



|                                 |
|---------------------------------|
| <b>Container Identification</b> |
| 5004487                         |

|                       |
|-----------------------|
| <b>Operator Name</b>  |
| SHELL CANADA UPSTREAM |

|                          |
|--------------------------|
| <b>Laboratory Number</b> |
| 13CG736255A              |

|                               |                                  |
|-------------------------------|----------------------------------|
| <b>Unique Well Identifier</b> | <b>Well Name</b>                 |
| 103/02-12-081-21W6/00         | SHELL Hz GROUNDBIRCH K12-8-81-20 |

|                      |                     |                          |
|----------------------|---------------------|--------------------------|
| <b>Field or Area</b> | <b>Pool or Zone</b> | <b>Sampler's Company</b> |
| GROUNDBIRCH          | MONTNEY B           | WEATHERFORD              |

|                     |                  |              |                  |                 |                        |
|---------------------|------------------|--------------|------------------|-----------------|------------------------|
| <b>Well License</b> | <b>Elevation</b> |              | <b>Test Type</b> | <b>Test No.</b> | <b>Name of Sampler</b> |
| 27862               | KB m 688.70      | GRD m 681.10 |                  |                 |                        |

|                                   |                       |                  |                  |               |                |                 |
|-----------------------------------|-----------------------|------------------|------------------|---------------|----------------|-----------------|
| <b>Test Interval or Perfs mKB</b> | <b>Sampling Point</b> | <b>Separator</b> | <b>Reservoir</b> | <b>Source</b> | <b>Sampled</b> | <b>Received</b> |
| 2520.00-4521.00                   | SIGHT GLASS           |                  |                  | 3100          | 3100           | 2700            |
| mKB                               |                       | Pressure (kPa)   |                  | 22            | 22             | 23              |

|                     |                      |                      |                      |                                       |
|---------------------|----------------------|----------------------|----------------------|---------------------------------------|
| <b>Date Sampled</b> | <b>Date Received</b> | <b>Date Analyzed</b> | <b>Date Reported</b> | <b>Location - Approved By - Title</b> |
| Jul 10, 2013        | Jul 12, 2013         | Jul 22, 2013         | Jul 22, 2013         | Calgary - Cung Tran - Reporter        |

|                                |
|--------------------------------|
| <b>Other Information</b>       |
| SFC: K12-08-081-20W6/00; FS-50 |

\* Results relate only to the items tested

| COMP.        | MOLE FRACTION | MASS FRACTION | VOLUME FRACTION |
|--------------|---------------|---------------|-----------------|
| N2           | 0.0001        | TRACE         | TRACE           |
| CO2          | 0.0003        | 0.0002        | 0.0001          |
| H2S          | 0.0000        | 0.0000        | 0.0000          |
| C1           | 0.1173        | 0.0214        | 0.0484          |
| C2           | 0.0574        | 0.0196        | 0.0372          |
| C3           | 0.0556        | 0.0278        | 0.0373          |
| IC4          | 0.0268        | 0.0177        | 0.0213          |
| NC4          | 0.0385        | 0.0254        | 0.0295          |
| IC5          | 0.0268        | 0.0219        | 0.0238          |
| NC5          | 0.0289        | 0.0237        | 0.0255          |
| C6           | 0.0660        | 0.0644        | 0.0659          |
| C7+          | 0.5823        | 0.7779        | 0.7110          |
| <b>TOTAL</b> | <b>1.0000</b> | <b>1.0000</b> | <b>1.0000</b>   |

### Observed Properties of C7+ Residue (15/15° C)

|                         |                         |                  |
|-------------------------|-------------------------|------------------|
| <i>Density</i>          | <i>Relative Density</i> | <i>API @ 15°</i> |
| 743.6 kg/m <sup>3</sup> | 0.7443                  | 58.6             |

*Relative Molecular Mass*

|       |
|-------|
| 117.8 |
|-------|

### Calculated Properties of Total Sample (15/15° C)

|                         |                         |                  |
|-------------------------|-------------------------|------------------|
| <i>Density</i>          | <i>Relative Density</i> | <i>API @ 15°</i> |
| 679.5 kg/m <sup>3</sup> | 0.6801                  | 76.5             |

*Relative Molecular Mass*

|      |
|------|
| 88.1 |
|------|

*Gas Equivalency*

|       |
|-------|
| 182.3 |
|-------|

Calculations for C6 and C7 are based on Boiling Point Grouping. If Carbon Number Grouping had been done, the mole fractions would be (C6: 0.0957) (C7+:0.5526)

This analysis and calculations are based on GPA 2186, GPA 2286, ASTM 2597, and ASTM 5307





|                 |                       |                       |
|-----------------|-----------------------|-----------------------|
| <b>File No.</b> | <b>Company</b>        | <b>UWI / LSD</b>      |
| 13CG736255A     | SHELL CANADA UPSTREAM | 103/02-12-081-21W6/00 |

| BOILING POINT RANGE (C) | COMPONENT         | MOLE FRACTION | MASS FRACTION | VOLUME FRACTION |        |
|-------------------------|-------------------|---------------|---------------|-----------------|--------|
| 36.1 - 68.9             | HEXANES.....      | C6            | 0.0653        | 0.0639          | 0.0654 |
| 68.9 - 98.3             | HEPTANES.....     | C7            | 0.0953        | 0.1056          | 0.1036 |
| 98.3 - 125.6            | OCTANES.....      | C8            | 0.1184        | 0.1493          | 0.1425 |
| 125.6 - 150.6           | NONANES.....      | C9            | 0.0888        | 0.1259          | 0.1177 |
| 150.6 - 173.9           | DECANES.....      | C10           | 0.0623        | 0.0980          | 0.0901 |
| 173.9 - 196.1           | UNDECANES.....    | C11           | 0.0346        | 0.0597          | 0.0544 |
| 196.1 - 215.0           | DODECANES.....    | C12           | 0.0165        | 0.0310          | 0.0279 |
| 215.0 - 235.0           | TRIDECANES.....   | C13           | 0.0129        | 0.0264          | 0.0235 |
| 235.0 - 252.2           | TETRADECANES..... | C14           | 0.0066        | 0.0146          | 0.0129 |
| 252.2 - 270.6           | PENTADECANES..... | C15           | 0.0033        | 0.0077          | 0.0067 |
| 270.6 - 287.8           | HEXADECANES.....  | C16           | 0.0013        | 0.0034          | 0.0029 |
| 287.8 - 302.8           | HEPTADECANES..... | C17           | 0.0010        | 0.0026          | 0.0023 |
| 302.8 - 317.2           | OCTADECANES.....  | C18           | 0.0007        | 0.0019          | 0.0016 |
| 317.2 - 330.0           | NONADECANES.....  | C19           | 0.0004        | 0.0011          | 0.0010 |
| 330.0 - 344.4           | EICOSANES.....    | C20           | 0.0002        | 0.0007          | 0.0006 |
| 344.4 - 357.2           | HENEICOSANES..... | C21           | 0.0001        | 0.0004          | 0.0003 |
| 357.2 - 369.4           | DOCOSANES.....    | C22           | 0.0001        | 0.0005          | 0.0004 |
| 369.4 - 380.0           | TRICOSANES.....   | C23           | 0.0001        | 0.0002          | 0.0002 |
| 380.0 - 391.1           | TETRACOSANES..... | C24           | 0.0000        | 0.0002          | 0.0002 |
| 391.1 - 401.7           | PENTACOSANES..... | C25           | 0.0000        | 0.0001          | 0.0001 |
| 401.7 - 412.2           | HEXACOSANES.....  | C26           | 0.0000        | 0.0000          | 0.0000 |
| 412.2 - 422.2           | HEPTACOSANES..... | C27           | 0.0000        | 0.0000          | 0.0000 |
| 422.2 - 431.7           | OCTACOSANES.....  | C28           | 0.0000        | 0.0000          | 0.0000 |
| 431.7 - 441.1           | NONACOSANES.....  | C29           | 0.0000        | 0.0000          | 0.0000 |
| 441.1 - PLUS            | TRIACONTANES      | C30+          | 0.0000        | 0.0000          | 0.0000 |

| BOILING POINT RANGE (C) | Aromatics              | MOLE FRACTION | MASS FRACTION | VOLUME FRACTION |        |
|-------------------------|------------------------|---------------|---------------|-----------------|--------|
| 80.0                    | BENZENE.....           | C6            | 0.0058        | 0.0050          | 0.0039 |
| 110.6                   | TOLUENE.....           | C7            | 0.0272        | 0.0277          | 0.0214 |
| 136.2                   | ETHYLBENZENE.....      | C8            | 0.0022        | 0.0026          | 0.0020 |
| 138.4 - 144.4           | XYLENES.....           | C8            | 0.0314        | 0.0368          | 0.0285 |
| 168.9                   | 1,2,4 TRIMETHYLBENZENE | C9            | 0.0035        | 0.0047          | 0.0036 |

| BOILING POINT RANGE (C) | Naphthenes              | MOLE FRACTION | MASS FRACTION | VOLUME FRACTION |        |
|-------------------------|-------------------------|---------------|---------------|-----------------|--------|
| 48.9                    | CYCLOPENTANE.....       | CC5           | 0.0007        | 0.0005          | 0.0005 |
| 72.2                    | METHYLCYCLOPENTANE..... | MCC5          | 0.0070        | 0.0065          | 0.0059 |
| 81.1                    | CYCLOHEXANE.....        | CC6           | 0.0169        | 0.0157          | 0.0135 |
| 101.1                   | METHYLCYCLOHEXANE.....  | MCC6          | 0.0457        | 0.0496          | 0.0433 |

The above hexanes plus values are based upon a measured mass fraction and a calculated mole fraction, and assume a total hydrocarbon recovery from the chromatographic system.

