

Apache Corporation

Eddy County, New Mexico (NAD 83)

Sec 32, T17S, R28E

AB State 647 #2

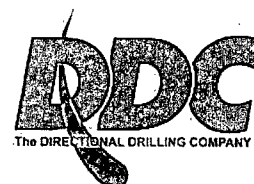
Wellbore #1

API # 30-015-41566

Design: Wellbore #1

DDC Survey Report

23 August, 2013





DDC
Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well AB State 647 #2
Project:	Eddy County, New Mexico (NAD 83)	TVD Reference:	Well @ 3697.0usft (Original Well Elev)
Site:	Sec 32, T17S, R28E	MD Reference:	Well @ 3697.0usft (Original Well Elev)
Well:	AB State 647 #2	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Project:	Eddy County, New Mexico (NAD 83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site:	Sec 32, T17S, R28E		
Site Position:		Northing:	651,211.44 usft
From:	Map	Easting:	582,974.92 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 47' 24.499 N
		Longitude:	104° 11' 52.221 W
		Grid Convergence:	0.07 °

Well		AB State 647 #2				
Well Position	+N/-S	0.0 usft	Northing:	651,211.44 usft	Latitude:	32° 47' 24.499 N
	+E/-W	0.0 usft	Easting:	582,974.92 usft	Longitude:	104° 11' 52.221 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	3,690.0 usft

Wellbore:	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF2010	8/13/2013	7.65	60.55	48,669

Design:	Wellbore #1				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(usft)	(usft)	(usft)	(°)	
	0.0	0.0	0.0	176.11	

Survey Program	Date: 8/23/2013			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
27.3	375.1	Gyro (Wellbore #1)	Good_gyro	Good Gyro
427.0	5,013.0	MWD (Wellbore #1)	MWD default	MWD - Standard

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)	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	
27.3	0.73	168.45	27.3	-0.2	0.0	0.2	2.67	2.67	0.00	
116.2	2.35	174.27	116.2	-2.5	0.3	2.6	1.83	1.82	6.55	
201.3	2.21	178.59	201.2	-5.9	0.5	5.9	0.26	-0.16	5.08	
286.5	2.02	176.02	286.3	-9.1	0.7	9.1	0.25	-0.22	-3.02	
375.1	1.79	179.25	374.9	-12.0	0.8	12.0	0.29	-0.26	3.65	
TIE IN @ 375.1' MD / 375' TVD										
375.2	1.79	179.25	375.0	-12.0	0.8	12.0	0.00	0.00	0.00	
427.0	1.50	183.30	426.8	-13.5	0.8	13.5	0.60	-0.56	7.82	
458.0	1.50	186.00	457.8	-14.3	0.7	14.3	0.23	0.00	8.71	



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Survey Report



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Project:	Eddy County, New Mexico (NAD 83)	TVD Reference:	Well @ 3697.0usft (Original Well Elev)
Site:	Sec 32, T17S, R28E	MD Reference:	Well @ 3697.0usft (Original Well Elev)
Well:	AB State 647 #2	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
488.0	1.50	187.10	487.7	-15.1	0.6	15.1	0.10	0.00	3.67
516.0	1.50	191.50	515.7	-15.8	0.5	15.8	0.41	0.00	15.71
543.0	1.50	192.30	542.7	-16.5	0.4	16.5	0.08	0.00	2.96
573.0	1.60	216.40	572.7	-17.2	0.0	17.2	2.18	0.33	80.33
616.0	2.20	241.00	615.7	-18.1	-1.0	18.0	2.32	1.40	57.21
658.0	2.50	248.30	657.7	-18.8	-2.6	18.6	1.01	0.71	17.38
719.0	2.50	249.30	718.6	-19.8	-5.1	19.4	0.07	0.00	1.64
744.0	2.70	250.30	743.6	-20.2	-6.1	19.7	0.82	0.80	4.00
787.0	3.20	253.10	786.5	-20.9	-8.2	20.3	1.21	1.16	6.51
829.0	3.20	253.40	828.5	-21.5	-10.5	20.8	0.04	0.00	0.71
872.0	3.20	257.50	871.4	-22.1	-12.8	21.2	0.53	0.00	9.53
915.0	3.70	258.80	914.3	-22.7	-15.3	21.6	1.18	1.16	3.02
957.0	4.10	261.30	956.2	-23.2	-18.2	21.9	1.03	0.95	5.95
1,000.0	4.10	261.80	999.1	-23.6	-21.2	22.1	0.08	0.00	1.16
1,043.0	4.40	262.10	1,042.0	-24.1	-24.4	22.4	0.70	0.70	0.70
1,085.0	5.00	262.20	1,083.8	-24.5	-27.8	22.6	1.43	1.43	0.24
1,128.0	5.60	260.90	1,126.7	-25.1	-31.7	22.9	1.42	1.40	-3.02
1,171.0	5.90	262.60	1,169.4	-25.7	-36.0	23.2	0.80	0.70	3.95
1,213.0	6.60	265.20	1,211.2	-26.2	-40.5	23.4	1.80	1.67	6.19
1,256.0	6.60	265.00	1,253.9	-26.6	-45.4	23.5	0.05	0.00	-0.47
1,298.0	6.60	264.60	1,295.6	-27.1	-50.2	23.6	0.11	0.00	-0.95
1,341.0	7.30	266.20	1,338.3	-27.5	-55.4	23.7	1.69	1.63	3.72
1,384.0	7.90	267.50	1,380.9	-27.8	-61.1	23.6	1.45	1.40	3.02
1,427.0	7.60	266.50	1,423.5	-28.1	-66.9	23.5	0.76	-0.70	-2.33
1,469.0	7.60	264.20	1,465.2	-28.5	-72.4	23.6	0.72	0.00	-5.48
1,512.0	8.30	259.80	1,507.8	-29.4	-78.3	24.0	2.16	1.63	-10.23
1,555.0	9.30	260.40	1,550.3	-30.5	-84.8	24.7	2.34	2.33	1.40
1,597.0	9.60	259.90	1,591.7	-31.7	-91.6	25.4	0.74	0.71	-1.19
1,640.0	9.70	260.90	1,634.1	-32.9	-98.7	26.1	0.45	0.23	2.33
1,683.0	10.20	261.20	1,676.4	-34.1	-106.0	26.8	1.17	1.16	0.70
1,725.0	10.70	262.20	1,717.7	-35.2	-113.6	27.4	1.27	1.19	2.38
1,768.0	11.10	262.30	1,760.0	-36.2	-121.6	27.9	0.93	0.93	0.23
1,811.0	11.70	262.30	1,802.1	-37.4	-130.0	28.5	1.40	1.40	0.00
1,854.0	12.10	261.80	1,844.2	-38.6	-138.8	29.1	0.96	0.93	-1.16
1,896.0	12.10	261.90	1,885.2	-39.9	-147.5	29.8	0.05	0.00	0.24
1,939.0	12.00	262.10	1,927.3	-41.1	-156.4	30.4	0.25	-0.23	0.47
1,982.0	12.00	262.20	1,969.4	-42.3	-165.3	31.0	0.05	0.00	0.23
2,024.0	12.10	262.00	2,010.4	-43.5	-174.0	31.6	0.26	0.24	-0.48
2,067.0	12.10	262.10	2,052.5	-44.8	-182.9	32.3	0.05	0.00	0.23
2,110.0	12.00	262.30	2,094.5	-46.0	-191.8	32.9	0.25	-0.23	0.47
2,152.0	12.00	259.70	2,135.6	-47.4	-200.4	33.7	1.29	0.00	-6.19
2,195.0	11.70	257.20	2,177.7	-49.1	-209.1	34.8	1.38	-0.70	-5.81
2,238.0	11.30	256.70	2,219.8	-51.1	-217.4	36.2	0.96	-0.93	-1.16



DDC
Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well AB State 647 #2
Project:	Eddy County, New Mexico (NAD 83)	TVD Reference:	Well @ 3697.0usft (Original Well Elev)
Site:	Sec 32, T17S, R28E	MD Reference:	Well @ 3697.0usft (Original Well Elev)
Well:	AB State 647 #2	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
2,281.0	10.90	256.70	2,262.0	-53.0	-225.5	37.6	0.93	-0.93	0.00
2,323.0	10.40	257.60	2,303.3	-54.7	-233.0	38.8	1.25	-1.19	2.14
2,366.0	9.60	257.10	2,345.7	-56.3	-240.3	39.9	1.87	-1.86	-1.16
2,409.0	8.80	257.80	2,388.1	-57.8	-247.0	40.9	1.88	-1.86	1.63
2,451.0	8.10	258.00	2,429.6	-59.1	-253.1	41.8	1.67	-1.67	0.48
2,494.0	7.40	258.20	2,472.3	-60.3	-258.7	42.6	1.63	-1.63	0.47
2,537.0	6.70	256.90	2,514.9	-61.5	-263.9	43.4	1.67	-1.63	-3.02
2,579.0	6.70	256.70	2,556.6	-62.6	-268.7	44.2	0.06	0.00	-0.48
2,622.0	6.50	259.10	2,599.4	-63.6	-273.5	44.9	0.79	-0.47	5.58
2,665.0	6.10	258.80	2,642.1	-64.5	-278.1	45.5	0.93	-0.93	-0.70
2,708.0	6.00	258.50	2,684.9	-65.4	-282.6	46.1	0.24	-0.23	-0.70
2,750.0	5.90	257.50	2,726.6	-66.3	-286.8	46.7	0.34	-0.24	-2.38
CROSSED HARDLINE @ 2771.1' MD / 2747.6' TVD									
2,771.1	5.61	256.94	2,747.6	-66.8	-288.9	47.0	1.42	-1.40	-2.64
2,793.0	5.30	256.30	2,769.4	-67.3	-290.9	47.4	1.42	-1.39	-2.94
2,836.0	4.80	256.40	2,812.3	-68.2	-294.6	48.0	1.16	-1.16	0.23
2,878.0	4.20	256.70	2,854.1	-68.9	-297.8	48.6	1.43	-1.43	0.71
2,921.0	3.60	256.60	2,897.0	-69.6	-300.6	49.0	1.40	-1.40	-0.23
2,964.0	2.90	260.70	2,940.0	-70.1	-303.0	49.4	1.71	-1.63	9.53
3,006.0	2.50	262.50	2,981.9	-70.4	-305.0	49.5	0.97	-0.95	4.29
3,049.0	1.80	267.20	3,024.9	-70.5	-306.6	49.6	1.68	-1.63	10.93
3,092.0	1.50	267.80	3,067.9	-70.6	-307.8	49.5	0.70	-0.70	1.40
3,135.0	1.20	276.70	3,110.9	-70.6	-308.8	49.4	0.85	-0.70	20.70
3,177.0	1.00	281.90	3,152.8	-70.4	-309.6	49.3	0.53	-0.48	12.38
3,220.0	0.70	300.00	3,195.8	-70.2	-310.2	49.0	0.93	-0.70	42.09
3,263.0	0.30	336.40	3,238.8	-70.0	-310.5	48.8	1.14	-0.93	84.65
3,305.0	0.30	318.80	3,280.8	-69.8	-310.6	48.6	0.22	0.00	-41.90
3,348.0	0.40	350.00	3,323.8	-69.6	-310.7	48.3	0.49	0.23	72.56
3,391.0	0.40	321.70	3,366.8	-69.3	-310.8	48.1	0.45	0.00	-65.81
3,476.0	0.40	339.60	3,451.8	-68.8	-311.1	47.5	0.15	0.00	21.06
3,561.0	0.40	317.70	3,536.8	-68.3	-311.4	47.0	0.18	0.00	-25.76
3,647.0	0.30	325.60	3,622.8	-67.9	-311.8	46.6	0.13	-0.12	9.19
3,732.0	0.40	308.20	3,707.8	-67.5	-312.1	46.2	0.17	0.12	-20.47
3,817.0	0.60	313.70	3,792.8	-67.0	-312.7	45.7	0.24	0.24	6.47
3,902.0	0.60	298.90	3,877.8	-66.5	-313.4	45.1	0.18	0.00	-17.41
3,988.0	0.20	348.50	3,963.8	-66.1	-313.8	44.7	0.57	-0.47	57.67
4,073.0	0.40	173.00	4,048.8	-66.3	-313.8	44.8	0.71	0.24	-206.47
4,159.0	0.60	193.00	4,134.8	-67.0	-313.9	45.6	0.31	0.23	23.26
4,244.0	0.60	195.60	4,219.8	-67.9	-314.1	46.4	0.03	0.00	3.06
4,329.0	0.40	235.30	4,304.8	-68.5	-314.5	47.0	0.46	-0.24	46.71
4,415.0	0.40	290.00	4,390.8	-68.6	-315.0	47.0	0.43	0.00	63.60
4,500.0	0.70	304.70	4,475.8	-68.2	-315.7	46.6	0.39	0.35	17.29
4,585.0	0.70	329.90	4,560.8	-67.4	-316.4	45.8	0.36	0.00	29.65
4,672.0	0.50	127.70	4,647.8	-67.2	-316.3	45.6	1.35	-0.23	181.38



DDC
Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well AB State 647 #2
Project:	Eddy County, New Mexico (NAD 83)	TVD Reference:	Well @ 3697.0usft (Original Well Elev)
Site:	Sec 32, T17S, R28E	MD Reference:	Well @ 3697.0usft (Original Well Elev)
Well:	AB State 647 #2	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,756.0	0.50	123.20	4,731.8	-67.6	-315.7	46.0	0.05	0.00	-5.36
4,842.0	0.70	108.60	4,817.8	-68.0	-314.9	46.5	0.29	0.23	-16.98
4,927.0	0.70	101.30	4,902.8	-68.3	-313.9	46.8	0.10	0.00	-8.59
4,968.0	0.70	89.00	4,943.8	-68.3	-313.4	46.9	0.37	0.00	-30.00
TD @ 5013' MD / 4988.8' TVD									
5,013.0	0.70	89.00	4,988.8	-68.3	-312.9	46.9	0.00	0.00	0.00

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
375.2	375.0	-12.0	0.8	TIE IN @ 375.1' MD / 375' TVD
2,771.1	2,747.6	-66.8	-288.9	CROSSED HARDLINE @ 2771.1' MD / 2747.6' TVD
5,013.0	4,988.8	-68.3	-312.9	TD @ 5013' MD / 4988.8' TVD

Checked By: _____	Approved By: _____	Date: _____
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Apache Corporation
303 Veterans Airpark Lane, #3000
Midland, TX 79705

AB State 647 #002
Eddy County, New Mexico

API # 30-015-41500

SL: 2356' FSL; 2400' FNL; K-32-175-28E

244	2.44	0.50	0.88	2.14	2.14
408	1.64	1.00	1.75	2.87	5.01



HOBBS OCD

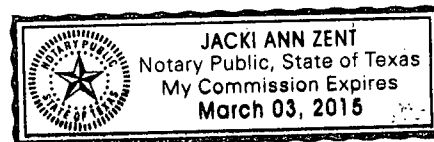
OCT 15 2013

RECEIVED

Archie Brown - General Manager

The attached instrument was acknowledged before me on the 28th day of August, 2013 by Archie Brown - General Manager, CapStar Drilling, Inc.

Notary Public

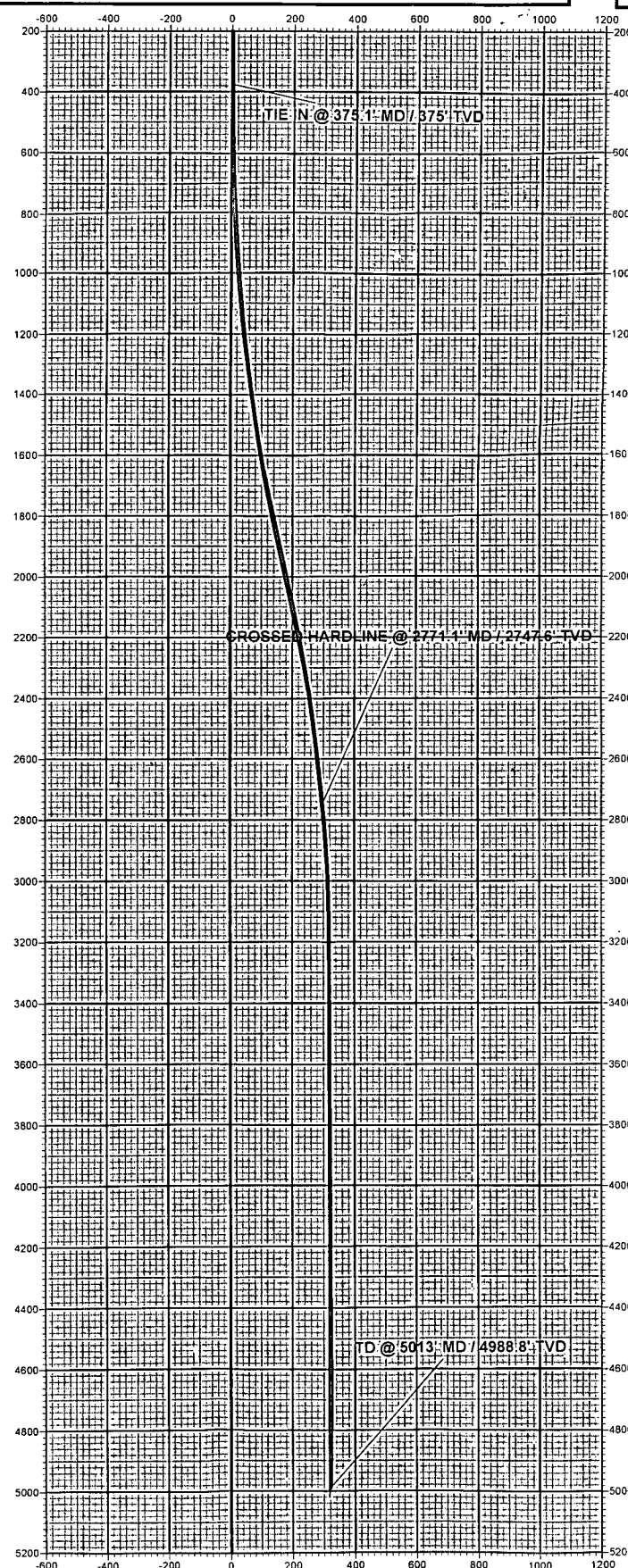


Company Name: Apache Corporation
AB State 647 #2
Eddy County, New Mexico (NAD 83)
Rig: Original Well Elev
Created By: TIFFANI MIZELL
Date: 8/23/2013

AB State 647 #2
Eddy County, New Mexico (NAD 83)
Q130706 & WT-13657
Design #2

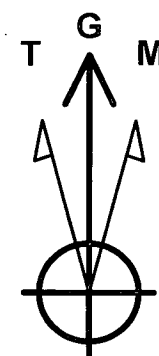
DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Vertical - AB State 647 #2	3200.0	-70.8	-309.2	651140.64	582665.72	32° 47' 23.803 N	104° 11' 55.844 W
- plan hits target center							
PBHL AB State 647 #2 Design	3000.0	-70.8	-309.2	651140.64	582665.72	32° 47' 23.803 N	104° 11' 55.844 W
- plan hits target center							



Vertical Section at 257.10° (200 usft/in)

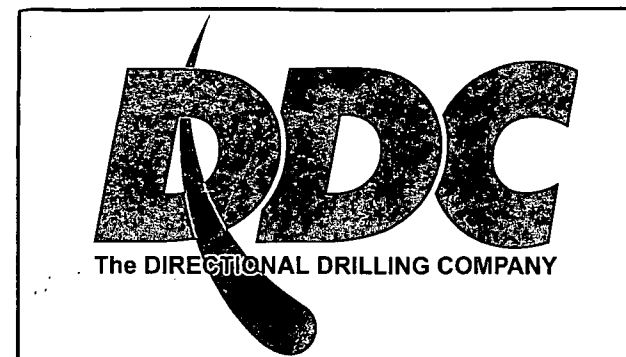
Apache



Azimuths to Grid North

Correction: 7.58°

Magnetic Field
Strength: 48669.4snT
Dip Angle: 60.55°
Date: 8/13/2013
Model: IGRF2010



PROJECT DETAILS: Eddy County, New Mexico (NAD 83)

Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: New Mexico Eastern Zone
System Datum: Mean Sea Level

WELL DETAILS: AB State 647 #2

		Ground Level:		3690.0	
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	651211.44	582974.9232	47° 24.499 N	104° 11' 52.221 W

ANNOTATIONS

MD	Inc	Azi	TVD	+N/-S	+E/-W	V	Sect	Departure	Annotation
375.2	1.79	179.25	375.0	-12.0	0.8	12.0	12.0		TIE IN @ 375.1' MD / 375' TVD
2771.1	5.61	256.94	2747.6	-66.8	-288.9	47.0	311.2		CROSSED HARDLINE @ 2771.1' MD / 2747.6' TVD
5013.0	0.70	89.00	4988.8	-68.3	-312.9	46.9	348.6		TD @ 5013' MD / 4988.8' TVD

