

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 |                 |
|--|-----------------|
| Sample   | H2S Conc. (ppm) |
| RZ080415-01  | 29.9            |
| RZ080415-02  | 31.0            |
| RZ080415-03  | 17.0            |
| RZ080415-04  | 25.1            |
| RZ080415-05  | 6.7             |
| RZ080415-06  | 8.0             |
| RZ080415-07  | 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

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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 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   |
| High Level 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   |

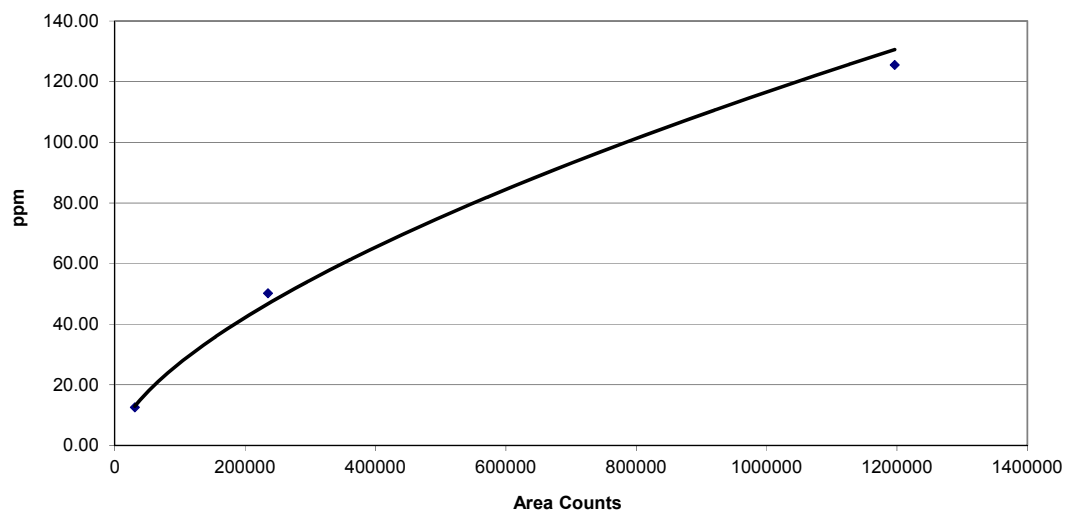
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Power Regression Calculations

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

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

## Hydrogen Sulfide



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

| Sample Analysis  |        |          |        |          |        |          |         |        |         |
|------------------|--------|----------|--------|----------|--------|----------|---------|--------|---------|
| RZ080415-01      |        |          |        |          |        |          |         |        |         |
| 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 |
| RZ080415-02      |        |          |        |          |        |          |         |        |         |
| 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 |
| RZ080415-03      |        |          |        |          |        |          |         |        |         |
| 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 |
| RZ080415-04      |        |          |        |          |        |          |         |        |         |
| 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 |
| RZ080415-05      |        |          |        |          |        |          |         |        |         |
| 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  |
| RZ080415-06      |        |          |        |          |        |          |         |        |         |
| 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  |
| RZ080415-07      |        |          |        |          |        |          |         |        |         |
| 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<br>ID  | Conc.<br>(ppm) | Inj. 2 |          | Inj. 3 |          | Inj. 4 |          | Average |        |       | Triplicate<br>OK? | Recovery<br>OK? | Audit<br>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            |

MT050908

**AIR POLLUTION TESTING**  
5530 MARSHALL ST.  
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T (303) 420-5949  
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CHAIN OF CUSTODY #

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CONTRACT/PURCHASE/QUOTE #

CARRIER / WAYBILL #

### Analysis Method

D5504

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