



## Gas Analysis Certificate

GPA Standard 2261-13

|                       |                      |                |                  |
|-----------------------|----------------------|----------------|------------------|
| Method Name           | C6+ Excel Recalc2    | Project #:     | 03143-0880       |
| Last calibration date | 6/19/2015 8:47:52 AM | Meter ID:      | 3004520327 (BHD) |
| Client:               | BP                   | Date Sampled   | 06-23-15         |
| Site Name:            | Federal GC L 001     | Date Received: | 06-23-15         |
| Sampled by:           | Brandn K.            | Date Analyzed: | 06-25-15         |
| Analyzed by:          | Logan Richter        | Analysis Time: | Standard         |
| Sample Pressure:      | 16 psig              |                |                  |
| Sample Temperature    |                      |                |                  |

### Component Results (14.696)

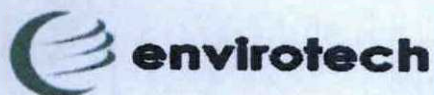
| Name           | Qty (Norm)<br>[Mol %] | Wt Percent<br>(%) | GPM    |
|----------------|-----------------------|-------------------|--------|
| Helium         | 0.744                 | 0.147             | 0.076  |
| Oxygen         | 0.008                 | 0.012             | 0.001  |
| Nitrogen       | 0.662                 | 0.913             | 0.073  |
| Carbon Dioxide | 0.000                 | 0.000             | 0.000  |
| Methane        | 81.549                | 64.435            | 13.836 |
| Ethane         | 8.174                 | 12.106            | 2.188  |
| Propane        | 5.314                 | 11.541            | 1.465  |
| i-Butane       | 1.081                 | 3.096             | 0.354  |
| n-Butane       | 1.478                 | 4.232             | 0.466  |
| i-Pentane      | 0.551                 | 1.957             | 0.202  |
| n-Pentane      | 0.439                 | 1.561             | 0.159  |
| C6+            | 0.000                 | 0.000             | 0.000  |
|                | 100.000               | 100.000           | 18.819 |

### Calculations at Pressure Base 14.696

|                                     |         |                                     |         |
|-------------------------------------|---------|-------------------------------------|---------|
| Compressibility (Z) (Dry Gas)       | 0.99668 | C2+                                 | 4.834   |
| Density (G) (Dry Gas)               | 0.70101 | C3+                                 | 2.647   |
| Component MW Total                  | 20.30   | C5+                                 | 0.361   |
| Heating Value (Dry Ideal) Total BTU | 1225.04 | Heating Value (Sat Ideal) Total BTU | 1203.66 |
| Heating Value (Dry Real) Total BTU  | 1229.12 | Heating Value (Sat Real) Total BTU  | 1207.54 |

  
Reviewed by

07/01/2015  
mm dd yyyy



## Gas Analysis Certificate

**GPA Standard 2261-13**

Method Name C6+ Excel Recalc2  
Last calibration date 6/19/2015 8:47:52 AM

|                    |                  |                |                  |
|--------------------|------------------|----------------|------------------|
| Client:            | BP               | Project #:     | 03143-0880       |
| Site Name:         | Federal GC L 001 | Meter ID:      | 3004520327 (CSG) |
| Sampled by:        | Brandon K.       | Date Sampled:  | 06-23-15         |
| Analyzed by:       | Logan Richter    | Date Received: | 06-23-15         |
| Sample Pressure:   | 13 psig          | Date Analyzed: | 06-25-15         |
| Sample Temperature |                  | Analysis Time: | Standard         |

### Component Results (14.696)

| Name           | Qty (Norm)<br>[Mol %] | Wt Percent<br>(%) | GPM    |
|----------------|-----------------------|-------------------|--------|
| Helium         | 0.310                 | 0.030             | 0.032  |
| Oxygen         | 0.004                 | 0.003             | 0.000  |
| Nitrogen       | 0.347                 | 0.236             | 0.039  |
| Carbon Dioxide | 1.569                 | 1.676             | 0.271  |
| Methane        | 32.917                | 12.819            | 5.652  |
| Ethane         | 7.042                 | 5.140             | 1.907  |
| Propane        | 18.355                | 19.647            | 5.122  |
| i-Butane       | 9.374                 | 13.225            | 3.107  |
| n-Butane       | 16.036                | 22.625            | 5.120  |
| i-Pentane      | 7.959                 | 13.940            | 2.948  |
| n-Pentane      | 6.086                 | 10.659            | 2.234  |
| C6+            | 0.000                 | 0.000             | 0.000  |
|                | 100.000               | 100.000           | 26.433 |

### Calculations at Pressure Base 14.696

|                                     |         |                                     |         |
|-------------------------------------|---------|-------------------------------------|---------|
| Compressibility (Z) (Dry Gas)       | 0.98483 | C2+                                 | 20.439  |
| Density (G) (Dry Gas)               | 1.42238 | C3+                                 | 18.531  |
| Component MW Total                  | 41.20   | C5+                                 | 5.183   |
| Heating Value (Dry Ideal) Total BTU | 2309.31 | Heating Value (Sat Ideal) Total BTU | 2269.01 |
| Heating Value (Dry Real) Total BTU  | 2344.88 | Heating Value (Sat Real) Total BTU  | 2302.74 |

*RJR*  
Reviewed by

07/01/2015  
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Needs Re-Pull