



Project: Lea Co., NM (NAD 83)
 Site: Sec 21-T9S-R35E
 Well: Sodbuster 21 FEE #4H
 Wellbore: HZ [240537]
 Design: FINAL



Azimuths to Grid North
 True North: -0.53°
 Magnetic North: 6.40°

Magnetic Field
 Strength: 48802.1 nT
 Dip Angle: 61.30°
 Date: 3/31/2017
 Model: HDGM

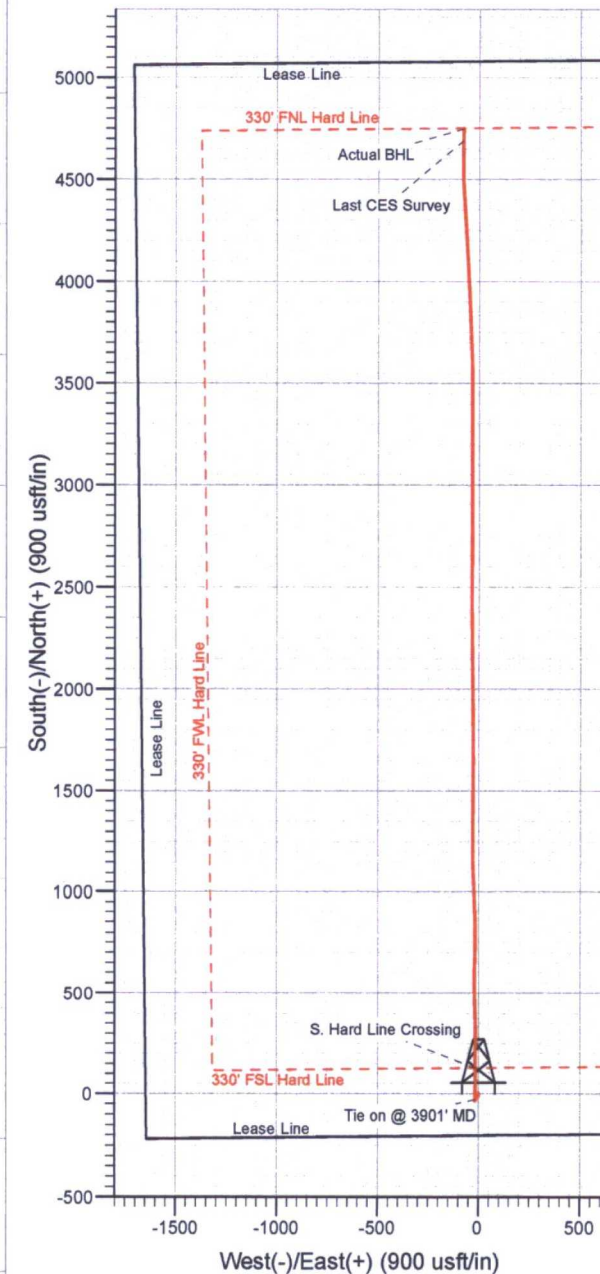
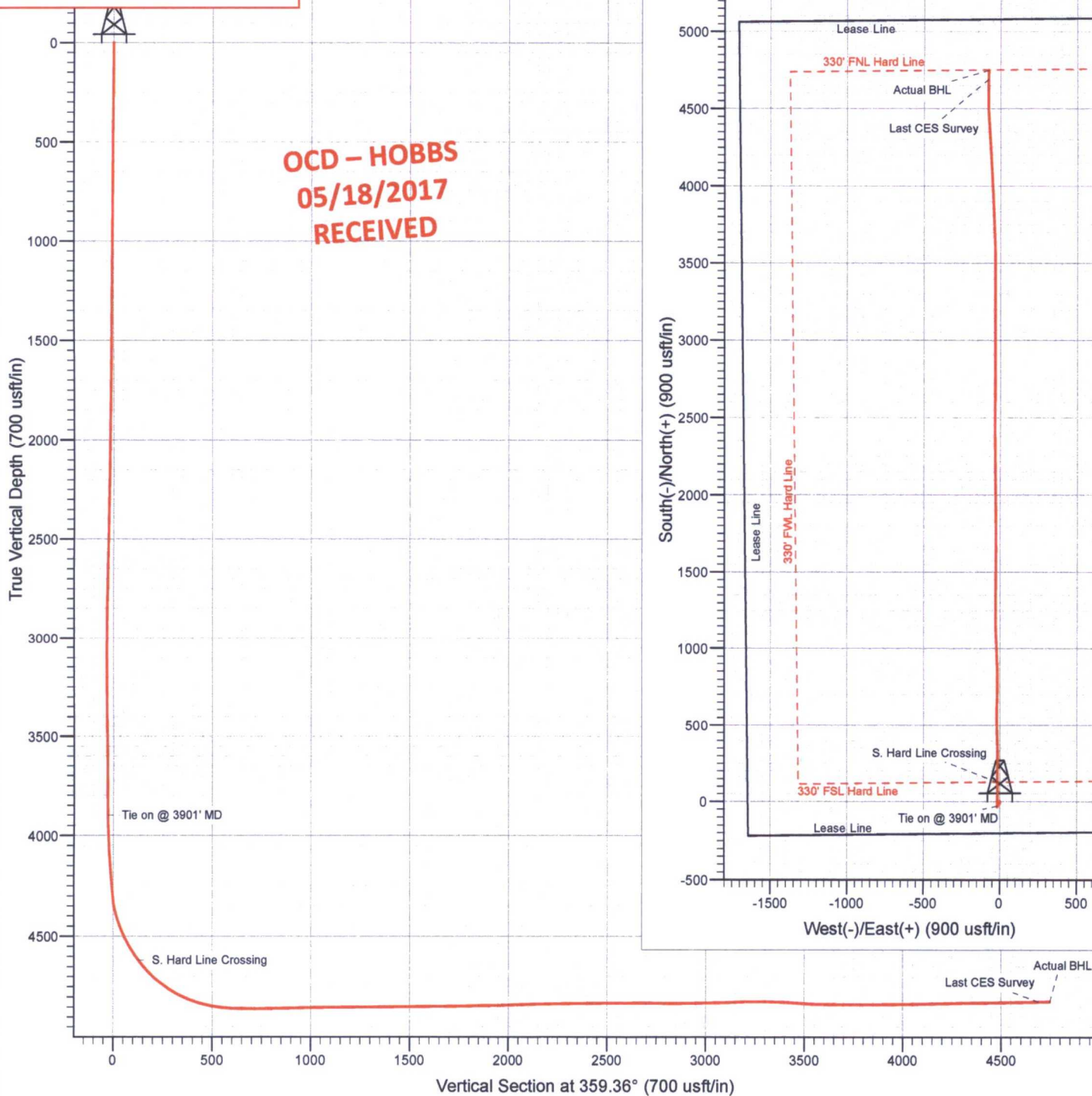
+N/-S	+E/-W	Northing	Ground Level: Easting	Latitude	Longitude
0.00	0.00	915554.90	835306.30	33.513005	-103.368855

ANNOTATIONS

TVD	MD	Inc	Azi	+N/-S	+E/-W	Vsect	Annotation
3901.00	3901.40	0.60	28.00	-27.96	-16.20	-27.77	Tie on @ 3901' MD
4618.58	4650.00	36.88	0.65	127.46	-16.56	127.64	S. Hard Line Crossing
4823.70	9292.00	91.40	0.90	4691.15	-77.85	4691.73	Last CES Survey
4822.33	9348.00	91.40	0.90	4747.13	-76.97	4747.70	Actual BHL

Actual Bottom Hole Location
 332' FNL / 1625' FWL
 X:835229.33 Y:920302.03

**OCD - HOBBS
 05/18/2017
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Actual BHL
 Last CES Survey



Cathedral Energy Services

Survey Report



Company:	Manzano LLC	Local Co-ordinate Reference:	Well Sodbuster 21 FEE #4H
Project:	Lea Co., NM (NAD 83)	TVD Reference:	13' KB @ 4165.00usft (Norton #4)
Site:	Sec 21-T9S-R35E	MD Reference:	13' KB @ 4165.00usft (Norton #4)
Well:	Sodbuster 21 FEE #4H	North Reference:	Grid
Wellbore:	HZ [240537]	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments
1,328.40	0.50	261.00	1,328.33	-9.28	0.84	-9.29	1.29	-0.73	
1,423.40	1.30	223.00	1,423.32	-10.13	-0.30	-10.13	1.01	0.84	
1,518.40	1.00	228.00	1,518.30	-11.47	-1.65	-11.45	0.33	-0.32	
1,613.40	1.20	233.00	1,613.28	-12.63	-3.06	-12.59	0.23	0.21	
1,709.40	0.30	179.00	1,709.28	-13.48	-3.86	-13.44	1.10	-0.94	
1,804.40	0.70	218.00	1,804.27	-14.19	-4.22	-14.14	0.53	0.42	
1,935.00	1.20	202.00	1,934.85	-16.09	-5.22	-16.03	0.43	0.38	
1,995.40	1.00	251.00	1,995.24	-16.84	-5.95	-16.78	1.54	-0.33	
2,090.40	1.40	223.00	2,090.22	-17.96	-7.53	-17.88	0.74	0.42	
2,186.40	1.40	196.00	2,186.20	-19.95	-8.65	-19.85	0.68	0.00	
2,282.40	1.40	219.00	2,282.17	-21.99	-9.71	-21.88	0.58	0.00	
2,377.40	1.00	215.00	2,377.15	-23.57	-10.92	-23.44	0.43	-0.42	
2,472.40	1.20	219.00	2,472.13	-25.02	-12.02	-24.88	0.23	0.21	
2,567.40	1.20	222.00	2,567.11	-26.53	-13.31	-26.38	0.07	0.00	
2,663.40	1.20	196.00	2,663.09	-28.25	-14.26	-28.08	0.56	0.00	
2,758.40	1.20	214.00	2,758.07	-30.03	-15.09	-29.85	0.40	0.00	
2,854.40	1.10	205.00	2,854.05	-31.69	-16.04	-31.51	0.21	-0.10	
2,948.40	0.80	224.00	2,948.04	-32.98	-16.88	-32.79	0.46	-0.32	
3,044.40	0.30	221.00	3,044.03	-33.66	-17.51	-33.46	0.52	-0.52	
3,139.40	0.30	355.00	3,139.03	-33.60	-17.70	-33.40	0.58	0.00	
3,235.40	0.40	344.00	3,235.03	-33.02	-17.81	-32.82	0.13	0.10	
3,330.40	0.10	272.00	3,330.03	-32.70	-17.99	-32.50	0.40	-0.32	
3,426.40	0.20	296.00	3,426.03	-32.63	-18.22	-32.42	0.12	0.10	
3,520.40	0.70	11.00	3,520.03	-31.99	-18.26	-31.78	0.72	0.53	
3,617.40	0.80	23.00	3,617.02	-30.79	-17.88	-30.58	0.19	0.10	
3,712.40	0.70	31.00	3,712.01	-29.68	-17.32	-29.48	0.15	-0.11	
3,806.40	0.60	37.00	3,806.00	-28.79	-16.73	-28.60	0.13	-0.11	
3,901.40	0.60	28.00	3,901.00	-27.96	-16.20	-27.77	0.10	0.00	Tie on @ 3901' MD
3,979.00	2.40	351.60	3,978.57	-25.99	-16.24	-25.81	2.51	2.32	
4,075.00	3.90	5.80	4,074.42	-20.75	-16.21	-20.57	1.75	1.56	
4,170.00	4.80	12.10	4,169.15	-13.65	-15.05	-13.48	1.07	0.95	
4,265.00	4.90	353.10	4,263.81	-5.74	-14.70	-5.57	1.69	0.11	
4,297.00	4.90	353.70	4,295.70	-3.02	-15.02	-2.85	0.16	0.00	
4,329.00	7.10	352.60	4,327.52	0.30	-15.42	0.47	6.88	6.87	
4,361.00	11.70	357.40	4,359.08	5.50	-15.82	5.68	14.57	14.37	
4,392.00	15.90	0.70	4,389.18	12.89	-15.91	13.07	13.78	13.55	
4,424.00	18.90	4.40	4,419.71	22.45	-15.46	22.62	9.99	9.37	
4,456.00	21.00	4.50	4,449.79	33.33	-14.62	33.49	6.56	6.56	
4,488.00	23.20	1.00	4,479.44	45.35	-14.06	45.51	8.01	6.87	
4,520.00	25.80	359.60	4,508.56	58.62	-13.99	58.77	8.32	8.12	
4,552.00	29.90	356.80	4,536.85	73.55	-14.49	73.71	13.45	12.81	
4,583.00	32.40	355.40	4,563.37	89.55	-15.59	89.72	8.40	8.06	
4,615.00	34.30	358.70	4,590.11	107.11	-16.48	107.29	8.21	5.94	
4,647.00	36.60	0.60	4,616.17	125.67	-16.58	125.85	7.97	7.19	
4,650.00	36.88	0.65	4,618.58	127.46	-16.56	127.64	9.42	9.37	S. Hard Line Crossing
4,679.00	39.60	1.10	4,641.35	145.41	-16.29	145.58	9.42	9.38	
4,710.00	41.90	2.00	4,664.84	165.63	-15.74	165.80	7.66	7.42	
4,742.00	45.30	1.60	4,688.01	187.69	-15.04	187.85	10.66	10.62	
4,774.00	49.50	0.30	4,709.66	211.23	-14.66	211.39	13.46	13.12	
4,806.00	52.40	359.30	4,729.82	236.08	-14.75	236.23	9.38	9.06	
4,838.00	54.80	358.80	4,748.81	261.83	-15.18	261.99	7.60	7.50	
4,869.00	58.20	359.40	4,765.92	287.68	-15.59	287.83	11.09	10.97	
4,901.00	61.40	0.30	4,782.01	315.33	-15.66	315.48	10.29	10.00	



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9,348.00	91.40	0.90	4,822.33	4,747.13	-76.97	4,747.70	0.00	0.00	Actual BHL

Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
P3 PBHL - Sodbuster 2'	0.00	0.00	4,829.50	4,750.40	-53.40	920,305.30	835,252.90	33.526060	-103.368886
- actual wellpath misses target center by 24.85usft at 9348.00usft MD (4822.33 TVD, 4747.13 N, -76.97 E)									
- Point									

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
3,901.40	3,901.00	-27.96	-16.20	Tie on @ 3901' MD	
4,650.00	4,618.58	127.46	-16.56	S. Hard Line Crossing	
9,292.00	4,823.70	4,691.15	-77.85	Last CES Survey	
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Checked By: _____ Approved By: _____ Date: _____