

DIRECTIONAL SURVEY CALCULATION

MINIMUM CURVATURE METHOD

Well Name		Target Direction	Slot Coordinate	N / S	E / W	Hole Size	Calculation by	Date			
Faldtz 2231 1-26H		1.45						1/16/13			
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 >>											
250	0	331	250	250.00	0.56	0.57	-0.32	0.12	0.12	132.36	
450	1	331	200	449.99	1.77	1.79	-1.00	0.10	0.10	0.00	
500	0	331	50	499.99	2.07	2.10	-1.17	0.40	-0.40	0.00	
720	0	331	220	719.99	3.22	3.27	-1.82	0.05	0.05	0.00	
1020	1	331	300	1,019.97	6.15	6.24	-3.48	0.17	0.17	0.00	
1217	1	331	197	1,216.95	8.52	8.65	-4.81	0.10	-0.10	0.00	
2014	1	315	797	2,013.80	19.87	20.24	-14.50	0.11	0.10	-1.98	
2483	1	330	469	2,482.69	27.47	28.01	-20.77	0.13	-0.11	3.24	
2948	0	338	465	2,947.66	31.80	32.40	-23.12	0.15	-0.15	1.57	
3421	0	357	473	3,420.65	34.23	34.84	-23.60	0.03	0.02	4.18	
3899	0	87	478	3,898.65	35.74	36.34	-22.91	0.08	-0.04	-56.58	
3931	1	36	32	3,930.65	35.87	36.46	-22.78	1.37	1.09	-158.22	
3962	1	348	31	3,961.65	36.31	36.90	-22.76	3.11	2.26	1,004.81	
3994	3	356	32	3,993.62	37.60	38.19	-22.90	6.94	6.88	26.06	
4026	6	351	32	4,025.51	40.12	40.72	-23.21	7.26	7.16	-15.66	
4055	8	350	29	4,054.32	43.43	44.05	-23.76	6.67	6.66	-3.31	
4086	10	353	31	4,084.95	48.08	48.72	-24.44	7.23	7.10	9.06	
4117	12	360	31	4,115.37	54.03	54.68	-24.77	9.26	8.23	22.23	
4148	15	5	31	4,145.47	61.44	62.08	-24.46	10.03	9.35	#####	
4179	18	6	31	4,175.15	70.35	70.98	-23.61	9.47	9.35	5.10	
4211	21	6	32	4,205.31	80.99	81.58	-22.47	7.97	7.97	0.00	
4242	23	5	31	4,234.09	92.49	93.06	-21.33	7.19	7.10	-3.10	
4273	25	5	31	4,262.40	105.08	105.62	-20.22	6.82	6.81	-0.87	
4304	28	5	31	4,290.19	118.78	119.30	-18.98	7.97	7.94	1.71	
4459	38	4	155	4,420.74	201.85	202.22	-12.30	6.46	6.44	-0.96	
4490	39	3	31	4,445.09	221.02	221.37	-11.07	4.95	4.84	-1.71	
4521	40	4	31	4,468.95	240.79	241.12	-9.84	4.23	4.19	0.84	
4552	42	4	31	4,492.31	261.15	261.45	-8.45	5.24	5.16	1.42	
4583	43	4	31	4,515.15	282.09	282.36	-7.00	4.26	4.19	-1.13	
4613	45	4	30	4,536.71	302.93	303.17	-5.58	5.70	5.67	0.87	
4645	47	4	32	4,559.02	325.85	326.06	-4.04	5.68	5.63	-1.09	
4676	48	3	31	4,579.94	348.71	348.89	-2.74	5.87	5.48	-2.84	
4707	49	3	31	4,600.50	371.90	372.06	-1.55	0.73	0.32	0.87	
4739	48	3	32	4,621.83	395.75	395.89	-0.38	2.25	-1.88	-1.66	
4770	48	3	31	4,642.64	418.73	418.85	0.70	0.70	-0.32	0.84	
4801	48	3	31	4,663.42	441.72	441.82	1.86	0.78	0.65	0.58	
4833	49	3	32	4,684.73	465.59	465.66	3.03	1.76	1.56	-1.09	
4864	49	3	31	4,705.27	488.80	488.85	4.14	0.41	0.00	0.55	
4895	50	2	31	4,725.53	512.26	512.30	5.20	4.64	4.52	-1.42	
4927	54	3	32	4,745.33	537.38	537.40	6.33	11.61	11.56	1.38	
4958	57	2	31	4,762.93	562.89	562.88	7.45	11.73	11.61	-1.97	
4989	61	2	31	4,778.94	589.43	589.41	8.36	11.03	10.97	-1.42	
5021	64	2	32	4,793.87	617.73	617.70	9.19	10.01	10.00	-0.56	
5051	66	1	30	4,806.59	644.90	644.86	9.89	7.35	7.33	-0.57	
5081	68	2	30	4,818.26	672.53	672.48	10.60	7.34	7.33	0.30	
5113	71	2	32	4,829.47	702.50	702.44	11.38	8.12	8.12	0.00	
5145	73	1	32	4,839.38	732.93	732.86	12.13	7.21	7.19	-0.56	
5177	75	1	32	4,848.20	763.68	763.61	12.62	6.14	5.63	-2.56	
5209	77	0	32	4,855.97	794.72	794.65	12.87	6.57	6.56	-0.19	
5241	81	360	32	4,862.10	826.11	826.05	12.92	12.38	12.19	1,122.81	
5272	84	0	31	4,866.07	856.84	856.79	12.90	11.38	11.29	#####	
5304	87	1	32	4,868.44	888.75	888.70	13.15	8.60	8.44	1.66	
5383	91	1	79	4,869.89	967.72	967.66	14.61	4.77	4.68	0.89	
5475	91	2	92	4,868.12	1,059.70	1,059.60	17.30	0.87	0.65	0.58	
5566	89	1	91	4,867.49	1,150.69	1,150.57	19.40	2.58	-2.20	-1.35	
5658	90	1	92	4,868.05	1,242.68	1,242.56	20.47	0.55	0.54	-0.10	
5750	91	0	92	4,867.41	1,334.66	1,334.55	21.25	1.13	1.09	-0.29	

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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 >>	
5842	91	0	92	4,866.28	1,426.64	1,426.54	21.67	0.47	-0.43	-0.18	
5934	90	0	92	4,865.64	1,518.61	1,518.54	21.96	0.22	-0.22	0.00	
6026	91	0	92	4,864.68	1,610.58	1,610.54	22.18	0.66	0.65	-0.10	
6118	90	1	92	4,863.71	1,702.57	1,702.52	23.31	1.49	-0.65	1.34	
6210	91	1	92	4,862.35	1,794.55	1,794.49	25.08	1.29	1.20	-0.48	
6302	90	2	92	4,861.47	1,886.54	1,886.45	27.55	2.34	-1.85	1.43	
6393	89	3	91	4,862.34	1,977.53	1,977.37	31.32	0.67	-0.55	0.38	
6485	89	3	92	4,863.46	2,069.50	2,069.26	35.69	0.44	0.22	0.38	
6577	91	3	92	4,863.38	2,161.46	2,161.13	40.42	1.42	1.41	0.10	
6669	90	3	92	4,862.82	2,253.43	2,253.01	45.15	0.77	-0.76	-0.10	
6763	90	0	94	4,862.74	2,347.42	2,346.96	47.81	2.71	0.11	-2.71	
6858	90	359	95	4,862.49	2,442.37	2,441.96	47.23	1.48	0.11	377.47	
6953	90	357	95	4,862.32	2,537.17	2,536.88	43.59	2.42	-0.21	-2.41	
7047	90	357	94	4,862.58	2,630.87	2,630.74	38.48	0.57	-0.33	0.47	
7143	89	358	96	4,863.39	2,726.64	2,726.65	34.36	0.99	-0.36	0.92	
7238	87	358	95	4,866.52	2,821.43	2,821.54	31.30	2.62	-2.59	0.37	
7333	88	359	95	4,870.46	2,916.23	2,916.43	29.12	1.74	1.57	0.75	
7362	88	358	29	4,871.37	2,945.19	2,945.41	28.48	2.45	-1.21	-2.14	
7393	89	359	31	4,872.18	2,976.14	2,976.39	27.74	3.44	3.13	1.42	
7424	91	360	31	4,872.28	3,007.11	3,007.39	27.39	6.23	5.39	3.13	
7456	91	1	32	4,871.84	3,039.11	3,039.38	27.61	3.65	0.81	#####	
7488	92	1	32	4,871.12	3,071.10	3,071.37	28.28	2.61	2.22	1.38	
7520	92	1	32	4,870.14	3,103.08	3,103.34	29.06	0.81	0.81	0.00	
7551	93	1	31	4,868.76	3,134.05	3,134.30	29.83	4.26	4.26	0.00	
7583	94	1	32	4,866.78	3,165.99	3,166.23	30.49	2.58	2.19	-1.38	
7615	94	0	32	4,864.52	3,197.91	3,198.15	30.86	2.11	0.84	-1.94	
7647	95	360	32	4,862.04	3,229.80	3,230.05	30.93	2.13	1.62	1,123.63	
7678	93	1	31	4,859.83	3,260.72	3,260.97	31.26	6.03	-3.97	#####	
7710	94	2	32	4,857.87	3,292.66	3,292.90	32.05	0.63	0.28	0.56	
7741	93	2	31	4,856.14	3,323.61	3,323.84	33.02	2.99	-2.26	1.97	
7773	93	2	32	4,854.44	3,355.56	3,355.77	34.17	1.13	1.09	-0.28	
7805	94	2	32	4,852.48	3,387.50	3,387.69	35.23	2.10	1.94	-0.81	
7837	93	2	32	4,850.71	3,419.45	3,419.63	36.14	4.20	-4.12	-0.81	
7868	93	2	31	4,849.23	3,450.41	3,450.58	37.11	2.42	1.42	1.97	
7900	92	3	32	4,847.98	3,482.38	3,482.53	38.41	4.62	-4.41	1.38	
7932	92	2	32	4,847.09	3,514.37	3,514.49	39.78	0.63	0.28	-0.56	
7964	92	3	32	4,846.01	3,546.34	3,546.44	41.18	2.08	1.91	0.84	
7995	93	3	31	4,844.61	3,577.30	3,577.37	42.68	2.44	2.29	0.84	
8027	91	3	32	4,843.40	3,609.27	3,609.31	44.22	5.03	-4.97	-0.81	
8059	89	2	32	4,843.18	3,641.26	3,641.28	45.53	6.33	-6.03	-1.94	
8091	89	2	32	4,843.53	3,673.26	3,673.26	46.56	1.13	-0.28	-1.09	
8123	90	2	32	4,843.80	3,705.26	3,705.25	47.51	1.13	1.09	0.28	
8154	90	2	31	4,843.87	3,736.26	3,736.23	48.46	1.13	1.13	0.00	
8186	90	2	32	4,843.73	3,768.26	3,768.22	49.40	1.49	1.37	-0.56	
8217	91	1	31	4,843.39	3,799.26	3,799.21	50.11	1.89	0.87	-1.68	
8312	90	1	95	4,842.74	3,894.25	3,894.19	52.01	0.77	-0.75	0.18	
8407	91	360	95	4,841.72	3,989.23	3,989.17	52.66	2.13	1.21	377.19	
8502	91	1	95	4,839.89	4,084.19	4,084.15	53.32	1.77	-0.19	-377.19	
8597	91	2	95	4,837.86	4,179.17	4,179.10	55.65	0.59	0.46	0.37	
8692	90	3	95	4,836.76	4,274.15	4,274.02	59.29	2.11	-1.66	1.29	
8787	91	3	95	4,835.74	4,369.10	4,368.88	64.31	1.64	1.57	0.46	
8883	93	4	96	4,831.99	4,464.95	4,464.60	70.48	2.05	1.83	0.92	
8978	91	5	95	4,828.34	4,559.75	4,559.24	77.83	2.04	-1.94	0.65	
9073	89	3	95	4,827.90	4,654.66	4,654.02	84.09	2.96	-2.14	-2.04	
9163	90	2	90	4,828.32	4,744.64	4,743.93	88.23	1.15	1.08	-0.39	
9218	90	2	55	4,828.11	4,799.63	4,798.88	90.59	0.00	0.00	0.00	
0	0	0		4,828.11	4,799.63	4,798.88	90.59				

