

Scientific Drilling



MARATHON OIL COMPANY

Field: Grisham Ranch

Site: Lea County, NM

Well: Palimentos ~~Dunes~~ 17 St. Com #1

Wellpath: OH - Job #32K0799182

Survey: Palimentos Dunes 17 #1

17 - 17s - 36e

SUR: 1650/N & 1650/E Unit C

Aloka = BHL: 1125/N & 2076/E Unit B

30-025-34652

San Andres = BHL 1641/N & 1661/E

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

David Novely Company Representative

SCIENTIFIC DRILLING

SURVEY REPORT

Company: MARATHON OIL COMPANY	Date: 7/29/1999	Time: 16:19:12	Page: 1
Field: Grisham Ranch	Co-ordinate(NE) Reference:	Site: Lea County, NM, True North	
Site: Lea County, NM	Vertical (TVD) Reference:	SITE 0.0 above Mean Sea Level	
Well: Palimentos Dunes 17 St C	Section (VS) Reference:	Slot (0.0E,0.0N,0.0Az)	
Wellpath: OH - Job #32K0799182	Survey Calculation Method:	Minimum Curvature	

Survey: Palimentos Dunes 17 #1 **Start Date:** 7/29/1999
 KSRG 0-4820

Company: S.D.I. **Engineer:** Jon Valenzuela
Tool: Keeper

Survey

MD ft	Incl deg	Azim deg	TVD ft	N/S ft	E/W ft	VS ft	DLS d/100ft	CtsA deg	CtsD ft
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.0
100.0	0.72	70.01	100.0	0.2	0.6	0.2	0.72	70.01	0.6
200.0	0.40	92.27	200.0	0.4	1.5	0.4	0.38	74.79	1.6
300.0	0.49	105.99	300.0	0.3	2.3	0.3	0.14	82.93	2.3
400.0	0.43	92.72	400.0	0.1	3.1	0.1	0.12	87.23	3.1
500.0	0.28	108.48	500.0	0.1	3.7	0.1	0.18	89.17	3.7
600.0	0.37	83.29	600.0	0.0	4.2	0.0	0.17	89.82	4.2
700.0	0.25	108.73	700.0	0.0	4.8	0.0	0.18	90.23	4.8
800.0	0.11	102.53	800.0	-0.1	5.1	-0.1	0.14	91.24	5.1
900.0	0.11	150.46	900.0	-0.2	5.2	-0.2	0.09	92.36	5.2
1000.0	0.14	171.00	1000.0	-0.4	5.3	-0.4	0.05	94.54	5.3
1100.0	0.07	228.08	1100.0	-0.6	5.2	-0.6	0.12	96.31	5.3
1200.0	0.15	310.25	1200.0	-0.5	5.1	-0.5	0.16	96.00	5.1
1300.0	0.15	324.25	1300.0	-0.3	4.9	-0.3	0.04	94.01	4.9
1400.0	0.20	276.02	1400.0	-0.2	4.7	-0.2	0.15	92.70	4.7
1500.0	0.30	288.73	1500.0	-0.1	4.2	-0.1	0.11	91.59	4.3
1600.0	0.28	247.69	1600.0	-0.1	3.8	-0.1	0.20	91.92	3.8
1700.0	0.29	288.49	1700.0	-0.1	3.3	-0.1	0.20	92.41	3.3
1800.0	0.32	278.21	1800.0	0.0	2.8	0.0	0.06	90.39	2.8
1900.0	0.49	268.30	1900.0	0.0	2.1	0.0	0.18	89.78	2.1
2000.0	0.30	294.69	2000.0	0.1	1.4	0.1	0.26	85.80	1.4
2100.0	0.36	282.35	2100.0	0.3	0.9	0.3	0.09	72.27	0.9
2200.0	0.24	273.36	2200.0	0.4	0.4	0.4	0.13	45.23	0.5
2300.0	0.18	318.68	2300.0	0.5	0.1	0.5	0.17	5.91	0.5
2400.0	0.07	208.18	2400.0	0.6	-0.1	0.6	0.21	351.62	0.6
2500.0	0.23	318.02	2500.0	0.7	-0.2	0.7	0.26	339.37	0.7
2600.0	0.30	344.76	2600.0	1.1	-0.4	1.1	0.14	336.94	1.1
2700.0	0.33	3.50	2700.0	1.6	-0.5	1.6	0.11	342.59	1.7
2800.0	0.60	2.59	2800.0	2.4	-0.5	2.4	0.27	349.21	2.4
2900.0	1.00	14.80	2899.9	3.8	-0.2	3.8	0.43	356.79	3.8
3000.0	1.55	20.79	2999.9	5.9	0.5	5.9	0.57	4.78	5.9
3100.0	1.58	20.22	3099.9	8.4	1.4	8.4	0.03	9.74	8.6
3200.0	1.19	11.08	3199.9	10.7	2.1	10.7	0.45	11.18	11.0
3300.0	1.34	12.53	3299.8	12.9	2.6	12.9	0.15	11.29	13.2
3400.0	1.24	7.62	3399.8	15.1	3.0	15.1	0.15	11.13	15.4
3500.0	1.16	357.99	3499.8	17.2	3.1	17.2	0.22	10.16	17.5
3600.0	1.18	352.42	3599.8	19.2	2.9	19.2	0.12	8.60	19.5
3700.0	1.29	338.21	3699.7	21.3	2.4	21.3	0.32	6.31	21.4
3800.0	1.27	343.36	3799.7	23.4	1.6	23.4	0.12	3.96	23.5
3900.0	1.05	339.52	3899.7	25.3	1.0	25.3	0.23	2.23	25.4
4000.0	1.28	321.13	3999.7	27.1	0.0	27.1	0.44	359.92	27.1
4100.0	1.38	319.04	4099.6	28.8	-1.5	28.8	0.11	356.97	28.9
4200.0	1.33	311.12	4199.6	30.5	-3.2	30.5	0.19	354.03	30.7
4300.0	1.09	307.64	4299.6	31.9	-4.8	31.9	0.25	351.40	32.2
4400.0	0.91	307.54	4399.6	32.9	-6.2	32.9	0.18	349.33	33.5
4500.0	0.74	306.24	4499.6	33.8	-7.4	33.8	0.17	347.72	34.6
4600.0	0.72	306.49	4599.6	34.5	-8.4	34.5	0.02	346.37	35.5
4700.0	0.64	296.89	4699.6	35.2	-9.4	35.2	0.14	345.06	36.4

IDENTIFIC DRILLING

SURVEY REPORT

Company: MARATHON OIL COMPANY	Date: 7/29/1999	Time: 16:19:12	Page: 2
Field: Grisham Ranch	Co-ordinate(NE) Reference:	Site: Lea County, NM, True North	
Site: Lea County, NM	Vertical (TVD) Reference:	SITE 0.0 above Mean Sea Level	
Well: Palmentos Dunes 17 St. C	Section (VS) Reference:	Slot (0.0E,0.0N,0.0Azi)	
Wellpath: OH - Job #32K0799182	Survey Calculation Method:	Minimum Curvature	

Survey

MD	Incl	Azim	TVD	N/S	E/W	VS	DLS	CkA	CkD
ft	deg	deg	ft	ft	ft	ft	d/100ft	deg	ft
4800.0	0.48	290.01	4799.6	35.6	-10.3	35.6	0.17	343.89	37.0
4820.0	0.71	272.80	4819.6	35.6	-10.5	35.6	1.44	343.60	37.1



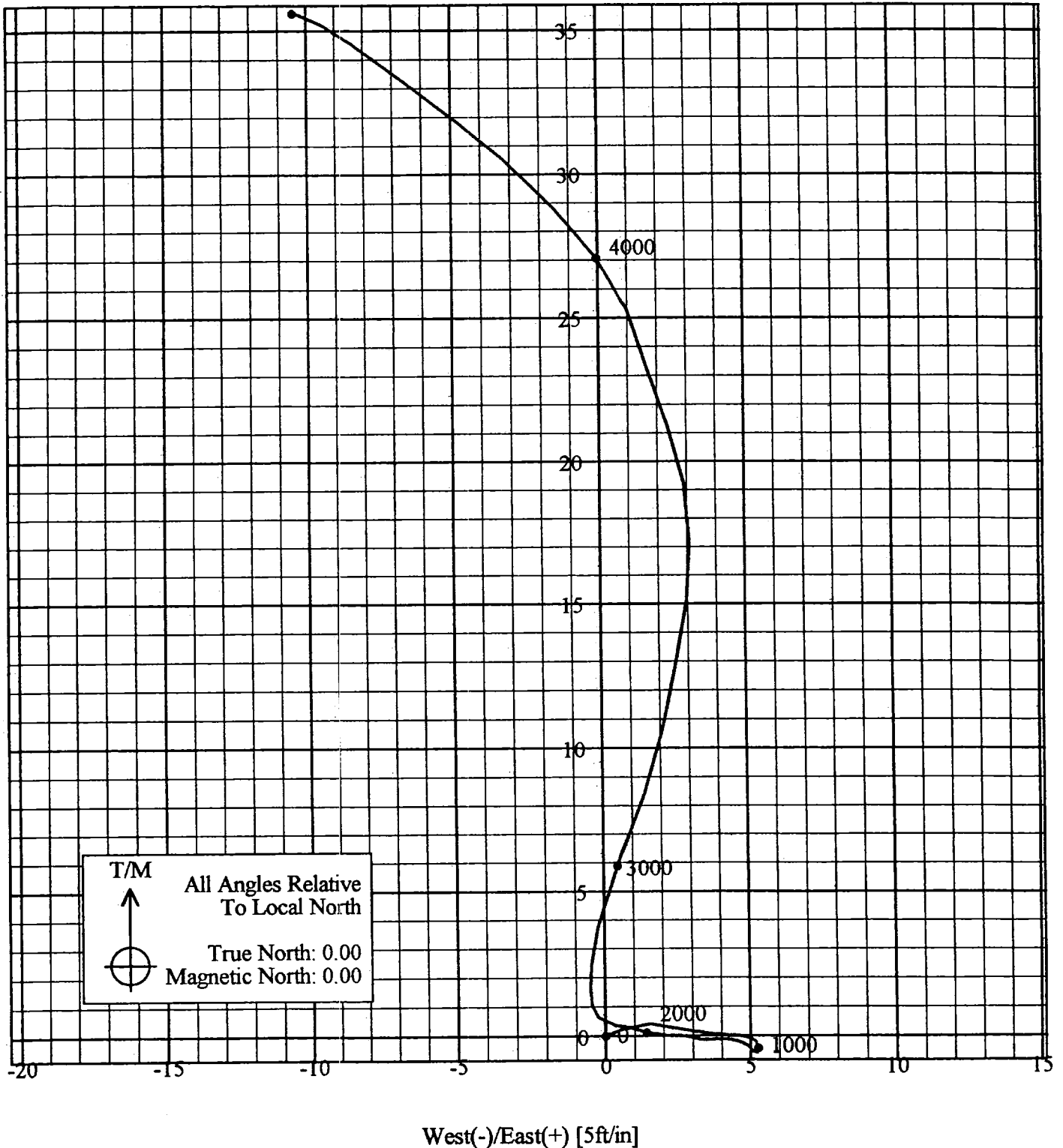
**Scientific
Drilling**

MARATHON OIL COMPANY

Field: Grisham Ranch
Site: Lea County, NM
Well: Palimentos Dunes 17 St. Com #1
Wellpath: OH - Job #32K0799182
Survey: Palimentos Dunes 17 #1



South(-)/North(+) [5ft/in]



* * * N A U T I C A L (V e r s i o n 4 . 0) * * *

Well: Palmetto Dunes *17* St. Com. #1

Target Azimuth: 320.71
Target TVD: 12200

Closure Direction: 321

Calculation Method - Minimum Curvature

Measured Depth (ft)	Inclination (deg.)	Azimuth (deg.)	True Vertical Depth (ft)	Vertical Section (ft)	North/South (ft)	East/West (ft)	Closure (ft)	Build Rate (deg/ft)	Walk Rate (deg/ft)	Dogleg Severity (d/100')	Tool Face (deg)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	<==== Tie-in Data				
100.00	0.72	70.01	100.00	-0.21	0.21	0.59	0.63	0.007	0.700	0.72	
200.00	0.40	92.27	199.99	-0.65	0.42	1.53	1.59	-0.003	0.223	0.38	
300.00	0.49	105.99	299.99	-1.23	0.28	2.29	2.31	0.001	0.137	0.14	
400.00	0.43	92.72	399.99	-1.83	0.15	3.08	3.08	-0.001	-0.133	0.12	
500.00	0.28	108.48	499.98	-2.29	0.05	3.68	3.68	-0.002	0.158	0.18	
600.00	0.37	83.29	599.98	-2.67	0.01	4.23	4.23	0.001	-0.252	0.17	
700.00	0.25	108.73	699.98	-3.03	-0.02	4.76	4.76	-0.001	0.254	0.18	
800.00	0.11	102.53	799.98	-3.29	-0.11	5.06	5.06	-0.001	-0.062	0.14	
900.00	0.11	150.46	899.98	-3.46	-0.21	5.20	5.21	0.000	0.479	0.09	
1,000.00	0.14	171.00	999.98	-3.66	-0.42	5.27	5.29	0.000	0.205	0.05	
1,100.00	0.07	228.08	1,099.98	-3.77	-0.58	5.24	5.28	-0.001	0.571	0.12	
1,200.00	0.15	310.25	1,199.98	-3.64	-0.54	5.10	5.13	0.001	0.822	0.16	
1,300.00	0.15	324.25	1,299.98	-3.38	-0.35	4.92	4.93	0.000	0.140	0.04	
1,400.00	0.20	276.02	1,399.98	-3.13	-0.22	4.67	4.68	0.001	-0.482	0.15	
1,500.00	0.30	288.73	1,499.98	-2.78	-0.12	4.25	4.25	0.001	0.127	0.11	
1,600.00	0.28	247.69	1,599.98	-2.49	-0.13	3.78	3.78	0.000	-0.410	0.20	
1,700.00	0.29	288.49	1,699.98	-2.20	-0.14	3.31	3.31	0.000	0.408	0.20	
1,800.00	0.32	278.21	1,799.97	-1.78	-0.02	2.79	2.79	0.000	-0.103	0.06	
1,900.00	0.49	268.30	1,899.97	-1.32	0.01	2.09	2.09	0.002	-0.099	0.18	
2,000.00	0.30	294.69	1,999.97	-0.82	0.10	1.42	1.43	-0.002	0.264	0.26	
2,100.00	0.36	282.35	2,099.97	-0.34	0.28	0.88	0.92	0.001	-0.123	0.09	
2,200.00	0.24	273.36	2,199.97	0.05	0.36	0.36	0.51	-0.001	-0.090	0.13	
2,300.00	0.18	318.68	2,299.97	0.35	0.49	0.05	0.49	-0.001	0.453	0.17	
2,400.00	0.07	208.18	2,399.97	0.48	0.56	-0.08	0.56	-0.001	-1.105	0.21	
2,500.00	0.23	318.02	2,499.97	0.66	0.65	-0.24	0.69	0.002	1.098	0.26	
2,600.00	0.30	344.76	2,599.96	1.10	1.05	-0.45	1.14	0.001	0.267	0.14	
2,700.00	0.33	3.50	2,699.96	1.55	1.59	-0.50	1.67	0.000	0.187	0.11	
2,800.00	0.60	2.59	2,799.96	2.15	2.40	-0.46	2.45	0.003	-0.009	0.27	
2,900.00	1.00	14.80	2,899.95	3.05	3.77	-0.21	3.78	0.004	0.122	0.43	
3,000.00	1.55	20.79	2,999.92	4.24	5.88	0.49	5.90	0.006	0.060	0.57	
3,100.00	1.58	20.22	3,099.89	5.61	8.44	1.45	8.56	0.000	-0.006	0.03	
3,200.00	1.19	11.08	3,199.86	6.97	10.75	2.12	10.96	-0.004	-0.091	0.45	
3,300.00	1.34	12.53	3,299.83	8.36	12.91	2.58	13.16	0.002	0.015	0.15	
3,400.00	1.24	7.62	3,399.81	9.82	15.12	2.97	15.41	-0.001	-0.049	0.15	
3,500.00	1.16	357.99	3,499.79	11.37	17.21	3.08	17.48	-0.001	-0.096	0.22	
3,600.00	1.18	352.42	3,599.77	13.05	19.24	2.91	19.46	0.000	-0.056	0.12	
3,700.00	1.29	338.21	3,699.74	15.00	21.30	2.36	21.43	0.001	-0.142	0.32	
3,800.00	1.27	343.36	3,799.72	17.09	23.41	1.62	23.47	0.000	0.052	0.12	
3,900.00	1.05	339.52	3,899.70	18.98	25.33	0.98	25.35	-0.002	-0.038	0.23	
4,000.00	1.28	321.13	3,999.68	20.97	27.06	-0.04	27.06	0.002	-0.184	0.44	
4,100.00	1.38	319.04	4,099.65	23.29	28.84	-1.53	28.88	0.001	-0.021	0.11	
4,200.00	1.33	311.12	4,199.62	25.64	30.51	-3.19	30.68	0.000	-0.079	0.19	
4,300.00	1.09	307.64	4,299.60	27.71	31.86	-4.82	32.22	-0.002	-0.035	0.25	
4,400.00	0.91	307.54	4,399.58	29.41	32.92	-6.20	33.50	-0.002	-0.001	0.18	
4,500.00	0.74	306.24	4,499.57	30.80	33.79	-7.35	34.58	-0.002	-0.013	0.17	
4,600.00	0.72	306.49	4,599.57	32.04	34.54	-8.38	35.54	0.000	0.003	0.02	
4,700.00	0.64	296.89	4,699.56	33.16	35.17	-9.38	36.40	-0.001	-0.096	0.14	
4,800.00	0.48	290.01	4,799.55	34.03	35.56	-10.27	37.02	-0.002	-0.069	0.17	
4,820.00	0.71	272.80	4,819.55	34.18	35.60	-10.48	37.11	0.012	-0.860	1.44	
5,200.00	0.50	299.00	5,199.53	37.30	36.52	-14.28	39.21	-0.001	0.069	0.09	
5,459.00	1.00	329.00	5,458.51	40.59	39.00	-16.43	42.32	0.002	0.116	0.24	

* * * N A U T I C A L (V e r s i o n 4 . 0) * * *

Well: Palmetto Dunes "17" St. Com. #1

Target Azimuth: 320.71

Closure Direction: 321

Target TVD: 12200

Calculation Method - Minimum Curvature

Measured Depth (ft)	Inclination (deg.)	Azimuth (deg.)	True Vertical Depth (ft)	Vertical Section (ft)	North/South (ft)	East/West (ft)	Closure (ft)	Build Rate (deg/ft)	Walk Rate (deg/ft)	Dogleg Severity (d/100')	Tool Face (deg)
5,711.00	0.50	309.00	5,710.49	43.84	41.58	-18.42	45.48	-0.002	-0.079	0.22	
5,993.00	0.75	359.00	5,992.47	46.50	44.20	-19.40	48.27	0.001	0.177	0.20	
6,212.00	0.75	329.00	6,211.46	49.04	46.86	-20.17	51.02	0.000	-0.137	0.18	
6,681.00	0.75	24.00	6,680.42	53.46	52.30	-20.50	56.17	0.000	0.117	0.15	
6,932.00	1.00	344.00	6,931.39	56.21	55.90	-20.44	59.52	0.001	-0.159	0.26	
7,183.00	1.00	349.00	7,182.36	60.15	60.16	-21.46	63.87	0.000	0.020	0.03	
7,433.00	1.00	294.00	7,432.32	64.02	63.19	-23.87	67.54	0.000	-0.220	0.37	
7,714.00	1.50	309.00	7,713.26	69.81	66.50	-28.97	72.53	0.002	0.053	0.21	
7,960.00	1.25	294.00	7,959.19	75.36	69.62	-33.92	77.44	-0.001	-0.061	0.18	
8,211.00	1.25	334.00	8,210.13	80.47	73.19	-37.62	82.29	0.000	0.159	0.34	
8,461.00	2.00	309.00	8,460.03	87.39	78.39	-42.21	89.03	0.003	-0.100	0.41	
8,712.00	2.00	329.00	8,710.88	96.02	84.90	-47.87	97.46	0.000	0.080	0.28	
9,005.00	3.50	345.00	9,003.54	109.23	97.92	-52.81	111.25	0.005	-0.055	0.57	
9,039.00	4.30	339.00	9,037.46	111.39	100.11	-53.54	113.53	0.024	-0.176	2.64	
9,070.00	5.00	341.10	9,068.36	113.76	102.48	-54.39	116.02	0.023	0.068	2.32	
9,102.00	5.20	343.70	9,100.23	116.40	105.19	-55.25	118.81	0.006	0.081	0.95	
9,164.00	5.60	343.90	9,161.96	121.76	110.79	-56.88	124.54	0.006	0.003	0.65	
9,227.00	6.10	342.80	9,224.63	127.69	116.94	-58.72	130.86	0.008	-0.017	0.81	
9,322.00	6.80	335.70	9,319.03	137.80	126.89	-62.53	141.46	0.007	-0.075	1.12	
9,385.00	6.60	335.30	9,381.60	144.91	133.58	-65.58	148.81	-0.003	-0.006	0.33	
9,447.00	6.90	335.30	9,443.17	151.96	140.20	-68.62	156.09	0.005	0.000	0.48	
9,479.00	7.00	336.30	9,474.93	155.70	143.73	-70.21	159.96	0.003	0.031	0.49	
9,510.00	7.20	338.10	9,505.70	159.37	147.26	-71.69	163.79	0.006	0.058	0.96	
9,542.00	7.70	337.50	9,537.42	163.34	151.10	-73.26	167.93	0.016	-0.019	1.58	
9,573.00	8.10	335.20	9,568.13	167.44	155.00	-74.97	172.18	0.013	-0.074	1.64	
9,604.00	8.50	338.90	9,598.81	171.73	159.12	-76.71	176.65	0.013	0.119	2.15	
9,636.00	9.20	340.40	9,630.42	176.39	163.74	-78.42	181.55	0.022	0.047	2.30	
9,667.00	9.40	341.70	9,661.02	181.08	168.48	-80.05	186.53	0.006	0.042	0.94	
9,698.00	9.50	341.00	9,691.60	185.85	173.30	-81.68	191.58	0.003	-0.023	0.49	
9,730.00	9.70	340.80	9,723.15	190.86	178.34	-83.42	196.89	0.006	-0.006	0.63	
9,755.00	9.70	341.60	9,747.79	194.80	182.33	-84.78	201.08	0.000	0.032	0.54	
9,811.00	9.75	322.00	9,803.00	203.95	190.55	-89.19	210.39	0.001	-0.350	5.88	
9,937.00	9.50	323.00	9,927.23	225.01	207.26	-102.02	231.00	-0.002	0.008	0.24	
10,156.00	8.75	324.00	10,143.46	259.70	235.17	-122.68	265.25	-0.003	0.005	0.35	
10,250.00	8.50	320.00	10,236.39	273.78	246.27	-131.35	279.11	-0.003	-0.043	0.69	
10,408.00	9.25	318.00	10,392.50	298.14	264.66	-147.35	302.91	0.005	-0.013	0.51	
10,750.00	12.00	320.00	10,728.61	361.16	312.33	-188.61	364.86	0.008	0.006	0.81	
10,907.00	12.75	327.00	10,881.97	394.70	339.36	-208.54	398.31	0.005	0.045	1.07	
11,095.00	16.25	308.00	11,064.05	441.02	372.98	-240.59	443.85	0.019	-0.101	3.12	
11,189.00	17.75	307.00	11,153.94	467.78	389.71	-262.40	469.81	0.016	-0.011	1.63	
11,346.00	16.50	328.00	11,304.12	513.19	423.05	-293.36	514.81	-0.008	0.134	4.00	
11,408.00	15.00	322.00	11,363.80	529.94	436.84	-302.96	531.62	-0.024	-0.097	3.57	
11,503.00	15.00	317.00	11,455.56	554.50	455.52	-318.92	556.06	0.000	-0.053	1.36	
11,597.00	15.25	316.00	11,546.31	578.96	473.31	-335.80	580.33	0.003	-0.011	0.38	
11,670.00	15.00	317.00	11,616.78	597.96	487.12	-348.91	599.19	-0.003	0.014	0.50	
11,764.00	12.00	307.00	11,708.18	619.60	501.91	-365.02	620.61	-0.032	-0.106	4.03	
11,858.00	9.50	312.00	11,800.53	636.76	512.98	-378.59	637.56	-0.027	0.053	2.84	
11,953.00	4.00	307.00	11,894.83	647.74	520.23	-387.07	648.43	-0.058	-0.053	5.82	
12,078.00	5.50	317.00	12,019.40	657.95	527.23	-394.64	658.57	0.012	0.080	1.37	
12,141.00	4.50	297.00	12,082.17	663.23	530.56	-398.90	663.79	-0.016	-0.317	3.17	
12,213.00	3.50	282.00	12,153.99	667.53	532.30	-403.57	667.99	-0.014	-0.208	2.00	
12,329.00	3.25	272.00	12,269.79	672.46	533.15	-410.32	672.76	-0.002	-0.086	0.55	

* * * N A U T I C A L (V e r s i o n 4 . 0) * * *

Well: Palmetto Dunes "17" St. Com. #1

Target Azimuth: 320.71
Target TVD: 12200

Closure Direction: 321

Calculation Method - Minimum Curvature

Measured Depth (ft)	Inclination (deg.)	Azimuth (deg.)	True Vertical Depth (ft)	Vertical Section (ft)	North/ South (ft)	East/ West (ft)	Closure (ft)	Build Rate (deg/ft)	Walk Rate (deg/ft)	Dogleg Severity (d/100')	Tool Face (deg)
12,454.00	3.25	253.00	12,394.60	676.15	532.24	-417.25	676.29	0.000	-0.152	0.86	
12,547.00	3.75	233.00	12,487.43	677.27	529.64	-422.20	677.32	0.005	-0.215	1.41	
12,641.00	4.00	213.00	12,581.21	676.39	525.04	-426.44	676.40	0.003	-0.213	1.45	