

8/12/15

Mr. Craig Snyder
Mr. Mitch Little
Hellman & Associates
11913 W Interstate 70 Frontage Rd N
Wheat Ridge, CO 80033

H2S Analysis by GC-FPD

Dear Mr. Little & Mr. Snyder,

APT Laboratory Services was delivered seven gas phase samples in foil lined Tedlar bags on August 6, 2015. An H2S analysis was performed by APT on August 7, 2015, utilizing a modified ASTM Method D5504. A three-point calibration was performed on a HP 5890 gas chromatograph equipped with a flame photometric detector. Samples were analyzed in triplicate for hydrogen sulfide and a post calibration check was performed to show the stability of the instrument. All calibrations and sample results are enclosed. A summary of the results is shown below.

Hellman & Associates – H2S by GC-FPD, August 7, 2015	
<i>Sample</i>	<i>H2S Conc. (ppm)</i>
CW080415-01	29.9
CW080415-02	31.0
CW080415-03	17.0
CW080415-04	25.1
CW080415-05	6.7
CW080415-06	8.0
CW080415-07	4.4

Modified ASTM D5504 Results

We look forward to being of service to Hellman & Associates in the future. Please call me with any questions or comments at (303) 420-5949 or (800) 268-6213.

Regards,



Daniel Williams
Asst Director of Laboratory Services

APT Project: LWTO5098

DENVER OFFICE
5530 Marshall Street
Arvada, CO 80002
(303) 420-5949
FAX (303) 420-5920
(800) 268-6213

Hellman & Associates
Wheat Ridge, CO
8/7/2015

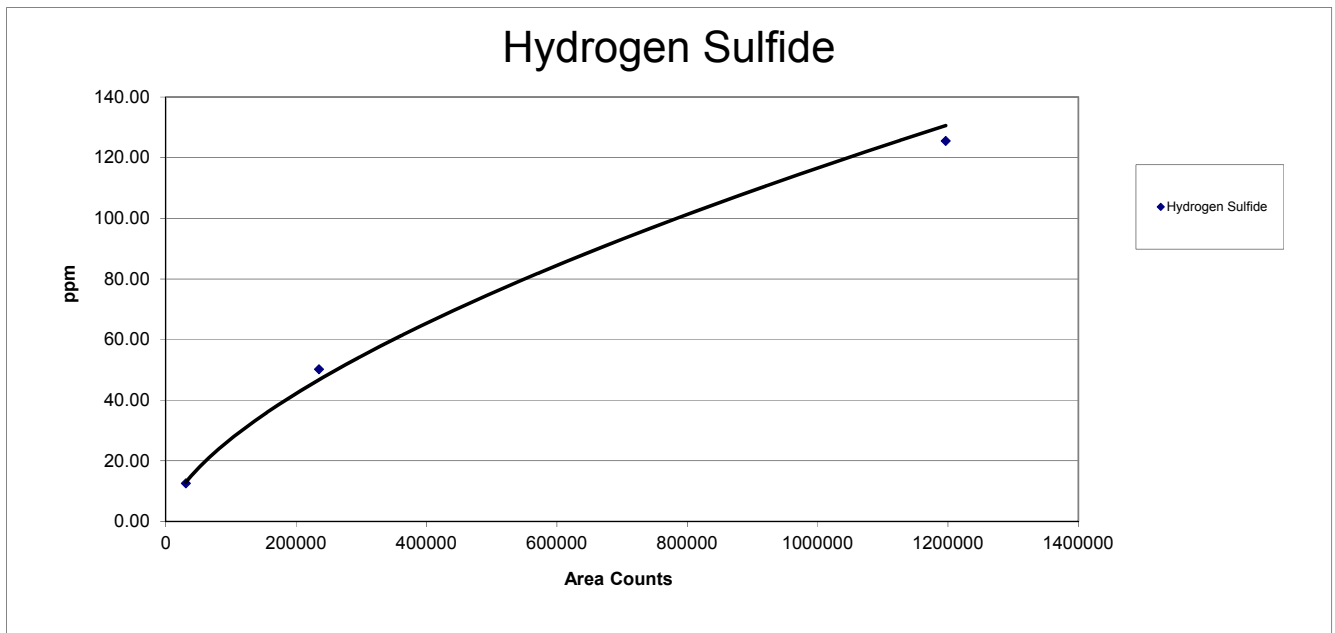
EPA Method 18: Determination of Gaseous Organic Compounds using Gas Chromatography

Initial Three-Point Calibration											
Low Level Calibration Standard											
Cpd ID	Conc. (ppm)	Inj. 1		Inj. 2		Inj. 3		Average		OK?	
		RT	AC	RT	AC	RT	AC	RT	AC		
Hydrogen Sulfide	12.55	1.921	32430.2	1.922	30161.4	1.924	29923.0	1.922	30838	Y	
Mid-Low Level Calibration Standard											
Cpd ID	Conc. (ppm)	Inj. 1		Inj. 2		Inj. 3		Average		OK?	
		RT	AC	RT	AC	RT	AC	RT	AC		
Hydrogen Sulfide	50.20	1.923	234464.0	1.923	233040	1.925	237866.0	1.924	235123	Y	
Mid-High Calibration Standard											
Cpd ID	Conc. (ppm)	Inj. 3		Inj. 4		Inj. 5		Average		OK?	
		RT	AC	RT	AC	RT	AC	RT	AC		
Hydrogen Sulfide	125.50	1.924	1161200.0	1.924	1180790	1.927	1247410.0	1.925	1196467	Y	

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Power Regression Calculations
conc= A*area^B

Hydrogen Sulfide					
Certified ppm	Average AC	Power Regression Statistics		ppm from curve	
		R ²	A		B
12.55	30838	0.9974	0.018937	0.631563	12.96
50.20	235123				46.73
125.50	1196467				130.58



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Sample Analysis										
CW080415-01										
Cpd ID	Inj. 3		Inj. 5		Inj. 6		Average			
	RT	AC	RT	AC	RT	AC	RT	AC	OK?	ppm
Hydrogen Sulfide	1.922	122288.2	1.923	112165.5	1.924	113834.3	1.923	116096	Y	29.93
CW080415-02										
Cpd ID	Inj. 1		Inj. 2		Inj. 3		Average			
	RT	AC	RT	AC	RT	AC	RT	AC	OK?	ppm
Hydrogen Sulfide	1.920	123491.7	1.923	121129.7	1.923	123026.7	1.922	122549	Y	30.97
CW080415-03										
Cpd ID	Inj. 2		Inj. 5		Inj. 6		Average			
	RT	AC	RT	AC	RT	AC	RT	AC	OK?	ppm
Hydrogen Sulfide	1.920	46788.5	1.922	49266.9	1.921	46014.3	1.921	47357	Y	16.99
CW080415-04										
Cpd ID	Inj. 1		Inj. 2		Inj. 3		Average			
	RT	AC	RT	AC	RT	AC	RT	AC	OK?	ppm
Hydrogen Sulfide	1.920	92733.7	1.923	83249.1	1.92	87837.5	1.921	87940	Y	25.11
CW080415-05										
Cpd ID	Inj. 1		Inj. 2		Inj. 3		Average			
	RT	AC	RT	AC	RT	AC	RT	AC	OK?	ppm
Hydrogen Sulfide	1.920	10226.2	1.921	11300.9	1.919	10849.9	1.920	10792	Y	6.68
CW080415-06										
Cpd ID	Inj. 1		Inj. 2		Inj. 3		Average			
	RT	AC	RT	AC	RT	AC	RT	AC	OK?	ppm
Hydrogen Sulfide	1.922	14604.5	1.923	14042.9	1.92	14610.6	1.922	14419	Y	8.02
CW080415-07										
Cpd ID	Inj. 1		Inj. 2		Inj. 3		Average			
	RT	AC	RT	AC	RT	AC	RT	AC	OK?	ppm
Hydrogen Sulfide	1.920	5883.4	1.92	5292.0	1.921	5620.3	1.920	5599	Y	4.41



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Quality Assurance														
Recovery / Spike (mid-level calibration gas to the sample probe)														
Cpd ID	Conc. (ppm)	Inj. 2		Inj. 3		Inj. 4		Average			Triplicate OK?	Recovery OK?	Audit OK?	
		RT	AC	RT	AC	RT	AC	RT	AC	ppm				
Hydrogen Sulfide	50.20	1.922	225530.9	1.92	245859.9	1.92	244440.3	1.921	238610	47.17	Y	Y	Y	

WT05098

AIR POLLUTION TESTING
5530 MARSHALL ST.
ARVADA, CO 80002
T 303-420-5549
F 303-420-5598

Temperature on Receipt _____

CHAIN OF CUSTODY RECORD - Shipping Receipt

Record all of the unit temperatures, unit pressures, collection dates and ambient conditions.

PROJECT CODE	Project Manager Mitch Little	CHAIN OF CUSTODY #
CLIENT NAME Helmman & Associates	TELEPHONE # / FAX # 970 460 4182	Page 1 of 1
ADDRESS 11913 W. J-70 Frontage Rd North Wheat Ridge	DATE 08/06/15	CONTRACT/PURCHASE/QUOTE #
CITY	STATE CO	LAB CONTACT Mike Pearson
ZIP CODE 80033	SITE CONTACT Mitch Little	CARRIER / WAYBILL #
		LAB NUMBER 303-420-5949 x 22

SITE NAME	WELL ID & SAMPLE	Cylinder #	Unit Temperature (°F)	Unit Pressure (psi)	Ambient T (°F)	Ambient P (psi)	Date Collected	Sampler's Initials	Analysis Method
Whiting Oil	RZ080415-01						08/04/15	ML	ASTM D5504
	RZ080415-02								
	RZ080415-03								
	RZ080415-04								
	RZ080415-05								
	RZ080415-06								
	RZ080415-07								

Notes:

1. Relinquished By Mitch Little	Date 08/06/15	Time 1638	1. Received By Dae Marx	Date 8/6/15	Time 1640
2. Relinquished By	Date	Time	2. Received By	Date	Time
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments: