

APR 30 2008
OCD-ARTESIA

30.015 36311

Mack Energy

Eddy County

Cardinals State Com #1H

Cardinals State Com #1H

Original Hole

Plan: Plan #1

Pathfinder Survey Report

24 April, 2008

Mack Energy Corporation



Azimuths to Grid North
True North: -0.13°
Magnetic North: 8.11°

Magnetic Field
Strength: 49313.9nT
Dip Angle: 60.83°
Date: 4/24/2008
Model: IGRF200510

PATHFINDER ENERGY SERVICES

WELL DETAILS: Cardinals State Com #1H

Ground Elevation: 3681.00
RKB Elevation: EST RKB @ 3680.00ft
Rig Name:

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	698708.700	575631.300	32° 55' 14.103 N	104° 5' 12.708 W	

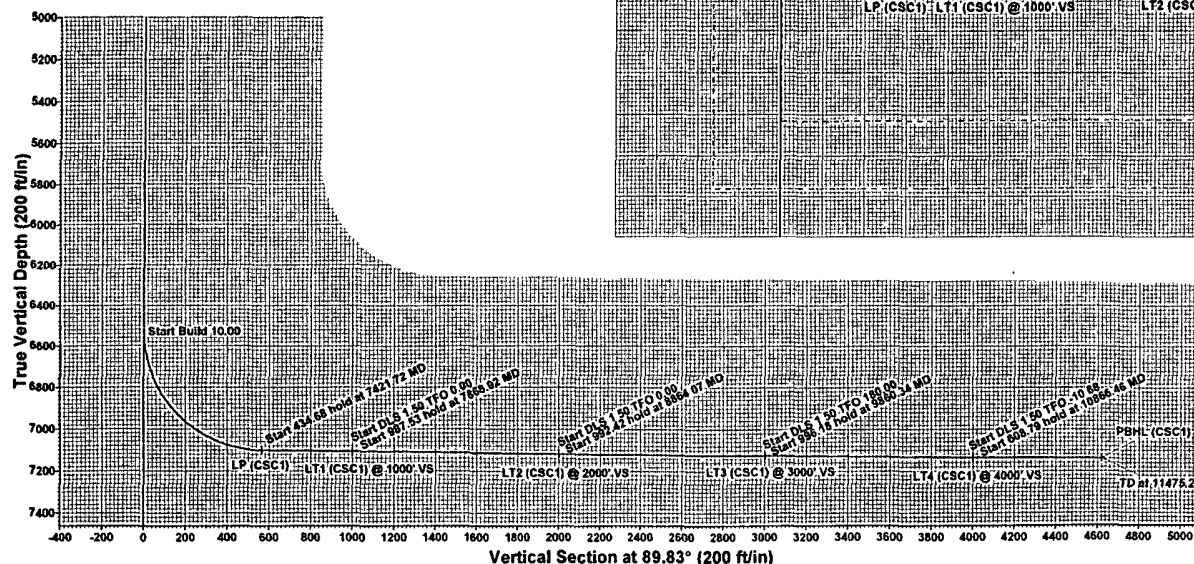
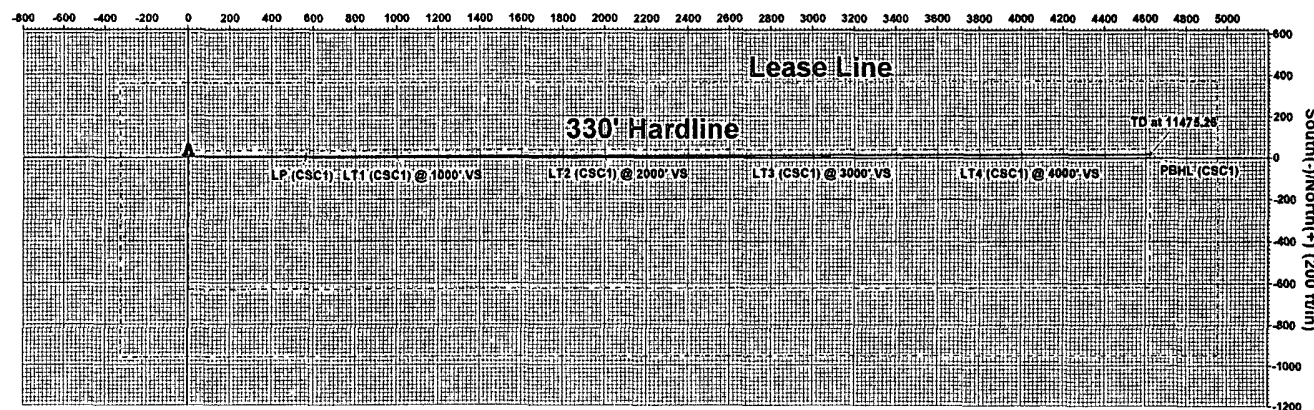
SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	6529.32	0.00	0.00	6529.32	0.00	0.00	0.00	0.00	0.00	
3	7421.72	89.24	89.83	7102.23	1.68	565.36	10.00	89.83	565.36	
4	7856.40	89.24	89.83	7107.99	2.97	1000.00	0.00	0.00	1000.00	LT1 (CSC1) @ 1000' VS
5	7868.92	89.43	89.83	7108.14	3.00	1012.52	1.50	0.00	1012.52	
6	8856.45	89.43	89.83	7118.00	5.93	1999.99	0.00	0.00	2000.00	LT2 (CSC1) @ 2000' VS
7	8864.07	89.54	89.83	7118.07	5.96	2007.61	1.50	0.00	2007.62	
8	8856.48	89.54	89.83	7126.00	8.90	2999.99	0.00	0.00	3000.00	LT3 (CSC1) @ 3000' VS
9	8860.34	89.48	89.83	7126.03	8.91	3003.84	1.50	180.00	3003.86	
10	10856.52	89.48	89.83	7135.00	11.87	3999.99	0.00	0.00	4000.00	LT4 (CSC1) @ 4000' VS
11	10866.46	89.63	89.80	7135.08	11.90	4008.02	1.50	-10.68	4009.94	
12	11475.26	89.63	89.80	7139.00	14.00	4618.70	0.00	0.00	4618.72	PBHL (CSC1)

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
LP (CSC1)	7102.23	1.68	565.36	Point
LT1 (CSC1) @ 1000' VS	7108.00	2.97	1000.00	Point
LT2 (CSC1) @ 2000' VS	7118.00	5.93	1999.99	Point
LT3 (CSC1) @ 3000' VS	7126.00	8.90	2999.99	Point
LT4 (CSC1) @ 4000' VS	7135.00	11.87	3999.99	Point
PBHL (CSC1)	7139.00	14.00	4618.70	Point

West(-)/East(+) (200 ft/in)



Project: Eddy County
Site: Cardinals State Com #1H
Well: Cardinals State Com #1H
Wellbore: Original Hole
Plan: Plan #1 (Cardinals State Com #1H/Original Hole)

Plan: Plan #1 (Cardinals State Com #1H/Original Hole)

Created By: Mark Freeman Date: 11/19, April 24 2008

Checked: _____ Date: _____

WHS

Pathfinder Survey Report

Company:	Mack Energy	Local Co-ordinate Reference:	Well Cardinals State Com #1H
Project:	Eddy County	TVD Reference:	EST RKB @ 3680.00ft
Site:	Cardinals State Com #1H	MD Reference:	EST RKB @ 3680.00ft
Well:	Cardinals State Com #1H	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Plan #1	Database:	EDM 2003.16 Single User Db

Project:	Eddy County		
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:		Cardinals State Com #1H			
Site Position:		Northing:	698,708.700ft	Latitude:	32° 55' 14.103 N
From:	Map	Easting:	575,631.300ft	Longitude:	104° 5' 12.708 W
Position Uncertainty:	0.00 ft	Slot Radius:	"	Grid Convergence:	0.13 °

Well:	Cardinals State Com #1H					
Well Position	+N-S	0.00 ft	Northing:	698,708.700 ft	Latitude:	32° 55' 14.103 N
	+E-W	0.00 ft	Easting:	575,631.300 ft	Longitude:	104° 5' 12.708 W
Position Uncertainty	0.00 ft	Wellhead Elevation:	ft	Ground Level:	3,661.00 ft	

Wellbore:	Original Hole
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	4/24/2008	8.24	60.83	49,314

Design:	Plan #1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	89.83

Survey Tool Program		Date: 4/24/2008		
From	To	Survey (Wellbore)	Tool Name	Description
(ft)	(ft)			
0.00	11,475.26	Plan #1 (Original Hole)	MWD	MWD - Standard

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00

WHS

Pathfinder Survey Report

Company:	Mack Energy	Local Co-ordinate Reference:	Well Cardinals State.Com #1H
Project:	Eddy County	TVD Reference:	EST RKB @ 3680.00ft
Site:	Cardinals State.Com #1H	MD Reference:	EST RKB @ 3680.00ft
Well:	Cardinals State.Com #1H	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Plan #1	Database:	EDM 2003.16 Single User Db

Planned Survey								
MD (ft)	Inc (°)	Azi (°)	TVD (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)	
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00	
2,700.00	0.00	0.00	2,700.00	0.00	0.00	0.00	0.00	
2,800.00	0.00	0.00	2,800.00	0.00	0.00	0.00	0.00	
2,900.00	0.00	0.00	2,900.00	0.00	0.00	0.00	0.00	
3,000.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00	
3,100.00	0.00	0.00	3,100.00	0.00	0.00	0.00	0.00	
3,200.00	0.00	0.00	3,200.00	0.00	0.00	0.00	0.00	
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00	
3,400.00	0.00	0.00	3,400.00	0.00	0.00	0.00	0.00	
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00	
3,600.00	0.00	0.00	3,600.00	0.00	0.00	0.00	0.00	
3,700.00	0.00	0.00	3,700.00	0.00	0.00	0.00	0.00	
3,800.00	0.00	0.00	3,800.00	0.00	0.00	0.00	0.00	
3,900.00	0.00	0.00	3,900.00	0.00	0.00	0.00	0.00	
4,000.00	0.00	0.00	4,000.00	0.00	0.00	0.00	0.00	
4,100.00	0.00	0.00	4,100.00	0.00	0.00	0.00	0.00	
4,200.00	0.00	0.00	4,200.00	0.00	0.00	0.00	0.00	
4,300.00	0.00	0.00	4,300.00	0.00	0.00	0.00	0.00	
4,400.00	0.00	0.00	4,400.00	0.00	0.00	0.00	0.00	
4,500.00	0.00	0.00	4,500.00	0.00	0.00	0.00	0.00	
4,600.00	0.00	0.00	4,600.00	0.00	0.00	0.00	0.00	
4,700.00	0.00	0.00	4,700.00	0.00	0.00	0.00	0.00	
4,800.00	0.00	0.00	4,800.00	0.00	0.00	0.00	0.00	
4,900.00	0.00	0.00	4,900.00	0.00	0.00	0.00	0.00	
5,000.00	0.00	0.00	5,000.00	0.00	0.00	0.00	0.00	
5,100.00	0.00	0.00	5,100.00	0.00	0.00	0.00	0.00	
5,200.00	0.00	0.00	5,200.00	0.00	0.00	0.00	0.00	
5,300.00	0.00	0.00	5,300.00	0.00	0.00	0.00	0.00	
5,400.00	0.00	0.00	5,400.00	0.00	0.00	0.00	0.00	
5,500.00	0.00	0.00	5,500.00	0.00	0.00	0.00	0.00	

WHS

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Well:	Cardinals State Com #1H	North Reference:	Grid:
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Design:	Plan #1	Database:	EDM 2003.16 Single User Db

Planned Survey									
MD (ft)	Inc (°)	Azi (°)	TVD (ft)	N/S (ft)	E/W (ft)	V: Sec (ft)	DLeg (°/100ft)		
5,600.00	0.00	0.00	5,600.00	0.00	0.00	0.00	0.00	0.00	0.00
5,700.00	0.00	0.00	5,700.00	0.00	0.00	0.00	0.00	0.00	0.00
5,800.00	0.00	0.00	5,800.00	0.00	0.00	0.00	0.00	0.00	0.00
5,900.00	0.00	0.00	5,900.00	0.00	0.00	0.00	0.00	0.00	0.00
6,000.00	0.00	0.00	6,000.00	0.00	0.00	0.00	0.00	0.00	0.00
6,100.00	0.00	0.00	6,100.00	0.00	0.00	0.00	0.00	0.00	0.00
6,200.00	0.00	0.00	6,200.00	0.00	0.00	0.00	0.00	0.00	0.00
6,300.00	0.00	0.00	6,300.00	0.00	0.00	0.00	0.00	0.00	0.00
6,400.00	0.00	0.00	6,400.00	0.00	0.00	0.00	0.00	0.00	0.00
6,500.00	0.00	0.00	6,500.00	0.00	0.00	0.00	0.00	0.00	0.00
6,529.32	0.00	0.00	6,529.32	0.00	0.00	0.00	0.00	0.00	0.00
6,550.00	2.07	89.83	6,550.00	0.00	0.37	0.37	10.00		
6,600.00	7.07	89.83	6,599.82	0.01	4.35	4.35	10.00		
6,650.00	12.07	89.83	6,649.11	0.04	12.66	12.66	10.00		
6,700.00	17.07	89.83	6,697.49	0.07	25.23	25.23	10.00		
6,750.00	22.07	89.83	6,744.58	0.12	41.98	41.98	10.00		
6,800.00	27.07	89.83	6,790.04	0.19	62.76	62.76	10.00		
6,850.00	32.07	89.83	6,833.52	0.26	87.42	87.42	10.00		
6,900.00	37.07	89.83	6,874.68	0.34	115.78	115.78	10.00		
6,950.00	42.07	89.83	6,913.21	0.44	147.62	147.62	10.00		
7,000.00	47.07	89.83	6,948.82	0.54	182.70	182.70	10.00		
7,050.00	52.07	89.83	6,981.24	0.65	220.74	220.75	10.00		
7,100.00	57.07	89.83	7,010.21	0.78	261.47	261.47	10.00		
7,150.00	62.07	89.83	7,035.53	0.90	304.57	304.57	10.00		
7,200.00	67.07	89.83	7,057.00	1.04	349.71	349.71	10.00		
7,250.00	72.07	89.83	7,074.44	1.18	396.55	396.55	10.00		
7,300.00	77.07	89.83	7,087.75	1.32	444.73	444.73	10.00		
7,350.00	82.07	89.83	7,096.80	1.47	493.89	493.89	10.00		
7,400.00	87.07	89.83	7,101.53	1.61	543.65	543.65	10.00		
7,421.72	89.24	89.83	7,102.23	1.68	565.36	565.36	10.00		
7,500.00	89.24	89.83	7,103.27	1.91	643.63	643.63	0.00		
7,600.00	89.24	89.83	7,104.59	2.21	743.62	743.62	0.00		
7,700.00	89.24	89.83	7,105.92	2.50	843.61	843.61	0.00		
7,800.00	89.24	89.83	7,107.24	2.80	943.60	943.60	0.00		
7,856.40	89.24	89.83	7,107.99	2.97	1,000.00	1,000.00	0.00		
7,868.92	89.43	89.83	7,108.14	3.00	1,012.52	1,012.52	1.50		
7,900.00	89.43	89.83	7,108.45	3.10	1,043.59	1,043.60	0.00		
8,000.00	89.43	89.83	7,109.45	3.39	1,143.59	1,143.59	0.00		
8,100.00	89.43	89.83	7,110.45	3.69	1,243.58	1,243.59	0.00		
8,200.00	89.43	89.83	7,111.44	3.99	1,343.58	1,343.58	0.00		
8,300.00	89.43	89.83	7,112.44	4.28	1,443.57	1,443.58	0.00		
8,400.00	89.43	89.83	7,113.44	4.58	1,543.57	1,543.57	0.00		
8,500.00	89.43	89.83	7,114.44	4.88	1,643.56	1,643.57	0.00		
8,600.00	89.43	89.83	7,115.44	5.17	1,743.55	1,743.56	0.00		

WHS

Pathfinder Survey Report

Company:	Mack Energy	Local Co-ordinate Reference:	Well Cardinals State Com #1H
Project:	Eddy County	TVD Reference:	EST RKB @ 3680.00ft
Site:	Cardinals State Com #1H	MD Reference:	EST RKB @ 3680.00ft
Well:	Cardinals State Com #1H	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Plan #1	Database:	EDM 2003.16 Single User Db

Planned Survey								
MD (ft)	Inc (°)	Azi (°)	TVD (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)	
8,700.00	89.43	89.83	7,116.44	5.47	1,843.55	1,843.56	0.00	
8,800.00	89.43	89.83	7,117.44	5.77	1,943.54	1,943.55	0.00	
8,856.45	89.43	89.83	7,118.00	5.93	1,999.99	2,000.00	0.00	
8,864.07	89.54	89.83	7,118.07	5.96	2,007.61	2,007.62	1.50	
8,900.00	89.54	89.83	7,118.36	6.06	2,043.54	2,043.55	0.00	
9,000.00	89.54	89.83	7,119.15	6.36	2,143.54	2,143.55	0.00	
9,100.00	89.54	89.83	7,119.95	6.66	2,243.53	2,243.54	0.00	
9,200.00	89.54	89.83	7,120.75	6.95	2,343.53	2,343.54	0.00	
9,300.00	89.54	89.83	7,121.55	7.25	2,443.52	2,443.54	0.00	
9,400.00	89.54	89.83	7,122.35	7.55	2,543.52	2,543.53	0.00	
9,500.00	89.54	89.83	7,123.15	7.84	2,643.52	2,643.53	0.00	
9,600.00	89.54	89.83	7,123.95	8.14	2,743.51	2,743.53	0.00	
9,700.00	89.54	89.83	7,124.75	8.44	2,843.51	2,843.52	0.00	
9,800.00	89.54	89.83	7,125.55	8.73	2,943.51	2,943.52	0.00	
9,856.48	89.54	89.83	7,126.00	8.90	2,999.99	3,000.00	0.00	
9,860.34	89.48	89.83	7,126.03	8.91	3,003.84	3,003.86	1.50	
9,900.00	89.48	89.83	7,126.39	9.03	3,043.50	3,043.52	0.00	
10,000.00	89.48	89.83	7,127.29	9.33	3,143.50	3,143.51	0.00	
10,100.00	89.48	89.83	7,128.19	9.62	3,243.49	3,243.51	0.00	
10,200.00	89.48	89.83	7,129.09	9.92	3,343.49	3,343.50	0.00	
10,300.00	89.48	89.83	7,129.99	10.22	3,443.48	3,443.50	0.00	
10,400.00	89.48	89.83	7,130.89	10.51	3,543.48	3,543.50	0.00	
10,500.00	89.48	89.83	7,131.79	10.81	3,643.48	3,643.49	0.00	
10,600.00	89.48	89.83	7,132.69	11.11	3,743.47	3,743.49	0.00	
10,700.00	89.48	89.83	7,133.59	11.40	3,843.47	3,843.48	0.00	
10,800.00	89.48	89.83	7,134.49	11.70	3,943.46	3,943.48	0.00	
10,856.52	89.48	89.83	7,135.00	11.87	3,999.98	4,000.00	0.00	
10,866.46	89.63	89.80	7,135.08	11.90	4,009.92	4,009.94	1.50	
10,900.00	89.63	89.80	7,135.29	12.02	4,043.46	4,043.48	0.00	
11,000.00	89.63	89.80	7,135.94	12.36	4,143.46	4,143.47	0.00	
11,100.00	89.63	89.80	7,136.58	12.71	4,243.45	4,243.47	0.00	
11,200.00	89.63	89.80	7,137.23	13.05	4,343.45	4,343.47	0.00	
11,300.00	89.63	89.80	7,137.87	13.40	4,443.45	4,443.47	0.00	
11,400.00	89.63	89.80	7,138.52	13.74	4,543.44	4,543.47	0.00	
11,475.26	89.63	89.80	7,139.00	14.00	4,618.70	4,618.72	0.00	

WHS

Pathfinder Survey Report

Company:	Mack Energy	Local Co-ordinate Reference:	Well Cardinals State Com #1H
Project:	Eddy County	TVD Reference:	EST RKB @ 3680.00ft
Site:	Cardinals State Com #1H	MD Reference:	EST RKB @ 3680.00ft
Well:	Cardinals State Com #1H	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Plan #1	Database:	EDM 2003.16 Single User Db

Targets									
Target Name	hit/miss target	Dip Angle	Dip Dir	TVD	+N/-S	+E/-W	Northing	Easting	
Shape		(°)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)	
PBHL (CSC1)	- plan hits target	0.00	0 00	7,139.00	14.00	4,618.70	698,722.700	580,250.000	32° 55' 14.131 N 104° 4' 18.522 W
	- Point								
LT2 (CSC1) @ 2000'	- plan hits target	0.00	0.00	7,118.00	5.93	1,999.99	698,714.634	577,631.291	32° 55' 14.115 N 104° 4' 49.244 W
	- Point								
LT1 (CSC1) @ 1000'	- plan hits target	0.00	0.00	7,108.00	2.97	1,000.00	698,711.667	576,631.296	32° 55' 14.109 N 104° 5' 0.976 W
	- Point								
LT4 (CSC1) @ 4000'	- plan hits target	0.00	0.00	7,135.00	11.87	3,999.98	698,720.568	579,631.282	32° 55' 14.125 N 104° 4' 25.781 W
	- Point								
LP (CSC1)	- plan hits target	0.00	0.00	7,102.23	1.68	565.36	698,710.380	576,196.660	32° 55' 14.106 N 104° 5' 6.075 W
	- Point								
LT3 (CSC1) @ 3000'	- plan hits target	0.00	0.00	7,126.00	8.90	2,999.99	698,717.601	578,631.287	32° 55' 14.120 N 104° 4' 37.513 W
	- Point								

Checked By: _____	Approved By: _____	Date: _____
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