23478-PeCDF	<	2.90	<	2.90	<	2.90E-06	<	6.85E-07	<	0.20	0.3	<	2.05E-07	<	0.06	<	1.35E-10
123478-HxCDF	<	2.50	<	2.50	<	2.50E-06	<	5.90E-07	<	0.18	0.1	<	5.90E-08	<	0.02	<	3.88E-11
123678-HxCDF	<	2.40	<	2.40	<	2.40E-06	<	5.67E-07	<	0.17	0.1	<	5.67E-08	<	0.02	<	3.72E-11
234678-HxCDF	<	2.70	<	2.70	<	2.70E-06	<	6.37E-07	<	0.19	0.1	<	6.37E-08	<	0.02	<	4.19E-11
123789-HxCDF	<	2.80	<	2.80	<	2.80E-06	<	6.61E-07	<	0.20	0.1	<	6.61E-08	<	0.02	<	4.34E-11
1234678-HpCDF	<	2.50	<	2.50	<	2.50E-06	<	5.90E-07	<	0.18	0.01	<	5.90E-09	<	0.00	<	3.88E-12
1234789-HpCDF	<	3.00	<	3.00	<	3.00E-06	<	7.08E-07	<	0.21	0.01	<	7.08E-09	<	0.00	<	4.65E-12
OCDF	<	2.50	<	2.50	<	2.50E-06	<	5.90E-07	<	0.18	0.0003	<	1.77E-10	<	0.00	<	1.16E-13
Total TCDD	<	4.90	<	4.90	<	4.90E-06	<	1.16E-06	<	0.34							
Total PeCDD	<	3.70	<	3.70	<	3.70E-06	<	8.73E-07	<	0.26							
Total HxCDD	<	8.50	<	8.50	<	8.50E-06	<	2.01E-06	<	0.60							
Total HpCDD	<	3.20	<	3.20	<	3.20E-06	<	7.55E-07	<	0.23							
Total TCDF	<	3.70	<	3.70	<	3.70E-06	<	8.73E-07	<	0.26							
Total PeCDF	<	2.90	<	2.90	<	2.90E-06	<	6.85E-07	<	0.20							
Total HxCDF	<	2.60	<	2.60	<	2.60E-06	<	6.14E-07	<	0.18							
Total HpCDF	<	2.70	<	2.70	<	2.70E-06	<	6.37E-07	<	0.19							
Total PCDD/PCDF			<	48.40	<	4.84E-05	<	1.14E-05	<	3.40							
TEQ Total												<	2.32E-06	<	0.69	<	1.53E-09

Sample volume (Vmstd, dscf)		149.61
Volumetric Air Flow (DSCFM)		175,398.34
Average % CO_2 by volume, dry		1.30
Average % O_2 by volume, dry		19.80

SPECIATED SEMI-VOLATILE ORGANIC COMPOUNDS TEST RESULTS SUMMARY
Run 1
Arcelor Mittal Burns Harbor LLC
Burns Harbor, Indiana
 # 2 Battery PEC Stack
August 23, 2016

Analytes		Sample Catch (ug)		(ug-Blank)		Concentration (ug/dscm)	Flowrate, dscfm		Emissions lb/hr
Acenaphthene	<	5.00	<	5.00	<	1.16E+00	193,818	<	8.43E-04
Acenaphthylene	<	5.00	<	5.00	<	1.16E+00	193,818	<	8.43E-04
Anthracene	<	5.00	<	5.00	<	1.16E+00	193,818	<	8.43E-04
Benzo (a) anthracene	<	5.00	<	5.00	<	1.16E+00	193,818	<	8.43E-04
Benzo (a) pyrene	<	5.00	<	5.00	<	1.16E+00	193,818	<	8.43E-04
Benzo (b) fluoranthene	<	5.00	<	5.00	<	1.16E+00	193,818	<	8.43E-04
Benzo (g,h,i) perylene	<	5.00	<	5.00	<	1.16E+00	193,818	<	8.43E-04
Benzo (k) fluoranthene	<	5.00	<	5.00	<	1.16E+00	193,818	<	8.43E-04
Chrysene	<	5.00	<	5.00	<	1.16E+00	193,818	<	8.43E-04
Dibenz (a,h) anthracene	<	5.00	<	5.00	<	1.16E+00	193,818	<	8.43E-04
Fluoranthene	<	5.00	<	5.00	<	1.16E+00	193,818	<	8.43E-04
Fluorene	<	5.00	<	5.00	<	1.16E+00	193,818	<	8.43E-04
Indeno (1,2,3-cd) pyrene	<	5.00	<	5.00	<	1.16E+00	193,818	<	8.43E-04
Naphthalene		101.00		101.00		2.34E+01	193,818		1.70E-02
Phenanthrene	<	5.00	<	5.00	<	1.16E+00	193,818	<	8.43E-04
Perylene	<	5.00	<	5.00	<	1.16E+00	193,818	<	8.43E-04
Pyrene	<	5.00	<	5.00	<	1.16E+00	193,818	<	8.43E-04
Total Semi-Volatile Organic Compounds			<	**181.00**	<	**4.20E+01**		<	**3.05E-02**

Sample volume (Vmstd, liters)		4308.41
Average % CO_2 by volume, dry		1.00
Average % O_2 by volume, dry		19.90

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SPECIATED SEMI-VOLATILE ORGANIC COMPOUNDS TEST RESULTS SUMMARY
Run 2
Arcelor Mittal Burns Harbor LLC
Burns Harbor, Indiana
 # 2 Battery PEC Stack
August 24, 2016

Analytes		Sample Catch (ug)		(ug-Blank)		Concentration (ug/dscm)	Flowrate, dscfm		Emissions lb/hr
Acenaphthene	<	5.00	<	5.00	<	1.17E+00	192,138	<	8.41E-04
Acenaphthylene	<	5.00	<	5.00	<	1.17E+00	192,138	<	8.41E-04
Anthracene	<	5.00	<	5.00	<	1.17E+00	192,138	<	8.41E-04
Benzo (a) anthracene	<	5.00	<	5.00	<	1.17E+00	192,138	<	8.41E-04
Benzo (a) pyrene	<	5.00	<	5.00	<	1.17E+00	192,138	<	8.41E-04
Benzo (b) fluoranthene	<	5.00	<	5.00	<	1.17E+00	192,138	<	8.41E-04
Benzo (g,h,i) perylene	<	5.00	<	5.00	<	1.17E+00	192,138	<	8.41E-04
Benzo (k) fluoranthene	<	5.00	<	5.00	<	1.17E+00	192,138	<	8.41E-04
Chrysene	<	5.00	<	5.00	<	1.17E+00	192,138	<	8.41E-04
Dibenz (a,h) anthracene	<	5.00	<	5.00	<	1.17E+00	192,138	<	8.41E-04
Fluoranthene	<	5.00	<	5.00	<	1.17E+00	192,138	<	8.41E-04
Fluorene	<	5.00	<	5.00	<	1.17E+00	192,138	<	8.41E-04
Indeno (1,2,3-cd) pyrene	<	5.00	<	5.00	<	1.17E+00	192,138	<	8.41E-04
Naphthalene		75.00		75.00		1.75E+01	192,138		1.26E-02
Phenanthrene	<	5.00	<	5.00	<	1.17E+00	192,138	<	8.41E-04
Perylene	<	5.00	<	5.00	<	1.17E+00	192,138	<	8.41E-04
Pyrene	<	5.00	<	5.00	<	1.17E+00	192,138	<	8.41E-04
Total Semi-Volatile Organic Compounds			<	**155.00**	<	**3.62E+01**		<	**2.61E-02**

Sample volume (Vmstd, liters)		4276.69
Average % CO_2 by volume, dry		1.10
Average % O_2 by volume, dry		19.70

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SPECIATED SEMI-VOLATILE ORGANIC COMPOUNDS TEST RESULTS SUMMARY
Run 3
Arcelor Mittal Burns Harbor LLC
Burns Harbor, Indiana
 # 2 Battery PEC Stack
August 25, 2016

Analytes		Sample Catch (ug)		(ug-Blank)		Concentration (ug/dscm)	Flowrate, dscfm		Emissions lb/hr
Acenaphthene	<	5.00	<	5.00	<	1.18E+00	175,398	<	7.75E-04
Acenaphthylene	<	5.00	<	5.00	<	1.18E+00	175,398	<	7.75E-04
Anthracene	<	5.00	<	5.00	<	1.18E+00	175,398	<	7.75E-04
Benzo (a) anthracene	<	5.00	<	5.00	<	1.18E+00	175,398	<	7.75E-04
Benzo (a) pyrene	<	5.00	<	5.00	<	1.18E+00	175,398	<	7.75E-04
Benzo (b) fluoranthene	<	5.00	<	5.00	<	1.18E+00	175,398	<	7.75E-04
Benzo (g,h,i) perylene	<	5.00	<	5.00	<	1.18E+00	175,398	<	7.75E-04
Benzo (k) fluoranthene	<	5.00	<	5.00	<	1.18E+00	175,398	<	7.75E-04
Chrysene	<	5.00	<	5.00	<	1.18E+00	175,398	<	7.75E-04
Dibenz (a,h) anthracene	<	5.00	<	5.00	<	1.18E+00	175,398	<	7.75E-04
Fluoranthene	<	5.00	<	5.00	<	1.18E+00	175,398	<	7.75E-04
Fluorene	<	5.00	<	5.00	<	1.18E+00	175,398	<	7.75E-04
Indeno (1,2,3-cd) pyrene	<	5.00	<	5.00	<	1.18E+00	175,398	<	7.75E-04
Naphthalene		52.00		52.00		1.23E+01	175,398		8.06E-03
Phenanthrene	<	5.00	<	5.00	<	1.18E+00	175,398	<	7.75E-04
Perylene	<	5.00	<	5.00	<	1.18E+00	175,398	<	7.75E-04
Pyrene	<	5.00	<	5.00	<	1.18E+00	175,398	<	7.75E-04
Total Semi-Volatile Organic Compounds			<	**132.00**	<	**3.12E+01**		<	**2.05E-02**

Sample volume (Vmstd, liters)		4236.48
Average % CO_2 by volume, dry		1.30
Average % O_2 by volume, dry		19.80

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Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Project Number: M162810
Test Location: #2 Battery PEC Stack

Test Method: 315

Description	Sample Date	ID#	vol. (ml)	Final Weight (grams)	Sample ID		Blank Weight (grams)	Blank ID	Final Weights used in calculations (grams)	Weights Minus Blank, not used in calculations, but show the magnitude of blank contamination (grams)	Toluene extractable material blank mls	weight of toluene grams
Filterable Particulate												
Test No. 1	8/23/2016											
Source Condition: Normal												
Filter Toluene Extractable		DAA67		0.0072	M315 Container 1	COC 001 DAA662	0.01118	QA/QC Batch 4654057 Toluene Method	0.0003	-0.0040		
Toluene Extractable Material		DAA67	65 ml	0.0087	M315 Container	COC 001 DAA675	0.0027	COC 010-011 DAA673	0.0060	0.0060	9.5	
Total Front Half Weight	Sample Calculation						(65 ml/225 ml) x 9.5/1000=0.0027		0.0063	0.0020		
Condensable Particulate												
DI/Acetone/Toluene Wash		DAA684	ml	0.0000	M315 Container	COC 002-003	0.0000	COC 010-011 DAA673	0.0005	0.0000		
Back Half TSO Weight		DAA684		0.0097	M315 Container	COC 002-003	0.0024	COC 010-011 DAA673	0.0073	0.0073	5	91
Total Back Half TSO Weight	Sample Calculation						(91 g/.85g/ml)/225 mls x 5.0 mg/1000 mg/g)=0.0045		0.0078	0.0073		
Total TSO Weight									0.0141	0.0093		
Filterable Particulate												
Test No. 2	8/24/2016											
Source Condition: Normal												
Filter Toluene Extractable		DAA66		0.0054	M315 Container 1	COC 004 DAA663	0.01118	QA/QC Batch 4654057 Toluene Method	0.0003	-0.0058		
Toluene Extractable Material		DAA67	65 ml	0.0055	M315 Container	COC 004 DAA676	0.0027	COC 010-011 DAA673	0.0028	0.0028	9.5	
Total Front Half Weight	Sample Calculation						(65 ml/225 ml) x 9.5/1000=0.0027		0.0031	-0.0030		
Condensable Particulate												
DI/Acetone/Toluene Wash		DAA691	ml	0.0000	M315 Container	COC 005-006	0.0000	COC 010-011 DAA673	0.0005	0.0000		
Back Half TSO Weight		DAA691		0.0104	M315 Container	COC 005-006	0.0025	COC 010-011 DAA673	0.0079	0.0079	5	96
Total Back Half TSO Weight	Sample Calculation						(96 g/.85g/ml)/225 mls x (5.0 mg/1000 mg/g)=0.0048		0.0084	0.0079		
Total TSO Weight									0.0114	0.0049		
Filterable Particulate												
Test No. 3	8/25/2016											
Source Condition: Normal												
Filter Toluene Extractable		DAA66		0.0135	M315 Container 1	COC 007 DAA664	0.01118	QA/QC Batch 4654057 Toluene Method	0.0023	0.0023		
Toluene Extractable Material		DAA67	65 ml	0.0080	M315 Container	COC 007 DAA677	0.0027	COC 010-011 DAA673	0.0053	0.0053	9.5	
Total Front Half Weight	Sample Calculation						(65 ml/225 ml) x 9.5/1000=0.0027		0.0076	0.0076		
Condensable Particulate												
DI/Acetone/Toluene Wash		DAA692	ml	0.0006	M315 Container	COC 008-009	0.0000	COC 010-011 DAA673	0.0006	0.0006		
Back Half TSO Weight		DAA692		0.0101	M315 Container	COC 008-009	0.0022	COC 010-011 DAA673	0.0079	0.0079	5	86
Total Back Half TSO Weight	Sample Calculation						(86 g/.85g/ml)/225 mls x (5.0 mg/1000 mg/g)=0.0043		0.0085	0.0085		
Total TSO Weight									0.0160	0.0160		
Reagent Blank Summary												
Acetone/Toluene Wash		DAA67	171 ml	0.0095						0.0095		

* Blanks were subtracted from the front half Toluene Extractable Material, and back half Toluene Extractive Material

*Estimated Probe Wash mls of Toluene: 40mls
*Lab mls of Toluene from Acetone Extration: 25mls
*Toluene Blank Volume in mls: 200mls
*Toluene Volume added by Lab: 25mls
*Density of 3 parts Toluene and 1 part Acetone: 0.85

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Appendix F - Reference Method Test Data (Computerized Sheets)

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Client:	ArcelorMittal Burns Harbor LLC		
Facility:	Burns Harbor, Indiana		
Test Location:	#2 Battery PEC Stack		
Project #:	M162810		
Test Method:	5/29		
Test Engineer:	BVG		
Test Technician:	DBD		
lb/mmBtu Emissions by:			
Type of Fuel Firing:	Other		
	R1	**R2**	**R3**
Heat Input, mmBtu/hr:			
Temp ID:	CM22	CM22	CM22
Meter ID:	CM22	CM22	CM22
Pitot ID:	316	316	316
Filter ID:	10086	10060	10061
Filter Pre-Weight (grams):	0.4598	0.4567	0.4571
Nozzle Diameter (Inches):	0.268	0.268	0.268
Meter Calibration Date:	7/28/2016	7/28/2016	7/28/2016
Meter Calibration Factor (Y):	0.998	0.998	0.998
Meter Orifice Setting (Delta H):	1.741	1.741	1.741
Nozzle Kit ID Number and Material:	glass	glass	glass
Pitot Tube Coefficient:	0.840		
Probe Length (Feet):	4.0		
Probe Liner Material:	Glass		
Sample Plane:	Horizontal		
Port Length (Inches):	6.50		
Port Size (Diameter, Inches):	4.00		
Port Type:	Nipple		
Duct Shape:	Circular		
Diameter (Feet):	9		
Duct Area (Square Feet):	63.617		
Upstream Diameters:	> 2.0		
Downstream Diameters:	> 3.0		
Number of Ports Sampled:	4		
Number of Points per Port:	6		
Minutes per Point:	4.0		
Minutes per Reading:	2.0		
Total Number of Traverse Points:	24		
Test Length (Minutes):	96		
Train Type:	Anderson Box		
Source Condition:	Normal		
Servomex Serial Number:	01440D1/3791		
Moisture Balance ID:	S10-35		
# of Runs	3		

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Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Test Location: #2 Battery PEC Stack
Test Method: 5/29

Source Condtion:		Normal Run 1	Normal Run 2	Normal Run 3
Identify Analyte:	Antimony (Sb)			
Molecular Weight:	121.75	DLL	BDL	BDL
ug (net) collected:		1.09	1.00	1.00
Identify Analyte:	Arsenic (As)			
Molecular Weight:	74.92	BDL	BDL	BDL
ug (net) collected:		1.00	1.00	1.00
Identify Analyte:	Beryllium (Be)			
Molecular Weight:	9.01	BDL	BDL	BDL
ug (net) collected:		0.25	0.25	0.25
Identify Analyte:	Cadmium (Cd)			
Molecular Weight:	112.4	ADL	ADL	DLL
ug (net) collected:		0.963	0.446	0.374
Identify Analyte:	Chromium (Cr)			
Molecular Weight:	51.99	ADL	ADL	ADL
ug (net) collected:		2.50	2.75	2.73
Identify Analyte:	Cobalt (Co)			
Molecular Weight:	58.93	DLL	DLL	DLL
ug (net) collected:		0.374	0.284	0.385
Identify Analyte:	Lead (Pb)			
Molecular Weight:	207.19	ADL	ADL	ADL
ug (net) collected:		4.23	2.07	1.29
Identify Analyte:	Manganese (Mn)			
Molecular Weight:	54.94	DLL	DLL	ADL
ug (net) collected:		2.54	5.05	6.54
Identify Analyte:	Nickel (Ni)			
Molecular Weight:	58.71	ADL	ADL	ADL
ug (net) collected:		2.94	3.1	3.96
Identify Analyte:	Selenium (Se)			
Molecular Weight:	78.96	DLL	DLL	BDL
ug (net) collected:		42.7	3.19	2.5
Identify Analyte:	Mercury (Hg)			
Molecular Weight:	200.59	DLL	DLL	DLL
ug (net) collected:		0.7931	0.4973	0.4605

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Run 1-Method 5/29

Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Test Location: #2 Battery PEC Stack
Source Condition: Normal

Date: 8/16/16
Start Time: 7:15
End Time: 17:25

DRY GAS METER CONDITIONS			STACK CONDITIONS		
ΔH:	4.87	in. H_2O	Static Pressure	-0.50	in. H_2O
Meter Temperature, Tm:	75.7	°F	Flue Pressure (Ps):	29.50	in. Hg. abs.
Sqrt ΔP:	1.009	in. H_2O	Carbon Dioxide:	1.10	%
Stack Temperature, Ts:	154.9	°F	Oxygen:	20.00	%
Meter Volume, Vm:	122.226	ft^3	Nitrogen:	78.90	%
Meter Volume, Vmstd:	120.143	dscf	Gas Weight dry, Md:	28.976	lb/lb mole
Meter Volume, Vwstd:	4.413	wscf	Gas Weight wet, Ms:	28.587	lb/lb mole
Isokinetic Variance:	105.5	%I	Excess Air:	—	%
Heat Input, mmBtu/hr		Heat input, mmBtu/hr	Gas Velocity, Vs:	61.851	fps
Test Length:	95.00	in mins.	Volumetric Flow:	236,087	acfm
Nozzle Diameter:	0.268	in inches	Volumetric Flow:	192,816	dscfm
Barometric Pressure:	29.54	in Hg	Volumetric Flow:	199,889	scfm
Filter ID:	10086		Calculated Fo:	0.82	
Filter Pre Weight (grams):	0.4598		Fo Validity:	Fail	

MOISTURE DETERMINATION

Initial Impinger Content:	3482.1	ml	Silica Initial Wt.	855.0	grams
Final Impinger Content:	3544.1	ml	Silica Final Wt.	886.7	grams
Impinger Difference:	62.0	ml	Silica Difference:	31.7	grams

Total Water Gain: 93.7 Moisture, Bws: 0.035 **Supersaturation Value, Bws:** 0.289

Port-Point No.	Clock Time	Velocity Head Δp in. H2O	Orifice ΔH in. H2O	Actual Meter Vol. ft^3	Stack Temp °F	Meter Temp Inlet °F	Meter Temp Outlet °F	Probe Temp °F	Filter Exit Temp °F	Impinger Exit Temp °F
1-1	7:15:00	1.00	4.80	34.530	125	72	71	250	242	59
1-1	7:29:00	0.98	4.70	37.100	125	72	71	252	249	58
1-2	7:42:00	0.95	4.60	39.600	129	72	71	253	251	58
1-2	7:54:00	0.98	4.70	41.995	138	74	72	250	252	62
1-3	8:05:00	0.95	4.50	44.480	142	74	73	250	250	58
1-3	8:16:00	0.98	4.70	46.975	144	73	73	250	249	63
1-4	8:28:00	0.95	4.60	49.450	150	73	73	249	248	62
1-4	8:39:00	1.00	4.80	51.905	150	73	72	250	243	65
1-5	8:48:00	1.10	5.30	54.430	153	73	73	250	249	62
1-5	9:09:00	1.10	5.30	57.070	151	73	72	250	248	64
1-6	9:20:00	1.00	4.80	59.705	151	73	73	250	255	59
1-6	9:33:00	1.10	5.20	62.235	157	73	73	250	247	59
	9:35:00			64.901						
2-1	9:53:00	1.00	4.80	65.255	151	74	73	249	248	60
2-1	10:04:00	1.10	5.20	67.800	152	74	73	250	254	63
2-2	10:18:00	1.10	5.20	70.420	153	74	73	250	249	66
2-2	10:43:00	1.00	4.80	73.040	149	74	73	250	249	67
2-3	11:01:00	1.00	4.80	75.545	145	74	74	250	250	64
2-3	11:13:00	1.00	4.80	78.062	149	74	74	252	253	65
2-4	11:24:00	0.95	4.50	80.585	154	74	74	250	250	65
2-4	11:35:00	0.95	4.50	83.050	157	75	74	250	250	66
2-5	11:47:00	0.90	4.30	85.485	162	75	74	252	249	63
2-5	11:59:00	0.85	4.00	87.849	163	76	75	250	250	65
2-6	12:16:00	0.85	4.00	90.150	159	76	76	250	248	66
2-6	12:27:00	0.88	4.20	92.485	157	77	76	252	252	67
	12:29:00			94.850						
3-1	12:40:00	1.00	4.80	94.850	158	77	76	253	251	64
3-1	12:53:00	1.10	5.20	97.360	160	78	77	250	250	64
3-2	13:04:00	1.10	5.20	99.910	160	78	77	251	251	61
3-2	13:23:00	1.10	5.20	102.635	160	78	78	252	252	66
3-3	13:37:00	1.10	5.20	105.270	159	78	78	252	250	65
3-3	13:48:00	1.20	5.70	107.880	159	78	78	252	254	66
3-4	13:59:00	1.10	5.20	110.650	160	78	78	252	249	62
3-4	14:10:00	1.10	5.20	113.285	160	78	78	252	253	64
3-5	14:22:00	1.00	4.80	116.000	161	78	78	252	252	61
3-5	14:34:00	1.00	4.80	118.435	160	78	78	252	252	63
3-6	14:44:00	1.00	4.80	120.970	160	78	78	250	250	62
3-6	14:57:00	0.95	4.50	123.450	162	78	78	252	251	62
	14:59:00			125.905						
4-1	15:10:00	1.10	5.30	125.905	161	78	78	252	250	59
4-1	15:23:00	1.20	5.70	128.585	163	78	78	252	250	65
4-2	15:36:00	1.10	5.30	131.355	162	78	78	252	252	66
4-2	15:48:00	1.10	5.30	134.035	163	78	78	252	251	66
4-3	15:58:00	1.10	5.30	136.720	164	78	78	250	249	66
4-3	16:09:00	1.00	4.80	139.385	164	78	78	252	251	65
4-4	16:21:00	1.10	5.30	141.960	163	78	78	252	252	66
4-4	16:35:00	1.00	4.80	144.640	162	78	78	252	251	68
4-5	16:47:00	1.00	4.80	147.190	161	78	78	252	250	67
4-5	16:57:00	0.95	4.60	149.715	161	78	78	251	251	67
4-6	17:08:00	0.95	4.60	152.235	163	78	77	252	253	66
4-6	17:23:00	0.90	4.30	154.730	167	78	78	251	252	66
	17:25:00			157.110						
Total	9:30:00			122.226		75.9	75.5			
Average			4.87		154.9	75.7				
Min			4.00		125.0	71.0				
Max			5.70		167.0	78.0				

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Run 2-Method 5/29

Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Test Location: #2 Battery PEC Stack
Source Condition: Normal

Date: 8/17/16
Start Time: 8:48
End Time: 18:45

DRY GAS METER CONDITIONS

ΔH:	4.71	in. H_2O
Meter Temperature, Tm:	77.6	°F
Sqrt ΔP:	1.001	in. H_2O
Stack Temperature, Ts:	157.9	°F
Meter Volume, Vm:	120.370	ft^3
Meter Volume, Vmstd:	117.269	dscf
Meter Volume, Vwstd:	4.187	wscf
Isokinetic Variance:	104.2	%I
Heat Input, mmBtu/hr		Heat Input, mmBtu/hr
Test Length:	96.00	in mins.
Nozzle Diameter:	0.268	in inches
Barometric Pressure:	29.39	in Hg
Filter ID:	10060	
Filter Pre Weight (grams):	0.4567	

STACK CONDITIONS

Static Pressure	-0.50	in. H_2O
Flue Pressure (Ps):	29.35	in. Hg. abs.
Carbon Dioxide:	1.20	%
Oxygen:	20.00	%
Nitrogen:	78.8	%
Gas Weight dry, Md:	28.992	lb/lb mole
Gas Weight wet, Ms:	28.613	lb/lb mole
Excess Air:	—	%
Gas Velocity, Vs:	61.638	fps
Volumetric Flow:	235,274	acfm
Volumetric Flow:	190,449	dscfm
Volumetric Flow:	197,249	scfm
Calculated Fo:	0.75	
Fo Validity:	Fail	

MOISTURE DETERMINATION

Initial Impinger Content:	3425.8	ml	Silica Initial Wt.	741.9	grams
Final Impinger Content:	3486.4	ml	Silica Final Wt.	770.2	grams
Impinger Difference:	60.6	ml	Silica Difference:	28.3	grams

Total Water Gain: 88.9 Moisture, Bws: 0.034 **Supersaturation Value, Bws:** 0.312

Port-Point No.	Clock Time	Velocity Head Δp in. H2O	Orifice ΔH in. H2O	Actual Meter Vol. ft^3	Stack Temp °F	Meter Temp Inlet °F	Meter Temp Outlet °F	Probe Temp °F	Filter Exit Temp °F	Impinger Exit Temp °F
1-1	8:48:00	1.10	5.30	57.475	115	69	69	252	249	66
1-1	9:11:00	1.00	4.80	60.320	115	69	69	250	252	62
1-2	9:23:00	1.00	4.80	62.850	124	71	70	253	252	60
1-2	9:33:00	1.00	4.70	65.460	137	72	71	250	253	60
1-3	9:43:00	1.00	4.70	67.880	143	73	72	253	255	63
1-3	9:55:00	1.00	4.70	70.345	152	74	73	250	249	65
1-4	10:05:00	0.98	4.60	72.890	156	75	74	250	251	62
1-4	10:15:00	0.90	4.20	75.315	160	76	74	252	251	63
1-5	10:28:00	0.90	4.20	77.725	162	76	75	250	248	63
1-5	10:41:00	0.88	4.10	80.145	163	77	76	250	251	66
1-6	10:55:00	0.85	4.00	82.405	162	77	76	253	252	65
1-6	11:07:00	0.85	4.00	84.710	163	77	77	254	254	62
	11:09:00			87.030						
2-1	11:21:00	1.10	5.10	87.230	166	78	77	250	251	66
2-1	11:31:00	1.00	4.70	89.825	164	77	77	250	256	65
2-2	11:44:00	1.10	5.10	92.385	164	77	77	253	252	68
2-2	12:02:00	1.10	5.10	94.925	162	77	77	252	255	61
2-3	12:18:00	1.00	4.70	97.540	158	76	77	253	254	64
2-3	12:30:00	1.10	5.10	100.135	157	76	77	252	254	62
2-4	12:41:00	1.10	5.10	102.590	161	76	77	253	254	62
2-4	12:53:00	0.92	4.30	105.100	165	79	76	254	254	61
2-5	13:03:00	0.89	4.20	107.920	167	79	76	254	254	63
2-5	13:15:00	0.94	4.40	110.340	169	79	76	254	253	62
2-6	13:32:00	0.95	4.50	112.560	168	79	76	254	253	64
2-6	13:51:00	0.92	4.30	115.220	156	79	78	253	252	61
	13:53:00			117.620						
3-1	14:01:00	1.10	5.20	117.620	153	79	78	254	254	64
3-1	14:18:00	1.00	4.70	120.140	152	79	79	250	247	58
3-2	14:29:00	1.00	4.70	122.450	150	79	79	249	249	60
3-2	14:43:00	1.10	5.20	124.950	151	78	78	250	250	59
3-3	14:56:00	1.00	4.70	127.500	156	78	78	251	253	57
3-3	15:08:00	1.10	5.20	130.159	158	78	78	250	252	63
3-4	15:17:00	1.00	4.70	132.717	160	79	78	253	250	64
3-4	15:31:00	1.10	5.20	135.285	160	79	79	250	245	61
3-5	15:45:00	0.98	4.60	137.815	159	80	79	250	252	60
3-5	16:03:00	0.95	4.40	140.328	155	80	80	250	254	60
3-6	16:16:00	0.95	4.40	142.695	156	81	80	250	250	66
3-6	16:28:00	0.95	4.40	145.180	158	82	81	254	251	68
	16:28:00			147.645						
4-1	16:38:00	1.10	5.20	147.645	168	82	81	250	257	64
4-1	16:48:00	1.10	5.20	150.270	165	81	81	250	249	66
4-2	16:59:00	1.10	5.20	152.850	172	81	81	250	256	67
4-2	17:09:00	1.10	5.20	155.550	169	81	81	250	252	65
4-3	17:21:00	1.00	4.70	158.280	169	80	80	250	253	60
4-3	17:33:00	1.00	4.70	160.695	167	80	80	250	254	61
4-4	17:44:00	1.10	5.20	163.260	166	80	80	252	254	65
4-4	17:56:00	0.98	4.60	165.830	165	79	79	250	264	64
4-5	18:10:00	0.95	4.40	168.300	164	78	78	254	256	60
4-5	18:20:00	0.95	4.40	170.690	166	79	79	252	252	66
4-6	18:33:00	0.95	4.40	173.130	168	79	79	253	255	57
4-6	18:43:00	1.00	4.70	175.550	167	79	79	253	250	62
	18:45:00			178.045						
Total	9:29:00			120.370		77.6	77.3			
Average			4.71		157.9	77.6				
Min			4.00		115.0	69.0				
Max			5.30		172.0	82.0				

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Run 3-Method 5/29

Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Test Location: #2 Battery PEC Stack
Source Condition: Normal

Date: 8/18/16
Start Time: 7:16
End Time: 19:08

DRY GAS METER CONDITIONS			STACK CONDITIONS		
ΔH:	4.39	in. H_2O	Static Pressure	-1.00	in. H_2O
Meter Temperature, Tm:	76.8	°F	Flue Pressure (Ps):	29.28	in. Hg, abs.
Sqrt ΔP:	0.980	in. H_2O	Carbon Dioxide:	1.00	%
Stack Temperature, Ts:	150.5	°F	Oxygen:	20.20	%
Meter Volume, Vm:	115.746	ft^3	Nitrogen:	78.8	%
Meter Volume, Vmstd:	112.672	dscf	Gas Weight dry, Md:	28.968	lb/lb mole
Meter Volume, Vwstd:	4.314	wscf	Gas Weight wet, Ms:	28.564	lb/lb mole
Isokinetic Variance:	102.0	%I	Excess Air:	—	%
Heat Input, mmBtu/hr		Heat Input, mmBtu/hr	Gas Velocity, Vs:	60.107	fps
Test Length:	96.00	in mins.	Volumetric Flow:	229,431	acfm
Nozzle Diameter:	0.268	in inches	Volumetric Flow:	187,011	dscfm
Barometric Pressure:	29.35	in Hg	Volumetric Flow:	194,171	scfm
Filter ID:	10061		Calculated Fo:	0.70	
Filter Pre Weight (grams):	0.4571		Fo Validity:	Fail	

MOISTURE DETERMINATION

Initial Impinger Content:	3521.9	ml	Silica Initial Wt.	794.0	grams
Final Impinger Content:	3585.4	ml	Silica Final Wt.	822.1	grams
Impinger Difference:	63.5	ml	Silica Difference:	28.1	grams

Total Water Gain: 91.6 Moisture, Bws: 0.037 **Supersaturation Value, Bws: 0.262**

Port-Point No.	Clock Time	Velocity Head Δp in. H2O	Orifice ΔH in. H2O	Actual Meter Vol. ft^3	Stack Temp °F	Meter Temp Inlet °F	Meter Temp Outlet °F	Probe Temp °F	Filter Exit Temp °F	Impinger Exit Temp °F
1-1	7:16:00	1.10	5.00	78.550	128	65	65	252	253	53
1-1	7:34:00	1.00	4.50	81.215	126	65	65	252	250	56
1-2	7:48:00	1.00	4.50	83.645	129	66	65	252	250	59
1-2	7:58:00	1.10	5.00	86.120	132	67	66	252	253	61
1-3	8:09:00	1.00	4.50	88.730	135	68	67	250	252	61
1-3	8:22:00	1.10	5.00	91.180	140	70	69	254	254	63
1-4	9:55:00	0.95	4.30	93.765	134	75	75	253	254	65
1-4	10:06:00	0.95	4.30	96.190	136	75	75	250	256	65
1-5	10:25:00	0.75	3.40	98.610	132	76	75	253	251	64
1-5	10:52:00	0.75	3.40	100.678	126	77	76	253	253	65
1-6	11:04:00	0.90	4.10	102.800	130	77	78	253	252	65
1-6	11:15:00	0.95	4.30	105.150	135	77	76	253	253	65
	11:17:00			107.515						
2-1	11:28:00	1.10	5.00	107.515	143	77	77	253	252	63
2-1	12:06:00	1.00	4.60	110.140	126	79	78	253	254	54
2-2	12:17:00	1.00	4.60	112.600	128	79	79	251	253	55
2-2	12:32:00	1.00	4.60	115.110	135	81	80	251	251	60
2-3	12:42:00	1.00	4.60	117.600	141	81	80	253	258	59
2-3	12:55:00	1.10	5.10	120.135	148	80	80	253	253	58
2-4	13:05:00	1.00	4.60	122.750	152	80	80	252	251	63
2-4	13:17:00	0.95	4.30	125.270	158	79	79	251	251	64
2-5	13:29:00	0.90	4.10	127.650	158	79	79	253	258	65
2-5	13:40:00	0.90	4.10	130.100	158	80	79	252	255	66
2-6	13:50:00	0.95	4.30	132.350	158	80	80	251	250	66
2-6	14:02:00	0.95	4.30	134.800	156	80	80	252	254	65
	14:04:00			137.230						
3-1	14:15:00	1.00	4.60	137.230	159	80	79	252	254	64
3-1	14:25:00	1.00	4.60	139.690	161	79	79	252	254	64
3-2	14:35:00	1.10	5.10	142.240	164	80	79	253	251	63
3-2	14:46:00	1.10	5.10	144.985	166	79	79	253	256	63
3-3	14:58:00	1.00	4.60	147.470	165	79	79	250	252	64
3-3	15:08:00	0.95	4.30	149.910	165	79	79	251	252	65
3-4	15:21:00	0.90	4.10	152.295	164	79	79	252	253	61
3-4	15:32:00	0.90	4.10	154.615	163	79	79	252	251	61
3-5	15:43:00	0.88	4.00	156.950	163	79	79	252	252	60
3-5	15:54:00	0.95	4.30	158.650	162	79	79	252	253	64
3-6	16:07:00	0.90	4.10	160.940	163	79	79	252	252	59
3-6	16:17:00	0.80	3.60	163.275	164	79	79	252	251	62
	16:19:00			165.525						
4-1	16:28:00	1.00	4.60	165.525	166	78	79	253	255	62
4-1	16:39:00	1.00	4.60	168.015	167	78	78	252	252	61
4-2	16:50:00	1.00	4.60	170.525	166	78	78	250	254	63
4-2	17:01:00	1.00	4.60	173.010	165	78	78	252	253	64
4-3	17:12:00	0.95	4.30	175.530	162	78	78	253	253	65
4-3	17:27:00	1.00	4.60	177.815	158	78	78	252	247	64
4-4	17:37:00	0.98	4.50	180.310	155	78	78	250	251	62
4-4	17:49:00	0.95	4.30	182.715	156	78	78	252	253	63
4-5	18:02:00	0.85	3.90	185.070	156	77	77	252	250	65
4-5	18:13:00	0.85	3.90	187.400	158	77	77	251	250	66
4-6	18:27:00	0.85	3.90	189.645	156	77	77	251	251	62
4-6	19:06:00	0.85	3.90	191.940	156	77	77	250	251	61
	19:08:00			194.286						
Total	11:21:00			115.748		77.0	76.7			
Average			4.39		150.5	78.8				
Min			3.40		126.0	65.0				
Max			5.10		167.0	81.0				

Client:	ArcelorMittal Burns Harbor LLC		
Facility:	Burns Harbor, Indiana		
Test Location:	#2 Battery PEC Stack		
Project #:	M162810		
Test Method:	5/202		
Test Engineer:	CSE		
Test Technician:	DBD/BM		
lb/mmBtu Emissions by:			
Type of Fuel Firing:	Other		
	R1	**R2**	**R3**
Heat Input, mmBtu/hr:			
Temp ID:	CM16	CM16	CM16
Meter ID:	CM16	CM16	CM16
Pitot ID:	314	314	314
Filter ID:	9444	9954	9443
Filter Pre-Weight (grams):	0.4409	0.4552	0.4441
Nozzle Diameter (Inches):	0.228	0.228	0.228
Meter Calibration Date:	8/4/2016	8/4/2016	8/4/2016
Meter Calibration Factor (Y):	0.994	0.994	0.994
Meter Orifice Setting (Delta H):	1.689	1.689	1.689
Nozzle Kit ID Number and Material:		0	0
Pitot Tube Coefficient:	0.840		
Probe Length (Feet):	4.0		
Probe Liner Material:	Glass		
Sample Plane:	Horizontal		
Port Length (Inches):	6.50		
Port Size (Diameter, Inches):	4.00		
Port Type:	Nipple		
Duct Shape:	Circular		
Diameter (Feet):	9		
Duct Area (Square Feet):	63.617		
Upstream Diameters:	> 2.0		
Downstream Diameters:	> 3.0		
Number of Ports Sampled:	4		
Number of Points per Port:	6		
Minutes per Point:	4.0		
Minutes per Reading:	2.0		
Total Number of Traverse Points:	24		
Test Length (Minutes):	96		
Train Type:	Anderson Box		
Source Condition:	Normal		
Servomex Serial Number:	01440D1/3791		
Moisture Balance ID:	S10-35		
# of Runs	3		

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Run 1-Method 5/202

Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Test Location: #2 Battery PEC Stack
Source Condition: Normal

Date: 8/16/16
Start Time: 7:15
End Time: 17:25

DRY GAS METER CONDITIONS			STACK CONDITIONS		
ΔH:	2.38	in. H_2O	Static Pressure	-0.50	in. H_2O
Meter Temperature, Tm:	76.1	°F	Flue Pressure (Ps):	29.50	in. Hg, abs.
Sqrt ΔP:	0.983	in. H_2O	Carbon Dioxide:	1.10	%
Stack Temperature, Ts:	155.0	°F	Oxygen:	20.00	%
Meter Volume, Vm:	87.430	ft^3	Nitrogen:	78.90	%
Meter Volume, Vmstd:	85.005	dscf	Gas Weight dry, Md:	28.976	lb/lb mole
Meter Volume, Vwstd:	2.920	wscf	Gas Weight wet, Ms:	28.611	lb/lb mole
Isokinetic Variance:	105.6	%I	Excess Air:	---	%
Heat Input, mmBtu/hr		Heat Input, mmBtu/hr	Gas Velocity, Vs:	60.259	fps
Test Length:	96.00	in mins.	Volumetric Flow:	230,010	acfm
Nozzle Diameter:	0.228	in inches	Volumetric Flow:	188,247	dscfm
Barometric Pressure:	29.54	in Hg	Volumetric Flow:	194,714	scfm
Filter ID:	9444		Calculated Fo:	0.82	
Filter Pre Weight (grams):	0.4409		Fo Validity:	Fail	

MOISTURE DETERMINATION

Initial Impinger Content:	1946.9	ml	Silica Initial Wt.	859.5	grams
Final Impinger Content:	1980.7	ml	Silica Final Wt.	887.7	grams
Impinger Difference:	33.8	ml	Silica Difference:	28.2	grams

Total Water Gain: 82.0 Moisture, Bws: 0.033 Supersaturation Value, Bws: 0.290

Port-Point No.	Clock Time	Velocity Head Δp in. H2O	Orifice ΔH in. H2O	Actual Meter Vol. ft^3	Stack Temp °F	Meter Temp Inlet °F	Meter Temp Outlet °F	Probe Temp °F	Filter Exit Temp °F	Impinger Exit Temp °F
1-1	7:15:00	1.00	2.40	6.630	124	72	71	252	253	55
1-1	7:29:00	0.98	2.40	8.510	125	72	71	254	253	55
1-2	7:42:00	0.96	2.30	10.300	129	72	71	251	250	58
1-2	7:54:00	0.96	2.30	12.210	136	72	71	253	251	56
1-3	8:05:00	0.92	2.20	13.890	142	71	71	248	250	55
1-3	8:16:00	0.90	2.20	15.870	145	71	71	247	246	58
1-4	8:28:00	0.95	2.30	17.610	149	71	71	250	248	60
1-4	8:39:00	1.00	2.40	19.400	151	72	72	252	250	65
1-5	8:49:00	1.10	2.70	21.390	154	73	72	248	249	65
1-5	9:09:00	1.00	2.40	23.040	151	73	73	251	250	66
1-6	9:20:00	0.98	2.40	25.070	153	73	73	251	250	61
1-6	9:33:00	0.98	2.40	26.910	154	73	73	257	250	60
	9:35:00			28.160						
2-1	9:53:00	0.98	2.40	28.370	152	74	73	251	249	55
2-1	10:04:00	0.98	2.40	30.240	152	74	74	252	251	48
2-2	10:18:00	1.10	2.70	32.110	154	74	74	248	250	57
2-2	10:43:00	1.00	2.40	34.110	148	74	74	249	250	55
2-3	11:01:00	0.98	2.40	35.910	146	74	74	250	250	59
2-3	11:13:00	0.90	2.20	37.770	149	74	74	249	250	57
2-4	11:24:00	0.93	2.30	39.570	156	75	75	249	249	56
2-4	11:35:00	0.95	2.30	41.340	159	75	75	250	249	57
2-5	11:47:00	0.80	1.90	43.120	164	76	75	254	250	58
2-5	11:59:00	0.80	1.90	44.890	163	77	76	249	249	57
2-6	12:16:00	0.75	1.80	46.540	160	77	76	249	251	58
2-6	12:27:00	0.80	1.90	48.180	158	77	77	250	249	58
	12:29:00			49.790						
3-1	12:40:00	0.99	2.40	49.790	156	77	77	251	248	59
3-1	12:53:00	1.20	2.90	51.820	158	77	77	249	250	56
3-2	13:04:00	1.10	2.70	53.360	160	78	78	251	249	56
3-2	13:23:00	1.20	2.90	55.480	158	78	78	248	250	58
3-3	13:37:00	1.10	2.70	57.450	159	79	79	248	251	58
3-3	13:48:00	1.10	2.70	59.590	158	79	79	253	250	62
3-4	13:59:00	0.95	2.30	61.520	159	79	79	250	250	60
3-4	14:10:00	0.90	2.20	63.370	161	79	79	250	250	62
3-5	14:22:00	0.95	2.30	65.180	160	79	79	250	250	60
3-5	14:34:00	0.85	2.10	66.930	161	79	79	250	250	62
3-6	14:44:00	0.90	2.20	68.630	161	79	79	250	250	60
3-6	14:57:00	0.90	2.20	70.480	161	79	79	248	248	62
	14:59:00			72.220						
4-1	15:10:00	1.10	2.70	72.220	162	79	79	253	249	58
4-1	15:23:00	1.10	2.70	74.220	162	79	79	256	249	59
4-2	15:36:00	1.00	2.40	76.190	163	79	79	250	250	58
4-2	15:48:00	1.00	2.40	78.040	163	79	79	250	250	56
4-3	15:58:00	1.10	2.70	79.880	164	79	79	250	249	58
4-3	16:09:00	1.10	2.70	81.880	163	79	79	250	251	56
4-4	16:21:00	0.95	2.30	83.740	162	79	79	257	251	59
4-4	16:35:00	0.90	2.20	85.610	162	79	79	253	251	58
4-5	16:47:00	0.95	2.30	87.410	163	79	79	255	251	57
4-5	16:57:00	0.85	2.10	89.120	162	79	79	247	250	58
4-6	17:08:00	0.85	2.10	90.900	164	79	79	255	250	56
4-6	17:23:00	0.80	1.90	92.610	168	79	79	250	250	58
	17:25:00			94.270						
Total	9:30:00			87.430		76.2	76.0			
Average			2.38		155.0	76.1				
Min			1.80		124.0	71.0				
Max			2.90		168.0	79.0				

Run 2-Method 5/202

Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Test Location: #2 Battery PEC Stack
Source Condition: Normal

Date: 8/17/16
Start Time: 8:48
End Time: 18:45

DRY GAS METER CONDITIONS

ΔH:	2.49	in. H_2O
Meter Temperature, Tm:	78.9	°F
Sqrt ΔP:	1.019	in. H_2O
Stack Temperature, Ts:	158.4	°F
Meter Volume, Vm:	90.210	ft^3
Meter Volume, Vmstd:	86.841	dscf
Meter Volume, Vwstd:	2.996	wscf
Isokinetic Variance:	104.7	%I
Heat Input, mmBtu/hr		Heat Input, mmBtu/hr
Test Length:	96.00	in mins.
Nozzle Diameter:	0.228	in inches
Barometric Pressure:	29.39	in Hg
Filter ID:	9954	
Filter Pre Weight (grams):	0.4552	

STACK CONDITIONS

Static Pressure	-1.00	in. H_2O
Flue Pressure (Ps):	29.32	in. Hg. abs.
Carbon Dioxide:	1.20	%
Oxygen:	20.00	%
Nitrogen:	78.8	%
Gas Weight dry, Md:	28.992	lb/lb mole
Gas Weight wet, Ms:	28.625	lb/lb mole
Excess Air:	—	%
Gas Velocity, Vs:	62.831	fps
Volumetric Flow:	239,828	acfm
Volumetric Flow:	193,962	dscfm
Volumetric Flow:	200,652	scfm
Calculated Fo:	0.75	
Fo Validity:	Fail	

MOISTURE DETERMINATION

Initial Impinger Content:	1839.9	ml	Silica Initial Wt.	818.9	grams
Final Impinger Content:	1878.2	ml	Silica Final Wt.	844.2	grams
Impinger Difference:	38.3	ml	Silica Difference:	25.3	grams

Total Water Gain: 63.6 Moisture, Bws: 0.033 Supersaturation Value, Bws: 0.317

Port-Point No.	Clock Time	Velocity Head Δp In. H2O	Orifice ΔH In. H2O	Actual Meter Vol. ft^3	Stack Temp °F	Meter Temp Inlet °F	Meter Temp Outlet °F	Probe Temp °F	Filter Exit Temp °F	Impinger Exit Temp °F
1-1	8:48:00	1.20	2.90	94.830	115	70	70	250	248	65
1-1	9:11:00	1.20	2.90	96.890	115	71	71	247	250	65
1-2	9:23:00	1.20	2.90	98.910	125	72	71	248	249	65
1-2	9:33:00	1.10	2.60	100.950	136	73	72	248	251	65
1-3	9:43:00	1.10	2.60	102.860	145	74	73	249	249	65
1-3	9:55:00	1.20	2.90	104.720	154	75	74	249	250	65
1-4	10:05:00	1.10	2.60	106.880	155	75	75	253	249	63
1-4	10:15:00	1.10	2.60	108.790	160	76	75	250	252	63
1-5	10:28:00	1.10	2.60	110.570	162	77	76	249	248	56
1-5	10:41:00	0.92	2.20	112.650	164	77	77	249	249	60
1-6	10:55:00	0.92	2.20	114.490	164	78	78	252	250	63
1-6	11:07:00	0.85	2.00	116.240	166	79	78	247	251	62
	11:09:00			117.950						
2-1	11:21:00	1.20	2.90	118.120	165	79	79	252	249	65
2-1	11:31:00	1.20	2.90	120.120	164	79	79	249	248	64
2-2	11:44:00	1.20	2.90	122.070	165	79	79	250	249	65
2-2	12:02:00	1.20	2.90	124.230	162	79	78	249	250	62
2-3	12:18:00	1.10	2.60	126.180	159	79	79	250	247	64
2-3	12:30:00	1.10	2.60	128.110	157	79	79	252	250	65
2-4	12:41:00	1.10	2.60	129.990	161	80	79	252	251	65
2-4	12:53:00	0.95	2.30	131.970	167	80	80	248	249	65
2-5	13:03:00	0.92	2.20	133.920	167	80	80	248	250	61
2-5	13:15:00	0.92	2.20	136.690	169	80	80	249	246	65
2-6	13:32:00	0.85	2.00	137.370	165	80	80	250	250	65
2-6	13:51:00	0.95	2.30	139.110	156	80	80	249	248	60
	13:53:00			140.750						
3-1	14:01:00	1.10	2.60	140.750	153	80	80	250	250	54
3-1	14:18:00	1.20	2.90	142.520	153	80	80	256	251	58
3-2	14:29:00	1.10	2.60	144.450	149	80	80	251	249	57
3-2	14:43:00	1.10	2.60	146.490	152	79	79	245	251	61
3-3	14:56:00	1.10	2.60	148.480	156	79	79	248	250	59
3-3	15:06:00	1.10	2.60	150.580	158	79	79	248	247	61
3-4	15:17:00	0.98	2.30	152.390	162	80	80	248	247	59
3-4	15:31:00	0.95	2.30	154.280	160	80	80	250	250	61
3-5	15:45:00	0.95	2.30	156.020	156	81	81	250	251	62
3-5	16:03:00	0.85	2.00	157.830	155	81	81	250	251	56
3-6	16:18:00	0.80	1.90	159.450	156	82	82	252	249	59
3-6	16:26:00	0.85	2.00	161.160	159	82	82	248	249	60
	16:28:00			162.770						
4-1	16:36:00	1.10	2.60	162.770	166	82	82	257	249	64
4-1	16:48:00	1.10	2.60	164.550	169	82	82	250	251	62
4-2	16:58:00	1.20	2.90	166.570	171	82	82	251	249	65
4-2	17:09:00	1.20	2.90	168.550	169	82	82	251	249	61
4-3	17:21:00	1.10	2.60	170.620	169	82	82	249	250	66
4-3	17:33:00	1.10	2.60	172.670	167	82	82	250	250	62
4-4	17:44:00	0.95	2.30	174.660	165	81	81	250	250	63
4-4	17:58:00	1.10	2.60	176.480	165	81	81	250	250	62
4-5	18:10:00	0.85	2.00	178.370	166	81	81	250	250	63
4-5	18:20:00	0.85	2.00	180.150	168	81	81	250	250	62
4-6	18:33:00	0.85	2.00	181.790	168	80	80	248	247	60
4-6	18:43:00	0.90	2.20	183.510	169	80	80	250	250	57
	18:45:00			185.210						
Total	9:29:00			90.210		79.0	78.8			
Average			2.49		158.4	78.9				
Min			1.90		115.0	70.0				
Max			2.90		171.0	82.0				

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Run 3-Method 5/202

Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Test Location: #2 Battery PEC Stack
Source Condition: Normal

Date: 8/18/16
Start Time: 7:16
End Time: 19:08

DRY GAS METER CONDITIONS			STACK CONDITIONS		
ΔH:	2.42	in. H_2O	Static Pressure	-1.00	in. H_2O
Meter Temperature, Tm:	78.6	°F	Flue Pressure (Ps):	29.28	in. Hg. abs.
Sqrt ΔP:	1.011	in. H_2O	Carbon Dioxide:	1.00	%
Stack Temperature, Ts:	151.2	°F	Oxygen:	20.20	%
Meter Volume, Vm:	89.785	ft^3	Nitrogen:	78.8	%
Meter Volume, Vmstd:	86.342	dscf	Gas Weight dry, Md:	28.968	lb/lb mole
Meter Volume, Vwstd:	3.193	wscf	Gas Weight wet, Ms:	28.577	lb/lb mole
Isokinetic Variance:	104.6	%I	Excess Air:	---	%
Heat Input, mmBtu/hr		Heat Input, mmBtu/hr	Gas Velocity, Vs:	62.076	fps
Test Length:	96.00	in mins.	Volumetric Flow:	236,947	acfm
Nozzle Diameter:	0.228	in inches	Volumetric Flow:	193,136	dscfm
Barometric Pressure:	29.35	in Hg	Volumetric Flow:	200,279	scfm
Filter ID:	9443		Calculated Fo:	0.70	
Filter Pre Weight (grams):	0.4441		Fo Validity:	Fail	

MOISTURE DETERMINATION

Initial Impinger Content:	1950.7	ml	Silica Initial Wt.	855.1	grams
Final Impinger Content:	1995.0	ml	Silica Final Wt.	878.6	grams
Impinger Difference:	44.3	ml	Silica Difference:	23.5	grams

Total Water Gain: 67.8 Moisture, Bws: 0.036 Supersaturation Value, Bws: 0.267

Port-Point No.	Clock Time	Velocity Head Δp in. H2O	Orifice ΔH in. H2O	Actual Meter Vol. ft^3	Stack Temp °F	Meter Temp Inlet °F	Meter Temp Outlet °F	Probe Temp °F	Filter Exit Temp °F	Impinger Exit Temp °F
1-1	7:16:00	1.10	2.50	85.550	128	66	66	249	250	65
1-1	7:34:00	1.10	2.50	87.450	126	67	66	251	250	64
1-2	7:46:00	1.20	2.80	89.450	130	67	67	249	249	65
1-2	7:58:00	1.00	2.30	91.360	133	68	68	250	249	59
1-3	8:08:00	1.00	2.30	93.170	136	70	69	251	251	61
1-3	8:22:00	1.10	2.50	94.940	140	71	70	251	251	59
1-4	9:55:00	1.10	2.50	96.840	135	77	77	250	251	56
1-4	10:06:00	0.95	2.20	98.730	137	78	77	247	250	53
1-5	10:25:00	0.95	2.20	100.560	134	78	77	251	249	53
1-5	10:52:00	0.98	2.30	102.270	129	78	78	249	250	52
1-6	11:04:00	0.90	2.10	104.130	131	79	78	250	251	53
1-6	11:15:00	0.90	2.10	105.870	137	79	78	249	250	56
	11:17:00			107.550						
2-1	11:28:00	1.10	2.60	107.915	143	79	78	251	250	56
2-1	12:08:00	1.10	2.60	109.920	129	80	79	250	250	57
2-2	12:17:00	1.10	2.60	111.830	127	81	80	250	250	56
2-2	12:32:00	1.10	2.60	113.770	138	82	81	250	250	60
2-3	12:42:00	1.00	2.40	115.670	144	82	82	249	250	57
2-3	12:55:00	1.00	2.40	117.540	149	82	82	249	250	57
2-4	13:05:00	1.00	2.40	119.440	153	81	81	250	250	58
2-4	13:17:00	0.98	2.30	121.220	158	81	81	250	250	62
2-5	13:29:00	0.93	2.20	123.050	159	81	81	248	246	59
2-5	13:40:00	0.93	2.20	124.940	159	81	81	249	251	65
2-6	13:50:00	0.85	2.00	126.630	159	81	81	252	249	64
2-6	14:02:00	0.90	2.10	128.370	159	81	81	248	252	64
	14:04:00			130.170						
3-1	14:15:00	1.20	2.90	130.170	160	80	80	251	251	65
3-1	14:25:00	1.20	2.90	132.310	162	80	81	253	250	65
3-2	14:35:00	1.20	2.90	134.370	164	81	81	254	251	65
3-2	14:46:00	1.20	2.90	136.310	167	81	81	248	250	64
3-3	14:58:00	1.20	2.90	138.340	165	81	82	249	249	63
3-3	15:08:00	1.00	2.40	140.410	166	81	82	252	249	65
3-4	15:21:00	0.95	2.20	142.320	163	81	82	248	249	62
3-4	15:32:00	0.95	2.20	144.120	162	81	82	249	249	61
3-5	15:43:00	0.90	2.10	145.870	164	81	81	249	249	62
3-5	15:54:00	0.90	2.10	147.630	162	81	81	249	252	62
3-6	16:07:00	0.95	2.20	149.400	163	81	81	250	250	63
3-6	16:17:00	0.85	2.00	151.210	164	81	81	250	250	60
	16:19:00			152.970						
4-1	16:28:00	1.20	2.90	152.970	168	80	81	255	250	61
4-1	16:39:00	1.20	2.90	155.120	167	80	81	250	251	61
4-2	16:50:00	1.10	2.60	157.080	167	80	81	249	250	63
4-2	17:01:00	1.10	2.60	158.960	165	80	80	250	249	62
4-3	17:12:00	1.10	2.60	160.990	163	79	80	250	250	62
4-3	17:27:00	1.10	2.60	162.910	157	79	80	250	250	62
4-4	17:37:00	1.00	2.40	164.900	155	80	80	250	248	64
4-4	17:49:00	1.00	2.40	166.740	156	80	80	249	249	59
4-5	18:02:00	0.93	2.20	168.490	159	79	80	249	250	59
4-5	18:13:00	0.95	2.20	170.410	159	79	79	249	252	59
4-6	18:27:00	0.93	2.20	172.220	158	78	79	253	248	61
4-6	19:06:00	0.85	2.00	174.040	155	78	79	250	250	60
	19:08:00			175.700						
Total	11:21:00			89.785		78.6	78.6			
Average			2.42		151.2	78.6				
Min			2.00		126.0	66.0				
Max			2.90		168.0	82.0				

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Client: ArcelorMittal
Facility: Burns Harbor, Indiana
Project #: M162810
Test Location: No.2 PEC Stack
Operating Condition: Normal
Date: 8/16/16
Run 1

Time	CO Outlet ppmvd	CO2 % (dry)	O2 % (dry)
7:17	49.80	1.19	19.67
7:18	47.60	0.97	19.88
7:30	44.30	1.19	19.65
7:31	44.00	0.91	19.92
7:43	51.90	1.22	19.65
7:44	48.40	0.81	20.06
7:55	65.80	1.23	19.62
7:56	48.80	1.09	19.75
8:16	60.10	1.46	19.24
8:17	53.20	1.27	19.48
8:29	54.60	1.28	19.60
8:30	48.00	1.19	19.69
8:40	55.50	1.23	19.63
8:41	36.60	1.14	19.71
8:50	63.40	1.24	19.61
8:51	45.40	1.09	19.75
9:10	60.30	1.24	19.65
9:11	33.80	0.79	20.10
9:20	44.50	1.30	19.57
9:21	39.90	1.27	19.61
9:34	50.50	1.23	19.64
9:35	44.60	0.97	19.89
9:54	60.20	1.27	19.62
9:55	48.20	1.18	19.70
10:05	49.50	1.36	19.53
10:06	43.00	1.31	19.59
10:19	55.90	1.31	19.57
10:20	49.60	1.25	19.64
10:45	52.40	1.15	19.68
10:46	47.80	0.76	20.09
11:02	51.30	1.30	19.59
11:03	41.70	1.23	19.66
11:14	54.70	1.29	19.60
11:15	53.70	0.99	19.87
11:25	49.90	1.32	19.58
11:26	40.50	1.25	19.64
11:48	45.90	1.28	19.61
11:49	43.30	0.90	19.97
11:59	51.20	1.26	19.56
12:00	46.50	1.26	19.61
12:17	47.30	1.26	19.63
12:18	47.10	1.20	19.69
12:28	57.10	1.31	19.58
12:29	46.10	1.17	19.70
12:41	72.00	1.12	19.55
12:42	52.70	0.91	19.77
12:54	72.30	1.23	19.58
12:55	44.60	1.08	19.75
13:24	57.20	1.23	19.60
13:25	48.60	1.14	19.70
13:37	43.60	1.24	19.62
13:38	40.70	1.19	19.67
13:49	69.60	1.13	19.66
13:50	64.00	0.99	19.80
14:00	57.20	1.25	19.60
14:01	44.00	1.17	19.67
14:11	49.40	1.20	19.63
14:12	46.80	0.99	19.83
14:35	56.50	1.13	19.63
14:36	54.10	0.93	19.82
14:46	51.20	1.22	19.58
14:47	46.70	0.98	19.80
14:58	51.50	1.22	19.65
14:59	43.00	1.07	19.77
15:10	42.50	1.24	19.61
15:11	42.70	1.23	19.64
15:23	47.90	1.14	19.69
15:24	46.70	1.20	19.65
15:37	51.00	1.20	19.59
15:38	43.40	1.12	19.68
15:59	56.10	1.19	19.68
16:00	43.80	1.08	19.78
16:10	60.90	1.12	19.74
16:11	46.30	1.02	19.83
16:22	69.50	1.25	19.43
16:23	45.90	1.09	19.61
16:35	38.90	1.17	19.72
16:36	36.10	1.14	19.75
16:48	62.40	1.24	19.62
16:49	43.60	1.17	19.71
16:58	58.60	1.26	19.61
16:59	40.50	1.15	19.72
17:09	58.50	1.20	19.66
17:10	45.40	0.89	19.97
17:24	60.60	1.15	19.74
17:25	48.20	0.89	19.99
Average	**50.30**	**1.16**	**19.69**
Min	33.80	0.76	19.24
Max	72.30	1.46	20.10

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Client: ArcelorMittal
Facility: Burns Harbor, Indiana
Project #: M162810
Test Location: No.2 PEC Stack
Operating Condition: Normal
Date: 8/17/16
Run 2

Time	CO Outlet ppmvd	CO2 % (dry)	O2 % (dry)
9:12	56.80	1.12	19.79
9:13	52.80	0.87	20.06
9:24	46.90	1.30	19.68
9:25	46.80	1.10	19.86
9:34	49.00	1.31	19.65
9:35	47.80	1.17	19.78
9:44	55.40	1.33	19.65
9:45	41.10	1.22	19.75
9:56	58.00	1.25	19.69
9:57	54.80	1.13	19.79
10:06	55.90	1.29	19.64
10:07	43.70	1.10	19.81
10:16	49.60	1.35	19.63
10:17	37.00	1.30	19.68
10:41	44.70	1.34	19.66
10:42	41.20	1.40	19.63
10:56	45.70	1.26	19.70
10:57	41.50	1.20	19.77
11:08	72.50	1.23	19.66
11:09	55.70	1.03	19.87
11:21	46.70	1.28	19.68
11:22	44.50	1.25	19.72
11:32	44.70	1.30	19.66
11:33	44.00	1.27	19.70
11:44	54.20	1.45	19.32
11:45	50.70	1.30	19.52
12:03	48.90	1.24	19.75
12:04	38.20	1.14	19.83
12:19	48.30	1.20	19.77
12:20	42.00	0.96	19.99
12:31	52.80	1.25	19.68
12:32	42.10	1.18	19.76
12:54	44.60	1.27	19.77
12:55	41.70	0.88	20.15
13:04	52.20	1.29	19.71
13:05	39.90	1.20	19.82
13:16	60.90	1.26	19.76
13:17	54.70	1.17	19.85
13:33	49.10	1.29	19.74
13:34	48.70	0.94	20.07
13:52	66.10	1.23	19.77
13:53	50.10	1.12	19.86
14:02	81.70	1.26	19.67
14:03	52.30	1.22	19.77
14:19	45.30	1.24	19.78
14:20	38.70	0.96	20.04
14:30	53.10	1.22	19.81
14:31	46.30	1.00	20.02
14:43	48.10	1.20	19.83
14:44	46.40	1.27	19.77
14:57	42.20	1.20	19.82
14:58	39.90	0.88	20.14
15:07	48.50	1.16	19.82
15:08	47.90	0.86	20.13
15:17	57.50	1.21	19.81
15:18	56.70	1.17	19.86
15:32	56.30	1.21	19.79
15:33	41.30	1.12	19.88
15:46	56.80	1.26	19.76
15:47	47.40	1.19	19.83
16:04	80.10	1.39	19.48
16:05	57.80	1.18	19.72
16:17	51.40	1.33	19.64
16:18	45.80	1.23	19.74
16:27	62.40	1.34	19.63
16:28	51.00	1.20	19.76
16:37	42.90	1.37	19.63
16:38	40.50	1.29	19.72
16:48	41.90	1.27	19.69
16:49	43.20	1.24	19.74
17:00	45.70	1.28	19.68
17:01	41.40	1.04	19.90
17:10	57.10	1.41	19.57
17:11	46.70	1.29	19.70
17:34	41.80	1.37	19.64
17:35	43.60	1.14	19.84
17:45	73.70	1.28	19.53
17:46	52.90	1.12	19.70
17:59	53.20	1.31	19.66
18:00	41.40	1.16	19.81
18:11	44.50	1.40	19.61
18:12	40.70	1.14	19.85
18:21	39.40	1.33	19.68
18:22	39.70	1.31	19.71
18:34	43.10	1.41	19.62
18:35	39.20	1.11	19.89
18:45	51.30	1.21	19.75
18:46	45.00	1.68	17.06
Average	**49.20**	**1.22**	**19.73**
Min	37.00	0.86	17.06
Max	81.70	1.68	20.15

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Client: ArcelorMittal
Facility: Burns Harbor, Indiana
Project #: M162810
Test Location: No.2 PEC Stack
Operating Condition: Normal
Date: 8/18/16
Run 3

Time	CO Outlet ppmvd	CO2 % (dry)	O2 % (dry)
7:17	54.80	1.09	19.74
7:18	45.50	0.97	19.87
7:35	73.90	0.98	19.77
7:36	60.80	0.92	19.86
7:47	56.90	1.18	19.70
7:48	42.80	1.11	19.77
7:59	54.80	1.18	19.68
8:00	42.70	1.08	19.77
8:10	57.30	1.20	19.65
8:11	40.60	1.07	19.78
8:23	41.30	1.18	19.68
8:24	37.20	0.90	19.94
9:57	52.40	1.14	19.74
9:58	48.50	0.90	19.98
10:07	86.50	1.12	19.64
10:08	50.00	0.96	19.82
10:26	76.80	1.09	19.87
10:27	41.60	0.98	20.00
10:53	60.40	1.10	19.96
10:54	50.30	0.90	20.19
11:05	67.20	1.27	19.88
11:06	46.60	1.08	20.06
11:16	62.00	1.21	19.93
11:17	42.10	1.08	20.04
12:07	54.80	1.15	19.93
12:08	45.20	1.01	20.06
12:18	63.70	1.01	19.81
12:19	46.40	0.85	20.04
12:33	70.30	1.12	19.90
12:34	42.00	0.96	20.07
12:43	53.00	1.18	19.86
12:44	39.10	0.92	20.12
12:55	45.70	1.16	19.90
12:56	50.20	1.12	19.95
13:18	64.90	1.05	19.91
13:19	45.90	0.88	20.11
13:29	48.10	1.13	19.92
13:30	45.20	1.14	19.91
13:41	46.00	1.12	19.92
13:42	44.50	0.88	20.16
13:51	47.70	1.17	19.89
13:52	42.90	1.13	19.93
14:03	44.00	1.22	19.85
14:04	33.90	1.16	19.92
14:25	49.30	1.16	19.90
14:26	39.10	1.19	19.86
14:36	56.20	1.25	19.82
14:37	39.70	1.08	19.98
14:47	56.90	1.17	19.82
14:48	38.30	1.03	19.97
14:59	54.90	1.12	19.92
15:00	49.70	0.91	20.12
15:09	60.50	1.28	19.74
15:10	46.00	1.14	19.90
15:22	62.60	1.20	19.83
15:23	45.70	1.08	19.93
15:32	65.80	1.31	19.56
15:33	51.20	1.13	19.76
15:55	45.00	1.13	19.89
15:56	40.90	1.10	19.92
16:08	49.70	1.11	19.92
16:09	42.90	0.83	20.22
16:18	59.40	1.24	19.83
16:19	38.70	1.06	19.99
16:29	53.40	1.23	19.80
16:30	41.50	1.17	19.87
16:40	54.00	1.16	19.86
16:41	43.30	1.00	20.01
16:51	56.50	1.17	19.85
16:52	40.70	1.06	19.96
17:02	61.40	1.16	19.85
17:03	43.70	1.03	19.98
17:13	40.70	1.04	19.92
17:14	46.80	1.05	19.89
17:38	72.40	1.16	19.77
17:39	47.90	1.01	19.94
17:50	48.00	1.14	19.83
17:51	40.80	0.90	20.08
18:03	58.10	1.18	19.84
18:04	44.20	1.07	19.95
18:13	51.20	1.11	19.84
18:14	49.30	1.07	19.90
18:28	62.00	1.13	19.87
18:29	47.80	1.04	19.96
19:08	26.40	0.85	19.91
19:09	49.10	1.00	19.72
Average	**50.40**	**1.08**	**19.90**
Min	26.40	0.83	19.56
Max	86.50	1.31	20.22

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Company:	Arcelor Mittal Burns Harbor LLC	
Total Average Run 1-3	Burns Harbor, Indiana	
Test Location:	# 2 Battery PEC Stack	
Test Method:	0031	
Test Engineer:	CSE	
Test Technician:	N/A	
Temp ID:	MM4A	
Meter ID:	MM4A	
Probe Length:	3.0	**ft**
Probe Liner Material:	Glass	
Meter Calibration Factor (Y):	1.000	
Sample Plane:	Horizontal	
Port Length:	6.50	**in.**
Port Size (diameter):	4.00	**in.**
Port Type:	Nipple	
Duct Shape:	Circular	
Diameter	9	**ft**
Duct Area:	63.617	**Sq. Ft.**
Test Length:	120	**min.**
Train Type:	Other	
Source Condition:	Normal	
# of Runs	3	

ICR M23 2/2/10

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Run 1-Method 0031

Total Average **Company: Arcelor Mittal Burns Harbor LLC**

Plant: Burns Harbor, Indiana

Test Location: # 2 Battery PEC Stack

Source Condition: Normal

Date: 8/30/16

Start Time: 7:13

End Time: 15:03

Meter Temperature, Tm:	79.3	°F
Stack Temperature, Ts:	147.6	°F
Test Length	80.00	in mins.
Barometric Pressure	29.40	in Hg
Set 1 Meter Volume, Vm:	20.281	cc
Set 1 Meter Volume, Vmstd:	19.512	dscc
Set 2 Meter Volume, Vm:	20.342	cc
Set 2 Meter Volume, Vmstd:	19.570	dscc
Set 3 Meter Volume, Vm:	20.454	cc
Set 3 Meter Volume, Vmstd:	19.678	dscc
Set 4 Meter Volume, Vm:	20.718	cc
Set 4 Meter Volume, Vmstd:	19.932	dscc
Total Meter Volume, Vmstd:	78.693	dscc
Carbon Dioxide:	1.20	%
Oxygen:	19.70	%
Nitrogen:	79.10	%
Gas Weight dry, Md:	28.980	lb/lb mole

Port-Reading No.	Clock Time	Actual Meter Vol. liters	Stack Temp °F	Meter Temp Inlet °F	Meter Temp Outlet °F
Set 1-1	7:13:00	0.000	140.0	73.7	73.7
	9:07:00	20.281			
Set 1 Data		20.281	140.0	73.7	
Set 2-1	9:34:00	0.000	143.4	75.6	75.6
	11:34:00	20.342			
Set 2 Data		20.342	143.4	75.6	
Set 3-1	11:44:00	0.000	149.5	81.4	81.4
	13:37:00	20.454			
Set 3 Data		20.454	149.5	81.4	
Set 4-1	13:45:00	0.000	157.3	86.4	86.4
	15:03:00	20.718			
Set 4 Data		20.718	157.3	86.4	

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Run 2-Method 0031

Total Average **Company: Arcelor Mittal Burns Harbor LLC**

Plant: Burns Harbor, Indiana

Test Location: # 2 Battery PEC Stack

Source Condition: Normal

Date: 8/31/16

Start Time: 7:10

End Time: 15:18

Meter Temperature, Tm:	78.1	°F
Stack Temperature, Ts:	150.9	°F
Test Length	80.00	in mins.
Barometric Pressure	29.29	in Hg
Set 1 Meter Volume, Vm:	20.512	cc
Set 1 Meter Volume, Vmstd:	19.704	dscc
Set 2 Meter Volume, Vm:	20.734	cc
Set 2 Meter Volume, Vmstd:	19.917	dscc
Set 3 Meter Volume, Vm:	20.536	cc
Set 3 Meter Volume, Vmstd:	19.727	dscc
Set 4 Meter Volume, Vm:	20.704	cc
Set 4 Meter Volume, Vmstd:	19.888	dscc
Total Meter Volume, Vmstd:	79.237	dscc
Carbon Dioxide:	1.20	%
Oxygen:	19.70	%
Nitrogen:	79.10	%
Gas Weight dry, Md:	28.980	lb/lb mole

Port-Reading No.	Clock Time	Actual Meter Vol. liters	Stack Temp °F	Meter Temp Inlet °F	Meter Temp Outlet °F
Set 1-1	7:10:00	0.000	140.0	77.6	77.6
	9:11:00	20.512			
Set 1 Data		20.512	140.0	77.6	
Set 2-1	9:19:00	0.000	154.2	78.6	78.6
	11:15:00	20.734			
Set 2 Data		20.734	154.2	78.6	
Set 3-1	11:27:00	0.000	156.5	79.2	79.2
	13:16:00	20.536			
Set 3 Data		20.536	156.5	79.2	
Set 4-1	13:23:00	0.000	152.9	76.9	76.9
	15:18:00	20.704			
Set 4 Data		20.704	152.9	76.9	

ICR M23 2/2/10

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Run 3-Method 0031

Total Average

Company: Arcelor Mittal Burns Harbor LLC
Plant: Burns Harbor, Indiana
Test Location: # 2 Battery PEC Stack
Source Condition: Normal
Date: 9/1/16
Start Time: 9:06
End Time: 17:22

Meter Temperature, Tm:	72.2	°F
Stack Temperature, Ts:	145.0	°F
Test Length	80.00	in mins.
Barometric Pressure	29.44	in Hg
Set 1 Meter Volume, Vm:	20.410	cc
Set 1 Meter Volume, Vmstd:	19.926	dscc
Set 2 Meter Volume, Vm:	20.287	cc
Set 2 Meter Volume, Vmstd:	19.806	dscc
Set 3 Meter Volume, Vm:	20.318	cc
Set 3 Meter Volume, Vmstd:	19.836	dscc
Set 4 Meter Volume, Vm:	20.311	cc
Set 4 Meter Volume, Vmstd:	19.829	dscc
Total Meter Volume, Vmstd:	79.397	dscc
Carbon Dioxide:	1.20	%
Oxygen:	19.70	%
Nitrogen:	79.10	%
Gas Weight dry, Md:	28.980	lb/lb mole

Port-Reading No.	Clock Time	Actual Meter Vol. liters	Stack Temp °F	Meter Temp Inlet °F	Meter Temp Outlet °F
Set 1-1	9:06:00	0.000	135.0	71.3	71.3
	10:59:00	20.410			
Set 1 Data		20.410	135.0	71.3	
Set 2-1	11:12:00	0.000	149.7	72.7	72.7
	13:14:00	20.287			
Set 2 Data		20.287	149.7	72.7	
Set 3-1	13:24:00	0.000	146.2	70.6	70.6
	15:21:00	20.318			
Set 3 Data		20.318	146.2	70.6	
Set 4-1	15:30:00	0.000	149.1	74.0	74.0
	17:22:00	20.311			
Set 4 Data		20.311	149.1	74.0	

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Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Project #: M162810

Test Location: #2 Battery PEC Stack
Date: 8/30/16

	Run 1		
Time	SO2 ppmvd	CO2 % (dry)	O2 % (dry)
7:14	24.30	0.94	19.56
7:15	28.20	0.80	19.76
7:31	20.10	1.19	19.55
7:32	39.20	1.08	19.64
7:44	26.80	1.10	19.60
7:45	33.20	0.84	19.87
7:56	36.60	0.93	19.71
7:57	31.10	0.47	20.27
8:27	30.90	1.17	19.50
8:28	37.90	0.98	19.69
8:43	20.50	1.16	19.54
8:44	30.70	1.01	19.67
8:54	22.40	1.15	19.52
8:55	35.50	1.03	19.63
9:06	37.40	1.10	19.51
9:07	37.80	0.79	19.84
9:35	27.80	0.89	19.72
9:36	29.30	0.70	19.95
9:45	29.90	1.01	19.61
9:46	33.70	0.74	19.92
10:03	33.50	1.15	19.56
10:04	40.90	0.97	19.73
10:14	24.60	1.11	19.58
10:15	35.50	0.92	19.78
10:27	30.10	1.28	19.48
10:28	40.70	1.00	19.72
10:38	36.30	1.23	19.52
10:39	41.10	0.94	19.80
11:15	26.40	1.08	19.63
11:16	37.20	0.95	19.76
11:32	5.00	0.93	19.82
11:33	20.40	0.16	20.63
11:44	2.90	0.85	19.83
11:45	22.70	0.29	20.49
12:02	30.00	0.98	19.70
12:03	36.60	0.76	19.96
12:11	10.70	1.21	19.49
12:12	35.70	0.96	19.71
12:22	37.50	0.98	19.71
12:23	36.10	0.66	20.08
12:32	18.30	1.24	19.47
12:33	42.00	1.16	19.55
12:57	18.60	1.19	19.45
12:58	39.30	1.08	19.57
13:08	37.60	1.15	19.51
13:09	42.00	0.96	19.69
13:20	37.00	1.14	19.53
13:21	40.90	0.93	19.73
13:36	36.50	1.09	19.58
13:37	36.70	0.72	19.97
13:46	40.40	1.15	19.48
13:47	44.20	0.90	19.74
13:57	19.20	0.92	19.71
13:58	24.40	0.17	20.58
14:09	10.60	1.00	19.64
14:10	22.10	0.23	20.51
14:31	32.00	1.10	19.44
14:32	40.20	0.83	19.74
14:42	33.60	0.93	19.68
14:43	37.40	0.79	19.88
14:54	20.30	1.54	19.28
14:55	41.20	1.25	19.44
15:08	40.60	1.34	19.42
15:09	42.20	0.93	19.71
15:18	26.20	1.22	19.43
15:19	51.70	1.12	19.52
15:29	48.60	1.20	19.46
15:30	46.10	0.73	19.93
16:04	25.60	1.17	19.42
16:05	42.20	1.06	19.53
16:15	39.50	1.12	19.47
16:16	39.40	0.75	19.86
16:27	19.80	0.66	19.92
16:28	15.40	0.15	20.51
16:37	30.30	0.87	19.71
16:38	25.10	0.27	20.39
16:54	37.40	0.84	19.70
16:55	33.10	0.51	20.10
17:06	35.90	1.03	19.37
17:07	41.30	0.81	19.63
17:17	47.60	0.96	19.59
17:18	46.90	0.74	19.85
Average	**32.30**	**0.93**	**19.73**

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Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Project #: M162810

Test Location: #2 Battery PEC Stack
Date: 8/31/16

Run 2

Time	SO2 ppmvd	CO2 % (dry)	O2 % (dry)
6:28:00	31.9	1.09	19.47
6:29:00	35.5	0.65	19.97
6:41:00	32.9	0.95	19.58
6:42:00	33.9	0.62	19.99
7:12:00	34.5	1.09	19.48
7:13:00	31.8	0.64	19.98
7:34:00	30	1.01	19.54
7:35:00	31.8	0.8	19.79
7:44:00	26.5	1.27	19.26
7:45:00	36.9	0.97	19.56
7:56:00	28.3	1.33	19.23
7:57:00	42.2	1.13	19.42
8:26:00	32.6	1.28	19.35
8:27:00	34.2	0.83	19.79
8:39:00	35.4	1.15	19.43
8:40:00	32.6	0.66	19.98
8:49:00	39.7	1.27	19.39
8:50:00	36.4	0.7	19.96
8:59:00	34.8	1.31	19.32
9:00:00	37.5	0.96	19.65
9:10:00	41.5	1.32	19.32
9:11:00	40.3	0.99	19.71
9:20:00	36.2	1.86	19.25
9:21:00	53.5	1.46	19.41
9:33:00	36.2	1.31	19.42
9:34:00	35.9	0.77	19.93
9:44:00	40.5	1.24	19.43
9:45:00	38.6	0.78	19.89
9:58:00	33.9	1.03	19.56
9:59:00	35.2	0.75	19.9
10:28:00	33.6	1.24	19.41
10:29:00	33.2	0.75	19.91
10:38:00	38.8	1.22	19.44
10:39:00	37.6	0.66	19.76
10:49:00	43.2	1.27	19.38
10:50:00	40.2	0.79	19.87
11:00:00	41.8	1.31	19.21
11:01:00	44.4	1.07	19.46
11:14:00	38.8	1.35	19.35
11:15:00	42.7	1.04	19.64
11:28:00	40.9	1.27	19.4
11:29:00	39.5	0.84	19.82
11:38:00	40.4	1.23	19.42
11:39:00	35.5	0.67	20
11:48:00	35.3	1.34	19.35
11:49:00	37	0.87	19.81
12:00:00	35.6	1.33	19.35
12:01:00	38.3	0.86	19.69
12:12:00	36.9	1.18	19.43
12:13:00	34.9	0.74	19.9
12:37:00	33.7	1.12	19.51
12:38:00	35.3	0.95	19.67
12:48:00	31.6	1.08	19.5
12:49:00	35.5	0.92	19.68
13:02:00	37.8	1.13	19.35
13:03:00	41.9	0.95	19.55
13:13:00	42.1	1.06	19.48
13:14:00	38.1	0.65	19.98
13:24:00	37.8	1.14	19.46
13:25:00	35.5	0.66	19.99
13:38:00	38.6	1.18	19.37
13:39:00	39.4	0.8	19.8
13:50:00	28.8	1.3	19.35
13:51:00	40.4	1.12	19.52
14:25:00	39.1	1.13	19.48
14:26:00	35.2	0.73	19.92
14:38:00	36.7	1.86	19.42
14:39:00	36.3	1.4	19.69
14:56:00	38.8	1.33	19.56
14:57:00	35.2	0.98	19.93
15:06:00	31.3	1.75	19.23
15:07:00	43.2	1.35	19.59
15:16:00	16.1	1.6	19.37
15:17:00	42.5	1.36	19.55
15:27:00	32.6	1.49	19.42
15:28:00	37.7	1.24	19.64
15:41:00	29.3	1.6	19.43
15:42:00	36.4	1.37	19.59
16:03:00	41.8	1.13	19.48
16:04:00	41.4	0.86	19.75
16:17:00	39.2	1.13	19.49
16:18:00	34.1	0.66	20.01
16:28:00	28.3	1.38	19.37
16:29:00	38.2	1.14	19.56
16:41:00	25.9	1.16	19.33
16:42:00	36.3	1	19.48
Average	**38.50**	**1.09**	**19.58**

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Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Project #: M162810

Test Location: #2 Battery PEC Stack
Date: 9/1/16

	Run 3		
Time	SO2 ppmvd	CO2 % (dry)	O2 % (dry)
8:55:00	26.1	1.24	19.6
8:56:00	30.6	1	19.82
9:07:00	37.4	1.2	19.62
9:08:00	35.1	0.75	20.08
9:18:00	32.2	1.12	19.71
9:19:00	35.5	0.83	20.01
9:29:00	42.2	1.31	19.57
9:30:00	39.5	0.73	20.14
9:58:00	39.6	1.23	19.63
9:59:00	36.9	0.73	20.13
10:10:00	23.2	1.22	19.6
10:11:00	38.1	1.11	19.7
10:22:00	41.5	1.24	19.61
10:23:00	40.4	0.89	19.94
10:33:00	41.8	1.3	19.57
10:34:00	42.7	1.02	19.81
10:46:00	38.7	1.32	19.56
10:47:00	40.6	1.02	19.83
10:58:00	34	1.27	19.56
10:59:00	39.7	1.06	19.75
11:13:00	34.7	1.34	19.49
11:14:00	42.1	1.14	19.69
11:23:00	34	1.19	19.67
11:24:00	37.7	0.95	19.91
11:35:00	36	1.31	19.59
11:36:00	39	1.01	19.87
11:45:00	28.4	1.36	19.57
11:46:00	43	1.23	19.68
11:57:00	40.6	1.26	19.64
11:58:00	39.6	0.84	20.06
12:20:00	25.5	1.1	19.79
12:21:00	29.3	0.57	20.36
12:30:00	39.9	1.29	19.62
12:31:00	40.8	0.99	19.9
12:45:00	31.3	1.17	19.7
12:46:00	33.2	0.89	19.97
13:13:00	34.7	1.34	19.6
13:14:00	41.2	1.16	19.75
13:24:00	24.5	1.39	19.55
13:25:00	41.3	1.3	19.63
13:35:00	43.2	1.35	19.59
13:36:00	43	0.95	19.96
13:46:00	36.1	1.34	19.59
13:47:00	37.5	0.96	19.95
14:07:00	16.6	1.12	19.74
14:08:00	29.2	0.62	20.29
14:19:00	35.5	1.34	19.57
14:20:00	39.7	1.05	19.84
14:30:00	39	1.26	19.61
14:31:00	39.6	0.94	19.92
14:41:00	31.7	1.22	19.53
14:42:00	40.6	1.09	19.67
14:55:00	38.4	1.41	19.53
14:56:00	46.4	1.25	19.67
15:10:00	35.4	1.08	19.8
15:11:00	31.9	0.62	20.3
15:20:00	42.5	1.19	19.68
15:21:00	39.1	0.67	20.23
15:31:00	29.7	1.35	19.56
15:32:00	38.2	1.19	19.71
15:41:00	27.8	1.38	19.54
15:42:00	39.9	1.25	19.66
16:03:00	37.3	1.25	19.64
16:04:00	38.3	0.98	19.89
16:19:00	39.1	1.23	19.64
16:20:00	38	0.85	20.02
16:33:00	38.5	1.13	19.71
16:34:00	34	0.71	20.17
16:43:00	33.4	1.34	19.56
16:44:00	44.1	1.23	19.65
16:58:00	33.2	1.21	19.63
16:59:00	34.5	0.84	20.01
17:10:00	40.1	1.32	19.57
17:11:00	41.8	0.96	19.91
17:22:00	40.8	1.14	19.74
17:23:00	33.2	0.53	20.39
17:43:00	30.4	1.34	19.54
17:44:00	39.6	1.13	19.73
17:55:00	34.2	1.32	19.59
17:56:00	39	1.08	19.79
18:06:00	40.6	1.2	19.66
18:07:00	37.7	0.79	20.07
18:21:00	29.7	1.32	19.58
18:22:00	37.4	1.19	19.69
Average	**36.50**	**1.11**	**19.77**

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Client:	ArcelorMittal Burns Harbor LLC		
Facility:	Burns Harbor, Indiana		
Test Location:	#2 Battery PEC Stack		
Project #:	M162810		
Test Method:	316		
Test Engineer:	JJR		
Test Technician:	BM		
	R1	**R2**	**R3**
Temp ID:	CM23	CM23	CM23
Meter ID:	CM23	CM23	CM23
Pitot ID:	M013	M013	M013
Nozzle Diameter (Inches):	0.225	0.256	0.256
Meter Calibration Date:	7/28/2016	7/28/2016	7/28/2016
Meter Calibration Factor (Y):	1.001	1.001	1.001
Meter Orifice Setting (Delta H):	1.405	1.405	1.405
Nozzle Kit ID Number and Material:	Glass	Glass	Glass
Pitot Tube Coefficient:	0.840		
Probe Length (Feet):	10.0		
Probe Liner Material:	Glass		
Sample Plane:	Horizontal		
Port Length (Inches):	6.50		
Port Size (Diameter, Inches):	4.00		
Port Type:	Nipple		
Duct Shape:	Circular		
Diameter (Feet):	9		
Duct Area (Square Feet):	63.617		
Upstream Diameters:	> 2.0		
Downstream Diameters:	> 3.0		
Number of Ports Sampled:	2		
Number of Points per Port:	12		
Minutes per Point:	4.0		
Minutes per Reading:	2.0		
Total Number of Traverse Points:	24		
Test Length (Minutes):	96		
Train Type:	Anderson Box		
Source Condition:	Normal		
Servomex Serial Number:	01440D1/3791		
Moisture Balance ID:	S10-35		
# of Runs	3		

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Run 1-Method 316

Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Test Location: #2 Battery PEC Stack
Source Condition: Normal

Date: 8/30/16
Start Time: 7:13
End Time: 17:18

DRY GAS METER CONDITIONS			STACK CONDITIONS		
ΔH:	2.55	in. H_2O	Static Pressure	-1.00	in. H_2O
Meter Temperature, Tm:	76.9	°F	Flue Pressure (Ps):	29.37	in. Hg. abs.
Sqrt ΔP:	0.905	in. H_2O	Carbon Dioxide:	1.00	%
Stack Temperature, Ts:	149.6	°F	Oxygen:	19.90	%
Meter Volume, Vm:	98.073	ft^3	Nitrogen:	79.10	%
Meter Volume, Vmstd:	95.607	dscf	Gas Weight dry, Md:	28.956	lb/lb mole
Meter Volume, Vwstd:	3.829	wscf	Gas Weight wet, Ms:	28.534	lb/lb mole
Isokinetic Variance:	102.6	%I	Excess Air:	---	%
Heat Input, mmBtu/hr		Heat Input, mmBtu/hr	Gas Velocity, Vs:	55.429	fps
Test Length:	96.00	in mins.	Volumetric Flow:	211,575	acfm
Nozzle Diameter:	0.256	in inches	Volumetric Flow:	172,941	dscfm
Barometric Pressure:	29.44	in Hg	Volumetric Flow:	179,868	scfm
Filter ID:			Calculated Fo:	1.00	
Filter Pre Weight (grams):			Fo Validity:	Fail	

MOISTURE DETERMINATION

Initial Impinger Content:	1907.4	ml	Silica Initial Wt.	857.5	grams
Final Impinger Content:	1965.3	ml	Silica Final Wt.	880.9	grams
Impinger Difference:	57.9	ml	Silica Difference:	23.4	grams

Total Water Gain: 81.3 Moisture, Bws: 0.039 Supersaturation Value, Bws: 0.255

Port-Point No.	Clock Time	Velocity Head Δp in. H2O	Orifice ΔH in. H2O	Actual Meter Vol. ft^3	Stack Temp °F	Meter Temp Inlet °F	Meter Temp Outlet °F	Probe Temp °F	Filter Exit Temp °F	Impinger Exit Temp °F
1-1	7:13:00	0.80	2.50	72.871	128	75	74	250	246	55
-1	7:30:00	0.80	2.50	74.831	124	76	75	250	249	56
-2	7:43:00	0.78	2.40	76.843	130	77	76	253	248	54
-2	7:54:00	0.75	2.30	78.947	137	77	76	252	250	53
-3	8:05:00	0.80	2.50	80.831	143	77	76	246	249	54
-3	8:16:00	0.78	2.40	82.833	148	77	76	250	251	53
-4	8:28:00	0.83	2.60	84.837	150	78	78	243	250	52
-4	8:42:00	0.80	2.50	86.521	147	80	79	245	249	52
-5	8:53:00	0.80	2.50	88.913	146	80	79	245	249	55
-5	9:05:00	0.80	2.50	90.940	144	81	80	251	250	55
-6	9:34:00	0.80	2.50	92.910	138	81	80	250	250	56
-6	9:44:00	0.80	2.50	94.979	135	80	79	250	249	56
-7	10:02:00	0.83	2.60	97.020	135	78	78	250	249	55
-7	10:13:00	0.80	2.50	99.063	137	76	77	251	250	57
-8	10:26:00	0.80	2.50	101.100	141	75	76	251	250	59
-8	10:37:00	0.80	2.50	103.104	147	74	75	249	249	57
-9	10:48:00	0.85	2.60	105.120	152	74	75	249	247	57
-9	11:03:00	0.85	2.60	107.159	151	74	74	249	246	59
-10	11:14:00	0.85	2.60	109.303	151	74	74	249	249	59
-10	11:32:00	0.85	2.60	111.359	147	74	74	248	250	61
-11	11:44:00	0.87	2.70	113.459	144	74	74	247	251	61
11	12:01:00	0.85	2.60	115.566	138	74	74	249	252	62
-12	12:11:00	0.85	2.60	117.620	141	75	75	249	247	63
-12	12:21:00	0.80	2.50	119.738	146	75	74	251	250	60
	12:23:00			121.759						
2-1	12:32:00	0.80	2.50	121.960	152	75	74	250	250	55
-1	12:42:00	0.83	2.60	123.798	153	76	75	250	250	55
-2	12:57:00	0.80	2.50	126.004	154	75	74	249	250	56
-2	13:07:00	0.83	2.60	128.001	156	75	74	248	252	55
-3	13:14:00	0.83	2.60	130.110	156	75	74	249	250	56
-3	13:35:00	0.80	2.50	132.179	155	76	75	250	250	58
-4	13:45:00	0.80	2.50	134.139	155	76	75	249	249	59
-4	13:57:00	0.80	2.50	136.220	157	76	75	249	250	59
-5	14:04:00	0.83	2.60	138.200	159	76	75	251	251	60
-5	14:19:00	0.80	2.50	140.300	158	77	76	246	251	60
-6	14:30:00	0.80	2.50	142.320	157	78	77	249	251	61
-6	14:41:00	0.83	2.60	144.378	157	78	77	252	249	61
-7	14:54:00	0.83	2.60	146.400	158	78	77	254	244	62
-7	15:07:00	0.83	2.60	148.455	160	78	78	249	250	62
-8	15:18:00	0.85	2.60	150.520	160	78	78	252	250	61
-8	15:28:00	0.85	2.60	152.598	163	78	78	249	250	60
-9	15:54:00	0.87	2.70	154.663	158	79	78	251	244	60
-9	16:04:00	0.85	2.60	156.799	155	79	78	249	250	61
-10	16:14:00	0.83	2.60	158.830	160	80	79	252	250	64
-10	16:27:00	0.83	2.60	160.875	163	80	80	248	249	66
-11	16:38:00	0.83	2.60	162.948	162	81	80	248	250	61
-11	16:52:00	0.83	2.60	164.998	155	81	80	252	250	61
-12	17:09:00	0.83	2.60	167.058	156	81	80	247	250	61
-12	17:16:00	0.80	2.50	169.001	158	81	80	247	250	61
	17:16:00			171.145						
Total	9:56:00			98.073		77.1	76.6			
Average			2.55		149.6	76.9				
Min			2.30		124.0	74.0				
Max			2.70		163.0	81.0				

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Run 2-Method 316

Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Test Location: #2 Battery PEC Stack
Source Condition: Normal

Date: 8/31/16
Start Time: 6:40
End Time: 16:42

DRY GAS METER CONDITIONS			STACK CONDITIONS		
ΔH:	2.62	in. H_2O	Static Pressure	-1.00	in. H_2O
Meter Temperature, Tm:	75.3	°F	Flue Pressure (Ps):	29.22	in. Hg. abs.
Sqrt ΔP:	0.923	in. H_2O	Carbon Dioxide:	1.10	%
Stack Temperature, Ts:	151.3	°F	Oxygen:	19.80	%
Meter Volume, Vm:	99.022	ft^3	Nitrogen:	79.1	%
Meter Volume, Vmstd:	96.334	dscf	Gas Weight dry, Md:	28.968	lb/lb mole
Meter Volume, Vwstd:	3.542	wscf	Gas Weight wet, Ms:	28.579	lb/lb mole
Isokinetic Variance:	101.5	%	Excess Air:	—	%
Heat Input, mmBtu/hr		Heat Input, mmBtu/hr	Gas Velocity, Vs:	56.701	fps
Test Length:	96.00	in mins.	Volumetric Flow:	216,429	acfm
Nozzle Diameter:	0.256	in inches	Volumetric Flow:	176,058	dscfm
Barometric Pressure:	29.29	in Hg	Volumetric Flow:	182,531	scfm
Filter ID:			Calculated Fo:	1.00	
Filter Pre Weight (grams):			Fo Validity:	Fail	

MOISTURE DETERMINATION

Initial Impinger Content:	1999.5	ml	Silica Initial Wt.	814.1	grams
Final Impinger Content:	2050.3	ml	Silica Final Wt.	838.5	grams
Impinger Difference:	50.8	ml	Silica Difference:	24.4	grams

Total Water Gain: 75.2 Moisture, Bws: 0.035 Supersaturation Value, Bws: 0.268

Port-Point No.	Clock Time	Velocity Head Δp in. H2O	Orifice ΔH in. H2O	Actual Meter Vol. ft^3	Stack Temp °F	Meter Temp Inlet °F	Meter Temp Outlet °F	Probe Temp °F	Filter Exit Temp °F	Impinger Exit Temp °F
1-1	6:40:00	0.83	2.60	71.351	142	72	72	242	245	52
-1	7:10:00	0.85	2.60	73.403	133	77	72	251	250	52
-2	7:33:00	0.85	2.60	75.459	126	77	75	250	250	54
-2	7:43:00	0.83	2.60	77.519	127	78	76	248	250	54
-3	7:55:00	0.87	2.70	79.580	132	78	76	250	249	53
-3	8:05:00	0.85	2.60	81.703	139	78	77	252	250	53
-4	8:25:00	0.85	2.60	83.772	146	76	76	248	251	54
-4	8:37:00	0.85	2.60	85.862	147	75	75	249	250	55
-5	8:48:00	0.87	2.70	87.002	149	74	74	249	250	55
-5	8:58:00	0.85	2.60	89.097	151	74	74	249	252	55
-6	9:09:00	0.85	2.60	91.052	154	74	74	252	250	56
-6	9:19:00	0.85	2.60	93.168	153	74	74	248	250	61
-7	9:32:00	0.87	2.70	95.265	155	74	74	251	249	62
-7	9:43:00	0.85	2.60	97.377	156	74	73	251	251	63
-8	9:57:00	0.83	2.60	99.481	156	74	74	251	250	62
-8	10:08:00	0.83	2.60	101.530	157	74	74	250	249	60
-9	10:27:00	0.85	2.60	103.575	154	74	74	247	250	55
-9	10:37:00	0.87	2.70	105.655	152	74	74	249	250	56
-10	10:47:00	0.85	2.60	107.767	152	74	74	251	250	57
-10	10:59:00	0.85	2.60	109.850	152	74	74	249	249	57
-11	11:13:00	0.85	2.60	111.935	153	74	74	252	250	60
11	11:27:00	0.85	2.60	114.020	153	74	74	252	250	61
-12	11:37:00	0.90	2.70	116.110	155	74	74	253	251	61
-12	11:47:00	0.85	2.60	118.246	162	74	74	247	251	64
	11:49:00			120.337						
2-1	11:59:00	0.85	2.60	120.643	163	74	74	251	249	65
-1	12:11:00	0.87	2.70	122.720	162	75	76	248	254	64
-2	12:25:00	0.85	2.60	124.832	158	76	75	249	250	57
-2	12:36:00	0.85	2.60	126.899	156	76	75	247	253	54
-3	12:47:00	0.85	2.60	129.000	155	76	75	249	249	52
-3	13:01:00	0.85	2.60	131.087	151	76	75	249	250	53
-4	13:12:00	0.85	2.60	133.172	150	76	75	249	250	54
-4	13:23:00	0.87	2.70	135.254	152	76	75	247	247	56
-5	13:37:00	0.87	2.70	137.359	153	77	76	250	250	56
-5	13:49:00	0.87	2.70	139.472	155	77	76	249	251	57
-6	14:00:00	0.85	2.60	141.574	157	77	76	249	248	57
-6	14:11:00	0.85	2.60	143.860	158	77	76	251	252	58
-7	14:24:00	0.87	2.70	145.747	157	77	76	250	250	59
-7	14:37:00	0.90	2.70	147.859	152	77	76	251	249	59
-8	14:54:00	0.87	2.70	150.000	152	77	76	248	250	59
-8	15:05:00	0.90	2.70	152.120	145	77	76	248	252	60
-9	15:16:00	0.87	2.70	154.254	150	77	76	252	253	63
-9	15:30:00	0.85	2.60	156.380	151	77	76	251	249	58
-10	15:40:00	0.85	2.60	158.443	156	77	76	250	250	58
-10	15:52:00	0.85	2.60	160.525	156	77	76	250	250	58
-11	16:02:00	0.80	2.50	162.620	157	78	77	249	252	60
-11	16:15:00	0.83	2.60	164.672	156	77	76	251	250	57
-12	16:27:00	0.76	2.40	166.687	155	77	76	251	253	57
-12	16:40:00	0.78	2.40	168.680	151	77	76	250	251	59
	16:42:00			170.679						
Total	9:52:00			99.022		75.7	75.0			
Average			2.62		151.3	75.3				
Min			2.40		126.0	72.0				
Max			2.70		163.0	78.0				

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Run 3-Method 316

Client:	**ArcelorMittal Burns Harbor LLC**	**Date:**	**9/1/16**
Facility:	**Burns Harbor, Indiana**	**Start Time:**	**8:53**
Test Location:	**#2 Battery PEC Stack**	**End Time:**	**19:10**
Source Condition:	**Normal**		

DRY GAS METER CONDITIONS

ΔH:	2.59	in. H_2O
Meter Temperature, Tm:	75.4	°F
Sqrt ΔP:	0.925	in. H_2O
Stack Temperature, Ts:	144.3	°F
Meter Volume, Vm:	100.487	ft^3
Meter Volume, Vmstd:	98.227	dscf
Meter Volume, Vwstd:	3.151	wscf
Isokinetic Variance:	102.0	%I
Heat Input, mmBtu/hr		Heat Input, mmBtu/hr
Test Length:	96.00	in mins.
Nozzle Diameter:	0.256	in inches
Barometric Pressure:	29.44	in Hg
Filter ID:		
Filter Pre Weight (grams):		

STACK CONDITIONS

Static Pressure	-1.00	in. H_2O
Flue Pressure (Ps):	29.37	in. Hg. abs.
Carbon Dioxide:	1.10	%
Oxygen:	19.80	%
Nitrogen:	79.1	%
Gas Weight dry, Md:	28.968	lb/lb mole
Gas Weight wet, Ms:	28.627	lb/lb mole
Excess Air:	—	%
Gas Velocity, Vs:	56.341	fps
Volumetric Flow:	215,055	acfm
Volumetric Flow:	178,701	dscfm
Volumetric Flow:	164,434	scfm
Calculated Fo:	1.00	
Fo Validity:	Fail	

MOISTURE DETERMINATION

Initial Impinger Content:	1923.8	ml	Silica Initial Wt.	885.4	grams
Final Impinger Content:	1971.4	ml	Silica Final Wt.	884.7	grams
Impinger Difference:	47.6	ml	Silica Difference:	19.3	grams

Total Water Gain: 66.9 Moisture, Bws: 0.031 **Supersaturation Value, Bws: 0.223**

Port-Point No.	Clock Time	Velocity Head Δp In. H2O	Orifice ΔH In. H2O	Actual Meter Vol. ft^3	Stack Temp °F	Meter Temp Inlet °F	Meter Temp Outlet °F	Probe Temp °F	Filter Exit Temp °F	Impinger Exit Temp °F
1-1	8:53:00	0.90	2.50	71.441	109	72	71	248	250	64
-1	9:06:00	0.85	2.50	73.580	112	73	72	248	251	61
-2	9:17:00	0.80	2.50	75.649	120	74	73	249	260	60
-2	9:28:00	0.83	2.50	77.685	126	75	74	249	250	60
-3	9:41:00	0.80	2.50	79.580	137	76	75	249	250	59
-3	9:56:00	0.80	2.50	81.852	141	76	75	249	250	59
-4	10:10:00	0.83	2.50	83.920	143	78	77	251	250	64
-4	10:21:00	0.83	2.50	85.972	143	79	77	249	249	65
-5	10:32:00	0.83	2.50	89.990	143	79	77	249	249	56
-5	10:45:00	0.85	2.50	90.090	144	79	76	248	248	56
-6	10:57:00	0.83	2.50	92.178	145	76	75	249	249	54
-6	11:12:00	0.90	2.50	94.233	146	75	74	250	250	53
-7	11:22:00	0.85	2.50	96.378	147	75	75	251	251	54
-7	11:34:00	0.83	2.50	98.460	149	74	75	251	250	52
-8	11:45:00	0.87	2.50	100.520	149	74	74	251	250	52
-8	11:56:00	0.87	2.50	102.830	153	74	74	250	248	53
-9	12:08:00	0.90	2.50	104.740	154	74	74	251	250	53
-9	12:18:00	0.87	2.50	106.884	156	74	74	249	250	53
-10	12:29:00	0.90	2.50	108.980	156	74	74	247	249	54
-10	12:43:00	0.90	2.50	111.735	150	75	74	249	252	54
-11	13:12:00	0.90	2.50	113.277	137	75	74	250	250	55
11	13:24:00	0.85	2.50	115.437	134	75	74	250	250	57
-12	13:34:00	0.87	2.50	117.520	137	75	74	251	250	57
-12	13:45:00	0.80	2.50	119.914	141	75	74	247	249	59
	13:47:00			121.835						
2-1	13:55:00	0.80	2.50	122.275	148	76	75	252	249	56
-1	14:05:00	0.83	2.60	124.280	151	76	76	247	249	56
-2	14:18:00	0.83	2.60	126.400	152	76	76	250	250	57
-2	14:29:00	0.83	2.60	128.408	151	76	75	247	250	56
-3	14:40:00	0.83	2.60	130.484	150	76	75	247	249	56
-3	14:54:00	0.85	2.60	132.517	149	77	76	250	249	56
-4	15:05:00	0.83	2.60	134.605	148	77	76	251	250	56
-4	15:19:00	0.83	2.60	136.655	147	77	76	250	250	54
-5	15:30:00	0.85	2.60	138.710	152	77	76	250	250	53
-5	15:40:00	0.85	2.60	140.784	155	77	76	251	250	54
-6	15:52:00	0.90	2.80	142.875	154	76	76	250	250	55
-6	16:02:00	0.85	2.60	145.201	156	77	76	250	249	54
-7	16:17:00	0.87	2.70	147.100	151	76	76	251	249	54
-7	16:31:00	0.90	2.80	149.214	148	76	76	250	250	56
-8	16:42:00	0.90	2.80	151.369	144	76	76	249	249	58
-8	16:57:00	0.87	2.70	153.489	143	76	76	250	250	58
-9	17:09:00	0.90	2.80	155.621	143	77	76	250	250	59
-9	17:20:00	0.90	2.80	157.750	145	76	76	250	250	60
-10	17:32:00	0.90	2.80	159.862	147	76	75	250	250	60
-10	17:42:00	0.87	2.70	162.043	149	76	75	250	250	56
-11	17:54:00	0.90	2.60	164.144	148	77	70	250	250	56
-11	18:04:00	0.87	2.70	166.297	150	78	77	250	249	60
-12	18:20:00	0.85	2.60	168.431	150	77	77	249	251	61
-12	19:08:00	0.85	2.60	170.484	122	77	76	252	250	55
	19:10:00			172.568						
Total	10:09:00			100.487		75.9	75.0			
Average			2.59		144.3	75.4				
Min			2.50		109.0	70.0				
Max			2.60		156.0	79.0				

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H2S Investigation of the Coke Oven

H2S Detection Limit

Run	Concentration
1	8.6899
2	8.5553
3	8.6788
4	8.5453
5	8.5927
6	8.3439
7	8.3693
Average	8.5393
St Dev.	0.1368

GC Event File: Time, sec	Event
0.05	inject #1
0.20	Load Loop
0.50	inject #2
0.70	Load Loop
1.00	inject #3
1.20	Load Loop
1.50	inject #4
1.70	Load Loop
2.00	inject #5
2.20	Load Loop
2.50	inject #6

Detection Limit = 3.14 x St. Dev. = 0.4297 ppm

Date: 8/30/2016

Calibration:

Certified Concentration	Area Counts Run #1	Run #2	Run #3	Average
5.858	155.2866	157.0184	159.815	157.373
8.738	356.9785	373.1438	365.2096	365.111
15.900	1137.5637	1124.5767	1143.2705	1135.137

Date: 8/31/2016

Calibration:

Certified Concentration	Area Counts Run #1	Run #2	Run #3	Average
5.858	162.4948	156.004	159.1649	159.221
8.738	382.3983	383.9556	384.7008	383.685
15.900	1389.465	1380.0701	1373.3932	1380.976

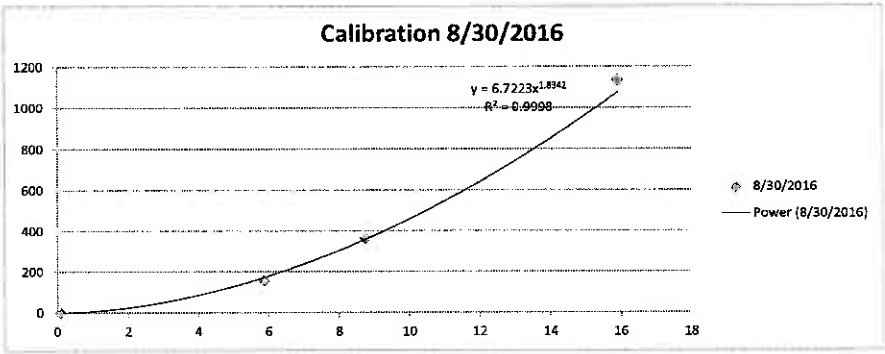
Date: 9/1/2016

Calibration:

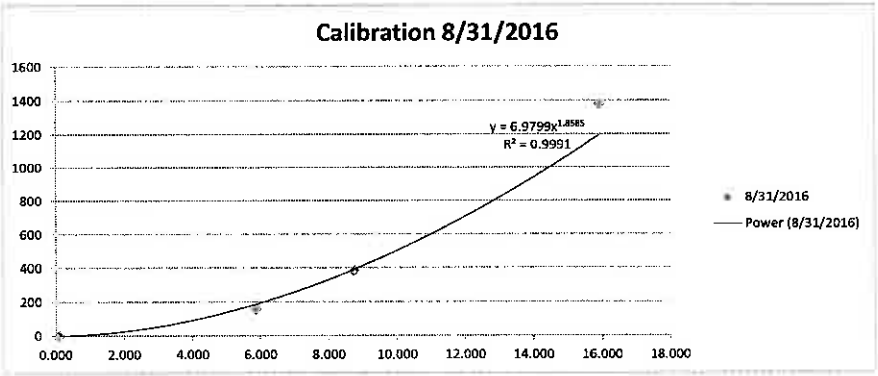
Certified Concentration	Area Counts Run #1	Run #2	Run #3	Average
5.858	149.3123	153.0902	154.9032	152.435
8.738	397.4115	396.0621	396.695	396.723
15.900	1415.403	1411.4957	1400.6486	1409.182

Line Loss Test

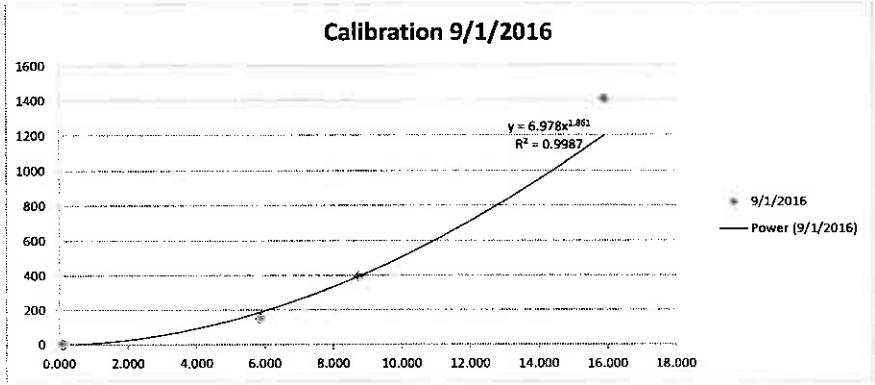
			Percent Loss
8.738	292.9104	8.5553	2.09



0.1	0.1
5.858	157.373
8.738	365.111
15.900	1135.137



0.100	0.1
5.858	159.221
8.738	383.685
15.900	1380.976



0.100	0.1
5.858	152.435
8.738	396.723
15.900	1409.182

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Date: 8/30/2016

Run #: 1

Pre-Cal Check

Certified Concentration	Area Counts	Calculated Concentration
8.738	302.2604	8.6788

	Injection #1		Injection #2		Injection #3		Injection #4		Injection #5		Injection #6	
Push Time	Area Counts	H2S Concentration	Area Counts	H2S Concentration	Area Counts	H2S Concentration	Area Counts	H2S Concentration	Area Counts	H2S Concentration	Area Counts	H2S Concentration
10:37	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
10:48	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
11:03	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
11:14	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
11:32	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
11:44	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
12:01	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
12:11	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
12:32	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
12:42	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
12:57	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
13:07	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
13:19	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
13:35	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
13:45	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
13:57	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
14:09	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
14:19	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
14:30	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
14:41	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
14:54	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
15:07	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
15:18	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
15:28	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
15:54	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
16:04	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
16:14	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
16:27	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
16:36	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
16:52	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
17:05	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
17:16	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL

Post-Cal Check

Certified Concentration	Area Counts	Calculated Concentration
8.738	292.9104	8.5553

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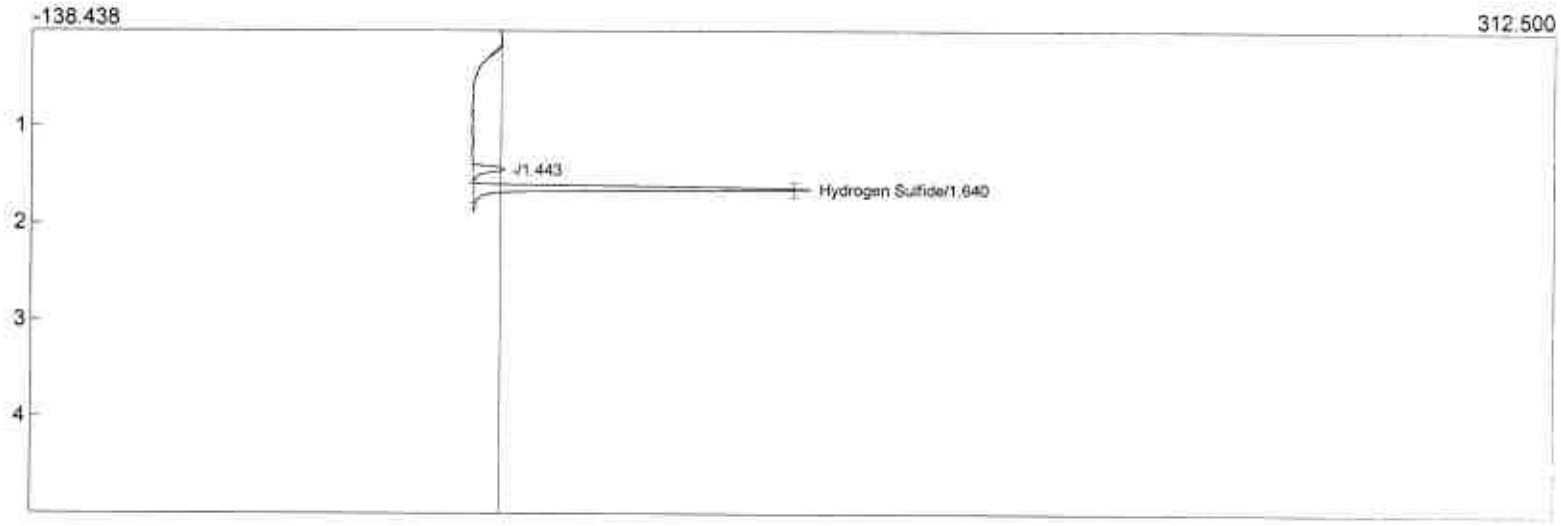
Lab name: Mostardi Platt
Client: ArcelorMittal Burns Harbor
Analysis date: 08/30/2016 10:31:06
Method: Air Sample
Description: FPD-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_116.chr ()
Sample: Pre Cal Check

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.443	41.7680	9.353	0.0000	
Hydrogen Sulfide	1.640	302.2604	100.388	8.6788	
		344.0284		8.6788	

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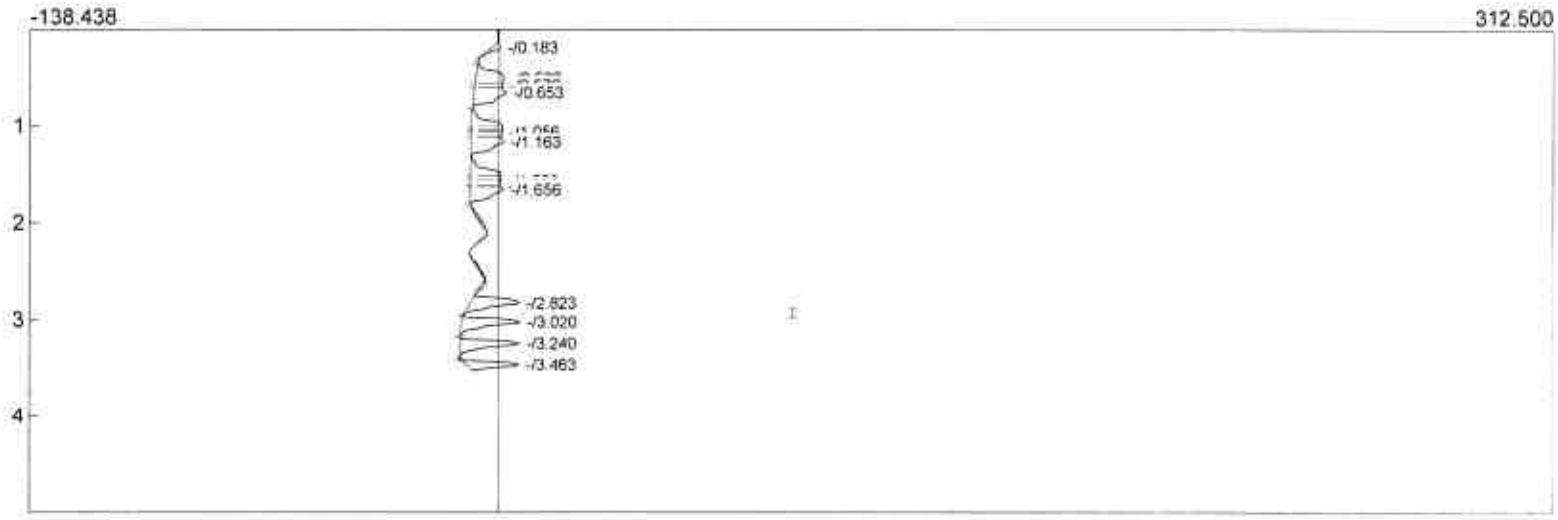
Analysis date: 08/30/2016 10:40:19
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_118.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.183	11.7084	2.455	0.0000	
-	0.503	67.9342	8.250	0.0000	
-	0.576	19.0902	8.123	0.0000	
-	0.653	77.7546	9.411	0.0000	
-	0.993	42.0227	8.947	0.0000	
-	1.020	14.3102	9.101	0.0000	
-	1.056	30.0297	9.001	0.0000	
-	1.163	75.4367	9.518	0.0000	
-	1.513	45.2368	8.871	0.0000	
-	1.540	17.7334	8.959	0.0000	
-	1.566	29.8706	8.967	0.0000	
-	1.620	12.1735	8.797	0.0000	
-	1.656	61.0035	9.682	0.0000	
-	2.823	81.1322	14.312	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.020	85.7518	16.967	0.0000	
-	3.240	82.7288	17.497	0.0000	
-	3.463	55.4174	15.311	0.0000	
		809.3347		0.0000	

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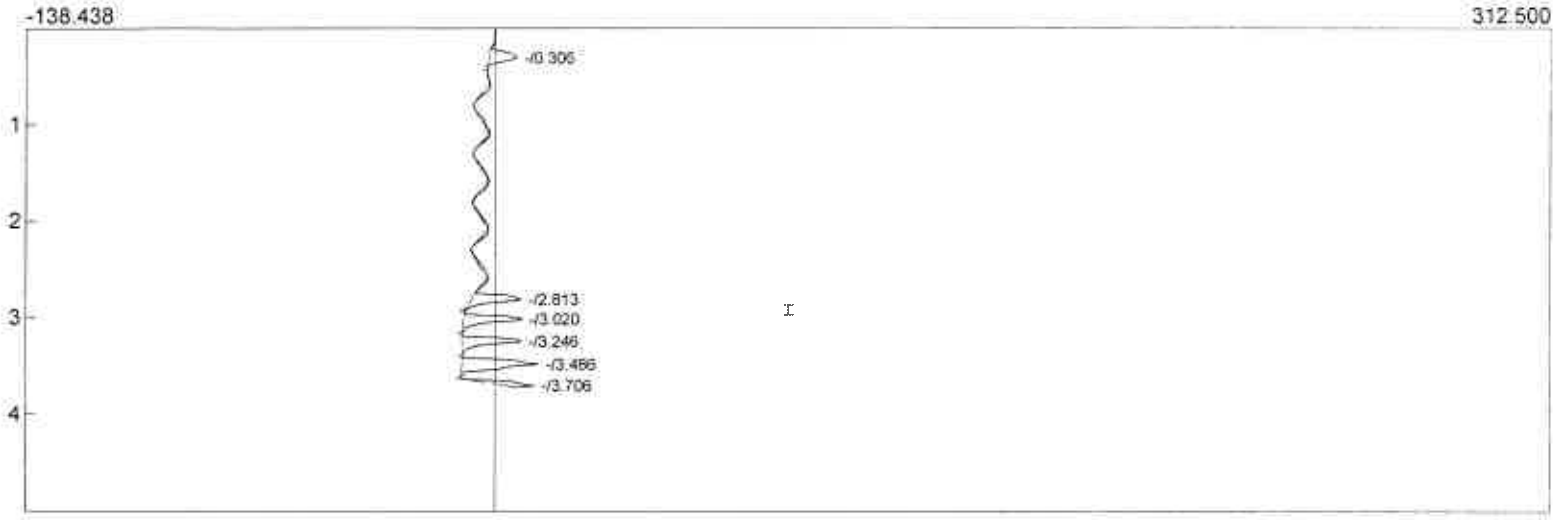
Analysis date: 08/30/2016 10:44:58
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_119.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.306	50.1627	8.348	0.0000	
-	2.813	71.7424	14.699	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.020	77.4946	17.368	0.0000	
-	3.246	78.0398	17.499	0.0000	
-	3.486	118.7520	22.701	0.0000	
-	3.706	33.1884	8.206	0.0000	
		429.3799		0.0000	

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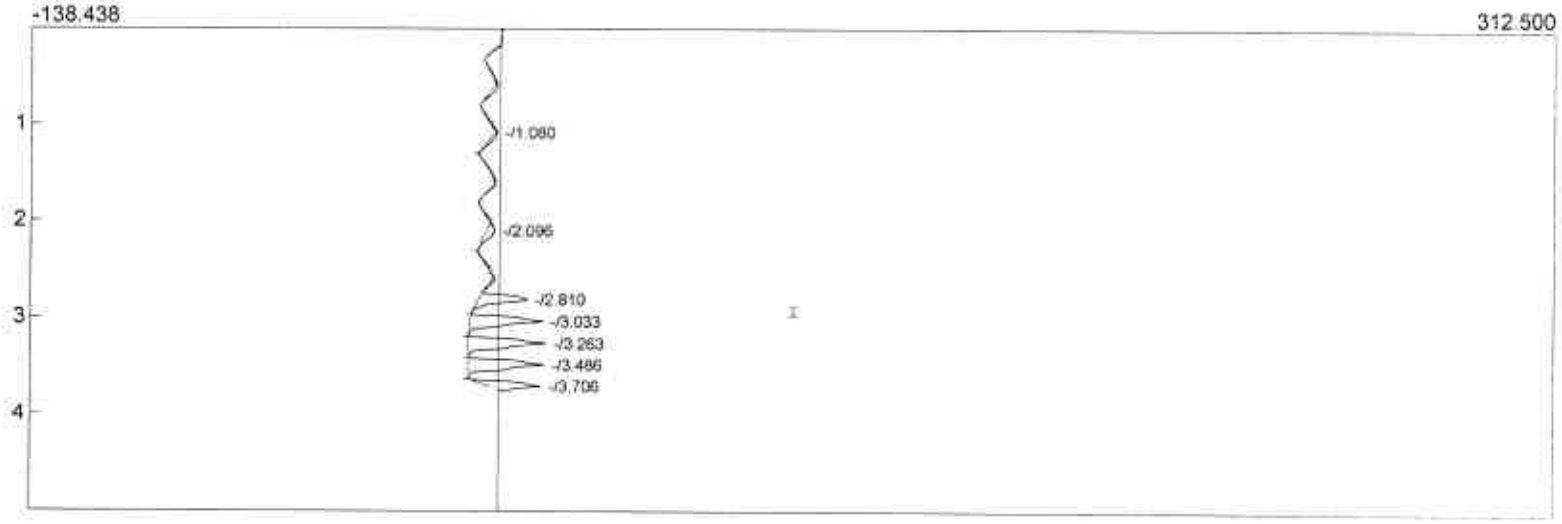
Analysis date: 08/30/2016 11:01:24
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_122.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.080	10.0266	0.768	0.0000	
-	2.096	24.6805	2.496	0.0000	
-	2.810	71.8576	14.398	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.033	109.7500	21.531	0.0000	
-	3.263	118.1761	23.026	0.0000	
-	3.486	117.2251	22.391	0.0000	
-	3.706	63.7181	15.547	0.0000	
		515.4340		0.0000	

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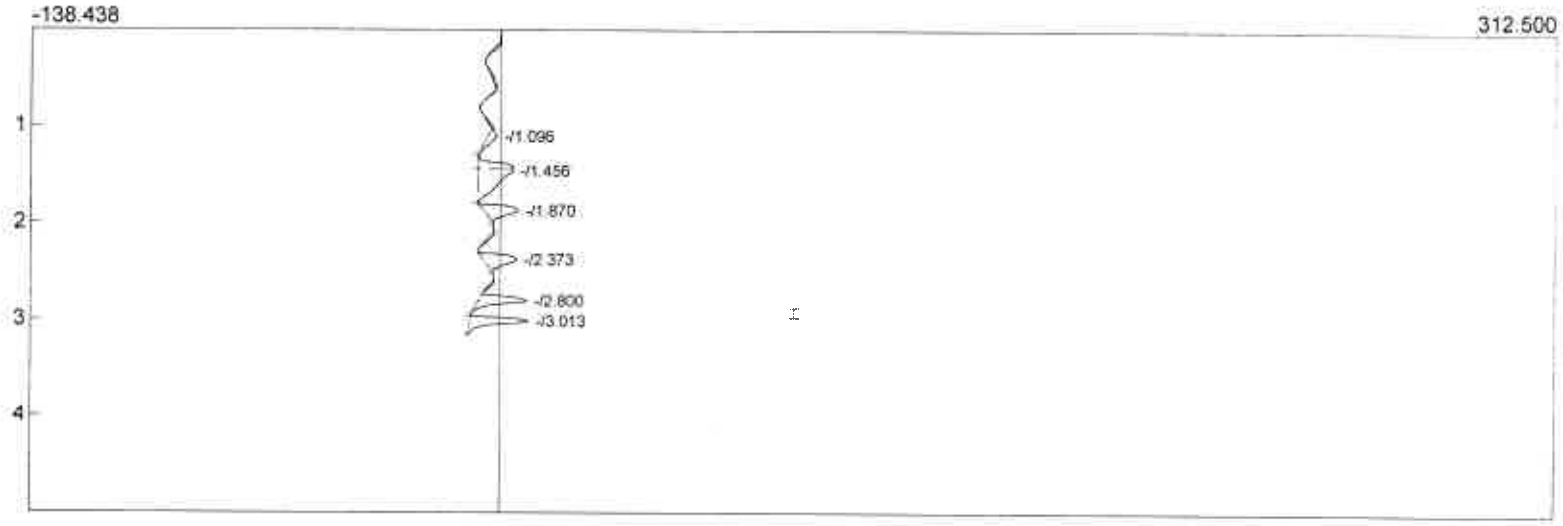
Analysis date: 08/30/2016 11:11:42
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_125.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.096	24.1562	2.754	0.0000	
-	1.420	41.8542	10.618	0.0000	
-	1.456	114.3560	10.340	0.0000	
-	1.870	67.1810	10.334	0.0000	
-	2.373	67.0352	10.024	0.0000	
-	2.800	70.8650	14.285	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.013	76.5660	17.550	0.0000	
		462.0136		0.0000	

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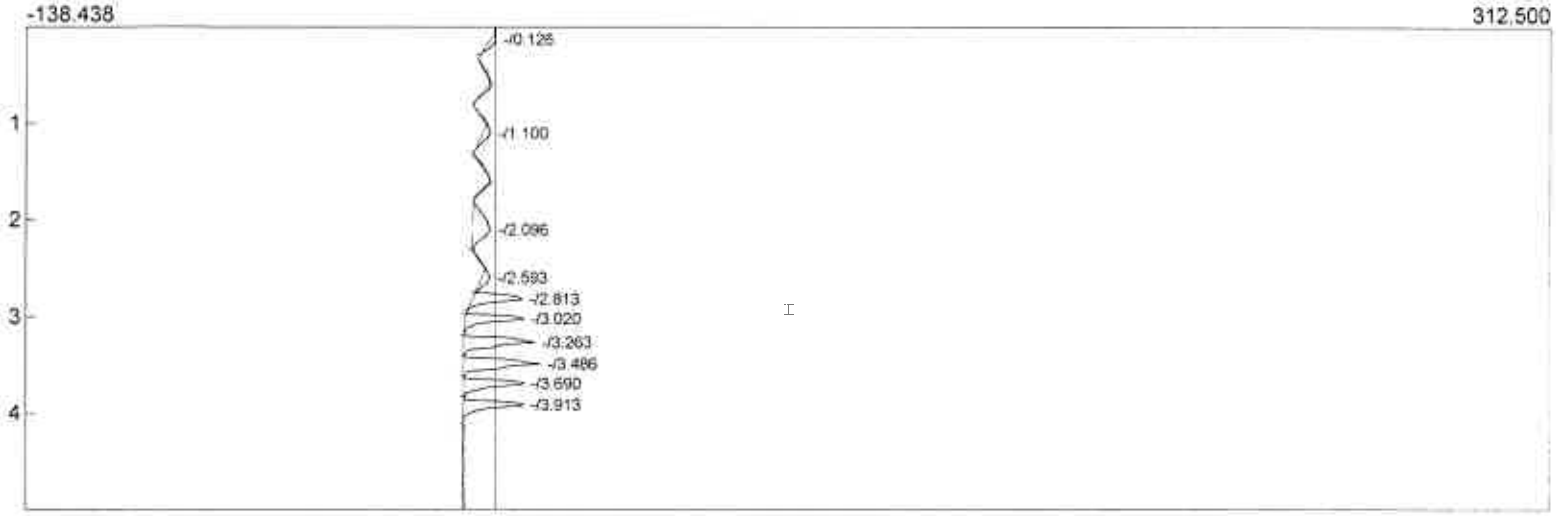
Analysis date: 08/30/2016 11:29:27
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_127.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.126	14.6359	1.604	0.0000	
-	1.100	21.0996	2.324	0.0000	
-	2.096	80.7726	5.319	0.0000	
-	2.593	19.7342	2.356	0.0000	
-	2.813	73.3722	14.656	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.020	78.0420	17.175	0.0000	
-	3.263	107.9996	21.025	0.0000	
-	3.486	116.0634	22.582	0.0000	
-	3.690	84.8986	17.772	0.0000	
-	3.913	83.4769	17.721	0.0000	
		680.0950		0.0000	

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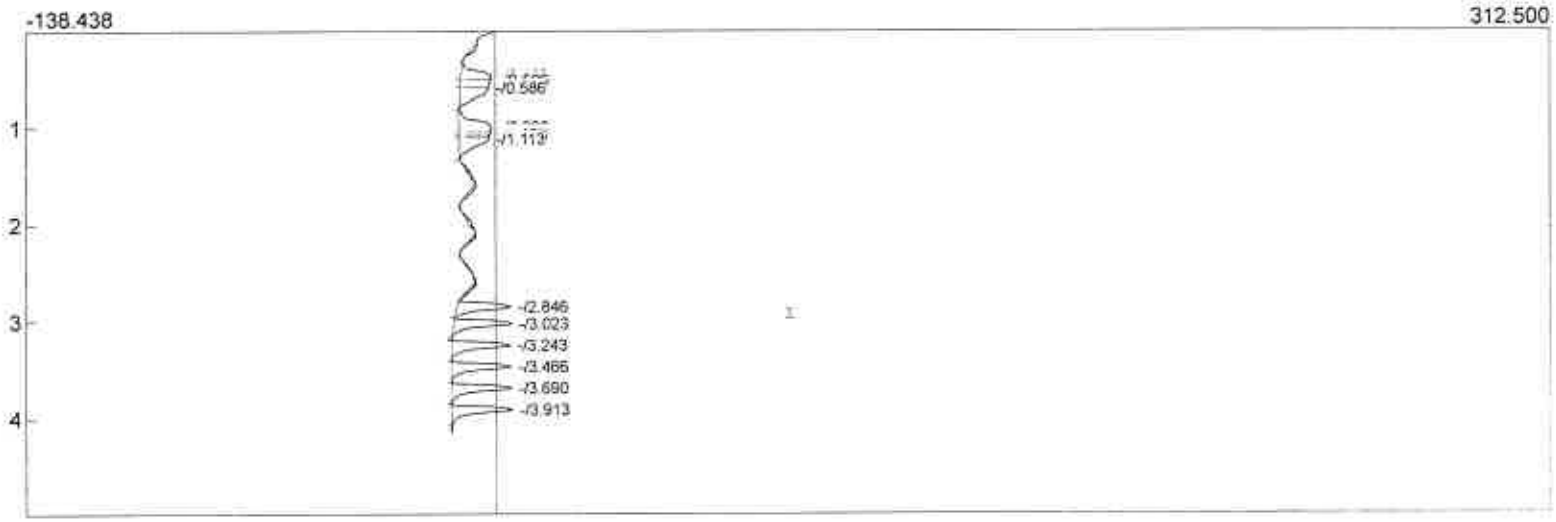
Analysis date: 08/30/2016 11:45:48
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_130.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.463	44.9628	8.886	0.0000	
-	0.506	42.2702	8.914	0.0000	
-	0.586	63.8738	8.367	0.0000	
-	0.993	70.7460	9.571	0.0000	
-	1.053	14.4814	9.265	0.0000	
-	1.073	15.7907	9.042	0.0000	
-	1.113	57.1732	8.724	0.0000	
-	2.846	76.5901	15.744	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.023	76.7186	16.958	0.0000	
-	3.243	78.1612	17.261	0.0000	
-	3.466	77.9865	17.586	0.0000	
-	3.690	79.0442	17.654	0.0000	
-	3.913	78.9132	17.950	0.0000	
		776.7119		0.0000	

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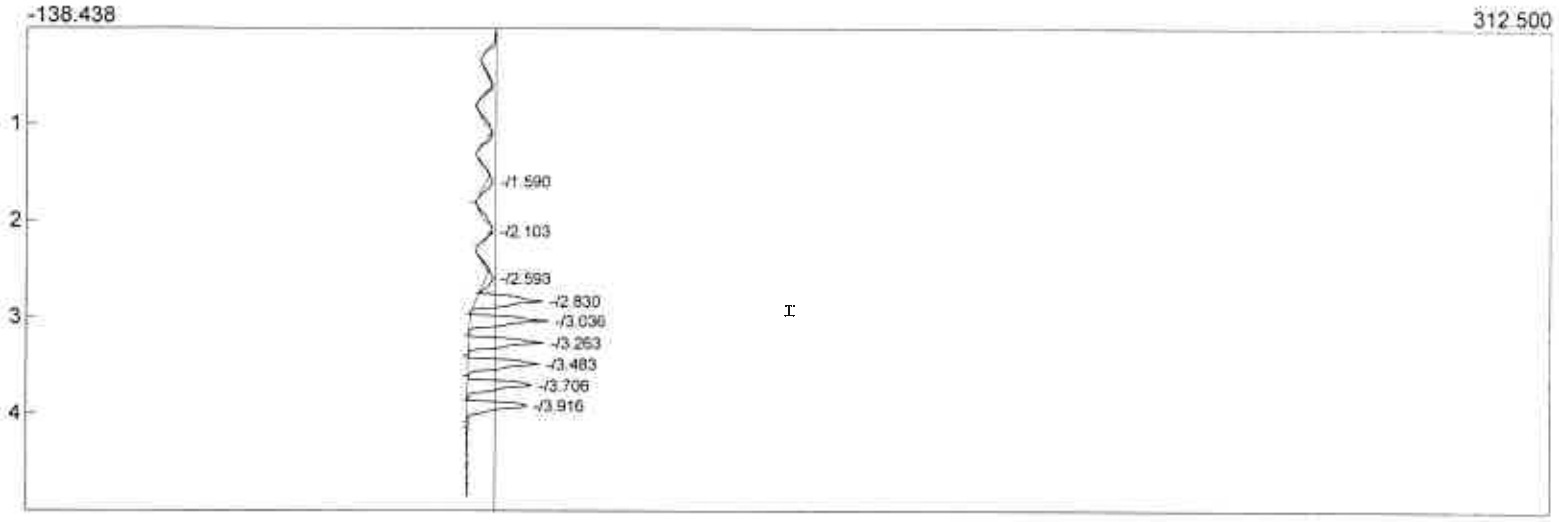
Analysis date: 08/30/2016 11:59:50
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_131.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.590	18.1512	1.993	0.0000	
-	2.103	12.9122	0.796	0.0000	
-	2.593	20.3504	2.286	0.0000	
-	2.830	111.2871	19.861	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.036	111.9494	23.147	0.0000	
-	3.263	109.6882	22.304	0.0000	
-	3.483	109.8866	21.074	0.0000	
-	3.706	103.4448	19.073	0.0000	
-	3.916	94.6576	17.763	0.0000	
		692.3275		0.0000	

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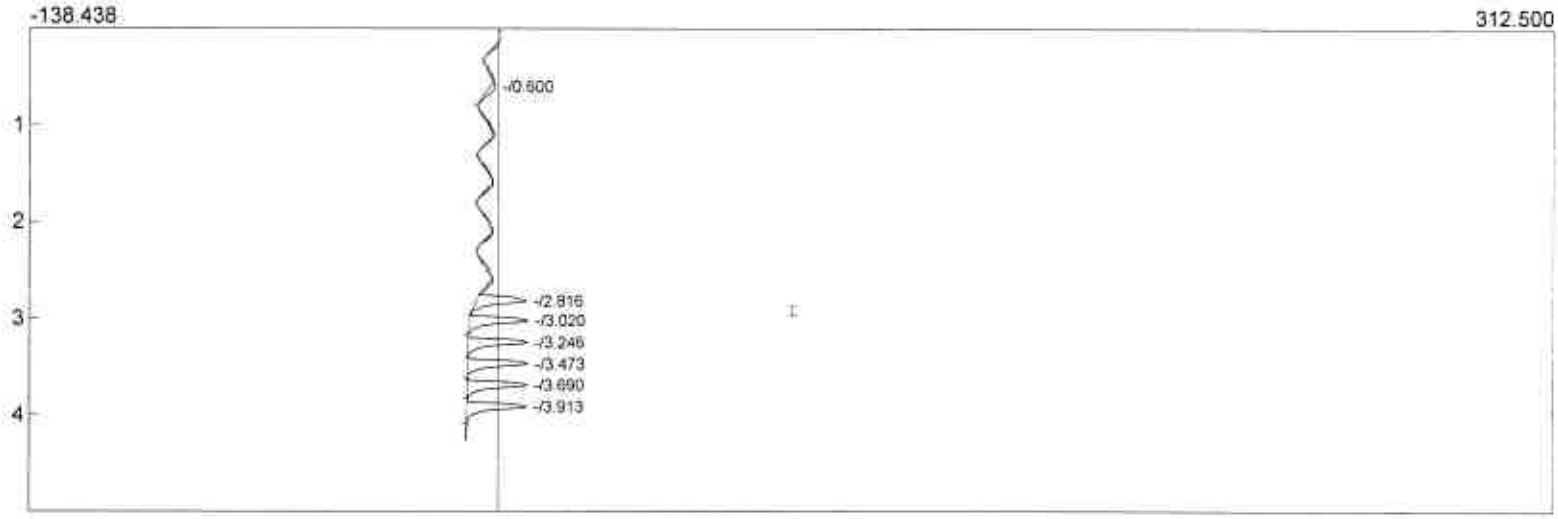
Analysis date: 08/30/2016 12:14:04
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_134.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.600	15.2806	1.634	0.0000	
-	2.816	74.5260	14.649	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.020	78.9643	17.227	0.0000	
-	3.246	78.8858	17.417	0.0000	
-	3.473	77.5875	17.649	0.0000	
-	3.690	78.5114	17.489	0.0000	
-	3.913	80.4035	17.539	0.0000	
		484.1591		0.0000	

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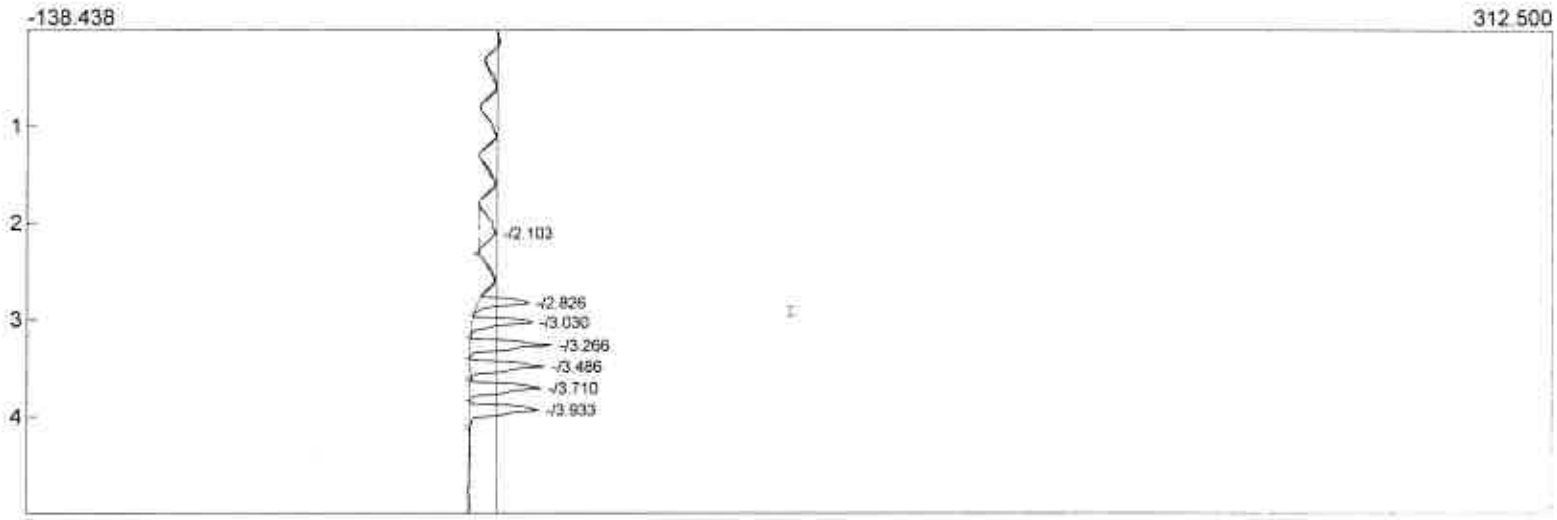
Analysis date: 08/30/2016 12:18:44
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_135.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	2.103	73.1520	4.907	0.0000	
-	2.826	72.3574	15.028	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.030	87.5960	17.868	0.0000	
-	3.266	121.2564	24.473	0.0000	
-	3.486	113.7065	22.286	0.0000	
-	3.710	113.9086	21.145	0.0000	
-	3.933	114.2394	20.505	0.0000	
		696.2163		0.0000	

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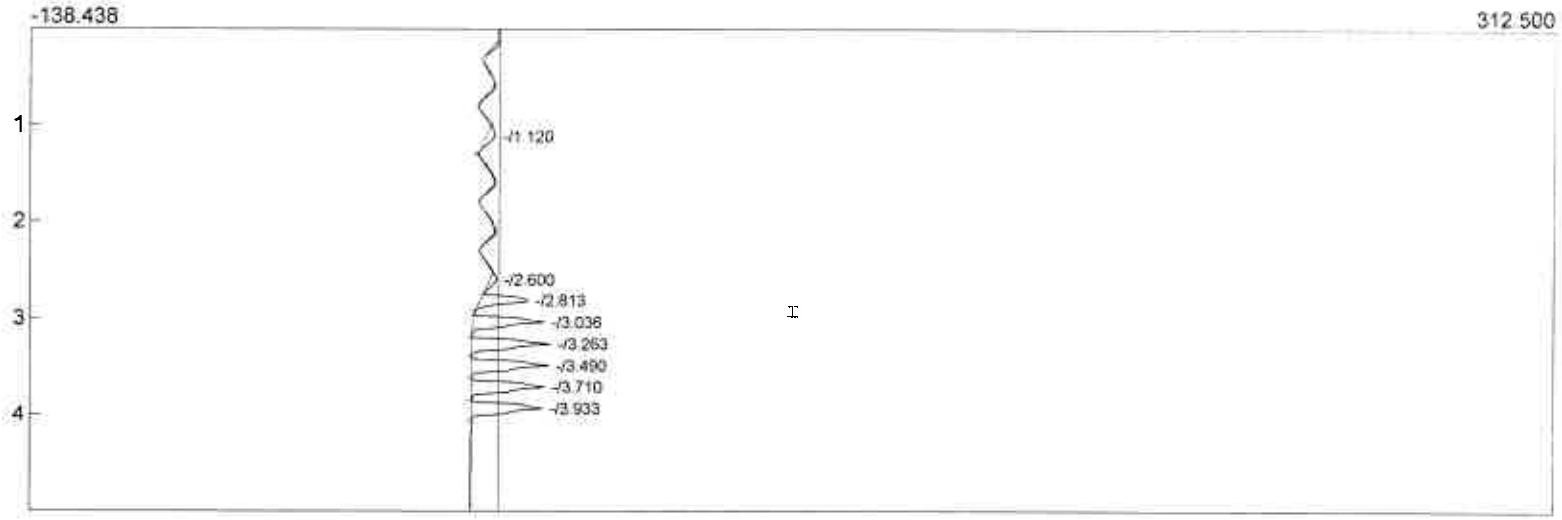
Analysis date: 08/30/2016 12:29:38
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_137.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.120	23.7632	2.693	0.0000	
-	2.600	15.3846	2.043	0.0000	
-	2.813	69.6044	13.947	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.036	105.1424	20.967	0.0000	
-	3.263	117.0779	23.377	0.0000	
-	3.490	116.4314	22.861	0.0000	
-	3.710	115.1836	21.497	0.0000	
-	3.933	111.5404	20.894	0.0000	
		674.1279		0.0000	

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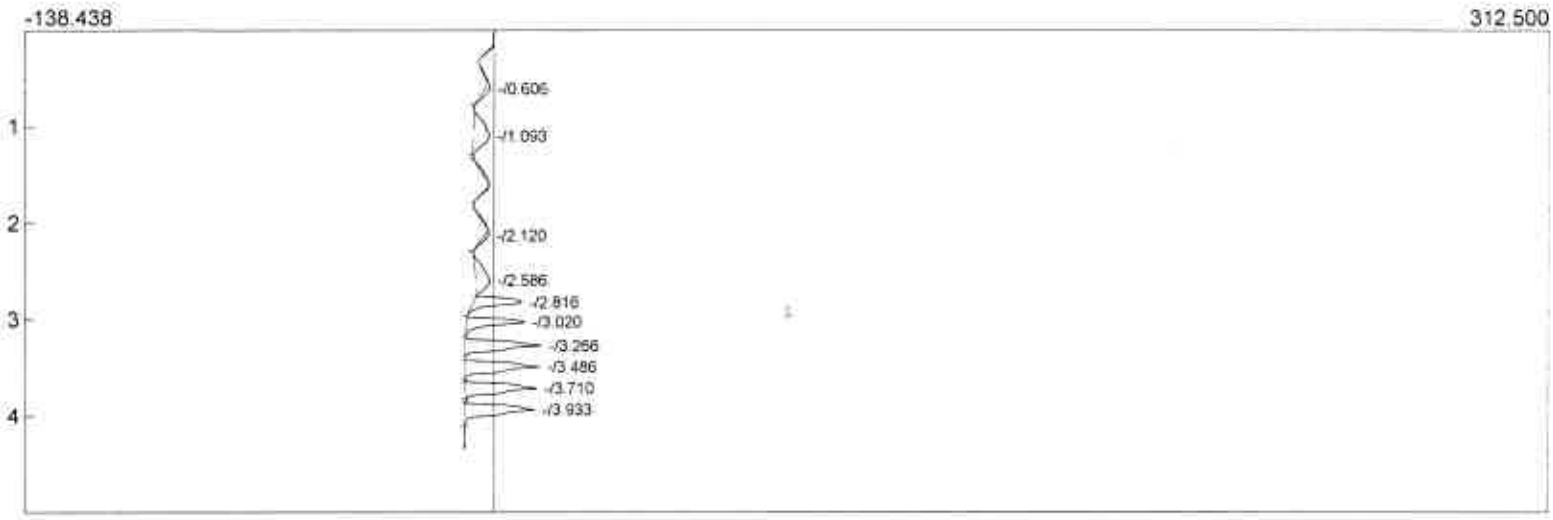
Analysis date: 08/30/2016 12:39:37
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_138.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.606	13.2749	1.783	0.0000	
-	1.093	74.3052	4.808	0.0000	
-	2.120	10.1636	1.429	0.0000	
-	2.586	59.6014	4.225	0.0000	
-	2.816	71.6306	14.292	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.020	77.7142	17.341	0.0000	
-	3.266	114.6542	22.817	0.0000	
-	3.486	115.1596	22.226	0.0000	
-	3.710	112.6798	21.246	0.0000	
-	3.933	113.1081	20.691	0.0000	
		762.2916		0.0000	

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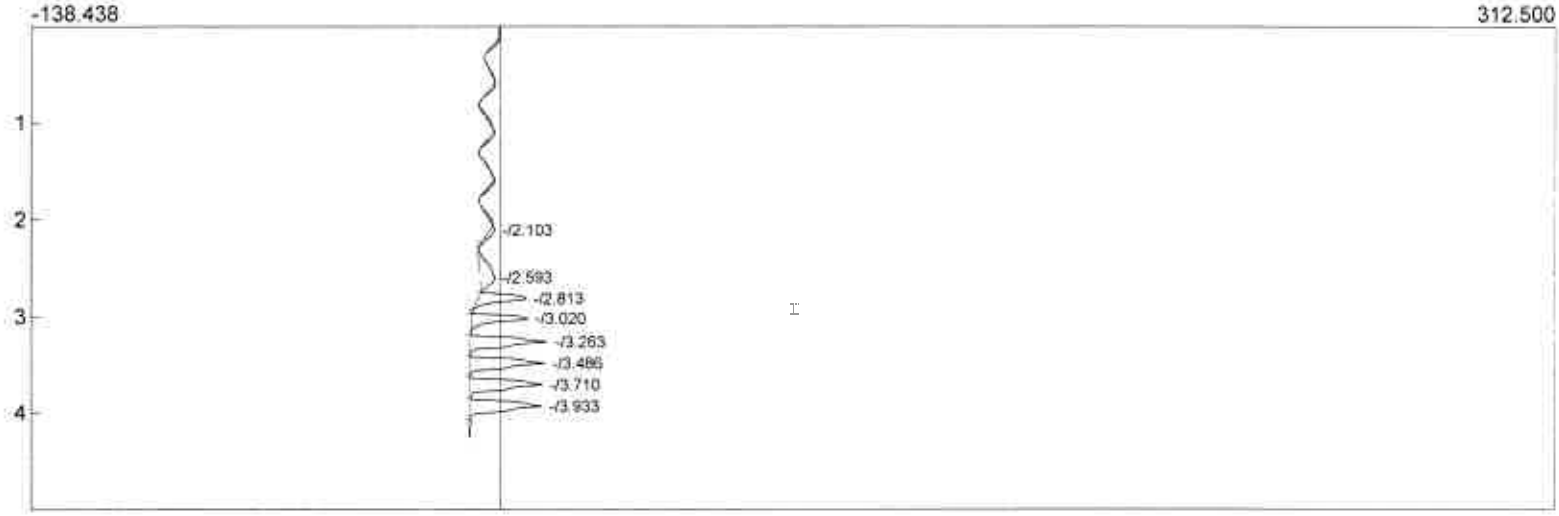
Analysis date: 08/30/2016 12:54:16
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_140.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	2.103	10.5932	1.471	0.0000	
-	2.593	65.4726	4.408	0.0000	
-	2.813	72.2037	14.261	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.020	75.9158	16.873	0.0000	
-	3.263	114.7086	22.951	0.0000	
-	3.486	115.2488	22.255	0.0000	
-	3.710	114.7352	21.442	0.0000	
-	3.933	114.3805	21.215	0.0000	
		683.2584		0.0000	

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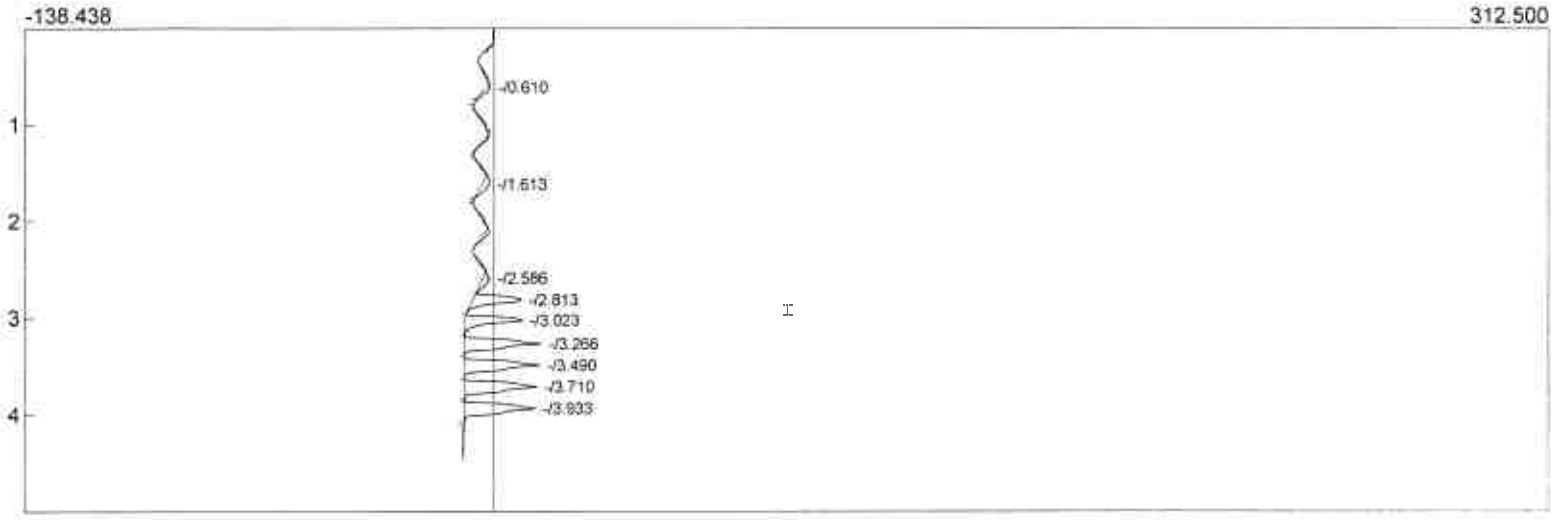
Analysis date: 08/30/2016 13:04:38
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_142.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.610	10.1825	1.428	0.0000	
-	1.613	19.0078	2.272	0.0000	
-	2.586	16.1824	2.067	0.0000	
-	2.813	72.6227	14.337	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.023	76.7124	16.858	0.0000	
-	3.266	113.0832	22.872	0.0000	
-	3.490	115.8863	22.371	0.0000	
-	3.710	114.2152	21.538	0.0000	
-	3.933	113.3189	21.122	0.0000	
		651.2114		0.0000	

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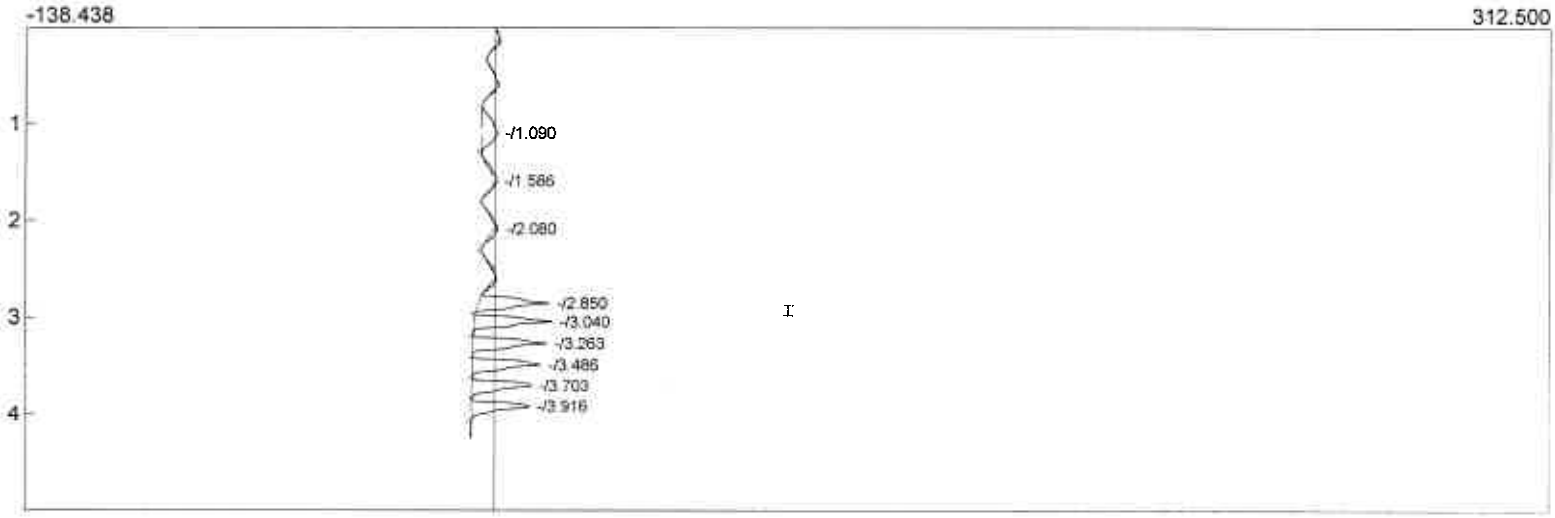
Analysis date: 08/30/2016 13:18:28
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_145.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.090	73.9747	4.909	0.0000	
-	1.586	10.1809	0.511	0.0000	
-	2.080	11.8904	1.310	0.0000	
-	2.850	110.5468	20.848	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.040	113.0572	23.152	0.0000	
-	3.263	111.4814	22.101	0.0000	
-	3.486	106.4488	20.386	0.0000	
-	3.703	97.1458	17.765	0.0000	
-	3.916	87.5582	17.382	0.0000	
		722.2842		0.0000	

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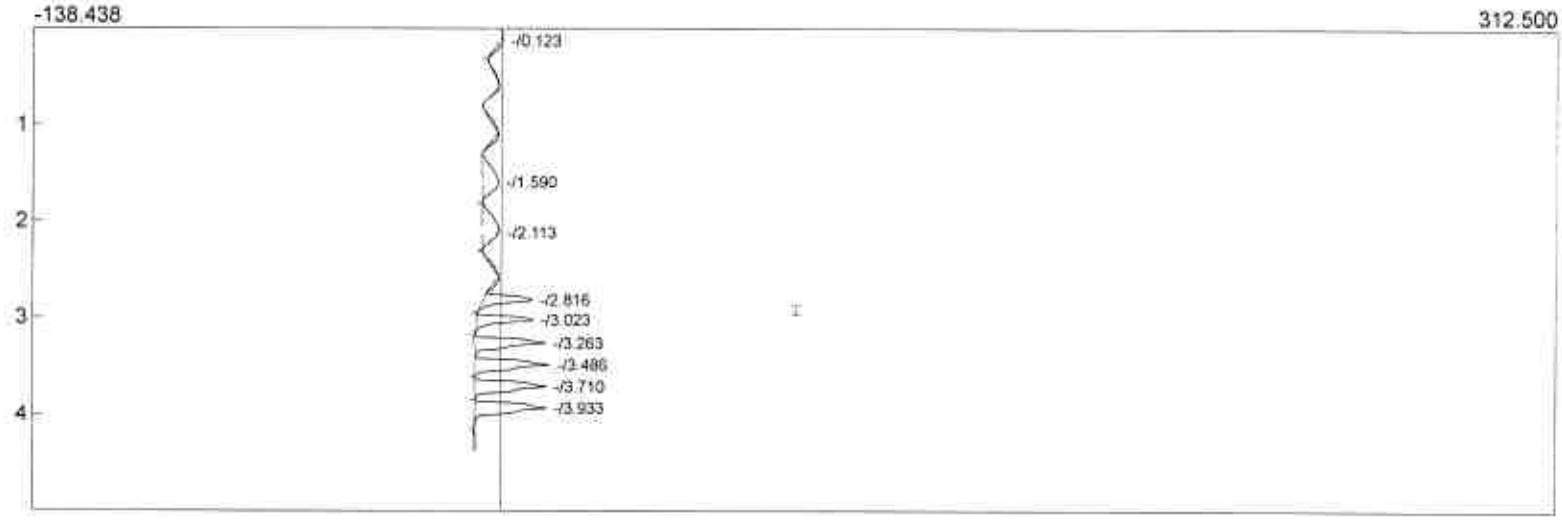
Analysis date: 08/30/2016 13:32:12
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_148.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.123	11.7550	1.076	0.0000	
-	1.590	80.1034	4.971	0.0000	
-	2.113	80.1526	5.095	0.0000	
-	2.816	69.9156	14.423	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.023	72.5094	16.611	0.0000	
-	3.263	107.0586	20.979	0.0000	
-	3.486	112.9823	22.140	0.0000	
-	3.710	115.4426	21.290	0.0000	
-	3.933	115.9916	21.095	0.0000	
		765.9111		0.0000	

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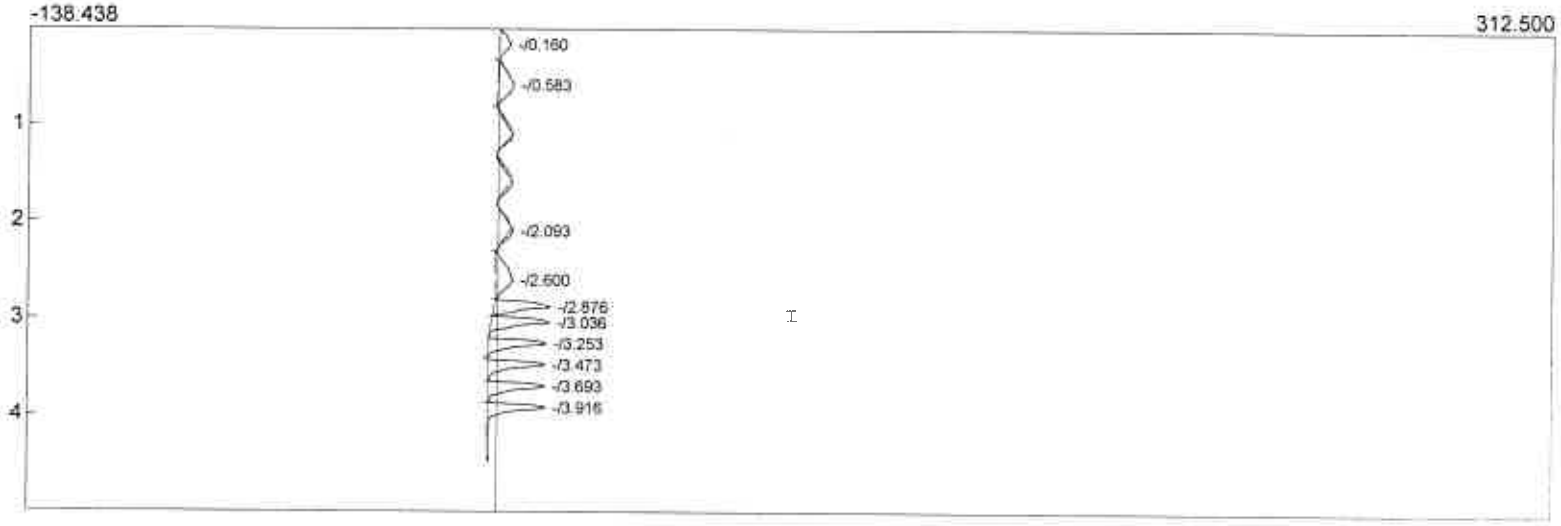
Analysis date: 08/30/2016 13:46:05
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_151.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.160	34.6990	3.484	0.0000	
-	0.583	76.1554	4.957	0.0000	
-	2.093	10.5138	1.251	0.0000	
-	2.600	81.9970	5.181	0.0000	
-	2.876	89.6766	16.913	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.036	88.3646	17.544	0.0000	
-	3.253	84.5333	17.245	0.0000	
-	3.473	81.0636	17.035	0.0000	
-	3.693	86.5784	17.068	0.0000	
-	3.916	79.6082	17.172	0.0000	
		713.1899		0.0000	

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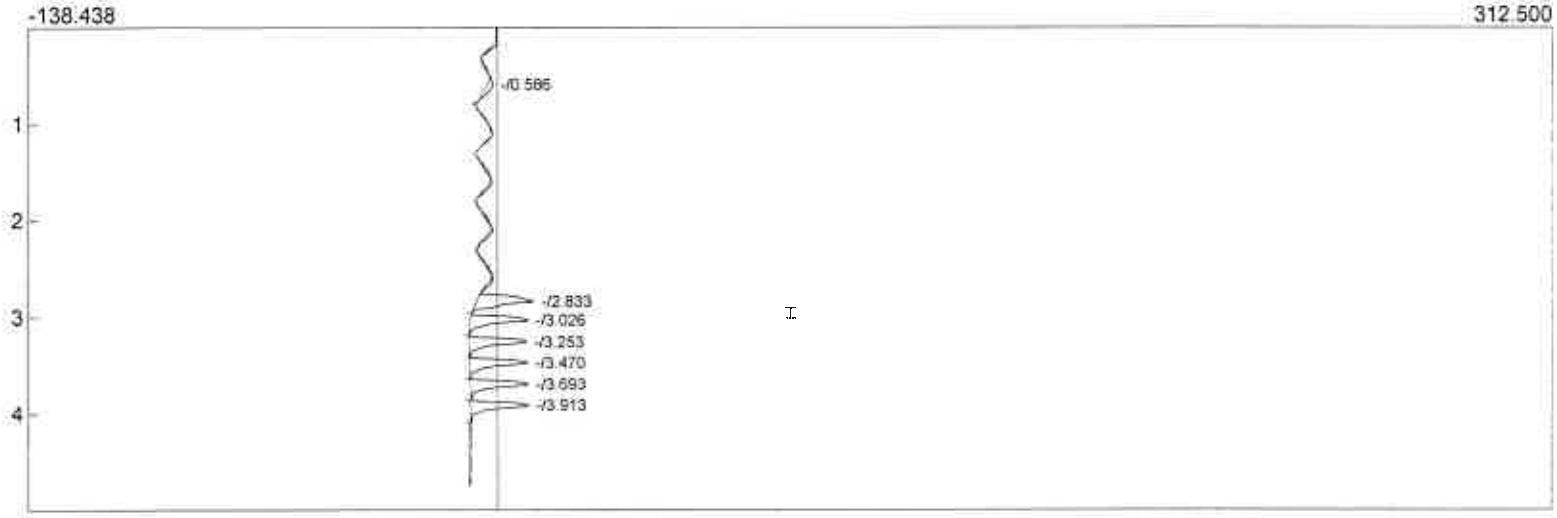
Analysis date: 08/30/2016 13:55:51
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_153.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.586	18.0286	1.935	0.0000	
-	2.833	93.5530	16.985	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.026	79.6481	16.939	0.0000	
-	3.253	81.7754	16.997	0.0000	
-	3.470	80.3717	17.320	0.0000	
-	3.693	75.0744	17.191	0.0000	
-	3.913	76.8998	17.257	0.0000	
		505.3510		0.0000	

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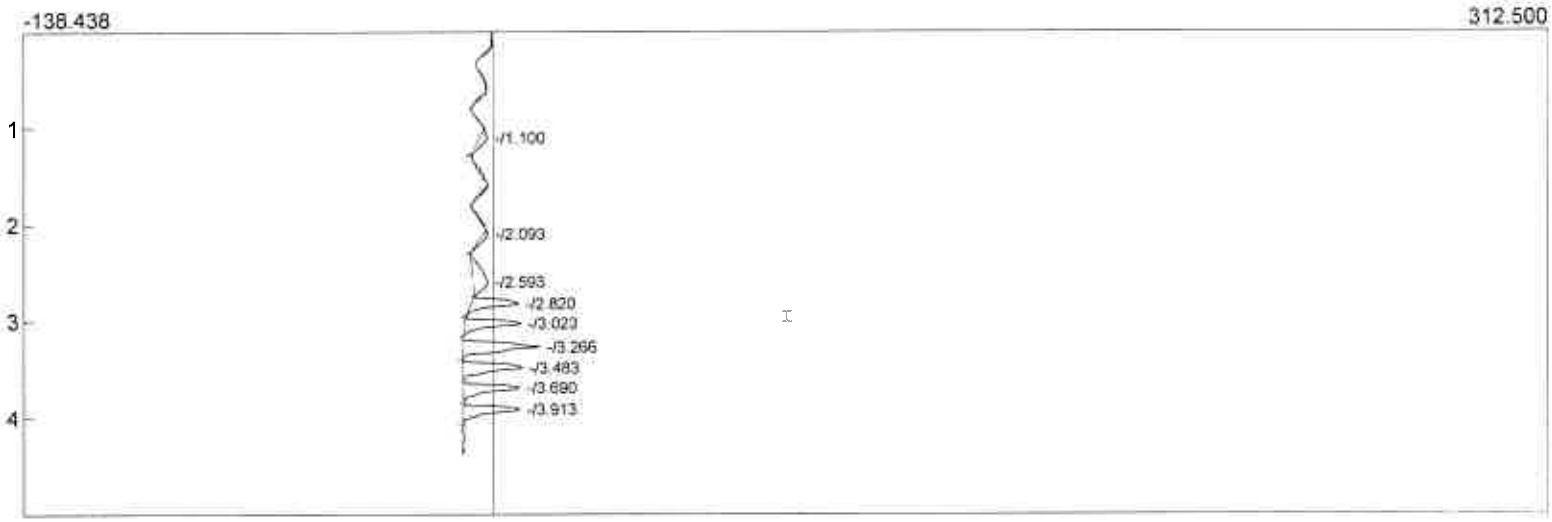
Analysis date: 08/30/2016 14:06:36
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_155.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.100	23.4846	2.404	0.0000	
-	2.093	12.7612	1.202	0.0000	
-	2.593	64.6663	4.234	0.0000	
-	2.820	68.3302	13.886	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.023	76.5718	16.424	0.0000	
-	3.266	114.6526	22.689	0.0000	
-	3.483	91.2757	17.493	0.0000	
-	3.690	79.6934	16.544	0.0000	
-	3.913	78.6788	16.576	0.0000	
		610.1146		0.0000	

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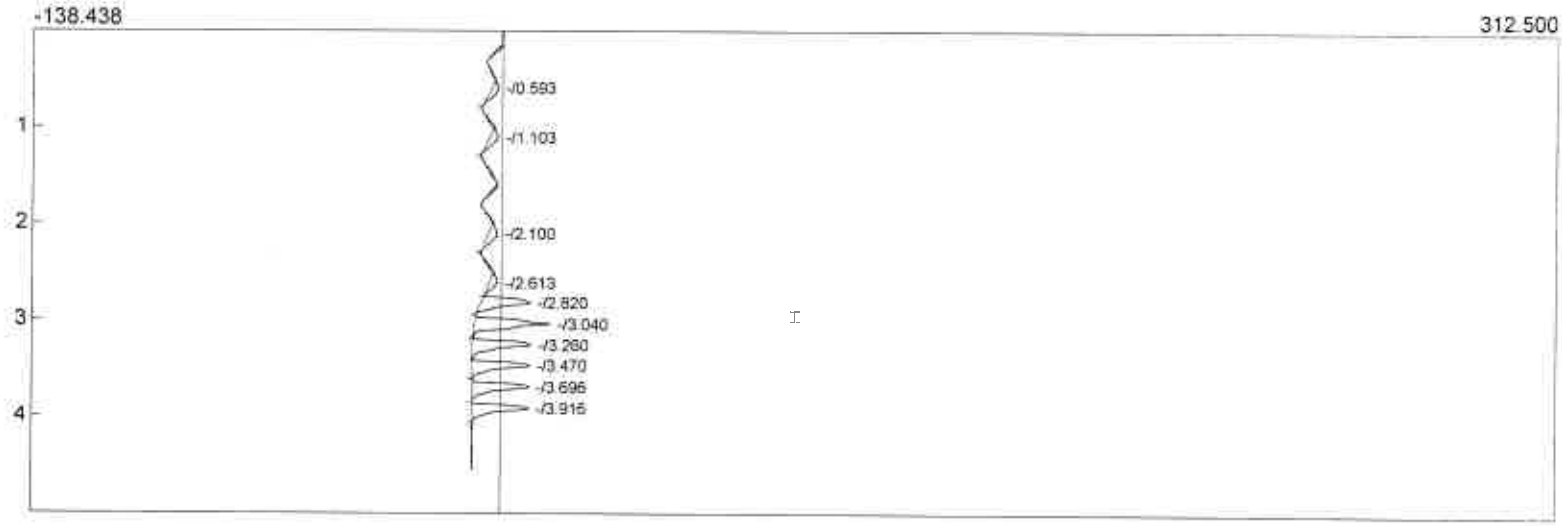
Analysis date: 08/30/2016 14:16:54
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_157.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.593	18.5684	1.952	0.0000	
-	1.103	22.9910	2.558	0.0000	
-	2.100	27.0754	2.684	0.0000	
-	2.613	18.8792	2.521	0.0000	
-	2.820	79.5794	14.485	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.040	110.6839	22.426	0.0000	
-	3.260	88.8385	17.390	0.0000	
-	3.470	80.5552	16.974	0.0000	
-	3.696	78.1420	16.569	0.0000	
-	3.916	77.7807	16.616	0.0000	
		603.0937		0.0000	

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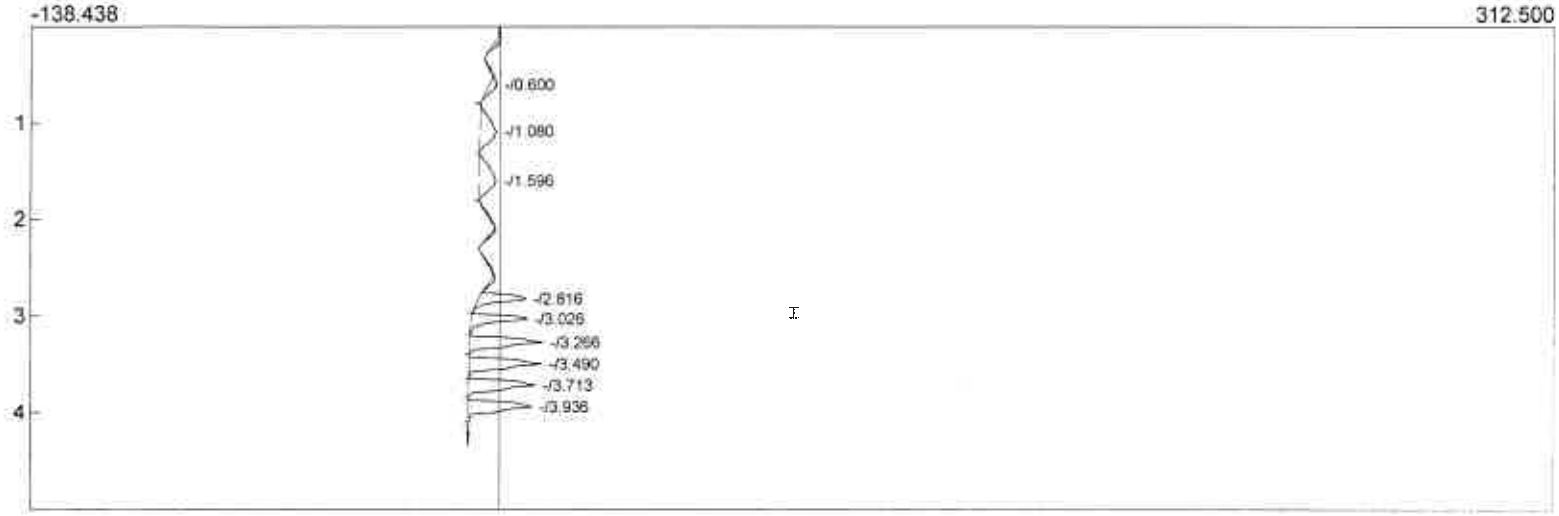
Analysis date: 08/30/2016 14:27:59
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_159.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.600	20.3958	2.272	0.0000	
-	1.080	73.5214	4.937	0.0000	
-	1.596	78.0204	5.038	0.0000	
-	2.816	68.9370	13.914	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.026	74.4076	16.534	0.0000	
-	3.266	110.3990	21.759	0.0000	
-	3.490	113.6967	21.523	0.0000	
-	3.713	108.7189	19.921	0.0000	
-	3.936	104.9716	18.822	0.0000	
		753.0684		0.0000	

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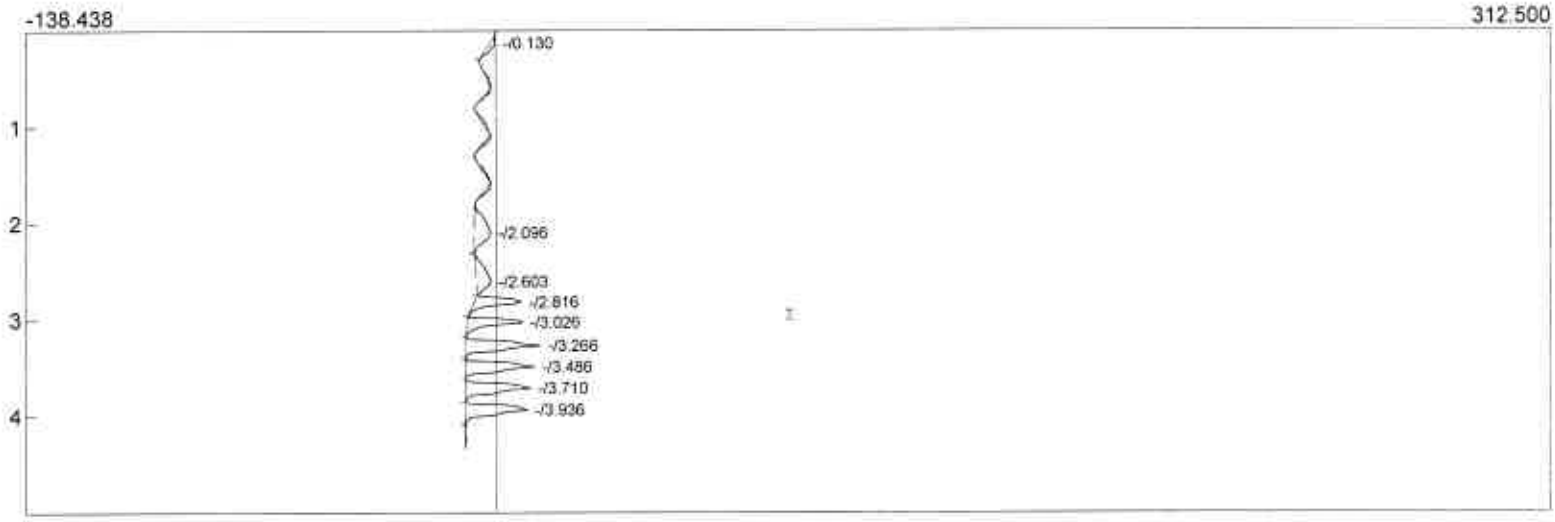
Analysis date: 08/30/2016 14:38:47
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_161.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.130	14.8991	1.701	0.0000	
-	2.096	77.1752	4.943	0.0000	
-	2.603	60.2131	4.316	0.0000	
-	2.816	69.4918	13.988	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.026	74.7656	16.621	0.0000	
-	3.266	111.5767	22.194	0.0000	
-	3.486	108.1927	20.623	0.0000	
-	3.710	106.9312	19.455	0.0000	
-	3.936	104.8863	18.546	0.0000	
		728.1317		0.0000	

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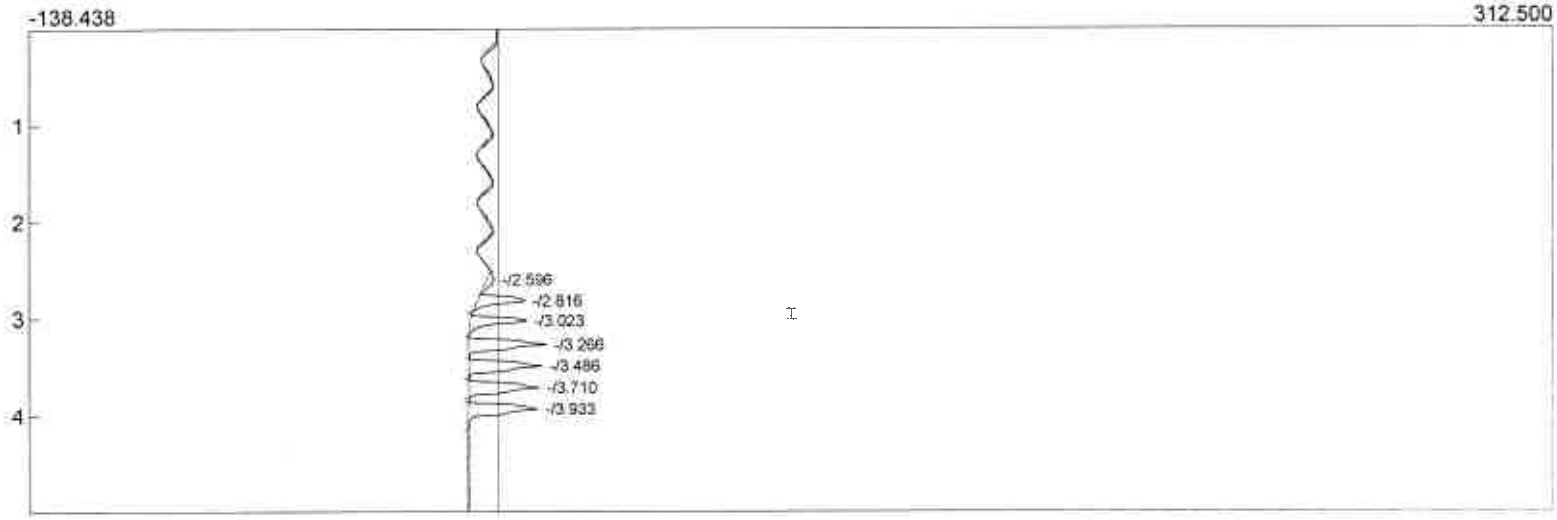
Analysis date: 08/30/2016 14:51:16
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_163.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	2.596	19.1169	2.394	0.0000	
-	2.816	68.5487	13.925	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.023	75.1550	16.618	0.0000	
-	3.266	116.5578	22.978	0.0000	
-	3.486	113.7712	21.669	0.0000	
-	3.710	111.9606	20.895	0.0000	
-	3.933	113.5491	20.454	0.0000	
		618.6593		0.0000	

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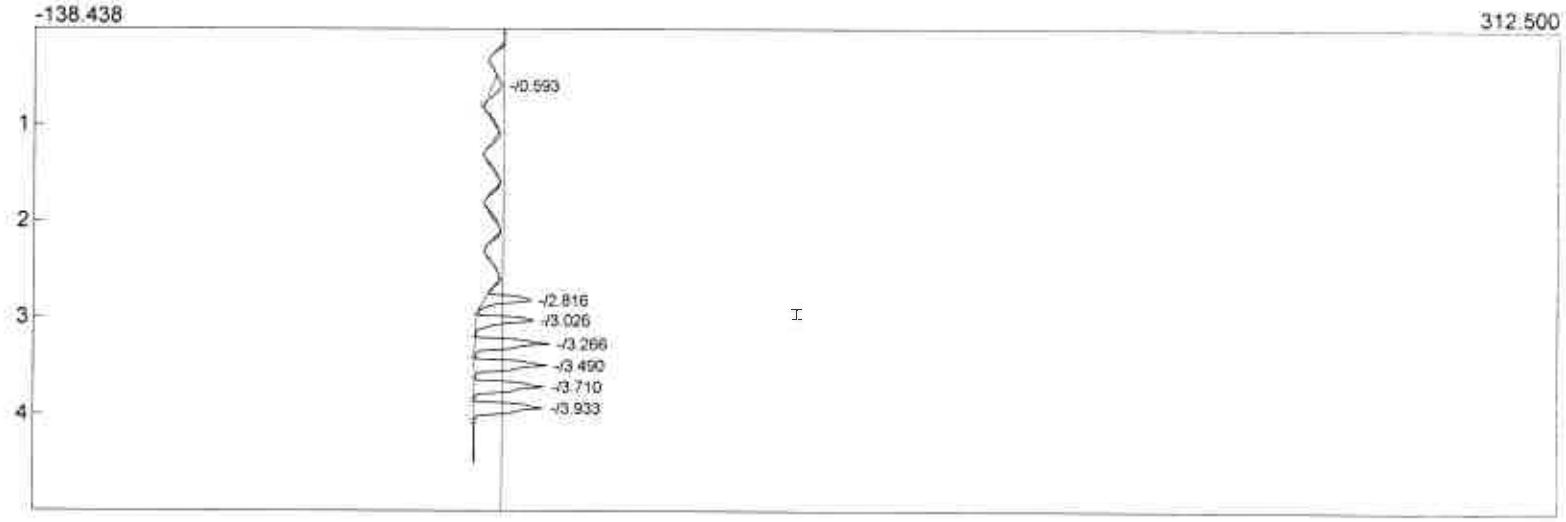
Analysis date: 08/30/2016 15:04:42
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_165.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.593	26.9910	2.811	0.0000	
-	2.816	69.1970	14.007	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.026	81.7686	16.830	0.0000	
-	3.266	112.5518	22.294	0.0000	
-	3.490	112.1694	21.513	0.0000	
-	3.710	111.1414	20.653	0.0000	
-	3.933	110.4785	20.476	0.0000	
		624.2977		0.0000	

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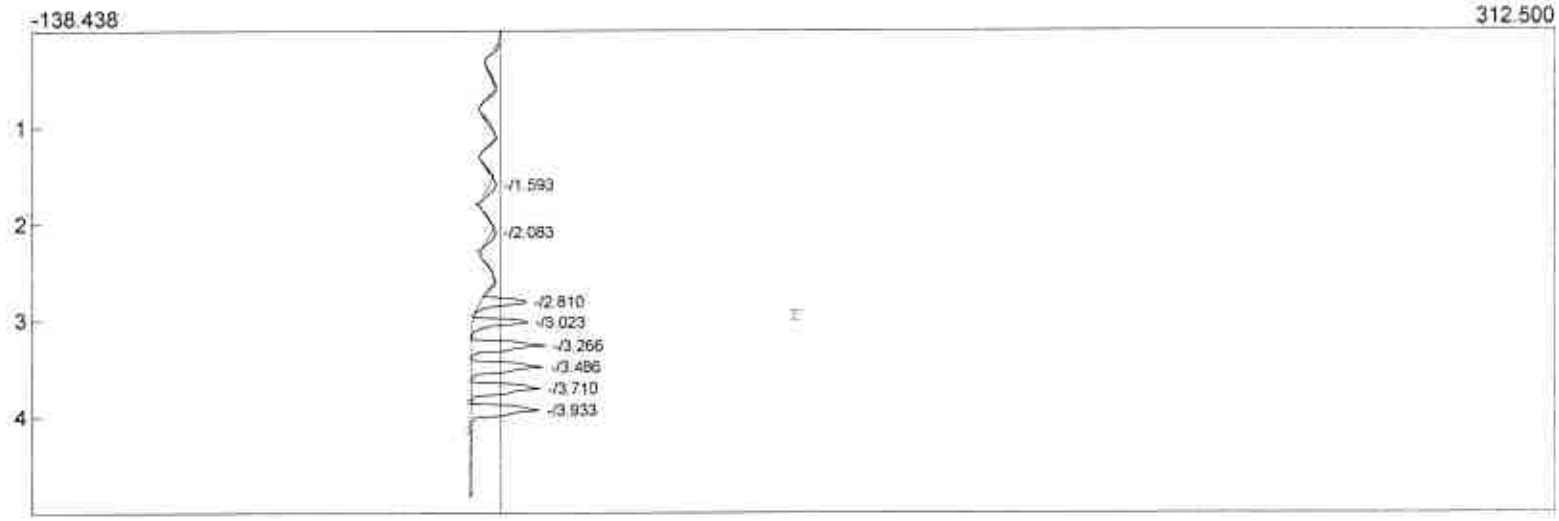
Analysis date: 08/30/2016 15:15:21
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_167.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
	1.593	20.9996	2.174	0.0000	
	2.083	14.1810	1.387	0.0000	
	2.810	67.0628	13.556	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
	3.023	75.0290	16.330	0.0000	
	3.266	112.6238	22.085	0.0000	
	3.486	112.1304	21.385	0.0000	
	3.710	110.7420	20.397	0.0000	
	3.933	111.9420	20.248	0.0000	
		624.7106		0.0000	

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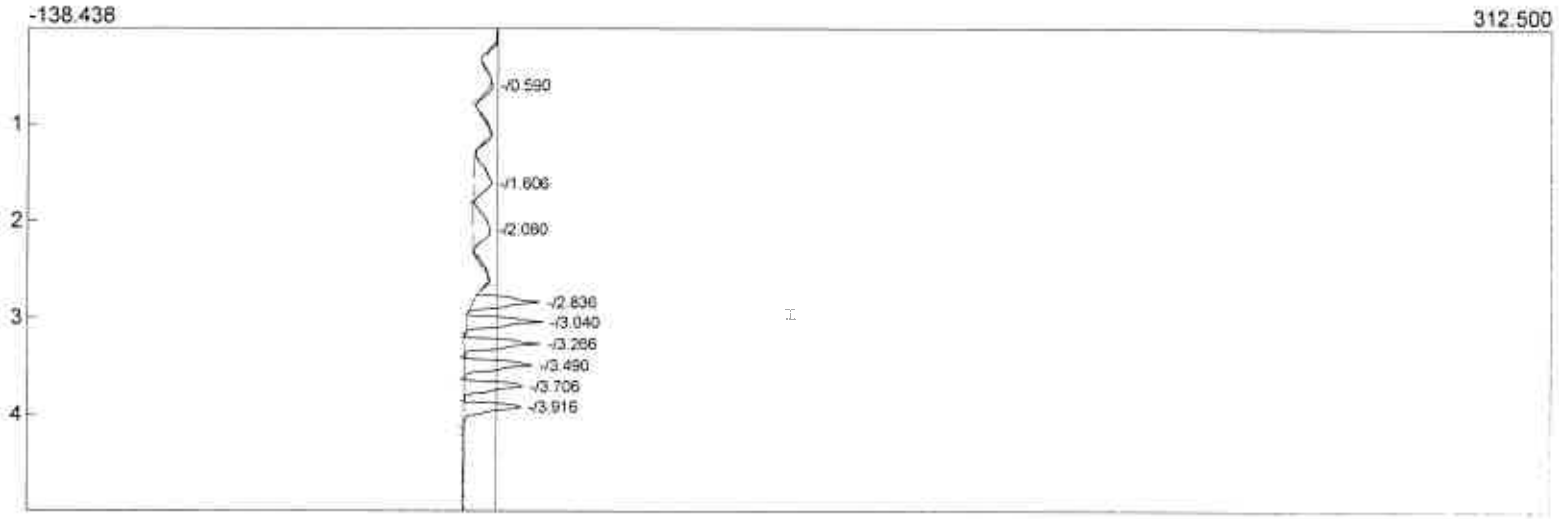
Analysis date: 08/30/2016 15:26:53
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_169.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.590	10.5380	0.962	0.0000	
-	1.606	81.8418	5.377	0.0000	
-	2.080	85.8366	5.112	0.0000	
-	2.836	106.7995	19.697	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.040	110.8712	22.603	0.0000	
-	3.266	114.1664	22.618	0.0000	
-	3.490	107.9532	20.154	0.0000	
-	3.706	95.0130	17.392	0.0000	
-	3.916	88.7806	16.810	0.0000	
		801.8003		0.0000	

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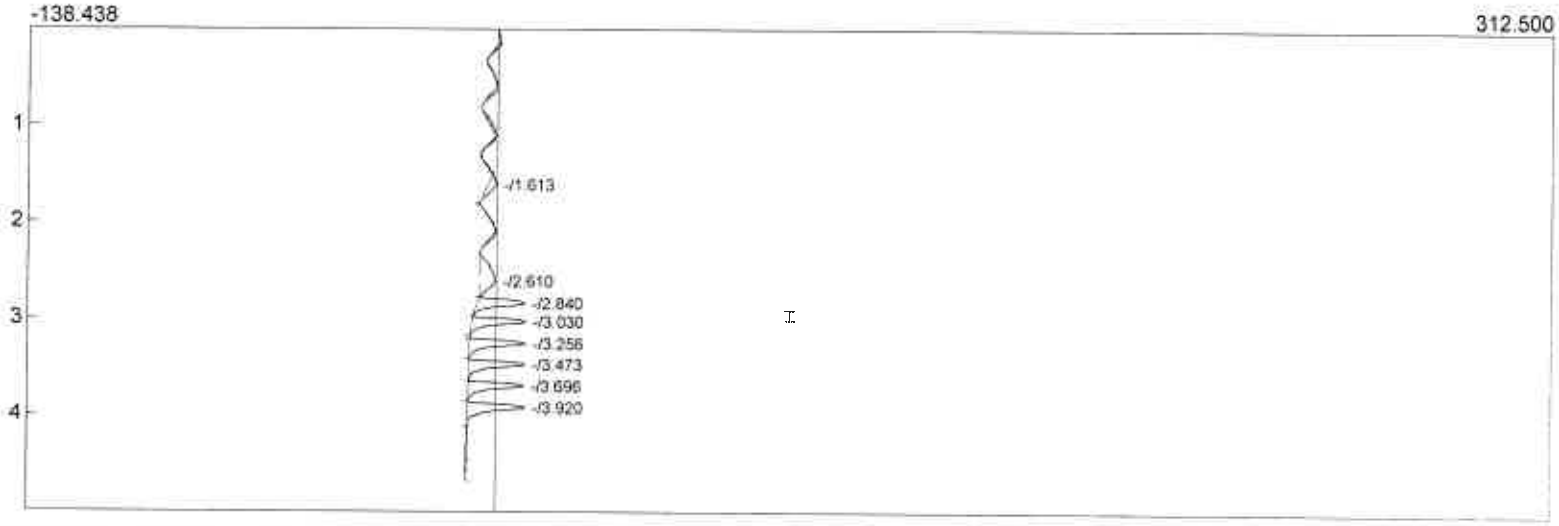
Analysis date: 08/30/2016 15:49:33
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_172.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.613	22.4646	2.589	0.0000	
-	2.610	73.1314	4.720	0.0000	
-	2.840	66.7578	14.145	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.030	70.0172	15.993	0.0000	
-	3.256	73.6899	16.755	0.0000	
-	3.473	73.5338	16.669	0.0000	
-	3.696	73.7806	16.403	0.0000	
-	3.920	80.2615	16.990	0.0000	
		533.6368		0.0000	

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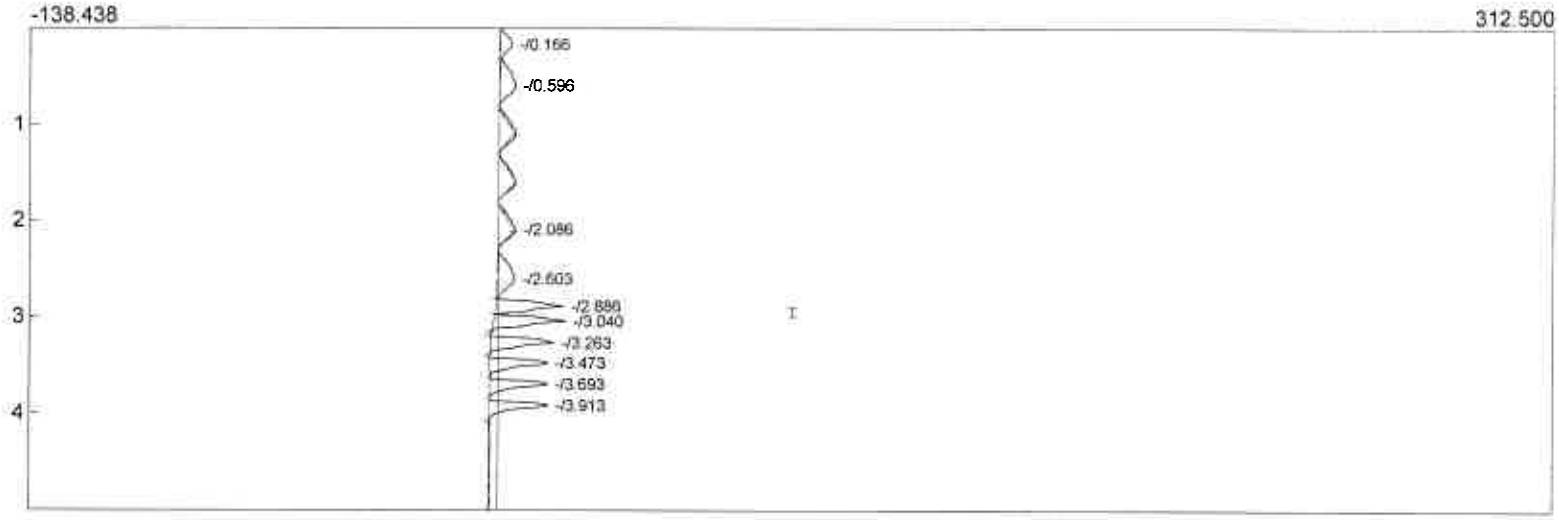
Analysis date: 08/30/2016 16:03:36
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_175.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.166	37.6386	3.588	0.0000	
-	0.596	77.3250	4.822	0.0000	
-	2.086	10.1324	0.716	0.0000	
-	2.603	86.0970	5.249	0.0000	
-	2.886	103.5464	19.981	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.040	104.8036	21.429	0.0000	
-	3.263	94.0164	18.876	0.0000	
-	3.473	87.1594	17.297	0.0000	
-	3.693	80.7408	17.063	0.0000	
-	3.913	78.8288	17.279	0.0000	
		760.2884		0.0000	

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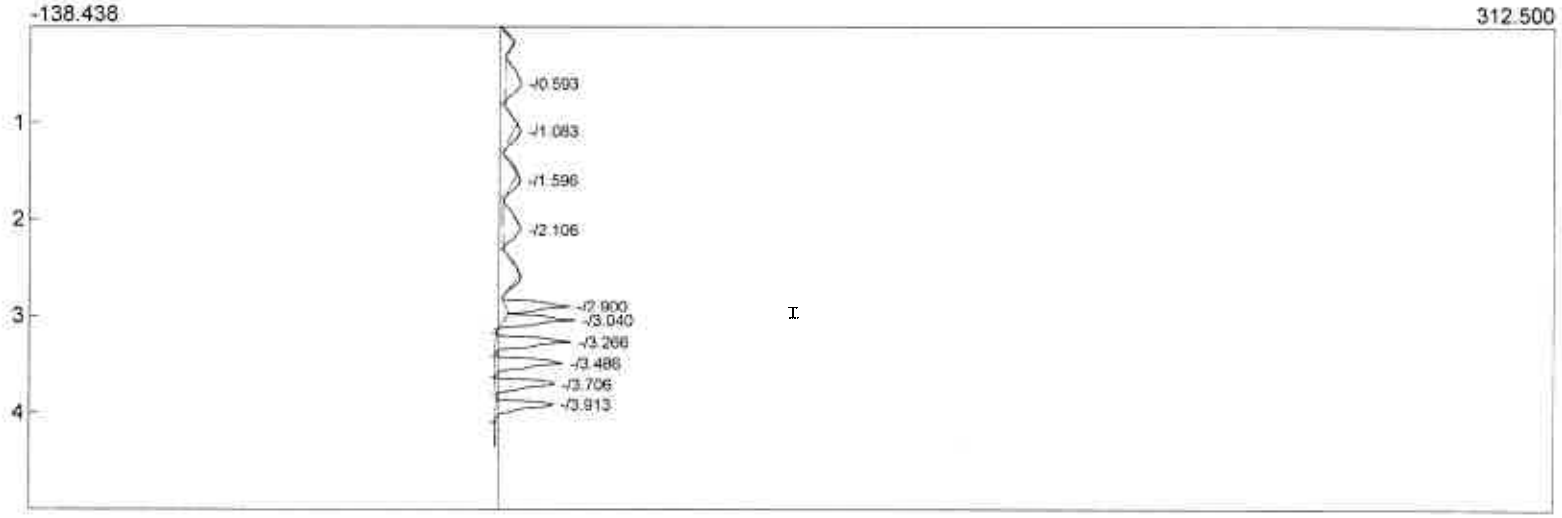
Analysis date: 08/30/2016 16:13:07
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_177.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.593	75.1438	4.796	0.0000	
-	1.083	23.0516	2.320	0.0000	
-	1.596	19.6739	2.200	0.0000	
-	2.106	84.3131	5.376	0.0000	
-	2.900	94.3670	19.095	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.040	98.6721	21.249	0.0000	
-	3.266	114.4439	22.441	0.0000	
-	3.486	108.1410	20.231	0.0000	
-	3.706	94.5496	17.538	0.0000	
-	3.913	88.0688	17.182	0.0000	
		800.4248		0.0000	

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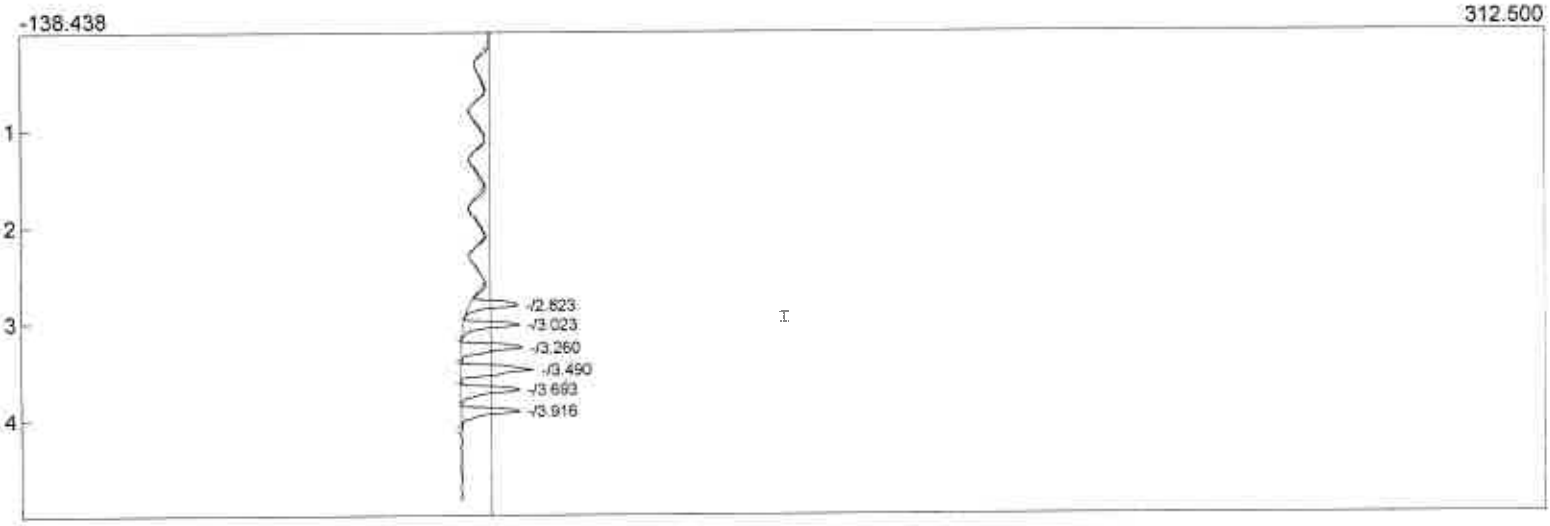
Analysis date: 08/30/2016 16:24:02
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_179.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	2.823	71.1382	14.473	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.023	73.8815	16.829	0.0000	
-	3.260	91.9040	18.129	0.0000	
-	3.490	115.9482	21.832	0.0000	
-	3.693	86.1272	17.621	0.0000	
-	3.916	80.9514	17.261	0.0000	
		519.9505		0.0000	

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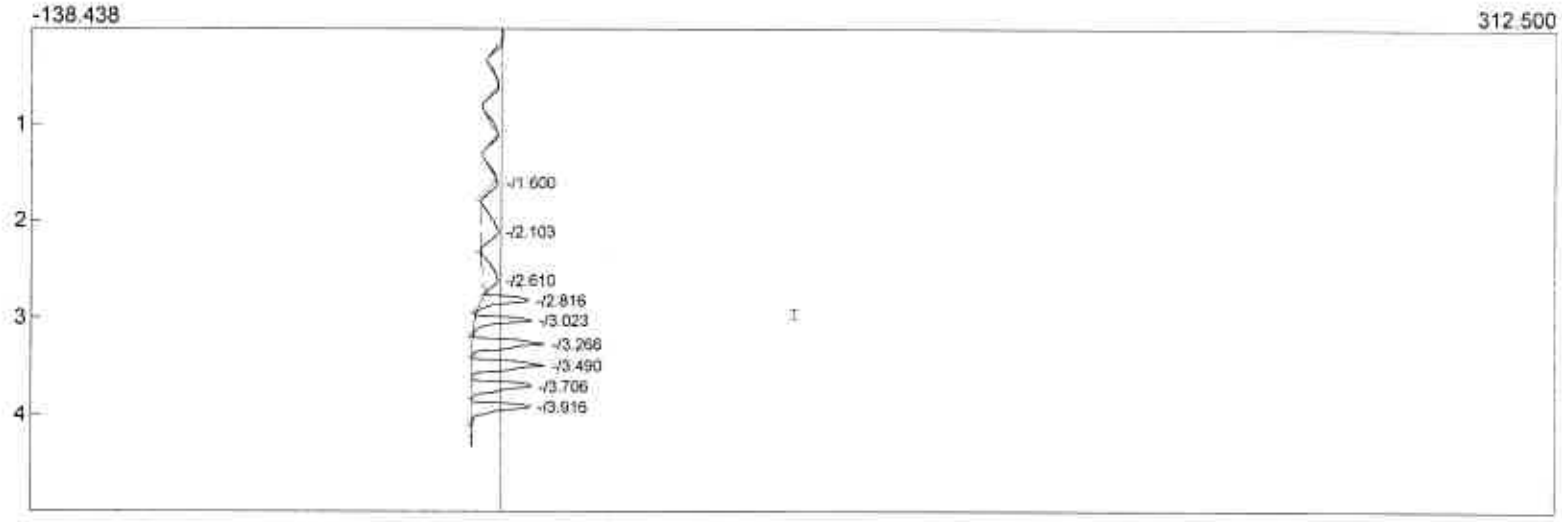
Analysis date: 08/30/2016 16:33:59
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_181.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.600	12.4535	1.557	0.0000	
-	2.103	82.2616	5.125	0.0000	
-	2.610	65.4756	4.362	0.0000	
-	2.816	68.2980	13.983	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.023	73.8130	16.887	0.0000	
-	3.266	111.2934	21.474	0.0000	
-	3.490	112.8650	21.515	0.0000	
-	3.706	95.9259	17.485	0.0000	
-	3.916	87.1039	17.318	0.0000	
		709.4899		0.0000	

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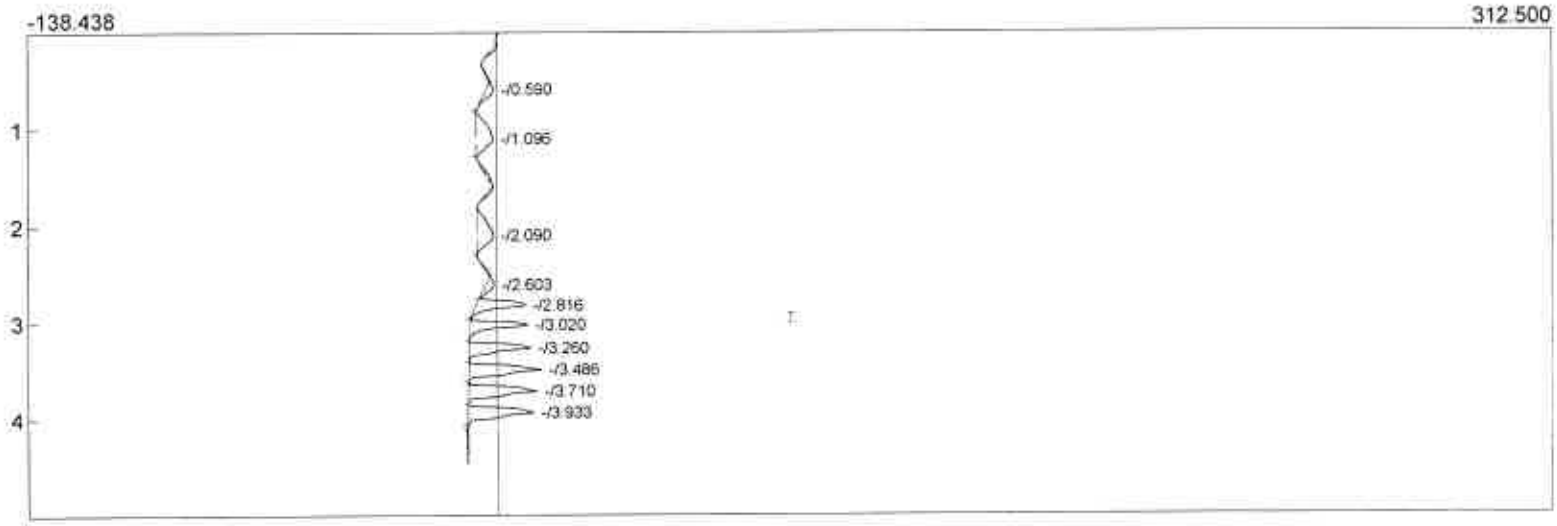
Analysis date: 08/30/2016 16:49:50
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_183.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.590	19.9194	2.319	0.0000	
-	1.096	78.2155	5.077	0.0000	
-	2.090	75.9192	4.913	0.0000	
-	2.603	20.2832	2.475	0.0000	
-	2.816	74.3600	14.559	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.020	74.5382	16.938	0.0000	
-	3.260	92.5830	18.263	0.0000	
-	3.486	112.3324	21.368	0.0000	
-	3.710	108.8738	20.236	0.0000	
-	3.933	107.7384	19.405	0.0000	
		764.7631		0.0000	

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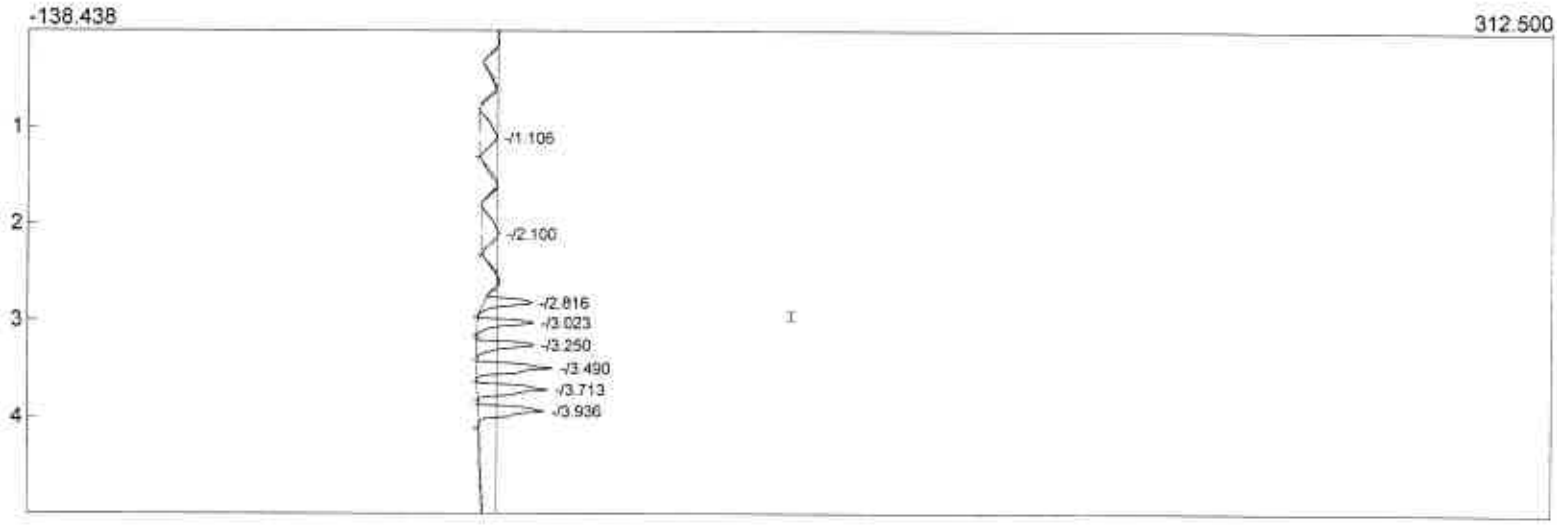
Analysis date: 08/30/2016 17:02:38
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_185.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.106	81.5100	5.036	0.0000	
-	2.100	80.8828	5.229	0.0000	
-	2.816	70.2959	14.269	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.023	73.8772	16.720	0.0000	
-	3.250	82.2653	17.053	0.0000	
-	3.490	117.9420	22.711	0.0000	
-	3.713	112.8946	21.050	0.0000	
-	3.936	107.5529	19.727	0.0000	
		727.2207		0.0000	

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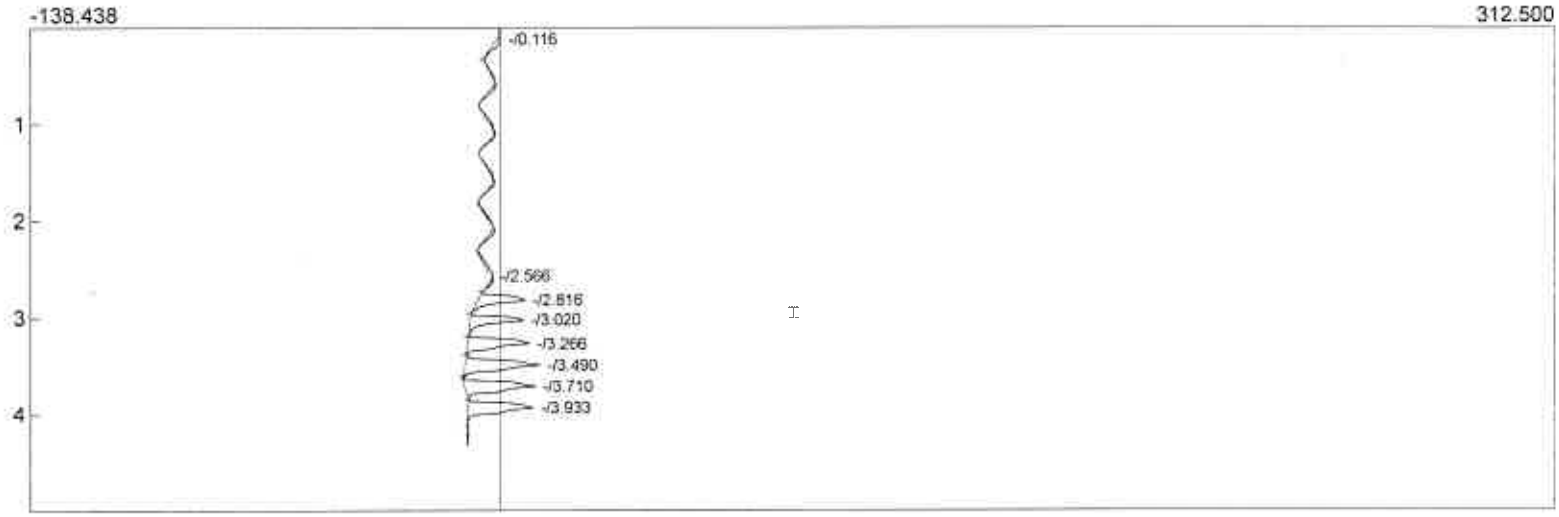
Analysis date: 08/30/2016 17:13:24
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_187.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.116	13.1086	1.278	0.0000	
-	2.566	10.8640	0.866	0.0000	
-	2.816	69.4774	14.038	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.020	71.3932	15.784	0.0000	
-	3.266	98.0568	18.318	0.0000	
-	3.490	124.3650	22.292	0.0000	
-	3.710	116.9236	21.131	0.0000	
-	3.933	107.8612	19.367	0.0000	
		612.0498		0.0000	

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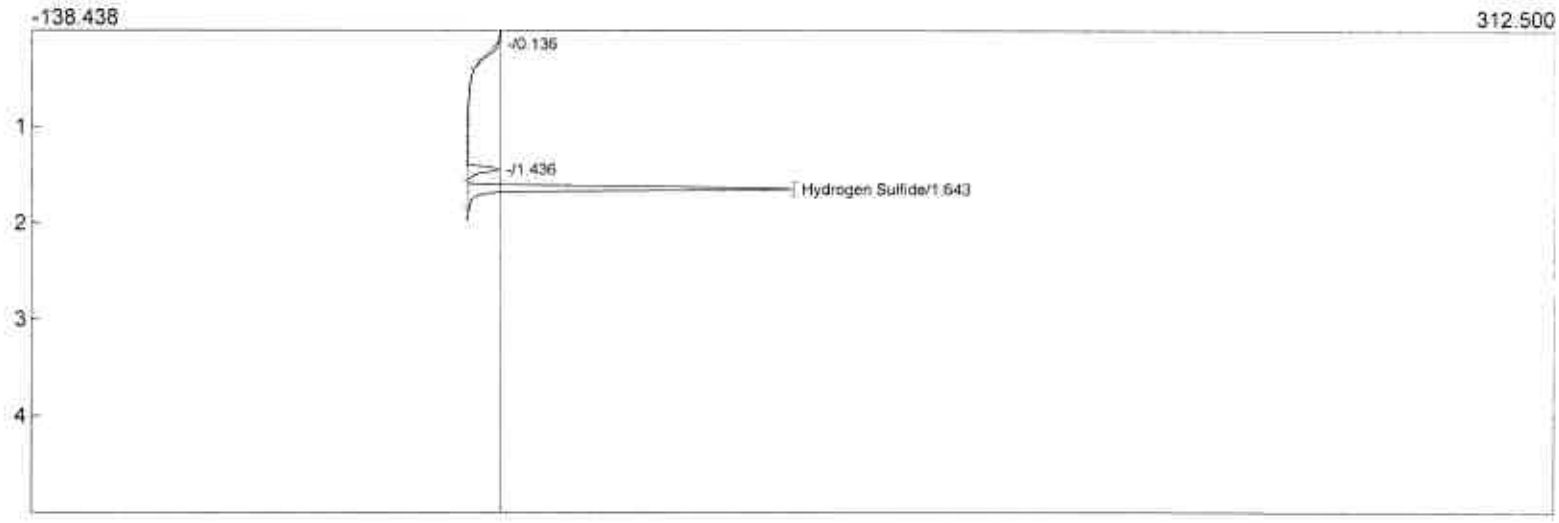
Lab name: Mostardi Platt
Client: ArcelorMittal Burns Harbor
Analysis date: 08/30/2016 17:22:17
Method: Air Sample
Description: FPD-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_189.chr ()
Sample: Post Run Cal Check

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.136	11.6603	0.876	0.0000	
-	1.436	40.5200	9.281	0.0000	
Hydrogen Sulfide	1.643	292.9104	96.736	8.5553	
		345.0907		8.5553	

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Date: 8/31/2016
Run #: 2
Pre-Cal Check

Certified Concentration	Area Counts	Calculated Concentration
8.738	367.1666	8.5927

	Injection #1		Injection #2		Injection #3		Injection #4		Injection #5		Injection #6	
Push Time	Area Counts	H2S Concentration	Area Counts	H2S Concentration	Area Counts	H2S Concentration	Area Counts	H2S Concentration	Area Counts	H2S Concentration	Area Counts	H2S Concentration
7:33	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
7:43	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
7:55	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
8:05	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
8:25	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
8:37	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
8:48	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
8:58	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
9:09	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
9:19	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
9:32	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
9:43	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
9:57	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
10:08	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
10:27	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
10:37	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
10:47	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
10:59	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
11:13	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
11:27	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
11:37	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
11:47	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
11:59	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
12:11	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
12:25	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
12:36	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
12:47	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
13:01	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
13:12	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
13:23	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
13:37	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
13:49	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
14:00	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
14:11	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
14:24	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
14:37	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
14:54	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
15:05	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
15:16	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
15:26	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
15:40	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
15:52	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
16:02	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
16:15	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
16:27	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
16:40	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL

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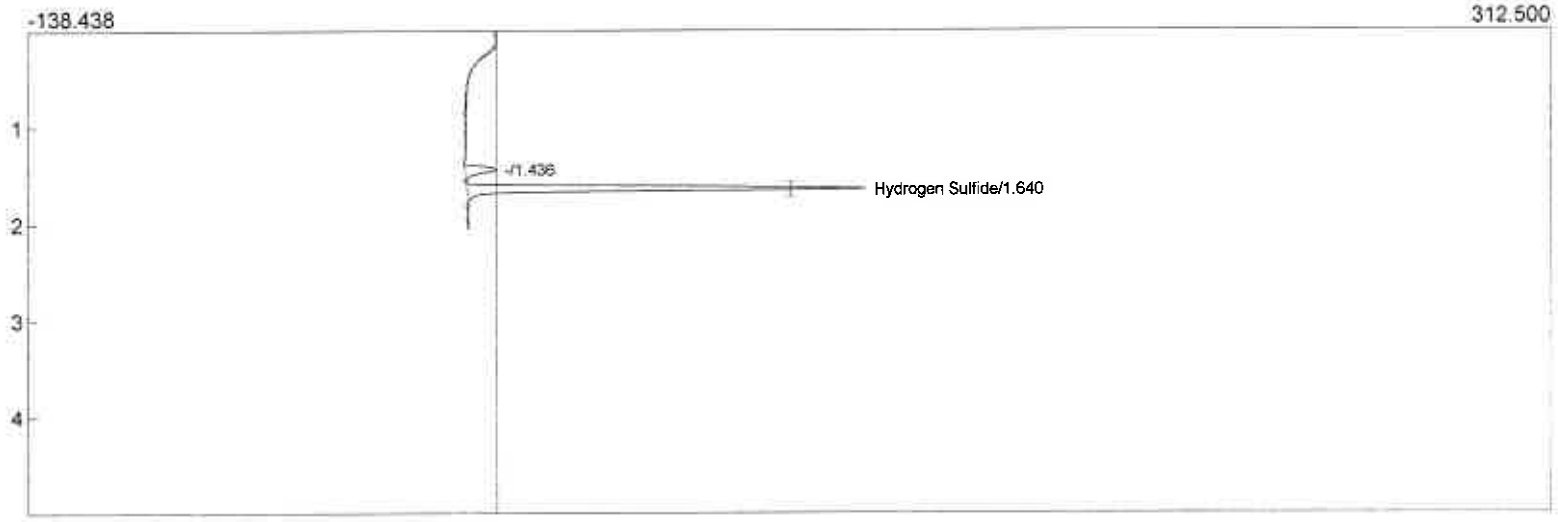
Lab name: Mostardi Platt
Client: ArcelorMittal Burns Harbor
Analysis date: 08/31/2016 06:56:38
Method: Air Sample
Description: FPD-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_222.chr ()
Sample: Pre Run Cal Check

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.436	43.4510	9.674	0.0000	
Hydrogen Sulfide	1.640	367.1666	118.625	8.5927	
		410.6176		8.5927	

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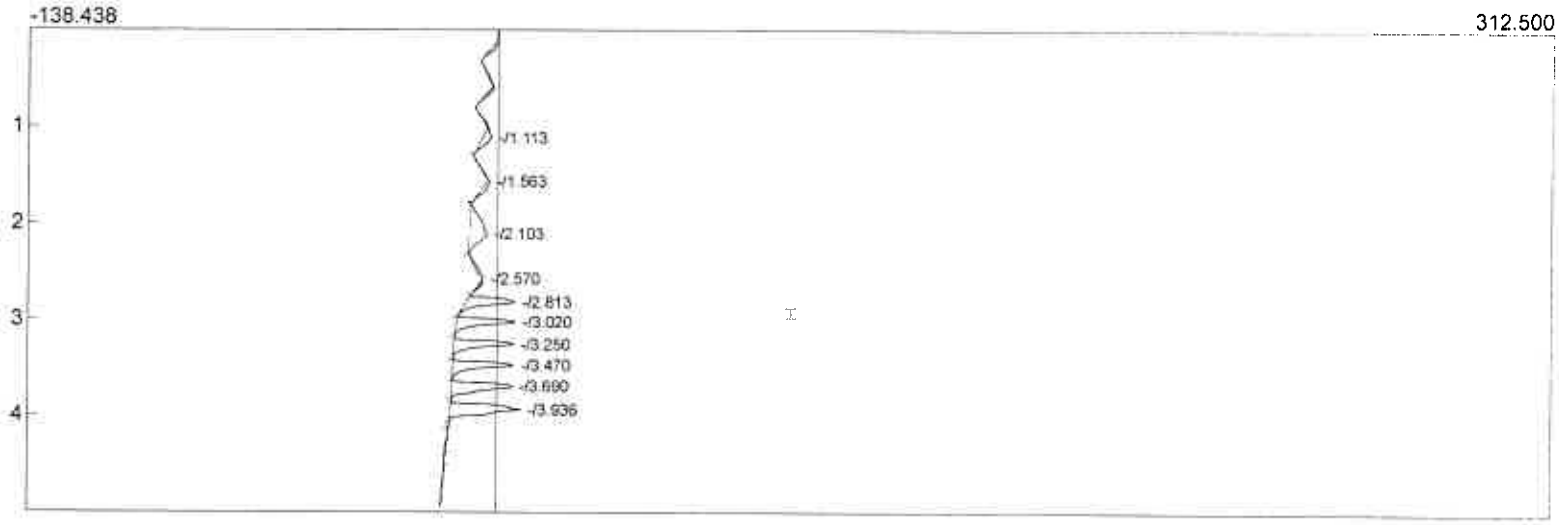
Analysis date: 08/31/2016 07:30:34
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_230.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.113	21.9866	2.679	0.0000	
-	1.563	11.8340	0.725	0.0000	
-	2.103	83.0068	5.268	0.0000	
-	2.570	10.2290	0.995	0.0000	
-	2.813	70.1426	14.452	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.020	75.9594	17.548	0.0000	
-	3.250	76.8383	17.856	0.0000	
-	3.470	77.0677	18.140	0.0000	
-	3.690	94.2868	18.036	0.0000	
-	3.936	113.9383	20.961	0.0000	
		635.2895		0.0000	

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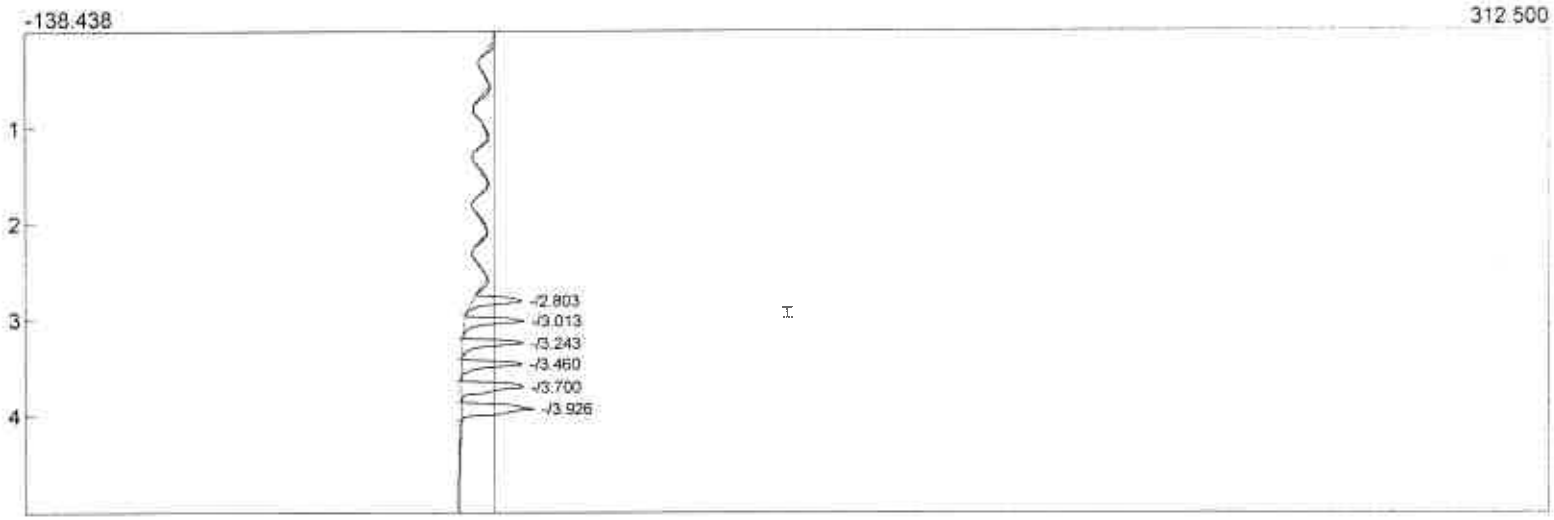
Analysis date: 08/31/2016 07:40:53
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_232.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	2.803	71.6507	14.725	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.013	76.2742	17.538	0.0000	
-	3.243	77.2730	18.073	0.0000	
-	3.460	78.1504	18.009	0.0000	
-	3.700	104.6096	18.561	0.0000	
-	3.926	120.5188	21.725	0.0000	
		528.4767		0.0000	

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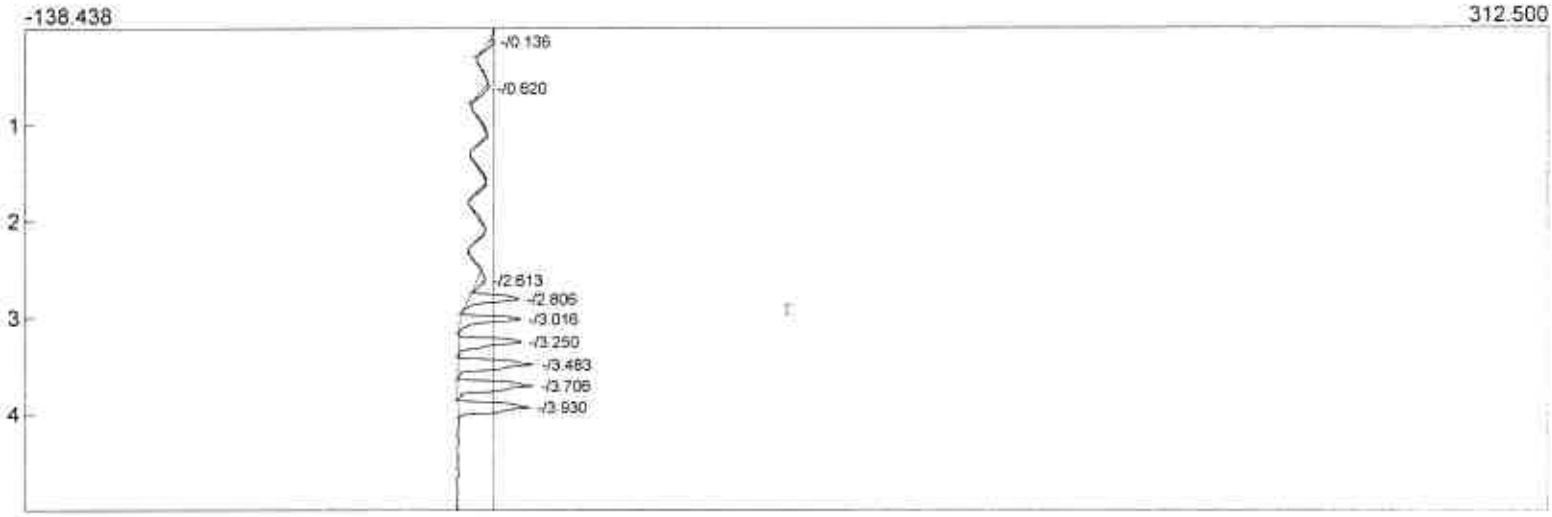
Analysis date: 08/31/2016 07:53:22
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_234.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.136	11.7060	1.208	0.0000	
-	0.620	11.5848	1.703	0.0000	
-	2.613	18.3268	2.427	0.0000	
-	2.806	72.4562	14.958	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	76.4203	17.922	0.0000	
-	3.250	94.7940	18.524	0.0000	
-	3.483	121.5582	22.521	0.0000	
-	3.706	124.6246	22.315	0.0000	
-	3.930	119.5344	21.172	0.0000	
		651.0053		0.0000	

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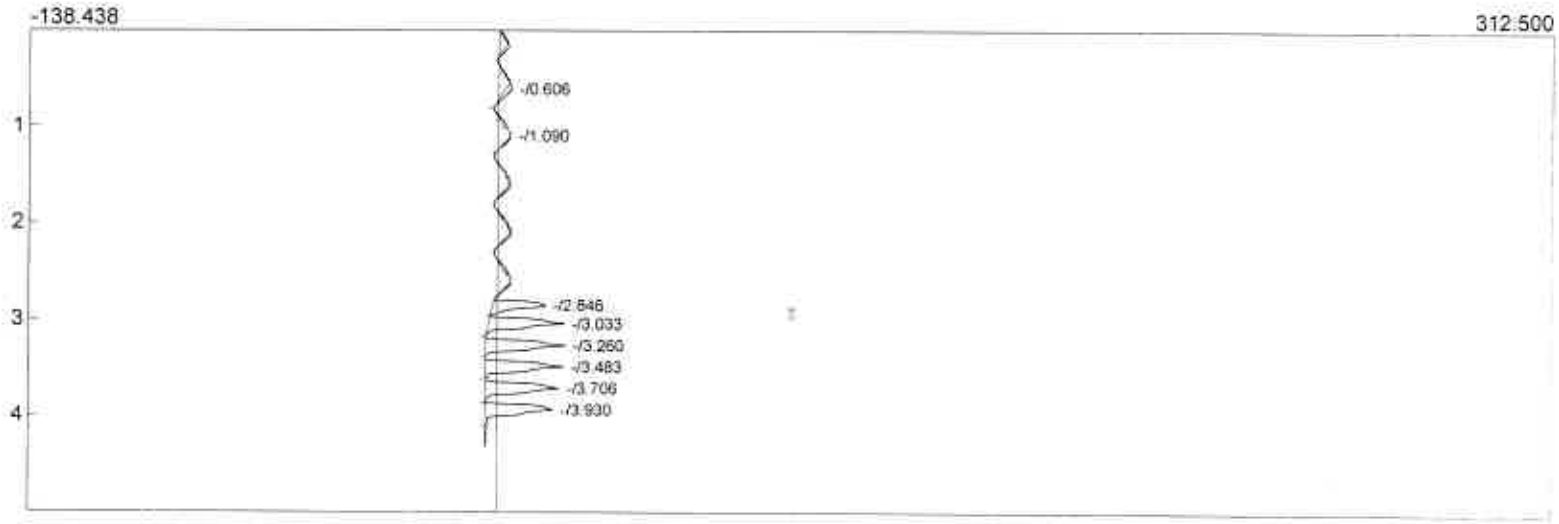
Analysis date: 08/31/2016 08:04:06
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_236.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.606	15.9152	2.080	0.0000	
-	1.090	10.5454	0.781	0.0000	
-	2.846	76.7368	15.640	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.033	114.3397	22.529	0.0000	
-	3.260	124.0641	23.922	0.0000	
-	3.483	123.9182	23.234	0.0000	
-	3.706	123.0680	22.023	0.0000	
-	3.930	112.9237	20.139	0.0000	
		701.5111		0.0000	

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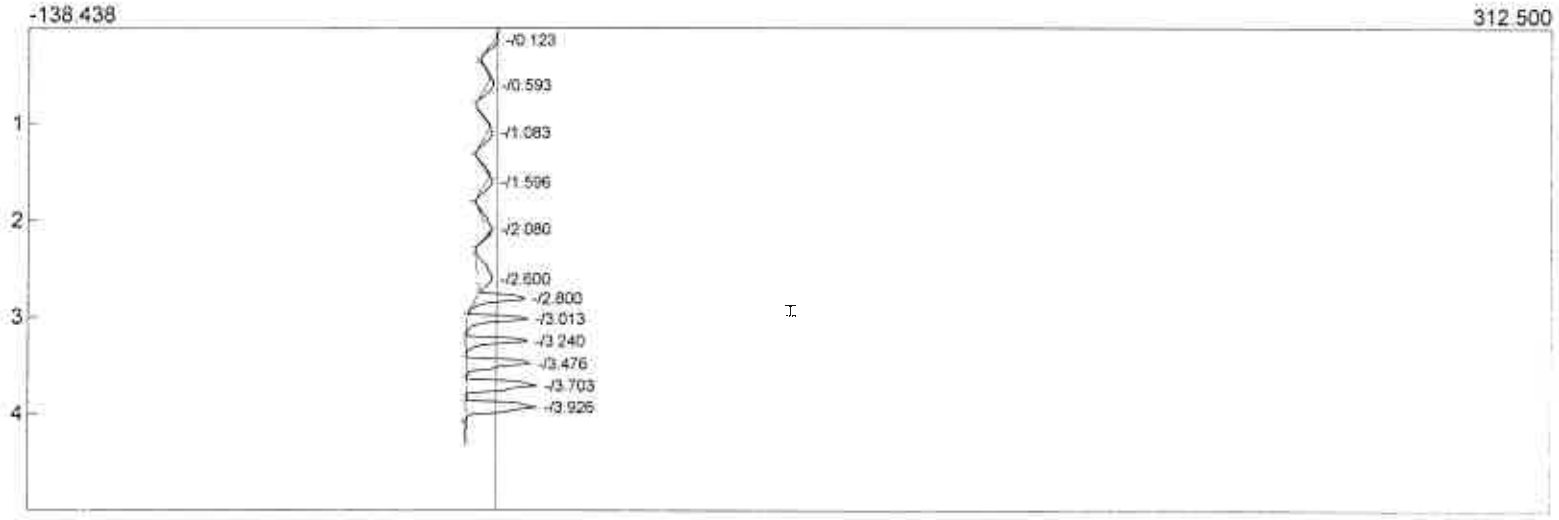
Analysis date: 08/31/2016 08:22:27
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_238.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.123	11.2784	1.109	0.0000	
-	0.593	20.3202	2.174	0.0000	
-	1.083	16.5276	1.598	0.0000	
-	1.596	19.0608	2.162	0.0000	
-	2.080	16.6110	1.637	0.0000	
-	2.600	62.1123	4.377	0.0000	
-	2.800	71.6291	14.497	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.013	78.2838	17.877	0.0000	
-	3.240	77.4162	18.211	0.0000	
-	3.476	97.7879	18.649	0.0000	
-	3.703	115.5384	21.034	0.0000	
-	3.926	120.2210	20.972	0.0000	
		706.7867		0.0000	

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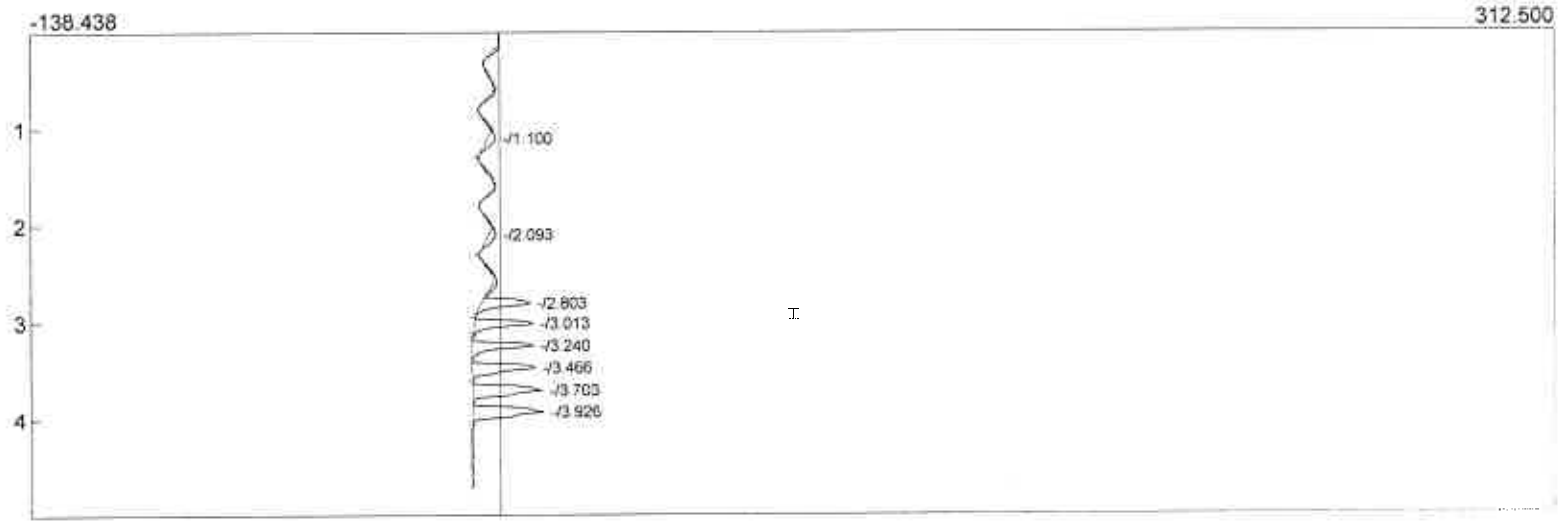
Analysis date: 08/31/2016 08:35:00
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_240.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.100	20.9370	2.366	0.0000	
-	2.093	21.7114	2.283	0.0000	
-	2.803	71.7151	14.390	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.013	73.1086	17.337	0.0000	
-	3.240	79.1618	18.188	0.0000	
-	3.466	95.3640	18.697	0.0000	
-	3.703	116.0872	20.721	0.0000	
-	3.926	116.4827	20.952	0.0000	
		594.5678		0.0000	

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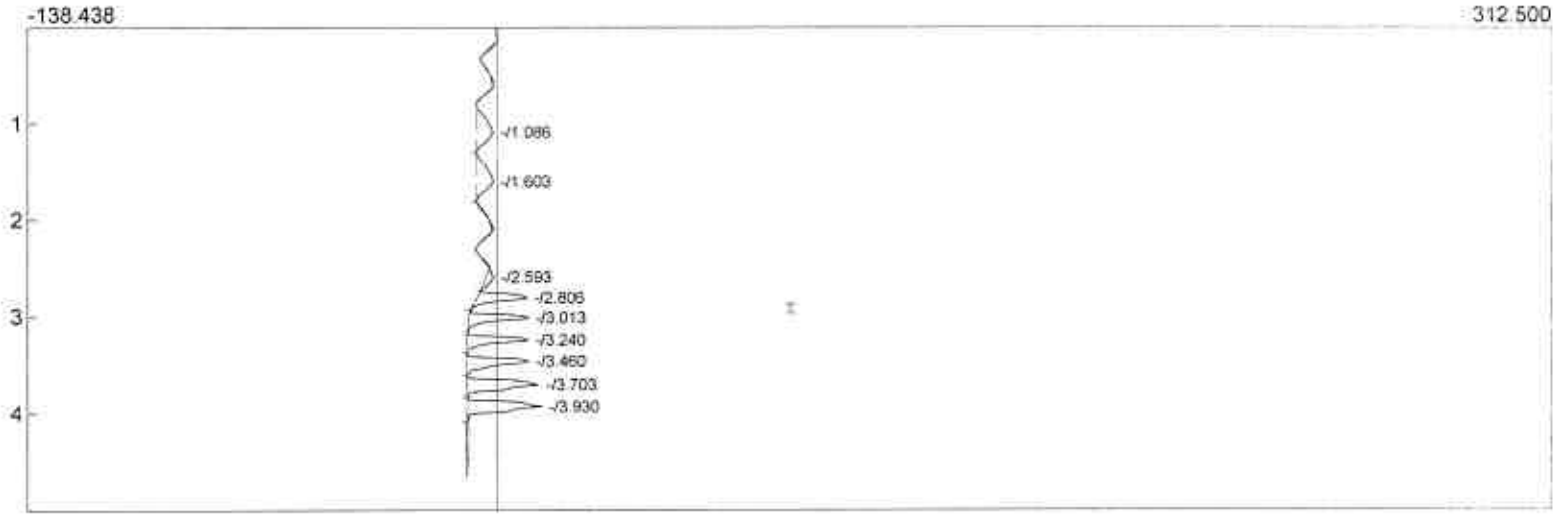
Analysis date: 08/31/2016 08:44:54
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_242.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.086	73.0178	4.932	0.0000	
-	1.603	74.3380	4.866	0.0000	
-	2.593	18.6598	2.361	0.0000	
-	2.806	71.5232	14.655	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.013	76.4640	17.484	0.0000	
-	3.240	78.5084	17.932	0.0000	
-	3.460	90.7769	18.092	0.0000	
-	3.703	117.1970	21.122	0.0000	
-	3.930	120.3123	21.832	0.0000	
		720.7974		0.0000	

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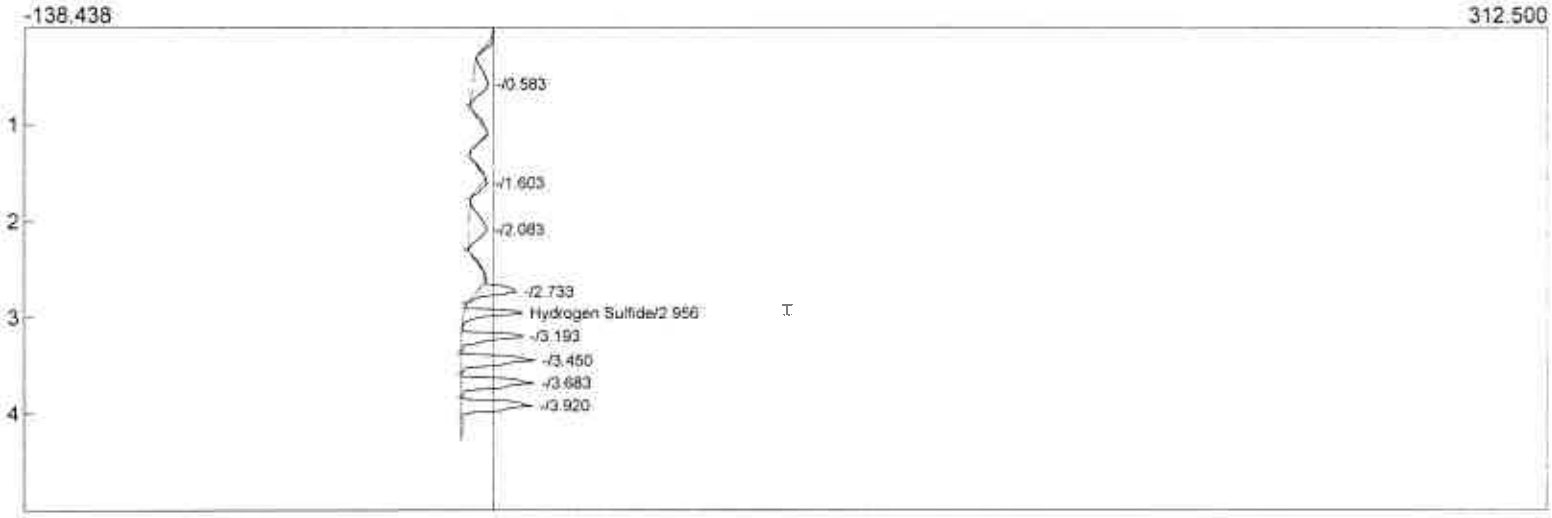
Analysis date: 08/31/2016 08:55:55
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_244.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.583	68.9848	4.791	0.0000	
-	1.603	12.6196	1.614	0.0000	
-	2.083	82.6962	5.425	0.0000	
-	2.733	67.0422	11.765	0.0000	
Hydrogen Sulfide	2.956	78.1046	17.394	4.1889	
-	3.193	90.9600	18.151	0.0000	
-	3.450	119.9814	22.051	0.0000	
-	3.683	121.1307	21.624	0.0000	
-	3.920	120.5432	21.095	0.0000	
		762.0627		4.1889	

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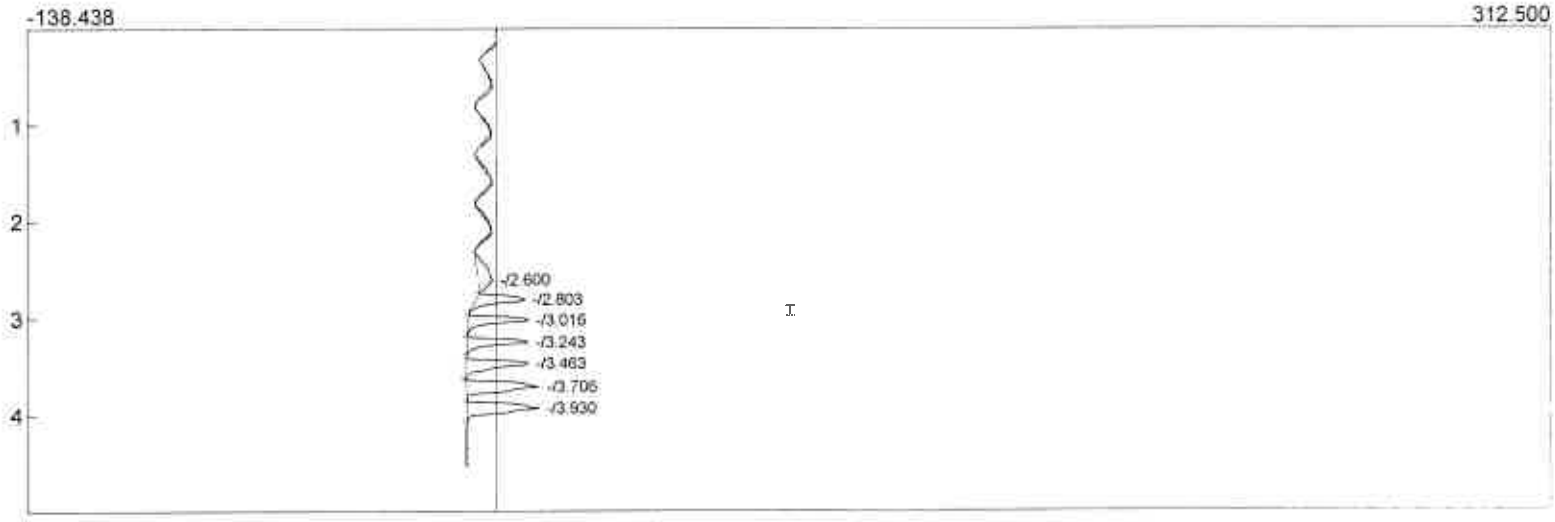
Analysis date: 08/31/2016 09:06:13
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_246.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	2.600	62.8800	4.388	0.0000	
-	2.803	73.3378	14.491	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	77.5788	17.758	0.0000	
-	3.243	75.6584	18.143	0.0000	
-	3.463	94.7368	18.402	0.0000	
-	3.706	120.1942	21.604	0.0000	
-	3.930	117.3034	21.201	0.0000	
		621.6894		0.0000	

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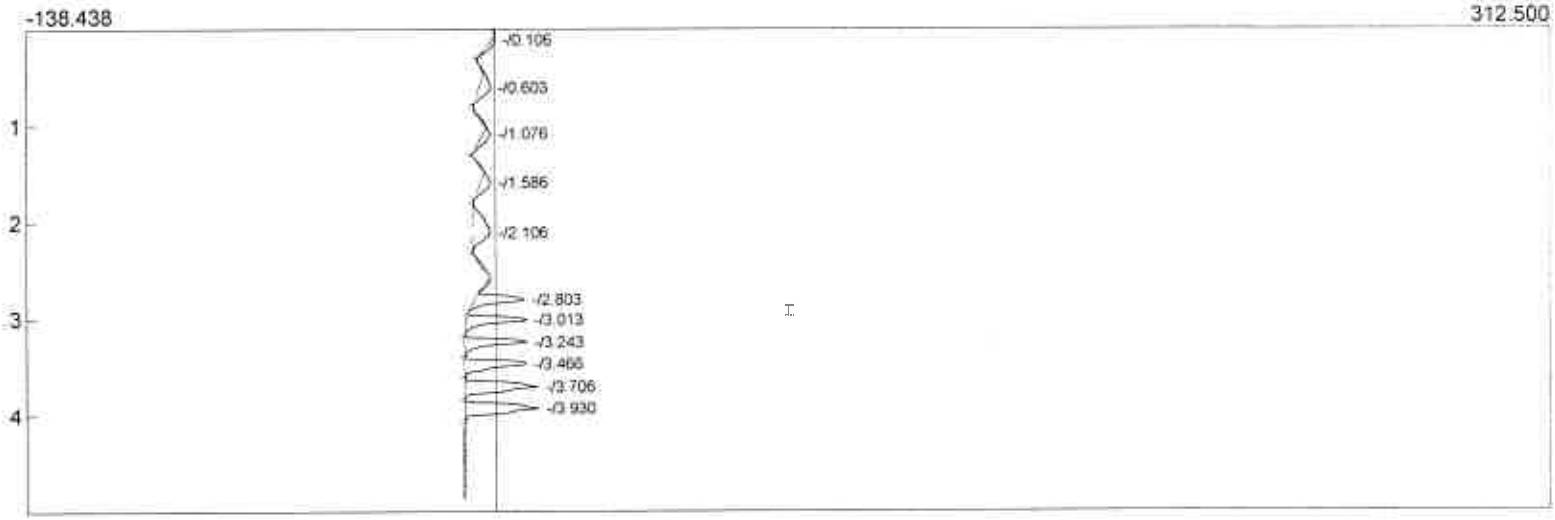
Analysis date: 08/31/2016 09:16:46
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_248.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.106	13.2818	0.767	0.0000	
-	0.603	38.1304	3.415	0.0000	
-	1.076	21.9676	2.137	0.0000	
-	1.586	29.2081	2.914	0.0000	
-	2.106	82.7944	5.440	0.0000	
-	2.803	72.9218	14.695	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.013	79.8454	17.755	0.0000	
-	3.243	78.6062	18.409	0.0000	
-	3.466	93.9659	18.272	0.0000	
-	3.706	119.6626	21.797	0.0000	
-	3.930	121.7439	21.956	0.0000	
		752.1281		0.0000	

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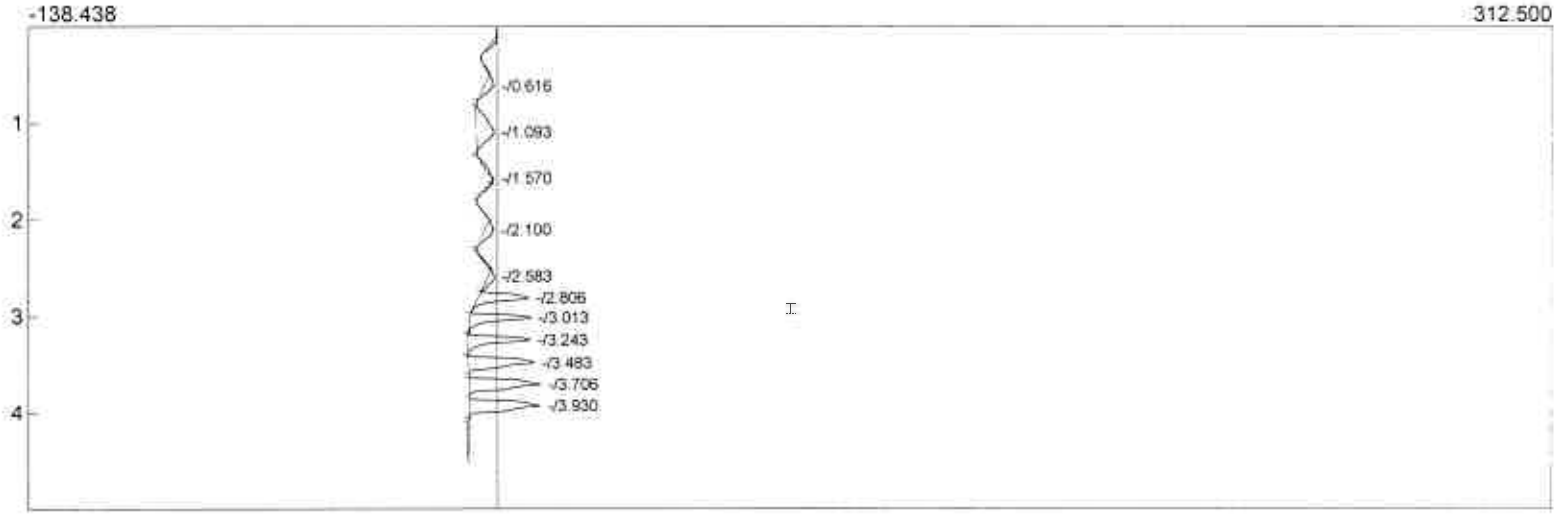
Analysis date: 08/31/2016 09:29:13
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_250.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.616	24.5188	3.005	0.0000	
-	1.093	81.6007	5.273	0.0000	
-	1.570	10.3652	1.157	0.0000	
-	2.100	26.1275	2.658	0.0000	
-	2.583	16.3177	1.947	0.0000	
-	2.806	72.8576	14.959	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.013	77.4748	18.008	0.0000	
-	3.243	80.1883	18.301	0.0000	
-	3.483	106.4948	19.569	0.0000	
-	3.706	116.6552	21.210	0.0000	
-	3.930	118.5510	21.116	0.0000	
		731.1516		0.0000	

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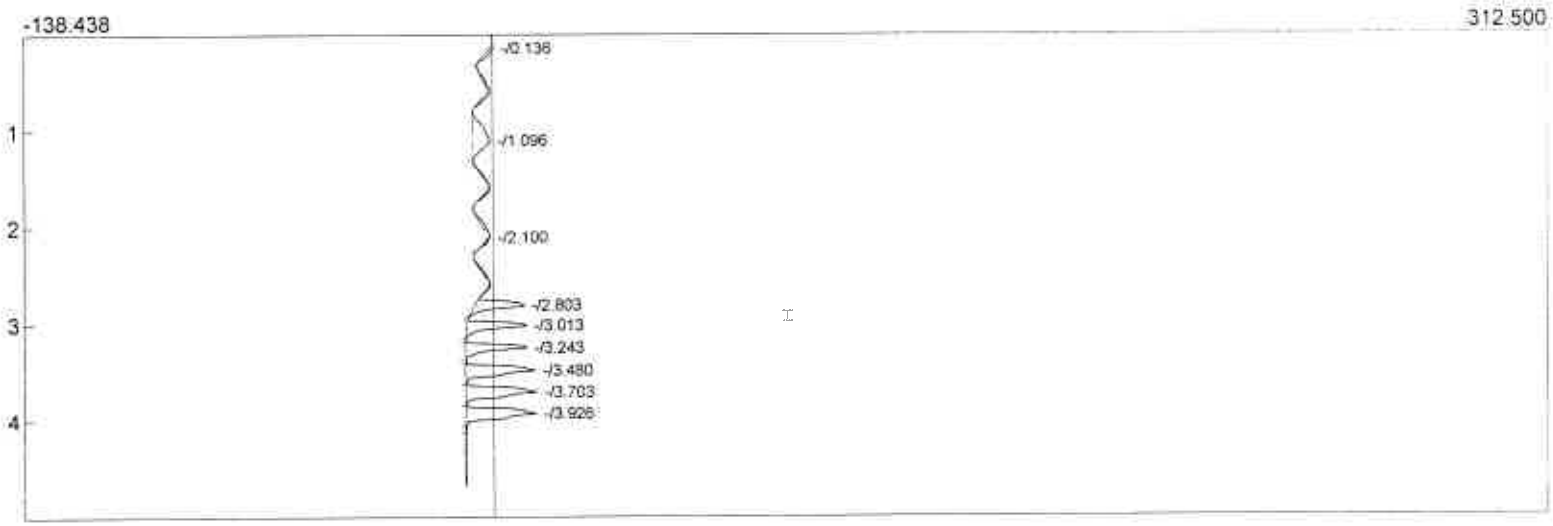
Analysis date: 08/31/2016 09:40:18
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_252.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.136	10.7411	1.143	0.0000	
-	1.096	83.8312	5.289	0.0000	
-	2.100	11.8374	0.609	0.0000	
-	2.803	72.3294	14.488	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.013	76.4359	17.564	0.0000	
-	3.243	77.2732	18.152	0.0000	
-	3.480	113.2823	20.714	0.0000	
-	3.703	117.5970	21.014	0.0000	
-	3.926	119.2443	20.908	0.0000	
		682.5718		0.0000	

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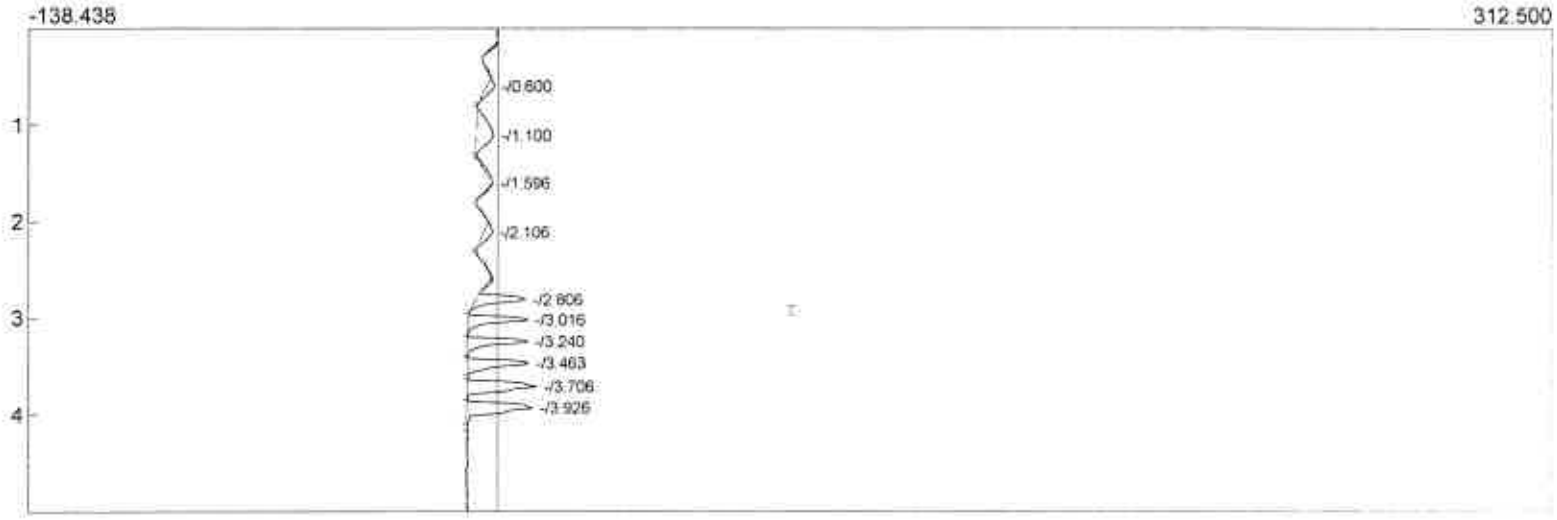
Analysis date: 08/31/2016 09:54:21
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_254.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.600	21.1574	2.434	0.0000	
-	1.100	84.5105	5.360	0.0000	
-	1.596	11.2018	0.453	0.0000	
-	2.106	25.6656	2.709	0.0000	
-	2.806	73.2539	14.857	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	76.2360	17.803	0.0000	
-	3.240	78.5246	18.018	0.0000	
-	3.463	87.9542	18.311	0.0000	
-	3.706	116.7027	20.804	0.0000	
-	3.926	115.7600	19.757	0.0000	
		690.9667		0.0000	

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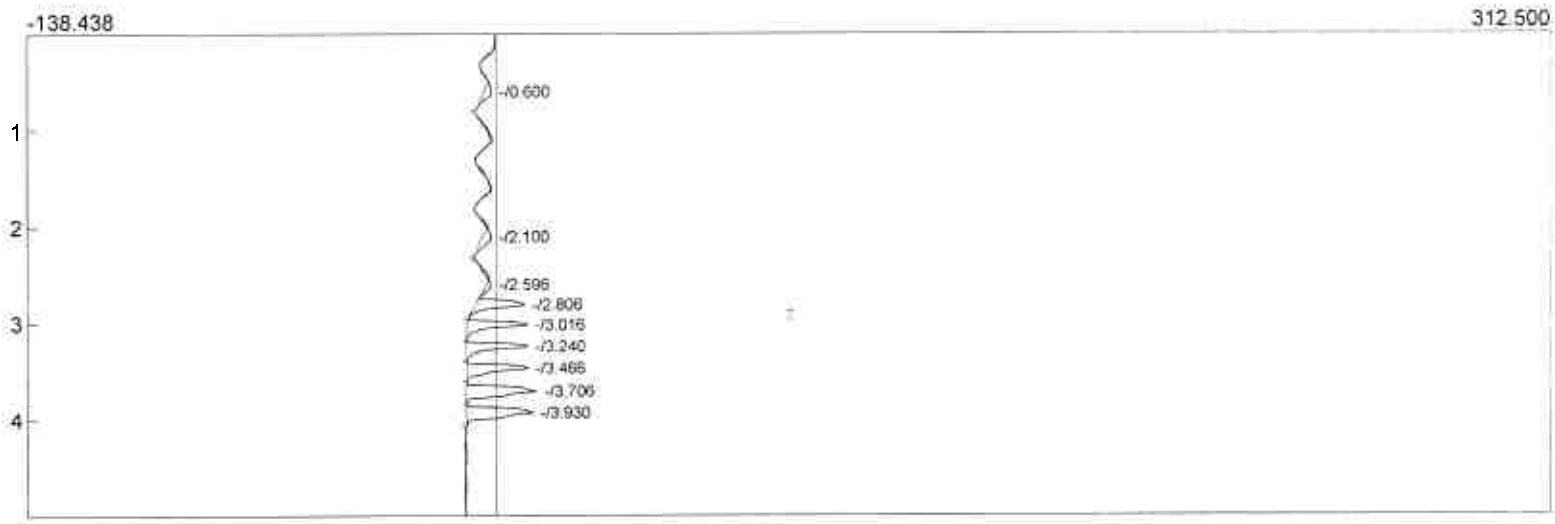
Analysis date: 08/31/2016 10:05:31
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_256.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.600	22.4032	2.423	0.0000	
-	2.100	25.6326	2.472	0.0000	
-	2.596	10.9465	1.497	0.0000	
-	2.806	72.5558	14.543	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	78.8576	17.757	0.0000	
-	3.240	78.1903	18.145	0.0000	
-	3.466	85.7759	17.994	0.0000	
-	3.706	117.2934	20.873	0.0000	
-	3.930	112.5802	19.626	0.0000	
		604.2355		0.0000	

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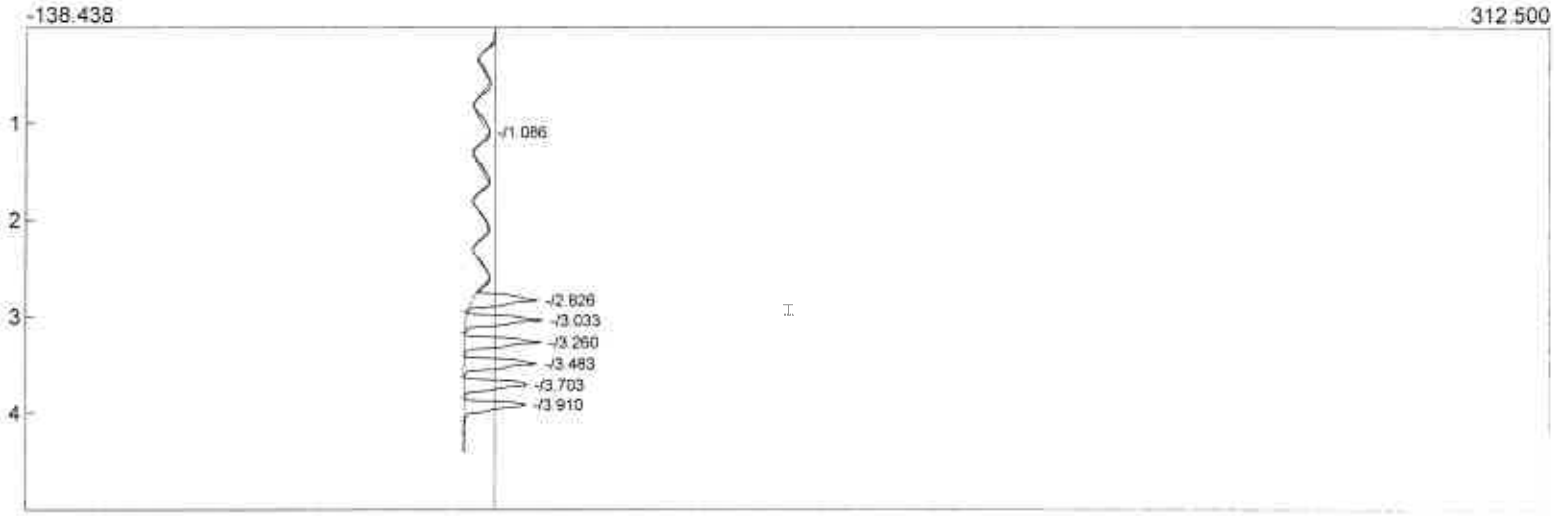
Analysis date: 08/31/2016 10:26:13
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_258.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.086	15.2330	1.096	0.0000	
-	2.826	111.8218	19.467	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.033	117.2712	23.043	0.0000	
-	3.260	118.1324	22.825	0.0000	
-	3.483	117.6958	21.884	0.0000	
-	3.703	105.3836	18.725	0.0000	
-	3.910	94.4368	18.219	0.0000	
		679.9746		0.0000	

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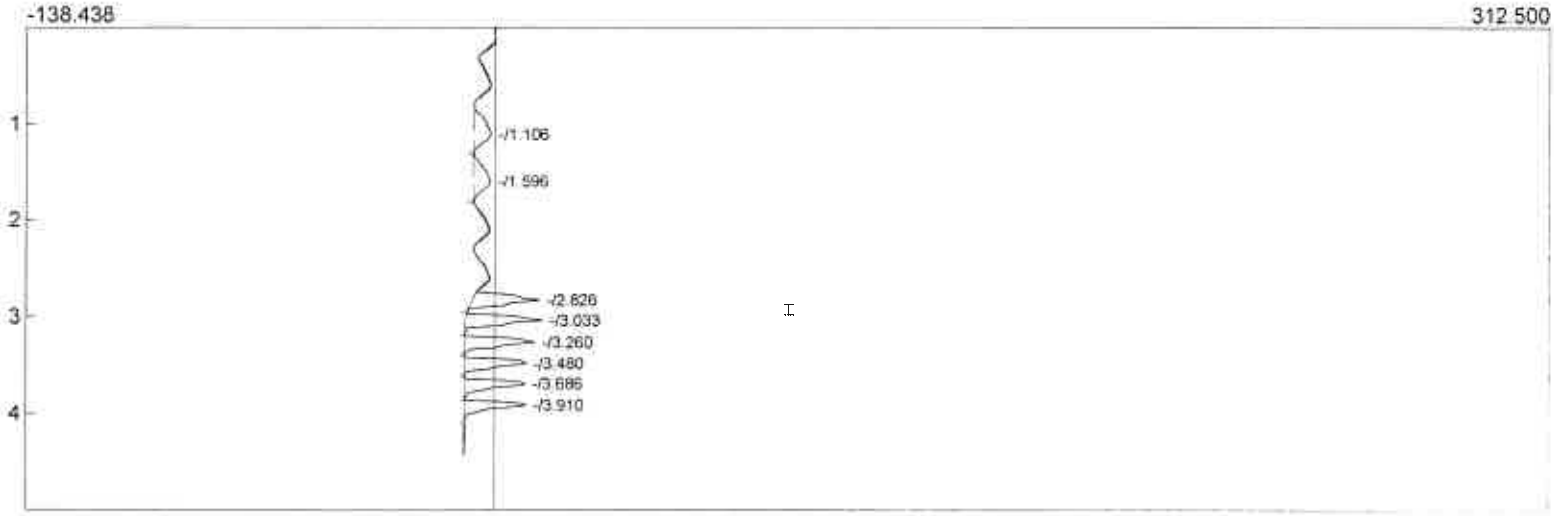
Analysis date: 08/31/2016 10:37:17
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_260.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.106	76.3910	5.211	0.0000	
-	1.596	76.7770	5.056	0.0000	
-	2.826	112.6158	19.684	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.033	116.0174	22.622	0.0000	
-	3.260	108.8642	20.766	0.0000	
-	3.480	96.3816	18.009	0.0000	
-	3.686	91.0383	17.730	0.0000	
-	3.910	84.7561	18.027	0.0000	
		762.8414		0.0000	

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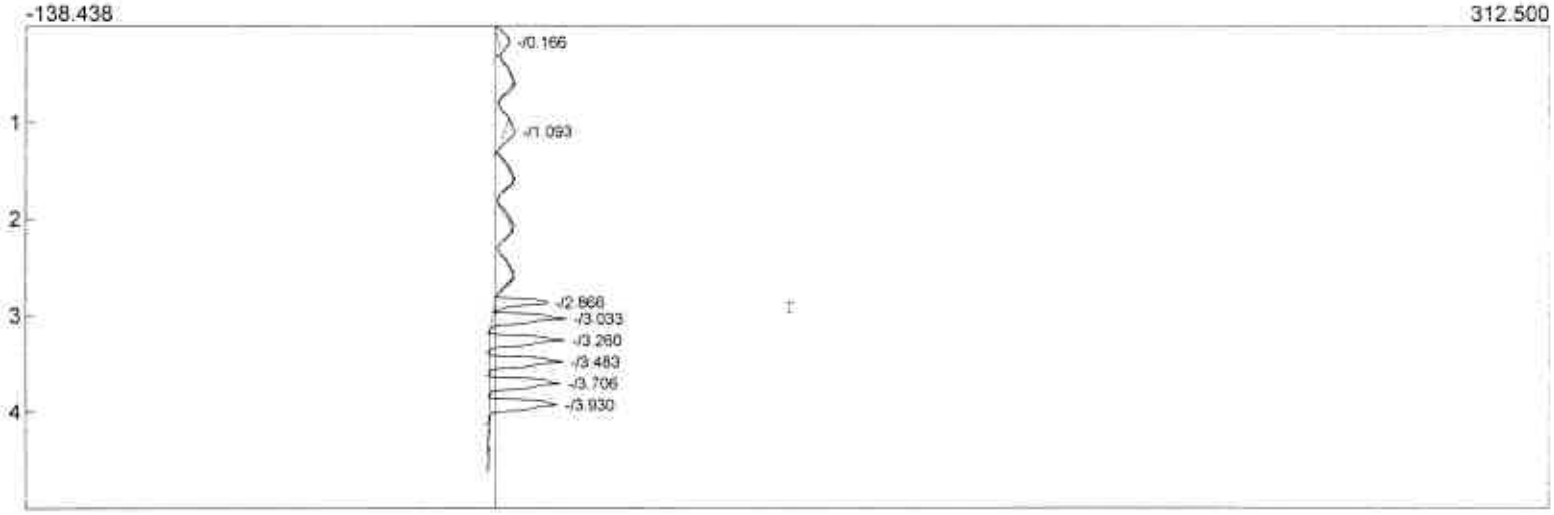
Analysis date: 08/31/2016 10:46:15
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_262.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.166	36.9012	3.536	0.0000	
-	1.093	33.4052	3.133	0.0000	
-	2.866	71.4526	15.781	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.033	110.6748	21.959	0.0000	
-	3.260	118.2106	22.665	0.0000	
-	3.483	116.4693	21.917	0.0000	
-	3.706	118.6066	21.366	0.0000	
-	3.930	115.0851	20.338	0.0000	
		720.8054		0.0000	

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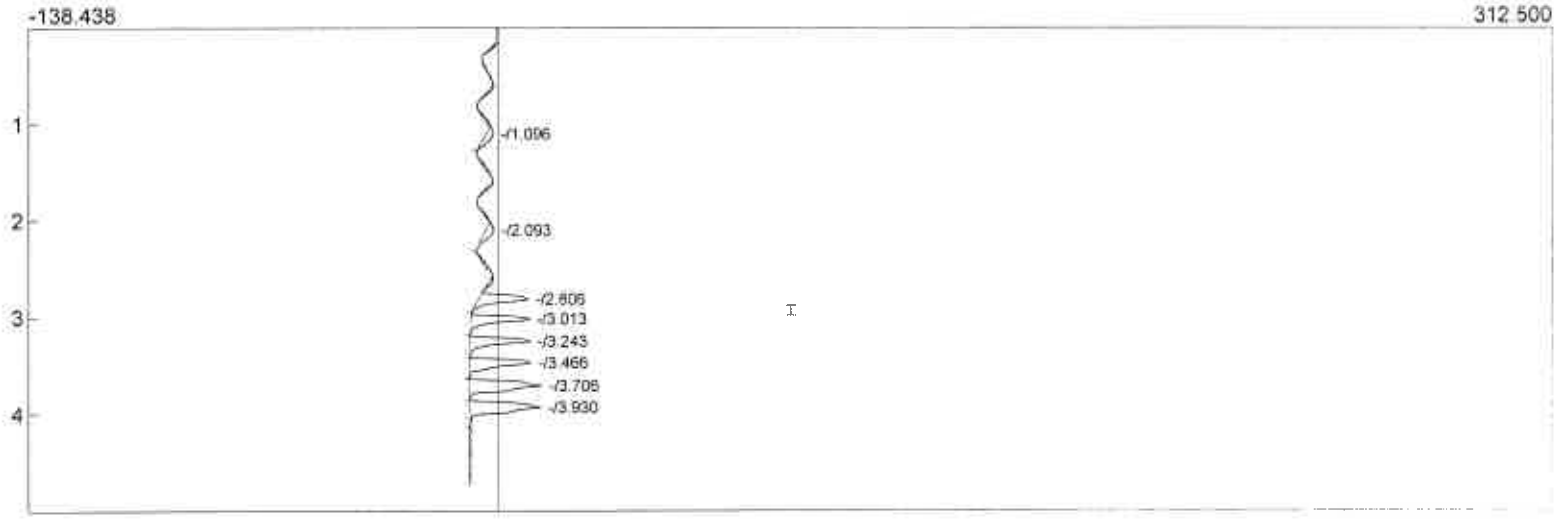
Analysis date: 08/31/2016 10:56:26
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_264.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.096	21.0186	2.166	0.0000	
-	2.093	24.3072	2.429	0.0000	
-	2.806	71.8192	14.734	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.013	76.5840	17.367	0.0000	
-	3.243	76.4553	17.836	0.0000	
-	3.466	89.9502	18.112	0.0000	
-	3.706	119.8484	21.500	0.0000	
-	3.930	117.6399	20.965	0.0000	
		597.6228		0.0000	

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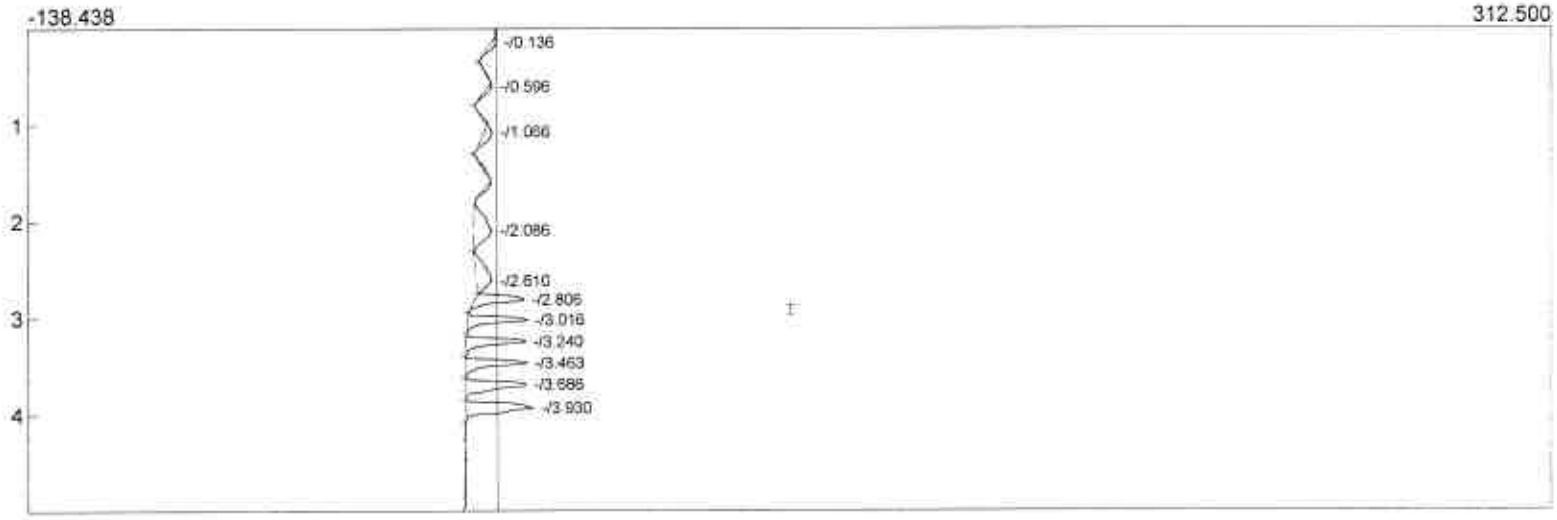
Analysis date: 08/31/2016 11:10:00
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_266.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.136	13.6470	1.380	0.0000	
-	0.596	10.3952	1.288	0.0000	
-	1.066	26.0760	2.351	0.0000	
-	2.086	82.8486	5.374	0.0000	
-	2.610	66.1526	4.530	0.0000	
-	2.806	71.8598	14.442	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	74.0216	17.486	0.0000	
-	3.240	76.6964	17.568	0.0000	
-	3.463	78.0230	18.130	0.0000	
-	3.686	94.7200	17.810	0.0000	
-	3.930	112.0808	20.008	0.0000	
		706.5210		0.0000	

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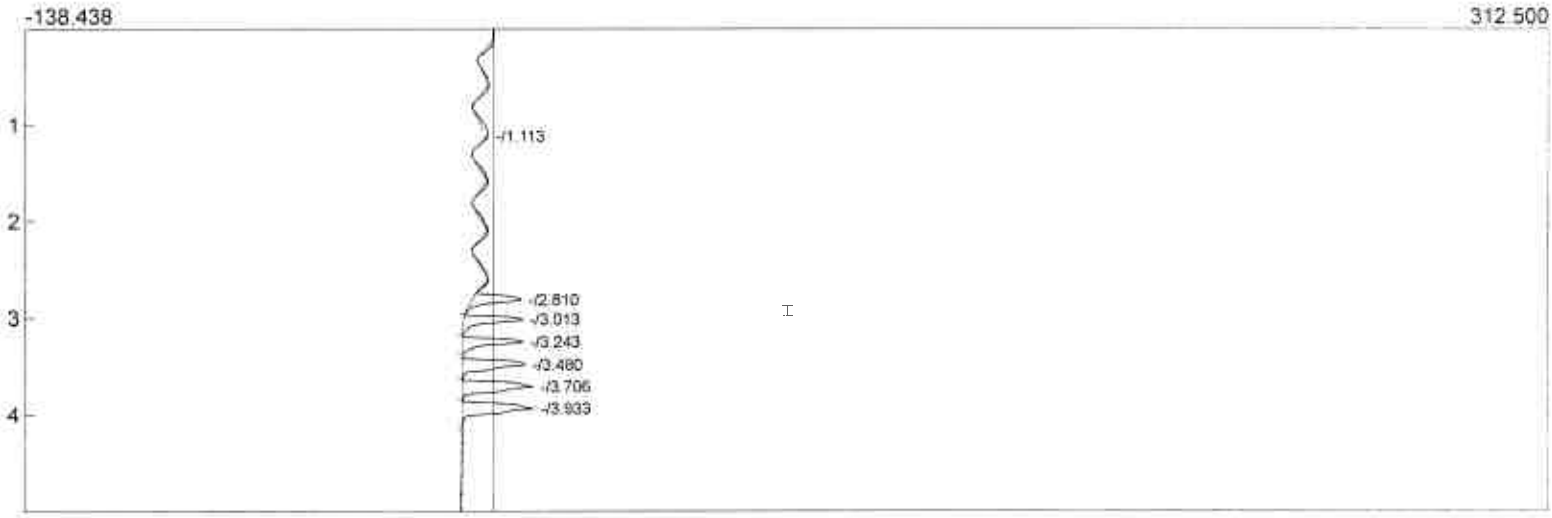
Analysis date: 08/31/2016 11:24:17
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_268.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.113	15.3552	0.761	0.0000	
-	2.810	73.0198	14.637	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.013	77.4383	17.431	0.0000	
-	3.243	78.2030	17.923	0.0000	
-	3.480	101.1918	18.480	0.0000	
-	3.706	117.3199	21.002	0.0000	
-	3.933	118.6970	21.066	0.0000	
		581.2250		0.0000	

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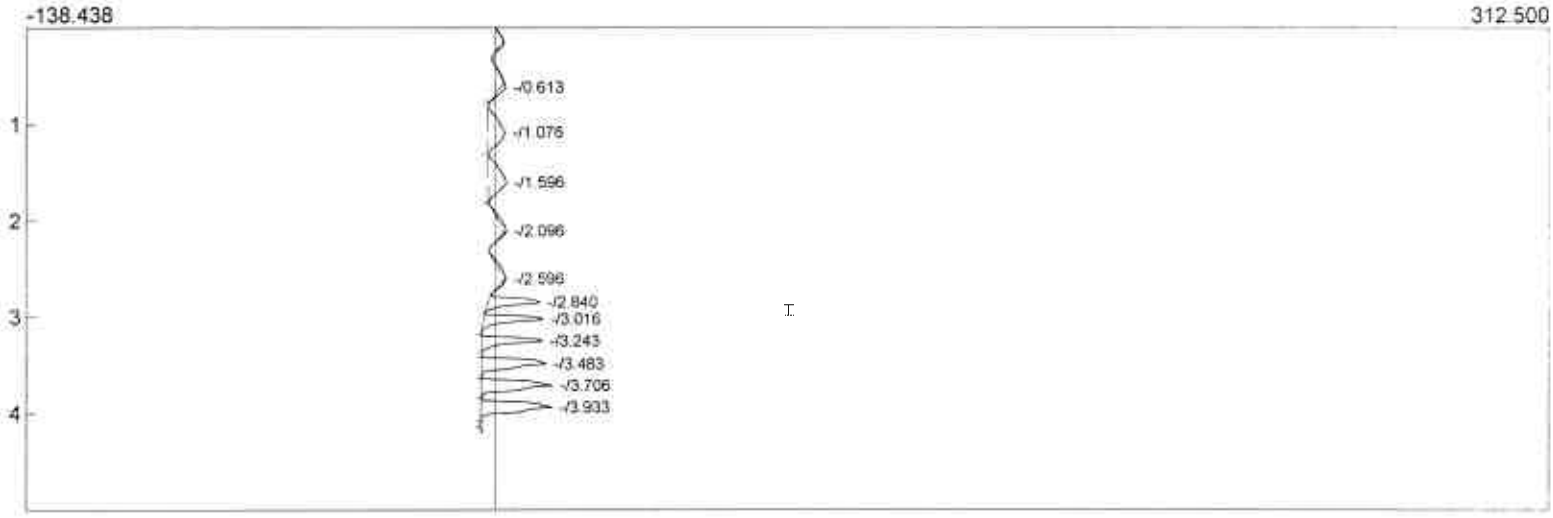
Analysis date: 08/31/2016 11:34:13
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_270.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.613	10.8081	1.604	0.0000	
-	1.076	79.8018	5.199	0.0000	
-	1.596	83.7632	5.405	0.0000	
-	2.096	10.1794	0.763	0.0000	
-	2.596	12.8216	0.747	0.0000	
-	2.840	70.9384	15.286	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	75.3764	17.627	0.0000	
-	3.243	76.3342	18.018	0.0000	
-	3.483	104.7848	19.201	0.0000	
-	3.706	115.6300	21.169	0.0000	
-	3.933	118.4113	21.061	0.0000	
		758.8492		0.0000	

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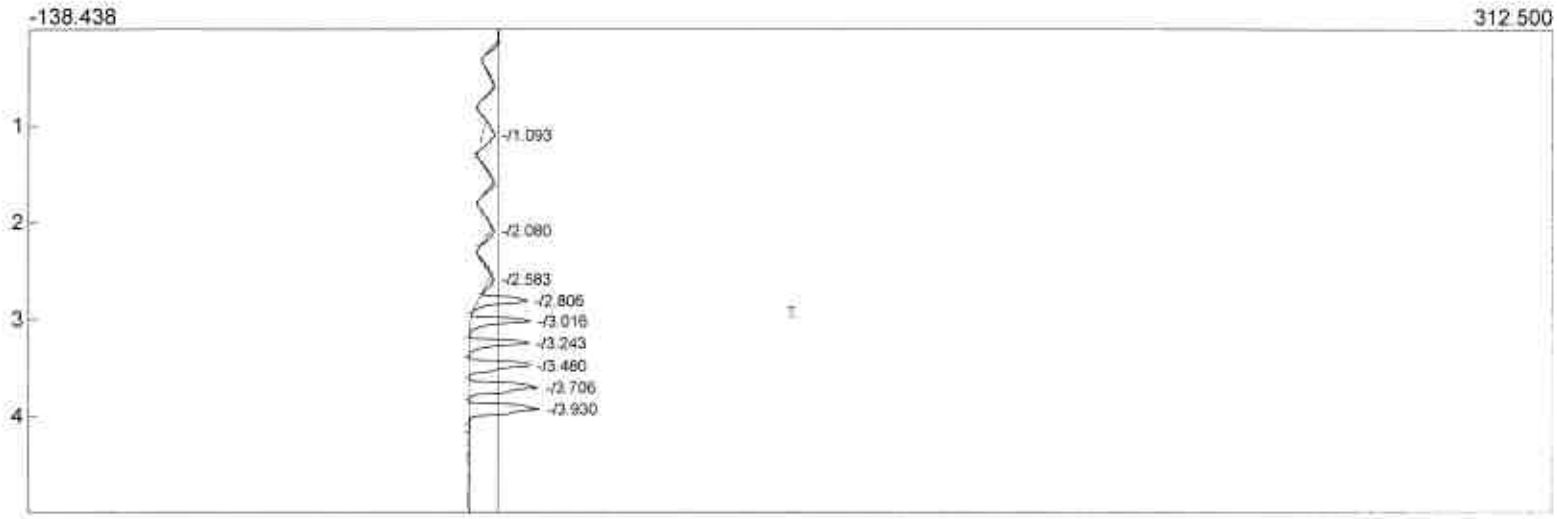
Analysis date: 08/31/2016 11:44:27
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_272.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.093	40.1590	3.710	0.0000	
-	2.080	10.7788	0.990	0.0000	
-	2.583	11.4235	1.415	0.0000	
-	2.806	71.1636	14.616	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	77.1834	17.883	0.0000	
-	3.243	74.4858	17.753	0.0000	
-	3.480	97.4498	18.125	0.0000	
-	3.706	115.4428	20.670	0.0000	
-	3.930	118.6200	21.146	0.0000	
		616.7067		0.0000	

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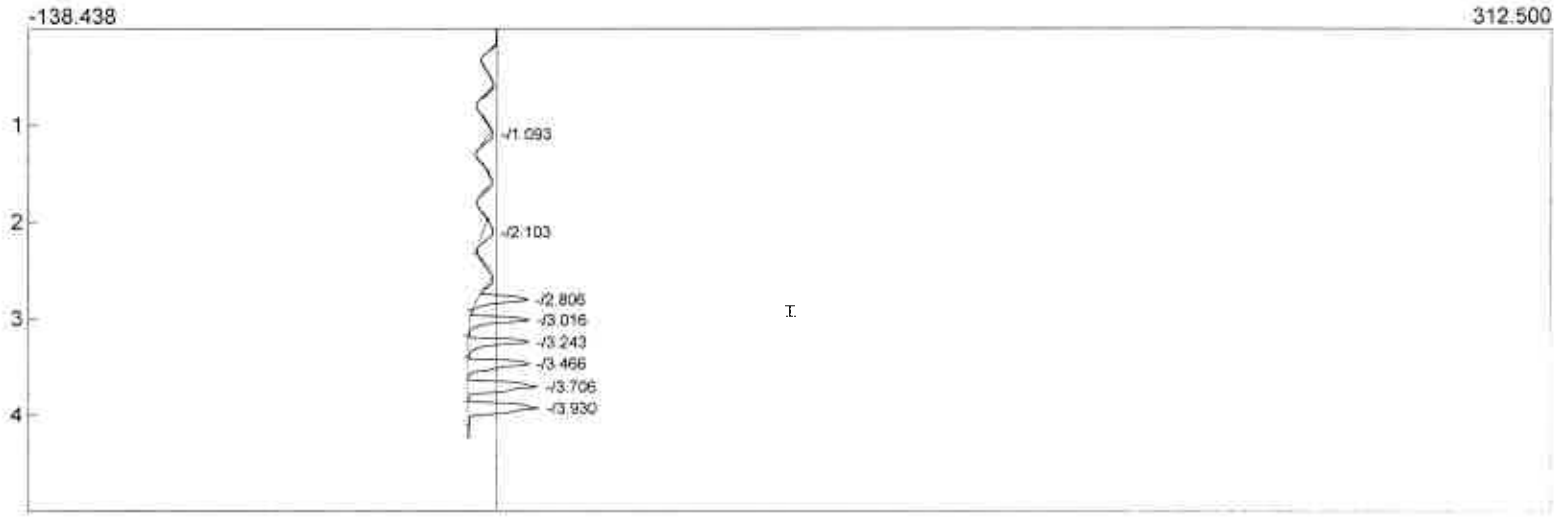
Analysis date: 08/31/2016 11:56:30
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_274.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.093	10.9851	1.403	0.0000	
-	2.103	31.4652	3.123	0.0000	
-	2.806	70.5062	14.876	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	74.7484	17.516	0.0000	
-	3.243	75.9128	17.866	0.0000	
-	3.466	95.1392	17.972	0.0000	
-	3.706	115.8434	20.880	0.0000	
-	3.930	116.8948	20.914	0.0000	
		591.4951		0.0000	

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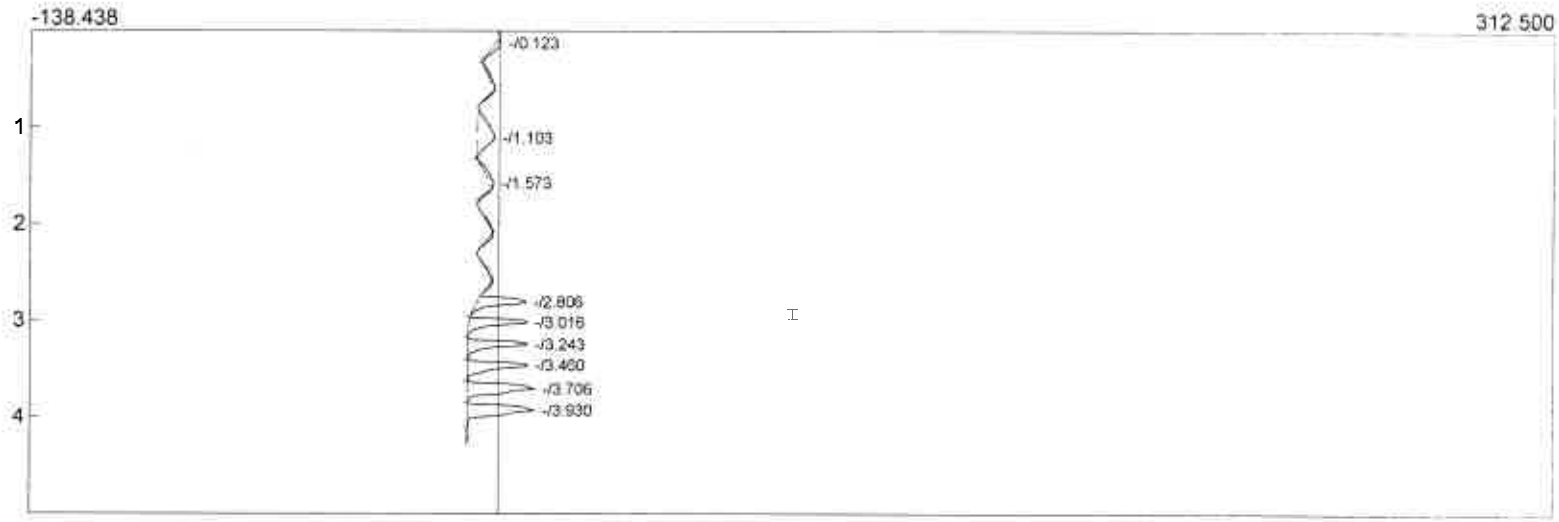
Analysis date: 08/31/2016 12:08:06
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_276.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.123	14.3818	1.528	0.0000	
-	1.103	81.0430	5.319	0.0000	
-	1.573	12.6648	1.014	0.0000	
-	2.806	71.2464	14.443	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	76.7612	17.259	0.0000	
-	3.243	78.1308	17.774	0.0000	
-	3.460	84.8470	17.762	0.0000	
-	3.706	112.6605	19.950	0.0000	
-	3.930	112.7898	19.910	0.0000	
		644.5253		0.0000	

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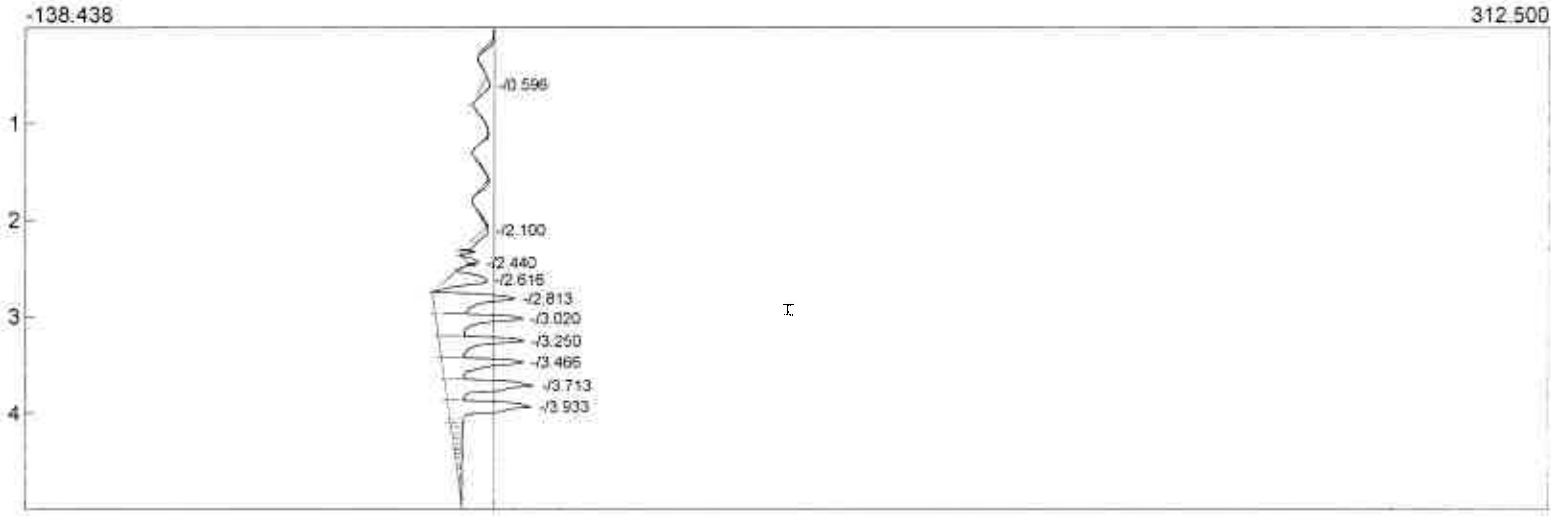
Analysis date: 08/31/2016 12:22:35
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_278.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
	0.596	24.0896	2.564	0.0000	
	2.100	29.9001	1.524	0.0000	
	2.440	10.3932	3.136	0.0000	
	2.616	89.4980	12.055	0.0000	
	2.813	192.7542	24.395	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
	3.020	187.9552	25.859	0.0000	
	3.250	169.7882	25.201	0.0000	
	3.466	168.3470	24.200	0.0000	
	3.713	185.6846	26.445	0.0000	
	3.933	165.6664	24.805	0.0000	
		1224.0765		0.0000	

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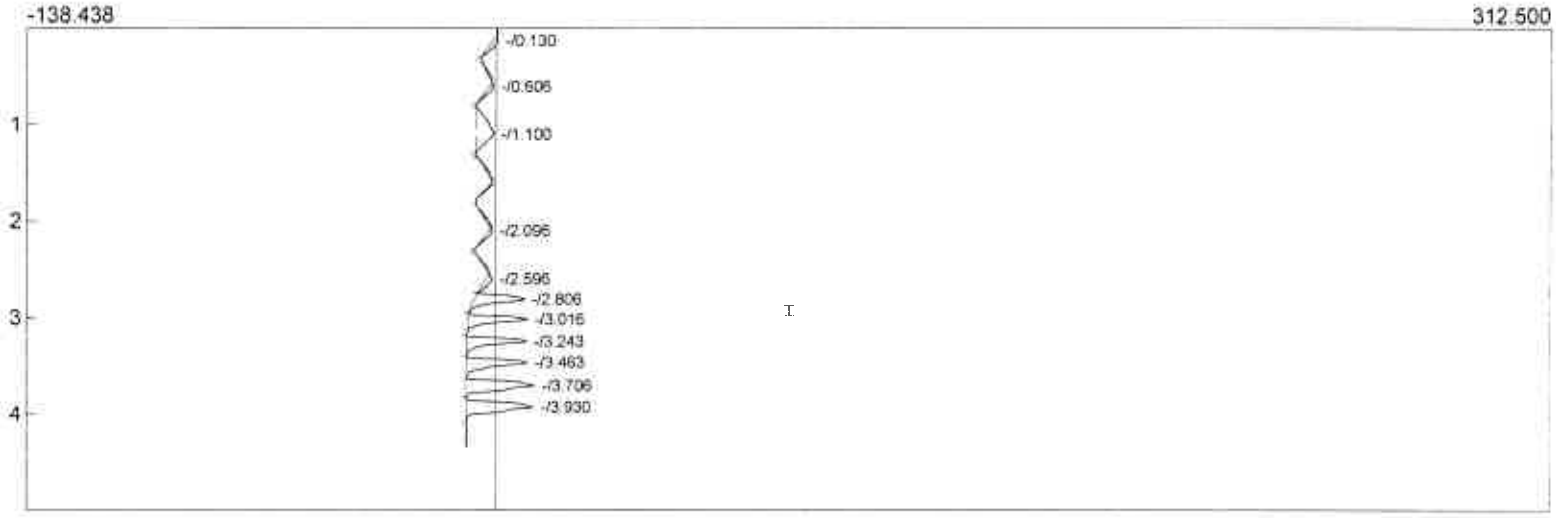
Analysis date: 08/31/2016 12:33:48
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_280.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.130	14.5972	1.491	0.0000	
-	0.606	10.4743	1.209	0.0000	
-	1.100	79.1722	5.225	0.0000	
-	2.096	10.3236	1.082	0.0000	
-	2.596	15.2214	1.920	0.0000	
-	2.806	72.9744	14.569	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	72.9224	17.329	0.0000	
-	3.243	77.3220	17.851	0.0000	
-	3.463	88.6258	18.129	0.0000	
-	3.706	114.5890	20.335	0.0000	
-	3.930	112.2604	19.879	0.0000	
		668.4827		0.0000	

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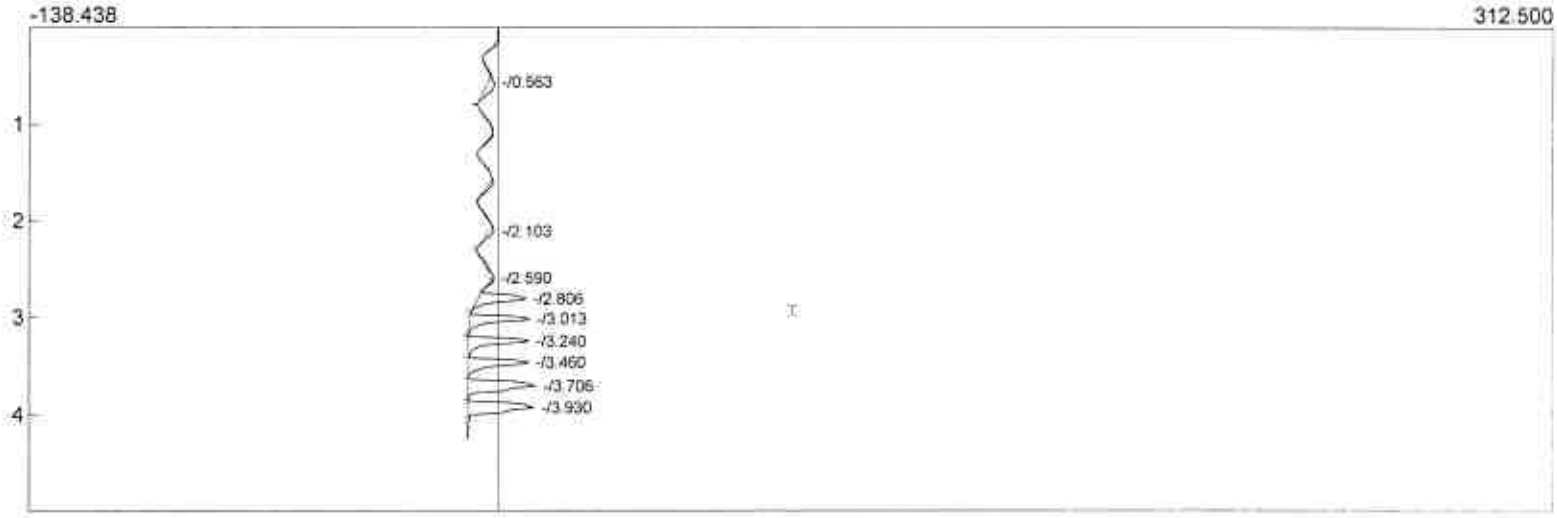
Analysis date: 08/31/2016 12:44:37
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_282.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.563	23.5125	1.864	0.0000	
-	2.103	10.2932	1.348	0.0000	
-	2.590	10.2004	0.702	0.0000	
-	2.806	70.2513	14.219	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.013	76.9502	17.638	0.0000	
-	3.240	78.5624	17.959	0.0000	
-	3.460	82.3603	17.762	0.0000	
-	3.706	114.7945	20.219	0.0000	
-	3.930	110.1947	19.616	0.0000	
		577.1195		0.0000	

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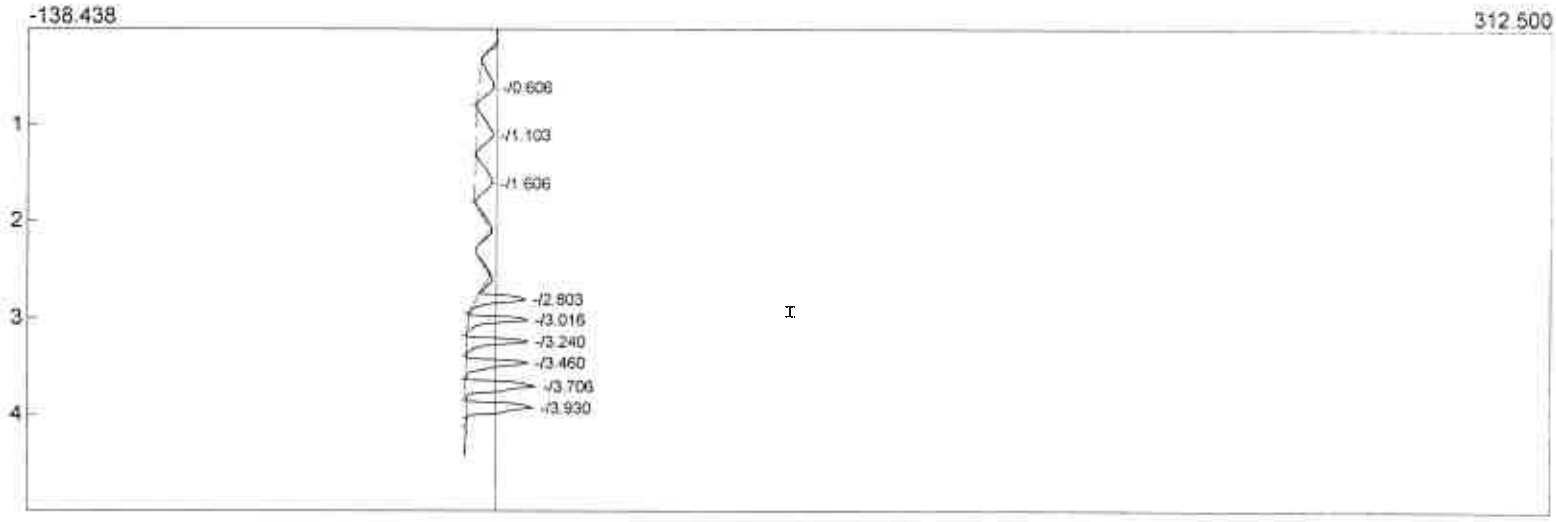
Analysis date: 08/31/2016 12:58:40
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_284.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.606	66.3373	4.858	0.0000	
-	1.103	80.5052	5.143	0.0000	
-	1.606	83.3358	5.334	0.0000	
-	2.803	70.7610	14.487	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	75.2764	17.310	0.0000	
-	3.240	76.6614	18.054	0.0000	
-	3.460	89.9986	18.081	0.0000	
-	3.706	117.7276	20.776	0.0000	
-	3.930	111.3660	19.664	0.0000	
		771.9693		0.0000	

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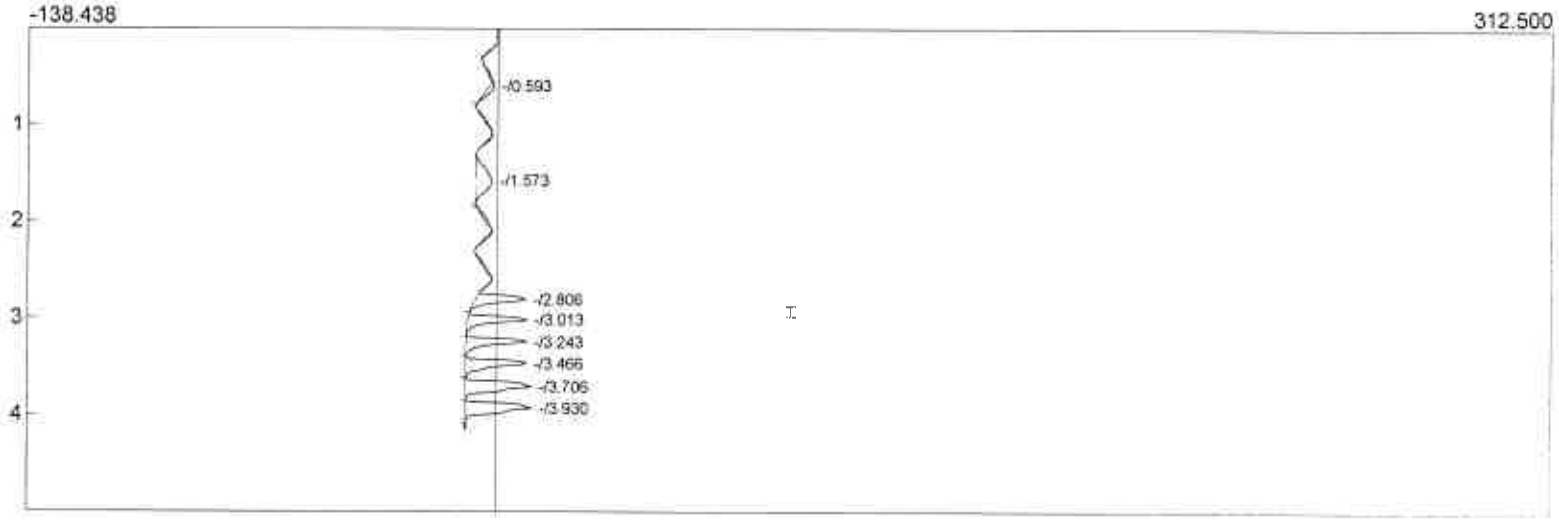
Analysis date: 08/31/2016 13:09:01
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_286.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.593	13.8888	1.628	0.0000	
-	1.573	76.0306	4.957	0.0000	
-	2.806	71.1939	14.925	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.013	76.5740	17.579	0.0000	
-	3.243	78.1338	18.080	0.0000	
-	3.466	88.6035	18.165	0.0000	
-	3.706	112.4282	19.712	0.0000	
-	3.930	110.8229	19.640	0.0000	
		627.6757		0.0000	

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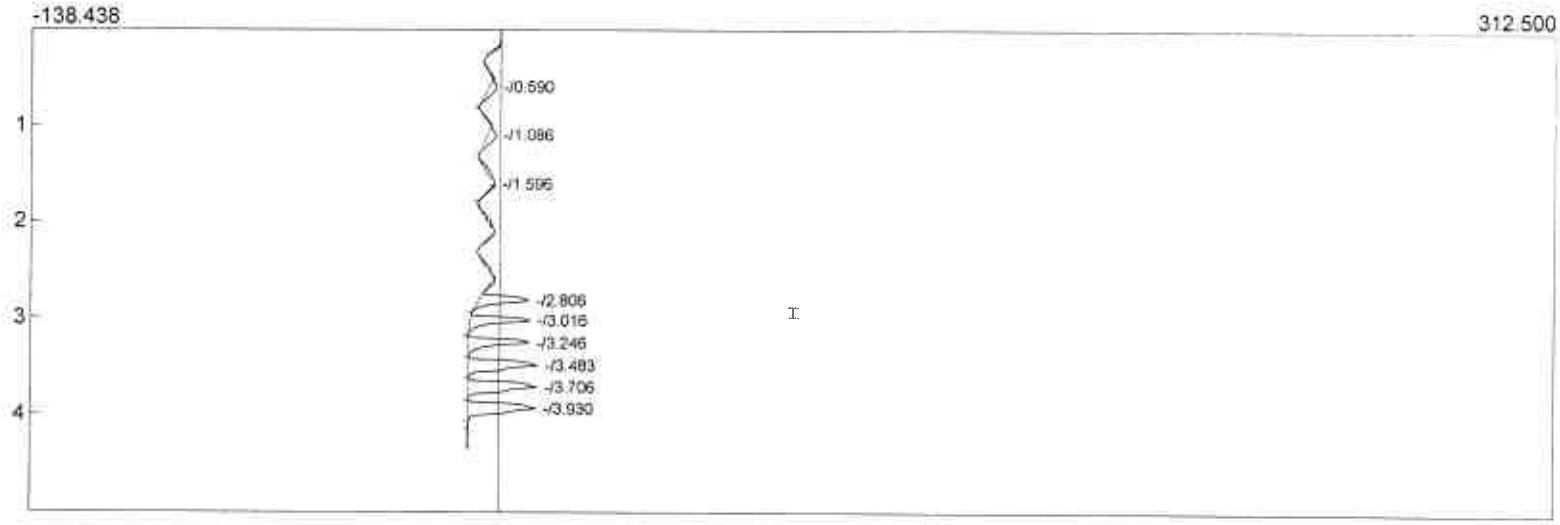
Analysis date: 08/31/2016 13:20:22
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_288.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.590	21.7023	2.290	0.0000	
-	1.086	25.3296	2.606	0.0000	
-	1.596	12.5286	0.608	0.0000	
-	2.806	70.9247	14.825	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	76.7924	17.634	0.0000	
-	3.246	79.2872	18.095	0.0000	
-	3.483	112.2957	20.577	0.0000	
-	3.706	114.4481	20.434	0.0000	
-	3.930	115.0338	20.044	0.0000	
		628.3424		0.0000	

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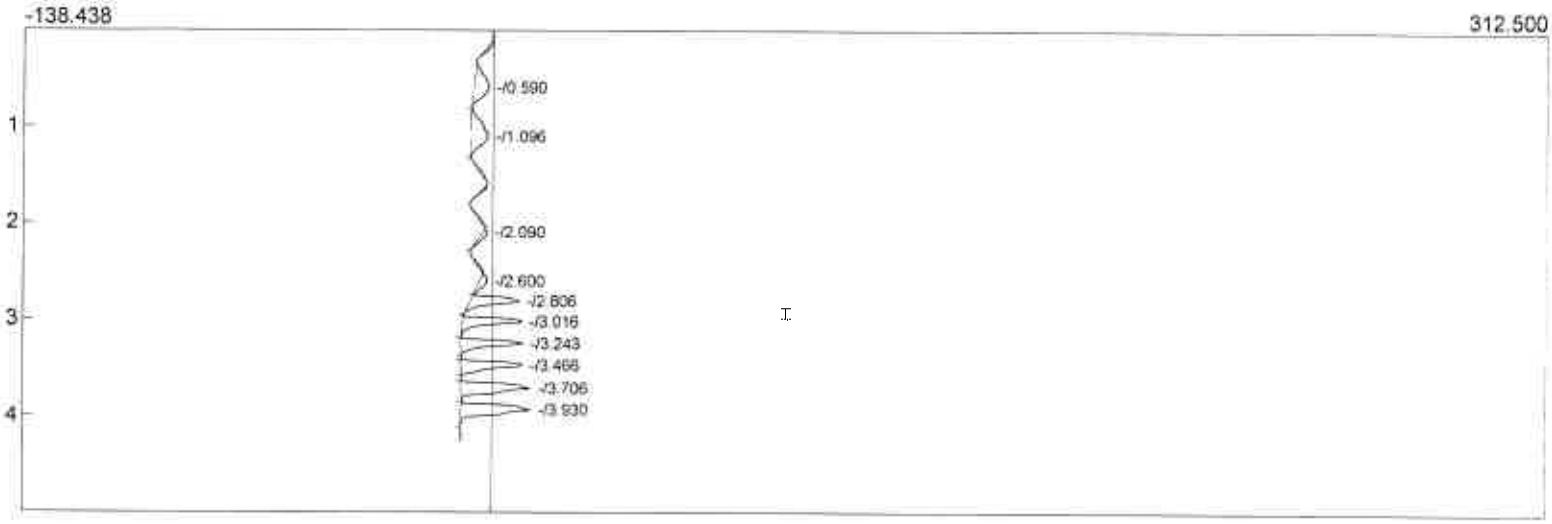
Analysis date: 08/31/2016 13:46:48
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_292.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.590	62.3890	4.368	0.0000	
-	1.096	79.2714	5.072	0.0000	
-	2.090	12.9957	1.356	0.0000	
-	2.600	18.6726	2.244	0.0000	
-	2.806	71.3972	14.443	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	75.8282	17.320	0.0000	
-	3.243	76.3224	18.279	0.0000	
-	3.466	86.7528	18.071	0.0000	
-	3.706	112.8000	20.509	0.0000	
-	3.930	117.6150	20.555	0.0000	
		714.0443		0.0000	

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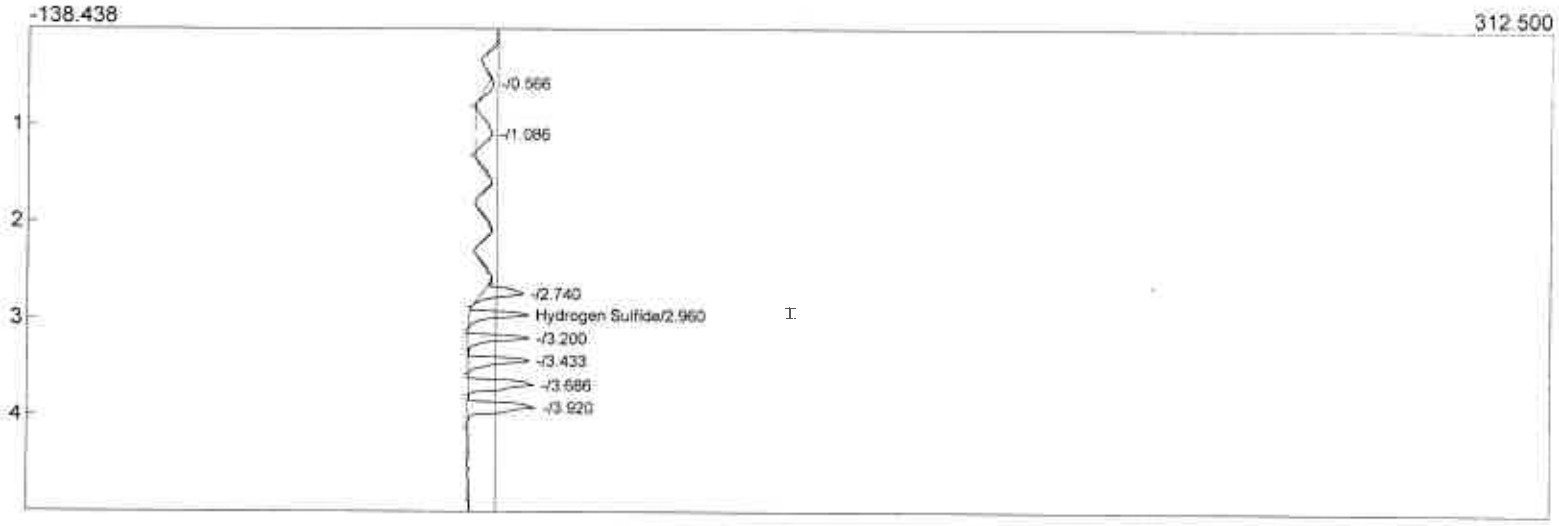
Analysis date: 08/31/2016 13:57:45
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_294.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.566	17.8742	1.477	0.0000	
-	1.086	78.0666	5.270	0.0000	
-	2.740	68.0772	12.299	0.0000	
Hydrogen Sulfide	2.960	76.9078	17.495	4.1586	
-	3.200	77.0602	18.231	0.0000	
-	3.433	84.7096	18.059	0.0000	
-	3.686	109.3698	19.513	0.0000	
-	3.920	115.2647	20.177	0.0000	
		627.3301		4.1586	

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

Quote # 554908

CAS	Analyte	Units	Reg Limit	MDL	PQL	RDL
108-88-3	Toluene	ug/L		0.23	1	1
127-18-4	Tetrachloroethene	ug/L		0.35	1	1
108-90-7	Chlorobenzene	ug/L		0.19	1	1
100-41-4	Ethylbenzene	ug/L		0.34	1	1
542-75-6	1,3-Dichloropropene, Total	ug/L		0.47	2	2
541-73-1	1,3-Dichlorobenzene	ug/L		0.25	1	1
106-46-7	1,4-Dichlorobenzene	ug/L		0.27	1	1
95-50-1	1,2-Dichlorobenzene	ug/L		0.38	1	1
335.4CNTW Cyanide, Total						
CN	Cyanide, Total	mg/L		0.00058	0.005	0.005
200.8TPB Lead - 200.8/TRMD						
7439-92-1	Lead, Total	mg/L		0.00033	0.001	0.001
200.8TZN Zinc - 200.8/TRMD						
7440-66-6	Zinc, Total	mg/L		0.00083	0.0025	0.0025
S4500WpHB pH by SM 4500pH-B						
PH	pH	pH_Uni				
Line Item 2 NPW: TOTAL RESIDUAL CHLORINE - NY CERT NOT OFFERED FOR THIS						
S4500TCL Chlorine, Total Residual						
TResCl	Chlorine, Total Residual	mg/L		0.00855	0.1	0.1

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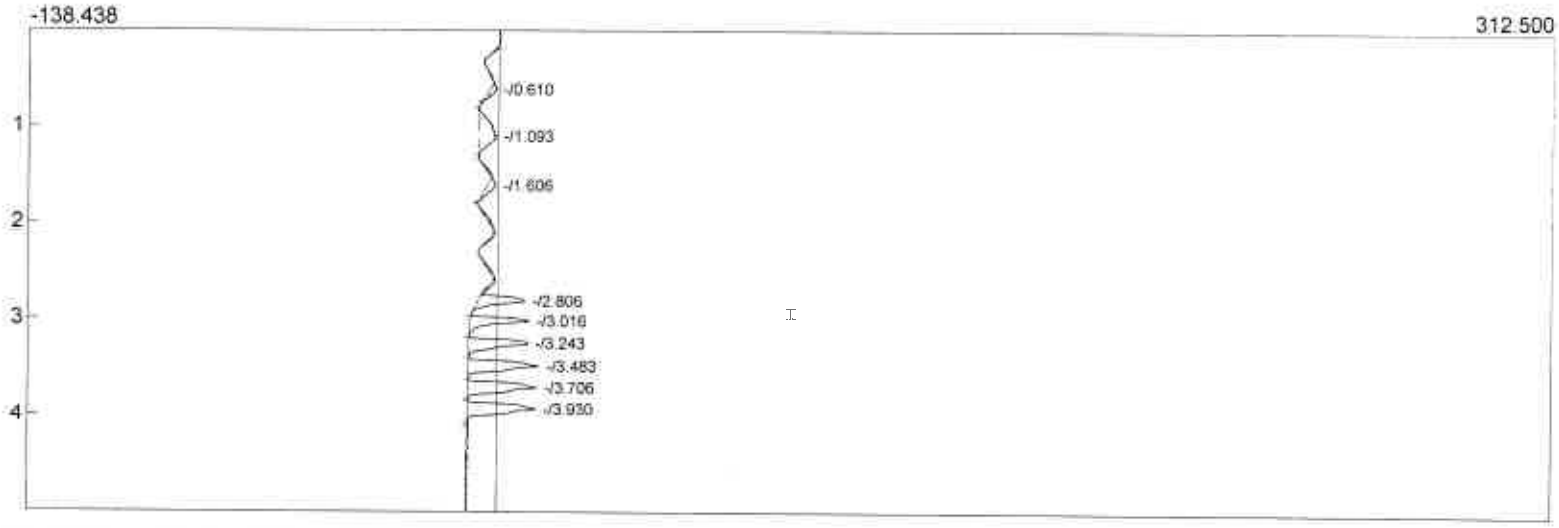
Analysis date: 08/31/2016 14:08:52
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_296.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.610	13.1089	1.797	0.0000	
-	1.093	82.8470	5.471	0.0000	
-	1.606	20.6047	2.521	0.0000	
-	2.806	70.8977	14.125	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	77.0508	17.902	0.0000	
-	3.243	92.8496	17.742	0.0000	
-	3.483	113.0114	21.164	0.0000	
-	3.706	115.3154	20.704	0.0000	
-	3.930	116.8094	20.362	0.0000	
		702.4949		0.0000	

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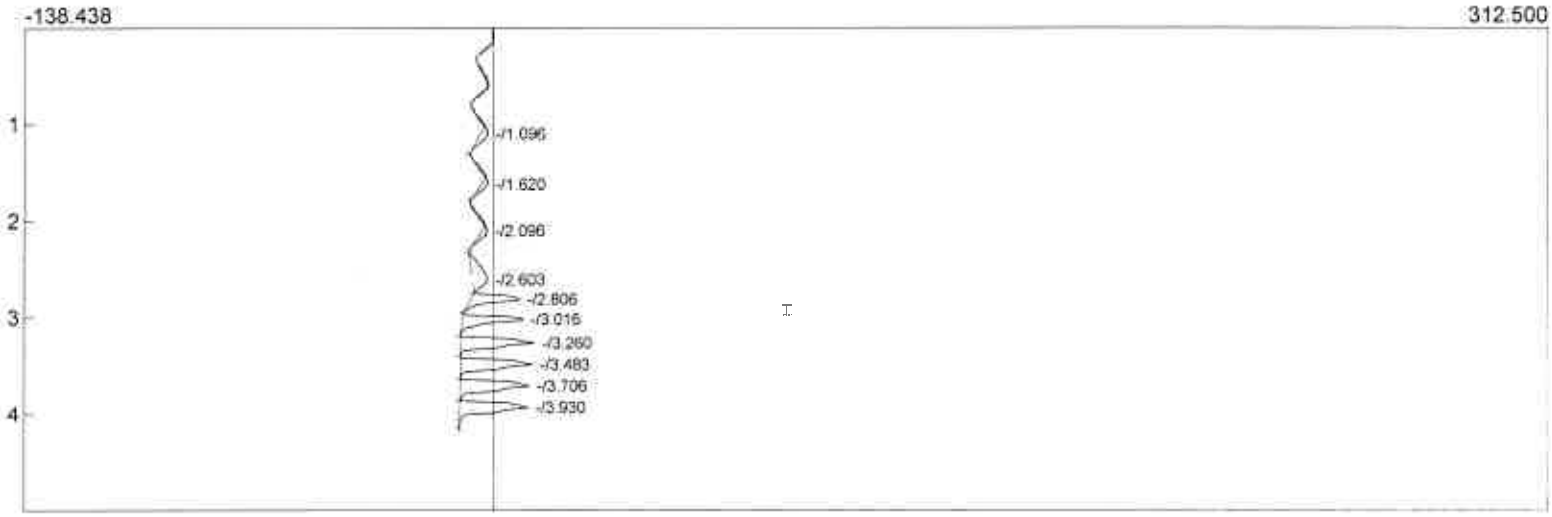
Analysis date: 08/31/2016 14:21:47
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_298.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.096	20.6037	2.278	0.0000	
-	1.620	14.4572	1.969	0.0000	
-	2.096	14.4076	1.529	0.0000	
-	2.603	64.1720	4.402	0.0000	
-	2.806	71.1320	14.356	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	82.9208	17.810	0.0000	
-	3.260	113.8384	21.825	0.0000	
-	3.483	114.9550	21.203	0.0000	
-	3.706	115.9530	20.366	0.0000	
-	3.930	114.9704	20.042	0.0000	
		727.4101		0.0000	

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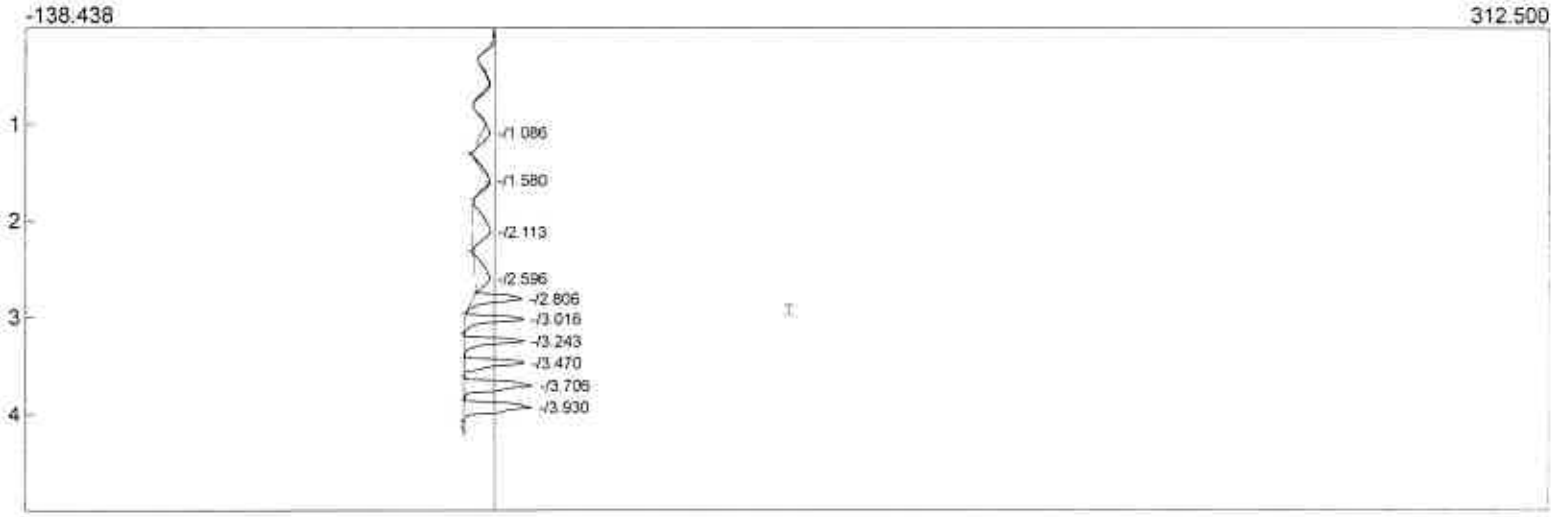
Analysis date: 08/31/2016 14:34:14
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_300.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.086	26.7937	2.585	0.0000	
-	1.580	10.1085	0.651	0.0000	
-	2.113	83.2844	5.296	0.0000	
-	2.596	63.9792	4.479	0.0000	
-	2.806	72.0692	14.580	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	76.5366	17.469	0.0000	
-	3.243	76.4011	17.732	0.0000	
-	3.470	89.0238	17.961	0.0000	
-	3.706	115.0830	20.555	0.0000	
-	3.930	115.5980	20.311	0.0000	
		728.8775		0.0000	

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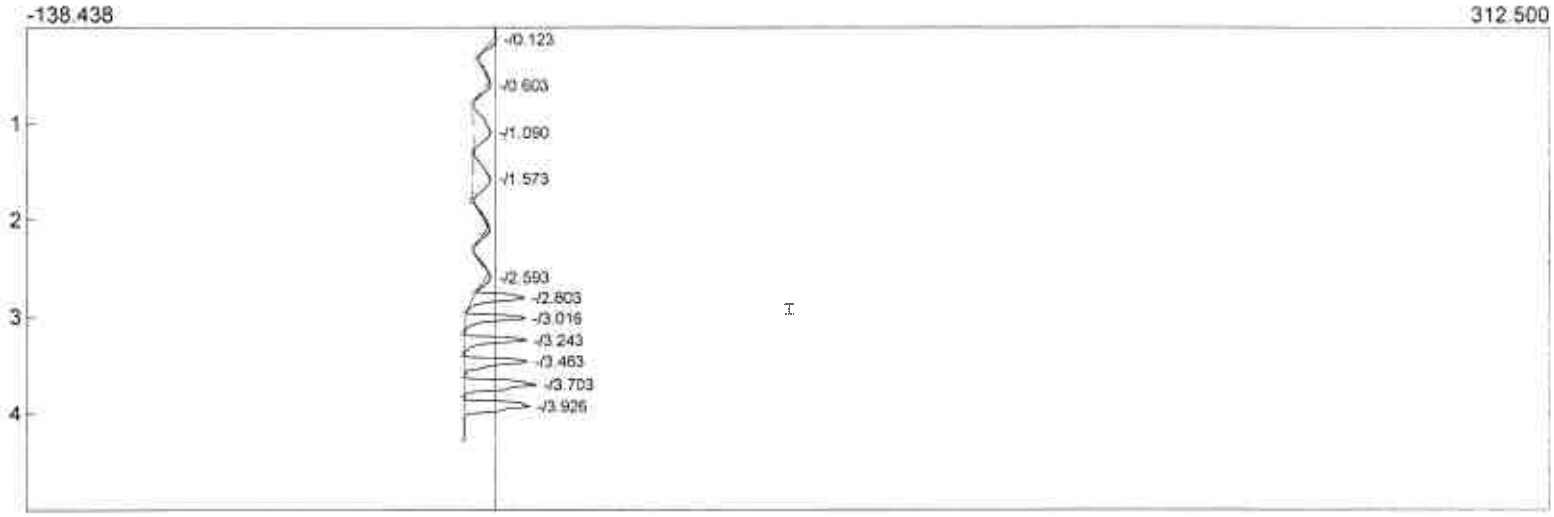
Analysis date: 08/31/2016 14:52:13
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_302.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.123	11.5344	1.109	0.0000	
-	0.603	11.0804	1.355	0.0000	
-	1.090	78.7805	5.240	0.0000	
-	1.573	82.4821	5.261	0.0000	
-	2.593	12.0826	1.603	0.0000	
-	2.803	73.0934	14.833	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	76.6528	17.414	0.0000	
-	3.243	78.3923	18.272	0.0000	
-	3.463	91.0390	18.542	0.0000	
-	3.703	118.5479	21.150	0.0000	
-	3.926	108.9609	19.301	0.0000	
		742.6463		0.0000	

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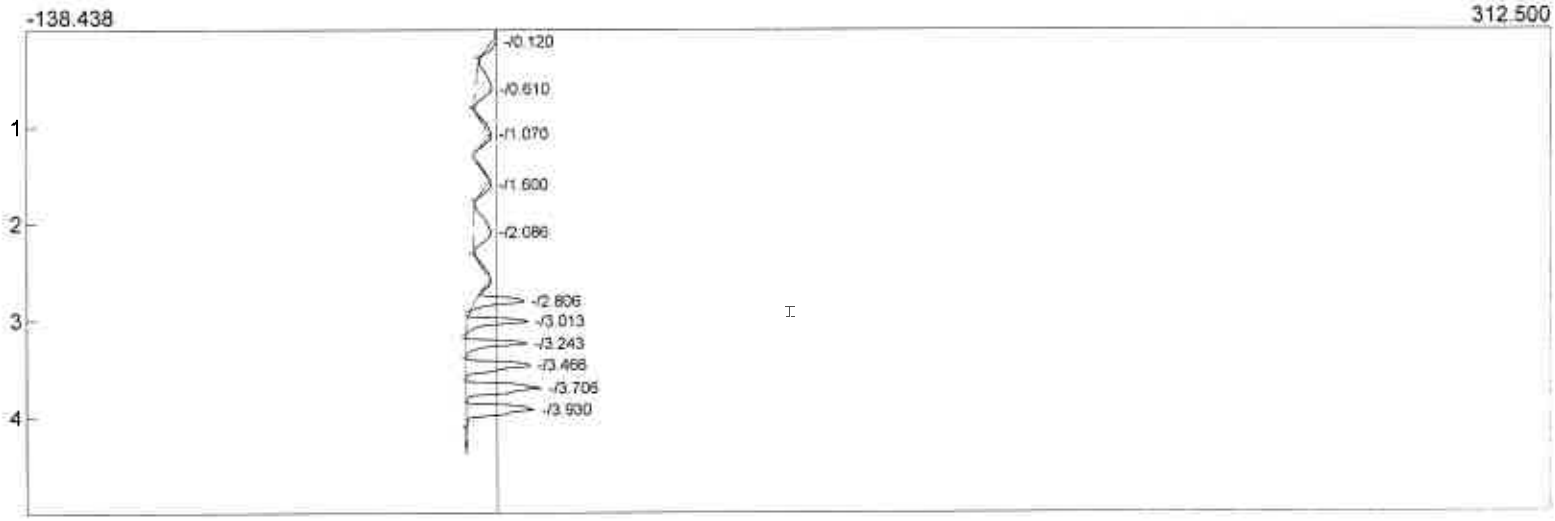
Analysis date: 08/31/2016 15:03:02
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_304.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.120	13.6226	1.267	0.0000	
-	0.610	72.8502	4.872	0.0000	
-	1.070	10.0206	0.711	0.0000	
-	1.600	12.7946	1.263	0.0000	
-	2.086	80.8638	5.242	0.0000	
-	2.806	71.4524	14.415	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.013	77.1779	17.986	0.0000	
-	3.243	77.5292	18.211	0.0000	
-	3.466	103.6688	19.016	0.0000	
-	3.706	125.2068	22.431	0.0000	
-	3.930	116.6282	20.105	0.0000	
		761.8151		0.0000	

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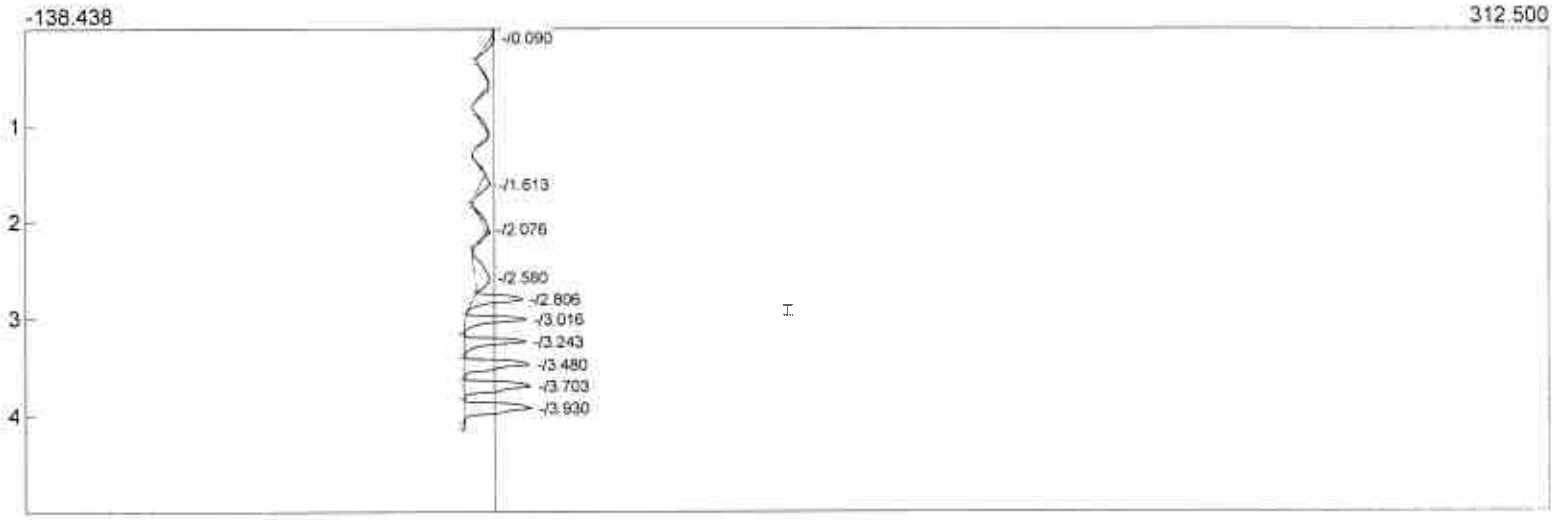
Analysis date: 08/31/2016 15:13:22
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_306.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.090	15.2284	0.929	0.0000	
-	1.613	25.6839	3.293	0.0000	
-	2.076	10.5102	0.668	0.0000	
-	2.580	65.6370	4.503	0.0000	
-	2.806	73.3160	14.582	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	78.0518	17.933	0.0000	
-	3.243	76.5872	18.016	0.0000	
-	3.480	105.0719	19.252	0.0000	
-	3.703	112.0046	19.768	0.0000	
-	3.930	114.6037	19.881	0.0000	
		676.6947		0.0000	

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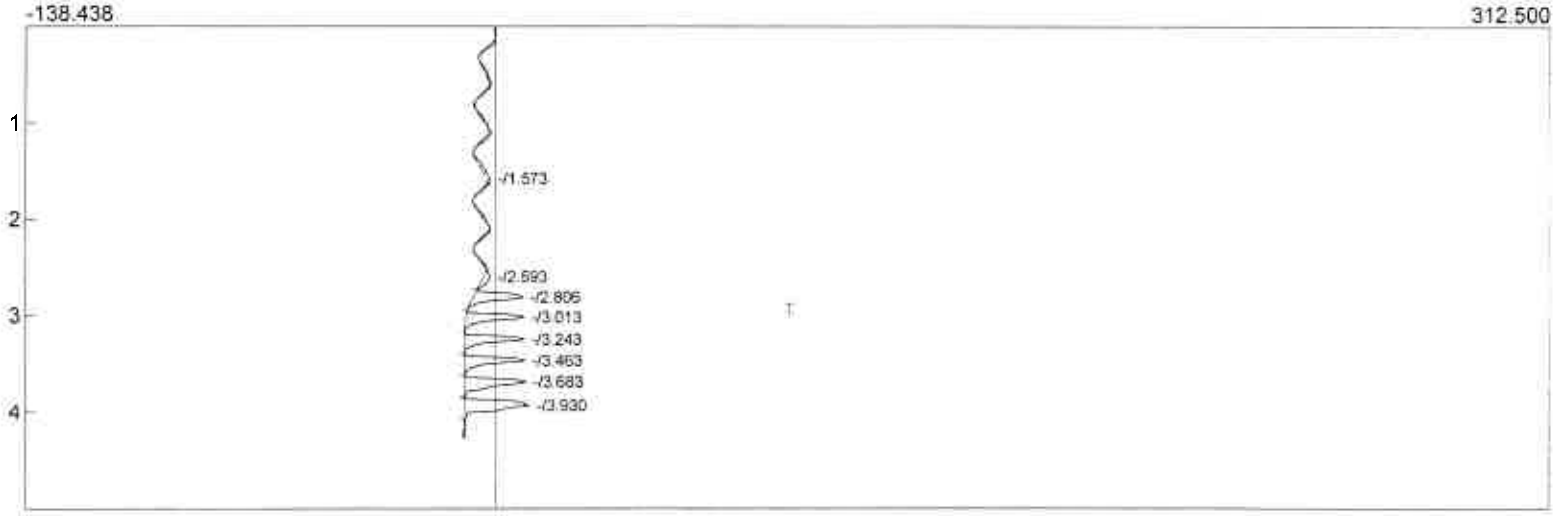
Analysis date: 08/31/2016 15:23:57
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_308.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.573	12.4474	1.140	0.0000	
-	2.593	16.4313	2.066	0.0000	
-	2.806	71.8506	14.849	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.013	75.2999	17.405	0.0000	
-	3.243	76.4592	17.765	0.0000	
-	3.463	77.0790	17.970	0.0000	
-	3.683	92.6855	18.339	0.0000	
-	3.930	109.3606	19.185	0.0000	
		531.6135		0.0000	

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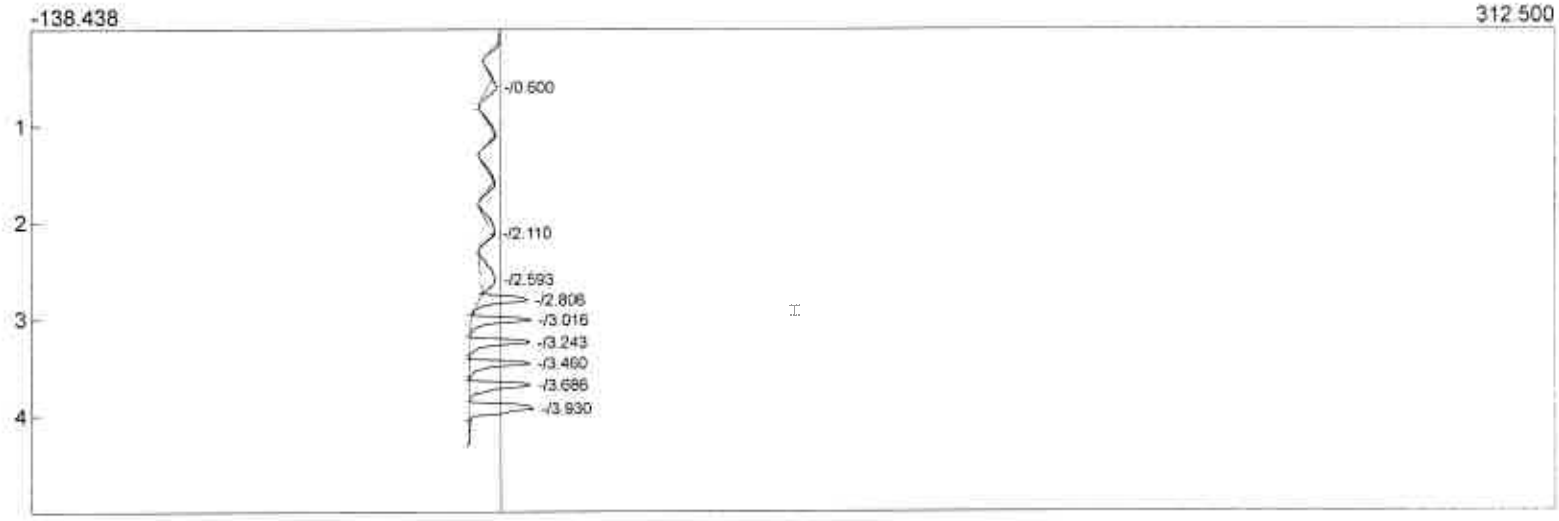
Analysis date: 08/31/2016 15:38:00
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_310.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.600	23.8046	2.684	0.0000	
-	2.110	17.2996	0.802	0.0000	
-	2.593	65.0840	4.565	0.0000	
-	2.806	72.0374	14.479	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	76.9704	17.995	0.0000	
-	3.243	76.4785	17.908	0.0000	
-	3.460	77.8438	18.122	0.0000	
-	3.686	87.4618	18.194	0.0000	
-	3.930	111.3902	19.280	0.0000	
		608.3703		0.0000	

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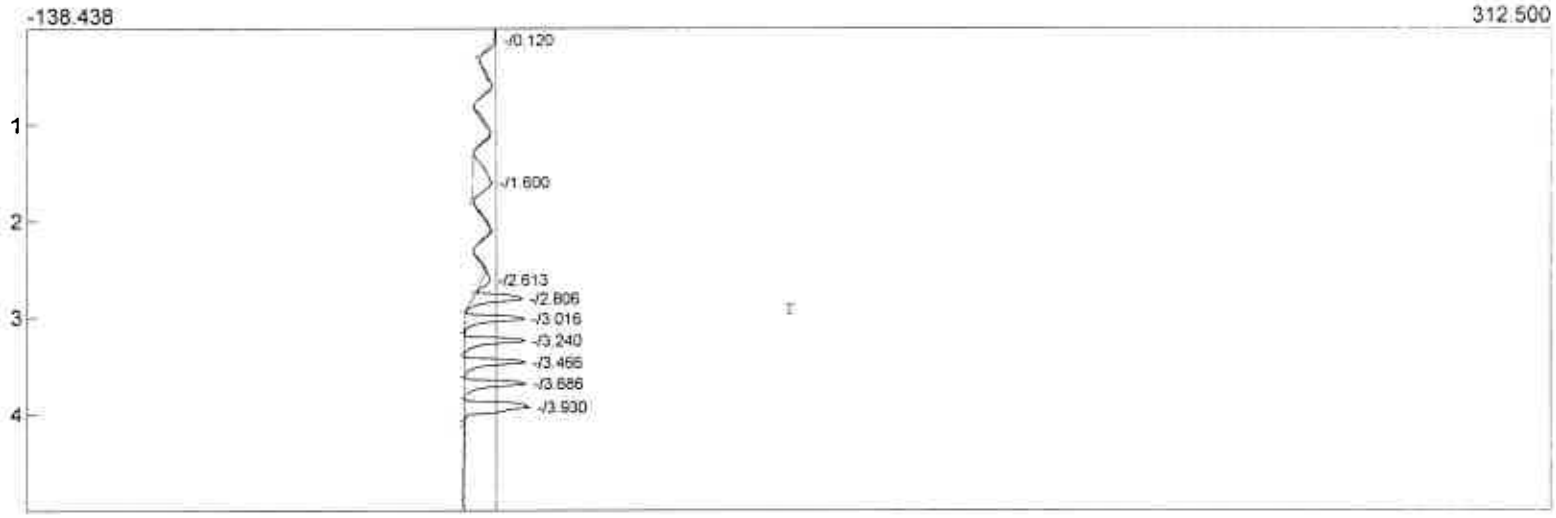
Analysis date: 08/31/2016 15:49:24
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_312.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.120	10.3182	0.862	0.0000	
-	1.600	85.6960	5.568	0.0000	
-	2.613	18.3560	2.520	0.0000	
-	2.806	72.3642	14.627	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	77.0754	17.447	0.0000	
-	3.240	75.9764	17.852	0.0000	
-	3.466	76.5282	17.959	0.0000	
-	3.686	76.6678	18.129	0.0000	
-	3.930	112.2266	19.324	0.0000	
		605.2088		0.0000	

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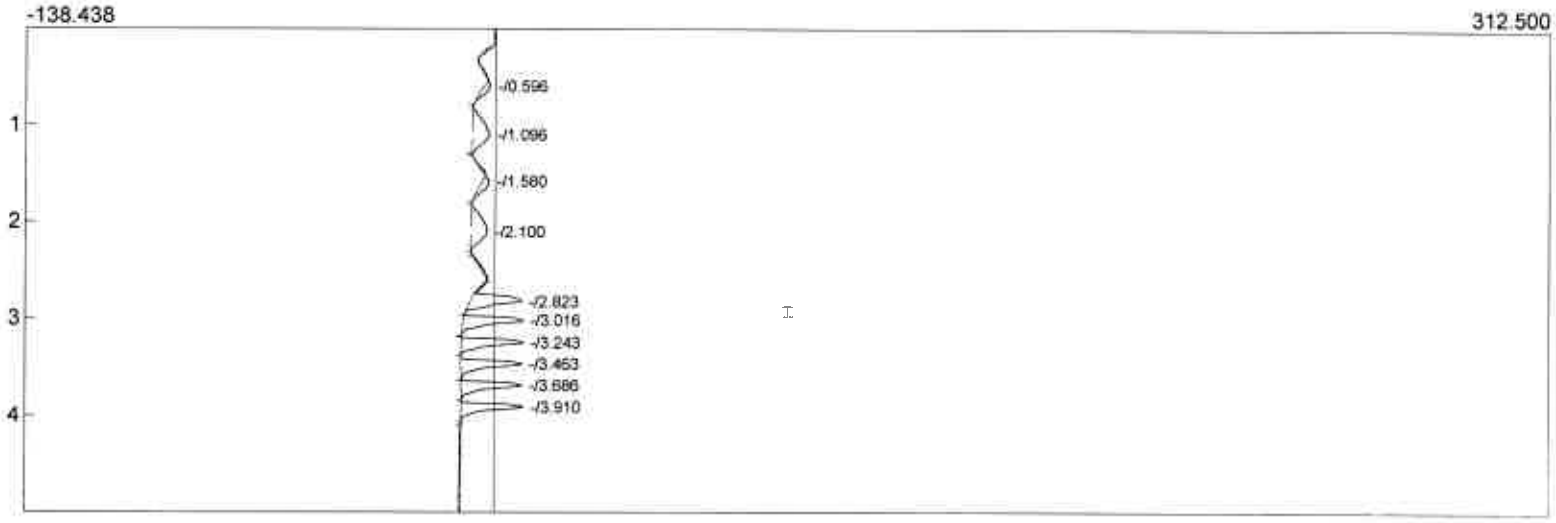
Analysis date: 08/31/2016 16:04:54
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_314.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.596	17.7336	1.862	0.0000	
-	1.096	81.1476	5.185	0.0000	
-	1.580	22.2926	2.187	0.0000	
-	2.100	82.5500	5.115	0.0000	
-	2.823	91.4345	15.255	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	89.5154	17.825	0.0000	
-	3.243	85.6068	18.380	0.0000	
-	3.463	86.0408	18.154	0.0000	
-	3.686	83.3952	18.060	0.0000	
-	3.910	80.3708	18.481	0.0000	
		720.0873		0.0000	

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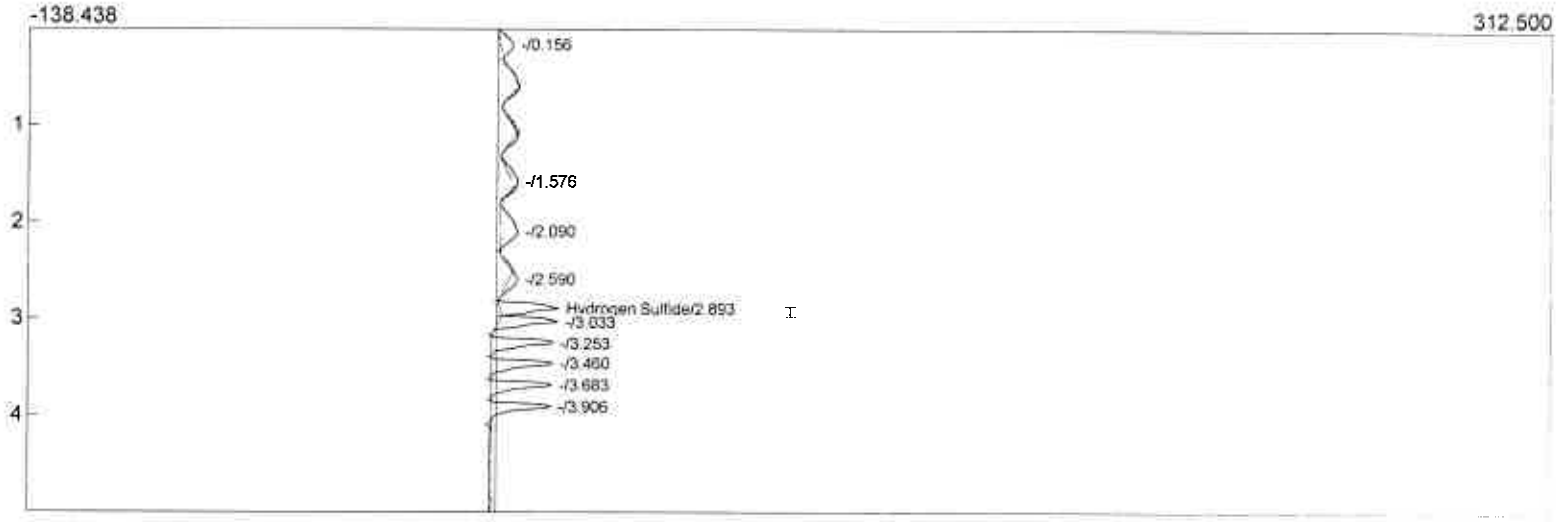
Analysis date: 08/31/2016 16:17:40
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_316.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.156	39.6900	3.875	0.0000	
-	1.576	21.1892	1.691	0.0000	
-	2.090	83.8174	5.270	0.0000	
-	2.590	27.9854	2.582	0.0000	
Hydrogen Sulfide	2.893	91.4582	17.433	4.5161	
-	3.033	85.7951	17.460	0.0000	
-	3.253	93.5728	18.187	0.0000	
-	3.460	90.4612	18.267	0.0000	
-	3.683	83.5600	18.128	0.0000	
-	3.906	82.1168	17.760	0.0000	
		699.6461		4.5161	

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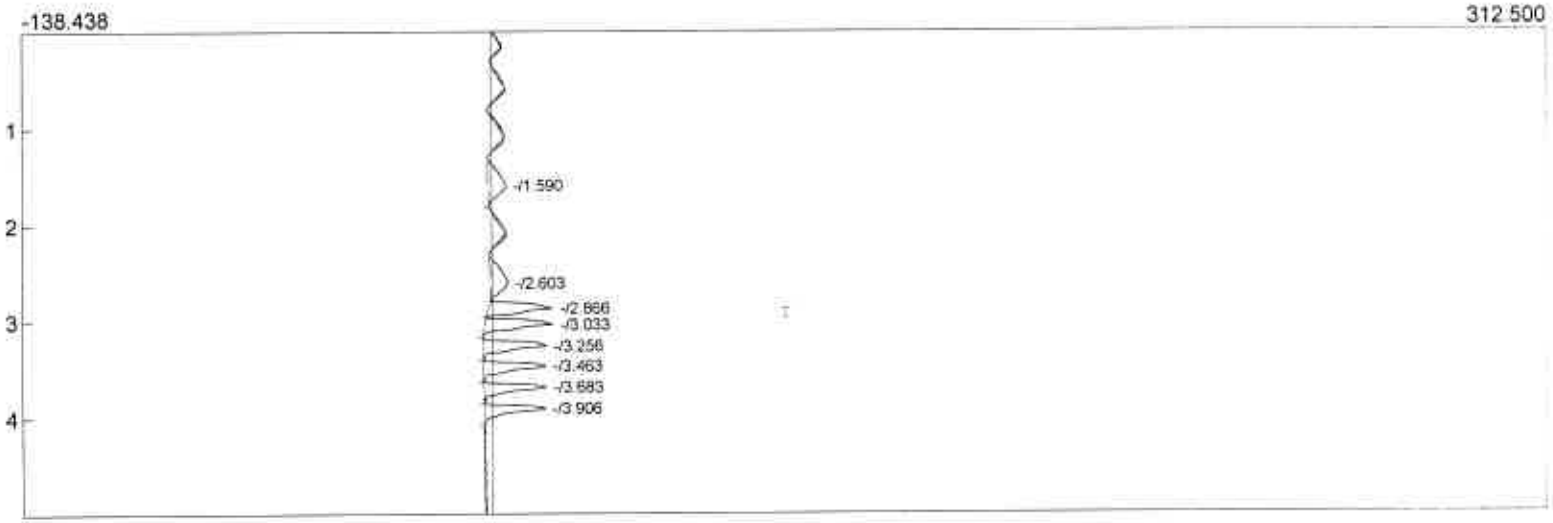
Analysis date: 08/31/2016 16:29:13
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_318.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.590	82.1958	5.313	0.0000	
-	2.603	81.2153	5.290	0.0000	
-	2.866	107.3194	19.163	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.033	106.0856	20.352	0.0000	
-	3.256	100.7938	18.834	0.0000	
-	3.463	94.7122	18.616	0.0000	
-	3.683	87.6192	18.693	0.0000	
-	3.906	85.4066	18.227	0.0000	
		745.3479		0.0000	

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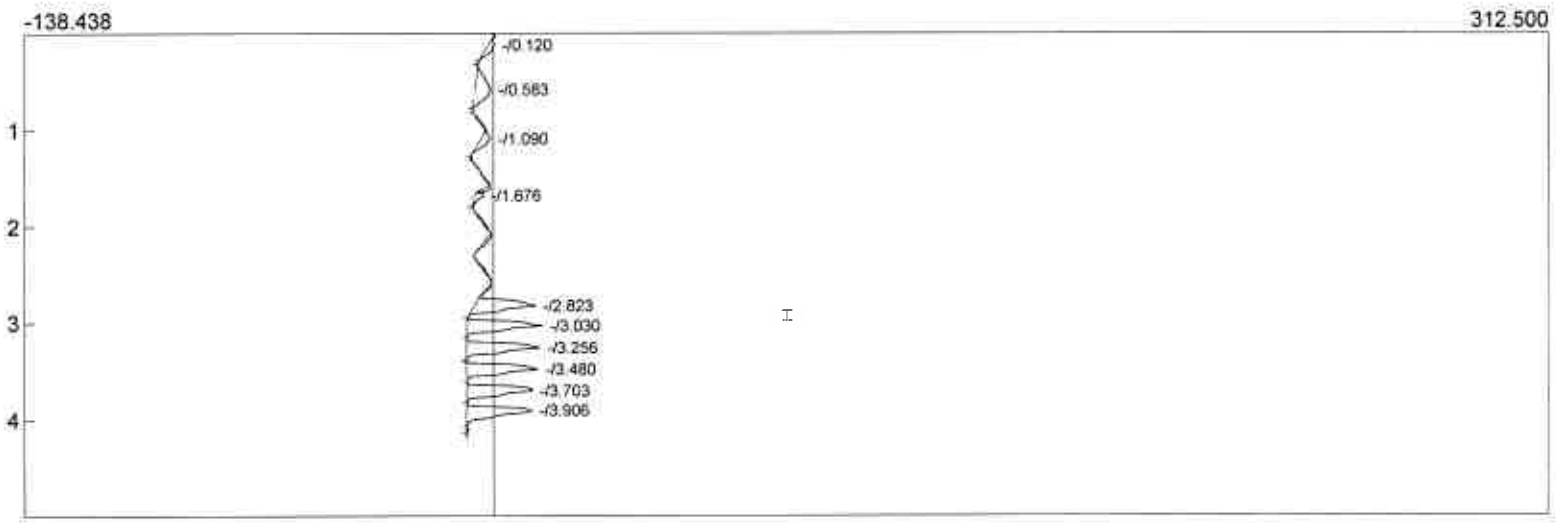
Analysis date: 08/31/2016 16:40:29
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_319.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.120	18.1272	1.825	0.0000	
-	0.583	66.9030	4.793	0.0000	
-	1.090	22.0900	2.805	0.0000	
-	1.676	11.9799	2.745	0.0000	
-	2.823	107.3102	18.161	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.030	115.7540	22.492	0.0000	
-	3.256	115.8628	21.830	0.0000	
-	3.480	114.0339	21.164	0.0000	
-	3.703	112.3524	19.366	0.0000	
-	3.906	107.1308	19.311	0.0000	
		791.5442		0.0000	

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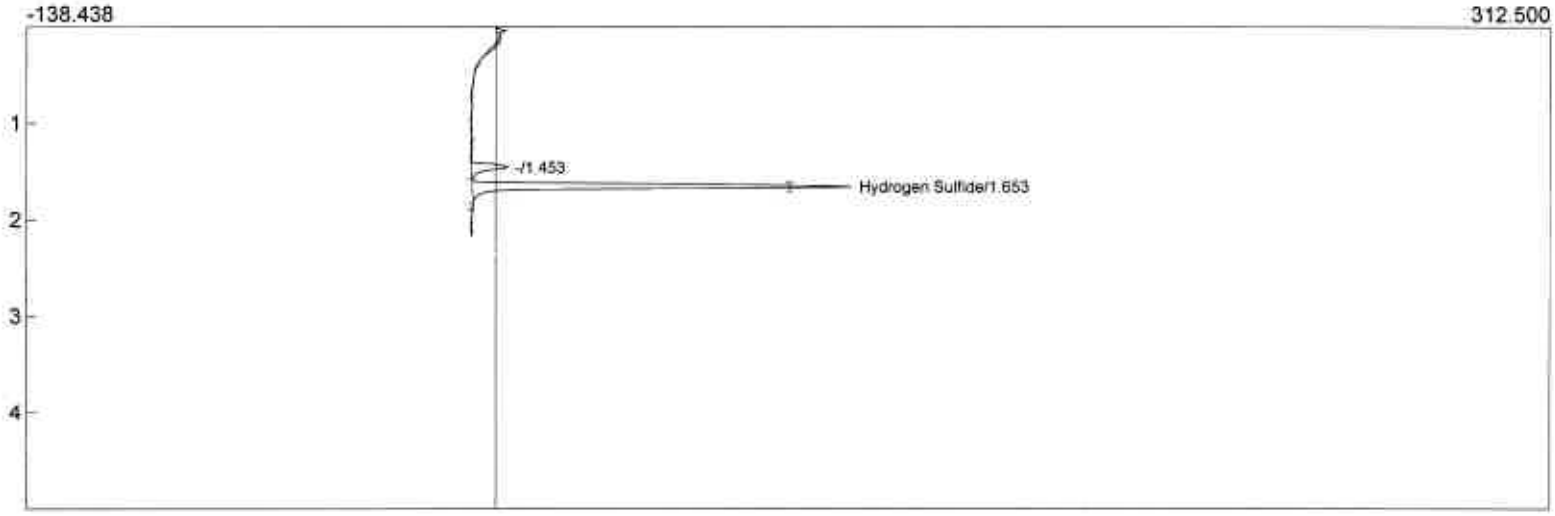
Lab name: Mostardi Platt
Client: ArcelorMittal Burns Harbor
Analysis date: 08/31/2016 16:57:16
Method: Air Sample
Description: FPD-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_325.chr ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.453	45.8725	10.800	0.0000	
Hydrogen Sulfide	1.653	344.2412	112.605	8.3439	
		390.1137		8.3439	

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Date: 9/1/2016

Run #: 3

Pre-Cal Check

Certified Concentration	Area Counts	Calculated Concentration
8.738	378.2358	8.7148

Post-Cal Check

Certified Concentration	Area Counts	Calculated Concentration
8.738	358.9884	8.511

	Injection #1		Injection #2		Injection #3		Injection #4		Injection #5		Injection #6	
Push Time	Area Counts	H2S Concentration	Area Counts	H2S Concentration	Area Counts	H2S Concentration	Area Counts	H2S Concentration	Area Counts	H2S Concentration	Area Counts	H2S Concentration
8:53	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
9:06	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
9:17	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
9:28	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
9:41	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
9:56	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
10:10	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
10:21	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
10:32	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
10:45	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
10:57	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
11:12	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
11:22	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
11:34	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
11:45	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
11:56	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
12:08	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
12:18	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
12:29	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
12:43	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
13:12	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
13:24	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
13:34	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
13:45	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
13:55	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
14:18	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
14:29	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
14:40	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
14:54	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
15:08	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
15:18	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
15:30	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
15:40	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
15:52	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
16:02	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
16:17	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
16:31	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
16:42	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
16:57	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
17:09	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
17:20	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
17:32	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
17:44	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
17:54	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
18:04	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL
18:20	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL	0	BDL

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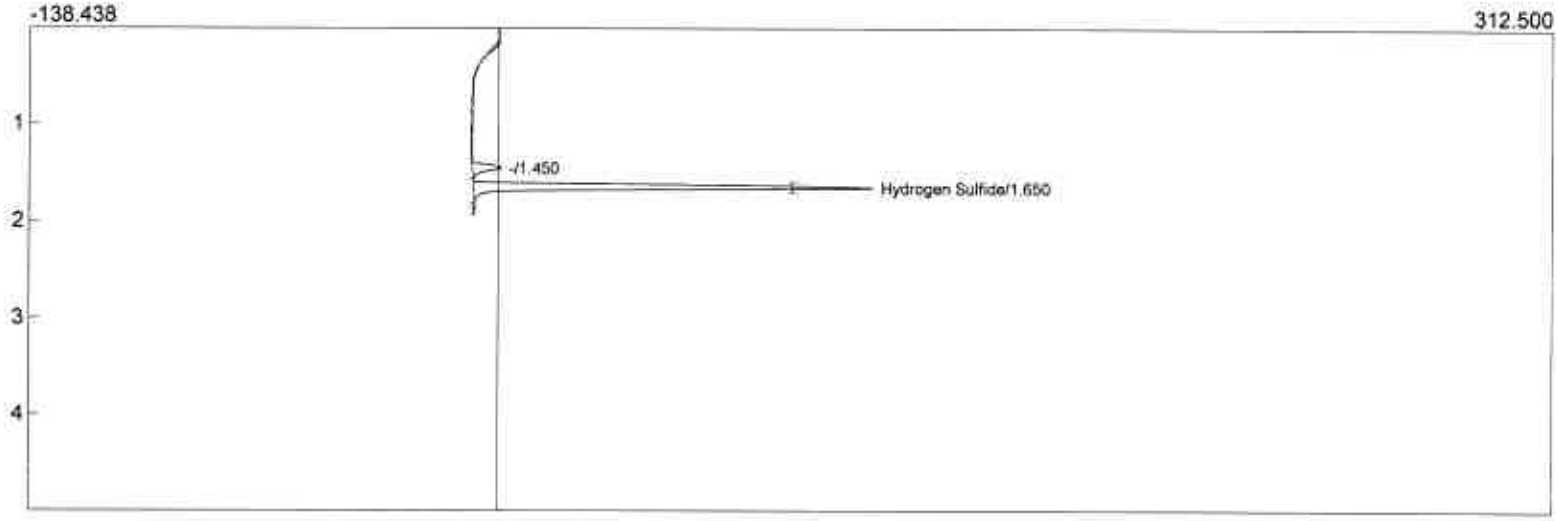
Lab name: Mostardi Platt
Client: ArcelorMittal Burns Harbor
Analysis date: 09/01/2016 08:28:52
Method: Air Sample
Description: FPD-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_354.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.450	37.7283	8.576	0.0000	
Hydrogen Sulfide	1.650	378.2358	118.517	8.7148	
		415.9641		8.7148	

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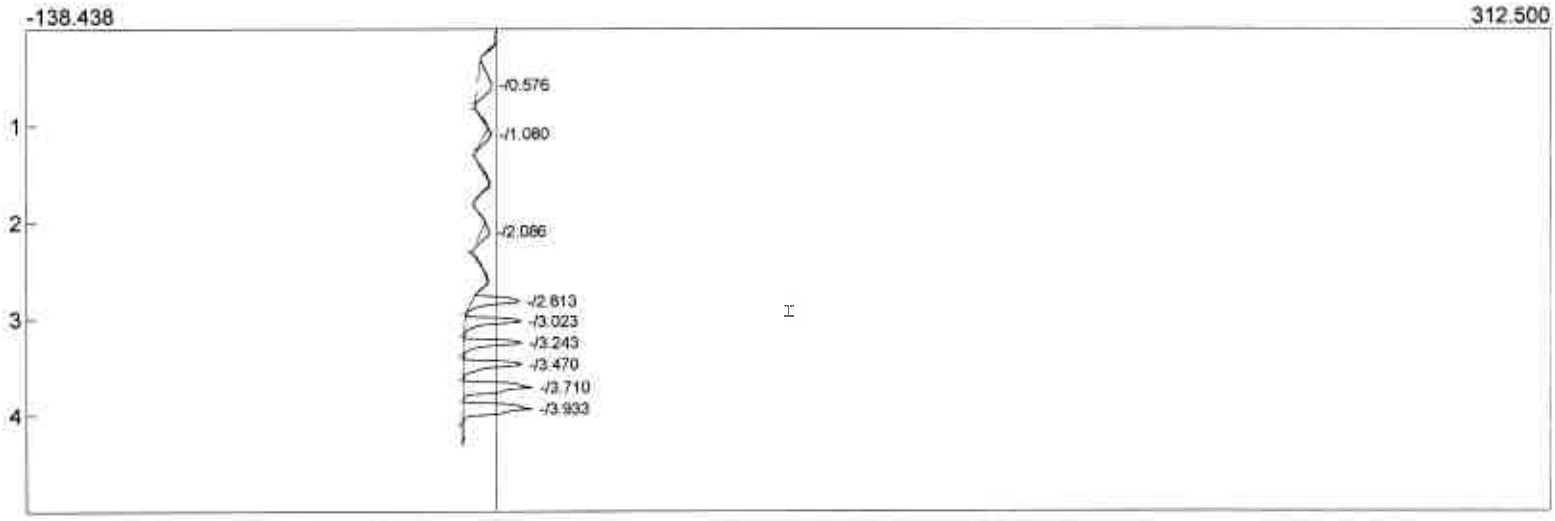
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 09:02:54
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_361.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.576	65.5174	4.352	0.0000	
-	1.080	17.8713	2.002	0.0000	
-	2.086	25.9962	2.450	0.0000	
-	2.813	71.0516	14.159	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.023	74.2210	16.621	0.0000	
-	3.243	73.3046	17.194	0.0000	
-	3.470	82.3575	17.295	0.0000	
-	3.710	113.2452	20.638	0.0000	
-	3.933	115.0700	20.478	0.0000	
		638.6348		0.0000	

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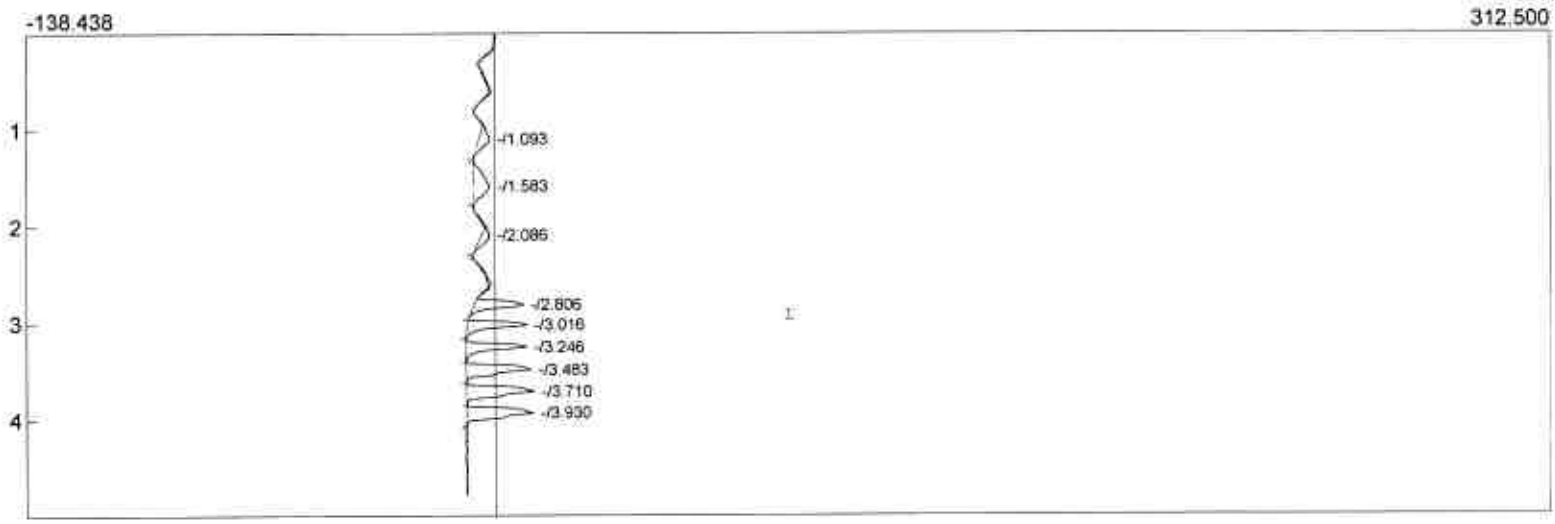
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 09:14:24
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_363.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.093	34.8682	3.176	0.0000	
-	1.583	71.3512	4.963	0.0000	
-	2.086	24.8436	2.320	0.0000	
-	2.806	70.3408	14.492	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	74.5997	17.518	0.0000	
-	3.246	76.9633	17.844	0.0000	
-	3.483	102.3890	19.138	0.0000	
-	3.710	111.8776	19.976	0.0000	
-	3.930	113.2367	19.662	0.0000	
		680.4701		0.0000	

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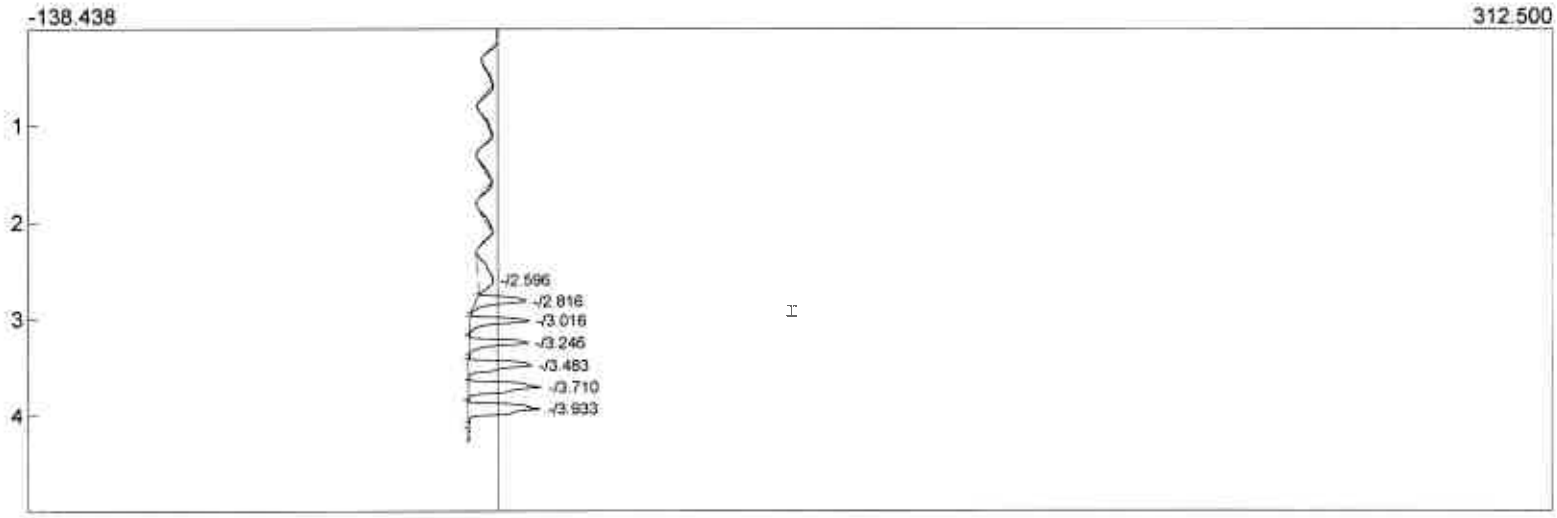
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 09:25:10
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_365.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	2.596	67.8600	4.500	0.0000	
-	2.816	72.2010	14.741	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	74.0274	17.486	0.0000	
-	3.246	74.5502	17.530	0.0000	
-	3.483	101.9979	18.809	0.0000	
-	3.710	118.8339	21.558	0.0000	
-	3.933	122.4699	21.472	0.0000	
		631.9403		0.0000	

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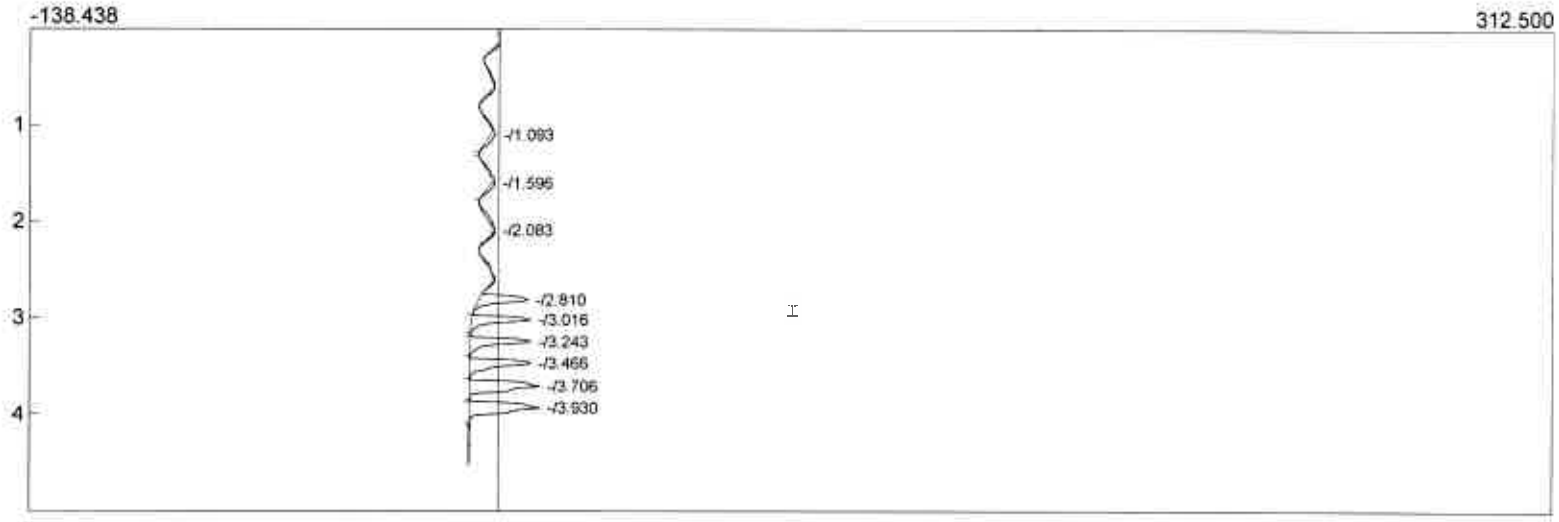
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 09:37:58
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_367.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.093	15.0238	1.748	0.0000	
-	1.596	10.4511	1.145	0.0000	
-	2.083	10.1856	0.555	0.0000	
-	2.810	71.6256	14.635	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	75.1438	17.568	0.0000	
-	3.243	77.8693	17.990	0.0000	
-	3.466	89.8506	18.087	0.0000	
-	3.706	116.1292	20.873	0.0000	
-	3.930	117.0594	20.927	0.0000	
		583.3384		0.0000	

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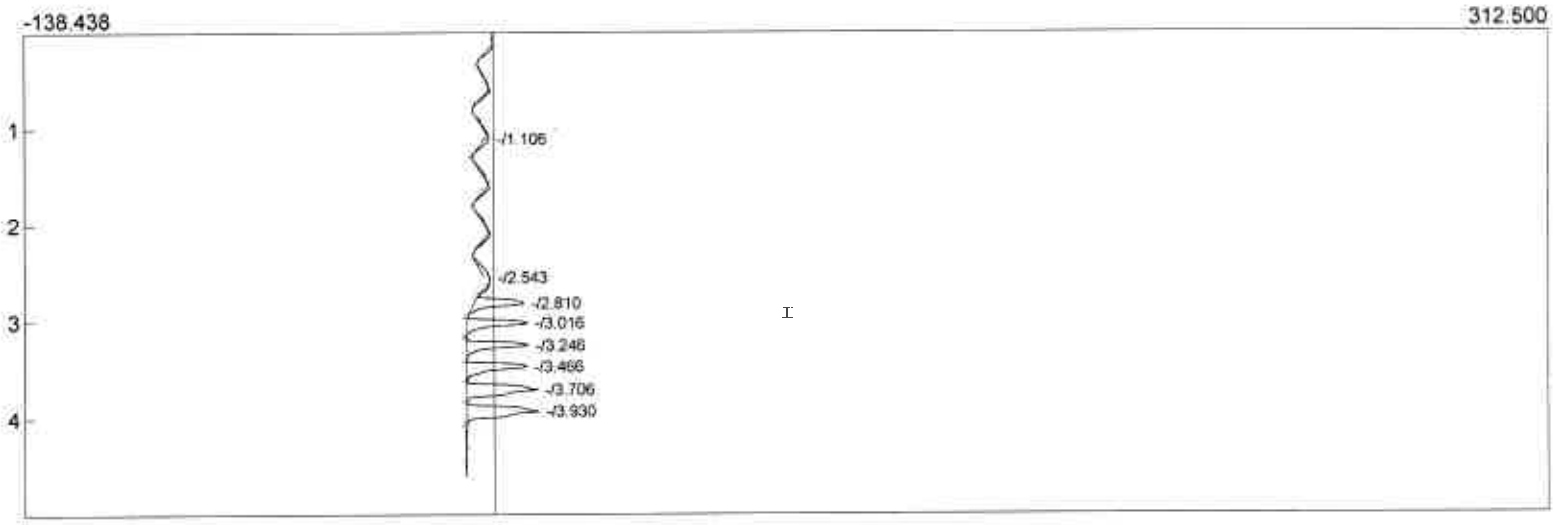
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 09:53:54
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_369.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.106	10.9911	1.465	0.0000	
-	2.543	19.4205	1.914	0.0000	
-	2.810	72.2098	14.730	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	76.0508	17.815	0.0000	
-	3.246	77.9202	18.398	0.0000	
-	3.466	85.0693	17.886	0.0000	
-	3.706	117.7594	21.132	0.0000	
-	3.930	120.0700	21.334	0.0000	
		579.4911		0.0000	

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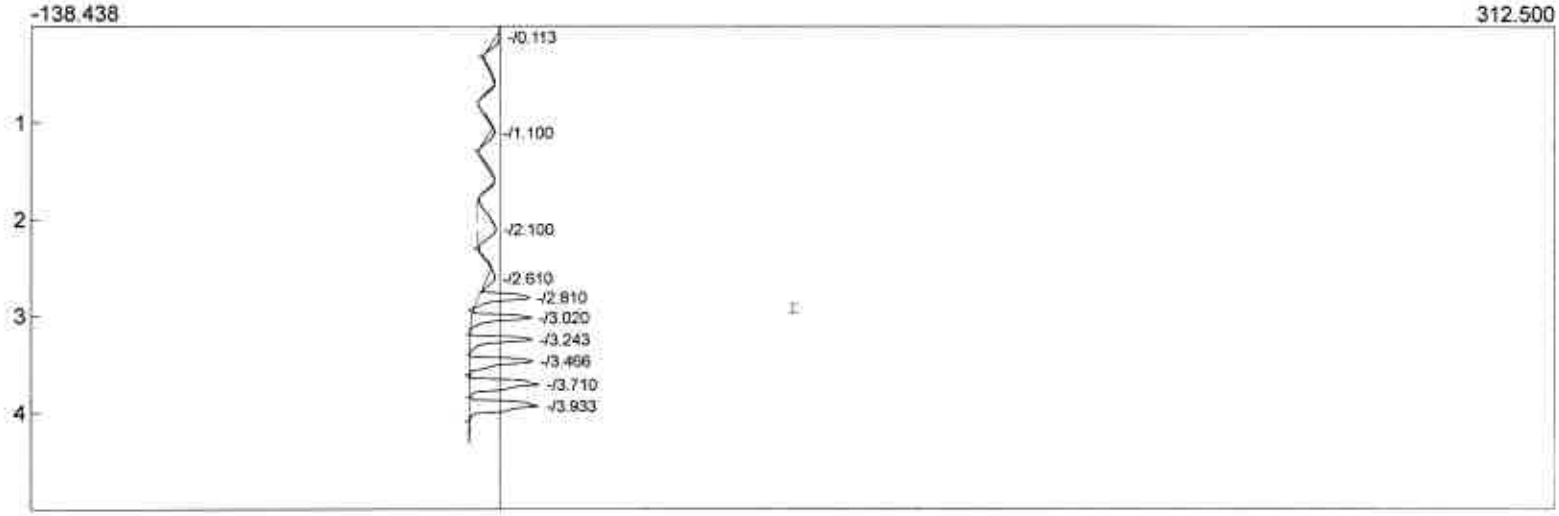
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 10:06:56
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_371.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.113	14.8762	1.312	0.0000	
-	1.100	13.7434	1.726	0.0000	
-	2.100	86.9750	5.558	0.0000	
-	2.610	20.0142	2.440	0.0000	
-	2.810	72.9974	15.060	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.020	75.9361	17.764	0.0000	
-	3.243	79.2434	18.634	0.0000	
-	3.466	91.6676	18.855	0.0000	
-	3.710	117.2656	20.769	0.0000	
-	3.933	117.5222	20.509	0.0000	
		690.2411		0.0000	

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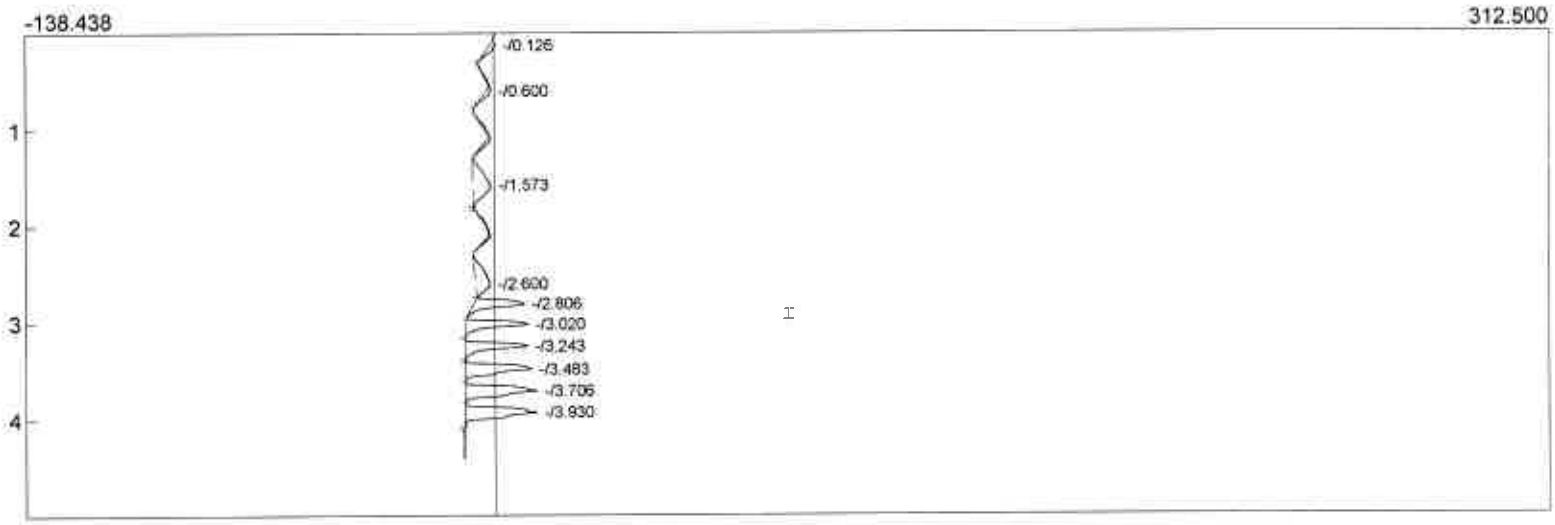
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 10:18:18
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_373.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.126	14.9611	1.716	0.0000	
-	0.600	11.0380	1.416	0.0000	
-	1.573	84.6825	5.393	0.0000	
-	2.600	63.8870	4.338	0.0000	
-	2.806	73.5118	14.888	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.020	79.3664	18.350	0.0000	
-	3.243	77.7804	18.469	0.0000	
-	3.483	105.0863	19.689	0.0000	
-	3.706	116.1556	21.055	0.0000	
-	3.930	120.0964	21.112	0.0000	
		746.5655		0.0000	

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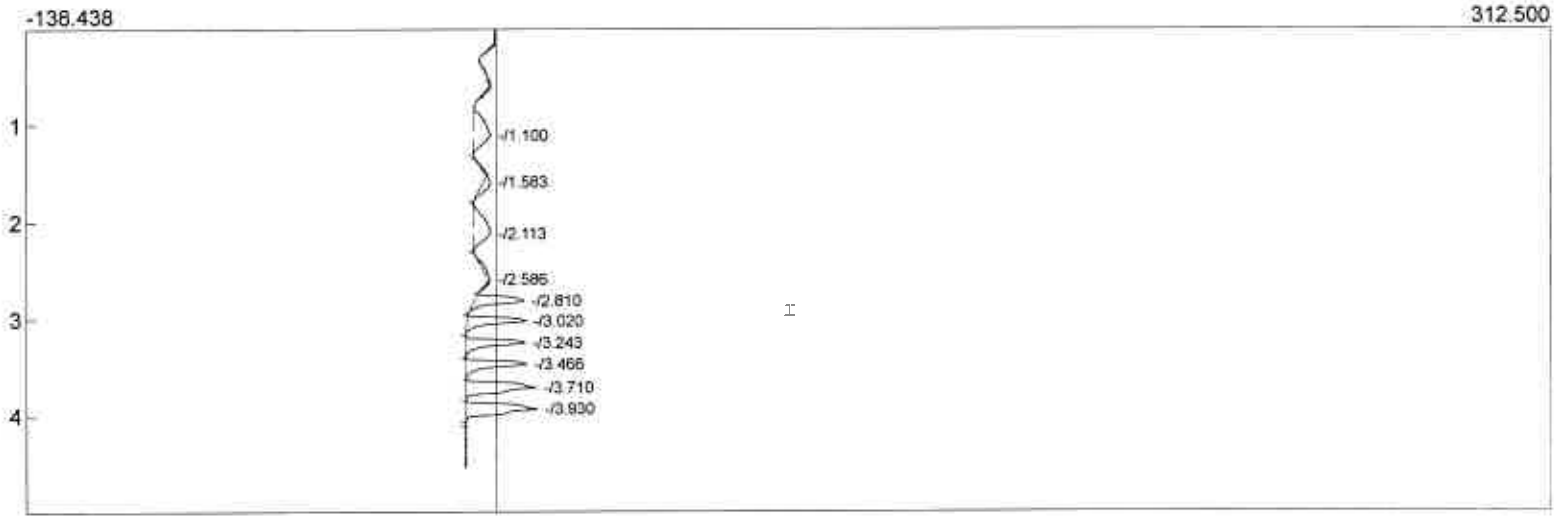
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 10:29:09
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_375.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.100	79.6839	5.344	0.0000	
-	1.583	22.5077	2.128	0.0000	
-	2.113	81.1888	5.175	0.0000	
-	2.586	10.1463	0.596	0.0000	
-	2.810	72.9928	14.910	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.020	76.0524	17.680	0.0000	
-	3.243	77.9724	17.859	0.0000	
-	3.466	81.9308	18.468	0.0000	
-	3.710	116.8658	21.015	0.0000	
-	3.930	119.4612	21.445	0.0000	
		738.8021		0.0000	

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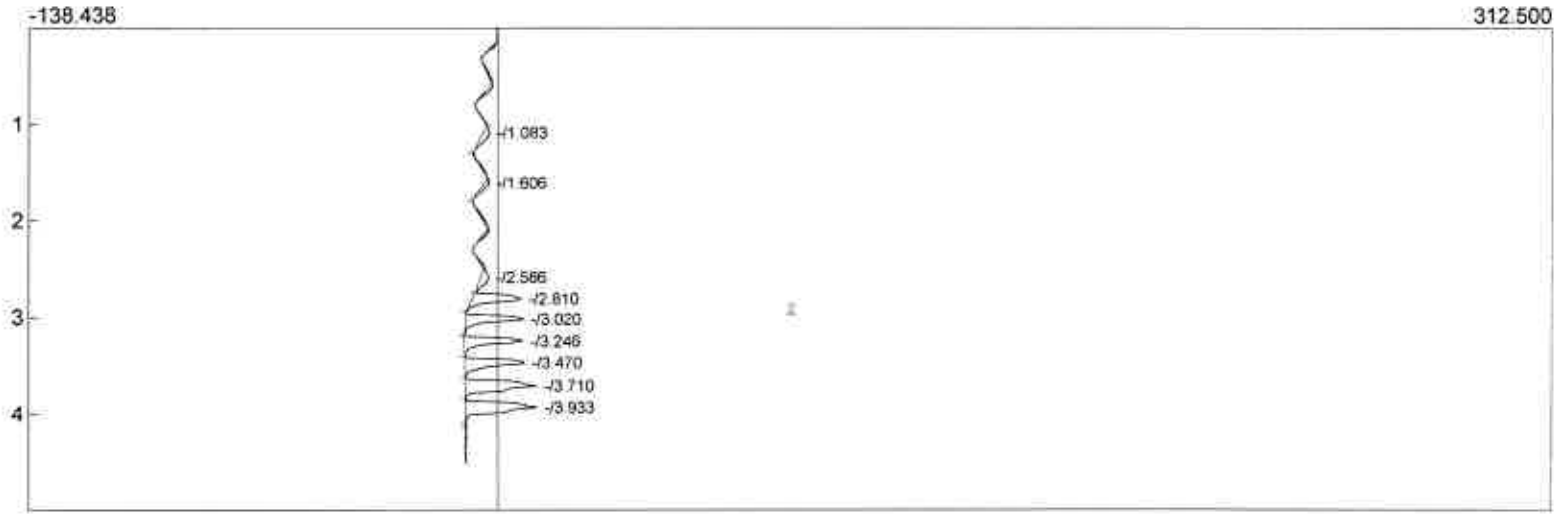
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 10:42:18
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_377.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.083	19.4192	1.935	0.0000	
-	1.606	11.4786	1.339	0.0000	
-	2.586	23.0102	2.535	0.0000	
-	2.810	70.6796	14.441	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.020	71.6950	16.975	0.0000	
-	3.246	74.5024	17.361	0.0000	
-	3.470	85.8776	17.634	0.0000	
-	3.710	118.6268	21.173	0.0000	
-	3.933	121.0083	21.157	0.0000	
		596.2977		0.0000	

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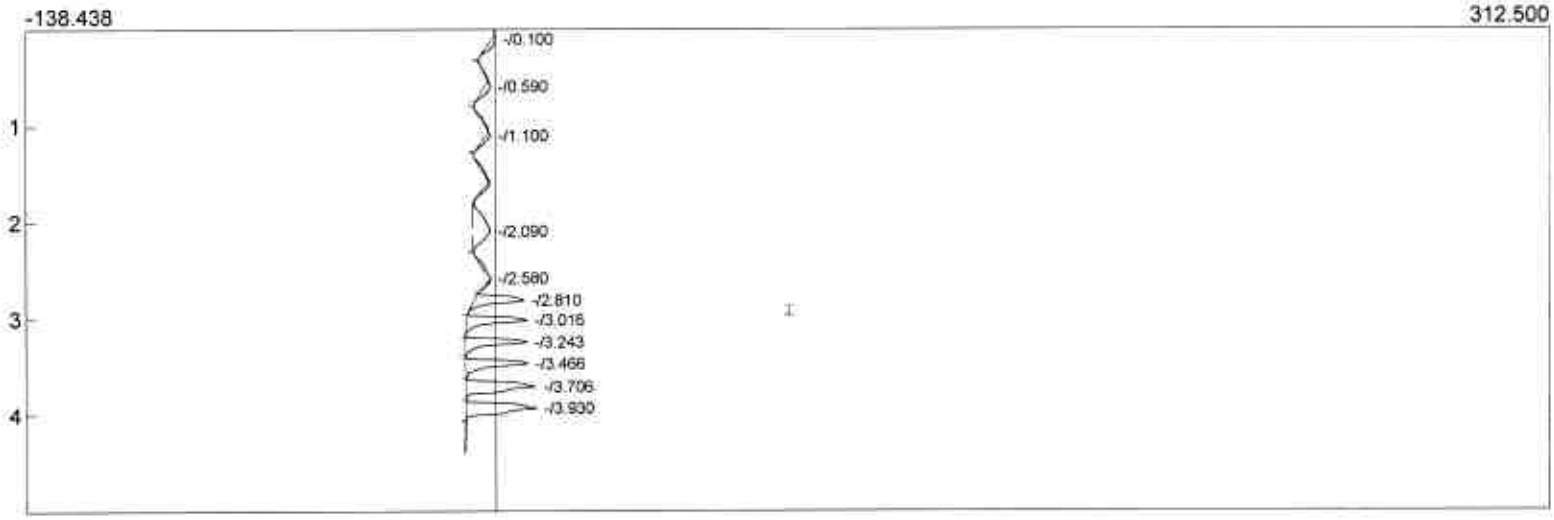
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 10:54:22
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_379.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.100	14.7419	1.277	0.0000	
-	0.590	16.5516	1.810	0.0000	
-	1.100	10.7459	1.476	0.0000	
-	2.090	85.2846	5.317	0.0000	
-	2.580	11.9278	1.045	0.0000	
-	2.810	71.3356	14.751	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	77.6728	18.000	0.0000	
-	3.243	77.9516	18.259	0.0000	
-	3.466	82.3965	18.470	0.0000	
-	3.706	115.9282	20.874	0.0000	
-	3.930	117.5434	21.058	0.0000	
		682.0799		0.0000	

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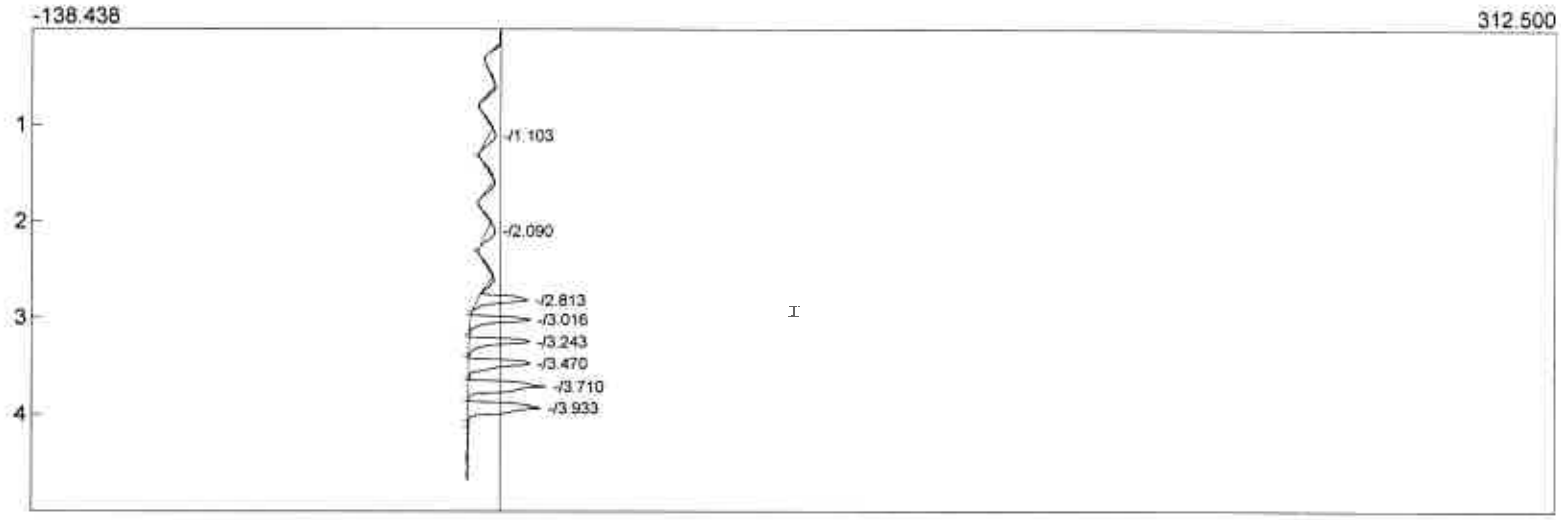
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 11:09:38
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_381.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.103	19.9718	2.167	0.0000	
-	2.090	24.9366	2.443	0.0000	
-	2.813	72.0650	15.079	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	75.2416	17.704	0.0000	
-	3.243	78.1836	17.942	0.0000	
-	3.470	94.0432	18.161	0.0000	
-	3.710	126.6068	22.921	0.0000	
-	3.933	121.9868	21.570	0.0000	
		613.0354		0.0000	

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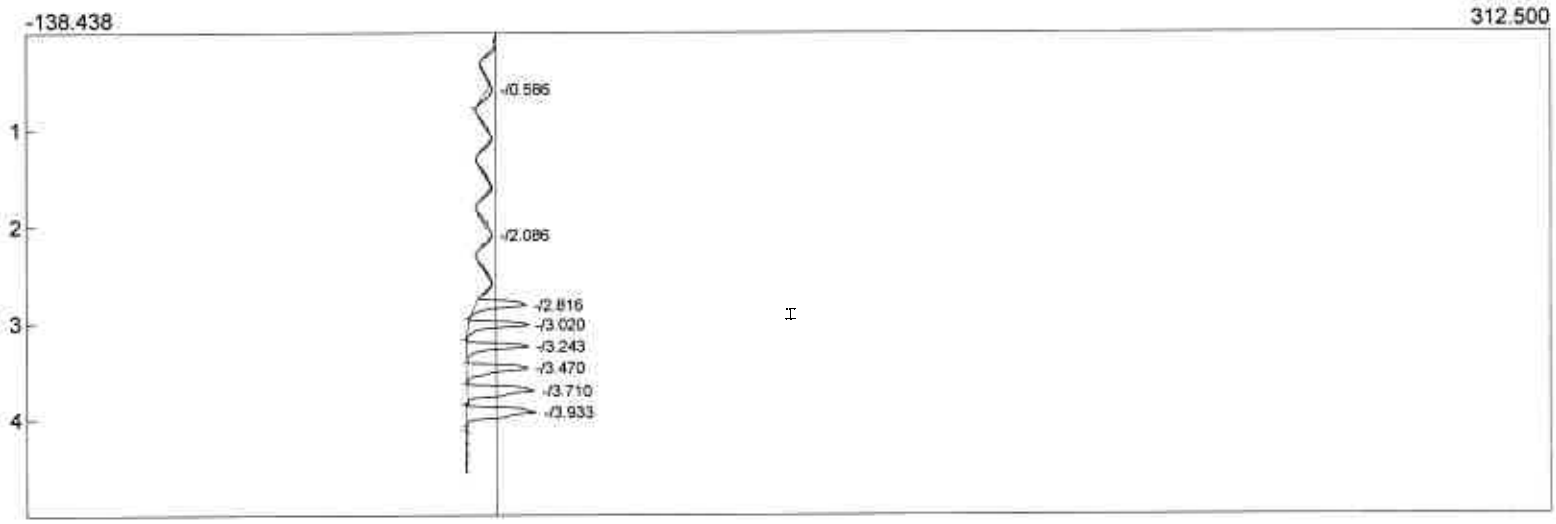
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 11:19:27
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_383.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.586	16.7128	1.698	0.0000	
-	2.086	12.4112	0.869	0.0000	
-	2.816	72.2150	15.034	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.020	77.7188	17.748	0.0000	
-	3.243	78.8194	18.352	0.0000	
-	3.470	93.3109	18.058	0.0000	
-	3.710	113.5094	20.062	0.0000	
-	3.933	118.8813	20.763	0.0000	
		583.5788		0.0000	

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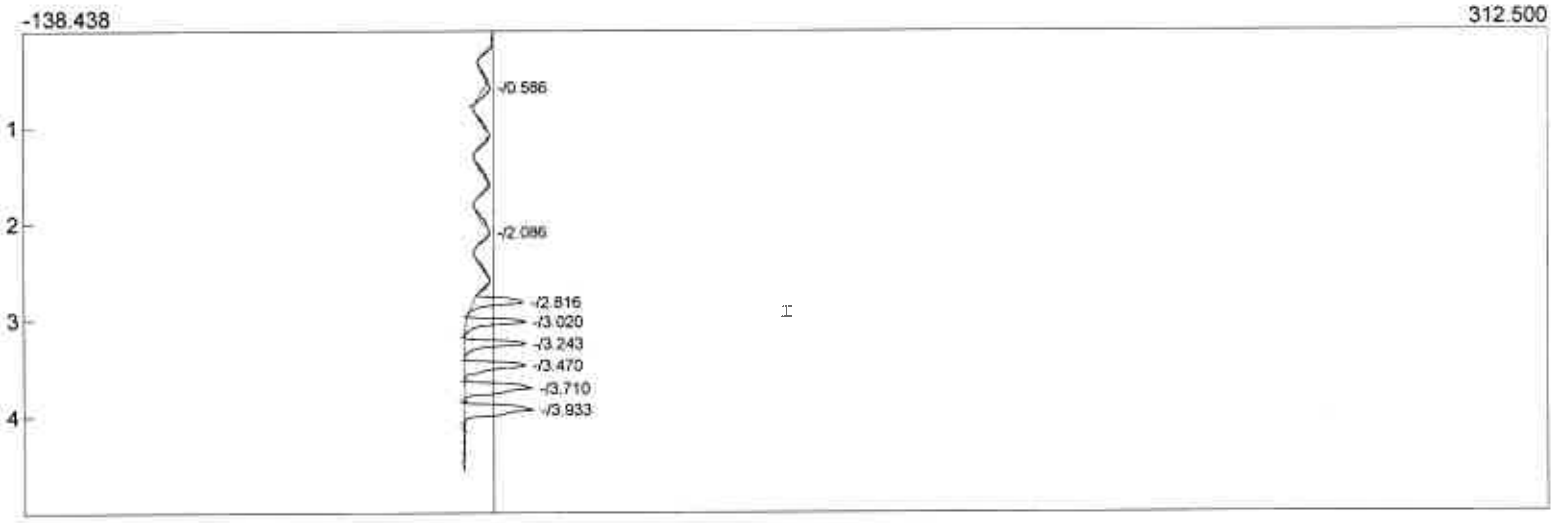
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 11:19:27
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_383.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.586	16.7128	1.698	0.0000	
-	2.086	12.4112	0.869	0.0000	
-	2.816	72.2150	15.034	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.020	77.7188	17.748	0.0000	
-	3.243	78.8194	18.352	0.0000	
-	3.470	93.3109	18.058	0.0000	
-	3.710	113.5094	20.062	0.0000	
-	3.933	118.8813	20.763	0.0000	
		583.5788		0.0000	

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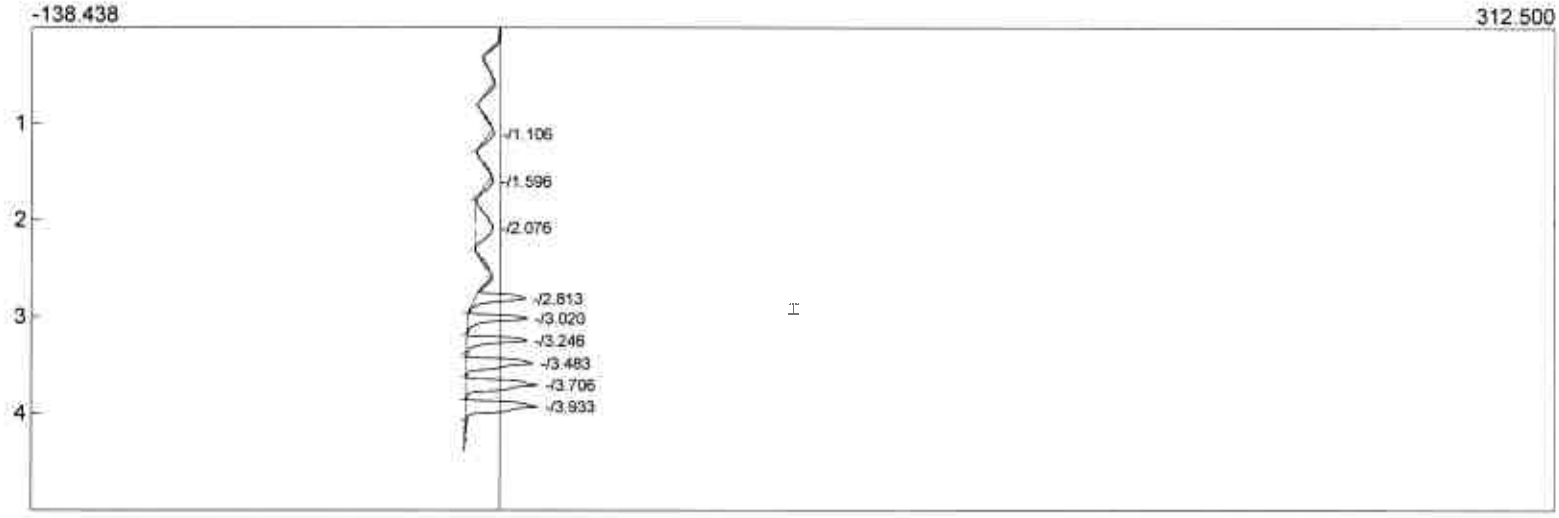
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 11:31:34
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_385.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.106	13.5759	1.783	0.0000	
-	1.596	13.2356	1.716	0.0000	
-	2.076	83.6760	5.380	0.0000	
-	2.813	73.9904	14.838	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.020	77.4682	17.602	0.0000	
-	3.246	75.2458	17.753	0.0000	
-	3.483	107.7674	19.705	0.0000	
-	3.706	121.3617	21.322	0.0000	
-	3.933	119.1758	21.049	0.0000	
		685.4968		0.0000	

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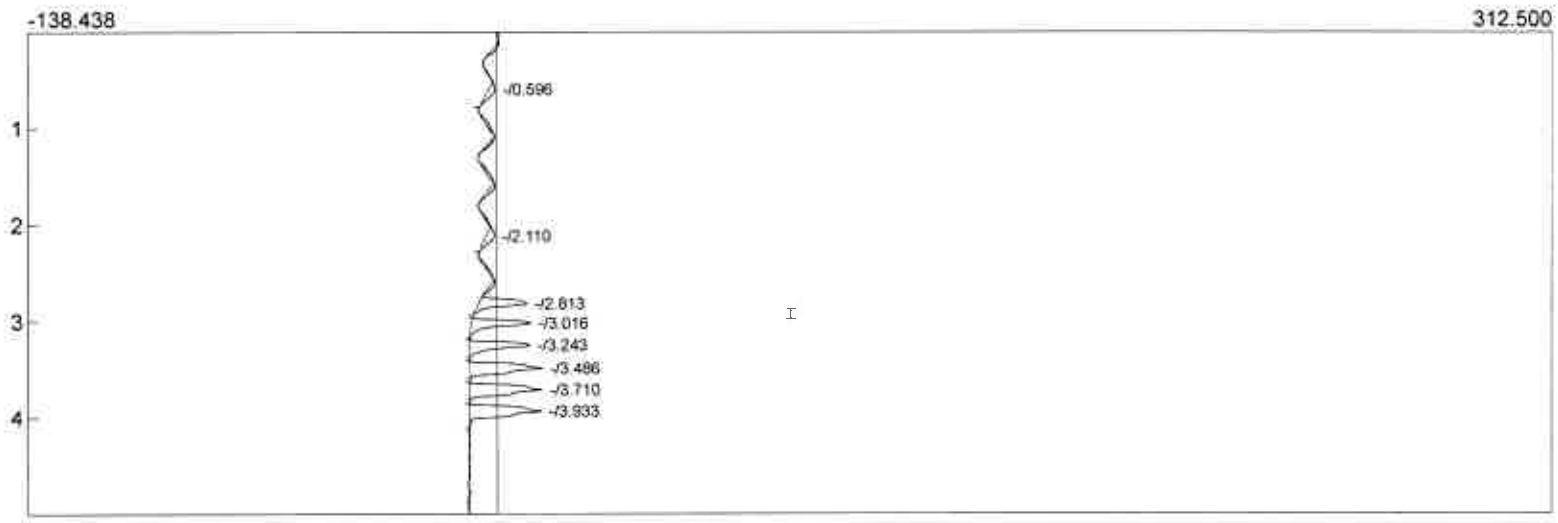
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 11:42:11
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_387.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.596	19.8466	2.063	0.0000	
-	2.110	23.2978	2.574	0.0000	
-	2.813	69.8280	14.547	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	78.4900	17.842	0.0000	
-	3.243	82.6939	18.204	0.0000	
-	3.486	115.0268	21.675	0.0000	
-	3.710	119.9522	21.707	0.0000	
-	3.933	121.6813	21.480	0.0000	
		630.8166		0.0000	

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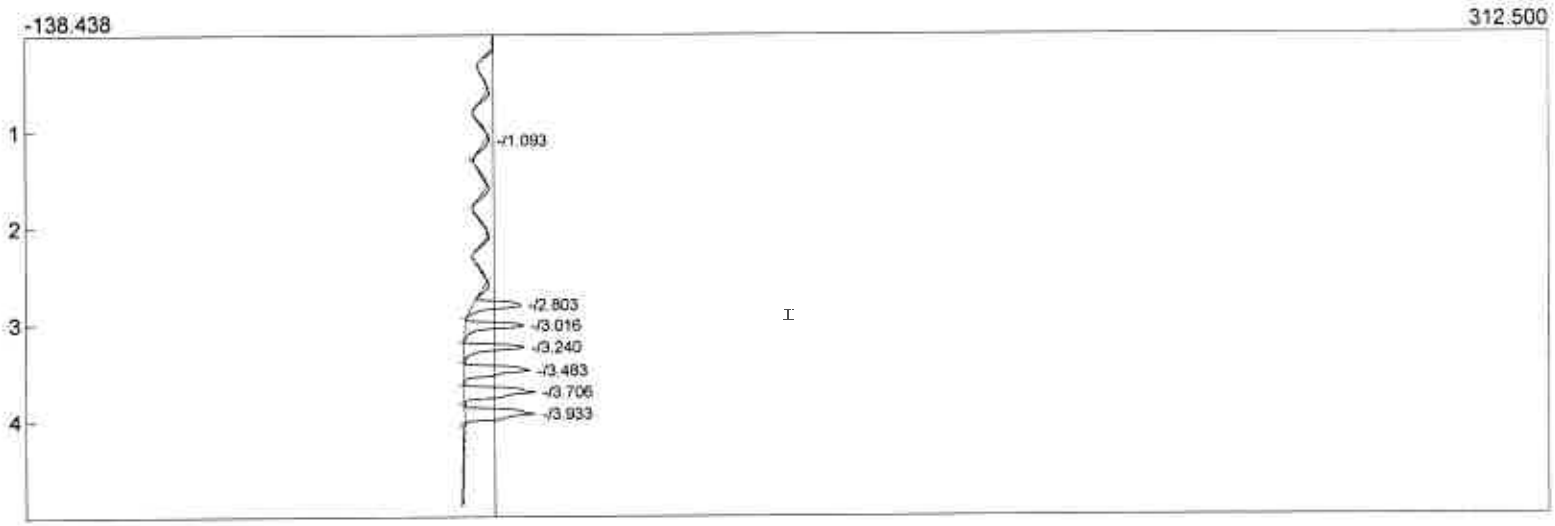
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 11:53:25
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_389.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.093	11.2706	1.237	0.0000	
-	2.803	71.5898	14.179	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	78.1752	17.337	0.0000	
-	3.240	76.8936	17.810	0.0000	
-	3.483	106.9192	19.514	0.0000	
-	3.706	118.0389	21.141	0.0000	
-	3.933	116.2483	20.769	0.0000	
		579.1356		0.0000	

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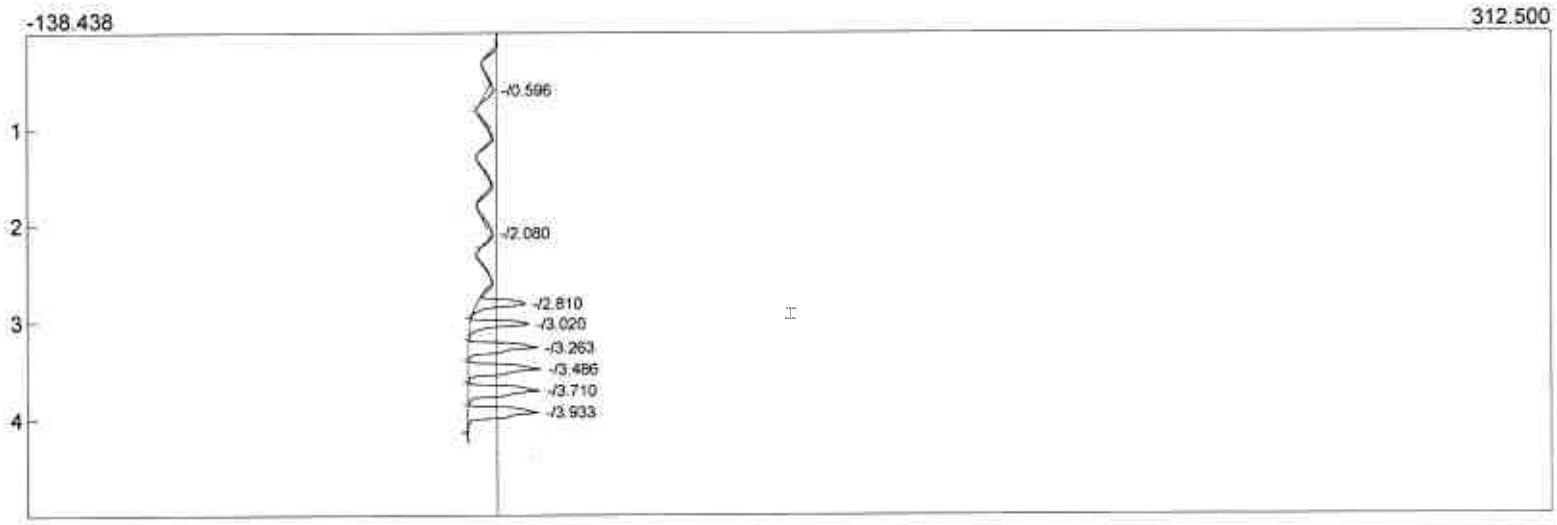
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 12:05:33
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_391.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.596	17.5005	2.219	0.0000	
-	2.080	11.3087	0.874	0.0000	
-	2.810	71.6760	14.376	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.020	75.8517	17.630	0.0000	
-	3.263	108.3613	20.604	0.0000	
-	3.486	115.5586	21.695	0.0000	
-	3.710	119.2267	21.193	0.0000	
-	3.933	120.5182	21.016	0.0000	
		640.0017		0.0000	

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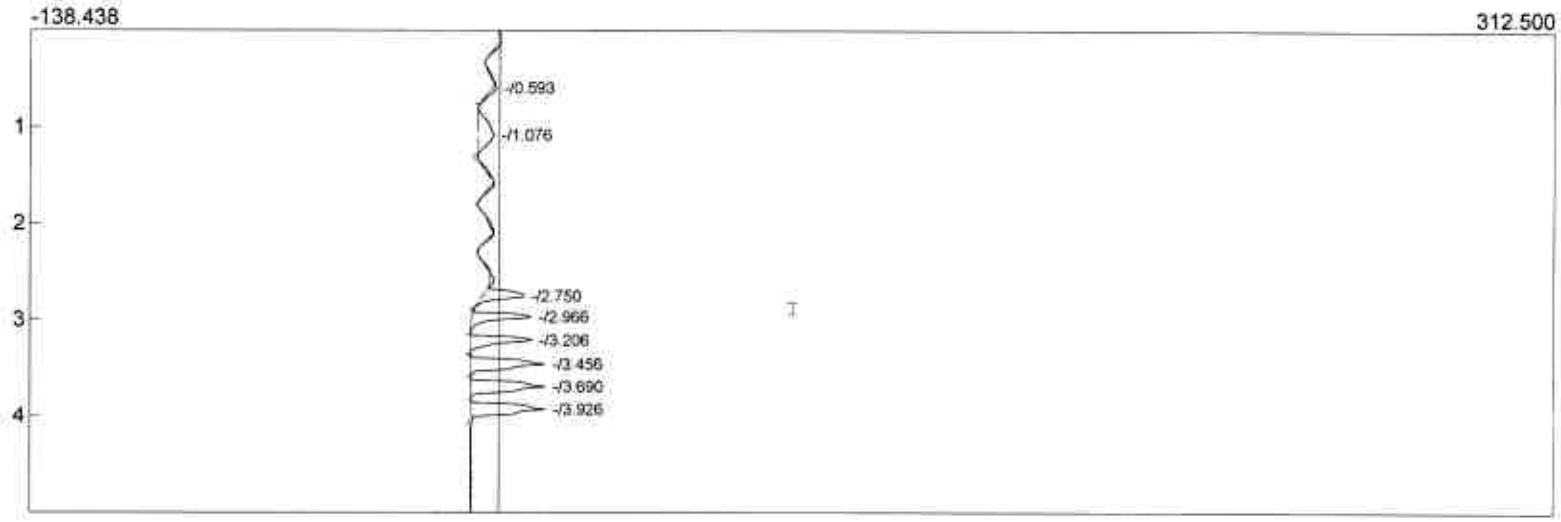
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 12:15:53
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_393.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.593	10.5402	1.315	0.0000	
-	1.076	75.8404	4.937	0.0000	
-	2.750	67.8780	12.181	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	2.966	77.5518	17.607	0.0000	
-	3.206	85.9270	18.233	0.0000	
-	3.456	118.5442	22.077	0.0000	
-	3.690	122.0060	22.047	0.0000	
-	3.926	121.3345	21.890	0.0000	
		679.6221		0.0000	

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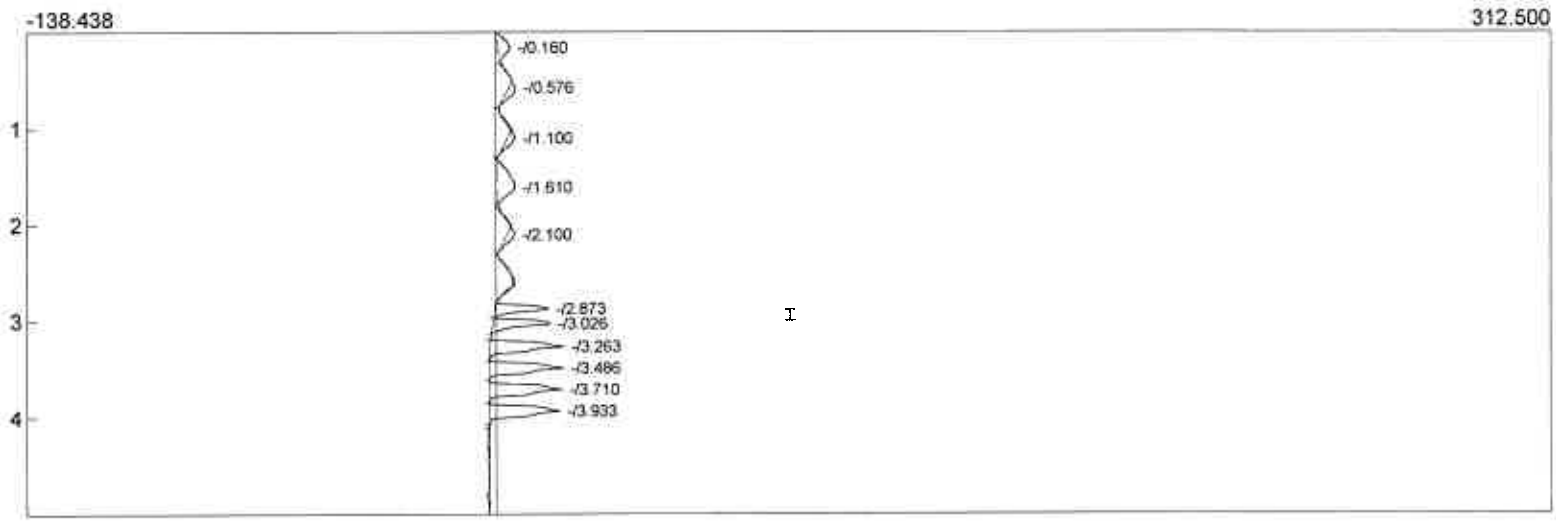
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 12:27:11
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_395.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.160	37.8254	3.706	0.0000	
-	0.576	20.1400	1.964	0.0000	
-	1.100	20.7120	2.394	0.0000	
-	1.610	80.4364	5.100	0.0000	
-	2.100	19.9532	2.244	0.0000	
-	2.873	68.7828	15.766	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.026	77.7195	16.841	0.0000	
-	3.263	113.9032	21.774	0.0000	
-	3.486	118.8936	21.989	0.0000	
-	3.710	120.6626	21.598	0.0000	
-	3.933	117.8164	20.845	0.0000	
		796.8451		0.0000	

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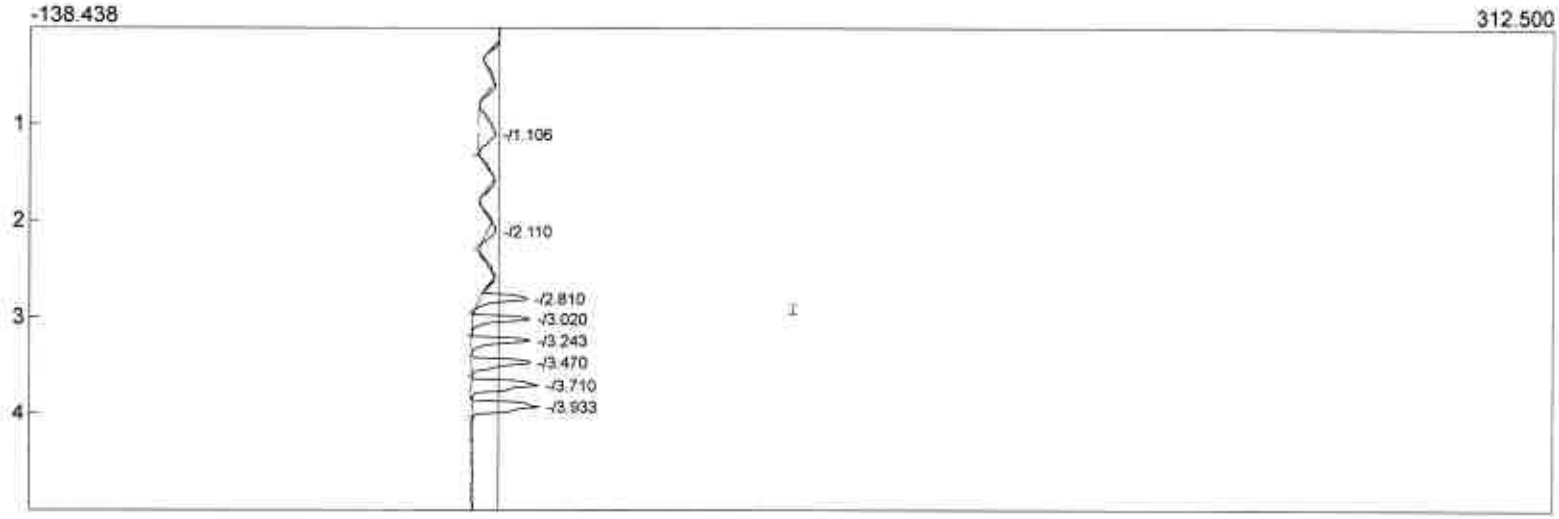
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 12:41:16
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_397.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.106	79.6434	5.079	0.0000	
-	2.110	21.5159	2.636	0.0000	
-	2.810	70.0015	14.242	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.020	74.3509	17.178	0.0000	
-	3.243	74.6949	17.505	0.0000	
-	3.470	90.6076	17.536	0.0000	
-	3.710	114.2755	20.061	0.0000	
-	3.933	114.2506	20.193	0.0000	
		639.3403		0.0000	

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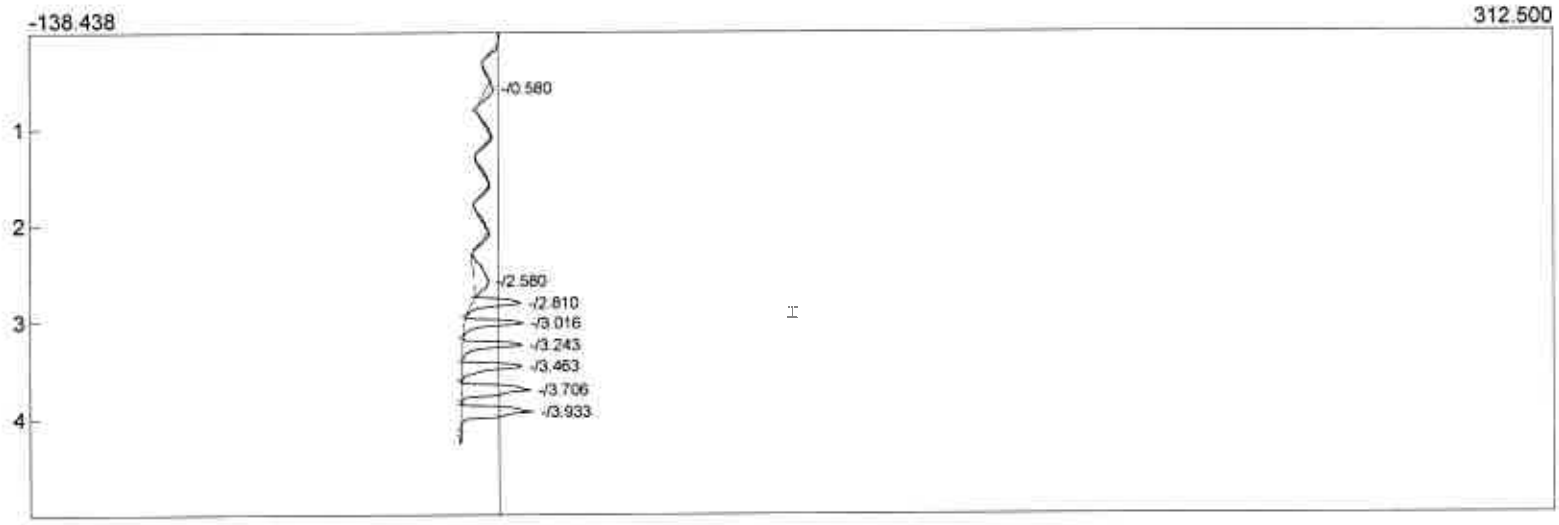
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 13:09:37
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_399.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.580	21.6925	2.218	0.0000	
-	2.580	65.4912	4.494	0.0000	
-	2.810	70.4710	14.435	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	74.0790	17.383	0.0000	
-	3.243	76.0252	17.700	0.0000	
-	3.463	82.8422	17.648	0.0000	
-	3.706	115.0802	20.458	0.0000	
-	3.933	121.3958	21.432	0.0000	
		627.0771		0.0000	

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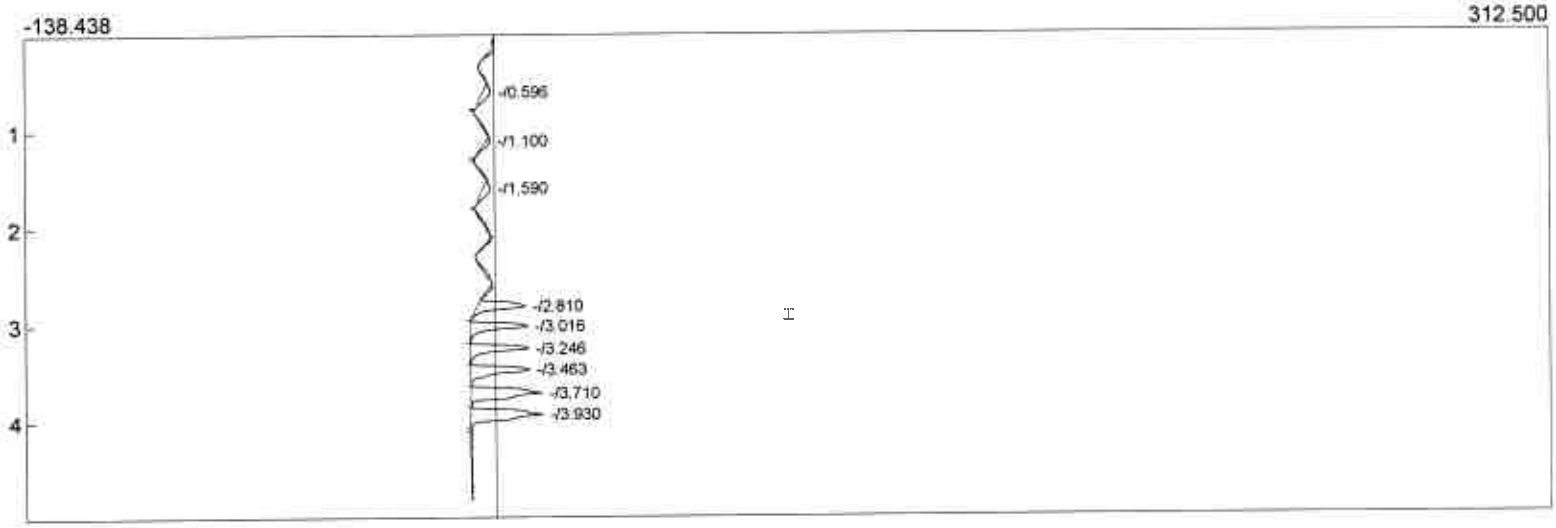
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 13:20:56
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_401.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.596	22.6231	2.397	0.0000	
-	1.100	11.5764	1.300	0.0000	
-	1.590	21.3864	2.220	0.0000	
-	2.810	69.8998	14.347	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	74.5870	17.005	0.0000	
-	3.246	74.4836	17.329	0.0000	
-	3.463	86.1534	17.585	0.0000	
-	3.710	116.9982	21.101	0.0000	
-	3.930	120.9246	21.400	0.0000	
		598.6325		0.0000	

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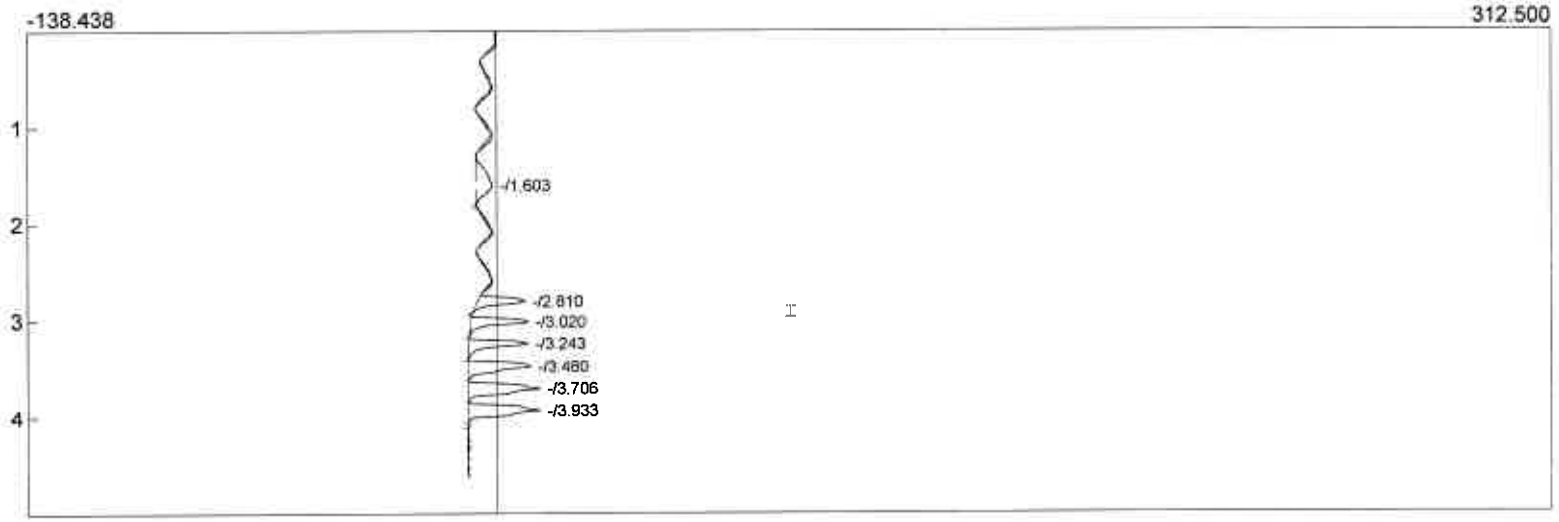
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 13:31:22
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_403.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.603	77.0988	4.982	0.0000	
-	2.810	67.7979	14.059	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.020	74.0142	16.926	0.0000	
-	3.243	76.1624	17.435	0.0000	
-	3.480	101.3265	18.275	0.0000	
-	3.706	117.8034	21.085	0.0000	
-	3.933	119.9702	21.178	0.0000	
		634.1734		0.0000	

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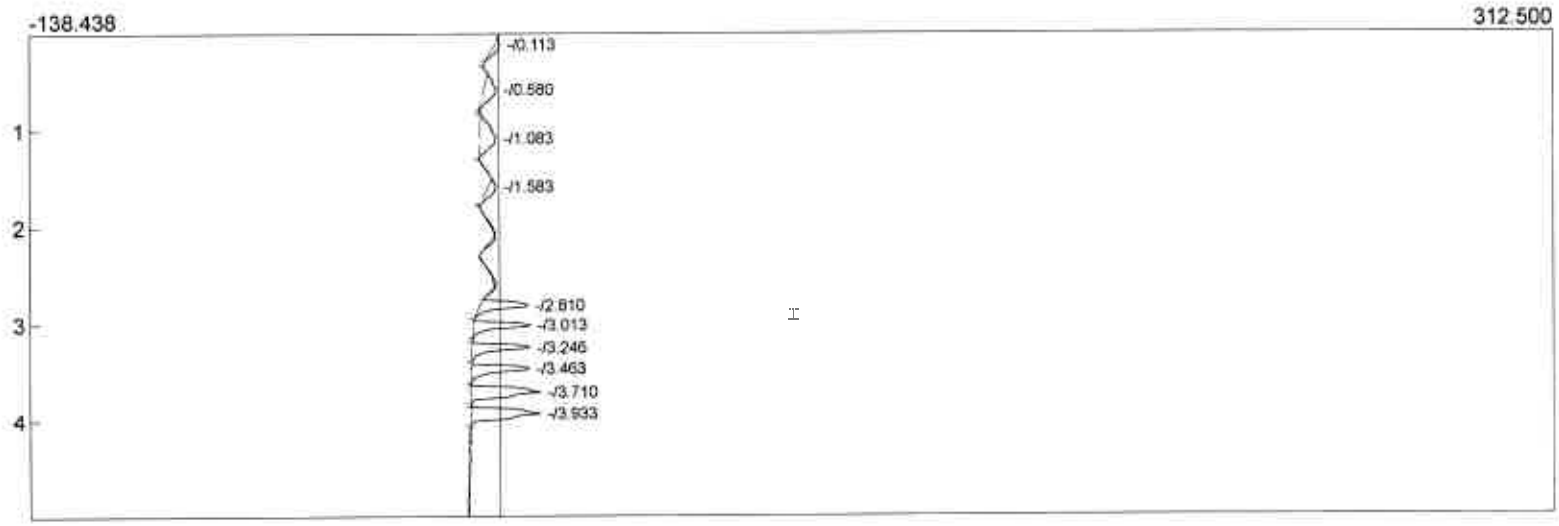
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 13:42:13
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_405.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.113	14.9176	1.471	0.0000	
-	0.580	47.7387	3.780	0.0000	
-	1.083	74.9682	4.920	0.0000	
-	1.583	24.6529	2.417	0.0000	
-	2.810	70.2647	14.185	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.013	71.3509	16.812	0.0000	
-	3.246	75.3123	17.166	0.0000	
-	3.463	80.1006	17.154	0.0000	
-	3.710	115.6856	20.820	0.0000	
-	3.933	115.9138	20.621	0.0000	
		690.9053		0.0000	

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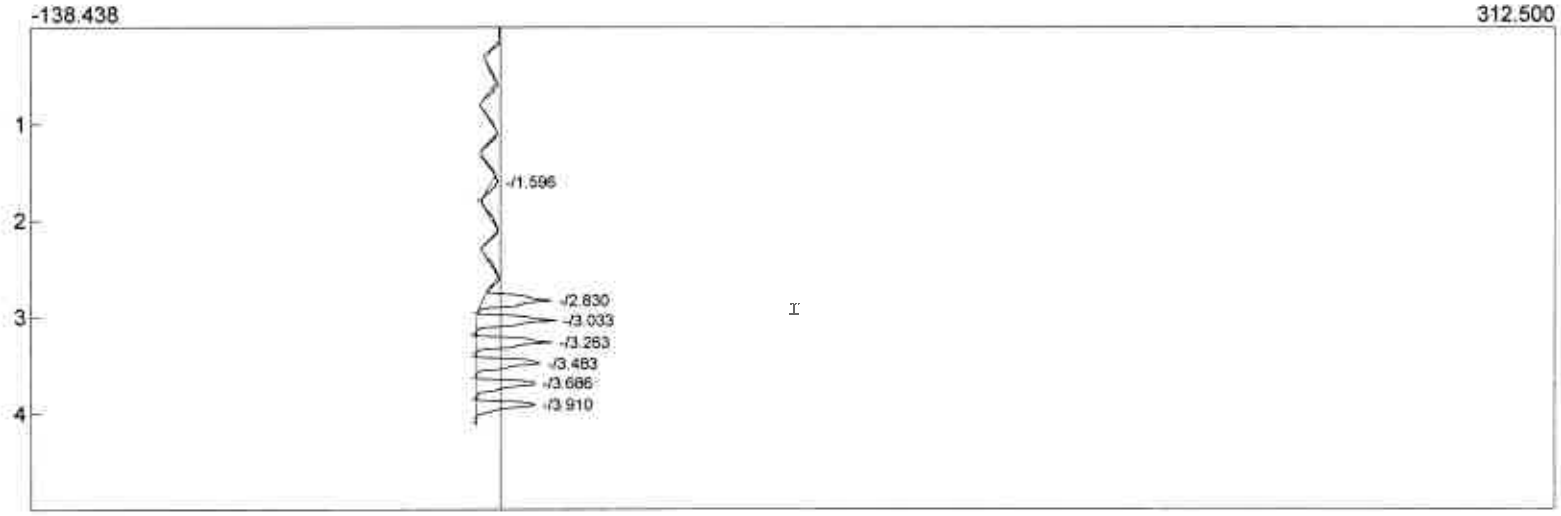
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 13:54:56
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_407.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.596	15.7497	1.958	0.0000	
-	2.830	115.4789	20.411	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.033	119.0307	23.631	0.0000	
-	3.263	114.1169	22.632	0.0000	
-	3.483	103.4932	19.107	0.0000	
-	3.686	95.2031	17.578	0.0000	
-	3.910	85.3296	17.563	0.0000	
		648.4021		0.0000	

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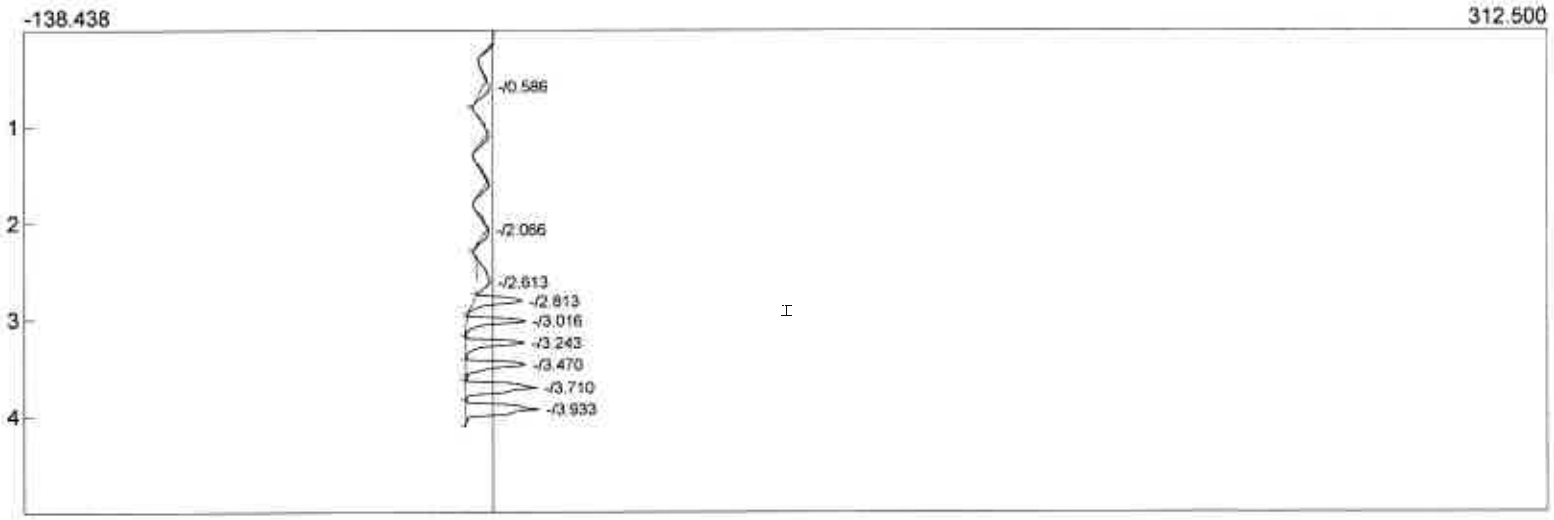
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 14:15:28
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_409.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.586	21.5466	2.189	0.0000	
-	2.066	11.7394	0.498	0.0000	
-	2.613	52.1015	4.105	0.0000	
-	2.813	69.3712	14.148	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	73.5257	17.139	0.0000	
-	3.243	75.6211	17.315	0.0000	
-	3.470	81.0128	17.451	0.0000	
-	3.710	118.9183	21.177	0.0000	
-	3.933	122.3728	21.679	0.0000	
		626.2094		0.0000	

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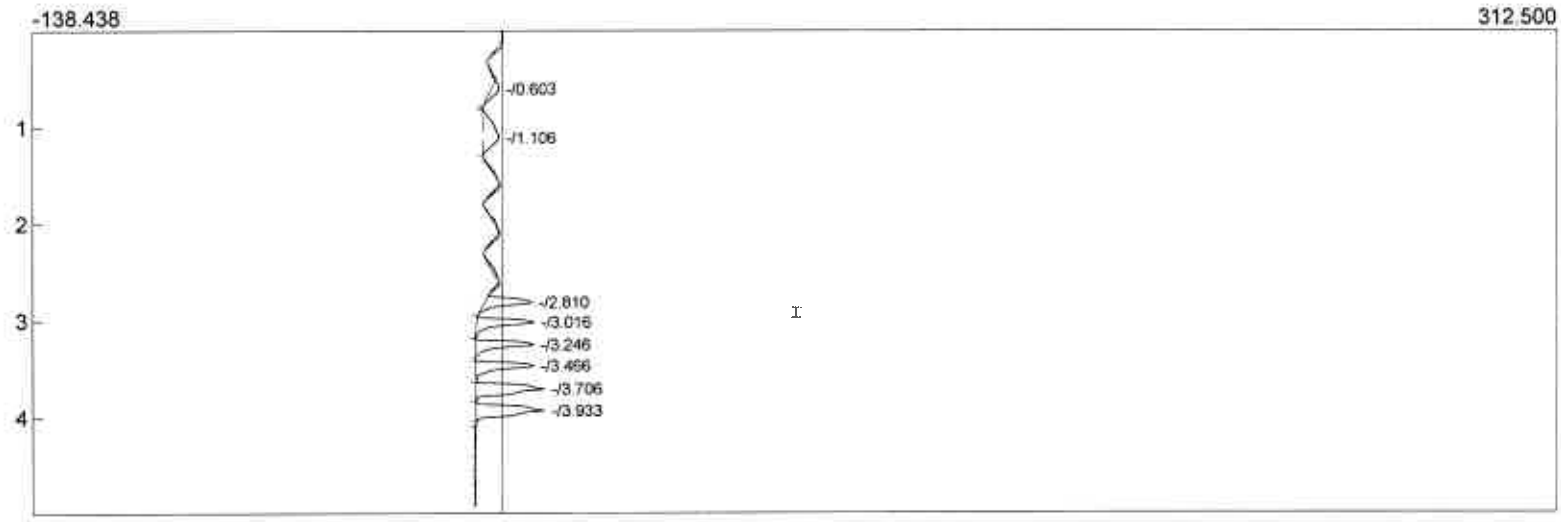
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 14:26:05
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_411.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.603	21.9466	2.304	0.0000	
-	1.106	76.0274	4.814	0.0000	
-	2.810	68.1842	13.881	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	75.7268	16.940	0.0000	
-	3.246	75.2832	17.178	0.0000	
-	3.466	78.5461	17.104	0.0000	
-	3.706	112.5968	20.396	0.0000	
-	3.933	114.1999	20.360	0.0000	
		622.5110		0.0000	

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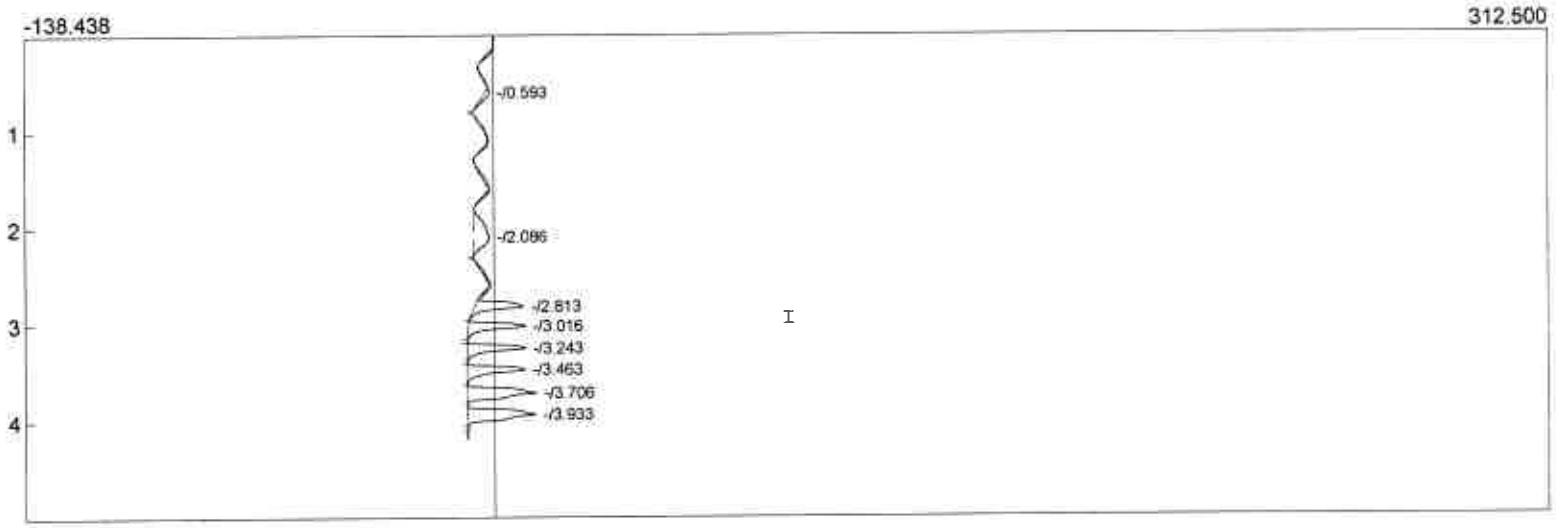
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 14:37:35
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_413.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.593	12.3272	1.208	0.0000	
-	2.086	77.0616	4.817	0.0000	
-	2.813	69.6540	14.392	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	72.6821	16.973	0.0000	
-	3.243	70.8378	17.180	0.0000	
-	3.463	78.7452	17.156	0.0000	
-	3.706	114.8316	20.586	0.0000	
-	3.933	114.6474	20.061	0.0000	
		610.7869		0.0000	

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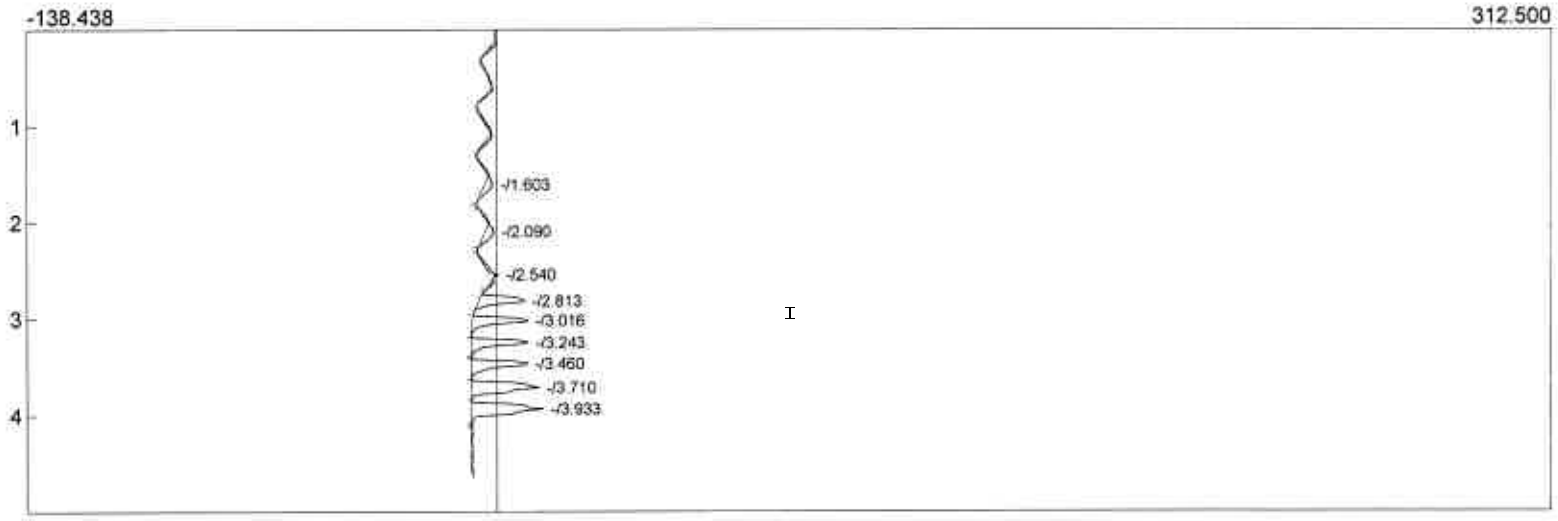
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 14:51:26
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_415.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.603	22.5086	2.463	0.0000	
-	2.090	24.2116	2.590	0.0000	
-	2.540	12.3694	2.730	0.0000	
-	2.813	66.8358	13.806	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	72.2367	16.566	0.0000	
-	3.243	72.8113	16.929	0.0000	
-	3.460	77.0590	16.658	0.0000	
-	3.710	112.4563	20.124	0.0000	
-	3.933	119.8619	21.560	0.0000	
		580.3506		0.0000	

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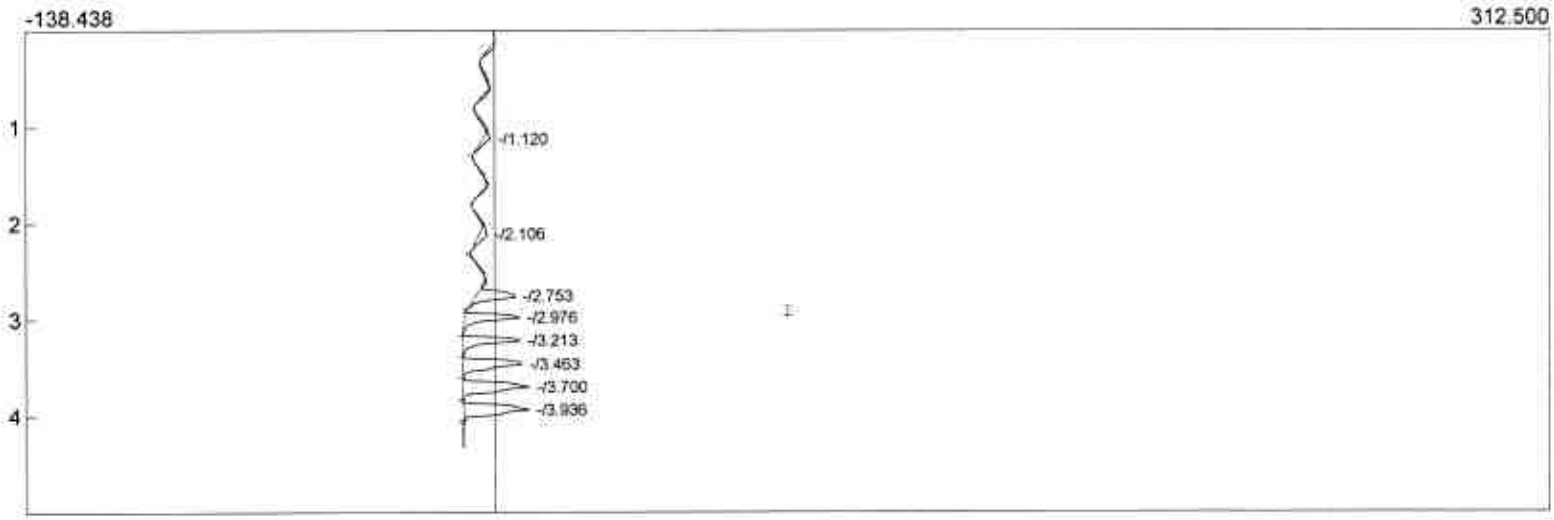
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 15:05:54
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_417.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.120	15.1448	2.213	0.0000	
-	2.106	20.7452	2.395	0.0000	
-	2.753	64.8832	11.602	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	2.976	73.0248	16.281	0.0000	
-	3.213	75.5296	17.019	0.0000	
-	3.463	97.2884	17.631	0.0000	
-	3.700	109.0152	19.654	0.0000	
-	3.936	108.7374	19.295	0.0000	
		564.3686		0.0000	

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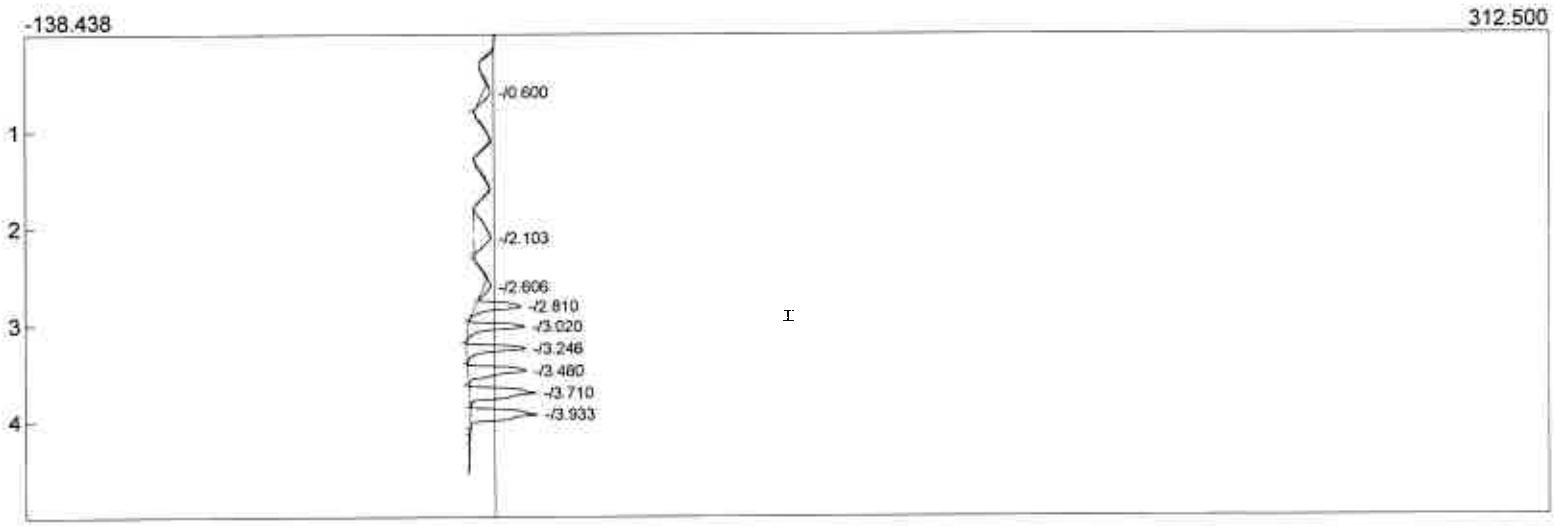
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 15:16:04
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_419.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.600	19.8064	2.295	0.0000	
-	2.103	75.3202	5.142	0.0000	
-	2.606	16.6698	2.235	0.0000	
-	2.810	67.1756	13.509	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.020	73.9144	16.702	0.0000	
-	3.246	74.8648	17.387	0.0000	
-	3.480	92.1836	17.213	0.0000	
-	3.710	112.1412	19.666	0.0000	
-	3.933	112.6384	19.905	0.0000	
		644.7144		0.0000	

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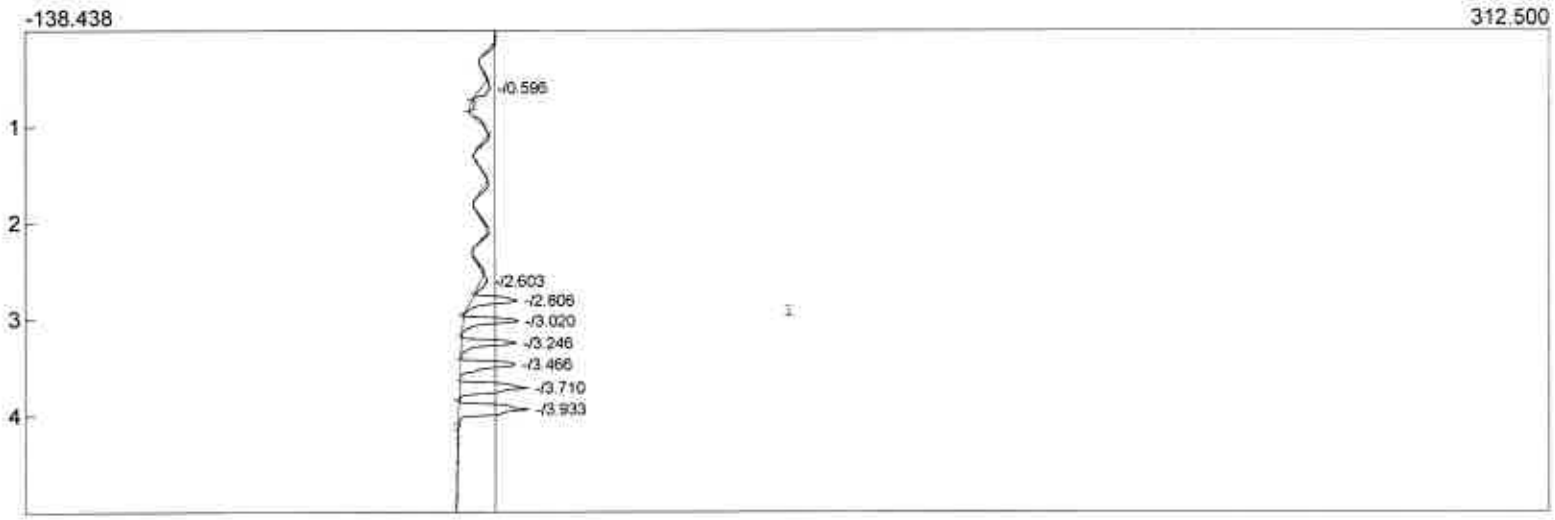
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 15:27:43
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_421.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.596	23.3406	2.691	0.0000	
-	2.603	16.1908	2.125	0.0000	
-	2.806	68.2336	13.723	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.020	70.4839	16.373	0.0000	
-	3.246	70.5384	16.299	0.0000	
-	3.466	81.8123	16.277	0.0000	
-	3.710	110.8194	20.313	0.0000	
-	3.933	116.5747	20.816	0.0000	
		557.9937		0.0000	

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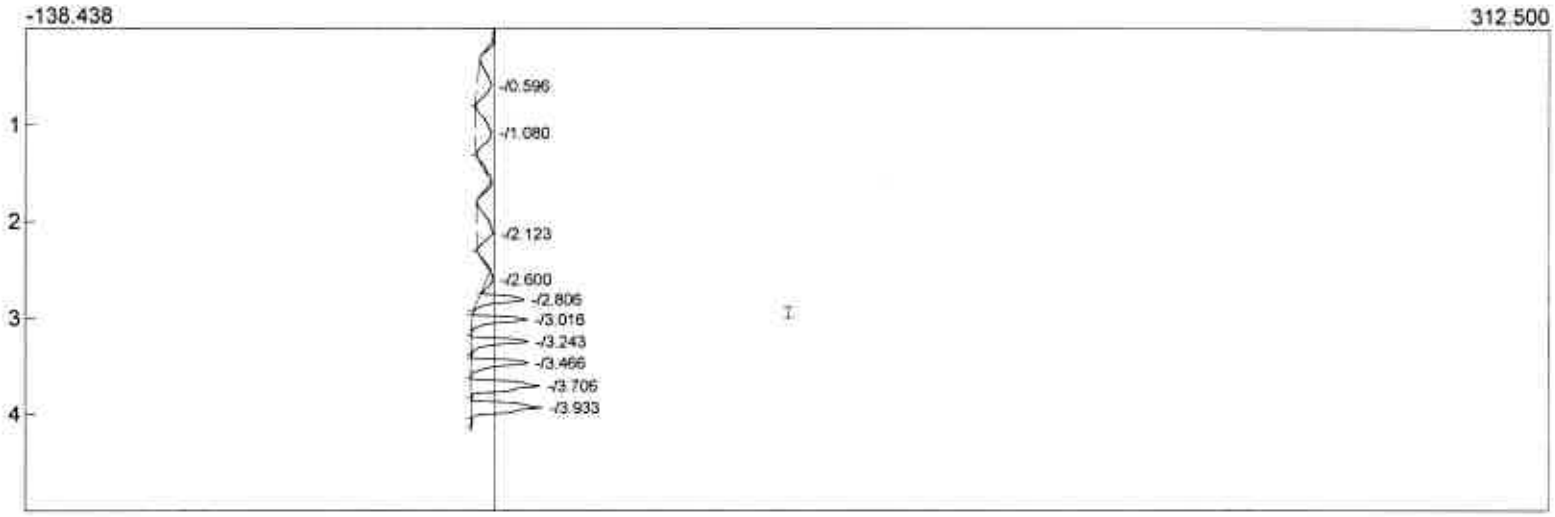
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 15:37:45
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_422.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.596	65.2022	4.393	0.0000	
-	1.080	77.6187	4.837	0.0000	
-	2.123	78.6127	4.997	0.0000	
-	2.600	16.3230	1.972	0.0000	
-	2.806	66.2663	13.480	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	70.7208	16.317	0.0000	
-	3.243	70.8920	16.827	0.0000	
-	3.466	79.5984	16.775	0.0000	
-	3.706	113.8758	20.502	0.0000	
-	3.933	116.4368	20.882	0.0000	
		755.5467		0.0000	

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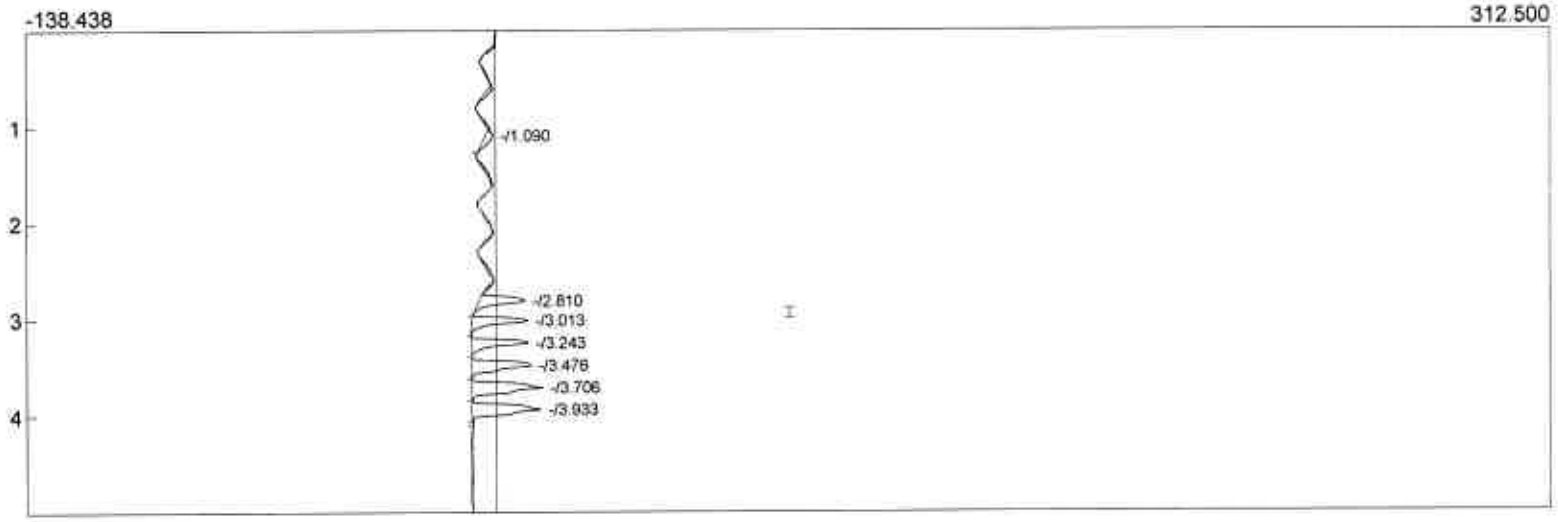
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 15:49:05
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_424.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.090	20.7979	2.278	0.0000	
-	2.810	69.7621	13.848	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.013	73.8163	16.585	0.0000	
-	3.243	74.1767	16.988	0.0000	
-	3.476	97.3134	17.662	0.0000	
-	3.706	117.5111	21.145	0.0000	
-	3.933	115.8636	20.500	0.0000	
		569.2411		0.0000	

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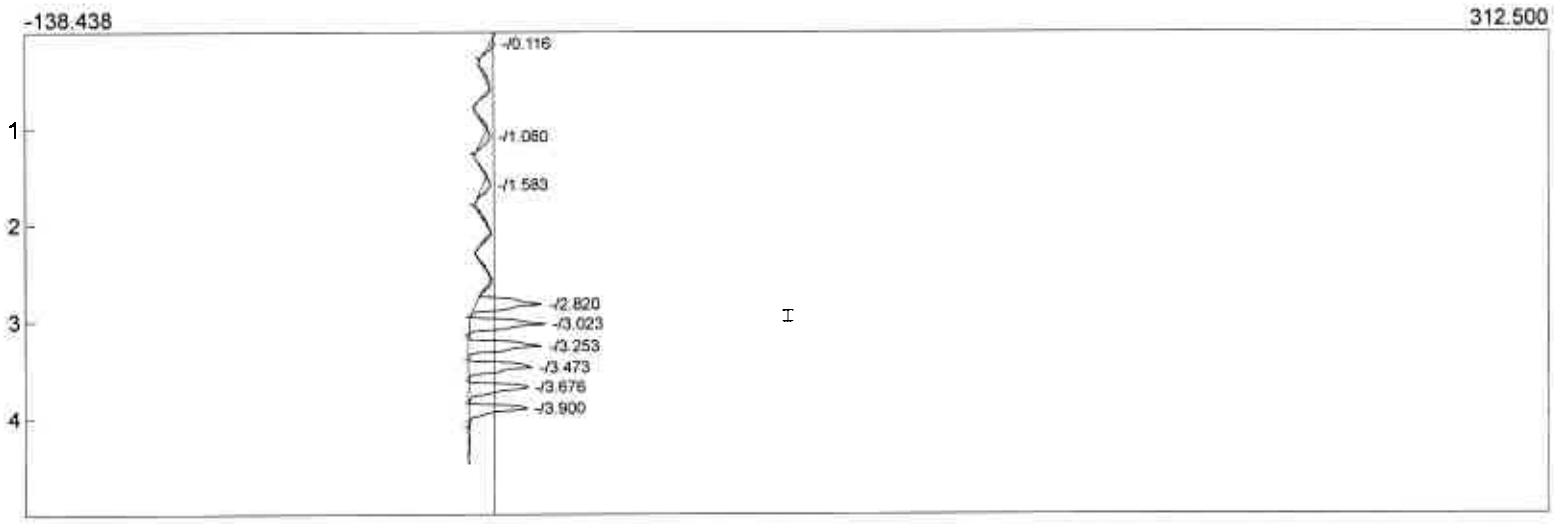
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 16:02:13
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_426.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.116	11.5834	1.405	0.0000	
-	1.080	18.5486	2.065	0.0000	
-	1.583	20.3672	2.205	0.0000	
-	2.820	109.4664	19.577	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.023	111.7505	22.292	0.0000	
-	3.253	112.8656	21.630	0.0000	
-	3.473	102.5969	18.889	0.0000	
-	3.676	94.1696	17.439	0.0000	
-	3.900	83.7769	17.336	0.0000	
		665.1251		0.0000	

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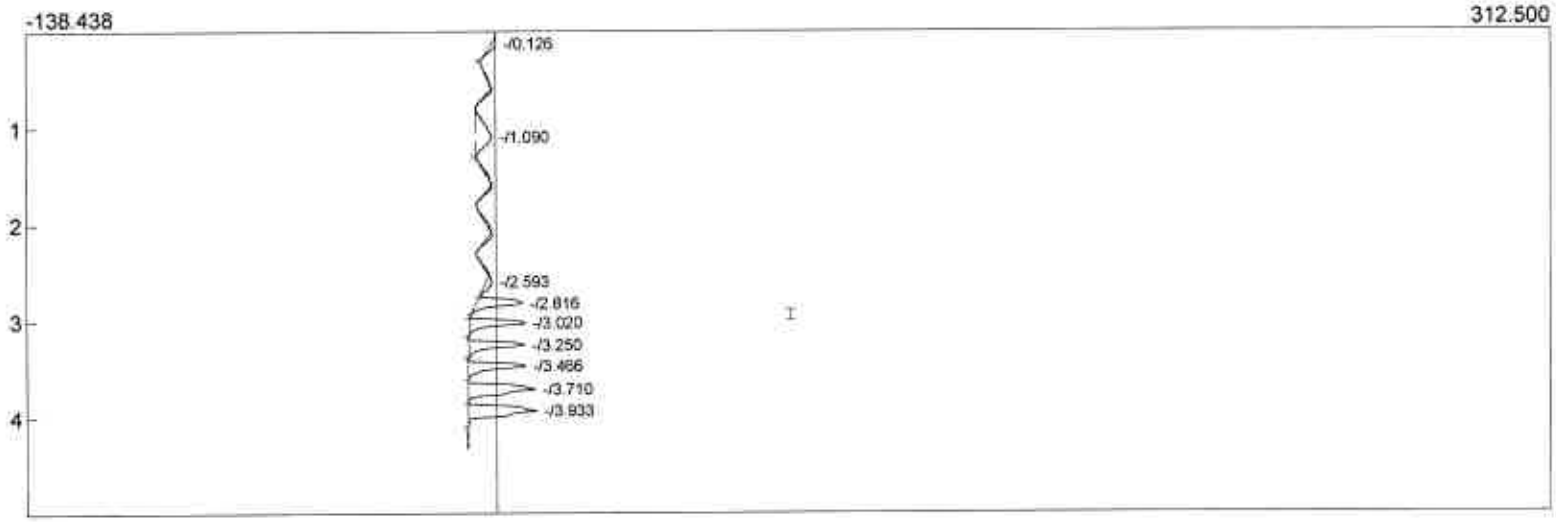
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 16:14:48
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_428.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.126	12.3678	1.412	0.0000	
-	1.090	72.6400	4.842	0.0000	
-	2.593	16.2488	1.950	0.0000	
-	2.816	67.4047	13.758	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.020	70.3630	16.541	0.0000	
-	3.250	69.2678	16.623	0.0000	
-	3.466	73.6400	17.182	0.0000	
-	3.710	111.2128	19.908	0.0000	
-	3.933	114.5450	20.377	0.0000	
		607.6899		0.0000	

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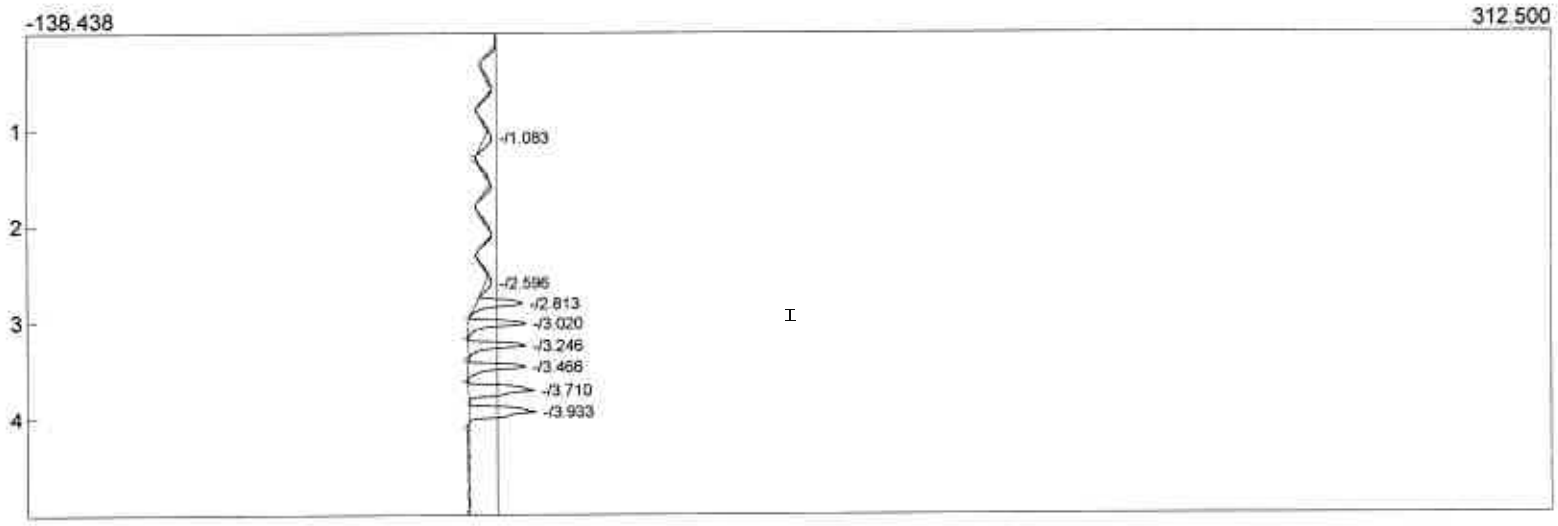
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 16:28:35
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_430.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.083	23.2924	2.233	0.0000	
-	2.596	16.1498	2.112	0.0000	
-	2.813	67.9350	13.664	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.020	75.1232	16.943	0.0000	
-	3.246	73.0214	17.038	0.0000	
-	3.466	75.9647	17.109	0.0000	
-	3.710	108.8985	19.556	0.0000	
-	3.933	111.4238	19.909	0.0000	
		551.8088		0.0000	

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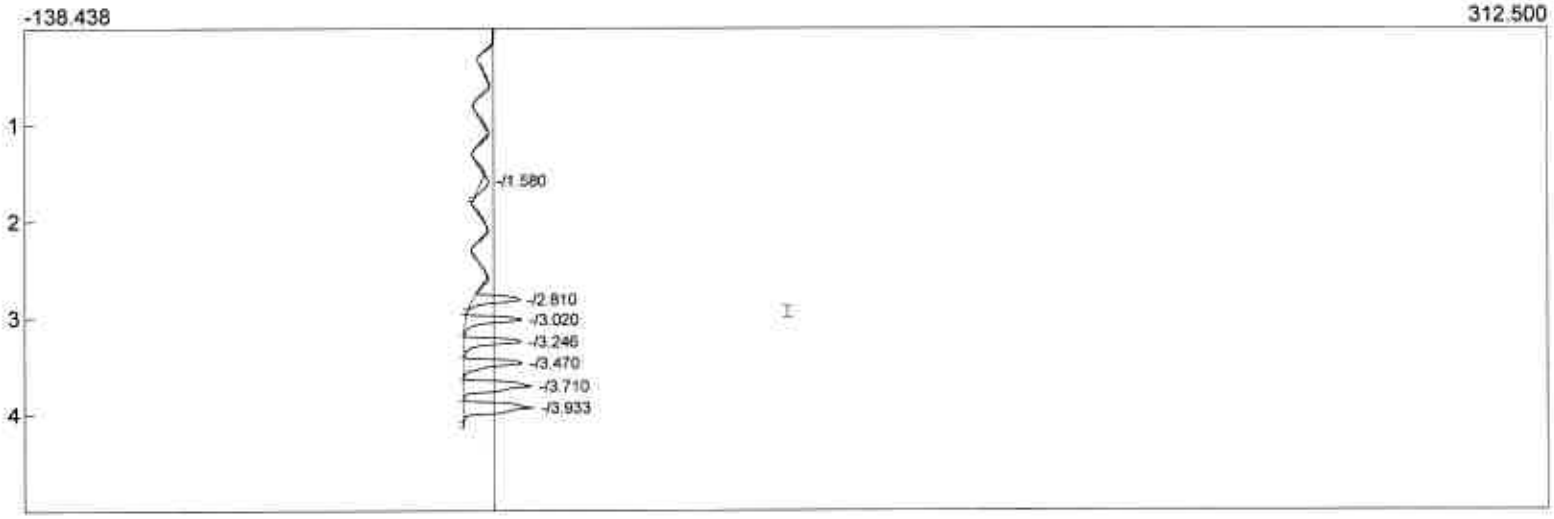
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 16:39:45
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_432.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.580	19.5874	2.079	0.0000	
-	2.810	66.9306	13.747	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.020	73.8703	16.552	0.0000	
-	3.246	73.6389	16.824	0.0000	
-	3.470	85.4122	17.129	0.0000	
-	3.710	113.3654	20.246	0.0000	
-	3.933	116.0744	20.547	0.0000	
		548.8792		0.0000	

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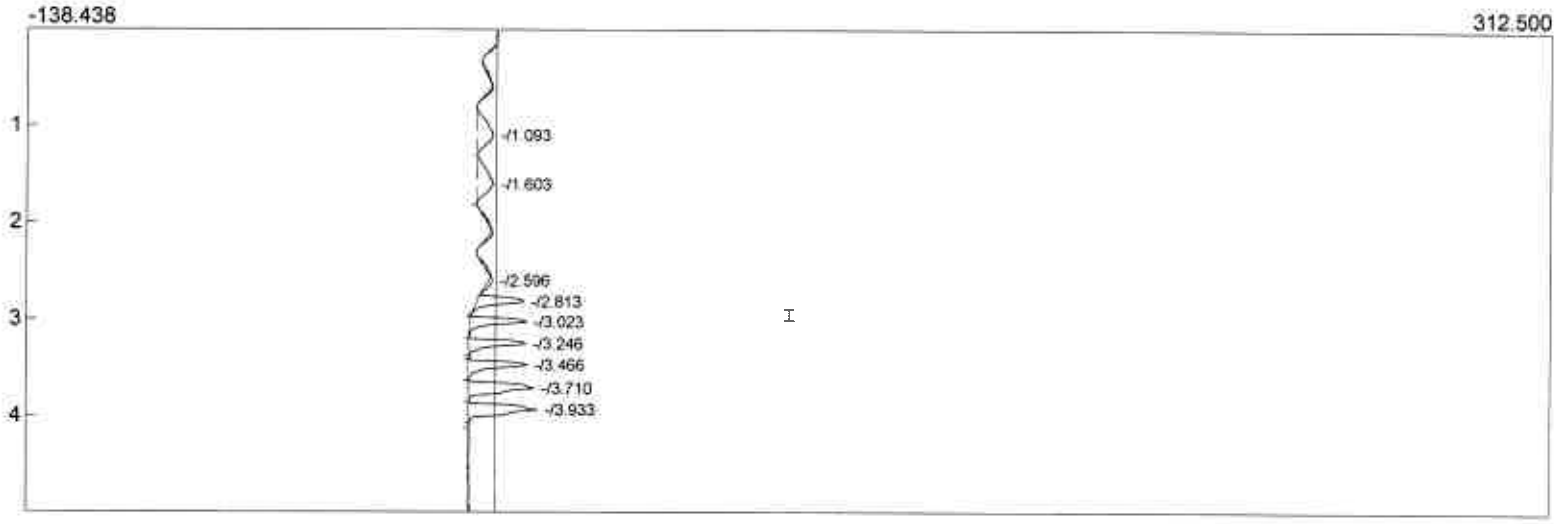
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 16:54:10
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_434.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.093	73.7810	4.861	0.0000	
-	1.603	76.5368	5.123	0.0000	
-	2.596	10.1073	1.181	0.0000	
-	2.813	68.2412	13.938	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.023	73.4449	16.776	0.0000	
-	3.246	72.7748	16.974	0.0000	
-	3.466	77.6250	17.465	0.0000	
-	3.710	107.8696	19.571	0.0000	
-	3.933	113.5222	20.480	0.0000	
		673.9028		0.0000	

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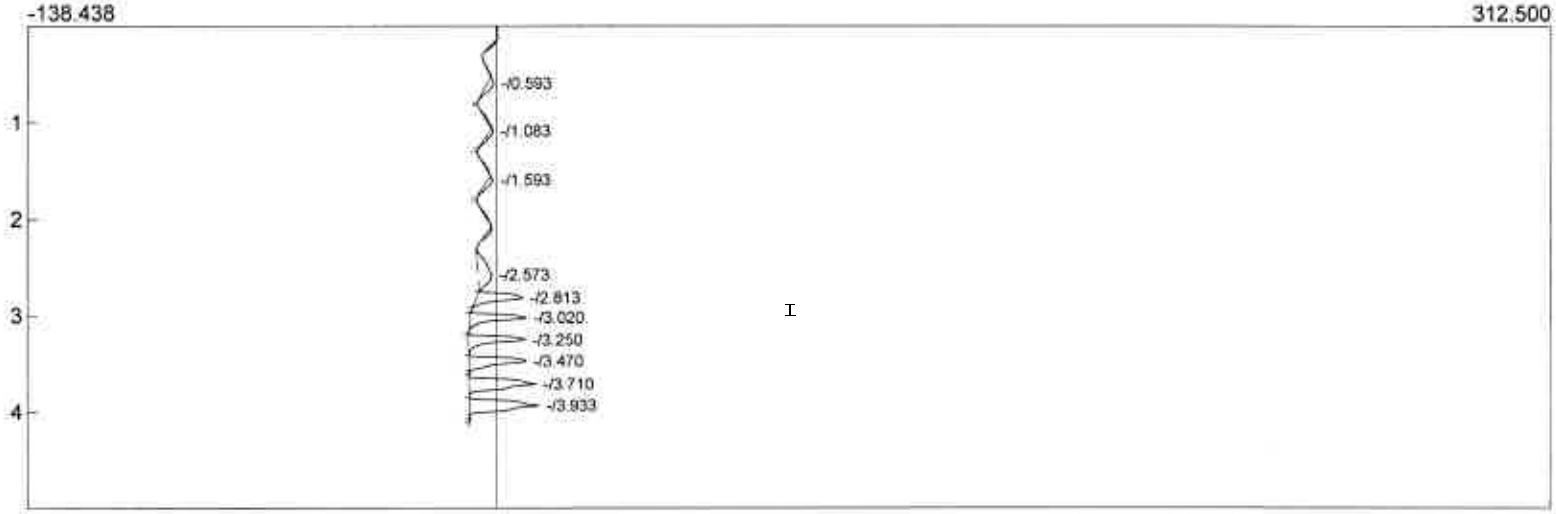
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 17:06:16
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_436.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.593	18.7564	2.116	0.0000	
-	1.083	10.5347	0.897	0.0000	
-	1.593	13.7874	1.619	0.0000	
-	2.573	63.3486	4.163	0.0000	
-	2.813	66.3300	13.629	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.020	70.5650	16.655	0.0000	
-	3.250	72.4200	16.673	0.0000	
-	3.470	79.5758	16.734	0.0000	
-	3.710	109.8993	19.792	0.0000	
-	3.933	112.7742	20.537	0.0000	
		617.9914		0.0000	

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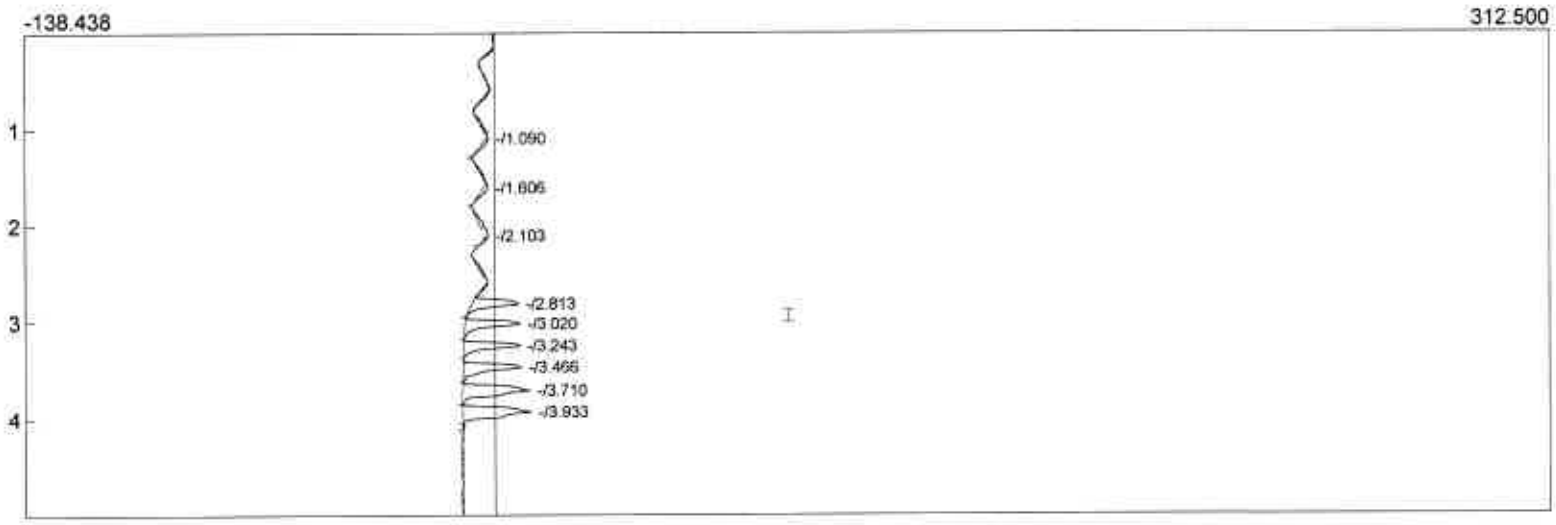
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 17:17:43
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_438.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.090	10.3318	0.857	0.0000	
-	1.606	11.7512	1.507	0.0000	
-	2.103	16.4710	1.159	0.0000	
-	2.813	66.8306	13.898	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.020	72.5621	16.419	0.0000	
-	3.243	71.6546	16.777	0.0000	
-	3.466	83.2556	17.296	0.0000	
-	3.710	114.2016	20.058	0.0000	
-	3.933	116.0441	20.446	0.0000	
		563.1026		0.0000	

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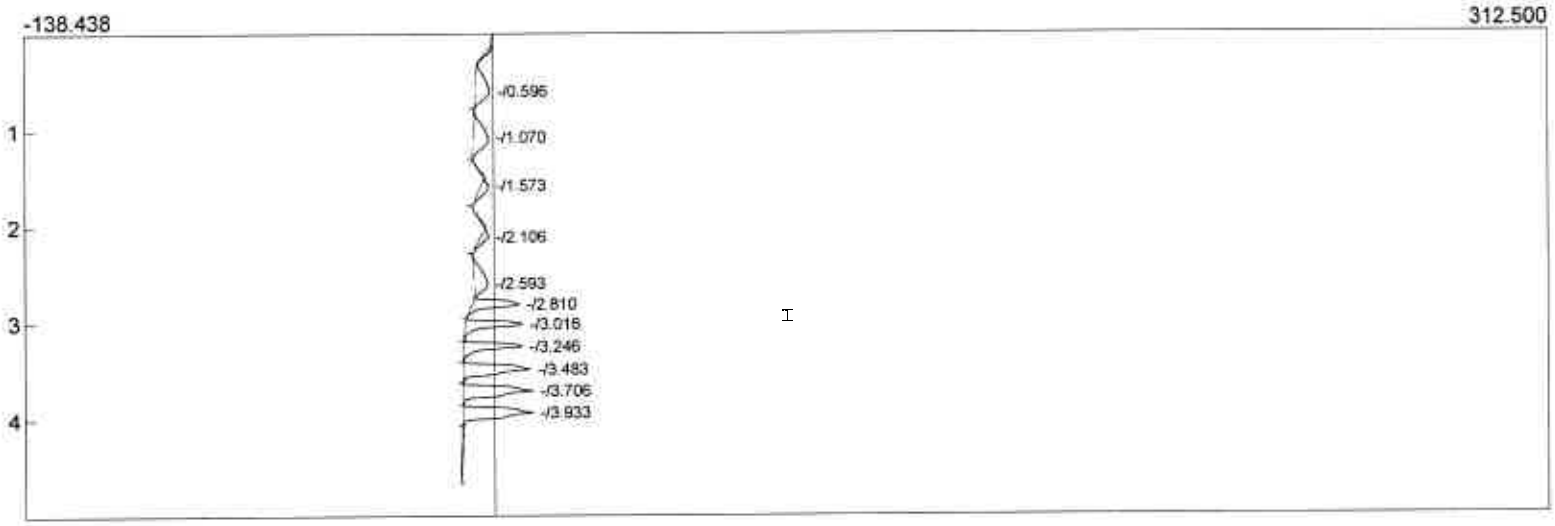
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 17:29:11
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_440.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.596	63.7790	4.264	0.0000	
-	1.070	67.5954	4.450	0.0000	
-	1.573	24.4311	2.214	0.0000	
-	2.106	17.9152	2.287	0.0000	
-	2.593	57.1544	4.031	0.0000	
-	2.810	66.2380	13.722	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	73.3858	16.883	0.0000	
-	3.246	75.1718	17.440	0.0000	
-	3.483	107.5032	19.897	0.0000	
-	3.706	113.8195	20.611	0.0000	
-	3.933	115.3145	20.490	0.0000	
		782.3079		0.0000	

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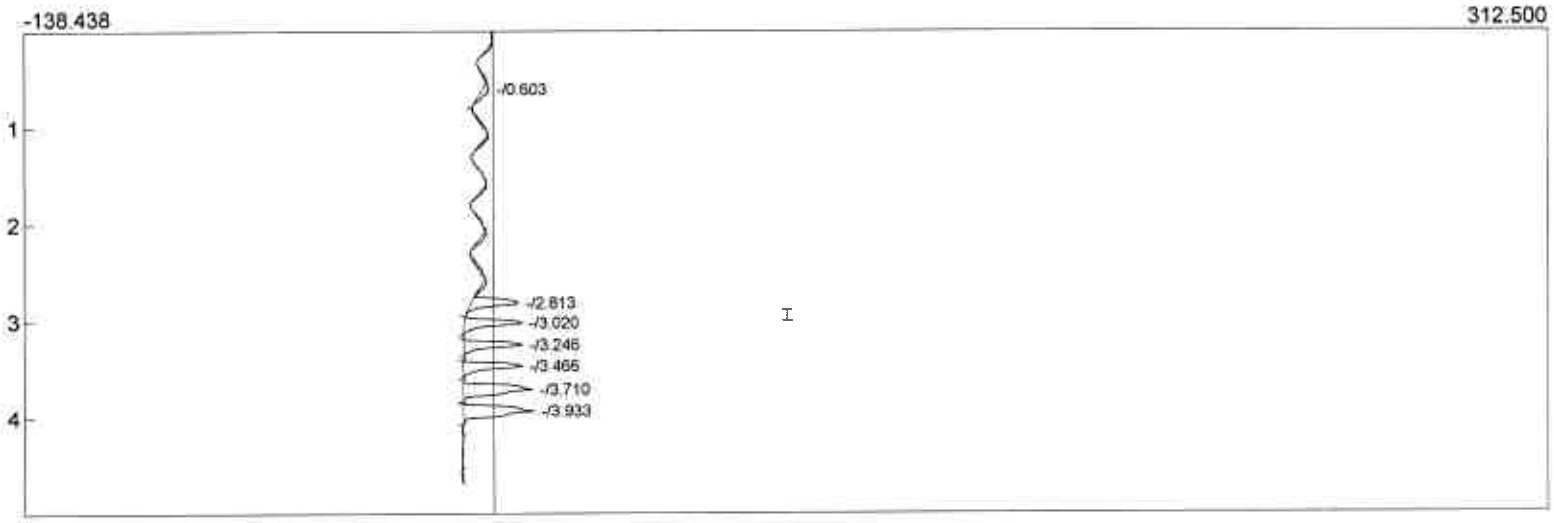
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 17:39:28
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_442.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.603	17.2117	1.997	0.0000	
-	2.813	68.7326	13.900	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.020	73.6186	16.922	0.0000	
-	3.246	70.6513	17.205	0.0000	
-	3.466	74.5000	17.384	0.0000	
-	3.710	111.4684	20.425	0.0000	
-	3.933	115.5418	20.772	0.0000	
		531.7244		0.0000	

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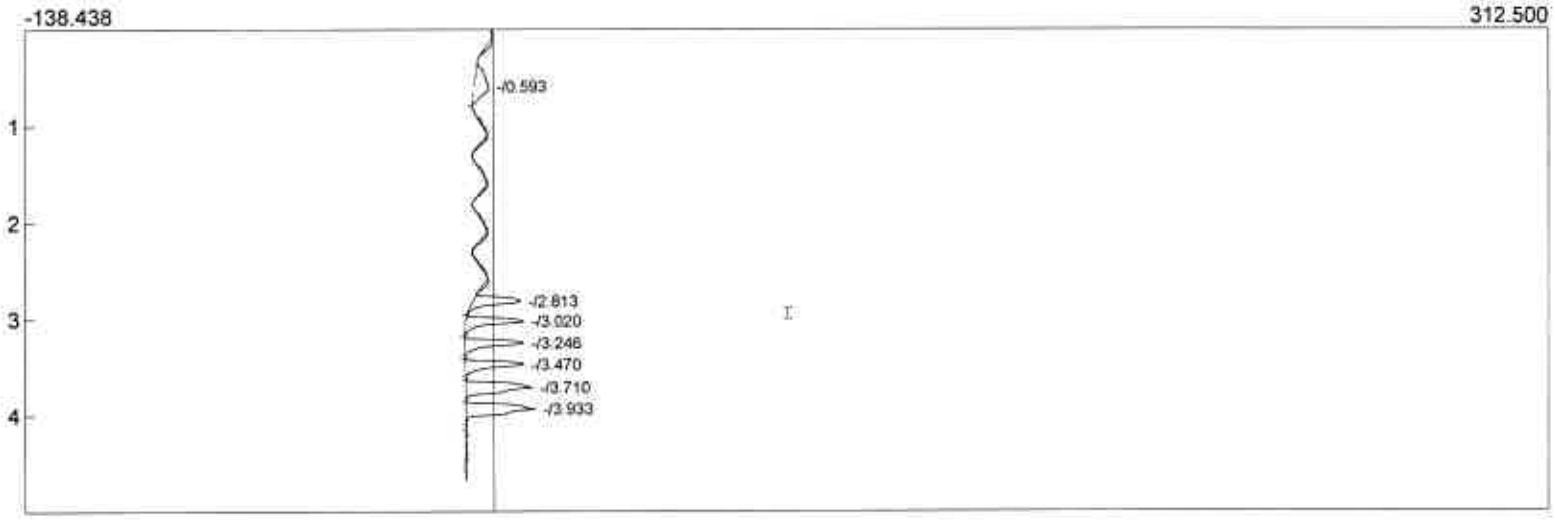
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 17:51:22
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_444.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.593	64.7562	4.501	0.0000	
-	2.813	70.0664	14.182	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.020	75.7570	17.186	0.0000	
-	3.246	75.1294	17.546	0.0000	
-	3.470	76.8426	17.435	0.0000	
-	3.710	113.7706	19.902	0.0000	
-	3.933	116.8682	20.741	0.0000	
		593.1904		0.0000	

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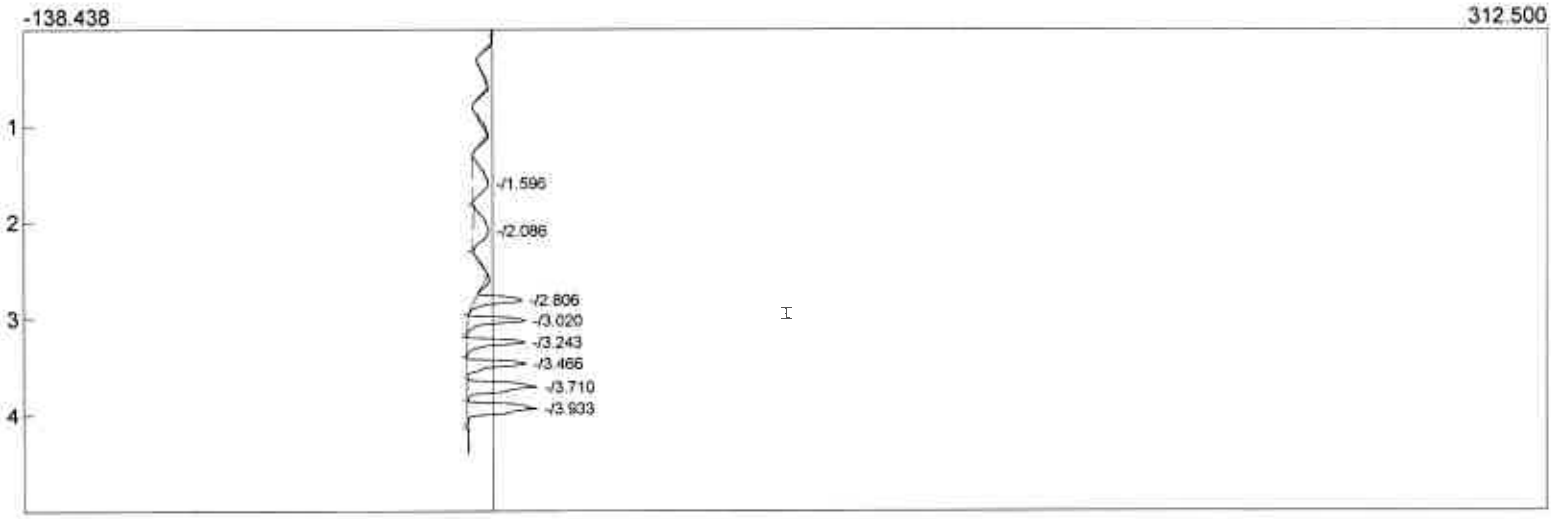
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 18:01:50
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_446.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.596	79.7721	4.844	0.0000	
-	2.086	74.0568	4.776	0.0000	
-	2.806	69.8862	13.977	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.020	73.1910	16.998	0.0000	
-	3.243	75.7880	17.331	0.0000	
-	3.466	82.0947	17.599	0.0000	
-	3.710	115.0066	20.698	0.0000	
-	3.933	118.3563	20.639	0.0000	
		688.1517		0.0000	

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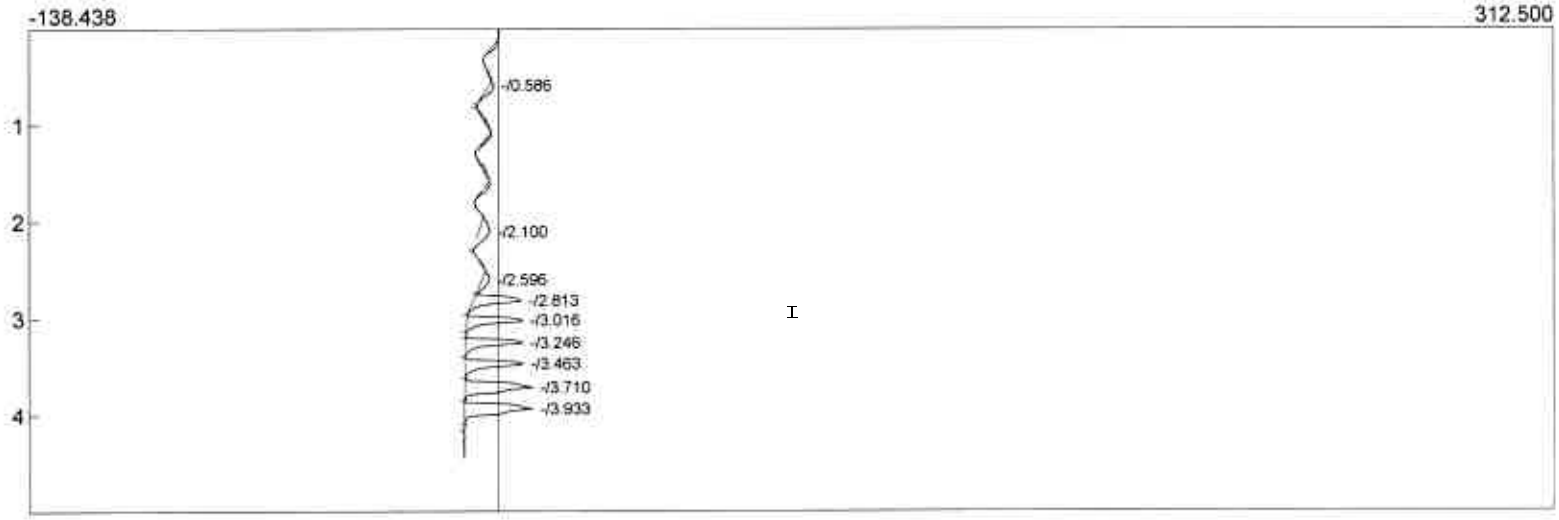
Lab name: SRI Instruments
Client: Valued Customer
Analysis date: 09/01/2016 18:17:31
Method: Syringe Injection
Description: FID-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_448.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	0.586	14.8622	1.542	0.0000	
-	2.100	35.9694	3.295	0.0000	
-	2.596	20.4380	2.308	0.0000	
-	2.813	69.5507	14.262	0.0000	
Hydrogen Sulfide	0.000	0.0000	0.000	0.0000	
-	3.016	71.6908	16.578	0.0000	
-	3.246	73.5888	17.123	0.0000	
-	3.463	74.7029	17.350	0.0000	
-	3.710	111.9346	20.162	0.0000	
-	3.933	115.7631	20.343	0.0000	
		588.5005		0.0000	

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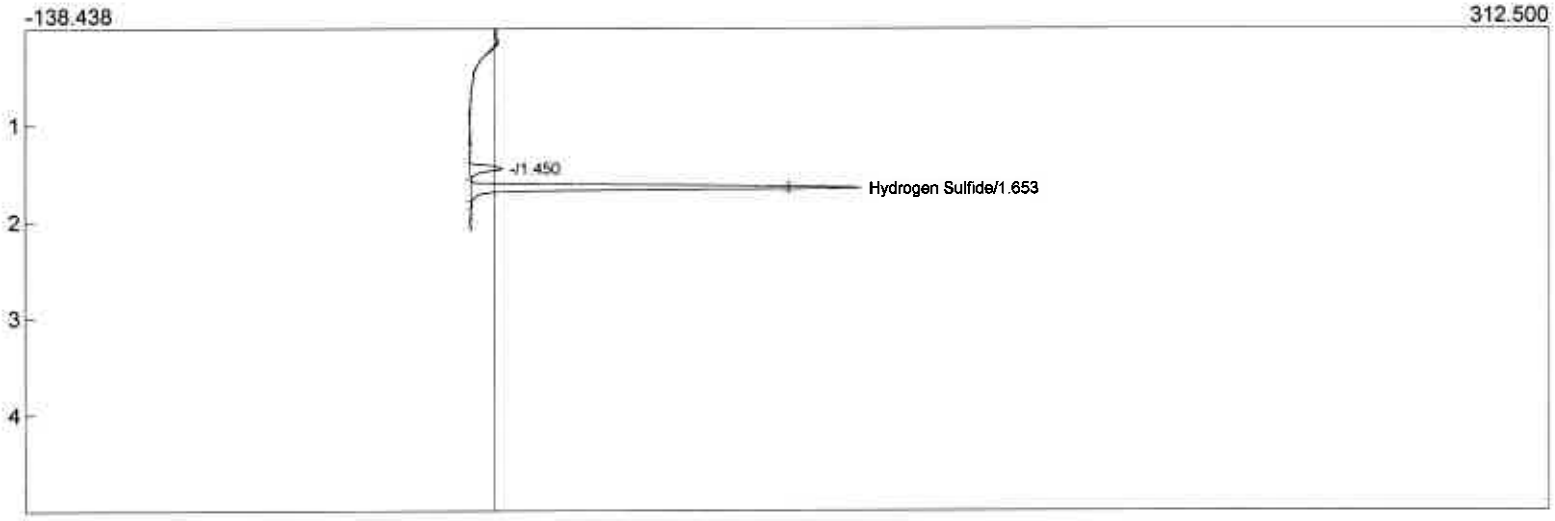
Lab name: Mostardi Platt
Client: ArcelorMittal Burns Harbor
Analysis date: 09/01/2016 18:45:09
Method: Air Sample
Description: FPD-CHANNEL 1
Column: RESTEK 15METER MXT-1
Carrier: HELIUM AT 5 PSI
Integration: Peak sens=95.0 Base sens=60.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
Data file: ChannelOne 8_23_17_455.CHR ()

Temperature program:

Init temp	Hold	Ramp	Final temp

Events:

Time	Event



Component	Retention	Area	Height	External	Units
-	1.450	41.2707	9.631	0.0000	
Hydrogen Sulfide	1.653	358.9884	115.705	8.5110	
		400.2591		8.5110	

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PEC-BH Run 1

Spectrum	Date	Time	HCl (ppmv wet)	HCN (ppmv wet)	HF (ppmv wet)	H2O (%v)	CO2 (%v wet)	FTIR Gas Cell Temp (C)	Pressure (Atm)
PEC-BH_000445.LAB	8/30/2016	7:13:00	0.2	0.6	0.3	2.5	0.1	190.3	1.002
PEC-BH_000446.LAB	8/30/2016	7:13:15	0.2	0.6	0.3	2.6	0.1	190.3	1.006
PEC-BH_000447.LAB	8/30/2016	7:13:30	0.2	0.6	0.3	2.6	0.2	190.3	1.006
PEC-BH_000448.LAB	8/30/2016	7:13:45	0.2	0.6	0.3	3.0	1.0	190.3	1.007
PEC-BH_000449.LAB	8/30/2016	7:14:00	0.2	0.8	0.3	3.8	1.5	190.3	1.006
PEC-BH_000450.LAB	8/30/2016	7:14:15	0.2	0.6	0.3	3.7	1.2	190.3	1.006
PEC-BH_000451.LAB	8/30/2016	7:14:30	0.2	0.6	0.3	3.5	1.0	190.2	1.006
PEC-BH_000452.LAB	8/30/2016	7:14:45	0.2	0.6	0.3	3.4	1.0	190.3	1.006
PEC-BH_000453.LAB	8/30/2016	7:15:00	0.2	0.6	0.3	3.4	0.9	190.3	1.007
PEC-BH_000513.LAB	8/30/2016	7:30:02	0.3	0.6	0.3	2.6	0.1	190.3	1.006
PEC-BH_000514.LAB	8/30/2016	7:30:17	0.2	0.6	0.3	2.8	0.1	190.3	1.005
PEC-BH_000515.LAB	8/30/2016	7:30:32	0.4	0.6	0.3	3.1	0.1	190.3	1.005
PEC-BH_000516.LAB	8/30/2016	7:30:47	0.2	0.6	0.3	3.1	0.1	190.3	1.004
PEC-BH_000517.LAB	8/30/2016	7:31:02	0.2	0.6	0.3	3.4	0.9	190.3	1.004
PEC-BH_000518.LAB	8/30/2016	7:31:17	0.3	0.6	0.3	3.5	1.2	190.3	1.004
PEC-BH_000519.LAB	8/30/2016	7:31:32	0.3	0.6	0.3	3.4	1.2	190.3	1.004
PEC-BH_000520.LAB	8/30/2016	7:31:47	0.3	0.6	0.3	3.4	1.2	190.3	1.005
PEC-BH_000565.LAB	8/30/2016	7:43:03	0.4	< 0.6	< 0.3	3.0	< 0.1	190.3	1.006
PEC-BH_000566.LAB	8/30/2016	7:43:18	0.4	< 0.6	< 0.3	3.0	< 0.1	190.2	1.002
PEC-BH_000567.LAB	8/30/2016	7:43:33	0.3	< 0.6	< 0.3	3.2	0.6	190.3	1.001
PEC-BH_000568.LAB	8/30/2016	7:43:48	0.4	< 0.6	< 0.3	3.4	1.2	190.3	1.003
PEC-BH_000569.LAB	8/30/2016	7:44:03	0.4	< 0.6	< 0.3	3.4	1.1	190.2	1.003
PEC-BH_000570.LAB	8/30/2016	7:44:18	0.5	< 0.6	< 0.3	3.4	1.1	190.3	1.003
PEC-BH_000571.LAB	8/30/2016	7:44:33	0.5	< 0.6	< 0.3	3.4	1.1	190.3	1.004
PEC-BH_000572.LAB	8/30/2016	7:44:48	0.7	< 0.6	< 0.3	3.4	1.1	190.3	1.004
PEC-BH_000613.LAB	8/30/2016	7:55:04	0.5	0.7	< 0.3	3.5	1.2	190.3	1.006
PEC-BH_000614.LAB	8/30/2016	7:55:19	0.7	< 0.6	< 0.3	3.5	1.1	190.4	1.006
PEC-BH_000615.LAB	8/30/2016	7:55:34	1.0	< 0.6	< 0.3	3.4	1.1	190.3	1.006
PEC-BH_000616.LAB	8/30/2016	7:55:49	1.3	< 0.6	< 0.3	3.5	1.1	190.3	1.002
PEC-BH_000617.LAB	8/30/2016	7:56:04	1.4	< 0.6	< 0.3	3.4	1.0	190.3	1.005
PEC-BH_000618.LAB	8/30/2016	7:56:19	1.5	< 0.6	< 0.3	3.4	1.0	190.3	1.006
PEC-BH_000619.LAB	8/30/2016	7:56:34	1.5	< 0.6	< 0.3	3.4	1.0	190.3	1.004
PEC-BH_000620.LAB	8/30/2016	7:56:49	1.6	< 0.6	< 0.3	3.4	1.0	190.3	1.002
PEC-BH_000740.LAB	8/30/2016	8:26:52	0.8	< 0.6	< 0.3	3.7	1.3	190.3	1.003
PEC-BH_000741.LAB	8/30/2016	8:27:07	1.2	< 0.6	< 0.3	3.7	1.2	190.3	1.002
PEC-BH_000742.LAB	8/30/2016	8:27:22	1.4	< 0.6	< 0.3	3.7	1.2	190.3	1.002
PEC-BH_000743.LAB	8/30/2016	8:27:37	1.8	< 0.6	< 0.3	3.6	1.2	190.3	1.002
PEC-BH_000744.LAB	8/30/2016	8:27:52	1.6	< 0.6	0.3	3.6	1.1	190.3	1.005
PEC-BH_000801.LAB	8/30/2016	8:42:09	0.5	< 0.6	< 0.3	3.2	< 0.1	190.3	1.005
PEC-BH_000802.LAB	8/30/2016	8:42:24	0.5	< 0.6	0.3	3.2	< 0.1	190.3	1.005
PEC-BH_000803.LAB	8/30/2016	8:42:39	0.4	< 0.6	< 0.3	3.4	0.4	190.3	1.003
PEC-BH_000804.LAB	8/30/2016	8:42:54	0.5	< 0.6	0.4	3.8	1.2	190.2	1.004
PEC-BH_000805.LAB	8/30/2016	8:43:09	0.6	< 0.6	< 0.3	3.8	1.2	190.3	1.008
PEC-BH_000806.LAB	8/30/2016	8:43:24	0.7	< 0.6	< 0.3	3.7	1.2	190.3	1.005
PEC-BH_000807.LAB	8/30/2016	8:43:39	0.7	< 0.6	0.4	3.7	1.2	190.3	1.005
PEC-BH_000808.LAB	8/30/2016	8:43:54	1.0	< 0.6	0.3	3.7	1.1	190.3	1.004
PEC-BH_000845.LAB	8/30/2016	8:53:10	0.4	< 0.6	< 0.3	3.1	< 0.1	190.3	1.003
PEC-BH_000846.LAB	8/30/2016	8:53:25	0.4	< 0.6	< 0.3	3.3	< 0.1	190.3	1.002
PEC-BH_000847.LAB	8/30/2016	8:53:40	0.5	< 0.6	0.3	3.3	0.1	190.3	1.000
PEC-BH_000848.LAB	8/30/2016	8:53:55	0.5	< 0.6	< 0.3	3.7	0.9	190.3	1.003
PEC-BH_000849.LAB	8/30/2016	8:54:10	0.5	< 0.6	0.4	3.8	1.2	190.3	1.003
PEC-BH_000850.LAB	8/30/2016	8:54:25	0.5	< 0.6	0.3	3.8	1.2	190.3	1.003
PEC-BH_000851.LAB	8/30/2016	8:54:40	0.6	< 0.6	< 0.3	3.8	1.2	190.3	1.004
PEC-BH_000852.LAB	8/30/2016	8:54:55	0.9	< 0.6	0.3	3.8	1.1	190.3	1.003

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PEC-BH Run 1

Spectrum	Date	Time	HCl (ppmv wet)	HCN (ppmv wet)	HF (ppmv wet)	H2O (%v)	CO2 (%v wet)	FTIR Gas Cell Temp (C)	Pressure (Atm)
PEC-BH_000893.LAB	8/30/2016	9:05:11	0.4	1.4	0.3	3.7	0.7	190.3	1.003
PEC-BH_000894.LAB	8/30/2016	9:05:27	0.4	0.8	0.4	4.0	1.3	190.3	1.003
PEC-BH_000895.LAB	8/30/2016	9:05:41	0.8	< 0.6	< 0.3	4.0	1.2	190.3	1.004
PEC-BH_000896.LAB	8/30/2016	9:05:56	1.0	< 0.6	0.4	3.9	1.2	190.3	1.005
PEC-BH_000897.LAB	8/30/2016	9:06:12	1.3	< 0.6	0.3	3.9	1.1	190.3	1.004
PEC-BH_000898.LAB	8/30/2016	9:06:26	1.4	< 0.6	0.4	3.8	1.1	190.3	1.003
PEC-BH_000899.LAB	8/30/2016	9:06:42	1.4	< 0.6	0.4	3.8	1.1	190.3	1.002
PEC-BH_000900.LAB	8/30/2016	9:06:57	1.4	< 0.6	0.4	3.8	1.1	190.3	1.002
PEC-BH_001009.LAB	8/30/2016	9:34:14	< 0.2	< 0.6	< 0.3	3.2	0.3	190.3	1.002
PEC-BH_001010.LAB	8/30/2016	9:34:30	0.2	0.8	< 0.3	3.6	1.2	190.3	1.003
PEC-BH_001011.LAB	8/30/2016	9:34:44	< 0.2	< 0.6	< 0.3	3.5	1.1	190.3	1.005
PEC-BH_001012.LAB	8/30/2016	9:35:00	0.2	< 0.6	< 0.3	3.5	1.1	190.3	1.005
PEC-BH_001013.LAB	8/30/2016	9:35:15	0.3	< 0.6	< 0.3	3.5	1.0	190.3	1.004
PEC-BH_001014.LAB	8/30/2016	9:35:30	0.5	< 0.6	< 0.3	3.5	1.0	190.3	1.004
PEC-BH_001015.LAB	8/30/2016	9:35:45	0.5	< 0.6	< 0.3	3.4	0.9	190.3	1.003
PEC-BH_001016.LAB	8/30/2016	9:36:00	0.6	< 0.6	< 0.3	3.4	0.9	190.3	1.004
PEC-BH_001048.LAB	8/30/2016	9:44:00	0.4	< 0.6	< 0.3	3.7	< 0.1	190.3	1.004
PEC-BH_001049.LAB	8/30/2016	9:44:15	0.3	< 0.6	< 0.3	3.6	< 0.1	190.3	1.004
PEC-BH_001050.LAB	8/30/2016	9:44:31	0.4	< 0.6	< 0.3	3.8	0.6	190.3	1.004
PEC-BH_001051.LAB	8/30/2016	9:44:46	0.3	< 0.6	0.3	4.0	1.2	190.3	1.002
PEC-BH_001052.LAB	8/30/2016	9:45:01	0.4	< 0.6	< 0.3	4.0	1.1	190.3	1.003
PEC-BH_001053.LAB	8/30/2016	9:45:16	0.3	< 0.6	< 0.3	4.0	1.1	190.3	1.004
PEC-BH_001054.LAB	8/30/2016	9:45:31	0.6	< 0.6	< 0.3	4.0	1.1	190.3	1.004
PEC-BH_001055.LAB	8/30/2016	9:45:46	0.6	< 0.6	0.3	4.0	1.0	190.3	1.003
PEC-BH_001120.LAB	8/30/2016	10:02:02	0.4	< 0.6	< 0.3	2.8	< 0.1	190.3	1.005
PEC-BH_001121.LAB	8/30/2016	10:02:17	0.3	< 0.6	< 0.3	2.9	< 0.1	190.3	1.006
PEC-BH_001122.LAB	8/30/2016	10:02:32	0.2	< 0.6	< 0.3	3.1	0.5	190.2	1.003
PEC-BH_001123.LAB	8/30/2016	10:02:47	0.3	< 0.6	< 0.3	3.4	1.2	190.3	1.004
PEC-BH_001124.LAB	8/30/2016	10:03:02	< 0.2	< 0.6	< 0.3	3.4	1.2	190.3	1.003
PEC-BH_001125.LAB	8/30/2016	10:03:17	0.3	< 0.6	< 0.3	3.3	1.2	190.3	1.003
PEC-BH_001126.LAB	8/30/2016	10:03:32	0.5	< 0.6	< 0.3	3.3	1.2	190.3	1.004
PEC-BH_001127.LAB	8/30/2016	10:03:47	0.6	< 0.6	< 0.3	3.3	1.2	190.3	1.001
PEC-BH_001164.LAB	8/30/2016	10:13:03	0.5	< 0.6	< 0.3	2.8	< 0.1	190.2	1.004
PEC-BH_001165.LAB	8/30/2016	10:13:18	0.4	< 0.6	< 0.3	3.1	< 0.1	190.2	1.003
PEC-BH_001166.LAB	8/30/2016	10:13:33	0.5	< 0.6	< 0.3	3.1	< 0.1	190.3	1.003
PEC-BH_001167.LAB	8/30/2016	10:13:49	0.4	< 0.6	< 0.3	3.4	0.8	190.3	1.001
PEC-BH_001168.LAB	8/30/2016	10:14:04	0.4	< 0.6	0.4	3.6	1.2	190.3	1.003
PEC-BH_001169.LAB	8/30/2016	10:14:19	0.5	< 0.6	0.3	3.6	1.1	190.3	1.004
PEC-BH_001170.LAB	8/30/2016	10:14:34	0.6	< 0.6	0.3	3.5	1.1	190.3	1.002
PEC-BH_001171.LAB	8/30/2016	10:14:49	0.7	< 0.6	< 0.3	3.5	1.1	190.2	1.005
PEC-BH_001216.LAB	8/30/2016	10:26:05	0.4	< 0.6	< 0.3	3.0	< 0.1	190.2	1.004
PEC-BH_001217.LAB	8/30/2016	10:26:20	0.3	< 0.6	0.3	3.1	< 0.1	190.2	1.001
PEC-BH_001218.LAB	8/30/2016	10:26:35	0.5	< 0.6	< 0.3	3.1	0.1	190.2	1.002
PEC-BH_001219.LAB	8/30/2016	10:26:50	0.4	0.8	< 0.3	3.6	0.9	190.2	1.005
PEC-BH_001220.LAB	8/30/2016	10:27:05	0.6	< 0.6	0.3	3.6	1.3	190.2	1.003
PEC-BH_001221.LAB	8/30/2016	10:27:20	0.8	< 0.6	< 0.3	3.6	1.2	190.2	1.004
PEC-BH_001222.LAB	8/30/2016	10:27:35	1.1	< 0.6	0.3	3.5	1.2	190.3	1.005
PEC-BH_001223.LAB	8/30/2016	10:27:50	1.3	< 0.6	< 0.3	3.5	1.2	190.3	1.007

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Spectrum	Date	Time	HCl (ppmv wet)	HCN (ppmv wet)	HF (ppmv wet)	H2O (%v)	CO2 (%v wet)	FTIR Gas Cell Temp (C)	Pressure (Atm)
PEC-BH_001260.LAB	8/30/2016	10:37:06	0.5	< 0.6	0.4	3.1	< 0.1	190.3	1.005
PEC-BH_001261.LAB	8/30/2016	10:37:21	0.5	< 0.6	< 0.3	3.1	< 0.1	190.3	1.003
PEC-BH_001262.LAB	8/30/2016	10:37:36	0.4	< 0.6	0.4	3.4	0.8	190.3	1.005
PEC-BH_001263.LAB	8/30/2016	10:37:51	0.5	< 0.6	0.3	3.6	1.3	190.3	1.002
PEC-BH_001264.LAB	8/30/2016	10:38:06	1.0	< 0.6	0.4	3.5	1.2	190.3	1.002
PEC-BH_001265.LAB	8/30/2016	10:38:21	1.2	< 0.6	0.4	3.5	1.2	190.3	1.006
PEC-BH_001266.LAB	8/30/2016	10:38:36	1.3	< 0.6	0.4	3.5	1.2	190.3	1.001
PEC-BH_001267.LAB	8/30/2016	10:38:51	1.5	< 0.6	0.5	3.5	1.2	190.3	1.002
PEC-BH_001408.LAB	8/30/2016	11:14:10	0.4	< 0.6	0.4	2.9	< 0.1	190.3	1.003
PEC-BH_001409.LAB	8/30/2016	11:14:25	0.3	< 0.6	0.4	3.2	< 0.1	190.3	1.003
PEC-BH_001410.LAB	8/30/2016	11:14:40	0.3	< 0.6	0.4	3.2	0.3	190.4	1.003
PEC-BH_001411.LAB	8/30/2016	11:14:55	0.4	< 0.6	0.4	3.6	1.1	190.3	1.000
PEC-BH_001412.LAB	8/30/2016	11:15:10	0.5	< 0.6	0.3	3.6	1.1	190.3	1.004
PEC-BH_001413.LAB	8/30/2016	11:15:25	0.6	< 0.6	0.4	3.5	1.1	190.3	1.006
PEC-BH_001414.LAB	8/30/2016	11:15:40	0.8	< 0.6	0.4	3.5	1.1	190.3	1.004
PEC-BH_001415.LAB	8/30/2016	11:15:55	0.9	< 0.6	0.4	3.5	1.1	190.3	1.002
PEC-BH_001476.LAB	8/30/2016	11:31:12	0.4	< 0.6	0.4	2.9	< 0.1	190.2	1.003
PEC-BH_001477.LAB	8/30/2016	11:31:27	0.2	< 0.6	< 0.3	2.9	< 0.1	190.2	1.002
PEC-BH_001478.LAB	8/30/2016	11:31:42	0.3	< 0.6	0.4	2.9	< 0.1	190.3	1.006
PEC-BH_001479.LAB	8/30/2016	11:31:57	0.3	< 0.6	< 0.3	3.0	< 0.1	190.3	1.003
PEC-BH_001480.LAB	8/30/2016	11:32:12	0.3	< 0.6	0.3	3.0	< 0.1	190.2	1.003
PEC-BH_001481.LAB	8/30/2016	11:32:27	< 0.2	< 0.6	< 0.3	3.1	0.4	190.2	1.004
PEC-BH_001482.LAB	8/30/2016	11:32:42	< 0.2	< 0.6	< 0.3	3.5	1.2	190.3	1.002
PEC-BH_001483.LAB	8/30/2016	11:32:57	0.3	< 0.6	0.4	3.4	1.1	190.2	1.004
PEC-BH_001524.LAB	8/30/2016	11:43:13	0.2	< 0.6	< 0.3	3.0	< 0.1	190.3	1.003
PEC-BH_001525.LAB	8/30/2016	11:43:28	0.3	< 0.6	0.3	3.0	< 0.1	190.3	1.002
PEC-BH_001526.LAB	8/30/2016	11:43:43	< 0.2	< 0.6	< 0.3	3.0	< 0.1	190.3	1.002
PEC-BH_001527.LAB	8/30/2016	11:43:58	0.3	< 0.6	0.4	3.2	< 0.1	190.3	1.000
PEC-BH_001528.LAB	8/30/2016	11:44:13	< 0.2	< 0.6	0.4	3.5	< 0.1	190.2	1.000
PEC-BH_001529.LAB	8/30/2016	11:44:28	0.3	< 0.6	0.3	3.6	< 0.1	190.2	1.003
PEC-BH_001530.LAB	8/30/2016	11:44:43	0.3	0.6	0.3	3.9	0.8	190.2	1.004
PEC-BH_001531.LAB	8/30/2016	11:44:58	0.3	0.7	0.5	4.1	1.2	190.3	1.003
PEC-BH_001595.LAB	8/30/2016	12:01:00	0.2	< 0.6	< 0.3	3.1	< 0.1	190.2	1.001
PEC-BH_001596.LAB	8/30/2016	12:01:15	0.3	< 0.6	0.3	3.1	< 0.1	190.2	1.003
PEC-BH_001597.LAB	8/30/2016	12:01:30	0.4	< 0.6	0.3	3.2	0.3	190.2	1.005
PEC-BH_001598.LAB	8/30/2016	12:01:45	0.3	< 0.6	< 0.3	3.6	1.1	190.2	1.003
PEC-BH_001599.LAB	8/30/2016	12:02:00	< 0.2	< 0.6	0.3	3.6	1.2	190.2	1.004
PEC-BH_001600.LAB	8/30/2016	12:02:15	0.2	< 0.6	< 0.3	3.7	1.1	190.2	1.002
PEC-BH_001601.LAB	8/30/2016	12:02:30	0.4	< 0.6	< 0.3	3.6	1.0	190.2	1.004
PEC-BH_001602.LAB	8/30/2016	12:02:45	0.7	< 0.6	0.3	3.5	1.0	190.2	1.004
PEC-BH_001603.LAB	8/30/2016	12:03:00	0.7	< 0.6	< 0.3	3.5	1.0	190.2	1.004
PEC-BH_001631.LAB	8/30/2016	12:10:01	0.3	< 0.6	< 0.3	2.8	< 0.1	190.3	1.002
PEC-BH_001632.LAB	8/30/2016	12:10:16	0.4	< 0.6	< 0.3	2.9	< 0.1	190.3	1.004
PEC-BH_001633.LAB	8/30/2016	12:10:31	0.5	< 0.6	0.4	3.5	< 0.1	190.2	1.002
PEC-BH_001634.LAB	8/30/2016	12:10:46	0.4	< 0.6	0.4	3.6	< 0.1	190.3	1.002
PEC-BH_001635.LAB	8/30/2016	12:11:01	0.3	< 0.6	0.4	3.6	< 0.1	190.2	1.001
PEC-BH_001636.LAB	8/30/2016	12:11:16	0.5	< 0.6	< 0.3	3.7	0.4	190.3	1.001
PEC-BH_001637.LAB	8/30/2016	12:11:31	0.4	< 0.6	0.4	3.9	1.2	190.3	1.002
PEC-BH_001638.LAB	8/30/2016	12:11:46	0.6	< 0.6	0.3	3.9	1.2	190.2	1.003
PEC-BH_001675.LAB	8/30/2016	12:21:02	0.4	< 0.6	0.4	3.3	< 0.1	190.2	1.003
PEC-BH_001676.LAB	8/30/2016	12:21:17	0.4	< 0.6	< 0.3	3.3	0.2	190.2	1.003
PEC-BH_001677.LAB	8/30/2016	12:21:32	0.3	< 0.6	< 0.3	3.7	1.0	190.2	1.000
PEC-BH_001678.LAB	8/30/2016	12:21:47	0.6	< 0.6	0.3	3.7	1.3	190.2	1.002
PEC-BH_001679.LAB	8/30/2016	12:22:02	0.7	< 0.6	0.3	3.7	1.2	190.2	1.001
PEC-BH_001680.LAB	8/30/2016	12:22:17	1.0	< 0.6	0.4	3.7	1.0	190.2	1.001
PEC-BH_001681.LAB	8/30/2016	12:22:32	1.1	< 0.6	0.4	3.6	1.0	190.2	1.003
PEC-BH_001682.LAB	8/30/2016	12:22:47	1.1	< 0.6	0.3	3.6	1.0	190.2	1.002
PEC-BH_001715.LAB	8/30/2016	12:31:03	0.3	< 0.6	< 0.3	2.8	< 0.1	190.2	1.001
PEC-BH_001716.LAB	8/30/2016	12:31:18	0.4	< 0.6	< 0.3	2.8	< 0.1	190.3	1.001
PEC-BH_001717.LAB	8/30/2016	12:31:33	0.5	< 0.6	0.4	3.0	< 0.1	190.2	1.001
PEC-BH_001718.LAB	8/30/2016	12:31:48	0.4	< 0.6	0.3	3.3	< 0.1	190.2	1.005
PEC-BH_001719.LAB	8/30/2016	12:32:03	0.5	< 0.6	0.3	3.3	0.2	190.2	1.002

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PEC-BH Run 1

Spectrum	Date	Time	HCl (ppmv wet)	HCN (ppmv wet)	HF (ppmv wet)	H2O (%v)	CO2 (%v wet)	FTIR Gas Cell Temp (C)	Pressure (Atm)
PEC-BH_001720.LAB	8/30/2016	12:32:18	0.4	< 0.6	0.4	3.7	1.1	190.3	1.000
PEC-BH_001721.LAB	8/30/2016	12:32:33	0.6	< 0.6	0.3	3.8	1.2	190.2	1.000
PEC-BH_001722.LAB	8/30/2016	12:32:48	0.9	< 0.6	0.5	3.8	1.2	190.2	1.000
PEC-BH_001815.LAB	8/30/2016	12:56:06	0.5	< 0.6	0.5	2.9	< 0.1	190.3	1.001
PEC-BH_001816.LAB	8/30/2016	12:56:21	0.3	< 0.6	< 0.3	2.9	< 0.1	190.3	1.002
PEC-BH_001817.LAB	8/30/2016	12:56:36	0.4	< 0.6	0.5	3.0	< 0.1	190.3	1.002
PEC-BH_001818.LAB	8/30/2016	12:56:51	0.4	< 0.6	0.6	3.1	< 0.1	190.3	1.002
PEC-BH_001819.LAB	8/30/2016	12:57:06	0.3	< 0.6	0.6	3.2	0.3	190.3	0.999
PEC-BH_001820.LAB	8/30/2016	12:57:21	0.4	0.6	0.4	3.6	1.2	190.3	1.002
PEC-BH_001821.LAB	8/30/2016	12:57:36	0.7	0.6	0.4	3.7	1.2	190.3	1.002
PEC-BH_001822.LAB	8/30/2016	12:57:51	1.1	< 0.6	0.5	3.6	1.1	190.3	1.002
PEC-BH_001859.LAB	8/30/2016	13:07:07	0.5	< 0.6	0.6	3.3	< 0.1	190.3	1.002
PEC-BH_001860.LAB	8/30/2016	13:07:22	0.4	< 0.6	0.4	3.2	< 0.1	190.3	1.000
PEC-BH_001861.LAB	8/30/2016	13:07:37	0.5	1.0	0.6	3.7	0.9	190.3	1.002
PEC-BH_001862.LAB	8/30/2016	13:07:52	0.6	< 0.6	0.6	3.8	1.2	190.4	1.001
PEC-BH_001863.LAB	8/30/2016	13:08:07	1.0	< 0.6	0.6	3.8	1.1	190.3	1.001
PEC-BH_001864.LAB	8/30/2016	13:08:22	1.2	< 0.6	0.6	3.7	1.1	190.4	1.001
PEC-BH_001865.LAB	8/30/2016	13:08:37	1.2	< 0.6	0.5	3.7	1.1	190.3	1.000
PEC-BH_001866.LAB	8/30/2016	13:08:52	1.4	< 0.6	0.6	3.7	1.1	190.3	0.998
PEC-BH_001907.LAB	8/30/2016	13:19:08	0.4	< 0.6	0.4	3.2	< 0.1	190.4	1.003
PEC-BH_001908.LAB	8/30/2016	13:19:23	0.4	< 0.6	0.4	3.2	0.3	190.4	1.004
PEC-BH_001909.LAB	8/30/2016	13:19:38	0.3	< 0.6	0.3	3.6	1.1	190.4	1.003
PEC-BH_001910.LAB	8/30/2016	13:19:53	0.5	< 0.6	0.3	3.7	1.2	190.4	1.001
PEC-BH_001911.LAB	8/30/2016	13:20:08	0.7	< 0.6	0.3	3.7	1.2	190.5	1.001
PEC-BH_001912.LAB	8/30/2016	13:20:23	0.8	< 0.6	0.6	3.7	1.2	190.4	0.999
PEC-BH_001913.LAB	8/30/2016	13:20:38	1.0	< 0.6	0.6	3.6	1.1	190.4	1.001
PEC-BH_001914.LAB	8/30/2016	13:20:54	1.1	< 0.6	0.6	3.6	1.1	190.3	1.000
PEC-BH_001971.LAB	8/30/2016	13:35:10	0.3	< 0.6	0.4	3.1	0.3	190.4	1.003
PEC-BH_001972.LAB	8/30/2016	13:35:25	< 0.2	< 0.6	0.3	3.5	1.2	190.4	1.000
PEC-BH_001973.LAB	8/30/2016	13:35:40	0.4	< 0.6	0.4	3.5	1.2	190.4	1.001
PEC-BH_001974.LAB	8/30/2016	13:35:55	0.7	< 0.6	0.4	3.5	1.1	190.4	0.998
PEC-BH_001975.LAB	8/30/2016	13:36:10	1.0	< 0.6	0.3	3.4	1.1	190.4	1.001
PEC-BH_001976.LAB	8/30/2016	13:36:25	1.0	< 0.6	0.4	3.4	1.1	190.5	1.000
PEC-BH_001977.LAB	8/30/2016	13:36:40	1.2	< 0.6	0.5	3.4	1.1	190.5	1.002
PEC-BH_001978.LAB	8/30/2016	13:36:55	1.1	< 0.6	0.5	3.4	1.1	190.4	1.002
PEC-BH_002011.LAB	8/30/2016	13:45:11	0.4	< 0.6	0.4	3.9	< 0.1	190.4	1.000
PEC-BH_002012.LAB	8/30/2016	13:45:27	0.4	< 0.6	0.4	3.8	0.1	190.5	0.999
PEC-BH_002013.LAB	8/30/2016	13:45:41	0.4	< 0.6	0.5	4.1	0.9	190.4	1.001
PEC-BH_002014.LAB	8/30/2016	13:45:56	0.5	< 0.6	0.4	4.2	1.3	190.4	1.000
PEC-BH_002015.LAB	8/30/2016	13:46:11	1.1	< 0.6	0.6	4.3	1.2	190.4	1.000
PEC-BH_002016.LAB	8/30/2016	13:46:26	1.5	< 0.6	0.4	4.1	1.1	190.4	1.003
PEC-BH_002017.LAB	8/30/2016	13:46:41	1.7	< 0.6	0.5	4.0	1.1	190.4	1.003
PEC-BH_002018.LAB	8/30/2016	13:46:56	1.8	< 0.6	0.6	4.0	1.1	190.4	1.000
PEC-BH_002055.LAB	8/30/2016	13:56:12	0.5	< 0.6	0.4	3.1	< 0.1	190.4	1.002
PEC-BH_002056.LAB	8/30/2016	13:56:27	0.4	< 0.6	0.5	3.0	< 0.1	190.3	1.001
PEC-BH_002057.LAB	8/30/2016	13:56:43	0.5	< 0.6	0.5	3.3	< 0.1	190.4	0.999
PEC-BH_002058.LAB	8/30/2016	13:56:57	0.5	< 0.6	0.4	3.4	< 0.1	190.4	0.999
PEC-BH_002059.LAB	8/30/2016	13:57:12	0.5	1.3	0.4	3.9	0.7	190.4	1.001
PEC-BH_002060.LAB	8/30/2016	13:57:28	0.9	< 0.6	0.6	4.0	1.2	190.4	1.003
PEC-BH_002061.LAB	8/30/2016	13:57:43	1.8	< 0.6	0.5	4.0	1.2	190.4	0.999
PEC-BH_002062.LAB	8/30/2016	13:57:58	1.9	< 0.6	0.6	3.8	0.9	190.3	1.000
PEC-BH_002103.LAB	8/30/2016	14:08:14	0.3	< 0.6	0.4	2.9	< 0.1	190.3	1.003
PEC-BH_002104.LAB	8/30/2016	14:08:29	0.3	< 0.6	0.4	2.9	< 0.1	190.4	1.000
PEC-BH_002105.LAB	8/30/2016	14:08:44	0.5	< 0.6	0.4	3.2	< 0.1	190.3	1.000
PEC-BH_002106.LAB	8/30/2016	14:08:59	0.2	< 0.6	0.3	3.4	< 0.1	190.4	1.002
PEC-BH_002107.LAB	8/30/2016	14:09:14	0.3	< 0.6	0.4	3.4	0.2	190.3	1.000
PEC-BH_002108.LAB	8/30/2016	14:09:29	0.4	0.6	0.5	3.7	1.0	190.3	1.000
PEC-BH_002109.LAB	8/30/2016	14:09:44	0.7	< 0.6	0.5	3.8	1.3	190.4	0.999
PEC-BH_002110.LAB	8/30/2016	14:09:59	1.2	< 0.6	0.5	3.7	1.1	190.4	0.999
PEC-BH_002190.LAB	8/30/2016	14:30:01	0.3	< 0.6	< 0.3	2.7	< 0.1	190.3	0.998

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PEC-BH Run 1

Spectrum	Date	Time	HCl (ppmv wet)	HCN (ppmv wet)	HF (ppmv wet)	H2O (%v)	CO2 (%v wet)	FTIR Gas Cell Temp (C)	Pressure (Atm)
PEC-BH_002191.LAB	8/30/2016	14:30:16	0.2	< 0.6	< 0.3	2.8	< 0.1	190.4	1.000
PEC-BH_002192.LAB	8/30/2016	14:30:31	< 0.2	< 0.6	0.5	3.0	< 0.1	190.3	1.002
PEC-BH_002193.LAB	8/30/2016	14:30:46	0.2	< 0.6	< 0.3	3.1	0.3	190.3	0.997
PEC-BH_002194.LAB	8/30/2016	14:31:01	0.3	< 0.6	0.5	3.6	1.1	190.3	0.999
PEC-BH_002195.LAB	8/30/2016	14:31:16	0.7	1.0	0.4	3.8	1.3	190.3	0.998
PEC-BH_002196.LAB	8/30/2016	14:31:31	1.3	< 0.6	0.5	3.7	1.2	190.3	0.998
PEC-BH_002197.LAB	8/30/2016	14:31:46	1.7	< 0.6	0.4	3.7	1.1	190.2	1.001
PEC-BH_002234.LAB	8/30/2016	14:41:02	0.3	< 0.6	0.5	2.8	< 0.1	190.4	1.000
PEC-BH_002235.LAB	8/30/2016	14:41:17	0.4	< 0.6	0.5	3.1	< 0.1	190.3	1.001
PEC-BH_002236.LAB	8/30/2016	14:41:32	0.4	< 0.6	0.4	3.1	0.3	190.3	0.997
PEC-BH_002237.LAB	8/30/2016	14:41:47	0.3	0.7	0.5	3.5	1.1	190.3	0.997
PEC-BH_002238.LAB	8/30/2016	14:42:03	0.7	< 0.6	0.4	3.5	1.2	190.3	0.998
PEC-BH_002239.LAB	8/30/2016	14:42:18	0.9	< 0.6	0.5	3.5	1.1	190.3	0.998
PEC-BH_002240.LAB	8/30/2016	14:42:33	1.2	< 0.6	0.6	3.5	1.0	190.3	0.998
PEC-BH_002241.LAB	8/30/2016	14:42:48	1.2	< 0.6	0.5	3.5	1.0	190.3	1.001
PEC-BH_002282.LAB	8/30/2016	14:53:04	0.5	< 0.6	0.3	2.7	< 0.1	190.4	0.999
PEC-BH_002283.LAB	8/30/2016	14:53:19	0.2	< 0.6	0.4	2.7	< 0.1	190.3	1.000
PEC-BH_002284.LAB	8/30/2016	14:53:34	0.3	< 0.6	0.6	3.0	< 0.1	190.3	0.999
PEC-BH_002285.LAB	8/30/2016	14:53:49	0.2	< 0.6	0.4	3.1	< 0.1	190.3	1.001
PEC-BH_002286.LAB	8/30/2016	14:54:04	0.3	< 0.6	0.4	3.2	0.4	190.3	0.998
PEC-BH_002287.LAB	8/30/2016	14:54:19	0.4	< 0.6	0.4	3.7	1.3	190.3	0.999
PEC-BH_002288.LAB	8/30/2016	14:54:34	1.1	0.6	0.7	3.8	1.3	190.3	1.001
PEC-BH_002289.LAB	8/30/2016	14:54:49	1.5	< 0.6	0.4	3.7	1.2	190.3	0.998
PEC-BH_002338.LAB	8/30/2016	15:07:05	0.3	< 0.6	0.4	3.0	< 0.1	190.3	1.000
PEC-BH_002339.LAB	8/30/2016	15:07:20	0.3	< 0.6	0.3	3.1	0.4	190.4	0.998
PEC-BH_002340.LAB	8/30/2016	15:07:35	0.4	0.6	0.4	3.6	1.2	190.3	0.999
PEC-BH_002341.LAB	8/30/2016	15:07:50	0.8	< 0.6	0.4	3.6	1.2	190.3	0.998
PEC-BH_002342.LAB	8/30/2016	15:08:05	1.1	< 0.6	0.7	3.6	1.2	190.3	0.999
PEC-BH_002343.LAB	8/30/2016	15:08:21	1.3	< 0.6	0.7	3.6	1.2	190.3	0.999
PEC-BH_002344.LAB	8/30/2016	15:08:36	1.6	< 0.6	0.6	3.5	1.2	190.3	0.999
PEC-BH_002345.LAB	8/30/2016	15:08:51	1.3	< 0.6	0.6	3.5	1.1	190.3	0.998
PEC-BH_002378.LAB	8/30/2016	15:17:06	0.5	< 0.6	0.5	2.7	< 0.1	190.3	1.000
PEC-BH_002379.LAB	8/30/2016	15:17:22	0.4	< 0.6	0.5	3.0	< 0.1	190.3	1.000
PEC-BH_002380.LAB	8/30/2016	15:17:37	0.5	< 0.6	0.5	3.5	< 0.1	190.3	0.996
PEC-BH_002381.LAB	8/30/2016	15:17:52	0.5	< 0.6	0.6	3.6	< 0.1	190.3	0.996
PEC-BH_002382.LAB	8/30/2016	15:18:07	0.3	< 0.6	0.4	3.8	0.5	190.3	0.999
PEC-BH_002383.LAB	8/30/2016	15:18:22	0.5	< 0.6	0.4	3.9	1.3	190.4	1.000
PEC-BH_002384.LAB	8/30/2016	15:18:37	0.8	< 0.6	0.6	3.8	1.2	190.3	0.998
PEC-BH_002385.LAB	8/30/2016	15:18:52	1.2	< 0.6	0.6	3.7	1.1	190.3	0.996
PEC-BH_002422.LAB	8/30/2016	15:28:08	0.6	< 0.6	0.7	4.1	0.3	190.3	0.996
PEC-BH_002423.LAB	8/30/2016	15:28:23	0.5	0.7	0.8	4.4	1.2	190.3	0.998
PEC-BH_002424.LAB	8/30/2016	15:28:38	0.6	< 0.6	0.6	4.3	1.2	190.3	0.996
PEC-BH_002425.LAB	8/30/2016	15:28:53	1.0	< 0.6	0.7	4.3	1.2	190.3	0.997
PEC-BH_002426.LAB	8/30/2016	15:29:08	1.1	< 0.6	0.8	4.2	1.2	190.3	1.000
PEC-BH_002427.LAB	8/30/2016	15:29:23	1.1	< 0.6	0.9	4.0	1.2	190.3	1.000
PEC-BH_002428.LAB	8/30/2016	15:29:38	1.3	< 0.6	0.7	4.0	1.2	190.3	0.999
PEC-BH_002429.LAB	8/30/2016	15:29:53	1.0	< 0.6	0.8	4.0	1.1	190.3	0.999

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PEC-BH Run 1

Spectrum	Date	Time	HCl (ppmv wet)	HCN (ppmv wet)	HF (ppmv wet)	H2O (%v)	CO2 (%v wet)	FTIR Gas Cell Temp (C)	Pressure (Atm)
PEC-BH_002562.LAB	8/30/2016	16:03:12	< 0.2	< 0.6	0.6	2.7	< 0.1	190.4	0.998
PEC-BH_002563.LAB	8/30/2016	16:03:27	< 0.2	< 0.6	0.5	3.0	< 0.1	190.4	0.998
PEC-BH_002564.LAB	8/30/2016	16:03:42	0.4	< 0.6	0.5	3.3	< 0.1	190.4	0.997
PEC-BH_002565.LAB	8/30/2016	16:03:57	0.3	< 0.6	0.8	3.5	0.3	190.4	0.999
PEC-BH_002566.LAB	8/30/2016	16:04:12	0.3	1.2	0.7	3.8	1.2	190.4	0.998
PEC-BH_002567.LAB	8/30/2016	16:04:27	0.6	< 0.6	0.8	3.8	1.2	190.4	0.999
PEC-BH_002568.LAB	8/30/2016	16:04:42	0.6	< 0.6	0.7	3.8	1.1	190.4	0.995
PEC-BH_002569.LAB	8/30/2016	16:04:57	1.0	< 0.6	0.6	3.7	1.1	190.4	1.000
PEC-BH_002606.LAB	8/30/2016	16:14:13	0.4	0.9	0.6	3.2	0.2	190.4	0.996
PEC-BH_002607.LAB	8/30/2016	16:14:28	0.3	< 0.6	0.6	3.6	1.1	190.4	0.997
PEC-BH_002608.LAB	8/30/2016	16:14:43	0.7	< 0.6	0.7	3.6	1.2	190.4	0.999
PEC-BH_002609.LAB	8/30/2016	16:14:58	0.9	< 0.6	0.6	3.6	1.1	190.5	0.996
PEC-BH_002610.LAB	8/30/2016	16:15:13	1.1	< 0.6	0.3	3.6	1.1	190.4	0.998
PEC-BH_002611.LAB	8/30/2016	16:15:28	1.4	< 0.6	0.8	3.5	1.1	190.4	1.000
PEC-BH_002612.LAB	8/30/2016	16:15:43	1.0	< 0.6	0.6	3.5	1.1	190.4	0.998
PEC-BH_002613.LAB	8/30/2016	16:15:58	1.3	< 0.6	0.7	3.5	1.1	190.4	0.997
PEC-BH_002654.LAB	8/30/2016	16:26:14	0.2	< 0.6	0.3	2.7	< 0.1	190.4	0.999
PEC-BH_002655.LAB	8/30/2016	16:26:29	0.2	< 0.6	0.5	2.8	< 0.1	190.4	1.000
PEC-BH_002656.LAB	8/30/2016	16:26:44	0.4	< 0.6	0.5	3.0	< 0.1	190.4	0.997
PEC-BH_002657.LAB	8/30/2016	16:26:59	0.2	< 0.6	0.6	3.1	0.2	190.5	0.997
PEC-BH_002658.LAB	8/30/2016	16:27:14	0.3	< 0.6	0.7	3.5	1.1	190.4	0.997
PEC-BH_002659.LAB	8/30/2016	16:27:29	0.6	0.7	0.8	3.7	1.3	190.4	0.997
PEC-BH_002660.LAB	8/30/2016	16:27:44	1.1	< 0.6	0.7	3.4	0.8	190.4	0.997
PEC-BH_002661.LAB	8/30/2016	16:27:59	1.1	< 0.6	0.6	2.8	0.2	190.4	0.998
PEC-BH_002693.LAB	8/30/2016	16:36:00	0.2	< 0.6	0.4	2.7	< 0.1	190.4	1.000
PEC-BH_002694.LAB	8/30/2016	16:36:15	< 0.2	< 0.6	0.6	2.8	< 0.1	190.3	0.998
PEC-BH_002695.LAB	8/30/2016	16:36:30	0.4	< 0.6	0.4	3.2	< 0.1	190.4	1.000
PEC-BH_002696.LAB	8/30/2016	16:36:45	< 0.2	< 0.6	0.5	3.2	0.2	190.4	0.997
PEC-BH_002697.LAB	8/30/2016	16:37:00	0.3	0.7	0.6	3.8	1.1	190.4	1.000
PEC-BH_002698.LAB	8/30/2016	16:37:15	0.4	< 0.6	0.4	3.7	1.2	190.4	0.997
PEC-BH_002699.LAB	8/30/2016	16:37:30	1.1	0.6	0.6	3.7	1.1	190.4	0.997
PEC-BH_002700.LAB	8/30/2016	16:37:45	1.2	< 0.6	0.7	3.7	1.2	190.4	0.996
PEC-BH_002701.LAB	8/30/2016	16:38:00	1.2	< 0.6	0.7	3.2	0.6	190.4	0.997
PEC-BH_002761.LAB	8/30/2016	16:53:02	< 0.2	< 0.6	< 0.3	3.4	1.1	190.4	0.999
PEC-BH_002762.LAB	8/30/2016	16:53:17	0.3	< 0.6	0.4	3.4	1.2	190.4	0.999
PEC-BH_002763.LAB	8/30/2016	16:53:32	0.5	< 0.6	0.5	3.4	1.1	190.4	1.000
PEC-BH_002764.LAB	8/30/2016	16:53:47	0.9	< 0.6	0.3	3.4	1.1	190.4	0.999
PEC-BH_002765.LAB	8/30/2016	16:54:02	1.2	< 0.6	0.4	3.4	1.0	190.4	1.000
PEC-BH_002766.LAB	8/30/2016	16:54:17	1.0	< 0.6	0.5	3.3	0.9	190.4	0.998
PEC-BH_002767.LAB	8/30/2016	16:54:32	1.0	< 0.6	0.5	3.3	0.9	190.4	1.000
PEC-BH_002768.LAB	8/30/2016	16:54:47	1.1	< 0.6	0.3	3.3	0.9	190.4	0.999
PEC-BH_002809.LAB	8/30/2016	17:05:04	0.3	< 0.6	0.3	3.0	< 0.1	190.5	0.997
PEC-BH_002810.LAB	8/30/2016	17:05:19	< 0.2	< 0.6	< 0.3	3.0	< 0.1	190.4	0.999
PEC-BH_002811.LAB	8/30/2016	17:05:34	< 0.2	< 0.6	0.3	3.0	< 0.1	190.4	0.998
PEC-BH_002812.LAB	8/30/2016	17:05:49	< 0.2	0.9	< 0.3	3.3	0.6	190.4	0.996
PEC-BH_002813.LAB	8/30/2016	17:06:04	0.3	1.2	0.5	4.0	1.5	190.4	0.999
PEC-BH_002814.LAB	8/30/2016	17:06:19	1.3	< 0.6	0.6	4.0	1.2	190.4	1.000
PEC-BH_002815.LAB	8/30/2016	17:06:34	2.0	< 0.6	0.4	3.9	1.2	190.4	0.999
PEC-BH_002816.LAB	8/30/2016	17:06:49	2.1	< 0.6	0.4	3.8	1.0	190.4	0.998
PEC-BH_002853.LAB	8/30/2016	17:16:05	0.6	< 0.6	0.5	3.8	< 0.1	190.4	0.996
PEC-BH_002854.LAB	8/30/2016	17:16:20	0.3	< 0.6	0.4	3.7	0.2	190.4	0.999
PEC-BH_002855.LAB	8/30/2016	17:16:35	0.5	< 0.6	0.4	4.1	1.1	190.4	1.000
PEC-BH_002856.LAB	8/30/2016	17:16:50	0.7	< 0.6	0.5	4.1	1.2	190.4	0.999
PEC-BH_002857.LAB	8/30/2016	17:17:05	1.0	< 0.6	0.4	4.0	1.2	190.4	0.999
PEC-BH_002858.LAB	8/30/2016	17:17:20	1.2	< 0.6	0.6	3.9	1.1	190.4	1.000
PEC-BH_002859.LAB	8/30/2016	17:17:35	1.4	< 0.6	0.5	3.9	1.0	190.4	0.997
PEC-BH_002860.LAB	8/30/2016	17:17:50	1.5	< 0.6	0.8	3.8	1.0	190.4	0.999

		HCl	HCN	HF	H2O	CO2
PEC-BH Run 1	Minimum	< 0.2	< 0.6	< 0.3	2.5	<0.1
	Maximum	2.1	1.4	1.0	4.4	1.5
	Average*	0.7	0.7	0.5	3.5	1.0

*When calculating averages, any value less than the determined detection limit will be assigned the detection limit value.

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PEC-BH Run 2

Spectrum	Date	Time	HCl (ppmv wet)	HCN (ppmv wet)	HF (ppmv wet)	H2O (%v)	CO2 (%v wet)	FTIR Gas Cell Temp (C)	FTIR Gas Cell Pressure
PEC-BH_003061.LAB	8/31/2016	6:28:48	0.7	< 0.6	< 0.3	3.5	1.1	190.2	1.000
PEC-BH_003062.LAB	8/31/2016	6:29:03	0.8	< 0.6	< 0.3	3.5	1.0	190.2	0.998
PEC-BH_003063.LAB	8/31/2016	6:29:18	0.6	< 0.6	< 0.3	3.4	0.9	190.2	1.000
PEC-BH_003064.LAB	8/31/2016	6:29:33	0.7	< 0.6	< 0.3	3.4	0.8	190.2	0.998
PEC-BH_003065.LAB	8/31/2016	6:29:49	0.8	< 0.6	< 0.3	3.2	0.6	190.1	1.001
PEC-BH_003066.LAB	8/31/2016	6:30:03	0.7	< 0.6	< 0.3	3.1	0.5	190.2	1.000
PEC-BH_003067.LAB	8/31/2016	6:30:18	0.7	< 0.6	< 0.3	3.0	0.4	190.2	1.001
PEC-BH_003068.LAB	8/31/2016	6:30:34	0.7	< 0.6	< 0.3	3.0	0.3	190.2	1.000
PEC-BH_003069.LAB	8/31/2016	6:30:49	0.7	< 0.6	< 0.3	2.8	0.2	190.2	1.000
PEC-BH_003109.LAB	8/31/2016	6:40:50	0.3	0.8	< 0.3	3.5	1.2	190.2	1.000
PEC-BH_003110.LAB	8/31/2016	6:41:05	0.4	< 0.6	< 0.3	3.5	1.2	190.1	1.000
PEC-BH_003111.LAB	8/31/2016	6:41:20	0.4	< 0.6	< 0.3	3.5	1.1	190.1	0.999
PEC-BH_003112.LAB	8/31/2016	6:41:35	0.5	< 0.6	< 0.3	3.4	1.0	190.1	0.999
PEC-BH_003113.LAB	8/31/2016	6:41:50	0.6	< 0.6	< 0.3	3.3	1.0	190.2	1.002
PEC-BH_003114.LAB	8/31/2016	6:42:05	0.6	< 0.6	< 0.3	3.3	0.9	190.2	0.998
PEC-BH_003115.LAB	8/31/2016	6:42:20	0.5	< 0.6	< 0.3	3.3	0.9	190.2	0.998
PEC-BH_003116.LAB	8/31/2016	6:42:35	0.7	< 0.6	< 0.3	3.3	0.8	190.2	0.998
PEC-BH_003117.LAB	8/31/2016	6:42:50	0.7	< 0.6	< 0.3	3.2	0.6	190.1	0.999
PEC-BH_003230.LAB	8/31/2016	7:11:08	0.2	< 0.6	< 0.3	3.4	1.2	190.2	1.000
PEC-BH_003231.LAB	8/31/2016	7:11:23	0.3	< 0.6	< 0.3	3.3	1.1	190.2	1.003
PEC-BH_003232.LAB	8/31/2016	7:11:38	0.2	< 0.6	< 0.3	3.3	1.2	190.2	1.000
PEC-BH_003233.LAB	8/31/2016	7:11:53	0.2	< 0.6	< 0.3	3.3	1.2	190.2	1.001
PEC-BH_003234.LAB	8/31/2016	7:12:08	0.2	< 0.6	< 0.3	3.2	1.1	190.2	1.003
PEC-BH_003235.LAB	8/31/2016	7:12:23	0.3	< 0.6	< 0.3	3.3	1.1	190.2	1.001
PEC-BH_003236.LAB	8/31/2016	7:12:38	0.4	< 0.6	< 0.3	3.2	1.1	190.2	1.004
PEC-BH_003237.LAB	8/31/2016	7:12:53	0.4	< 0.6	< 0.3	3.2	1.1	190.2	1.001
PEC-BH_003238.LAB	8/31/2016	7:13:08	0.3	< 0.6	< 0.3	3.2	1.0	190.2	1.003
PEC-BH_003320.LAB	8/31/2016	7:33:40	0.3	< 0.6	< 0.3	3.3	1.2	190.3	1.004
PEC-BH_003321.LAB	8/31/2016	7:33:55	< 0.2	< 0.6	< 0.3	3.5	1.3	190.2	1.003
PEC-BH_003322.LAB	8/31/2016	7:34:10	< 0.2	< 0.6	< 0.3	3.4	1.2	190.3	1.005
PEC-BH_003323.LAB	8/31/2016	7:34:25	0.2	< 0.6	< 0.3	3.4	1.1	190.2	1.004
PEC-BH_003324.LAB	8/31/2016	7:34:40	< 0.2	< 0.6	< 0.3	3.3	1.0	190.2	1.003
PEC-BH_003325.LAB	8/31/2016	7:34:55	0.3	< 0.6	< 0.3	3.3	1.0	190.3	1.003
PEC-BH_003326.LAB	8/31/2016	7:35:10	0.2	< 0.6	< 0.3	3.3	1.0	190.2	1.003
PEC-BH_003327.LAB	8/31/2016	7:35:25	< 0.2	< 0.6	< 0.3	3.3	1.0	190.3	1.004
PEC-BH_003362.LAB	8/31/2016	7:44:11	0.2	1.2	< 0.3	3.8	1.5	190.2	1.003
PEC-BH_003363.LAB	8/31/2016	7:44:26	0.5	0.7	< 0.3	3.9	1.4	190.2	1.005
PEC-BH_003364.LAB	8/31/2016	7:44:41	0.5	0.7	< 0.3	3.7	1.3	190.3	1.004
PEC-BH_003365.LAB	8/31/2016	7:44:56	0.9	< 0.6	< 0.3	3.7	1.1	190.2	1.003
PEC-BH_003366.LAB	8/31/2016	7:45:11	1.0	< 0.6	< 0.3	3.6	1.1	190.2	1.001
PEC-BH_003367.LAB	8/31/2016	7:45:26	1.1	< 0.6	< 0.3	3.5	1.0	190.3	1.004
PEC-BH_003368.LAB	8/31/2016	7:45:41	1.3	0.6	< 0.3	3.5	1.0	190.3	1.002
PEC-BH_003369.LAB	8/31/2016	7:45:56	1.2	< 0.6	< 0.3	3.5	1.0	190.3	1.002
PEC-BH_003410.LAB	8/31/2016	7:56:12	0.7	1.1	< 0.3	3.7	1.4	190.3	1.000
PEC-BH_003411.LAB	8/31/2016	7:56:27	1.1	0.7	< 0.3	3.7	1.3	190.3	1.001
PEC-BH_003412.LAB	8/31/2016	7:56:42	1.6	< 0.6	< 0.3	3.6	1.3	190.3	1.001
PEC-BH_003413.LAB	8/31/2016	7:56:57	1.9	< 0.6	< 0.3	3.5	1.2	190.3	1.001
PEC-BH_003414.LAB	8/31/2016	7:57:13	2.1	< 0.6	< 0.3	3.5	1.2	190.3	1.002
PEC-BH_003415.LAB	8/31/2016	7:57:28	2.2	< 0.6	< 0.3	3.5	1.2	190.3	0.999
PEC-BH_003416.LAB	8/31/2016	7:57:43	1.9	< 0.6	< 0.3	3.4	1.2	190.3	1.002
PEC-BH_003417.LAB	8/31/2016	7:57:57	1.8	< 0.6	< 0.3	3.4	1.1	190.3	1.001
PEC-BH_003418.LAB	8/31/2016	7:58:13	1.9	< 0.6	< 0.3	3.3	1.0	190.3	1.004
PEC-BH_003527.LAB	8/31/2016	8:25:30	0.4	0.8	< 0.3	3.3	1.1	190.2	1.003
PEC-BH_003528.LAB	8/31/2016	8:25:45	0.6	< 0.6	< 0.3	3.3	1.3	190.3	1.002
PEC-BH_003529.LAB	8/31/2016	8:26:00	1.0	< 0.6	< 0.3	3.2	1.2	190.3	1.002
PEC-BH_003530.LAB	8/31/2016	8:26:15	1.1	< 0.6	< 0.3	3.2	1.2	190.3	1.002
PEC-BH_003531.LAB	8/31/2016	8:26:30	1.2	< 0.6	0.3	3.2	1.2	190.3	1.003
PEC-BH_003532.LAB	8/31/2016	8:26:45	1.3	< 0.6	< 0.3	3.2	1.2	190.3	1.001
PEC-BH_003533.LAB	8/31/2016	8:27:01	1.3	< 0.6	< 0.3	3.2	1.2	190.3	1.003
PEC-BH_003534.LAB	8/31/2016	8:27:16	1.2	< 0.6	< 0.3	3.2	1.2	190.3	1.002
PEC-BH_003535.LAB	8/31/2016	8:27:31	1.3	< 0.6	< 0.3	3.2	1.1	190.2	1.003
PEC-BH_003576.LAB	8/31/2016	8:38:11	0.5	< 0.6	< 0.3	3.4	1.2	190.2	1.003
PEC-BH_003577.LAB	8/31/2016	8:38:26	0.7	0.6	< 0.3	3.6	1.2	190.3	1.001
PEC-BH_003578.LAB	8/31/2016	8:38:41	1.2	< 0.6	< 0.3	3.5	1.2	190.3	1.001
PEC-BH_003579.LAB	8/31/2016	8:38:56	1.5	< 0.6	0.3	3.5	1.2	190.3	1.002
PEC-BH_003580.LAB	8/31/2016	8:39:11	1.5	< 0.6	< 0.3	3.4	1.1	190.3	1.002
PEC-BH_003581.LAB	8/31/2016	8:39:26	1.5	< 0.6	< 0.3	3.4	1.1	190.3	1.002
PEC-BH_003582.LAB	8/31/2016	8:39:41	1.6	< 0.6	< 0.3	3.4	1.1	190.2	1.002
PEC-BH_003583.LAB	8/31/2016	8:39:56	1.6	< 0.6	< 0.3	3.4	1.1	190.2	1.002
PEC-BH_003584.LAB	8/31/2016	8:40:11	1.6	< 0.6	< 0.3	3.3	1.0	190.3	1.003

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Spectrum	Date	Time	HCl (ppmv wet)	HCN (ppmv wet)	HF (ppmv wet)	H2O (%v)	CO2 (%v wet)	FTIR Gas Cell Temp (C)	FTIR Gas Cell Pressure
PEC-BH_003616.LAB	8/31/2016	8:48:12	0.5	< 0.6	0.3	3.6	1.3	190.3	1.001
PEC-BH_003617.LAB	8/31/2016	8:48:27	0.9	< 0.6	0.3	3.6	1.3	190.3	1.002
PEC-BH_003618.LAB	8/31/2016	8:48:42	1.1	< 0.6	< 0.3	3.5	1.3	190.3	1.002
PEC-BH_003619.LAB	8/31/2016	8:48:57	1.3	< 0.6	< 0.3	3.4	1.3	190.3	1.006
PEC-BH_003620.LAB	8/31/2016	8:49:12	1.6	< 0.6	< 0.3	3.4	1.3	190.3	1.003
PEC-BH_003621.LAB	8/31/2016	8:49:27	1.4	< 0.6	0.4	3.4	1.2	190.3	1.003
PEC-BH_003622.LAB	8/31/2016	8:49:42	1.5	< 0.6	0.4	3.4	1.2	190.3	1.001
PEC-BH_003623.LAB	8/31/2016	8:49:57	1.5	< 0.6	0.4	3.4	1.2	190.3	1.002
PEC-BH_003624.LAB	8/31/2016	8:50:12	1.5	< 0.6	0.3	3.3	1.1	190.2	1.000
PEC-BH_003658.LAB	8/31/2016	8:58:43	0.6	0.6	0.3	3.6	1.4	190.3	1.002
PEC-BH_003659.LAB	8/31/2016	8:58:58	1.0	< 0.6	< 0.3	3.7	1.3	190.3	1.002
PEC-BH_003660.LAB	8/31/2016	8:59:13	1.2	< 0.6	< 0.3	3.6	1.3	190.3	1.004
PEC-BH_003661.LAB	8/31/2016	8:59:28	1.6	< 0.6	0.3	3.6	1.2	190.3	1.001
PEC-BH_003662.LAB	8/31/2016	8:59:43	1.6	< 0.6	< 0.3	3.5	1.2	190.3	1.003
PEC-BH_003663.LAB	8/31/2016	8:59:58	1.8	< 0.6	0.3	3.5	1.2	190.3	1.003
PEC-BH_003664.LAB	8/31/2016	9:00:13	1.6	< 0.6	0.4	3.5	1.2	190.3	1.003
PEC-BH_003665.LAB	8/31/2016	9:00:28	1.7	< 0.6	< 0.3	3.4	1.1	190.3	1.004
PEC-BH_003666.LAB	8/31/2016	9:00:43	1.5	< 0.6	0.4	3.4	1.0	190.3	1.002
PEC-BH_003701.LAB	8/31/2016	9:09:29	0.6	0.9	0.3	3.8	1.4	190.3	1.004
PEC-BH_003702.LAB	8/31/2016	9:09:44	1.1	< 0.6	0.4	3.9	1.4	190.3	1.001
PEC-BH_003703.LAB	8/31/2016	9:09:59	1.5	< 0.6	0.4	3.7	1.3	190.3	1.003
PEC-BH_003704.LAB	8/31/2016	9:10:14	1.8	< 0.6	0.4	3.7	1.2	190.3	1.001
PEC-BH_003705.LAB	8/31/2016	9:10:29	1.8	< 0.6	0.4	3.6	1.2	190.3	1.002
PEC-BH_003706.LAB	8/31/2016	9:10:44	1.8	< 0.6	0.4	3.6	1.2	190.3	1.003
PEC-BH_003707.LAB	8/31/2016	9:10:59	1.7	< 0.6	0.4	3.5	1.2	190.3	1.001
PEC-BH_003708.LAB	8/31/2016	9:11:14	1.7	< 0.6	0.4	3.5	1.2	190.4	1.004
PEC-BH_003709.LAB	8/31/2016	9:11:29	1.7	< 0.6	0.4	3.4	1.1	190.3	1.003
PEC-BH_003710.LAB	8/31/2016	9:11:44	1.7	< 0.6	0.4	3.4	1.0	190.3	1.002
PEC-BH_003743.LAB	8/31/2016	9:20:00	0.6	0.8	0.4	4.4	1.3	190.2	1.004
PEC-BH_003744.LAB	8/31/2016	9:20:15	0.9	< 0.6	0.4	4.2	1.3	190.3	1.003
PEC-BH_003745.LAB	8/31/2016	9:20:30	1.3	< 0.6	0.5	4.2	1.4	190.3	1.001
PEC-BH_003746.LAB	8/31/2016	9:20:45	1.5	< 0.6	0.4	4.2	1.3	190.3	1.002
PEC-BH_003747.LAB	8/31/2016	9:21:00	1.6	< 0.6	0.4	4.2	1.3	190.3	1.002
PEC-BH_003748.LAB	8/31/2016	9:21:15	1.7	< 0.6	0.5	4.1	1.3	190.3	1.003
PEC-BH_003749.LAB	8/31/2016	9:21:31	1.6	< 0.6	0.5	4.0	1.3	190.3	1.003
PEC-BH_003750.LAB	8/31/2016	9:21:46	1.6	< 0.6	0.5	3.9	1.3	190.3	1.004
PEC-BH_003751.LAB	8/31/2016	9:22:01	1.5	< 0.6	0.5	3.8	1.2	190.3	1.002
PEC-BH_003752.LAB	8/31/2016	9:22:16	1.5	< 0.6	0.6	3.7	1.0	190.3	1.002
PEC-BH_003792.LAB	8/31/2016	9:32:17	0.6	0.7	0.4	3.7	1.2	190.3	1.003
PEC-BH_003793.LAB	8/31/2016	9:32:32	0.6	< 0.6	0.5	3.7	1.3	190.3	1.000
PEC-BH_003794.LAB	8/31/2016	9:32:47	0.9	< 0.6	0.4	3.7	1.3	190.2	1.002
PEC-BH_003795.LAB	8/31/2016	9:33:02	1.1	< 0.6	0.4	3.7	1.3	190.3	1.003
PEC-BH_003796.LAB	8/31/2016	9:33:17	1.3	< 0.6	0.5	3.7	1.2	190.3	1.001
PEC-BH_003797.LAB	8/31/2016	9:33:32	1.2	< 0.6	0.4	3.7	1.2	190.3	1.001
PEC-BH_003798.LAB	8/31/2016	9:33:47	1.2	< 0.6	0.6	3.7	1.2	190.3	1.003
PEC-BH_003799.LAB	8/31/2016	9:34:02	1.2	< 0.6	0.5	3.6	1.2	190.3	1.004
PEC-BH_003800.LAB	8/31/2016	9:34:17	1.2	< 0.6	0.5	3.5	1.1	190.3	1.003
PEC-BH_003801.LAB	8/31/2016	9:34:32	1.2	< 0.6	0.4	3.4	1.0	190.3	1.002
PEC-BH_003836.LAB	8/31/2016	9:43:18	0.5	< 0.6	0.5	4.0	1.2	190.3	1.003
PEC-BH_003837.LAB	8/31/2016	9:43:33	0.8	< 0.6	0.4	3.9	1.2	190.3	1.001
PEC-BH_003838.LAB	8/31/2016	9:43:48	0.9	< 0.6	0.4	3.9	1.2	190.3	1.001
PEC-BH_003839.LAB	8/31/2016	9:44:03	1.3	< 0.6	0.5	3.8	1.2	190.3	1.003
PEC-BH_003840.LAB	8/31/2016	9:44:18	1.2	< 0.6	0.4	3.8	1.2	190.3	1.004
PEC-BH_003841.LAB	8/31/2016	9:44:33	1.4	< 0.6	0.5	3.8	1.2	190.3	1.004
PEC-BH_003842.LAB	8/31/2016	9:44:48	1.4	< 0.6	0.7	3.8	1.2	190.3	1.002
PEC-BH_003843.LAB	8/31/2016	9:45:03	1.2	< 0.6	0.5	3.8	1.2	190.3	1.000
PEC-BH_003844.LAB	8/31/2016	9:45:18	1.3	< 0.6	0.6	3.7	1.1	190.3	1.003
PEC-BH_003845.LAB	8/31/2016	9:45:33	1.2	< 0.6	0.6	3.5	1.0	190.3	1.003
PEC-BH_003893.LAB	8/31/2016	9:57:38	0.3	< 0.6	0.4	3.6	1.2	190.3	1.001
PEC-BH_003894.LAB	8/31/2016	9:57:53	0.8	0.6	0.4	3.6	1.4	190.2	1.002
PEC-BH_003895.LAB	8/31/2016	9:58:08	1.1	< 0.6	0.4	3.5	1.2	190.3	1.002
PEC-BH_003896.LAB	8/31/2016	9:58:23	1.1	< 0.6	0.5	3.5	1.1	190.3	1.002
PEC-BH_003897.LAB	8/31/2016	9:58:38	1.3	< 0.6	0.5	3.5	1.1	190.3	1.003
PEC-BH_003898.LAB	8/31/2016	9:58:53	1.3	< 0.6	0.6	3.4	1.0	190.3	1.002
PEC-BH_003899.LAB	8/31/2016	9:59:08	1.3	< 0.6	0.5	3.4	1.0	190.3	1.003
PEC-BH_003900.LAB	8/31/2016	9:59:23	1.2	< 0.6	0.5	3.4	1.0	190.3	1.005
PEC-BH_003901.LAB	8/31/2016	9:59:40	1.2	< 0.6	0.6	3.3	0.9	190.3	1.002

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Spectrum	Date	Time	HCl (ppmv wet)	HCN (ppmv wet)	HF (ppmv wet)	H2O (%v)	CO2 (%v wet)	FTIR Gas Cell Temp (C)	FTIR Gas Cell Pressure
PEC-BH_004011.LAB	8/31/2016	10:27:30	0.3	0.6	< 0.3	3.3	1.3	190.3	1.002
PEC-BH_004012.LAB	8/31/2016	10:27:45	0.6	< 0.6	0.3	3.3	1.2	190.3	1.003
PEC-BH_004013.LAB	8/31/2016	10:28:00	0.8	< 0.6	0.4	3.3	1.2	190.3	1.002
PEC-BH_004014.LAB	8/31/2016	10:28:15	1.1	< 0.6	0.3	3.3	1.2	190.3	1.004
PEC-BH_004015.LAB	8/31/2016	10:28:30	1.2	< 0.6	0.4	3.2	1.2	190.3	1.001
PEC-BH_004016.LAB	8/31/2016	10:28:45	1.1	< 0.6	0.4	3.2	1.2	190.3	0.998
PEC-BH_004017.LAB	8/31/2016	10:29:00	1.0	< 0.6	0.4	3.2	1.2	190.3	1.003
PEC-BH_004018.LAB	8/31/2016	10:29:15	1.1	< 0.6	0.4	3.2	1.1	190.3	1.003
PEC-BH_004019.LAB	8/31/2016	10:29:30	1.1	< 0.6	0.3	3.1	1.0	190.3	1.004
PEC-BH_004051.LAB	8/31/2016	10:37:31	0.4	0.9	0.4	3.6	1.0	190.3	1.001
PEC-BH_004052.LAB	8/31/2016	10:37:46	0.5	0.8	0.4	3.6	1.3	190.3	1.002
PEC-BH_004053.LAB	8/31/2016	10:38:01	1.1	< 0.6	0.3	3.5	1.2	190.3	1.001
PEC-BH_004054.LAB	8/31/2016	10:38:16	1.4	< 0.6	0.5	3.5	1.2	190.3	1.002
PEC-BH_004055.LAB	8/31/2016	10:38:31	1.5	< 0.6	0.5	3.4	1.2	190.3	1.001
PEC-BH_004056.LAB	8/31/2016	10:38:46	1.6	< 0.6	0.5	3.4	1.2	190.3	1.002
PEC-BH_004057.LAB	8/31/2016	10:39:01	1.6	< 0.6	0.4	3.4	1.1	190.3	1.002
PEC-BH_004058.LAB	8/31/2016	10:39:16	1.6	< 0.6	0.5	3.4	1.1	190.3	1.003
PEC-BH_004059.LAB	8/31/2016	10:39:31	1.5	< 0.6	0.4	3.3	1.1	190.3	1.002
PEC-BH_004060.LAB	8/31/2016	10:39:46	1.3	< 0.6	0.5	3.3	1.0	190.3	1.002
PEC-BH_004094.LAB	8/31/2016	10:48:17	0.4	0.7	0.3	3.5	1.3	190.3	1.001
PEC-BH_004095.LAB	8/31/2016	10:48:32	0.8	< 0.6	0.5	3.5	1.3	190.3	1.002
PEC-BH_004096.LAB	8/31/2016	10:48:47	1.3	< 0.6	0.4	3.5	1.3	190.3	1.003
PEC-BH_004097.LAB	8/31/2016	10:49:02	1.5	< 0.6	0.4	3.5	1.3	190.3	1.000
PEC-BH_004098.LAB	8/31/2016	10:49:17	1.7	< 0.6	0.4	3.4	1.2	190.3	1.001
PEC-BH_004099.LAB	8/31/2016	10:49:32	1.4	< 0.6	0.5	3.4	1.2	190.3	1.003
PEC-BH_004100.LAB	8/31/2016	10:49:47	1.5	< 0.6	0.5	3.4	1.2	190.3	1.003
PEC-BH_004101.LAB	8/31/2016	10:50:02	1.5	< 0.6	0.6	3.4	1.2	190.3	1.004
PEC-BH_004102.LAB	8/31/2016	10:50:17	1.7	< 0.6	0.4	3.3	1.1	190.3	1.004
PEC-BH_004103.LAB	8/31/2016	10:50:32	1.4	< 0.6	0.5	3.3	1.0	190.3	1.003
PEC-BH_004140.LAB	8/31/2016	10:59:48	0.6	0.7	0.4	3.8	1.4	190.3	1.003
PEC-BH_004141.LAB	8/31/2016	11:00:03	1.6	< 0.6	0.5	3.9	1.3	190.3	1.001
PEC-BH_004142.LAB	8/31/2016	11:00:18	2.3	< 0.6	0.6	3.8	1.3	190.3	1.002
PEC-BH_004143.LAB	8/31/2016	11:00:33	2.7	< 0.6	0.5	3.8	1.3	190.3	1.002
PEC-BH_004144.LAB	8/31/2016	11:00:48	2.6	< 0.6	0.5	3.8	1.2	190.3	1.002
PEC-BH_004145.LAB	8/31/2016	11:01:03	2.6	< 0.6	0.6	3.7	1.2	190.3	1.005
PEC-BH_004146.LAB	8/31/2016	11:01:18	2.6	< 0.6	0.5	3.7	1.2	190.4	1.004
PEC-BH_004147.LAB	8/31/2016	11:01:33	2.4	< 0.6	0.5	3.6	1.2	190.3	1.002
PEC-BH_004148.LAB	8/31/2016	11:01:48	2.4	< 0.6	0.6	3.6	1.1	190.3	1.003
PEC-BH_004149.LAB	8/31/2016	11:02:03	2.2	< 0.6	0.7	3.5	1.0	190.3	1.001
PEC-BH_004196.LAB	8/31/2016	11:13:50	0.5	0.6	0.4	3.4	1.3	190.3	1.002
PEC-BH_004197.LAB	8/31/2016	11:14:05	0.9	< 0.6	0.4	3.4	1.3	190.4	1.004
PEC-BH_004198.LAB	8/31/2016	11:14:20	1.3	< 0.6	0.4	3.3	1.3	190.3	1.003
PEC-BH_004199.LAB	8/31/2016	11:14:35	1.4	< 0.6	0.4	3.3	1.3	190.3	1.003
PEC-BH_004200.LAB	8/31/2016	11:14:50	1.5	< 0.6	0.4	3.3	1.3	190.3	1.000
PEC-BH_004201.LAB	8/31/2016	11:15:05	1.5	< 0.6	0.4	3.3	1.2	190.3	1.002
PEC-BH_004202.LAB	8/31/2016	11:15:20	1.4	< 0.6	0.6	3.3	1.2	190.3	1.003
PEC-BH_004203.LAB	8/31/2016	11:15:35	1.5	< 0.6	0.6	3.3	1.2	190.3	1.001
PEC-BH_004204.LAB	8/31/2016	11:15:50	1.3	< 0.6	0.5	3.2	1.1	190.3	1.005
PEC-BH_004205.LAB	8/31/2016	11:16:05	1.2	< 0.6	0.5	3.1	0.9	190.3	1.003
PEC-BH_004251.LAB	8/31/2016	11:27:36	0.5	< 0.6	0.3	3.6	1.3	190.3	1.003
PEC-BH_004252.LAB	8/31/2016	11:27:51	0.9	< 0.6	0.4	3.7	1.2	190.3	1.000
PEC-BH_004253.LAB	8/31/2016	11:28:06	1.2	< 0.6	0.5	3.6	1.3	190.3	1.003
PEC-BH_004254.LAB	8/31/2016	11:28:21	1.3	< 0.6	0.6	3.6	1.2	190.3	1.003
PEC-BH_004255.LAB	8/31/2016	11:28:36	1.5	< 0.6	0.6	3.5	1.2	190.3	1.002
PEC-BH_004256.LAB	8/31/2016	11:28:51	1.5	< 0.6	0.7	3.5	1.2	190.3	1.001
PEC-BH_004257.LAB	8/31/2016	11:29:06	1.3	< 0.6	0.5	3.4	1.2	190.2	1.001
PEC-BH_004258.LAB	8/31/2016	11:29:21	1.3	< 0.6	0.5	3.4	1.1	190.3	1.003
PEC-BH_004259.LAB	8/31/2016	11:29:36	1.4	< 0.6	0.6	3.3	1.0	190.3	1.001
PEC-BH_004290.LAB	8/31/2016	11:37:22	1.3	1.0	0.5	3.7	1.2	190.3	1.001
PEC-BH_004291.LAB	8/31/2016	11:37:37	4.9	< 0.6	0.6	3.6	1.3	190.3	1.002
PEC-BH_004292.LAB	8/31/2016	11:37:52	4.5	< 0.6	0.7	3.6	1.3	190.3	1.003
PEC-BH_004293.LAB	8/31/2016	11:38:07	3.8	< 0.6	0.6	3.6	1.3	190.3	1.001
PEC-BH_004294.LAB	8/31/2016	11:38:22	3.3	< 0.6	0.7	3.5	1.2	190.3	1.002
PEC-BH_004295.LAB	8/31/2016	11:38:37	3.1	0.7	0.6	3.5	1.2	190.3	1.002
PEC-BH_004296.LAB	8/31/2016	11:38:52	3.0	< 0.6	0.7	3.5	1.2	190.3	1.002
PEC-BH_004297.LAB	8/31/2016	11:39:07	2.9	< 0.6	0.6	3.4	1.1	190.3	1.002
PEC-BH_004298.LAB	8/31/2016	11:39:22	2.7	< 0.6	0.7	3.3	1.0	190.3	1.004
PEC-BH_004331.LAB	8/31/2016	11:47:38	0.7	< 0.6	0.4	3.5	1.2	190.3	1.001
PEC-BH_004332.LAB	8/31/2016	11:47:53	0.9	< 0.6	0.5	3.5	1.3	190.3	1.001
PEC-BH_004333.LAB	8/31/2016	11:48:08	1.3	< 0.6	0.5	3.4	1.2	190.3	1.002
PEC-BH_004334.LAB	8/31/2016	11:48:23	1.2	< 0.6	0.5	3.4	1.3	190.3	1.001
PEC-BH_004335.LAB	8/31/2016	11:48:38	1.5	< 0.6	0.6	3.4	1.3	190.3	1.003
PEC-BH_004336.LAB	8/31/2016	11:48:53	1.6	< 0.6	0.5	3.3	1.3	190.3	1.003
PEC-BH_004337.LAB	8/31/2016	11:49:08	1.7	< 0.6	0.7	3.3	1.2	190.2	1.003
PEC-BH_004338.LAB	8/31/2016	11:49:23	1.5	< 0.6	0.7	3.3	1.2	190.3	1.002
PEC-BH_004339.LAB	8/31/2016	11:49:38	1.3	< 0.6	0.6	3.2	1.1	190.3	1.001

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Spectrum	Date	Time	HCl (ppmv wet)	HCN (ppmv wet)	HF (ppmv wet)	H2O (%v)	CO2 (%v wet)	FTIR Gas Cell Temp (C)	FTIR Gas Cell Pressure
PEC-BH_004379.LAB	8/31/2016	11:59:39	0.3	< 0.6	0.3	3.2	1.1	190.3	1.001
PEC-BH_004380.LAB	8/31/2016	11:59:54	0.7	< 0.6	0.5	3.3	1.4	190.3	1.001
PEC-BH_004381.LAB	8/31/2016	12:00:09	1.0	< 0.6	0.5	3.2	1.3	190.3	1.003
PEC-BH_004382.LAB	8/31/2016	12:00:24	1.2	< 0.6	0.5	3.2	1.3	190.3	1.002
PEC-BH_004383.LAB	8/31/2016	12:00:40	1.2	< 0.6	0.5	3.2	1.3	190.3	1.002
PEC-BH_004384.LAB	8/31/2016	12:00:54	1.4	< 0.6	0.6	3.2	1.2	190.3	1.002
PEC-BH_004385.LAB	8/31/2016	12:01:10	1.3	< 0.6	0.6	3.2	1.2	190.3	1.003
PEC-BH_004386.LAB	8/31/2016	12:01:25	1.4	< 0.6	0.7	3.2	1.2	190.3	1.001
PEC-BH_004387.LAB	8/31/2016	12:01:40	1.3	< 0.6	0.6	3.1	1.1	190.3	1.000
PEC-BH_004426.LAB	8/31/2016	12:11:26	0.4	0.8	0.5	3.4	1.2	190.3	1.001
PEC-BH_004427.LAB	8/31/2016	12:11:41	1.2	0.6	0.5	3.5	1.3	190.3	1.004
PEC-BH_004428.LAB	8/31/2016	12:11:56	1.5	< 0.6	0.5	3.4	1.2	190.3	1.004
PEC-BH_004429.LAB	8/31/2016	12:12:11	1.6	< 0.6	0.6	3.3	1.2	190.3	1.002
PEC-BH_004430.LAB	8/31/2016	12:12:26	1.7	< 0.6	0.5	3.3	1.2	190.3	1.002
PEC-BH_004431.LAB	8/31/2016	12:12:41	1.8	< 0.6	0.6	3.3	1.1	190.3	1.001
PEC-BH_004432.LAB	8/31/2016	12:12:56	1.7	< 0.6	0.5	3.2	1.1	190.3	1.003
PEC-BH_004433.LAB	8/31/2016	12:13:11	1.6	< 0.6	0.6	3.2	1.1	190.3	1.003
PEC-BH_004434.LAB	8/31/2016	12:13:26	1.5	< 0.6	0.5	3.1	1.0	190.3	1.003
PEC-BH_004529.LAB	8/31/2016	12:37:13	0.5	0.7	0.4	3.2	1.4	190.3	1.001
PEC-BH_004530.LAB	8/31/2016	12:37:28	0.8	< 0.6	0.4	3.2	1.2	190.3	1.002
PEC-BH_004531.LAB	8/31/2016	12:37:43	1.1	< 0.6	0.5	3.2	1.1	190.3	1.001
PEC-BH_004532.LAB	8/31/2016	12:37:58	1.2	< 0.6	0.5	3.1	1.0	190.3	1.003
PEC-BH_004533.LAB	8/31/2016	12:38:14	1.1	< 0.6	0.5	3.1	1.0	190.3	1.003
PEC-BH_004534.LAB	8/31/2016	12:38:29	1.3	< 0.6	0.6	3.0	1.0	190.2	1.004
PEC-BH_004535.LAB	8/31/2016	12:38:43	1.2	< 0.6	0.5	3.0	1.0	190.3	1.002
PEC-BH_004536.LAB	8/31/2016	12:38:59	1.1	< 0.6	0.5	3.0	0.9	190.3	1.002
PEC-BH_004572.LAB	8/31/2016	12:48:00	0.4	< 0.6	0.4	3.3	1.2	190.3	1.001
PEC-BH_004573.LAB	8/31/2016	12:48:14	0.7	0.6	0.4	3.4	1.3	190.3	1.003
PEC-BH_004574.LAB	8/31/2016	12:48:30	1.2	< 0.6	0.5	3.3	1.2	190.3	1.001
PEC-BH_004575.LAB	8/31/2016	12:48:44	1.6	< 0.6	0.5	3.3	1.1	190.3	1.001
PEC-BH_004576.LAB	8/31/2016	12:49:00	1.6	< 0.6	0.6	3.2	1.0	190.3	1.003
PEC-BH_004577.LAB	8/31/2016	12:49:15	1.4	< 0.6	0.5	3.2	1.0	190.3	1.001
PEC-BH_004578.LAB	8/31/2016	12:49:30	1.4	< 0.6	0.5	3.1	1.0	190.3	1.004
PEC-BH_004579.LAB	8/31/2016	12:49:45	1.4	< 0.6	0.5	3.1	0.9	190.3	1.001
PEC-BH_004628.LAB	8/31/2016	13:02:01	0.5	1.5	< 0.3	3.7	1.4	190.3	1.003
PEC-BH_004629.LAB	8/31/2016	13:02:16	2.0	1.5	0.5	3.9	1.3	190.3	1.003
PEC-BH_004630.LAB	8/31/2016	13:02:31	2.9	0.7	0.5	3.6	1.1	190.3	1.003
PEC-BH_004631.LAB	8/31/2016	13:02:46	2.9	< 0.6	0.4	3.5	1.1	190.3	1.002
PEC-BH_004632.LAB	8/31/2016	13:03:01	2.9	< 0.6	0.5	3.5	1.0	190.3	1.001
PEC-BH_004633.LAB	8/31/2016	13:03:16	2.8	< 0.6	0.6	3.4	1.0	190.4	1.002
PEC-BH_004634.LAB	8/31/2016	13:03:31	2.7	< 0.6	0.6	3.4	1.0	190.3	1.002
PEC-BH_004635.LAB	8/31/2016	13:03:46	2.6	< 0.6	0.5	3.4	1.0	190.3	1.003
PEC-BH_004636.LAB	8/31/2016	13:04:01	2.6	< 0.6	0.5	3.3	1.0	190.3	1.002
PEC-BH_004669.LAB	8/31/2016	13:12:17	0.6	0.7	0.5	3.6	1.1	190.3	1.001
PEC-BH_004670.LAB	8/31/2016	13:12:32	1.1	< 0.6	0.5	3.6	1.2	190.3	1.000
PEC-BH_004671.LAB	8/31/2016	13:12:47	1.7	< 0.6	0.5	3.6	1.1	190.3	1.004
PEC-BH_004672.LAB	8/31/2016	13:13:02	2.0	< 0.6	0.5	3.6	1.1	190.3	1.002
PEC-BH_004673.LAB	8/31/2016	13:13:17	2.1	< 0.6	0.5	3.5	1.1	190.3	1.002
PEC-BH_004674.LAB	8/31/2016	13:13:32	2.1	< 0.6	0.6	3.4	1.0	190.3	1.002
PEC-BH_004675.LAB	8/31/2016	13:13:47	2.0	< 0.6	0.6	3.4	1.0	190.3	1.001
PEC-BH_004676.LAB	8/31/2016	13:14:02	2.0	< 0.6	0.6	3.3	1.0	190.3	1.002
PEC-BH_004677.LAB	8/31/2016	13:14:17	2.0	< 0.6	0.4	3.2	1.0	190.3	1.003
PEC-BH_004713.LAB	8/31/2016	13:23:18	0.5	0.7	< 0.3	3.3	1.0	190.3	1.002
PEC-BH_004714.LAB	8/31/2016	13:23:33	1.2	< 0.6	0.4	3.4	1.2	190.2	1.001
PEC-BH_004715.LAB	8/31/2016	13:23:48	1.6	< 0.6	0.4	3.2	1.1	190.3	1.002
PEC-BH_004716.LAB	8/31/2016	13:24:03	1.8	< 0.6	0.4	3.2	1.2	190.3	1.002
PEC-BH_004717.LAB	8/31/2016	13:24:18	1.9	< 0.6	0.5	3.1	1.2	190.3	1.001
PEC-BH_004718.LAB	8/31/2016	13:24:33	1.8	< 0.6	0.5	3.1	1.1	190.3	1.001
PEC-BH_004719.LAB	8/31/2016	13:24:48	1.8	< 0.6	0.5	3.0	1.1	190.3	1.001
PEC-BH_004720.LAB	8/31/2016	13:25:03	1.7	< 0.6	0.5	3.1	1.1	190.2	1.002
PEC-BH_004721.LAB	8/31/2016	13:25:19	1.5	< 0.6	0.6	3.0	1.0	190.3	1.001

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Spectrum	Date	Time	HCl (ppmv wet)	HCN (ppmv wet)	HF (ppmv wet)	H2O (%v)	CO2 (%v wet)	FTIR Gas Cell Temp (C)	FTIR Gas Cell Pressure
PEC-BH_004779.LAB	8/31/2016	13:37:22	0.6	0.7	< 0.3	3.0	1.1	190.3	1.001
PEC-BH_004780.LAB	8/31/2016	13:37:26	0.5	1.0	0.5	3.0	1.2	190.3	1.007
PEC-BH_004781.LAB	8/31/2016	13:37:30	0.8	1.5	0.3	3.0	1.3	190.3	1.004
PEC-BH_004782.LAB	8/31/2016	13:37:33	1.2	0.7	0.3	3.0	1.3	190.3	1.001
PEC-BH_004783.LAB	8/31/2016	13:37:37	1.3	1.0	0.4	3.0	1.3	190.3	1.002
PEC-BH_004784.LAB	8/31/2016	13:37:41	1.6	< 0.6	< 0.3	3.0	1.2	190.3	1.004
PEC-BH_004785.LAB	8/31/2016	13:37:45	1.8	0.7	0.5	3.0	1.2	190.2	1.003
PEC-BH_004786.LAB	8/31/2016	13:37:48	1.7	< 0.6	0.3	3.0	1.2	190.3	1.001
PEC-BH_004787.LAB	8/31/2016	13:37:52	2.0	< 0.6	0.4	3.0	1.1	190.3	0.998
PEC-BH_004788.LAB	8/31/2016	13:37:56	1.9	< 0.6	0.7	3.0	1.1	190.2	1.002
PEC-BH_004789.LAB	8/31/2016	13:38:00	1.9	< 0.6	0.3	3.0	1.1	190.3	1.002
PEC-BH_004790.LAB	8/31/2016	13:38:03	1.9	< 0.6	0.5	3.0	1.2	190.4	1.002
PEC-BH_004791.LAB	8/31/2016	13:38:07	2.0	< 0.6	< 0.3	3.0	1.2	190.3	0.998
PEC-BH_004792.LAB	8/31/2016	13:38:11	2.1	< 0.6	0.5	2.9	1.1	190.3	1.000
PEC-BH_004793.LAB	8/31/2016	13:38:15	1.9	< 0.6	< 0.3	2.9	1.2	190.3	1.001
PEC-BH_004794.LAB	8/31/2016	13:38:18	2.1	< 0.6	0.6	2.9	1.2	190.3	1.002
PEC-BH_004795.LAB	8/31/2016	13:38:22	1.9	< 0.6	0.5	2.9	1.2	190.2	0.998
PEC-BH_004796.LAB	8/31/2016	13:38:26	1.9	< 0.6	0.6	2.9	1.1	190.2	1.001
PEC-BH_004797.LAB	8/31/2016	13:38:30	2.0	< 0.6	0.4	2.9	1.1	190.3	1.002
PEC-BH_004798.LAB	8/31/2016	13:38:33	1.7	< 0.6	0.5	2.9	1.1	190.3	0.997
PEC-BH_004799.LAB	8/31/2016	13:38:37	2.1	< 0.6	0.4	2.9	1.1	190.3	0.999
PEC-BH_004800.LAB	8/31/2016	13:38:41	1.9	< 0.6	< 0.3	2.8	1.1	190.3	1.000
PEC-BH_004801.LAB	8/31/2016	13:38:45	2.1	< 0.6	0.6	2.8	1.1	190.3	0.999
PEC-BH_004802.LAB	8/31/2016	13:38:49	2.1	< 0.6	0.5	2.8	1.1	190.3	0.999
PEC-BH_004803.LAB	8/31/2016	13:38:52	2.2	< 0.6	0.5	2.8	1.1	190.2	1.001
PEC-BH_004804.LAB	8/31/2016	13:38:56	2.0	< 0.6	0.6	2.8	1.1	190.2	1.003
PEC-BH_004922.LAB	8/31/2016	13:49:57	< 0.2	< 0.6	0.4	2.6	1.0	190.3	1.004
PEC-BH_004923.LAB	8/31/2016	13:50:12	0.5	< 0.6	0.4	2.7	1.3	190.3	1.003
PEC-BH_004924.LAB	8/31/2016	13:50:27	1.0	< 0.6	< 0.3	2.7	1.2	190.3	1.003
PEC-BH_004925.LAB	8/31/2016	13:50:42	1.1	< 0.6	0.5	2.7	1.2	190.3	1.003
PEC-BH_004926.LAB	8/31/2016	13:50:57	1.4	< 0.6	0.4	2.6	1.2	190.3	1.004
PEC-BH_004927.LAB	8/31/2016	13:51:12	1.4	< 0.6	0.4	2.6	1.2	190.3	1.003
PEC-BH_004928.LAB	8/31/2016	13:51:27	1.1	< 0.6	0.5	2.6	1.2	190.3	1.003
PEC-BH_004929.LAB	8/31/2016	13:51:42	1.3	< 0.6	0.4	2.6	1.2	190.3	1.001
PEC-BH_004930.LAB	8/31/2016	13:51:57	1.3	< 0.6	0.5	2.5	1.1	190.3	1.001
PEC-BH_005058.LAB	8/31/2016	14:24:01	< 0.2	0.6	0.3	2.5	0.9	190.3	1.001
PEC-BH_005059.LAB	8/31/2016	14:24:16	0.5	< 0.6	< 0.3	2.7	1.3	190.3	1.000
PEC-BH_005060.LAB	8/31/2016	14:24:31	0.9	< 0.6	0.4	2.7	1.2	190.3	1.004
PEC-BH_005061.LAB	8/31/2016	14:24:46	1.2	< 0.6	0.4	2.7	1.2	190.3	1.003
PEC-BH_005062.LAB	8/31/2016	14:25:01	1.1	< 0.6	0.5	2.7	1.1	190.3	1.000
PEC-BH_005063.LAB	8/31/2016	14:25:16	1.2	< 0.6	0.4	2.6	1.1	190.2	1.002
PEC-BH_005064.LAB	8/31/2016	14:25:31	1.4	< 0.6	0.5	2.6	1.1	190.3	1.001
PEC-BH_005065.LAB	8/31/2016	14:25:46	1.3	< 0.6	0.6	2.6	1.1	190.3	1.000
PEC-BH_005066.LAB	8/31/2016	14:26:01	1.2	< 0.6	0.4	2.6	1.1	190.2	1.002
PEC-BH_005067.LAB	8/31/2016	14:26:16	1.3	< 0.6	0.4	2.6	1.0	190.2	1.002
PEC-BH_005112.LAB	8/31/2016	14:37:32	0.2	0.9	0.4	2.9	1.3	190.3	1.002
PEC-BH_005113.LAB	8/31/2016	14:37:47	0.7	< 0.6	0.4	2.9	1.2	190.3	1.000
PEC-BH_005114.LAB	8/31/2016	14:38:02	1.0	< 0.6	0.3	2.9	1.1	190.3	1.000
PEC-BH_005115.LAB	8/31/2016	14:38:18	1.1	< 0.6	0.3	2.8	1.1	190.3	0.999
PEC-BH_005116.LAB	8/31/2016	14:38:32	1.3	< 0.6	0.4	2.8	1.1	190.3	1.001
PEC-BH_005117.LAB	8/31/2016	14:38:47	1.3	< 0.6	0.4	2.8	1.1	190.3	1.001
PEC-BH_005118.LAB	8/31/2016	14:39:03	1.2	< 0.6	0.5	2.8	1.1	190.3	1.000
PEC-BH_005119.LAB	8/31/2016	14:39:18	1.2	< 0.6	0.5	2.8	1.1	190.3	1.003
PEC-BH_005120.LAB	8/31/2016	14:39:32	1.2	< 0.6	0.4	2.7	1.0	190.3	1.004
PEC-BH_005121.LAB	8/31/2016	14:39:48	1.2	< 0.6	0.5	2.7	1.0	190.3	0.999
PEC-BH_005184.LAB	8/31/2016	14:55:34	1.0	1.3	0.3	3.4	1.4	190.2	0.998
PEC-BH_005185.LAB	8/31/2016	14:55:49	2.4	1.2	0.4	3.4	1.2	190.3	0.998
PEC-BH_005186.LAB	8/31/2016	14:56:04	2.9	< 0.6	0.3	3.2	1.0	190.3	1.000
PEC-BH_005187.LAB	8/31/2016	14:56:19	3.2	< 0.6	0.5	3.1	0.9	190.3	1.001
PEC-BH_005188.LAB	8/31/2016	14:56:34	3.0	< 0.6	0.4	3.1	0.9	190.3	1.000
PEC-BH_005189.LAB	8/31/2016	14:56:49	2.8	< 0.6	0.5	3.1	0.9	190.3	1.002
PEC-BH_005190.LAB	8/31/2016	14:57:04	2.6	< 0.6	0.4	3.0	0.8	190.3	1.003
PEC-BH_005191.LAB	8/31/2016	14:57:19	2.6	< 0.6	0.4	3.0	0.8	190.3	1.002
PEC-BH_005192.LAB	8/31/2016	14:57:35	2.4	< 0.6	0.6	2.9	0.7	190.3	1.003
PEC-BH_005226.LAB	8/31/2016	15:06:06	0.4	0.9	< 0.3	3.3	1.0	190.3	0.999
PEC-BH_005227.LAB	8/31/2016	15:06:20	1.1	2.3	0.4	4.0	1.7	190.3	0.998
PEC-BH_005228.LAB	8/31/2016	15:06:36	3.1	1.3	0.5	3.7	1.3	190.3	1.000
PEC-BH_005229.LAB	8/31/2016	15:06:50	3.5	0.9	0.4	3.5	1.1	190.3	1.001
PEC-BH_005230.LAB	8/31/2016	15:07:05	3.4	0.6	0.5	3.4	1.0	190.3	0.998
PEC-BH_005231.LAB	8/31/2016	15:07:21	3.5	< 0.6	0.4	3.3	1.0	190.3	0.999
PEC-BH_005232.LAB	8/31/2016	15:07:36	3.3	< 0.6	0.5	3.3	1.0	190.3	1.000
PEC-BH_005233.LAB	8/31/2016	15:07:51	3.2	< 0.6	0.5	3.2	0.9	190.3	1.000

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PEC-BH Run 2

Spectrum	Date	Time	HCl (ppmv wet)	HCN (ppmv wet)	HF (ppmv wet)	H2O (%v)	CO2 (%v wet)	FTIR Gas Cell Temp (C)	FTIR Gas Cell Pressure
PEC-BH_005267.LAB	8/31/2016	15:16:21	0.6	1.3	< 0.3	3.1	0.9	190.3	1.001
PEC-BH_005268.LAB	8/31/2016	15:16:37	1.6	0.8	0.4	3.3	1.2	190.3	1.002
PEC-BH_005269.LAB	8/31/2016	15:16:52	2.2	< 0.6	0.5	3.3	1.1	190.3	1.001
PEC-BH_005270.LAB	8/31/2016	15:17:07	2.6	< 0.6	0.4	3.3	1.0	190.3	1.001
PEC-BH_005271.LAB	8/31/2016	15:17:22	2.7	< 0.6	0.4	3.2	1.1	190.3	1.004
PEC-BH_005272.LAB	8/31/2016	15:17:37	2.5	< 0.6	0.5	3.2	1.0	190.3	1.002
PEC-BH_005273.LAB	8/31/2016	15:17:52	2.6	< 0.6	0.5	3.1	1.0	190.3	1.004
PEC-BH_005274.LAB	8/31/2016	15:18:07	2.5	< 0.6	0.5	3.1	0.9	190.3	1.003
PEC-BH_005309.LAB	8/31/2016	15:26:53	0.5	0.9	0.4	3.0	1.2	190.3	1.002
PEC-BH_005310.LAB	8/31/2016	15:27:08	2.0	0.9	0.5	3.3	1.3	190.3	1.003
PEC-BH_005311.LAB	8/31/2016	15:27:23	2.4	< 0.6	0.4	3.1	1.1	190.3	1.002
PEC-BH_005312.LAB	8/31/2016	15:27:38	2.5	< 0.6	0.5	3.1	1.1	190.3	1.001
PEC-BH_005313.LAB	8/31/2016	15:27:53	2.4	< 0.6	0.4	3.0	1.1	190.4	1.000
PEC-BH_005314.LAB	8/31/2016	15:28:08	2.5	< 0.6	0.6	3.0	1.1	190.3	1.002
PEC-BH_005315.LAB	8/31/2016	15:28:23	2.5	< 0.6	0.5	2.9	1.0	190.3	1.001
PEC-BH_005316.LAB	8/31/2016	15:28:38	2.3	< 0.6	0.6	2.9	1.0	190.3	1.001
PEC-BH_005317.LAB	8/31/2016	15:28:53	2.1	< 0.6	0.6	2.8	1.0	190.3	1.002
PEC-BH_005365.LAB	8/31/2016	15:40:54	0.3	0.8	0.4	2.5	1.2	190.3	1.002
PEC-BH_005366.LAB	8/31/2016	15:41:09	0.9	< 0.6	0.4	2.6	1.2	190.3	1.004
PEC-BH_005367.LAB	8/31/2016	15:41:24	1.2	< 0.6	0.4	2.5	1.2	190.3	1.002
PEC-BH_005368.LAB	8/31/2016	15:41:39	1.3	< 0.6	0.5	2.5	1.1	190.3	1.004
PEC-BH_005369.LAB	8/31/2016	15:41:54	1.5	< 0.6	0.4	2.5	1.2	190.3	1.002
PEC-BH_005370.LAB	8/31/2016	15:42:09	1.5	< 0.6	0.5	2.5	1.1	190.3	1.000
PEC-BH_005371.LAB	8/31/2016	15:42:24	1.3	< 0.6	0.4	2.5	1.2	190.3	1.004
PEC-BH_005372.LAB	8/31/2016	15:42:39	1.4	< 0.6	0.5	2.5	1.1	190.2	1.001
PEC-BH_005373.LAB	8/31/2016	15:42:54	1.3	< 0.6	0.5	2.5	1.0	190.3	1.002
PEC-BH_005374.LAB	8/31/2016	15:43:09	1.3	< 0.6	0.5	2.4	0.9	190.3	1.000
PEC-BH_005452.LAB	8/31/2016	16:02:41	0.9	1.4	0.4	3.1	1.1	190.3	0.998
PEC-BH_005453.LAB	8/31/2016	16:02:57	2.3	0.8	0.5	3.0	1.3	190.3	0.998
PEC-BH_005454.LAB	8/31/2016	16:03:12	2.7	< 0.6	0.4	2.8	1.2	190.3	1.001
PEC-BH_005455.LAB	8/31/2016	16:03:27	2.5	< 0.6	0.4	2.8	1.1	190.3	1.004
PEC-BH_005456.LAB	8/31/2016	16:03:42	2.4	< 0.6	0.5	2.7	1.1	190.3	1.003
PEC-BH_005457.LAB	8/31/2016	16:03:57	2.4	< 0.6	0.5	2.7	1.0	190.3	1.002
PEC-BH_005458.LAB	8/31/2016	16:04:12	2.4	< 0.6	0.6	2.7	1.0	190.3	0.999
PEC-BH_005459.LAB	8/31/2016	16:04:27	2.1	< 0.6	0.5	2.6	0.9	190.3	1.001
PEC-BH_005506.LAB	8/31/2016	16:16:13	0.7	0.7	0.4	2.7	1.3	190.3	1.001
PEC-BH_005507.LAB	8/31/2016	16:16:28	1.2	< 0.6	0.3	2.6	1.2	190.3	1.004
PEC-BH_005508.LAB	8/31/2016	16:16:43	1.4	0.6	0.4	2.6	1.2	190.3	1.002
PEC-BH_005509.LAB	8/31/2016	16:16:58	1.7	< 0.6	0.5	2.6	1.2	190.3	1.003
PEC-BH_005510.LAB	8/31/2016	16:17:13	1.5	< 0.6	0.4	2.6	1.1	190.3	1.003
PEC-BH_005511.LAB	8/31/2016	16:17:28	1.6	< 0.6	0.4	2.6	1.1	190.3	1.003
PEC-BH_005512.LAB	8/31/2016	16:17:43	1.5	< 0.6	0.5	2.5	1.1	190.3	1.001
PEC-BH_005513.LAB	8/31/2016	16:17:58	1.6	< 0.6	0.4	2.5	1.1	190.3	1.003
PEC-BH_005514.LAB	8/31/2016	16:18:13	1.5	< 0.6	0.4	2.5	1.0	190.3	1.003
PEC-BH_005553.LAB	8/31/2016	16:27:59	0.4	0.8	0.3	2.6	1.0	190.3	1.004
PEC-BH_005554.LAB	8/31/2016	16:28:14	0.8	< 0.6	0.3	2.7	1.2	190.2	1.004
PEC-BH_005555.LAB	8/31/2016	16:28:29	1.2	< 0.6	0.4	2.7	1.2	190.3	1.002
PEC-BH_005556.LAB	8/31/2016	16:28:44	1.4	< 0.6	0.5	2.7	1.2	190.2	1.002
PEC-BH_005557.LAB	8/31/2016	16:28:59	1.5	< 0.6	0.4	2.7	1.2	190.3	1.000
PEC-BH_005558.LAB	8/31/2016	16:29:14	1.6	< 0.6	0.5	2.6	1.1	190.3	1.001
PEC-BH_005559.LAB	8/31/2016	16:29:29	1.5	< 0.6	0.5	2.6	1.1	190.3	0.999
PEC-BH_005560.LAB	8/31/2016	16:29:44	1.4	< 0.6	0.4	2.6	1.0	190.3	0.999
PEC-BH_005561.LAB	8/31/2016	16:29:59	1.4	< 0.6	0.5	2.5	1.0	190.2	0.999
PEC-BH_005605.LAB	8/31/2016	16:41:01	0.4	1.3	0.3	2.9	1.1	190.3	1.002
PEC-BH_005606.LAB	8/31/2016	16:41:16	1.3	< 0.6	0.4	3.1	1.2	190.3	1.004
PEC-BH_005607.LAB	8/31/2016	16:41:31	1.8	< 0.6	< 0.3	3.0	1.1	190.3	1.002
PEC-BH_005608.LAB	8/31/2016	16:41:46	2.2	< 0.6	0.5	3.0	1.1	190.3	1.001
PEC-BH_005609.LAB	8/31/2016	16:42:01	2.2	< 0.6	0.5	3.0	1.1	190.3	1.001
PEC-BH_005610.LAB	8/31/2016	16:42:16	2.1	< 0.6	0.5	2.9	1.0	190.3	1.002
PEC-BH_005611.LAB	8/31/2016	16:42:31	2.1	< 0.6	0.4	2.9	1.0	190.3	1.003
PEC-BH_005612.LAB	8/31/2016	16:42:46	2.1	< 0.6	0.5	2.9	1.0	190.3	1.001
PEC-BH_005613.LAB	8/31/2016	16:43:01	2.0	< 0.6	0.5	2.8	0.9	190.3	1.004
PEC-BH Run 2	Minimum		< 0.2	< 0.6	< 0.3	2.4	< 0.1		
	Maximum		4.9	2.3	1.0	4.4	1.7		
	Average*		1.4	0.9	0.5	3.3	1.1		

*When calculating averages, any value less than the determined detection limit will be assigned the detection limit value.

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PEC-BH Run 3

Spectrum	Date	Time	HCl (ppmv wet)	HCN (ppmv wet)	HF (ppmv wet)	H2O (%v)	CO2 (%v wet)	FTIR Gas Cell Temp (C)	FTIR Gas Cell Pressure
PEC-BH_005815.LAB	9/1/2016	8:54:37	< 0.2	0.7	< 0.3	1.9	1.3	190.5	1.006
PEC-BH_005816.LAB	9/1/2016	8:54:52	< 0.2	< 0.6	< 0.3	2.0	1.3	190.5	1.007
PEC-BH_005817.LAB	9/1/2016	8:55:07	< 0.2	< 0.6	< 0.3	2.0	1.2	190.5	1.004
PEC-BH_005818.LAB	9/1/2016	8:55:22	< 0.2	< 0.6	< 0.3	2.0	1.2	190.5	1.004
PEC-BH_005819.LAB	9/1/2016	8:55:37	< 0.2	< 0.6	< 0.3	1.9	1.2	190.5	1.004
PEC-BH_005820.LAB	9/1/2016	8:55:52	< 0.2	< 0.6	< 0.3	1.9	1.2	190.4	1.005
PEC-BH_005821.LAB	9/1/2016	8:56:07	< 0.2	0.7	< 0.3	1.9	1.2	190.5	1.006
PEC-BH_005822.LAB	9/1/2016	8:56:22	< 0.2	< 0.6	< 0.3	1.9	1.2	190.5	1.004
PEC-BH_005823.LAB	9/1/2016	8:56:37	< 0.2	< 0.6	< 0.3	1.9	1.1	190.5	1.004
PEC-BH_005824.LAB	9/1/2016	8:56:52	< 0.2	< 0.6	< 0.3	1.9	1.0	190.5	1.004
PEC-BH_005861.LAB	9/1/2016	9:06:08	< 0.2	< 0.6	< 0.3	2.5	1.0	190.4	1.006
PEC-BH_005862.LAB	9/1/2016	9:06:23	< 0.2	< 0.6	< 0.3	2.9	1.3	190.4	1.004
PEC-BH_005863.LAB	9/1/2016	9:06:38	0.2	< 0.6	< 0.3	2.9	1.3	190.4	1.004
PEC-BH_005864.LAB	9/1/2016	9:06:53	< 0.2	< 0.6	< 0.3	2.7	1.2	190.5	1.004
PEC-BH_005865.LAB	9/1/2016	9:07:08	0.3	< 0.6	< 0.3	2.6	1.2	190.5	1.006
PEC-BH_005866.LAB	9/1/2016	9:07:23	0.4	< 0.6	< 0.3	2.6	1.2	190.5	1.005
PEC-BH_005867.LAB	9/1/2016	9:07:38	0.4	< 0.6	< 0.3	2.6	1.2	190.5	1.005
PEC-BH_005868.LAB	9/1/2016	9:07:53	0.4	< 0.6	< 0.3	2.6	1.2	190.4	1.006
PEC-BH_005869.LAB	9/1/2016	9:08:08	0.6	< 0.6	< 0.3	2.5	1.1	190.5	1.005
PEC-BH_005870.LAB	9/1/2016	9:08:23	0.6	< 0.6	< 0.3	2.5	1.0	190.5	1.004
PEC-BH_005907.LAB	9/1/2016	9:17:39	0.4	0.7	< 0.3	2.8	1.2	190.5	1.004
PEC-BH_005908.LAB	9/1/2016	9:17:54	0.7	< 0.6	< 0.3	2.8	1.1	190.5	1.004
PEC-BH_005909.LAB	9/1/2016	9:18:09	0.8	< 0.6	< 0.3	2.7	1.1	190.5	1.007
PEC-BH_005910.LAB	9/1/2016	9:18:24	1.2	< 0.6	< 0.3	2.6	1.1	190.5	1.005
PEC-BH_005911.LAB	9/1/2016	9:18:39	1.3	< 0.6	< 0.3	2.6	1.1	190.5	1.004
PEC-BH_005912.LAB	9/1/2016	9:18:54	1.4	< 0.6	< 0.3	2.6	1.1	190.5	1.003
PEC-BH_005913.LAB	9/1/2016	9:19:09	1.6	< 0.6	< 0.3	2.6	1.1	190.5	1.005
PEC-BH_005914.LAB	9/1/2016	9:19:24	1.3	< 0.6	< 0.3	2.6	1.0	190.5	1.006
PEC-BH_005915.LAB	9/1/2016	9:19:39	1.3	< 0.6	< 0.3	2.6	1.0	190.5	1.005
PEC-BH_005950.LAB	9/1/2016	9:28:25	0.8	< 0.6	< 0.3	2.4	1.4	190.5	1.007
PEC-BH_005951.LAB	9/1/2016	9:28:40	1.2	< 0.6	< 0.3	2.4	1.4	190.4	1.005
PEC-BH_005952.LAB	9/1/2016	9:28:55	1.9	< 0.6	< 0.3	2.4	1.3	190.4	1.004
PEC-BH_005953.LAB	9/1/2016	9:29:10	2.2	< 0.6	< 0.3	2.4	1.3	190.4	1.003
PEC-BH_005954.LAB	9/1/2016	9:29:25	2.5	< 0.6	< 0.3	2.4	1.3	190.4	1.007
PEC-BH_005955.LAB	9/1/2016	9:29:40	2.4	< 0.6	< 0.3	2.3	1.3	190.4	1.007
PEC-BH_005956.LAB	9/1/2016	9:29:55	2.5	< 0.6	< 0.3	2.3	1.3	190.4	1.007
PEC-BH_005957.LAB	9/1/2016	9:30:10	2.5	< 0.6	< 0.3	2.3	1.2	190.5	1.003
PEC-BH_005958.LAB	9/1/2016	9:30:25	2.3	< 0.6	< 0.3	2.2	1.1	190.4	1.005
PEC-BH_006001.LAB	9/1/2016	9:41:12	0.8	< 0.6	< 0.3	2.3	1.1	190.5	1.006
PEC-BH_006002.LAB	9/1/2016	9:41:27	1.3	< 0.6	< 0.3	2.4	1.3	190.5	1.007
PEC-BH_006003.LAB	9/1/2016	9:41:42	2.1	< 0.6	< 0.3	2.4	1.3	190.5	1.006
PEC-BH_006004.LAB	9/1/2016	9:41:57	2.4	< 0.6	< 0.3	2.4	1.3	190.5	1.002
PEC-BH_006005.LAB	9/1/2016	9:42:12	2.7	< 0.6	< 0.3	2.3	1.3	190.5	1.006
PEC-BH_006006.LAB	9/1/2016	9:42:27	2.8	< 0.6	< 0.3	2.3	1.2	190.5	1.006
PEC-BH_006007.LAB	9/1/2016	9:42:42	2.7	< 0.6	< 0.3	2.3	1.2	190.5	1.005
PEC-BH_006008.LAB	9/1/2016	9:42:57	2.7	< 0.6	< 0.3	2.3	1.2	190.5	1.002
PEC-BH_006009.LAB	9/1/2016	9:43:12	2.6	< 0.6	< 0.3	2.2	1.2	190.4	1.005
PEC-BH_006010.LAB	9/1/2016	9:43:27	2.5	< 0.6	< 0.3	2.1	1.0	190.5	1.004
PEC-BH_006065.LAB	9/1/2016	9:57:13	0.6	0.8	< 0.3	2.2	1.2	190.4	1.005
PEC-BH_006066.LAB	9/1/2016	9:57:28	1.2	< 0.6	< 0.3	2.2	1.3	190.5	1.006
PEC-BH_006067.LAB	9/1/2016	9:57:44	1.6	< 0.6	< 0.3	2.2	1.3	190.4	1.005
PEC-BH_006068.LAB	9/1/2016	9:57:59	2.0	< 0.6	< 0.3	2.2	1.3	190.5	1.006
PEC-BH_006069.LAB	9/1/2016	9:58:14	2.1	< 0.6	0.4	2.1	1.3	190.5	1.006
PEC-BH_006070.LAB	9/1/2016	9:58:29	2.3	< 0.6	< 0.3	2.1	1.2	190.5	1.004
PEC-BH_006071.LAB	9/1/2016	9:58:44	2.2	< 0.6	< 0.3	2.1	1.2	190.5	1.003
PEC-BH_006072.LAB	9/1/2016	9:58:59	2.2	< 0.6	< 0.3	2.1	1.2	190.5	1.005
PEC-BH_006073.LAB	9/1/2016	9:59:14	2.1	< 0.6	< 0.3	2.1	1.2	190.5	1.003
PEC-BH_006074.LAB	9/1/2016	9:59:29	2.1	< 0.6	< 0.3	2.0	1.0	190.5	1.004
PEC-BH_006117.LAB	9/1/2016	10:10:15	0.8	< 0.6	< 0.3	2.3	1.3	190.5	1.007
PEC-BH_006118.LAB	9/1/2016	10:10:30	1.6	< 0.6	< 0.3	2.3	1.2	190.5	1.006
PEC-BH_006119.LAB	9/1/2016	10:10:45	2.1	< 0.6	< 0.3	2.3	1.2	190.5	1.007
PEC-BH_006120.LAB	9/1/2016	10:11:00	2.4	< 0.6	< 0.3	2.2	1.2	190.5	1.006
PEC-BH_006121.LAB	9/1/2016	10:11:15	2.4	< 0.6	< 0.3	2.2	1.2	190.5	1.005
PEC-BH_006122.LAB	9/1/2016	10:11:30	2.7	< 0.6	< 0.3	2.2	1.1	190.5	1.003
PEC-BH_006123.LAB	9/1/2016	10:11:45	2.6	< 0.6	< 0.3	2.2	1.1	190.5	1.005
PEC-BH_006124.LAB	9/1/2016	10:12:00	2.4	< 0.6	< 0.3	2.2	1.1	190.4	1.007
PEC-BH_006125.LAB	9/1/2016	10:12:15	2.5	< 0.6	< 0.3	2.1	1.0	190.5	1.003
PEC-BH_006162.LAB	9/1/2016	10:21:31	0.8	0.6	0.4	2.5	1.3	190.5	1.005
PEC-BH_006163.LAB	9/1/2016	10:21:46	1.7	< 0.6	< 0.3	2.4	1.2	190.5	1.005
PEC-BH_006164.LAB	9/1/2016	10:22:01	2.1	< 0.6	< 0.3	2.4	1.2	190.5	1.003
PEC-BH_006165.LAB	9/1/2016	10:22:16	2.4	< 0.6	< 0.3	2.4	1.3	190.5	1.003
PEC-BH_006166.LAB	9/1/2016	10:22:31	2.4	< 0.6	0.3	2.3	1.2	190.5	1.005
PEC-BH_006167.LAB	9/1/2016	10:22:46	2.5	< 0.6	0.4	2.3	1.2	190.5	1.007
PEC-BH_006168.LAB	9/1/2016	10:23:01	2.5	< 0.6	< 0.3	2.3	1.2	190.6	1.005
PEC-BH_006169.LAB	9/1/2016	10:23:16	2.4	< 0.6	0.3	2.3	1.2	190.5	1.005
PEC-BH_006170.LAB	9/1/2016	10:23:31	2.3	< 0.6	0.3	2.2	1.1	190.6	1.007
PEC-BH_006171.LAB	9/1/2016	10:23:46	2.3	< 0.6	< 0.3	2.1	1.0	190.5	1.004
PEC-BH_006206.LAB	9/1/2016	10:32:32	0.7	< 0.6	< 0.3	2.4	1.3	190.5	1.003
PEC-BH_006207.LAB	9/1/2016	10:32:47	1.4	< 0.6	< 0.3	2.4	1.3	190.5	1.004
PEC-BH_006208.LAB	9/1/2016	10:33:02	1.8	< 0.6	0.4	2.4	1.3	190.5	1.006
PEC-BH_006209.LAB	9/1/2016	10:33:17	2.2	< 0.6	0.3	2.3	1.3	190.5	1.005
PEC-BH_006210.LAB	9/1/2016	10:33:32	2.2	< 0.6	0.3	2.3	1.3	190.5	1.004
PEC-BH_006211.LAB	9/1/2016	10:33:47	2.4	< 0.6	0.4	2.3	1.3	190.5	1.004
PEC-BH_006212.LAB	9/1/2016	10:34:03	2.2	< 0.6	< 0.3	2.3	1.2	190.5	1.006
PEC-BH_006213.LAB	9/1/2016	10:34:18	2.3	< 0.6	0.4	2.3	1.2	190.5	1.005
PEC-BH_006214.LAB	9/1/2016	10:34:33	2.0	< 0.6	0.4	2.2	1.2	190.5	1.008
PEC-BH_006215.LAB	9/1/2016	10:34:47	2.3	< 0.6	< 0.3	2.2	1.1	190.5	1.006

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Spectrum	Date	Time	HCl (ppmv wet)	HCN (ppmv wet)	HF (ppmv wet)	H2O (%v)	CO2 (%v wet)	FTIR Gas Cell Temp (C)	FTIR Gas Cell Pressure
PEC-BH_006258.LAB	9/1/2016	10:45:34	0.5	0.8	< 0.3	2.3	1.1	190.5	1.005
PEC-BH_006259.LAB	9/1/2016	10:45:49	1.0	< 0.6	< 0.3	2.4	1.4	190.5	1.003
PEC-BH_006260.LAB	9/1/2016	10:46:04	1.3	< 0.6	< 0.3	2.4	1.3	190.5	1.004
PEC-BH_006261.LAB	9/1/2016	10:46:19	1.6	< 0.6	0.3	2.3	1.3	190.5	1.004
PEC-BH_006262.LAB	9/1/2016	10:46:34	1.9	< 0.6	0.3	2.3	1.3	190.5	1.007
PEC-BH_006263.LAB	9/1/2016	10:46:49	1.9	< 0.6	0.3	2.3	1.3	190.4	1.006
PEC-BH_006264.LAB	9/1/2016	10:47:04	1.9	< 0.6	< 0.3	2.3	1.2	190.5	1.006
PEC-BH_006265.LAB	9/1/2016	10:47:19	1.9	< 0.6	0.4	2.3	1.2	190.5	1.004
PEC-BH_006266.LAB	9/1/2016	10:47:34	1.8	< 0.6	0.4	2.2	1.2	190.5	1.004
PEC-BH_006267.LAB	9/1/2016	10:47:49	1.7	< 0.6	0.3	2.2	1.1	190.5	1.004
PEC-BH_006307.LAB	9/1/2016	10:57:50	0.9	< 0.6	< 0.3	2.8	1.3	190.5	1.005
PEC-BH_006308.LAB	9/1/2016	10:58:05	1.4	< 0.6	< 0.3	2.7	1.3	190.5	1.005
PEC-BH_006309.LAB	9/1/2016	10:58:20	2.1	< 0.6	0.3	2.7	1.3	190.4	1.007
PEC-BH_006310.LAB	9/1/2016	10:58:35	2.5	< 0.6	0.4	2.7	1.2	190.4	1.006
PEC-BH_006311.LAB	9/1/2016	10:58:50	2.6	< 0.6	0.3	2.7	1.2	190.4	1.005
PEC-BH_006312.LAB	9/1/2016	10:59:05	2.5	< 0.6	0.4	2.7	1.2	190.5	1.004
PEC-BH_006313.LAB	9/1/2016	10:59:20	2.6	< 0.6	0.4	2.7	1.2	190.5	1.006
PEC-BH_006314.LAB	9/1/2016	10:59:35	2.4	< 0.6	0.5	2.6	1.2	190.4	1.007
PEC-BH_006315.LAB	9/1/2016	10:59:50	2.4	< 0.6	0.3	2.6	1.1	190.5	1.005
PEC-BH_006316.LAB	9/1/2016	11:00:05	2.2	< 0.6	0.4	2.5	1.0	190.5	1.003
PEC-BH_006367.LAB	9/1/2016	11:12:52	0.7	< 0.6	< 0.3	2.4	1.2	190.4	1.006
PEC-BH_006368.LAB	9/1/2016	11:13:07	1.9	1.5	0.3	2.9	1.6	190.4	1.005
PEC-BH_006369.LAB	9/1/2016	11:13:22	3.8	0.7	0.4	2.8	1.4	190.4	1.006
PEC-BH_006370.LAB	9/1/2016	11:13:37	4.0	< 0.6	0.3	2.7	1.3	190.4	1.005
PEC-BH_006371.LAB	9/1/2016	11:13:52	4.0	< 0.6	0.4	2.6	1.2	190.4	1.005
PEC-BH_006372.LAB	9/1/2016	11:14:07	3.8	< 0.6	0.5	2.6	1.2	190.4	1.003
PEC-BH_006373.LAB	9/1/2016	11:14:22	3.7	< 0.6	0.4	2.6	1.2	190.4	1.005
PEC-BH_006374.LAB	9/1/2016	11:14:37	3.6	< 0.6	0.5	2.5	1.2	190.5	1.006
PEC-BH_006375.LAB	9/1/2016	11:14:52	3.4	< 0.6	0.4	2.5	1.2	190.4	1.006
PEC-BH_006376.LAB	9/1/2016	11:15:07	3.3	< 0.6	0.4	2.4	1.0	190.5	1.007
PEC-BH_006453.LAB	9/1/2016	11:34:42	1.1	< 0.6	0.3	2.7	1.3	190.4	1.004
PEC-BH_006454.LAB	9/1/2016	11:34:57	1.9	< 0.6	0.4	2.7	1.3	190.5	1.003
PEC-BH_006455.LAB	9/1/2016	11:35:12	2.4	< 0.6	0.4	2.7	1.3	190.5	1.006
PEC-BH_006456.LAB	9/1/2016	11:35:27	2.7	< 0.6	0.4	2.7	1.3	190.4	1.003
PEC-BH_006457.LAB	9/1/2016	11:35:43	2.6	< 0.6	0.4	2.7	1.2	190.5	1.006
PEC-BH_006458.LAB	9/1/2016	11:35:57	2.7	< 0.6	0.4	2.7	1.2	190.5	1.007
PEC-BH_006459.LAB	9/1/2016	11:36:12	2.7	< 0.6	0.4	2.7	1.2	190.5	1.004
PEC-BH_006460.LAB	9/1/2016	11:36:27	2.6	< 0.6	0.5	2.6	1.2	190.5	1.003
PEC-BH_006461.LAB	9/1/2016	11:36:43	2.5	< 0.6	0.6	2.5	1.1	190.5	1.002
PEC-BH_006495.LAB	9/1/2016	11:45:13	1.2	< 0.6	0.3	2.6	1.4	190.4	1.004
PEC-BH_006496.LAB	9/1/2016	11:45:29	1.9	< 0.6	0.4	2.6	1.3	190.5	1.004
PEC-BH_006497.LAB	9/1/2016	11:45:43	2.4	< 0.6	0.3	2.5	1.3	190.4	1.005
PEC-BH_006498.LAB	9/1/2016	11:45:59	2.6	< 0.6	0.5	2.5	1.3	190.5	1.006
PEC-BH_006499.LAB	9/1/2016	11:46:14	2.6	< 0.6	0.5	2.5	1.3	190.4	1.006
PEC-BH_006500.LAB	9/1/2016	11:46:29	2.7	< 0.6	0.6	2.5	1.2	190.5	1.006
PEC-BH_006501.LAB	9/1/2016	11:46:44	2.5	< 0.6	0.5	2.4	1.2	190.5	1.005
PEC-BH_006502.LAB	9/1/2016	11:46:59	2.5	< 0.6	0.6	2.4	1.2	190.5	1.006
PEC-BH_006503.LAB	9/1/2016	11:47:14	2.4	< 0.6	0.5	2.3	1.0	190.5	1.005
PEC-BH_006540.LAB	9/1/2016	11:56:30	0.9	< 0.6	0.5	2.6	1.2	190.4	1.006
PEC-BH_006541.LAB	9/1/2016	11:56:45	2.2	< 0.6	0.3	2.7	1.3	190.4	1.009
PEC-BH_006542.LAB	9/1/2016	11:57:00	3.0	< 0.6	0.4	2.6	1.3	190.4	1.005
PEC-BH_006543.LAB	9/1/2016	11:57:15	3.1	< 0.6	0.6	2.6	1.3	190.4	1.006
PEC-BH_006544.LAB	9/1/2016	11:57:30	3.0	< 0.6	0.5	2.5	1.3	190.4	1.006
PEC-BH_006545.LAB	9/1/2016	11:57:45	2.9	< 0.6	0.6	2.4	1.2	190.5	1.006
PEC-BH_006546.LAB	9/1/2016	11:58:00	3.0	< 0.6	0.6	2.4	1.2	190.4	1.006
PEC-BH_006547.LAB	9/1/2016	11:58:15	2.6	< 0.6	0.7	2.4	1.2	190.4	1.003
PEC-BH_006548.LAB	9/1/2016	11:58:30	2.6	< 0.6	0.6	2.4	1.1	190.4	1.003
PEC-BH_006587.LAB	9/1/2016	12:08:16	1.6	< 0.6	0.4	2.5	1.3	190.5	1.008
PEC-BH_006588.LAB	9/1/2016	12:08:31	2.6	< 0.6	0.6	2.5	1.2	190.5	1.007
PEC-BH_006589.LAB	9/1/2016	12:08:46	2.8	< 0.6	0.6	2.5	1.2	190.4	1.006
PEC-BH_006590.LAB	9/1/2016	12:09:01	2.9	< 0.6	0.5	2.5	1.2	190.5	1.007
PEC-BH_006591.LAB	9/1/2016	12:09:16	2.9	< 0.6	0.5	2.5	1.2	190.5	1.004
PEC-BH_006592.LAB	9/1/2016	12:09:31	2.7	< 0.6	0.6	2.5	1.2	190.5	1.003
PEC-BH_006593.LAB	9/1/2016	12:09:46	2.8	< 0.6	0.6	2.4	1.2	190.5	1.005
PEC-BH_006594.LAB	9/1/2016	12:10:01	2.6	< 0.6	0.6	2.4	1.1	190.5	1.005
PEC-BH_006595.LAB	9/1/2016	12:10:16	2.6	< 0.6	0.7	2.3	1.1	190.4	1.005
PEC-BH_006629.LAB	9/1/2016	12:18:47	1.1	< 0.6	0.6	2.8	1.4	190.4	1.006
PEC-BH_006630.LAB	9/1/2016	12:19:02	2.2	< 0.6	0.5	2.7	1.3	190.4	1.006
PEC-BH_006631.LAB	9/1/2016	12:19:17	2.6	< 0.6	0.5	2.6	1.4	190.5	1.005
PEC-BH_006632.LAB	9/1/2016	12:19:32	2.6	< 0.6	0.5	2.6	1.3	190.4	1.006
PEC-BH_006633.LAB	9/1/2016	12:19:47	2.7	< 0.6	0.5	2.5	1.3	190.5	1.008
PEC-BH_006634.LAB	9/1/2016	12:20:02	2.7	< 0.6	0.7	2.5	1.3	190.5	1.006
PEC-BH_006635.LAB	9/1/2016	12:20:17	2.5	< 0.6	0.7	2.5	1.3	190.5	1.006
PEC-BH_006636.LAB	9/1/2016	12:20:32	2.4	< 0.6	0.6	2.5	1.2	190.5	1.008
PEC-BH_006637.LAB	9/1/2016	12:20:47	2.5	< 0.6	0.7	2.4	1.1	190.5	1.005
PEC-BH_006638.LAB	9/1/2016	12:21:02	2.3	< 0.6	0.6	2.3	1.0	190.5	1.006

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Spectrum	Date	Time	HCl (ppmv wet)	HCN (ppmv wet)	HF (ppmv wet)	H2O (%v)	CO2 (%v wet)	FTIR Gas Cell Temp (C)	FTIR Gas Cell Pressure
PEC-BH_006672.LAB	9/1/2016	12:29:33	0.9	0.8	0.5	2.6	1.3	190.5	1.005
PEC-BH_006673.LAB	9/1/2016	12:29:48	1.5	< 0.6	0.4	2.6	1.3	190.4	1.004
PEC-BH_006674.LAB	9/1/2016	12:30:03	2.2	< 0.6	0.4	2.6	1.3	190.4	1.005
PEC-BH_006675.LAB	9/1/2016	12:30:18	2.5	< 0.6	0.6	2.5	1.3	190.4	1.007
PEC-BH_006676.LAB	9/1/2016	12:30:33	2.4	< 0.6	0.5	2.5	1.2	190.5	1.005
PEC-BH_006677.LAB	9/1/2016	12:30:48	2.5	< 0.6	0.6	2.5	1.2	190.5	1.005
PEC-BH_006678.LAB	9/1/2016	12:31:03	2.3	< 0.6	0.8	2.4	1.2	190.4	1.005
PEC-BH_006679.LAB	9/1/2016	12:31:18	2.3	< 0.6	0.7	2.4	1.2	190.5	1.007
PEC-BH_006680.LAB	9/1/2016	12:31:34	2.3	< 0.6	0.7	2.4	1.1	190.5	1.005
PEC-BH_006681.LAB	9/1/2016	12:31:48	2.2	< 0.6	0.7	2.3	1.0	190.5	1.006
PEC-BH_006732.LAB	9/1/2016	12:44:35	0.4	< 0.6	< 0.3	2.4	1.3	190.5	1.007
PEC-BH_006733.LAB	9/1/2016	12:44:50	1.0	< 0.6	0.4	2.5	1.2	190.5	1.004
PEC-BH_006734.LAB	9/1/2016	12:45:05	1.4	< 0.6	0.3	2.5	1.2	190.5	1.003
PEC-BH_006735.LAB	9/1/2016	12:45:20	1.6	< 0.6	0.4	2.5	1.2	190.5	1.005
PEC-BH_006736.LAB	9/1/2016	12:45:35	1.7	< 0.6	0.4	2.5	1.1	190.5	1.006
PEC-BH_006737.LAB	9/1/2016	12:45:50	1.7	< 0.6	0.4	2.5	1.1	190.5	1.004
PEC-BH_006738.LAB	9/1/2016	12:46:05	1.7	< 0.6	0.4	2.5	1.1	190.5	1.004
PEC-BH_006739.LAB	9/1/2016	12:46:20	1.6	< 0.6	0.5	2.4	1.1	190.5	1.005
PEC-BH_006740.LAB	9/1/2016	12:46:35	1.6	< 0.6	0.5	2.4	1.0	190.5	1.005
PEC-BH_006845.LAB	9/1/2016	13:12:53	< 0.2	< 0.6	< 0.3	2.1	1.2	190.4	1.004
PEC-BH_006846.LAB	9/1/2016	13:13:08	0.4	< 0.6	< 0.3	2.2	1.3	190.4	1.005
PEC-BH_006847.LAB	9/1/2016	13:13:23	0.6	< 0.6	< 0.3	2.2	1.3	190.4	1.003
PEC-BH_006848.LAB	9/1/2016	13:13:38	0.9	< 0.6	< 0.3	2.2	1.3	190.4	1.002
PEC-BH_006849.LAB	9/1/2016	13:13:53	1.3	< 0.6	< 0.3	2.1	1.3	190.4	1.005
PEC-BH_006850.LAB	9/1/2016	13:14:08	1.2	< 0.6	< 0.3	2.1	1.2	190.5	1.006
PEC-BH_006851.LAB	9/1/2016	13:14:23	1.2	< 0.6	< 0.3	2.1	1.2	190.5	1.002
PEC-BH_006852.LAB	9/1/2016	13:14:38	1.2	< 0.6	< 0.3	2.1	1.2	190.5	1.006
PEC-BH_006853.LAB	9/1/2016	13:14:53	1.1	< 0.6	0.3	2.1	1.2	190.4	1.005
PEC-BH_006854.LAB	9/1/2016	13:15:08	1.1	< 0.6	< 0.3	2.1	1.0	190.4	1.005
PEC-BH_006890.LAB	9/1/2016	13:24:09	0.3	< 0.6	< 0.3	2.3	1.1	190.4	1.005
PEC-BH_006891.LAB	9/1/2016	13:24:24	0.7	0.6	< 0.3	2.4	1.4	190.4	1.006
PEC-BH_006892.LAB	9/1/2016	13:24:39	1.2	< 0.6	< 0.3	2.4	1.3	190.5	1.005
PEC-BH_006893.LAB	9/1/2016	13:24:54	1.5	< 0.6	< 0.3	2.4	1.3	190.4	1.005
PEC-BH_006894.LAB	9/1/2016	13:25:09	1.6	< 0.6	< 0.3	2.3	1.3	190.4	1.004
PEC-BH_006895.LAB	9/1/2016	13:25:24	1.8	< 0.6	0.3	2.3	1.3	190.5	1.003
PEC-BH_006896.LAB	9/1/2016	13:25:39	1.8	< 0.6	0.4	2.3	1.3	190.4	1.003
PEC-BH_006897.LAB	9/1/2016	13:25:54	1.6	< 0.6	0.4	2.3	1.3	190.5	1.005
PEC-BH_006898.LAB	9/1/2016	13:26:09	1.7	< 0.6	0.4	2.3	1.2	190.5	1.007
PEC-BH_006899.LAB	9/1/2016	13:26:24	1.4	< 0.6	0.4	2.2	1.1	190.5	1.005
PEC-BH_006931.LAB	9/1/2016	13:34:25	0.7	< 0.6	< 0.3	2.5	1.0	190.5	1.005
PEC-BH_006932.LAB	9/1/2016	13:34:40	1.2	< 0.6	0.3	2.7	1.4	190.5	1.002
PEC-BH_006933.LAB	9/1/2016	13:34:55	1.7	< 0.6	0.3	2.6	1.3	190.5	1.003
PEC-BH_006934.LAB	9/1/2016	13:35:10	2.1	< 0.6	0.3	2.7	1.3	190.5	1.004
PEC-BH_006935.LAB	9/1/2016	13:35:25	2.2	< 0.6	0.5	2.6	1.3	190.4	1.005
PEC-BH_006936.LAB	9/1/2016	13:35:41	2.2	< 0.6	0.4	2.5	1.3	190.5	1.003
PEC-BH_006937.LAB	9/1/2016	13:35:55	2.3	< 0.6	0.5	2.5	1.3	190.4	1.005
PEC-BH_006938.LAB	9/1/2016	13:36:11	2.3	< 0.6	0.4	2.5	1.2	190.4	1.005
PEC-BH_006939.LAB	9/1/2016	13:36:25	2.0	< 0.6	0.5	2.4	1.2	190.4	1.003
PEC-BH_006940.LAB	9/1/2016	13:36:41	2.0	< 0.6	0.6	2.4	1.1	190.5	1.005
PEC-BH_006976.LAB	9/1/2016	13:45:42	1.2	< 0.6	0.5	2.5	1.4	190.5	1.006
PEC-BH_006977.LAB	9/1/2016	13:45:57	1.9	< 0.6	0.4	2.4	1.3	190.5	1.007
PEC-BH_006978.LAB	9/1/2016	13:46:12	2.0	< 0.6	0.5	2.4	1.3	190.4	1.005
PEC-BH_006979.LAB	9/1/2016	13:46:27	2.3	< 0.6	0.4	2.4	1.3	190.5	1.005
PEC-BH_006980.LAB	9/1/2016	13:46:42	2.3	< 0.6	0.5	2.4	1.3	190.4	1.002
PEC-BH_006981.LAB	9/1/2016	13:46:57	2.2	< 0.6	0.5	2.3	1.3	190.4	1.004
PEC-BH_006982.LAB	9/1/2016	13:47:12	2.2	< 0.6	0.6	2.3	1.3	190.5	1.004
PEC-BH_006983.LAB	9/1/2016	13:47:27	2.2	< 0.6	0.7	2.3	1.2	190.4	1.003
PEC-BH_006984.LAB	9/1/2016	13:47:42	2.0	< 0.6	0.6	2.2	1.1	190.5	1.007
PEC-BH_007015.LAB	9/1/2016	13:55:28	0.7	< 0.6	0.4	2.5	1.1	190.5	1.006
PEC-BH_007016.LAB	9/1/2016	13:55:43	1.5	< 0.6	0.4	2.5	1.3	190.5	1.003
PEC-BH_007017.LAB	9/1/2016	13:55:58	1.9	< 0.6	0.4	2.5	1.3	190.5	1.006
PEC-BH_007018.LAB	9/1/2016	13:56:13	2.3	< 0.6	0.4	2.5	1.3	190.5	1.001
PEC-BH_007019.LAB	9/1/2016	13:56:28	2.4	< 0.6	0.7	2.4	1.3	190.5	1.006
PEC-BH_007020.LAB	9/1/2016	13:56:43	2.5	< 0.6	0.6	2.4	1.2	190.4	1.004
PEC-BH_007021.LAB	9/1/2016	13:56:58	2.4	< 0.6	0.6	2.4	1.2	190.5	1.005
PEC-BH_007022.LAB	9/1/2016	13:57:13	2.3	< 0.6	0.7	2.4	1.2	190.4	1.006
PEC-BH_007023.LAB	9/1/2016	13:57:28	2.2	< 0.6	0.7	2.3	1.1	190.5	1.006
PEC-BH_007057.LAB	9/1/2016	14:05:59	0.6	0.6	0.5	2.4	1.0	190.4	1.004
PEC-BH_007058.LAB	9/1/2016	14:06:14	1.4	0.8	0.6	2.5	1.3	190.3	1.006
PEC-BH_007059.LAB	9/1/2016	14:06:29	2.3	< 0.6	0.7	2.5	1.2	190.4	1.004
PEC-BH_007060.LAB	9/1/2016	14:06:44	2.6	< 0.6	0.6	2.5	1.2	190.4	1.006
PEC-BH_007061.LAB	9/1/2016	14:06:59	2.7	< 0.6	0.7	2.4	1.2	190.4	1.004
PEC-BH_007062.LAB	9/1/2016	14:07:14	2.7	< 0.6	0.7	2.4	1.2	190.4	1.004
PEC-BH_007063.LAB	9/1/2016	14:07:29	2.5	< 0.6	0.8	2.4	1.2	190.3	1.004
PEC-BH_007064.LAB	9/1/2016	14:07:44	2.5	< 0.6	0.7	2.4	1.1	190.4	1.006
PEC-BH_007065.LAB	9/1/2016	14:07:59	2.4	< 0.6	0.6	2.3	1.1	190.4	1.005
PEC-BH_007066.LAB	9/1/2016	14:08:14	2.2	< 0.6	0.7	2.3	1.0	190.4	1.004
PEC-BH_007108.LAB	9/1/2016	14:18:45	0.7	< 0.6	0.5	2.3	1.2	190.5	1.005
PEC-BH_007109.LAB	9/1/2016	14:19:00	1.7	< 0.6	0.4	2.3	1.3	190.5	1.003
PEC-BH_007110.LAB	9/1/2016	14:19:15	2.0	< 0.6	0.4	2.3	1.3	190.5	1.005
PEC-BH_007111.LAB	9/1/2016	14:19:30	2.2	< 0.6	0.6	2.3	1.3	190.5	1.006
PEC-BH_007112.LAB	9/1/2016	14:19:45	2.4	< 0.6	0.6	2.3	1.3	190.6	1.004
PEC-BH_007113.LAB	9/1/2016	14:20:00	2.3	< 0.6	0.6	2.3	1.2	190.5	1.005
PEC-BH_007114.LAB	9/1/2016	14:20:15	2.1	< 0.6	0.6	2.2	1.2	190.5	1.004
PEC-BH_007115.LAB	9/1/2016	14:20:30	2.1	< 0.6	0.6	2.2	1.2	190.5	1.004
PEC-BH_007116.LAB	9/1/2016	14:20:45	2.0	< 0.6	0.7	2.2	1.1	190.5	1.005
PEC-BH_007117.LAB	9/1/2016	14:21:00	2.0	< 0.6	0.6	2.1	1.0	190.5	1.005

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Spectrum	Date	Time	HCl (ppmv wet)	HCN (ppmv wet)	HF (ppmv wet)	H2O (%v)	CO2 (%v wet)	FTIR Gas Cell Temp (C)	FTIR Gas Cell Pressure
PEC-BH_007151.LAB	9/1/2016	14:29:31	1.0	< 0.6	0.4	2.5	1.3	190.5	1.005
PEC-BH_007152.LAB	9/1/2016	14:29:46	1.8	< 0.6	0.6	2.5	1.2	190.6	1.004
PEC-BH_007153.LAB	9/1/2016	14:30:01	2.3	< 0.6	0.4	2.5	1.3	190.5	1.001
PEC-BH_007154.LAB	9/1/2016	14:30:16	2.5	< 0.6	0.6	2.5	1.2	190.5	1.005
PEC-BH_007155.LAB	9/1/2016	14:30:32	2.6	< 0.6	0.6	2.4	1.2	190.5	1.005
PEC-BH_007156.LAB	9/1/2016	14:30:47	2.5	< 0.6	0.6	2.4	1.2	190.5	1.005
PEC-BH_007157.LAB	9/1/2016	14:31:02	2.5	< 0.6	0.7	2.4	1.2	190.5	1.005
PEC-BH_007158.LAB	9/1/2016	14:31:17	2.4	< 0.6	0.7	2.4	1.2	190.5	1.007
PEC-BH_007159.LAB	9/1/2016	14:31:32	2.3	< 0.6	0.6	2.3	1.1	190.6	1.006
PEC-BH_007160.LAB	9/1/2016	14:31:47	2.1	< 0.6	0.6	2.3	1.0	190.6	1.006
PEC-BH_007197.LAB	9/1/2016	14:41:03	1.6	< 0.6	0.4	2.7	1.3	190.5	1.004
PEC-BH_007198.LAB	9/1/2016	14:41:18	3.6	< 0.6	0.6	2.8	1.2	190.6	1.003
PEC-BH_007199.LAB	9/1/2016	14:41:33	4.2	< 0.6	0.6	2.7	1.2	190.6	1.005
PEC-BH_007200.LAB	9/1/2016	14:41:48	4.3	< 0.6	0.8	2.7	1.2	190.5	1.005
PEC-BH_007201.LAB	9/1/2016	14:42:03	4.1	< 0.6	0.7	2.6	1.2	190.5	1.005
PEC-BH_007202.LAB	9/1/2016	14:42:18	4.1	< 0.6	0.7	2.6	1.1	190.5	1.006
PEC-BH_007203.LAB	9/1/2016	14:42:33	3.8	< 0.6	0.8	2.6	1.1	190.5	1.006
PEC-BH_007204.LAB	9/1/2016	14:42:48	3.7	< 0.6	0.6	2.6	1.1	190.5	1.004
PEC-BH_007205.LAB	9/1/2016	14:43:03	3.4	< 0.6	0.7	2.5	1.0	190.5	1.006
PEC-BH_007206.LAB	9/1/2016	14:43:18	3.2	< 0.6	0.6	2.4	1.0	190.5	1.005
PEC-BH_007253.LAB	9/1/2016	14:55:04	1.3	< 0.6	0.4	2.5	1.4	190.5	1.003
PEC-BH_007254.LAB	9/1/2016	14:55:19	1.9	< 0.6	0.4	2.4	1.3	190.5	1.003
PEC-BH_007255.LAB	9/1/2016	14:55:34	2.3	< 0.6	0.5	2.4	1.4	190.5	1.004
PEC-BH_007256.LAB	9/1/2016	14:55:49	2.5	< 0.6	0.5	2.4	1.3	190.5	1.005
PEC-BH_007257.LAB	9/1/2016	14:56:04	2.5	< 0.6	0.5	2.4	1.3	190.5	1.006
PEC-BH_007258.LAB	9/1/2016	14:56:19	2.4	< 0.6	0.6	2.3	1.3	190.5	1.006
PEC-BH_007259.LAB	9/1/2016	14:56:34	2.5	< 0.6	0.7	2.3	1.3	190.5	1.004
PEC-BH_007260.LAB	9/1/2016	14:56:49	2.3	< 0.6	0.7	2.3	1.2	190.5	1.007
PEC-BH_007261.LAB	9/1/2016	14:57:05	2.1	< 0.6	0.7	2.2	1.1	190.4	1.006
PEC-BH_007262.LAB	9/1/2016	14:57:19	2.0	< 0.6	0.7	2.1	1.0	190.5	1.005
PEC-BH_007309.LAB	9/1/2016	15:09:06	0.5	< 0.6	0.4	2.3	1.3	190.5	1.005
PEC-BH_007310.LAB	9/1/2016	15:09:21	1.3	< 0.6	0.4	2.2	1.2	190.5	1.006
PEC-BH_007311.LAB	9/1/2016	15:09:36	1.7	< 0.6	0.4	2.2	1.2	190.5	1.005
PEC-BH_007312.LAB	9/1/2016	15:09:51	2.0	< 0.6	< 0.3	2.2	1.1	190.5	1.003
PEC-BH_007313.LAB	9/1/2016	15:10:06	2.1	< 0.6	0.4	2.2	1.1	190.5	1.004
PEC-BH_007314.LAB	9/1/2016	15:10:21	1.9	< 0.6	0.5	2.2	1.1	190.5	1.004
PEC-BH_007315.LAB	9/1/2016	15:10:36	2.0	< 0.6	0.4	2.2	1.1	190.5	1.002
PEC-BH_007316.LAB	9/1/2016	15:10:51	1.9	< 0.6	0.5	2.1	1.1	190.5	1.002
PEC-BH_007317.LAB	9/1/2016	15:11:06	1.9	< 0.6	0.5	2.1	1.0	190.5	1.004
PEC-BH_007350.LAB	9/1/2016	15:19:22	1.1	< 0.6	0.5	3.0	1.3	190.5	1.008
PEC-BH_007351.LAB	9/1/2016	15:19:37	2.3	< 0.6	0.6	2.9	1.2	190.5	1.007
PEC-BH_007352.LAB	9/1/2016	15:19:52	2.8	< 0.6	0.5	2.9	1.2	190.4	1.003
PEC-BH_007353.LAB	9/1/2016	15:20:07	2.8	< 0.6	0.6	2.9	1.2	190.5	1.006
PEC-BH_007354.LAB	9/1/2016	15:20:22	2.8	< 0.6	0.6	2.8	1.2	190.5	1.002
PEC-BH_007355.LAB	9/1/2016	15:20:37	2.8	< 0.6	0.7	2.7	1.2	190.5	1.006
PEC-BH_007356.LAB	9/1/2016	15:20:52	2.7	< 0.6	0.7	2.7	1.2	190.5	1.006
PEC-BH_007357.LAB	9/1/2016	15:21:07	2.5	< 0.6	0.7	2.7	1.1	190.5	1.005
PEC-BH_007358.LAB	9/1/2016	15:21:22	2.4	< 0.6	0.8	2.6	1.0	190.5	1.003
PEC-BH_007396.LAB	9/1/2016	15:30:53	0.7	0.9	0.5	2.4	1.0	190.5	1.006
PEC-BH_007397.LAB	9/1/2016	15:31:08	1.4	< 0.6	0.4	2.5	1.3	190.5	1.008
PEC-BH_007398.LAB	9/1/2016	15:31:23	2.1	< 0.6	0.4	2.5	1.3	190.5	1.005
PEC-BH_007399.LAB	9/1/2016	15:31:38	2.5	< 0.6	0.6	2.5	1.3	190.5	1.007
PEC-BH_007400.LAB	9/1/2016	15:31:53	2.7	< 0.6	0.5	2.4	1.3	190.5	1.007
PEC-BH_007401.LAB	9/1/2016	15:32:08	2.5	< 0.6	0.7	2.4	1.3	190.4	1.005
PEC-BH_007402.LAB	9/1/2016	15:32:23	2.5	< 0.6	0.6	2.4	1.2	190.5	1.005
PEC-BH_007403.LAB	9/1/2016	15:32:38	2.3	< 0.6	0.7	2.4	1.2	190.5	1.004
PEC-BH_007404.LAB	9/1/2016	15:32:53	2.3	< 0.6	0.6	2.3	1.2	190.4	1.005
PEC-BH_007405.LAB	9/1/2016	15:33:08	2.3	< 0.6	0.7	2.3	1.1	190.4	1.003
PEC-BH_007437.LAB	9/1/2016	15:41:09	1.1	< 0.6	0.5	2.5	1.4	190.4	1.005
PEC-BH_007438.LAB	9/1/2016	15:41:24	2.0	< 0.6	0.6	2.5	1.3	190.4	1.003
PEC-BH_007439.LAB	9/1/2016	15:41:39	2.3	< 0.6	0.5	2.4	1.3	190.4	1.006
PEC-BH_007440.LAB	9/1/2016	15:41:54	2.4	< 0.6	0.7	2.4	1.3	190.4	1.007
PEC-BH_007441.LAB	9/1/2016	15:42:09	2.5	< 0.6	0.7	2.4	1.3	190.4	1.005
PEC-BH_007442.LAB	9/1/2016	15:42:24	2.5	< 0.6	0.8	2.3	1.3	190.4	1.007
PEC-BH_007443.LAB	9/1/2016	15:42:39	2.3	< 0.6	0.7	2.3	1.2	190.4	1.005
PEC-BH_007444.LAB	9/1/2016	15:42:54	2.3	< 0.6	0.8	2.3	1.2	190.4	1.004
PEC-BH_007445.LAB	9/1/2016	15:43:09	2.2	< 0.6	0.6	2.3	1.1	190.4	1.003

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Spectrum	Date	Time	HCl (ppmv wet)	HCN (ppmv wet)	HF (ppmv wet)	H2O (%v)	CO2 (%v wet)	FTIR Gas Cell Temp (C)	FTIR Gas Cell Pressure
PEC-BH_007481.LAB	9/1/2016	15:52:11	0.7	0.9	0.4	2.4	1.1	190.4	1.006
PEC-BH_007482.LAB	9/1/2016	15:52:25	2.1	0.9	0.5	2.6	1.4	190.4	1.006
PEC-BH_007483.LAB	9/1/2016	15:52:41	3.2	< 0.6	0.5	2.5	1.3	190.4	1.005
PEC-BH_007484.LAB	9/1/2016	15:52:56	3.4	< 0.6	0.7	2.5	1.2	190.4	1.003
PEC-BH_007485.LAB	9/1/2016	15:53:11	3.3	< 0.6	0.6	2.4	1.2	190.4	1.003
PEC-BH_007486.LAB	9/1/2016	15:53:26	3.0	< 0.6	0.6	2.4	1.2	190.4	1.004
PEC-BH_007487.LAB	9/1/2016	15:53:41	3.0	< 0.6	0.7	2.4	1.2	190.5	1.005
PEC-BH_007488.LAB	9/1/2016	15:53:56	2.9	< 0.6	0.8	2.4	1.2	190.5	1.006
PEC-BH_007489.LAB	9/1/2016	15:54:11	2.7	< 0.6	0.7	2.3	1.1	190.5	1.008
PEC-BH_007490.LAB	9/1/2016	15:54:26	2.7	< 0.6	0.7	2.3	1.0	190.4	1.007
PEC-BH_007523.LAB	9/1/2016	16:02:42	1.4	< 0.6	0.5	2.5	1.3	190.4	1.003
PEC-BH_007524.LAB	9/1/2016	16:02:57	2.3	< 0.6	0.5	2.5	1.2	190.5	1.006
PEC-BH_007525.LAB	9/1/2016	16:03:12	2.4	< 0.6	0.5	2.4	1.2	190.4	1.006
PEC-BH_007526.LAB	9/1/2016	16:03:27	2.6	< 0.6	0.7	2.4	1.2	190.4	1.005
PEC-BH_007527.LAB	9/1/2016	16:03:42	2.8	< 0.6	0.6	2.4	1.2	190.4	1.005
PEC-BH_007528.LAB	9/1/2016	16:03:57	2.6	< 0.6	0.7	2.4	1.2	190.4	1.007
PEC-BH_007529.LAB	9/1/2016	16:04:12	2.5	< 0.6	0.7	2.3	1.2	190.4	1.001
PEC-BH_007530.LAB	9/1/2016	16:04:27	2.4	< 0.6	0.7	2.3	1.1	190.5	1.007
PEC-BH_007531.LAB	9/1/2016	16:04:42	2.2	< 0.6	0.7	2.3	1.1	190.5	1.006
PEC-BH_007532.LAB	9/1/2016	16:04:57	2.3	< 0.6	0.6	2.2	1.0	190.5	1.003
PEC-BH_007585.LAB	9/1/2016	16:18:13	1.2	0.9	0.4	2.3	1.3	190.5	1.004
PEC-BH_007586.LAB	9/1/2016	16:18:28	2.4	< 0.6	0.4	2.3	1.3	190.5	1.006
PEC-BH_007587.LAB	9/1/2016	16:18:43	2.7	< 0.6	0.5	2.3	1.3	190.5	1.006
PEC-BH_007588.LAB	9/1/2016	16:18:58	2.8	< 0.6	0.4	2.3	1.3	190.4	1.004
PEC-BH_007589.LAB	9/1/2016	16:19:13	2.8	< 0.6	0.5	2.3	1.3	190.5	1.004
PEC-BH_007590.LAB	9/1/2016	16:19:28	2.7	< 0.6	0.6	2.3	1.2	190.5	1.006
PEC-BH_007591.LAB	9/1/2016	16:19:43	2.5	< 0.6	0.5	2.3	1.2	190.5	1.006
PEC-BH_007592.LAB	9/1/2016	16:19:58	2.6	< 0.6	0.6	2.3	1.2	190.5	1.004
PEC-BH_007593.LAB	9/1/2016	16:20:13	2.4	< 0.6	0.6	2.2	1.1	190.4	1.006
PEC-BH_007594.LAB	9/1/2016	16:20:28	2.3	< 0.6	0.5	2.2	1.1	190.4	1.006
PEC-BH_007595.LAB	9/1/2016	16:20:44	2.2	< 0.6	0.6	2.1	1.0	190.5	1.003
PEC-BH_007640.LAB	9/1/2016	16:32:00	0.5	0.7	< 0.3	2.2	1.3	190.5	1.005
PEC-BH_007641.LAB	9/1/2016	16:32:15	1.1	0.6	0.3	2.3	1.3	190.5	1.004
PEC-BH_007642.LAB	9/1/2016	16:32:30	1.7	< 0.6	0.4	2.3	1.2	190.5	1.003
PEC-BH_007643.LAB	9/1/2016	16:32:45	2.1	< 0.6	0.3	2.3	1.2	190.5	1.003
PEC-BH_007644.LAB	9/1/2016	16:33:00	2.4	< 0.6	0.5	2.3	1.2	190.5	1.003
PEC-BH_007645.LAB	9/1/2016	16:33:15	2.4	< 0.6	0.5	2.3	1.2	190.5	1.004
PEC-BH_007646.LAB	9/1/2016	16:33:30	2.2	< 0.6	0.5	2.3	1.2	190.5	1.004
PEC-BH_007647.LAB	9/1/2016	16:33:45	2.2	< 0.6	0.6	2.2	1.2	190.5	1.006
PEC-BH_007648.LAB	9/1/2016	16:34:00	2.0	< 0.6	0.5	2.2	1.1	190.5	1.002
PEC-BH_007649.LAB	9/1/2016	16:34:15	2.0	< 0.6	0.5	2.2	1.0	190.5	1.004
PEC-BH_007684.LAB	9/1/2016	16:43:01	0.9	0.8	0.4	2.7	1.2	190.5	1.003
PEC-BH_007685.LAB	9/1/2016	16:43:16	1.8	< 0.6	0.4	2.7	1.3	190.5	1.005
PEC-BH_007686.LAB	9/1/2016	16:43:31	2.4	< 0.6	0.5	2.6	1.3	190.5	1.003
PEC-BH_007687.LAB	9/1/2016	16:43:46	2.6	< 0.6	0.6	2.6	1.3	190.5	1.005
PEC-BH_007688.LAB	9/1/2016	16:44:01	2.7	< 0.6	0.5	2.6	1.3	190.5	1.002
PEC-BH_007689.LAB	9/1/2016	16:44:16	2.7	< 0.6	0.7	2.5	1.2	190.5	1.005
PEC-BH_007690.LAB	9/1/2016	16:44:31	2.7	< 0.6	0.6	2.5	1.2	190.5	1.006
PEC-BH_007691.LAB	9/1/2016	16:44:46	2.5	< 0.6	0.6	2.4	1.2	190.5	1.005
PEC-BH_007692.LAB	9/1/2016	16:45:01	2.3	< 0.6	0.7	2.4	1.2	190.4	1.006
PEC-BH_007693.LAB	9/1/2016	16:45:16	2.3	< 0.6	0.6	2.4	1.1	190.4	1.004
PEC-BH_007742.LAB	9/1/2016	16:57:32	0.7	1.1	0.3	2.4	1.2	190.6	1.007
PEC-BH_007743.LAB	9/1/2016	16:57:47	1.7	< 0.6	0.5	2.5	1.2	190.5	1.006
PEC-BH_007744.LAB	9/1/2016	16:58:02	2.5	< 0.6	0.5	2.6	1.2	190.6	1.006
PEC-BH_007745.LAB	9/1/2016	16:58:17	2.9	< 0.6	0.5	2.5	1.2	190.5	1.004
PEC-BH_007746.LAB	9/1/2016	16:58:33	3.0	< 0.6	0.5	2.5	1.2	190.5	1.004
PEC-BH_007747.LAB	9/1/2016	16:58:48	2.9	< 0.6	0.5	2.5	1.2	190.5	1.005
PEC-BH_007748.LAB	9/1/2016	16:59:03	2.7	< 0.6	0.6	2.4	1.1	190.5	1.005
PEC-BH_007749.LAB	9/1/2016	16:59:18	2.6	< 0.6	0.6	2.4	1.1	190.5	1.008
PEC-BH_007750.LAB	9/1/2016	16:59:33	2.5	< 0.6	0.6	2.4	1.0	190.5	1.006
PEC-BH_007790.LAB	9/1/2016	17:09:34	1.0	< 0.6	0.4	2.8	1.3	190.5	1.004
PEC-BH_007791.LAB	9/1/2016	17:09:49	2.1	< 0.6	0.4	2.8	1.3	190.5	1.003
PEC-BH_007792.LAB	9/1/2016	17:10:04	2.8	< 0.6	0.5	2.7	1.3	190.5	1.006
PEC-BH_007793.LAB	9/1/2016	17:10:19	3.0	< 0.6	0.6	2.7	1.3	190.5	1.004
PEC-BH_007794.LAB	9/1/2016	17:10:34	3.0	< 0.6	0.6	2.6	1.3	190.5	1.004
PEC-BH_007795.LAB	9/1/2016	17:10:49	2.9	< 0.6	0.6	2.6	1.2	190.5	1.007
PEC-BH_007796.LAB	9/1/2016	17:11:04	2.8	< 0.6	0.6	2.6	1.2	190.5	1.005
PEC-BH_007797.LAB	9/1/2016	17:11:19	2.6	< 0.6	0.6	2.5	1.2	190.5	1.001
PEC-BH_007798.LAB	9/1/2016	17:11:34	2.6	< 0.6	0.7	2.5	1.2	190.5	1.004
PEC-BH_007799.LAB	9/1/2016	17:11:49	2.4	< 0.6	0.6	2.4	1.0	190.5	1.005
PEC-BH_007836.LAB	9/1/2016	17:21:05	1.6	< 0.6	0.4	2.6	1.4	190.5	1.007
PEC-BH_007837.LAB	9/1/2016	17:21:20	2.6	< 0.6	0.5	2.5	1.3	190.5	1.006
PEC-BH_007838.LAB	9/1/2016	17:21:35	2.9	< 0.6	0.5	2.5	1.3	190.5	1.004
PEC-BH_007839.LAB	9/1/2016	17:21:50	3.1	< 0.6	0.6	2.4	1.3	190.5	1.004
PEC-BH_007840.LAB	9/1/2016	17:22:05	2.9	0.6	0.6	2.4	1.3	190.5	1.006
PEC-BH_007841.LAB	9/1/2016	17:22:20	2.9	< 0.6	0.7	2.4	1.2	190.5	1.007
PEC-BH_007842.LAB	9/1/2016	17:22:35	2.7	< 0.6	0.7	2.4	1.2	190.5	1.004
PEC-BH_007843.LAB	9/1/2016	17:22:50	2.7	< 0.6	0.7	2.3	1.2	190.5	1.003
PEC-BH_007844.LAB	9/1/2016	17:23:05	2.5	< 0.6	0.6	2.3	1.0	190.5	1.005

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PEC-BH Run 3

Spectrum	Date	Time	HCl (ppmv wet)	HCN (ppmv wet)	HF (ppmv wet)	H2O (%v)	CO2 (%v wet)	FTIR Gas Cell Temp (C)	FTIR Gas Cell Pressure
PEC-BH_007880.LAB	9/1/2016	17:32:06	0.6	< 0.6	0.4	2.4	1.0	190.5	1.004
PEC-BH_007881.LAB	9/1/2016	17:32:21	1.6	0.7	0.6	2.5	1.4	190.5	1.005
PEC-BH_007882.LAB	9/1/2016	17:32:36	2.5	< 0.6	0.5	2.4	1.3	190.5	1.005
PEC-BH_007883.LAB	9/1/2016	17:32:51	2.7	< 0.6	0.5	2.4	1.3	190.5	1.004
PEC-BH_007884.LAB	9/1/2016	17:33:06	2.8	< 0.6	0.6	2.4	1.3	190.5	1.003
PEC-BH_007885.LAB	9/1/2016	17:33:21	2.9	< 0.6	0.6	2.4	1.3	190.5	1.005
PEC-BH_007886.LAB	9/1/2016	17:33:36	2.8	< 0.6	0.6	2.3	1.3	190.5	1.004
PEC-BH_007887.LAB	9/1/2016	17:33:51	2.6	< 0.6	0.8	2.3	1.2	190.5	1.007
PEC-BH_007888.LAB	9/1/2016	17:34:06	2.6	< 0.6	0.7	2.3	1.2	190.5	1.004
PEC-BH_007889.LAB	9/1/2016	17:34:21	2.6	< 0.6	0.7	2.3	1.1	190.5	1.006
PEC-BH_007923.LAB	9/1/2016	17:42:52	0.8	0.7	0.5	2.6	1.3	190.5	1.006
PEC-BH_007924.LAB	9/1/2016	17:43:07	2.1	< 0.6	0.4	2.6	1.3	190.5	1.005
PEC-BH_007925.LAB	9/1/2016	17:43:22	2.7	< 0.6	0.5	2.6	1.3	190.5	1.005
PEC-BH_007926.LAB	9/1/2016	17:43:37	3.0	< 0.6	0.6	2.6	1.3	190.5	1.002
PEC-BH_007927.LAB	9/1/2016	17:43:52	3.1	< 0.6	0.6	2.5	1.3	190.5	1.007
PEC-BH_007928.LAB	9/1/2016	17:44:07	3.1	< 0.6	0.7	2.5	1.2	190.5	1.005
PEC-BH_007929.LAB	9/1/2016	17:44:22	2.9	< 0.6	0.7	2.5	1.2	190.5	1.007
PEC-BH_007930.LAB	9/1/2016	17:44:38	2.9	< 0.6	0.8	2.5	1.2	190.5	1.006
PEC-BH_007931.LAB	9/1/2016	17:44:52	2.6	< 0.6	0.7	2.4	1.1	190.4	1.006
PEC-BH_007932.LAB	9/1/2016	17:45:08	2.5	< 0.6	0.6	2.3	1.0	190.5	1.006
PEC-BH_007971.LAB	9/1/2016	17:54:54	1.3	< 0.6	0.4	2.4	1.4	190.5	1.003
PEC-BH_007972.LAB	9/1/2016	17:55:09	2.1	< 0.6	0.5	2.4	1.3	190.5	1.006
PEC-BH_007973.LAB	9/1/2016	17:55:24	2.2	< 0.6	0.6	2.4	1.3	190.5	1.007
PEC-BH_007974.LAB	9/1/2016	17:55:39	2.4	< 0.6	0.6	2.4	1.3	190.4	1.005
PEC-BH_007975.LAB	9/1/2016	17:55:54	2.5	< 0.6	0.6	2.4	1.2	190.5	1.006
PEC-BH_007976.LAB	9/1/2016	17:56:09	2.4	< 0.6	0.7	2.3	1.2	190.4	1.007
PEC-BH_007977.LAB	9/1/2016	17:56:24	2.4	< 0.6	0.6	2.3	1.2	190.5	1.005
PEC-BH_007978.LAB	9/1/2016	17:56:39	2.2	< 0.6	0.7	2.3	1.2	190.5	1.006
PEC-BH_007979.LAB	9/1/2016	17:56:54	2.2	< 0.6	0.7	2.3	1.1	190.4	1.005
PEC-BH_007980.LAB	9/1/2016	17:57:09	2.1	< 0.6	0.6	2.2	1.0	190.5	1.004
PEC-BH_008012.LAB	9/1/2016	18:05:10	1.2	< 0.6	0.5	2.6	1.3	190.4	1.005
PEC-BH_008013.LAB	9/1/2016	18:05:25	2.1	< 0.6	0.6	2.6	1.3	190.5	1.004
PEC-BH_008014.LAB	9/1/2016	18:05:40	2.6	< 0.6	0.6	2.5	1.3	190.5	1.007
PEC-BH_008015.LAB	9/1/2016	18:05:55	2.8	< 0.6	0.6	2.5	1.3	190.5	1.004
PEC-BH_008016.LAB	9/1/2016	18:06:10	2.8	< 0.6	0.6	2.5	1.2	190.4	1.004
PEC-BH_008017.LAB	9/1/2016	18:06:25	2.6	< 0.6	0.7	2.4	1.2	190.5	1.002
PEC-BH_008018.LAB	9/1/2016	18:06:40	2.6	< 0.6	0.7	2.5	1.2	190.4	1.006
PEC-BH_008019.LAB	9/1/2016	18:06:55	2.6	< 0.6	0.6	2.4	1.2	190.5	1.004
PEC-BH_008020.LAB	9/1/2016	18:07:10	2.5	< 0.6	0.7	2.4	1.1	190.4	1.005
PEC-BH_008021.LAB	9/1/2016	18:07:25	2.3	< 0.6	0.8	2.3	1.0	190.5	1.005
PEC-BH_008075.LAB	9/1/2016	18:20:56	0.5	0.7	0.3	2.3	1.3	190.5	1.003
PEC-BH_008076.LAB	9/1/2016	18:21:11	1.2	< 0.6	0.3	2.3	1.3	190.4	1.004
PEC-BH_008077.LAB	9/1/2016	18:21:26	1.6	< 0.6	0.4	2.3	1.3	190.5	1.005
PEC-BH_008078.LAB	9/1/2016	18:21:41	2.0	< 0.6	0.4	2.3	1.3	190.4	1.003
PEC-BH_008079.LAB	9/1/2016	18:21:56	2.0	< 0.6	0.3	2.3	1.3	190.4	1.005
PEC-BH_008080.LAB	9/1/2016	18:22:11	2.0	< 0.6	0.5	2.3	1.2	190.4	1.005
PEC-BH_008081.LAB	9/1/2016	18:22:26	2.0	< 0.6	0.5	2.3	1.2	190.4	1.003
PEC-BH_008082.LAB	9/1/2016	18:22:41	1.9	< 0.6	0.6	2.3	1.2	190.5	1.003
PEC-BH_008083.LAB	9/1/2016	18:22:57	1.9	< 0.6	0.5	2.3	1.1	190.4	1.005
PEC-BH_008084.LAB	9/1/2016	18:23:12	1.7	< 0.6	0.5	2.2	1.0	190.4	1.005
PEC-BH Run 3	Minimum		< 0.2	< 0.6	< 0.3	1.9	< 0.1		
	Maximum		4.9	1.5	0.8	3.0	1.6		
	Average*		2.1	0.8	0.5	2.4	1.2		

*When calculating averages, any value less than the determined detection limit will be assigned the detection limit value.

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Client:	ArcelorMittal Burns Harbor LLC		
Facility:	Burns Harbor, Indiana		
Test Location:	#2 Battery PEC Stack		
Project #:	M162810		
Test Method:	0010/23		
Test Engineer:	CSE		
Test Technician:	DBD		
	R1	**R2**	**R3**
Temp ID:	CM22	CM22	CM22
Meter ID:	CM22	CM22	CM22
Pitot ID:	30	30	30
Nozzle Diameter (Inches):	0.282	0.282	0.292
Meter Calibration Date:	7/28/2016	7/28/2016	7/28/2016
Meter Calibration Factor (Y):	0.998	0.998	0.998
Meter Orifice Setting (Delta H):	1.741	1.741	1.741
Nozzle Kit ID Number and Material:	Glass	Glass	Glass
Pitot Tube Coefficient:		0.840	
Probe Length (Feet):		10.0	
Probe Liner Material:		Glass	
Sample Plane:		Horizontal	
Port Length (Inches):		6.50	
Port Size (Diameter, Inches):		4.00	
Port Type:		Nipple	
Duct Shape:		Circular	
Diameter (Feet):		9	
Duct Area (Square Feet):		63.617	
Upstream Diameters:		> 2.0	
Downstream Diameters:		> 3.0	
Number of Ports Sampled:		2	
Number of Points per Port:		14	
Minutes per Point:		4.0	
Minutes per Reading:		2.0	
Total Number of Traverse Points:		28	
Test Length (Minutes):		112	
Train Type:		Anderson Box	
Source Condition:		Normal	
Servomex Serial Number:		01440D1/3791	
Moisture Balance ID:		S10-35	
# of Runs		3	

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Run 1-Method 0010/23

Client: ArcelorMittal Burns Harbor LLC | **Date: 8/23/16**
Facility: Burns Harbor, Indiana | **Start Time: 7:13**
Test Location: #2 Battery PEC Stack | **End Time: 19:25**
Source Condition: Normal

DRY GAS METER CONDITIONS			STACK CONDITIONS		
ΔH:	5.72	in. H_2O	Static Pressure	-1.00	in. H_2O
Meter Temperature, Tm:	77.6	°F	Flue Pressure (Ps):	29.38	in. Hg. abs.
Sqrt ΔP:	1.008	in. H_2O	Carbon Dioxide:	1.00	%
Stack Temperature, Ts:	155.5	°F	Oxygen:	19.90	%
Meter Volume, Vm:	155.470	ft^3	Nitrogen:	79.10	%
Meter Volume, Vmstd:	152.149	dscf	Gas Weight dry, Md:	28.956	lb/lb mole
Meter Volume, Vwstd:	3.570	wscf	Gas Weight wet, Ms:	28.705	lb/lb mole
Isokinetic Variance:	102.9	%I	Excess Air:	---	%
Standard Fuel Factor Fd:	Enter Manuall	dscf/mmBtu	Gas Velocity, Vs:	61.705	fps
Test Length:	112.00	in mins.	Volumetric Flow:	235,532	acfm
Nozzle Diameter:	0.282	in inches	Volumetric Flow:	193,816	dscfm
Barometric Pressure:	29.45	in Hg	Volumetric Flow:	198,366	scfm
Filter ID:	0		Calculated Fc:	1.00	

MOISTURE DETERMINATION

Initial Impinger Content:	2461.4	ml	Silica Initial Wt.	730.8	grams
Final Impinger Content:	2515.1	ml	Silica Final Wt.	752.9	grams
Impinger Difference:	53.7	ml	Silica Difference:	22.1	grams

Total Water Gain: 75.8 | Moisture, Bws: 0.023 | **Supersaturation Value, Bws: 0.295**

Port-Point No.	Clock Time	Velocity Head Δp in. H2O	Orifice ΔH in. H2O	Actual Meter Vol. ft^3	Stack Temp °F	Meter Temp Inlet °F	Meter Temp Outlet °F	Probe Temp °F	Filter Exit Temp °F	Impinger Exit Temp °F
1-1	7:13:00	1.00	5.80	96.220	127	68	68	250	250	53
1-1	7:25:00	0.95	5.30	96.940	127	69	68	250	245	54
1-2	7:38:00	0.95	5.30	101.780	135	70	69	251	243	54
1-2	7:51:00	0.98	5.50	104.330	150	71	70	256	251	56
1-3	8:03:00	1.00	5.60	107.150	158	72	70	249	250	57
1-3	8:14:00	1.10	6.10	109.850	162	73	71	258	251	58
1-4	8:40:00	1.10	6.10	112.570	152	74	73	258	251	56
1-4	8:51:00	1.00	5.60	115.150	150	75	74	253	251	60
1-5	9:02:00	1.00	5.60	118.180	155	76	75	247	250	57
1-5	9:14:00	1.00	5.60	120.890	156	77	75	254	249	59
1-6	9:25:00	1.00	5.60	123.460	157	77	76	253	251	58
1-6	9:37:00	1.00	5.60	126.290	160	77	77	247	249	60
7	9:48:00	1.10	6.10	128.980	158	77	76	246	253	60
7	10:00:00	1.10	6.10	131.890	158	77	76	248	247	56
8	10:13:00	1.10	6.10	134.950	160	76	76	254	251	58
8	10:23:00	1.10	6.10	137.590	162	76	76	252	252	56
9	10:35:00	1.10	6.10	140.490	162	76	76	247	252	58
9	10:46:00	1.10	6.10	143.380	164	76	76	248	252	56
10	10:58:00	1.00	5.60	146.380	170	76	76	250	249	59
10	11:08:00	0.95	5.40	149.030	168	77	76	248	251	58
11	11:19:00	0.83	4.70	151.910	167	77	76	251	251	57
11	11:30:00	0.85	4.80	154.240	165	77	76	246	252	56
12	11:46:00	0.85	4.80	156.820	164	78	77	254	251	56
12	11:59:00	1.00	5.60	159.410	161	78	77	250	251	57
13	12:16:00	1.10	6.10	162.080	164	78	78	254	247	53
13	12:32:00	1.10	6.10	165.020	157	79	78	251	250	59
14	12:46:00	1.00	5.60	167.940	154	79	78	247	251	59
14	12:58:00	1.00	5.60	170.560	152	79	79	247	245	61
	13:00:00			173.330						
2-1	13:12:00	1.10	6.30	173.330	152	79	79	246	249	58
1	13:26:00	1.10	6.30	176.110	149	79	79	246	252	57
2	13:41:00	1.10	6.30	179.020	149	79	79	252	252	60
2	14:03:00	1.00	5.70	182.000	146	79	79	246	253	57
3	14:17:00	1.10	6.30	184.640	147	79	79	255	251	59
3	14:29:00	1.10	6.30	187.350	150	80	79	252	246	59
4	14:42:00	1.00	5.70	190.440	154	80	80	256	252	59
4	14:53:00	1.00	5.70	193.350	158	80	80	252	249	60
5	15:05:00	0.98	5.60	196.110	164	81	80	247	248	57
5	15:20:00	1.00	5.70	199.070	161	81	80	258	250	60
6	15:31:00	0.98	5.60	201.580	160	81	80	253	249	58
6	15:42:00	1.00	5.70	204.330	156	81	80	248	253	59
7	15:57:00	1.00	5.70	207.110	153	81	80	245	250	59
7	16:10:00	1.00	5.70	210.070	150	81	80	248	249	58
8	16:20:00	0.98	5.60	212.970	151	81	80	248	245	57
8	16:30:00	1.00	5.70	215.550	155	81	80	251	248	57
9	16:41:00	1.00	5.70	218.140	163	81	80	245	252	58
9	16:51:00	1.00	5.70	221.110	165	81	80	249	250	56
10	17:04:00	1.00	5.70	224.000	163	81	81	251	251	58
10	17:17:00	1.00	5.70	226.790	159	81	81	249	249	59
11	17:27:00	1.00	5.70	229.420	158	81	80	247	253	58
11	17:42:00	1.00	5.70	232.120	155	80	80	250	249	59
12	17:55:00	1.00	5.70	235.170	155	80	80	250	253	60
12	18:06:00	0.98	5.60	237.990	158	80	80	251	254	60
13	18:16:00	0.96	5.60	240.510	163	81	80	253	249	59
13	18:26:00	0.96	5.60	243.490	166	81	80	260	249	57
14	19:12:00	0.96	5.60	246.330	134	78	78	250	251	55
14	19:23:00	0.96	5.60	249.010	140	78	78	250	250	55
	19:25:00			251.890						
Total	12:00:00			155.470		77.9	77.2			
Average			5.72		155.5	77.6				
Min			4.70		127.0	68.0				
Max			6.30		170.0	81.0				

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Run 2-Method 0010/23

Client: ArcelorMittal Burns Harbor LLC | **Date: 8/24/16**
Facility: Burns Harbor, Indiana | **Start Time: 7:25**
Test Location: #2 Battery PEC Stack | **End Time: 19:56**
Source Condition: Normal

DRY GAS METER CONDITIONS			STACK CONDITIONS		
ΔH:	5.68	In. H_2O	Static Pressure	-1.00	In. H_2O
Meter Temperature, Tm:	76.8	°F	Flue Pressure (Ps):	29.22	In. Hg. abs.
Sqrt ΔP:	1.005	In. H_2O	Carbon Dioxide:	1.10	%
Stack Temperature, Ts:	151.9	°F	Oxygen:	19.70	%
Meter Volume, Vm:	154.950	ft^3	Nitrogen:	79.2	%
Meter Volume, Vmstd:	151.029	dscf	Gas Weight dry, Md:	28.964	lb/lb mole
Meter Volume, Vwstd:	5.153	wscf	Gas Weight wet, Ms:	28.602	lb/lb mole
Isokinetic Variance:	103.0	%I	Excess Air:	—	%
Standard Fuel Factor Fd:	Enter Manually	dscf/mmBtu	Gas Velocity, Vs:	61.776	fps
Test Length:	112.00	in mins.	Volumetric Flow:	235,802	acfm
Nozzle Diameter:	0.282	in inches	Volumetric Flow:	192,138	dscfm
Barometric Pressure:	29.29	in Hg	Volumetric Flow:	198,693	scfm
Filter ID:	0		Calculated Fo:	1.09	

MOISTURE DETERMINATION

Initial Impinger Content:	2559.6	ml	Silica Initial Wt.	839.7	grams
Final Impinger Content:	2663.1	ml	Silica Final Wt.	889.1	grams
Impinger Difference:	60.0	ml	Silica Difference:	49.4	grams

Total Water Gain: 109.4 | Moisture, Bws: 0.033 | **Supersaturation Value, Bws: 0.271**

Port-Point No.	Clock Time	Velocity Head Δp in. H2O	Orifice ΔH in. H2O	Actual Meter Vol. ft^3	Stack Temp °F	Meter Temp Inlet °F	Meter Temp Outlet °F	Probe Temp °F	Filter Exit Temp °F	Impinger Exit Temp °F
1-1	7:25:00	0.95	5.30	53.470	132	73	72	251	255	60
1-1	7:35:00	0.98	5.50	56.240	133	74	72	251	258	55
1-2	7:47:00	0.95	5.30	58.840	138	73	73	244	256	53
1-2	8:06:00	0.95	5.30	61.330	136	72	72	248	246	55
1-3	8:21:00	0.95	5.30	64.110	139	71	72	250	258	54
1-3	8:33:00	0.95	5.30	66.720	145	71	72	243	243	55
1-4	8:43:00	0.95	5.30	69.330	149	71	71	243	256	55
1-4	8:54:00	0.98	5.50	72.170	154	71	71	249	255	58
1-5	9:05:00	1.00	5.60	75.040	156	71	71	247	242	57
1-5	9:18:00	1.00	5.60	77.510	154	71	71	253	255	55
1-6	9:29:00	1.10	6.20	80.340	152	71	71	251	243	50
1-6	9:42:00	0.98	5.50	83.230	151	71	71	249	254	49
7	9:55:00	1.10	6.20	86.030	149	72	71	255	244	48
7	10:06:00	1.10	6.20	89.010	152	73	72	256	253	50
8	10:17:00	1.00	5.60	91.780	154	74	73	253	257	50
8	10:27:00	1.00	5.60	94.420	157	75	74	256	252	52
9	10:39:00	1.10	6.20	97.110	157	76	74	247	248	52
9	10:51:00	1.10	6.20	100.030	157	77	75	251	255	56
10	11:02:00	1.10	6.20	103.100	156	77	76	253	252	54
10	11:16:00	1.00	5.60	105.960	153	76	77	249	258	53
11	11:29:00	1.10	6.20	108.950	149	76	77	248	248	50
11	11:42:00	1.00	5.60	111.520	150	76	77	249	247	53
12	11:52:00	1.00	5.60	114.420	148	78	78	253	249	52
12	12:45:00	1.10	6.20	117.160	127	80	79	244	248	54
13	12:59:00	1.00	5.60	120.010	129	79	79	248	254	54
13	13:12:00	0.98	5.50	122.840	138	79	78	251	244	55
14	13:23:00	1.10	6.20	125.380	143	79	79	249	259	54
14	13:34:00	1.00	5.60	128.280	147	79	78	247	243	57
	13:36:00			131.120						
2-1	13:48:00	1.10	6.20	131.330	150	79	78	256	244	64
1	14:04:00	1.10	6.20	134.070	151	79	79	255	252	58
2	14:18:00	1.10	6.20	136.850	150	80	79	250	249	58
2	14:34:00	1.10	6.20	139.920	150	80	80	248	250	59
3	14:44:00	1.10	6.20	142.440	155	80	80	248	255	59
3	14:54:00	1.10	6.20	145.220	159	81	80	249	253	60
4	15:06:00	1.10	6.20	148.250	159	81	80	253	249	60
4	15:19:00	1.10	6.20	151.120	159	80	80	248	251	60
5	15:32:00	1.10	6.20	154.070	161	80	80	248	245	59
5	15:48:00	1.00	5.60	157.040	155	79	79	253	251	58
6	16:01:00	0.98	5.50	160.090	163	78	78	253	253	54
6	16:15:00	1.00	5.60	162.830	160	78	78	248	253	57
7	16:25:00	0.98	5.50	165.420	163	78	78	252	255	62
7	16:38:00	1.00	5.60	168.060	169	79	78	248	254	63
8	16:51:00	0.98	5.50	171.070	164	79	78	251	255	66
8	17:04:00	0.93	5.20	173.550	163	80	79	255	252	60
9	17:19:00	0.98	5.50	176.110	160	80	80	253	248	58
9	17:33:00	0.98	5.50	179.010	159	80	80	249	249	57
10	17:44:00	0.93	5.20	181.920	162	80	80	251	252	57
10	17:56:00	0.98	5.50	184.520	165	80	79	251	258	57
11	18:09:00	0.90	5.10	187.120	169	79	79	246	244	58
11	18:20:00	0.98	5.50	190.010	169	79	79	246	245	57
12	18:33:00	0.93	5.20	192.650	169	79	79	249	250	57
12	19:12:00	0.85	4.80	195.390	147	79	79	247	255	54
13	19:23:00	1.00	5.60	197.850	142	79	79	250	257	59
13	19:32:00	0.93	5.20	200.770	141	78	78	246	250	59
14	19:43:00	0.98	5.50	203.340	142	78	78	250	250	58
14	19:54:00	0.93	5.20	205.950	142	78	78	250	250	58
	19:56:00			208.630						
Total	12:19:00			154.950		77.0	76.8			
Average			5.68		151.9	76.8				
Min			4.80		127.0	71.0				
Max			6.20		169.0	81.0				

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Run 3-Method 0010/23

Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Test Location: #2 Battery PEC Stack
Source Condition: Normal

Date: 8/25/16
Start Time: 9:34
End Time: 20:55

DRY GAS METER CONDITIONS

ΔH:	5.51	in. H_2O
Meter Temperature, Tm:	77.3	°F
Sqrt ΔP:	0.916	in. H_2O
Stack Temperature, Ts:	155.8	°F
Meter Volume, Vm:	153.920	ft^3
Meter Volume, Vmstd:	149.609	dscf
Meter Volume, Vwstd:	3.994	wscf
Isokinetic Variance:	104.2	%I
Standard Fuel Factor Fd:	Enter Manuall	dscf/mmBtu
Test Length:	112.00	in mins.
Nozzle Diameter:	0.292	in inches
Barometric Pressure:	29.25	in Hg
Filter ID:	0	

STACK CONDITIONS

Static Pressure	-1.00	in. H_2O
Flue Pressure (Ps):	29.18	in. Hg. abs.
Carbon Dioxide:	1.30	%
Oxygen:	19.80	%
Nitrogen:	78.9	%
Gas Weight dry, Md:	29.000	lb/lb mole
Gas Weight wet, Ms:	28.714	lb/lb mole
Excess Air:	—	%
Gas Velocity, Vs:	56.424	fps
Volumetric Flow:	215,374	acfm
Volumetric Flow:	175,398	dscfm
Volumetric Flow:	180,081	scfm
Calculated Fo:	0.85	

MOISTURE DETERMINATION

Initial Impinger Content:	2514.6	ml	Silica Initial Wt.	730.0	grams
Final Impinger Content:	2578.7	ml	Silica Final Wt.	750.7	grams
Impinger Difference:	64.1	ml	Silica Difference:	20.7	grams

Total Water Gain: 84.8 Moisture, Bws: 0.026 **Supersaturation Value, Bws: 0.299**

Port-Point No.	Clock Time	Velocity Head Δp in. H2O	Orifice ΔH in. H2O	Actual Meter Vol. ft^3	Stack Temp °F	Meter Temp Inlet °F	Meter Temp Outlet °F	Probe Temp °F	Filter Exit Temp °F	Impinger Exit Temp °F
1-1	9:34:00	0.85	5.50	9.110	119	70	68	259	250	60
1-1	9:44:00	0.83	5.40	11.840	126	70	69	251	251	60
1-2	9:57:00	0.83	5.40	14.050	133	70	69	250	250	60
1-2	10:15:00	0.84	5.50	17.250	142	72	71	253	253	60
1-3	10:27:00	0.84	5.50	20.080	146	73	72	252	252	60
1-3	10:38:00	0.83	5.40	22.770	151	73	72	250	252	60
1-4	10:51:00	0.82	5.40	25.610	156	73	73	250	253	60
1-4	11:02:00	0.82	5.40	28.220	154	73	73	251	252	60
1-5	11:14:00	0.80	5.20	31.100	160	74	73	251	252	60
1-5	11:25:00	0.85	5.60	33.690	160	75	75	254	253	60
1-6	11:37:00	0.83	5.40	36.550	160	75	74	251	253	60
1-6	11:49:00	0.83	5.40	39.120	161	75	74	252	252	60
7	12:03:00	0.82	5.40	41.880	161	75	75	252	252	60
7	12:14:00	0.85	5.60	44.600	160	75	75	252	251	60
8	12:24:00	0.81	5.30	47.380	162	75	75	252	252	60
8	12:35:00	0.84	5.50	50.060	162	75	76	252	251	54
9	12:46:00	0.82	5.40	52.810	164	75	75	252	255	53
9	12:58:00	0.82	5.40	55.550	161	76	76	252	254	54
10	13:13:00	0.85	5.60	58.260	160	76	76	252	257	53
10	13:25:00	0.84	5.50	61.080	157	75	76	252	254	53
11	13:38:00	0.83	5.40	63.630	160	75	76	252	254	52
11	13:50:00	0.83	5.40	66.660	158	77	77	252	252	53
12	14:04:00	0.83	5.40	69.290	159	77	77	252	256	57
12	14:15:00	0.82	5.40	72.180	161	77	77	251	255	56
13	14:26:00	0.81	5.30	74.740	161	78	79	251	257	63
13	14:38:00	0.85	5.60	77.470	158	78	79	252	256	56
14	14:48:00	0.84	5.50	80.210	159	78	78	252	259	55
14	14:59:00	0.84	5.50	83.010	162	79	78	252	253	55
	15:01:00			85.790						
2-1	15:10:00	0.80	5.20	86.010	160	78	77	253	253	54
1	15:22:00	0.85	5.60	88.940	161	77	77	257	254	55
2	15:35:00	0.85	5.60	91.150	163	81	80	258	254	58
2	15:45:00	0.85	5.60	94.110	164	79	80	258	255	55
3	15:58:00	0.86	5.60	97.150	167	82	81	254	255	66
3	16:09:00	0.87	5.70	99.340	167	82	81	257	255	65
4	16:19:00	0.84	5.50	102.230	169	83	82	252	253	62
4	16:30:00	0.86	5.60	105.240	167	83	82	252	255	62
5	16:40:00	0.85	5.60	108.160	169	82	82	253	255	55
5	16:51:00	0.84	5.50	110.290	167	83	82	252	252	55
6	17:03:00	0.85	5.60	113.050	166	83	82	252	253	54
6	17:16:00	0.85	5.60	116.090	164	83	82	252	252	54
7	17:27:00	0.86	5.60	119.020	163	82	82	252	253	54
7	17:38:00	0.86	5.60	121.430	165	82	82	255	253	54
8	17:49:00	0.85	5.60	124.030	168	82	82	252	252	51
8	18:01:00	0.85	5.60	127.270	164	82	82	254	253	52
9	18:11:00	0.85	5.60	130.380	164	83	81	252	253	62
9	18:21:00	0.85	5.60	133.150	167	80	81	255	253	54
10	19:14:00	0.85	5.60	135.240	139	79	78	258	253	59
10	19:25:00	0.84	5.50	138.230	135	81	78	259	251	50
11	19:34:00	0.84	5.50	141.260	137	79	78	258	252	51
11	19:47:00	0.85	5.60	144.180	138	79	77	258	252	51
12	19:58:00	0.85	5.60	146.060	141	78	78	258	254	53
12	20:09:00	0.86	5.60	149.050	143	77	78	259	254	49
13	20:21:00	0.85	5.60	152.400	145	77	77	258	252	49
13	20:32:00	0.84	5.50	155.210	146	78	77	258	253	49
14	20:42:00	0.84	5.50	157.810	146	77	76	254	254	50
14	20:53:00	0.85	5.60	160.020	146	77	76	259	254	50
	20:55:00			163.250						
Total	11:12:00			153.920		77.5	77.1			
Average			5.51		155.8	77.3				
Min			5.20		119.0	68.0				
Max			5.70		169.0	83.0				

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Client:	ArcelorMittal Burns Harbor LLC		
Facility:	Burns Harbor, Indiana		
Test Location:	#2 Battery PEC Stack		
Project #:	M162810		
Test Method:	315		
Test Engineer:	BVG		
Test Technician:	DBD		
Type of Fuel Firing:	Other		
	R1	**R2**	**R3**
Temp ID:	CM23	CM23	CM23
Meter ID:	CM23	CM23	CM23
Pitot ID:	235	235	235
Nozzle Diameter (Inches):	0.225	0.225	0.225
Meter Calibration Date:	7/28/2016	7/28/2016	7/28/2016
Meter Calibration Factor (Y):	1.001	1.001	1.001
Meter Orifice Setting (Delta H):	1.405	1.405	1.405
Nozzle Kit ID Number and Material:	Glass	Glass	Glass
Pitot Tube Coefficient:	0.840		
Probe Length (Feet):	10.0		
Probe Liner Material:	Glass		
Sample Plane:	Horizontal		
Port Length (Inches):	6.50		
Port Size (Diameter, Inches):	4.00		
Port Type:	Nipple		
Duct Shape:	Circular		
Diameter (Feet):	9		
Duct Area (Square Feet):	63.617		
Upstream Diameters:	> 2.0		
Downstream Diameters:	> 3.0		
Number of Ports Sampled:	2		
Number of Points per Port:	12		
Minutes per Point:	4.0		
Minutes per Reading:	2.0		
Total Number of Traverse Points:	24		
Test Length (Minutes):	96		
Train Type:	Anderson Box		
Source Condition:	Normal		
Servomex Serial Number:	01440D1/3791		
Moisture Balance ID:	S10-35		
# of Runs	3		

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Run 1-Method 315

Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Test Location: #2 Battery PEC Stack
Source Condition: Normal

Date: 8/23/16
Start Time: 7:13
End Time: 17:19

DRY GAS METER CONDITIONS			STACK CONDITIONS		
ΔH:	1.80	in. H_2O	Static Pressure	-1.00	in. H_2O
Meter Temperature, Tm:	78.6	°F	Flue Pressure (Ps):	29.38	in. Hg. abs.
Sqrt ΔP:	1.003	in. H_2O	Carbon Dioxide:	1.00	%
Stack Temperature, Ts:	154.6	°F	Oxygen:	19.90	%
Meter Volume, Vm:	83.705	ft^3	Nitrogen:	79.10	%
Meter Volume, Vmstd:	81.216	dscf	Gas Weight dry, Md:	28.956	lb/lb mole
Meter Volume, Vwstd:	2.247	wscf	Gas Weight wet, Ms:	28.661	lb/lb mole
Isokinetic Variance:	101.2	%	Excess Air:	—	%
Heat Input, mmBtu/hr		Heat Input, mmBtu/hr	Gas Velocity, Vs:	61.526	fps
Test Length:	96.00	in mins.	Volumetric Flow:	234,847	acfm
Nozzle Diameter:	0.225	in inches	Volumetric Flow:	192,750	dscfm
Barometric Pressure:	29.45	in Hg	Volumetric Flow:	198,082	scfm
Filter ID:			Calculated Fo:	1.00	

MOISTURE DETERMINATION

Initial Impinger Content:	2018.6	ml	Silica Initial Wt.	867.4	grams
Final Impinger Content:	2049.6	ml	Silica Final Wt.	884.1	grams
Impinger Difference:	31.0	ml	Silica Difference:	16.7	grams

Total Water Gain: 47.7 Moisture, Bws: 0.027 **Supersaturation Value, Bws: 0.289**

Port-Point No.	Clock Time	Velocity Head Δp In. H2O	Orifice ΔH In. H2O	Actual Meter Vol. ft^3	Stack Temp °F	Meter Temp Inlet °F	Meter Temp Outlet °F	Probe Temp °F	Filter Exit Temp °F	Impinger Exit Temp °F
1-1	7:13:00	0.80	1.40	27.680	125	71	69	260	260	58
-1	7:25:00	0.70	1.20	29.225	125	72	70	258	260	57
-2	7:39:00	0.75	1.30	30.850	134	72	71	255	257	62
-2	7:51:00	0.80	1.40	32.150	143	72	71	256	255	62
-3	8:03:00	0.88	1.50	33.715	155	73	72	255	258	63
-3	8:14:00	0.90	1.60	35.405	159	74	73	255	258	62
-4	8:40:00	0.90	1.60	37.110	151	76	74	261	260	62
-4	8:51:00	0.95	1.70	38.620	148	76	75	257	259	65
-5	9:02:00	0.95	1.70	40.475	151	77	76	256	259	66
-5	9:14:00	0.98	1.70	42.110	154	78	77	263	260	66
-6	9:25:00	1.00	1.80	43.750	157	78	77	260	261	67
-6	9:37:00	1.00	1.80	45.550	158	78	77	259	259	66
-7	9:48:00	0.95	1.70	47.298	157	78	78	253	259	61
-7	10:00:00	1.10	1.90	48.900	157	78	77	257	258	58
-8	10:13:00	1.10	1.90	50.750	158	77	77	258	260	60
-8	10:23:00	1.10	1.90	52.535	160	77	77	258	258	63
-9	10:35:00	1.00	1.80	54.435	160	77	77	258	259	58
-9	10:46:00	1.00	1.80	56.150	161	77	77	258	259	65
-10	10:58:00	1.20	2.10	57.825	164	78	77	258	258	62
-10	11:08:00	1.10	1.90	59.750	167	78	77	257	260	58
-11	11:19:00	1.10	1.90	61.650	165	78	77	256	258	66
11	11:30:00	1.10	1.90	63.500	162	78	78	257	256	66
-12	11:46:00	1.20	2.10	65.255	161	79	78	257	258	61
-12	11:59:00	1.00	1.80	67.110	159	79	78	257	258	60
	12:01:00			68.904						
2-1	12:18:00	0.90	1.60	68.904	156	79	78	258	258	63
-1	12:32:00	1.00	1.80	70.710	155	80	79	259	259	65
-2	12:46:00	1.00	1.80	72.250	153	80	79	239	261	65
-2	12:58:00	0.95	1.70	74.010	154	81	80	241	261	62
-3	13:12:00	0.90	1.60	75.820	152	80	80	244	251	59
-3	13:28:00	0.95	1.70	77.385	149	80	80	243	257	60
-4	13:41:00	1.00	1.80	79.155	149	81	80	238	258	58
-4	14:03:00	0.97	1.70	80.850	147	81	80	256	264	60
-5	14:17:00	1.20	2.20	82.579	148	81	80	243	257	57
-5	14:29:00	1.00	1.80	84.455	150	82	81	245	255	61
-6	14:42:00	1.00	1.80	86.175	155	82	81	249	259	61
-6	14:53:00	1.20	2.20	87.925	158	82	81	240	256	64
-7	15:05:00	1.00	1.80	89.842	163	82	81	242	255	61
-7	15:20:00	1.20	2.20	91.578	161	82	81	256	258	62
-8	15:31:00	1.00	1.80	93.478	160	82	82	242	257	60
-8	15:42:00	1.00	1.80	95.243	159	83	82	256	258	67
-9	15:57:00	1.20	2.20	96.960	153	82	82	237	259	62
-9	16:10:00	1.10	2.00	98.665	150	83	82	254	256	60
-10	16:20:00	1.00	1.80	100.682	151	83	82	247	259	59
-10	16:30:00	1.10	2.00	102.433	158	83	82	247	259	59
-11	16:41:00	1.00	1.80	104.350	161	83	82	241	257	59
-11	16:51:00	1.10	2.00	106.004	165	83	82	249	258	60
-12	17:04:00	1.10	2.00	107.815	163	83	82	250	258	61
-12	17:17:00	1.00	1.80	109.630	159	83	82	243	257	60
	17:19:00			111.385						
Total	9:51:00			83.705		79.0	78.1			
Average			1.80		154.6	78.6				
Min			1.20		125.0	69.0				
Max			2.20		167.0	83.0				

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Run 2-Method 315

Client: ArcelorMittal Burns Harbor LLC | **Date: 8/24/16**
Facility: Burns Harbor, Indiana | **Start Time: 7:25**
Test Location: #2 Battery PEC Stack | **End Time: 17:58**
Source Condition: Normal

DRY GAS METER CONDITIONS			STACK CONDITIONS		
ΔH:	1.79	in. H_2O	Static Pressure	-1.00	in. H_2O
Meter Temperature, Tm:	76.7	°F	Flue Pressure (Ps):	29.22	in. Hg. abs.
Sqrt ΔP:	0.982	in. H_2O	Carbon Dioxide:	1.10	%
Stack Temperature, Ts:	150.9	°F	Oxygen:	19.70	%
Meter Volume, Vm:	81.987	ft^3	Nitrogen:	79.2	%
Meter Volume, Vmstd:	79.394	dscf	Gas Weight dry, Md:	28.964	lb/lb mole
Meter Volume, Vwstd:	3.076	wscf	Gas Weight wet, Ms:	28.555	lb/lb mole
Isokinetic Variance:	101.8	%I	Excess Air:	—	%
Heat Input, mmBtu/hr		Heat Input, mmBtu/hr	Gas Velocity, Vs:	60.372	fps
Test Length:	96.00	in mins.	Volumetric Flow:	230,443	acfm
Nozzle Diameter:	0.225	in inches	Volumetric Flow:	187,236	dscfm
Barometric Pressure:	29.29	in Hg	Volumetric Flow:	194,489	scfm
Filter ID:	9951		Calculated Fo:	1.09	

MOISTURE DETERMINATION

Initial Impinger Content:	2094.3	ml	Silica Initial Wt.	832.2	grams
Final Impinger Content:	2142.7	ml	Silica Final Wt.	849.1	grams
Impinger Difference:	48.4	ml	Silica Difference:	16.9	grams

Total Water Gain: 65.3 | Moisture, Bws: 0.037 | **Supersaturation Value, Bws: 0.265**

Port-Point No.	Clock Time	Velocity Head Δp in. H2O	Orifice ΔH in. H2O	Actual Meter Vol. ft^3	Stack Temp °F	Meter Temp Inlet °F	Meter Temp Outlet °F	Probe Temp °F	Filter Exit Temp °F	Impinger Exit Temp °F
1-1	7:25:00	0.90	1.70	12.118	132	73	72	247	246	62
-1	7:35:00	0.95	1.80	13.921	134	74	73	250	251	56
-2	7:47:00	0.93	1.70	15.468	139	74	73	251	252	54
-2	8:08:00	0.93	1.70	17.145	137	73	72	250	250	59
-3	8:21:00	0.95	1.80	18.801	140	72	72	248	252	58
-3	8:33:00	0.90	1.70	20.493	143	72	72	248	257	59
-4	8:43:00	0.96	1.80	22.140	149	72	72	250	250	58
-4	8:54:00	0.93	1.70	23.885	153	72	72	247	249	60
-5	9:05:00	0.97	1.80	25.572	154	72	72	246	251	62
-5	9:18:00	0.97	1.80	27.285	153	72	72	246	251	62
-6	9:29:00	1.10	2.00	28.985	151	72	72	243	249	59
-6	9:42:00	1.00	1.80	30.851	149	72	72	249	250	62
-7	9:55:00	1.00	1.80	32.555	148	73	72	248	247	63
-7	10:06:00	1.00	1.80	34.290	152	74	73	248	249	61
-8	10:17:00	0.97	1.90	36.020	154	75	74	250	251	62
-8	10:27:00	0.97	1.80	37.745	155	75	74	248	250	64
-9	10:39:00	0.90	1.70	39.452	157	76	75	248	254	65
-9	10:51:00	0.95	1.80	41.020	156	77	76	246	255	65
-10	11:02:00	0.97	1.80	42.804	156	77	76	252	245	63
-10	11:16:00	0.90	1.70	44.540	152	78	77	234	249	63
-11	11:28:00	0.93	1.70	46.160	148	79	78	233	256	60
11	11:42:00	0.95	1.80	47.840	147	79	78	244	249	57
-12	11:52:00	0.95	1.80	49.540	146	79	78	237	246	60
-12	12:45:00	0.95	1.80	51.342	127	80	79	248	254	61
	12:47:00			52.934						
2-1	12:59:00	0.95	1.80	52.934	130	80	79	249	257	61
-1	13:12:00	0.93	1.70	54.630	139	79	79	250	251	61
-2	13:23:00	0.85	1.60	56.305	143	79	78	250	247	62
-2	13:34:00	0.87	1.60	57.955	147	79	78	249	250	64
-3	13:48:00	1.00	1.80	59.572	148	78	78	253	250	62
-3	14:04:00	1.00	1.80	61.302	149	79	78	251	252	63
-4	14:16:00	1.10	2.00	63.020	152	80	79	248	250	63
-4	14:34:00	1.10	2.00	64.863	151	80	79	249	256	65
-5	14:44:00	1.10	2.00	66.661	154	80	79	252	251	63
-5	14:54:00	1.00	1.90	68.492	157	80	80	252	248	63
-6	15:06:00	0.97	1.80	70.240	160	80	80	250	250	62
-6	15:14:00	1.00	1.80	72.023	158	80	80	252	252	65
-7	15:32:00	1.10	2.00	73.681	161	80	79	250	249	60
-7	15:49:00	0.95	1.80	75.561	155	80	79	253	251	60
-8	16:01:00	0.97	1.80	77.195	156	78	78	250	251	57
-8	16:15:00	0.95	1.80	78.932	157	78	78	248	249	60
-9	16:25:00	0.95	1.80	80.615	161	78	78	249	250	62
-9	16:38:00	0.97	1.80	82.319	163	78	78	248	250	62
-10	16:51:00	1.00	1.80	84.021	163	79	79	249	249	62
-10	17:04:00	0.95	1.80	85.762	162	79	79	249	251	62
-11	17:19:00	0.95	1.80	87.456	160	80	79	249	253	61
-11	17:33:00	0.93	1.70	89.147	159	80	79	249	249	59
-12	17:41:00	0.95	1.80	90.825	162	80	80	251	249	57
-12	17:56:00	0.90	1.70	92.524	164	79	79	250	250	60
	17:58:00			94.105						
Total	10:21:00			81.987		77.0	76.4			
Average			1.79		150.9	76.7				
Min			1.60		127.0	72.0				
Max			2.00		164.0	80.0				

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Run 3-Method 315

Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Test Location: #2 Battery PEC Stack
Source Condition: Normal

Date: 8/25/16
Start Time: 9:34
End Time: 19:27

DRY GAS METER CONDITIONS

ΔH:	1.53	in. H_2O
Meter Temperature, Tm:	78.7	°F
Sqrt ΔP:	0.900	in. H_2O
Stack Temperature, Ts:	157.2	°F
Meter Volume, Vm:	75.332	ft^3
Meter Volume, Vmstd:	72.537	dscf
Meter Volume, Vwstd:	2.600	wscf
Isokinetic Variance:	102.0	%I
Heat Input, mmBtu/hr		Heat Input, mmBtu/hr
Test Length:	96.00	in mins.
Nozzle Diameter:	0.225	in inches
Barometric Pressure:	29.25	in Hg
Filter ID:	10034	

STACK CONDITIONS

Static Pressure	-1.00	in. H_2O
Flue Pressure (Ps):	29.18	in. Hg. abs.
Carbon Dioxide:	1.30	%
Oxygen:	19.80	%
Nitrogen:	78.9	%
Gas Weight dry, Md:	29.000	lb/lb mole
Gas Weight wet, Ms:	28.619	lb/lb mole
Excess Air:	---	%
Gas Velocity, Vs:	55.541	fps
Volumetric Flow:	212,002	acfm
Volumetric Flow:	170,745	dscfm
Volumetric Flow:	176,865	scfm
Calculated Fo:	0.85	

MOISTURE DETERMINATION

Initial Impinger Content:	1850.0	ml	Silica Initial Wt.	853.8	grams
Final Impinger Content:	1891.4	ml	Silica Final Wt.	867.6	grams
Impinger Difference:	41.4	ml	Silica Difference:	13.8	grams

Total Water Gain: 55.2 Moisture, Bws: 0.035 **Supersaturation Value, Bws:** 0.309

Port-Point No.	Clock Time	Velocity Head Δp in. H2O	Orifice ΔH in. H2O	Actual Meter Vol. ft^3	Stack Temp °F	Meter Temp Inlet °F	Meter Temp Outlet °F	Probe Temp °F	Filter Exit Temp °F	Impinger Exit Temp °F
1-1	9:34:00	0.85	1.60	95.038	122	71	70	249	251	66
-1	9:44:00	0.83	1.50	96.650	128	71	71	248	249	61
-2	9:57:00	0.83	1.50	98.321	135	72	71	249	249	65
-2	10:15:00	0.83	1.50	99.825	140	74	73	250	251	62
-3	10:27:00	0.83	1.50	101.317	144	75	74	250	250	65
-3	10:38:00	0.80	1.50	102.890	150	75	74	247	249	59
-4	10:51:00	0.85	1.60	104.536	151	75	75	248	250	60
-4	11:02:00	0.85	1.60	106.099	156	75	75	251	251	60
-5	11:14:00	0.85	1.60	107.745	157	76	75	246	249	62
-5	11:25:00	0.85	1.60	109.351	157	76	76	251	250	59
-6	11:37:00	0.83	1.50	110.953	157	76	76	252	250	59
-6	11:48:00	0.83	1.50	112.525	158	76	76	250	250	57
-7	12:03:00	0.78	1.40	114.113	159	76	76	251	251	56
-7	12:14:00	0.78	1.40	115.520	161	76	76	248	250	57
-8	12:24:00	0.72	1.30	117.109	163	76	76	246	250	60
-8	12:35:00	0.72	1.30	118.521	164	77	76	246	250	60
-9	12:46:00	0.70	1.30	120.147	164	77	77	248	250	56
-9	12:58:00	0.70	1.30	121.597	163	77	77	247	250	56
-10	13:13:00	0.73	1.30	123.031	159	77	77	252	249	60
-10	13:25:00	0.70	1.30	124.530	156	78	77	248	250	57
-11	13:36:00	0.70	1.30	125.995	157	78	78	249	249	58
11	13:50:00	0.70	1.30	127.442	159	78	78	248	250	59
-12	14:04:00	0.70	1.30	128.905	160	79	79	247	250	60
-12	14:15:00	0.70	1.30	130.367	161	79	79	251	249	63
	14:17:00			131.950						
2-1	14:26:00	0.90	1.70	132.220	161	79	79	252	251	58
-1	14:38:00	0.85	1.60	133.726	161	80	79	249	250	50
-2	14:48:00	0.85	1.60	135.334	161	80	80	253	250	52
-2	14:59:00	0.90	1.70	137.158	159	80	80	248	250	53
-3	15:10:00	0.85	1.70	138.629	162	80	80	254	250	57
-3	15:22:00	0.87	1.60	140.340	161	80	81	252	250	59
-4	15:35:00	0.85	1.70	141.950	160	81	81	249	249	54
-4	15:45:00	0.85	1.70	143.500	165	82	81	249	250	53
-5	15:58:00	0.85	1.70	145.154	166	82	82	251	250	58
-5	16:09:00	0.85	1.70	146.755	165	83	82	250	250	48
-6	16:19:00	0.85	1.70	148.381	167	83	83	250	250	59
-6	16:30:00	0.85	1.70	149.959	167	83	83	250	250	60
-7	16:40:00	0.85	1.70	151.572	165	83	83	251	250	61
-7	16:51:00	0.85	1.70	153.155	165	83	83	249	250	61
-8	17:03:00	0.85	1.70	154.772	163	83	83	248	250	58
-8	17:16:00	0.85	1.70	156.390	162	83	83	247	250	56
-9	17:27:00	0.83	1.50	157.992	160	83	83	249	250	57
-9	17:38:00	0.80	1.50	159.582	161	83	83	248	250	57
-10	17:49:00	0.80	1.50	161.130	164	83	83	249	250	58
-10	18:01:00	0.83	1.50	162.683	164	82	83	252	250	57
-11	18:11:00	0.80	1.50	164.271	165	82	82	250	249	57
-11	18:21:00	0.80	1.50	165.820	163	82	82	251	250	56
-12	19:14:00	0.83	1.50	167.390	139	80	80	251	249	56
-12	19:25:00	0.83	1.50	168.971	137	80	80	251	249	58
	19:27:00			170.640						
Total	9:44:00			75.332		78.6	78.6			
Average			1.53		157.2	78.7				
Min			1.30		122.0	70.0				
Max			1.70		167.0	83.0				

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Appendix G - Field Data Sheets

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Isokinetic Sampling Cover Sheet

Test Engineer: BVG
Test Technician: PBD

Plant Information

Run Number: 1
Test Location: PEC #2
Duct Shape: Circular or Rectangular
Flue Area: 63.617
Port Type: nipple
Test Method: 5 / 29

Date: 8/16/16
Client Name: ARCELOR MITTAL
Length: _____ Width: _____ or
Upstream Diameters: >2.0
Port Length: 6.5
Source Condition: normal

Project Number: M162810
Plant Name: BURNS HARBOR
Diameter: 9'
Downstream Diameters: >3.0
Port Diameter: 4"

Meter and Probe Data

Meter ID: CM22
Pitot ID: 316
Nozzle ID #: AMMO BOX
Probe Length: 4'
Pre-Test Nozzle Leak Check: ✓ @ 8 "Hg
Pre-Test Pitot Leak Check: ✓ @ 4 "H_2O

Meter Y Value: .996
Pitot Coefficient: .840
Nozzle Diameter: .268
Probe Liner: GLASS

ΔH Value: 1.741
Train Type: ANDERSON
Filter Number/Weight: 10086 .4598
Thimble Number/Weight: N/A
Post-Test Nozzle Leak Check: ✓ @ 8 "Hg
Post-Test Pitot Leak Check: ✓ @ 4 "H_2O

Traverse Data

Ports Sampled: 4
Total Points: 24

Points/Port: 6
Total Test Time: 96

Min/Point: 4
Sample Plane: Horizontal or Vertical

Stack Parameters

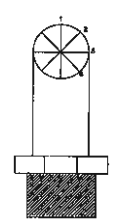
Barometric Pressure: 29.54
CO_2 %: ~~1.2~~ / / / Avg. 1.1
Imp and/or silica balance Model and S/N: S10 - 35
Initial Imp. Volume or Weight: 3482.1
Initial Silica Weight: 855

Static Pressure: -.5
O_2 %: ~~19.1~~ / / / Avg. 20.0
Final Imp. Volume or Weight: 3544.1
Final Silica Weight: 886.7

Determined by: Method 3 or Method 3A
Servomex Serial #: 6144D1 / 3791
Imp. Volume or Weight Gain: 62
Silica Weight Gain: 31.7

Comments:

Post-Test Nozzle Verification:



1) ✓ 2) ✓ 3) ✓ 4) ✓

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Isokinetic Sampling Field Data Sheet

Project Number: M162810
Client: ARCELOR MITTAL
Plant: BURNS HARBOR

Date: 8/16/16
Test Location: PEC #2
Test Method: 5/29

Test Number: 1
Operator: BVG
Test Tech: DBD
Page Number: 1 of 2

4.806 1.256 x2

Port-Point #.	Time	(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft³, Actual	Square Root, ΔP	Meter Rate, Cubic Feet/Min.	Theoretical Meter Volume, (V_m) ft³, per point	Theoretical Meter Volume, (V_m) ft³, total	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, " Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp. °F
1-1	0715	1.0	4.8	34.530	1.0	1.25	2.516		125	72	71	6	250	242	59
1	717/729	.98	4.7	37.100	.990	1.25	2.491	37.046	125	72	71	6	252	249	58
2	731/742	.95	4.6	39.600	.975	1.23	2.450	39.54	129	72	71	6	253	251	58
2	744/754	.98	4.7	41.995	.990	1.25	2.491	41.99	136	74	72	5	250	252	62
3	756/805	.95	4.5	44.480	.989	1.24	2.480	44.485	142	74	73	6	250	250	58
3	807/816	.98	4.7	46.975	.990	1.25	2.491	46.973	144	73	73	6	250	249	63
4	818/828	.95	4.6	49.450	.975	1.23	2.450	49.464	150	73	73	6	249	246	62
4	830/839	1.0	4.8	51.905	1.0	1.25	2.516	51.914	150	73	72	6	250	243	65
5	841/849	1.1	5.3	54.430	1.0	1.31	2.638	54.430	153	73	73	6	250	249	62
5	851/909	1.1	5.3	57.070	1.0	1.31	2.638	57.068	151	73	72	6	250	248	64
6	911/920	1.0	4.8	59.705	1.0	1.25	2.516	59.706	151	73	73	6	250	255	59
6	922/933	1.1	5.2	62.235	1.04	1.31	2.634	62.222	157	73	73	6	250	244	59
	935			64.901				64.456							
2-1	953	1.0	4.8	65.255	1.0	1.25	2.512		151	74	73	6	249	248	60
1	955/1004	1.1	5.2	67.800	1.04	1.31	2.634	67.767	152	74	73	7	250	254	63
2	1006/1018	1.1	5.2	70.420	1.04	1.31	2.634	70.407	153	74	73	7	250	249	64
2	1020/1043	1.0	4.8	73.040	1.0	1.25	2.512	73.035	149	74	73	7	250	249	67
3	1045/1101	1.0	4.8	75.545	1.0	1.25	2.512	75.547	145	74	74	7	250	250	64
3	1103/1113	1.0	4.8	78.042	1.0	1.25	2.512	78.059	149	74	74	7	252	253	65
4	1115/1124	.95	4.5	80.585	.974	1.22	2.448	80.571	154	74	74	7	250	250	65
4	1126/1135	.95	4.5	83.050	.974	1.22	2.448	83.019	157	75	74	7	250	250	66
5	1137/1147	.90	4.3	85.465	.948	1.19	2.383	85.467	162	75	74	7	252	249	63
5	1149/1159	.85	4.0	87.649	.921	1.15	2.315	87.650	163	76	75	7	250	250	65
6	1201/1216	.85	4.0	90.150	.921	1.15	2.315	90.165	159	76	76	6	250	248	66
6	1218/1227	.88	4.2	92.485	.938	1.17	2.356	92.480	157	77	76	6	252	252	67
	1229			94.850				94.836							

Project No. M162810A
#2 Coke Battery PEC Baghouse Stack
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Isokinetic Sampling Field Data Sheet-M202

Project Number: M162810 | Date: 8/16/16 | Test Number: 1

Client: ARCELOR MITTAL | Test Location: PEC H2 | Operator: BKG | Test Tech: DBD

Plant: BURNS HARBOR | Test Method: 5 ~~202~~ 29 | Page Number: 2 of 2

4.879 1.280 x2

Port-Point #.	Time	(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft^3, Actual	Square Root, ΔP	Meter Rate, Cubic Feet/ Min.	Theoretical Meter Volume, (V_m) ft^3, per point	Theoretical Meter Volume, (V_m) ft^3, total	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, " Hg	Probe Temp. °F	Filter Temp. °F	CPM Filter Temp °F	Impinger Outlet Well Temp. °F
3-1	1240	1.0	4.8	94.850	1.0	1.256	2.512		156	77	76	6	253	251		64
1	1242/1253	1.1	5.2	97.360	1.0	1.31	2.634	97.362	160	78	77	7	250	250		64
2	1255/1304	1.1	5.2	99.910	1.0	1.31	2.634	99.996	160	78	77	7	251	251		61
2	1306/1323	1.1	5.2	102.630	1.0	1.31	2.634	102.630	160	78	78	7	252	252		66
3	1325/1337	1.1	5.2	105.270	1.0	1.31	2.634	105.264	159	78	78	7	252	250		65
3	1339/1348	1.2	5.7	107.890	1.0	1.37	2.751	107.998	159	78	78	8	252	254		66
4	1350/1359	1.1	5.2	110.650	1.0	1.31	2.634	110.649	160	78	78	8	252	249		62
4	1401/1410	1.1	5.2	113.285	1.0	1.31	2.634	113.283	160	78	78	8	252	253		64
5	1412/1422	1.0	4.8	116.000	1.0	1.25	2.512	115.917	161	78	78	7	252	252		61
5	1424/1434	1.0	4.8	118.435	1.0	1.25	2.512	118.429	160	78	78	7	252	252		63
6	1436/1446	1.0	4.8	120.970	1.0	1.25	2.512	120.941	160	78	78	7	250	250		62
6	1446/1457	.95	4.5	123.450	.974	1.22	2.448	123.453	162	78	78	7	252	251		67
	1459			125.905				125.901								
4-1	1510	1.1	5.3	125.905	1.0	1.34	2.684		161	78	78	8	252	250		59
1	1512/1523	1.2	5.7	128.585	1.0	1.37	2.751	128.589	163	78	78	8	252	250		65
2	1525/1536	1.1	5.3	131.355	1.0	1.34	2.684	131.340	162	78	78	8	252	252		66
2	1538/1548	1.1	5.3	134.035	1.0	1.34	2.684	134.024	163	78	78	8	252	251		66
3	1550/1558	1.1	5.3	136.720	1.0	1.34	2.684	136.708	164	78	78	8	250	249		66
3	1600/1609	1.0	4.8	139.385	1.0	1.28	2.560	139.392	164	78	78	8	252	251		65
4	1611/1621	1.1	5.3	141.960	1.0	1.34	2.684	141.952	163	78	78	8	252	252		66
4	1623/1635	1.0	4.8	144.640	1.0	1.28	2.560	144.636	162	78	78	8	252	251		66
5	1637/1647	1.0	4.8	147.190	1.0	1.28	2.560	147.196	161	78	78	8	252	250		67
5	1649/1657	.95	4.6	149.715	.974	1.24	2.495	149.756	161	78	78	7	251	251		67
6	1659/1708	.95	4.6	152.235	.974	1.24	2.495	152.251	163	78	77	7	252	253		66
6	1710/1723	.90	4.3	154.730	.948	1.15	2.304	154.746	167	78	78	7	251	252		68
	1725			157.110				157.050								

Project No. M162810A
#2 Coke Battery PEC Baghouse Stack
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IMPINGER WEIGHT SHEET

PLANT: Arcelor Mittal

UNIT NO: Burns Harbor

LOCATION: NO. 2 PEC Stack

DATE: 8-16-16

TEST NO: 1

METHOD: 5/29

WEIGHED/MEASURED BY: SLB

BALANCE ID: SID-35

Circle One:	FINAL WEIGHT MLS / GRAMS	INITIAL WEIGHT MLS / GRAMS	IMPINGER GAIN	IMPINGER CONTENTS
IMPINGER 1	760.4	713	47.4	HNO_3/H_2O_2
IMPINGER 2	755.9	735.7	20.2	HNO_3/H_2O_2
IMPINGER 3	537.6	537.2		empty
IMPINGER 4	728.2	726.1		KMNO4
IMPINGER 5	762	770.1		KMNO4
IMPINGER 6	886.7	855		Silica
IMPINGER 7				
IMPINGER 8				

	FINAL TOTAL	INITIAL TOTAL	TOTAL IMPINGER GAIN
IMPINGERS	3544.1	3482.1	62
SILICA	886.7	855	31.7

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Isokinetic Sampling Cover Sheet

Test Engineer: BJB
Test Technician: DBD

Plant Information

Run Number: 2
Test Location: PEC #2
Duct Shape: ~~Circular~~ or Rectangular
Flue Area: 63.617
Port Type: NIPPLE
Test Method: 5/29

Date: 8/17/16
Client Name: ARCELOR MITTAL
Length: _____ Width: _____ or Diameter: 9'
Upstream Diameters: >2.0
Port Length: 6.5"
Source Condition: NORMAL

Project Number: M162810
Plant Name: BURNS HARBOR
Downstream Diameters: >3.0
Port Diameter: 4"

Meter and Probe Data

Meter ID: DM22
Pitot ID: 316
Nozzle Kit ID (AMMO CAN)
Probe Length: 4'
Pre-Test Nozzle Leak Check: ✓ @ 8 "Hg
Pre-Test Pitot Leak Check: ✓ @ 4 "H_2O

Meter Y Value: .998
Pitot Coefficient: .840
Nozzle Diameter: .268
Probe Liner: GLASS

ΔH Value: 1.741
Train Type: ANDERSON
Filter Number/Weight: 10060 / 0.4567
Thimble Number/Weight: –
Post-Test Nozzle Leak Check: ✓ @ 15 "Hg
Post-Test Pitot Leak Check: ✓ @ 4 "H_2O

Traverse Data

Ports Sampled: 4
Total Points: 24

Points/Port: 6
Total Test Time: 0.6

Min/Point: 2
Sample Plane: ~~Horizontal~~ or Vertical

Stack Parameters

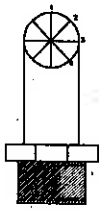
Barometric Pressure: 29.39
CO_2 %: 1.2 / / Avg. 1.2
Imp and/or silica balance Model and S/N: S10-35
Initial Imp. Volume or Weight: 3425.4
Initial Silica Weight: 771.0

Static Pressure: -.5
O_2 %: 19.7 / / Avg. 20.0
Servomex Serial #: 0144610 / 3791
Final Imp. Volume or Weight: 3486.4
Final Silica Weight: 770.2

Determined by: Method 3 or Method 3A
Imp. Volume or Weight Gain: 60.6
Silica Weight Gain: 28.3

Comments:

Post-Test Nozzle Verification:



1) ✓ 2) ✓ 3) ✓ 4) ✓

DS-004 Rev042809

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Isokinetic Sampling Field Data Sheet

Project Number: M162810 Date: 8/17/16 Test Number: 2

Client: ARCELOR MITTAL Test Location: PEC #2 Operator: BVG Test Tech: DBD

Plant: BURNS HARBOR Test Method: 5/29 Page Number: 1 of 2

4.726 1.250

Port-Point #.	Time		(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft^3, Actual	Square Root, ΔP	Meter Rate, Cubic Feet/ Min.	Theoretical Meter Volume, (V_m) ft^3, per point	Theoretical Meter Volume, (V_m) ft^3, total	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, " Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp. °F
1-1	848		1.1	5.3	57.475	1.0	1.39	2.796		115	69	69	10	252	249	66
1	850	911	1.0	4.8	60.320	1.0	1.27	2.542	60.271	115	69	69	8	250	252	62
2	913	923	1.0	4.8	62.850	1.0	1.27	2.542	62.813	124	71	70	8	255	252	60
2	925	933	1.0	4.7	65.460	1.0	1.25	2.500	65.355	137	72	71	8	250	253	60
3	935	943	1.0	4.7	67.860	1.0	1.25	2.500	67.855	143	73	72	8	253	255	63
3	945	955	1.0	4.7	70.345	1.0	1.25	2.500	70.355	152	74	73	8	250	249	65
4	957	1005	.98	4.6	72.890	.989	1.23	2.474	72.855	156	75	74	8	250	251	62
4	1007	1015	.90	4.2	75.315	.948	1.18	2.371	75.329	160	76	74	8	252	251	63
5	1017	1028	.90	4.2	77.725	.948	1.18	2.371	77.700	162	76	75	8	250	248	63
5	1030	1041	.88	4.1	80.145	.938	1.17	2.345	80.071	163	77	76	7	250	251	66
6	1043	1055	.85	4.0	82.405	.921	1.15	2.304	82.416	162	77	76	7	253	252	65
6	1057	1107	.85	4.0	84.710	.921	1.15	2.304	84.720	163	77	77	7	254	254	62
	1109				87.030				87.024							
2-1	1121		1.1	5.1	87.230	1.04	1.31	2.622		166	78	77	9	250	251	66
1	1123	1131	1.0	4.7	89.825	1.0	1.25	2.500	89.852	164	77	77	8	250	256	65
2	1133	1144	1.1	5.1	92.065	1.04	1.31	2.622	92.352	164	77	77	9	253	252	66
2	1146	1202	1.1	5.1	94.925	1.04	1.31	2.622	94.974	162	77	77	9	252	255	61
3	1204	1218	1.0	4.7	97.590	1.0	1.25	2.500	97.596	158	78	77	8	253	254	64
3	1220	1230	1.1	5.1	100.135	1.04	1.31	2.622	100.096	157	78	77	8	252	254	62
4	1232	1241	1.1	5.1	102.59	1.04	1.31	2.622	102.718	161	78	77	8	253	254	62
4	1243	1253	.92	4.3	105.1	.959	1.19	2.4	105.34	165	79	78	9	254	254	61
5	1255	1303	.89	4.2	107.92	.943	1.18	2.4	107.73	167	79	78	9	254	254	63
5	1305	1315	.94	4.4	110.34	.97	1.21	2.4	110.09	169	79	78	9	254	253	62
6	1317	1332	.95	4.5	112.56	.975	1.22	2.4	112.51	166	79	78	9	254	253	64
6	1334	1351	.92	4.3	115.22	.959	1.2	2.4	114.95	156	79	78	8	253	252	61
	1352				117.62				117.35							

Project No. M162810A
#2 Coke Battery PEC Baghouse Stack
343 of 476
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Isokinetic Sampling Field Data Sheet

Project Number: M162810 | Date: 8/17/16 | Test Number: 2

Client: ARCELOR MITTAL | Test Location: PEC #2 | Operator: BVG | Test Tech: DBM

Plant: BURNS HARBOR | Test Method: 5/29 | Page Number: 2 of 2

4.726 | 1.25

Port-Point #.	Time		(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft^3, Actual	Square Root, ΔP	Meter Rate, Cubic Feet/ Min.	Theoretical Meter Volume, (V_m) ft^3, per point	Theoretical Meter Volume, (V_m) ft^3, total	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, " Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp. °F
3-1	1401		1.1	5.2	117.62	1.05	1.31	2.622		153	79	78	9	254	254	64
1	1403	1418	1.0	4.7	120.14	1.0	1.25	2.500	119.97	152	79	79	9	250	247	58
2	1420	1429	1.0	4.7	122.450	1.0	1.25	2.500	122.470	150	79	79	9	249	249	60
2	1431	1443	1.1	5.2	124.950	1.05	1.31	2.622	124.970	151	78	78	10	250	250	53
3	1445	1456	1.0	4.7	127.500	1.0	1.25	2.500	127.592	156	78	78	9	251	253	57
3	1458	1506	1.1	5.2	130.159	1.05	1.31	2.622	130.092	158	78	78	10	250	252	63
4	1508	1517	1.0	4.7	132.717	1.0	1.25	2.500	132.714	160	79	78	9	253	250	64
4	1519	1531	1.1	5.2	135.285	1.05	1.31	2.622	135.214	160	79	79	9	250	245	61
5	1533	1545	.90	4.6	137.815	.949	1.23	2.474	137.836	159	80	79	9	250	252	60
5	1547	1603	.95	4.4	140.328	.974	1.21	2.436	140.310	155	80	80	8	250	254	60
6	1605	1616	.95	4.4	142.695	.974	1.21	2.436	142.746	156	81	80	8	250	250	66
6	1618	1626	.95	4.4	145.180	.974	1.21	2.436	145.182	158	82	81	8	254	251	66
	1628				147.645				147.618							
4-1	1636		1.1	5.2	147.645	1.05	1.31	2.622		166	82	81	9	250	254	64
1	1639	1648	1.1	5.2	150.270	1.05	1.31	2.622	150.267	165	81	81	9	250	249	66
2	1650	1659	1.1	5.2	152.650	1.05	1.31	2.622	152.889	172	81	81	9	250	256	67
2	1701	1709	1.1	5.2	155.550	1.05	1.31	2.622	155.511	169	81	81	9	250	252	65
3	1711	1721	1.0	4.7	158.280	1.0	1.25	2.500	158.133	169	80	80	9	250	253	60
3	1723	1733	1.0	4.7	160.695	1.0	1.25	2.500	160.632	167	80	80	9	250	254	61
4	1735	1744	1.1	5.2	163.260	1.05	1.31	2.622	163.133	166	80	80	9	252	254	65
4	1746	1758	.98	4.6	165.830	.949	1.23	2.474	165.755	165	79	79	9	250	264	64
5	1800	1810	.95	4.4	168.300	.974	1.21	2.436	168.279	164	78	78	9	254	256	60
5	1812	1820	.95	4.4	170.690	.974	1.21	2.436	170.665	166	79	79	9	252	252	65
6	1822	1833	.95	4.4	173.130	.974	1.21	2.436	173.101	166	79	79	9	253	255	57
6	1835	1843	1.0	4.7	175.550	1.0	1.25	2.500	175.537	167	79	79	9	253	250	62
	1845				178.045				178.037							

Project No. M162810A
#2 Coke Battery PEC Baghouse Stack
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IMPINGER WEIGHT SHEET

PLANT: Arcelor Mittal

UNIT NO: Burns Harbor

LOCATION: NO. 2 PEC Stack

DATE: 8-17-16

TEST NO: 2

METHOD: 29

WEIGHED/MEASURED BY: SLB

BALANCE ID: S10-35

Circle One:	FINAL WEIGHT MLS / GRAMS	INITIAL WEIGHT MLS / GRAMS	IMPINGER GAIN	IMPINGER CONTENTS
IMPINGER 1	741.0	699.4	41.6	HNO_3/H_2O_2
IMPINGER 2	753.7	737.3	16.4	HNO_3/H_2O_2
IMPINGER 3	586.3	581.8	4.5	empty
IMPINGER 4	665.3	662.4	2.9	$KMnO_4$
IMPINGER 5	740.1	744.9	-4.8	$KMnO_4$
IMPINGER 6	770.2	741.9	28.3	Silica
IMPINGER 7				
IMPINGER 8				

	FINAL TOTAL	INITIAL TOTAL	TOTAL IMPINGER GAIN
IMPINGERS	3486.4	3425.8	60.6

	FINAL TOTAL	INITIAL TOTAL	TOTAL SILICA GAIN
SILICA	770.2	741.9	28.3

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Isokinetic Sampling Cover Sheet

Test Engineer: BVG
Test Technician: DBD

Plant Information

Run Number: 3
Test Location: PEC #2
Duct Shape: Circular or Rectangular
Flue Area: 63.617
Port Type: NIPPLE
Test Method: 5/29

Date: 8/18/16
Client Name: ARCELOR MITTAL
Length: _____ Width: _____ or Diameter: 91
Upstream Diameters: >2.0
Port Length: 6.5"
Source Condition: NORMAL

Project Number: M162810
Plant Name: BURNS HARBOR
Downstream Diameters: >3.0
Port Diameter: 4"

Meter and Probe Data

Meter ID: EM 22
Pitot ID: 316
Nozzle ID #
Probe Length: 4'
Pre-Test Nozzle Leak Check: ✓ @ 8 "Hg
Pre-Test Pitot Leak Check: ✓ @ 4 "H_2O

Meter Y Value: .998
Pitot Coefficient: .840
Nozzle Diameter: .265
Probe Liner: GLASS

ΔH Value: 1.741
Train Type: ANDERSON
Filter Number/Weight: 100 61 / 1457 1
Thimble Number/Weight:
Post-Test Nozzle Leak Check: ✓ @ 15 "Hg
Post-Test Pitot Leak Check: ✓ @ 4 "H_2O

Traverse Data

Ports Sampled: 4
Total Points: 24

Points/Port: 6
Total Test Time: 96

Min/Point: 2
Sample Plane: Horizontal or Vertical

Stack Parameters

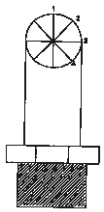
Barometric Pressure: 29.34 1.0
CO_2 %: ____ / ____ / ____ / Avg. 12
Imp and/or silica balance Model and S/N: 510-35
Initial Imp. Volume or Weight: 3521.9
Initial Silica Weight: 794.0

Static Pressure: -1
O_2 %: ____ / ____ / ____ /Avg. 19 20.2
Servomex Serial #: 0144001 / 3791
Final Imp. Volume or Weight: 3585.4
Final Silica Weight: 822.1

Determined by: Method 3 or Method 3A
Imp. Volume or Weight Gain: 63.5
Silica Weight Gain: 28.1

Comments:

Post-Test Nozzle Verification:



1)____ 2)____ 3)____ 4)____

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Isokinetic Sampling Field Data Sheet

Project Number: M162810 | Date: 8/18/16 | Test Number: 3

Client: ARCELOR MITTAL | Test Location: PEC #2 | Operator: BVG | Test Tech: DBO

Plant: BUKNS HARBOR | Test Method: 5/29 | Page Number: 1 of 2

4.597 1.240 x2

Port-Point #.	Time		(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft³, Actual	Square Root, ΔP	Meter Rate, Cubic Feet/ Min.	Theoretical Meter Volume, (V_m) ft³, per point	Theoretical Meter Volume, (V_m) ft³, total	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, " Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp. °F
L1	0716		1.1	5.0	78.550	1.04	1.30	2.601		128	65	65	10	252	253	53
1	0718	0734	1.0	4.5	81.215	1.0	1.24	2.480	81.151	126	65	65	9	252	250	56
2	0736	0746	1.0	4.5	83.695	1.0	1.24	2.480	83.631	129	66	65	9	252	250	59
2	0748	0758	1.1	5.0	86.120	1.04	1.30	2.601	86.111	132	67	66	9	252	253	61
3	0800	0809	1.0	4.5	88.730	1.0	1.24	2.480	88.712	135	68	67	9	250	252	61
3	0811	0822	1.1	5.0	91.180	1.04	1.30	2.601	91.192	140	70	69	10	254	254	63
4	0824	0955	.95	4.3	93.765	.974	1.17	2.356	93.793	134	75	75	9	253	254	65
4	0957	1006	.95	4.3	96.190	.974	1.17	2.356	96.149	136	75	75	9	250	256	65
5	1008	1025	.75	3.4	98.610	.866	1.07	2.147	98.505	132	76	75	8	253	251	64
5	1027	1052	.75	3.4	100.678	.866	1.07	2.147	100.652	126	77	76	8	253	253	65
6	1054	1104	.90	4.1	102.800	.948	1.17	2.352	102.799	130	77	76	9	253	252	65
6	1106	1115	.95	4.3	105.150	.974	1.17	2.356	105.151	135	77	76	9	253	253	65
	1117				107.515				107.507							
L1	1128		1.1	5.0	107.515	1.04	1.30	2.601		143	77	77	10	253	252	63
1	1130	1206	1.0	4.6	110.140	1.0	1.25	2.502	110.116	126	79	78	9	253	254	54
2	1208	1217	1.0	4.6	112.600	1.0	1.25	2.502	112.618	128	79	79	9	251	253	55
2	1219	1232	1.0	4.6	115.110	1.0	1.25	2.502	115.120	135	81	80	9	251	251	60
3	1234	1242	1.0	4.6	117.600	1.0	1.25	2.502	117.622	141	81	80	9	255	258	59
3	1244	1255	1.1	5.1	120.135	1.04	1.31	2.624	120.124	148	80	80	9	258	253	58
4	1257	1305	1.0	4.6	122.750	1.0	1.25	2.502	122.748	152	80	80	9	252	251	63
4	1307	1317	.95	4.3	125.270	.974	1.20	2.417	125.250	156	79	79	9	251	251	64
5	1319	1329	.90	4.1	127.650	.948	1.17	2.352	127.667	158	79	79	9	253	256	65
5	1331	1340	.90	4.1	130.100	.948	1.17	2.352	130.019	158	80	79	9	253	255	66
6	1342	1350	.95	4.3	132.350	.974	1.20	2.417	132.371	158	80	80	9	251	250	66
6	1352	1402	.95	4.3	134.800	.974	1.20	2.417	134.788	156	80	80	9	252	254	65
	1404				137.230				137.205							

Project No. M162810A
#2 Coke Battery PEC Baghouse Stack
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Isokinetic Sampling Field Data Sheet

Project Number:	M162810	Date:	8/18/16	Test Number:	3
Client:	ARCELOR MITTAL	Test Location:	PEC #2	Operator:	BVG Test Tech: DBO
Plant:	BURNS HARBOR	Test Method:	5/29	Page Number:	2 of 2

4.597 1.240

Port-Point #.	Time		(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft^3, Actual	Square Root, ΔP	Meter Rate, Cubic Feet/ Min.	Theoretical Meter Volume, (V_m) ft^3, per point	Theoretical Meter Volume, (V_m) ft^3, total	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, " Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp. °F
3-1	1415		1.0	4.6	137.230	1.0	1.25	2.502		159	80	79	9	252	254	64
1	1417	1425	1.0	4.6	139.690	1.0	1.25	2.502	139.732	161	79	79	9	253	254	64
2	1427	1435	1.1	5.1	142.240	1.04	1.31	2.624	142.234	164	80	79	10	253	251	63
2	1437	1446	1.1	5.1	144.985	1.04	1.31	2.624	144.858	166	79	79	10	253	256	63
3	1448	1458	1.0	4.6	147.470	1.0	1.25	2.502	147.482	165	79	79	9	250	252	64
3	1500	1503	.95	4.3	149.910	.974	1.14	2.293	149.984	165	79	79	9	251	252	65
4	1510	1521	.90	4.1	152.295	.948	1.176	2.352	152.277	164	79	79	9	252	253	61
4	1523	1532	.90	4.1	154.615	.948	1.176	2.352	154.629	163	79	79	9	252	251	61
5	1534	1543	.88	4.0	156.950	.930	1.16	2.326	156.951	163	79	79	9	252	252	60
5	1545	1554	.95	4.3	158.650	.974	1.14	2.293	158.652	162	79	79	9	252	253	64
6	1556	1607	.90	4.1	160.940	.948	1.176	2.352	160.945	163	79	79	9	252	252	59
6	1609	1617	.80	3.6	163.275	.894	1.10	2.218	163.297	164	79	79	9	252	251	61
	1619				165.525				165.515							
4-1	1628		1.0	4.6	165.525	1.0	1.25	2.502		166	78	79	9	253	253	62
1	1630	1639	1.0	4.6	168.015	1.0	1.25	2.502	168.027	167	78	78	9	253	252	67
2	1641	1650	1.0	4.6	170.525	1.0	1.25	2.502	170.529	164	78	78	9	250	254	63
2	1652	1701	1.0	4.6	173.010	1.0	1.25	2.502	173.031	165	78	78	9	252	253	64
3	1703	1712	.95	4.3	175.530	.974	1.14	2.293	175.533	162	78	78	9	253	253	65
3	1714	1727	1.0	4.6	177.815	1.0	1.25	2.502	177.826	158	78	78	9	252	247	64
4	1729	1737	.98	4.5	180.310	.989	1.22	2.455	180.328	155	78	78	9	250	251	62
4	1739	1749	.95	4.3	182.715	.974	1.14	2.293	182.783	156	78	78	9	252	253	63
5	1751	1802	.85	3.9	185.010	.921	1.14	2.286	185.076	156	77	77	9	252	250	65
5	1804	1813	.85	3.9	187.400	.921	1.19	2.286	187.362	158	77	77	9	251	250	60
6	1815	1827	.85	3.9	189.645	.921	1.19	2.286	189.648	156	77	77	9	251	251	62
6	1829	1906	.85	3.9	191.940	.921	1.19	2.286	191.934	156	77	77	9	250	251	61
		1908			194.296				194.220	156	77	77	9	250	257	60

Project No. M162810A
#2 Coke Battery PEC Baghouse Stack
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IMPINGER WEIGHT SHEET

PLANT: Arcelor Mittal

UNIT NO: Burns Harbor

LOCATION: NO. 2 PEC STACK

DATE: 8-18-16

TEST NO: 3

METHOD: 29

WEIGHED/MEASURED BY: SLB

BALANCE ID: S10-35

Circle One:	FINAL WEIGHT MLS / GRAMS	INITIAL WEIGHT MLS / GRAMS	IMPINGER GAIN	IMPINGER CONTENTS
IMPINGER 1	790.4	747.9	42.5	HNO_3/H_2O_2
IMPINGER 2	694.7	678.6	16.1	HNO_3/H_2O_2
IMPINGER 3	641	637.1	3.9	Blank
IMPINGER 4	746.7	750.6	-3.9	KMNO4
IMPINGER 5	712.6	708.2	4.4	KMNO4
IMPINGER 6	822.1	794	28.1	silica
IMPINGER 7				
IMPINGER 8				

	FINAL TOTAL	INITIAL TOTAL	TOTAL IMPINGER GAIN
IMPINGERS	3585.4	3521.9	63.5
SILICA	822.1	794	28.1

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Isokinetic Sampling Cover Sheet

Test Engineer: CSE
Test Technician: DBD / BM

Plant Information

Run Number: 1
Date: 8-16-16
Project Number: M162810
Test Location: #2 Battery PEC Duct
Client Name: Arcelor Mittal
Plant Name: Burns Harbor, Indiana
Duct Shape: (Circular) or Rectangular
Length: — Width: — or Diameter: 9'
Flue Area: 63.617
Upstream Diameters: >2.0
Downstream Diameters: >3.0
Port Type: Nipple
Port Length: 6.5"
Port Diameter: 4"
Test Method: M5/202
Source Condition: Normal

Meter and Probe Data

Meter ID: CM16
Meter Y Value: .994
ΔH Value: 1.689
Pitot ID: 314
Pitot Coefficient: .84
Train Type: Anderson
Nozzle ID #
Nozzle Diameter: .228
Filter Number/Weight: 9444 / .4409
Probe Length: 4'
Probe Liner: Glass
Thimble Number/Weight: —
Pre-Test Nozzle Leak Check: ✓0.00 @ 10 "Hg
Post-Test Nozzle Leak Check: ✓0.00 @ 10 "Hg
Pre-Test Pitot Leak Check: ✓0.5 "H_2O
Post-Test Pitot Leak Check: ✓0.5 "H_2O

Traverse Data

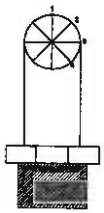
Ports Sampled: 4
Points/Port: 6
Min/Point: 4
Total Points: 24
Total Test Time: 96
Sample Plane: (Horizontal) or Vertical

Stack Parameters

Barometric Pressure: 29.54 1.1
Static Pressure: -.5 20.0
CO_2 %: / / / Avg. 12
O_2 %: / / / Avg. 19.7
Determined by: Method 3 or (Method 3A)
Imp and/or silica balance Model and S/N: S10-35
Servomex Serial #: 0144061 / 3791
Initial Imp. Volume or Weight: 1946.9
Final Imp. Volume or Weight: 1980.7
Imp. Volume or Weight Gain: 33.8
Initial Silica Weight: 859.5
Final Silica Weight: 887.7
Silica Weight Gain: 28.2

Comments:

Post-Test Nozzle Verification:



1) ✓ 2) ✓ 3) ✓ 4) ✓

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K-.931
K'-2.175 x 2

Isokinetic Sampling Field Data Sheet-M202

Project Number: M162810
Client: Arcelor Mittal
Plant: Burns Harbor, Indiana
Date: 8-16-16
Test Location: #2 Battery PEC Duct
Test Method: M5 /202
Test Number: 1
Operator: CSE
Test Tech: DBO/BM
Page Number: 1 of 2

Port-Point #.	Time	(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft³, Actual	Square Root, ΔP	Meter Rate, Cubic Feet/Min.	Theoretical Meter Volume, (V_m) ft³, per point	Theoretical Meter Volume, (V_m) ft³, total	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, " Hg	Probe Temp. °F	Filter Temp. °F	CPM Filter Temp °F	Impinger Outlet Well Temp. °F
1-1	715	1.0	2.4	6.630	1.00	.933	1.866		124	72	71	4	252	253	73	55
1	717/729	.98	2.4	8.51	.989	.923	1.847	8.498	125	72	71	4	254	253	73	55
2	731/743	.95	2.3	10.30	.974	.909	1.818	10.345	129	72	71	4	251	250	73	56
2	744/754	.95	2.3	12.21	.974	.909	1.818	12.163	136	72	71	4	253	251	74	56
3	756/805	.92	2.2	13.89	.959	.894	1.789	13.981	142	71	71	4	248	250	74	55
3	807/816	.90	2.2	15.87	.948	.885	1.770	15.770	145	71	71	4	247	246	72	58
4	818/828	.95	2.3	17.61	.974	.909	1.818	17.540	149	71	71	4	250	248	72	60
4	830/839	1.0	2.4	19.40	1.00	.933	1.866	19.358	151	72	72	4	252	250	77	65
5	841/849	1.1	2.7	21.39	1.048	.978	1.957	21.224	154	73	72	4	248	249	77	65
5	851/909	1.0	2.4	23.04	1.00	.933	1.866	23.181	151	73	73	4	251	250	76	66
6	911/920	.98	2.4	25.07	.989	.921	1.843	25.047	153	73	73	4	251	250	73	61
6	922/933	.98	2.4	26.91	.989	.921	1.843	26.890	154	73	73	4	257	250	74	60
	935			28.160				28.733								
2-1	953	.98	2.4	28.370	.989	.921	1.843		152	74	73	4	251	249	75	55
1	955/1004	.98	2.4	30.24	.989	.921	1.843	30.213	152	74	74	4	252	251	80	46
2	1006/1018	1.1	2.7	32.11	1.048	.976	1.952	32.056	154	74	74	4	248	250	80	57
2	1020/1043	1.0	2.4	34.11	1.00	.921	1.862	34.008	148	74	74	4	249	250	80	55
3	1045/1101	.98	2.4	35.91	.989	.921	1.843	35.870	146	74	74	4	250	250	80	59
3	1103/1113	.90	2.2	37.77	.948	.883	1.766	37.713	149	74	74	4	249	250	85	57
4	1115/1124	.93	2.3	39.57	.964	.897	1.795	39.479	155	75	75	4	249	249	83	55
4	1126/1135	.95	2.3	41.34	.974	.907	1.814	41.274	159	75	75	4	250	249	85	57
5	1137/1147	.80	1.9	43.12	.894	.832	1.665	43.088	164	76	75	4	254	250	85	56
5	1149/1159	.80	1.9	44.89	.894	.832	1.665	44.753	163	77	76	4	249	249	85	57
6	1201/1216	.75	1.8	46.54	.866	.806	1.612	46.418	160	77	76	4	249	251	85	56
6	1218/1227	.80	1.9	48.18	.894	.832	1.665	48.030	158	77	77	4	250	249	85	58
	1229			49.790				49.695								

Project No. M162810A
#2 Coke Battery PEC Baghouse Stack
351 of 476
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K-.931 x.2
K'-2.475

Isokinetic Sampling Field Data Sheet-M202

Project Number: M162810
Client: Arcelor Mittal
Plant: Burns Harbor, Indiana

Date: 8-16-16
Test Location: #2 Battery PEC Duct
Test Method: M5 /202

Test Number: 1
Operator: CSE
Test Tech: DBD/BM
Page Number: 2 of 2

Port-Point #.	Time	(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft³, Actual	Square Root, ΔP	Meter Rate, Cubic Feet/ Min.	Theoretical Meter Volume, (V_m) ft³, per point	Theoretical Meter Volume, (V_m) ft³, total	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, " Hg	Probe Temp. °F	Filter Temp. °F	CPM Filter Temp °F	Impinger Outlet Well Temp. °F
3-1	1240	.99	2.4	49.79	.995	.93	1.860		156	77	77	4	251	248	84	59
1	1242/1253	1.2	2.9	51.62	1.095	1.019	2.039	51.555	158	77	77	4	249	250	83	56
2	1255/1304	1.1	2.7	53.36	1.048	.976	1.952	53.594	160	78	78	4	251	249	78	56
2	1306/1323	1.2	2.9	55.48	1.095	1.019	2.039	55.546	158	78	78	4	248	250	78	58
3	1325/1337	1.1	2.7	57.45	1.048	.976	1.952	57.585	159	79	79	4	248	251	78	58
3	1339/1348	1.1	2.7	59.59	1.048	.976	1.952	59.537	158	79	79	4	253	250	80	62
4	1350/1359	.95	2.3	61.52	.974	.907	1.814	61.489	159	79	79	4	250	250	79	60
4	1401/1410	.90	2.2	63.37	.948	.883	1.766	63.303	161	79	79	4	250	250	79	62
5	1412/1422	.95	2.3	65.18	.974	.907	1.814	65.069	160	79	79	4	250	250	79	60
5	1424/1434	.85	2.1	66.93	.921	.858	1.716	66.883	161	79	79	4	250	250	76	62
6	1436/1446	.90	2.2	68.63	.948	.883	1.766	68.599	161	79	79	4	250	250	75	60
6	1448/1457	.90	2.2	70.48	.948	.883	1.766	70.365	161	79	79	4	248	248	77	62
	1459			72.220				72.131								
4-1	1510	1.1	2.7	72.220	1.048	.976	1.952		162	79	79	4	253	249	76	58
1	1512/1523	1.1	2.7	74.22	1.048	.976	1.952	74.172	162	79	79	4	256	249	76	59
2	1525/1536	1.0	2.4	76.19	1.00	.932	1.862	76.124	163	79	79	4	250	250	74	58
2	1538/1548	1.0	2.4	78.04	1.00	.931	1.862	77.986	163	79	79	4	250	250	74	56
3	1550/1558	1.1	2.7	79.88	1.048	.976	1.952	79.848	164	79	79	4	250	249	73	58
3	1600/1609	1.1	2.7	81.88	1.048	.976	1.952	81.800	163	79	79	4	250	251	75	56
4	1611/1621	.95	2.3	83.74	.974	.907	1.814	83.752	162	79	79	4	257	251	76	59
4	1623/1635	.90	2.2	85.61	.948	.883	1.766	85.566	162	79	79	4	253	251	84	58
5	1637/1647	.95	2.3	87.41	.974	.907	1.814	87.332	163	79	79	4	255	251	85	57
5	1649/1657	.85	2.1	89.18	.921	.858	1.716	89.146	162	79	79	4	247	250	84	56
6	1659/1708	.85	2.1	90.90	.921	.858	1.716	90.862	164	79	79	4	255	250	84	56
6	1710/1723	.80	1.9	92.61	.894	.832	1.665	92.578	166	79	79	4	250	250	83	58
	1725			94.270				94.243								

Project No. M162810A
#2 Coke Battery PEC Baghouse Stack
352 of 476
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IMPINGER WEIGHT SHEET

PLANT: Arcelor Mittal

UNIT NO: Burns Harbor

LOCATION: No 2 PEC Stack

DATE: 8-16-16

TEST NO: 1

METHOD: 5/202

WEIGHED/MEASURED BY: SLB

BALANCE ID: S10-38

Circle One:	FINAL WEIGHT MLS / GRAMS	INITIAL WEIGHT MLS / GRAMS	IMPINGER GAIN	IMPINGER CONTENTS
IMPINGER 1	635.9	597.7	38.2	blank
IMPINGER 2	622.2	622.2	0	blank
IMPINGER 3	722.6	727	-4.4	DI
IMPINGER 4	887.7	859.5	28.2	silica
IMPINGER 5				
IMPINGER 6				
IMPINGER 7				
IMPINGER 8				

	FINAL TOTAL	INITIAL TOTAL	TOTAL IMPINGER GAIN
IMPINGERS	1980.1	1946.9	33.2
SILICA	887.7	859.5	28.2

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Isokinetic Sampling Cover Sheet

Test Engineer: CSE
Test Technician: DBD / BM

Plant Information

Run Number: 2
Test Location: #2 Battery PEC Duct
Duct Shape: (Circular) or Rectangular
Flue Area: 63.617
Port Type: Nipple
Test Method: M5/202

Date: 8-17-16
Client Name: ArcelorMittal
Length: — Width: — or Diameter: 9'
Upstream Diameters: >2.0
Port Length: 6.5"
Source Condition: Normal

Project Number: M162810
Plant Name: Burns Harbor, Indiana
Downstream Diameters: >3.0
Port Diameter: 4"

Meter and Probe Data

Meter ID: CM116
Pitot ID: 314
Nozzle ID #
Probe Length: 4'
Pre-Test Nozzle Leak Check: ✓ 0.00 @ 10 "Hg
Pre-Test Pitot Leak Check: ✓ @ 5 "H_2O

Meter Y Value: .994
Pitot Coefficient: .84
Nozzle Diameter: .228
Probe Liner: Glass

ΔH Value: 1.689
Train Type: Anderson
Filter Number/Weight: 9954 / .4552
Thimble Number/Weight: —
Post-Test Nozzle Leak Check: ✓ 0.00 @ 10 "Hg
Post-Test Pitot Leak Check: ✓ @ 5 "H_2O

Traverse Data

Ports Sampled: 4
Total Points: 24

Points/Port: 6
Total Test Time: 96

Min/Point: 4
Sample Plane: (Horizontal) or Vertical

Stack Parameters

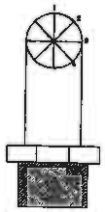
Barometric Pressure: 29.39
CO_2 %: / / / Avg. 1.2
Imp and/or silica balance Model and S/N: 310-35
Initial Imp. Volume or Weight: 1839.9
Initial Silica Weight: 818.9

Static Pressure: -1.00
O_2 %: / / / Avg. ~~19.7~~ 20.0
Servomex Serial #: 0140001 / 3791
Final Imp. Volume or Weight: 1878.2
Final Silica Weight: 844.2

Determined by: Method 3 or (Method 3A)
Imp. Volume or Weight Gain: 38.3
Silica Weight Gain: 25.3

Comments:

Post-Test Nozzle Verification:



1) ✓ 2) ✓ 3) ✓ 4) ✓

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K. 924 #2
K'-2.445

Isokinetic Sampling Field Data Sheet-M202

Project Number: M162810 | Date: 8-17-16 | Test Number: 2
Client: Arcelor Mittal | Test Location: #2 Battery PEC Duct | Operator: CSE | Test Tech: DBD/BM
Plant: Burns Harbor, Indiana | Test Method: M5 1202 | Page Number: 1 of 2

Port-Point #.	Time	(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft^3, Actual	Square Root, ΔP	Meter Rate, Cubic Feet/ Min.	Theoretical Meter Volume, (V_m) ft^3, per point	Theoretical Meter Volume, (V_m) ft^3, total	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, " Hg	Probe Temp. °F	Filter Temp. °F	CPM Filter Temp °F	Impinger Outlet Well Temp. °F
1-1	848	1.2	2.9	94.830	1.095	1.012	2.024	—	115	70	70	7	250	248	79	65
1	850/911	1.2	2.9	96.99	1.095	1.012	2.024	96.854	115	71	71	7	247	250	78	65
2	913/923	1.2	2.9	98.91	1.095	1.012	2.024	98.878	125	72	71	7	248	249	76	65
2	925/933	1.1	2.6	100.95	1.048	.969	1.938	100.902	138	73	72	7	248	251	76	65
3	935/943	1.1	2.6	102.88	1.048	.969	1.938	102.840	145	74	73	7	249	249	76	65
3	945/955	1.2	2.9	104.72	1.095	1.012	2.024	104.778	154	75	74	7	249	250	77	65
4	957/1005	1.1	2.6	106.88	1.048	.969	1.938	106.802	155	75	75	7	253	249	76	63
4	1007/1015	1.1	2.6	108.76	1.048	.969	1.938	108.740	160	76	75	7	250	252	78	63
5	1017/1028	1.1	2.6	110.57	1.048	.969	1.938	110.678	162	77	76	7	249	248	76	58
5	1030/1041	.92	2.2	112.65	.959	.886	1.772	112.616	164	77	77	7	249	249	77	60
6	1043/1055	.92	2.2	114.49	.959	.886	1.772	114.388	164	78	78	7	252	250	78	63
6	1057/1107	.85	2.0	116.24	.921	.851	1.703	116.160	166	79	78	7	247	251	80	62
	1109			117.950				117.863								
2-1	1121	1.2	2.9	118.120	1.095	1.012	2.024	—	165	79	79	7	252	249	82	65
1	1123/1131	1.2	2.9	120.12	1.095	1.012	2.024	120.144	164	79	79	7	249	248	79	64
2	1133/1144	1.2	2.9	122.07	1.095	1.012	2.024	122.168	165	79	79	7	250	249	85	65
2	1146/1202	1.2	2.9	124.23	1.095	1.012	2.024	124.192	162	79	78	7	249	250	84	62
3	1204/1218	1.1	2.6	126.18	1.048	.969	1.938	126.216	159	79	79	7	250	247	85	64
3	1220/1230	1.1	2.6	128.11	1.048	.969	1.938	128.154	157	79	79	7	252	250	85	65
4	1232/1241	1.1	2.6	129.99	1.048	.969	1.938	130.092	161	80	79	7	252	251	85	65
4	1243/1253	.95	2.3	131.97	.974	.900	1.801	132.030	167	80	80	7	248	249	85	65
5	1255/1303	.92	2.2	133.92	.959	.886	1.772	133.831	167	80	80	7	248	250	85	61
5	1305/1315	.92	2.2	136.69	.959	.886	1.772	135.603	169	80	80	7	249	246	85	65
6	1317/1332	.85	2.0	137.37	.921	.851	1.703	137.375	165	80	80	7	250	250	85	65
6	1335/1351	.95	2.3	139.11	.974	.900	1.801	139.078	156	80	80	7	249	248	76	60
	1353			140.750				140.879								

Project No. M162810A
#2 Coke Battery PEC Baghouse Stack
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K-.924 x 2
K'-2.445

Isokinetic Sampling Field Data Sheet-M202

Project Number: M1628 10
Client: Arcelor Mittal
Plant: Burns Harbor, Indiana

Date: 8-17-16
Test Location: #2 Battery PEC Duct
Test Method: M5 /202

Test Number: 2
Operator: CSE
Test Tech: DBO/BM
Page Number: 2 of 2

Port-Point #.	Time	(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft³, Actual	Square Root, ΔP	Meter Rate, Cubic Feet/ Min.	Theoretical Meter Volume, (V_m) ft³, per point	Theoretical Meter Volume, (V_m) ft³, total	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, " Hg	Probe Temp. °F	Filter Temp. °F	CPM Filter Temp °F	Impinger Outlet Well Temp. °F
3-1	1401	1.1	2.6	140.750	1.048	.969	1.938		153	80	80	7	250	250	70	54
1	1403/1418	1.2	2.9	142.52	1.095	1.012	2.024	142.688	153	80	80	7	256	251	70	58
2	1420/1429	1.1	2.6	144.45	1.048	.969	1.938	144.712	149	80	80	7	251	249	70	57
2	1431/1443	1.1	2.6	146.49	1.048	.969	1.938	146.650	152	79	79	7	245	251	70	61
3	1445/1456	1.1	2.6	148.48	1.048	.969	1.938	148.588	156	79	79	7	248	250	74	59
3	1458/1506	1.1	2.6	150.58	1.048	.969	1.938	150.526	158	79	79	7	248	247	75	61
4	1508/1517	.98	2.3	152.39	.989	.914	1.829	152.464	162	80	80	7	248	247	74	59
4	1519/1531	.95	2.3	154.26	.974	.900	1.801	154.293	160	80	80	7	250	250	75	61
5	1533/1545	.95	2.3	156.02	.974	.900	1.801	156.094	158	81	81	7	250	251	75	62
5	1547/1603	.85	2.0	157.83	.921	.851	1.703	157.895	155	81	81	7	250	251	75	56
6	1605/1616	.80	1.9	159.45	.894	.826	1.652	159.598	156	82	82	7	252	249	76	59
6	1618/1626	.85	2.0	161.16	.921	.851	1.703	161.250	159	82	82	7	248	249	76	60
	1628			162.770				162.953								
1-1	1636	1.1	2.6	162.770	1.048	.969	1.938		166	82	82	7	257	249	77	64
1	1638/1648	1.1	2.6	164.55	1.048	.969	1.938	164.708	169	82	82	7	250	251	78	62
2	1650/1659	1.2	2.9	166.57	1.095	1.012	2.024	166.646	171	82	82	7	246	249	78	65
2	1701/1709	1.2	2.9	168.55	1.095	1.012	2.024	168.670	169	82	82	7	251	249	78	61
3	1711/1721	1.1	2.6	170.62	1.048	.969	1.938	170.694	169	82	82	7	249	250	80	66
3	1723/1733	1.1	2.6	172.67	1.048	.969	1.938	172.632	167	82	82	7	250	250	79	62
4	1735/1744	.95	2.3	174.66	.974	.900	1.801	174.570	165	81	81	7	250	250	77	63
4	1746/1758	1.1	2.6	176.48	1.048	.969	1.938	176.371	165	81	81	7	250	250	77	62
5	1800/1810	.85	2.0	178.37	.921	.851	1.703	178.309	166	81	81	7	250	250	78	63
5	1812/1820	.85	2.0	180.15	.921	.851	1.703	180.012	166	81	81	7	250	250	76	62
6	1822/1833	.85	2.0	181.79	.921	.851	1.703	181.715	168	80	80	7	248	247	70	60
6	1835/1843	.90	2.2	183.51	.948	.876	1.753	183.418	169	80	80	7	250	250	70	57
	1845			185.210				185.171								

Project No. M1628 10A
#2 Coke Battery PEC Baghouse Stack

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IMPINGER WEIGHT SHEET

PLANT: ArcelorMittal

UNIT NO: Burns Harbor

LOCATION: No. 2 PEC stack

DATE: 8-17-16

TEST NO: 2

METHOD: 5/202

WEIGHED/MEASURED BY: SLB

BALANCE ID: S10-35

Circle One:	FINAL WEIGHT MLS / GRAMS	INITIAL WEIGHT MLS / GRAMS	IMPINGER GAIN	IMPINGER CONTENTS
IMPINGER 1	629.2	583.9		blank
IMPINGER 2	554.5	554.5		blank
IMPINGER 3	694.5	701.5		DI
IMPINGER 4	844.2	818.9		silica
IMPINGER 5				
IMPINGER 6				
IMPINGER 7				
IMPINGER 8				

	FINAL TOTAL	INITIAL TOTAL	TOTAL IMPINGER GAIN
IMPINGERS	1878.2	1839.9	38.3
SILICA	844.2	818.9	25.3

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Isokinetic Sampling Cover Sheet

Test Engineer: CSE
Test Technician: DBD / BM

Plant Information

Run Number: 3
Test Location: #2 Battery PEC Duct
Duct Shape: (Circular) or Rectangular
Flue Area: 63.617
Port Type: Nipple
Test Method: M5/202

Date: 8-18-16
Client Name: Arcelor Mittal
Length: — Width: — or Diameter: 9'
Upstream Diameters: >2.0
Port Length: 6.5"
Source Condition: Normal

Project Number: M162810
Plant Name: Burns Harbor, Indiana
Downstream Diameters: >3.0
Port Diameter: 4"

Meter and Probe Data

Meter ID: CM16
Pitot ID: 314
Nozzle ID #
Probe Length: 4'
Pre-Test Nozzle Leak Check: ✓ 0.00 @ 10 "Hg
Pre-Test Pitot Leak Check: ✓ @ 5 "H_2O

Meter Y Value: .994
Pitot Coefficient: .84
Nozzle Diameter: .228
Probe Liner: Glass

ΔH Value: 1.689
Train Type: Anderson
Filter Number/Weight: 9443 / .4441
Thimble Number/Weight: ---
Post-Test Nozzle Leak Check: ✓ 0.00 @ 10 "Hg
Post-Test Pitot Leak Check: ✓ @ 5 "H_2O

Traverse Data

Ports Sampled: 4
Total Points: 24

Points/Port: 6
Total Test Time: 96

Min/Point: 4
Sample Plane (Horizontal) or Vertical

Stack Parameters

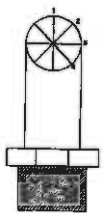
Barometric Pressure: 29.35
CO_2 %: / / / Avg. 1.0
Imp and/or silica balance Model and S/N: S10-35
Initial Imp. Volume or Weight: 1950.7
Initial Silica Weight: 855.1

Static Pressure: -1.0
O_2 %: / / / Avg. 20.7
Servomex Serial #: 0144001 / 3791
Final Imp. Volume or Weight: 1995.0
Final Silica Weight: 878.6

Determined by: Method 3 or (Method 3A)
Imp. Volume or Weight Gain: 44.3
Silica Weight Gain: 23.5

Comments:

Post-Test Nozzle Verification: 1) ✓ 2) ✓ 3) ✓ 4) ✓



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Isokinetic Sampling Field Data Sheet-M202

Project Number: M1628110
Client: Arcelor Mittal
Plant: Burns Harbor, Indiana

Date: 8-18-16
Test Location: #2 Battery PEC Duct
Test Method: M5 /202

Test Number: 3
Operator: CSE
Test Tech: DSD / BM
Page Number: 1 of 2

Port-Point #.	Time	(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft^3, Actual	Square Root, ΔP	Meter Rate, Cubic Feet/ Min.	Theoretical Meter Volume, (V_m) ft^3, per point	Theoretical Meter Volume, (V_m) ft^3, total	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, " Hg	Probe Temp. °F	Filter Temp. °F	CPM Filter Temp °F	Impinger Outlet Well Temp. °F
1-1	716	1.1	2.5	85.550	1.048	.942	1.885		128	66	66	6	249	250	72	65
1	718/734	1.1	2.5	87.45	1.048	.942	1.885	87.435	126	67	66	6	251	250	72	64
2	736/746	1.2	2.8	89.45	1.095	.984	1.969	89.320	130	67	67	6	249	249	71	65
2	748/758	1.0	2.3	91.36	1.00	.899	1.798	91.289	133	68	68	6	250	249	69	59
3	800/809	1.0	2.3	93.17	1.00	.899	1.798	93.087	136	70	69	6	251	251	69	61
3	811/822	1.1	2.5	94.94	1.048	.942	1.885	94.885	140	71	70	6	251	251	69	59
4	824/835	1.1	2.5	96.84	1.048	.942	1.885	96.770	135	77	77	6	250	251	69	56
4	837/[illegible]	.95	2.2	98.73	.974	.892	1.785	98.655	137	78	77	6	247	250	69	53
5	1008/1018	.95	2.2	100.56	.974	.892	1.785	100.440	134	78	77	6	251	249	69	52
5	1027/1037	.98	2.3	102.27	.989	.906	1.813	102.225	129	78	75	6	249	250	69	52
6	[illegible]	.90	2.1	104.13	.948	.868	1.737	104.038	131	79	78	6	250	251	69	52
6	[illegible]/1115	.90	2.1	105.87	.948	.868	1.737	105.775	137	79	78	6	249	250	71	56
	1117			107.500				107.512								
2-1	1118	1.1	2.6	107.915	1.048	.960	1.921		123	79	78	7	251	250	78	56
1	1120/1206	1.1	2.6	[illegible]	1.048	.960	1.921	[illegible]	126	80	79	7	250	250	78	57
2	1208/1217	1.1	2.6	111.83	1.048	.960	1.921	111.757	127	81	80	7	250	250	78	55
2	1229/1237	1.1	2.6	113.77	1.048	.960	1.921	113.678	136	82	81	7	250	250	80	60
3	1239/1247	1.0	2.4	115.67	1.00	.929	1.858	115.599	144	82	82	7	249	250	81	57
3	1248/1255	1.0	2.4	117.54	1.00	.929	1.858	117.457	149	82	82	7	249	250	80	57
4	1257/1305	1.0	2.4	119.44	1.00	.929	1.858	119.315	153	81	81	7	250	250	85	58
4	1307/1317	.98	2.3	121.22	.989	.919	1.839	121.173	158	81	81	7	250	250	85	62
5	1319/1329	.93	2.2	123.05	.964	.895	1.791	123.012	159	81	81	7	248	246	81	59
5	1331/1340	.93	2.2	124.94	.964	.895	1.791	124.863	159	81	81	7	249	251	80	65
6	1342/1350	.85	2.0	126.63	.921	.856	1.712	126.594	159	81	81	7	252	249	79	64
6	1352/1402	.90	2.1	128.37	.948	.881	1.762	128.306	159	81	81	7	248	252	80	64
	1404			130.170				130.068								

Project No. M1628110A
#2 Coke Battery PEC Baghouse Stack

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K .929 x.2
K: 2.417

Isokinetic Sampling Field Data Sheet-M202

Project Number: M162810
Client: Arcelor Mittal
Plant: Burns Harbor, Indiana

Date: 8-18-16
Test Location: #2 Battery PEC Duct
Test Method: M5 /202

Test Number: 3
Operator: CSE
Test Tech: DBD/BM
Page Number: 2 of 2

Port-Point #.	Time	(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft³, Actual	Square Root, ΔP	Meter Rate, Cubic Feet/ Min.	Theoretical Meter Volume, (V_m) ft³, per point	Theoretical Meter Volume, (V_m) ft³, total	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, " Hg	Probe Temp. °F	Filter Temp. °F	CPM Filter Temp °F	Impinger Outlet Well Temp. °F
3-1	1415	1.2	2.9	130.170	1.095	1.017	2.035	—	160	80	80	7	251	251	85	65
1	1417/1425	1.2	2.9	132.31	1.095	1.017	2.035	132.205	162	80	81	7	253	250	85	65
2	1427/1435	1.2	2.9	134.37	1.095	1.017	2.035	134.240	164	81	81	7	254	251	85	65
2	1437/1446	1.2	2.9	136.31	1.095	1.017	2.035	136.275	167	81	81	7	248	250	85	64
3	1448/1458	1.2	2.9	138.34	1.095	1.017	2.035	138.310	165	81	82	7	249	249	85	63
3	1500/1508	1.0	2.4	140.41	1.00	.929	1.858	140.345	166	81	82	7	252	249	85	65
4	1510/1521	.95	2.2	142.32	.974	.905	1.810	142.203	163	81	82	7	248	249	85	62
4	1523/1532	.95	2.2	144.12	.974	.905	1.810	144.013	162	81	82	7	249	251	85	61
5	1534/1543	.90	2.1	145.87	.948	.881	1.762	145.823	164	81	81	7	249	249	85	62
5	1545/1554	.90	2.1	147.63	.948	.881	1.762	147.585	162	81	81	7	249	252	85	62
6	1556/1607	.95	2.2	149.40	.974	.905	1.810	149.347	163	81	81	7	250	250	85	63
6	1609/1617	.85	2.0	151.21	.921	.856	1.712	151.157	164	81	81	7	250	250	82	60
	1619			152.970				152.869								
4-1	1628	1.2	2.9	152.970	1.095	1.017	2.035	—	168	80	81	7	255	250	83	61
1	1630/1639	1.2	2.9	155.12	1.095	1.017	2.035	155.005	167	80	81	7	250	251	80	61
2	1641/1650	1.1	2.6	157.08	1.048	.974	1.948	157.04	167	80	81	7	249	250	80	63
2	1652/1701	1.1	2.6	158.96	1.048	.974	1.948	158.988	165	80	80	7	250	249	77	62
3	1703/1712	1.1	2.6	160.99	1.048	.974	1.948	160.936	163	79	80	7	250	250	77	62
3	1714/1727	1.1	2.6	162.91	1.048	.974	1.948	162.884	157	79	80	7	250	250	77	62
4	1729/1737	1.0	2.4	164.90	1.00	.929	1.858	164.832	155	80	80	7	250	248	78	64
4	1739/1749	1.0	2.4	166.74	1.00	.929	1.858	166.690	156	80	80	7	249	249	74	59
5	1751/1803	.93	2.2	168.49	.964	.895	1.791	168.548	159	79	80	7	249	250	74	59
5	1804/1813	.95	2.2	170.41	.974	.905	1.810	170.339	159	79	79	7	249	252	81	59
6	1815/1827	.93	2.2	172.22	.964	.895	1.791	172.149	158	78	79	7	253	248	74	61
6	1829/1900	.85	2.0	174.04	.921	.856	1.712	173.940	155	78	79	7	250	250	74	60
	1908			175.700				175.652								

Project No. M162810A
#2 Coke Battery PEC Baghouse Stack
360 of 476
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IMPINGER WEIGHT SHEET

PLANT: Arcelor Mittal

UNIT NO: Burns Harbor

LOCATION: # 2 PEC Stack

DATE: 8/18/16

TEST NO: 3

METHOD: 5/202

WEIGHED/MEASURED BY: SLB

BALANCE ID: S10-35

Circle One:	FINAL WEIGHT MLS / GRAMS	INITIAL WEIGHT MLS / GRAMS	IMPINGER GAIN	IMPINGER CONTENTS
IMPINGER 1	632.5	589.5		blank
IMPINGER 2	639.9	638.6		blank
IMPINGER 3	722.6	722.6		DI
IMPINGER 4	878.6	855.1		silica
IMPINGER 5				
IMPINGER 6				
IMPINGER 7				
IMPINGER 8				

	FINAL TOTAL	INITIAL TOTAL	TOTAL IMPINGER GAIN
IMPINGERS	1995.0	1950.7	44.3

	FINAL TOTAL	INITIAL TOTAL	TOTAL SILICA GAIN
SILICA	878.6	855.1	23.5

MULTI METHOD NON-ISOKINETIC FIELD DATA SHEET

Project Name/Number: M162810 Date: 8-30-16
Test Location: #2 PEC. DUCT Source Condition: Normal
Test Method: M0031 Meter ID: 308 #4 Pre-Calibration Date: 7-28-16
Meter ΔH: 1 LITER MIN Meter Y: 1.00 Test Engineer: CSE

Test (Run) No. 1A Barometric Pressure (P_{bar}) 29.4 in. Hg
Static Pressure: -1.0 Stack Temperature: _____ (From Method _____ Test Data)

Gas Sample Analysis: 1.2 %CO_2 19.7 %O_2

Clock Time 24 hour	Meter Volume (V_m) ft³ or L (Circle One)	Meter Gage Pressure (ΔH) in. H_2O	Meter Inlet Temp. (t_m) °F	Meter Outlet Temp. (t_m) °F	Impinger Outlet Temp °F	Meter Vacuum "Hg
713	0.00	258	72	72	55	3
715/720	2.019	261	73	73	55	3
722/748	4.055	261	73	73	54	3
748/754	6.113	262	74	74	52	4
756/805	8.128	261	74	74	52	4
807/816	10.143	261	74	74	50	4
818/826	12.149	261	75	75	50	4
828/842	14.161	260	74	74	51	4
844/853	16.194	260	74	74	51	4
855/905	18.240	260	74	74	52	4
907	20.281					
Total Vol. in ft³ (V_m)=	20.281	Multiply total volume collected in Liters by 0.035315 to convert to ft³				

Condensate: _____ mls (V_f) - _____ mls (V_i) = _____ mls gained

Silica Gel or Train: _____ grams (W_f) - _____ grams (W_i) = _____ grams gained

Average Meter Temperature: _____
(average of both inlet and outlet if applicable)

Comments:

Pre-Test Leak Check: 0.00 @ 7 "Hg

Post-Test Leak Check: 0.00 @ 7 "Hg

Test (Run) No. 1B Barometric Pressure (P_{bar}) 29.4 in. Hg
Static Pressure: -1.0 Stack Temperature: _____ (From Method _____ Test Data)

Gas Sample Analysis: _____ %CO_2 _____ %O_2

Clock Time 24 hour	Meter Volume (V_m) ft³ or L (Circle One)	Meter Gage Pressure (ΔH) in. H_2O	Meter Inlet Temp. (t_m) °F	Meter Outlet Temp. (t_m) °F	Impinger Outlet Temp °F	Meter Vacuum "Hg
934	0.00	260	74	74	50	4
936/944	2.033	261	74	74	50	5
946/1003	4.108	261	74	74	51	5
1004/1013	6.123	262	74	74	53	5
1015/1026	8.139	261	75	75	55	5
1028/1037	10.153	262	76	76	55	5
1039/1048	12.188	261	77	77	53	5
1050/1103	14.206	260	77	77	53	5
1105/1114	16.232	260	77	77	56	5
1116/1132	18.259	259	78	78	57	5
1134	20.342					
Total Vol. in ft³ (V_m)=	20.342	Multiply total volume collected in Liters by 0.035315 to convert to ft³				

Condensate: _____ mls (V_f) - _____ mls (V_i) = _____ mls gained

Silica Gel or Train: _____ grams (W_f) - _____ grams (W_i) = _____ grams gained

Average Meter Temperature: _____
(average of both inlet and outlet if applicable)

Comments:

Pre-Test Leak Check: 0.00 @ 7 "Hg

Post-Test Leak Check: _____ @ _____ "Hg

MULTI METHOD NON-ISOKINETIC FIELD DATA SHEET

Project Name/Number: M162810 Date: 8-30-16
Test Location: #2 PEC Duct Source Condition: Normal
Test Method: M0031 Meter ID: 308 #4 Pre-Calibration Date: 7-28-16
Meter ΔH: 1 Liter min Meter Y: 1.00 Test Engineer: CSE

Test (Run) No. 1C Barometric Pressure (P_{bar}) 29.4 in. Hg
Static Pressure: -1.0 Stack Temperature: _____ (From Method _____ Test Data)

Gas Sample Analysis: 1.2 %CO_2 19.2 %O_2

Clock Time 24 hour	Meter Volume (V_m) ft^3 or L (Circle One)	Meter Gage Pressure (ΔH) in. H_2O	Meter Inlet Temp. (t_m) °F	Meter Outlet Temp. (t_m) °F	Impinger Outlet Temp °F	Meter Vacuum "Hg
1144	0.00	260	79	79	53	5
1146/1201	2.061	262	79	79	53	5
1203/1211	4.092	261	80	80	55	5
1213/1221	6.118	261	81	81	57	5
1223/1232	8.265	260	82	82	57	5
1233/1242	10.293	260	82	82	56	5
1244/1252	12.337	261	82	82	54	5
1254/1307	14.353	261	82	82	54	5
1309/1319	16.396	261	83	83	57	5
1321/1335	18.418	261	84	84	58	5
1337	20.454					

Total Vol. in ft^3 (V_m)= 20.454 Multiply total volume collected in Liters by 0.035315 to convert to ft^3

Condensate: _____ mls (V_f) - _____ mls (V_i) = _____ mls gained

Silica Gel or Train: _____ grams (W_f) - _____ grams (W_i) = _____ grams gained

Average Meter Temperature: _____
(average of both inlet and outlet if applicable)

Comments:

Pre-Test Leak Check: ✓0.00 @ 7 "Hg
Post-Test Leak Check: ✓0.00 @ 7 "Hg

Test (Run) No. 1D Barometric Pressure (P_{bar}) 29.4 in. Hg
Static Pressure: -1.0 Stack Temperature: _____ (From Method _____ Test Data)

Gas Sample Analysis: _____ %CO_2 _____ %O_2

Clock Time 24 hour	Meter Volume (V_m) ft^3 or L (Circle One)	Meter Gage Pressure (ΔH) in. H_2O	Meter Inlet Temp. (t_m) °F	Meter Outlet Temp. (t_m) °F	Impinger Outlet Temp °F	Meter Vacuum "Hg
1345	0.00	259	85	85	58	5
1347/1357	2.168	261	85	85	55	5
1359/1409	4.206	261	86	86	56	5
1411/1419	6.295	260	86	86	54	5
1421/1430	8.359	261	86	86	54	5
1432/1441	10.447	261	86	86	56	5
1443/1454	12.519	261	87	87	55	5
1456/1507	14.536	259	87	87	57	5
1509/1518	16.565	261	88	88	57	5
1520/1528	18.587	260	88	88	55	5
1530	20.718					

Total Vol. in ft^3 (V_m)= 20.718 Multiply total volume collected in Liters by 0.035315 to convert to ft^3

Condensate: _____ mls (V_f) - _____ mls (V_i) = _____ mls gained

Silica Gel or Train: _____ grams (W_f) - _____ grams (W_i) = _____ grams gained

Average Meter Temperature: _____
(average of both inlet and outlet if applicable)

Comments:

Pre-Test Leak Check: ✓0.00 @ 7 "Hg
Post-Test Leak Check: ✓0.00 @ 7 "Hg

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MULTI METHOD NON-ISOKINETIC FIELD DATA SHEET

Project Name/Number: M162810 Date: 8-31-16
Test Location: #2 PEC Duct Source Condition: Normal
Test Method: M0031 Meter ID: 30B #4 Pre-Calibration Date: 7-28-16
Meter ΔH: 1 Liter Min Meter Y: 1.00 Test Engineer: CSG

Test (Run) No. 2A Barometric Pressure (P_{bar}) 29.29 in. Hg
Static Pressure: -1.0 Stack Temperature: _____ (From Method _____ Test Data)

Gas Sample Analysis: _____ %CO_2 _____ %O_2

Clock Time 24 hour	Meter Volume (V_m) ft³ or L (Circle One)	Meter Gage Pressure (ΔH) in. H_2O	Meter Inlet Temp. (t_m) °F	Meter Outlet Temp. (t_m) °F	Impinger Outlet Temp °F	Meter Vacuum "Hg
710	0.00	256	75	75	50	5
712/733	2.015	259	77	77	53	5
735/743	4.048	261	77	77	53	5
745/755	6.127	260	77	77	55	5
757/805	8.150	261	78	78	54	5
807/825	10.243	260	78	78	51	5
827/837	12.328	260	78	78	51	5
839/848	14.414	260	78	78	50	5
850/858	16.455	260	79	79	55	5
900/907	18.481	260	79	79	55	5
910	20.532					
Total Vol. in ft³ (V_m)=		Multiply total volume collected in Liters by 0.035315 to convert to ft³				

Condensate: _____ mls (V_f) - _____ mls (V_i) = _____ mls gained

Silica Gel or Train: _____ grams (W_f) - _____ grams (W_i) = _____ grams gained

Average Meter Temperature: _____
(average of both inlet and outlet if applicable)

Comments:

Pre-Test Leak Check: ✓0.00 @ 10 "Hg

Post-Test Leak Check: ✓0.00 @ 10 "Hg

Test (Run) No. 2B Barometric Pressure (P_{bar}) 29.29 in. Hg
Static Pressure: -1.0 Stack Temperature: _____ (From Method _____ Test Data)

Gas Sample Analysis: _____ %CO_2 _____ %O_2

Clock Time 24 hour	Meter Volume (V_m) ft³ or L (Circle One)	Meter Gage Pressure (ΔH) in. H_2O	Meter Inlet Temp. (t_m) °F	Meter Outlet Temp. (t_m) °F	Impinger Outlet Temp °F	Meter Vacuum "Hg
919	0.00	259	79	79	56	6
921/932	2.068	260	78	78	56	6
934/943	4.092	260	79	79	54	6
945/957	6.210	260	79	79	53	6
959/1008	8.271	260	78	78	50	6
1010/1027	10.343	260	78	78	50	6
1029/1037	12.399	261	78	78	51	6
1039/1047	14.433	260	79	79	55	6
1049/1059	16.519	259	79	79	54	6
1101/1113	18.598	260	79	79	54	6
1115	20.734					
Total Vol. in ft³ (V_m)=	20.734	Multiply total volume collected in Liters by 0.035315 to convert to ft³				

Condensate: _____ mls (V_f) - _____ mls (V_i) = _____ mls gained

Silica Gel or Train: _____ grams (W_f) - _____ grams (W_i) = _____ grams gained

Average Meter Temperature: _____
(average of both inlet and outlet if applicable)

Comments:

Pre-Test Leak Check: ✓0.00 @ 10 "Hg

Post-Test Leak Check: ✓0.00 @ 10 "Hg

MULTI METHOD NON-ISOKINETIC FIELD DATA SHEET

Project Name/Number: M162810 Date: 8-31-16
Test Location: #2 PEC Duct Source Condition: Normal
Test Method: M0031 Meter ID: 303 #4 Pre-Calibration Date: 7-28-16
Meter ΔH: 1 Liter Min Meter Y: 1.00 Test Engineer: CSE

Test (Run) No. 3C Barometric Pressure (P_{bar}) 29.29 in. Hg
Static Pressure: -1.0 Stack Temperature: _____ (From Method _____ Test Data)

Gas Sample Analysis: _____ %CO_2 _____ %O_2

Clock Time 24 hour	Meter Volume (V_m) ft^3 or L (Circle One)	Meter Gage Pressure (ΔH) in. H_2O	Meter Inlet Temp. (t_m) °F	Meter Outlet Temp. (t_m) °F	Impinger Outlet Temp °F	Meter Vacuum "Hg
1127	0.00	260	80	80	58	7
1129/1137	2.015	260	81	81	57	7
1139/1147	4.052	259	80	80	55	7
1149/1159	6.254	260	80	80	55	7
1201/1211	8.275	259	79	79	53	7
1213/1225	10.316	261	79	79	50	7
1227/1236	12.330	260	79	79	50	7
1238/1247	14.410	261	78	78	53	7
1249/1301	16.431	260	78	78	56	7
1303/1312	18.425	260	78	78	56	7
1316	20.536					
Total Vol. in ft^3 (V_m)=	20.536	Multiply total volume collected in Liters by 0.035315 to convert to ft^3				

Condensate: _____ mls (V_f) - _____ mls (V_i) = _____ mls gained

Silica Gel or Train: _____ grams (W_f) - _____ grams (W_i) = _____ grams gained

Average Meter Temperature: _____
(average of both inlet and outlet if applicable)

Comments:

Pre-Test Leak Check: ✓0.00 @ 10 "Hg

Post-Test Leak Check: ✓0.00 @ 10 "Hg

Test (Run) No. 3D Barometric Pressure (P_{bar}) 29.29 in. Hg
Static Pressure: -1.0 Stack Temperature: _____ (From Method _____ Test Data)

Gas Sample Analysis: _____ %CO_2 _____ %O_2

Clock Time 24 hour	Meter Volume (V_m) ft^3 or L (Circle One)	Meter Gage Pressure (ΔH) in. H_2O	Meter Inlet Temp. (t_m) °F	Meter Outlet Temp. (t_m) °F	Impinger Outlet Temp °F	Meter Vacuum "Hg
1323	0.00	259	78	78	56	6
1325/1337	2.089	261	78	78	56	6
1339/1349	4.108	260	78	78	57	6
1351/1406	6.226	259	77	77	58	6
1402/1411	8.385	260	77	77	55	6
1413/1424	10.415	260	76	76	54	6
1426/1437	12.440	259	77	77	50	6
1439/1454	14.486	260	76	76	53	6
1456/1505	16.503	260	76	76	57	6
1507/1516	18.558	260	76	76	58	6
1518	20.704					
Total Vol. in ft^3 (V_m)=	20.704	Multiply total volume collected in Liters by 0.035315 to convert to ft^3				

Condensate: _____ mls (V_f) - _____ mls (V_i) = _____ mls gained

Silica Gel or Train: _____ grams (W_f) - _____ grams (W_i) = _____ grams gained

Average Meter Temperature: _____
(average of both inlet and outlet if applicable)

Comments:

Pre-Test Leak Check: ✓0.00 @ 10 "Hg

Post-Test Leak Check: ✓0.00 @ 10 "Hg

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MULTI METHOD NON-ISOKINETIC FIELD DATA SHEET

Project Name/Number: M162810 Date: 9-1-16
Test Location: #2 PEC Duct Source Condition: Normal
Test Method: M 0031 Meter ID: 308 #4 Pre-Calibration Date: 7-28-16
Meter ΔH: 1 Liter Min Meter Y: 1.00 Test Engineer: CSE

Test (Run) No. 3A Barometric Pressure (P_{bar}) 29.44 in. Hg
Static Pressure: -1.0 Stack Temperature: _____ (From Method _____ Test Data)

Gas Sample Analysis: 1.2 %CO_2 19.7 %O_2

Clock Time 24 hour	Meter Volume (V_m) ft^3 or L (Circle One)	Meter Gage Pressure (ΔH) in. H_2O	Meter Inlet Temp. (t_m) °F	Meter Outlet Temp. (t_m) °F	Impinger Outlet Temp °F	Meter Vacuum "Hg
906	0.00	261	67	67	58	3
908/917	2.062	260	70	70	56	3
919/928	4.094	261	71	71	54	3
930/941	6.117	258	70	70	54	3
943/956	8.151	258	71	71	51	3
958/1010	10.194	261	71	71	54	3
1012/1021	12.212	262	72	72	55	3
1023/1032	14.278	260	73	73	55	3
1034/1045	16.315	260	74	74	53	3
1047/1057	18.375	260	74	74	54	3
1059	20.410					
Total Vol. in ft^3 (V_m)=		Multiply total volume collected in Liters by 0.035315 to convert to ft^3				

Condensate: _____ mls (V_f) - _____ mls (V_i) = _____ mls gained

Silica Gel or Train: _____ grams (W_f) - _____ grams (W_i) = _____ grams gained

Average Meter Temperature: _____
(average of both inlet and outlet if applicable)

Comments:

Pre-Test Leak Check: ✓0.00 @ 7 "Hg
Post-Test Leak Check: ✓0.00 @ 7 "Hg

Test (Run) No. 3B Barometric Pressure (P_{bar}) 29.44 in. Hg
Static Pressure: -1.0 Stack Temperature: _____ (From Method _____ Test Data)

Gas Sample Analysis: _____ %CO_2 _____ %O_2

Clock Time 24 hour	Meter Volume (V_m) ft^3 or L (Circle One)	Meter Gage Pressure (ΔH) in. H_2O	Meter Inlet Temp. (t_m) °F	Meter Outlet Temp. (t_m) °F	Impinger Outlet Temp °F	Meter Vacuum "Hg
1112	0.00	261	74	74	55	7
1114/1122	2.036	260	74	74	54	7
1124/1134	4.056	261	74	74	54	7
1136/1145	6.103	260	75	75	51	7
1147/1156	8.136	260	73	73	50	7
1158/1208	10.166	261	72	72	54	7
1210/1218	12.202	263	71	71	58	7
1220/1229	14.216	261	71	71	58	7
1231/1243	16.236	260	72	72	55	7
1245/1312	18.256	260	71	71	55	7
1314	20.287					
Total Vol. in ft^3 (V_m)=	20.287	Multiply total volume collected in Liters by 0.035315 to convert to ft^3				

Condensate: _____ mls (V_f) - _____ mls (V_i) = _____ mls gained

Silica Gel or Train: _____ grams (W_f) - _____ grams (W_i) = _____ grams gained

Average Meter Temperature: _____
(average of both inlet and outlet if applicable)

Comments:

Pre-Test Leak Check: ✓0.00 @ 10 "Hg
Post-Test Leak Check: ✓0.00 @ 10 "Hg

MOISTURE FIELD DATA SHEET

Project Name/Number: M162801 Date: 9-1-16
Test Location: #2 PEC Duct Source Condition: Normal
Test Method: M 0031 Meter ID: 30B #4 Pre-Calibration Date: 7-08-16
Meter ΔH: 1 Liter Min Meter Y: 1.00 Test Engineer: CSG

Test (Run) No. 3C Barometric Pressure (P_{bar}) _____ in. Hg
Static Pressure: -1.0 Stack Temperature: _____ (From Method _____ Test Data)

Gas Sample Analysis: _____ %CO_2 _____ %O_2

Clock Time 24 hour	Meter Volume (Vm) ft3 or L (Circle One)	Meter Gage Pressure (ΔH) in. H_2O	Meter Inlet Temp. (t_m) °F	Meter Outlet Temp. (t_m) °F	Impinger Outlet Temp °F	Meter Vacuum "Hg
1323	0.00	258	71	71	55	7
1324 / 1334	2.007	261	70	70	55	7
1336 / 1345	4.056	261	70	70	54	7
1347 / 1355	6.070	262	70	70	55	7
1357 / 1419	8.099	260	71	71	55	7
1420 / 1429	10.122	260	70	70	56	7
1431 / 1440	12.162	260	71	71	54	7
1442 / 1451	14.180	261	71	71	58	7
1453 / 1504	16.212	261	71	71	55	7
1506 / 1519	18.290	261	71	71	55	7
1521	20.318					
Total Vol. in ft3 (Vm)=	20.313	Multiply total volume collected in Liters by 0.035315 to convert to ft^3				

Condensate: ____/____/____ mls (V_f) - ____/____/____ mls (V_i) = _____ mls gained

Silica Gel or Train: _____ grams (W_f) - _____ grams (W_i) = _____ grams gained

Average Meter Temperature: _____
(average of both inlet and outlet if applicable)

Pre-Test Leak Check: 0.00 @ 10 "Hg
Post-Test Leak Check: 0.00 @ 10 "Hg

Comments:

Test (Run) No 3D Barometric Pressure (P_{bar}) _____ in. Hg
Static Pressure -1.0 Stack Temperature: _____ (From Method _____ Test Data)

Gas Sample Analysis: _____ %CO_2 _____ %O_2

Clock Time 24 hour	Meter Volume (Vm) ft3 or L (Circle One)	Meter Gage Pressure (ΔH) in. H_2O	Meter Inlet Temp (t_m) °F	Meter Outlet Temp. (t_m) °F	Impinger Outlet Temp °F	Meter Vacuum "Hg
1530	0.00	262	71	71	56	6
1532/1540	2.008	257	72	72	56	6
1542/1552	4.025	262	72	72	54	6
1554/1602	6.046	260	73	73	54	6
1604/1617	8.052	261	74	74	54	6
1619/1631	10.067	260	75	75	54.5	6
1633/1642	12.126	261	75	75	55	6
1644/1657	14.141	261	76	76	54	6
1659/1709	16.175	260	76	76	55	6
1711/1720	18.218	262	76	76	55	6
1722	20.311					
Total Vol. in ft3 (Vm)=	20.311	Multiply total volume collected in Liters by 0.035315 to convert to ft^3				

Condensate: ____/____/____ mls (V_f) - ____/____/____ mls (V_i) = _____ mls gained

Silica Gel or Train: _____ grams (W_f) - _____ grams (W_i) = _____ grams gained

Average Meter Temperature: _____
(average of both inlet and outlet if applicable)

Pre-Test Leak Check: 0.00 @ 10 "Hg
Post-Test Leak Check: 0.00 @ 10 "Hg

Comments:

Isokinetic Sampling Cover Sheet

Test Engineer: JJR
Test Technician: BM

Plant Information

Run Number:	1	Date:	8/30/16	Project Number:	M162810
Test Location:	#2 Dec stack	Client Name:	Arcelor Mittal	Plant Name:	Burns Harbor
Duct Shape:	Circular or Rectangular	Length:	Width:	or Diameter:	9'
Flue Area:	165.130	Upstream Diameters:	72	Downstream Diameters:	73
Port Type:	Nipple	Port Length:	6.5	Port Diameter:	4"
Test Method:	316	Source Condition:	Normal		

Meter and Probe Data

Meter ID:	CM 23	Meter Y Value:	1.001	ΔH Value:	1.405
Pitot ID:	4013	Pitot Coefficient:	.84	Train Type:	Anderson Box
Nozzle ID #	GLASS	Nozzle Diameter:	.256	Filter Number/Weight:	NA
Probe Length:	10	Probe Liner:	glass	Thimble Number/Weight:	

Pre-Test Nozzle Leak Check: ✓ @ 12 "Hg Post-Test Nozzle Leak Check: ✓ @ 12 "Hg
Pre-Test Pitot Leak Check: ✓ @ 4 "H_2O Post-Test Pitot Leak Check: ✓ @ 4 "H_2O

Traverse Data

Ports Sampled:	2	Points/Port:	24	Min/Point:	4
Total Points:	48	Total Test Time:	96	Sample Plane:	Horizontal or Vertical

Stack Parameters

Barometric Pressure: 29.43 Static Pressure: -1.0
CO_2 %: ___/___/___/ Avg. 1.2 O_2 %: ___/___/___/Avg. 18.7 Determined by: Method 3 or Method 3A
Imp and/or silica balance Model and S/N: _____ Servomex Serial #: 01440D 1/3791
Initial Imp. Volume or Weight: 1907.4 Final Imp. Volume or Weight: 1965.3 Imp. Volume or Weight Gain: 57.9
Initial Silica Weight: 857.5 Final Silica Weight: 880.9 Silica Weight Gain: 23.4

Comments:

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Isokinetic Sampling Field Data Sheet

Project Number:	M162810	Date:	8/30/16	Test Number:	1
Client:	Arcelor Mittal	Test Location:	#2 Pec Stack	Operator:	JJR / Test Tech: DBD
Plant:	Burns Harbor	Test Method:	316	Page Number:	1 of 2

3.04 1.13

Port-Point #.	Time		(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft^3, Actual	Square Root, ΔP	Meter Rate, Cubic Feet/ Min.	Theoretical Meter Volume, (V_m) ft^3, per point	Theoretical Meter Volume, (V_m) ft^3, total	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, " Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp. °F
1-1	9.3		.90	2.5	71.917	.894	1.01	2.021	—	128	75	74	7	250	248	55
1	9.5	9.58	.90	2.5	74.931	.894	1.01	2.021	74.938	134	76	75	7	250	249	56
2	9.59	9.[illegible]	.77	2.4	76.943	.863	.998	2.07	76.959	130	77	76	7	253	248	54
2	9.[illegible]5	10.04	.75	2.3	78.847	.866	.979	1.96	78.959	137	77	76	7	250	250	53
3	9.56	10.04	.90	2.5	80.931	.894	1.011	2.021	80.819	143	77	76	7	248	249	54
3	10.07	10.1[illegible]	.78	2.4	82.433	.863	.998	2.07	82.840	148	77	76	7	250	251	53
4	10.14	10.2[illegible]	.83	2.6	84.937	.911	1.029	2.059	84.840	150	78	76	7	253	250	52
4	10.24	10.32	.90	2.5	86.921	.894	1.01	2.021	86.899	147	80	79	7	250	249	52
5	10.34	10.42	.90	2.5	88.913	.894	1.01	2.021	88.920	142	80	79	7	250	250	55
5	10.50	10.58	.90	2.5	90.945	.894	1.01	2.021	90.941	141	81	80	7	251	250	55
6	10.59	11.07	.90	2.5	92.910	.894	1.01	2.021	92.962	134	81	80	7	250	250	54
6	11.09	11.17	.90	2.5	94.979	.894	1.01	2.021	94.983	135	80	79	7	250	249	56
7	11.19	11.27	.93	2.6	97.020	.911	1.029	2.059	97.004	135	76	78	7	250	249	55
7	11.29	11.37	.90	2.5	99.063	.894	1.01	2.021	99.063	137	76	77	7	251	250	57
8	11.39	11.47	.90	2.5	101.100	.894	1.01	2.021	101.084	141	75	76	7	251	250	59
8	11.49	11.57	.90	2.5	103.121	.894	1.01	2.021	103.105	147	74	75	7	249	249	57
9	11.59	12.08	.95	2.6	105.120	.923	1.042	2.084	105.126	152	74	75	7	249	248	57
9	12.09	12.18	.95	2.6	107.159	.923	1.042	2.084	107.210	151	74	74	7	249	248	59
10	12.19	12.28	.95	2.6	109.303	.923	1.042	2.084	109.294	151	74	74	7	249	249	59
10	12.29	12.38	.95	2.6	111.359	.923	1.042	2.084	111.378	147	74	74	7	248	250	67
11	12.39	12.49	.97	2.7	113.459	.933	1.054	2.108	113.462	144	74	74	7	247	251	61
11	12.49	12.59	.95	2.6	115.566	.923	1.042	2.084	115.570	138	74	74	7	249	252	62
12	12.59	13.09	.95	2.6	117.620	.923	1.042	2.084	117.654	141	75	75	7	249	247	63
12	13.09	13.19	.90	2.5	119.733	.894	1.01	2.021	119.738	146	75	74	7	251	250	60
	13.23				121.759				121.759							

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Isokinetic Sampling Field Data Sheet

Project Number:	M16 [illegible]	Date:	8/30/16	Test Number:	1
Client:	Arcelor Mittal	Test Location:	#2 Pec Stack	Operator:	JR Test Tech: DBD
Plant:	Burns Harbor	Test Method:	8/16	Page Number:	2 of 2

Port-Point #.	Time		(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft^3, Actual	Square Root, ΔP	Meter Rate, Cubic Feet/ Min.	Theoretical Meter Volume, (V_m) ft^3, per point	Theoretical Meter Volume, (V_m) ft^3, total	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, " Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp. °F
2-1	12.32		.80	2.5	121.960	.894	1.01	2.021		152	75	74	7	250	250	55
-1	12.34	12.42	.83	2.6	123.799	.911	1.030	2.059	123.951	153	76	75	6	250	250	55
2	12.44	12.52	.80	2.5	126.004	.894	1.01	2.021	126.040	154	75	74	6	249	250	55
2	12.54	13.04	.83	2.6	128.001	.911	1.030	2.059	128.061	156	75	74	6	248	252	55
3	13.04	13.14	.83	2.6	130.110	.911	1.030	2.059	130.120	156	75	74	7	249	250	56
3	13.14	13.25	.80	2.5	132.179	.894	1.01	2.021	132.179	154	76	75	7	250	250	58
4	13.27	13.45	.80	2.5	134.159	.894	1.01	2.021	134.200	155	76	75	7	249	249	59
4	13.47	13.57	.80	2.5	136.220	.894	1.01	2.021	136.221	157	76	75	7	249	250	59
5	13.59	14.04	.83	2.6	138.2	.911	1.030	2.059	138.243	159	76	75	7	251	251	60
5	14.06	14.19	.80	2.5	140.300	.894	1.01	2.021	140.301	158	77	76	7	246	251	60
6	14.21	14.30	.80	2.5	142.320	.894	1.01	2.021	142.327	157	78	77	7	249	251	61
6	14.32	14.41	.83	2.6	144.338	.911	1.030	2.059	144.343	157	76	77	7	252	249	61
7	14.43	14.54	.83	2.6	146.400	.911	1.030	2.059	146.402	158	76	77	7	245	244	62
7	14.56	15.07	.83	2.6	148.455	.911	1.030	2.059	148.461	160	78	78	7	249	250	62
8	15.09	15.16	.85	2.6	150.520	.923	1.042	2.084	150.520	160	78	79	7	252	250	61
8	15.20	15.28	.85	2.6	152.598	.923	1.042	2.084	152.604	163	78	78	7	249	250	60
9	15.30	15.51	.87	2.7	154.663	.933	1.054	2.108	154.664	158	79	78	7	251	244	60
9	15.53	16.04	.85	2.6	156.799	.923	1.042	2.084	156.796	155	79	78	7	249	250	61
10	16.06	16.14	.83	2.6	158.830	.911	1.030	2.059	158.830	160	80	79	7	252	250	61
10	16.14	16.24	.83	2.6	160.875	.911	1.030	2.059	160.889	163	80	80	7	248	249	60
11	16.29	16.34	.83	2.6	162.939	.911	1.030	2.059	162.948	162	81	80	7	248	250	61
11	16.34	16.52	.83	2.6	164.998	.911	1.030	2.059	165.007	158	81	80	7	252	250	61
12	16.54	17.09	.83	2.6	167.058	.911	1.030	2.059	167.066	156	81	80	7	247	250	61
12	17.11	17.16	.80	2.5	169.061	.894	1.01	2.021	169.125	158	81	80	7	247	250	61
	17.18				171.145				171.146							

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IMPINGER WEIGHT SHEET

PLANT: Arcelor Mittal

UNIT NO: Burns Harbor

LOCATION: #2 PEC Stack

DATE: 8-30-16

TEST NO: 1

METHOD: 316

WEIGHED/MEASURED BY: SLB

BALANCE ID: S10-35

Circle One:	FINAL WEIGHT MLS / GRAMS	INITIAL WEIGHT MLS / GRAMS	IMPINGER GAIN	IMPINGER CONTENTS
IMPINGER 1	769.7	732.8		DI
IMPINGER 2	633.8	617		DI
IMPINGER 3	561.8	557.6		empty
IMPINGER 4	880.9	857.5		silica
IMPINGER 5				
IMPINGER 6				
IMPINGER 7				
IMPINGER 8				

	FINAL TOTAL	INITIAL TOTAL	TOTAL IMPINGER GAIN
IMPINGERS	1965.3	1907.4	57.9
SILICA	880.9	857.5	23.4

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Isokinetic Sampling Cover Sheet

Test Engineer: JJR
Test Technician: BM / DBD

Plant Information

Run Number: 2
Test Location: #2 Rec Stack
Duct Shape: Circular or Rectangular
Flue Area: 165.130
Port Type: nipple
Test Method: 316

Date: 9/31/16
Client Name: Arcelor Mittal
Length: _____ Width: _____ or Diameter: 0
Upstream Diameters: >2
Port Length: 6.5
Source Condition: normal

Project Number: M162810
Plant Name: Burns Harbor
Downstream Diameters: >3
Port Diameter: 4"

Meter and Probe Data

Meter ID: CM 23
Pitot ID: 4013
Nozzle ID #: EU55
Probe Length: 10
Pre-Test Nozzle Leak Check: ✓ @ 10 "Hg
Pre-Test Pitot Leak Check: ✓ @ 4 "H_2O

Meter Y Value: 1.001
Pitot Coefficient: .84
Nozzle Diameter: .250
Probe Liner: glass

ΔH Value: 1.405
Train Type: Anderson Oven
Filter Number/Weight: NA
Thimble Number/Weight: _____
Post-Test Nozzle Leak Check: ✓ @ 16 "Hg
Post-Test Pitot Leak Check: ✓ @ 4 "H_2O

Traverse Data

Ports Sampled: 2
Total Points: 48

Points/Port: 24
Total Test Time: 96 min

Min/Point: 2
Sample Plane: Horizontal or Vertical

Stack Parameters

Barometric Pressure: 29.99
CO_2 %: ___ / ___ / ___ / Avg. 1.7
Imp and/or silica balance Model and S/N: _____
Initial Imp. Volume or Weight: 2002.5
Initial Silica Weight: 802.2

Static Pressure: -1.0
O_2 %: ___ / ___ / ___ /Avg. 19.9
Servomex Serial #: 01440D 1/3791
Final Imp. Volume or Weight: 2347.8
Final Silica Weight: 823.8

Determined by: Method 3 or Method 3A
Imp. Volume or Weight Gain: 343.3
Silica Weight Gain: 21.6

Comments:

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Isokinetic Sampling Field Data Sheet

Project Number:	M162810	Date:	9/31/15	Test Number:	2
Client:	ArcelorMittal	Test Location:	#2 Bag Stack	Operator:	JJR Test Tech: DJD
Plant:	Burns Harbor	Test Method:	312	Page Number:	1 of 2

3.0[illegible] 1.13

Port-Point #.	Time		(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft^3, Actual	Square Root, ΔP	Meter Rate, Cubic Feet/ Min.	Theoretical Meter Volume, (V_m) ft^3, per point	Theoretical Meter Volume, (V_m) ft^3, total	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, " Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp. °F
[illegible]	[illegible]		.63	2.6	71.351	.911	1.029	2.059		142	72	72	10	247	246	52
1	6.41	7.30	.85	2.6	73.403	.922	1.042	2.084	73.410	133	72	72	10	251	250	52
2	7.[illegible]	7.13	.85	2.6	[illegible]	.922	1.042	[illegible]	75.4[illegible]	[illegible]	77	75	10	250	[illegible]	54
3	7.35	7.43	.85	2.6	77.512	.911	[illegible]	[illegible]	77.524	127	74	76	10	248	250	54
4	7.47	7.55	.89	2.7	79.580	.922	1.054	2.108	79.567	132	78	76	10	250	249	53
5	7.57	8.05	.85	2.6	81.703	.922	1.042	2.084	81.695	139	78	77	10	252	250	53
6	8.07	8.25	.85	2.6	83.792	.922	1.042	2.084	83.779	146	76	76	10	249	251	54
7	8.27	8.37	.85	2.6	85.862	.922	1.042	2.084	85.863	147	75	75	10	249	250	54
8	8.37	8.47	.87	2.7	87.002	.933	1.054	2.108	86.905	149	74	74	10	249	250	55
9	8.50	8.58	.85	2.6	89.097	.922	1.042	2.084	89.013	151	74	74	10	249	252	57
10	9.00	9.09	.85	2.6	91.052	.922	1.042	2.084	91.097	154	74	74	10	252	250	61
11	9.11	9.19	.85	2.6	93.168	.922	1.042	2.084	93.181	153	74	74	10	248	250	61
12	9.21	9.33	.87	2.7	95.241	.933	1.054	2.108	95.265	155	74	74	10	251	249	62
13	9.34	9.43	.85	2.6	97.377	.922	1.042	2.084	97.373	156	74	73	10	251	251	63
14	9.45	9.57	.83	2.6	99.461	.911	1.029	2.059	99.457	156	74	74	10	251	250	62
15	9.59	10.08	.83	2.6	101.540	.911	1.029	2.059	101.516	157	74	74	10	250	249	60
16	10.10	10.27	.85	2.6	103.574	.922	1.042	2.084	103.575	154	74	74	10	247	250	55
17	10.27	10.37	.87	2.7	105.654	.933	1.054	2.108	105.659	152	74	74	10	249	250	55
18	10.37	10.47	.85	2.6	107.767	.922	1.042	2.084	107.767	152	74	74	10	251	250	57
19	10.49	10.59	.85	2.6	109.850	.922	1.042	2.084	109.851	152	74	74	10	249	249	57
20	11.01	11.13	.85	2.6	111.935	.922	1.042	2.084	111.935	153	74	74	10	252	250	60
21	11.15	11.27	.85	2.6	114.020	.922	1.042	2.084	114.019	153	74	74	10	252	250	61
22	11.29	11.37	.90	2.7	116.110	.949	1.072	2.144	116.103	155	74	74	10	253	251	64
23	11.39	11.47	.85	2.6	118.246	.922	1.042	2.084	118.247	162	74	74	10	247	251	64
	11.49				120.337				120.331							

46.9

Project No. M162810A
#2 Coke Battery PEC Baghouse Stack
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Isokinetic Sampling Field Data Sheet

Project Number: M162810 | Date: 6/30/16 | Test Number: 2

Client: Arcelor Mittal | Test Location: #2 Pec Stack | Operator: JJR | Test Tech: DBO

Plant: Burns Harbor | Test Method: 316 | Page Number: 2 of 2

3.0

Port-Point #.	Time		(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft^3, Actual	Square Root, ΔP	Meter Rate, Cubic Feet/Min.	Theoretical Meter Volume, (V_m) ft^3, per point	Theoretical Meter Volume, (V_m) ft^3, total	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, " Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp. °F
2-1	11.59		.85	2.6	120.643	.922	1.042	2.084		103	74	74	10	251	249	65
1	12.01	12.11	.87	2.7	122.720	.933	1.054	2.108	122.727	162	75	76	10	244	254	64
2	12.13	12.25	.85	2.6	124.832	.922	1.042	2.084	124.835	158	76	75	10	249	250	57
2	12.27	12.36	.85	2.6	126.899	.922	1.042	2.084	126.919	156	76	75	10	247	253	51
3	12.38	12.47	.85	2.6	129.000	.922	1.042	2.084	129.003	155	76	75	10	249	249	52
3	12.49	13.01	.85	2.6	131.087	.922	1.042	2.084	131.087	151	76	75	10	249	250	53
4	13.03	13.12	.85	2.6	133.172	.922	1.042	2.084	133.171	150	76	75	10	249	250	54
4	13.14	13.23	.87	2.7	135.254	.933	1.054	2.108	135.255	152	76	75	10	247	247	56
5	13.25	13.37	.87	2.7	137.359	.933	1.054	2.108	137.363	153	77	76	10	256	250	56
5	13.39	13.49	.87	2.7	139.472	.933	1.054	2.108	139.471	155	77	76	10	249	251	57
6	13.51	14.00	.85	2.6	141.574	.922	1.042	2.084	141.579	157	77	76	10	249	248	57
6	14.02	14.11	.85	2.6	143.668	.922	1.042	2.084	143.663	156	77	76	10	251	252	58
7	14.13	14.24	.87	2.7	145.747	.933	1.054	2.108	145.747	157	77	76	10	250	250	59
7	14.26	14.37	.90	2.7	147.859	.949	1.072	2.144	147.855	152	77	76	10	251	249	59
8	14.39	14.51	.87	2.7	150.000	.933	1.054	2.108	149.999	152	77	76	10	248	250	59
8	14.56	15.05	.90	2.7	152.120	.949	1.072	2.144	152.107	145	72	76	10	246	252	60
9	15.07	15.16	.87	2.7	154.254	.933	1.054	2.108	154.251	150	77	76	10	252	253	65
9	15.18	15.26	.85	2.6	156.360	.922	1.042	2.084	156.359	151	77	76	10	251	249	58
10	15.28	15.40	.85	2.6	158.443	.922	1.042	2.084	158.443	156	77	76	10	250	250	58
10	15.42	15.52	.85	2.6	160.525	.922	1.042	2.084	160.527	156	77	76	10	250	250	58
11	15.54	16.02	.80	2.5	162.620	.894	1.011	2.021	162.611	157	78	77	10	249	252	60
11	16.04	16.15	.83	2.6	164.672	.911	1.029	2.059	164.632	156	77	76	10	251	250	57
12	16.17	16.27	.78	2.4	166.687	.883	.998	1.996	166.691	155	77	76	10	251	253	57
12	16.29	16.40	.78	2.4	168.680	.883	.998	1.996	168.687	151	77	76	10	250	251	59
	16.42				170.679				170.683							

Project No. M162810A
#2 Coke Battery PEC Baghouse Stack
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IMPINGER WEIGHT SHEET

PLANT: Arcelor Mittal

UNIT NO: Burns Harbor

LOCATION: # 2 PEC Stack

DATE: 8-31-16

TEST NO: 2

METHOD: 316

WEIGHED/MEASURED BY: SLB

BALANCE ID: S10-35

Circle One:	FINAL WEIGHT MLS / GRAMS	INITIAL WEIGHT MLS / GRAMS	IMPINGER GAIN	IMPINGER CONTENTS
IMPINGER 1	746.1	714.7	31.4	DI
IMPINGER 2	761.9	747.4	14.5	DI
IMPINGER 3	542.3	537.4	4.9	empty
IMPINGER 4	838.5	814.1		Silica
IMPINGER 5				
IMPINGER 6				
IMPINGER 7				
IMPINGER 8				

	FINAL TOTAL	INITIAL TOTAL	TOTAL IMPINGER GAIN
IMPINGERS	2050.3	1999.5	50.8
SILICA	838.5	814.1	24.4

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Isokinetic Sampling Cover Sheet

Test Engineer: JJR
Test Technician: DBD

Plant Information

Run Number: 3
Test Location: #2 PEC Stack
Duct Shape: ~~Circular~~ or Rectangular
Flue Area: 145.130
Port Type: nipple
Test Method: 316

Date: 9/1/16
Client Name: Arcelor Mittal
Length: _____ Width: _____ or Diameter: 9
Upstream Diameters: >6
Port Length: 6.5
Source Condition: Normal

Project Number: M162810
Plant Name: Burns Harbor
Downstream Diameters: >3
Port Diameter: 4"

Meter and Probe Data

Meter ID: CM23
Pitot ID: 4013
Nozzle ID #: GLASS
Probe Length: 10
Pre-Test Nozzle Leak Check: ✓ @ 10 "Hg
Pre-Test Pitot Leak Check: ✓ @ 4 "H_2O

Meter Y Value: 1.001
Pitot Coefficient: .84
Nozzle Diameter: .256
Probe Liner: Glass

ΔH Value: 1.405
Train Type: Anderson Oven
Filter Number/Weight: NA
Thimble Number/Weight: _____
Post-Test Nozzle Leak Check: ✓ @ 10 "Hg
Post-Test Pitot Leak Check: ✓ @ 4 "H_2O

Traverse Data

Ports Sampled: 7
Total Points: 48

Points/Port: 24
Total Test Time: 96 min

Min/Point: 2
Sample Plane: ~~Horizontal~~ or Vertical

Stack Parameters

Barometric Pressure: 29.44
CO_2 %: ___/___/___/ Avg. 1.2
Imp and/or silica balance Model and S/N: _____
Initial Imp. Volume or Weight: 1921.4
Initial Silica Weight: 853.4

Static Pressure: -1.0
O_2 %: ___/___/___/Avg. 19.7
Final Imp. Volume or Weight: 2265.6
Final Silica Weight: 870.3

Determined by: Method 3 or ~~Method 3A~~
Servomex Serial #: D1UU0D1 / 3791
Imp. Volume or Weight Gain: 343.8
Silica Weight Gain: 16.9

Comments:

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Isokinetic Sampling Field Data Sheet

Project Number:	M162810	Date:	9-1-16	Test Number:	3
Client:	Arcelor Mittal	Test Location:	#2 PEC stack	Operator:	JJR Test Tech: DBD
Plant:	Burns Harbor	Test Method:	316	Page Number:	1 of 2

3.075 1.13

Port-Point #.	Time		(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft^3, Actual	Square Root, ΔP	Meter Rate, Cubic Feet/ Min.	Theoretical Meter Volume, (V_m) ft^3, per point	Theoretical Meter Volume, (V_m) ft^3, total	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, " Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp. °F
1-1	9:53		.90	2.8	71.441	.949	1.072	2.144		109	72	71	10	248	250	64
1	9:57	9:05	.85	2.6	73.580	.922	1.042	2.084	73.585	112	73	72	10	248	251	61
2	9:08	9:17	.80	2.5	75.649	.894	1.011	2.021	75.667	120	74	73	10	249	250	60
2	9:19	9:28	.83	2.6	77.685	.911	1.029	2.059	77.688	126	75	74	10	249	250	60
3	9:30	9:41	.80	2.3	79.580	.922	1.042	2.084	79.747	137	76	75	10	249	250	59
3	9:43	9:56	.80	2.5	81.452	.922	1.042	2.084	81.831	141	76	75	10	249	250	59
4	9:58	10:10	.83	2.6	83.920	.911	1.029	2.059	83.915	143	78	77	10	251	250	64
4	10:12	10:21	.83	2.6	85.972	.911	1.029	2.059	85.974	143	79	72	10	249	249	65
5	10:23	10:32	.83	2.6	88.990	.911	1.029	2.059	88.033	143	79	77	10	249	248	56
5	10:34	10:45	.85	2.6	90.090	.922	1.042	2.084	90.092	144	79	76	10	248	249	56
6	10:47	10:57	.83	2.6	92.176	.911	1.029	2.059	92.176	145	76	75	10	249	250	54
6	10:59	11:12	.90	2.8	94.233	.949	1.072	2.144	94.235	146	75	74	10	250	250	53
7	11:14	11:22	.85	2.6	96.379	.922	1.042	2.084	96.379	147	75	75	10	251	250	54
7	11:24	11:34	.83	2.6	98.460	.911	1.029	2.059	98.463	149	74	75	10	251	250	52
8	11:36	11:45	.87	2.7	100.520	.933	1.054	2.108	100.527	149	74	74	10	250	248	53
8	11:47	11:56	.87	2.7	102.630	.933	1.054	2.108	102.630	153	74	74	10	251	250	53
9	11:58	12:08	.90	2.8	104.740	.949	1.072	2.144	104.738	154	74	74	10	249	250	53
9	12:10	12:18	.87	2.7	106.884	.933	1.054	2.108	106.882	156	74	74	10	247	249	54
10	12:20	12:29	.90	2.8	108.950	.949	1.072	2.144	108.990	156	74	74	10	247	249	54
10	12:31	12:43	.90	2.8	111.135	.949	1.072	2.144	111.134	150	75	74	10	249	252	55
11	12:47	13:12	.90	2.8	113.277	.949	1.072	2.144	113.278	137	75	74	10	250	250	55
11	13:14	13:24	.85	2.6	115.437	.922	1.042	2.084	115.422	134	75	74	10	260	250	57
12	13:26	13:34	.87	2.6	117.520	.933	1.054	2.108	117.506	137	75	74	10	251	250	57
12	13:36	13:45	.80	2.5	119.614	.894	1.011	2.021	119.614	141	75	74	10	247	249	59
	13:47				121.635				121.635							

Project No. M162810A
#2 Coke Battery PEC Baghouse Stack
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Isokinetic Sampling Field Data Sheet

Project Number:	M162810	Date:	9-1-16	Test Number:	3
Client:	ArcelorMittal	Test Location:	#2 Pec Stack	Operator:	JJR Test Tech: DBD
Plant:	Burns Harbor	Test Method:	316	Page Number:	2 of 2

Port-Point #.	Time		(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft^3, Actual	Square Root, ΔP	Meter Rate, Cubic Feet/ Min.	Theoretical Meter Volume, (V_m) ft^3, per point	Theoretical Meter Volume, (V_m) ft^3, total	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, " Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp. °F
2-1	13.55		.70	2.5	122.275	.844	1.011	2.021		148	76	75	10	252	249	56
1	13.57	14.05	.83	2.6	124.280	.911	1.029	2.059	124.296	151	76	76	10	242	249	56
2	14.07	14.14	.83	2.6	126.400	.911	1.029	2.054	126.355	152	76	76	10	250	250	57
3	14.20	14.29	.83	2.6	128.408	.911	1.029	2.054	128.409	151	76	75	10	247	250	56
3	14.31	14.40	.83	2.6	130.464	.911	1.029	2.054	130.463	150	76	75	10	247	249	56
3	14.42	14.54	.85	2.6	132.512	.922	1.042	2.054	132.517	149	77	76	10	250	249	56
4	14.56	15.05	.83	2.6	134.605	.911	1.029	2.054	134.601	148	77	76	10	251	250	56
4	15.07	15.19	.83	2.6	136.656	.911	1.029	2.054	136.655	147	77	76	10	250	250	57
5	15.21	15.30	.85	2.6	138.710	.922	1.042	2.054	138.709	152	77	76	10	250	250	53
5	15.32	15.40	.85	2.6	140.754	.922	1.042	2.044	140.793	155	77	76	10	251	250	54
6	15.42	15.52	.90	2.8	142.875	.941	1.072	2.144	142.877	154	76	76	10	250	250	55
6	15.54	16.02	.85	2.6	145.201	.922	1.042	2.054	145.021	156	77	76	10	256	249	54
7	16.[illegible]	16.17	.87	2.7	147.1	.933	1.054	2.108	147.105	151	76	76	10	251	244	56
7	16.19	16.31	.90	2.8	149.214	.941	1.072	2.144	149.213	148	76	76	10	250	250	58
8	16.33	16.42	.90	2.8	151.369	.941	1.072	2.144	151.357	149	76	76	10	249	249	58
8	16.44	16.57	.87	2.7	153.489	.933	1.054	2.108	153.501	143	76	76	10	250	250	58
9	17.01	17.09	.90	2.8	155.621	.941	1.072	2.144	155.609	143	77	76	10	250	250	59
9	17.11	17.20	.90	2.8	157.750	.941	1.072	2.144	157.753	145	76	76	10	250	250	60
10	17.22	17.32	.90	2.8	159.882	.941	1.072	2.144	159.897	147	76	75	10	250	250	60
10	17.33	17.42	.87	2.7	162.043	.933	1.054	2.108	162.041	149	76	75	10	250	250	56
11	17.46	17.51	.90	2.8	164.144	.941	1.072	2.144	164.149	148	77	76	10	250	250	56
11	17.56	18.04	.87	2.7	166.297	.933	1.054	2.108	166.293	150	76	77	10	250	249	60
12	18.10	18.20	.85	2.6	168.431	.922	1.042	2.054	168.401	150	77	77	10	249	251	61
12	18.22	19.06	.85	2.6	170.484	.922	1.042	2.054	170.485	122	77	76	10	252	250	55
					172.564				172.569							

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IMPINGER WEIGHT SHEET

PLANT: Arcelor Mittal

UNIT NO: Burns Harb.

LOCATION: #2 Pec stack

DATE: 9-1-16

TEST NO: 3

METHOD: 31b

WEIGHED/MEASURED BY: JJR

BALANCE ID: 510-35

Circle One:	FINAL WEIGHT MLS / GRAMS	INITIAL WEIGHT MLS / GRAMS	IMPINGER GAIN	IMPINGER CONTENTS
IMPINGER 1	760.0	740.9 g		DI
IMPINGER 2	645.5	619.4 g		DI
IMPINGER 3	565.9	563.1 g		empty
IMPINGER 4	884.7	865.4 g		Silica
IMPINGER 5				
IMPINGER 6				
IMPINGER 7				
IMPINGER 8				

	FINAL TOTAL	INITIAL TOTAL	TOTAL IMPINGER GAIN
IMPINGERS	1971.4	1923.8 g	47.6 g
SILICA	884.7 g	865.4 g	19.3

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Isokinetic Sampling Cover Sheet

Test Engineer: CSE
Test Technician: DBD

Plant Information

Run Number: 1
Date: 8-23-16
Project Number: M162810
Test Location: #2 PEC Duct
Client Name: Arcelor Mittal
Plant Name: Burns Harbor, IN
Duct Shape: Circular or Rectangular
Length: – Width: – or Diameter: 9'
Flue Area: 63.617
Upstream Diameters: >2.0
Downstream Diameters: >3.0
Port Type: Nipple
Port Length: 6.5"
Port Diameter: 4"
Test Method: M 0010
Source Condition: Normal

Meter and Probe Data

Meter ID: CM 22
Meter Y Value: .998
ΔH Value: 1.741
Pitot ID: 30
Pitot Coefficient: .84
Train Type: Anderson
Nozzle ID #: Glass
Nozzle Diameter: .282
Filter Number/Weight: —
Probe Length: 10'
Probe Liner: Glass
Thimble Number/Weight: —
Pre-Test Nozzle Leak Check: ✓ 0.00 @ 10 "Hg
Post-Test Nozzle Leak Check: ✓ 0.00 @ 20 "Hg
Pre-Test Pitot Leak Check: ✓ @5 "H_2O
Post-Test Pitot Leak Check: ✓ @5 "H_2O

Traverse Data

Ports Sampled: 2
Points/Port: 14
Min/Point: 2
Total Points: 28
Total Test Time: 118
Sample Plane: Horizontal or Vertical

Stack Parameters

Barometric Pressure: 29.45
Static Pressure: -1.0
CO_2 %: / / / Avg. 1.2
O_2 %: / / / Avg. 19.7
Determined by: Method 3 or Method 3A
Imp and/or silica balance Model and S/N: S10-35
Servomex Serial #: 0144001/3791
Initial Imp. Volume or Weight: 2461.4
Final Imp. Volume or Weight: 2515.1
Imp. Volume or Weight Gain: 53.7
Initial Silica Weight: 730.8
Final Silica Weight: 752.9
Silica Weight Gain: 22.1

Comments:

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K-1.395 x 2
K'-5.730

Isokinetic Sampling Field Data Sheet-M23

Project No. M162810A
#2 Coke Battery PEC Baghouse Stack

Project Number:	M162810	Date:	8-23-16	Test Number:	1
Client:	Arcelor Mittal	Test Location:	#2 PEC Duct	Operator:	CSE Test Tech: DBD
Plant:	Burns Harbor, IN	Test Method:	M-0010 23	Page Number:	1 of 2

Port-Point #.	Time	(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft^3, Actual	Square Root, ΔP	Meter Rate, Cubic Feet/ Min.	Theoretical Meter Volume, (V_m) ft^3, per point	Theoretical Meter Volume, (V_m) ft^3, total	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, " Hg	Probe Temp. °F	Filter Temp. °F	CPM Filter Temp °F	Impinger Outlet Well Temp. °F
1-1	713	1.0	5.6	96.220	1.00	1.369	2.738	—	127	68	68	14	250	250		53
1	715/725	.95	5.3	98.94	.974	1.334	2.668	98.958	127	69	68	14	250	245		54
2	727/739	.95	5.3	101.78	.974	1.334	2.668	101.626	135	70	69	14	251	243		54
2	741/751	.98	5.5	104.33	.989	1.355	2.710	104.294	150	71	70	14	256	251		56
3	753/803	1.0	5.6	107.15	1.00	1.369	2.738	107.004	156	72	70	14	249	250		57
3	805/814	1.1	6.1	109.65	1.048	1.435	2.871	109.742	162	73	71	14	258	251		58
4	816/840	1.1	6.1	112.57	1.048	1.435	2.871	112.613	152	74	73	14	258	251		56
4	842/851	1.0	5.6	115.15	1.00	1.369	2.738	115.484	150	75	74	14	253	251		60
5	853/902	1.0	5.6	118.18	1.00	1.369	2.738	118.222	155	76	75	14	247	250		57
5	904/914	1.0	5.6	120.89	1.00	1.369	2.738	120.960	156	77	75	14	254	249		59
6	916/925	1.0	5.6	123.416	1.00	1.369	2.738	123.698	157	77	76	14	253	251		58
6	927/937	1.0	5.6	126.29	1.00	1.369	2.738	126.436	160	77	77	14	247	249		60
7	939/948	1.1	6.1	128.98	1.048	1.435	2.871	129.174	158	77	76	14	246	253		60
7	950/1000	1.1	6.1	131.99	1.048	1.435	2.871	132.045	158	77	76	14	248	247		56
8	1002/1013	1.1	6.1	134.95	1.048	1.435	2.871	134.916	160	76	76	14	254	251		58
8	1015/1023	1.1	6.1	137.59	1.048	1.435	2.871	137.787	162	76	76	14	252	252		56
9	1025/1035	1.1	6.1	140.49	1.048	1.435	2.871	140.658	162	76	76	14	247	252		58
9	1037/1046	1.1	6.1	143.38	1.048	1.435	2.871	143.529	164	76	76	14	248	252		56
10	1048/1058	1.0	5.6	146.38	1.00	1.369	2.738	146.400	170	76	76	14	250	249		59
10	1100/1108	.95	5.4	149.03	.974	1.359	2.719	149.138	168	77	76	14	248	251		56
11	1110/1119	.83	4.7	151.91	.911	1.270	2.541	151.857	167	77	76	14	251	251		57
11	1121/1130	.85	4.8	154.24	.921	1.286	2.572	154.398	165	77	76	14	246	252		56
12	1132/1146	.85	4.8	156.82	.921	1.286	2.572	156.970	164	78	77	14	254	251		58
12	1148/1159	1.0	5.6	159.41	1.00	1.369	2.738	159.542	161	78	77	14	250	251		57
13	1201/1216	1.1	6.1	162.08	1.048	1.435	2.871	162.280	164	78	78	14	254	247		63
13	1218/1232	1.1	6.1	165.02	1.048	1.435	2.871	165.151	157	79	78	14	251	250		59
14	1234/1246	1.0	5.6	167.94	1.00	1.369	2.738	168.022	154	79	78	14	247	251		59
14	1248/1258	1.0	5.6	170.58	1.00	1.369	2.738	170.760	152	79	79	14	247	245		61
	1300			173.330				173.498								

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K-1.395 x2
K-5.730

Isokinetic Sampling Field Data Sheet-M23

Project Number:	M162810	Date:	8-23-16	Test Number:	1
Client:	ArcelorMittal	Test Location:	#2 PEC Duct	Operator:	CSG Test Tech: DBD
Plant:	Burns Harbor, IN	Test Method:	M-0010 23	Page Number:	2 of 2

Port-Point #.	Time	(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft^3, Actual	Square Root, ΔP	Meter Rate, Cubic Feet/ Min.	Theoretical Meter Volume, (V_m) ft^3, per point	Theoretical Meter Volume, (V_m) ft^3, total	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, " Hg	Probe Temp. °F	Filter Temp. °F	CPM Filter Temp °F	Impinger Outlet Well Temp. °F
2-1	1312	1.1	6.3	173.330	1.048	1.463	2.926		152	79	79	14	246	249		58
1	1314/1328	1.1	6.3	176.11	1.048	1.463	2.926	176.256	149	79	79	14	248	252		57
2	1430/1341	1.1	6.3	179.02	1.048	1.463	2.926	179.182	149	79	79	14	252	252		60
2	1343/1403	1.0	5.7	182.00	1.00	1.395	2.790	182.108	146	79	79	14	248	253		57
3	1405/1417	1.1	6.3	184.64	1.048	1.463	2.926	184.898	147	79	79	14	255	251		59
3	1419/1429	1.1	6.3	187.35	1.048	1.463	2.926	187.824	150	80	79	14	252	246		59
4	1431/1442	1.0	5.7	190.44	1.00	1.395	2.790	190.750	154	80	80	14	256	252		59
4	1444/1453	1.0	5.7	193.35	1.00	1.395	2.790	193.540	158	80	80	14	252	249		60
5	[illegible]/1505	.98	5.6	196.11	.989	1.380	2.761	196.330	164	81	80	14	247	248		57
5	1507/1520	1.0	5.7	199.07	1.00	1.395	2.790	199.091	161	81	80	14	256	250		60
6	1522/1531	.98	5.6	201.58	.989	1.380	2.761	201.881	160	81	80	14	253	249		58
6	1533/1542	1.0	5.7	204.33	1.00	1.395	2.790	204.642	158	81	80	14	248	253		59
7	1544/1557	1.0	5.7	207.11	1.00	1.395	2.790	207.432	153	81	80	14	245	250		59
7	1559/1610	1.0	5.7	210.07	1.00	1.395	2.790	210.222	150	81	80	14	248	249		58
8	1612/1620	.98	5.6	212.97	.989	1.380	2.761	213.012	151	81	80	14	246	245		57
8	1622/1630	1.0	5.7	215.55	1.00	1.395	2.790	215.773	156	81	80	14	251	248		57
9	1632/1641	1.0	5.7	218.14	1.00	1.395	2.790	218.563	163	81	80	14	245	252		58
9	1643/1651	1.0	5.7	221.11	1.00	1.395	2.790	221.353	165	81	80	14	249	250		56
10	1653/1704	1.0	5.7	224.00	1.00	1.395	2.790	224.143	163	81	81	14	251	251		58
10	1706/1717	1.0	5.7	226.79	1.00	1.395	2.790	226.933	159	81	81	14	249	249		59
11	1719/1727	1.0	5.7	229.42	1.00	1.395	2.790	229.723	158	81	80	14	247	253		58
11	1729/1742	1.0	5.7	232.18	1.00	1.395	2.790	232.513	155	80	80	14	250	249		59
12	1744/1755	1.0	5.7	235.17	1.00	1.395	2.790	235.303	155	80	80	14	250	253		60
12	1801/1810	.98	5.6	237.99	.989	1.380	2.761	238.093	158	80	80	14	251	254		60
13	1808/1816	.98	5.6	240.51	.989	1.380	2.761	240.854	163	81	80	14	253	249		59
13	1818/1826	.98	5.6	243.49	.989	1.380	2.761	243.615	166	81	80	14	250	249		57
14	1828/1912	.98	5.6	246.33	.989	1.380	2.761	246.376	134	78	78	14	250	251		55
14	1914/1923	.98	5.6	249.01	.989	1.380	2.761	249.137	140	78	78	14	250	250		55
	1925			251.690				251.898								

Project No. M162810A
#2 Coke Battery PEC Baghouse Stack
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IMPINGER WEIGHT SHEET

PLANT: Arcelor Mittal

UNIT NO: Burns Harbor

LOCATION: #2 PEC Stack

DATE: 8-23-16

TEST NO: 1

METHOD: 0010

WEIGHED/MEASURED BY: SLB

BALANCE ID: S10-35

Circle One:	FINAL WEIGHT MLS / GRAMS	INITIAL WEIGHT MLS / GRAMS	IMPINGER GAIN	IMPINGER CONTENTS
IMPINGER 1	569.3	521.3		empty
IMPINGER 2	731.9	730.8		DI
IMPINGER 3	621.3	616.7		DI
IMPINGER 4	592.6	592.6		empty
IMPINGER 5	752.9	730.8		Silica
IMPINGER 6				
IMPINGER 7				
IMPINGER 8				

	FINAL TOTAL	INITIAL TOTAL	TOTAL IMPINGER GAIN
IMPINGERS	2515.1	2461.4	53.7

	FINAL TOTAL	INITIAL TOTAL	TOTAL SILICA GAIN
SILICA	752.9	730.8	22.1

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Isokinetic Sampling Cover Sheet

Test Engineer: CSE
Test Technician: DAO

Plant Information

Run Number: 2
Date: 8-24-16
Project Number: M162810
Test Location: #2 PEC Duct
Client Name: Arcelor Mittal
Plant Name: Burns Harbor, IN
Duct Shape: Circular or Rectangular
Length: ____ Width: ____ or Diameter: 9'
Flue Area: 63.617
Upstream Diameters: >2.0
Downstream Diameters: >3.0
Port Type: Nipple
Port Length: 6.5"
Port Diameter: 4"
Test Method: M0010
Source Condition: Normal

Meter and Probe Data

Meter ID: CM 22
Meter Y Value: .998
ΔH Value: 1.741
Pitot ID: 30
Pitot Coefficient: .84
Train Type: Anderson
Nozzle ID #: Glass
Nozzle Diameter: .282
Filter Number/Weight: —
Probe Length: 10'
Probe Liner: Glass
Thimble Number/Weight: —
Pre-Test Nozzle Leak Check: ✓ 0.00 @ 10 "Hg
Post-Test Nozzle Leak Check: ✓ 0.00 @ 20 "Hg
Pre-Test Pitot Leak Check: ✓ 0.5 "H_2O
Post-Test Pitot Leak Check: ✓ 0.5 "H_2O

Traverse Data

Ports Sampled: 2
Points/Port: 14
Min/Point: 2
Total Points: 28
Total Test Time: 112
Sample Plane: Horizontal or Vertical

Stack Parameters

Barometric Pressure: 29.29
Static Pressure: -1.0
CO_2 %: / / / Avg. 1.2
O_2 %: / / /Avg. 19.7
Determined by: Method 3 or Method 3A
Imp and/or silica balance Model and S/N: S10-35
Servomex Serial #: 0144021/3791
Initial Imp. Volume or Weight: 2559.6
Final Imp. Volume or Weight: 2653.1
Imp. Volume or Weight Gain: 60
Initial Silica Weight: 839.7
Final Silica Weight: 889.1
Silica Weight Gain: 49.4

Comments:

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K-1.383 v.2
K'-5.667

Isokinetic Sampling Field Data Sheet-M23

Project Number:	M162810	Date:	8-24-16	Test Number:	2
Client:	Arcelor Mittal	Test Location:	#2 PEC Duct	Operator:	CSE / Test Tech: DBD
Plant:	Burns Harbor IN	Test Method:	M-0010 23	Page Number:	1 of 2

Port-Point #.	Time	(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft^3, Actual	Square Root, ΔP	Meter Rate, Cubic Feet/ Min.	Theoretical Meter Volume, (V_m) ft^3, per point	Theoretical Meter Volume, (V_m) ft^3, total	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, " Hg	Probe Temp. °F	Filter Temp. °F	CPM Filter Temp °F	Impinger Outlet Well Temp. °F
-1	725	.95	5.3	53.470	.974	1.347	2.695		132	73	72	11	251	255		60
1	727/735	.98	5.5	56.24	.989	1.369	2.738	56.165	133	74	72	13	251	258		55
2	737/747	.95	5.3	58.84	.974	1.347	2.695	58.903	138	73	73	14	244	255		53
2	749/808	.95	5.3	61.33	.974	1.347	2.695	61.598	138	72	72	14	248	246		55
3	810/821	.95	5.3	64.11	.974	1.347	2.695	64.293	139	71	72	14	250	258		54
3	823/833	.95	5.3	66.72	.974	1.347	2.695	66.988	145	71	72	14	243	243		55
4	835/843	.95	5.3	69.33	.974	1.347	2.695	69.683	149	71	71	14	243	256		55
4	845/854	.98	5.5	72.17	.989	1.369	2.738	72.378	154	71	71	14	249	255		58
5	856/905	1.0	5.6	75.04	1.00	1.383	2.766	75.116	156	71	71	14	247	242		57
5	907/918	1.0	5.6	77.91	1.00	1.383	2.766	77.882	154	71	71	14	253	255		55
6	920/929	1.1	6.2	80.34	1.048	1.450	2.901	80.648	157	71	71	14	251	243		50
6	931/942	.98	5.5	83.22	.989	1.369	2.738	83.549	151	71	71	14	249	254		49
7	944/955	1.1	6.2	86.03	1.048	1.450	2.901	86.287	149	72	71	14	255	244		48
7	957/1006	1.1	6.2	89.01	1.048	1.450	2.901	89.188	152	72	72	14	256	253		50
8	1008/1017	1.0	5.6	91.916	1.00	1.383	2.766	92.087	154	74	73	14	253	253		50
8	1019/1029	1.0	5.6	94.48	1.00	1.383	2.766	94.853	157	75	74	14	251	258		50
9	1029/1039	1.1	6.2	97.11	1.048	1.450	2.901	97.601	157	75	74	14	247	245		50
9	1041/1051	1.1	6.2	100.02	1.048	1.450	2.901	100.502	157	77	75	14	251	255		56
10	1053/1103	1.1	6.2	103.10	1.048	1.450	2.901	103.403	156	77	76	14	253	252		54
10	1104/1116	1.0	5.6	105.98	1.00	1.383	2.766	106.304	153	78	77	14	249	258		53
11	1118/1129	1.1	6.2	108.92	1.048	1.450	2.901	109.205	149	78	77	14	248	246		50
11	1131/1146	1.0	5.6	111.58	1.00	1.383	2.766	111.971	150	78	77	14	249	247		53
12	1144/1153	1.0	5.6	114.40	1.00	1.383	2.766	114.737	148	78	78	14	253	249		58
12	1154/1204	1.1	6.2	117.56	1.048	1.450	2.901	117.638	151	80	79	14	244	248		54
13	1206/1219	1.0	5.6	120.21	1.00	1.383	2.766	120.404	153	79	79	14	246	254		54
13	1221/1232	.98	5.5	123.24	.989	1.369	2.738	123.142	138	79	78	14	251	241		55
14	1234/1243	1.1	6.2	125.38	1.048	1.450	2.901	126.043	143	79	79	14	249	259		54
14	1246/1254	1.0	5.6	128.28	1.00	1.383	2.766	128.809	147	79	78	14	247	248		57
	1256			131.120				131.595								

Project No. M162810A
#2 Coke Battery PEC Baghouse Stack
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Isokinetic Sampling Field Data Sheet-M23

Project Number:	M162810	Date:	8-24-16	Test Number:	2
Client:	ArcelorMittal	Test Location:	#2 PEC Duct	Operator:	CSC Test Tech: SBO
Plant:	Burns Harbor, IN	Test Method:	Modified 23	Page Number:	2 of 2

Port-Point #.	Time	(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft^3, Actual	Square Root, ΔP	Meter Rate, Cubic Feet/ Min.	Theoretical Meter Volume, (V_m) ft^3, per point	Theoretical Meter Volume, (V_m) ft^3, total	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, " Hg	Probe Temp. °F	Filter Temp. °F	CPM Filter Temp °F	Impinger Outlet Well Temp. °F
2-1	1348	1.1	6.2	121.330	1.048	1.450	2.901	———	150	79	78	14	256	244		64
1	1350/1404	1.1	6.2	124.07	1.048	1.450	2.901	124.231	151	79	79	14	255	252		58
2	1406/1416	1.1	6.2	126.85	1.048	1.450	2.901	127.132	150	80	79	14	250	249		58
2	1418/1434	1.1	6.2	139.92	1.048	1.450	2.901	140.033	150	80	80	14	248	250		59
3	1436/1441	1.1	6.2	142.44	1.048	1.450	2.901	142.934	155	80	80	14	248	255		59
3	1443/1451	1.1	6.2	145.22	1.048	1.450	2.901	145.835	159	81	80	14	249	253		60
4	1456/1502	1.1	6.2	148.25	1.048	1.450	2.901	148.736	159	81	80	14	253	249		60
4	1504/1509	1.1	6.2	151.12	1.048	1.450	2.901	151.637	159	80	80	14	248	251		60
5	1521/1532	1.1	6.2	154.07	1.048	1.450	2.901	154.538	161	80	80	14	248	245		59
5	1534/1539	1.0	5.6	157.04	1.00	1.383	2.766	157.439	155	79	79	14	253	251		58
6	1551/1601	.98	5.5	160.09	.989	1.369	2.738	160.205	163	78	78	14	253	253		54
6	1603/1615	1.0	5.6	162.63	1.00	1.383	2.766	162.943	160	78	78	14	248	253		57
7	1617/1625	.98	5.5	165.42	.989	1.369	2.738	165.709	163	78	78	14	252	255		62
7	1627/1638	1.0	5.6	168.08	1.00	1.383	2.766	168.447	169	79	78	14	248	254		63
8	1640/1651	.98	5.5	171.07	.989	1.369	2.738	171.213	164	79	78	14	251	255		66
8	1653/1704	.93	5.0	173.55	.964	1.333	2.667	173.951	163	80	79	14	255	252		60
9	1706/1719	.98	5.5	176.11	.989	1.369	2.738	176.618	160	80	80	14	253	246		58
9	1721/1733	.98	5.5	179.01	.989	1.369	2.738	179.356	159	80	80	14	249	249		57
10	1735/1744	.93	5.0	181.92	.964	1.333	2.667	182.024	162	80	80	14	251	252		57
10	1746/1756	.98	5.5	184.52	.989	1.369	2.738	184.761	165	80	79	14	251	258		57
11	1758/1809	.90	5.1	187.12	.948	1.312	2.624	187.499	169	79	79	14	248	244		58
11	1811/1820	.98	5.5	190.01	.989	1.369	2.738	190.123	169	79	79	14	246	245		57
12	1822/1833	.93	5.0	192.65	.964	1.333	2.667	192.861	169	79	79	14	249	250		57
12	1835/1912	.85	4.8	195.39	.921	1.275	2.550	195.528	147	79	79	14	247	255		54
13	1914/1923	1.0	5.6	197.85	1.00	1.383	2.766	198.078	142	79	79	14	250	257		59
13	1925/1932	.93	5.0	200.77	.964	1.333	2.667	200.844	141	78	78	14	246	250		59
14	1934/1943	.98	5.5	203.34	.989	1.369	2.738	203.511	142	78	78	14	250	250		58
14	1945/1954	.93	5.0	205.95	.964	1.333	2.667	206.249	142	78	78	14	250	250		58
	1956			208.630				208.916								

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IMPINGER WEIGHT SHEET

PLANT: Arcelor Mittal

UNIT NO: Burns Harbor

LOCATION: #2 PEC stack

DATE: 8-24-16

TEST NO: 2

METHOD: 0010/23

WEIGHED/MEASURED BY: SUB

BALANCE ID: S10-35

Circle One:	FINAL WEIGHT MLS / GRAMS	INITIAL WEIGHT MLS / GRAMS	IMPINGER GAIN	IMPINGER CONTENTS
IMPINGER 1	579.6	513.8		empty
IMPINGER 2	694.3	689.2		DI
IMPINGER 3	776.8	754.2		DI
IMPINGER 4	602.4	602.4		empty
IMPINGER 5	889.1	839.7		silica
IMPINGER 6				
IMPINGER 7				
IMPINGER 8				

	FINAL TOTAL	INITIAL TOTAL	TOTAL IMPINGER GAIN
IMPINGERS	2653.1	2559.6	60
SILICA	889.1	839.7	49.4

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Isokinetic Sampling Cover Sheet

Test Engineer: CSE
Test Technician: DBO

Plant Information

Run Number: 3
Date: 8-25-16
Project Number: M162810
Test Location: 2 PEC Duct
Client Name: Arcelor Mittal
Plant Name: Burns Harbor
Duct Shape: Circular or Rectangular
Length: — Width: — or Diameter: 9'
Flue Area: 63.617
Upstream Diameters: >2.0
Downstream Diameters: >3.0
Port Type: Nipple
Port Length: 6.5"
Port Diameter: 4"
Test Method: M0010
Source Condition: Normal

Meter and Probe Data

Meter ID: CM 22
Meter Y Value: .998
ΔH Value: 1.741
Pitot ID: 30
Pitot Coefficient: .84
Train Type: Anderson
Nozzle ID #: Glass
Nozzle Diameter: .292
Filter Number/Weight: —
Probe Length: 10'
Probe Liner: Glass
Thimble Number/Weight: —
Pre-Test Nozzle Leak Check: ✓ 0.00 @ 10 "Hg
Post-Test Nozzle Leak Check: ✓ 0.00 @ 20 "Hg
Pre-Test Pitot Leak Check: ✓ @ 5 "H_2O
Post-Test Pitot Leak Check: ✓ @ 5 "H_2O

Traverse Data

Ports Sampled: 2
Points/Port: 14
Min/Point: 2
Total Points: 28
Total Test Time: 112
Sample Plane: Horizontal or Vertical

Stack Parameters

Barometric Pressure: 29.25
Static Pressure: -1.0
CO_2 %: / / / Avg. 1.2
O_2 %: / / / Avg. 19.7
Determined by: Method 3 or Method 3A
Imp and/or silica balance Model and S/N: S10-35
Servomex Serial #: 014401 / 3791
Initial Imp. Volume or Weight: 2514.6
Final Imp. Volume or Weight: 2578.7
Imp. Volume or Weight Gain: 64.1
Initial Silica Weight: 730.0
Final Silica Weight: 750.7
Silica Weight Gain: 20.7

Comments:

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K-1.503 x.2
C-6.599

Isokinetic Sampling Field Data Sheet-M23

Project Number:	M162810	Date:	8-25-16	Test Number:	3
Client:	Arcelor Mittal	Test Location:	2 PEC Duct	Operator:	CSE Test Tech: DBD
Plant:	Burns Harbor IN	Test Method:	Method 23	Page Number:	1 of 2

Port-Point #.	Time	(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft^3, Actual	Square Root, ΔP	Meter Rate, Cubic Feet/ Min.	Theoretical Meter Volume, (V_m) ft^3, per point	Theoretical Meter Volume, (V_m) ft^3, total	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, " Hg	Probe Temp. °F	Filter Temp. °F	CPM Filter Temp °F	Impinger Outlet Well. Temp. °F
1-1	934	.85	5.6	9.110	.921	1.385	2.771	—	119	70	68	14	259	250		60
1	936/941	.83	5.4	11.64	.911	1.369	2.738	11.881	126	70	69	14	251	251		60
2	946/957	.83	5.4	14.05	.911	1.369	2.738	14.619	133	70	69	14	250	250		60
2	959/1005	.84	5.5	17.25	.916	1.377	2.755	17.357	142	72	71	14	253	253		60
3	1007/1023	.84	5.5	20.06	.916	1.377	2.755	20.112	146	73	72	14	252	252		60
3	1027/1032	.83	5.4	22.77	.911	1.369	2.738	22.867	151	72	72	14	250	252		60
4	1040/1059	.82	5.4	25.61	.905	1.361	2.722	25.605	156	73	73	14	250	253		60
4	1055/1102	.82	5.4	28.22	.905	1.361	2.722	28.327	154	72	72	14	251	252		60
5	1104/1114	.80	5.2	31.10	.894	1.344	2.688	31.049	160	74	72	14	251	252		60
5	1116/1125	.85	5.6	33.69	[illegible]	1.385	2.771	33.727	160	75	75	14	254	253		60
6	1127/1137	.83	5.4	36.55	.911	1.369	2.738	36.508	160	75	74	14	251	253		60
6	1139/1149	.83	5.4	39.12	.911	1.369	2.738	39.246	161	75	74	14	252	252		60
7	1151/1202	.82	5.4	41.88	.905	1.361	2.722	41.984	161	75	75	14	252	252		60
7	1203/1214	.83	5.6	44.60	.921	1.385	2.771	44.706	160	76	75	14	252	253		60
8	1216/1229	.81	5.3	47.38	.900	1.352	2.705	47.477	162	75	75	14	252	252		60
8	1231/1235	.84	5.5	50.06	.916	1.377	2.755	50.182	162	75	76	14	252	251		54
9	1237/1246	.82	5.4	52.81	.905	1.361	2.722	52.937	164	75	75	14	252	255		53
9	1248/1258	.82	5.4	55.55	.905	1.361	2.722	55.659	161	76	76	14	252	254		54
10	1300/1313	.85	5.6	58.26	.921	1.385	2.771	58.381	160	76	76	14	252	253		53
10	1326/1325	.84	5.5	61.08	.916	1.377	2.755	61.152	157	75	76	14	252	254		53
11	1337/1336	.83	5.4	63.83	.911	1.369	2.738	63.907	160	75	76	14	252	254		53
11	1340/1350	.83	5.4	66.66	.911	1.369	2.738	66.645	158	77	77	14	252	252		53
12	1352/1402	.83	5.4	69.29	.911	1.369	2.738	69.383	159	77	77	14	252	256		57
12	1404/1412	.82	5.4	72.19	.905	1.361	2.722	72.121	161	77	77	14	251	255		56
13	1417/1427	.81	5.3	74.74	.900	1.352	2.705	74.843	161	78	79	14	251	257		53
13	1429/1439	.85	5.6	77.47	.921	1.385	2.771	77.548	158	78	78	14	252	258		56
14	1440/1449	.83	5.5	80.21	.916	1.377	2.755	80.319	159	78	78	14	252	259		55
14	1450/1459	.83	5.5	83.01	.916	1.377	2.755	83.074	162	79	78	14	252	253		55
	1501			85.790				85.829								

Project No. M162810A
#2 Coke Battery PEC Baghouse Stack
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Isokinetic Sampling Field Data Sheet-M23

Project Number:	M162810	Date:	8-25-16	Test Number:	3
Client:	Acute Metal	Test Location:	2 PEC Duct	Operator:	CSG Test Tech: DBD
Plant:	Burns Harbor IN	Test Method:	M0010. 23	Page Number:	2 of 2

Port-Point #.	Time	(ΔP)	Orifice Setting (ΔH) (×6.548)	Meter Volume (V_m) ft^3, Actual	Square Root, ΔP	Meter Rate, Cubic Feet/Min. (×1.503)	Theoretical Meter Volume, (V_m) ft^3, per point (×2)	Theoretical Meter Volume, (V_m) ft^3, total (+)	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, " Hg	Probe Temp. °F	Filter Temp. °F	CPM Filter Temp °F	Impinger Outlet Well Temp. °F
2-1	1516	.80	5.2	86.010	.894	[illegible]	2.688	—	160	78	77	14	253	253		50
1	1522/1527	.85	5.6	88.94	.921	1.385	[illegible]	89.699	161	77	77	14	257	254		55
2	1527/1535	.85	5.6	91.15	.921	1.385	2.771	91.469	163	81	80	14	258	254		56
2	1537/1545	.85	5.6	94.11	.921	1.385	2.771	94.240	164	79	80	14	258	255		55
3	1547/1558	.86	5.8	97.15	.927	1.393	2.787	97.011	167	82	81	14	254	255		66
3	1600/1606	.87	5.7	99.34	.932	1.401	2.803	99.798	167	82	81	14	257	255		65
4	1608/1616	.84	5.5	102.23	.916	1.377	2.755	102.601	169	82	82	14	252	253		57
4	1618/1626	.86	5.6	105.24	.927	1.393	2.787	105.356	167	83	82	14	252	255		62
5	1628/1639	.85	5.6	108.16	.921	1.385	2.771	108.143	169	82	82	14	253	255		55
5	1642/1651	.84	5.5	110.99	.916	1.377	2.755	110.901	167	83	82	14	257	252		55
6	1653/1703	.85	5.6	113.05	.921	1.385	2.771	113.660	166	83	82	14	252	253		54
6	1705/1715	.85	5.6	116.09	.921	1.385	2.771	116.440	164	83	82	14	252	252		54
7	1717/1727	.86	5.6	119.02	.927	1.393	2.787	119.211	163	82	82	14	257	253		54
7	1729/1739	.86	5.6	121.43	.927	1.393	2.787	121.998	165	82	82	14	255	253		54
8	1741/1749	.85	5.6	124.03	.921	1.385	2.771	124.785	162	82	82	14	252	252		51
8	1751/1801	.85	5.6	127.27	.921	1.385	2.771	127.556	164	82	82	14	254	253		52
9	1803/1811	.85	5.6	130.38	.921	1.385	2.771	130.327	164	83	81	14	252	253		62
9	1813/1821	.86	5.6	133.15	.927	1.393	2.787	133.098	167	80	81	14	255	252		54
10	1823/1831	.85	5.6	135.24	.921	1.385	2.771	135.869	159	79	78	14	258	252		59
10	1836/1845	.84	5.5	138.03	.916	1.377	2.755	138.624	135	81	78	14	259	251		50
11	1847/1857	.84	5.5	141.26	.916	1.377	2.755	141.411	137	79	78	14	258	252		51
11	1859/1947	.85	5.6	144.18	.921	1.385	2.771	144.116	138	79	77	14	256	257		51
12	1949/1958	.85	5.6	146.85	.921	1.385	2.771	146.887	141	78	78	14	258	254		53
12	2000/2009	.86	5.6	149.05	.927	1.393	2.787	149.658	143	77	78	14	259	254		49
13	2011/2021	.85	5.6	151.40	.921	1.385	2.771	152.415	145	77	77	14	258	252		49
13	2023/2032	.84	5.5	155.21	.916	1.377	2.755	155.216	146	76	77	14	256	253		49
14	2034/2042	.84	5.5	157.61	.916	1.377	2.755	157.971	146	77	76	14	254	254		50
14	2044/2053	.85	5.6	160.02	.921	1.385	2.771	160.736	146	77	76	14	259	254		50
				163.25				163.497								

Project No. M162810A
#2 Coke Battery PEC Baghouse Stack
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IMPINGER WEIGHT SHEET

PLANT: Arcelor Mittal

UNIT NO: Burns Harbor

LOCATION: #2 PEC Stack

DATE: 8-25-16

TEST NO: 3

METHOD: 0010 / 23

WEIGHED/MEASURED BY: SLB

BALANCE ID: S10-35

Circle One:	FINAL WEIGHT MLS / GRAMS	INITIAL WEIGHT MLS / GRAMS	IMPINGER GAIN	IMPINGER CONTENTS
IMPINGER 1	591.2	523.7		empty
IMPINGER 2	627.2	627.2		DI
IMPINGER 3	737.1	741.3		DI
IMPINGER 4	623.2	622.4		empty
IMPINGER 5	750.7	730		silica
IMPINGER 6				
IMPINGER 7				
IMPINGER 8				

	FINAL TOTAL	INITIAL TOTAL	TOTAL IMPINGER GAIN
IMPINGERS	2578.7	2514.6	64.1

	FINAL TOTAL	INITIAL TOTAL	TOTAL SILICA GAIN
SILICA	750.7	730.0	20.7

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Isokinetic Sampling Cover Sheet

Test Engineer: BJG
Test Technician: DBD

Plant Information

Run Number: 1
Date: 8/23/16
Project Number: M162810
Test Location: #2 BATTERY PEC STACK
Client Name: ARCELOR MITTAL
Plant Name: BURNS HARBOR
Duct Shape: Circular or Rectangular
Length: _____ Width: _____ or Diameter: 9'
Flue Area: 63.617
Upstream Diameters: >2.
Downstream Diameters: >3.
Port Type: NIPPLE
Port Length: 6.5
Port Diameter: 4
Test Method: 315
Source Condition: NORMAL

Meter and Probe Data

Meter ID: CM23
Meter Y Value: 1.001
ΔH Value: 1.405
Pitot ID: 235
Pitot Coefficient: .840
Train Type: ANDERSON
Nozzle ID #: Glass
Nozzle Diameter: .225
Filter Number/Weight: _____
Probe Length: 10'
Probe Liner: GLASS
Thimble Number/Weight: _____
Pre-Test Nozzle Leak Check: ✓ @ 10 "Hg
Post-Test Nozzle Leak Check: ✓ @ 20 "Hg
Pre-Test Pitot Leak Check: ✓ @ 4 "H_2O
Post-Test Pitot Leak Check: ✓ @ 4 "H_2O

Traverse Data

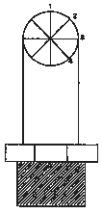
Ports Sampled: 2
Points/Port: 12
Min/Point: 4
Total Points: 24
Total Test Time: 96
Sample Plane: Horizontal or Vertical

Stack Parameters

Barometric Pressure: 29.45
Static Pressure: -1
CO_2 %: ___ / ___ / ___ / Avg. 1.2
O_2 %: ___ / ___ / ___ / Avg. 19.7
Determined by: Method 3 or Method 3A
Imp and/or silica balance Model and S/N: 510-35
Servomex Serial #: 0144001 / 3791
Initial Imp. Volume or Weight: 2018.6
Final Imp. Volume or Weight: 2049.6
Imp. Volume or Weight Gain: 31.0
Initial Silica Weight: 867.4
Final Silica Weight: 884.1
Silica Weight Gain: 16.7

Comments:

Post-Test Nozzle Verification: 1)_____ 2)_____ 3)_____ 4)_____



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Isokinetic Sampling Field Data Sheet

Project Number: M162810 | Date: 8/24/16 | Test Number: 1

Client: ARCELOR MITTAL | Test Location: #2 BATTERY PEC | Operator: BVG | Test Tech: DBD

Plant: BURNS HARBOR | Test Method: 315 | Page Number: 1 of 2

1.8 .87

Port-Point #.	Time		(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft^3, Actual	Square Root, ΔP	Meter Rate, Cubic Feet/ Min.	Theoretical Meter Volume, (V_m) ft^3, per point	Theoretical Meter Volume, (V_m) ft^3, total	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, " Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp. °F
1-1	713		.80	1.4	27.680	.894	.778	1.554		125	71	69	4	260	260	58
1	715	725	.70	1.2	29.225	.836	.727	1.455	29.236	125	72	70	4	254	260	57
2	727	739	.75	1.3	30.650	.866	.753	1.506	30.691	134	72	71	4	255	257	62
2	741	751	.80	1.4	32.150	.894	.778	1.556	32.197	143	72	71	4	254	255	62
3	753	803	.80	1.5	33.715	.938	.816	1.632	33.753	155	73	72	4	255	258	63
3	805	814	.90	1.6	35.405	.949	.825	1.650	35.385	159	74	73	4	255	258	62
4	816	840	.90	1.6	37.110	.949	.825	1.650	37.035	151	76	74	4	241	260	62
4	842	851	.95	1.7	38.620	.974	.847	1.695	38.685	148	76	75	4	257	259	65
5	853	902	.95	1.7	40.475	.974	.847	1.695	40.380	151	77	76	4	256	259	66
5	904	914	.98	1.7	42.110	.989	.861	1.722	42.075	154	78	77	4	263	260	66
6	916	925	1.0	1.8	43.750	1.0	.870	1.740	43.797	157	78	77	4	260	261	67
6	927	937	1.0	1.8	45.550	1.0	.870	1.740	45.537	158	78	77	4	259	259	66
7	939	948	.95	1.7	47.298	.977	.847	1.695	47.277	157	78	78	4	253	257	61
7	950	1000	1.1	1.9	48.900	1.04	.912	1.824	48.90	157	78	77	4	257	258	58
8	1002	1013	1.1	1.9	50.750	1.04	.912	1.824	50.764	158	77	77	4	258	260	60
8	1015	1025	1.1	1.9	52.535	1.04	.912	1.824	52.588	160	77	77	4	258	258	63
9	1025	1035	1.0	1.8	54.435	1.0	.870	1.740	54.412	160	77	77	4	258	259	58
9	1037	1046	1.0	1.8	56.150	1.0	.870	1.740	56.152	161	77	77	4	258	259	65
10	1048	1058	1.2	2.1	57.825	1.09	.953	1.906	57.892	164	78	77	4	258	258	62
10	1100	1108	1.1	1.9	59.750	1.04	.912	1.824	59.798	167	78	77	4	257	260	58
11	1110	1119	1.1	1.9	61.650	1.04	.912	1.824	61.622	165	78	77	4	256	258	66
11	1121	1130	1.1	1.9	63.500	1.04	.912	1.824	63.446	162	78	78	4	257	256	66
12	1132	1146	1.2	2.1	65.255	1.09	.953	1.906	65.270	161	79	78	4	257	258	61
12	1148	1159	1.0	1.8	67.110	1.0	.870	1.740	67.176	159	79	78	4	257	258	60
	1201				68.904				68.916							

Project No. M162810A
#2 Coke Battery PEC Baghouse Stack
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Isokinetic Sampling Field Data Sheet

Project Number: M162810
Client: ARCELOR MITTAL
Plant: BURNS HARBOR

Date: 8/25/16
Test Location: #2 BATTERY PEC
Test Method: 315

Test Number: 1
Operator: BVB
Test Tech: DBD
Page Number: 2 of 2

1.8 .87 x 2

Port-Point #.	Time		(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft^3, Actual	Square Root, ΔP	Meter Rate, Cubic Feet/ Min.	Theoretical Meter Volume, (V_m) ft^3, per point	Theoretical Meter Volume, (V_m) ft^3, total	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, " Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp. °F
21	1216		.90	1.6	68.904	.948	.825	1.650		158	79	79	4	258	259	63
1	1218	1232	1.0	1.8	70.710	1.0	.870	1.740	70.554	155	80	79	4	259	259	65
2	1234	1246	1.0	1.8	72.250	1.0	.870	1.740	72.294	153	80	79	4	239	261	65
2	1244	1256	.95	1.7	74.010	.974	.847	1.696	74.034	154	81	80	4	241	261	62
3	13:00	13:12	.90	1.6	75.820	.948	.825	1.650	75.730	152	80	80	4	244	251	59
3	13:14	13:26	.95	1.7	77.385	.974	.847	1.696	77.380	149	80	80	4	243	257	60
4	13:28	13:41	1.0	1.8	79.155	1.0	.870	1.740	79.076	149	81	80	4	238	258	58
4	13:43	14:03	.97	1.7	80.850	.985	.857	1.714	80.816	147	81	80	4	256	264	60
5	14:05	14:17	1.2	2.2	82.579	1.10	.953	1.906	82.530	148	81	80	4	243	257	57
5	14:19	14:29	1.0	1.8	84.455	1.0	.870	1.740	84.436	150	82	81	4	245	255	61
6	14:31	14:43	1.0	1.8	86.175	1.0	.870	1.740	86.176	155	82	81	4	249	259	61
6	14:44	1453	1.2	2.2	87.925	1.10	.953	1.906	87.916	154	82	81	4	240	256	64
7	1455	15.05	1.0	1.8	89.892	1.0	.870	1.740	89.822	163	82	81	4	242	255	61
7	15.07	15.20	1.2	2.2	91.578	1.1	.953	1.906	91.562	161	82	81	4	256	258	62
8	15.22	15.31	1.0	1.8	93.478	1.0	.870	1.740	93.468	160	83	82	4	247	257	60
8	15:33	15.42	1.0	1.8	95.243	1.0	.870	1.740	95.208	159	83	82	4	256	258	67
9	15.44	15.57	1.2	2.2	96.960	1.1	.953	1.906	96.944	153	82	82	4	237	259	62
9	15.59	16.10	1.1	2.0	98.865	1.050	.912	1.823	98.854	150	83	82	4	254	256	60
10	16.12	16.20	1.0	1.8	100.692	1.0	.870	1.740	100.679	151	83	82	4	247	259	59
10	16.22	16.30	1.1	2.0	102.433	1.050	.912	1.823	102.419	158	83	82	4	247	259	59
11	16.32	16.41	1.0	1.8	104.350	1.0	.870	1.740	104.242	161	83	82	4	241	257	59
11	16.43	16.51	1.1	2.0	106.004	1.050	.912	1.823	105.982	165	83	82	4	249	258	60
12	16.53	17.04	1.1	2.0	107.815	1.050	.912	1.823	107.805	163	83	82	4	250	258	61
12	17.06	17.17	1.0	1.8	109.630	1.0	.870	1.740	109.628	159	83	82	4	243	257	60
					111.385				111.364							

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IMPINGER WEIGHT SHEET

PLANT: Arcelor Mittal

UNIT NO: Burns Harbor

LOCATION: # 2 PEC Stack

DATE: 8-23-16

TEST NO: 1

METHOD: 315

WEIGHED/MEASURED BY: SLB

BALANCE ID: S10-35

Circle One:	FINAL WEIGHT MLS / GRAMS	INITIAL WEIGHT MLS / GRAMS	IMPINGER GAIN	IMPINGER CONTENTS
IMPINGER 1	744.3	720.5		DI
IMPINGER 2	718.2	713.6		DI
IMPINGER 3	587.1	584		empty
IMPINGER 4	884.1	867.4		silica
IMPINGER 5				
IMPINGER 6				
IMPINGER 7				
IMPINGER 8				

	FINAL TOTAL	INITIAL TOTAL	TOTAL IMPINGER GAIN
IMPINGERS	2049.6	2018.6	31

	FINAL TOTAL	INITIAL TOTAL	TOTAL SILICA GAIN
SILICA	884.1	867.4	16.7

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Isokinetic Sampling Cover Sheet

Test Engineer: JJR
Test Technician: DBD

Plant Information

Run Number: 2
Date: 8/24/16
Project Number: M162810
Test Location: #2 BATTERY PEC STACK
Client Name: ARCELOR MITTAL
Plant Name: BURNS HARBOR
Duct Shape: Circular or Rectangular
Length: ____ Width: ____ or Diameter: 9'
Flue Area: 63.617
Upstream Diameters: 72.0
Downstream Diameters: 73.0
Port Type: NIPPLE
Port Length: 6.5
Port Diameter: 4
Test Method: 315
Source Condition: NORMAL

Meter and Probe Data

Meter ID: CM23
Meter Y Value: 1.001
ΔH Value: 1.405
Pitot ID: 235
Pitot Coefficient: .840
Train Type: ANDERSON
Nozzle ID #: Glass
Nozzle Diameter: .225
Filter Number/Weight: 9951 / 1.4544
Probe Length: 10'
Probe Liner: GLASS
Thimble Number/Weight: ____
Pre-Test Nozzle Leak Check: ✓ @ 10 "Hg
Post-Test Nozzle Leak Check: ✓ @ 10 "Hg
Pre-Test Pitot Leak Check: ✓ @ 4 "H_2O
Post-Test Pitot Leak Check: ✓ @ 4 "H_2O

Traverse Data

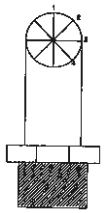
Ports Sampled: 2
Points/Port: 12
Min/Point: 4
Total Points: 24
Total Test Time: 96
Sample Plane: Horizontal or Vertical

Stack Parameters

Barometric Pressure: 29.29
Static Pressure: -1
CO_2 %: ____ / ____ / ____ / Avg. 1.2
O_2 %: ____ / ____ / ____ / Avg. 19.7
Determined by: Method 3 or Method 3A
Imp and/or silica balance Model and S/N: S10-35
Servomex Serial #: 01444001 / 3791
Initial Imp. Volume or Weight: 2094.3
Final Imp. Volume or Weight: 2142.7
Imp. Volume or Weight Gain: 48.4
Initial Silica Weight: 832.2
Final Silica Weight: 849.1
Silica Weight Gain: 16.9

Comments:

Post-Test Nozzle Verification:



1)____ 2)____ 3)____ 4)____

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Isokinetic Sampling Field Data Sheet-M202

Project Number: M162810
Client: Arcelor Mittal
Plant: Burns Harbor

Date: 8/24/16
Test Location: #2 Battery
Test Method: 315 ~~202~~

Test Number: 2
Operator:
Test Tech:
Page Number: 1 of 2

1.84 .87

Port-Point #.	Time		(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft³, Actual	Square Root, ΔP	Meter Rate, Cubic Feet/ Min.	Theoretical Meter Volume, (V_m) ft³, per point	Theoretical Meter Volume, (V_m) ft³, total	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, " Hg	Probe Temp. °F	Filter Temp. °F	CPM Filter Temp °F	Impinger Outlet Well Temp. °F
1-1	7:25		.90	1.7	12.118	.949	.825	1.650		132	73	72	5	247	246		62
1	7:27	7:35	.95	1.8	13.921	.975	.848	1.696	13.769	134	74	73	5	250	251		56
2	7:37	7:47	.93	1.7	15.468	.964	.839	1.678	15.465	139	74	73	5	251	252		54
2	7:49	8:08	.93	1.7	17.145	.964	.839	1.678	17.143	137	73	72	5	250	250		59
3	8:10	8:21	.95	1.8	18.801	.975	.848	1.696	18.821	140	72	72	5	248	252		58
3	8:23	8:33	.90	1.7	20.493	.949	.825	1.650	20.517	143	72	72	5	248	257		59
4	8:35	8:43	.96	1.8	22.140	.980	.852	1.705	22.167	149	72	72	5	250	250		58
4	8:45	8:54	.93	1.7	23.665	.964	.839	1.67	23.872	153	72	72	5	247	249		60
5	8:56	9:05	.97	1.8	25.572	.985	.857	1.714	25.597	154	22	72	5	246	251		62
5	9:07	9:18	.97	1.8	27.265	.985	.857	1.714	27.264	153	72	72	5	246	251		62
6	9:20	9:29	1.1	2.0	28.985	1.049	.913	1.825	28.975	151	72	72	5	243	249		59
6	9:31	9:42	1.0	1.8	30.851	1.000	.870	1.740	30.800	149	72	72	5	249	250		62
7	9:44	9:55	1.0	1.8	32.555	1.000	.870	1.740	32.540	148	73	72	5	246	247		63
7	9:57	10:06	1.0	1.8	34.290	1.00	.870	1.740	34.280	152	74	73	5	246	240		61
8	10:08	10:17	.97	1.8	36.020	.985	.857	1.714	36.020	154	75	74	5	250	251		62
8	10:19	10:28	.97	1.8	37.745	.985	.857	1.714	37.734	155	75	74	5	248	250		64
9	10:29	10:39	.90	1.7	39.452	.949	.825	1.650	39.448	157	76	75	5	246	254		65
9	10:41	10:51	.95	1.8	41.020	.975	.848	1.696	41.098	156	77	76	5	246	255		65
10	10:53	11:02	.97	1.8	42.744	.985	.857	1.714	42.794	156	77	76	5	252	245		63
10	11:04	11:16	.90	1.7	44.540	.949	.825	1.650	44.508	152	78	77	5	234	249		63
11	11:18	11:29	.93	1.7	46.160	.964	.839	1.678	46.158	148	79	78	5	233	256		60
11	11:31	11:42	.95	1.8	47.840	.975	.848	1.696	47.836	147	79	78	5	244	249		57
12	11:44	11:52	.95	1.8	49.540	.975	.848	1.696	49.532	146	79	78	5	239	246		60
12	11:54	12:04	.95	1.8	51.342	.975	.848	1.696	51.228	127	80	79	5	248	254		61
					52.934				52.934								

Project No. M162810A
#2 Coke Battery PEC Baghouse Stack
397 of 476
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Isokinetic Sampling Field Data Sheet-M202

Project Number: M162810 | Date: 8/24/16 | Test Number: 2

Client: Arcelor Mittal | Test Location: # 2. Battery PEC | Operator: JJR | Test Tech: PBD

Plant: Burns Harbor | Test Method: 315 ~~202~~ | Page Number: 2 of 2

1.84 .97 Y2

Port-Point #.	Time		(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft³, Actual	Square Root, ΔP	Meter Rate, Cubic Feet/ Min.	Theoretical Meter Volume, (V_m) ft³, per point	Theoretical Meter Volume, (V_m) ft³, total	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, "Hg	Probe Temp. °F	Filter Temp. °F	CPM Filter Temp °F	Impinger Outlet Well Temp. °F
2-1	12.59		.95	1.8	52.934	.975	.848	1.696		130	80	79	5	249	257		61
1	13.01	13.12	.93	1.7	54.630	.964	.839	1.678	54.620	139	79	79	5	250	251		61
2	13.14	13.23	.85	1.6	56.305	.922	.802	1.604	56.298	143	79	78	5	250	247		62
2	13.25	13.34	.87	1.6	57.955	.933	.811	1.623	57.902	147	79	78	5	249	250		64
3	13.36	13.49	1.0	1.8	59.572	1.00	.870	1.740	59.525	148	78	78	5	253	250		62
3	13.50	14.01	1.0	1.8	61.302	1.00	.870	1.740	61.265	149	79	78	5	251	252		63
4	14.06	14.16	1.1	2.0	63.020	1.049	.912	1.825	63.005	152	80	79	5	248	260		63
4	14.18	14.34	1.1	2.0	64.863	1.049	.912	1.825	64.830	151	80	79	5	249	256		65
5	14.36	14.44	1.1	2.0	66.661	1.049	.912	1.825	66.655	154	80	79	5	252	251		63
5	14.46	14.54	1.0	1.8	68.492	1.00	.870	1.740	68.490	157	80	80	5	252	248		63
6	14.56	15.06	.97	1.8	70.240	.985	.857	1.714	70.22	160	80	80	5	250	250		62
6	15.06	15.14	1.0	1.8	72.023	1.00	.870	1.740	71.934	158	80	80	5	252	252		65
7	15.16	15.32	1.1	2.0	73.681	1.049	.920	1.825	73.674	161	80	79	5	250	249		60
7	15.34	15.49	.95	1.8	75.561	.975	.848	1.696	75.499	155	80	79	5	253	251		60
8	15.51	16.01	.97	1.8	77.195	.985	.857	1.714	77.194	156	78	78	5	250	251		57
8	16.03	16.15	.95	1.8	78.932	.975	.848	1.696	78.909	157	78	78	5	248	249		60
9	16.17	16.27	.95	1.8	80.615	.975	.848	1.696	80.605	161	78	78	5	249	250		62
9	16.27	16.38	.97	1.8	82.319	.985	.857	1.714	82.301	163	78	78	5	248	250		62
10	16.40	16.51	1.0	1.8	84.021	1.00	.870	1.740	84.015	163	79	79	5	249	249		62
10	16.53	17.04	.95	1.8	85.762	.975	.848	1.696	85.753	162	79	79	5	249	251		62
11	17.06	17.19	.95	1.8	87.455	.975	.848	1.696	87.451	160	80	79	5	249	253		61
11	17.21	17.33	.93	1.7	89.147	.964	.839	1.678	89.147	159	80	79	5	249	249		59
12	17.35	17.43	.95	1.8	90.825	.975	.848	1.696	90.825	162	80	80	5	251	249		57
12	17.43	17.56	.90	1.7	92.524	.949	.825	1.650	92.521	164	79	79	5	250	250		60
	17.58				94.145				94.171								

Project No. M162810A
#2 Coke Battery PEC Baghouse Stack
398 of 476
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IMPINGER WEIGHT SHEET

PLANT: Arcelor Mittal

UNIT NO: Burns Harbor

LOCATION: # 2 PEC Stack

DATE: 8-24-16

TEST NO: 2

METHOD: 315

WEIGHED/MEASURED BY: SLR

BALANCE ID: S10-35

Circle One:	FINAL WEIGHT MLS / GRAMS	INITIAL WEIGHT MLS / GRAMS	IMPINGER GAIN	IMPINGER CONTENTS
IMPINGER 1	752.2	714.8		DI
IMPINGER 2	755.1	748.7		DI
IMPINGER 3	635.4	630.8		empty
IMPINGER 4	849.1	832.2		silica
IMPINGER 5				
IMPINGER 6				
IMPINGER 7				
IMPINGER 8				

	FINAL TOTAL	INITIAL TOTAL	TOTAL IMPINGER GAIN
IMPINGERS	2142.7	2094.3	48.4
SILICA	849.1	832.2	16.9

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Isokinetic Sampling Cover Sheet

Test Engineer: SSB
Test Technician: DGD

Plant Information

Run Number: 3
Date: 8/25/16
Project Number: M162810
Test Location: #2 BATTERY PEC STACK
Client Name: ARCELOR MITTAL
Plant Name: BURNS HARBOR
Duct Shape: Circular or Rectangular
Length: ____ Width: ____ or Diameter: 9'
Flue Area: 63.617
Upstream Diameters: 7.2D
Downstream Diameters: 73.0
Port Type: NIPPLE
Port Length: 6.5
Port Diameter: 4
Test Method: 315
Source Condition: NORMAL

Meter and Probe Data

Meter ID: CM23
Meter Y Value: 1.0001
ΔH Value: 1.405
Pitot ID: 235
Pitot Coefficient: .8440
Train Type: ANDERSON
Nozzle ID #: Glass
Nozzle Diameter: .1225
Filter Number/Weight: 10034 / .4566
Probe Length: 10'
Probe Liner: GLASS
Thimble Number/Weight: ____
Pre-Test Nozzle Leak Check: ✓ 0.00 @ 10 "Hg
Post-Test Nozzle Leak Check: ✓ 0.00 @ 10 "Hg
Pre-Test Pitot Leak Check: ✓ ℓ5 "H_2O
Post-Test Pitot Leak Check: ✓ ℓ5 "H_2O

Traverse Data

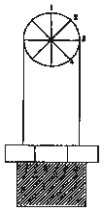
Ports Sampled: 2
Points/Port: 12
Min/Point: 4
Total Points: 24
Total Test Time: 96
Sample Plane: Horizontal or Vertical

Stack Parameters

Barometric Pressure: 29.25
Static Pressure: -1
CO_2 %: ____ / ____ / ____ / Avg. 1.2
O_2 %: ____ / ____ / ____ / Avg. 19.7
Determined by: Method 3 or Method 3A
Imp and/or silica balance Model and S/N: SIO-35
Servomex Serial #: 0144001 / 3791
Initial Imp. Volume or Weight: 1850.0
Final Imp. Volume or Weight: 1891.4
Imp. Volume or Weight Gain: 41.4
Initial Silica Weight: 853.8
Final Silica Weight: 867.6
Silica Weight Gain: 13.8

Comments:

Post-Test Nozzle Verification: 1)____ 2)____ 3)____ 4)____



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Isokinetic Sampling Field Data Sheet

Project Number: M162810
Client: Arcelor Mittal
Plant: Burns Harbor
1.44

Date: 4/25/16
Test Location: #2 Battery Pec
Test Method: 315
.27

Test Number: 3
Operator: JJR
Test Tech: DBD
Page Number: 1 of 2

Port-Point #.	Time		(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft^3, Actual	Square Root, ΔP	Meter Rate, Cubic Feet/ Min.	Theoretical Meter Volume, (V_m) ft^3, per point	Theoretical Meter Volume, (V_m) ft^3, total	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, " Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp °F
1-1	9.34		.40	1.6	95.038	.922	.707	1.604		122	71	76	5	240	251	66
1	9.35	9.44	.62	1.5	96.652	.911	.793	1.585	96.642	134	71	71	5	248	240	61
2	9.46	9.55	.73	1.5	97.321	.911	.793	1.585	98.227	135	72	71	5	240	240	65
2	9.59	10.15	.73	1.5	99.825	.911	.793	1.585	99.412	140	74	73	5	250	251	62
3	10.17	10.27	.73	1.5	101.397	.911	.793	1.585	101.997	144	75	74	5	250	250	65
3	10.29	10.38	.80	1.5	102.990	.89	.774	1.586	102.926	150	75	74	5	247	249	59
4	10.40	10.51	.85	1.6	104.586	.922	.802	1.604	104.538	151	75	75	5	248	250	60
4	10.52	11.02	.85	1.6	106.099	.922	.802	1.604	106.142	156	75	75	5	251	251	60
5	11.04	11.14	.85	1.6	107.745	.922	.802	1.604	107.746	157	76	75	5	246	248	62
5	11.16	11.26	.85	1.6	109.351	.922	.802	1.604	109.350	157	76	76	6	251	250	59
6	11.28	11.37	.83	1.5	110.953	.911	.793	1.585	110.954	157	76	76	6	252	250	59
6	11.39	11.49	.83	1.5	112.525	.911	.793	1.585	112.539	158	76	76	6	250	250	57
7	11.51	12.03	.78	1.4	114.113	.883	.768	1.537	114.124	159	76	76	6	251	250	56
7	12.05	12.14	.78	1.4	115.520	.883	.768	1.537	115.661	161	76	76	6	248	250	57
8	12.16	12.24	.72	1.3	117.109	.849	.738	1.476	117.198	163	76	76	6	246	250	60
8	12.26	12.35	.72	1.3	118.571	.849	.738	1.476	118.674	164	77	76	6	246	250	60
9	12.37	12.46	.70	1.3	120.147	.837	.728	1.456	120.150	164	77	77	6	248	250	56
9	12.48	12.56	.70	1.3	121.597	.837	.728	1.456	121.606	163	77	77	6	247	250	56
10	13.00	13.13	.73	1.3	123.031	.854	.743	1.487	123.062	159	77	77	6	252	249	60
10	13.15	13.25	.70	1.3	124.530	.837	.728	1.456	124.549	156	76	77	6	246	250	57
11	13.27	13.38	.70	1.3	125.995	.837	.728	1.456	126.005	157	78	78	6	249	249	56
11	13.40	13.50	.70	1.3	127.442	.837	.728	1.456	127.461	159	78	78	6	248	250	59
12	13.52	14.04	.70	1.3	128.905	.837	.728	1.456	128.917	160	79	79	6	247	250	60
12	14.06	14.15	.70	1.3	130.367	.837	.728	1.456	130.373	161	79	79	6	251	249	62
	14.17				131.950				131.829							
					132.220											

Isokinetic Sampling Field Data Sheet

Project Number: M162810
Client: Arcelor Mittal
Plant: Burns Harbor
1.44

Date: 4/25/16
Test Location: #2 Battery PEC
Test Method: 315
.87

Test Number: 3
Operator: JJP Test Tech: DBD
Page Number: 2 of 2

Port-Point #.	Time	(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft^3, Actual	Square Root, ΔP	Meter Rate, Cubic Feet/ Min.	Theoretical Meter Volume, (V_m) ft^3, per point	Theoretical Meter Volume, (V_m) ft^3, total	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, " Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp °F
2-1	14.26	.90	1.7	132.220	.949	.825	1.651	—	161	79	79	6	252	251	58
1	14.29	14.34	.85	1.6	133.726	.922	.802	1.604	133.871	161	80	79	6	249	250	50
2	14.40	14.46	.85	1.6	135.334	.922	.802	1.604	135.475	161	80	80	6	253	250	52
2	14.50	14.59	.90	1.7	137.157	.949	.825	1.651	137.079	159	80	80	6	248	250	53
3	15.01	15.10	.85	1.7	138.629	.922	.802	1.604	138.730	162	80	80	6	254	250	57
3	15.12	15.22	.87	1.6	140.340	.933	.811	1.623	140.334	161	80	81	6	252	250	54
4	15.24	15.35	.85	1.7	141.950	.922	.802	1.604	141.957	160	81	81	6	249	249	54
4	15.37	15.45	.85	1.7	143.500	.922	.802	1.604	143.561	165	82	81	6	249	250	53
5	15.47	15.58	.85	1.7	145.154	.922	.802	1.604	145.165	166	82	82	6	251	250	56
5	16.0	16.09	.85	1.7	146.765	.922	.802	1.604	146.769	165	83	82	6	250	250	48
6	16.11	16.19	.85	1.7	148.381	.922	.802	1.604	148.373	167	83	83	6	250	250	59
6	16.21	16.30	.85	1.7	149.959	.922	.802	1.604	149.977	167	83	83	6	250	250	60
7	16.32	16.40	.85	1.7	151.572	.922	.802	1.604	151.581	165	83	83	6	251	250	61
7	16.41	16.51	.85	1.7	153.155	.922	.802	1.604	153.165	165	83	83	6	249	250	61
8	16.53	17.03	.85	1.7	154.772	.922	.802	1.604	154.784	163	83	83	6	248	250	58
8	17.05	17.16	.85	1.7	156.390	.922	.802	1.604	156.393	162	83	83	6	247	250	56
9	17.18	17.27	.83	1.5	157.992	.911	.793	1.585	157.997	160	83	83	6	249	250	57
9	17.29	17.38	.80	1.5	159.582	.894	.778	1.556	159.582	161	83	83	6	248	250	52
10	17.40	17.49	.80	1.5	161.130	.894	.778	1.556	161.138	164	83	83	6	249	250	58
10	17.51	18.01	.83	1.5	162.683	.911	.793	1.585	162.694	164	82	83	6	252	250	57
11	18.03	18.11	.80	1.5	164.271	.894	.778	1.556	164.279	165	82	82	6	250	249	57
11	18.13	18.21	.80	1.5	165.820	.894	.778	1.556	165.835	163	82	82	6	251	250	56
12	18.23	18.14	.83	1.5	167.390	.911	.793	1.585	167.391	159	80	80	6	251	249	56
12	18.16	1935	.83	1.5	168.971	.911	.793	1.585	168.976	157	80	80	6	251	249	56
	1937			170.640				170.561							

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IMPINGER WEIGHT SHEET

PLANT: ArcelorMittal

UNIT NO: Burns Harbor

LOCATION: #2 PEC Stack

DATE: 8-25-16

TEST NO: 3

METHOD: 315

WEIGHED/MEASURED BY: SLB

BALANCE ID: SID-35

Circle One:	FINAL WEIGHT MLS / GRAMS	INITIAL WEIGHT MLS / GRAMS	IMPINGER GAIN	IMPINGER CONTENTS
IMPINGER 1	703	669.9		DI
IMPINGER 2	613.3	606.4		DI
IMPINGER 3	575.1	573.7		empty
IMPINGER 4	867.6	853.8		silica
IMPINGER 5				
IMPINGER 6				
IMPINGER 7				
IMPINGER 8				

	FINAL TOTAL	INITIAL TOTAL	TOTAL IMPINGER GAIN
IMPINGERS	1891.4	1850.0	41.4
SILICA	867.6	853.8	13.8

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Appendix H - Calibration Data

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MOSTARDI PLATT

Procedures for Method 5 and Flow Calibration

Nozzles

The nozzles are measured according to Method 5, Section 10.1

Dry Gas Meters

The test meters are calibrated according to Method 5, Section 10.3 and 16.1. and "Procedures for Calibrating and Using Dry Gas Volume Meters as Calibration Standards" by P.R. Westlin and R.T. Shigehara, March 10, 1978.

Analytical Balance

The accuracy of the analytical balance is checked with Class S, Stainless Steel Type 303 weights manufactured by F. Hopken and Son, Jersey City, New Jersey.

Temperature Sensing Devices

The potentiometer and thermocouples are calibrated utilizing a NIST traceable millivolt source.

Pitot Tubes

The pitot tubes utilized during this test program are manufactured according to the specification described and illustrated in the *Code of Federal Regulations*, Title 40, Part 60, Appendix A, Methods 1 and 2. The pitot tubes comply with the alignment specifications in Method 2, Section 10.1; and the pitot tube assemblies are in compliance with specifications in the same section.

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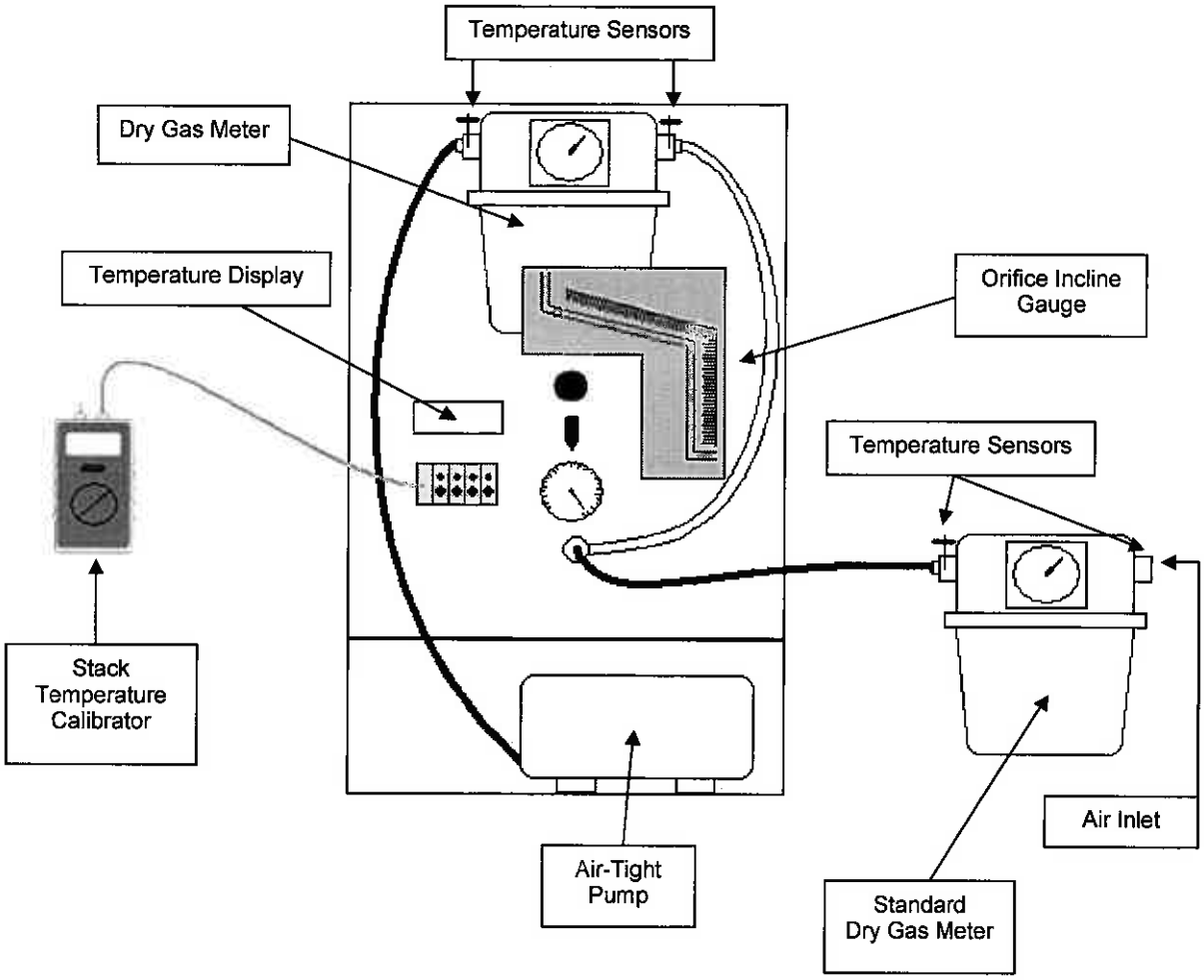
Dry Gas Meter/Control Module Calibration Diagram



Client: ArcelorMittal
Facility: Burns Harbor, Indiana
Fuel Type: Other
Fuel Factor: Enter Fuel Factor Here
Diluent: O2 %

Location: No.2 PEC Stack
Date: 8/16/16 through 8/18/16
Operator: Stuart Burton
Project #: M162810
Fuel Factor: by Standard

CO Outlet ppmvd Correction Data

Run #	Cma	Precal	Postcal	Pre zero	Post zero	Co	Cm	C	Cgas	Span Bias	Span Drift	Zero Bias	Zero Drift
1	251.50	253.60	253.00	0.10	-0.40	-0.15	253.30	50.30	50.1	0.13	-0.13	0.00	-0.11
2	251.50	253.00	251.10	-0.40	-0.40	-0.40	252.05	49.20	49.4	0.56	-0.42	0.00	0.00
3	251.50	251.10	248.80	-0.40	-0.40	-0.40	249.95	50.40	51.0	1.07	-0.51	0.00	0.00

CO2 % (dry) Correction Data

Run #	Cma	Precal	Postcal	Pre zero	Post zero	Co	Cm	C	Cgas	Span Bias	Span Drift	Zero Bias	Zero Drift
1	10.23	10.05	10.06	0.06	0.06	0.06	10.06	1.16	1.1	0.35	0.05	-0.05	0.00
2	10.23	10.06	10.08	0.06	0.06	0.06	10.07	1.22	1.2	0.25	0.10	-0.05	0.00
3	10.23	10.08	10.09	0.06	0.06	0.06	10.09	1.08	1.0	0.20	0.05	-0.05	0.00

O2 % (dry) Correction Data

Run #	Cma	Precal	Postcal	Pre zero	Post zero	Co	Cm	C	Cgas	Span Bias	Span Drift	Zero Bias	Zero Drift
1	12.08	11.90	11.90	-0.02	-0.01	-0.02	11.90	19.69	20.0	0.32	0.00	-0.14	0.05
2	12.08	11.90	11.90	-0.01	-0.01	-0.01	11.90	19.73	20.0	0.32	0.00	-0.14	0.00
3	12.08	11.90	11.90	-0.01	-0.01	-0.01	11.90	19.90	20.2	0.32	0.00	-0.14	0.00

Calibration Corrected Data

Run #	Run Date	Start Time	End Time		CO2 % (dry)	O2 % (dry)	CO ppmvd
1	8/16/16	7:17	17:25		1.1	20.0	FALSE
2	8/17/16	9:12	18:46		1.2	20.0	FALSE
3	8/18/16	7:17	19:09		1.0	20.2	FALSE

Calibration Corrected Data

Run #	Run Date	Start Time	End Time						CO Outlet ppmvd		
1	8/16/16	7:17	17:25						50.1		
2	8/17/16	9:12	18:46						49.4		
3	8/18/16	7:17	19:09						51.0		

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Client:	ArcelorMittal	**Test Location:**	No.2 PEC Stack
Facility:	Burns Harbor, Indiana	**Date:**	8/16/16
Project #:	M162810	**Operator:**	Stuart Burton
Operating Condition:	Normal		

Probe Length:	6.0	**ft**	**Point Markings (including port**	
Probe Type:	Extractive		**Point #**	**inches**
Sample Plane:	Horizontal		1	22.25
Port Length:	6.50	**in.**	2	53.74
Port Size (diameter):	4	**in.**	3	85.24
Port Type:	Nipple			
Duct Shape:	Circular			
Diameter:	9	**ft**		
Duct Area:	63.62	**Sq. Ft.**		
Upstream Diameters:	> 0.5			
Downstream Diameters:	> 2.0			
Number of Ports Sampled:	1			
Number of Points per Port:	3			
Total Number of Traverse Points:	3			

Type	Setting	Cylinder ID	Cylinder Value	Analyzer Response	Difference, % of Span	Expiration Date
CO Outlet ppmvd	Zero		0	-0.40	0.09%	
	Mid	XCO31061B	251.5	253.60	-0.47%	7/5/2024
	High	CC7510	448.5	449.70	-0.27%	9/27/2022
CO2 % (dry)	Zero		0	0.05	-0.25%	
	Mid	CC178776	10.23	10.13	0.51%	2/15/2024
	High	EB0021818	19.74	19.87	-0.66%	6/22/2023
O2 % (dry)	Zero		0	-0.04	0.18%	
	Mid	CC100304	12.08	11.97	0.51%	6/3/2024
	High	EB0064892	21.65	21.72	-0.32%	8/7/2023

Response Time Data

Type	RM Analyzer Make/Model	RM Analyzer s/n	Analyzer Span	RM Gas Span
CO Outlet ppmvd	Thermo 48C	0508911033	500	448.5
CO2 % (dry)	Servomex 1440	01440D1/3791	20	19.74
O2 % (dry)	Servomex 1440	01440D1/3791	25	21.65
	Start		95% Response	Time (min)
Upscale				1.5
Downscale				1.5

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Client: ArcelorMittal
Facility: Burns Harbor, Indiana
Project #: M162810
Test Location: No.2 PEC Stack
Operating Condition: Normal
Date: 8/16/16

Linearity Cal/Pre 1 Cal

Time	CO Outlet ppmvd		CO2 % (dry)		O2 % (dry)	
5:53	-0.80		19.87		-0.06	
5:54	-0.80		19.87		-0.06	
5:55	-1.10		19.87	ih	-0.06	
5:56	0.40		1.27		20.56	
5:57	0.20		0.07		22.06	
5:58	0.20		0.06		21.92	
5:59	0.20		0.06		21.72	
6:00	0.20		0.06		21.72	ih
6:01	175.90		0.06		6.64	
6:02	946.20		0.05		0.00	
6:03	963.00		0.05		0.00	
6:04	964.00		0.05		-0.01	
6:05	738.50		0.05		-0.01	
6:06	480.80		0.05		-0.01	
6:07	450.50		0.05		-0.02	
6:08	450.70		0.05		-0.02	
6:09	449.70	ih	2.80		-0.03	
6:10	139.30		10.17		-0.06	
6:11	0.10		10.12		-0.06	
6:12	-0.40		10.12		-0.07	
6:13	-0.40	iz	10.13	im	-0.07	
6:14	-0.20		2.45		9.19	
6:15	0.10		0.06		11.97	
6:16	0.10		0.05		11.97	im
6:17	1.20		0.06		9.02	
6:18	192.10		0.05		-0.04	
6:19	252.10		0.05		-0.04	
6:20	253.40		0.05		-0.04	
6:21	253.60	im	0.05	iz	-0.04	iz
6:22	183.00		4.19		7.88	
6:23	4.30		10.04		-0.04	
6:24	-0.40		10.05		-0.04	
6:25	-0.40		10.06		-0.04	
6:26	-0.40		10.06		-0.04	
6:27	-0.40		10.06		-0.03	
6:28	-0.40		10.05	m	-0.02	z
6:29	-0.10		0.36		11.55	
6:30	0.10		0.08		11.89	
6:31	0.10		0.07		11.90	
6:32	0.10	z	0.06	z	11.90	m
6:33	25.20		0.06		5.13	
6:34	239.10		0.06		0.02	
6:35	253.40		0.06		0.01	
6:36	253.60	m	0.06		0.01	
6:37	204.10		0.10		14.06	
6:38	8.00		0.11		20.78	

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Client: ArcelorMittal
Facility: Burns Harbor, Indiana
Project #: M162810
Test Location: No.2 PEC Stack
Operating Condition: Normal
Date: 8/17/16

Linearity Cal/Pre 2 Cal

Time	CO Outlet ppmvd		CO2 % (dry)		O2 % (dry)	
6:33	1.60		16.02		3.49	
6:34	-0.30		19.94		-0.08	
6:35	-0.40		19.71	ih	-0.06	
6:36	-0.40	iz	10.55		10.07	
6:37	0.10		0.07		21.92	
6:38	0.10		0.06		21.93	
6:39	0.10		0.06		21.78	ih
6:40	0.40		0.06		17.28	
6:41	284.30		0.05		0.02	
6:42	434.40		0.05		0.01	
6:43	434.70		0.05		0.01	
6:44	439.60		0.05		0.00	
6:45	448.80	ih	0.05	iz	0.00	
6:46	364.90		7.43		-0.03	
6:47	13.70		10.06		-0.05	
6:48	0.10		10.06		-0.05	
6:49	-0.30		10.06	im	-0.05	iz
6:50	-0.20		2.59		9.05	
6:51	0.10		0.06		12.01	
6:52	0.10		0.05		12.01	im
6:53	35.10		0.06		4.42	
6:54	251.50		0.05		-0.01	
6:55	253.20	im	0.05		-0.01	
6:56	236.30		1.47		6.57	
6:57	36.70		9.95		0.00	
6:58	-0.10		9.98		-0.01	
6:59	-0.40		9.99	m	-0.01	
7:00	-0.10	z	0.80		11.06	
7:01	0.10		0.07		11.93	
7:02	0.10		0.06		11.94	m
7:03	2.40		0.06		7.86	
7:04	199.70		0.06		0.04	
7:05	253.80		0.06		0.03	
7:06	254.00		0.06	z	0.03	z
7:07	252.60	m	0.07		5.88	

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Client: ArcelorMittal
Facility: Burns Harbor, Indiana
Project #: M162810
Test Location: No.2 PEC Stack
Operating Condition: Normal
Date: 8/18/16

Linearity Cal/Pre 2 Cal

Time	CO Outlet ppmvd		CO2 % (dry)		O2 % (dry)	
6:33	1.60		16.02		3.49	
6:34	-0.30		19.94		-0.08	
6:35	-0.40		19.71	ih	-0.06	
6:36	-0.40	iz	10.55		10.07	
6:37	0.10		0.07		21.92	
6:38	0.10		0.06		21.93	
6:39	0.10		0.06		21.78	ih
6:40	0.40		0.06		17.28	
6:41	284.30		0.05		0.02	
6:42	434.40		0.05		0.01	
6:43	434.70		0.05		0.01	
6:44	439.60		0.05		0.00	
6:45	448.80	ih	0.05	iz	0.00	
6:46	364.90		7.43		-0.03	
6:47	13.70		10.06		-0.05	
6:48	0.10		10.06		-0.05	
6:49	-0.30		10.06	im	-0.05	iz
6:50	-0.20		2.59		9.05	
6:51	0.10		0.06		12.01	
6:52	0.10		0.05		12.01	im
6:53	35.10		0.06		4.42	
6:54	251.50		0.05		-0.01	
6:55	253.20	im	0.05		-0.01	
6:56	236.30		1.47		6.57	
6:57	36.70		9.95		0.00	
6:58	-0.10		9.98		-0.01	
6:59	-0.40		9.99	m	-0.01	
7:00	-0.10	z	0.80		11.06	
7:01	0.10		0.07		11.93	
7:02	0.10		0.06		11.94	m
7:03	2.40		0.06		7.86	
7:04	199.70		0.06		0.04	
7:05	253.80		0.06		0.03	
7:06	254.00		0.06	z	0.03	z
7:07	252.60	m	0.07		5.88	

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Client: ArcelorMittal
Facility: Burns Harbor, Indiana
Project #: M162810

Test Location: No.2 PEC Stack
Operating Condition: Normal
Date: 8/16/16

Post 1/Pre 2

Time	CO Outlet ppmvd		CO2 % (dry)		O2 % (dry)	
7:58	3.60		10.06	m	-0.03	
7:59	-0.40	z	7.10		3.48	
8:00	0.10		0.08		11.89	
8:01	0.10		0.07		11.90	m
8:02	51.70		0.06		3.24	
8:03	249.60		0.06		0.00	
8:04	252.80		0.06		0.00	
8:05	252.70		0.06		-0.01	
8:06	253.00	m	0.06	z	-0.01	z
8:07	241.80		0.47		9.24	
8:08	53.70		0.55		20.32	
8:09	11.80		0.30		20.61	
8:10	7.90		0.22		20.69	

Post 2/Pre 3

Time	CO Outlet ppmvd		CO2 % (dry)		O2 % (dry)	
9:38	6.20		10.07		-0.03	
9:39	-0.40	z	10.08	m	-0.04	
9:40	-0.40		7.53		2.96	
9:41	0.00		0.09		11.89	
9:42	0.10		0.07		11.90	
9:43	0.10		0.06		11.90	m
9:44	97.10		0.06		1.04	
9:45	252.10		0.06		0.00	
9:46	252.90		0.06	z	-0.01	z
9:47	251.10	m	0.07		5.42	

Post 3/Pre 4

Time	CO Outlet ppmvd		CO2 % (dry)		O2 % (dry)	
11:29	17.50		7.55		3.76	
11:30	1.50		10.09	m	-0.04	
11:31	-0.40	z	7.50		3.00	
11:32	0.00		0.09		11.89	
11:33	0.10		0.07		11.90	m
11:34	61.80		0.06		2.81	
11:35	249.20		0.06		-0.01	
11:36	252.10		0.06	z	-0.01	z
11:37	248.80	m	0.36		6.61	

Post 4

Time	CO Outlet ppmvd		CO2 % (dry)		O2 % (dry)	
12:59	13.70		10.06		-0.04	
13:00	-0.40		10.10		-0.05	
13:01	-0.40		10.10		-0.06	
13:02	-0.40		10.11		-0.06	
13:03	-0.40	z	10.11	m	-0.06	
13:04	-0.40		8.77		1.45	
13:05	-0.10		0.11		11.86	
13:06	0.10		0.07		11.88	m
13:07	88.30		0.06		1.43	
13:08	249.90		0.06		-0.02	
13:09	250.90		0.05		-0.02	
13:10	251.20	m	0.05	z	-0.02	z

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Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Project #: M162810

Test Location: #2 Battery PEC Stack
Date: 8/30/2016
Operator: Stuart Burton

Box Truck:	BT4	
Probe Length:	8.0	ft
Probe Type:	Extractive	
Sample Plane:	Horizontal	
Port Length:	6.5	in.
Port Size (diameter):	4	in.
Port Type:	Nipple	
Duct Shape:	Circular	
Diameter:	9	ft
Duct Area:	63.62	Sq. Ft.
Upstream Diameters:	> 0.5	
Downstream Diameters:	> 2.0	
Number of Ports Sampled:	1	
Number of Points per Port:	3	
Total Number of Traverse Points:	3	

Point Markings (including port length):

Point #	Inches
1	22.25
2	53.74
3	85.24

Calibration Gases

Type	Setting	Cylinder ID	Cylinder Value	Analyzer Response	Difference, % of Span	Expiration Date	Mid cylinder % of high cylinder
SO2 ppmvd	Zero		0	0.40	-0.43%		
	Mid	CC473054	51.93	52.10	-0.18%	10/26/2023	55.53%
	High	SG9153190BAL	93.52	94.00	-0.51%	5/22/2023	
CO ppmvd	Zero		0	0.60	-0.13%		
	Mid	XCO31061B	251.5	253.40	-0.42%	7/5/2024	56.08%
	High	CC7510	448.5	451.20	-0.60%	9/27/2022	
CO2 % (dry)	Zero		0	0.01	-0.05%		
	Mid	CC17707	10.18	10.00	0.91%	5/3/2024	51.57%
	High	EB0021818	19.74	19.67	0.35%	6/22/2023	
O2 % (dry)	Zero		0	-0.02	0.09%		
	Mid	CC100304	12.08	12.02	0.28%	6/3/2024	55.80%
	High	EB0064892	21.65	21.69	-0.18%	8/7/2023	

Response Time Data

Type	RM Analyzer Make/Model	RM Analyzer s/n	Analyzer Span	RM Gas Span
SO2 ppmvd	Thermo 43i	0704320661	100	93.52
CO ppmvd	Thermo 48C	0508911033	500	448.5
CO2 % (dry)	Servomex 1440	01440D1/3791	20	19.74
O2 % (dry)	Servomex 1440	01440D1/3791	25	21.65
	Start		95% Response	Time (min)
Upscale				1.5
Downscale				1.5

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Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Test Location: #2 Battery PEC Stack
Date: 8/30/16
Project #: M162810

Linearity Cal/Pre 1 Cal

Time	SO2 ppmvd		CO ppmvd		CO2 % (dry)		O2 % (dry)	
5:36	0.20		0.60		0.04		21.30	
5:37	0.20		0.60		0.04		21.30	
5:38	0.20		0.60		0.04		21.29	
5:39	0.20		0.60		0.04		21.29	
5:40	0.20		3.20		13.51		6.12	
5:41	0.30		0.80		19.46		0.07	
5:42	0.90		0.00		19.67	ih	0.06	
5:43	1.40		-0.20		17.52		2.61	
5:44	0.50		0.80		0.01		22.19	
5:45	0.10		0.60		-0.01		22.08	
5:46	0.10		0.60		0.01		21.69	ih
5:47	0.10		7.20		0.01		13.88	
5:48	0.20		361.80		0.01		0.12	
5:49	0.70		439.70		0.01		0.11	
5:50	1.20		440.10		0.01		0.11	
5:51	1.40		442.60		0.01		0.11	
5:52	1.40		451.30		0.01		0.04	
5:53	1.40		451.20	ih	0.01		0.03	
5:54	9.90		304.30		0.02		16.56	
5:55	69.70		4.20		0.02		20.91	
5:56	89.20		0.60		0.01		20.91	
5:57	91.50		0.60		0.01		20.91	
5:58	91.80		0.60		0.01		20.91	
5:59	92.10		0.60		0.01		20.91	
6:00	92.90		0.60		0.01		20.91	
6:01	93.70		0.60		0.01		20.91	
6:02	93.80		0.60		0.01		20.90	
6:03	93.90		0.60		0.01		20.90	
6:04	94.00	ih	0.60	iz	0.01	iz	20.90	
6:05	80.60		0.40		9.07		3.39	
6:06	16.50		0.10		10.03		-0.01	
6:07	2.60		0.10		10.00		-0.02	
6:08	1.90		0.10		10.00	im	-0.02	iz
6:09	1.70		0.10		9.83		0.24	
6:10	0.90		0.30		0.06		11.98	
6:11	0.40		0.60		0.01		12.02	
6:12	0.40		0.60		0.00		12.02	im
6:13	0.40	iz	89.80		0.01		1.78	
6:14	0.70		253.00		0.00		0.01	
6:15	1.30		253.40	im	0.00		0.01	
6:16	1.50		252.60		0.00		5.71	
6:17	26.50		56.40		0.00		19.20	
6:18	49.20		0.60		0.00		19.26	
6:19	51.70		0.60		0.00		19.26	
6:20	52.60		0.60		0.00		19.26	
6:21	52.10	im	0.70		0.08		19.61	
6:22	27.70		1.60		8.62		2.80	
6:23	6.20		0.10		9.91		0.01	
6:24	2.70		0.10		9.92		0.01	
6:25	2.30		0.10	z	9.94	m	0.02	
6:26	1.40		0.30		0.34		11.54	
6:27	0.70		0.60		0.02		11.92	

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Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Project #: M162810

Test Location: #2 Battery PEC Stack
Date: 8/30/16

Post 1/Pre 2

Time	SO2 ppmvd		CO ppmvd		CO2 % (dry)		O2 % (dry)	
8:02	4.40		1.30		9.79		0.07	
8:03	3.30		0.10		9.97		0.03	
8:04	2.50		0.10		9.97	m	0.02	z
8:05	2.10		0.10		7.62		2.82	
8:06	0.90		0.40		0.03		11.95	
8:07	0.60	z	0.60		0.01		11.97	m
8:08	0.60		73.70		0.00		2.34	
8:09	0.90		249.80		0.00		0.06	
8:10	1.40		252.20		-0.01		0.05	
8:11	1.50		252.10	m	-0.01		0.05	
8:12	1.70		220.20		-0.01		11.01	
8:13	26.10		13.20		-0.01		19.13	
8:14	46.70		0.60		-0.01		19.18	
8:15	49.90		0.60		-0.01		19.19	
8:16	51.00		0.60		-0.01		19.19	
8:17	51.60	m	0.60	z	-0.01	z	19.20	

Post 2/Pre 3

Time	SO2 ppmvd		CO ppmvd		CO2 % (dry)		O2 % (dry)	
9:14	2.30		0.60		0.05		20.67	
9:15	1.90		0.90		0.03		20.67	
9:16	3.30		0.10		10.01		0.03	
9:17	1.50		0.10	z	10.02	m	0.02	z
9:18	1.80		0.40		6.85		4.11	
9:19	0.80		0.60		0.02		11.97	
9:20	0.40	z	0.80		0.00		11.97	m
9:21	0.40		89.20		0.00		3.27	
9:22	0.60		249.60		0.00		0.05	
9:23	1.20		252.20		0.00		0.05	
9:24	0.80		251.30	m	0.00	z	0.04	
9:25	0.90		234.20		0.00		12.87	
9:26	17.90		13.20		0.00		19.27	
9:27	48.20		0.60		0.00		19.24	
9:28	50.40		0.60		0.00		19.24	
9:29	50.80		0.60		0.00		19.24	
9:30	51.10	m	0.60		0.00		19.23	
9:31	19.20		0.60		0.02		20.18	

Post 3/Pre 4

Time	SO2 ppmvd		CO ppmvd		CO2 % (dry)		O2 % (dry)	
10:44	4.20		0.10		9.99		0.04	
10:45	2.90		0.10		10.00	m	0.03	z
10:46	2.30		0.10		5.98		4.83	
10:47	1.00		0.40		0.03		11.98	
10:48	0.80		0.60		0.01		11.99	
10:49	0.70		0.60		0.00		11.99	
10:50	0.60		0.60		0.00		11.99	
10:51	0.50		0.60		0.00		11.99	
10:52	0.50		0.60		0.00		11.99	
10:53	0.50	z	0.60	z	0.00		11.99	m
10:54	0.50		0.60		0.00		10.17	
10:55	0.50		157.00		0.00		0.09	
10:56	1.00		251.90		0.00		0.07	
10:57	1.40		252.10		0.00		0.07	
10:58	1.50		252.30	m	0.00	z	0.07	
10:59	1.80		214.00		0.00		11.79	
11:00	24.60		9.10		0.00		19.13	
11:01	46.20		0.60		0.00		19.20	
11:02	50.40		0.60		0.00		19.21	
11:03	51.50		0.60		0.00		19.21	
11:04	51.90	m	0.60		0.00		19.21	

Post 4/Pre 5

Time	SO2 ppmvd		CO ppmvd		CO2 % (dry)		O2 % (dry)	
12:37	8.70		2.20		9.91		0.05	
12:38	4.10		0.10		9.94		0.04	
12:39	2.90		0.10		9.95	m	0.03	z
12:40	2.40		0.10		7.20		3.32	
12:41	1.10		0.40		0.04		11.96	
12:42	0.70		0.60		0.01		11.97	
12:43	0.60	z	0.60	z	0.01		11.97	m
12:44	0.60		91.50		0.01		1.44	
12:45	1.00		250.40		0.00		0.07	
12:46	1.70		251.80		0.00		0.07	
12:47	1.90		252.10	m	0.00	z	0.06	
12:48	3.40		178.00		0.00		14.88	
12:49	32.20		3.40		0.00		19.16	
12:50	47.80		0.60		0.00		19.17	
12:51	50.60		0.60		0.00		19.18	
12:52	51.40	m	0.60		0.00		19.18	
12:53	46.40		0.80		0.05		20.39	

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Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Project #: M162810

Test Location: #2 Battery PEC Stack
Date: 8/30/16

Post 5/Pre 6

Time	SO2 ppmvd		CO ppmvd		CO2 % (dry)		O2 % (dry)	
14:12	6.30		5.40		8.11		3.45	
14:13	4.40		0.10		9.91		0.04	
14:14	3.00		0.10		9.92	m	0.03	z
14:15	2.60		0.10		7.68		2.72	
14:16	1.10		0.30		0.03		11.94	
14:17	0.70		0.60		0.01		11.96	m
14:18	0.60	z	91.00		0.00		1.44	
14:19	1.20		249.80		0.00		0.07	
14:20	2.00		251.20	m	-0.01		0.07	
14:21	3.70		177.00		-0.01		14.96	
14:22	32.10		3.10		-0.01		19.14	
14:23	48.00		0.60		-0.01		19.16	
14:24	50.60		0.60		-0.01		19.16	
14:25	51.40		0.60		-0.01	z	19.16	
14:26	51.30	m	0.60	z	0.02		19.83	

Post 6/Pre 7

Time	SO2 ppmvd		CO ppmvd		CO2 % (dry)		O2 % (dry)	
15:42	2.50		0.80		9.80		0.05	
15:43	2.90		0.10		9.90		0.03	
15:44	3.50		0.10		9.91	m	0.02	z
15:45	2.20		0.10		0.82		10.92	
15:46	0.80		0.10		0.00		11.93	
15:47	0.70		0.10		-0.01		11.93	
15:48	0.70	z	0.10		-0.01		11.93	m
15:49	0.60		0.20		-0.01		10.71	
15:50	0.80		143.50		-0.01		0.09	
15:51	2.20		249.80		-0.01		0.06	
15:52	3.90		250.10		-0.02		0.06	
15:53	4.20		248.40	m	-0.01		4.55	
15:54	13.70		68.20		-0.02		18.96	
15:55	42.60		0.70		-0.02		19.11	
15:56	49.40		0.60		-0.02		19.12	
15:57	50.90		0.60		-0.02	z	19.12	
15:58	51.00	m	0.60	z	0.03		19.78	

Post 7/Pre 8

Time	SO2 ppmvd		CO ppmvd		CO2 % (dry)		O2 % (dry)	
17:21	7.70		0.00		9.95		0.10	
17:22	5.00		-0.20		9.96		0.09	
17:23	4.40		-0.30		9.96	m	0.09	z
17:24	4.00		-0.30		6.66		3.91	
17:25	1.40		0.10		0.02		11.92	
17:26	0.90	z	0.10		0.00		11.93	m
17:27	0.90		87.70		0.00		1.55	
17:28	1.80		246.90		-0.01		0.13	
17:29	3.40		248.40	m	-0.01		0.12	
17:30	3.90		199.90		-0.01		12.73	
17:31	29.10		7.50		-0.02		19.06	
17:32	46.90		0.60		-0.02		19.08	
17:33	50.10		0.50		-0.02		19.09	
17:34	51.10	m	0.30	z	-0.01	z	19.30	

Post 8/Pre 9

Time	SO2 ppmvd	CO ppmvd	CO2 % (dry)	O2 % (dry)

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Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Fuel Type: Other
Fuel Factor: Enter Fuel Factor Here
Diluent: O2 %

Location: #2 Battery PEC Stack
Date: 8/30/16
Operator: Stuart Burton
Project #: M162810
O2 % Correction:

SO2 ppmvd Correction Data

Run #	Cma	Precal	Postcal	Pre zero	Post zero	Co	Cm	C	Cgas	Span Bias	Span Drift	Zero Bias	Zero Drift
1	51.93	51.60	51.60	0.50	0.60	0.55	51.60	29.90	29.9	0.53	0.00	-0.21	0.11
2	51.93	51.60	51.10	0.60	0.40	0.50	51.35	31.60	31.8	1.07	-0.53	0.00	-0.21
3	51.93	51.10	51.90	0.40	0.50	0.45	51.50	33.60	33.7	0.21	0.86	-0.11	0.11
4	51.93	51.90	51.40	0.50	0.60	0.55	51.65	25.80	25.7	0.75	-0.53	-0.21	0.11
5	51.93	51.40	51.30	0.80	0.60	0.60	51.35	32.10	32.2	0.86	-0.11	-0.21	0.00
6	51.93	51.30	51.00	0.60	0.70	0.65	51.15	38.30	38.7	1.18	-0.32	-0.32	0.11
7	51.93	51.00	51.10	0.70	0.90	0.80	51.05	34.30	34.6	1.07	0.11	-0.53	0.21

CO ppmvd Correction Data

Run #	Cma	Precal	Postcal	Pre zero	Post zero	Co	Cm	C	Cgas	Span Bias	Span Drift	Zero Bias	Zero Drift
1	251.5	253.60	252.10	0.10	0.60	0.35	252.85	42.70	42.2	0.29	-0.33	0.00	0.11
2	251.5	252.10	251.30	0.60	0.10	0.35	251.70	48.70	48.4	0.47	-0.18	0.11	-0.11
3	251.5	251.30	252.30	0.10	0.60	0.35	251.80	41.60	41.3	0.25	0.22	0.00	0.11
4	251.5	252.30	252.10	0.60	0.60	0.60	252.20	39.10	38.5	0.29	-0.04	0.00	0.00
5	251.5	252.10	251.20	0.60	0.60	0.60	251.65	45.30	44.8	0.49	-0.20	0.00	0.00
6	251.5	251.20	248.40	0.60	0.60	0.60	249.80	44.10	43.9	1.11	-0.62	0.00	0.00
7	251.5	248.40	248.40	0.60	0.30	0.45	248.40	36.60	36.7	1.11	0.00	0.07	-0.07

CO2 % (dry) Correction Data

Run #	Cma	Precal	Postcal	Pre zero	Post zero	Co	Cm	C	Cgas	Span Bias	Span Drift	Zero Bias	Zero Drift
1	10.18	9.94	9.97	0.00	-0.01	-0.01	9.96	0.92	0.9	0.15	0.15	0.10	-0.05
2	10.18	9.97	10.02	-0.01	0.00	-0.01	10.00	1.00	1.0	-0.10	0.25	0.05	0.05
3	10.18	10.02	10.00	0.00	0.00	0.00	10.01	1.00	1.0	0.00	-0.10	0.05	0.00
4	10.18	10.00	9.95	0.00	0.00	0.00	9.98	0.87	0.9	0.25	-0.25	0.05	0.00
5	10.18	9.95	9.92	0.00	-0.01	-0.01	9.94	0.90	0.9	0.41	-0.15	0.10	-0.05
6	10.18	9.92	9.91	-0.01	-0.02	-0.02	9.92	1.08	1.1	0.46	-0.05	0.15	-0.05
7	10.18	9.91	9.96	-0.02	-0.01	-0.02	9.94	0.78	0.8	0.20	0.25	0.10	0.05

O2 % (dry) Correction Data

Run #	Cma	Precal	Postcal	Pre zero	Post zero	Co	Cm	C	Cgas	Span Bias	Span Drift	Zero Bias	Zero Drift
1	12.08	11.92	11.97	0.05	0.02	0.04	11.95	19.75	20.0	0.23	0.23	-0.18	-0.14
2	12.08	11.97	11.97	0.02	0.02	0.02	11.97	19.60	19.8	0.23	0.00	-0.18	0.00
3	12.08	11.97	11.99	0.02	0.03	0.03	11.98	19.70	19.9	0.14	0.09	-0.23	0.05
4	12.08	11.99	11.97	0.03	0.03	0.03	11.98	19.85	20.0	0.23	-0.09	-0.23	0.00
5	12.08	11.97	11.96	0.03	0.03	0.03	11.97	19.76	20.0	0.28	-0.05	-0.23	0.00
6	12.08	11.96	11.93	0.03	0.02	0.03	11.95	19.60	19.8	0.42	-0.14	-0.18	-0.05
7	12.08	11.93	11.93	0.02	0.09	0.06	11.93	19.79	20.1	0.42	0.00	-0.51	0.32

Cma = Concentration of Cal Gas
Cm=Average Pre and Post Span
C = Average value of test
Cgas = Corrected gas value of test
Co=Average Pre and Post Zero

Calibration Corrected Data

Run #	Run Date	Start Time	End Time	SO2 ppmvd	CO2 % (dry)	O2 % (dry)	CO ppmvd	CO ppmvd @ % O2	O2 based SO2 lb/mmBtu	O2 based CO lb/mmBtu	Flow, DSCFH	SO2 lb/hr	CO lb/hr
1	8/30/16	7:14		29.9	0.9	20.0	42.2	980.0	#VALUE!	#VALUE!		0.000	0.000
2	8/30/16	8:27		31.8	1.0	19.8	48.4	919.6	#VALUE!	#VALUE!		0.000	0.000
3	8/30/16	9:35		33.7	1.0	19.9	41.3	863.2	#VALUE!	#VALUE!		0.000	0.000
4	8/30/16	11:15		25.7	0.9	20.0	38.5	894.1	#VALUE!	#VALUE!		0.000	0.000
5	8/30/16	12:57		32.2	0.9	20.0	44.8	1040.4	#VALUE!	#VALUE!		0.000	0.000
6	8/30/16	14:31		38.7	1.1	19.8	43.9	834.1	#VALUE!	#VALUE!		0.000	0.000
7	8/30/16	16:04	17:18	34.6	0.8	20.1	36.7	958.8	#VALUE!	#VALUE!		0.000	0.000

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Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Project #: M162810

Test Location: #2 Battery PEC Stack
Date: 8/31/2016
Operator: Stuart Burton

Box Truck:	BT4	
Probe Length:	8.0	ft
Probe Type:	Extractive	
Sample Plane:	Horizontal	
Port Length:	6.5	in.
Port Size (diameter):	4	in.
Port Type:	Nipple	
Duct Shape:	Circular	
Diameter:	9	ft
Duct Area:	63.62	Sq. Ft.
Upstream Diameters:	> 0.5	
Downstream Diameters:	> 2.0	
Number of Ports Sampled:	1	
Number of Points per Port:	3	
Total Number of Traverse Points:	3	

Point Markings (including port length):

Point #	Inches
1	22.25
2	53.74
3	85.24

Calibration Gases

Type	Setting	Cylinder ID	Cylinder Value	Analyzer Response	Difference, % of Span	Expiration Date	Mid cylinder % of high cylinder
SO2 ppmvd	Zero		0	0.60	-0.64%		
	Mid	CC473054	51.93	51.50	0.46%	10/26/2023	55.53%
	High	SG9153190BAL	93.52	93.80	-0.30%	5/22/2023	
CO ppmvd	Zero		0	0.10	-0.02%		
	Mid	XCO31061B	251.5	251.80	-0.07%	7/5/2024	56.08%
	High	CC7510	448.5	448.20	0.07%	9/27/2022	
CO2 % (dry)	Zero		0	0.00	0.00%		
	Mid	CC17707	10.18	10.03	0.76%	5/3/2024	51.57%
	High	EB0021818	19.74	19.78	-0.20%	6/22/2023	
O2 % (dry)	Zero		0	0.04	-0.18%		
	Mid	CC100304	12.08	12.09	-0.05%	6/3/2024	55.80%
	High	EB0064892	21.65	21.66	-0.05%	8/7/2023	

Response Time Data

Type	RM Analyzer Make/Model	RM Analyzer s/n	Analyzer Span	RM Gas Span
SO2 ppmvd	Thermo 43i	0704320661	100	93.52
CO ppmvd	Thermo 48C	0508911033	500	448.5
CO2 % (dry)	Servomex 1440	01440D1/3791	20	19.74
O2 % (dry)	Servomex 1440	01440D1/3791	25	21.65
	Start		95% Response	Time (min)
Upscale				1.5
Downscale				1.5

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Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Test Location: #2 Battery PEC Stack
Date: 8/31/16
Project #: M162810

Linearity Cal/Pre 1 Cal

Time	SO2 ppmvd		CO ppmvd		CO2 % (dry)		O2 % (dry)	
5:29	0.30		1.60		0.18		20.63	
5:30	0.30		0.60		0.18		21.24	
5:31	0.30		0.40		0.19		21.67	
5:32	0.30		0.40		0.18		21.66	ih
5:33	0.40		0.60		15.52		4.31	
5:34	0.90		-0.10		19.82		-0.02	
5:35	3.40		-0.40		19.78	ih	-0.01	
5:36	4.70		11.30		11.46		0.07	
5:37	4.30		372.30		0.01		0.10	
5:38	4.60		433.30		0.01		0.10	
5:39	4.70		434.00		0.00		0.09	
5:40	4.70		441.20		0.00		0.09	
5:41	4.70		448.20	ih	0.00	iz	0.09	
5:42	14.70		302.80		0.00		17.24	
5:43	75.30		3.90		0.00		20.99	
5:44	93.50		0.60		0.00		20.99	
5:45	93.80		0.60		0.00		20.99	
5:46	93.80	ih	0.60		1.44		18.72	
5:47	62.20		0.30		9.99		0.06	
5:48	8.10		0.10		10.02		0.05	
5:49	5.40		0.10	iz	10.03	im	0.04	iz
5:50	5.60		0.10		6.86		3.90	
5:51	1.10		0.60		0.01		12.08	
5:52	0.70		0.60		0.00		12.08	
5:53	0.60	iz	0.60		0.00		12.09	im
5:54	0.60		21.20		0.00		5.48	
5:55	1.70		245.00		0.00		0.06	
5:56	4.70		251.60		0.00		0.06	
5:57	6.10		251.80	im	0.00		0.06	
5:58	11.20		182.80		0.00		14.89	
5:59	41.20		3.10		0.02		19.34	
6:00	50.90		0.60		0.03		19.35	
6:01	51.40		0.60		0.03		19.34	
6:02	51.50	im	0.60		0.03		19.40	
6:03	37.20		1.50		6.79		6.62	
6:04	10.30		0.10		10.01		0.06	
6:05	5.60		0.10		10.04		0.06	
6:06	5.80		0.10		10.06	m	0.05	
6:07	5.70		0.10		9.93		0.05	
6:08	3.00		0.30		0.46		11.51	
6:09	1.00		0.60		0.04		12.01	
6:10	0.90	z	0.60	z	0.03		12.01	m
6:11	0.90		1.10		0.03		8.99	
6:12	1.40		177.60		0.02		0.18	
6:13	3.60		251.10		0.02		0.17	
6:14	5.20		251.20		0.02		0.08	
6:15	5.40		251.10		0.02		0.07	
6:16	5.50		251.40		0.02		0.07	
6:17	5.50		251.10		0.02		0.07	
6:18	5.60		251.50	m	0.02	z	0.07	z
6:19	6.20		179.80		0.02		15.00	
6:20	32.90		3.40		0.02		19.07	

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Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Project #: M162810

Test Location: #2 Battery PEC Stack
Date: 8/31/16

Post 1/Pre 2

Time	SO2 ppmvd		CO ppmvd		CO2 % (dry)		O2 % (dry)	
8:00	11.50		0.20		10.00		0.04	
8:01	7.40		0.10		10.02	m	0.03	z
8:02	6.70		0.10		8.09		2.32	
8:03	2.60		0.20		0.07		11.87	
8:04	1.30		0.60		0.04		11.89	
8:05	1.10		0.60		0.03		11.90	m
8:06	1.00	z	0.70		0.03		10.46	
8:07	1.30		143.30		0.02		0.09	
8:08	3.10		249.10		0.02		0.07	
8:09	4.80		249.40		0.02		0.07	
8:10	5.10		249.60	m	0.02	z	0.06	
8:11	4.60		213.10		0.02		11.79	
8:12	25.00		11.50		0.02		19.00	
8:13	48.20		0.60		0.02		19.06	
8:14	50.80		0.60		0.02		19.07	
8:15	51.60	m	0.60	z	0.03		19.48	

Post 2/Pre 3

Time	SO2 ppmvd		CO ppmvd		CO2 % (dry)		O2 % (dry)	
10:04	3.00		1.40		0.09		20.63	
10:05	2.40		1.00		0.07		20.66	
10:06	4.10		1.00		8.56		2.24	
10:07	3.20		0.40		10.01		0.02	
10:08	2.20		0.20		10.02	m	0.02	z
10:09	2.20		0.20		6.99		3.85	
10:10	0.80		0.60		0.02		11.98	
10:11	0.40	z	0.40		0.00		11.98	m
10:12	0.40		65.30		0.00		3.32	
10:13	0.60		248.70		0.00		0.05	
10:14	1.20		251.70		0.01		0.05	
10:15	1.20		253.20	m	0.01	z	0.04	
10:16	1.20		214.70		0.01		12.03	
10:17	28.40		14.60		0.02		19.22	
10:18	47.50		0.50		0.02		19.24	
10:19	50.20		0.50		0.02		19.26	
10:20	51.60		0.50		0.02		19.24	
10:21	51.80	m	0.50	z	0.02		19.14	

Post 3/Pre 4

Time	SO2 ppmvd		CO ppmvd		CO2 % (dry)		0	
12:21	3.20		1.00		9.88		0.07	
12:22	3.10		0.10		9.98		0.05	z
12:23	3.50		0.10		9.91	m	0.17	
12:24	1.90		0.20		0.19		11.78	
12:25	0.80		0.60		0.05		11.93	
12:26	0.70		0.60	z	0.04		11.93	m
12:27	0.60	z	3.00		0.04		8.05	
12:28	1.00		195.00		0.04		0.09	
12:29	2.30		249.50		0.04		0.08	
12:30	3.20		249.70	m	0.04		0.07	
12:31	3.30		218.50		0.04		10.86	
12:32	28.40		13.50		0.03		19.02	
12:33	47.10		0.60		0.03		19.10	
12:34	51.00		0.60		0.03	z	19.11	
12:35	51.40	m	0.70		0.06		19.79	

Post 4/Pre 5

Time	SO2 ppmvd		CO ppmvd		CO2 % (dry)		0	
14:03	3.30		0.10		10.04		0.03	
14:04	3.10		0.10		10.04		0.03	
14:05	3.00		0.10		10.04		0.03	
14:06	3.00		0.10		10.04		0.03	
14:07	2.90		0.10	z	10.04	m	0.02	z
14:08	2.80		0.10		7.72		2.79	
14:09	0.90		0.10		0.08		11.89	
14:10	0.50		0.60		0.05		11.91	
14:11	0.50	z	0.50		0.04		11.91	
14:12	0.50		0.50		0.04		11.91	m
14:13	0.50		88.90		0.04		1.29	
14:14	1.40		248.20		0.04		0.07	
14:15	2.30		249.50		0.03		0.06	
14:16	2.50		249.40		0.03		0.06	
14:17	2.50		249.50	m	0.03	z	2.89	
14:18	11.30		93.10		0.03		18.87	
14:19	41.00		0.80		0.03		19.08	
14:20	49.00		0.60		0.03		19.09	
14:21	50.70	m	0.60		0.04		19.30	

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Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Project #: M162810

Test Location: #2 Battery PEC Stack
Date: 8/31/16

Post 5/Pre 6

Time	SO2 ppmvd		CO ppmvd		CO2 % (dry)		O2 % (dry)	
15:46	5.20		0.20		10.17		0.04	
15:47	3.80		0.10		10.17	m	0.03	z
15:48	2.80		0.10		3.33		8.08	
15:49	1.00		0.40		0.06		11.91	
15:50	0.80		0.60		0.05		11.92	m
15:51	0.70	z	11.30		0.04		6.35	
15:52	1.10		218.50		0.04		0.07	
15:53	2.30		249.30		0.04		0.06	
15:54	2.90		249.50	m	0.04		0.06	
15:55	2.80		233.30		0.03		8.94	
15:56	22.90		25.50		0.03		19.03	
15:57	48.90		0.60		0.03		19.08	
15:58	51.20	m	0.60	z	0.03	z	19.09	
15:59	49.20		0.80		0.07		20.05	

Post 6/Pre 7

Time	SO2 ppmvd		CO ppmvd		CO2 % (dry)		O2 % (dry)	
16:45	11.40		0.90		10.08		0.04	
16:46	4.80		0.10		10.09	m	0.03	z
16:47	3.80		0.10		9.27		1.27	
16:48	1.90		0.10		0.09		11.87	
16:49	0.90	z	0.30		0.05		11.90	m
16:50	0.80		16.50		0.05		5.75	
16:51	1.10		227.60		0.04		0.07	
16:52	2.30		249.20	m	0.04		0.06	
16:53	2.70		244.50		0.04		6.84	
16:54	17.90		44.80		0.04		19.01	
16:55	47.00		0.60		0.04		19.07	
16:56	50.60		0.60		0.04	z	19.08	
16:57	51.80	m	0.60	z	0.10		19.24	

Post 7/Pre 8

Time	SO2 ppmvd	CO ppmvd	CO2 % (dry)	0

Post 8/Pre 9

Time	SO2 ppmvd	CO ppmvd	CO2 % (dry)	0

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Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Fuel Type: Other
Fuel Factor: Enter Fuel Factor Here
Diluent: O2 %

Location: #2 Battery PEC Stack
Date: 8/31/16
Operator: Stuart Burton
Project #: M162810
O2 % Correction:

SO2 ppmvd Correction Data

Run #	Cma	Precal	Postcal	Pre zero	Post zero	Co	Cm	C	Cgas	Span Bias	Span Drift	Zero Bias	Zero Drift
1	51.93	51.60	51.60	0.90	1.00	0.95	51.60	33.20	33.1	-0.11	0.00	-0.43	0.11
2	51.93	51.80	51.80	1.00	0.40	0.70	51.70	37.70	37.7	-0.32	0.21	0.21	-0.64
3	51.93	51.80	51.40	0.40	0.60	0.50	51.60	38.30	38.4	0.11	-0.43	0.00	0.21
4	51.93	51.40	50.70	0.60	0.50	0.55	51.05	36.90	37.4	0.86	-0.75	0.11	-0.11
5	51.93	50.70	51.20	0.50	0.70	0.60	50.95	35.20	35.7	0.32	0.53	-0.11	0.21
6	51.93	51.20	51.80	0.70	0.90	0.80	51.50	35.70	35.7	-0.32	0.64	-0.32	0.21

CO ppmvd Correction Data

Run #	Cma	Precal	Postcal	Pre zero	Post zero	Co	Cm	C	Cgas	Span Bias	Span Drift	Zero Bias	Zero Drift
1	251.5	251.50	249.60	0.60	0.60	0.60	250.55	50.90	50.6	0.49	-0.42	-0.11	0.00
2	251.5	249.60	253.20	0.60	0.50	0.55	251.40	45.00	44.6	-0.31	0.80	-0.09	-0.02
3	251.5	253.20	249.70	0.50	0.60	0.55	251.45	47.80	47.4	0.47	-0.78	-0.11	0.02
4	251.5	249.70	249.50	0.60	0.10	0.35	249.60	52.80	52.9	0.51	-0.04	0.00	-0.11
5	251.5	249.50	249.50	0.10	0.60	0.35	249.50	56.40	56.6	0.51	0.00	-0.11	0.11
6	251.5	249.50	249.20	0.60	0.60	0.60	249.35	54.50	54.5	0.58	-0.07	-0.11	0.00

CO2 % (dry) Correction Data

Run #	Cma	Precal	Postcal	Pre zero	Post zero	Co	Cm	C	Cgas	Span Bias	Span Drift	Zero Bias	Zero Drift
1	10.18	10.06	10.02	0.02	0.02	0.02	10.04	0.96	1.0	0.05	-0.20	-0.10	0.00
2	10.18	10.02	10.02	0.02	0.01	0.02	10.02	1.10	1.1	0.05	0.00	-0.05	-0.05
3	10.18	10.02	9.91	0.01	0.03	0.02	9.97	1.10	1.1	0.61	-0.56	-0.15	0.10
4	10.18	9.91	10.04	0.03	0.03	0.03	9.98	1.00	1.0	-0.05	0.66	-0.15	0.00
5	10.18	10.04	10.17	0.03	0.03	0.03	10.11	1.36	1.3	-0.71	0.66	-0.15	0.00
6	10.18	10.17	10.09	0.03	0.04	0.04	10.13	1.06	1.0	-0.30	-0.41	-0.20	0.05

O2 % (dry) Correction Data

Run #	Cma	Precal	Postcal	Pre zero	Post zero	Co	Cm	C	Cgas	Span Bias	Span Drift	Zero Bias	Zero Drift
1	12.08	12.01	11.90	0.07	0.03	0.05	11.96	19.61	19.8	0.88	-0.51	0.05	-0.18
2	12.08	11.90	11.98	0.03	0.02	0.03	11.94	19.60	19.8	0.51	0.37	0.09	-0.05
3	12.08	11.98	11.93	0.02	0.05	0.04	11.96	19.60	19.8	0.74	-0.23	-0.05	0.14
4	12.08	11.93	11.91	0.05	0.02	0.04	11.92	19.60	19.9	0.83	-0.09	0.09	-0.14
5	12.08	11.91	11.92	0.02	0.03	0.03	11.92	19.56	19.8	0.79	0.05	0.05	0.05
6	12.08	11.92	11.90	0.03	0.03	0.03	11.91	19.60	19.9	0.88	-0.09	0.05	0.00

Cma = Concentration of Cal Gas
Cm=Average Pre and Post Span
C = Average value of test
Cgas = Corrected gas value of test
Co=Average Pre and Post Zero

Calibration Corrected Data

Run #	Run Date	Start Time	End Time	SO2 ppmvd	CO2 % (dry)	O2 % (dry)	CO ppmvd	CO ppmvd @ % O2	O2 based SO2 lb/mmBtu	O2 based CO lb/mmBtu	Flow, DSCFH	SO2 lb/hr	CO lb/hr
1	8/31/16	6:28		33.1	1.0	19.8	50.6	961.4	#VALUE!	#VALUE!		0.000	0.000
2	8/31/16			37.7	1.1	19.8	44.6	847.4	#VALUE!	#VALUE!		0.000	0.000
3	8/31/16			38.4	1.1	19.8	47.4	900.6	#VALUE!	#VALUE!		0.000	0.000
4	8/31/16			37.4	1.0	19.9	52.9	1105.6	#VALUE!	#VALUE!		0.000	0.000
5	8/31/16			35.7	1.3	19.8	56.6	1075.4	#VALUE!	#VALUE!		0.000	0.000
6	8/31/16		16:42	35.7	1.0	19.9	54.5	1139.1	#VALUE!	#VALUE!		0.000	0.000

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Client:	ArcelorMittal Burns Harbor LLC	**Test Location:**	#2 Battery PEC Stack
Facility:	Burns Harbor, Indiana	**Date:**	9/1/2016
Project #:	M162810	**Operator:**	Stuart Burton

Box Truck:	BT4	
Probe Length:	8.0	ft
Probe Type:	Extractive	
Sample Plane:	Horizontal	
Port Length:	6.5	In.
Port Size (diameter):	4	In.
Port Type:	Nipple	
Duct Shape:	Circular	
Diameter:	9	ft
Duct Area:	63.62	Sq. Ft.
Upstream Diameters:	> 0.5	
Downstream Diameters:	> 2.0	
Number of Ports Sampled:	1	
Number of Points per Port:	3	
Total Number of Traverse Points:	3	

Point Markings (including port length):

Point #	Inches
1	22.25
2	53.74
3	85.24

Calibration Gases

Type	Setting	Cylinder ID	Cylinder Value	Analyzer Response	Difference, % of Span	Expiration Date	Mid cylinder % of high cylinder
SO2 ppmvd	Zero		0	0.50	-0.53%		
	Mid	CC473054	51.93	52.40	-0.50%	10/26/2023	55.53%
	High	SG9153190BAL	93.52	93.20	0.34%	5/22/2023	
CO ppmvd	Zero		0	0.10	-0.02%		
	Mid	XCO31061B	251.5	253.10	-0.36%	7/5/2024	56.08%
	High	CC7510	448.5	452.10	-0.80%	9/27/2022	
CO2 % (dry)	Zero		0	0.02	-0.10%		
	Mid	CC17707	10.18	10.04	0.71%	5/3/2024	51.57%
	High	EB0021818	19.74	19.88	-0.71%	6/22/2023	
O2 % (dry)	Zero		0	0.01	-0.05%		
	Mid	CC100304	12.08	11.96	0.55%	6/3/2024	55.80%
	High	EB0064892	21.65	21.66	-0.05%	8/7/2023	

Response Time Data

Type	RM Analyzer Make/Model	RM Analyzer s/n	Analyzer Span	RM Gas Span
SO2 ppmvd	Thermo 43i	0704320661	100	93.52
CO ppmvd	Thermo 48C	0508911033	500	448.5
CO2 % (dry)	Servomex 1440	01440D1/3791	20	19.74
O2 % (dry)	Servomex 1440	01440D1/3791	25	21.65
	Start		95% Response	Time (min)
Upscale				1.5
Downscale				1.5

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Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Test Location: #2 Battery PEC Stack
Date: 9/1/16
Project #: M162810

Linearity Cal/Pre 1 Cal

Time	SO2 ppmvd		CO ppmvd		CO2 % (dry)		O2 % (dry)	
7:00	0.30		2.20		0.13		20.55	
7:01	0.60		0.70		0.07		21.68	
7:02	0.50	iz	0.60		0.07		21.66	ih
7:03	0.50		2.80		10.89		8.94	
7:04	0.50		1.70		19.86		-0.06	
7:05	0.90		0.10		19.86		-0.06	
7:06	1.30		0.10		19.88	ih	-0.07	
7:07	1.30		62.30		6.82		-0.01	
7:08	1.20		413.10		0.03		0.01	
7:09	1.20		443.60		0.03		0.01	
7:10	1.20		452.10	ih	0.03		0.01	iz
7:11	1.20		442.40		0.03		0.61	
7:12	14.20		218.10		0.02		20.70	
7:13	65.90		1.50		0.02		20.77	
7:14	81.80		0.80		0.02		20.78	
7:15	93.10		0.60		0.02		20.78	
7:16	93.20	ih	0.60		0.02	iz	20.76	
7:17	60.40		1.10		0.03		12.02	
7:18	8.80		0.60		0.02		11.95	
7:19	3.00		0.60		0.02		11.96	im
7:20	1.80		0.60		1.77		10.44	
7:21	1.50		0.20		10.04		-0.03	
7:22	1.60		0.10	iz	10.04	im	-0.03	
7:23	1.80		9.50		5.67		-0.01	
7:24	1.80		226.90		0.03		0.00	
7:25	1.80		253.20		0.03		0.00	
7:26	1.70		253.10	im	0.02		0.00	
7:27	2.50		241.20		0.03		9.07	
7:28	33.00		26.50		0.02		19.30	
7:29	49.60		0.60		0.02		19.34	
7:30	52.50		0.60		0.02		19.35	
7:31	52.60		0.60		0.02		19.37	
7:32	52.40	im	0.60		0.05		19.83	
7:33	27.30		0.70		8.98		1.90	
7:34	6.60		0.10		10.00		0.06	
7:35	3.20		0.10		10.01		0.05	
7:36	2.40		0.10		10.13	m	0.04	z
7:37	2.10		0.10		6.79		4.07	
7:38	1.20		0.50		0.07		12.04	
7:39	1.00		0.60		0.04		12.05	
7:40	0.90		0.60		0.03		12.06	m
7:41	0.80	z	0.60		0.03		11.55	
7:42	0.80		130.80		0.03		0.13	
7:43	1.10		252.30		0.03		0.08	
7:44	1.40		252.70		0.03		0.08	
7:45	1.40		252.70		0.02		0.08	
7:46	1.40		252.90		0.02		0.07	
7:47	1.30		252.80		0.02		0.07	
7:48	1.30		252.80		0.02		0.07	
7:49	1.30		252.90	m	0.02	z	0.07	
7:50	2.10		213.10		0.05		11.96	
7:51	28.10		10.50		0.07		19.28	

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Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Project #: M162810

Test Location: #2 Battery PEC Stack
Date: 9/1/16

Post 1/Pre 2

Time	SO2 ppmvd		CO ppmvd		CO2 % (dry)		O2 % (dry)	
9:35	4.40		0.70		10.08		0.06	
9:36	3.00		0.10		10.12	m	0.03	z
9:37	2.00		0.20		1.43		10.41	
9:38	1.10		0.60		0.03		12.03	
9:39	0.90		0.60		0.01		12.04	m
9:40	0.70	z	1.10		0.01		9.62	
9:41	0.80		168.10		0.01		0.08	
9:42	1.20		250.50		0.01		0.06	
9:43	1.50		250.50	m	0.01	z	0.06	
9:44	4.60		154.70		0.01		16.87	
9:45	35.90		1.70		0.01		19.28	
9:46	49.50		0.60		0.01		19.29	
9:47	51.90		0.60		0.01		19.29	
9:48	51.70	m	0.60	z	0.01		19.29	

Post 2/Pre 3

Time	SO2 ppmvd		CO ppmvd		CO2 % (dry)		O2 % (dry)	
10:38	6.20		2.20		1.20		20.72	
10:39	3.80		0.80		10.11		0.04	
10:40	2.50		0.20		10.17	m	0.02	z
10:41	2.00		0.40		2.11		9.99	
10:42	1.00		0.40		0.04		11.98	
10:43	0.80		0.40	z	0.03		12.01	m
10:44	0.60		1.40		0.03		9.95	
10:45	0.40	z	157.40		0.02		0.07	
10:46	1.00		251.40		0.02		0.05	
10:47	1.60		251.60	m	0.02	z	0.05	
10:48	5.20		127.80		0.02		17.80	
10:49	41.20		2.20		0.02		19.62	
10:50	51.40		0.80		0.02		19.59	
10:51	51.80	m	0.60		0.02		19.59	
10:52	4.20		1.60		0.04		20.77	
10:53	3.20		1.40		0.06		20.82	

Post 3/Pre 4

Time	SO2 ppmvd		CO ppmvd		CO2 % (dry)		O2 % (dry)	
12:01	8.40		5.10		0.11		20.83	
12:02	6.20		1.90		0.06		19.77	
12:03	33.90		0.80		0.01		19.33	
12:04	49.10		0.60		0.01		19.34	
12:05	52.20		0.60		0.01		19.34	
12:06	53.10		0.40		0.01		19.34	
12:07	52.20	m	0.60	z	0.01	z	17.36	
12:08	43.00		140.90		0.01		0.12	
12:09	12.30		250.00		0.01		0.08	
12:10	4.80		250.20		0.01		0.07	
12:11	3.20		250.20		0.01		0.07	
12:12	2.60		250.20	m	1.00		0.07	
12:13	2.30		101.80		10.05		0.03	
12:14	2.10		0.40		10.12		0.03	
12:15	1.90		0.10		10.13	m	0.03	z
12:16	1.50		0.10		3.92		7.46	
12:17	0.80		0.60		0.04		12.06	
12:18	0.70	z	0.60		0.02		12.06	m

Post 4/Pre 5

Time	SO2 ppmvd		CO ppmvd		CO2 % (dry)		O2 % (dry)	
13:49	12.60		5.00		0.14		19.92	
13:50	23.80		1.60		0.01		19.21	
13:51	45.90		0.50		0.01		19.34	
13:52	50.40		0.40		0.01		19.34	
13:53	51.60		0.10		0.01		19.34	
13:54	51.60	m	16.10		0.01		9.58	
13:55	28.70		226.90		0.01		0.09	
13:56	7.30		249.70		0.01		0.07	
13:57	3.90		249.70		0.01		0.07	
13:58	2.90		249.70	m	0.01	z	0.07	
13:59	2.40		210.10		6.19		0.05	
14:00	2.20		10.80		10.11		0.03	
14:01	2.00		0.10		10.12		0.03	
14:02	1.80		0.10	z	10.13	m	0.03	z
14:03	1.60		0.10		4.95		6.23	
14:04	0.70		0.60		0.04		12.05	
14:05	0.60	z	0.60		0.03		12.06	m

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Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Project #: M162810

Test Location: #2 Battery PEC Stack
Date: 9/1/16

Post 5/Pre 6

Time	SO2 ppmvd		CO ppmvd		CO2 % (dry)		O2 % (dry)	
15:44	19.50		11.40		0.22		20.45	
15:45	19.00		3.10		0.03		18.98	
15:46	43.50		0.50		0.01		19.32	
15:47	50.10		0.30		0.01		19.32	
15:48	51.50		0.20		0.01		19.32	
15:49	51.70	m	21.10		0.01		8.82	
15:50	27.80		231.70		0.01		0.09	
15:51	7.30		249.30		0.01		0.07	
15:53	2.80		249.60	m	0.01	z	0.07	
15:54	2.30		218.10		5.73		0.05	
15:55	2.10		14.30		10.11		0.03	
15:56	1.90		0.10		10.12		0.03	
15:57	1.80		0.10		10.13	m	0.03	z
15:58	1.40		0.10		3.77		7.65	
15:59	0.70		0.60		0.04		12.04	
16:00	0.60	z	0.60	z	0.03		12.05	m

Post 6/Pre 7

Time	SO2 ppmvd		CO ppmvd		CO2 % (dry)		O2 % (dry)	
17:27	2.80		0.10		10.11		0.30	
17:28	1.20		0.20		10.20	m	2.55	
17:29	0.80		0.60		0.04		12.03	
17:30	0.60	z	0.60		0.03		12.05	m
17:31	0.60		1.10		0.03		9.34	
17:32	0.60		168.10		0.02		0.06	
17:33	1.00		250.50		0.02		0.04	
17:34	1.20		250.50	m	0.02	z	0.04	z
17:36	39.80		1.70		0.02		19.29	
17:37	50.80		0.60		0.02		19.31	
17:38	51.70		0.60		0.02		19.31	
17:39	51.60	m	0.60	z	0.02		19.31	

Post 7/Pre 8

Time	SO2 ppmvd		CO ppmvd		CO2 % (dry)		O2 % (dry)	
18:26	14.30		4.00		0.04		18.81	
18:27	41.90		0.90		0.01		19.31	
18:28	49.60		0.60		0.01		19.31	
18:29	51.40		0.60		0.01		19.31	
18:30	51.30	m	18.20		0.01		8.21	
18:31	26.90		183.90		0.01		0.08	
18:32	6.80		246.30		0.01		0.06	
18:33	3.60		251.70		0.01		0.06	
18:34	2.60		252.30		0.01		0.06	
18:35	2.10		251.40	m	0.01	z	0.06	
18:36	1.90		160.80		8.74		0.03	
18:37	1.80		21.30		10.11		0.02	
18:38	1.70		2.30		10.12		0.02	
18:39	1.60		0.20		10.13	m	0.01	z
18:40	1.40		0.10		4.54		6.72	
18:41	0.60		0.30		0.04		12.03	
18:42	0.60		0.60		0.03		12.04	
18:43	0.50	z	0.60	z	0.02		12.04	m

Post 8/Pre 9

Time	SO2 ppmvd	CO ppmvd	CO2 % (dry)	O2 % (dry)

Client: ArcelorMittal Burns Harbor LLC
Facility: Burns Harbor, Indiana
Fuel Type: Other
Fuel Factor: Enter Fuel Factor Here
Diluent: O2 %

Location: #2 Battery PEC Stack
Date: 9/1/16
Operator: Stuart Burton
Project #: M162810
O2 % Correction:

SO2 ppmvd Correction Data

Run #	Cma	Precal	Postcal	Pre zero	Post zero	Co	Cm	C	Cgas	Span Bias	Span Drift	Zero Bias	Zero Drift
1	51.93	52.40	51.70	0.80	0.70	0.75	52.05	34.80	34.5	0.75	-0.75	-0.21	-0.11
2	51.93	51.70	51.80	0.70	0.40	0.55	51.75	38.00	38.0	0.64	0.11	0.11	-0.32
3	51.93	51.80	52.20	0.40	0.70	0.55	52.00	37.40	37.2	0.21	0.43	-0.21	0.32
4	51.93	52.20	51.60	0.70	0.60	0.65	51.90	35.80	35.6	0.86	-0.64	-0.11	-0.11
5	51.93	51.60	51.70	0.60	0.60	0.60	51.65	35.60	35.6	0.75	0.11	-0.11	0.00
6	51.93	51.70	51.60	0.60	0.60	0.60	51.65	37.60	37.6	0.86	-0.11	-0.11	0.00
7	51.93	51.60	51.30	0.60	0.50	0.55	51.45	36.10	36.3	1.18	-0.32	0.00	-0.11

CO ppmvd Correction Data

Run #	Cma	Precal	Postcal	Pre zero	Post zero	Co	Cm	C	Cgas	Span Bias	Span Drift	Zero Bias	Zero Drift
1	251.5	252.90	250.50	0.60	0.60	0.60	251.70	49.30	48.8	0.58	-0.54	-0.11	0.00
2	251.5	250.50	251.60	0.60	0.40	0.50	251.05	44.50	44.2	0.33	0.25	-0.07	-0.04
3	251.5	251.60	250.20	0.40	0.60	0.50	250.90	51.10	50.8	0.65	-0.31	-0.11	0.04
4	251.5	250.20	249.70	0.60	0.10	0.35	249.95	44.20	44.2	0.76	-0.11	0.00	-0.11
5	251.5	249.70	249.60	0.10	0.60	0.35	249.65	44.60	44.6	0.78	-0.02	-0.11	0.11
6	251.5	249.60	250.50	0.60	0.60	0.60	250.05	46.70	46.5	0.58	0.20	-0.11	0.00
7	251.5	250.50	251.40	0.60	0.60	0.60	250.95	46.20	45.8	0.38	0.20	-0.11	0.00

CO2 % (dry) Correction Data

Run #	Cma	Precal	Postcal	Pre zero	Post zero	Co	Cm	C	Cgas	Span Bias	Span Drift	Zero Bias	Zero Drift
1	10.18	10.13	10.12	0.02	0.01	0.02	10.13	1.02	1.0	-0.41	-0.05	0.05	-0.05
2	10.18	10.12	10.17	0.01	0.02	0.02	10.15	1.10	1.1	-0.66	0.25	0.00	0.05
3	10.18	10.17	10.13	0.02	0.01	0.02	10.15	1.16	1.2	-0.46	-0.20	0.05	-0.05
4	10.18	10.13	10.13	0.01	0.01	0.01	10.13	1.10	1.1	-0.46	0.00	0.05	0.00
5	10.18	10.13	10.13	0.01	0.01	0.01	10.13	1.11	1.1	-0.46	0.00	0.05	0.00
6	10.18	10.13	10.20	0.01	0.02	0.02	10.17	1.05	1.0	-0.81	0.35	0.00	0.05
7	10.18	10.20	10.13	0.02	0.01	0.02	10.17	1.17	1.2	-0.46	-0.35	0.05	-0.05

O2 % (dry) Correction Data

Run #	Cma	Precal	Postcal	Pre zero	Post zero	Co	Cm	C	Cgas	Span Bias	Span Drift	Zero Bias	Zero Drift
1	12.08	12.06	12.04	0.04	0.03	0.04	12.05	19.82	19.9	-0.37	-0.09	-0.09	-0.05
2	12.08	12.04	12.01	0.03	0.02	0.03	12.03	19.70	19.8	-0.23	-0.14	-0.05	-0.05
3	12.08	12.01	12.06	0.02	0.03	0.03	12.04	19.71	19.8	-0.46	0.23	-0.09	0.05
4	12.08	12.06	12.06	0.03	0.03	0.03	12.06	19.80	19.9	-0.46	0.00	-0.09	0.00
5	12.08	12.06	12.05	0.03	0.03	0.03	12.06	19.77	19.8	-0.42	-0.05	-0.09	0.00
6	12.08	12.05	12.05	0.03	0.04	0.04	12.05	19.80	19.9	-0.42	0.00	-0.14	0.05
7	12.08	12.05	12.04	0.04	0.01	0.03	12.05	19.71	19.8	-0.37	-0.05	0.00	-0.14

Cma = Concentration of Cal Gas
Cm=Average Pre and Post Span
C = Average value of test
Cgas = Corrected gas value of test
Co=Average Pre and Post Zero

Calibration Corrected Data

Run #	Run Date	Start Time	End Time	SO2 ppmvd	CO2 % (dry)	O2 % (dry)	CO ppmvd	CO ppmvd @ % O2	O2 based SO2 lb/mmBtu	O2 based CO lb/mmBtu	Flow, DSCFH	SO2 lb/hr	CO lb/hr
1	9/1/16	8:55		34.5	1.0	19.9	48.8	1019.9	#VALUE!	#VALUE!		0.000	0.000
2	9/1/16			38.0	1.1	19.8	44.2	839.8	#VALUE!	#VALUE!		0.000	0.000
3	9/1/16			37.2	1.2	19.8	50.8	965.2	#VALUE!	#VALUE!		0.000	0.000
4	9/1/16			35.6	1.1	19.9	44.2	923.8	#VALUE!	#VALUE!		0.000	0.000
5	9/1/16			35.6	1.1	19.8	44.6	847.4	#VALUE!	#VALUE!		0.000	0.000
6	9/1/16			37.6	1.0	19.9	46.5	971.9	#VALUE!	#VALUE!		0.000	0.000
7	9/1/16		18:22	36.3	1.2	19.8	45.8	870.2	#VALUE!	#VALUE!		0.000	0.000

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Meter Box Calibration

Dry Gas Meter Calibration Data

Dry Gas Meter No.	CM23	Date:	August 4, 2016
Standard Meter No.	16745468	Calibrated By:	JDV
Standard Meter (Y)	1.0006	Barometric Pressure:	29.47

Run Number		Orifice Setting in H_2O Chg (H)	Standard Meter Gas Volume vr	Dry Gas Meter Gas Volume vd	Standard Meter Temp. F° tr	Dry Gas Meter Inlet Temp. F° tdi	Dry Gas Meter Outlet Temp. F° tdo	Dry Gas Meter Avg. Temp. F° td	Time Min	Time Sec	Y	Chg (H)
Final			93.689	67.574	84	91	88					
Initial			83.589	57.371	83	91	87					
Difference	1	0.20	10.100	10.203	84	91	88	89	35	9	1.000	1.400
Final			102.502	76.473	85	93	89					
Initial			93.942	67.836	84	90	89					
Difference	2	0.50	8.560	8.637	85	92	89	90	18	50	1.000	1.402
Final			10.771	84.797	85	94	90					
Initial			2.674	76.645	85	93	89					
Difference	3	0.70	8.097	8.152	85	94	90	92	15	3	1.003	1.400
Final			21.122	95.144	80	81	80					
Initial			11.157	85.184	79	79	79					
Difference	4	0.90	9.965	9.960	80	80	80	80	16	20	0.999	1.402
Final			29.130	103.142	80	85	81					
Initial			21.554	95.559	80	83	81					
Difference	5	1.20	7.576	7.583	80	84	81	83	10	46	1.001	1.400
Final			83.490	57.271	83	93	87					
Initial			75.736	49.494	82	86	83					
Difference	6	2.00	7.754	7.777	83	90	85	87	8	37	1.001	1.428
									Average		**1.001**	**1.405**

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Stack Temperature Sensor Calibration

Meter Box # : CM23 *Name :* JDV

Ambient Temperature : 83 °F *Date :* August 4, 2016

Calibrator Model # : CL23A

Serial # : T-249465

Date Of Certification : January 8, 2016

Primary Standards Directly Traceable National Institute of Standards and Technology (NIST)

Reference Source Temperature (° F)	Test Thermometer Temperature (° F)	Temperature Difference %
0	0	0.0
250	251	0.1
600	601	0.1
1200	1205	0.3

$$\frac{(\text{Ref. Temp., °F} + 460) - (\text{Test Therm. Temp., °F} + 460)}{\text{Ref. Temp., °F} + 460} * 100 <= 1.5\ \%$$

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Meter Box Calibration

Dry Gas Meter Calibration Data

Dry Gas Meter No.	CM23	Date:	September 20, 2016
Standard Meter No.	16745468	Calibrated By:	MLIP
Standard Meter (Y)	1.0006	Barometric Pressure:	29.56

Run Number		Orifice Setting in H_2O Chg (H)	Standard Meter Gas Volume vr	Dry Gas Meter Gas Volume vd	Standard Meter Temp. F° tr	Dry Gas Meter Inlet Temp. F° tdi	Dry Gas Meter Outlet Temp. F° tdo	Dry Gas Meter Avg. Temp. F° td	Time Min	Time Sec	Y	Chg (H)
Final			85.398	44.555	80	84	81					
Initial			79.497	38.608	80	81	79					
Difference	1	0.20	5.901	5.947	80	83	80	81	20	40	0.994	1.416
Final			93.101	52.315	76	79	77					
Initial			86.300	45.479	76	77	76					
Difference	2	0.50	6.801	6.836	76	78	77	77	15	2	0.996	1.400
Final			100.070	59.343	76	81	77					
Initial			93.101	52.315	76	79	77					
Difference	3	0.70	6.969	7.028	76	80	77	79	13	16	0.994	1.450
Final			107.565	66.905	76	84	80					
Initial			100.070	59.343	76	81	77					
Difference	4	0.90	7.495	7.562	76	83	79	81	12	59	0.997	1.538
Final			118.450	77.900	76	88	82					
Initial			107.565	66.905	76	84	80					
Difference	5	1.20	10.885	10.995	76	86	81	84	16	32	1.001	1.568
Final			79.321	38.430	80	80	79					
Initial			70.442	29.569	79	79	79					
Difference	6	2.00	8.879	8.861	80	80	79	79	10	20	0.997	1.567
										Average	**0.997**	**1.490**

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Stack Temperature Sensor Calibration

Meter Box # : CM23 *Name :* JDV

Ambient Temperature : 75 °F *Date :* September 20, 2016

Calibrator Model # : CL23A

Serial # : T-249465

Date Of Certification : January 8, 2016

Primary Standards Directly Traceable National Institute of Standards and Technology (NIST)

Reference Source Temperature (° F)	Test Thermometer Temperature (° F)	Temperature Difference %
0	0	0.0
250	251	0.1
600	601	0.1
1200	1205	0.3

$$\frac{(\text{Ref. Temp., °F} + 460) - (\text{Test Therm. Temp., °F} + 460)}{\text{Ref. Temp., °F} + 460} * 100 <= 1.5\ \%$$

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Meter Box Calibration

Dry Gas Meter Calibration Data

Dry Gas Meter No.	CM22	Date:	July 28, 2016
Standard Meter No.	4319699	Calibrated By:	JDV
Standard Meter (Y)	0.9967	Barometric Pressure:	29.32

Run Number		Orifice Setting in H_2O Chg (H)	Standard Meter Gas Volume vr	Dry Gas Meter Gas Volume vd	Standard Meter Temp. F° tr	Dry Gas Meter Inlet Temp. F° tdi	Dry Gas Meter Outlet Temp. F° tdo	Dry Gas Meter Avg. Temp. F° td	Time Min	Time Sec	Y	Chg (H)
Final			29.185	36.363	81	81	85					
Initial			21.913	29.031	81	86	83					
Difference	1	0.20	7.272	7.332	81	84	84	84	27	29	0.993	1.682
Final			36.593	43.819	81	90	86					
Initial			29.415	36.590	82	87	85					
Difference	2	0.50	7.178	7.229	82	89	86	87	17	32	0.998	1.749
Final			45.541	52.825	82	92	87					
Initial			36.820	44.046	82	89	86					
Difference	3	0.70	8.721	8.779	82	91	87	89	18		1.000	1.747
Final			52.664	59.997	87	91	88					
Initial			45.870	53.154	82	89	88					
Difference	4	0.90	6.794	6.843	85	90	88	89	12	24	0.996	1.771
Final			59.071	66.452	82	92	88					
Initial			52.857	60.195	82	90	88					
Difference	5	1.20	6.214	6.257	82	91	88	90	9	40	1.001	1.698
Final			21.744	28.879	81	87	83					
Initial			11.398	18.570	81	82	82					
Difference	6	2.00	10.346	10.309	81	85	83	84	12	47	1.000	1.798
									Average		**0.998**	**1.741**

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Stack Temperature Sensor Calibration

Meter Box # : CM22 *Name :* JDV

Ambient Temperature : 84 °F *Date :* July 28, 2016

Calibrator Model # : CL23A

Serial # : T-249465

Date Of Certification : January 8, 2016

Primary Standards Directly Traceable National Institute of Standards and Technology (NIST)

Reference Source Temperature (° F)	Test Thermometer Temperature (° F)	Temperature Difference %
0	1	0.2
250	251	0.1
600	601	0.1
1200	1205	0.3

$$\frac{(\text{Ref. Temp., °F} + 460) - (\text{Test Therm. Temp., °F} + 460)}{\text{Ref. Temp., °F} + 460} * 100 <= 1.5\ \%$$

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Meter Box Calibration

Dry Gas Meter Calibration Data

Dry Gas Meter No.	CM22	Date:	September 14, 2013
Standard Meter No.	4319699	Calibrated By:	JDV
Standard Meter (Y)	0.9967	Barometric Pressure:	29.62

Run Number		Orifice Setting in H_2O Chg (H)	Standard Meter Gas Volume vr	Dry Gas Meter Gas Volume vd	Standard Meter Temp. F° tr	Dry Gas Meter Inlet Temp. F° tdi	Dry Gas Meter Outlet Temp. F° tdo	Dry Gas Meter Avg. Temp. F° td	Time Min	Time Sec	Y	Chg (H)
Final			100.591	86.820	75	79	78					
Initial			95.165	81.393	75	78	76					
Difference	1	0.20	5.426	5.427	75	79	77	78	21	24	1.001	1.793
Final			11.725	97.925	77	81	79					
Initial			0.780	87.004	76	79	78					
Difference	2	0.50	10.945	10.921	77	80	79	79	26	44	1.003	1.724
Final			19.589	105.780	77	83	80					
Initial			11.989	98.185	77	81	79					
Difference	3	0.70	7.600	7.595	77	82	80	81	15	53	1.003	1.765
Final			28.420	14.626	77	85	81					
Initial			19.813	6.011	77	84	80					
Difference	4	0.90	8.607	8.615	77	85	81	83	16	2	1.004	1.797
Final			37.230	23.465	78	87	82					
Initial			28.605	14.815	77	85	82					
Difference	5	1.20	8.625	8.650	78	86	82	84	13	42	1.003	1.741
Final			95.010	81.000	75	78	76					
Initial			79.949	66.321	75	75	75					
Difference	6	2.00	15.061	14.679	75	77	76	76	18	47	1.020	1.798
									Average		**1.005**	**1.770**

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Stack Temperature Sensor Calibration

Meter Box # : CM22 *Name :* JDV

Ambient Temperature : 78 °F *Date :* September 14, 2013

Calibrator Model # : CL23A

Serial # : T-249465

Date Of Certification : January 8, 2016

Primary Standards Directly Traceable National Institute of Standards and Technology (NIST)

Reference Source Temperature (° F)	Test Thermometer Temperature (° F)	Temperature Difference %
0	0	0.0
250	250	0.0
600	600	0.0
1200	1204	0.2

$$\frac{(\text{Ref. Temp., °F} + 460) - (\text{Test Therm. Temp., °F} + 460)}{\text{Ref. Temp., °F} + 460} * 100 <= 1.5\ \%$$

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Meter Box Calibration

Dry Gas Meter Calibration Data

Dry Gas Meter No.	CM16	Date:	August 19, 2016
Standard Meter No.	16745468	Calibrated By:	JDV
Standard Meter (Y)	1.0006	Barometric Pressure:	29.38

Run Number	Orifice Setting in H_2O Chg (H)	Standard Meter Gas Volume vr	Dry Gas Meter Gas Volume vd	Standard Meter Temp. F° tr	Dry Gas Meter Inlet Temp. F° tdi	Dry Gas Meter Outlet Temp. F° tdo	Dry Gas Meter Avg. Temp. F° td	Time Min	Time Sec	Y	Chg (H)
Final		56.897	37.164	81	83	82					
Initial		51.300	31.611	80	83	80					
Difference 1	0.20	5.597	5.553	81	83	81	82	20	56	1.011	1.633
Final		63.986	44.401	82	85	83					
Initial		56.999	37.363	81	83	82					
Difference 2	0.50	6.987	7.038	82	84	83	83	16	33	0.995	1.640
Final		73.447	53.949	83	87	84					
Initial		64.187	44.615	82	86	83					
Difference 3	0.70	9.260	9.334	83	87	84	85	18	43	0.995	1.672
Final		80.169	60.716	83	88	85					
Initial		73.671	54.170	83	87	84					
Difference 4	0.90	6.498	6.546	83	88	85	86	11	39	0.997	1.692
Final		88.134	68.728	84	89	86					
Initial		80.418	60.968	83	87	85					
Difference 5	1.20	7.716	7.760	84	88	86	87	11	55	0.998	1.675
Final		51.139	31.439	79	83	80					
Initial		36.031	16.374	77	79	79					
Difference 6	2.00	15.108	15.065	78	81	80	80	18	36	1.003	1.759
								Average		1.000	1.678

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Stack Temperature Sensor Calibration

Meter Box # : CM16 *Name :* JDV

Ambient Temperature : 83 °F *Date :* August 19, 2016

Calibrator Model # : CL23A

Serial # : T-249465

Date Of Certification : January 8, 2016

Primary Standards Directly Traceable Nationa	90.04	63.396	78	82 #
	84.53	57.862	78	80 #

Reference Source Temperature (° F)	Thermometer Temperature (° F)	78 78 Difference %
0	0	[redacted]
250	250	[redacted]
600	599	0.1
1200	1200	

Ref. Temp., °F + 460

84.408	57.738	77	79 #
75.241	48.625	77	77 #

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Meter Box Calibration

Dry Gas Meter Calibration Data

Dry Gas Meter No.	CM16	Date:	September 19, 2016
Standard Meter No.	16745468	Calibrated By:	jdv
Standard Meter (Y)	1.0006	Barometric Pressure:	29.44

Run Number		Orifice Setting in H_2O Chg (H)	Standard Meter Gas Volume vr	Dry Gas Meter Gas Volume vd	Standard Meter Temp. F° tr	Dry Gas Meter Inlet Temp. F° tdi	Dry Gas Meter Outlet Temp. F° tdo	Dry Gas Meter Avg. Temp. F° td	Time Min	Time Sec	Y	Chg (H)
Final			94.985	65.628	73	77	76					
Initial			87.020	57.614	73	75	74					
Difference	1	0.20	7.965	8.014	73	76	75	76	31	33	0.999	1.799
Final			102.295	72.989	73	78	77					
Initial			95.300	65.963	74	77	76					
Difference	2	0.50	6.995	7.026	74	78	77	77	17	5	1.001	1.708
Final			9.403	80.117	74	79	77					
Initial			2.484	73.169	73	78	77					
Difference	3	0.70	6.919	6.948	74	79	77	78	14	28	1.003	1.750
Final			15.679	86.439	74	79	77					
Initial			9.954	80.680	74	79	77					
Difference	4	0.90	5.725	5.759	74	79	77	78	10	31	1.000	1.740
Final			21.662	92.627	74	85	81					
Initial			16.084	86.980	74	79	77					
Difference	5	1.20	5.578	5.647	74	82	79	81	9	2	0.997	1.794
Final			86.799	57.394	73	75	74					
Initial			78.595	49.233	72	73	73					
Difference	6	2.00	8.204	8.161	73	74	74	74	10	12	1.003	1.775
									Average		**1.001**	**1.761**

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Stack Temperature Sensor Calibration

Meter Box # : CM16 *Name :* jdv

Ambient Temperature : 77 °F *Date :* September 19, 2016

Calibrator Model # : CL23A

Serial # : T-249465

Date Of Certification : January 8, 2016

Primary Standards Directly Traceable National Institute of Standards and Technology (NIST)

Reference Source Temperature (° F)	Test Thermometer Temperature (° F)	Temperature Difference %
0	-1	0.2
250	249	0.1
600	598	0.2
1200	1201	0.1

$$\frac{(\text{Ref. Temp., °F} + 460) - (\text{Test Therm. Temp., °F} + 460)}{\text{Ref. Temp., °F} + 460} * 100 <= 1.5\ \%$$

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Project No. M162810A
#2 Coke Battery PEC Baghouse Stack

METER CALIBRATION

Meter Information					
Console Model	XC-260	Dry Gas Meter Number	M4 A	Encoder Model	HEDS-9100-F00
Gas Meter Model	SK25	Totalizer Scale Factor (Initial)	1.0000	Totalizer Model	RED LION
		Totalizer Scale Factor (Final)	1.0004	Temp Display Model	JENCO

Calibration Conditions							
WTM ID	15340981	Calibration Technician	JDV			Calibration Date	28-Jul-16
WTM Cal Factor	0.9974	Barometric Pressure	(Pb)	745.40455	mm Hg		

	Calibration Data										Results				
	Run Time		Dry Gas Meter		Wet Test Meter		Standardized Volumes				Totalizer Gamma	Totalizer Gamma	Meter Gamma		Corrected Flowrate
	Elapsed		Gas Temp	Totalizer Display	Gas Volume	Gas Temp	Totalizer Initial SF	Totalizer Final SF	Dry Gas Meter	Wet Test Meter	Initial	Variation	DGM Display	Variation	
	(Θ)		(t_m)		(V_w)	(t_w)	($V_{m(std)}$)	($V_{m(std)}$)	($V_{m(std)}$)	($V_{w(std)}$)	(Y)	(ΔY)	(Y)	(ΔY)	(Q_m)
	min		°C	liters	liters	°C	std liters	std liters	std liters	std liters					slm
Run 1 - Initial	0.00		26.66	0	602.78	26.66									
Final	30.00		27.77	240.935	844.17	26.66									
Total/Avg	30.00		27.215	240.935	241.39	26.66	230.793	230.890		231.054	1.001	0.001			7.68
Run 2 - Initial	0.00		27.77	0	844.17	26.66									
Final	30.00		28.33	64.319	907.82	27.22									
Total/Avg	30.00		28.05	64.319	63.65	26.94	61.441	61.466		60.868	0.991	-0.010			2.02
Run 3 - Initial	0.00		28.33	0	907.82	27.22									
Final	30.00		28.88	31.188	939.24	27.22									
Total/Avg	30.00		28.605	31.188	31.42	27.22	29.737	29.750		30.019	1.009	0.009			1.00

1.000

Average Meter Calibration Factor Y **1.000**

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.

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METER CALIBRATION

Meter Information					
Console Model	XC-260	Dry Gas Meter Number	M4 B	Encoder Model	HEDS-9100-F00
Gas Meter Model	SK25	Totalizer Scale Factor (Initial)	1.0000	Totalizer Model	RED LION
		Totalizer Scale Factor (Final)	0.9992	Temp Display Model	JENCO

Calibration Conditions							
WTM ID	15340981	Calibration Technician	JDV			Calibration Date	28-Jul-16
WTM Cal Factor	0.9974	Barometric Pressure	(Pb)	745.40455	mm Hg		

	Calibration Data										Results				
	Run Time		Dry Gas Meter		Wet Test Meter		Standardized Volumes				Totalizer Gamma	Totalizer Gamma	Meter Gamma		Corrected Flowrate
	Elapsed		Gas Temp	Totalizer Display	Gas Volume	Gas Temp	Totalizer Initial SF	Totalizer Final SF	Dry Gas Meter	Wet Test Meter	Initial	Variation	DGM Display	Variation	
	(Θ)		(t_m)		(V_w)	(t_w)	($V_{m(std)}$)	($V_{m(std)}$)	($V_{m(std)}$)	($V_{w(std)}$)	(Y)	(ΔY)	(Y)	(ΔY)	(Q_m)
	min		°C	liters	liters	°C	std liters	std liters	std liters	std liters					slm
Run 1 - Initial	0.00		28.33	0	939.24	26.66									
Final	30.00		29.44	138.622	1077.05	26.66									
Total/Avg	30.00		28.885	138.622	137.81	26.66	132.052	131.947		131.909	0.999	0.000			4.39
Run 2 - Initial	0.00		29.44	0	77.05	26.66									
Final	30.00		29.44	62.966	139.58	27.22									
Total/Avg	30.00		29.44	62.966	62.53	26.94	59.872	59.824		59.797	0.999	0.000			1.99
Run 3 - Initial	0.00		29.44	0	139.58	27.22									
Final	30.00		29.44	29.15	168.59	27.22									
Total/Avg	30.00		29.44	29.15	29.01	27.22	27.717	27.695		27.716	1.000	0.001			0.92

0.999

Average Meter Calibration Factor Y **0.999**

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.

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Stack Temperature Sensor Calibration

Meter Box # : M4

Name : JDV

Ambient Temperature : 84 °F

Date : July 28, 2016

Calibrator Model # : CL23A

Serial # : T-249465

Date Of Certification : January 8, 2016

Primary Standards Directly Traceable National Institute of Standards and Technology (NIST)

Reference Source Temperature (° F)	Test Thermometer Temperature (° F)	Temperature Difference %
0	-1	0.2
250	249	0.1
600	597	0.3
1200	1199	0.1

$$\frac{(\text{Ref. Temp., °F} + 460) - (\text{Test Therm. Temp., °F} + 460)}{\text{Ref. Temp., °F} + 460} * 100 <= 1.5\ \%$$

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METER CALIBRATION

Meter Information					
Console Model	XC-260	Dry Gas Meter Number	M4 A	Encoder Model	HEDS-9100-F00
Gas Meter Model	SK25	Totalizer Scale Factor (Initial)	1.0000	Totalizer Model	RED LION
		Totalizer Scale Factor (Final)	1.0014	Temp Display Model	JENCO

Calibration Conditions							
WTM ID	15340981	Calibration Technician	MLIP			Calibration Date	20-Sep-16
WTM Cal Factor	0.9904	Barometric Pressure	(Pb)	750.737939	mm Hg		

	Calibration Data											Results				
	Run Time		Dry Gas Meter		Wet Test Meter		Standardized Volumes				Totalizer Gamma	Totalizer Gamma	Meter Gamma		Corrected Flowrate
	Elapsed		Gas Temp	Totalizer Display	Gas Volume	Gas Temp	Totalizer Initial SF	Totalizer Final SF	Dry Gas Meter	Wet Test Meter	Initial	Variation	DGM Display	Variation	
	(Θ)		(t_m)		(V_w)	(t_w)	($V_{m(std)}$)	($V_{m(std)}$)	($V_{m(std)}$)	($V_{w(std)}$)	(Y)	(ΔY)	(Y)	(ΔY)	(Q_m)
	min		°C	liters	liters	°C	std liters	std liters	std liters	std liters					slm
Run 1 - Initial	0.00		24.44	0	3617.41	23.88									
Final	30.00		24.44	126.776	3745.28	23.88									
Total/Avg	30.00		24.44	126.776	127.87	23.88	123.449	123.617		123.552	1.001	-0.001			4.08
Run 2 - Initial	0.00		24.44	0	3745.82	23.88									
Final	30.00		25.55	64.99	3811.38	23.88									
Total/Avg	30.00		24.995	64.99	65.56	23.88	63.167	63.253		63.346	1.003	0.001			2.09
Run 3 - Initial	0.00		25.55	0	3811.38	23.88									
Final	30.00		25.55	34.235	3845.8	24.44									
Total/Avg	30.00		25.55	34.235	34.42	24.16	33.213	33.258		33.226	1.000	-0.001			1.10

1.001

Average Meter Calibration Factor Y **1.001**

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.

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METER CALIBRATION

Meter Information

Console Model	XC-260	Dry Gas Meter Number	M4 B	Encoder Model	HEDS-9100-F00
Gas Meter Model	SK25	Totalizer Scale Factor (Initial)	1.0000	Totalizer Model	RED LION
		Totalizer Scale Factor (Final)	0.9981	Temp Display Model	JENCO

Calibration Conditions

WTM ID	15340981	Calibration Technician	JDV			Calibration Date	20-Sep-16
WTM Cal Factor	0.9974	Barometric Pressure	(Pb)	751.499852	mm Hg		

Calibration Data

	Run Time		Dry Gas Meter		Wet Test Meter		Standardized Volumes				Totalizer Gamma	Results			
	Elapsed		Gas Temp	Totalizer Display	Gas Volume	Gas Temp	Totalizer Initial SF	Totalizer Final SF	Dry Gas Meter	Wet Test Meter	Initial	Totalizer Gamma Variation	Meter Gamma DGM Display	Meter Gamma Variation	Corrected Flowrate
	(Θ)		(t_m)		(V_w)	(t_w)	($V_{m(std)}$)	($V_{m(std)}$)	($V_{m(std)}$)	($V_{w(std)}$)	(Y)	(ΔY)	(Y)	(ΔY)	(Q_m)
	min		°C	liters	liters	°C	std liters	std liters	std liters	std liters					slm
Run 1 - Initial	0.00		25.55	0	849.04	24.44									
Final	30.00		26.66	140.28	988.65	24.44									
Total/Avg	30.00		26.105	140.28	139.61	24.44	135.976	135.716		135.731	0.998	0.000			4.51
Run 2 - Initial	0.00		26.66	0	988.65	24.44									
Final	30.00		26.66	64.01	1052.63	24.44									
Total/Avg	30.00		26.66	64.01	63.98	24.44	61.931	61.813		62.202	1.004	0.006			2.07
Run 3 - Initial	0.00		26.66	0	1052.63	24.44									
Final	30.00		27.22	31.198	1083.42	25									
Total/Avg	30.00		26.94	31.198	30.79	24.72	30.157	30.099		29.906	0.992	-0.006			0.99

0.998

Average Meter Calibration Factor Y **0.998**

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.

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Stack Temperature Sensor Calibration

Meter Box # : *M4*

Name : *JDV*

Ambient Temperature : *79* °F

Date : *September 20, 2016*

Calibrator Model # : *CL23A*

Serial # : *T-249465*

Date Of Certification : *January 8, 2016*

Primary Standards Directly Traceable National Institute of Standards and Technology (NIST)

Reference Source Temperature (° F)	**Test Thermometer Temperature (° F)**	**Temperature Difference %**
0	-1	0.2
250	248	0.3
600	597	0.3
1200	1198	0.1

$$\frac{(\text{Ref. Temp.,}\ ^\circ F + 460) - (\text{Test Therm. Temp.,}\ ^\circ F + 460)}{\text{Ref. Temp.,}\ ^\circ F + 460} * 100 <= 1.5\ \%$$

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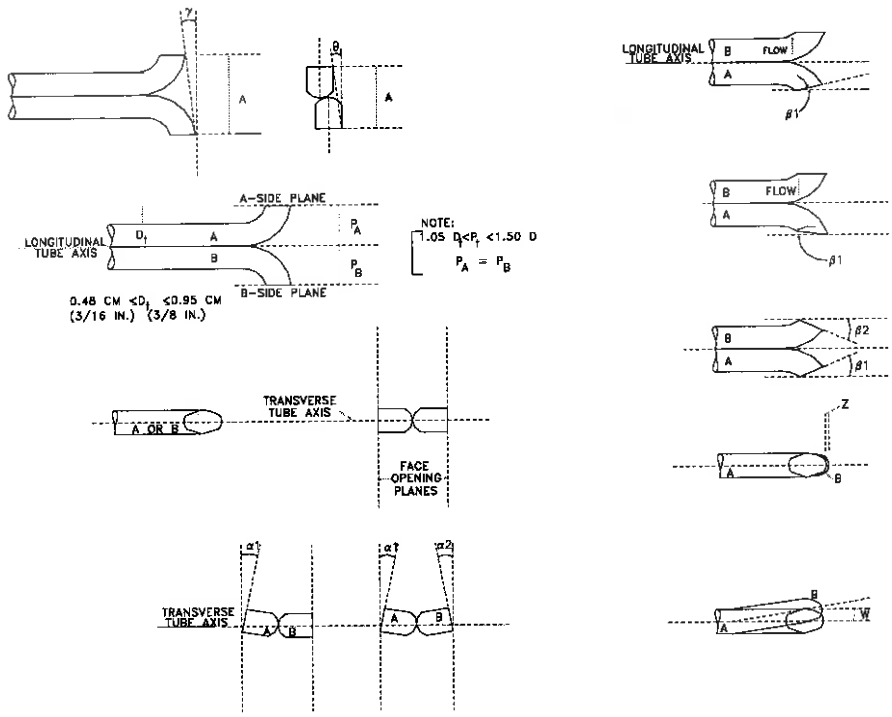
S TYPE PITOT TUBE INSPECTION WORKSHEET

Pitot Tube No: 13 Date: 4/15/2016 Inspectors Name: EMC

Type of Probe: (circle one) **M2** M5 M17 Probe Length: 10 ft.



Pitot tube assembly level? X yes ____ no

Pitot tube openings damaged? ____ yes (explain below) X no

a_1 = 1 ° (<10°), a_2 = 1 ° (<10°) z = A sin g = 0.008 (in.); (<0.125 in.)

b_1 = 2 ° (<5°), b_2 = 1 ° (<5°) w = A sin q = 0.025 (in.); (<0.03125 in.)

γ = 0.5 °, θ = 1.5 °, A = 0.942 (in.) P_A = 0.463 (in.), P_B = 0.463 (in.), D_t = 0.375 (in.)

Calibration required? ____ yes X no

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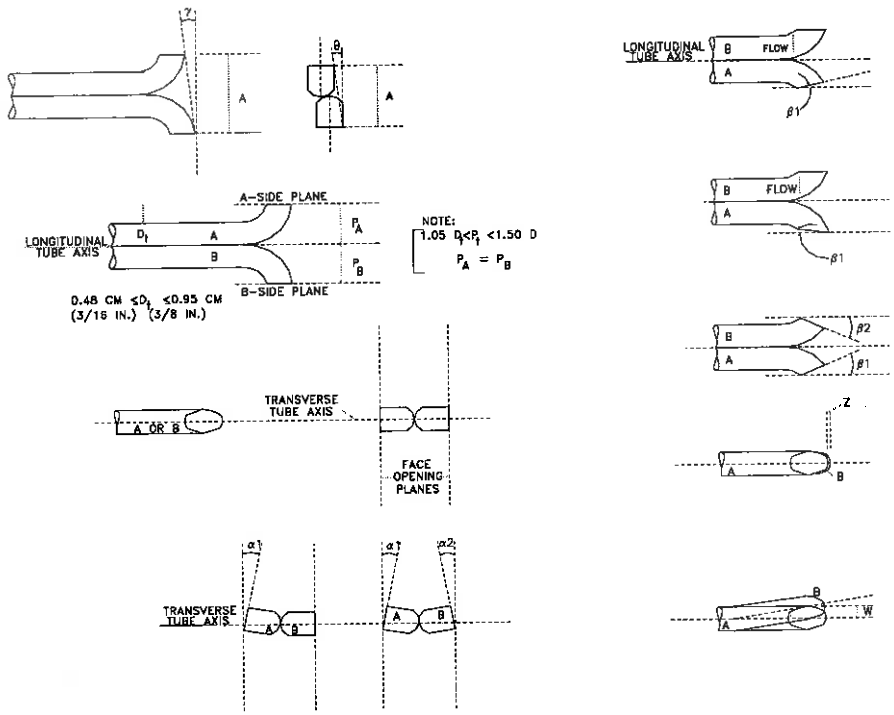
S TYPE PITOT TUBE INSPECTION WORKSHEET

Pitot Tube No: 13 Date: 9/20/2016 Inspectors Name: NCC

Type of Probe: (circle one) **M2** M5 M17 Probe Length: 10 ft.



Pitot tube assembly level? X yes ____ no

Pitot tube openings damaged? ____ yes (explain below) X no

a_1 = 1 ° (<10°), a_2 = 1 ° (<10°) z = A sin g = 0.016 (in.); (<0.125 in.)

b_1 = 2 ° (<5°), b_2 = 1 ° (<5°) w = A sin q = 0.025 (in.); (<0.03125 in.)

γ = 1 °, θ = 1.5 °, A = 0.942 (in.) P_A = 0.463 (in.), P_B = 0.463 (in.), D_t = 0.375 (in.)

Calibration required? ____ yes X no

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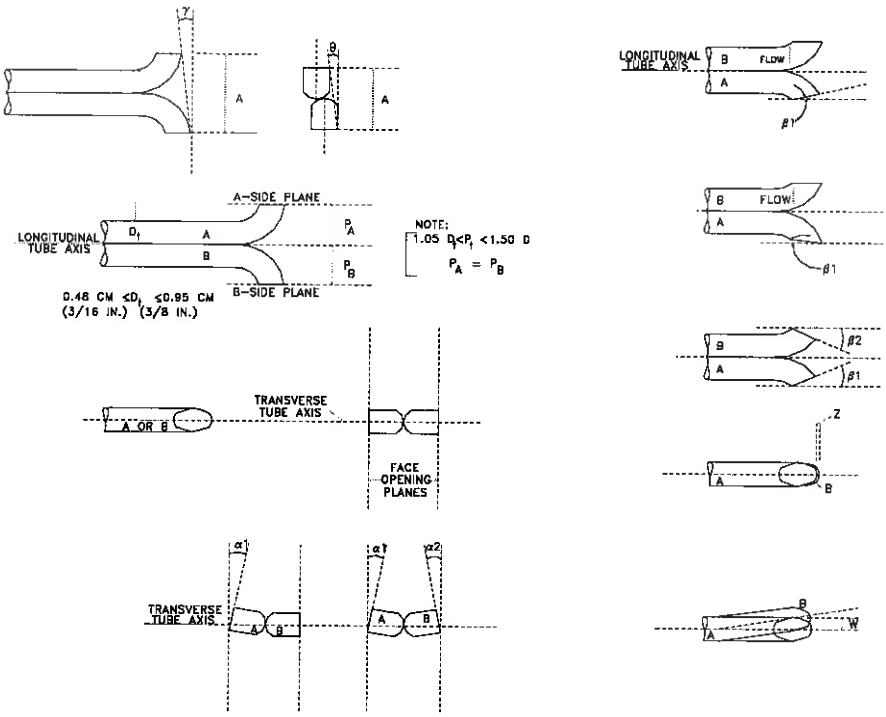
S TYPE PITOT TUBE INSPECTION WORKSHEET

Pitot Tube No: 30 Date: 8/18/2016 Inspector's Name: ncc

Type of Probe: (circle one) M2 M5 M17 Probe Length: 10 ft.



Pitot tube assembly level? x yes ____ no

Pitot tube openings damaged? ____ yes (explain below) x no

a_1 = 1 ° (<10°), a_2 = 0 ° (<10°) z = A sin g = 0.033 (in.); (<0.125 in.)

b_1 = 1 ° (<5°), b_2 = 0 ° (<5°) w = A sin q = 0.016 (in.); (<0.03125 in.)

γ = 2 °, θ = 1 °, A = 0.945 (in.) P_A = 0.473 (in.), P_B = 0.473 (in.), D_t = 0.375 (in.)

Calibration required? ____ yes x no

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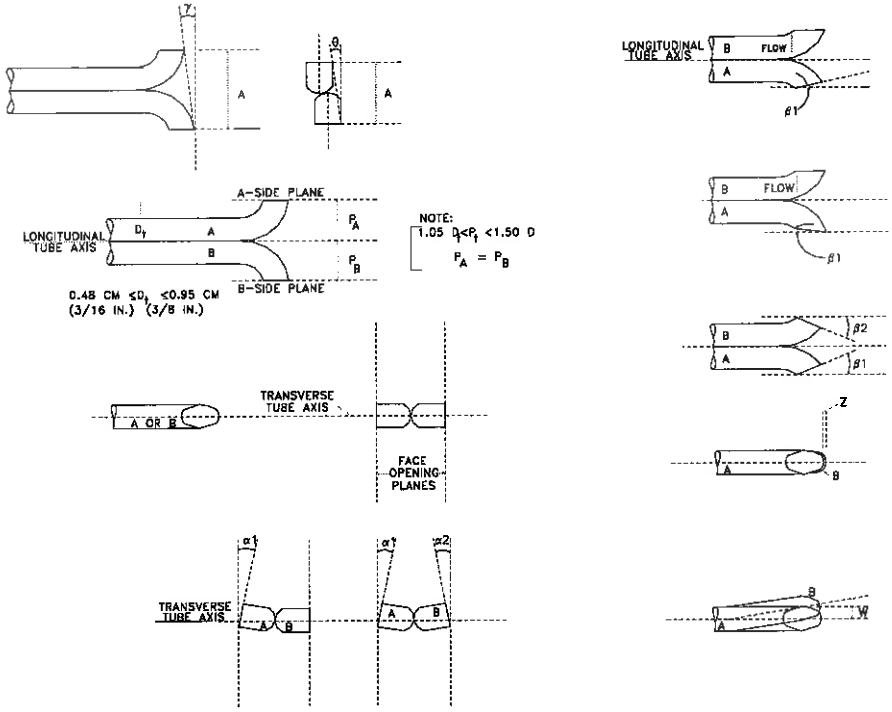
S TYPE PITOT TUBE INSPECTION WORKSHEET

Pitot Tube No: 30 Date: 9/19/2016 Inspector's Name: ncc

Type of Probe: (circle one) M2 M5 M17 Probe Length: 10 ft.



Pitot tube assembly level? x yes ____ no

Pitot tube openings damaged? ____ yes (explain below) x no

a_1 = 1 ° (<10°), a_2 = 1 ° (<10°) z = A sin g = 0.025 (in.); (<0.125 in.)

b_1 = 2 ° (<5°), b_2 = 1 ° (<5°) w = A sin q = 0.008 (in.); (<0.03125 in.)

γ = 1.5 °, θ = 0.5 °, A = 0.948 (in.) P_A = 0.474 (in.), P_B = 0.474 (in.), D_t = 0.375 (in.)

Calibration required? ____ yes x no

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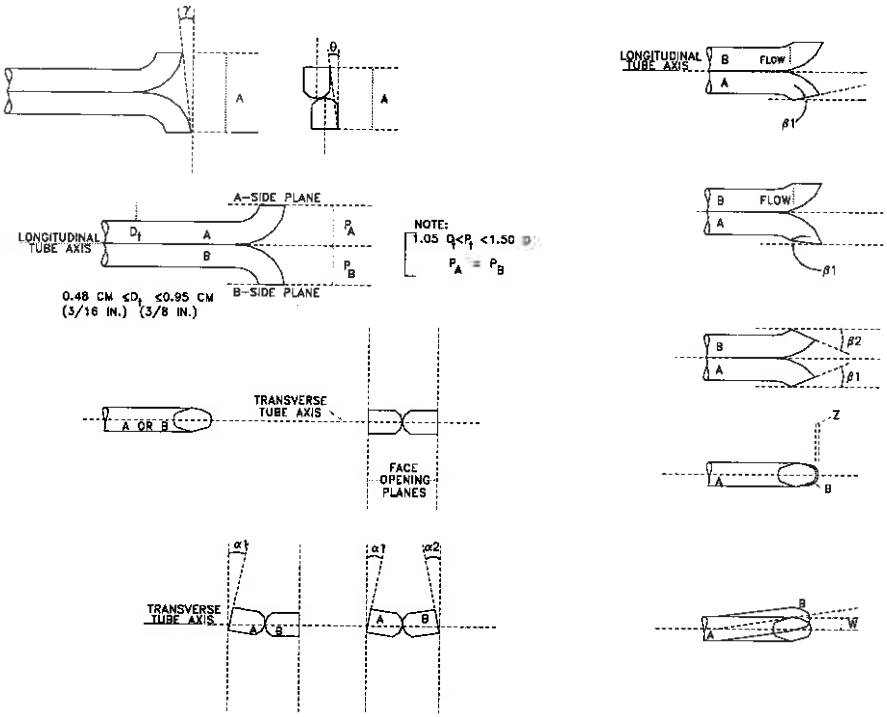
S TYPE PITOT TUBE INSPECTION WORKSHEET

Pitot Tube No: 314 Date: 6/20/2015 Inspector's Name: NLJ

Type of Probe: (circle one) M2 M5 M17 Probe Length: 4 ft.



Pitot tube assembly level? x yes ____ no

Pitot tube openings damaged? ____ yes (explain below) x no

a_1 = 1 ° (<10°), a_2 = 1.5 ° (<10°) z = A sin g = 0.073 (in.); (<0.125 in.)

b_1 = 3 ° (<5°), b_2 = 2.5 ° (<5°) w = A sin q = 0.016 (in.); (<0.03125 in.)

γ = 4.5 °, θ = 1 °, A = 0.936 (in.) P_A = 0.468 (in.), P_B = 0.468 (in.), D_t = 0.375 (in.)

Calibration required? ____ yes x no

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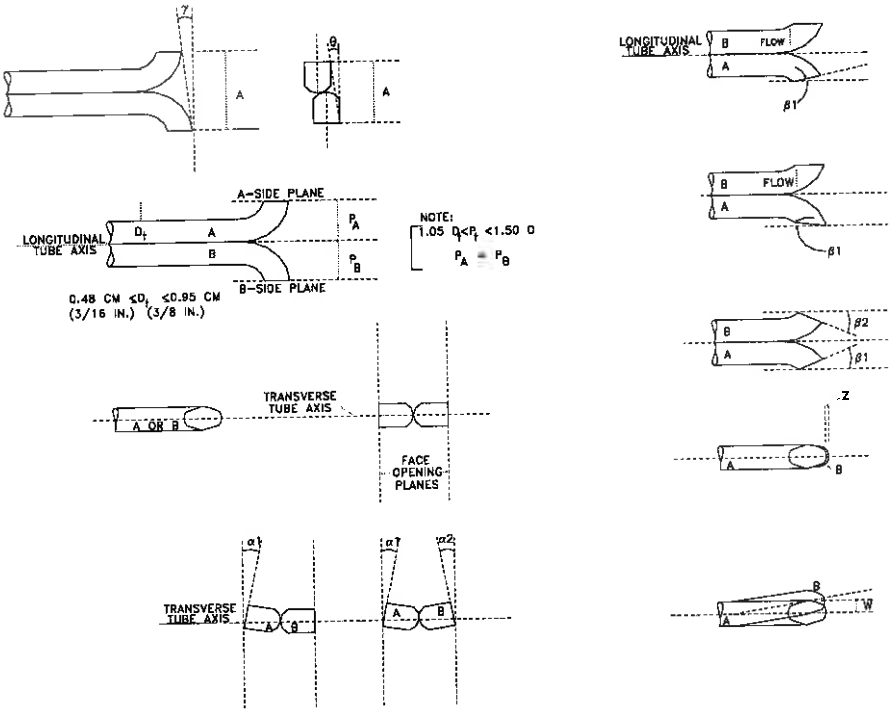
S TYPE PITOT TUBE INSPECTION WORKSHEET

Pitot Tube No: 314 Date: 9/22/2016 Inspector's Name: JHOWE

Type of Probe: (circle one) M2 M5 M17 Probe Length: 4 ft.



Pitot tube assembly level? x yes ____ no

Pitot tube openings damaged? ____ yes (explain below) x no

a_1 = 1 ° (<10°), a_2 = 1.5 ° (<10°) z = A sin g = 0.073 (in.); (<0.125 in.)

b_1 = 3 ° (<5°), b_2 = 3 ° (<5°) w = A sin q = 0.016 (in.); (<0.03125 in.)

γ = 4.5 °, θ = 1 °, A = 0.936 (in.) P_A = 0.468 (in.), P_B = 0.468 (in.), D_t = 0.375 (in.)

Calibration required? ____ yes x no

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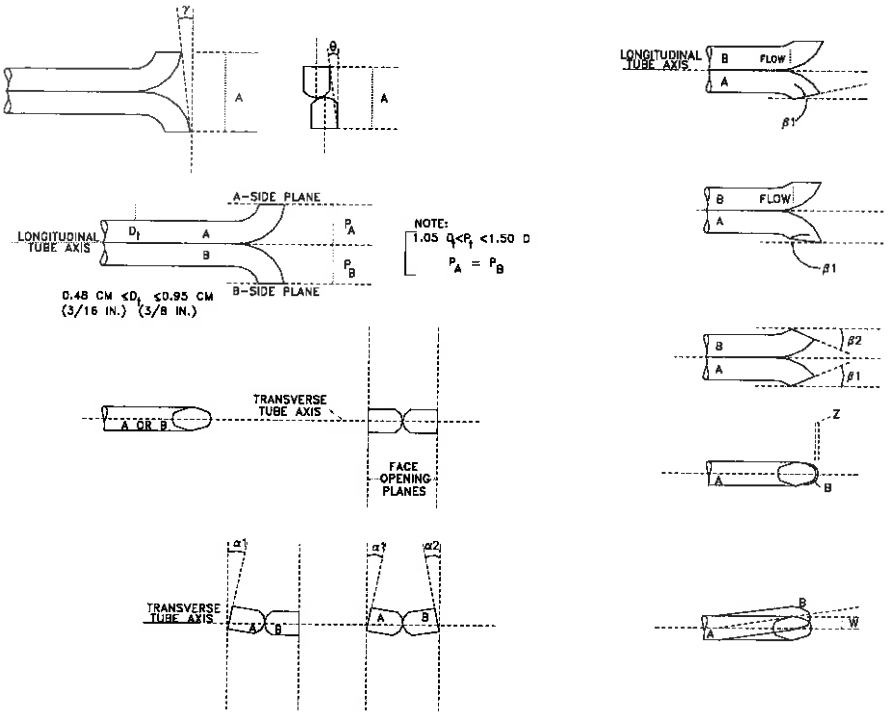
S TYPE PITOT TUBE INSPECTION WORKSHEET

Pitot Tube No: 316 Date: 6/20/2016 Inspector's Name: NLJ

Type of Probe: (circle one) M2 M5 M17 Probe Length: 4 ft.



Pitot tube assembly level? x yes ____ no

Pitot tube openings damaged? ____ yes (explain below) x no

a_1 = 0.5 ° (<10°), a_2 = 1 ° (<10°) z = A sin g = 0.008 (in.); (<0.125 in.)

b_1 = 1 ° (<5°), b_2 = 1 ° (<5°) w = A sin q = 0.017 (in.); (<0.03125 in.)

γ = 0.5 °, θ = 1 °, A = 0.952 (in.) P_A = 0.476 (in.), P_B = 0.476 (in.), D_t = 0.375 (in.)

Calibration required? ____ yes x no

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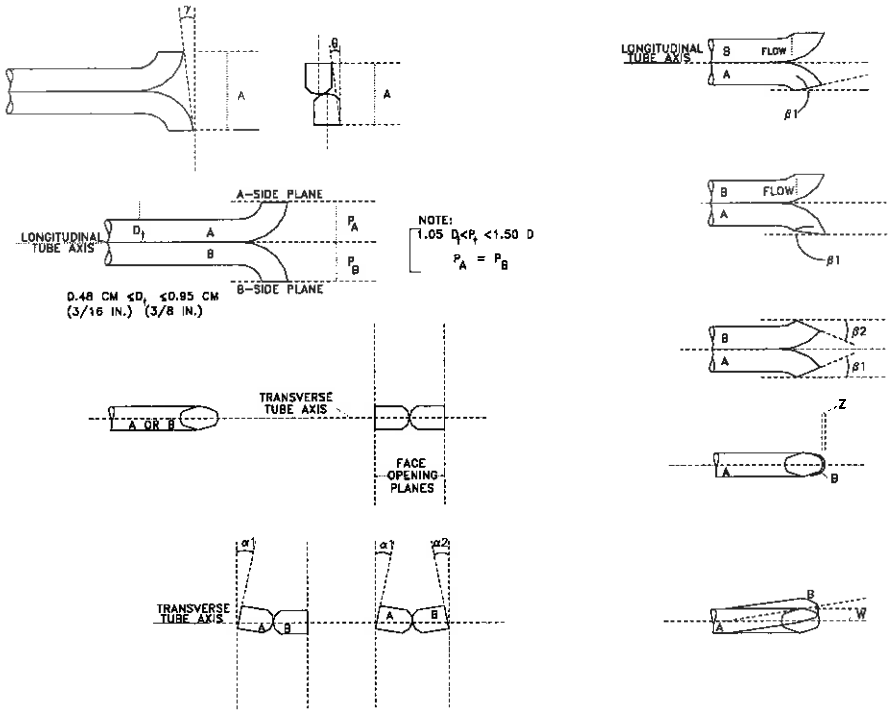
S TYPE PITOT TUBE INSPECTION WORKSHEET

Pitot Tube No: 316 Date: 9/22/2016 Inspector's Name: JHOWE

Type of Probe: (circle one) M2 M5 M17 Probe Length: 4 ft.



Pitot tube assembly level? x yes ____ no

Pitot tube openings damaged? ____ yes (explain below) x no

a_1 = 0.5 ° (<10°), a_2 = 1 ° (<10°) z = A sin g = 0.017 (in.); (<0.125 in.)

b_1 = 1 ° (<5°), b_2 = 1 ° (<5°) w = A sin q = 0.025 (in.); (<0.03125 in.)

γ = 1 °, θ = 1.5 °, A = 0.952 (in.) P_A = 0.476 (in.), P_B = 0.476 (in.), D_t = 0.375 (in.)

Calibration required? ____ yes x no

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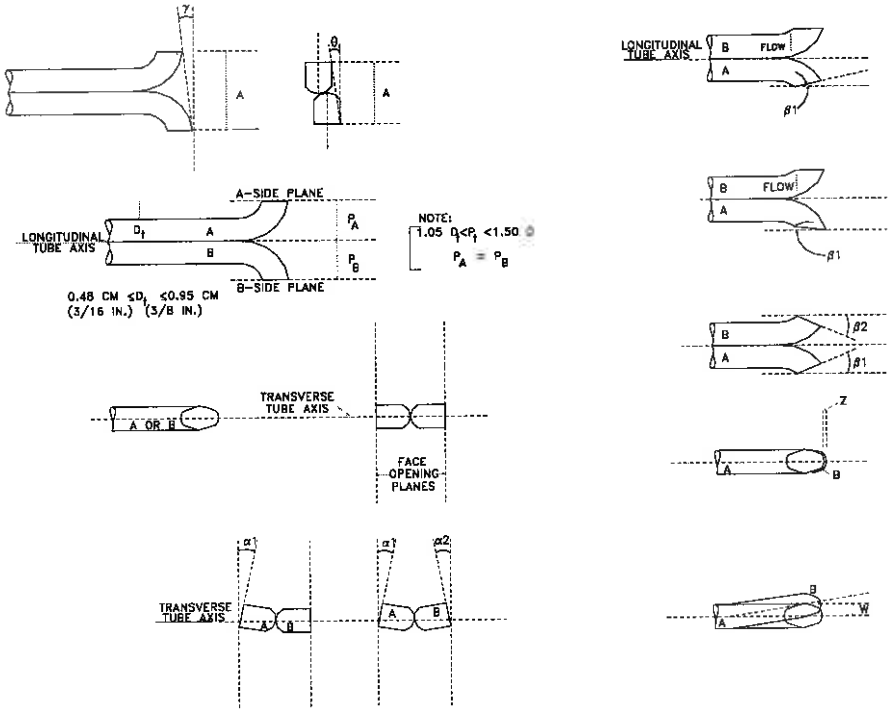
S TYPE PITOT TUBE INSPECTION WORKSHEET

Pitot Tube No: 235 Date: 7/8/2016 Inspector's Name: SMO

Type of Probe: (circle one) M2 M5 M17 Probe Length: 10 ft.



Pitot tube assembly level? x yes ____ no

Pitot tube openings damaged? ____ yes (explain below) x no

a_1 = 1.5 ° (<10°), a_2 = 2 ° (<10°) z = A sin g = 0.000 (in.); (<0.125 in.)

b_1 = 2.5 ° (<5°), b_2 = 1.5 ° (<5°) w = A sin q = 0.008 (in.); (<0.03125 in.)

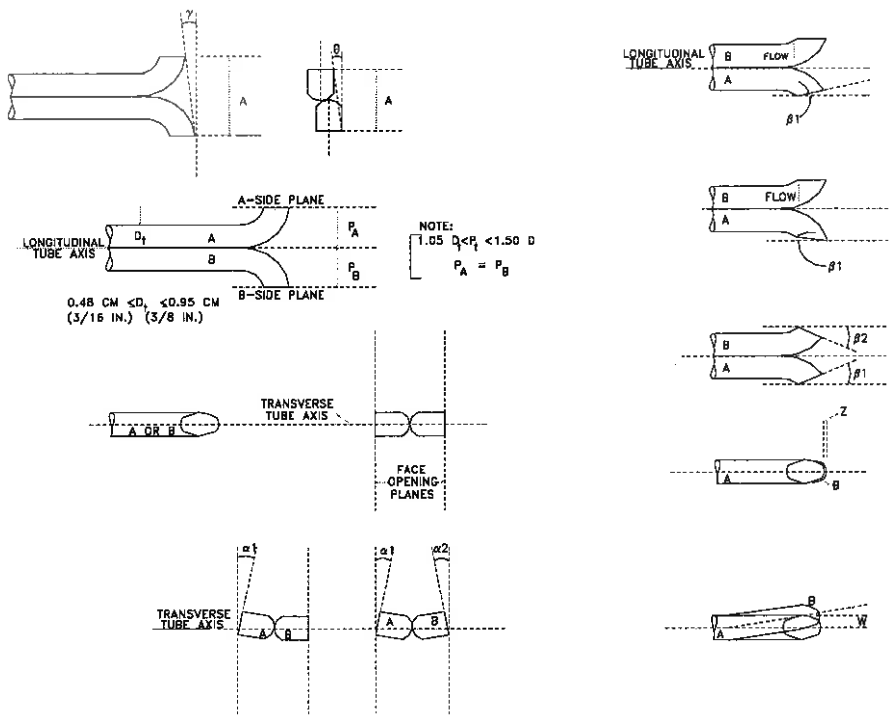
γ = 0 °, θ = 0.5 °, A = 0.963 (in.) P_A = 0.481 (in.), P_B = 0.481 (in.), D_t = 0.375 (in.)

Calibration required? ____ yes x no

S TYPE PITOT TUBE INSPECTION WORKSHEET

Pitot Tube No: 235 Date: 9/22/2016 Inspector's Name: JHOWE

Type of Probe: (circle one) M2 M5 M17 Probe Length: 10 ft.



Pitot tube assembly level? x yes ____ no

Pitot tube openings damaged? ____ yes (explain below) x no

a_1 = 1.5 ° (<10°), a_2 = 2 ° (<10°) z = A sin g = 0.008 (in.); (<0.125 in.)

b_1 = 2.5 ° (<5°), b_2 = 1.5 ° (<5°) w = A sin q = 0.017 (in.); (<0.03125 in.)

γ = 0.5 °, θ = 1 °, A = 0.963 (in.) P_A = 0.481 (in.), P_B = 0.481 (in.), D_t = 0.375 (in.)

Calibration required? ____ yes x no

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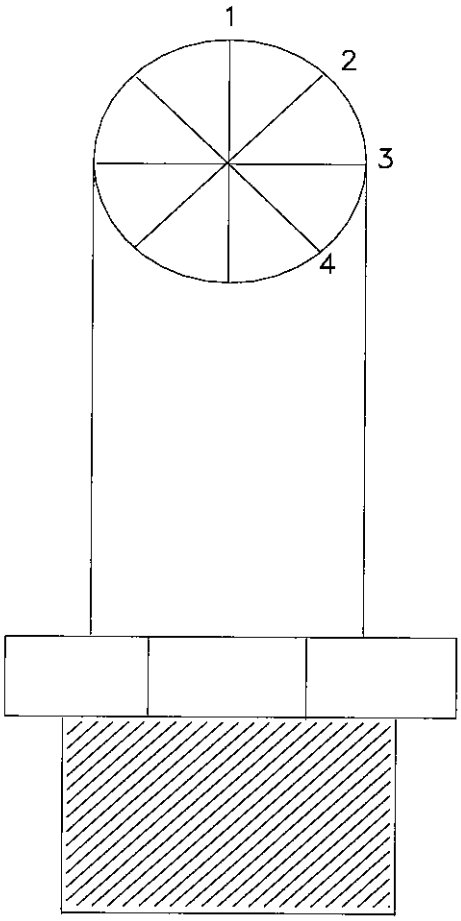
Nozzle Calibration

Date: 9/3/2015

Nozzle ID No.: 372

Analyst: ECS1

Material/Type: Glass



0.268	1
0.268	2
0.268	3
0.267	4

Valid Data

Average
0.268

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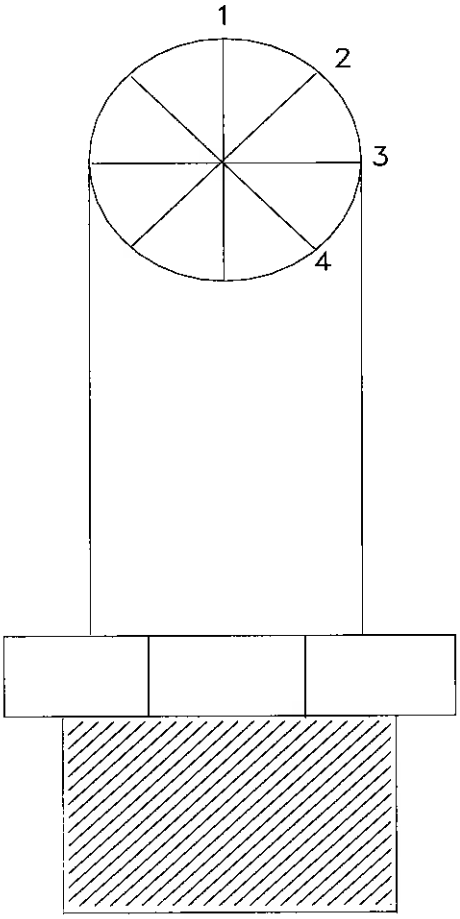
Nozzle Calibration

Date: 9/22/2016

Nozzle ID No.: 372

Analyst: JHOWE

Material/Type: Glass



0.267	1
0.269	2
0.269	3
0.266	4

Valid Data

Average
0.268

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Nozzle Calibration

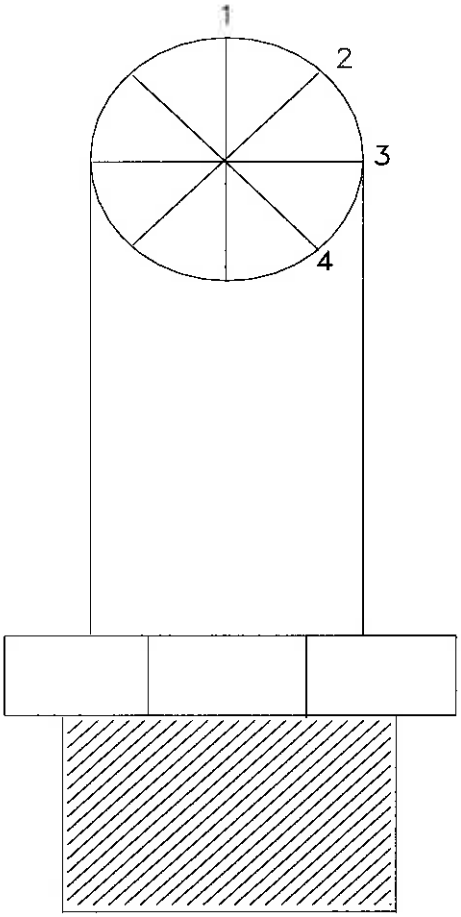
Date: 8/30/2016

Nozzle ID No.: 559

0

Analyst: JRK

Material/Type: Glass



0.255	1
0.254	2
0.255	3
0.255	4

Valid Data

Average
0.254

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Nozzle Calibration

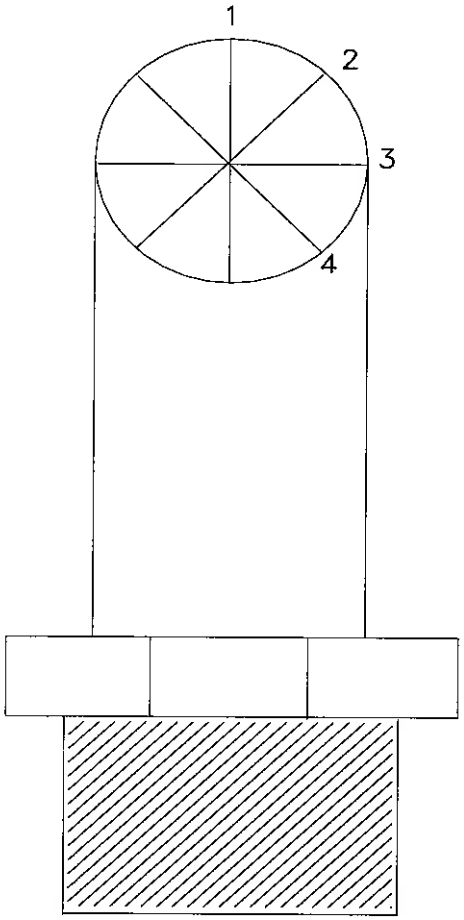
Date: 9/22/2016

Nozzle ID No.: 559

0

Analyst: JHOWE

Material/Type: Glass



0.253	1
0.254	2
0.255	3
0.256	4

Valid Data

Average
0.254

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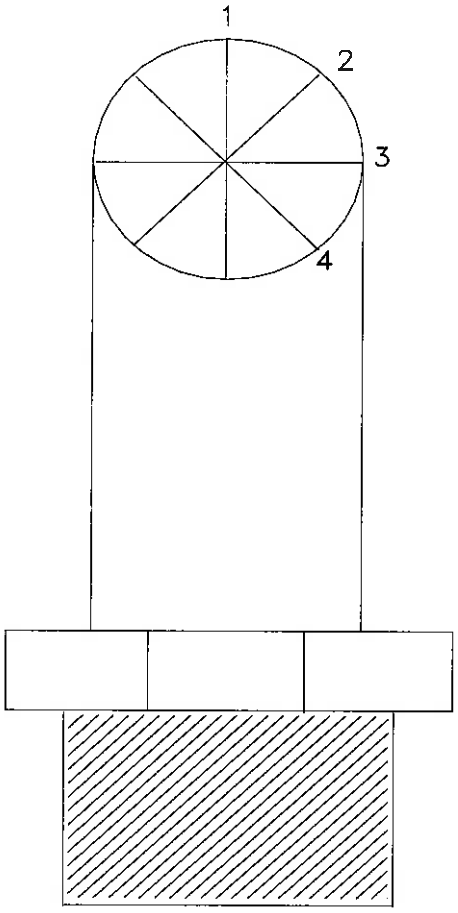
Nozzle Calibration

Date: 2/20/2015

Nozzle ID No.: 226

Analyst: KJC

Material/Type: Glass



0.282	1
0.282	2
0.282	3
0.282	4

Average
0.282

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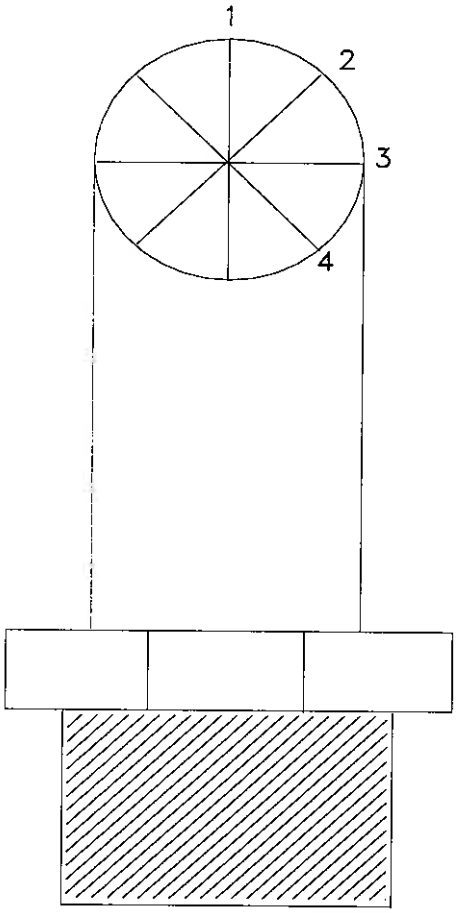
Nozzle Calibration

Date: 9/22/2015

Nozzle ID No.: 226

Analyst: Jhowe

Material/Type: Glass



0.280	1
0.284	2
0.283	3
0.282	4

Average
0.282

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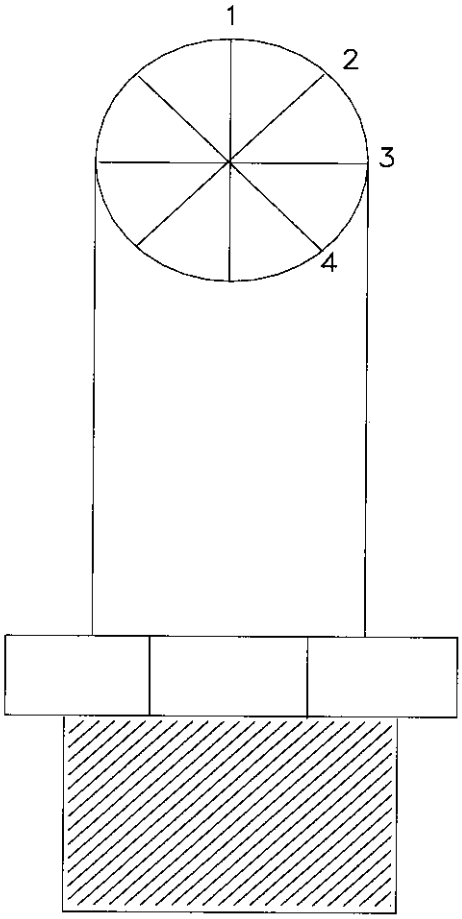
Nozzle Calibration

Date: 9/3/2015

Nozzle ID No.: 353

Analyst: ECS1

Material/Type: Glass



0.230	1
0.227	2
0.228	3
0.228	4

Valid Data

Average
0.228

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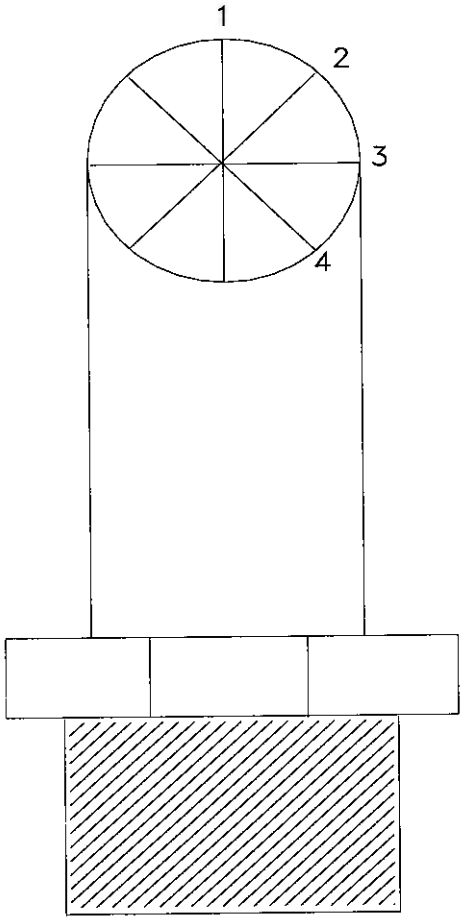
Nozzle Calibration

Date: 9/22/2016

Nozzle ID No.: 353

Analyst: JHOWE

Material/Type: Glass



0.226	1
0.227	2
0.228	3
0.229	4

Valid Data

Average
0.228

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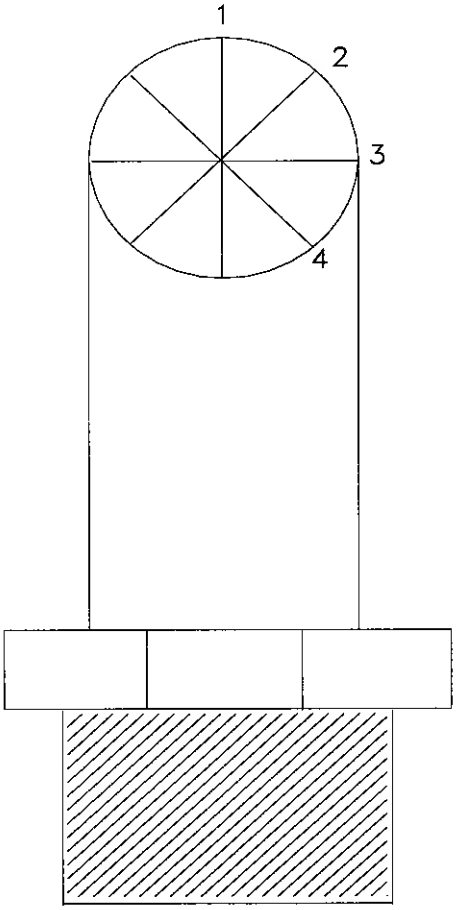
Nozzle Calibration

Date: 1/26/2016

Nozzle ID No.: 445

Analyst: LCM

Material/Type: Glass



0.225	1
0.225	2
0.225	3
0.225	4

Average
0.225

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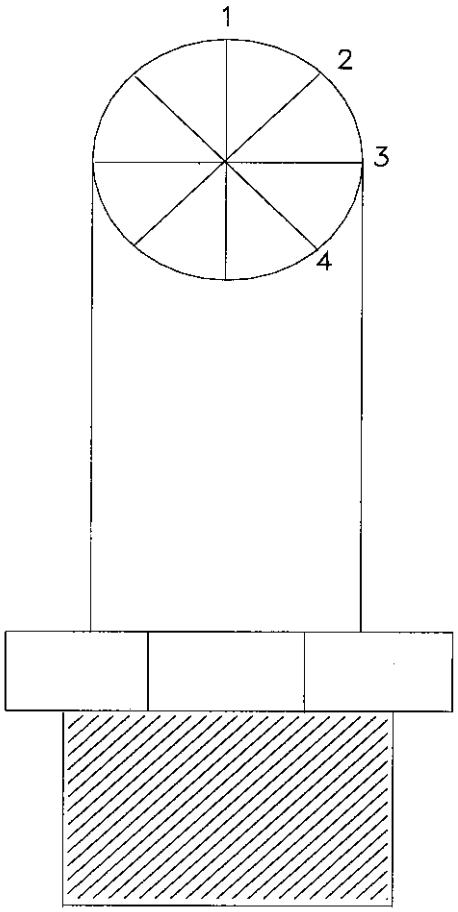
Nozzle Calibration

Date: 9/22/2016

Nozzle ID No.: 445

Analyst: JHOWE

Material/Type: Glass



0.225	1
0.225	2
0.225	3
0.225	4

Average
0.225

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Appendix I - Gas Cylinder Certification

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Airgas

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E02AI99E15A0655	Reference Number:	54-124518981-2
Cylinder Number:	CC473054	Cylinder Volume:	146.2 CF
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12015	Valve Outlet:	660
Gas Code:	SO2,BALA	Certification Date:	Oct 26, 2015

Expiration Date: Oct 26, 2023

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
SULFUR DIOXIDE	50.00 PPM	51.93 PPM	G1	+/- 1.0% NIST Traceable	10/19/2015, 10/26/2015
AIR	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	07120203	CC240061	100.7 PPM SULFUR DIOXIDE/NITROGEN	+/- 1.0%	Sep 22, 2017

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet 6700 AHR0801332	FTIR	Sep 28, 2015

Triad Data Available Upon Request

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Chicago, IL 60628
(773) 785-3000 Fax: (773) 785-1928
Airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E02AI99E15A07F9	Reference Number:	54-124493827-2
Cylinder Number:	SG9153190BAL	Cylinder Volume:	146.2 CF
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12015	Valve Outlet:	660
Gas Code:	SO2,BALA	Certification Date:	May 22, 2015

Expiration Date: May 22, 2023

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
SULFUR DIOXIDE	90.00 PPM	93.52 PPM	G1	+/- 1.0% NIST Traceable	05/15/2015, 05/22/2015
AIR	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	07120202	CC240069	100.7 PPM SULFUR DIOXIDE/NITROGEN	+/- 1.0%	Sep 22, 2017

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet 6700 AHR0801332	FTIR	May 08, 2015

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an Air Liquide company

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Chicago, IL 60628
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CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E02NI99E15A0080	Reference Number:	54-124562666-1
Cylinder Number:	XC031061B	Cylinder Volume:	144.3 CF
Laboratory:	124 - Chicago - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12016	Valve Outlet:	350
Gas Code:	CO,BALN	Certification Date:	Jul 05, 2016

Expiration Date: Jul 05, 2024

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

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

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON MONOXIDE	250.0 PPM	251.5 PPM	G1	+/- 0.5% NIST Traceable	07/05/2016
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	12060328	CC353961	249.3 PPM CARBON MONOXIDE/NITROGEN	+/- 0.4%	Oct 26, 2017

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
CO-2 HORIBA VIA-510 851174011	NDIR	Jun 22, 2016

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Chicago, IL 60628
(773) 785-3000 Fax: (773) 785-1928
www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E02NI99E15A0499	Reference Number:	54-124455546-8
Cylinder Number:	CC7510	Cylinder Volume:	144.3 CF
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12014	Valve Outlet:	350
Gas Code:	CO,BALN	Certification Date:	Sep 27, 2014

Expiration Date: Sep 27, 2022

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

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

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON MONOXIDE	450.0 PPM	448.5 PPM	G1	+/- 0.7% NIST Traceable	09/27/2014
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	12062418	CC2591	487.1 PPM CARBON MONOXIDE/NITROGEN	+/- 0.6%	Jun 22, 2018

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
CO-1 HORIBA VIA-510 TKPPF7FG	NDIR	Sep 03, 2014

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CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E02NI90E15A0123	Reference Number:	54-124538223-1
Cylinder Number:	CC178776	Cylinder Volume:	149.8 CF
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12016	Valve Outlet:	580
Gas Code:	CO2,BALN	Certification Date:	Feb 15, 2016

Expiration Date: Feb 15, 2024

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

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

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON DIOXIDE	10.00 %	10.23 %	G1	+/- 1.0% NIST Traceable	02/15/2016
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	06120402	CC184369	19.66 % CARBON DIOXIDE/NITROGEN	+/- 0.5%	May 01, 2018

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
CO2-1 HORIBA VIA-510 V1E3H7P5	NDIR	Feb 09, 2016

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Chicago, IL 60628
773-785-3000 Fax: 773-785-1928
Airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E02NI90E15A0123	Reference Number:	54-124552006-1
Cylinder Number:	CC17707	Cylinder Volume:	149.8 CF
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12016	Valve Outlet:	580
Gas Code:	CO2,BALN	Certification Date:	May 03, 2016

Expiration Date: May 03, 2024

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

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

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON DIOXIDE	10.00 %	10.18 %	G1	+/- 1% NIST Traceable	05/03/2016
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	13060817	CC416652	24.04 % CARBON DIOXIDE/NITROGEN	+/- 0.6%	May 16, 2019

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
CO2-1 HORIBA VIA-510 V1E3H7P5	NDIR	May 02, 2016

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CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E02NI80E15ACMD7	Reference Number:	54-124500021-2
Cylinder Number:	EB0021818	Cylinder Volume:	156.5 CF
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12015	Valve Outlet:	580
Gas Code:	CO2,BALN	Certification Date:	Jun 22, 2015

Expiration Date: Jun 22, 2023

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

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

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON DIOXIDE	19.50 %	19.74 %	G1	+/- 1.0% NIST Traceable	06/22/2015
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	06120402	CC184369	19.66 % CARBON DIOXIDE/NITROGEN	+/- 0.5%	May 01, 2016

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
CO2-1 HORIBA VIA-510 V1E3H7P5	NDIR	Jun 12, 2015

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Airgas Specialty Gases
Airgas USA, LLC
12722 South Wentworth Avenue
Chicago, IL 60628
773-785-3000 Fax: 773-785-1928
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E02NI88E15A3424	Reference Number:	54-124558221-4
Cylinder Number:	CC100304	Cylinder Volume:	145.4 CF
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12016	Valve Outlet:	590
Gas Code:	O2,BALN	Certification Date:	Jun 03, 2016

Expiration Date: Jun 03, 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	12.00 %	12.08 %	G1	+/- 1.0% NIST Traceable	06/03/2016
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	98051016	SG9163074BAL	12.05 % OXYGEN/NITROGEN	+/- 0.7%	Dec 02, 2017

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
O2-1 HORIBA MPA-510 3VUYL9NR	Paramagnetic	May 31, 2016

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CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E02NI78E15A0124	Reference Number:	54-124506970-1
Cylinder Number:	EB0064892	Cylinder Volume:	146.3 CF
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12015	Valve Outlet:	590
Gas Code:	O2,BALN	Certification Date:	Aug 07, 2015

Expiration Date: Aug 07, 2023

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	22.00 %	21.65 %	G1	+/- 1.0% NIST Traceable	08/07/2015
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	06120204	CC195893	20.90 % OXYGEN/NITROGEN	+/- 0.4%	Dec 01, 2015

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
O2-1 HORIBA MPA-510 3VUYL9NR	Paramagnetic	Jul 31, 2015

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END OF THE REPORT

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