DIRECTIONAL SURVEY CALCULATION

MINIMUM CURVATURE METHOD

Well Name	Target Direction	Slot Coordinate	N / S	E / W	Hole Size	Calculation by	Date
Murphy 1-7H	181.30						6/28/12
Job Number	Type of Survey	Tie-in Point				Directional Co.	
0							

Meaured Depth	Hole Angle	Hole Direction	Course Length	True Vertical Depth	Vertical Section	Total Coordinate N + / S -	Total Coordinate E + / W -	Dogleg Severity	Build Up °/100 ft	Walk/ °/100 ft
0	0	0	0	0.00	0.00			<< TIE-IN POINT >>		
1078	2	251	1078	1,077.86	5.12	-4.80	-14.26	0.15	0.15	23.32
1552	1	199	474	1,551.73	12.50	-12.00	-22.28	0.28	-0.06	-11.08
2026	2	178	474	2,025.57	24.64	-24.11	-23.74	0.14	0.08	-4.47
2501	1	210	475	2,500.43	35.69	-35.12	-25.70	0.20	-0.13	6.69
2977	1	177	476	2,976.37	42.62	-42.00	-27.80	0.13	-0.08	-6.81
3452	0	224	475	3,451.36	46.13	-45.50	-28.23	0.12	-0.11	9.77
3927	1	191	475	3,926.34	50.01	-49.36	-29.42	0.13	0.13	-6.86
4117	1	47	190	4,116.33	50.63	-49.98	-28.95	0.70	-0.11	-75.63
4148	0	135	31	4,147.33	50.51	-49.87	-28.83	1.94	-1.94	281.94
4180	1	184	32	4,179.33	50.79	-50.15	-28.84	3.12	3.13	153.44
4211	4	182	31	4,210.30	52.14	-51.50	-28.90	9.68	9.68	-6.13
4243	7	179	32	4,242.14	55.26	-54.62	-28.89	10.04	10.00	-9.38
4275	10	180	32	4,273.78	60.02	-59.38	-28.85	8.46	8.44	4.06
4306	12	181	31	4,304.22	65.91	-65.27	-28.88	6.78	6.77	1.29
4338	14	180	32	4,335.41	73.02	-72.39	-28.93	5.31	5.31	-0.62
4369	16	181	31	4,365.39	80.91	-80.28	-29.00	6.78	6.77	0.97
4401	18	181	32	4,396.00	90.24	-89.60	-29.12	7.19	7.19	0.94
4432	20	182	31	4,425.26	100.46	-99.82	-29.34	7.45	7.42	1.94
4464	22	181	32	4,455.06	112.14	-111.49	-29.63	6.25	6.25	-0.31
4496	25	182	32	4,484.38	124.94	-124.30	-30.05	7.58	7.50	2.81
4528	27	183	32	4,513.19	138.87	-138.21	-30.69	6.30	6.25	1.87
4559	28	183	31	4,540.67	153.20	-152.53	-31.45	4.86	4.84	0.97
4591	30	182	32	4,568.59	168.83	-168.14	-32.21	6.06	5.94	-2.50
4622	32	181	31	4,595.09	184.91	-184.21	-32.74	6.98	6.77	-3.23
4654	34	179	32	4,621.83	202.47	-201.78	-32.79	7.48	6.25	-7.50
4686	36	176	32	4,648.03	220.80	-220.14	-32.01	6.87	4.69	-8.75
4717	37	174	31	4,673.02	239.05	-238.42	-30.46	5.15	3.23	-6.77
4749	38	173	32	4,698.51	258.21	-257.64	-28.25	3.50	2.50	-4.06
4781	38	173	32	4,723.76	277.65	-277.14	-25.75	1.91	1.88	-0.63
4812	39	173	31	4,748.03	296.71	-296.26	-23.32	1.72	1.61	0.97
4844	40	173	32	4,772.85	316.71	-316.32	-20.89	2.92	2.81	1.25
4876	42	174	32	4,797.07	337.43	-337.09	-18.56	7.60	7.50	1.87
4908	45	175	32	4,820.26	359.31	-359.03	-16.42	9.92	9.69	3.13
4939	48	176	31	4,841.62	381.66	-381.43	-14.64	9.08	8.71	3.55
4971	51	177	32	4,862.44	405.86	-405.67	-13.08	10.10	10.00	1.87
5003	54	178	32	4,882.01	431.11	-430.95	-11.80	8.49	8.13	3.13
5034	54	178	31	4,900.27	456.11	-455.98	-10.77	1.95	1.94	0.32
5066	54	178	32	4,919.02	482.00	-481.90	-9.78	0.60	-0.31	0.63
5098	53	177	32	4,938.03	507.68	-507.62	-8.70	3.75	-3.44	-1.87
5129	52	176	31	4,956.86	532.23	-532.20	-7.28	4.01	-2.58	-3.87
5161	52	176	32	4,976.62	557.29	-557.30	-5.51	2.31	-2.19	-0.94
5193	52	176	32	4,996.39	582.34	-582.41	-3.77	2.51	2.19	1.56
5224	55	177	31	5,014.89	607.14	-607.24	-2.39	7.86	7.42	3.23
5256	59	178	32	5,032.51	633.79	-633.92	-1.25	13.19	13.13	1.56
5287	63	179	31	5,047.67	660.78	-660.94	-0.48	13.27	12.90	3.55
5319	66	179	32	5,061.52	689.60	-689.78	0.13	10.33	10.31	-0.63
5351	69	180	32	5,073.66	719.18	-719.38	0.54	11.01	10.63	3.13
5382	73	180	31	5,083.68	748.50	-748.71	0.54	11.44	11.29	1.94
5414	75	181	32	5,092.42	779.28	-779.49	0.24	7.96	7.81	1.56
5446	79	181	32	5,099.64	810.45	-810.65	-0.22	9.69	9.69	0.31
5466	81	181	20	5,103.25	830.12	-830.32	-0.46	11.17	11.00	-2.00
5637	92	181	171	5,114.72	1,000.46	-1,000.67	-2.10	6.37	6.37	0.06
5732	92	180	95	5,111.73	1,095.41	-1,095.62	-2.84	0.53	0.42	-0.32
5827	90	180	95	5,109.91	1,190.37	-1,190.60	-3.42	1.90	-1.89	0.11
5922	90	181	95	5,109.58	1,285.37	-1,285.59	-4.75	0.84	0.00	0.84
6017	90	181	95	5,109.41	1,380.37	-1,380.57	-6.49	0.38	-0.21	-0.32
6112	90	180	95	5,109.50	1,475.36	-1,475.57	-7.32	0.85	-0.11	-0.84

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Job Number	Type of Survey	Tie-in Point				Directional Co.	
0							

Meaured Depth	Hole Angle	Hole Direction	Course Length	True Vertical Depth	Vertical Section	Total Coordinate N + / S -	Total Coordinate E + / W -	Dogleg Severity	Build Up °/100 ft	Walk/ °/100 ft
0	0	0	0	0.00	0.00			<< TIE-IN POINT >>		
6207	90	181	95	5,109.83	1,570.35	-1,570.56	-8.56	1.38	-0.21	1.37
6302	90	182	95	5,110.16	1,665.35	-1,665.52	-11.30	0.57	0.21	0.53
6397	89	181	95	5,110.74	1,760.34	-1,760.48	-13.95	0.82	-0.53	-0.63
6492	90	182	95	5,111.57	1,855.33	-1,855.42	-16.94	1.07	0.21	1.05
6587	90	183	95	5,111.82	1,950.31	-1,950.33	-21.08	0.67	0.53	0.42
6682	90	183	95	5,111.65	2,045.29	-2,045.24	-25.39	0.21	0.00	-0.21
6777	90	182	95	5,111.82	2,140.27	-2,140.16	-29.20	0.60	-0.42	-0.42
6872	90	182	95	5,112.23	2,235.27	-2,235.11	-32.27	0.54	0.11	-0.53
6967	90	182	95	5,112.56	2,330.26	-2,330.07	-34.92	0.00	0.00	0.00
7062	90	182	95	5,112.65	2,425.26	-2,425.03	-37.74	0.38	0.32	0.21
7157	91	183	95	5,112.07	2,520.24	-2,519.94	-41.80	1.47	0.53	1.37
7252	91	182	95	5,111.15	2,615.20	-2,614.82	-46.36	0.74	-0.11	-0.74
7347	91	182	95	5,110.24	2,710.18	-2,709.74	-50.34	0.11	0.11	0.00
7442	91	182	95	5,109.08	2,805.16	-2,804.64	-54.31	0.21	0.21	0.00
7537	90	183	95	5,108.50	2,900.13	-2,899.55	-58.46	0.97	-0.95	0.21
7632	89	182	95	5,109.08	2,995.11	-2,994.46	-62.52	0.61	-0.53	-0.32
7727	89	182	95	5,110.49	3,090.09	-3,089.39	-65.92	0.74	-0.53	-0.53
7822	89	182	95	5,112.56	3,185.07	-3,184.32	-68.82	0.33	-0.32	-0.11
7917	89	182	95	5,114.55	3,280.04	-3,279.26	-71.63	0.42	0.42	0.00
8012	89	181	95	5,116.21	3,375.03	-3,374.22	-73.79	0.84	0.00	-0.84
8107	90	181	95	5,117.29	3,470.02	-3,469.20	-75.28	0.74	0.74	0.00
8202	90	181	95	5,117.79	3,565.02	-3,564.18	-77.19	0.53	0.00	0.53
8297	89	182	95	5,118.61	3,660.01	-3,659.14	-79.76	0.53	-0.42	0.32
8392	90	182	95	5,119.61	3,755.00	-3,754.10	-82.49	0.24	0.21	-0.11
8487	90	181	95	5,120.44	3,850.00	-3,849.06	-84.98	0.21	0.00	-0.21
8582	87	182	95	5,123.01	3,944.96	-3,943.99	-87.55	2.23	-2.21	0.32
8607	87	182	25	5,124.14	3,969.93	-3,968.95	-88.27	0.40	0.00	-0.40
8702	90	182	95	5,126.13	4,064.90	-4,063.87	-91.25	2.98	2.95	0.42
8797	89	181	95	5,126.63	4,159.89	-4,158.83	-93.99	1.28	-1.05	-0.74
8892	89	181	95	5,128.37	4,254.87	-4,253.80	-95.48	0.99	-0.53	-0.84
8987	89	182	95	5,129.94	4,349.86	-4,348.76	-97.72	1.94	0.74	1.79
9082	91	182	95	5,129.45	4,444.84	-4,443.69	-101.11	1.92	1.89	-0.32
9177	91	181	95	5,127.87	4,539.83	-4,538.64	-103.85	0.74	-0.53	-0.53
9272	91	181	95	5,126.79	4,634.82	-4,633.61	-106.09	0.15	-0.11	-0.11
9365	90	181	93	5,126.23	4,727.82	-4,726.58	-108.12	0.55	-0.54	-0.11
9415	90	181	50	5,126.14	4,777.82	-4,776.57	-109.16	0.00	0.00	0.00
0	0	0		5,126.14	4,777.82	-4,776.57	-109.16			
0	0	0		5,126.14	4,777.82	-4,776.57	-109.16			
0	0	0		5,126.14	4,777.82	-4,776.57	-109.16			
0	0	0		5,126.14	4,777.82	-4,776.57	-109.16			
0	0	0		5,126.14	4,777.82	-4,776.57	-109.16			
0	0	0		5,126.14	4,777.82	-4,776.57	-109.16			
0	0	0		5,126.14	4,777.82	-4,776.57	-109.16			
0	0	0		5,126.14	4,777.82	-4,776.57	-109.16			
0	0	0		5,126.14	4,777.82	-4,776.57	-109.16			
0	0	0		5,126.14	4,777.82	-4,776.57	-109.16			
0	0	0		5,126.14	4,777.82	-4,776.57	-109.16			
0	0	0		5,126.14	4,777.82	-4,776.57	-109.16			
0	0	0		5,126.14	4,777.82	-4,776.57	-109.16			
0	0	0		5,126.14	4,777.82	-4,776.57	-109.16			
0	0	0		5,126.14	4,777.82	-4,776.57	-109.16			
0	0	0		5,126.14	4,777.82	-4,776.57	-109.16			
0	0	0		5,126.14	4,777.82	-4,776.57	-109.16			
0	0	0		5,126.14	4,777.82	-4,776.57	-109.16			
0	0	0		5,126.14	4,777.82	-4,776.57	-109.16			
0	0	0		5,126.14	4,777.82	-4,776.57	-109.16			
0	0	0		5,126.14	4,777.82	-4,776.57	-109.16			