

APACHE CORPORATION

Lea County, NM (NAD27 NME)

V. Laughlin #5

V Laughlin #5

OH

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Survey: MWD Survey

SDI Standard Survey Report

18 November, 2010

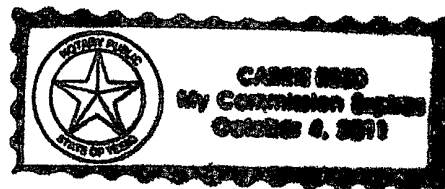
This survey is correct to the best of my knowledge and is supported by actual field data.

K. Hart

Notorized this date 19th of November, 2010.

Carmel Reed

Notary Signature
County of Midland
State of Texas



Scientific Drilling International, Inc.
SDI Standard Survey Report

Company:	APACHE CORPORATION	Local Co-ordinate Reference:	Well V Laughlin #5
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB Elev (16.5') @ 3572.5usft (Key #115)
Site:	V. Laughlin #5	MD Reference:	KB Elev (16.5') @ 3572.5usft (Key #115)
Well:	V Laughlin #5	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Regulatory

Project	Lea County, NM (NAD27 NME), USA		
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	V. Laughlin #5				
Site Position:		Northing:	581,447.84 usft	Latitude:	32° 35' 38.055 N
From:	Map	Easting:	831,151.52 usft	Longitude:	103° 15' 29.242 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"	Grid Convergence:	0.58 °

Well	V Laughlin #5					
Well Position	+N/-S	0.0 usft	Northing:	581,447.84 usft	Latitude:	32° 35' 38.055 N
	+E/-W	0.0 usft	Easting:	831,151.52 usft	Longitude:	103° 15' 29.242 W
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft	Ground Level:	3,556.0 usft	

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2010	10/8/2010	7.60	60.61	48,988

Design:	Actual				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:		Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
		0.0	0.0	0.0	217.32

Survey Program	Date 11/18/2010				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
104.5	6,904.5	Gyro Survey (OH)	Keeper	Keeper Standard Rate Gyro	
6,979.0	8,714.0	MWD Survey (OH)	MWD	MWD - Standard ISCWSA	

Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
6,904.5	0.63	326.19	6,902.7	-67.4	-48.8	215.88	83.2
6,979.0	10.43	235.27	6,976.8	-70.9	-54.6	217.57	89.5
6,994.0	13.62	229.81	6,991.4	-72.9	-57.0	218.06	92.5
7,010.0	16.16	225.91	7,006.9	-75.6	-60.1	218.46	96.6
7,042.0	22.69	227.97	7,037.1	-82.9	-67.9	219.32	107.1
7,071.0	28.12	225.22	7,063.3	-91.4	-76.9	220.06	119.5
7,102.0	36.71	220.15	7,089.4	-103.7	-88.1	220.34	136.0
7,133.0	48.34	226.03	7,112.2	-118.9	-102.4	220.75	156.9
7,165.0	60.84	231.63	7,130.7	-135.9	-122.1	221.93	182.7
7,180.0	66.47	232.54	7,137.4	-144.2	-132.7	222.62	195.9
7,197.0	71.44	235.62	7,143.5	-153.5	-145.5	223.48	211.5

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SDI Standard Survey Report

Company:	APACHE CORPORATION	Local Co-ordinate Reference:	Well V Laughlin #5
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB Elev (16.5') @ 3572.5usft (Key #115)
Site:	V. Laughlin #5	MD Reference:	KB Elev (16.5') @ 3572.5usft (Key #115)
Well:	V Laughlin #5	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Regulatory

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
7,229.0	79.84	242.72	7,151.4	-169.3	-172.1	225.47	241.4
7,261.0	83.60	245.02	7,156.0	-183.2	-200.5	227.58	271.6
7,292.0	86.41	249.44	7,158.7	-195.2	-229.0	229.56	300.9
7,324.0	87.88	253.75	7,160.3	-205.3	-259.3	231.64	330.7
7,356.0	87.58	256.27	7,161.6	-213.5	-290.2	233.65	360.3
7,388.0	88.29	256.93	7,162.8	-220.9	-321.3	235.49	390.0
7,420.0	90.24	255.93	7,163.2	-228.5	-352.4	237.05	420.0
7,451.0	90.84	256.89	7,162.9	-235.7	-382.5	238.36	449.4
7,483.0	91.58	257.23	7,162.2	-242.9	-413.7	239.58	479.8
7,515.0	89.40	255.21	7,161.9	-250.5	-444.8	240.61	510.5
7,546.0	89.39	255.96	7,162.2	-258.2	-474.8	241.46	540.5
7,578.0	89.53	255.54	7,162.6	-266.1	-505.8	242.25	571.6
7,610.0	88.49	256.16	7,163.1	-273.9	-536.9	242.97	602.7
7,642.0	88.49	255.53	7,163.9	-281.8	-567.9	243.61	633.9
7,673.0	89.13	254.94	7,164.6	-289.7	-597.9	244.15	664.3
7,704.0	89.73	254.69	7,164.9	-297.8	-627.8	244.62	694.8
7,736.0	90.00	254.39	7,165.0	-306.3	-658.6	245.06	726.4
7,768.0	90.50	254.35	7,164.8	-314.9	-689.4	245.45	758.0
7,799.0	91.11	253.82	7,164.4	-323.4	-719.2	245.79	788.6
7,830.0	90.24	252.67	7,164.0	-332.4	-748.9	246.07	819.4
7,862.0	90.57	252.60	7,163.8	-341.9	-779.5	246.31	851.2
7,894.0	91.11	252.18	7,163.3	-351.6	-810.0	246.53	883.0
7,957.0	89.73	250.29	7,162.9	-371.9	-869.6	246.85	945.8
7,989.0	89.97	249.68	7,163.0	-382.8	-899.7	246.95	977.7
8,020.0	89.63	249.09	7,163.1	-393.7	-928.7	247.02	1,008.7
8,052.0	89.60	247.19	7,163.3	-405.6	-958.4	247.06	1,040.7
8,083.0	89.90	247.75	7,163.4	-417.5	-987.0	247.07	1,071.7
8,115.0	90.27	248.41	7,163.4	-429.5	-1,016.7	247.10	1,103.7
8,146.0	90.71	248.29	7,163.1	-440.9	-1,045.5	247.13	1,134.7
8,178.0	91.07	247.78	7,162.6	-452.9	-1,075.2	247.16	1,166.7
8,210.0	90.77	249.04	7,162.1	-464.6	-1,104.9	247.19	1,198.7
8,241.0	89.63	249.10	7,162.0	-475.7	-1,133.9	247.24	1,229.6
8,273.0	89.83	248.72	7,162.1	-487.2	-1,163.7	247.28	1,261.6
8,304.0	89.73	248.53	7,162.3	-498.5	-1,192.6	247.31	1,292.6
8,335.0	90.13	248.88	7,162.3	-509.8	-1,221.5	247.35	1,323.6
8,367.0	90.34	248.49	7,162.2	-521.4	-1,251.3	247.38	1,355.6
8,399.0	90.07	248.24	7,162.0	-533.2	-1,281.0	247.40	1,387.6
8,430.0	90.34	248.18	7,161.9	-544.7	-1,309.8	247.42	1,418.6
8,462.0	90.81	248.62	7,161.6	-556.5	-1,339.6	247.44	1,450.6
8,493.0	91.04	249.14	7,161.1	-567.7	-1,368.5	247.47	1,481.6
8,525.0	90.84	248.81	7,160.6	-579.2	-1,398.4	247.50	1,513.6
8,556.0	90.87	248.24	7,160.1	-590.5	-1,427.2	247.52	1,544.5
8,588.0	91.51	249.16	7,159.5	-602.1	-1,457.0	247.55	1,576.5
8,651.0	92.05	248.08	7,157.5	-625.1	-1,515.7	247.59	1,639.5

Scientific Drilling International, Inc.

SDI Standard Survey Report

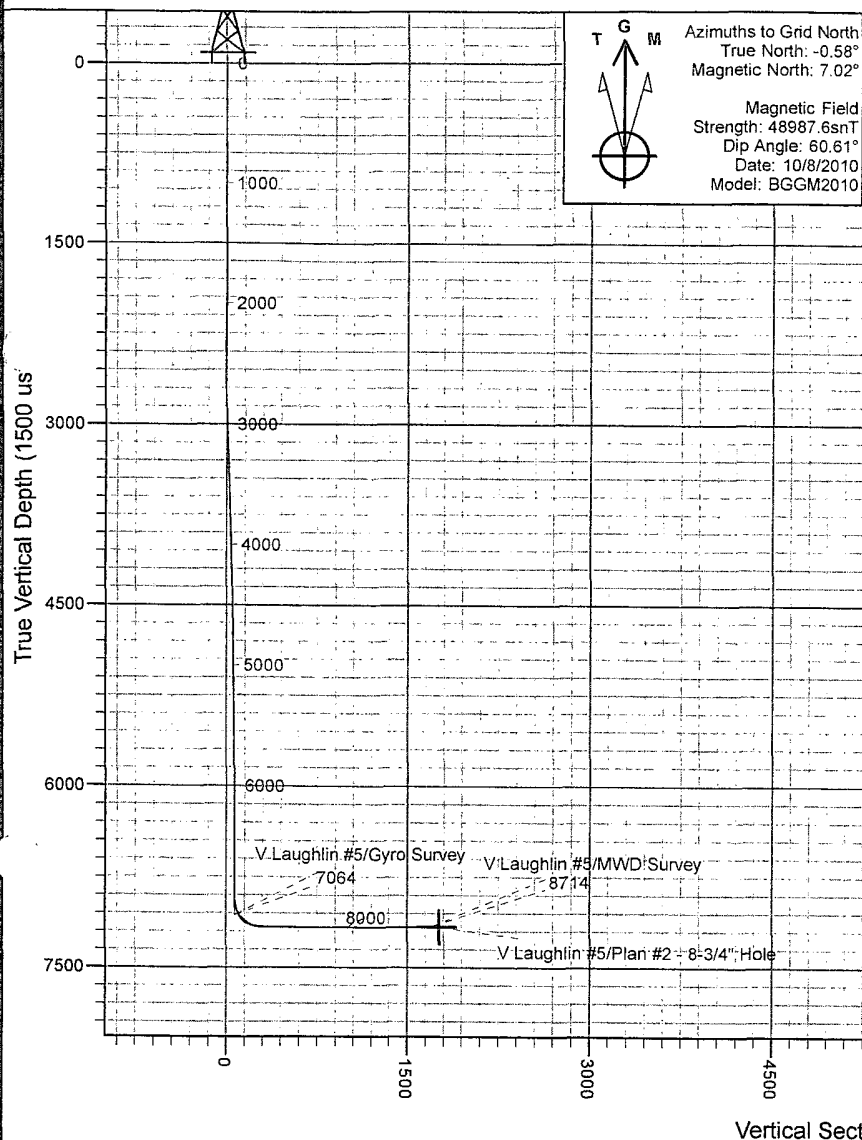
Company:	APACHE CORPORATION	Local Co-ordinate Reference:	Well V Laughlin #5
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB Elev (16.5') @ 3572.5usft (Key #115)
Site:	V. Laughlin #5	MD Reference:	KB Elev (16.5') @ 3572.5usft (Key #115)
Well:	V Laughlin #5	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Regulatory

Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
8,714.0	92.02	248.86	7,155.3	-648.2	-1,574.2	247.62	1,702.4

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
6,904.5	6,902.7	-67.4	-48.8	Gyro tie-in
8,714.0	7,155.3	-648.2	-1,574.2	Last MWD Survey
8,773.0	7,153.2	-669.4	-1,629.2	Projection to Bit



Project: Lea County, NM (NAD27 NME)
 Site: V. Laughlin #5
 Well: V Laughlin #5
 Wellbore: OH
 Design: Plan #2 - 8-3/4" Hole



Azimuths to Grid North
 True North: -0.58°
 Magnetic North: 7.02°
 Magnetic Field
 Strength: 48987.6snT
 Dip Angle: 60.61°
 Date: 10/8/2010
 Model: BGGM2010

+N/-S +E/-W
 0.0 0.0

Northing
 581447.84

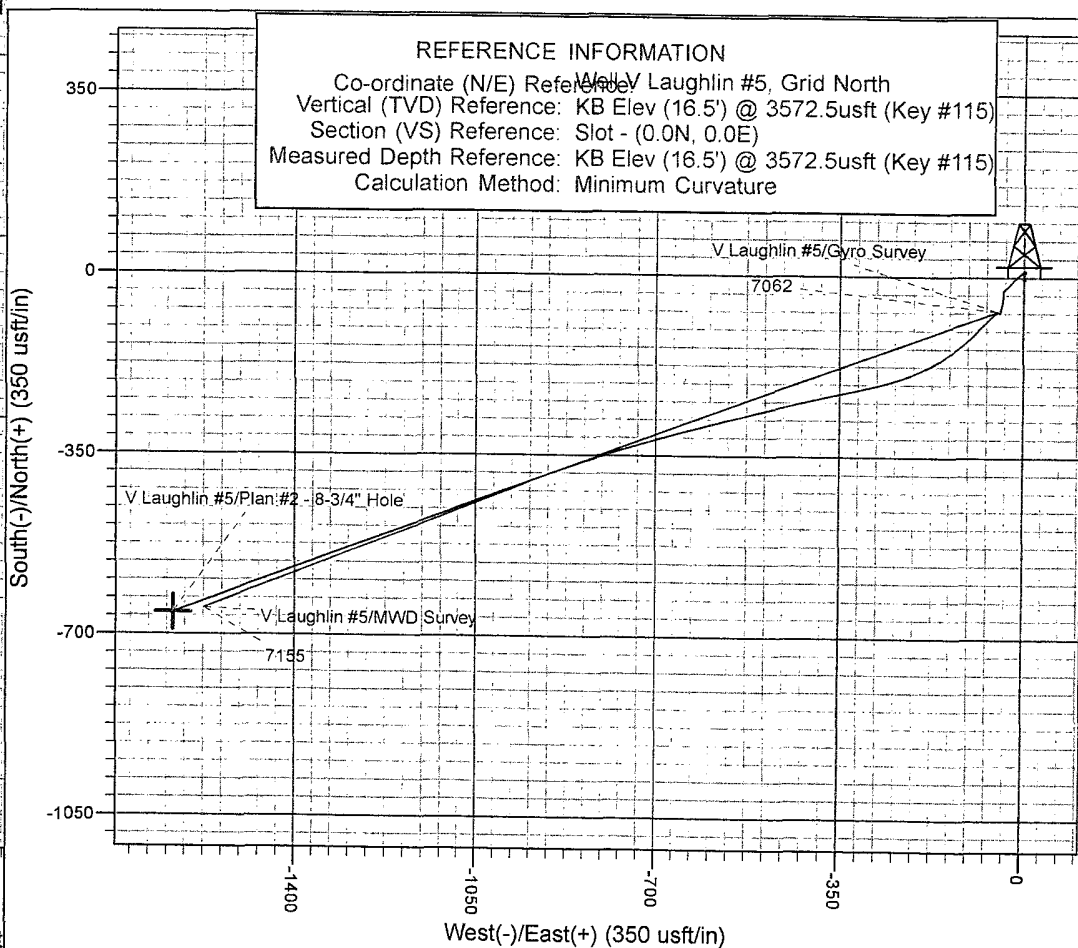
WELL DETAILS: V. Laughlin #5
 KB Elev (16.5') @ 3572.5usft (Key #115)

Ground Level: 3556.0

Easting 831151.52 Latitude 32° 35' 38.055 N

Longitude 103° 15' 29.242 W

Slot



REFERENCE INFORMATION

Co-ordinate (N/E) Reference: V. Laughlin #5, Grid North
 Vertical (TVD) Reference: KB Elev (16.5') @ 3572.5usft (Key #115)
 Section (VS) Reference: Slot - (0.0N, 0.0E)
 Measured Depth Reference: KB Elev (16.5') @ 3572.5usft (Key #115)
 Calculation Method: Minimum Curvature

COMPANY DETAILS: APACHE CORPORATION
 141131

Calculation Method: Minimum Curvature
 Error System: ISCWSA
 Scan Method: Closest Approach 3D
 Error Surface: Elliptical Conic
 Warning Method: Error Ratio

PROJECT DETAILS: Lea County, NM (NAD27 NME)
 Geodetic System: US State Plane 1927 (Exact solution)
 Datum: NAD 1927 (NADCON CONUS)
 Ellipsoid: Clarke 1866
 Zone: New Mexico East 3001
 System Datum: Mean Sea Level

SITE DETAILS: V. Laughlin #5
 Site Centre Latitude: 32° 35' 38.055 N
 Longitude: 103° 15' 29.242 W
 Positional Uncertainty: 0.0
 Convergence: 0.58
 Local North: Grid

APACHE CORP

Monument Tubb

Lea county, NM

V. Laughlin #5

VH - Job #32K0810610

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Survey: Actual

SDI Standard Survey Report

25 August, 2010

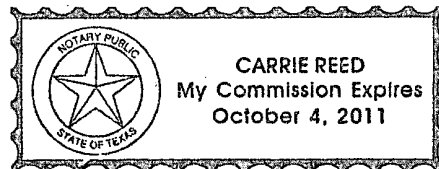
This survey is correct to the best of my knowledge and is supported by actual field data.

Richard

Notorized this date 24th of September, 2010.

Carrie Reed

Notary Signature
County of Midland
State of Texas



Scientific Drilling International, Inc.
SDI Standard Survey Report

Company:	APACHE CORP	Local Co-ordinate Reference:	Well V. Laughlin #5
Project:	Monument Tubb	TVD Reference:	WELL @ 0.0usft (Original Well Elev)
Site:	Lea county, NM	MD Reference:	WELL @ 0.0usft (Original Well Elev)
Well:	V. Laughlin #5	North Reference:	Grid
Wellbore:	VH - Job #32K0810610	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K0810610	Database:	EDM-Regulatory

Project	Monument Tubb		
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		

Well	V. Laughlin #5, Vertical				
Well Position	+N/-S	0.0 usft	Northing:	581,119.32 usft	Latitude: 32° 35' 34.800 N
	+E/-W	0.0 usft	Easting:	831,192.67 usft	Longitude: 103° 15' 28.800 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level: 0.0 usft

Wellbore	VH - Job #32K0810610				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	8/25/2010	7.55	60.62	49,013

Design	VH - Job #32K0810610				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	217.32	

Survey Program	Date 8/25/2010				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.0	7,059.0	Actual (VH - Job #32K0810610)	Keeper	Keeper Gyro	

Survey								
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)	
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.0	
100.0	0.12	68.75	100.0	0.0	0.1	68.75	0.1	
200.0	0.16	50.56	200.0	0.2	0.3	61.49	0.3	
300.0	0.09	87.04	300.0	0.3	0.5	62.26	0.6	
400.0	0.19	88.27	400.0	0.3	0.7	70.04	0.8	
500.0	0.14	169.80	500.0	0.2	0.9	80.68	0.9	
600.0	0.30	153.44	600.0	-0.2	1.1	100.86	1.1	
700.0	0.27	136.89	700.0	-0.6	1.3	114.49	1.5	
800.0	0.27	172.57	800.0	-1.0	1.5	123.58	1.8	
900.0	0.45	173.52	900.0	-1.6	1.6	135.62	2.3	
1,000.0	0.48	171.29	1,000.0	-2.4	1.7	144.99	3.0	
1,100.0	0.49	166.51	1,100.0	-3.3	1.9	150.20	3.8	
1,200.0	0.45	173.27	1,200.0	-4.1	2.0	153.65	4.6	
1,300.0	0.40	273.95	1,300.0	-4.4	1.7	158.86	4.8	
1,400.0	0.38	261.80	1,400.0	-4.5	1.0	166.87	4.6	
1,500.0	0.43	290.37	1,500.0	-4.4	0.4	175.28	4.4	
1,600.0	0.50	322.06	1,600.0	-3.9	-0.3	183.78	3.9	

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Company:	APACHE CORP	Local Co-ordinate Reference:	Well V. Laughlin #5
Project:	Monument Tubb	TVD Reference:	WELL @ 0.0usft (Original Well Elev)
Site:	Lea county, NM	MD Reference:	WELL @ 0.0usft (Original Well Elev)
Well:	V. Laughlin #5	North Reference:	Grid
Wellbore:	VH - Job #32K0810610	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K0810610	Database:	EDM-Regulatory

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
1,700.0	0.70	332.18	1,700.0	-3.0	-0.8	195.01	3.1
1,800.0	0.75	348.93	1,800.0	-1.8	-1.2	213.55	2.2
1,900.0	1.32	19.93	1,899.9	-0.1	-1.0	262.97	1.0
2,000.0	1.46	21.96	1,999.9	2.1	-0.1	357.70	2.1
2,100.0	1.61	20.88	2,099.9	4.6	0.9	10.87	4.7
2,200.0	1.54	15.60	2,199.8	7.2	1.8	13.60	7.5
2,300.0	1.40	18.85	2,299.8	9.7	2.5	14.51	10.0
2,400.0	1.04	9.79	2,399.8	11.7	3.1	14.59	12.1
2,500.0	0.48	342.16	2,499.8	13.0	3.1	13.30	13.4
2,600.0	0.59	264.43	2,599.8	13.4	2.4	10.34	13.6
2,700.0	1.18	242.46	2,699.8	12.9	1.0	4.52	12.9
2,800.0	1.59	231.45	2,799.7	11.5	-1.0	355.14	11.6
2,900.0	1.91	229.40	2,899.7	9.6	-3.3	340.82	10.1
3,000.0	2.11	227.74	2,999.6	7.3	-6.0	320.59	9.4
3,100.0	2.07	227.54	3,099.6	4.8	-8.7	298.99	9.9
3,200.0	2.06	228.11	3,199.5	2.4	-11.3	281.85	11.6
3,300.0	2.27	225.07	3,299.4	-0.2	-14.1	269.09	14.1
3,400.0	2.23	225.34	3,399.3	-3.0	-16.8	259.94	17.1
3,500.0	2.12	223.76	3,499.3	-5.7	-19.5	253.73	20.3
3,600.0	2.24	223.70	3,599.2	-8.4	-22.1	249.13	23.7
3,700.0	2.27	224.79	3,699.1	-11.3	-24.9	245.66	27.3
3,800.0	2.43	221.94	3,799.0	-14.2	-27.7	242.79	31.1
3,900.0	2.21	228.83	3,899.0	-17.1	-30.6	240.79	35.0
4,000.0	1.87	228.76	3,998.9	-19.4	-33.2	239.69	38.5
4,100.0	1.76	225.21	4,098.8	-21.6	-35.6	238.74	41.6
4,200.0	1.67	210.47	4,198.8	-23.9	-37.4	237.38	44.4
4,300.0	1.62	198.14	4,298.8	-26.5	-38.6	235.48	46.8
4,400.0	1.64	188.67	4,398.7	-29.3	-39.2	233.26	49.0
4,500.0	1.63	191.24	4,498.7	-32.1	-39.7	231.06	51.1
4,600.0	1.92	178.88	4,598.6	-35.2	-40.0	228.65	53.2
4,700.0	1.77	178.36	4,698.6	-38.4	-39.9	226.10	55.4
4,800.0	1.86	178.76	4,798.5	-41.6	-39.8	223.77	57.5
4,900.0	1.87	185.20	4,898.5	-44.8	-39.9	221.70	60.0
5,000.0	1.72	185.54	4,998.4	-47.9	-40.2	220.00	62.6
5,100.0	1.51	189.03	5,098.4	-50.7	-40.6	218.66	64.9
5,200.0	1.37	195.68	5,198.4	-53.2	-41.1	217.70	67.2
5,300.0	1.20	197.72	5,298.3	-55.3	-41.7	217.04	69.3
5,400.0	1.27	199.86	5,398.3	-57.4	-42.4	216.50	71.3
5,500.0	1.41	191.87	5,498.3	-59.6	-43.1	215.85	73.5
5,600.0	1.31	184.96	5,598.2	-61.9	-43.4	215.03	75.6
5,700.0	0.91	185.61	5,698.2	-63.9	-43.6	214.31	77.3
5,800.0	0.73	195.38	5,798.2	-65.3	-43.8	213.88	78.6
5,900.0	0.78	195.06	5,898.2	-66.5	-44.2	213.58	79.9
6,000.0	0.76	193.31	5,998.2	-67.8	-44.5	213.27	81.1

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SDI Standard Survey Report

Company:	APACHE CORP	Local Co-ordinate Reference:	Well V. Laughlin #5
Project:	Monument Tubb	TVD Reference:	WELL @ 0.0usft (Original Well Elev)
Site:	Lea county, NM	MD Reference:	WELL @ 0.0usft (Original Well Elev)
Well:	V. Laughlin #5	North Reference:	Grid
Wellbore:	VH - Job #32K0810610	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K0810610	Database:	EDM-Regulatory

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
6,100.0	0.43	213.74	6,098.2	-68.8	-44.9	213.11	82.1
6,200.0	0.33	331.54	6,198.2	-68.9	-45.2	213.29	82.4
6,300.0	0.44	309.47	6,298.2	-68.4	-45.7	213.73	82.2
6,400.0	0.29	282.28	6,398.2	-68.1	-46.2	214.16	82.3
6,500.0	0.23	271.84	6,498.2	-68.0	-46.6	214.44	82.5
6,600.0	0.26	243.40	6,598.2	-68.1	-47.0	214.64	82.8
6,700.0	0.27	281.76	6,698.2	-68.2	-47.5	214.86	83.1
6,800.0	0.46	285.85	6,798.2	-68.0	-48.1	215.27	83.3
6,900.0	0.63	326.19	6,898.2	-67.4	-48.8	215.89	83.2
7,000.0	0.82	319.97	6,998.2	-66.4	-49.6	216.72	82.9
7,059.0	0.90	318.05	7,057.2	-65.8	-50.1	217.32	82.7



Scientific Drilling
Directional Drilling Operations

Proj: Monument Tubb
Lea county, NM
Well: V. Laughlin #5
Wellbore: VH - Job #32K0810610
Design: VH - Job #32K0810610

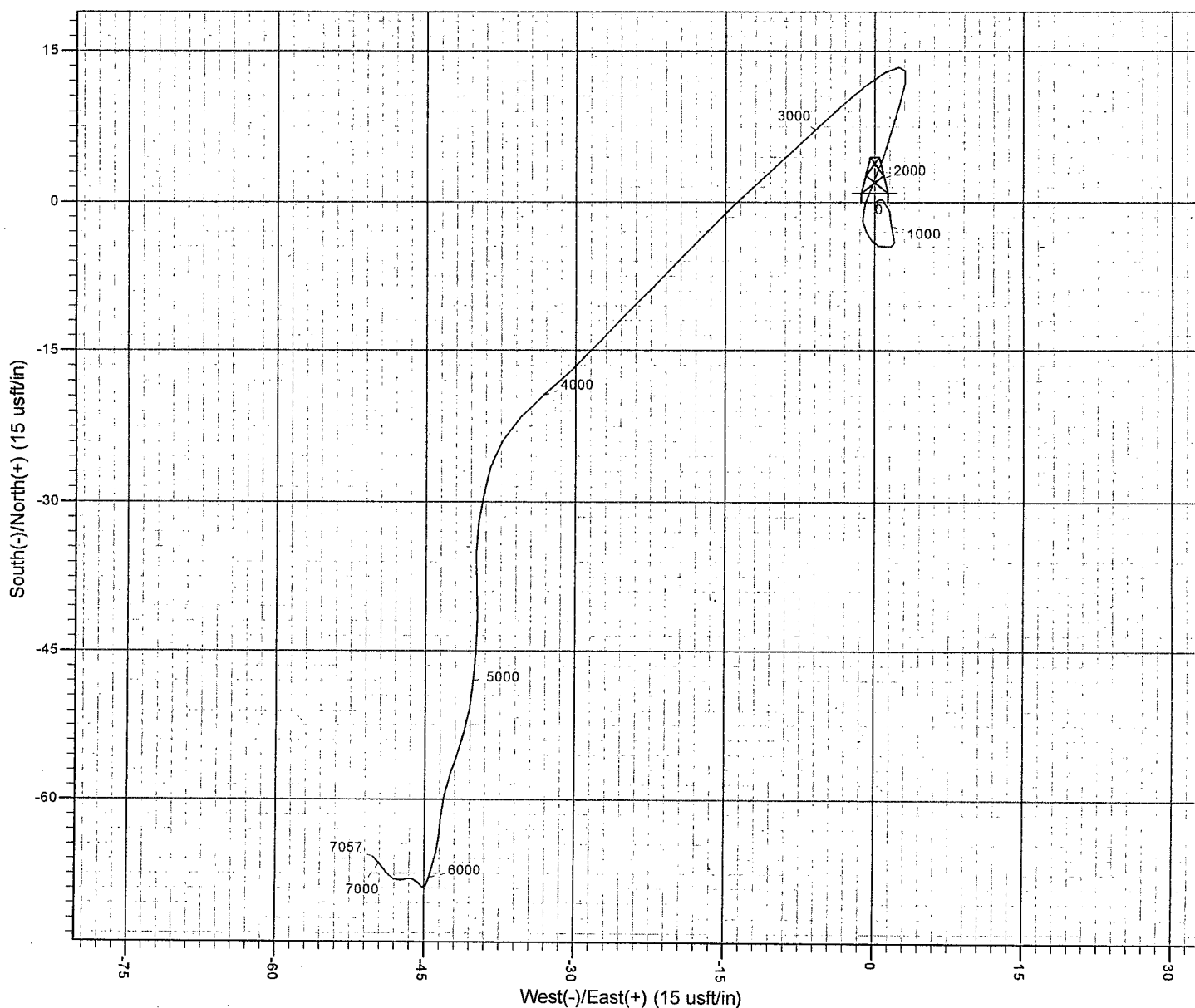


Azimuths to Grid North
True North: -0.58°
Magnetic North: 6.98°

Magnetic Field
Strength: 49012.7snT
Dip Angle: 60.62°
Date: 8/25/2010
Model: IGRF200510

WELL DETAILS: V. Laughlin #5
WELL @ 0.0usft (Original Well Elev)
Ground Level: 0.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	581119.32	831192.67	32° 35' 34.800 N	103° 15' 28.800 W	



PROJECT DETAILS: Monument Tubb
Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: New Mexico East 3001
System Datum: Mean Sea Level

SITE DETAILS: Lea county, NM
Site Centre Latitude: 32° 35' 34.800 N
Longitude: 103° 15' 28.800 W
Positional Uncertainty: 0.0
Convergence: 0.58
Local North: Grid