

DIRECTIONAL SURVEY CALCULATION

MINIMUM CURVATURE METHOD

Well Name		Target Direction	Slot Coordinate	N / S	E / W	Hole Size	Calculation by	Date			
Lawyer 2629 1-30		2.04						10/30/12			
Job Number		Type of Survey	Tie-in Point				Directional Co.				
0											
Measured Depth	Hole Angle	Hole Direction	Course Length	True Vertical Depth	Vertical Section	Total Coordinate		Dogleg Severity	Build Up %/100 ft	Walk/ %/100 ft	
						N + / S -	E + / W -				
0	0	0	0	0.00	0.00						
0	0	0		0.00	0.00	0.00	0.00				
1648	1	303	1648	1,647.97	4.47	4.72	-7.22	0.04	0.04	18.40	
1903	0	89	255	1,902.97	5.19	5.47	-7.67	0.34	-0.12	-84.08	
2377	1	54	474	2,376.95	6.79	6.95	-4.42	0.08	0.06	-7.34	
2885	0	272	508	2,884.94	8.43	8.57	-3.60	0.17	-0.06	42.93	
3362	0	289	477	3,361.94	8.80	9.02	-6.03	0.02	0.00	3.54	
3839	0	317	477	3,838.93	10.33	10.63	-8.35	0.04	0.02	5.77	
4062	1	264	223	4,061.92	10.74	11.10	-9.86	0.18	0.04	-23.54	
4095	1	282	33	4,094.92	10.75	11.12	-10.20	0.82	0.61	53.64	
4126	1	353	31	4,125.92	11.03	11.40	-10.41	3.07	0.65	231.29	
4158	2	2	32	4,157.90	11.94	12.32	-10.42	4.73	4.69	#####	
4190	4	3	32	4,189.85	13.84	14.22	-10.33	6.26	6.25	5.63	
4221	6	360	31	4,220.71	16.76	17.13	-10.27	6.53	6.45	1,150.32	
4253	8	360	32	4,252.44	20.87	21.25	-10.28	6.25	6.25	-0.62	
4284	11	2	31	4,283.02	25.96	26.34	-10.20	6.88	6.77	#####	
4316	13	3	32	4,314.37	32.37	32.74	-9.94	6.57	6.56	1.88	
4347	15	1	31	4,344.48	39.74	40.11	-9.74	7.56	7.42	-6.13	
4379	17	2	32	4,375.24	48.55	48.92	-9.52	6.97	6.88	4.06	
4411	20	1	32	4,405.61	58.63	58.99	-9.23	7.83	7.81	-1.88	
4443	22	2	32	4,435.55	69.91	70.27	-8.93	6.57	6.56	0.63	
4475	24	1	32	4,465.09	82.21	82.57	-8.65	5.67	5.63	-1.88	
4506	26	1	31	4,493.24	95.18	95.54	-8.39	8.07	8.06	0.97	
4538	27	1	32	4,521.84	109.54	109.89	-8.05	4.06	4.06	0.31	
4570	29	1	32	4,550.11	124.53	124.89	-7.79	4.23	4.06	-2.50	
4603	31	0	33	4,578.81	140.80	141.16	-7.70	5.81	5.76	-1.52	
4634	32	1	31	4,605.38	156.76	157.13	-7.61	3.29	3.23	1.29	
4666	34	0	32	4,632.36	173.96	174.34	-7.51	6.58	6.56	-0.94	
4697	36	0	31	4,657.75	191.74	192.12	-7.41	9.04	9.03	0.65	
4730	39	3	33	4,683.93	211.82	212.20	-6.88	7.80	6.67	6.67	
4761	40	1	31	4,707.88	231.49	231.86	-6.26	6.11	5.16	-5.16	
4794	43	1	33	4,732.56	253.40	253.77	-5.98	8.54	8.48	-1.52	
4825	47	1	31	4,754.57	275.21	275.59	-5.77	11.29	11.29	0.32	
4857	49	2	32	4,776.04	298.93	299.31	-5.29	8.81	8.44	3.44	
4889	50	2	32	4,796.89	323.21	323.57	-4.57	0.94	0.94	0.00	
4920	49	2	31	4,817.08	346.73	347.08	-3.85	1.00	-0.97	0.32	
4952	49	2	32	4,837.99	370.95	371.29	-3.09	0.00	0.00	0.00	
4984	49	1	32	4,858.92	395.15	395.49	-2.48	1.68	-0.31	-2.19	
5016	49	1	32	4,879.94	419.28	419.62	-1.95	1.17	-0.94	0.94	
5048	51	2	32	4,900.46	443.83	444.16	-1.29	8.16	8.13	0.94	
5079	55	2	31	4,919.14	468.57	468.88	-0.40	10.16	10.00	2.26	
5111	58	4	32	4,937.01	495.10	495.38	1.11	10.64	9.69	5.31	
5143	61	5	32	4,953.39	522.55	522.76	3.37	10.51	10.00	3.75	
5175	64	6	32	4,968.12	550.90	551.03	6.17	11.42	11.25	2.19	
5207	68	7	32	4,980.98	580.12	580.15	9.36	11.96	11.88	1.56	
5239	72	7	32	4,991.87	610.11	610.04	12.82	11.89	11.88	0.63	
5270	75	6	31	5,000.72	639.73	639.56	16.10	9.29	9.03	-2.26	
5302	76	8	32	5,008.79	670.57	670.29	19.93	7.64	3.75	6.88	
5334	79	9	32	5,015.63	701.63	701.21	24.50	10.38	10.31	1.25	
5365	82	9	31	5,020.64	732.01	731.44	29.15	9.08	9.03	0.97	
5397	86	8	32	5,023.99	763.63	762.90	33.88	12.07	11.88	-2.19	
5429	89	7	32	5,025.30	795.43	794.58	38.22	11.22	10.94	-2.50	
5495	91	7	66	5,025.13	861.17	860.07	46.38	2.45	2.27	-0.91	
5527	91	8	32	5,024.62	893.04	891.82	50.36	2.19	0.00	2.19	
5590	90	6	63	5,024.02	955.81	954.35	57.93	2.21	-1.11	-1.90	
5623	90	6	33	5,023.99	988.72	987.16	61.49	1.09	-0.91	-0.61	
5687	89	4	64	5,024.49	1,052.64	1,050.92	66.96	3.91	-1.09	-3.75	
5720	89	3	33	5,024.89	1,085.63	1,083.86	68.86	2.50	0.61	-2.42	

DIRECTIONAL SURVEY CALCULATION

MINIMUM CURVATURE METHOD

Well Name		Target Direction	Slot	N / S	E / W	Hole Size	Calculation by	Date			
Lawyer 2629 1-30H		2.04	Coordinate					10/30/12			
Job Number		Type of Survey	Tie-in Point				Directional Co.				
0											
Measured Depth	Hole Angle	Hole Direction	Course Length	True Vertical Depth	Vertical Section	Total Coordinate		Dogleg Severity	Build Up %/100 ft	Walk/ %/100 ft	
						N + / S -	E + / W -				
0	0	0	0	0.00	0.00					<< TIE-IN POINT >>	
5784	90	0	64	5,025.29	1,149.62	1,147.83	70.64	4.14	0.78	-4.06	
5815	90	360	31	5,025.23	1,180.60	1,178.83	70.67	2.07	1.29	1,159.68	
5879	91	0	64	5,024.39	1,244.55	1,242.83	70.67	1.54	1.41	-561.88	
5911	91	360	32	5,023.67	1,276.52	1,274.82	70.62	1.98	0.63	1,123.13	
5974	90	359	63	5,023.17	1,339.45	1,337.81	70.01	3.05	-3.02	-0.48	
6006	90	1	32	5,023.29	1,371.43	1,369.81	69.98	4.47	1.87	#####	
6037	90	360	31	5,023.39	1,402.41	1,400.81	70.04	3.76	-1.94	1,158.06	
6102	91	359	65	5,023.22	1,467.34	1,465.80	69.30	2.14	2.00	-0.77	
6165	91	359	63	5,022.01	1,530.23	1,528.78	68.04	1.24	0.95	-0.79	
6197	92	358	32	5,021.09	1,562.14	1,560.75	67.03	2.95	1.56	-2.50	
6261	92	357	64	5,019.19	1,625.92	1,624.66	64.30	1.00	-0.63	-0.78	
6293	91	358	32	5,018.47	1,657.82	1,656.63	63.01	2.79	-1.25	2.50	
6357	91	358	64	5,017.57	1,721.66	1,720.59	60.95	0.95	-0.94	0.16	
6388	91	358	31	5,017.30	1,752.60	1,751.57	60.00	0.32	0.00	0.32	
6453	91	358	65	5,016.62	1,817.46	1,816.54	58.13	0.34	0.31	0.15	
6484	91	358	31	5,016.16	1,848.39	1,847.52	57.21	1.16	0.97	-0.65	
6547	92	358	63	5,014.62	1,911.23	1,910.48	55.34	1.31	1.27	0.32	
6579	92	359	32	5,013.48	1,943.16	1,942.45	54.64	2.69	1.56	2.19	
6611	91	0	32	5,012.45	1,975.12	1,974.43	54.48	4.69	-2.81	#####	
6674	91	2	63	5,011.40	2,038.10	2,037.40	55.79	3.19	-1.43	2.86	
6738	90	1	64	5,011.01	2,102.10	2,101.37	57.69	1.33	-0.47	-1.25	
6769	90	1	31	5,011.06	2,133.09	2,132.36	58.42	1.96	-1.94	0.32	
6832	91	1	63	5,011.01	2,196.09	2,195.35	59.74	1.56	1.43	-0.63	
6864	91	1	32	5,010.65	2,228.08	2,227.34	60.36	1.13	0.94	0.63	
6895	90	2	31	5,010.32	2,259.08	2,258.33	61.20	2.60	-1.29	2.26	
6927	91	2	32	5,010.04	2,291.08	2,290.31	62.28	0.70	0.62	0.31	
6959	91	2	32	5,009.62	2,323.07	2,322.28	63.46	1.13	0.94	0.63	
7024	90	4	65	5,008.94	2,388.06	2,387.19	66.86	2.63	-0.92	2.46	
7055	91	3	31	5,008.67	2,419.04	2,418.13	68.81	1.82	1.29	-1.29	
7087	90	4	32	5,008.59	2,451.03	2,450.06	70.81	3.66	-3.44	1.25	
7119	89	4	32	5,008.87	2,483.02	2,481.99	72.94	0.62	-0.62	0.00	
7150	90	3	31	5,009.06	2,514.00	2,512.93	74.85	2.28	1.61	-1.61	
7213	90	4	63	5,009.28	2,576.98	2,575.81	78.76	0.85	-0.32	0.79	
7245	89	3	32	5,009.53	2,608.97	2,607.75	80.74	1.82	-0.94	-1.56	
7309	89	3	64	5,010.20	2,672.95	2,671.65	84.25	0.47	0.00	-0.47	
7340	89	3	31	5,010.52	2,703.95	2,702.60	85.93	0.65	0.00	0.65	
7403	89	3	63	5,011.24	2,766.93	2,765.50	89.34	0.35	-0.16	-0.32	
7435	89	3	32	5,011.66	2,798.92	2,797.45	91.09	0.99	-0.31	0.94	
7499	90	3	64	5,011.99	2,862.91	2,861.36	94.56	1.68	1.56	-0.63	
7530	90	3	31	5,011.88	2,893.90	2,892.31	96.21	0.97	0.00	0.97	
7594	90	3	64	5,011.77	2,957.89	2,956.22	99.61	0.56	-0.31	-0.47	
7625	90	3	31	5,011.83	2,988.89	2,987.18	101.18	0.65	-0.65	0.00	
7689	90	10	64	5,012.22	3,052.67	3,050.75	108.25	10.79	-0.47	10.78	
7720	89	2	31	5,012.57	3,083.57	3,081.56	111.46	24.86	-0.97	-24.84	
7783	89	1	63	5,013.39	3,146.57	3,144.52	113.33	1.28	0.16	-1.27	
7816	89	0	33	5,013.86	3,179.55	3,177.52	113.71	3.99	-0.61	-3.94	
7879	90	1	63	5,014.19	3,242.52	3,240.51	114.20	2.38	1.90	1.43	
7911	90	2	32	5,013.99	3,274.52	3,272.50	114.93	2.52	0.31	2.50	
7974	90	1	63	5,013.55	3,337.52	3,335.48	116.47	0.95	0.00	-0.95	
8005	90	0	31	5,013.36	3,368.51	3,366.48	116.82	2.92	-0.32	-2.90	
8069	91	1	64	5,012.86	3,432.48	3,430.48	117.43	1.19	0.47	1.09	
8101	91	1	32	5,012.47	3,464.48	3,462.47	118.08	1.68	0.63	1.56	
8165	91	1	64	5,011.41	3,528.46	3,526.44	119.47	0.66	0.47	-0.47	
8197	91	1	32	5,010.79	3,560.45	3,558.43	119.97	1.25	0.00	-1.25	
8260	90	1	63	5,010.02	3,623.43	3,621.42	120.96	1.42	-1.27	0.63	
8291	90	1	31	5,009.99	3,654.42	3,652.42	121.45	2.07	-1.61	-1.29	
8355	90	1	64	5,010.27	3,718.41	3,716.40	122.62	1.10	-0.16	1.09	

