

Fram Operating, LLC

Mesa Co., CO

Sec.33-T12S-R97W

Mansur 33-1-G

Wellbore #2-ST

Design: Wellbore #2-ST

Standard Survey Report

13 June, 2011



Great White Directional Services, LLC

Survey Report



Company:	Fram Operating, LLC	Local Co-ordinate Reference:	Well Mansur 33-1-G
Project:	Mesa Co., CO	TVD Reference:	WELL @ 6093.00usft (Frontier 4)
Site:	Sec.33-T12S-R97W	MD Reference:	WELL @ 6093.00usft (Frontier 4)
Well:	Mansur 33-1-G	North Reference:	True
Wellbore:	Wellbore #2-ST	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #2-ST	Database:	EDM 5000.1 EDMDBBW

Project	Mesa Co., CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Central Zone		

Site		Sec.33-T12S-R97W			
Site Position:		Northing:	1,423,710.811 usft	Latitude:	38° 57' 51.977 N
From:	Lat/Long	Easting:	2,220,392.914 usft	Longitude:	108° 14' 32.318 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-1.73 °

Well		Mansur 33-1-G				
Well Position	+N/-S	0.00 usft	Northing:	1,423,710.806 usft	Latitude:	38° 57' 51.977 N
	+E/-W	0.00 usft	Easting:	2,220,392.914 usft	Longitude:	108° 14' 32.318 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	6,079.00 usft

Wellbore	Wellbore #2-ST				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2011/05/19	10.40	65.25	51,932

Design	Wellbore #2-ST				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	332.68	

Survey Program	Date	2011/06/13			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
515.00	3,148.00	Survey #1 (Wellbore #2-ST)	MWD	MWD - Standard	
3,148.00	4,227.00	Survey #2-ST (Wellbore #2-ST)	MWD	MWD - Standard	

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
First GWDS Survey										
515.00	1.60	194.40	514.93	-6.96	-1.79	-5.37	0.31	0.31	0.00	
546.00	1.50	191.50	545.92	-7.78	-1.98	-6.01	0.41	-0.32	-9.35	
577.00	1.80	196.90	576.91	-8.64	-2.20	-6.67	1.09	0.97	17.42	
608.00	1.10	218.20	607.90	-9.34	-2.52	-7.14	2.81	-2.26	68.71	
638.00	0.70	313.40	637.90	-9.44	-2.84	-7.09	4.52	-1.33	317.33	
669.00	0.70	317.50	668.89	-9.17	-3.10	-6.73	0.16	0.00	13.23	
700.00	0.50	16.40	699.89	-8.91	-3.19	-6.45	1.98	-0.65	190.00	
730.00	1.00	64.70	729.89	-8.67	-2.92	-6.36	2.55	1.67	161.00	
761.00	1.30	68.40	760.88	-8.42	-2.35	-6.41	1.00	0.97	11.94	
792.00	1.20	75.80	791.88	-8.21	-1.70	-6.52	0.61	-0.32	23.87	

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Well:	Mansur 33-1-G	North Reference:	True
Wellbore:	Wellbore #2-ST	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #2-ST	Database:	EDM 5000.1 EDMDBBW

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
823.00	1.10	68.50	822.87	-8.03	-1.11	-6.62	0.57	-0.32	-23.55	
853.00	1.20	70.10	852.86	-7.81	-0.55	-6.69	0.35	0.33	5.33	
884.00	1.10	85.90	883.86	-7.68	0.05	-6.85	1.07	-0.32	50.97	
915.00	0.90	80.40	914.85	-7.62	0.59	-7.04	0.71	-0.65	-17.74	
946.00	1.10	79.90	945.85	-7.53	1.12	-7.20	0.65	0.65	-1.61	
978.00	0.80	98.90	977.84	-7.51	1.65	-7.42	1.35	-0.94	59.37	
1,009.00	1.10	97.80	1,008.84	-7.58	2.15	-7.72	0.97	0.97	-3.55	
1,040.00	0.90	122.40	1,039.84	-7.75	2.65	-8.11	1.51	-0.65	79.35	
1,072.00	1.10	113.60	1,071.83	-8.01	3.15	-8.56	0.79	0.62	-27.50	
1,104.00	1.10	118.50	1,103.82	-8.28	3.70	-9.05	0.29	0.00	15.31	
1,135.00	1.10	127.80	1,134.82	-8.60	4.20	-9.57	0.58	0.00	30.00	
1,167.00	1.10	152.80	1,166.81	-9.06	4.58	-10.16	1.49	0.00	78.12	
1,199.00	0.90	152.40	1,198.81	-9.56	4.84	-10.71	0.63	-0.62	-1.25	
1,231.00	0.70	182.20	1,230.81	-9.98	4.95	-11.14	1.42	-0.62	93.12	
1,262.00	0.10	181.30	1,261.80	-10.20	4.94	-11.32	1.94	-1.94	-2.90	
1,294.00	0.40	211.60	1,293.80	-10.32	4.88	-11.41	0.99	0.94	94.69	
1,325.00	0.80	264.30	1,324.80	-10.43	4.61	-11.38	2.07	1.29	170.00	
1,357.00	0.80	290.10	1,356.80	-10.38	4.17	-11.14	1.12	0.00	80.62	
1,389.00	0.90	270.70	1,388.80	-10.30	3.71	-10.85	0.95	0.31	-60.62	
1,421.00	0.90	279.30	1,420.79	-10.25	3.21	-10.58	0.42	0.00	26.87	
1,452.00	1.10	273.00	1,451.79	-10.20	2.68	-10.29	0.74	0.65	-20.32	
1,469.00	1.40	297.50	1,468.78	-10.09	2.33	-10.04	3.56	1.76	144.12	
1,501.00	1.40	280.00	1,500.77	-9.85	1.60	-9.48	1.33	0.00	-54.69	
1,533.00	1.40	274.70	1,532.76	-9.75	0.82	-9.04	0.40	0.00	-16.56	
1,564.00	1.00	299.80	1,563.76	-9.58	0.21	-8.61	2.10	-1.29	80.97	
1,596.00	1.20	303.10	1,595.75	-9.26	-0.31	-8.08	0.66	0.62	10.31	
1,628.00	1.60	329.40	1,627.74	-8.69	-0.82	-7.34	2.33	1.25	82.19	
1,659.00	2.10	336.40	1,658.73	-7.80	-1.27	-6.35	1.77	1.61	22.58	
1,691.00	2.40	337.00	1,690.70	-6.64	-1.76	-5.09	0.94	0.94	1.87	
1,723.00	2.00	333.60	1,722.68	-5.53	-2.28	-3.87	1.31	-1.25	-10.62	
1,754.00	1.10	313.30	1,753.67	-4.84	-2.73	-3.04	3.36	-2.90	-65.48	
1,786.00	0.80	284.80	1,785.66	-4.57	-3.17	-2.61	1.72	-0.94	-89.06	
1,817.00	0.90	285.40	1,816.66	-4.45	-3.62	-2.29	0.32	0.32	1.94	
1,849.00	0.80	265.50	1,848.66	-4.40	-4.08	-2.04	0.97	-0.31	-62.19	
1,881.00	0.70	255.60	1,880.65	-4.47	-4.49	-1.91	0.51	-0.31	-30.94	
1,912.00	0.60	302.00	1,911.65	-4.43	-4.81	-1.73	1.68	-0.32	149.68	
1,944.00	0.40	357.70	1,943.65	-4.23	-4.96	-1.48	1.56	-0.62	174.06	
1,976.00	0.20	356.30	1,975.65	-4.06	-4.97	-1.33	0.63	-0.62	-4.37	
2,008.00	0.30	355.20	2,007.65	-3.92	-4.98	-1.20	0.31	0.31	-3.44	
2,039.00	0.20	106.00	2,038.65	-3.86	-4.93	-1.16	1.34	-0.32	357.42	
2,071.00	0.40	106.50	2,070.65	-3.90	-4.77	-1.28	0.63	0.62	1.56	
2,103.00	0.40	118.20	2,102.65	-3.99	-4.57	-1.45	0.25	0.00	36.56	
2,135.00	0.40	141.20	2,134.65	-4.13	-4.40	-1.65	0.50	0.00	71.87	
2,166.00	0.70	66.30	2,165.65	-4.14	-4.16	-1.77	2.29	0.97	-241.61	
2,197.00	1.50	32.30	2,196.64	-3.72	-3.77	-1.57	3.22	2.58	-109.68	
2,229.00	1.30	42.70	2,228.63	-3.10	-3.30	-1.24	1.01	-0.62	32.50	
2,262.00	1.10	48.00	2,261.62	-2.61	-2.81	-1.03	0.69	-0.61	16.06	
2,293.00	0.70	46.70	2,292.62	-2.28	-2.45	-0.90	1.29	-1.29	-4.19	
2,325.00	0.70	51.10	2,324.62	-2.02	-2.16	-0.81	0.17	0.00	13.75	
2,357.00	0.50	65.60	2,356.62	-1.84	-1.88	-0.78	0.78	-0.62	45.31	
2,389.00	0.40	72.60	2,388.61	-1.75	-1.64	-0.80	0.36	-0.31	21.87	
2,420.00	0.40	147.50	2,419.61	-1.81	-1.48	-0.93	1.57	0.00	241.61	
2,452.00	0.40	156.30	2,451.61	-2.01	-1.38	-1.15	0.19	0.00	27.50	
2,484.00	0.50	343.20	2,483.61	-1.98	-1.37	-1.13	2.81	0.31	-540.94	

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2,516.00	1.20	334.80	2,515.61	-1.54	-1.55	-0.65	2.22	2.19	-26.25
2,548.00	1.10	310.80	2,547.60	-1.03	-1.93	-0.03	1.53	-0.31	-75.00
2,580.00	1.80	320.90	2,579.59	-0.44	-2.48	0.74	2.32	2.19	31.56
2,611.00	3.80	336.60	2,610.55	0.88	-3.19	2.24	6.85	6.45	50.65
2,643.00	5.70	337.90	2,642.44	3.32	-4.21	4.89	5.95	5.94	4.06
2,675.00	7.60	341.30	2,674.23	6.80	-5.49	8.56	6.06	5.94	10.62
2,706.00	9.50	340.20	2,704.88	11.15	-7.01	13.12	6.15	6.13	-3.55
2,738.00	11.40	341.90	2,736.35	16.64	-8.89	18.86	6.01	5.94	5.31
2,770.00	13.20	345.10	2,767.61	23.18	-10.81	25.55	6.01	5.62	10.00
2,801.00	15.20	346.60	2,797.66	30.55	-12.66	32.96	6.56	6.45	4.84
2,833.00	17.00	344.60	2,828.41	39.14	-14.88	41.61	5.89	5.62	-6.25
2,865.00	19.00	343.20	2,858.84	48.64	-17.63	51.31	6.39	6.25	-4.37
2,897.00	20.60	343.00	2,888.95	59.01	-20.78	61.97	5.00	5.00	-0.62
2,928.00	22.80	343.90	2,917.75	70.00	-24.04	73.22	7.18	7.10	2.90
2,960.00	25.40	345.20	2,946.96	82.59	-27.51	86.01	8.29	8.12	4.06
2,991.00	29.30	345.90	2,974.49	96.38	-31.06	99.89	12.62	12.58	2.26
3,023.00	35.60	344.90	3,001.48	112.99	-35.40	116.63	19.76	19.69	-3.12
3,054.00	41.00	343.90	3,025.80	131.48	-40.57	135.44	17.53	17.42	-3.23
3,086.00	44.00	342.00	3,049.39	152.14	-46.92	156.71	10.20	9.37	-5.94
3,117.00	46.30	339.60	3,071.25	172.89	-54.16	178.46	9.23	7.42	-7.74
Tie-In / OH									
3,148.00	48.80	337.50	3,092.17	194.17	-62.53	201.21	9.49	8.06	-6.77
First ST GWDS Survey									
3,194.00	51.70	335.10	3,121.59	226.54	-76.75	236.50	7.47	6.30	-5.22
3,225.00	54.20	333.60	3,140.26	248.84	-87.47	261.23	8.94	8.06	-4.84
3,255.00	57.20	331.70	3,157.17	270.85	-98.86	286.00	11.29	10.00	-6.33
3,287.00	59.00	330.70	3,174.08	294.65	-111.95	313.16	6.22	5.62	-3.12
3,318.00	59.40	331.00	3,189.95	317.91	-124.92	339.78	1.53	1.29	0.97
3,350.00	59.20	332.90	3,206.29	342.19	-137.85	367.29	5.14	-0.62	5.94
3,382.00	59.00	332.30	3,222.72	366.57	-150.49	394.74	1.73	-0.62	-1.87
3,413.00	61.20	334.40	3,238.18	390.58	-162.54	421.61	9.21	7.10	6.77
3,445.00	63.90	334.10	3,252.93	416.16	-174.87	450.00	8.48	8.44	-0.94
3,471.00	65.90	333.40	3,263.96	437.27	-185.29	473.54	8.07	7.69	-2.69
3,503.00	68.60	333.70	3,276.33	463.69	-198.43	503.04	8.48	8.44	0.94
3,535.00	70.30	334.10	3,287.56	490.60	-211.61	533.00	5.44	5.31	1.25
3,566.00	71.80	334.00	3,297.63	516.96	-224.44	562.31	4.85	4.84	-0.32
3,598.00	72.40	333.80	3,307.46	544.31	-237.84	592.75	1.97	1.87	-0.62
3,630.00	74.20	333.50	3,316.66	571.77	-251.44	623.39	5.70	5.62	-0.94
3,661.00	75.80	333.20	3,324.68	598.53	-264.87	653.34	5.25	5.16	-0.97
3,693.00	75.60	333.00	3,332.59	626.19	-278.90	684.34	0.87	-0.62	-0.62
3,724.00	76.20	333.70	3,340.14	653.06	-292.39	714.41	2.92	1.94	2.26
3,754.00	76.10	332.40	3,347.32	679.02	-305.59	743.53	4.22	-0.33	-4.33
3,786.00	76.20	332.80	3,354.98	706.61	-319.89	774.60	1.25	0.31	1.25
3,818.00	76.50	333.10	3,362.53	734.30	-334.03	805.70	1.31	0.94	0.94
3,850.00	75.90	332.90	3,370.17	761.99	-348.14	836.77	1.97	-1.87	-0.62
3,881.00	75.90	332.40	3,377.72	788.70	-361.95	866.84	1.56	0.00	-1.61
3,913.00	75.60	332.70	3,385.59	816.22	-376.25	897.85	1.31	-0.94	0.94
3,944.00	75.50	332.30	3,393.33	842.85	-390.11	927.87	1.29	-0.32	-1.29
3,976.00	75.40	332.40	3,401.37	870.28	-404.48	958.85	0.43	-0.31	0.31
4,008.00	75.70	332.40	3,409.35	897.74	-418.84	989.83	0.94	0.94	0.00
4,040.00	75.90	332.50	3,417.20	925.25	-433.19	1,020.86	0.69	0.62	0.31
4,072.00	75.60	332.60	3,425.08	952.77	-447.48	1,051.87	0.99	-0.94	0.31
4,103.00	75.70	332.60	3,432.76	979.44	-461.31	1,081.90	0.32	0.32	0.00
4,135.00	75.90	332.70	3,440.61	1,006.99	-475.56	1,112.93	0.69	0.62	0.31



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Last ST GWDS Survey										
4,167.00	75.40	332.90	3,448.54	1,034.56	-489.73	1,143.93	1.68	-1.56	0.62	
Proj. to TD										
4,227.00	75.40	332.90	3,463.67	1,086.25	-516.18	1,201.99	0.00	0.00	0.00	

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
515.00	514.93	-6.96	-1.79	First GWDS Survey	
3,148.00	3,092.17	194.17	-62.53	Tie-In / OH	
3,194.00	3,121.59	226.54	-76.75	First ST GWDS Survey	
4,167.00	3,448.54	1,034.56	-489.73	Last ST GWDS Survey	
4,227.00	3,463.67	1,086.25	-516.18	Proj. to TD	

Checked By: _____ Approved By: _____ Date: _____