

HALLIBURTON
EXCELLENCE
IN ENERGY

**SPECTRAL DENSITY
DUAL SPACED NEUTRON
TRUE VERTICAL DEPTH
2"=100'**

COMPANY NORTHWEST NATURAL GAS
WELL IW 13B-23-65
FIELD MIST (SCHLICKEER POOL STORAGE)
COUNTY COLUMBIA
STATE OR

Location: 43877 WEST AVE
24243M SOUTH FROM
THE NORTHEAST CORNER
OF SECTION 22, W83M

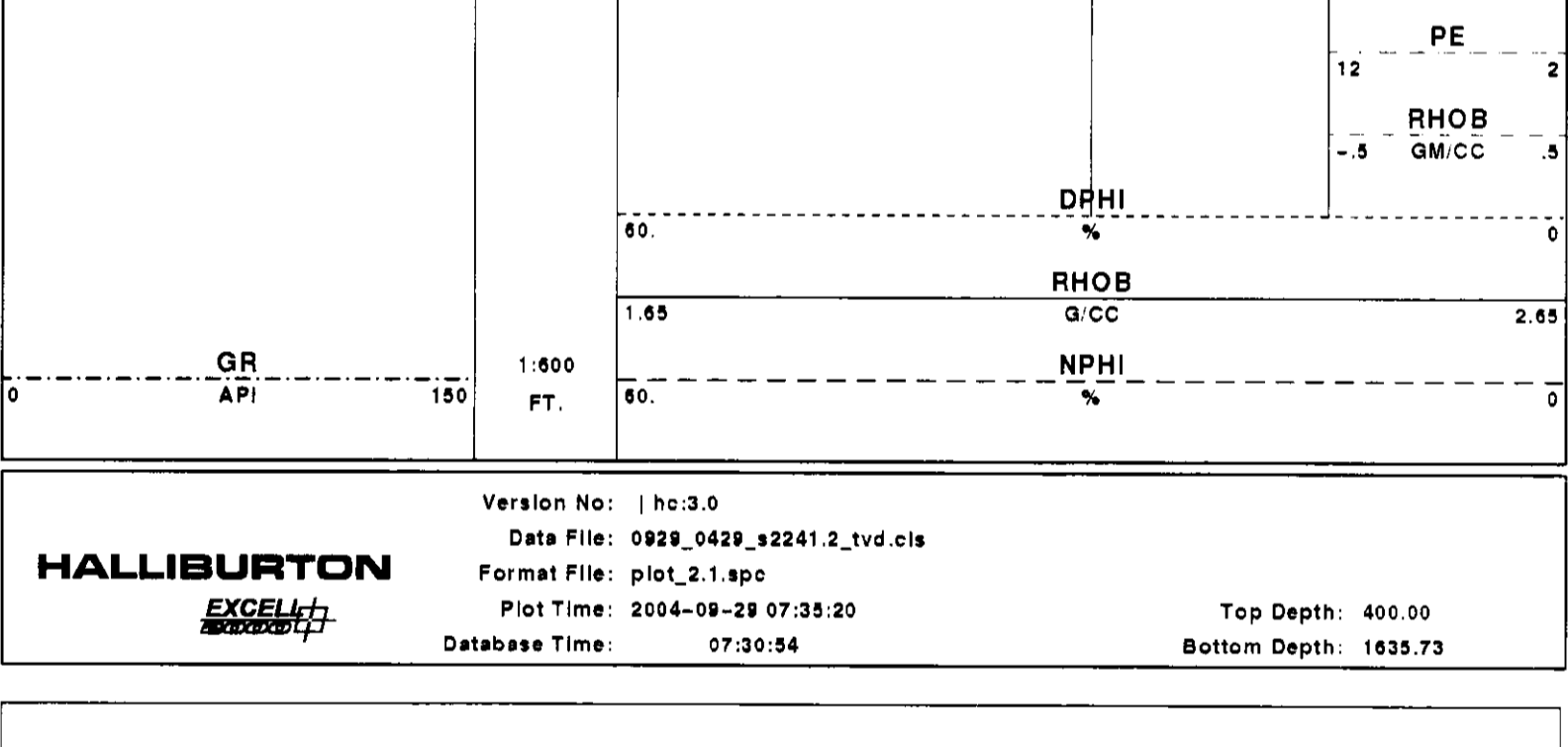
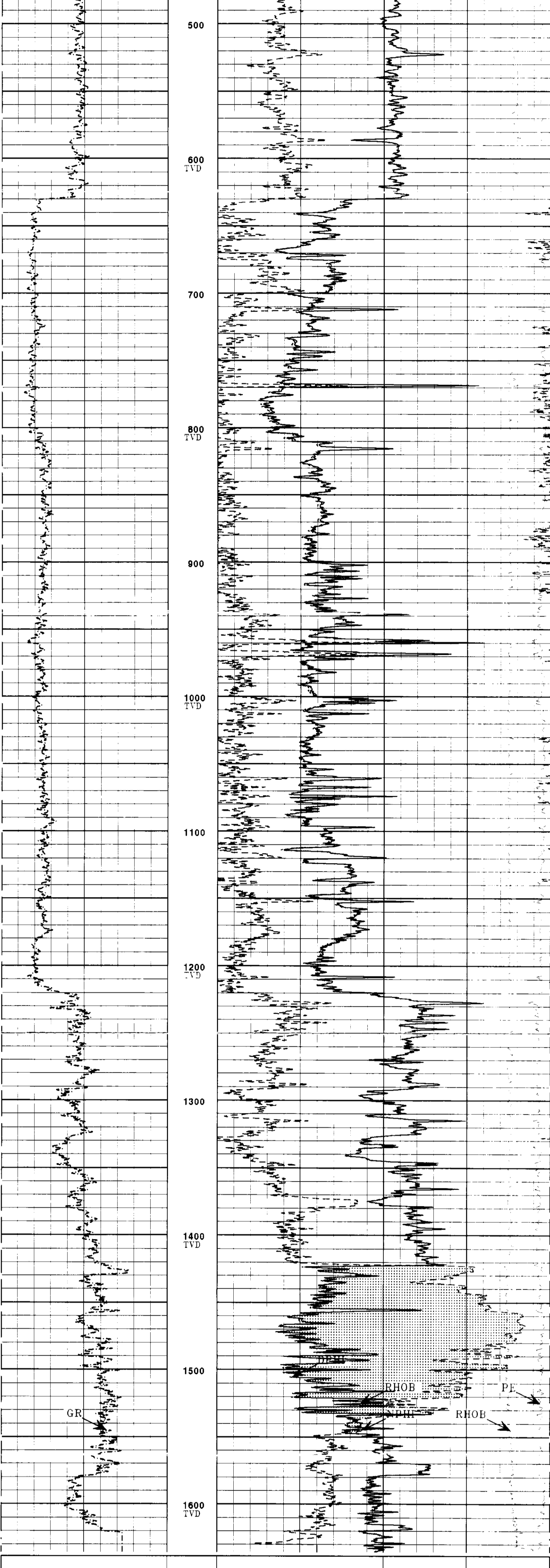
Elevations: K.B.: 778.4' R.T.: G.L.: 739.4'

Date Processed 09-29-2004 SDLT-DSNT
Job Number 3310704 Date Logged 09-29-2004
Interval Processed 2294'-411' Location GEI
Processed By G. ROUSSEAU
Processed At WELLSITE
COMPUTER PROCESSED PRODUCT

| | | | | | |
|--|---------|-----------------|--------------|--------------|---------|
| Service Ticket No.: | 3310704 | API Serial No.: | 36-008-00357 | PGM Version: | XL v5.0 |
| DIRECTIONAL INFORMATION | | | | | |
| Maximum Deviation | 54.32 | deg. @ | 1755' | KOP | 192' |
| Remarks: SDLT-DSNT-NGRT RUN IN COMBINATION. | | | | | |
| CREW: D. ROSENSTEEL, D. BRIGHT, K. CHAN. RIG: TAYLOR DRILLING NO. 9. | | | | | |

HALLIBURTON DOES NOT GUARANTEE THE ACCURACY OF ANY INTERPRETATION OF THE LOG DATA COVERS OR OF LOG DATA TO PHYSICAL ROCK PARAMETERS OR RECOMMENDATIONS THEREON. HALLIBURTON, PERSONNEL OR WHICH APPEAR ON THE LOGS OR IN ANY OTHER FORM, FOR USE OF LOG DATA, REPRESENTATIONS, COORDINATES OR RECOMMENDATIONS AGREES THAT HALLIBURTON IS NOT RESPONSIBLE EXCEPT WHERE DUE TO GROSS NEGLIGENCE OR WILLFUL MISCONDUCT FOR ANY LOSS, DAMAGES OR EXPENSES RESULTING FROM THE USE THEREOF.

Version No: | hc:3.0
Data File: 0929_0429_s2241.2_tvd.cls
Format File: plot_2.1.spc
Plot Time: 2004-09-29 07:35:45
Database Time: 07:30:54
Top Depth: 400.00
Bottom Depth: 1635.73



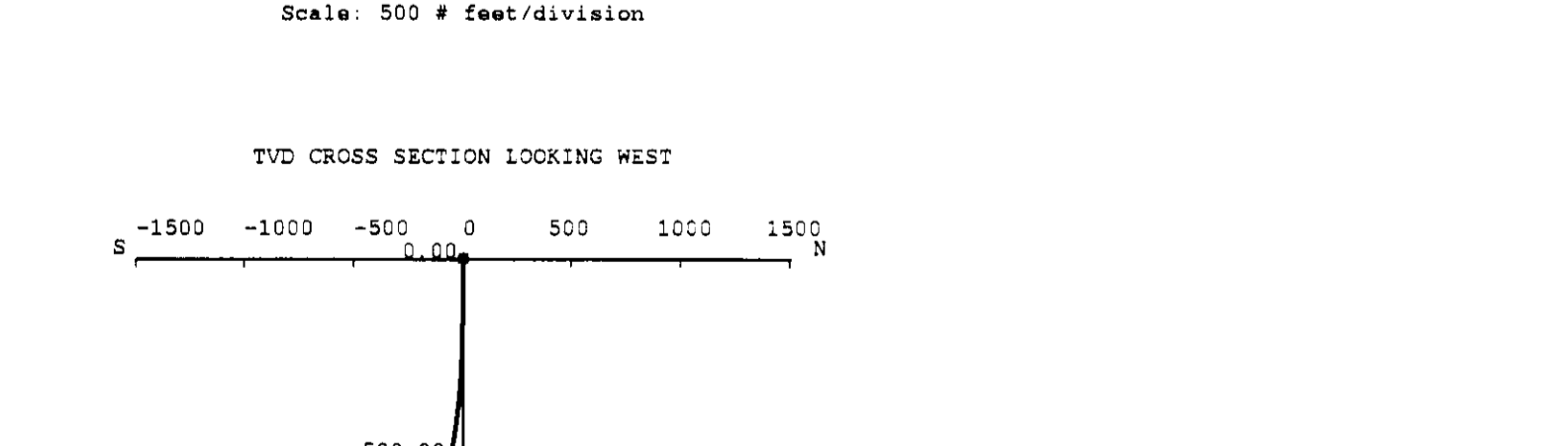
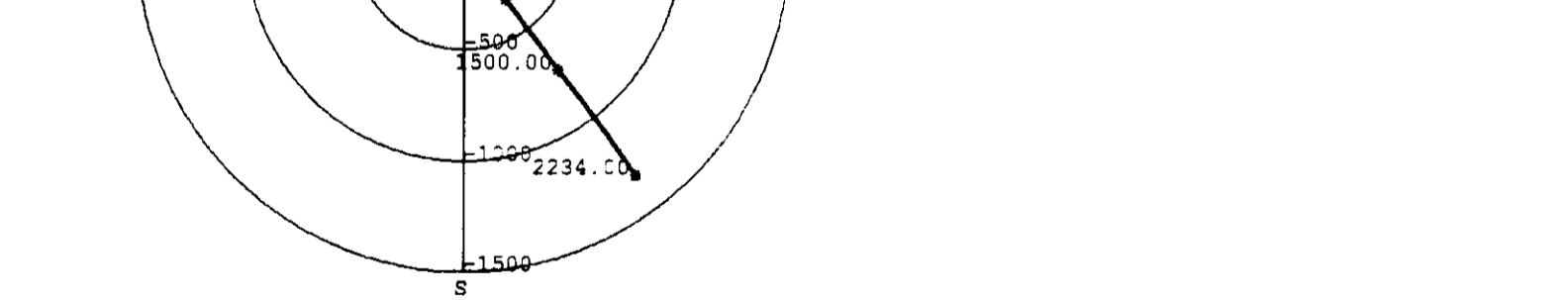
Version No: | hc:3.0
Data File: 0929_0429_s2241.2_tvd.cls
Format File: plot_2.1.spc
Plot Time: 2004-09-29 07:35:20
Database Time: 07:30:54
Top Depth: 400.00
Bottom Depth: 1635.73

RECORD OF TVD SURVEY
Date: 29-Sep-2004 07:30
Calculated by Desktop Petrophysics TVD, Minimum Curvature Method

| MEAS. DEPTH (FT) | DRIFT ANGLE (DEG) | T. V. D. (FT) | HOLE BEARING (DEG) | NORTH (FT) | SOUTH (FT) | EAST (FT) | WEST (FT) | TOTAL NORTH (FT) | TOTAL SOUTH (FT) | TOTAL EAST (FT) | TOTAL WEST (FT) |
|------------------|-------------------|---------------|--------------------|------------|------------|-----------|-----------|------------------|------------------|-----------------|-----------------|
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 132.00 | 0.29 | 132.00 | 69.71 | 0.05 | 0.10 | 0.40 | 0.14 | 0.14 | 0.20 | 0.60 | 0.00 |
| 222.00 | 1.22 | 192.00 | 162.00 | -0.53 | 0.40 | 0.40 | -0.39 | -0.39 | 1.00 | 1.00 | 0.00 |
| 283.00 | 7.50 | 282.70 | 152.20 | -5.19 | 2.40 | 2.40 | -6.69 | -6.69 | 1.40 | 1.40 | 0.00 |
| 313.00 | 9.40 | 312.37 | 147.90 | -3.81 | 2.22 | 2.22 | -10.50 | -10.50 | 5.62 | 5.62 | 0.00 |
| 343.00 | 11.80 | 341.86 | 148.60 | -4.69 | 2.90 | 2.90 | -15.19 | -15.19 | 8.52 | 8.52 | 0.00 |
| 404.00 | 16.76 | 400.96 | 146.60 | -12.67 | 8.10 | 8.10 | -27.86 | -27.86 | 16.62 | 16.62 | 0.00 |
| 467.00 | 19.03 | 460.91 | 142.20 | -15.70 | 11.30 | 11.30 | -43.56 | -43.56 | 27.92 | 27.92 | 0.00 |
| 528.00 | 19.53 | 518.49 | 145.30 | -16.24 | 11.90 | 11.90 | -59.80 | -59.80 | 39.82 | 39.82 | 0.00 |
| 557.00 | 20.65 | 545.73 | 146.00 | -8.22 | 5.62 | 5.62 | -68.02 | -68.02 | 45.44 | 45.44 | 0.00 |
| 587.00 | 22.63 | 573.61 | 146.30 | -9.19 | 6.16 | 6.16 | -77.21 | -77.21 | 51.60 | 51.60 | 0.00 |
| 618.00 | 24.13 | 602.06 | 146.40 | -10.24 | 6.82 | 6.82 | -87.45 | -87.45 | 58.42 | 58.42 | 0.00 |
| 649.00 | 26.16 | 630.12 | 146.40 | -10.97 | 7.29 | 7.29 | -98.42 | -98.42 | 65.71 | 65.71 | 0.00 |
| 679.00 | 28.39 | 656.78 | 146.90 | -11.48 | 7.56 | 7.56 | -109.90 | -109.90 | 73.27 | 73.27 | 0.00 |
| 708.00 | 30.50 | 682.03 | 146.90 | -11.94 | 7.78 | 7.78 | -121.84 | -121.84 | 81.05 | 81.05 | 0.00 |
| 739.00 | 32.37 | 708.48 | 146.30 | -13.50 | 8.90 | 8.90 | -135.94 | -135.94 | 89.95 | 89.95 | 0.00 |
| 769.00 | 34.86 | 733.46 | 145.70 | -13.77 | 9.29 | 9.29 | -149.11 | -149.11 | 98.24 | 98.24 | 0.00 |
| 798.00 | 37.09 | 756.93 | 145.10 | -14.02 | 9.67 | 9.67 | -163.13 | -163.13 | 109.91 | 109.91 | 0.00 |
| 828.00 | 39.20 | 780.52 | 144.00 | -15.09 | 10.75 | 10.75 | -178.22 | -178.22 | 119.66 | 119.66 | 0.00 |
| 858.00 | 41.21 | 803.43 | 142.70 | -15.53 | 11.56 | 11.56 | -193.75 | -193.75 | 131.22 | 131.22 | 0.00 |
| 888.00 | 43.21 | 825.65 | 141.00 | -15.84 | 12.45 | 12.45 | -209.59 | -209.59 | 143.67 | 143.67 | 0.00 |
| 918.00 | 45.28 | 847.14 | 141.70 | -16.35 | 13.07 | 13.07 | -225.94 | -225.94 | 156.74 | 156.74 | 0.00 |
| 949.00 | 47.27 | 868.57 | 142.90 | -17.73 | 13.70 | 13.70 | -243.67 | -243.67 | 170.44 | 170.44 | 0.00 |
| 979.00 | 49.70 | 888.45 | 143.50 | -18.99 | 13.45 | 13.45 | -261.66 | -261.66 | 183.89 | 183.89 | 0.00 |
| 1009.00 | 52.03 | 907.38 | 143.10 | -19.66 | 13.91 | 13.91 | -280.32 | -280.32 | 197.80 | 197.80 | 0.00 |
| 1040.00 | 54.24 | 925.98 | 142.50 | -19.75 | 15.00 | 15.00 | -300.07 | -300.07 | 212.80 | 212.80 | 0.00 |
| 1102.00 | 53.46 | 962.55 | 142.50 | -39.72 | 30.48 | 30.48 | -339.79 | -339.79 | 243.28 | 243.28 | 0.00 |
| 1165.00 | 52.65 | 1000.42 | 142.30 | -39.89 | 30.72 | 30.72 | -379.68 | -379.68 | 274.00 | 274.00 | 0.00 |
| 1225.00 | 53.31 | 1036.55 | 142.70 | -38.01 | 29.16 | 29.16 | -417.69 | -417.69 | 303.16 | 303.16 | 0.00 |
| 1287.00 | 53.64 | 1073.45 | 142.60 | -39.61 | 30.23 | 30.23 | -457.30 | -457.30 | 333.39 | 333.39 | 0.00 |
| 1348.00 | 52.79 | 1109.98 | 142.40 | -38.76 | 29.74 | 29.74 | -496.06 | -496.06 | 363.13 | 363.13 | 0.00 |
| 1411.00 | 53.17 | 1147.91 | 142.60 | -39.91 | 30.62 | 30.62 | -535.97 | -535.97 | 393.75 | 393.75 | 0.00 |
| 1474.00 | 52.39 | 1186.02 | 142.70 | -39.88 | 30.44 | 30.44 | -575.85 | -575.85 | 424.19 | 424.19 | 0.00 |
| 1538.00 | 53.54 | 1242.64 | 142.50 | -59.61 | 45.58 | 45.58 | -635.46 | -635.46 | 469.77 | 469.77 | 0.00 |
| 1601.00 | 54.11 | 1297.53 | 142.40 | -59.52 | 45.75 | 45.75 | -694.98 | -694.98 | 515.52 | 515.52 | 0.00 |
| 1755.00 | 54.32 | 1352.50 | 142.70 | -60.54 | 46.37 | 46.37 | -755.52 | -755.52 | 561.89 | 561.89 | 0.00 |
| 1816.00 | 53.47 | 1388.44 | 142.60 | -39.18 | 29.90 | 29.90 | -794.70 | -794.70 | 591.79 | 591.79 | 0.00 |
| 1889.00 | 53.69 | 1431.78 | 143.20 | -46.85 | 35.43 | 35.43 | -841.55 | -841.55 | 627.22 | 627.22 | 0.00 |
| 1950.00 | 53.41 | 1468.02 | 145.30 | -39.87 | 28.67 | 28.67 | -881.37 | -881.37 | 655.89 | 655.89 | 0.00 |
| 2033.00 | 53.86 | 1517.24 | 143.20 | -54.24 | 39.03 | 39.03 | -935.61 | -935.61 | 694.94 | 694.94 | 0.00 |
| 2234.00 | 53.86 | 1635.78 | 143.20 | -129.98 | 97.24 | 97.24 | -1065.59 | -1065.59 | 792.18 | 792.18 | 0.00 |
| 2234.00 | 53.86 | 1635.78 | 143.20 | -129.98 | 97.24 | 97.24 | -1065.59 | -1065.59 | 792.18 | 792.18 | 0.00 |

MAGNETIC DECLINATION (Directional Offset) = 0.00
CLOSURE DISTANCE = 1327.79 FEET
CLOSURE ANGLE = 143.37 DEGREE

Hole Bearing is corrected for Magnetic Declination (Directional Offset).



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|---|--------------------------------|---|----|
| COMPANY | NORTHWEST NATURAL GAS | | |
| WELL | IW 13B-23-65 | | |
| FIELD | MIST (SCHLICKEER POOL STORAGE) | | |
| COUNTY | COLUMBIA | STATE | OR |
| HALLIBURTON EXCELLENCE IN ENERGY | | SPECTRAL DENSITY DUAL SPACED NEUTRON TRUE VERTICAL DEPTH 2"=100' | |