Schlumberger

OXY

HOBBS OCD

NOV 20 2018

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Borehole:	Well:	Field:	Structure:
Original Borehole	Mesa Verde BS Unit 23H	NM Lea County (NAD 83)	Oxy Mesa Verde BS Unit 23H

Gravity & Magnetic Parameters

Model: HDGM 2018 Dip: 59.908° Date: 10-Sep-2018
MagDec: 6.783° FS: 47966.876nT Gravity FS: 998.432mgn (9.80665 Based)

Surface Location NAD83 New Mexico State Plane, Eastern Zone, US Feet

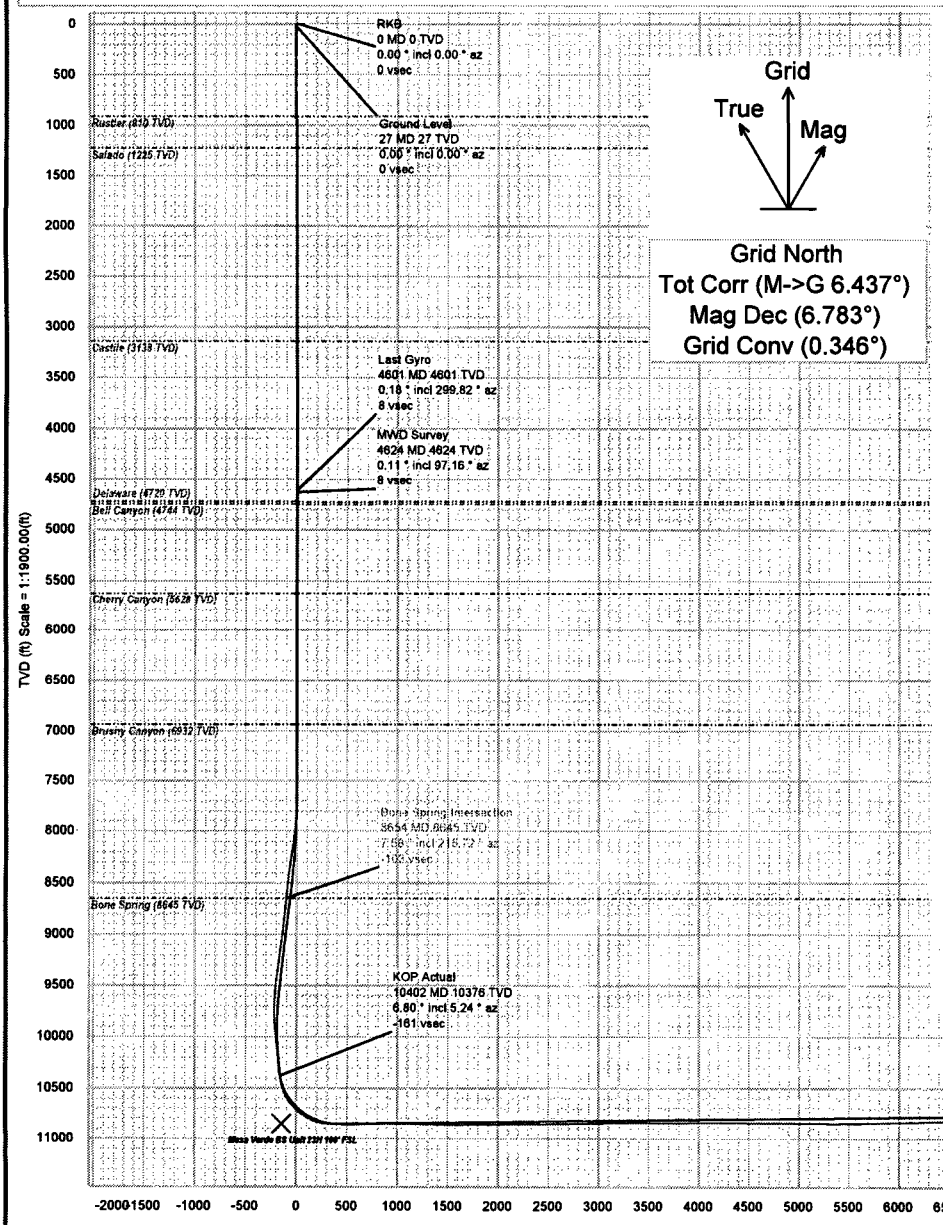
Lat: N 32 12 39.43 Northing: 441084.94ftUS Grid Conv: 0.3461°
Lon: W 103 41 2.87 Easting: 742122.66ftUS Scale Fact: 0.99996526

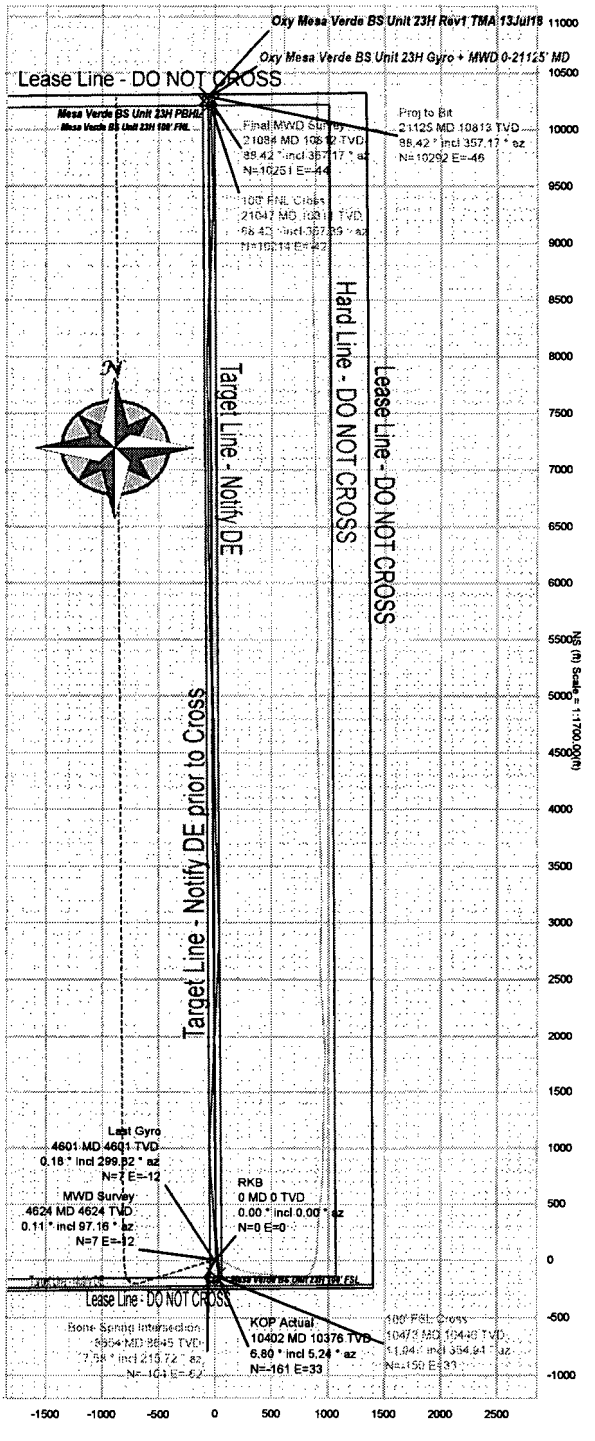
Miscellaneous

Slot: Mesa Verde BS Unit 23H TVD Ref: RKB=26.5'(3594.7ft above MSL)
Plan: Oxy Mesa Verde BS Unit 23H Gyro + MWD 0-21125' MD

Critical Points

Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLS
RKB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Ground Level	26.50	0.00	0.00	26.50	0.00	0.00	0.00	0.00
Last Gyro	4601.00	0.18	299.82	4600.92	7.54	7.47	-11.73	0.05
MWD Survey	4624.00	0.11	97.16	4623.92	7.56	7.49	-11.74	1.24
Bone Spring Intersection	8654.00	7.58	215.72	8645.31	-103.34	-103.71	-62.05	0.91
KOP Actual	10402.00	6.80	5.24	10375.73	-160.85	-160.65	33.08	1.12
100' FSL Cross	10473.00	11.04	354.84	10445.86	-149.88	-149.69	32.86	6.37
100' FNL Cross	21047.00	88.42	357.89	10810.55	10214.10	10214.03	-42.36	1.95
Final MWD Survey	21084.00	88.42	357.17	10811.57	10251.06	10250.98	-43.96	1.95
Proj to Bit	21125.00	88.42	357.17	10812.70	10292.01	10291.92	-45.98	0.01





Vertical Section (ft) Azim = 359.66° Scale = 1:1900.00(ft) Origin = 0N/-S, 0E/-W

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Oxy Mesa Verde BS Unit 23H Gyro + MWD 0-21125' MD Survey Geodetic Report

(Def Survey)

Report Date:	September 11, 2018 - 04:52 PM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	OXY	**Vertical Section Azimuth:**	359.660 ° (Grid North)
Field:	NM Lea County (NAD 83)	**Vertical Section Origin:**	0.000 ft, 0.000 ft
Structure / Slot:	Oxy Mesa Verde BS Unit 23H / Mesa Verde BS Unit 23H	**TVD Reference Datum:**	RKB=26.5'
Well:	Mesa Verde BS Unit 23H	**TVD Reference Elevation:**	3594.700 ft above MSL
Borehole:	Original Borehole	**Seabed / Ground Elevation:**	3568.200 ft above MSL
UWI / API#:	Unknown / Unknown	**Magnetic Declination:**	6.783 °
Survey Name:	Oxy Mesa Verde BS Unit 23H Gyro + MWD 0-21125' MD	**Total Gravity Field Strength:**	998.4319mgn (9.80665 Based)
Survey Date:	September 10, 2018	**Gravity Model:**	GARM
Tort / AHD / DDI / ERD Ratio:	281.492 ° / 10850.983 ft / 6.774 / 0.999	**Total Magnetic Field Strength:**	47965.876 nT
Coordinate Reference System:	NAD83 New Mexico State Plane, Eastern Zone, US Feet	**Magnetic Dip Angle:**	59.908 °
Location Lat / Long:	N 32° 12' 39.42888", W 103° 41' 2.86648"	**Declination Date:**	September 10, 2018
Location Grid N/E Y/X:	N 441084.940 ftUS, E 742122.660 ftUS	**Magnetic Declination Model:**	HDGM 2018
CRS Grid Convergence Angle:	0.3461 °	**North Reference:**	Grid North
Grid Scale Factor:	0.99995526	**Grid Convergence Used:**	0.3461 °
Version / Patch:	2.10.740.0	**Total Corr Mag North->Grid North:**	6.4371 °
		Local Coord Referenced To:	Well Head

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")	
RKB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	441084.94	742122.66	N 32 12 39.43	W 103 41	2.87
Ground Level	26.50	0.00	0.00	26.50	0.00	0.00	0.00	0.00	441084.94	742122.66	N 32 12 39.43	W 103 41	2.87
	51.08	0.49	260.18	51.08	-0.02	-0.02	-0.10	1.99	441084.92	742122.56	N 32 12 39.43	W 103 41	2.87
	145.87	0.99	264.42	145.86	-0.16	-0.17	-1.32	0.53	441084.77	742121.34	N 32 12 39.43	W 103 41	2.88
	240.66	0.97	272.14	240.64	-0.20	-0.22	-2.93	0.14	441084.72	742119.73	N 32 12 39.43	W 103 41	2.90
	335.45	0.87	266.33	335.42	-0.21	-0.23	-4.45	0.14	441084.71	742118.21	N 32 12 39.43	W 103 41	2.92
	430.24	0.81	268.96	430.20	-0.26	-0.29	-5.84	0.08	441084.65	742116.82	N 32 12 39.43	W 103 41	2.93
	525.03	0.67	280.92	524.98	-0.16	-0.20	-7.06	0.22	441084.74	742115.60	N 32 12 39.43	W 103 41	2.95
	619.82	0.53	299.98	619.76	0.17	0.13	-7.98	0.26	441085.07	742114.68	N 32 12 39.43	W 103 41	2.96
	714.61	0.46	319.46	714.55	0.69	0.63	-8.61	0.19	441085.57	742114.05	N 32 12 39.44	W 103 41	2.97
	809.40	0.46	326.82	809.34	1.30	1.24	-9.06	0.06	441086.18	742113.60	N 32 12 39.44	W 103 41	2.97
	904.19	0.49	344.74	904.12	2.01	1.95	-9.38	0.18	441086.89	742113.28	N 32 12 39.45	W 103 41	2.98
	998.98	0.37	340.93	998.91	2.69	2.63	-9.58	0.13	441087.57	742113.08	N 32 12 39.46	W 103 41	2.98
	1093.77	0.25	325.71	1093.70	3.15	3.09	-9.80	0.15	441088.03	742112.86	N 32 12 39.46	W 103 41	2.98
	1188.56	0.20	322.15	1188.49	3.45	3.39	-10.02	0.05	441088.33	742112.64	N 32 12 39.46	W 103 41	2.98
	1283.35	0.19	322.22	1283.28	3.71	3.65	-10.22	0.01	441088.59	742112.44	N 32 12 39.47	W 103 41	2.99
	1378.14	0.18	318.30	1378.07	3.95	3.88	-10.41	0.02	441088.82	742112.25	N 32 12 39.47	W 103 41	2.99
	1472.93	0.15	340.28	1472.86	4.17	4.11	-10.55	0.07	441089.05	742112.11	N 32 12 39.47	W 103 41	2.99
	1567.72	0.15	32.38	1567.65	4.40	4.33	-10.53	0.14	441089.27	742112.13	N 32 12 39.47	W 103 41	2.99
	1662.51	0.15	75.33	1662.44	4.53	4.47	-10.34	0.12	441089.41	742112.32	N 32 12 39.47	W 103 41	2.99
	1757.30	0.17	351.64	1757.23	4.70	4.64	-10.24	0.23	441089.58	742112.42	N 32 12 39.48	W 103 41	2.99
	1852.09	0.17	65.76	1852.02	4.90	4.84	-10.14	0.22	441089.78	742112.53	N 32 12 39.48	W 103 41	2.98
	1946.88	0.15	19.97	1946.80	5.07	5.01	-9.96	0.13	441089.95	742112.70	N 32 12 39.48	W 103 41	2.98
	2041.67	0.15	17.36	2041.59	5.30	5.25	-9.89	0.01	441090.19	742112.78	N 32 12 39.48	W 103 41	2.98
	2136.46	0.20	174.68	2136.38	5.26	5.20	-9.83	0.36	441090.14	742112.83	N 32 12 39.48	W 103 41	2.98
	2231.25	0.14	56.39	2231.17	5.16	5.10	-9.72	0.31	441090.04	742112.94	N 32 12 39.48	W 103 41	2.98
	2326.04	0.15	341.12	2325.96	5.34	5.28	-9.66	0.19	441090.22	742113.00	N 32 12 39.48	W 103 41	2.98
	2420.83	0.16	325.52	2420.75	5.57	5.51	-9.78	0.05	441090.45	742112.88	N 32 12 39.48	W 103 41	2.98
	2515.62	0.15	266.88	2515.54	5.67	5.61	-9.98	0.16	441090.55	742112.68	N 32 12 39.48	W 103 41	2.98
	2610.41	0.14	3.71	2610.33	5.78	5.72	-10.10	0.23	441090.66	742112.57	N 32 12 39.49	W 103 41	2.98
	2705.20	0.17	354.30	2705.12	6.03	5.97	-10.10	0.04	441090.91	742112.56	N 32 12 39.49	W 103 41	2.98
	2799.99	0.17	297.20	2799.91	6.24	6.18	-10.24	0.17	441091.12	742112.42	N 32 12 39.49	W 103 41	2.99
	2894.78	0.15	289.42	2894.70	6.35	6.28	-10.48	0.03	441091.22	742112.18	N 32 12 39.49	W 103 41	2.99
	2989.57	0.17	294.62	2989.49	6.45	6.38	-10.73	0.03	441091.32	742111.93	N 32 12 39.49	W 103 41	2.99
	3084.36	0.11	5.08	3084.28	6.60	6.53	-10.85	0.18	441091.47	742111.81	N 32 12 39.49	W 103 41	2.99
	3179.15	0.14	29.56	3179.07	6.79	6.72	-10.78	0.06	441091.66	742111.88	N 32 12 39.50	W 103 41	2.99
	3273.94	0.13	5.03	3273.86	7.00	6.93	-10.72	0.06	441091.87	742111.94	N 32 12 39.50	W 103 41	2.99
	3368.73	0.12	38.43	3368.65	7.18	7.12	-10.64	0.08	441092.06	742112.02	N 32 12 39.50	W 103 41	2.99
	3463.52	0.13	7.08	3463.44	7.36	7.30	-10.57	0.07	441092.24	742112.09	N 32 12 39.50	W 103 41	2.99
	3558.31	0.15	253.25	3558.23	7.44	7.37	-10.68	0.25	441092.31	742111.99	N 32 12 39.50	W 103 41	2.99
	3653.10	0.14	215.55	3653.02	7.31	7.24	-10.86	0.10	441092.18	742111.80	N 32 12 39.50	W 103 41	2.99
	3747.89	0.18	111.66	3747.81	7.16	7.09	-10.79	0.27	441092.03	742111.87	N 32 12 39.50	W 103 41	2.99
	3842.68	0.15	53.19	3842.60	7.18	7.11	-10.55	0.17	441092.05	742112.11	N 32 12 39.50	W 103 41	2.99
	3937.47	0.13	280.97	3937.39	7.27	7.21	-10.56	0.27	441092.15	742112.10	N 32 12 39.50	W 103 41	2.99
	4032.26	0.18	287.65	4032.18	7.34	7.27	-10.81	0.06	441092.21	742111.85	N 32 12 39.50	W 103 41	2.99
	4127.05	0.12	109.49	4126.97	7.35	7.29	-10.85	0.32	441092.22	742111.81	N 32 12 39.50	W 103 41	2.99
	4221.84	0.23	264.24	4221.76	7.30	7.23	-10.95	0.36	441092.17	742111.71	N 32 12 39.50	W 103 41	2.99
	4316.63	0.15	159.14	4316.55	7.18	7.10	-11.10	0.32	441092.04	742111.57	N 32 12 39.50	W 103 41	3.00
	4411.42	0.27	302.74	4411.34	7.17	7.10	-11.24	0.42	441092.04	742111.42	N 32 12 39.50	W 103 41	3.00
	4506.21	0.15	314.55	4506.13	7.38	7.31	-11.52	0.13	441092.25	742111.15	N 32 12 39.50	W 103 41	3.00
Last Gyro	4601.00	0.18	299.82	4600.92	7.54	7.47	-11.73	0.05	441092.41	742110.93	N 32 12 39.50	W 103 41	3.00
MWD Survey	4624.00	0.11	97.16	4623.92	7.56	7.49	-11.74	1.24	441092.43	742110.92	N 32 12 39.50	W 103 41	3.00
	4824.00	0.08	250.58	4823.92	7.48	7.41	-11.69	0.09	441092.35	742110.97	N 32 12 39.50	W 103 41	3.00
	4916.10	0.07	216.95	4916.02	7.42	7.35	-11.78	0.05	441092.29	742110.88	N 32 12 39.50	W 103 41	3.00
	4916.20	0.07	299.93	4916.12	7.42	7.35	-11.78	88.78	441092.29	742110.88	N 32 12 39.50	W 103 41	3.00
	4916.30	0.08	298.59	4916.22	7.42	7.35	-11.78	3.36	441092.29	742110.88	N 32 12 39.50	W 103 41	3.00
	4916.40	0.02	7.01	4916.32	7.42	7.35	-11.78	58.62	441092.29	742110.88	N 32 12 39.50	W 103 41	3.00
	4916.50	0.16	243.41	4916.42	7.42	7.35	-11.78	169.53	441092.29	742110.88	N 32 12 39.50	W 103 41	3.00
	4916.60	0.07	323.28	4916.52	7.42	7.35	-11.78	159.24	441092.29	742110.88	N 32 12 39.50	W 103 41	3.00
	4918.00	0.06	209.47	4917.92	7.42	7.35	-11.79	7.43	441092.29	742110.88	N 32 12 39.50	W 103 41	3.00
	4918.10	0.07	187.30	4918.02	7.42	7.35	-11.79	25.10	441092.29	742110.88	N 32 12 39.50	W 103 41	3.00
	4924.20	0.03	351.36	4924.12	7.42	7.35	-11.79	1.58	441092.29	742110.87	N 32 12 39.50	W 103 41	3.00
	4924.30	0.03	241.87	4924.22	7.42	7.35	-11.79	50.63	441092.29	742110.87	N 32 12 39.50	W 103 41	3.00
	4924.40	0.03	235.54	4924.32	7.42	7.35	-11.79	3.42	441092.29	742110.87	N 32 12 39.50	W 103 41	3.00
	4924.60	0.03	133.62	4924.52	7.42	7.35	-11.79	24.08	441092.29	742110.87	N 32 12 39.50	W 103 41	3.00
	4928.10	0.03	63.56	4928.02	7.42	7.35	-11.78	1.02	441092.29	742110.88	N 32 12 39.50	W 103 41	3.00
	4928.50	0.03	291.29	4928.42	7.42	7.35	-11.78	14.18	441092.29	742110.88	N 32 12 39.50	W 103 41	3.00
	4981.00	0.07	29.48	4980.92	7.45	7.38	-11.78	0.15	441092.32	742110.88	N 32 12 39.50	W 103 41	3.00
	5076.00	0.04	62.28	5075.92	7.51	7.44	-11.73	0.05	441092.38	742110.93	N 32 12 39.50	W 103 41	3.00
	5171.00	0.04	64.89	5170.92	7.54	7.47	-11.67	0.00	441092.41	742110.99	N 32 12 39.50	W 103 41	3.00
	5265.00	0.04	277.75	5264.92	7.56	7.49	-11.67	0.08	441092.43	742110.99	N 32 12 39.50	W 103 41	3.00
	5360.00	0.04	75.97	5359.92	7.57	7.50	-11.67	0.08	441092.44	742110.99	N 32 12 39.50	W 103 41	3.00
	5454.00	0.04	46.24	5453.92	7.60	7.53	-11.62	0.02	441092.47	742111.04	N 32 12 39.50	W 103 41	3.00
	5549.00	0.04	183.48	5548.92	7.59	7.52	-11.60	0.07	441092.46	742111.06	N 32 12 39.50	W 103 41	3.00
	5644.00	0.04	86.59	5643.92	7.57	7.50	-11.58	0.07	441092.44	742111.08	N 32 12 39.50	W 103 41	3.00
	5739.00	0.04	132.73	5738.92	7.56	7.49	-11.53	0.04	441092.43	742111.13	N 32 12 39.50	W 103 41	3.00
	5833.00	0.04	109.38	5832.92	7.53	7.46	-11.47	0.02	441092.40	742111.19	N 32 12 39.50	W 103 41	3.00
	5928.00	0.04	259.65	5927.92	7.51	7.44	-11.47	0.08	441092.38	742111.19	N 32 12 39.50	W 103 41	3.00
	6023.00	0.04	143.26	6022.92	7.48	7.41	-11.48	0.07	441092.35	742111.18	N 32 12 39.50	W 103 41	3.00

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")	
	6117.00	0.01	121.23	6116.92	7.45	7.38	-11.46	0.03	441092.32	742111.21	N 32 12 39.50	W 103 41	3.00
	6212.00	0.04	194.91	6211.92	7.42	7.35	-11.45	0.04	441092.29	742111.21	N 32 12 39.50	W 103 41	3.00
	6306.00	0.07	260.38	6305.92	7.38	7.31	-11.52	0.07	441092.25	742111.14	N 32 12 39.50	W 103 41	3.00
	6401.00	0.04	45.97	6400.92	7.39	7.32	-11.55	0.11	441092.26	742111.11	N 32 12 39.50	W 103 41	3.00
	6495.00	0.04	165.54	6494.92	7.38	7.31	-11.53	0.07	441092.25	742111.14	N 32 12 39.50	W 103 41	3.00
	6590.00	0.04	65.95	6589.92	7.36	7.30	-11.49	0.06	441092.24	742111.17	N 32 12 39.50	W 103 41	3.00
	6779.00	0.06	257.36	6778.92	7.37	7.30	-11.53	0.05	441092.24	742111.13	N 32 12 39.50	W 103 41	3.00
	6874.00	0.04	157.82	6873.92	7.33	7.26	-11.56	0.08	441092.20	742111.10	N 32 12 39.50	W 103 41	3.00
	6968.00	0.04	237.80	6967.92	7.29	7.22	-11.58	0.05	441092.16	742111.08	N 32 12 39.50	W 103 41	3.00
	7157.00	0.01	106.60	7156.92	7.25	7.18	-11.61	0.02	441092.12	742111.05	N 32 12 39.50	W 103 41	3.00
	7252.00	0.04	292.81	7251.92	7.26	7.19	-11.63	0.05	441092.13	742111.03	N 32 12 39.50	W 103 41	3.00
	7347.00	0.01	121.77	7346.92	7.26	7.19	-11.65	0.05	441092.13	742111.01	N 32 12 39.50	W 103 41	3.00
	7441.00	0.06	222.95	7440.92	7.22	7.15	-11.67	0.07	441092.09	742110.99	N 32 12 39.50	W 103 41	3.00
	7536.00	0.01	171.22	7535.92	7.18	7.11	-11.70	0.05	441092.05	742110.96	N 32 12 39.50	W 103 41	3.00
	7631.00	0.07	191.70	7630.92	7.11	7.04	-11.71	0.06	441091.98	742110.95	N 32 12 39.50	W 103 41	3.00
	7725.00	1.59	200.56	7724.90	5.84	5.76	-12.18	1.62	441090.70	742110.48	N 32 12 39.49	W 103 41	3.01
	7820.00	3.84	198.60	7819.79	1.60	1.51	-13.66	2.36	441086.45	742109.00	N 32 12 39.44	W 103 41	3.03
	7914.00	5.99	197.08	7913.44	-6.06	-6.16	-16.11	2.30	441078.78	742108.55	N 32 12 39.37	W 103 41	3.05
	8009.00	7.87	197.52	8007.74	-16.99	-17.10	-19.52	1.97	441067.84	742103.14	N 32 12 39.28	W 103 41	3.09
	8062.00	8.39	197.46	8060.21	-24.12	-24.25	-21.77	0.98	441060.69	742100.89	N 32 12 39.19	W 103 41	3.12
	8104.00	8.91	197.69	8101.73	-30.13	-30.27	-23.68	1.26	441054.67	742098.98	N 32 12 39.13	W 103 41	3.14
	8199.00	9.38	197.84	8195.52	-44.49	-44.65	-28.29	0.49	441040.29	742094.37	N 32 12 38.99	W 103 41	3.20
	8388.00	8.91	207.47	8382.13	-72.07	-72.31	-39.76	0.85	441012.63	742082.90	N 32 12 38.72	W 103 41	3.33
	8482.00	8.53	216.49	8475.05	-84.10	-84.38	-47.27	1.51	441000.57	742075.39	N 32 12 38.60	W 103 41	3.42
	8577.00	8.16	218.64	8569.04	-94.98	-95.31	-55.67	0.51	440989.63	742066.99	N 32 12 38.49	W 103 41	3.52
Bone Spring Intersection	*8654.00*	*7.58*	*215.72*	*8645.31*	*-103.34*	*-103.71*	*-62.05*	*0.91*	*440981.24*	*742060.61*	*N 32 12 38.41*	*W 103 41*	*3.60*
	8671.00	7.46	215.01	8662.17	-105.14	-105.52	-63.34	0.91	440979.42	742059.33	N 32 12 38.39	W 103 41	3.61
	8766.00	6.82	211.52	8756.43	-114.97	-115.38	-69.82	0.81	440969.56	742052.84	N 32 12 38.29	W 103 41	3.69
	8860.00	6.49	208.19	8849.80	-124.38	-124.83	-75.25	0.54	440960.12	742047.41	N 32 12 38.20	W 103 41	3.75
	8955.00	6.49	201.65	8944.19	-134.07	-134.55	-79.77	0.78	440950.40	742042.89	N 32 12 38.10	W 103 41	3.80
	9050.00	7.16	183.38	9038.53	-144.95	-145.44	-82.10	2.38	440939.50	742040.56	N 32 12 37.99	W 103 41	3.83
	9144.00	7.79	174.14	9131.73	-157.14	-157.63	-81.79	1.44	440927.32	742040.87	N 32 12 37.87	W 103 41	3.83
	9239.00	8.02	163.94	9225.83	-169.93	-170.41	-79.30	1.49	440914.54	742043.36	N 32 12 37.75	W 103 41	3.80
	9334.00	8.87	156.94	9319.80	-183.07	-183.52	-74.60	1.40	440901.43	742048.07	N 32 12 37.62	W 103 41	3.75
	9428.00	8.55	150.45	9412.72	-195.86	-196.26	-68.31	1.10	440888.69	742054.35	N 32 12 37.49	W 103 41	3.68
	9523.00	8.59	133.04	9506.68	-206.89	-207.25	-59.65	2.72	440877.70	742063.02	N 32 12 37.38	W 103 41	3.58
	9617.00	8.84	119.07	9599.61	-215.26	-215.55	-48.21	2.26	440869.40	742074.45	N 32 12 37.30	W 103 41	3.44
	9652.00	8.58	114.37	9634.20	-217.67	-217.93	-43.48	2.16	440867.02	742079.18	N 32 12 37.28	W 103 41	3.39
	9711.00	7.84	101.83	9692.60	-220.36	-220.57	-35.53	3.28	440864.38	742087.13	N 32 12 37.25	W 103 41	3.30
	9747.00	8.04	96.66	9728.26	-221.18	-221.37	-30.63	2.06	440863.58	742092.03	N 32 12 37.24	W 103 41	3.24
	9897.00	11.44	84.49	9876.18	-216.13	-216.17	-6.76	4.19	440868.78	742115.90	N 32 12 37.29	W 103 41	2.96
	9929.00	11.55	83.18	9907.54	-213.35	-213.36	-1.04	0.89	440871.59	742121.62	N 32 12 37.32	W 103 41	2.89
	10023.00	9.63	45.78	9999.96	-203.70	-203.63	13.00	3.95	440881.32	742135.66	N 32 12 37.41	W 103 41	2.73
	10118.00	8.28	38.33	10093.80	-192.71	-192.58	22.75	2.10	440892.37	742145.41	N 32 12 37.52	W 103 41	2.62
	10213.00	7.34	20.17	10187.93	-181.53	-181.37	28.89	2.50	440903.58	742151.55	N 32 12 37.63	W 103 41	2.54
	10307.00	5.84	9.56	10281.31	-171.20	-171.01	31.76	2.05	440913.94	742154.42	N 32 12 37.73	W 103 41	2.51
KOP Actual	10402.00	6.80	5.24	10375.73	-160.85	-160.65	33.08	1.12	440924.30	742155.73	N 32 12 37.84	W 103 41	2.49
100' FSL Cross	*10473.00*	*11.04*	*354.94*	*10445.86*	*-149.88*	*-149.69*	*32.86*	*6.37*	*440935.26*	*742155.52*	*N 32 12 37.95*	*W 103 41*	*2.49*
	10496.00	12.46	353.12	10468.38	-145.22	-145.03	32.37	6.37	440939.92	742155.03	N 32 12 37.99	W 103 41	2.50
	10511.00	14.16	351.78	10482.98	-141.80	-141.61	31.91	11.49	440943.34	742154.57	N 32 12 38.03	W 103 41	2.51
	10591.00	24.30	350.77	10558.41	-115.78	-115.61	27.86	12.68	440969.33	742150.52	N 32 12 38.28	W 103 41	2.55
	10686.00	38.07	353.69	10639.50	-67.10	-66.97	21.48	14.58	441017.97	742144.14	N 32 12 38.76	W 103 41	2.62
	10781.00	46.34	355.30	10709.81	-3.60	-3.50	15.44	8.78	441081.44	742138.10	N 32 12 39.39	W 103 41	2.69
	10875.00	56.02	356.64	10768.67	69.40	69.47	10.35	10.36	441154.40	742133.01	N 32 12 40.12	W 103 41	2.74
	10970.00	65.29	356.04	10815.18	151.98	152.02	5.05	9.77	441236.95	742127.71	N 32 12 40.93	W 103 41	2.80
	11064.00	79.72	355.11	10843.37	241.17	241.16	-1.89	15.38	441326.09	742120.77	N 32 12 41.82	W 103 41	2.87
	11159.00	87.34	356.15	10854.07	335.26	335.21	-9.07	8.10	441420.13	742113.59	N 32 12 42.75	W 103 41	2.95
	11190.00	87.65	356.30	10855.42	366.17	366.11	-11.11	1.10	441451.03	742111.55	N 32 12 43.05	W 103 41	2.97
	11235.00	88.42	355.95	10856.97	411.06	410.98	-14.15	1.87	441495.90	742108.51	N 32 12 43.50	W 103 41	3.00
	11327.00	89.31	356.28	10858.79	502.86	502.75	-20.38	1.04	441587.67	742102.28	N 32 12 44.40	W 103 41	3.07
	11419.00	91.76	356.02	10857.93	594.68	594.53	-26.56	2.67	441679.44	742096.10	N 32 12 45.31	W 103 41	3.13
	11511.00	91.21	353.92	10855.56	686.34	686.14	-34.62	2.36	441771.05	742088.04	N 32 12 46.22	W 103 41	3.22
	11603.00	91.38	356.18	10853.48	778.01	777.77	-42.56	2.47	441862.67	742080.10	N 32 12 47.13	W 103 41	3.31
	11695.00	91.38	357.86	10851.27	869.88	869.62	-47.34	1.82	441954.51	742075.32	N 32 12 48.04	W 103 41	3.36
	11786.00	90.48	358.42	10849.80	960.84	960.55	-50.30	1.16	442045.45	742072.37	N 32 12 48.94	W 103 41	3.38
	11877.00	88.76	0.29	10850.40	1051.82	1051.54	-51.32	2.79	442136.43	742071.34	N 32 12 49.84	W 103 41	3.39
	11969.00	88.45	3.43	10852.63	1143.72	1143.45	-48.33	3.43	442228.34	742074.33	N 32 12 50.75	W 103 41	3.35
	12063.00	88.14	2.67	10855.43	1237.51	1237.28	-43.33	0.87	442322.16	742079.33	N 32 12 51.67	W 103 41	3.28
	12158.00	88.49	4.18	10858.23	1332.26	1332.06	-37.65	1.63	442416.94	742085.01	N 32 12 52.61	W 103 41	3.21
	12252.00	88.62	4.29	10860.60	1425.93	1425.78	-30.72	0.19	442510.65	742091.95	N 32 12 53.54	W 103 41	3.12
	12346.00	89.79	2.97	10861.89	1519.69	1519.57	-24.77	1.87	442604.44	742097.89	N 32 12 54.47	W 103 41	3.05
	12441.00	90.41	2.58	10861.72	1614.55	1614.46	-20.17	0.77	442699.33	742102.49	N 32 12 55.41	W 103 41	2.99
	12535.00	90.35	1.87	10861.10	1708.46	1708.39	-16.53	0.76	442793.25	742106.13	N 32 12 56.33	W 103 41	2.94
	12629.00	90.45	1.45	10860.45	1802.40	1802.35	-13.81	0.45	442887.20	742108.85	N 32 12 57.26	W 103 41	2.90
	12724.00	90.28	1.56	10859.85	1897.35	1897.31	-11.31	0.21	442982.16	742111.35	N 32 12 58.20	W 103 41	2.86
	12819.00	90.59	3.48	10859.14	1992.22	1992.21	-7.13	2.05	443077.06	742115.53	N 32 12 59.14	W 103 41	2.81
	12913.00	90.59	1.98	10858.18	2086.08	2086.10	-2.65	1.60	443170.94	742120.01	N 32 13 0.07	W 103 41	2.75
	13007.00	90.48	3.95	10857.30	2179.91	2179.96	2.21	2.10	443264.80	742124.87	N 32 13 1.00	W 103 41	2.69
	13102.00	90.38	3.72	10856.59	2274.66	2274.75	8.56	0.27	443359.58	742131.22	N 32 13 1.94	W 103 41	2.61
	13197.00	90.38	1.54	10855.96	2369.52	2369.64	12.92	2.29	443454.47	742135.58	N 32 13 2.88	W 103 41	2.55
	13291.00	90.52	3.98	10855.22	2463.38	2463.52	17.44	2.59	443548.35	742140.10	N 32 13 3.80	W 103 41	2.49
	13386.00	90.76	4.33	10854.17	2558.08	2558.27	24.32	0.45	443643.09	742146.98	N 32 13 4.74	W 103 41	2.40
	13481.00	90.72	0.04	10852.94	2652.96	2653.17	27.93	4.51	443737.98	742150.59	N 32 13 5.68	W 103 41	2.35
	13575.00	91.00	5.90	10851.53	2746.75	2746.99	32.80	6.24	443831.80	742155.46	N 32 13 6.61	W 103 41	2.29
	13670.00	91.03	358.22	10849.84	2841.58	2841.84	36.21	8.09	443926.65	742158.87	N 32 13 7.55	W 103 41	2.25
	13764.00	91.27	359.19	10847.95	2935.54	2935.80	34.08	1.06	444020.60	742156.74	N 32 13 8.48	W 103 41	2.26
	13954.00	90.90	358.44	10844.35	3125.49	3125.72	30.14	0.44	444210.52	742152.79	N 32 13 10.36	W 103 41	2.30
	14048.00	90.69	357.52	10843.05	3219.44	3219.65	26.82	1.00	444304.44	742149.48	N 32 13 11.29	W 103 41	2.33
	14237.00	89.83	358.07	10842.20	3408.33	3408.51	19.56	0.54	444493.29	742142.22	N 32 13 13.15	W 103 41	2.40
	14332.00	89.93	358.14	10842.40	3503.30	3503.46	16.43	0.13	444588.23	742139.09	N 32 13 14.09	W 103 41	2.43
	14426.00	89.76	357.84	10842.66	3597.26	3597.40	13.13	0.37	444682.17	742135.79	N 32 13 15.02	W 103 41	2.46
	14521.00	89.83	357.04	10843.00	3692.19	3692.30	8.89	0.85	444777.07	742131.55	N 32 13 15.96	W 103 41	2.50
	14710.00	90.48	359.17	10842.49	3881.10	3881.19	2.64	1.18	444965.95	742125.30	N 32 13 17.83	W 103 41	2.56
	14899.00	89.90	358.47	10841.86	4070.08	4070.14	-1.24	0.48	445154.89	742121.42	N 32 13 19.70	W 103 41	2.59
	14994.00	90.45	358.54	10841.58	4165.06	4165.11	-3.72	0.58	445249.86	742118.94	N 32 13 20.64	W 103 41	2.62
	15183.00	89.52	358.34	10841.63	4354.01	4354.04	-8.86	0.50	445438.78	742113.80	N 32 13 22.51	W 103 41	2.66
	15278.00	89.73	359.73	10842.26	4449.00	4449.02	-10.47	1.48	445533.75	742112.19	N 32 13 23.45	W 103 41	2.68
	15372.00	89.66	358.12	10842.77	4542.99	4543.00	-12.23	1.72	445627.73	742110.43	N 32 13 24.38	W 103 41	2.69
	15467.00	89.59	358.85	10843.39	4637.97	4637.96	-14.75	0.78	445722.69	742107.91	N 32 13 25.32	W 103 41	2.71
	15561.00	89.59	359.06	10844.07	4731.96	4731.95	-16.46	0.22	445816.66	742106.20	N 32 13 26.25	W 103 41	2.73
	15656.00	89.69	359.16	10844.67	4826.95	4826.93	-17.94	0.15	445911.65	742104.72	N 32 13 27.19	W 103 41	2.74
	15845.00	89.48	357.61	10846.03	5015.90	5015.85	-23.27	0.83	446100.55	742099.39	N 32 13 29.06	W 103 41	2.78
	15939.00	89.55	357.62	10846.82	5109.83	5109.76	-27.19	0.07	446194.46	742095.48	N 32 13 29.99	W 103 41	2.82
	16033.00	89.31	355.77	10847.75	5203.70	5203.60	-32.60	1.98	446288.29	742090.06	N 32 13 30.92	W 103 41	2.86
	16128.00	89.31	358.14	10848.89	5298.58	5298.45	-37.65	2.49	446383.14	742085.01	N 32 13 31.86	W 103 41	2.93
	16223.00	90.59	358.46	10848.98	5393.55	5393.40	-40.47	1.38	446478.09	742082.19	N 32 13 32.80	W 103 41	2.96
	16317.00	90.55	357.96	10848.05	5487.51	5487.35	-43.42	0.54	446572.04	742079.25	N 32 13 33.73	W 103 41	2.99
	16411.00	91.14	358.89	10846.66	5581.48	5581.31	-46.00	1.17	446665.99	742076.66	N 32 13 34.66	W 103 41	3.01

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")	
	16506.00	90.96	358.25	10844.92	5676.45	5676.26	-48.37	0.69	446760.93	742074.29	N 32 13 35.60	W 103 41	3.03
	16601.00	91.00	359.67	10843.30	5771.42	5771.23	-50.09	1.49	446855.90	742072.57	N 32 13 36.54	W 103 41	3.04
	16696.00	91.55	0.24	10841.18	5866.40	5866.20	-50.17	0.84	446950.87	742072.50	N 32 13 37.48	W 103 41	3.04
	16885.00	91.45	358.41	10836.25	6055.32	6055.12	-52.40	0.97	447139.78	742070.27	N 32 13 39.35	W 103 41	3.05
	16979.00	91.38	357.37	10833.93	6149.25	6149.02	-55.86	1.11	447233.68	742066.80	N 32 13 40.28	W 103 41	3.08
	17074.00	91.83	357.89	10831.28	6244.15	6243.91	-59.79	0.72	447328.55	742062.87	N 32 13 41.22	W 103 41	3.12
	17168.00	91.07	358.41	10828.90	6338.09	6337.83	-62.83	0.98	447422.47	742059.84	N 32 13 42.15	W 103 41	3.15
	17357.00	91.55	1.89	10824.59	6527.01	6526.75	-62.67	1.75	447611.38	742059.99	N 32 13 44.01	W 103 41	3.14
	17451.00	91.48	359.93	10822.10	6620.95	6620.70	-61.35	1.87	447705.33	742061.32	N 32 13 44.94	W 103 41	3.11
	17546.00	91.00	359.46	10820.05	6715.93	6715.68	-61.86	0.71	447800.31	742060.81	N 32 13 45.88	W 103 41	3.11
	17641.00	89.97	359.07	10819.25	6810.92	6810.67	-63.08	1.16	447895.29	742059.58	N 32 13 46.82	W 103 41	3.12
	17735.00	90.41	359.63	10818.94	6904.92	6904.66	-64.15	0.76	447989.28	742058.51	N 32 13 47.75	W 103 41	3.13
	17830.00	87.66	359.55	10820.54	6999.90	6999.63	-64.83	2.90	448084.25	742057.83	N 32 13 48.69	W 103 41	3.13
	17920.55	90.59	359.30	10821.92	7090.42	7090.16	-65.74	3.24	448174.77	742056.92	N 32 13 49.59	W 103 41	3.13
	18019.00	89.42	359.51	10821.92	7188.87	7188.60	-66.77	1.21	448273.21	742055.90	N 32 13 50.56	W 103 41	3.14
	18113.00	90.69	0.80	10821.84	7282.86	7282.60	-66.51	1.93	448367.20	742056.15	N 32 13 51.49	W 103 41	3.13
	18208.00	91.89	1.09	10819.70	7377.81	7377.56	-64.94	1.31	448462.15	742057.72	N 32 13 52.43	W 103 41	3.10
	18302.00	90.72	357.95	10817.55	7471.78	7471.52	-65.73	3.56	448556.11	742056.94	N 32 13 53.36	W 103 41	3.11
	18396.00	91.34	359.21	10815.85	7565.74	7565.47	-68.05	1.49	448650.06	742054.61	N 32 13 54.29	W 103 41	3.13
	18491.00	89.69	358.58	10815.00	7660.73	7660.45	-69.89	1.86	448745.03	742052.78	N 32 13 55.23	W 103 41	3.14
	18585.00	91.48	358.86	10814.04	7754.70	7754.41	-71.98	1.93	448838.99	742050.68	N 32 13 56.16	W 103 41	3.16
	18680.00	90.79	359.29	10812.16	7849.68	7849.38	-73.52	0.85	448933.96	742049.15	N 32 13 57.10	W 103 41	3.17
	18869.00	90.45	1.17	10810.11	8038.65	8038.36	-72.77	1.01	449122.93	742049.90	N 32 13 58.97	W 103 41	3.15
	18964.00	91.34	1.75	10808.63	8133.59	8133.32	-70.34	1.12	449217.88	742052.32	N 32 13 59.91	W 103 41	3.11
	19059.00	92.96	3.42	10805.06	8228.39	8228.15	-66.06	2.44	449312.70	742056.60	N 32 14 0.85	W 103 41	3.06
	19153.00	91.07	1.26	10801.76	8322.22	8322.00	-62.23	3.05	449406.55	742060.44	N 32 14 1.78	W 103 41	3.01
	19248.00	92.20	1.99	10799.05	8417.13	8416.92	-59.53	1.42	449501.47	742063.13	N 32 14 2.72	W 103 41	2.97
	19342.00	91.79	2.92	10795.77	8510.98	8510.78	-55.51	1.08	449595.32	742067.15	N 32 14 3.65	W 103 41	2.91
	19532.00	91.65	2.76	10790.06	8700.58	8700.46	-46.11	0.11	449784.99	742076.55	N 32 14 5.52	W 103 41	2.79
	19721.00	91.41	1.34	10785.01	8889.34	8889.27	-39.35	0.76	449973.79	742083.31	N 32 14 7.39	W 103 41	2.70
	19815.00	91.24	3.05	10782.84	8983.22	8983.17	-35.76	1.82	450067.69	742086.91	N 32 14 8.32	W 103 41	2.65
	20005.00	89.17	3.64	10782.15	9172.82	9172.83	-24.67	1.13	450257.34	742097.99	N 32 14 10.20	W 103 41	2.51
	20099.00	88.45	359.98	10784.10	9266.71	9266.75	-21.70	3.98	450351.28	742100.96	N 32 14 11.12	W 103 41	2.47
	20194.00	88.62	0.17	10786.53	9361.68	9361.72	-21.58	0.28	450446.22	742101.08	N 32 14 12.06	W 103 41	2.46
	20289.00	88.31	0.53	10789.06	9456.64	9456.68	-21.00	0.50	450541.18	742101.66	N 32 14 13.00	W 103 41	2.45
	20383.00	88.25	357.57	10791.89	9550.58	9550.62	-22.56	3.15	450635.11	742100.10	N 32 14 13.93	W 103 41	2.46
	20478.00	88.49	359.09	10794.60	9645.51	9645.53	-25.33	1.63	450730.02	742097.33	N 32 14 14.87	W 103 41	2.48
	20572.00	88.80	358.14	10796.83	9739.47	9739.48	-27.59	1.06	450823.96	742095.07	N 32 14 15.80	W 103 41	2.50
	20667.00	88.59	359.05	10799.00	9834.43	9834.42	-29.92	0.98	450918.90	742092.74	N 32 14 16.74	W 103 41	2.52
	20856.00	87.97	357.27	10804.67	10023.27	10023.23	-35.99	1.00	451107.70	742086.67	N 32 14 18.61	W 103 41	2.58
	20951.00	88.28	358.58	10807.78	10118.17	10118.12	-39.43	1.42	451202.58	742083.24	N 32 14 19.55	W 103 41	2.61
	21045.00	88.42	357.93	10810.49	10212.11	10212.03	-42.29	0.71	451296.50	742080.37	N 32 14 20.48	W 103 41	2.64
100' FNL Cross	*21047.00*	*88.42*	*357.89*	*10810.55*	*10214.10*	*10214.03*	*-42.36*	*1.95*	*451298.49*	*742080.30*	*N 32 14 20.50*	*W 103 41*	*2.64*
Final MWD Survey	21084.00	88.42	357.17	10811.57	10251.06	10250.98	-43.96	1.95	451335.44	742078.71	N 32 14 20.86	W 103 41	2.66
Proj to Bit	21125.00	88.42	357.17	10812.70	10292.01	10291.92	-45.98	0.01	451376.38	742076.68	N 32 14 21.27	W 103 41	2.68

Survey Type: Def Survey

Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma

Survey Program:

Description	Part	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	1	0.000	26.500	1/98.425	30.000	30.000	NAL_NSG+MSHOT-Depth Only	Original Borehole / Oxy Mesa Verde BS Unit 23H Gyro + MWD 0-21125' MD
	1	26.500	26.500	Act Stns	30.000	30.000	NAL_NSG+MSHOT-Depth Only	Original Borehole / Oxy Mesa Verde BS Unit 23H Gyro + MWD 0-21125' MD
	1	26.500	4601.000	Act Stns	30.000	30.000	NAL_NSG+MSHOT	Original Borehole / Oxy Mesa Verde BS Unit 23H Gyro + MWD
	1	4601.000	4824.000	Act Stns	30.000	30.000	NAL_MWD_PLUS_0.5_DEG	Original Borehole / Oxy Mesa Verde BS Unit 23H Gyro + MWD
	1	4824.000	21125.000	Act Stns	30.000	30.000	NAL_MWD_IFR1+MS	Original Borehole / Oxy Mesa Verde BS Unit 23H Gyro + MWD