



# CONFIDENTIAL WELL COMPLETION FORM

## WELL HISTORY - DESCRIPTION OF WELL & LEASE

OPERATOR: License # 34662  
Name: Tug Hill Operating, LLC  
Address 1: 550 BAILEY AVE, STE 510  
Address 2: \_\_\_\_\_  
City: FT. WORTH State: TX Zip: 76107 + \_\_\_\_\_  
Contact Person: Winnie Scott  
Phone: ( 817 ) 632-3400  
CONTRACTOR: License # 34670  
Name: Patterson-UTI Drilling Company LLC  
Wellsite Geologist: NA  
Purchaser: \_\_\_\_\_

Designate Type of Completion:  
 New Well     Re-Entry     Workover  
  
 Oil     WSW     SWD     SLOW  
 Gas     D&A     ENHR     SIGW  
 OG     GSW     Temp. Abd.  
 CM (Coal Bed Methane)  
 Cathodic     Other (Core. Expl., etc.): \_\_\_\_\_

If Workover/Re-entry: Old Well Info as follows:  
Operator: \_\_\_\_\_  
Well Name: \_\_\_\_\_  
Original Comp. Date: \_\_\_\_\_ Original Total Depth: \_\_\_\_\_  
 Deepening     Re-perf.     Conv. to ENHR     Conv. to SWD  
 Conv. to GSW  
  
 Plug Back: \_\_\_\_\_ Plug Back Total Depth \_\_\_\_\_  
 Commingled    Permit #: \_\_\_\_\_  
 Dual Completion    Permit #: \_\_\_\_\_  
 SWD    Permit #: \_\_\_\_\_  
 ENHR    Permit #: \_\_\_\_\_  
 GSW    Permit #: \_\_\_\_\_  
  
09/06/2012    09/23/2012    11/09/2012  
Spud Date or    Date Reached TD    Completion Date or  
Recompletion Date       Recompletion Date

API No. 15 - 15-083-21784-01-00  
Spot Description: \_\_\_\_\_  
N2 N2 NE NE Sec. 31 Twp. 23 S. R. 22  East  West  
200 Feet from  North /  South Line of Section  
660 Feet from  East /  West Line of Section  
Footages Calculated from Nearest Outside Section Corner:  
 NE     NW     SE     SW  
County: Hodgeman  
Lease Name: Imel Well #: 1-31H  
Field Name: \_\_\_\_\_  
Producing Formation: Mississippi  
Elevation: Ground: 2342 Kelly Bushing: 23  
Total Depth: 9193 Plug Back Total Depth: 9193  
Amount of Surface Pipe Set and Cemented at: 815 Feet  
Multiple Stage Cementing Collar Used?  Yes  No  
If yes, show depth set: \_\_\_\_\_ Feet  
If Alternate II completion, cement circulated from: \_\_\_\_\_  
feet depth to: \_\_\_\_\_ w/ \_\_\_\_\_ sx cmt.

**Drilling Fluid Management Plan**  
(Data must be collected from the Reserve Pit)  
Chloride content: 18000 ppm Fluid volume: 1300 bbls  
Dewatering method used: Evaporated  
Location of fluid disposal if hauled offsite: \_\_\_\_\_  
Operator Name: \_\_\_\_\_  
Lease Name: \_\_\_\_\_ License #: \_\_\_\_\_  
Quarter \_\_\_\_\_ Sec. \_\_\_\_\_ Twp. \_\_\_\_\_ S. R. \_\_\_\_\_  East  West  
County: \_\_\_\_\_ Permit #: \_\_\_\_\_

**AFFIDAVIT**

I am the affiant and I hereby certify that all requirements of the statutes, rules and regulations promulgated to regulate the oil and gas industry have been fully complied with and the statements herein are complete and correct to the best of my knowledge.

Submitted Electronically

**KCC Office Use ONLY**

Letter of Confidentiality Received  
Date: 12/04/2012

Confidential Release Date: \_\_\_\_\_

Wireline Log Received

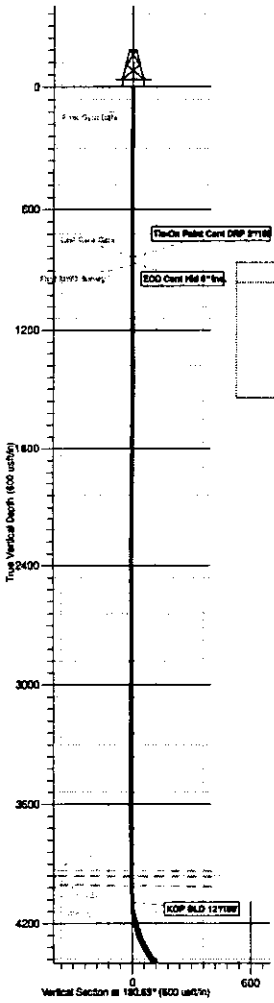
Geologist Report Received

UIC Distribution

ALT  I     II     III Approved by: NAOMI JAMES Date: 12/06/2012



Tug Hill Operating LLC  
 Project: Hodgeman County, Kansas (NAD 83)  
 Site: Sec 31, T23S, R22W  
 Well: Inel #1-31H  
 Wellbore: Original Wellbore  
 Design: Plan #4  
 Lat: 38° 0' 51.026 N  
 Long: 99° 46' 24.082 W  
 Pad GL: 2338.0  
 KB: WELL @ 2359.0ush



| FORMATION TOP DETAILS |         |             |             |
|-----------------------|---------|-------------|-------------|
| TYD/Fath              | MD/Fath | Formation   | Dip/Angle   |
| 3653.0                | 3653.0  | Washers     | 0.00 180.63 |
| 3864.0                | 3864.0  | Douglas     | 0.00 180.63 |
| 4071.0                | 4071.0  | Lansing     | 0.00 180.63 |
| 4267.0                | 4267.0  | Marathon    | 0.00 180.63 |
| 4363.0                | 4363.0  | Cherokee    | 0.00 180.63 |
| 4522.0                | 4522.0  | Mississippi | 0.00 180.63 |
| 4636.0                | 4636.0  |             | 0.00 180.63 |

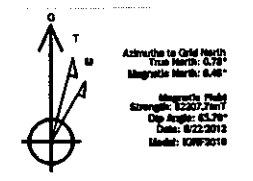
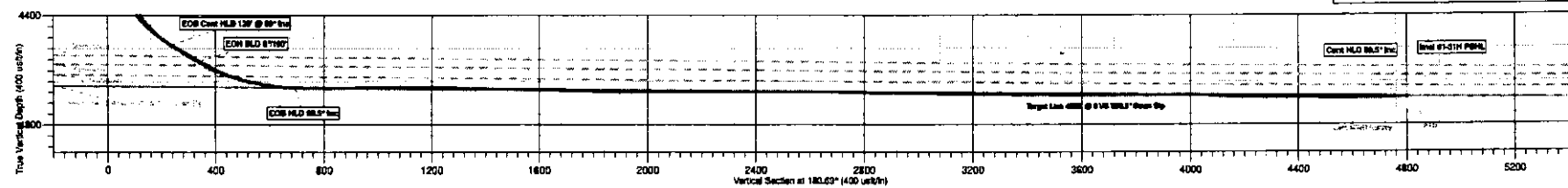
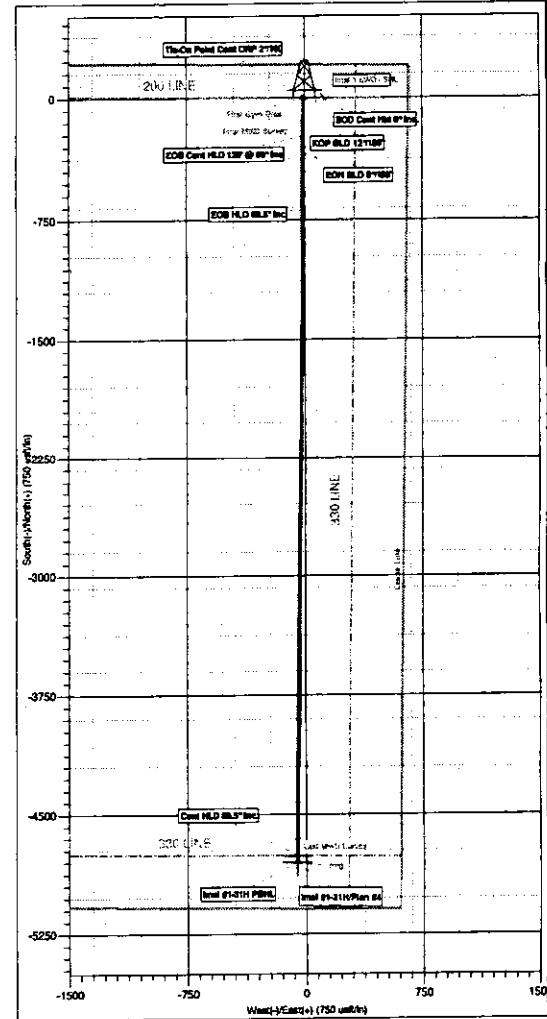
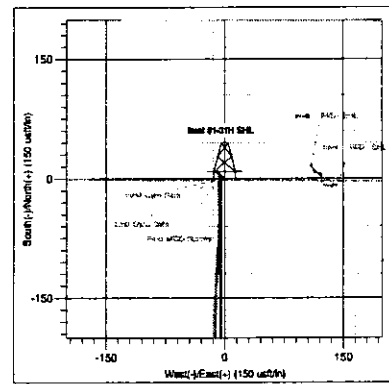
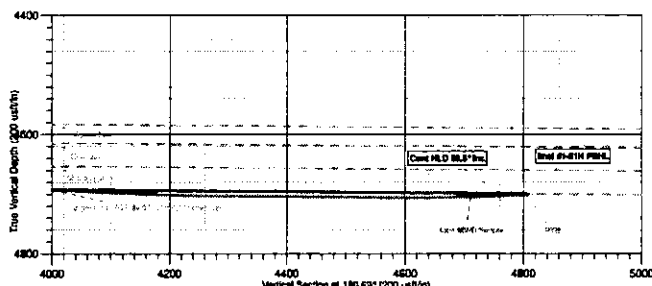
Target Line 4537 @ 0 VS INCL'S Down Dip

| WELL DETAILS: Inel #1-31H |         |       |              |
|---------------------------|---------|-------|--------------|
| TYD                       | +N-S    | +E-W  | Ground Level |
| 4700.5                    | -4700.7 | -27.4 | 2338.0       |
| 4700.8                    | -4800.8 | -27.9 | 1825457.23   |

Northings: 1825457.23  
 Eastings: 943503.33  
 Lat/Long: 38° 0' 51.026 N 99° 46' 24.082 W

| WELLBORE TARGET DETAILS (LAT/LONG) |        |         |       |
|------------------------------------|--------|---------|-------|
| Name                               | TYD    | +N-S    | +E-W  |
| Core HLD INCL'S Inc.               | 4700.5 | -4700.7 | -27.4 |
| Inel #1-31H P89L                   | 4700.8 | -4800.8 | -27.9 |

| SECTION DETAILS |       |        |        |        |       |       |        |        |                      |
|-----------------|-------|--------|--------|--------|-------|-------|--------|--------|----------------------|
| SID             | Inc   | Adj    | TYD    | +N-S   | +E-W  | Dip   | T/Face | V/Sec  | Target               |
| 837.9           | 0.48  | 186.30 | 837.0  | 2.5    | -4.9  | 0.00  | 0.00   | -2.8   |                      |
| 861.6           | 0.00  | 0.00   | 861.6  | 2.5    | -4.9  | 0.00  | 180.00 | -2.4   |                      |
| 4084.6          | 0.00  | 0.00   | 4084.6 | 2.5    | -4.9  | 0.00  | 0.00   | -2.4   |                      |
| 4384.6          | 60.00 | 199.10 | 4384.1 | -298.2 | -2.3  | 12.00 | 180.10 | 298.3  | Core HLD INCL'S Inc. |
| 4714.6          | 60.00 | 180.10 | 4714.1 | -361.9 | -2.6  | 8.80  | 8.88   | 260.3  | Core HLD INCL'S Inc. |
| 6305.4          | 63.00 | 180.63 | 6304.0 | -922.1 | -4.0  | 8.00  | 1.21   | 632.1  | Core HLD INCL'S Inc. |
| 7915.3          | 63.00 | 180.63 | 7914.0 | -474.7 | 0.00  | 0.00  | 4781.0 | 0.00   | Core HLD INCL'S Inc. |
| 8912.5          | 63.00 | 180.63 | 8911.0 | -450.7 | -27.9 | 8.00  | 8.00   | 4601.0 |                      |





## **Tug Hill Operating LLC**

**Hodgeman County, Kansas (NAD 83)**

**Sec 31, T23S, R22W**

**Imel #1-31H**

**Original Wellbore**

**Survey: MWD Surveys**

## **Standard Survey Report**

**22 September, 2012**



Company: Tug Hill Operating LLC  
 Project: Hodgeman County, Kansas (NAD 83)  
 Site: Sec 31, T23S, R22W  
 Well: Imel #1-31H  
 Wellbore: Original Wellbore  
 Design: Original Wellbore

Local Co-ordinate Reference: Site Sec 31, T23S, R22W  
 TVD Reference: WELL @ 2359.0usft  
 MD Reference: WELL @ 2359.0usft  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature  
 Database: EDM 5000.1 Single User Db

|                    |                                  |                      |                |
|--------------------|----------------------------------|----------------------|----------------|
| <b>Project</b>     | Hodgeman County, Kansas (NAD 83) |                      |                |
| <b>Map System:</b> | US State Plane 1983              | <b>System Datum:</b> | Mean Sea Level |
| <b>Geo Datum:</b>  | North American Datum 1983        |                      |                |
| <b>Map Zone:</b>   | Kansas Southern Zone             |                      |                |

|                              |                    |                     |                   |                          |         |
|------------------------------|--------------------|---------------------|-------------------|--------------------------|---------|
| <b>Site</b>                  | Sec 31, T23S, R22W |                     |                   |                          |         |
| <b>Site Position:</b>        | <b>Northing:</b>   | 1,805,497.39 usft   | <b>Latitude:</b>  | 38° 0' 51.026 N          |         |
| <b>From:</b>                 | <b>Easting:</b>    | 945,503.39 usft     | <b>Longitude:</b> | 99° 46' 24.082 W         |         |
| <b>Position Uncertainty:</b> | 0.0 usft           | <b>Slot Radius:</b> | 13-3/16 "         | <b>Grid Convergence:</b> | -0.78 ° |

|                             |             |                            |                  |                      |                   |                  |
|-----------------------------|-------------|----------------------------|------------------|----------------------|-------------------|------------------|
| <b>Well</b>                 | Imel #1-31H |                            |                  |                      |                   |                  |
| <b>Well Position</b>        | <b>+N-S</b> | 0.0 usft                   | <b>Northing:</b> | 1,805,497.39 usft    | <b>Latitude:</b>  | 38° 0' 51.026 N  |
|                             | <b>+E-W</b> | 0.0 usft                   | <b>Easting:</b>  | 945,503.39 usft      | <b>Longitude:</b> | 99° 46' 24.082 W |
| <b>Position Uncertainty</b> | 0.0 usft    | <b>Wellhead Elevation:</b> | usft             | <b>Ground Level:</b> | 2,336.0 usft      |                  |

|                  |                   |                    |                    |                  |                       |
|------------------|-------------------|--------------------|--------------------|------------------|-----------------------|
| <b>Wellbore</b>  | Original Wellbore |                    |                    |                  |                       |
| <b>Magnetics</b> | <b>Model Name</b> | <b>Sample Date</b> | <b>Declination</b> | <b>Dip Angle</b> | <b>Field Strength</b> |
|                  | IGRF2010          | 8/22/2012          | (°)                | (°)              | (nT)                  |
|                  |                   |                    | 5.68               | 65.79            | 52,208                |

|                          |                         |               |             |                      |     |
|--------------------------|-------------------------|---------------|-------------|----------------------|-----|
| <b>Design</b>            | Original Wellbore       |               |             |                      |     |
| <b>Audit Notes:</b>      |                         |               |             |                      |     |
| <b>Version:</b>          | 1.0                     | <b>Phase:</b> | ACTUAL      | <b>Tie On Depth:</b> | 0.0 |
| <b>Vertical Section:</b> | <b>Depth From (TVD)</b> | <b>+N-S</b>   | <b>+E-W</b> | <b>Direction</b>     |     |
|                          | (usft)                  | (usft)        | (usft)      | (°)                  |     |
|                          | 0.0                     | 0.0           | 0.0         | 180.69               |     |

|                       |                       |                                  |                  |                      |
|-----------------------|-----------------------|----------------------------------|------------------|----------------------|
| <b>Survey Program</b> | <b>Date</b> 9/22/2012 |                                  |                  |                      |
| <b>From</b>           | <b>To</b>             | <b>Survey (Wellbore)</b>         | <b>Tool Name</b> | <b>Description</b>   |
| (usft)                | (usft)                |                                  |                  |                      |
| 100.0                 | 837.0                 | Gyro Surveys (Original Wellbore) | NS-GYRO-SS       | NS Gyro single shots |
| 875.0                 | 9,193.0               | MWD Surveys (Original Wellbore)  | MWD              | MWD - Standard       |

|                         |                    |                |                       |             |             |                         |                    |                   |                  |  |
|-------------------------|--------------------|----------------|-----------------------|-------------|-------------|-------------------------|--------------------|-------------------|------------------|--|
| <b>Survey</b>           |                    |                |                       |             |             |                         |                    |                   |                  |  |
| <b>Measured Depth</b>   | <b>Inclination</b> | <b>Azimuth</b> | <b>Vertical Depth</b> | <b>+N-S</b> | <b>+E-W</b> | <b>Vertical Section</b> | <b>Dogleg Rate</b> | <b>Build Rate</b> | <b>Turn Rate</b> |  |
| (usft)                  | (°)                | (°)            | (usft)                | (usft)      | (usft)      | (usft)                  | (°/100usft)        | (°/100usft)       | (°/100usft)      |  |
| 837.0                   | 0.49               | 186.30         | 837.0                 | 2.6         | -4.8        | -2.5                    | 0.00               | 0.00              | 0.00             |  |
| 875.0                   | 0.50               | 173.50         | 875.0                 | 2.3         | -4.8        | -2.2                    | 0.29               | 0.03              | -33.68           |  |
| <b>First MWD Survey</b> |                    |                |                       |             |             |                         |                    |                   |                  |  |
| 967.0                   | 0.50               | 182.90         | 967.0                 | 1.5         | -4.8        | -1.4                    | 0.09               | 0.00              | 10.22            |  |
| 1,059.0                 | 0.60               | 200.50         | 1,059.0               | 0.6         | -5.0        | -0.6                    | 0.21               | 0.11              | 19.13            |  |
| 1,151.0                 | 0.50               | 193.50         | 1,151.0               | -0.2        | -5.3        | 0.3                     | 0.13               | -0.11             | -7.61            |  |
| 1,243.0                 | 0.60               | 184.40         | 1,243.0               | -1.1        | -5.4        | 1.1                     | 0.14               | 0.11              | -9.89            |  |
| 1,335.0                 | 0.70               | 194.80         | 1,334.9               | -2.1        | -5.6        | 2.2                     | 0.17               | 0.11              | 11.30            |  |
| 1,428.0                 | 0.70               | 190.90         | 1,427.9               | -3.2        | -5.8        | 3.3                     | 0.05               | 0.00              | -4.19            |  |
| 1,520.0                 | 0.60               | 8.60           | 1,519.9               | -3.3        | -5.9        | 3.4                     | 1.41               | -0.11             | 193.15           |  |

Company: Tug Hill Operating LLC  
 Project: Hodgeman County, Kansas (NAD 83)  
 Site: Sec 31, T23S, R22W  
 Well: Imel #1-31H  
 Wellbore: Original Wellbore  
 Design: Original Wellbore

Local Co-ordinate Reference: Site Sec 31, T23S, R22W  
 TVD Reference: WELL @ 2359.0usft  
 MD Reference: WELL @ 2359.0usft  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature  
 Database: EDM 5000.1 Single User Db

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (*/100usft) | Build Rate (*/100usft) | Turn Rate (*/100usft) |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|
| 1,612.0               | 0.40            | 8.20        | 1,611.9               | -2.5         | -5.8         | 2.6                     | 0.22                    | -0.22                  | -0.43                 |
| 1,705.0               | 0.50            | 5.40        | 1,704.9               | -1.8         | -5.7         | 1.8                     | 0.11                    | 0.11                   | -3.01                 |
| 1,797.0               | 0.50            | 6.50        | 1,796.9               | -1.0         | -5.6         | 1.0                     | 0.01                    | 0.00                   | 1.20                  |
| 1,890.0               | 0.40            | 341.30      | 1,889.9               | -0.3         | -5.6         | 0.3                     | 0.24                    | -0.11                  | -27.10                |
| 1,983.0               | 0.50            | 344.50      | 1,982.9               | 0.4          | -5.9         | -0.4                    | 0.11                    | 0.11                   | 3.44                  |
| 2,074.0               | 0.60            | 355.40      | 2,073.9               | 1.3          | -6.0         | -1.2                    | 0.16                    | 0.11                   | 11.98                 |
| 2,166.0               | 0.40            | 343.20      | 2,165.9               | 2.1          | -6.1         | -2.0                    | 0.25                    | -0.22                  | -13.26                |
| 2,258.0               | 0.20            | 356.50      | 2,257.9               | 2.5          | -6.2         | -2.5                    | 0.23                    | -0.22                  | 14.46                 |
| 2,350.0               | 0.40            | 341.90      | 2,349.9               | 3.0          | -6.3         | -2.9                    | 0.23                    | 0.22                   | -15.87                |
| 2,442.0               | 0.40            | 332.40      | 2,441.9               | 3.6          | -6.6         | -3.5                    | 0.07                    | 0.00                   | -10.33                |
| 2,535.0               | 0.50            | 327.60      | 2,534.9               | 4.2          | -7.0         | -4.2                    | 0.11                    | 0.11                   | -5.16                 |
| 2,630.0               | 0.40            | 337.70      | 2,629.9               | 4.9          | -7.3         | -4.8                    | 0.13                    | -0.11                  | 10.63                 |
| 2,725.0               | 0.40            | 343.70      | 2,724.9               | 5.5          | -7.5         | -5.4                    | 0.04                    | 0.00                   | 6.32                  |
| 2,819.0               | 0.40            | 321.60      | 2,818.9               | 6.1          | -7.8         | -6.0                    | 0.16                    | 0.00                   | -23.51                |
| 2,914.0               | 0.40            | 334.10      | 2,913.9               | 6.6          | -8.2         | -6.5                    | 0.09                    | 0.00                   | 13.16                 |
| 3,009.0               | 0.40            | 331.50      | 3,008.9               | 7.2          | -8.5         | -7.1                    | 0.02                    | 0.00                   | -2.74                 |
| 3,103.0               | 0.50            | 316.00      | 3,102.9               | 7.8          | -8.9         | -7.7                    | 0.17                    | 0.11                   | -16.49                |
| 3,198.0               | 0.60            | 312.90      | 3,197.9               | 8.5          | -9.6         | -8.3                    | 0.11                    | 0.11                   | -3.26                 |
| 3,292.0               | 0.50            | 332.20      | 3,291.9               | 9.2          | -10.1        | -9.0                    | 0.22                    | -0.11                  | 20.53                 |
| 3,386.0               | 0.80            | 324.80      | 3,385.9               | 10.1         | -10.7        | -9.9                    | 0.33                    | 0.32                   | -7.87                 |
| 3,481.0               | 0.70            | 205.80      | 3,480.9               | 10.1         | -11.3        | -9.9                    | 1.36                    | -0.11                  | -125.26               |
| 3,575.0               | 0.60            | 202.40      | 3,574.9               | 9.1          | -11.8        | -9.0                    | 0.11                    | -0.11                  | -3.62                 |
| 3,669.0               | 0.60            | 92.40       | 3,668.9               | 8.6          | -11.5        | -8.5                    | 1.05                    | 0.00                   | -117.02               |
| 3,763.0               | 1.50            | 135.00      | 3,762.8               | 7.7          | -10.1        | -7.6                    | 1.21                    | 0.96                   | 45.32                 |
| 3,858.0               | 1.50            | 145.50      | 3,857.8               | 5.8          | -8.5         | -5.7                    | 0.29                    | 0.00                   | 11.05                 |
| 3,953.0               | 1.50            | 163.40      | 3,952.8               | 3.6          | -7.5         | -3.5                    | 0.49                    | 0.00                   | 18.84                 |
| 4,047.0               | 1.10            | 182.30      | 4,046.8               | 1.5          | -7.1         | -1.4                    | 0.62                    | -0.43                  | 20.11                 |
| 4,099.0               | 3.70            | 184.30      | 4,098.7               | -0.6         | -7.3         | 0.7                     | 5.00                    | 5.00                   | 3.85                  |
| 4,130.0               | 8.40            | 182.10      | 4,129.5               | -3.9         | -7.4         | 4.0                     | 15.18                   | 15.16                  | -7.10                 |
| 4,161.0               | 12.70           | 178.60      | 4,160.0               | -9.6         | -7.4         | 9.7                     | 14.02                   | 13.87                  | -11.29                |
| 4,193.0               | 16.20           | 177.60      | 4,191.0               | -17.6        | -7.2         | 17.6                    | 10.96                   | 10.94                  | -3.13                 |
| 4,224.0               | 19.50           | 177.60      | 4,220.5               | -27.0        | -6.8         | 27.1                    | 10.65                   | 10.65                  | 0.00                  |
| 4,256.0               | 21.70           | 178.70      | 4,250.4               | -38.3        | -6.4         | 38.4                    | 6.98                    | 6.88                   | 3.44                  |
| 4,287.0               | 23.90           | 181.50      | 4,279.0               | -50.3        | -6.4         | 50.4                    | 7.91                    | 7.10                   | 9.03                  |
| 4,319.0               | 26.90           | 182.30      | 4,307.9               | -64.0        | -6.9         | 64.1                    | 9.44                    | 9.38                   | 2.50                  |
| 4,350.0               | 29.70           | 182.70      | 4,335.2               | -78.7        | -7.6         | 78.8                    | 9.05                    | 9.03                   | 1.29                  |
| 4,382.0               | 31.90           | 183.30      | 4,362.7               | -95.1        | -8.4         | 95.2                    | 6.94                    | 6.88                   | 1.88                  |
| 4,413.0               | 35.20           | 183.10      | 4,388.5               | -112.2       | -9.4         | 112.3                   | 10.65                   | 10.65                  | -0.65                 |
| 4,445.0               | 38.70           | 183.00      | 4,414.1               | -131.4       | -10.4        | 131.5                   | 10.94                   | 10.94                  | -0.31                 |
| 4,477.0               | 41.10           | 182.70      | 4,438.6               | -151.9       | -11.4        | 152.0                   | 7.52                    | 7.50                   | -0.94                 |
| 4,508.0               | 45.10           | 181.30      | 4,461.3               | -173.0       | -12.1        | 173.2                   | 13.27                   | 12.90                  | -4.52                 |
| 4,539.0               | 49.40           | 179.80      | 4,482.3               | -195.8       | -12.3        | 195.9                   | 14.32                   | 13.87                  | -4.84                 |
| 4,571.0               | 54.50           | 178.70      | 4,502.0               | -221.0       | -12.0        | 221.1                   | 16.17                   | 15.94                  | -3.44                 |

**Company:** Tug Hill Operating LLC  
**Project:** Hodgeman County, Kansas (NAD 83)  
**Site:** Sec 31, T23S, R22W  
**Well:** Imel #1-31H  
**Wellbore:** Original Wellbore  
**Design:** Original Wellbore

**Local Co-ordinate Reference:** Site Sec 31, T23S, R22W  
**TVD Reference:** WELL @ 2359.0usft  
**MD Reference:** WELL @ 2359.0usft  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** EDM 5000.1 Single User Db

**Survey**

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N-S (usft) | +E-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) |
|-----------------------|-----------------|-------------|-----------------------|-------------|-------------|-------------------------|-------------------------|------------------------|-----------------------|
| 4,602.0               | 58.00           | 179.30      | 4,519.3               | -246.7      | -11.6       | 246.9                   | 11.40                   | 11.29                  | 1.94                  |
| 4,634.0               | 58.50           | 180.00      | 4,536.1               | -274.0      | -11.4       | 274.1                   | 2.43                    | 1.56                   | 2.19                  |
| 4,665.0               | 59.00           | 180.20      | 4,552.2               | -300.5      | -11.4       | 300.6                   | 1.70                    | 1.61                   | 0.65                  |
| 4,697.0               | 59.50           | 180.30      | 4,568.5               | -328.0      | -11.6       | 328.1                   | 1.59                    | 1.56                   | 0.31                  |
| 4,728.0               | 62.00           | 180.30      | 4,583.7               | -355.0      | -11.7       | 355.1                   | 8.06                    | 8.06                   | 0.00                  |
| 4,760.0               | 66.70           | 180.50      | 4,597.5               | -383.8      | -11.9       | 384.0                   | 14.70                   | 14.69                  | 0.63                  |
| 4,792.0               | 70.00           | 180.80      | 4,609.3               | -413.6      | -12.2       | 413.7                   | 10.35                   | 10.31                  | 0.94                  |
| 4,823.0               | 72.30           | 180.70      | 4,619.3               | -442.9      | -12.6       | 443.0                   | 7.43                    | 7.42                   | -0.32                 |
| 4,854.0               | 74.40           | 181.10      | 4,628.2               | -472.6      | -13.1       | 472.7                   | 6.89                    | 6.77                   | 1.29                  |
| 4,886.0               | 75.60           | 180.70      | 4,636.5               | -503.5      | -13.6       | 503.6                   | 3.94                    | 3.75                   | -1.25                 |
| 4,917.0               | 78.40           | 180.00      | 4,643.5               | -533.7      | -13.8       | 533.8                   | 9.30                    | 9.03                   | -2.26                 |
| 4,948.0               | 80.00           | 180.30      | 4,649.3               | -564.2      | -13.8       | 564.3                   | 5.25                    | 5.16                   | 0.97                  |
| 4,980.0               | 80.40           | 180.30      | 4,654.7               | -595.7      | -14.0       | 595.8                   | 1.25                    | 1.25                   | 0.00                  |
| 5,011.0               | 82.20           | 180.00      | 4,659.4               | -626.3      | -14.1       | 626.5                   | 5.88                    | 5.81                   | -0.97                 |
| 5,043.0               | 85.30           | 179.20      | 4,662.9               | -658.1      | -13.9       | 658.3                   | 10.00                   | 9.69                   | -2.50                 |
| 5,074.0               | 88.30           | 178.90      | 4,664.6               | -689.1      | -13.4       | 689.2                   | 9.73                    | 9.68                   | -0.97                 |
| 5,106.0               | 89.10           | 179.30      | 4,665.4               | -721.1      | -12.8       | 721.2                   | 2.79                    | 2.50                   | 1.25                  |
| 5,137.0               | 89.70           | 179.30      | 4,665.7               | -752.1      | -12.5       | 752.2                   | 1.94                    | 1.94                   | 0.00                  |
| 5,169.0               | 90.20           | 179.40      | 4,665.7               | -784.1      | -12.1       | 784.2                   | 1.59                    | 1.56                   | 0.31                  |
| 5,264.0               | 90.60           | 178.90      | 4,665.1               | -879.1      | -10.7       | 879.1                   | 0.67                    | 0.42                   | -0.53                 |
| 5,356.0               | 91.30           | 178.60      | 4,663.5               | -971.0      | -8.7        | 971.1                   | 0.83                    | 0.76                   | -0.33                 |
| 5,449.0               | 90.20           | 179.80      | 4,662.3               | -1,064.0    | -7.4        | 1,064.0                 | 1.75                    | -1.18                  | 1.29                  |
| 5,541.0               | 90.10           | 179.30      | 4,662.1               | -1,156.0    | -6.7        | 1,156.0                 | 0.55                    | -0.11                  | -0.54                 |
| 5,633.0               | 88.60           | 180.10      | 4,663.1               | -1,248.0    | -6.2        | 1,248.0                 | 1.85                    | -1.63                  | 0.87                  |
| 5,725.0               | 87.60           | 181.50      | 4,666.2               | -1,339.9    | -7.5        | 1,339.9                 | 1.87                    | -1.09                  | 1.52                  |
| 5,817.0               | 88.80           | 182.00      | 4,669.1               | -1,431.8    | -10.3       | 1,431.9                 | 1.41                    | 1.30                   | 0.54                  |
| 5,909.0               | 89.40           | 182.20      | 4,670.5               | -1,523.8    | -13.7       | 1,523.8                 | 0.69                    | 0.65                   | 0.22                  |
| 6,002.0               | 87.80           | 181.70      | 4,672.8               | -1,616.7    | -16.8       | 1,616.8                 | 1.80                    | -1.72                  | -0.54                 |
| 6,094.0               | 88.60           | 181.60      | 4,675.7               | -1,708.6    | -19.5       | 1,708.7                 | 0.88                    | 0.87                   | -0.11                 |
| 6,186.0               | 88.40           | 180.80      | 4,678.1               | -1,800.5    | -21.4       | 1,800.7                 | 0.90                    | -0.22                  | -0.87                 |
| 6,279.0               | 88.80           | 180.50      | 4,680.3               | -1,893.5    | -22.4       | 1,893.6                 | 0.54                    | 0.43                   | -0.32                 |
| 6,372.0               | 89.70           | 179.70      | 4,681.6               | -1,986.5    | -22.6       | 1,986.6                 | 1.29                    | 0.97                   | -0.86                 |
| 6,464.0               | 91.10           | 179.30      | 4,680.9               | -2,078.5    | -21.8       | 2,078.6                 | 1.58                    | 1.52                   | -0.43                 |
| 6,556.0               | 90.70           | 181.00      | 4,679.5               | -2,170.5    | -22.0       | 2,170.6                 | 1.90                    | -0.43                  | 1.85                  |
| 6,647.0               | 89.80           | 181.20      | 4,679.1               | -2,261.5    | -23.8       | 2,261.6                 | 1.01                    | -0.99                  | 0.22                  |
| 6,739.0               | 89.90           | 181.50      | 4,679.3               | -2,353.4    | -26.0       | 2,353.6                 | 0.34                    | 0.11                   | 0.33                  |
| 6,832.0               | 90.70           | 181.30      | 4,678.8               | -2,446.4    | -28.2       | 2,446.6                 | 0.89                    | 0.86                   | -0.22                 |
| 6,924.0               | 89.20           | 180.30      | 4,678.9               | -2,538.4    | -29.5       | 2,538.6                 | 1.96                    | -1.63                  | -1.09                 |
| 7,016.0               | 89.70           | 181.00      | 4,679.8               | -2,630.4    | -30.6       | 2,630.5                 | 0.94                    | 0.54                   | 0.76                  |
| 7,111.0               | 88.80           | 181.40      | 4,681.0               | -2,725.3    | -32.5       | 2,725.5                 | 1.04                    | -0.95                  | 0.42                  |
| 7,205.0               | 89.40           | 181.40      | 4,682.5               | -2,819.3    | -34.8       | 2,819.5                 | 0.64                    | 0.64                   | 0.00                  |
| 7,300.0               | 88.60           | 180.90      | 4,684.2               | -2,914.3    | -36.8       | 2,914.5                 | 0.99                    | -0.84                  | -0.53                 |
| 7,395.0               | 88.50           | 180.40      | 4,686.6               | -3,009.2    | -37.8       | 3,009.5                 | 0.54                    | -0.11                  | -0.53                 |

**Company:** Tug Hill Operating LLC  
**Project:** Hodgeman County, Kansas (NAD 83)  
**Site:** Sec 31, T23S, R22W  
**Well:** Imel #1-31H  
**Wellbore:** Original Wellbore  
**Design:** Original Wellbore

**Local Co-ordinate Reference:** Site Sec 31, T23S, R22W  
**TVD Reference:** WELL @ 2359.0usft  
**MD Reference:** WELL @ 2359.0usft  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** EDM 5000.1 Single User Db

| Measured Depth (usft)  | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) |  |
|------------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|--|
| 7,489.0                | 88.60           | 180.50      | 4,689.0               | -3,103.2     | -38.6        | 3,103.4                 | 0.15                    | 0.11                   | 0.11                  |  |
| 7,584.0                | 89.50           | 180.60      | 4,690.5               | -3,198.2     | -39.5        | 3,198.4                 | 0.95                    | 0.95                   | 0.11                  |  |
| 7,678.0                | 90.20           | 179.70      | 4,690.8               | -3,292.2     | -39.7        | 3,292.4                 | 1.21                    | 0.74                   | -0.96                 |  |
| 7,772.0                | 89.10           | 179.60      | 4,691.3               | -3,386.2     | -39.2        | 3,386.4                 | 1.18                    | -1.17                  | -0.11                 |  |
| 7,867.0                | 89.30           | 179.80      | 4,692.7               | -3,481.2     | -38.7        | 3,481.4                 | 0.30                    | 0.21                   | 0.21                  |  |
| 7,961.0                | 90.40           | 179.80      | 4,692.9               | -3,575.2     | -38.3        | 3,575.4                 | 1.17                    | 1.17                   | 0.00                  |  |
| 8,056.0                | 89.10           | 179.50      | 4,693.3               | -3,670.2     | -37.7        | 3,670.3                 | 1.40                    | -1.37                  | -0.32                 |  |
| 8,151.0                | 90.90           | 180.80      | 4,693.3               | -3,765.1     | -38.0        | 3,765.3                 | 2.34                    | 1.89                   | 1.37                  |  |
| 8,245.0                | 90.50           | 181.00      | 4,692.2               | -3,859.1     | -39.5        | 3,859.3                 | 0.48                    | -0.43                  | 0.21                  |  |
| 8,340.0                | 89.60           | 181.10      | 4,692.1               | -3,954.1     | -41.2        | 3,954.3                 | 0.95                    | -0.95                  | 0.11                  |  |
| 8,434.0                | 87.00           | 181.50      | 4,694.9               | -4,048.0     | -43.3        | 4,048.3                 | 2.80                    | -2.77                  | 0.43                  |  |
| 8,529.0                | 87.70           | 182.40      | 4,699.3               | -4,142.9     | -46.6        | 4,143.1                 | 1.20                    | 0.74                   | 0.95                  |  |
| 8,624.0                | 89.00           | 182.60      | 4,702.0               | -4,237.7     | -50.7        | 4,238.1                 | 1.38                    | 1.37                   | 0.21                  |  |
| 8,718.0                | 89.60           | 180.70      | 4,703.2               | -4,331.7     | -53.4        | 4,332.0                 | 2.12                    | 0.64                   | -2.02                 |  |
| 8,813.0                | 89.80           | 180.00      | 4,703.7               | -4,426.7     | -54.0        | 4,427.0                 | 0.77                    | 0.21                   | -0.74                 |  |
| 8,907.0                | 88.80           | 179.80      | 4,704.8               | -4,520.7     | -53.8        | 4,521.0                 | 1.08                    | -1.06                  | -0.21                 |  |
| 9,002.0                | 90.20           | 179.90      | 4,705.6               | -4,615.7     | -53.6        | 4,616.0                 | 1.48                    | 1.47                   | 0.11                  |  |
| 9,097.0                | 91.40           | 179.70      | 4,704.3               | -4,710.7     | -53.3        | 4,711.0                 | 1.28                    | 1.26                   | -0.21                 |  |
| <b>Last MWD Survey</b> |                 |             |                       |              |              |                         |                         |                        |                       |  |
| 9,193.0                | 91.40           | 179.70      | 4,702.0               | -4,806.6     | -52.8        | 4,806.9                 | 0.00                    | 0.00                   | 0.00                  |  |
| <b>PTB</b>             |                 |             |                       |              |              |                         |                         |                        |                       |  |

| Measured Depth (usft) | Vertical Depth (usft) | Local Coordinates |              | Comment          |
|-----------------------|-----------------------|-------------------|--------------|------------------|
|                       |                       | +N/-S (usft)      | +E/-W (usft) |                  |
| 875.0                 | 875.0                 | 2.3               | -4.8         | First MWD Survey |
| 9,097.0               | 4,704.3               | -4,710.7          | -53.3        | Last MWD Survey  |
| 9,193.0               | 4,702.0               | -4,806.6          | -52.8        | PTB              |

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_