

Apache Corporation  
303 Veterans Airpark Lane, #3000  
Midland, TX 79705  
Original Name  
Raven Federal Com #023H  
Eddy County, New Mexico

APT # 30-015-4336Z

Sec. 7 TITS B31E

Eddy Co, NMexico

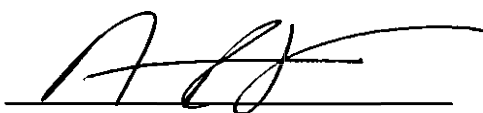
Cedar Lake Fed CA 723H

|      |      |      |      |       |       |
|------|------|------|------|-------|-------|
| 439  | 4.39 | 0.70 | 1.23 | 5.38  | 5.38  |
| 779  | 3.40 | 0.50 | 0.88 | 2.98  | 8.35  |
| 993  | 2.14 | 0.40 | 0.70 | 1.50  | 9.85  |
| 1249 | 2.56 | 0.10 | 0.18 | 0.45  | 10.30 |
| 1462 | 2.13 | 0.70 | 1.23 | 2.61  | 12.91 |
| 1760 | 2.98 | 0.50 | 0.88 | 2.61  | 15.52 |
| 2059 | 2.99 | 0.30 | 0.53 | 1.57  | 17.09 |
| 2315 | 2.56 | 0.00 | 0.00 | 0.00  | 17.09 |
| 2568 | 2.53 | 0.00 | 0.00 | 0.00  | 17.09 |
| 2867 | 2.99 | 0.30 | 0.53 | 1.57  | 18.66 |
| 3122 | 2.55 | 0.10 | 0.18 | 0.45  | 19.10 |
| 3296 | 1.74 | 0.20 | 0.35 | 0.61  | 19.71 |
| 3462 | 1.66 | 0.10 | 0.18 | 0.29  | 20.00 |
| 3523 | 0.61 | 0.20 | 0.35 | 0.21  | 20.21 |
| 3742 | 2.19 | 0.60 | 1.05 | 2.30  | 22.51 |
| 4041 | 2.99 | 1.20 | 2.10 | 6.28  | 28.79 |
| 4349 | 3.08 | 2.20 | 3.85 | 11.86 | 40.65 |

NM OIL CONSERVATION  
ARTESIA DISTRICT

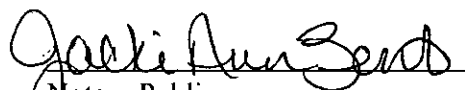
JUL 29 2016

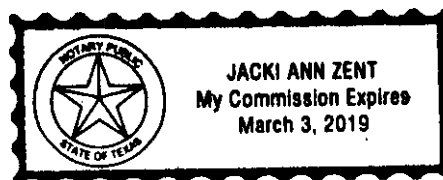
RECEIVED



Archie Brown - General Manager

The attached instrument was acknowledged before me on the 3<sup>rd</sup> day of December, 2015  
by Archie Brown - General Manager, CapStar Drilling, Inc.

  
Notary Public





**PHOENIX**  
**TECHNOLOGY SERVICES**

December 10, 2015

**NM OIL CONSERVATION**  
ARTESIA DISTRICT

**JUL 29 2016**

**RECEIVED**

Apache Corporation  
Attention: Regulatory Department  
303 Veterans Airpark Lane, Suite 3000,  
Midland, TX 79705

Re: Apache Corporation

Raven Federal Com #23H

Eddy County, NM

API #30-015-43362

Job No. 1514630

*- Cedar Lake Federal CA 723 H*

Dear Regulatory Department;

Phoenix Technology Services, Inc. has filed the Survey Data Certification, Surveys, and Lease Plat for the above referenced well with the State of New Mexico Oil Conservation Division – District 2 via certified mail. A copy of the filing is attached for your records.

| Name of Surveyor | Drain Hole Number | Surveyed Depths |       | Dates Performed |          | Type of Survey |
|------------------|-------------------|-----------------|-------|-----------------|----------|----------------|
|                  |                   | From            | To    | Start           | End      |                |
| Bernard Caldwell | 23H               | 4,349           | 8,701 | 11/22/15        | 11/25/15 | MWD            |

Thank you for the opportunity to be of service. Please contact me if you have any questions or require additional information.

Best Regards,

*Claudia Carreon*

Claudia Carreon  
Operations Administrator



**PHOENIX**  
**TECHNOLOGY SERVICES**

December 10, 2015

Oil Conservation Division  
State of New Mexico  
811 S. First St.  
Artesia, New Mexico 88210

Dear District 2 - Artesia

Attention: Regulatory Department

Re: Apache Corporation  
Raven Federal Com #23H - Cedar Lake Federal CA 723H  
Eddy County, NM  
API #30-015-43362  
Job No. 1514630

Enclosed please find the Survey Data Certification, and the original Plat and one copy of the Survey Report performed on the above referenced Well by Phoenix Technology Services, Inc. (P-5 No. 664171). Other information required by your office is as follows:

| Name & Title of Surveyor | Drain Hole Number | Surveyed Depths |       | Dates Performed |          | Type of Survey |
|--------------------------|-------------------|-----------------|-------|-----------------|----------|----------------|
|                          |                   | From            | To    | Start           | End      |                |
| Bernard Caldwell         | 23H               | 4,349           | 8,701 | 11/22/15        | 11/25/15 | MWD            |

A certified plat on which the bottom hole location is oriented both to the surface location and to the lease lines (or unit lines in case of pooling) is attached to the survey report. If any other information is required, please contact the undersigned at the letterhead address and phone number.

Best Regards,

*Claudia Carreon*

Claudia Carreon  
Operations Administrator

Certified mail receipt number: 7015 0640 0000 9907 5210

Phoenix Technology Services  
SURVEY DATA CERTIFICATION



PHOENIX JOB NUMBER

1514630

ENERGY COMPANY Apache Corp

WELL NAME Raven Federal Com #23H

COUNTY & STATE

Eddy County, NM

API WELL NUMBER

30-015-43362

PROPOSED DIRECTION

89.98°

| TIE-IN DATA |             |        |         |         |        |        |
|-------------|-------------|--------|---------|---------|--------|--------|
| MEASURED    | VERTICAL    |        |         | N-S     | E-W    | DATA   |
| DEPTH       | DEPTH       | INCLIN | AZIMUTH | COORD   | COORD  | SOURCE |
| 4,118. ft   | 4,117.87 ft | 0.73°  | 16.48°  | 9.27 ft | .45 ft | Gyro   |

| FIRST     | FIRST       |        |         |
|-----------|-------------|--------|---------|
| SURVEY    | SURVEY      |        |         |
| DATE      | DEPTH       | INCLIN | AZIMUTH |
| 22-Nov-15 | 4,349.00 ft | 2.2°   | 84.5°   |

SURVEY INSTRUMENT  
TYPE

Phoenix MWD

| LAST      | LAST        |        |         |
|-----------|-------------|--------|---------|
| SURVEY    | SURVEY      |        |         |
| DATE      | DEPTH       | INCLIN | AZIMUTH |
| 25-Nov-15 | 8,701.00 ft | 88.7°  | 90.9°   |

TO THE BEST OF MY KNOWLEDGE I  
CERTIFY THIS SURVEY DATA TO BE  
TRUE AND CORRECT.

| PROJECTED | PROJECTED   |        |         |
|-----------|-------------|--------|---------|
| TD SURVEY | TD SURVEY   |        |         |
| DATE      | DEPTH       | INCLIN | AZIMUTH |
| 25-Nov-15 | 8,765.00 ft | 88.7°  | 90.9°   |

Bernard Caldwell

PRINT YOUR NAME ABOVE

*Bernard Caldwell*

SIGN YOUR NAME ABOVE

11/26/15

TODAY'S DATE

MAGNETIC DECLINATION OR TOTAL GRID

|                       |      |
|-----------------------|------|
| TOTAL CORRECTION USED | 7.42 |
| DECLINATION OR GRID   | GRID |

MWD SUPERVISOR 1

Bernard Caldwell

DIRECTIONAL DRILLER 1

David Eddins

MWD SUPERVISOR 2

Steve Poer

DIRECTIONAL DRILLER 2

Brad Jones

Phoenix Technology Services  
Design Report 26-Nov-2015 07:10:51

Apache Corporation

Raven Federal #23H  
Eddy County, NM (NAD27 NME)  
OH / Job #1514630  
Surveys (Capstar 114)

Surface Loc.:

Northing: (Y) 672324.90  
 Easting: (X) 628585.60  
 KB Elev: 3733.00'  
 GL Elev: 3722.00'

Survey Type Information:

H 100.00 - 4118.00 PHOENIX GYRO SURVEYS : CB-GYRO-MS  
H 4349.00 - 8765.00 PHOENIX MWD SURVEYS : PHX+MWD+HDGM

| Measured |       |        | Sub-Sea  | Vertical |         | Local Coor |           | UTM Coor |         | Vertical  | Dogleg     |
|----------|-------|--------|----------|----------|---------|------------|-----------|----------|---------|-----------|------------|
| Depth    | Incl. | Azim.  | Depth    | Depth    | (+N/-S) | (+E/-W)    | Northings | Eastings | Section | Rate      |            |
| (ft)     | ;     |        | (ft)     | (ft)     | (ft)    | (ft)       | (ft)      | (ft)     | (ft)    | (°/100ft) | Annotation |
| 0        | 0     | 0      | -3733    | 0        | 0       | 0          | 672324.9  | 628585.6 | 0       | 0         |            |
| 100      | 0.21  | 87.59  | -3633    | 100      | 0.01    | 0.18       | 672324.9  | 628585.8 | 0.18    | 0.21      |            |
| 200      | 0.31  | 172.68 | -3533    | 200      | -0.25   | 0.4        | 672324.7  | 628586   | 0.4     | 0.36      |            |
| 300      | 0.48  | 243.81 | -3433    | 300      | -0.71   | 0.06       | 672324.2  | 628585.7 | 0.06    | 0.48      |            |
| 400      | 0.69  | 238.18 | -3333.01 | 399.99   | -1.21   | -0.83      | 672323.7  | 628584.8 | -0.83   | 0.22      |            |
| 500      | 0.63  | 235.98 | -3233.01 | 499.99   | -1.83   | -1.8       | 672323.1  | 628583.8 | -1.8    | 0.07      |            |
| 600      | 0.63  | 230.38 | -3133.02 | 599.98   | -2.49   | -2.67      | 672322.4  | 628582.9 | -2.68   | 0.06      |            |
| 700      | 0.51  | 312.88 | -3033.02 | 699.98   | -2.54   | -3.42      | 672322.4  | 628582.2 | -3.43   | 0.76      |            |
| 800      | 0.48  | 321.12 | -2933.03 | 799.97   | -1.91   | -4.01      | 672323    | 628581.6 | -4.01   | 0.08      |            |

|      |      |        |          |         |       |       |          |          |       |                                     |
|------|------|--------|----------|---------|-------|-------|----------|----------|-------|-------------------------------------|
| 900  | 0.28 | 334.41 | -2833.03 | 899.97  | -1.36 | -4.38 | 672323.5 | 628581.2 | -4.38 | 0.22                                |
| 1000 | 0.39 | 5.69   | -2733.03 | 999.97  | -0.8  | -4.45 | 672324.1 | 628581.2 | -4.45 | 0.21                                |
| 1100 | 0.78 | 44.53  | -2633.04 | 1099.96 | 0.02  | -3.94 | 672324.9 | 628581.7 | -3.94 | 0.54                                |
| 1200 | 0.88 | 51.99  | -2533.05 | 1199.95 | 0.98  | -2.86 | 672325.9 | 628582.7 | -2.86 | 0.15                                |
| 1300 | 0.95 | 62.68  | -2433.06 | 1299.94 | 1.83  | -1.52 | 672326.7 | 628584.1 | -1.52 | 0.18                                |
| 1400 | 0.85 | 82.57  | -2333.07 | 1399.93 | 2.31  | -0.05 | 672327.2 | 628585.6 | -0.05 | 0.33                                |
| 1500 | 0.72 | 91.26  | -2233.08 | 1499.92 | 2.39  | 1.32  | 672327.3 | 628586.9 | 1.32  | 0.18                                |
| 1600 | 0.57 | 15.99  | -2133.09 | 1599.91 | 2.85  | 2.08  | 672327.8 | 628587.7 | 2.08  | 0.8                                 |
| 1700 | 0.55 | 331.29 | -2033.09 | 1699.91 | 3.75  | 1.99  | 672328.7 | 628587.6 | 1.99  | 0.43                                |
| 1800 | 0.48 | 0.54   | -1933.09 | 1799.91 | 4.59  | 1.76  | 672329.5 | 628587.4 | 1.76  | 0.27                                |
| 1900 | 0.25 | 165.92 | -1833.1  | 1899.9  | 4.8   | 1.82  | 672329.7 | 628587.4 | 1.82  | 0.72                                |
| 2000 | 0.16 | 123.68 | -1733.1  | 1999.9  | 4.51  | 1.99  | 672329.4 | 628587.6 | 1.99  | 0.17                                |
| 2100 | 0.26 | 349.73 | -1633.1  | 2099.9  | 4.66  | 2.06  | 672329.6 | 628587.7 | 2.07  | 0.39                                |
| 2200 | 0.27 | 262.58 | -1533.1  | 2199.9  | 4.85  | 1.79  | 672329.8 | 628587.4 | 1.79  | 0.37                                |
| 2300 | 0.15 | 170.6  | -1433.1  | 2299.9  | 4.69  | 1.58  | 672329.6 | 628587.2 | 1.58  | 0.31                                |
| 2400 | 0.14 | 39.6   | -1333.1  | 2399.9  | 4.65  | 1.68  | 672329.6 | 628587.3 | 1.68  | 0.26                                |
| 2500 | 0.04 | 57.34  | -1233.1  | 2499.9  | 4.77  | 1.78  | 672329.7 | 628587.4 | 1.79  | 0.1                                 |
| 2600 | 0.07 | 51.45  | -1133.1  | 2599.9  | 4.82  | 1.86  | 672329.7 | 628587.5 | 1.86  | 0.03                                |
| 2700 | 0.08 | 72.01  | -1033.1  | 2699.9  | 4.88  | 1.98  | 672329.8 | 628587.6 | 1.98  | 0.03                                |
| 2800 | 0.31 | 198.32 | -933.1   | 2799.9  | 4.65  | 1.96  | 672329.6 | 628587.6 | 1.96  | 0.36                                |
| 2900 | 0.09 | 53.25  | -833.1   | 2899.9  | 4.44  | 1.93  | 672329.3 | 628587.5 | 1.94  | 0.39                                |
| 3000 | 0.1  | 258.11 | -733.1   | 2999.9  | 4.47  | 1.91  | 672329.4 | 628587.5 | 1.91  | 0.19                                |
| 3100 | 0.14 | 159.06 | -633.1   | 3099.9  | 4.34  | 1.87  | 672329.2 | 628587.5 | 1.87  | 0.18                                |
| 3200 | 0.13 | 286.8  | -533.1   | 3199.9  | 4.25  | 1.81  | 672329.2 | 628587.4 | 1.81  | 0.24                                |
| 3300 | 0.12 | 98.23  | -433.1   | 3299.9  | 4.27  | 1.8   | 672329.2 | 628587.4 | 1.8   | 0.25                                |
| 3400 | 0.13 | 348.4  | -333.1   | 3399.9  | 4.37  | 1.88  | 672329.3 | 628587.5 | 1.88  | 0.2                                 |
| 3500 | 0.15 | 264.51 | -233.1   | 3499.9  | 4.47  | 1.73  | 672329.4 | 628587.3 | 1.73  | 0.19                                |
| 3600 | 0.24 | 332.56 | -133.1   | 3599.9  | 4.64  | 1.5   | 672329.5 | 628587.1 | 1.5   | 0.23                                |
| 3700 | 0.59 | 303.81 | -33.1    | 3699.9  | 5.11  | 0.98  | 672330   | 628586.6 | 0.98  | 0.4                                 |
| 3800 | 0.51 | 306.19 | 66.89    | 3799.89 | 5.66  | 0.19  | 672330.6 | 628585.8 | 0.19  | 0.08                                |
| 3900 | 0.81 | 24.23  | 166.89   | 3899.89 | 6.57  | 0.12  | 672331.5 | 628585.7 | 0.12  | 0.86                                |
| 4000 | 0.71 | 352.72 | 266.88   | 3999.88 | 7.83  | 0.33  | 672332.7 | 628585.9 | 0.34  | 0.42                                |
| 4118 | 0.73 | 16.48  | 384.87   | 4117.87 | 9.27  | 0.45  | 672334.2 | 628586.1 | 0.46  | 0.25 Tie In to Phoenix Gyro Surveys |
| 4349 | 2.2  | 84.5   | 615.8    | 4348.8  | 11.11 | 5.28  | 672336   | 628590.9 | 5.29  | 0.88 First Phoenix MWD Survey       |

|      |      |      |         |         |        |         |          |          |         |       |
|------|------|------|---------|---------|--------|---------|----------|----------|---------|-------|
| 4392 | 8.7  | 94.4 | 658.58  | 4391.58 | 10.94  | 9.35    | 672335.8 | 628595   | 9.36    | 15.22 |
| 4434 | 15.1 | 92   | 699.66  | 4432.66 | 10.51  | 18      | 672335.4 | 628603.6 | 18      | 15.28 |
| 4477 | 21.5 | 92   | 740.46  | 4473.46 | 10.03  | 31.48   | 672334.9 | 628617.1 | 31.49   | 14.88 |
| 4520 | 27   | 94.8 | 779.66  | 4512.66 | 8.94   | 49.1    | 672333.8 | 628634.7 | 49.1    | 13.06 |
| 4562 | 32.3 | 97.1 | 816.14  | 4549.14 | 6.76   | 69.75   | 672331.7 | 628655.4 | 69.75   | 12.9  |
| 4605 | 36.9 | 98.7 | 851.53  | 4584.53 | 3.38   | 93.92   | 672328.3 | 628679.5 | 93.93   | 10.9  |
| 4648 | 41.2 | 98.5 | 884.92  | 4617.92 | -0.67  | 120.7   | 672324.2 | 628706.3 | 120.7   | 10    |
| 4690 | 45.3 | 99.3 | 915.5   | 4648.5  | -5.13  | 149.13  | 672319.8 | 628734.7 | 149.13  | 9.85  |
| 4733 | 49.9 | 99.5 | 944.49  | 4677.49 | -10.31 | 180.45  | 672314.6 | 628766.1 | 180.44  | 10.7  |
| 4776 | 54.1 | 98.7 | 970.96  | 4703.96 | -15.66 | 213.9   | 672309.2 | 628799.5 | 213.89  | 9.88  |
| 4818 | 59   | 97.8 | 994.1   | 4727.1  | -20.68 | 248.57  | 672304.2 | 628834.2 | 248.56  | 11.8  |
| 4861 | 64.3 | 97.5 | 1014.51 | 4747.51 | -25.72 | 286.06  | 672299.2 | 628871.7 | 286.05  | 12.34 |
| 4904 | 66.8 | 97.6 | 1032.31 | 4765.31 | -30.86 | 324.86  | 672294   | 628910.5 | 324.85  | 5.82  |
| 4946 | 70.6 | 98.8 | 1047.56 | 4780.56 | -36.44 | 363.58  | 672288.5 | 628949.2 | 363.57  | 9.43  |
| 4989 | 74.3 | 99.7 | 1060.53 | 4793.53 | -43.04 | 404.04  | 672281.9 | 628989.6 | 404.03  | 8.83  |
| 5032 | 80.3 | 99.7 | 1069.98 | 4802.98 | -50.1  | 445.37  | 672274.8 | 629031   | 445.35  | 13.95 |
| 5080 | 85.4 | 98.5 | 1075.95 | 4808.95 | -57.63 | 492.38  | 672267.3 | 629078   | 492.36  | 10.91 |
| 5123 | 87.3 | 96.6 | 1078.69 | 4811.69 | -63.27 | 534.92  | 672261.6 | 629120.5 | 534.9   | 6.24  |
| 5251 | 87.4 | 94.3 | 1084.61 | 4817.61 | -75.41 | 662.2   | 672249.5 | 629247.8 | 662.17  | 1.8   |
| 5379 | 87.6 | 92.1 | 1090.19 | 4823.19 | -82.55 | 789.87  | 672242.4 | 629375.5 | 789.84  | 1.72  |
| 5507 | 87.8 | 88.4 | 1095.33 | 4828.33 | -83.1  | 917.74  | 672241.8 | 629503.3 | 917.71  | 2.89  |
| 5635 | 88.8 | 87.8 | 1099.12 | 4832.12 | -78.86 | 1045.61 | 672246   | 629631.2 | 1045.58 | 0.91  |
| 5763 | 87.8 | 87.5 | 1102.92 | 4835.92 | -73.62 | 1173.44 | 672251.3 | 629759   | 1173.42 | 0.82  |
| 5891 | 87.7 | 87.1 | 1107.95 | 4840.95 | -67.59 | 1301.2  | 672257.3 | 629886.8 | 1301.18 | 0.32  |
| 6019 | 89.8 | 89.3 | 1110.74 | 4843.74 | -63.57 | 1429.1  | 672261.3 | 630014.7 | 1429.07 | 2.38  |
| 6147 | 90.3 | 91.1 | 1110.63 | 4843.63 | -64.02 | 1557.09 | 672260.9 | 630142.7 | 1557.07 | 1.46  |
| 6275 | 88.4 | 90.1 | 1112.08 | 4845.08 | -65.36 | 1685.07 | 672259.5 | 630270.7 | 1685.04 | 1.68  |
| 6399 | 86.3 | 88.7 | 1117.81 | 4850.81 | -64.06 | 1808.92 | 672260.8 | 630394.5 | 1808.89 | 2.03  |
| 6526 | 87.5 | 87.3 | 1124.68 | 4857.68 | -59.64 | 1935.65 | 672265.3 | 630521.3 | 1935.63 | 1.45  |
| 6655 | 88.6 | 87.2 | 1129.07 | 4862.07 | -53.45 | 2064.42 | 672271.5 | 630650   | 2064.4  | 0.86  |
| 6782 | 89.1 | 86.5 | 1131.62 | 4864.62 | -46.48 | 2191.2  | 672278.4 | 630776.8 | 2191.19 | 0.68  |
| 6910 | 87.8 | 87.2 | 1135.08 | 4868.08 | -39.44 | 2318.96 | 672285.5 | 630904.6 | 2318.95 | 1.15  |
| 7038 | 88.6 | 88.9 | 1139.1  | 4872.1  | -35.09 | 2446.82 | 672289.8 | 631032.4 | 2446.81 | 1.47  |
| 7167 | 89.3 | 89   | 1141.47 | 4874.47 | -32.73 | 2575.77 | 672292.2 | 631161.4 | 2575.76 | 0.55  |

|      |      |      |         |         |        |         |          |          |         |                          |
|------|------|------|---------|---------|--------|---------|----------|----------|---------|--------------------------|
| 7295 | 89.5 | 89   | 1142.81 | 4875.81 | -30.49 | 2703.75 | 672294.4 | 631289.4 | 2703.74 | 0.16                     |
| 7422 | 89.2 | 88.5 | 1144.25 | 4877.25 | -27.72 | 2830.71 | 672297.2 | 631416.3 | 2830.7  | 0.46                     |
| 7550 | 88.6 | 87.8 | 1146.71 | 4879.71 | -23.59 | 2958.62 | 672301.3 | 631544.2 | 2958.61 | 0.72                     |
| 7678 | 88.3 | 88.3 | 1150.17 | 4883.17 | -19.24 | 3086.49 | 672305.7 | 631672.1 | 3086.49 | 0.46                     |
| 7806 | 87.5 | 87.7 | 1154.86 | 4887.86 | -14.77 | 3214.33 | 672310.1 | 631799.9 | 3214.32 | 0.78                     |
| 7934 | 87   | 87.6 | 1161    | 4894    | -9.53  | 3342.07 | 672315.4 | 631927.7 | 3342.07 | 0.4                      |
| 8062 | 88   | 88.3 | 1166.58 | 4899.58 | -4.96  | 3469.87 | 672319.9 | 632055.5 | 3469.87 | 0.95                     |
| 8190 | 88.2 | 89.3 | 1170.83 | 4903.83 | -2.28  | 3597.77 | 672322.6 | 632183.4 | 3597.77 | 0.8                      |
| 8319 | 88.5 | 89.3 | 1174.54 | 4907.54 | -0.7   | 3726.7  | 672324.2 | 632312.3 | 3726.7  | 0.23                     |
| 8447 | 87.7 | 89.1 | 1178.78 | 4911.78 | 1.08   | 3854.62 | 672326   | 632440.2 | 3854.62 | 0.64                     |
| 8574 | 90.5 | 92   | 1180.78 | 4913.78 | -0.14  | 3981.57 | 672324.8 | 632567.2 | 3981.57 | 3.17                     |
| 8701 | 88.7 | 90.9 | 1181.67 | 4914.67 | -3.35  | 4108.52 | 672321.6 | 632694.1 | 4108.52 | 1.66                     |
| 8765 | 88.7 | 90.9 | 1183.12 | 4916.12 | -4.36  | 4172.5  | 672320.5 | 632758.1 | 4172.5  | Final Phoenix MWD Survey |
|      |      |      |         |         |        |         |          |          |         | 0 Projection to TD       |

All data are in feet unless otherwise stated. Directions and coordinates are relative to Grid North.

Vertical depths are relative to KB. Northings and Eastings are relative to Well.

The Dogleg Severity is in Degrees per 100 feet.

Vertical Section is from Slot and calculated along an Azimuth of 89.980° (Grid).

Coordinate System is NAD 1927 (NADCON CONUS) US State Plane 1927 (Exact solution), New Mexico East 3001.

Grid Convergence at Surface is 0.227°.

Based upon Minimum Curvature type calculations, at a Measured Depth of 8765.00ft., the Bottom Hole Displacement is 4172.50ft., in the Direction of 89.980° (Grid).





## Apache Corporation

Eddy County, NM (NAD27 NME)

Raven Federal

#23H

*- Cedar Lake Federal CA 723H*

OH / Job #1514630

*Gyro +  
mud*

Design: Surveys (Capstar 114)

## Standard Survey Report

26 November, 2015





# Phoenix Technology Services LP

## Survey Report



|           |                             |                              |                                |
|-----------|-----------------------------|------------------------------|--------------------------------|
| Company:  | Apache Corporation          | Local Co-ordinate Reference: | Well #23H                      |
| Project:  | Eddy County, NM (NAD27 NME) | TVD Reference:               | KB @ 3733.00usft (Capstar 114) |
| Site:     | Raven Federal               | MD Reference:                | KB @ 3733.00usft (Capstar 114) |
| Well:     | #23H                        | North Reference:             | Grid                           |
| Wellbore: | OH / Job #1514630           | Survey Calculation Method:   | Minimum Curvature              |
| Design:   | Surveys (Capstar 114)       | Database:                    | Compass 5000 GCR               |

|             |                                      |               |                |
|-------------|--------------------------------------|---------------|----------------|
| Project     | Eddy County, NM (NAD27 NME)          |               |                |
| Map System: | US State Plane 1927 (Exact solution) | System Datum: | Mean Sea Level |
| Geo Datum:  | NAD 1927 (NADCON CONUS)              |               |                |
| Map Zone:   | New Mexico East 3001                 |               |                |

|      |               |  |  |
|------|---------------|--|--|
| Site | Raven Federal |  |  |
|------|---------------|--|--|

|                       |           |              |                 |                   |                     |
|-----------------------|-----------|--------------|-----------------|-------------------|---------------------|
| Site Position:        |           | Northing:    | 673,239.70 usft | Latitude:         | 32° 51' 0.24298 N   |
| From:                 | Map       | Easting:     | 633,303.50 usft | Longitude:        | 103° 53' 57.35087 W |
| Position Uncertainty: | 0.00 usft | Slot Radius: | 13-3/16 "       | Grid Convergence: | 0.24 °              |

|                      |           |                     |            |                 |               |                     |
|----------------------|-----------|---------------------|------------|-----------------|---------------|---------------------|
| Well                 | #23H      |                     |            |                 |               |                     |
| Well Position        | +N/-S     | 0.00 usft           | Northings: | 672,324.90 usft | Latitude:     | 32° 50' 51.37938 N  |
|                      | +E/-W     | 0.00 usft           | Easting:   | 628,585.60 usft | Longitude:    | 103° 54' 52.69762 W |
| Position Uncertainty | 0.00 usft | Wellhead Elevation: | usft       | Ground Level:   | 3,722.00 usft |                     |

|          |                   |  |  |  |  |
|----------|-------------------|--|--|--|--|
| Wellbore | OH / Job #1514630 |  |  |  |  |
|----------|-------------------|--|--|--|--|

|           |            |             |                 |               |                     |
|-----------|------------|-------------|-----------------|---------------|---------------------|
| Magnetics | Model Name | Sample Date | Declination (°) | Dip Angle (°) | Field Strength (nT) |
|           | HDGM       | 10/29/2015  | 7.65            | 60.77         | 48,543              |

|        |                       |  |  |  |  |
|--------|-----------------------|--|--|--|--|
| Design | Surveys (Capstar 114) |  |  |  |  |
|--------|-----------------------|--|--|--|--|

|              |     |        |        |               |      |
|--------------|-----|--------|--------|---------------|------|
| Audit Notes: |     |        |        |               |      |
| Version:     | 1.0 | Phase: | ACTUAL | Tie On Depth: | 0.00 |

|                   |                         |              |              |               |
|-------------------|-------------------------|--------------|--------------|---------------|
| Vertical Section: | Depth From (TVD) (usft) | +N/-S (usft) | +E/-W (usft) | Direction (°) |
|                   | 0.00                    | 0.00         | 0.00         | 89.98         |

|                |           |                                        |              |                             |  |
|----------------|-----------|----------------------------------------|--------------|-----------------------------|--|
| Survey Program |           | Date 11/26/2015                        |              |                             |  |
| From (usft)    | To (usft) | Survey (Wellbore)                      | Tool Name    | Description                 |  |
| 100.00         | 4,118.00  | Phoenix Gyro Surveys (OH / Job #151463 | CB-GYRO-MS   | Camera based gyro multishot |  |
| 4,349.00       | 8,765.00  | Phoenix MWD Surveys (OH / Job #151463  | PHX+MWD+HDGM | PHX+OWSG MWD + HDGM         |  |

|                       |                 |             |                       |              |              |                         |                         |                        |                       |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|
| 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) |
| 0.00                  | 0.00            | 0.00        | 0.00                  | 0.00         | 0.00         | 0.00                    | 0.00                    | 0.00                   | 0.00                  |
| 100.00                | 0.21            | 87.59       | 100.00                | 0.01         | 0.18         | 0.18                    | 0.21                    | 0.21                   | 0.00                  |
| 200.00                | 0.31            | 172.68      | 200.00                | -0.25        | 0.40         | 0.40                    | 0.36                    | 0.10                   | 85.09                 |
| 300.00                | 0.48            | 243.81      | 300.00                | -0.71        | 0.06         | 0.06                    | 0.48                    | 0.17                   | 71.13                 |
| 400.00                | 0.69            | 238.18      | 399.99                | -1.21        | -0.83        | -0.83                   | 0.22                    | 0.21                   | -5.63                 |
| 500.00                | 0.63            | 235.98      | 499.99                | -1.83        | -1.80        | -1.80                   | 0.07                    | -0.06                  | -2.20                 |
| 600.00                | 0.63            | 230.38      | 599.98                | -2.49        | -2.67        | -2.68                   | 0.06                    | 0.00                   | -5.60                 |
| 700.00                | 0.51            | 312.88      | 699.98                | -2.54        | -3.42        | -3.43                   | 0.76                    | -0.12                  | 82.50                 |
| 800.00                | 0.48            | 321.12      | 799.97                | -1.91        | -4.01        | -4.01                   | 0.08                    | -0.03                  | 8.24                  |
| 900.00                | 0.28            | 334.41      | 899.97                | -1.36        | -4.38        | -4.38                   | 0.22                    | -0.20                  | 13.29                 |



# Phoenix Technology Services LP

## Survey Report



|                  |                             |                                     |                                |
|------------------|-----------------------------|-------------------------------------|--------------------------------|
| <b>Company:</b>  | Apache Corporation          | <b>Local Co-ordinate Reference:</b> | Well #23H                      |
| <b>Project:</b>  | Eddy County, NM (NAD27 NME) | <b>TVD Reference:</b>               | KB @ 3733.00usft (Capstar 114) |
| <b>Site:</b>     | Raven Federal               | <b>MD Reference:</b>                | KB @ 3733.00usft (Capstar 114) |
| <b>Well:</b>     | #23H                        | <b>North Reference:</b>             | Grid                           |
| <b>Wellbore:</b> | OH / Job #1514630           | <b>Survey Calculation Method:</b>   | Minimum Curvature              |
| <b>Design:</b>   | Surveys (Capstar 114)       | <b>Database:</b>                    | Compass 5000 GCR               |

| 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) |
| 1,000.00                       | 0.39            | 5.69        | 999.97                | -0.80        | -4.45        | -4.45                   | 0.21                    | 0.11                   | 31.28                 |
| 1,100.00                       | 0.78            | 44.53       | 1,099.96              | 0.02         | -3.94        | -3.94                   | 0.54                    | 0.39                   | 38.84                 |
| 1,200.00                       | 0.88            | 51.99       | 1,199.95              | 0.98         | -2.86        | -2.86                   | 0.15                    | 0.10                   | 7.46                  |
| 1,300.00                       | 0.95            | 62.68       | 1,299.94              | 1.83         | -1.52        | -1.52                   | 0.18                    | 0.07                   | 10.69                 |
| 1,400.00                       | 0.85            | 82.57       | 1,399.93              | 2.31         | -0.05        | -0.05                   | 0.33                    | -0.10                  | 19.89                 |
| 1,500.00                       | 0.72            | 91.26       | 1,499.92              | 2.39         | 1.32         | 1.32                    | 0.18                    | -0.13                  | 8.69                  |
| 1,600.00                       | 0.57            | 15.99       | 1,599.91              | 2.85         | 2.08         | 2.08                    | 0.80                    | -0.15                  | -75.27                |
| 1,700.00                       | 0.55            | 331.29      | 1,699.91              | 3.75         | 1.99         | 1.99                    | 0.43                    | -0.02                  | -44.70                |
| 1,800.00                       | 0.48            | 0.54        | 1,799.91              | 4.59         | 1.76         | 1.76                    | 0.27                    | -0.07                  | 29.25                 |
| 1,900.00                       | 0.25            | 165.92      | 1,899.90              | 4.80         | 1.82         | 1.82                    | 0.72                    | -0.23                  | 165.38                |
| 2,000.00                       | 0.16            | 123.68      | 1,999.90              | 4.51         | 1.99         | 1.99                    | 0.17                    | -0.09                  | -42.24                |
| 2,100.00                       | 0.26            | 349.73      | 2,099.90              | 4.66         | 2.06         | 2.07                    | 0.39                    | 0.10                   | -133.95               |
| 2,200.00                       | 0.27            | 262.58      | 2,199.90              | 4.85         | 1.79         | 1.79                    | 0.37                    | 0.01                   | -87.15                |
| 2,300.00                       | 0.15            | 170.60      | 2,299.90              | 4.69         | 1.58         | 1.58                    | 0.31                    | -0.12                  | -91.98                |
| 2,400.00                       | 0.14            | 39.60       | 2,399.90              | 4.65         | 1.68         | 1.68                    | 0.26                    | -0.01                  | -131.00               |
| 2,500.00                       | 0.04            | 57.34       | 2,499.90              | 4.77         | 1.78         | 1.79                    | 0.10                    | -0.10                  | 17.74                 |
| 2,600.00                       | 0.07            | 51.45       | 2,599.90              | 4.82         | 1.86         | 1.86                    | 0.03                    | 0.03                   | -5.89                 |
| 2,700.00                       | 0.08            | 72.01       | 2,699.90              | 4.88         | 1.98         | 1.98                    | 0.03                    | 0.01                   | 20.56                 |
| 2,800.00                       | 0.31            | 198.32      | 2,799.90              | 4.65         | 1.96         | 1.96                    | 0.36                    | 0.23                   | 126.31                |
| 2,900.00                       | 0.09            | 53.25       | 2,899.90              | 4.44         | 1.93         | 1.94                    | 0.39                    | -0.22                  | -145.07               |
| 3,000.00                       | 0.10            | 258.11      | 2,999.90              | 4.47         | 1.91         | 1.91                    | 0.19                    | 0.01                   | -155.14               |
| 3,100.00                       | 0.14            | 159.06      | 3,099.90              | 4.34         | 1.87         | 1.87                    | 0.18                    | 0.04                   | -99.05                |
| 3,200.00                       | 0.13            | 286.80      | 3,199.90              | 4.25         | 1.81         | 1.81                    | 0.24                    | -0.01                  | 127.74                |
| 3,300.00                       | 0.12            | 98.23       | 3,299.90              | 4.27         | 1.80         | 1.80                    | 0.25                    | -0.01                  | 171.43                |
| 3,400.00                       | 0.13            | 348.40      | 3,399.90              | 4.37         | 1.88         | 1.88                    | 0.20                    | 0.01                   | -109.83               |
| 3,500.00                       | 0.15            | 264.51      | 3,499.90              | 4.47         | 1.73         | 1.73                    | 0.19                    | 0.02                   | -83.89                |
| 3,600.00                       | 0.24            | 332.56      | 3,599.90              | 4.64         | 1.50         | 1.50                    | 0.23                    | 0.09                   | 68.05                 |
| 3,700.00                       | 0.59            | 303.81      | 3,699.90              | 5.11         | 0.98         | 0.98                    | 0.40                    | 0.35                   | -28.75                |
| 3,800.00                       | 0.51            | 306.19      | 3,799.89              | 5.66         | 0.19         | 0.19                    | 0.08                    | -0.08                  | 2.38                  |
| 3,900.00                       | 0.81            | 24.23       | 3,899.89              | 6.57         | 0.12         | 0.12                    | 0.86                    | 0.30                   | 78.04                 |
| 4,000.00                       | 0.71            | 352.72      | 3,999.88              | 7.83         | 0.33         | 0.34                    | 0.42                    | -0.10                  | -31.51                |
| 4,118.00                       | 0.73            | 16.48       | 4,117.87              | 9.27         | 0.45         | 0.46                    | 0.25                    | 0.02                   | 20.14                 |
| Tie In to Phoenix Gyro Surveys |                 |             |                       |              |              |                         |                         |                        |                       |
| 4,349.00                       | 2.20            | 84.50       | 4,348.80              | 11.11        | 5.28         | 5.29                    | 0.88                    | 0.64                   | 29.45                 |
| First Phoenix MWD Survey       |                 |             |                       |              |              |                         |                         |                        |                       |
| 4,392.00                       | 8.70            | 94.40       | 4,391.58              | 10.94        | 9.35         | 9.36                    | 15.22                   | 15.12                  | 23.02                 |
| 4,434.00                       | 15.10           | 92.00       | 4,432.66              | 10.51        | 18.00        | 18.00                   | 15.28                   | 15.24                  | -5.71                 |
| 4,477.00                       | 21.50           | 92.00       | 4,473.46              | 10.03        | 31.48        | 31.49                   | 14.88                   | 14.88                  | 0.00                  |
| 4,520.00                       | 27.00           | 94.80       | 4,512.66              | 8.94         | 49.10        | 49.10                   | 13.06                   | 12.79                  | 6.51                  |
| 4,562.00                       | 32.30           | 97.10       | 4,549.14              | 6.76         | 69.75        | 69.75                   | 12.90                   | 12.62                  | 5.48                  |
| 4,605.00                       | 36.90           | 98.70       | 4,584.53              | 3.38         | 93.92        | 93.93                   | 10.90                   | 10.70                  | 3.72                  |
| 4,648.00                       | 41.20           | 98.50       | 4,617.92              | -0.67        | 120.70       | 120.70                  | 10.00                   | 10.00                  | -0.47                 |
| 4,690.00                       | 45.30           | 99.30       | 4,648.50              | -5.13        | 149.13       | 149.13                  | 9.85                    | 9.76                   | 1.90                  |



# Phoenix Technology Services LP

## Survey Report



|                  |                             |                                     |                                |
|------------------|-----------------------------|-------------------------------------|--------------------------------|
| <b>Company:</b>  | Apache Corporation          | <b>Local Co-ordinate Reference:</b> | Well #23H                      |
| <b>Project:</b>  | Eddy County, NM (NAD27 NME) | <b>TVD Reference:</b>               | KB @ 3733.00usft (Capstar 114) |
| <b>Site:</b>     | Raven Federal               | <b>MD Reference:</b>                | KB @ 3733.00usft (Capstar 114) |
| <b>Well:</b>     | #23H                        | <b>North Reference:</b>             | Grid                           |
| <b>Wellbore:</b> | OH / Job #1514630           | <b>Survey Calculation Method:</b>   | Minimum Curvature              |
| <b>Design:</b>   | Surveys (Capstar 114)       | <b>Database:</b>                    | Compass 5000 GCR               |

| 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) |
| 4,733.00                 | 49.90           | 99.50       | 4,677.49              | -10.31       | 180.45       | 180.44                  | 10.70                   | 10.70                  | 0.47                  |
| 4,776.00                 | 54.10           | 98.70       | 4,703.96              | -15.66       | 213.90       | 213.89                  | 9.88                    | 9.77                   | -1.86                 |
| 4,818.00                 | 59.00           | 97.80       | 4,727.10              | -20.68       | 248.57       | 248.56                  | 11.80                   | 11.67                  | -2.14                 |
| 4,861.00                 | 64.30           | 97.50       | 4,747.51              | -25.72       | 286.06       | 286.05                  | 12.34                   | 12.33                  | -0.70                 |
| 4,904.00                 | 66.80           | 97.60       | 4,765.31              | -30.86       | 324.86       | 324.85                  | 5.82                    | 5.81                   | 0.23                  |
| 4,946.00                 | 70.60           | 98.80       | 4,780.56              | -36.44       | 363.58       | 363.57                  | 9.43                    | 9.05                   | 2.86                  |
| 4,989.00                 | 74.30           | 99.70       | 4,793.53              | -43.04       | 404.04       | 404.03                  | 8.83                    | 8.60                   | 2.09                  |
| 5,032.00                 | 80.30           | 99.70       | 4,802.98              | -50.10       | 445.37       | 445.35                  | 13.95                   | 13.95                  | 0.00                  |
| 5,080.00                 | 85.40           | 98.50       | 4,808.95              | -57.63       | 492.38       | 492.36                  | 10.91                   | 10.63                  | -2.50                 |
| 5,123.00                 | 87.30           | 96.60       | 4,811.69              | -63.27       | 534.92       | 534.90                  | 6.24                    | 4.42                   | -4.42                 |
| 5,251.00                 | 87.40           | 94.30       | 4,817.61              | -75.41       | 662.20       | 662.17                  | 1.80                    | 0.08                   | -1.80                 |
| 5,379.00                 | 87.60           | 92.10       | 4,823.19              | -82.55       | 789.87       | 789.84                  | 1.72                    | 0.16                   | -1.72                 |
| 5,507.00                 | 87.80           | 88.40       | 4,828.33              | -83.10       | 917.74       | 917.71                  | 2.89                    | 0.16                   | -2.89                 |
| 5,635.00                 | 88.80           | 87.80       | 4,832.13              | -78.86       | 1,045.61     | 1,045.58                | 0.91                    | 0.78                   | -0.47                 |
| 5,763.00                 | 87.80           | 87.50       | 4,835.92              | -73.62       | 1,173.45     | 1,173.42                | 0.82                    | -0.78                  | -0.23                 |
| 5,891.00                 | 87.70           | 87.10       | 4,840.95              | -67.59       | 1,301.20     | 1,301.18                | 0.32                    | -0.08                  | -0.31                 |
| 6,019.00                 | 89.80           | 89.30       | 4,843.74              | -63.57       | 1,429.10     | 1,429.07                | 2.38                    | 1.64                   | 1.72                  |
| 6,147.00                 | 90.30           | 91.10       | 4,843.63              | -64.02       | 1,557.09     | 1,557.07                | 1.46                    | 0.39                   | 1.41                  |
| 6,275.00                 | 88.40           | 90.10       | 4,845.08              | -65.36       | 1,685.07     | 1,685.04                | 1.68                    | -1.48                  | -0.78                 |
| 6,399.00                 | 86.30           | 88.70       | 4,850.81              | -64.06       | 1,808.92     | 1,808.89                | 2.03                    | -1.69                  | -1.13                 |
| 6,526.00                 | 87.50           | 87.30       | 4,857.68              | -59.64       | 1,935.65     | 1,935.63                | 1.45                    | 0.94                   | -1.10                 |
| 6,655.00                 | 88.60           | 87.20       | 4,862.07              | -53.45       | 2,064.42     | 2,064.40                | 0.86                    | 0.85                   | -0.08                 |
| 6,782.00                 | 89.10           | 86.50       | 4,864.62              | -46.48       | 2,191.20     | 2,191.19                | 0.68                    | 0.39                   | -0.55                 |
| 6,910.00                 | 87.80           | 87.20       | 4,868.08              | -39.44       | 2,318.96     | 2,318.95                | 1.15                    | -1.02                  | 0.55                  |
| 7,038.00                 | 88.60           | 88.90       | 4,872.10              | -35.09       | 2,446.82     | 2,446.81                | 1.47                    | 0.63                   | 1.33                  |
| 7,167.00                 | 89.30           | 89.00       | 4,874.47              | -32.73       | 2,575.77     | 2,575.76                | 0.55                    | 0.54                   | 0.08                  |
| 7,295.00                 | 89.50           | 89.00       | 4,875.81              | -30.49       | 2,703.75     | 2,703.74                | 0.16                    | 0.16                   | 0.00                  |
| 7,422.00                 | 89.20           | 88.50       | 4,877.25              | -27.72       | 2,830.71     | 2,830.70                | 0.46                    | -0.24                  | -0.39                 |
| 7,550.00                 | 88.60           | 87.80       | 4,879.71              | -23.59       | 2,958.62     | 2,958.61                | 0.72                    | -0.47                  | -0.55                 |
| 7,678.00                 | 88.30           | 88.30       | 4,883.17              | -19.24       | 3,086.49     | 3,086.49                | 0.46                    | -0.23                  | 0.39                  |
| 7,806.00                 | 87.50           | 87.70       | 4,887.86              | -14.77       | 3,214.33     | 3,214.32                | 0.78                    | -0.63                  | -0.47                 |
| 7,934.00                 | 87.00           | 87.60       | 4,894.00              | -9.53        | 3,342.07     | 3,342.07                | 0.40                    | -0.39                  | -0.08                 |
| 8,062.00                 | 88.00           | 88.30       | 4,899.58              | -4.96        | 3,469.87     | 3,469.87                | 0.95                    | 0.78                   | 0.55                  |
| 8,190.00                 | 88.20           | 89.30       | 4,903.83              | -2.28        | 3,597.77     | 3,597.77                | 0.80                    | 0.16                   | 0.78                  |
| 8,319.00                 | 88.50           | 89.30       | 4,907.54              | -0.70        | 3,726.70     | 3,726.70                | 0.23                    | 0.23                   | 0.00                  |
| 8,447.00                 | 87.70           | 89.10       | 4,911.78              | 1.08         | 3,854.62     | 3,854.62                | 0.64                    | -0.63                  | -0.16                 |
| 8,574.00                 | 90.50           | 92.00       | 4,913.78              | -0.14        | 3,981.57     | 3,981.57                | 3.17                    | 2.20                   | 2.28                  |
| 8,701.00                 | 88.70           | 90.90       | 4,914.67              | -3.35        | 4,108.52     | 4,108.52                | 1.66                    | -1.42                  | -0.87                 |
| Final Phoenix MWD Survey |                 |             |                       |              |              |                         |                         |                        |                       |
| 8,765.00                 | 88.70           | 90.90       | 4,916.12              | -4.36        | 4,172.50     | 4,172.50                | 0.00                    | 0.00                   | 0.00                  |
| Projection to TD         |                 |             |                       |              |              |                         |                         |                        |                       |



# Phoenix Technology Services LP

## Survey Report



|           |                             |                              |                                |
|-----------|-----------------------------|------------------------------|--------------------------------|
| Company:  | Apache Corporation          | Local Co-ordinate Reference: | Well #23H                      |
| Project:  | Eddy County, NM (NAD27 NME) | TVD Reference:               | KB @ 3733.00usft (Capstar 114) |
| Site:     | Raven Federal               | MD Reference:                | KB @ 3733.00usft (Capstar 114) |
| Well:     | #23H                        | North Reference:             | Grid                           |
| Wellbore: | OH / Job #1514630           | Survey Calculation Method:   | Minimum Curvature              |
| Design:   | Surveys (Capstar 114)       | Database:                    | Compass 5000 GCR               |

| Design Annotations    |                       |                   |              |                                |
|-----------------------|-----------------------|-------------------|--------------|--------------------------------|
| Measured Depth (usft) | Vertical Depth (usft) | Local Coordinates |              | Comment                        |
|                       |                       | +N/-S (usft)      | +E/-W (usft) |                                |
| 4,118.00              | 4,117.87              | 9.27              | 0.45         | Tie In to Phoenix Gyro Surveys |
| 4,349.00              | 4,348.80              | 11.11             | 5.28         | First Phoenix MWD Survey       |
| 8,701.00              | 4,914.67              | -3.35             | 4,108.52     | Final Phoenix MWD Survey       |
| 8,765.00              | 4,916.12              | -4.36             | 4,172.50     | Projection to TD               |

|                   |                    |             |
|-------------------|--------------------|-------------|
| Checked By: _____ | Approved By: _____ | Date: _____ |
|-------------------|--------------------|-------------|

