



123 Robert S. Kerr Ave.
Oklahoma City, OK 73102

Survey VORNAUF 2-18H

Step #1 - Create a Deviation Survey

Step

#2 - Attach the survey "Description" to the Wellbore - Deviation Survey

Wellbores - Step #2

Actual Deviation Survey Vornauf 2-18H, Proposed? No	Wellbore Name Original Hole
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Deviation Surveys - Step #1

Description Vornauf 2-18H	Date 7/12/2012	VS Dir (°)	Comment
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Tie-in Data

Azimuth North Type	Convergence (°)	Declination (°)	MD Tie In (ftKB)	Azimuth Tie In (°)	Inclination Tie In (°)	TVDTie In (ftKB)	NSTie In (ft)	EWTie In (ft)
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Survey Data

MD (ftKB)	Incl (°)	Azim (°)	Survey Company	Method	TVD (ftKB)	VS (ft)	NS (ft)	EW (ft)	DLS (°/100ft)
1,064	0.7	222.03	Baker Hughes INTEQ	MWD	1,064	5	-4.90	-4.41	0.07
1,526	0.3	162.99	Baker Hughes INTEQ	MWD	1,526	8	-8.33	-5.93	0.13
1,994	0.3	181.56	Baker Hughes INTEQ	MWD	1,994	11	-10.97	-5.56	0.02
2,469	0.3	191.00	Baker Hughes INTEQ	MWD	2,469	13	-13.47	-5.82	0.01
2,944	0.6	102.26	Baker Hughes INTEQ	MWD	2,944	15	-15.19	-3.58	0.14
3,418	0.6	30.33	Baker Hughes INTEQ	MWD	3,418	14	-13.62	0.12	0.15
3,914	0.5	339.26	Baker Hughes INTEQ	MWD	3,914	9	-9.39	0.64	0.10
3,964	0.8	265.02	Baker Hughes INTEQ	MWD	3,964	9	-9.22	0.23	1.59
3,996	3.3	209.87	Baker Hughes INTEQ	MWD	3,996	10	-10.03	-0.44	9.09
4,028	6.5	196.17	Baker Hughes INTEQ	MWD	4,028	13	-12.56	-1.40	10.54
4,059	8.9	196.90	Baker Hughes INTEQ	MWD	4,058	16	-16.53	-2.59	7.88
4,091	11.6	196.33	Baker Hughes INTEQ	MWD	4,090	22	-22.00	-4.21	8.54
4,123	13.6	193.20	Baker Hughes INTEQ	MWD	4,121	29	-28.75	-5.98	6.34
4,154	15.0	190.85	Baker Hughes INTEQ	MWD	4,151	36	-36.23	-7.56	5.07
4,186	16.8	189.32	Baker Hughes INTEQ	MWD	4,182	45	-44.85	-9.09	5.65
4,218	18.9	186.33	Baker Hughes INTEQ	MWD	4,212	54	-54.57	-10.41	7.36
4,249	21.6	185.00	Baker Hughes INTEQ	MWD	4,242	65	-65.25	-11.46	8.61
4,281	23.9	182.32	Baker Hughes INTEQ	MWD	4,271	77	-77.58	-12.24	7.85
4,312	26.0	181.06	Baker Hughes INTEQ	MWD	4,299	90	-90.65	-12.62	7.21
4,344	28.1	181.67	Baker Hughes INTEQ	MWD	4,328	105	-105.19	-12.97	6.37
4,376	30.1	181.70	Baker Hughes INTEQ	MWD	4,356	121	-120.73	-13.42	6.38
4,408	32.0	180.70	Baker Hughes INTEQ	MWD	4,383	137	-137.22	-13.77	6.09
4,439	33.7	178.84	Baker Hughes INTEQ	MWD	4,409	154	-154.02	-13.69	6.32
4,471	35.4	178.37	Baker Hughes INTEQ	MWD	4,435	172	-172.14	-13.25	5.41
4,502	37.2	178.25	Baker Hughes INTEQ	MWD	4,460	190	-190.47	-12.71	5.91
4,534	38.6	178.49	Baker Hughes INTEQ	MWD	4,486	210	-210.12	-12.15	4.52
4,534	37.2	178.25	Baker Hughes INTEQ	MWD	4,486	210	-210.12	-12.15	4.52
4,566	40.1	178.99	Baker Hughes INTEQ	MWD	4,511	230	-230.10	-11.67	9.24
4,598	42.4	179.46	Baker Hughes INTEQ	MWD	4,535	251	-251.20	-11.39	7.22
4,629	43.7	179.11	Baker Hughes INTEQ	MWD	4,557	272	-272.36	-11.12	4.30
4,661	45.6	178.97	Baker Hughes INTEQ	MWD	4,580	295	-294.84	-10.75	5.76
4,693	48.3	178.80	Baker Hughes INTEQ	MWD	4,602	318	-318.21	-10.29	8.73
4,738	50.7	177.87	Baker Hughes INTEQ	MWD	4,631	352	-352.42	-9.29	5.41
4,788	50.7	177.48	Baker Hughes INTEQ	MWD	4,663	391	-391.07	-7.72	0.61
4,833	50.2	176.49	Baker Hughes INTEQ	MWD	4,692	426	-425.73	-5.90	2.00
4,874	49.9	175.92	Baker Hughes INTEQ	MWD	4,718	457	-457.09	-3.82	1.38
4,915	49.9	175.45	Baker Hughes INTEQ	MWD	4,744	488	-488.37	-1.46	0.89
4,946	52.8	176.65	Baker Hughes INTEQ	MWD	4,764	512	-512.53	0.20	9.80
4,946	52.8	176.65	Baker Hughes INTEQ	MWD	4,764	512	-512.53	0.20	9.80
4,976	55.3	178.69	Baker Hughes INTEQ	MWD	4,781	537	-536.80	1.19	9.93
5,010	58.2	179.29	Baker Hughes INTEQ	MWD	4,800	565	-565.22	1.68	8.60
5,042	61.7	178.64	Baker Hughes INTEQ	MWD	4,816	593	-592.92	2.19	11.23
5,073	65.1	178.72	Baker Hughes INTEQ	MWD	4,830	621	-620.63	2.83	10.87
5,105	68.7	179.36	Baker Hughes INTEQ	MWD	4,842	650	-650.05	3.32	11.21
5,137	72.0	180.12	Baker Hughes INTEQ	MWD	4,853	680	-680.18	3.45	10.77



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Step #1 - Create a Deviation Survey

Step

#2 - Attach the survey "Description" to the Wellbore - Deviation Survey

Survey Data

MD (ftKB)	Incl (°)	Azm (°)	Survey Company	Method	TVD (ftKB)	VS (ft)	NS (ft)	EW (ft)	DLS (°/100ft)
5,169	74.6	180.23	Baker Hughes INTEQ	MWD	4,862	711	-710.83	3.36	8.13
5,200	77.2	180.38	Baker Hughes INTEQ	MWD	4,870	741	-740.89	3.20	8.24
5,232	79.8	180.32	Baker Hughes INTEQ	MWD	4,876	772	-772.24	3.01	8.16
5,264	82.2	180.48	Baker Hughes INTEQ	MWD	4,881	804	-803.85	2.78	7.67
5,295	84.1	180.32	Baker Hughes INTEQ	MWD	4,885	835	-834.63	2.57	6.15
5,327	85.2	180.21	Baker Hughes INTEQ	MWD	4,888	866	-866.48	2.42	3.24
5,359	87.5	180.02	Baker Hughes INTEQ	MWD	4,890	898	-898.42	2.36	7.34
5,427	89.6	181.11	Baker Hughes INTEQ	MWD	4,892	966	-966.39	1.69	3.44
5,491	89.8	181.19	Baker Hughes INTEQ	MWD	4,892	1,030	-1,030.37	0.40	0.31
5,554	89.2	181.33	Baker Hughes INTEQ	MWD	4,893	1,093	-1,093.35	-0.98	0.90
5,618	89.3	181.10	Baker Hughes INTEQ	MWD	4,893	1,157	-1,157.33	-2.34	0.39
5,681	88.9	181.37	Baker Hughes INTEQ	MWD	4,894	1,220	-1,220.31	-3.70	0.78
5,744	88.6	181.00	Baker Hughes INTEQ	MWD	4,896	1,283	-1,283.28	-5.00	0.70
5,808	88.5	181.11	Baker Hughes INTEQ	MWD	4,897	1,347	-1,347.25	-6.18	0.24
5,903	90.0	179.62	Baker Hughes INTEQ	MWD	4,899	1,442	-1,442.24	-6.78	2.18
5,998	89.5	179.55	Baker Hughes INTEQ	MWD	4,899	1,537	-1,537.23	-6.09	0.49
6,093	89.6	178.26	Baker Hughes INTEQ	MWD	4,900	1,632	-1,632.21	-4.28	1.36
6,188	89.9	179.44	Baker Hughes INTEQ	MWD	4,900	1,727	-1,727.19	-2.37	1.28
6,283	90.3	180.22	Baker Hughes INTEQ	MWD	4,900	1,822	-1,822.19	-2.09	0.91
6,378	90.1	180.36	Baker Hughes INTEQ	MWD	4,900	1,917	-1,917.19	-2.57	0.25
6,473	89.6	180.77	Baker Hughes INTEQ	MWD	4,900	2,012	-2,012.18	-3.51	0.66
6,568	89.2	179.81	Baker Hughes INTEQ	MWD	4,901	2,107	-2,107.17	-3.99	1.09
6,663	89.4	179.61	Baker Hughes INTEQ	MWD	4,902	2,202	-2,202.16	-3.51	0.31
6,758	88.4	179.81	Baker Hughes INTEQ	MWD	4,904	2,297	-2,297.14	-3.03	1.08
6,853	89.3	179.53	Baker Hughes INTEQ	MWD	4,906	2,392	-2,392.12	-2.48	1.01
6,949	90.5	179.11	Baker Hughes INTEQ	MWD	4,906	2,488	-2,488.11	-1.34	1.32
7,044	89.9	179.43	Baker Hughes INTEQ	MWD	4,906	2,583	-2,583.11	-0.13	0.70
7,139	89.3	179.06	Baker Hughes INTEQ	MWD	4,907	2,678	-2,678.09	1.12	0.81
7,193	90.2	179.11	Baker Hughes INTEQ	MWD	4,907	2,732	-2,732.09	1.98	1.78
7,257	91.5	179.36	Baker Hughes INTEQ	MWD	4,906	2,796	-2,796.07	2.84	2.05
7,352	91.8	179.24	Baker Hughes INTEQ	MWD	4,903	2,891	-2,891.03	4.00	0.29
7,447	92.3	178.66	Baker Hughes INTEQ	MWD	4,900	2,986	-2,985.95	5.74	0.82
7,542	91.7	179.04	Baker Hughes INTEQ	MWD	4,896	3,081	-3,080.87	7.64	0.74
7,637	91.9	179.20	Baker Hughes INTEQ	MWD	4,893	3,176	-3,175.81	9.10	0.31
7,732	89.8	178.81	Baker Hughes INTEQ	MWD	4,892	3,271	-3,270.78	10.75	2.34
7,828	89.2	179.41	Baker Hughes INTEQ	MWD	4,893	3,367	-3,366.77	12.24	0.88
7,923	89.2	179.52	Baker Hughes INTEQ	MWD	4,894	3,462	-3,461.75	13.13	0.12
8,018	91.5	180.78	Baker Hughes INTEQ	MWD	4,894	3,557	-3,556.74	12.88	2.81
8,113	91.1	180.82	Baker Hughes INTEQ	MWD	4,892	3,652	-3,651.71	11.56	0.49
8,208	91.1	180.82	Baker Hughes INTEQ	MWD	4,890	3,746	-3,746.68	10.20	0.00
8,303	90.3	179.85	Baker Hughes INTEQ	MWD	4,889	3,841	-3,841.67	9.64	1.30
8,398	90.7	181.25	Baker Hughes INTEQ	MWD	4,888	3,936	-3,936.66	8.73	1.51
8,493	90.9	180.55	Baker Hughes INTEQ	MWD	4,886	4,031	-4,031.64	7.24	0.79
8,588	88.6	180.07	Baker Hughes INTEQ	MWD	4,887	4,126	-4,126.63	6.72	2.46
8,683	88.4	178.53	Baker Hughes INTEQ	MWD	4,889	4,221	-4,221.59	7.88	1.63
8,778	90.4	177.05	Baker Hughes INTEQ	MWD	4,890	4,316	-4,316.51	11.55	2.58
8,873	90.6	180.43	Baker Hughes INTEQ	MWD	4,889	4,411	-4,411.47	13.63	3.56
8,968	90.9	179.58	Baker Hughes INTEQ	MWD	4,888	4,506	-4,506.46	13.63	0.96
9,063	87.6	179.30	Baker Hughes INTEQ	MWD	4,889	4,601	-4,601.43	14.55	3.50
9,158	88.3	179.08	Baker Hughes INTEQ	MWD	4,893	4,696	-4,696.36	15.90	0.82
9,253	90.2	179.27	Baker Hughes INTEQ	MWD	4,894	4,791	-4,791.34	17.26	1.92
9,348	91.0	179.27	Baker Hughes INTEQ	MWD	4,893	4,886	-4,886.33	18.47	0.92



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Survey Data

MD (ftKB)	Incl (°)	Azm (°)	Survey Company	Method	TVD (ftKB)	VS (ft)	NS (ft)	EW (ft)	DLS (°/100ft)
9,443	90.8	177.87	Baker Hughes INTEQ	MWD	4,892	4,981	-4,981.28	20.84	1.49
9,538	93.0	177.95	Baker Hughes INTEQ	MWD	4,888	5,076	-5,076.16	24.31	2.33
9,633	90.1	176.28	Baker Hughes INTEQ	MWD	4,886	5,171	-5,170.99	29.09	3.60
9,728	89.7	176.16	Baker Hughes INTEQ	MWD	4,886	5,266	-5,265.78	35.35	0.38
9,823	91.7	175.57	Baker Hughes INTEQ	MWD	4,885	5,361	-5,360.52	42.20	2.13
9,918	92.4	176.49	Baker Hughes INTEQ	MWD	4,882	5,455	-5,455.23	48.77	1.22
10,013	92.1	175.73	Baker Hughes INTEQ	MWD	4,878	5,550	-5,549.94	55.21	0.85
10,108	91.3	176.71	Baker Hughes INTEQ	MWD	4,875	5,645	-5,644.69	61.47	1.36
10,172	89.8	177.33	Baker Hughes INTEQ	MWD	4,874	5,709	-5,708.60	64.80	2.51
10,235	88.7	177.13	Baker Hughes INTEQ	MWD	4,875	5,772	-5,771.52	67.84	1.79
10,298	88.5	176.56	Baker Hughes INTEQ	MWD	4,877	5,835	-5,834.41	71.31	0.94
10,393	88.8	176.66	Baker Hughes INTEQ	MWD	4,879	5,930	-5,929.21	76.93	0.27
10,488	88.4	176.90	Baker Hughes INTEQ	MWD	4,881	6,025	-6,024.04	82.26	0.42
10,583	90.0	178.22	Baker Hughes INTEQ	MWD	4,883	6,120	-6,118.94	86.30	2.13
10,678	90.5	179.18	Baker Hughes INTEQ	MWD	4,882	6,215	-6,213.91	88.46	1.15
10,742	89.5	178.88	Baker Hughes INTEQ	MWD	4,882	6,279	-6,277.90	89.54	1.66
10,837	89.5	179.77	Baker Hughes INTEQ	MWD	4,883	6,374	-6,372.89	90.66	0.94
10,900	89.7	179.57	Baker Hughes INTEQ	MWD	4,884	6,437	-6,435.88	91.02	0.50
10,964	89.9	179.60	Baker Hughes INTEQ	MWD	4,884	6,501	-6,499.88	91.49	0.25
11,027	88.8	179.04	Baker Hughes INTEQ	MWD	4,885	6,564	-6,562.87	92.24	1.89
11,122	89.1	179.06	Baker Hughes INTEQ	MWD	4,886	6,659	-6,657.84	93.81	0.28
11,217	89.5	179.16	Baker Hughes INTEQ	MWD	4,887	6,753	-6,752.83	95.29	0.46
11,312	90.4	179.52	Baker Hughes INTEQ	MWD	4,888	6,848	-6,847.82	96.38	0.99
11,408	91.0	180.22	Baker Hughes INTEQ	MWD	4,886	6,944	-6,943.81	96.60	0.95
11,471	90.3	180.37	Baker Hughes INTEQ	MWD	4,886	7,007	-7,006.80	96.27	1.07
11,534	90.2	180.95	Baker Hughes INTEQ	MWD	4,885	7,070	-7,069.80	95.55	0.94
11,629	91.9	181.29	Baker Hughes INTEQ	MWD	4,884	7,165	-7,164.76	93.69	1.75
11,693	90.3	182.04	Baker Hughes INTEQ	MWD	4,882	7,229	-7,228.72	91.83	2.63