

7/11/17

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

H2S Analysis by GC-FPD

Dear Mr. Little,

APT Laboratory Services was delivered two gas phase samples in foil lined Tedlar bags on July 7, 2017. An H2S analysis was performed by APT on July 10, 2017, 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, September 15, 2015	
Sample	H2S Conc. (ppm)
Razor 12G-WH1309-170706	53.4
Razor 12G-WH1310-170706	63.6
Razor 12H-North FWKO-170706	31.9
Razor 12H-South FWKO-170706	27.8

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: LWTO7099

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



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 Modified ASTM D5504: Determination of Gaseous Reduced Sulfur Compounds using Gas Chromatography

Initial Three-Point Calibration									
Low Level Calibration Standard									
Cpd ID	Conc. (ppm)	Inj. 1		Inj. 2		Inj. 3		Average	
		RT	AC	RT	AC	RT	AC	RT	AC
Hydrogen Sulfide	20.25	2.212	110882.2	2.212	110021.5	2.212	109506.8	2.212	110137
Mid Level Calibration Standard									
Cpd ID	Conc. (ppm)	Inj. 1		Inj. 2		Inj. 3		Average	
		RT	AC	RT	AC	RT	AC	RT	AC
Hydrogen Sulfide	40.50	2.213	342006.4	2.212	324115.1	2.212	326407.3	2.212	330843
High Level Calibration Standard									
Cpd ID	Conc. (ppm)	Inj. 1		Inj. 2		Inj. 3		Average	
		RT	AC	RT	AC	RT	AC	RT	AC
Hydrogen Sulfide	81.00	2.212	1160219.7	2.212	1136289	2.211	1193660.0	2.212	1163389

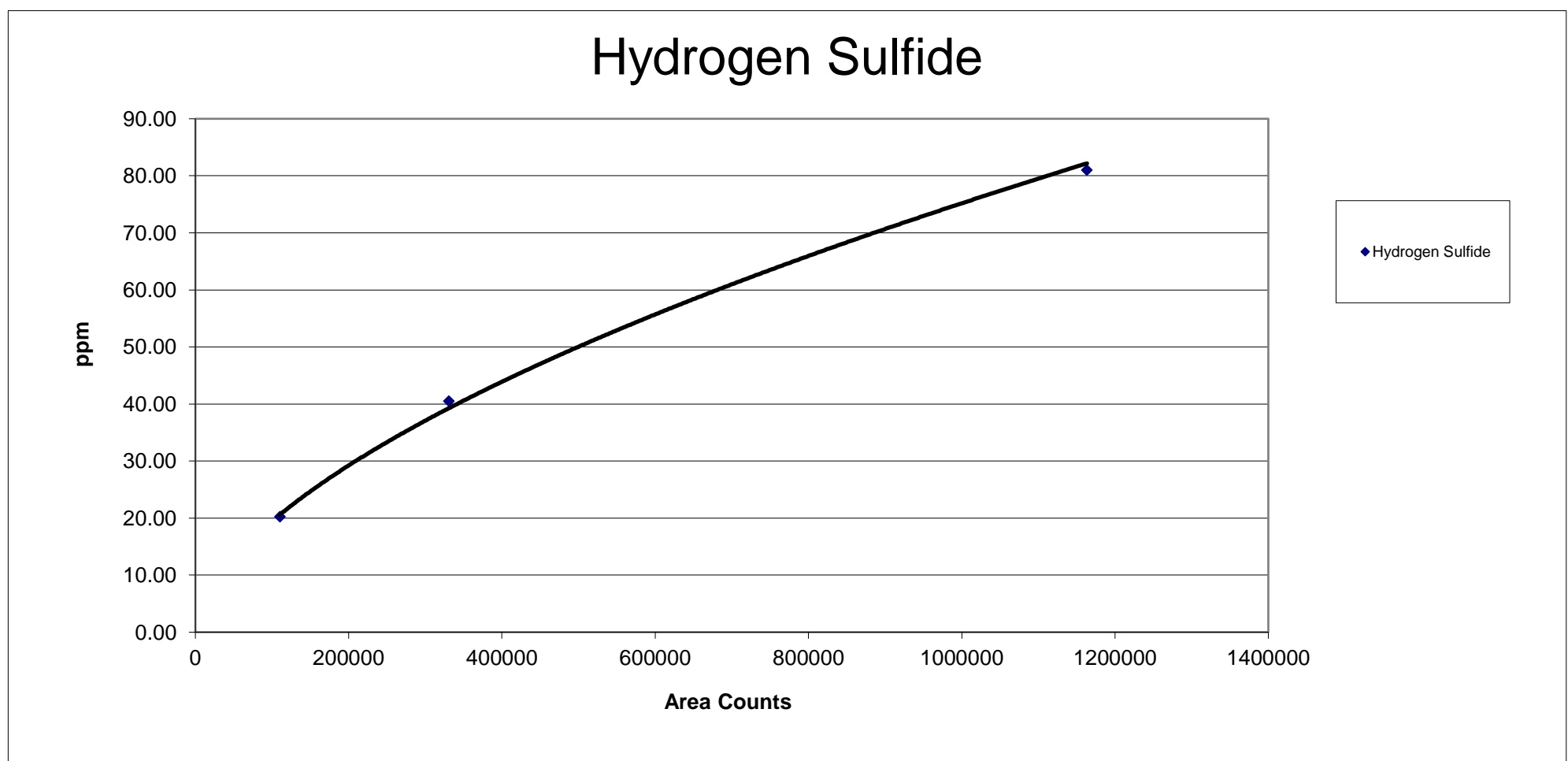
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Power Regression Calculations

$$\text{conc} = A \cdot \text{area}^B$$

Hydrogen Sulfide					
Certified ppm	Average AC	Power Regression Statistics			ppm from curve
		R ²	A	B	
20.25	110137	0.9989	0.022541	0.587194	20.59
40.50	330843				39.27
81.00	1163389				82.17





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Sample Analysis								
Razor 12G-WH1309-170706								
Cpd ID	Inj. 1		Inj. 2		Inj. 3		Average	
	RT	AC	RT	AC	RT	AC	OK?	ppm
Hydrogen Sulfide	2.211	583249.9	2.21	548955.5	2.211	542244.1	2.211 558150	Y 53.39
Razor 12G-WH1310-170706								
Cpd ID	Inj. 1		Inj. 2		Inj. 3		Average	
	RT	AC	RT	AC	RT	AC	OK?	ppm
Hydrogen Sulfide	2.213	763916.1	2.213	758317.1	2.214	730844.8	2.213 751026	Y 63.55
Razor 12H-North FWKO-170706								
Cpd ID	Inj. 1		Inj. 2		Inj. 3		Average	
	RT	AC	RT	AC	RT	AC	OK?	ppm
Hydrogen Sulfide	2.213	229697.2	2.213	223369.1	2.213	242941	2.213 232002	Y 31.88
Razor 12H-South FWKO-170706								
Cpd ID	Inj. 1		Inj. 2		Inj. 3		Average	
	RT	AC	RT	AC	RT	AC	OK?	ppm
Hydrogen Sulfide	2.212	180093.1	2.212	185237.7	2.211	187097.5	2.212 184143	Y 27.84



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Quality Assurance													
Recovery / Spike (mid-level calibration gas to the sample probe)													
Cpd ID	Conc. (ppm)	Inj. 1		Inj. 2		Inj. 3		Average			Triplicate OK?	Recovery OK?	Audit OK?
		RT	AC	RT	AC	RT	AC	RT	AC	ppm			
Hydrogen Sulfide	81.00	2.212	1182584	2.213	1157932	2.213	1150429	2.213	1163648	82.18	Y	Y	Y

CHAIN OF CUSTODY RECORD - Shipping Receipt

Temperature on Receipt: _____

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

AIR POLLUTION TESTING
5530 MARSHALL ST.
ARVADA, CO 80002
T: (303) 425-5849
F: (303) 425-5833

PROJECT CODE

LESTO 7099

Project Manager

Michael Little

CHAIN OF CUSTODY #

CLIENT NAME

Hellen Assoc. / Witing Oil

TELEPHONE # / FAX #

970 460 4182

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ADDRESS

11913 W. E. 30 Frontenord, North
Westridge

DATE

CONTRACT/PURCHASE/QUOTE #

CITY

STATE
CO

ZIP CODE
80033

SITE CONTACT

LAB CONTACT
Mike Pearson

LAB NUMBER
303-420-5849 x 22

CARRIER / WAYBILL #

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

Razor 124-North Funks-170706

Witing

7/2/17

ML

Hz S

Razor 124-South-Funks-170706

Witing

Razor 126-WH1309-170706

Witing

Razor 126-WH1310-170706

Witing

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Notes:

1. Relinquished By

7/2/17 [Signature]

Date 7/2/17

Time 13:38

1. Received By

[Signature]

Date 7/2/17

Time 13:38

2. Relinquished By

Date

Time

2. Received By

[Signature]

Date

Time

3. Relinquished By

Date

Time

3. Received By

[Signature]

Date

Time

Comments: