

Joint Resources

DrilTech L.L.C.

Hadaway Consulting & Eng. LLC
 Site: Joint Resources Co. - LEA Cnty, NM (NAD 83)
 Well: Commander 2H
 Section 31:T17S-39E
 Wellbore: Wellbore #1
 Plan: Plan #1
 Norton 2

SURFACE LOCATION

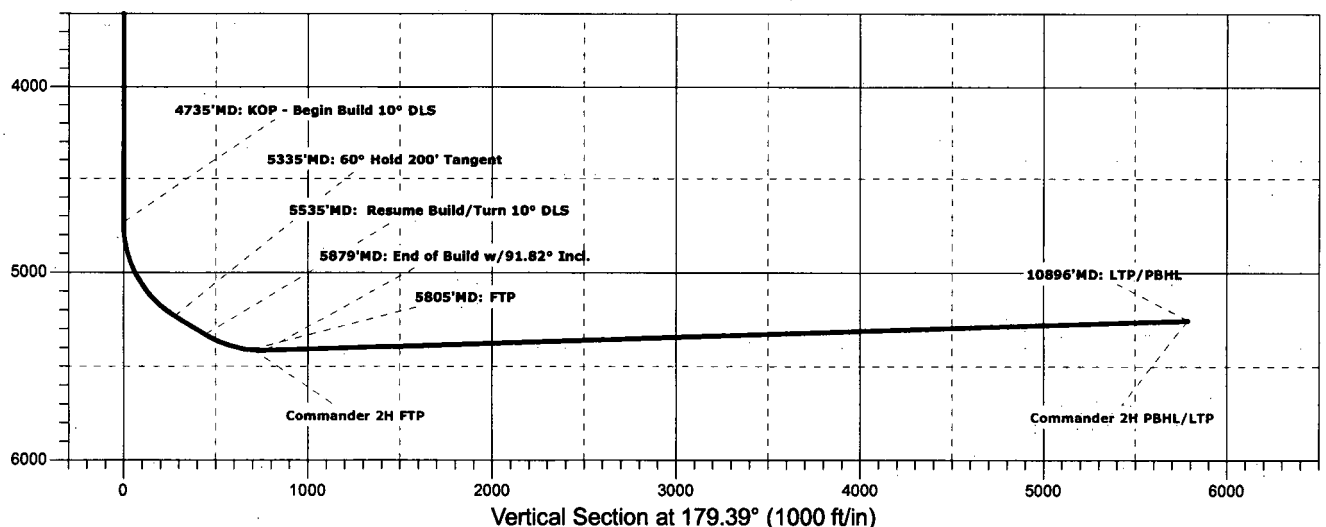
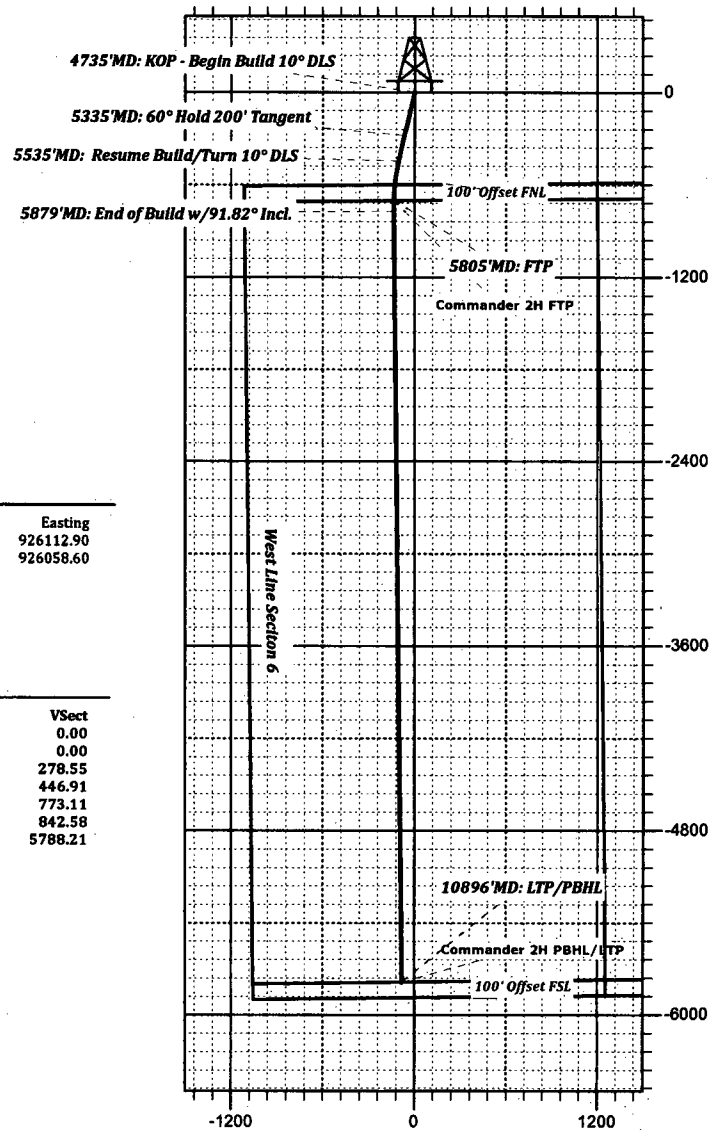
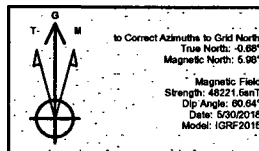
US State Plane 1983
 New Mexico Eastern Zone
 Elevation: GL 3632' + 17' RKB @ 3649.00ft (Norton 2)
 Commander 2H
 Latitude 32.786°N
 Longitude 103.081°W
 Northing 651781.40
 Easting 926195.40

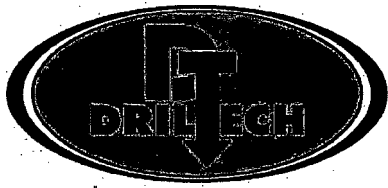
DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting
Commander 2H PBHL/LTP	5255.00	-5789.41	-82.50	645992.00	926112.90
Commander 2H FTP	5410.00	-701.20	-136.80	651080.20	926058.60

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4734.69	0.00	0.00	4734.69	0.00	0.00	0.00	0.00	0.00
5334.89	60.00	192.98	5231.05	-279.25	-64.37	10.00	192.98	278.55
5534.89	60.00	192.98	5331.05	-448.03	-103.27	0.00	0.00	446.91
5878.52	91.82	179.39	5414.00	-774.60	-135.85	10.00	-24.59	773.11
5948.04	91.82	179.39	5411.80	-844.07	-135.11	0.00	0.00	842.58
10896.14	91.82	179.39	5255.00	-5789.41	-82.50	0.00	0.00	5788.21





Hadaway Consulting & Eng. LLC

Joint Resources Co. - LEA Cnty, NM (NAD 83)

Commander 2H

Well #1

Wellbore #1

Plan: Plan #1

Standard Planning Report

31 July, 2018



Planning Report

Database:	EDM 5000.14 Single User Db	Local Co-ordinate Reference:	Well Well #1
Company:	Hadaway Consulting & Eng. LLC	TVD Reference:	GL 3632' + 17' RKB @ 3649.00ft (Norton 2)
Project:	Joint Resources Co. - LEA Cnty, NM (NAD 83)	MD Reference:	GL 3632' + 17' RKB @ 3649.00ft (Norton 2)
Site:	Commander 2H	North Reference:	Grid
Well:	Well #1	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1		

Project	Joint Resources Co. - LEA Cnty, NM (NAD 83), Lea County, NM		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Commander 2H
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Site Position:		Northing:	651,781.40 usft	Latitude:	32.786°N
From:	Map	Easting:	926,195.40 usft	Longitude:	103.081°W
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in	Grid Convergence:	0.68 °

Well	Well #1				
Well Position	+N/-S	0.00 ft	Northing:	651,781.40 usft	Latitude: 32.786°N
	+E/-W	0.00 ft	Easting:	926,195.40 usft	Longitude: 103.081°W
Position Uncertainty	0.00 ft	Wellhead Elevation:		Ground Level:	3,632.00 ft

Wellbore	Wellbore #1
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	5/30/2018	6.66	60.64	48,221.53859108

Design	Plan #1
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Audit Notes:	
Version:	Phase: PROTOTYPE Tie On Depth: 0.00

Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	-3.00	0.00	0.00	179.39

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,734.69	0.00	0.00	4,734.69	0.00	0.00	0.00	0.00	0.00	0.00	
5,334.89	60.00	192.98	5,231.05	-279.25	-64.37	10.00	10.00	0.00	192.98	
5,534.89	60.00	192.98	5,331.05	-448.03	-103.27	0.00	0.00	0.00	0.00	
5,878.52	91.82	179.39	5,414.00	-774.60	-135.85	10.00	9.26	-3.95	-24.59	
5,948.04	91.82	179.39	5,411.80	-844.07	-135.11	0.00	0.00	0.00	0.00	
10,896.14	91.82	179.39	5,255.00	-5,789.41	-82.50	0.00	0.00	0.00	0.00	Commander 2H PB



Planning Report

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Company:	Hadaway Consulting & Eng. LLC	TVD Reference:	GL 3632' + 17' RKB @ 3649.00ft (Norton 2)
Project:	Joint Resources Co. - LEA Cnty, NM (NAD 83)	MD Reference:	GL 3632' + 17' RKB @ 3649.00ft (Norton 2)
Site:	Commander 2H	North Reference:	Grid
Well:	Well #1	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.00	0.00	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	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	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	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	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	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	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	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	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	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	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	0.00	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	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	0.00	0.00
2,200.00	0.00	0.00	2,200.00	0.00	0.00	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	0.00	0.00
2,400.00	0.00	0.00	2,400.00	0.00	0.00	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	0.00	0.00
2,600.00	0.00	0.00	2,600.00	0.00	0.00	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	0.00	0.00
2,800.00	0.00	0.00	2,800.00	0.00	0.00	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	0.00	0.00
3,000.00	0.00	0.00	3,000.00	0.00	0.00	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	0.00	0.00
3,200.00	0.00	0.00	3,200.00	0.00	0.00	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	0.00	0.00
3,400.00	0.00	0.00	3,400.00	0.00	0.00	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	0.00	0.00
3,600.00	0.00	0.00	3,600.00	0.00	0.00	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	0.00	0.00
3,800.00	0.00	0.00	3,800.00	0.00	0.00	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	0.00	0.00
4,000.00	0.00	0.00	4,000.00	0.00	0.00	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	0.00	0.00
4,200.00	0.00	0.00	4,200.00	0.00	0.00	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	0.00	0.00
4,400.00	0.00	0.00	4,400.00	0.00	0.00	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	0.00	0.00
4,600.00	0.00	0.00	4,600.00	0.00	0.00	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	0.00	0.00
4,734.69	0.00	0.00	4,734.69	0.00	0.00	0.00	0.00	0.00	0.00
4735'MD: KOP - Begin Build 10° DLS									
4,800.00	6.53	192.98	4,799.86	-3.62	-0.83	3.61	10.00	10.00	0.00
4,900.00	16.53	192.98	4,897.72	-23.07	-5.32	23.01	10.00	10.00	0.00
5,000.00	26.52	192.98	4,990.63	-58.78	-13.55	58.63	10.00	10.00	0.00



Planning Report

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Company:	Hadaway Consulting & Eng. LLC	TVD Reference:	GL 3632' + 17' RKB @ 3649.00ft (Norton 2)
Project:	Joint Resources Co. - LEA Cnty, NM (NAD 83)	MD Reference:	GL 3632' + 17' RKB @ 3649.00ft (Norton 2)
Site:	Commander 2H	North Reference:	Grid
Well:	Well #1	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
5,100.00	36.52	192.98	5,075.76	-109.66	-25.28	109.38	10.00	10.00	0.00
5,200.00	46.52	192.98	5,150.54	-174.16	-40.15	173.73	10.00	10.00	0.00
5,300.00	56.51	192.98	5,212.70	-250.34	-57.70	249.72	10.00	10.00	0.00
5,334.89	60.00	192.98	5,231.05	-279.25	-64.37	278.55	10.00	10.00	0.00
5335'MD: 60° Hold 200' Tangent									
5,400.00	60.00	192.98	5,263.61	-334.20	-77.03	333.36	0.00	0.00	0.00
5,500.00	60.00	192.98	5,313.61	-418.59	-96.48	417.54	0.00	0.00	0.00
5,534.89	60.00	192.98	5,331.05	-448.03	-103.27	446.91	0.00	0.00	0.00
5535'MD: Resume Build/Turn 10° DLS									
5,600.00	65.95	190.02	5,360.63	-504.84	-114.79	503.59	10.00	9.14	-4.55
5,700.00	75.19	185.95	5,393.86	-598.12	-127.78	596.73	10.00	9.24	-4.06
5,800.00	84.50	182.23	5,411.48	-696.18	-134.75	694.71	10.00	9.30	-3.73
5,804.94	84.96	182.05	5,411.94	-701.09	-134.93	699.62	10.00	9.32	-3.63
Commander 2H FTP									
5,805.04	84.97	182.04	5,411.95	-701.20	-134.93	699.72	10.00	9.32	-3.63
5805'MD: FTP									
5,878.52	91.82	179.39	5,414.00	-774.60	-135.85	773.11	10.00	9.33	-3.61
5879'MD: End of Build w/91.82° Incl.									
5,900.00	91.82	179.39	5,413.32	-796.06	-135.62	794.57	0.00	0.00	0.00
5,948.04	91.82	179.39	5,411.80	-844.07	-135.11	842.58	0.00	0.00	0.00
6,000.00	91.82	179.39	5,410.15	-896.00	-134.55	894.52	0.00	0.00	0.00
6,100.00	91.82	179.39	5,406.97	-995.95	-133.49	994.47	0.00	0.00	0.00
6,200.00	91.82	179.39	5,403.80	-1,095.89	-132.43	1,094.42	0.00	0.00	0.00
6,300.00	91.82	179.39	5,400.62	-1,195.84	-131.36	1,194.37	0.00	0.00	0.00
6,400.00	91.82	179.39	5,397.45	-1,295.78	-130.30	1,294.32	0.00	0.00	0.00
6,500.00	91.82	179.39	5,394.27	-1,395.72	-129.23	1,394.27	0.00	0.00	0.00
6,600.00	91.82	179.39	5,391.09	-1,495.67	-128.17	1,494.22	0.00	0.00	0.00
6,700.00	91.82	179.39	5,387.92	-1,595.61	-127.11	1,594.17	0.00	0.00	0.00
6,800.00	91.82	179.39	5,384.74	-1,695.56	-126.04	1,694.12	0.00	0.00	0.00
6,900.00	91.82	179.39	5,381.57	-1,795.50	-124.98	1,794.07	0.00	0.00	0.00
7,000.00	91.82	179.39	5,378.39	-1,895.44	-123.91	1,894.02	0.00	0.00	0.00
7,100.00	91.82	179.39	5,375.21	-1,995.39	-122.85	1,993.97	0.00	0.00	0.00
7,200.00	91.82	179.39	5,372.04	-2,095.33	-121.79	2,093.92	0.00	0.00	0.00
7,300.00	91.82	179.39	5,368.86	-2,195.27	-120.72	2,193.86	0.00	0.00	0.00
7,400.00	91.82	179.39	5,365.69	-2,295.22	-119.66	2,293.81	0.00	0.00	0.00
7,500.00	91.82	179.39	5,362.51	-2,395.16	-118.59	2,393.76	0.00	0.00	0.00
7,600.00	91.82	179.39	5,359.33	-2,495.11	-117.53	2,493.71	0.00	0.00	0.00
7,700.00	91.82	179.39	5,356.16	-2,595.05	-116.47	2,593.66	0.00	0.00	0.00
7,800.00	91.82	179.39	5,352.98	-2,694.99	-115.40	2,693.61	0.00	0.00	0.00
7,900.00	91.82	179.39	5,349.81	-2,794.94	-114.34	2,793.56	0.00	0.00	0.00
8,000.00	91.82	179.39	5,346.63	-2,894.88	-113.27	2,893.51	0.00	0.00	0.00
8,100.00	91.82	179.39	5,343.45	-2,994.83	-112.21	2,993.46	0.00	0.00	0.00
8,200.00	91.82	179.39	5,340.28	-3,094.77	-111.14	3,093.41	0.00	0.00	0.00
8,300.00	91.82	179.39	5,337.10	-3,194.71	-110.08	3,193.36	0.00	0.00	0.00
8,400.00	91.82	179.39	5,333.93	-3,294.66	-109.02	3,293.31	0.00	0.00	0.00
8,500.00	91.82	179.39	5,330.75	-3,394.60	-107.95	3,393.26	0.00	0.00	0.00
8,600.00	91.82	179.39	5,327.57	-3,494.55	-106.89	3,493.21	0.00	0.00	0.00
8,700.00	91.82	179.39	5,324.40	-3,594.49	-105.82	3,593.16	0.00	0.00	0.00
8,800.00	91.82	179.39	5,321.22	-3,694.43	-104.76	3,693.11	0.00	0.00	0.00
8,900.00	91.82	179.39	5,318.05	-3,794.38	-103.70	3,793.06	0.00	0.00	0.00
9,000.00	91.82	179.39	5,314.87	-3,894.32	-102.63	3,893.01	0.00	0.00	0.00
9,100.00	91.82	179.39	5,311.69	-3,994.26	-101.57	3,992.96	0.00	0.00	0.00
9,200.00	91.82	179.39	5,308.52	-4,094.21	-100.50	4,092.91	0.00	0.00	0.00



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Project:	Joint Resources Co. - LEA Cnty, NM (NAD 83)	MD Reference:	GL 3632' + 17' RKB @ 3649.00ft (Norton 2)
Site:	Commander 2H	North Reference:	Grid
Well:	Well #1	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
9,300.00	91.82	179.39	5,305.34	-4,194.15	-99.44	4,192.86	0.00	0.00	0.00
9,400.00	91.82	179.39	5,302.17	-4,294.10	-98.38	4,292.81	0.00	0.00	0.00
9,500.00	91.82	179.39	5,298.99	-4,394.04	-97.31	4,392.76	0.00	0.00	0.00
9,600.00	91.82	179.39	5,295.81	-4,493.98	-96.25	4,492.70	0.00	0.00	0.00
9,700.00	91.82	179.39	5,292.64	-4,593.93	-95.18	4,592.65	0.00	0.00	0.00
9,800.00	91.82	179.39	5,289.46	-4,693.87	-94.12	4,692.60	0.00	0.00	0.00
9,900.00	91.82	179.39	5,286.29	-4,793.82	-93.06	4,792.55	0.00	0.00	0.00
10,000.00	91.82	179.39	5,283.11	-4,893.76	-91.99	4,892.50	0.00	0.00	0.00
10,100.00	91.82	179.39	5,279.93	-4,993.70	-90.93	4,992.45	0.00	0.00	0.00
10,200.00	91.82	179.39	5,276.76	-5,093.65	-89.86	5,092.40	0.00	0.00	0.00
10,300.00	91.82	179.39	5,273.58	-5,193.59	-88.80	5,192.35	0.00	0.00	0.00
10,400.00	91.82	179.39	5,270.41	-5,293.54	-87.73	5,292.30	0.00	0.00	0.00
10,500.00	91.82	179.39	5,267.23	-5,393.48	-86.67	5,392.25	0.00	0.00	0.00
10,600.00	91.82	179.39	5,264.05	-5,493.42	-85.61	5,492.20	0.00	0.00	0.00
10,700.00	91.82	179.39	5,260.88	-5,593.37	-84.54	5,592.15	0.00	0.00	0.00
10,800.00	91.82	179.39	5,257.70	-5,693.31	-83.48	5,692.10	0.00	0.00	0.00
10,896.14	91.82	179.39	5,255.00	-5,789.41	-82.50	5,788.21	0.00	0.00	0.00

10896'MD: LTP/PBHL - Commander 2H PBHL/LTP

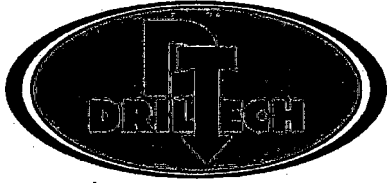
Design Targets

Target Name

- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- Shape									
Commander 2H PBHL	0.00	0.07	5,255.00	-5,789.41	-82.50	645,992.00	926,112.90	32.770°N	103.082°W
- plan hits target center									
- Point									
Commander 2H FTP	0.00	0.07	5,410.00	-701.20	-136.80	651,080.20	926,058.60	32.784°N	103.082°W
- plan misses target center by 2.70ft at 5804.94ft MD (5411.94 TVD, -701.10 N, -134.93 E)									
- Point									

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Comment
4,734.69	4,734.69	0.00	0.00	4735'MD: KOP - Begin Build 10° DLS
5,334.89	5,231.05	-279.25	-64.37	5335'MD: 60° Hold 200' Tangent
5,534.89	5,331.05	-448.03	-103.27	5535'MD: Resume Build/Turn 10° DLS
5,805.04	5,411.95	-701.20	-134.93	5805'MD: FTP
5,878.52	5,414.00	-774.60	-135.85	5879'MD: End of Build w/91.82° Incl.
10,896.14	5,255.00	-5,789.41	-82.50	10896'MD: LTP/PBHL



Hadaway Consulting & Eng. LLC

Joint Resources Co. - LEA Cnty, NM (NAD 83)

Commander 2H

Well #1

Wellbore #1

Plan: Plan #1

Standard Planning Report - Geographic

31 July, 2018



Planning Report - Geographic

Database:	EDM 5000.14 Single User Db	Local Co-ordinate Reference:	Well Well #1
Company:	Hadaway Consulting & Eng. LLC	TVD Reference:	GL 3632' + 17' RKB @ 3649.00ft (Norton 2)
Project:	Joint Resources Co. - LEA Cnty, NM (NAD 83)	MD Reference:	GL 3632' + 17' RKB @ 3649.00ft (Norton 2)
Site:	Commander 2H	North Reference:	Grid
Well:	Well #1	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1		

Project	Joint Resources Co. - LEA Cnty, NM (NAD 83), Lea County, NM		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Commander 2H
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Site Position:		Northing:	651,781.40 usft	Latitude:	32.786°N
From:	Map	Easting:	926,195.40 usft	Longitude:	103.081°W
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in	Grid Convergence:	0.68 °

Well	Well #1				
Well Position	+N/-S	0.00 ft	Northing:	651,781.40 usft	Latitude: 32.786°N
	+E/-W	0.00 ft	Easting:	926,195.40 usft	Longitude: 103.081°W
Position Uncertainty	0.00 ft		Wellhead Elevation:		Ground Level: 3,632.00 ft

Wellbore	Wellbore #1
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	5/30/2018	6.66	60.64	48,221.53859108

Design	Plan #1
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Audit Notes:	
Version:	Phase: PROTOTYPE Tie On Depth: 0.00

Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	-3.00	0.00	0.00	179.39

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,734.69	0.00	0.00	4,734.69	0.00	0.00	0.00	0.00	0.00	0.00	
5,334.89	60.00	192.98	5,231.05	-279.25	-64.37	10.00	10.00	0.00	192.98	
5,534.89	60.00	192.98	5,331.05	-448.03	-103.27	0.00	0.00	0.00	0.00	
5,878.52	91.82	179.39	5,414.00	-774.60	-135.85	10.00	9.26	-3.95	-24.59	
5,948.04	91.82	179.39	5,411.80	-844.07	-135.11	0.00	0.00	0.00	0.00	
10,896.14	91.82	179.39	5,255.00	-5,789.41	-82.50	0.00	0.00	0.00	0.00	Commander 2H PB



Planning Report - Geographic

Database:	EDM 5000.14 Single User Db	Local Co-ordinate Reference:	Well Well #1
Company:	Hadaway Consulting & Eng. LLC	TVD Reference:	GL 3632' + 17' RKB @ 3649.00ft (Norton 2)
Project:	Joint Resources Co. - LEA Cnty, NM (NAD 83)	MD Reference:	GL 3632' + 17' RKB @ 3649.00ft (Norton 2)
Site:	Commander 2H	North Reference:	Grid
Well:	Well #1	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.00	0.00	0.00	0.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
100.00	0.00	0.00	100.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
200.00	0.00	0.00	200.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
300.00	0.00	0.00	300.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
400.00	0.00	0.00	400.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
500.00	0.00	0.00	500.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
600.00	0.00	0.00	600.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
700.00	0.00	0.00	700.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
800.00	0.00	0.00	800.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
900.00	0.00	0.00	900.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
1,000.00	0.00	0.00	1,000.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
1,100.00	0.00	0.00	1,100.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
1,200.00	0.00	0.00	1,200.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
1,300.00	0.00	0.00	1,300.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
1,400.00	0.00	0.00	1,400.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
1,500.00	0.00	0.00	1,500.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
1,600.00	0.00	0.00	1,600.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
1,700.00	0.00	0.00	1,700.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
1,800.00	0.00	0.00	1,800.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
1,900.00	0.00	0.00	1,900.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
2,000.00	0.00	0.00	2,000.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
2,100.00	0.00	0.00	2,100.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
2,200.00	0.00	0.00	2,200.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
2,300.00	0.00	0.00	2,300.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
2,400.00	0.00	0.00	2,400.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
2,500.00	0.00	0.00	2,500.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
2,600.00	0.00	0.00	2,600.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
2,700.00	0.00	0.00	2,700.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
2,800.00	0.00	0.00	2,800.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
2,900.00	0.00	0.00	2,900.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
3,000.00	0.00	0.00	3,000.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
3,100.00	0.00	0.00	3,100.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
3,200.00	0.00	0.00	3,200.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
3,300.00	0.00	0.00	3,300.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
3,400.00	0.00	0.00	3,400.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
3,500.00	0.00	0.00	3,500.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
3,600.00	0.00	0.00	3,600.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
3,700.00	0.00	0.00	3,700.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
3,800.00	0.00	0.00	3,800.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
3,900.00	0.00	0.00	3,900.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
4,000.00	0.00	0.00	4,000.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
4,100.00	0.00	0.00	4,100.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
4,200.00	0.00	0.00	4,200.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
4,300.00	0.00	0.00	4,300.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
4,400.00	0.00	0.00	4,400.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
4,500.00	0.00	0.00	4,500.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
4,600.00	0.00	0.00	4,600.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
4,700.00	0.00	0.00	4,700.00	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
4,734.69	0.00	0.00	4,734.69	0.00	0.00	651,781.40	926,195.40	32.786°N	103.081°W
4735MD: KOP - Begin Build 10° DLS									
4,800.00	6.53	192.98	4,799.86	-3.62	-0.83	651,777.78	926,194.57	32.786°N	103.081°W
4,900.00	16.53	192.98	4,897.72	-23.07	-5.32	651,758.33	926,190.08	32.785°N	103.081°W
5,000.00	26.52	192.98	4,990.63	-58.78	-13.55	651,722.63	926,181.85	32.785°N	103.081°W
5,100.00	36.52	192.98	5,075.76	-109.66	-25.28	651,671.75	926,170.13	32.785°N	103.081°W



Planning Report - Geographic

Database:	EDM 5000.14 Single User Db	Local Co-ordinate Reference:	Well Well #1
Company:	Hadaway Consulting & Eng. LLC	TVD Reference:	GL 3632' + 17' RKB @ 3649.00ft (Norton 2)
Project:	Joint Resources Co. - LEA Cnty, NM (NAD 83)	MD Reference:	GL 3632' + 17' RKB @ 3649.00ft (Norton 2)
Site:	Commander 2H	North Reference:	Grid
Well:	Well #1	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
5,200.00	46.52	192.98	5,150.54	-174.16	-40.15	651,607.24	926,155.26	32.785°N	103.081°W
5,300.00	56.51	192.98	5,212.70	-250.34	-57.70	651,531.06	926,137.70	32.785°N	103.081°W
5,334.89	60.00	192.98	5,231.05	-279.25	-64.37	651,502.15	926,131.03	32.785°N	103.081°W
5335°MD: 60° Hold 200' Tangent									
5,400.00	60.00	192.98	5,263.61	-334.20	-77.03	651,447.21	926,118.37	32.785°N	103.081°W
5,500.00	60.00	192.98	5,313.61	-418.59	-96.48	651,362.82	926,098.92	32.784°N	103.081°W
5,534.89	60.00	192.98	5,331.05	-448.03	-103.27	651,333.37	926,092.13	32.784°N	103.081°W
5535°MD: Resume Build/Turn 10° DLS									
5,600.00	65.95	190.02	5,360.63	-504.84	-114.79	651,276.56	926,080.61	32.784°N	103.081°W
5,700.00	75.19	185.95	5,393.86	-598.12	-127.78	651,183.28	926,067.62	32.784°N	103.081°W
5,800.00	84.50	182.23	5,411.48	-696.18	-134.75	651,085.22	926,060.66	32.784°N	103.082°W
5,804.94	84.96	182.05	5,411.94	-701.09	-134.93	651,080.31	926,060.47	32.784°N	103.082°W
Commander 2H FTP									
5,805.04	84.97	182.04	5,411.95	-701.20	-134.93	651,080.21	926,060.47	32.784°N	103.082°W
5805°MD: FTP									
5,878.52	91.82	179.39	5,414.00	-774.60	-135.85	651,006.81	926,059.55	32.783°N	103.082°W
5879°MD: End of Build w/91.82° Incl.									
5,900.00	91.82	179.39	5,413.32	-796.06	-135.62	650,985.35	926,059.78	32.783°N	103.082°W
5,948.04	91.82	179.39	5,411.80	-844.07	-135.11	650,937.34	926,060.29	32.783°N	103.082°W
6,000.00	91.82	179.39	5,410.15	-896.00	-134.55	650,885.40	926,060.85	32.783°N	103.082°W
6,100.00	91.82	179.39	5,406.97	-995.95	-133.49	650,785.46	926,061.91	32.783°N	103.082°W
6,200.00	91.82	179.39	5,403.80	-1,095.89	-132.43	650,685.52	926,062.97	32.783°N	103.082°W
6,300.00	91.82	179.39	5,400.62	-1,195.84	-131.36	650,585.57	926,064.04	32.782°N	103.082°W
6,400.00	91.82	179.39	5,397.45	-1,295.78	-130.30	650,485.63	926,065.10	32.782°N	103.082°W
6,500.00	91.82	179.39	5,394.27	-1,395.72	-129.23	650,385.68	926,066.17	32.782°N	103.082°W
6,600.00	91.82	179.39	5,391.09	-1,495.67	-128.17	650,285.74	926,067.23	32.781°N	103.082°W
6,700.00	91.82	179.39	5,387.92	-1,595.61	-127.11	650,185.80	926,068.29	32.781°N	103.082°W
6,800.00	91.82	179.39	5,384.74	-1,695.56	-126.04	650,085.85	926,069.36	32.781°N	103.082°W
6,900.00	91.82	179.39	5,381.57	-1,795.50	-124.98	649,985.91	926,070.42	32.781°N	103.082°W
7,000.00	91.82	179.39	5,378.39	-1,895.44	-123.91	649,885.97	926,071.49	32.780°N	103.082°W
7,100.00	91.82	179.39	5,375.21	-1,995.39	-122.85	649,786.02	926,072.55	32.780°N	103.082°W
7,200.00	91.82	179.39	5,372.04	-2,095.33	-121.79	649,686.08	926,073.62	32.780°N	103.082°W
7,300.00	91.82	179.39	5,368.86	-2,195.27	-120.72	649,586.13	926,074.68	32.779°N	103.082°W
7,400.00	91.82	179.39	5,365.69	-2,295.22	-119.66	649,486.19	926,075.74	32.779°N	103.082°W
7,500.00	91.82	179.39	5,362.51	-2,395.16	-118.59	649,386.25	926,076.81	32.779°N	103.082°W
7,600.00	91.82	179.39	5,359.33	-2,495.11	-117.53	649,286.30	926,077.87	32.779°N	103.082°W
7,700.00	91.82	179.39	5,356.16	-2,595.05	-116.47	649,186.36	926,078.94	32.778°N	103.082°W
7,800.00	91.82	179.39	5,352.98	-2,694.99	-115.40	649,086.42	926,080.00	32.778°N	103.082°W
7,900.00	91.82	179.39	5,349.81	-2,794.94	-114.34	648,986.47	926,081.06	32.778°N	103.082°W
8,000.00	91.82	179.39	5,346.63	-2,894.88	-113.27	648,886.53	926,082.13	32.778°N	103.082°W
8,100.00	91.82	179.39	5,343.45	-2,994.83	-112.21	648,786.58	926,083.19	32.777°N	103.082°W
8,200.00	91.82	179.39	5,340.28	-3,094.77	-111.14	648,686.64	926,084.26	32.777°N	103.082°W
8,300.00	91.82	179.39	5,337.10	-3,194.71	-110.08	648,586.70	926,085.32	32.777°N	103.082°W
8,400.00	91.82	179.39	5,333.93	-3,294.66	-109.02	648,486.75	926,086.38	32.776°N	103.082°W
8,500.00	91.82	179.39	5,330.75	-3,394.60	-107.95	648,386.81	926,087.45	32.776°N	103.082°W
8,600.00	91.82	179.39	5,327.57	-3,494.55	-106.89	648,286.87	926,088.51	32.776°N	103.082°W
8,700.00	91.82	179.39	5,324.40	-3,594.49	-105.82	648,186.92	926,089.58	32.776°N	103.082°W
8,800.00	91.82	179.39	5,321.22	-3,694.43	-104.76	648,086.98	926,090.64	32.775°N	103.082°W
8,900.00	91.82	179.39	5,318.05	-3,794.38	-103.70	647,987.04	926,091.70	32.775°N	103.082°W
9,000.00	91.82	179.39	5,314.87	-3,894.32	-102.63	647,887.09	926,092.77	32.775°N	103.082°W
9,100.00	91.82	179.39	5,311.69	-3,994.26	-101.57	647,787.15	926,093.83	32.775°N	103.082°W
9,200.00	91.82	179.39	5,308.52	-4,094.21	-100.50	647,687.20	926,094.90	32.774°N	103.082°W
9,300.00	91.82	179.39	5,305.34	-4,194.15	-99.44	647,587.26	926,095.96	32.774°N	103.082°W



Planning Report - Geographic

Database:	EDM 5000.14 Single User Db	Local Co-ordinate Reference:	Well Well #1
Company:	Hadaway Consulting & Eng. LLC	TVD Reference:	GL 3632' + 17' RKB @ 3649.00ft (Norton 2)
Project:	Joint Resources Co. - LEA Cnty, NM (NAD 83)	MD Reference:	GL 3632' + 17' RKB @ 3649.00ft (Norton 2)
Site:	Commander 2H	North Reference:	Grid
Well:	Well #1	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
9,400.00	91.82	179.39	5,302.17	-4,294.10	-98.38	647,487.32	926,097.03	32.774°N	103.082°W
9,500.00	91.82	179.39	5,298.99	-4,394.04	-97.31	647,387.37	926,098.09	32.773°N	103.082°W
9,600.00	91.82	179.39	5,295.81	-4,493.98	-96.25	647,287.43	926,099.15	32.773°N	103.082°W
9,700.00	91.82	179.39	5,292.64	-4,593.93	-95.18	647,187.49	926,100.22	32.773°N	103.082°W
9,800.00	91.82	179.39	5,289.46	-4,693.87	-94.12	647,087.54	926,101.28	32.773°N	103.082°W
9,900.00	91.82	179.39	5,286.29	-4,793.82	-93.06	646,987.60	926,102.35	32.772°N	103.082°W
10,000.00	91.82	179.39	5,283.11	-4,893.76	-91.99	646,887.65	926,103.41	32.772°N	103.082°W
10,100.00	91.82	179.39	5,279.93	-4,993.70	-90.93	646,787.71	926,104.47	32.772°N	103.082°W
10,200.00	91.82	179.39	5,276.76	-5,093.65	-89.86	646,687.77	926,105.54	32.772°N	103.082°W
10,300.00	91.82	179.39	5,273.58	-5,193.59	-88.80	646,587.82	926,106.60	32.771°N	103.082°W
10,400.00	91.82	179.39	5,270.41	-5,293.54	-87.73	646,487.88	926,107.67	32.771°N	103.082°W
10,500.00	91.82	179.39	5,267.23	-5,393.48	-86.67	646,387.94	926,108.73	32.771°N	103.082°W
10,600.00	91.82	179.39	5,264.05	-5,493.42	-85.61	646,287.99	926,109.79	32.770°N	103.082°W
10,700.00	91.82	179.39	5,260.88	-5,593.37	-84.54	646,188.05	926,110.86	32.770°N	103.082°W
10,800.00	91.82	179.39	5,257.70	-5,693.31	-83.48	646,088.11	926,111.92	32.770°N	103.082°W
10,896.14	91.82	179.39	5,255.00	-5,789.41	-82.50	645,992.00	926,112.90	32.770°N	103.082°W

10896'MD: LTP/PBHL - Commander 2H PBHL/LTP

Design Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
Commander 2H PBHL	0.00	0.07	5,255.00	-5,789.41	-82.50	645,992.00	926,112.90	32.770°N	103.082°W
- plan hits target center									
- Point									
Commander 2H FTP	0.00	0.07	5,410.00	-701.20	-136.80	651,080.20	926,058.60	32.784°N	103.082°W
- plan misses target center by 2.70ft at 5804.94ft MD (5411.94 TVD, -701.10 N, -134.93 E)									
- Point									

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
4,734.69	4,734.69	0.00	0.00	4735'MD: KOP - Begin Build 10° DLS
5,334.89	5,231.05	-279.25	-64.37	5335'MD: 60° Hold 200' Tangent
5,534.89	5,331.05	-448.03	-103.27	5535'MD: Resume Build/Turn 10° DLS
5,805.04	5,411.95	-701.20	-134.93	5805'MD: FTP
5,878.52	5,414.00	-774.60	-135.85	5879'MD: End of Build w/91.82° Incl.
10,896.14	5,255.00	-5,789.41	-82.50	10896'MD: LTP/PBHL