

## Apache Corporation Eddy County, NM (Nad27)

Raven Federal #10H **Raven Federal #10H Raven Federal** 

Survey: Phoenix MWD Surveys

## Apache

02 January, 2013



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CORACHE Exploring What's Possible	Phoenix Technology Services Apache	ly Services		PHOENIX TTCHMOLOGT ELANCES
Company 1, 2 Project: 1, 2 Site: control (Nad27) Site: control (Nad27) Site: control (Nad27) Raven Federal #10H Weilbore: Control (Nad27) Raven Federal #10H Weilbore: Control (Nad27) Raven Federal #10H Design: control (Nad27) Raven Federal #10H Design: control (Nad27) Raven Federal #10H		Local Co-ordinate Reference TVD Reference MD Reference North Reference Survey Catculation Method: Survey Catculation Method:	efterence: Method:	Well Raven Federal #10H Well @ 3741.00usft (Original Well Elev + 14 <sup>,</sup> KB) Well @ 3741.00usft (Original Well Elev + 14 <sup>,</sup> KB) Grid Minimum Curvature GCR DB v5000
i Project				
Map System:         US State Plane 1927 (Exact solution)           Geo Datum:         NAD 1927 (NADCON CONUS)           Map Zone:         New Mexico East 3001		System Datum:	Mean Sea Level	
Street Stre				1. Alexandree and the second se
osition:	Northing:	673,239.70 usft	Latitude:	32° 51° 0.2430 N
From: Map Position Uncertainty: 0.00 usft	Easting: Slot Radius:	633,303.50 usft 13-3/16 *	Longitude: Grid Convergence:	103° 53' 57.3509 W 0.24 °
الا المالية الم الالمالية المالية المالي				
Well Position +N/-S 0.00 usft	Northing:	673,239.70 usft	Latitude:	32° 51' 0.2430 N
+E/-W 0.00 usft		633,303.50 usft	Longitude:	103° 53' 57.3509 W
Position Uncertainty 0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,727.00 usft
Wellborg Control of Street Raven Federal #10H	والترابية والمحافظ			
Magnetics 2010 - 24 Model Name - 5 2 Sample Date - 5 10 Sample	iple Date (1990, 2010, 2010, 2010, 2010, 2010, 2010, 2010, 2010, 2010) ການ ການ ການ ການ ການ ການ ການ ການ ການ ການ		K Field Strength M. A.	
Design 81, 74, 54, 55, 7 Raven Federal #10H Surveys		an a		
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Version: 1.0 Vertical Section: 1.5 25 25 25 25 25 20 0 0 0 0 0 0	AUTUAL TIE ON Depth:	u.uo Direction ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) (		
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(ellbore)	ToolName	Description		
486.00 9,601.00 Phoenix MWD Suiveys (Raven Federal #1	QMW	MWD - Standard		
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Phoenix Technology Services Apache

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NIS         LEN         V. Sec         Dieg         Northing           0.00         0.00         0.00         0.00         673,239           0.01         0.02         0.03         673,239           0.01         0.02         0.03         673,239           0.01         0.02         0.03         673,239           0.01         0.02         0.03         673,239           0.01         0.178         0.23         673,239           0.01         0.178         0.23         673,239           0.02         0.03         0.03         673,239           0.02         0.03         0.03         673,239           0.02         0.03         0.03         673,239           0.02         0.03         0.148         0.73           0.02         0.03         0.148         0.73           0.02         0.03         0.1445         0.14           0.18         15.12         0.1445         0.73           0.23         0.1445         0.70         667           0.24         15.14         15.14         0.73           0.25         0.249         0.25         673,243           0.2
NIS         Lieth         Lieth <thlieth< th="">         Li</thlieth<>
0.00         0.00 <t< th=""></t<>
-0.20       0.20       0.20       0.23         -0.78       0.79       0.79       0.23         -1.78       1.78       0.23         -3.16       3.16       0.23         -4.66       4.66       0.23         -4.68       4.86       0.23         -4.69       -4.66       0.23         -4.68       -4.66       0.23         -4.69       -4.66       0.23         -9.10       9.10       9.10         -11.61       11.60       0.17         -11.61       11.60       0.17         -11.61       11.60       0.17         -13.91       13.90       0.26         -15.13       15.12       0.17         -15.13       15.12       0.70         -15.13       15.12       0.70         -15.14       12.56       0.70         -10.33       -1.52       1.25         -15.12       3.24       0.26         -1.52       1.51       0.26         -1.52       -1.51       0.26         -1.52       1.51       0.23         -1.52       -1.51       0.23         3.65       -1.64
-0.79       0.79       0.79       0.23         -1.78       1.78       0.23         -3.16       3.16       0.23         -3.16       3.16       0.23         -4.66       4.66       0.23         -4.93       4.86       0.23         -4.93       4.86       0.23         -9.10       9.10       9.10         -9.11.61       11.61       0.23         -9.12       9.10       9.10         -11.61       11.60       0.14         -11.61       11.60       0.13         -11.61       11.60       0.13         -15.13       15.12       0.13         -15.13       15.12       0.13         -15.13       15.41       0.72         -15.44       15.42       0.70         -15.43       15.43       0.70         -10.33       10.26       0.70         -1.52       5.07       0.28         -1.52       1.51       0.23         -1.52       0.41       0.23         -1.52       0.41       0.23         -1.53       -3.55       0.33         -1.55       -3.55       0.33
-1.78       1.78       0.23         -3.16       3.16       0.23         -3.16       3.16       0.23         -4.66       4.66       0.23         -9.10       9.10       0.13         -9.10       9.10       9.10       0.13         -9.11.61       11.61       0.166       0.13         -9.10       9.10       9.10       0.13         -9.11.61       11.60       0.13       0.14         -11.61       11.60       0.13       0.14         -15.13       15.12       0.14       0.17         -15.13       15.12       0.13       0.17         -15.13       15.44       12.58       0.17         -10.33       10.26       0.53       0.70         -10.33       10.26       0.53       0.70         -1.52       5.07       0.66       0.70         -1.52       5.07       0.63       0.53         -1.52       3.65       0.12       0.53         -1.53       -3.65       0.12       0.73         -1.52       5.07       0.56       0.73         -1.53       -3.65       0.103       0.73      3
-3.16 3.16 0.23 -4.66 4.86 0.23 -4.93 4.93 0.29 -9.10 9.10 9.10 0.17 -11.61 11.60 0.13 -15.13 15.12 0.66 -15.13 15.12 0.66 -12.64 15.41 0.72 -14.49 14.45 0.17 -12.64 15.43 0.70 -10.33 10.26 0.63 -6.63 6.56 0.53 -6.63 6.56 0.53 -3.27 3.24 0.28 -1.51 2.28 -1.51 2.28 -1.51 2.28 -3.63 -0.41 0.28 -3.63 -3.55 0.53 -3.65 0.53 -3.55 0.33 -3.65 0.33
-4.66       4.66       0.23         -4.63       -4.66       0.28         -6.92       -6.92       0.14         -9.10       9.10       9.10       0.13         -11.61       11.60       0.17       0.14         -13.91       13.90       0.63       0.13         -15.13       15.12       0.66       0.13         -15.13       15.12       0.66       0.14         -15.13       15.12       0.66       0.72         -14.49       14.45       0.70       0.66         -12.64       12.56       0.70       0.70         -12.64       12.56       0.70       0.70         -12.64       12.56       0.70       0.66         -10.33       10.26       0.53       0.53         -5.12       5.07       0.69       0.70         -1.52       3.24       0.28       0.53         -1.52       3.65       -0.41       0.23         3.65       -3.65       0.72       0.72         3.65       -3.65       0.72       0.73         3.65       -3.65       0.72       0.72         3.65       -3.65       0.72
-4.83       -6.92       -6.92       0.14         -9.10       9.10       9.10       0.13         -9.11.61       11.60       0.13       0.14         -11.61       11.60       0.13       0.13         -15.13       15.12       0.66       0.17         -15.13       15.12       0.66       0.17         -15.13       15.12       0.66       0.17         -15.13       15.12       0.66       0.70         -15.13       15.12       0.66       0.70         -12.64       12.56       0.70       0.70         -10.33       10.26       0.70       0.70         -10.33       10.26       0.70       0.70         -12.64       12.56       0.70       0.66         -1.52       5.07       0.66       0.53         -1.52       1.51       0.28       0.53         -1.52       1.51       0.28       0.73         3.65       -0.41       0.28       0.12         3.61       -3.65       0.74       0.73         3.63       -3.65       0.33       0.33
-6.92       6.92       0.14         -9.10       9.10       0.13         -11.61       11.60       0.13         -11.61       11.60       0.13         -15.13       15.12       0.66         -15.13       15.12       0.66         -15.13       15.12       0.66         -15.44       15.43       0.72         -14.49       15.43       0.72         -12.64       12.56       0.70         -10.33       10.26       0.70         -10.33       10.26       0.70         -10.33       10.26       0.70         -12.64       12.56       0.70         -12.55       0.43       0.26         -1.52       5.07       0.26         -1.52       0.41       0.28         -1.53       -2.26       0.12         3.63       -3.65       0.12         3.61       -3.65       0.33         3.65       -3.65       0.33
-9.10       9.10       9.10       0.17       1.         -11.61       11.60       0.17       0.17       1.         -13.91       13.90       0.53       0.55       0.56         -15.13       15.12       0.66       0.70       0.72         -15.44       15.41       0.72       0.76       0.70         -12.64       12.58       0.70       0.40       0.70         -10.33       10.26       0.70       0.40       0.70         -10.33       10.26       0.70       0.66       0.70         -10.33       10.26       0.70       0.69       0.70         -10.33       10.26       0.70       0.69       0.70         -10.33       10.26       0.53       0.53       0.53         -5.12       3.24       0.28       0.53       0.28         -1.52       1.51       0.28       0.12       2.31         3.63       -3.65       0.74       0.72       0.73         3.61       -3.65       0.33       0.33       0.33
-11.61     11.60     0.17       -13.91     13.90     0.63       -15.13     15.12     0.66       -15.44     15.12     0.66       -15.44     15.41     0.72       -15.43     15.45     0.72       -12.64     12.58     0.70       -12.64     12.58     0.40       -10.33     10.26     0.40       -10.33     10.26     0.53       -6.63     6.56     0.53       -5.12     5.07     0.66       -5.12     3.24     0.53       -5.12     3.24     0.28       -1.52     1.51     0.53       -1.52     0.41     0.28       -1.52     0.41     0.28       -1.53     -0.41     0.28       -1.53     -0.41     0.23       3.63     -3.65     0.12       3.63     -3.65     0.33       3.65     -3.55     0.33
-13.91       13.90       0.63         -15.13       15.12       0.66         -15.44       15.41       0.72         -15.49       14.45       0.72         -12.64       12.58       0.40         -10.33       10.26       0.40         -10.33       10.26       0.40         -10.33       10.26       0.59         -8.00       7.93       1.24         -8.63       6.56       0.53         -5.12       5.07       0.66         -5.12       5.07       0.66         -5.12       3.24       0.28         -5.12       3.24       0.28         -5.12       3.24       0.26         -5.12       3.24       0.28         -5.13       -2.55       0.10         3.63       -3.65       0.12         3.61       -3.55       0.33         3.65       -3.55       0.33
-15.13       15.12       0.66         -15.44       15.41       0.72         -14.49       15.41       0.72         -12.64       12.56       0.40         -10.33       10.26       0.40         -10.33       10.26       0.53         -8.63       6.56       0.53         -5.12       5.07       0.66         -1.52       1.51       0.53         -1.52       1.51       0.28         -1.52       1.51       0.28         -1.52       1.51       0.28         -1.52       3.24       0.28         -1.53       -0.41       0.28         -1.53       -0.41       0.28         3.63       -3.65       0.12         3.63       -3.65       0.33         3.65       -3.55       0.33
-15.44 15.41 0.72 -14.49 14.45 0.70 -12.64 12.58 0.70 -10.33 10.26 0.69 -6.63 6.56 0.53 -5.12 5.07 0.66 -1.52 1.51 0.58 -1.52 3.24 0.28 -1.52 3.24 0.28 -1.52 3.24 0.28 -1.52 3.24 0.28 -3.65 1.23 -3.65 0.12 3.63 -3.55 0.33
-14.49 14.45 0.70 -12.64 12.58 0.70 -10.33 10.26 0.69 -8.63 6.56 0.53 -5.12 5.07 0.68 -3.27 3.24 0.58 -1.52 1.51 0.59 0.43 -0.41 0.28 3.63 -3.55 1.03 3.63 -3.55 0.12 3.65 -3.55 0.33
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-10.33 10.26 0.69 -8.00 7.93 1.24 -8.63 6.56 0.53 -5.12 5.07 0.66 -1.52 1.51 0.28 0.43 -0.41 0.28 0.43 -0.41 0.28 3.63 -3.55 1.03 3.63 -3.55 0.12 3.65 -3.55 0.33
-8.00     7.93     1.24       -6.63     6.56     0.53       -5.12     5.07     0.66       -3.27     3.24     0.28       -1.52     1.51     0.28       -1.52     1.51     0.28       -1.52     1.51     0.28       -1.52     1.51     0.28       -1.52     1.51     0.28       3.63     -0.41     0.23       3.63     -3.55     0.12       3.65     -3.55     0.33
-6.63 6.56 0.53 -5.12 5.07 0.66 -3.27 3.24 0.26 -1.52 1.51 0.26 0.43 -0.41 0.26 2.31 -2.26 0.12 3.63 -3.55 1.03 3.65 -3.55 0.33
-5.12 5.07 0.66 -3.27 3.24 0.28 -1.52 1.51 0.59 0.43 -0.41 0.59 2.31 -2.26 0.12 3.63 -3.55 1.03 3.65 -3.55 0.33
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-1.52 1.51 0.59 0.43 -0.41 0.59 2.31 -2.26 0.12 3.63 -3.55 1.03 3.81 0.74 3.65 0.33
0.43 -0.41 0.23 2.31 -2.26 0.12 3.63 -3.55 1.03 3.91 -3.81 0.74 3.65 -3.55 0.33
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3.63 -3.55 1.03 3.81 -3.81 0.74 3.65 -3.55 0.33
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Phoenix Technology Services Apache

PHOENIX TICHHOLOGT MAVICES		
	Well Raven Federal #10H Well @ 3741.00usft (Original Well Elev + 14' KB) Well @ 3741.00usft (Original Well Elev + 14' KB) Grid Minimum Curvature GCR DB v5000	ĎLeg. (usft) (usft) (usft) (usft) (
	ordinate Reference: ************************************	

District         Adj (grammi)         Toris         NS         Give         NS	Company: Apache Corporation Project: 64, Eddy County, NM (N Site: 7 Raven Federal Welt: 7 Raven Federal #10H WeltBone: 8 Raven Federal #10H Design: 8 Raven Federal #10H	Apache Corporation Eddy County, NM (Nad27) Raven Federal Raven Federal #10H Raven Federal #10H Raven Federal #10H Surveys					A Local Co-ordinate Reference: TVD Reference: MD Reference: North Reference: Survey Calculation Method: Database:	Reference:		Well Raven Federal #10H Well @ 3741.00usft (Original Well Elev + 14' KB) Well @ 3741.00usft (Original Well Elev + 14' KB) Grid Minimum Curvature GCR DB v5000	- 14' KB) - 14' KB) - 14' KB)
MD         MD<								-12			
2,300.00 $1,15$ $147.60$ $-1,341.50$ $2,469.10$ $-16.00$ $3.02$ $-2.89$ $2,800.00$ 0.31 $2,327$ $-1,141.91$ $2,590.00$ $-161.2$ $2.46$ $-2.33$ $2,700.00$ 0.30 $3.477$ $-1,141.91$ $2,590.00$ $-161.7$ $-1.36$ $-2.33$ $2,700.00$ 0.30 $3.477$ $-1,141.91$ $2,590.00$ $-161.7$ $-1.61.0$ $-2.33$ $2,700.00$ 0.30 $238.10$ $-1,41.91$ $2,590.00$ $-1.61.7$ $-1.16$ $-1.30$ $3,100.00$ 0.23 $289.26$ $-41.91$ $2,390.00$ $-1.77.9$ $-1.61.7$ $-0.25$ $3,000.00$ 0.24 $241.91$ $3,390.00$ $-1.77.9$ $-1.67$ $0.23$ $3,000.00$ 0.30 $234.10$ $-141.92$ $3,390.00$ $-1.77.9$ $-1.05$ $-1.26$ $3,000.00$ 0.30 $-141.92$ $3,390.00$ $-177.9$ $-1.05$ $-1.26$ $3,000.00$ 0	Ň	ine Pi		1 9 mile )	,36 y 4 3 ' ≁∖x 4 ' •			V. Sec (usft)	Ďl.eĝ	A)	Easting
0,1         253,71         -1,141,91         2,598,00         -19,12         2,46         2,23           0,20         34,73         -1,041,91         2,598,00         -18,17         1,115         -1,103           0,30         364,73         -1,041,91         2,598,00         -18,37         1,115         -1,103           0,30         286,51         -941,91         2,798,00         -18,17         0,77         0,77         -1,103           0,23         289,10         -441,91         2,999,00         -17,87         0,37         -0,25           0,23         289,11         -541,91         3,199,00         -17,78         0,37         0,26           0,23         289,10         -41,91         3,399,00         -17,79         0,37         0,25           0,24         284,10         -141,92         3,399,00         -17,79         0,54         0,67           0,23         284,10         -141,92         3,399,00         -17,19         2,399         1,17         0,22           0,24         283,11         -41,92         3,399,00         -17,19         2,394         0,51         0,51           0,23         284,10         -141,92         3,399,00         -17,28<	2,500.00	1.15	197.68	-1,241.90	2,499.10		3.02	1 i	0.33	673,221.70	633,306.52
0.30         314.73         -1,041.31         2,580.03         -18.34         2.01         -1.18           0.30         304.72         -941.31         2,789.03         -18.37         11.6         -1.50           0.30         228.51         -941.31         2,799.03         -18.37         11.6         -1.03           0.23         298.51         -941.31         2,799.03         -18.17         0.77         0.03           0.23         283.10         -441.91         2,799.03         -17.87         0.27         0.22           0.23         283.10         -441.91         3,199.03         -17.24         0.24         0.23           0.24         283.10         -441.91         3,199.03         -17.79         0.74         0.22           0.24         289.10         -441.91         3,199.03         -17.79         0.24         0.67           0.24         293.40         -441.92         3,199.03         -17.79         0.24         0.67           0.35         284.10         -141.92         3,199.03         -17.79         0.24         0.67           0.36         399.04         -16.37         -2.21         2.24         2.54           0.36	2,600.00	0.31	253.71	-1,141.91	2,599.09	-19.12	2.46	-2.33	1.01	673,220.58	633,305.96
0.30         304.72         -341.91         2.780.00         -15.50         1.62         -1.50           0.30         286.51         -341.91         2.399.00         -16.10         0.78         -0.63           0.23         289.51         -341.91         2.399.00         -17.97         0.37         -0.25           0.23         289.51         -41.91         3.199.00         -17.87         0.37         -0.25           0.23         289.10         -41.91         3.199.00         -17.79         0.37         -0.25           0.23         289.10         -41.91         3.199.00         -17.79         0.37         -0.25           0.24         289.10         -11.18         3.199.00         -17.79         -1.05         1.17           0.28         294.10         -14.192         3.399.00         -17.79         -1.05         0.26           0.30         293.00         -17.79         -1.05         1.16         1.17           0.30         294.10         -1.192         3.399.00         -1.13         2.254         2.61           0.31         0.32         3.399.05         -1.13         2.252         2.34         2.61           0.74         340.55<	2,700.00	0.30	314.73	-1,041.91	2,699.09	-18.94	2.01	-1.88	0.31	673,220.76	633,305.51
0.30 $28651$ $-44151$ $2.999.09$ $-16.37$ $1.16$ $-1.03$ $0.23$ $280.86$ $-74151$ $2.999.09$ $-17.57$ $0.77$ $-0.55$ $-0.55$ $0.23$ $280.31$ $-54151$ $3.999.09$ $-17.56$ $0.26$ $-0.55$ $0.26$ $0.23$ $289.10$ $-41151$ $3.999.09$ $-17.56$ $0.26$ $0.05$ $0.20$ $280.10$ $-14122$ $3.999.00$ $-17.79$ $-1.05$ $0.07$ $0.30$ $284410$ $-14192$ $3.299.00$ $-17.79$ $-1.05$ $0.07$ $0.30$ $284410$ $-14192$ $3.299.00$ $-17.79$ $-1.05$ $0.07$ $0.30$ $284410$ $-14192$ $3.499.06$ $-17.79$ $-1.05$ $0.77$ $0.30$ $284410$ $-14192$ $3.799.06$ $-17.79$ $-2.62$ $2.34$ $0.74$ $369.07$ $-17.219$ $-12.51$ $-1.05$ $2.61$ $0.74$ <t< td=""><td>2,800.00</td><td>0:30</td><td>304.72</td><td>-941.91</td><td>2,799.09</td><td>-18.59</td><td>1.62</td><td>-1.50</td><td>0.05</td><td>673,221.11</td><td>633,305.12</td></t<>	2,800.00	0:30	304.72	-941.91	2,799.09	-18.59	1.62	-1.50	0.05	673,221.11	633,305.12
0.23         288.8         -741.91         2,990.00         -16.10         0.76         -0.63           0.29         282.83         -641.91         3,090.00         -17.87         0.37         -0.25           0.29         283.11         -541.91         3,190.00         -17.87         0.37         -0.25           0.20         283.11         -541.91         3,190.00         -17.64         -0.54         0.07           0.20         289.10         -441.31         3,290.08         -17.79         -0.54         0.07           0.40         289.10         -141.92         3,390.08         -17.79         -0.54         0.07           0.30         294.10         -141.92         3,390.08         -17.79         -0.54         0.07           0.30         294.10         -141.92         3,590.08         -17.79         -1.05         1.17           0.30         299.01         -15.88         -1.17         9.04         -2.23         2.34           0.31         345.1         550.05         3,590.06         -15.88         -2.31         2.24           0.70         344.91         -15.88         -16.91         -1.33         -2.22         2.34           0	2,900.00	0.30	298.51	-841.91	2,899.09	-18.37	1.16	-1.03	0.03	673,221 33	633,304.66
0.29         282.93         -641.91         3,099.09         -17,97         0.37         -0.25           0.22         283.11         -541.91         3,199.09         -17,85         -0.14         0.28           0.22         289.10         -441.91         3,299.08         -17,79         -0.54         0.67           0.23         289.10         -441.91         3,299.08         -17,79         -1.05         1.17           0.40         280.38         -341.92         3,399.08         -17,79         -1.05         1.17           0.30         229.41         -41.92         3,599.08         -18.08         -1.76         1.18           0.30         239.10         -141.92         3,599.06         -18.08         -1.76         1.18           0.30         234.10         -141.92         3,599.06         -16.33         -2.22         2.34           0.70         349.14         249.06         -15.88         -17.73         -2.42         2.61           0.71         340.14         258.06         3,999.05         -14.53         -3.47         3.55           0.71         34.199.03         -10.33         -13.37         -2.42         2.61           0.71	3,000.00	0.23	298.88	-741.91	2,999.09	-18.10	0.76	-0.63	, 0.07	673,221.60	633,304.26
0.29         283.11         -541.91         3,199.09         -17.85         -0.14         0.28           0.21         289.10         -441.91         3,299.08         -17.79         -1.05         1.17           0.40         280.38         -341.92         3,399.08         -17.79         -1.05         1.17           0.30         294.10         -141.92         3,599.08         -18.31         -2.22         2.34           0.30         294.10         -141.92         3,599.06         -18.31         -2.22         2.34           0.30         294.10         -141.92         3,599.06         -16.81         -2.42         2.54           0.31         352.76         58.06         -145.02         3,799.06         -15.81         -2.42         2.54           0.74         340.55         158.05         3,799.06         -15.81         -2.42         2.54         2.61           0.71         349.14         2,690.05         -14.53         -2.42         2.54         2.61           0.72         349.14         2,690.05         -14.45         3.690.05         -14.53         -2.82         2.22           0.74         340.55         158.06         -14.53         -2.82	3,100.00	0.29	282.93	-641.91	3,099.08	-17.97	0.37	-0.25	0.09	673,221.73	633,303.87
0.22         289.10         -441.91         3,299.09         -17.24         -0.54         0.67           0.40         280.38         -341.82         3,399.08         -17.79         -1.05         1.17           0.38         239.40         -341.82         3,399.08         -18.31         -2.22         2.34           0.38         239.40         -141.92         3,599.08         -18.31         -2.22         2.34           0.30         294.10         -141.92         3,599.06         -15.88         -2.42         2.54           0.86         352.76         58.06         3,799.06         -15.88         -2.42         2.84           0.70         349.14         258.05         3,899.05         -14.53         -2.42         2.84           0.70         349.14         258.05         3,899.05         -14.53         -2.82         2.34           0.70         341.84         358.04         -16.80         -16.83         -2.42         2.87           0.71         349.18         358.05         -14.53         -2.42         2.84         2.66           0.70         341.84         358.05         -14.53         -2.82         2.84         2.61           0.71<	3,200.00	0.29	283.11	-541.91	3,199.09	-17.85	-0.14	0.26	0.00	673,221.85	633,303.36
0.40         260.36         -341.32         3,399.08         -17.79         -1.05         1.17           0.38         239.40         -241.92         3,499.08         -18.31         -2.22         2.34           0.30         239.41         -141.92         3,599.08         -18.31         -2.22         2.34           0.30         239.41         -141.92         3,599.06         -18.31         -2.22         2.34           0.86         352.76         58.06         3,799.06         -16.81         -2.42         2.54           0.74         340.95         158.05         3,799.06         -14.53         -2.42         2.34           0.77         349.14         258.05         3,999.05         -14.53         -2.82         2.32           0.77         341.94         358.04         4,099.04         -12.18         -3.47         3.55           0.77         341.99         358.04         -13.60         -13.37         -3.21         3.33           0.79         331.18         458.03         4,199.03         -10.59         -4.13         3.56           0.70         331.54         558.04         4,990.03         -13.34         3.56           0.76 <td< td=""><td>3,300.00</td><td>0.22</td><td>269.10</td><td>-441.91</td><td>3,299.09</td><td>-17.84</td><td>-0.54</td><td>0.67</td><td>0.09</td><td>673,221.86</td><td>633,302.96</td></td<>	3,300.00	0.22	269.10	-441.91	3,299.09	-17.84	-0.54	0.67	0.09	673,221.86	633,302.96
0.38       239.40       -241.92       3,499.08       -18.31       -1.76       1.88         0.30       294.10       -141.92       3,599.08       -18.31       -2.22       2.34         0.82       359.04       -41.93       3,599.06       -18.31       -2.22       2.34         0.86       352.76       58.06       3,799.06       -15.88       -2.42       2.61         0.74       340.95       158.05       3,999.05       -14.53       -2.82       2.94         0.70       349.14       258.05       3,999.05       -13.37       -2.82       2.92         0.70       349.18       458.03       4,199.03       -10.99       -4.03       3.30         0.70       349.18       458.03       4,199.03       -10.99       -4.03       3.30         0.70       334.51       558.02       4,199.03       -7.98       -3.27       3.56         0.70       334.54       568.01       4,990.01       -7.98       -5.02       5.08         0.80       0.81       4,990.01       -7.98       -5.02       5.06       5.66         0.81       2.66.0       5.67       -5.09       -5.60       5.66         0.82 <td>3,400.00</td> <td>0.40</td> <td>260.38</td> <td>-341.92</td> <td>3,399.08</td> <td>-17.79</td> <td>-1.05</td> <td>1.17</td> <td>0.19</td> <td>673,221.91</td> <td>633,302.45</td>	3,400.00	0.40	260.38	-341.92	3,399.08	-17.79	-1.05	1.17	0.19	673,221.91	633,302.45
0.30 $294,10$ $-141,92$ $3,599,08$ $-18,31$ $-2.22$ $2.34$ $0.82$ $339,04$ $-41,93$ $3,699,07$ $-17,39$ $-2.22$ $2.34$ $0.86$ $332,76$ $58,06$ $3,799,06$ $-15,88$ $-2.42$ $2.54$ $0.74$ $340,14$ $258,05$ $3,999,05$ $-14,53$ $-2.82$ $2.92$ $0.70$ $349,14$ $258,05$ $3,999,05$ $-14,53$ $-2.82$ $2.92$ $0.70$ $341,18$ $258,05$ $3,999,05$ $-14,53$ $-2.82$ $2.92$ $0.70$ $341,18$ $258,05$ $3,999,05$ $-14,53$ $-2.82$ $2.92$ $0.70$ $331,18$ $4,580,03$ $4,199,03$ $-12,18$ $-3.47$ $3.55$ $0.70$ $331,54$ $658,02$ $4,199,03$ $-10,99$ $-4.66$ $4.10$ $0.70$ $335,55$ $758,01$ $4,99,01$ $-7.50$ $-2.104$ $2.109$ $0.8$ $274,14$	3,500.00	0.38	239.40	-241.92	3,499,08	-18.08	-1.76	1.88	0.14	673,221.62	633,301.74
0.82         359.04         -41.93         5,699.07         -17.39         -2.42         2.54           0.86         352.76         53.06         3,799.06         -15.88         -2.82         2.92           0.74         340.95         158.05         3,899.05         -14.53         -2.82         2.92           0.70         349.14         258.05         3,899.05         -14.53         -2.82         2.92           0.70         341.84         358.04         4,099.04         -12.18         -3.21         3.30           0.76         331.18         458.03         4,199.03         -10.99         -4.03         4.10           0.76         331.54         658.02         4,399.02         -9.97         -4.54         4.60           0.60         334.51         558.02         4,399.03         -7.50         -7.60         5.66           0.97         305.55         758.01         4,499.01         -7.60         -7.60         5.66           18.92         274.14         1,019.39         4,685.33         -7.50         -2.1.04         21.09           35.88         276.60         944.33         4,685.33         -7.50         -2.1.04         21.09	3,600.00	0.30	294.10	-141.92	3,599.08	-18.31	-2.22	2.34	0.32	673,221.39	. 633,301.28
0.86         352.76         58.06         3,799.06         -15.88         -2.51         2.61           0.74         340.95         158.05         3,899.05         -14.53         -2.82         2.92           0.70         349.14         258.05         3,999.05         -14.53         -2.82         2.92           0.70         341.18         258.05         3,999.05         -14.53         -3.21         3.30           0.70         341.18         258.05         3,999.05         -12.18         -3.27         3.30           0.70         341.18         258.03         4,199.03         -10.99         -4.03         4,10           0.70         331.54         558.02         4,399.02         -9.97         -4.54         4.60           0.97         331.54         558.02         4,99.01         -7.98         -5.02         5.08           0.97         365.55         758.01         4,990.01         -7.98         -5.60         5.66           18.92         273.12         856.31         4,990.01         -7.98         -5.60         5.66           18.92         274.14         1,019.69         4,760.89         3.83         -10.46         1.09           57	3,700.00	0.82	359.04	41.93	3,699.07	-17.39	-2.42	2.54	0.75	673,222.31	633,301.08
0.74       340.95       158.05       3,899.05       -14.53       -2.82       2.92         0.70       349.14       256.05       3,999.05       -13.37       -3.21       3.30         0.70       341.84       256.05       3,999.05       -12.18       -3.21       3.30         0.70       341.84       358.04       4,099.04       -12.18       -3.27       3.30         0.76       331.18       458.03       4,190.03       -10.99       -4.03       4.10         0.60       334.51       558.02       4,399.02       -9.97       -4.54       4.60         0.67       331.54       658.02       4,399.02       -9.04       -7.98       -5.02       5.08         0.97       305.55       756.01       4,499.01       -7.98       -5.02       5.08         18.92       273.12       856.31       4,665.33       -7.760       -21.04       21.09         18.92       274.14       1,019.89       4,760.89       3.83       -132.46       132.43         18.92       268.38       1,061.71       4,857.31       -7.16       -21.04       21.09         18.92       268.38       1,061.71       4,657.33       -21.04       13	3,800.00	0.86	352.76	58.06	3,799.06	-15.88	-2.51	2.61	0.10	673,223.82	633,300.99
0.70         349.14         258.05         3,990.05         -13.37         -3.21         3.30           0.70         341.84         358.04         4,099.04         -12.18         -3.47         3.55           0.76         331.16         458.03         4,199.03         -10.99         -4.03         4.10           0.60         334.51         558.02         4,199.03         -10.99         -4.03         4.10           0.60         334.51         558.02         4,199.03         -10.99         -4.03         4.10           0.61         334.51         558.02         4,199.01         -7.98         -4.69         4.60           0.67         305.55         756.01         4,499.01         -7.98         -5.02         5.08           0.97         36.58         273.12         856.31         4,597.31         -7.50         -21.04         21.09           18.92         273.14         1,019.39         4,605.33         -2.49         -67.46         67.47         1           35.88         276.60         944.33         4,605.33         -2.104         21.09         1         1           45.89         274.14         1,019.39         4,760.89         3.83	3,900.00	0.74	340.95	158.05	3,899.05	-14.53	-2.82	2.92	0.20	673,225.17	633,300.68
0.70         341.84         358.04         4,099.04         -12.18         -3.47         3.55           0.76         331.16         458.03         4,199.03         -10.99         -4.03         4.10           0.76         331.54         558.02         4,299.02         -9.97         -4.63         4.10           0.60         334.51         558.02         4,299.02         -9.97         -4.54         4.60           0.67         331.54         658.02         4,399.01         -7.98         -5.02         5.08           0.97         305.55         756.01         4,499.01         -7.98         -5.60         5.66           0.87         305.55         756.01         4,499.01         -7.98         -5.104         21.09           18.92         273.12         856.31         4,597.31         -7.56         -21.04         21.09           18.92         274.14         1,019.39         4,760.89         3.83         -132.46         132.43         1           57.35         268.38         1,061.71         4,857.31         -2.429         -30.08         300.05         1           57.35         274.14         1,019.39         4,760.89         3.83         -132.43	4,000.00	0.70	349.14	258.05	3,999.05	-13.37	-3.21	3.30	0.11	673,226.33	633,300.29
0.76       331.18       458.03       4,199.03       -10.99       -4.03       4,10         0.60       334.51       558.02       4,299.02       -9.97       -4.54       4.60         0.61       334.51       558.02       4,299.02       -9.97       -4.54       4.60         0.62       331.54       558.02       4,399.02       -9.04       -5.02       5.08         0.97       305.55       758.01       4,499.01       -7.98       -5.02       5.08         18.92       273.12       856.31       4,597.31       -7.59       -21.04       21.09         35.88       276.60       944.33       4,685.33       -2.49       -67.46       67.47       1         35.88       274.14       1,019.89       4,760.89       3.83       -132.43       1       1         35.38       274.14       1,019.89       4,760.89       3.83       -132.46       132.43       1         45.69       27.12       1,26.31       4,857.31       -2.10.81       21.078       1         57.35       268.38       1,019.89       4,760.89       3.83       -132.43       1         57.35       271.22       1,126.31       4,857.31       <	4,100.00	0.70	341.84	358.04	4,099.04	-12.18	-3.47	3.55	0.09	673,227.52	633,300.03
0.60         334.51         558.02         4,299.02         -9.97         -4.54         4.60           0.62         331.54         658.02         4,399.02         -9.04         -5.02         5.08           0.97         305.55         756.01         4,499.01         -7.98         -5.60         5.66           18.92         273.12         856.31         4,597.31         -7.50         -21.04         21.09         1           35.88         276.60         944.33         4,665.33         -2.49         -67.46         67.47         1           35.88         276.60         944.33         4,665.33         -2.49         -67.46         132.43         1           45.69         274.14         1,019.89         4,760.89         3.83         -132.46         132.43         1           57.35         268.38         1,081.71         4,822.71         4,25         -210.81         210.78         1           57.35         271.22         1,126.31         4,867.31         4,27         -300.08         3000.05         1	4,200.00	0.76	331,18	458.03	4,199.03	-10.99	4.03	4.10	0.15	673,228.71	633,299.47
0.62         331.54         658.02         4,399.02         -9.04         -5.02         5.08           0.97         305.55         758.01         4,499.01         -7.98         -5.60         5.66           18.92         273.12         856.31         4,697.31         -7.98         -5.60         5.66           35.88         276.60         944.33         4,685.33         -2.49         -67.46         67.47           35.88         276.14         1,019.89         4,760.89         3.83         -21.04         21.09           45.89         274.14         1,019.89         4,760.89         3.83         -132.46         132.43           57.35         268.38         1,081.71         4,822.71         4,25         -210.81         210.78           57.35         268.38         1,081.71         4,867.31         4,25         -210.81         210.78           57.35         271.22         1,126.31         4,867.31         4,25         -210.81         200.05	4,300.00	0.60	334,51	558.02	4,299.02	-9,97	-4,54	4.60	0.16	673,229.73	633,298.96
0.97         305.55         758.01         4,499.01         -7.98         -5.60         5.65           18.92         273.12         856.31         4,597.31         -7.50         -21.04         21.09           35.88         276.60         944.33         4,685.33         -2.49         -67.46         87.47           35.88         274.14         1,019.89         4,760.89         3.83         -132.46         132.43           45.69         274.14         1,019.89         4,760.89         3.83         -132.46         132.43           57.35         268.38         1,081.71         4,822.71         4.25         -210.81         210.78           57.35         271.22         1,126.31         4,822.71         4.25         -210.81         210.78           69.55         271.22         1,126.31         4,867.31         4.27         -300.08         300.05	4,400.00	0.62	331.54	658.02	4,399.02	-9.04	-5.02	5.08	0.04	673,230.66	633,298.48
18.92         273.12         856.31         4,597.31         -7.50         -21.04         21.09           35.88         276.60         944.33         4,685.33         -2.49         -67.46         87.47           45.89         274.14         1,019.89         4,760.89         3.83         -132.46         132.43           57.35         268.38         1,081.71         4,822.71         4,25         -210.81         210.78           57.35         268.38         1,081.71         4,822.71         4,25         -210.81         210.78           57.35         271.22         1,126.31         4,867.31         4,25         -210.81         210.78	4,500.00	0.97	305.55	758.01	4,499.01	-7.98	-5.60	5.66	0.49	673,231.72	633,297.90
35.88         276.60         944.33         4,685.33         -2.49         -67.46         67.47           45.89         274.14         1,019.89         4,760.89         3.83         -132.46         132.43           57.35         268.38         1,081.71         4,822.71         4.25         -210.81         210.78           69.55         271.22         1,126.31         4,867.31         4,27         -300.08         300.05	4,600.00	18.92	273.12	856.31	4,597.31	-7.50	-21.04	21.09	18.11	673,232.20	633,282.46
45.69         274.14         1,019.89         4,760.89         3.83         -132.46         132.43           57.35         268.38         1,081.71         4,827.71         4,25         -210.81         210.78           69.55         271.22         1,126.31         4,867.31         4,27         -300.08         300.05	4,700.00	35.88	276.60	944.33	4,685.33	-2.49	-67.46	67.47	17.03	673,237.21	633,236.04
57.35 268.38 1.081.71 4.82.71 4.25 -210.81 210.78 69.55 271.22 1.126.31 4.867.31 4.27 -300.08 300.05	4,800.00	45.89	274.14	1,019.89	4,760.89	3.83	-132.46	132.43	10.14	673,243.53	633,171.04
69.55 271.22 1,126.31 4,867.31 4.27 -300.08 300.05	4,900.00	57.35	268.38	1,081.71	4,822.71	4.25	-210.81	210.78	12.30	673,243.95	633,092.69
	5,000.00	69.55	271.22	1,126.31	4,867.31	4.27	-300.08	300.05	12.46	673,243.97	633,003.42
84.22 272.61 1,149.49 4,890.49 6.85 -397.01 396.96	. 5,100.00	84.22	272.61	1,149.49	4,890.49	6.85	-397.01	396.96	14.74	673,246.55	632,906.49
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Company: Apache Corpo Project: Eddy County I Sitio: Raven Federal Well: Aran Raven Federal Wellbore: Raven Federal	Apache Corporation Eddy County, NM (Nad27) Raven Federal #10H Raven Federal #10H Raven Federal #10H Raven Federal #10H Surveys	5				Local Co-ordinate Reference TVD Reference: MD Reference: North Reference: Survey Calculation Method: Database:		Well Raven Federal #10H Well @ 3741.00usft (Origi Well @ 3741.00usft (Origi Grid Grid CCR DB v5000	Well Raven Federal #10H Well @ 3741.00usft (Original Well Elev + 14' KB) Well @ 3741.00usft (Original Well Elev + 14' KB) Grid Minimum Curvature GCR DB v5000	14' (KB) 14' (KB)
	h									
(Usb)	(1)	azimuth)	TVDSS	(heu) TVD: TVD: TVD: TVD: TVD: TVD: TVD: TVD:	SIN (Uso)	EW **	ve 40 5	DLeg		Easting.
7,900.00	90.46			4,858.80	-17.64	-3,195.18	3,195.22	1.06	673,222.06	630,108.32
8,000.00	89.23 .	268.88	1,118.58	4,859.58	-20.41	-3,295.13	3,295.19	1.73	673,219.29	630,008.37
8,100.00	89.96	269.29	1,118.74	4,859.74	-22.35	-3,395.11	3,395.18	0.84	673,217.35	629,908.39
8,200.00	89.05	270.79	1,120.13	4,861.13	-21.99	-3,495.09	3,495.16	1.75	673,217.71	629,808.41
8,300.00	90.13	270.60	1,120.75	4,861.75	-20.48	-3,595.08	3,595.13	1.10	673,219.22	629,708.42
8,400.00	90.93	269.73	1,119.85	4,860.85	-20.41	-3,695.07	3,695.12	1.19	673,219.29	629,608.43
B,500.00	91.91	269.60	1,117.40	4,858.40	-21.04	-3,795.04	3,795.09	0.98	673,218.66	629,508.46
8,600.00	91.47	270.18	1,113.72	4,854.72	-21.52	-3,894.97	3,895.02	0.73	673,218.18	629,408.53
8,700.00	90.69	270.70	1,112.58	4,853.58	-20.36	-3,994,95	3,995.00	0,94	673,219.34	629,308.55
B,800.00	91.73	270.34	1,110.47	4,851.47	-19.47	-4,094.92	4,034.96	1.10	673,220.23	629,208.58
8,900.00	90.73	269.75	1,107.52	4,848.52	-19.28	-4,194.88	4,194,91	1.17	673,220.42	629,108.62
8,000.00	<u>90.02</u>	269.34	1,107.59	4,848.59	-20.23	-4,294.87	4,294.91	0.81	673,219.47	629,008,63
9,100.00	91.01	269.04	1,106.78	4,847.78	-21.58	-4,394.86	4,394.90	1.03	673,218.12	628,908.64
9,200.00	92.16	269.31	1,104.01	4,845.01	-23.22	-4,494.80	4,494.86	1.18	673,216.48	628,808.70
9,300.00	91.35	269.36	1,100.45	4,841.45	-24.23	-4,594.73	4,594.79	0.81	673,215.47	628,708.77
9,400.00	91.36	268.54	1,098.48	4,839.48	-25.92	-4,694,70	4,694.77	0.82	673,213.78	628,608.80
9,500.00	92,69	268.54	1,095.09	4,836.09	-28.68	-4,794.60	4,794.68	1.33	673,211.02	628,508.90
9,543.00	93.10	268,60	1,092.88	4,833.88	-29.74	-4,837.53	4,837.62	0.96	673,209.96	628,465.97
Last Phoenix MWD Survey, 9543 9,600.00 93.10	D Survey, 9543' 93.10	268.60	1,089.79	4,830.79	-31.13	-4,894.43	4,894,53	0.00	673,208.57	628,409.07
9,601.00	93.10	268.60	1,089.74	4,830.74	-31.16	-4,895.43	4,895.53	0.00	673,208.54	628,408.07
Projection to Bit, 9601	9601									

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ນີ້ວິໂຄວີເລັ້າ ຈີ່ມີເຈົ້າຂໍ້ໄຂນen Federal Buell: ຈີ່ສາດສາຍ ເທື່ອນເພິ່ງ ຈີ່ມີ Raven Federal #10H ເນື້ອເຊັ່ງ ຈີ່ເຊັ່ງ Raven Federal #10H	Raven Federal #10H Raven Federal #10H Raven Federal #10H Surveys		MD Reterence: Yes and State well go 3/41.00051 (Ongutal Well Clever 14 ND) North; Reterence: Sources and Clind Survey, Calculation, Method: Source Minimum Curvature
tions :	Vertical Vertical Depth Depth (usht) 485.97 4.833.88 4.833.88 4.833.88 4.833.88	Local Coordinates (1975) Local Coordinates (1975) N.S. N.S. -0.13 -4.66 First Phoenix MWD Survey, 9543' -2.9.74 -4.837.53 Last Phoenix MWD Survey, 9543' -31.16 -4.895.43 Projection to Bit, 9601'	
Checked By:	r	Approved By:	Date:
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Submit within 45 days	s of C	State of New Mexico			Revised November 6, 2013												
well completion	E	Energy, Minerals and Natural Resources				1. WELL API NO. 30-015-40466											
Oil Conservation Division 1220 S. St Francis Dr. Santa Fe, NM 87505 HYDRAULIC FRACTURING FLUID DISCLOSURE					2. Weil Name: RAVEN FEDERAL COM #010H     3. Weil Number: 010H     4. Surface Hole Location: Unit:E Lot:E Section:8 Township:17S Range:31E Feet from:2218 N/S Line:N Feet from:220 E/W Line:W     5. Bottom Hole Location: Unit:E Lot:E Section:8 Township:17S Range:31E Feet from:2218 N/S Line:N Feet from:2218 N/S Line:N Feet from:220 E/W Line:W     6. latitude: 32.8501644852288 -103.899910778643												
													7.	County: Eddy		52288	-103.899910778643
									8. Operator Name and Address: APACHE CORP 303 Veterans Airpark Lane Suite 3000 Midland 79705					9. OGRID:	10. Phone Number: 432- 873 818-1062 .		
									11. Last Fracture Date: 4/25/2015 Frac Performed by: Elite					12. Production Type: O			
13. Pool Code(s): 96831					14. Gross Fractured Intervat: 5,573 ft to 9,595 ft												
15. True Vertical Depth (TVD):					16. Total Volume of Fluid Pumped: 2,953,314 gals												
4,831 ft 17. Total Volume of Re-Use Water Pumped: N/A					18. Percent of Re-Use Water in Fluid Pumped: Not Disclosed												
19. HYDRAULIC Trade Name	Supplier	POSITION AND Purpose	CONCENTRATION	(CAS #) Chemical Abstract Service #		Concentr	Maximum ingredient Maximum ingredient Concentration in Concentration In HF Additive (% by mass) Fiuid (% by mass)										
Water	Customer	Carrier/Base Fluid	Water	7732-18-5		Audite	100%	87.07681%									
Sand (Proppant)	US Silica	Proppant	Silica Substrate	14808-60-7			100%	7.04946%									
RCS (Proppant)	Momentive	Proppant	Silica Substrate	14808-60-7			100%	2.37819%									
Hydrochloric Acid (15%)	CNR	Acidizing	Hydrochloric Acid	7647-01-0			38.8%	1.25158%									
Claymax	Chemplex	Clay Stabilizer	Choline Chloride	67-48-1			62%	0.00587%									
4-N-1 Plus	Chemplex	Iron	Acetic Acid	64-19-7			80%	0.01951%									
		Control,Corr Inhib,Surfactant	Methanol	67-56-1		[	10%	0.00244%									
Plexcide 24L	Chemplex	Biocide	Tetrahydro-3,Dimethyl- 2H	533-74-4			24%	0.00579%									
Plexset 730	Chemplex	Activator	Secondary Alcohol Ethoxylate	84133-50-6			50%	0.0355%									
Plexslick 953	Chemplex	Friction Reducer	Alcohol Ethoxylate Surfactants	Proprietary			8%	0.007.34%									
			Hydrotreated Petroleum Distillate		2-47-8		30%	0.02753%									
			Polyacrylamide-co- Acrytic Acid	9003-		-	32%	0.02936%									
Greenhib 679	Chemplex	Scale Inhibitor	Glycerine	56-81			35%	0.01717%									
			Proprietary Water	Propr 7732-	ietary 18-5		35% 30%	0.01717% 0.01472%									
20. I, as Operator, here	eby certify that the in	formation shown on th	is disclosure form is true and	la maine		my knowle	dge and bellef.										
Signature:	Signed Electronically Printed Name: Fatima Vasquez Title: Regulatory Analyst							Analyst									
	6/5/2015		-														
E-mail Address:	fatima.vasquez@	apachecorp.com	_														

MOCD does not require the reporting of information beyond MSDS data as described in 29 CFR 1910,1200. NMOCD does not require the reporting or disclosure of proprietary, trade secret or confidential business information.

## APACHE CORPORATION WELLBORE DIAGRAM AND INFORMATION

