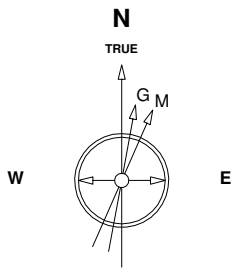
Great Western Operating Company, LLC

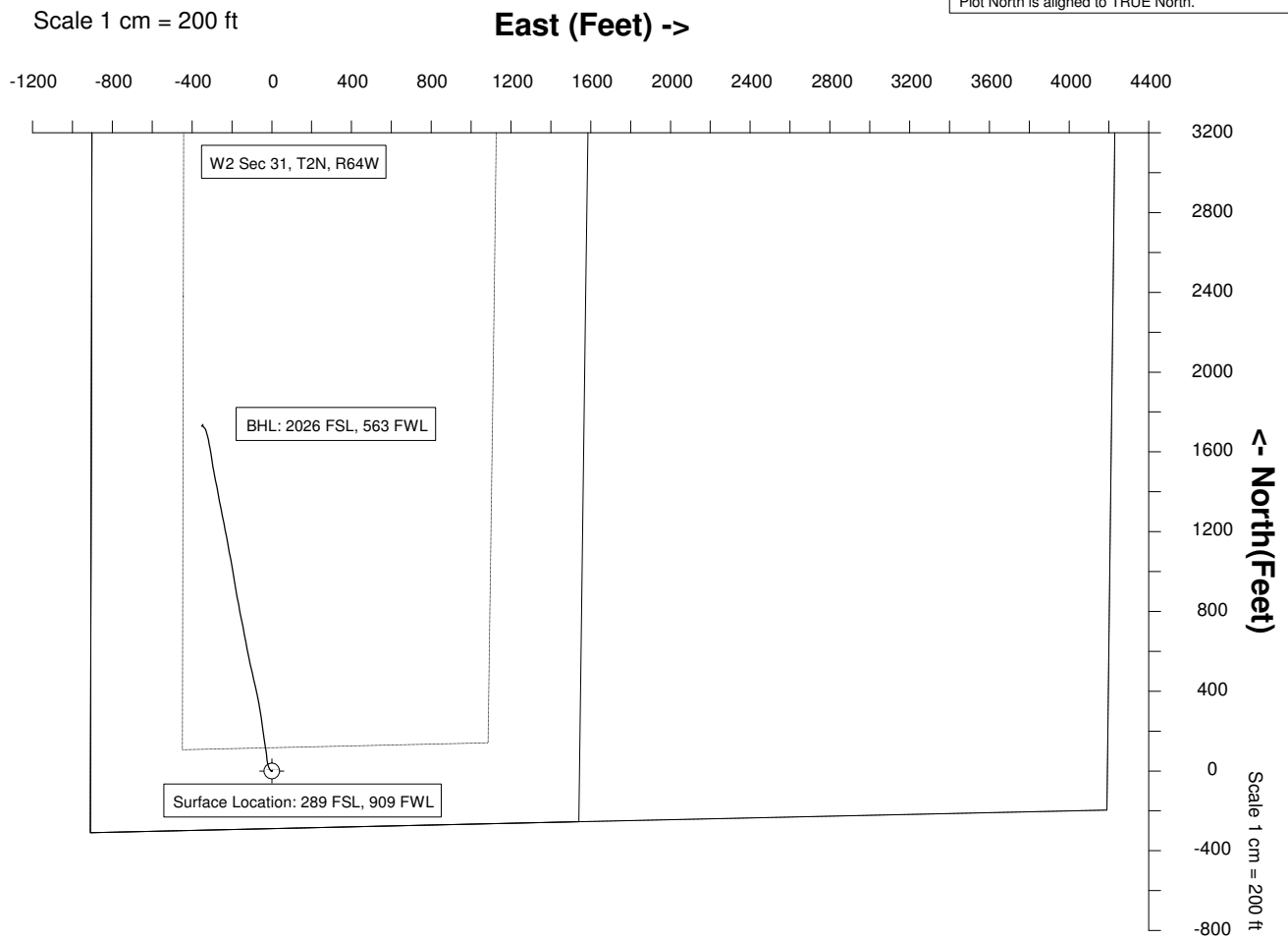
Location	**Colorado**	**Slot**	**Land JG 31-18D**
Field	**Wattenburg**	**Well**	**Land JG 31-18D**
Installation	**Land**	**Wellbore**	**Land JG 31-18D (AWB)**

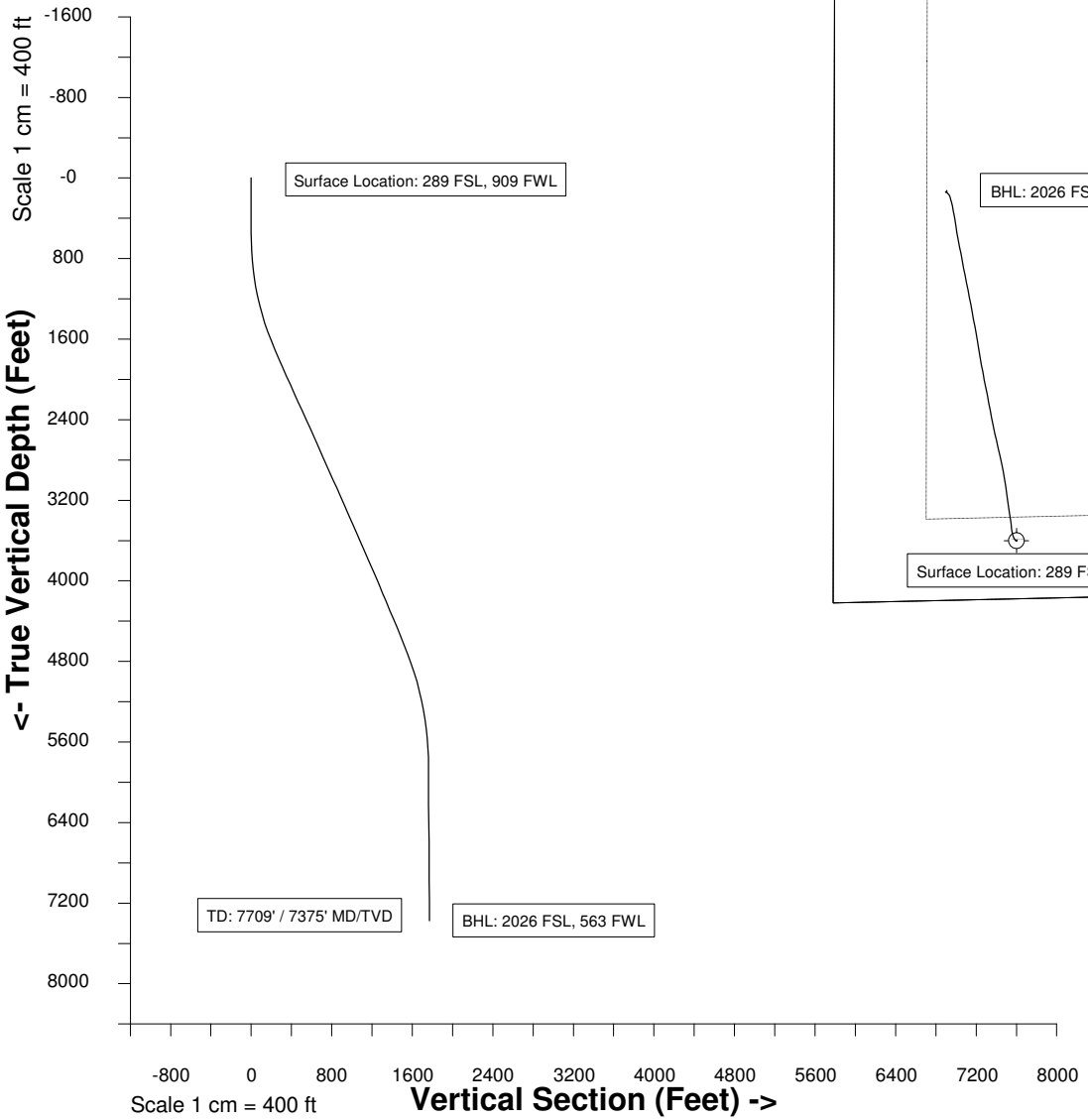
Created by admin
Date plotted 14-Mar-2016

Plot reference is Land JG 31-18D (AWB).
Ref wellpath is Land JG 31-18D (AWP#1).
Coordinates are in Feet reference Land JG 31-18D.
True Vertical Depths are reference Rig Datum.
Measured Depths are reference Rig Datum.
Rig Datum: Actual Datum #1
Rig Datum to Mean Sea Level: 4946.60 ft.
Plot North is aligned to TRUE North.



28-Aug-2015
IGRF Model [1900.0-2020.0] Dip: 66.68 deg Field: 52453.1 nT
Lat: N40 5 17.5596 Long: W104 35 57.6708 Elev: 4932.60 ft
Magnetic North is 8.29 deg East of TRUE North
To correct azimuth from Magnetic to TRUE add 8.29 deg





PATRIOT DIRECTIONAL

Company: GREAT WESTERN
Field: WATTENBERG
Cty/Blk/Par: WELD
Well Name: Land JG 31-18D
Rig: CADE 25

Job Number: PA-2522
Magnetic Decl.: 8.56
Grid Corr.: TRUE
Total Survey Corr.: 8.56
Target Info: 2016' FSL & 575' FWL

Calculation Method: Minimum Curvature
Proposed Azimuth: 349.15
Depth Reference: RKB
Tie Into Drill SURFACE

No.	Tool Type	Survey Depth (ft)	Incl (°)	Azimuth (°)	Course Lgth (ft)	TVD (ft)	VS (ft)	Coordinates N/S (ft)		Coordinates E/W (ft)		DLS (°/100')	Bld Rate (°/100')	Wlk Rate (°/100')	Remarks
0	Tie In	0	0.00	0.00		0.00	0.00	0.00		0.00					SURFACE
1	MWD	88	0.40	102.60	88	88.00	-0.12	0.07	S	0.30	E	0.45	0.5	116.6	
2	MWD	178	0.60	75.70	90	178.00	-0.22	0.02	S	1.06	E	0.34	0.2	-29.9	
3	MWD	271	0.40	81.20	93	270.99	-0.20	0.15	N	1.86	E	0.22	-0.2	5.9	
4	MWD	364	1.10	258.20	93	363.99	-0.23	0.02	N	1.30	E	1.61	0.8	190.3	
5	MWD	454	1.20	250.10	90	453.97	-0.39	0.48	S	0.43	W	0.21	0.1	-9.0	
6	MWD	544	1.20	263.60	90	543.95	-0.47	0.91	S	2.25	W	0.31	0.0	15.0	
7	MWD	635	2.10	307.00	91	634.91	0.84	0.01	S	4.53	W	1.63	1.0	47.7	
8	MWD	725	3.50	328.20	90	724.81	4.63	3.32	N	7.30	W	1.91	1.6	23.6	
9	MWD	820	4.70	335.30	95	819.56	11.12	9.32	N	10.45	W	1.37	1.3	7.5	
10	MWD	915	6.80	337.40	95	914.08	20.41	18.05	N	14.24	W	2.22	2.2	2.2	
11	MWD	988	8.00	341.30	73	986.47	29.67	26.85	N	17.53	W	1.78	1.6	5.3	
12	MWD	1077	10.40	351.20	89	1074.33	43.84	40.66	N	20.74	W	3.22	2.7	11.1	
13	MWD	1172	12.00	350.80	95	1167.51	62.28	58.88	N	23.63	W	1.69	1.7	-0.4	
14	MWD	1267	14.00	352.90	95	1260.07	83.62	80.04	N	26.63	W	2.16	2.1	2.2	
15	MWD	1361	15.80	354.00	94	1350.91	107.72	104.05	N	29.38	W	1.94	1.9	1.2	
16	MWD	1455	18.20	350.30	94	1440.80	135.15	131.25	N	33.19	W	2.80	2.6	-3.9	
17	MWD	1550	20.60	351.20	95	1530.40	166.69	162.39	N	38.25	W	2.55	2.5	0.9	
18	MWD	1643	21.50	352.90	93	1617.19	200.05	195.48	N	42.86	W	1.17	1.0	1.8	
19	MWD	1738	23.00	352.70	95	1705.12	235.95	231.16	N	47.37	W	1.58	1.6	-0.2	
20	MWD	1832	23.50	351.20	94	1791.48	273.00	267.90	N	52.57	W	0.82	0.5	-1.6	
21	MWD	1927	23.70	350.60	95	1878.54	311.02	305.45	N	58.58	W	0.33	0.2	-0.6	
22	MWD	2022	24.40	348.90	95	1965.29	349.73	343.55	N	65.48	W	1.04	0.7	-1.8	
23	MWD	2116	24.20	348.20	94	2050.96	388.41	381.46	N	73.16	W	0.37	-0.2	-0.7	
24	MWD	2211	23.80	346.40	95	2137.75	427.02	419.15	N	81.65	W	0.88	-0.4	-1.9	
25	MWD	2306	25.10	348.20	95	2224.23	466.32	457.51	N	90.27	W	1.58	1.4	1.9	
26	MWD	2400	24.40	346.60	94	2309.60	505.65	495.91	N	98.85	W	1.03	-0.7	-1.7	
27	MWD	2494	24.40	347.80	94	2395.20	544.46	533.77	N	107.45	W	0.53	0.0	1.3	
28	MWD	2589	24.60	348.90	95	2481.65	583.85	572.36	N	115.41	W	0.52	0.2	1.2	
29	MWD	2683	23.70	348.30	94	2567.42	622.31	610.06	N	123.00	W	0.99	-1.0	-0.6	
30	MWD	2777	23.70	349.40	94	2653.49	660.09	647.13	N	130.31	W	0.47	0.0	1.2	
31	MWD	2872	24.20	349.80	95	2740.31	698.65	685.06	N	137.27	W	0.55	0.5	0.4	
32	MWD	2966	23.60	348.70	94	2826.25	736.73	722.47	N	144.37	W	0.80	-0.6	-1.2	
33	MWD	3059	24.30	347.80	93	2911.25	774.48	759.43	N	152.06	W	0.85	0.8	-1.0	
34	MWD	3152	24.80	349.80	93	2995.84	813.11	797.33	N	159.56	W	1.04	0.5	2.2	
35	MWD	3246	24.10	349.20	94	3081.41	852.02	835.58	N	166.65	W	0.79	-0.7	-0.6	
36	MWD	3341	23.20	349.80	95	3168.43	890.12	873.05	N	173.60	W	0.98	-0.9	0.6	
37	MWD	3436	23.60	349.80	95	3255.62	927.85	910.19	N	180.28	W	0.42	0.4	0.0	
38	MWD	3530	24.40	351.20	94	3341.49	966.07	947.89	N	186.58	W	1.04	0.9	1.5	
39	MWD	3625	24.70	351.00	95	3427.90	1005.52	986.89	N	192.69	W	0.33	0.3	-0.2	
40	MWD	3719	23.40	349.90	94	3513.74	1043.81	1024.67	N	199.03	W	1.46	-1.4	-1.2	
41	MWD	3813	23.60	348.90	94	3599.94	1081.29	1061.51	N	205.93	W	0.47	0.2	-1.1	
42	MWD	3908	23.10	349.90	95	3687.16	1118.95	1098.52	N	212.86	W	0.67	-0.5	1.1	
43	MWD	4002	23.60	349.90	94	3773.46	1156.20	1135.19	N	219.39	W	0.53	0.5	0.0	
44	MWD	4095	23.40	348.50	93	3858.75	1193.28	1171.62	N	226.34	W	0.64	-0.2	-1.5	
45	MWD	4190	23.30	349.00	95	3945.97	1230.93	1208.55	N	233.68	W	0.23	-0.1	0.5	
46	MWD	4284	23.00	348.70	94	4032.40	1267.89	1244.81	N	240.83	W	0.34	-0.3	-0.3	
47	MWD	4379	22.10	348.30	95	4120.14	1304.32	1280.51	N	248.09	W	0.96	-0.9	-0.4	
48	MWD	4473	22.90	348.70	94	4206.98	1340.28	1315.76	N	255.26	W	0.87	0.9	0.4	
49	MWD	4568	22.50	349.00	95	4294.62	1376.95	1351.73	N	262.35	W	0.44	-0.4	0.3	
50	MWD	4662	23.50	349.80	94	4381.15	1413.67	1387.83	N	269.10	W	1.11	1.1	0.9	
51	MWD	4757	22.30	349.60	95	4468.66	1450.64	1424.20	N	275.71	W	1.27	-1.3	-0.2	
52	MWD	4852	21.60	349.40	95	4556.77	1486.15	1459.11	N	282.18	W	0.74	-0.7	-0.2	
53	MWD	4947	21.10	348.30	95	4645.25	1520.73	1493.05	N	288.86	W	0.67	-0.5	-1.2	
54	MWD	5042	21.10	350.10	95	4733.89	1554.93	1526.64	N	295.27	W	0.68	0.0	1.9	
55	MWD	5137	20.00	350.50	95	4822.84	1588.27	1559.51	N	300.89	W	1.17	-1.2	0.4	
56	MWD	5232	18.30	352.90	95	4912.58	1619.39	1590.33	N	305.42	W	1.97	-1.8	2.5	
57	MWD	5326	15.70	349.00	94	5002.47	1646.84	1617.47	N	309.67	W	3.02	-2.8	-4.1	
58	MWD	5422	12.60	350.50	96	5095.54	1670.31	1640.55	N	313.88	W	3.25	-3.2	1.6	
59	MWD	5517	12.30	348.50	95	5188.31	1690.78	1660.68	N	317.60	W	0.55	-0.3	-2.1	
60	MWD	5612	11.10	345.40	95	5281.34	1710.03	1679.45	N	321.93	W	1.43	-1.3	-3.3	
61	MWD	5707	8.60	344.00	95	5374.93	1726.23	1695.13	N	326.19	W	2.64	-2.6	-1.5	
62	MWD	5802	7.10	340.60	95	5469.04	1739.11	1707.50	N	330.10	W	1.65	-1.6	-3.6	
63	MWD	5896	5.20	321.60	94	5562.50	1748.63	1716.32	N	334.68	W	2.94	-2.0	-20.2	
64	MWD	5991	4.10	318.60	95	5657.19	1755.38	1722.24	N	339.60	W	1.19	-1.2	-3.2	
65	MWD	6086	2.40	322.70	95	5752.03	1760.08	1726.37	N	343.05	W	1.80	-1.8	4.3	
66	MWD	6181	0.10	196.60	95	5847.00	1761.79	1727.87	N	344.28	W	2.59	-2.4	-132.7	
67	MWD	6368	0.40	261.90	187	6034.00	1761.68	1727.62	N	344.97	W	0.20	0.2	34.9	
68	MWD	6558	0.70	268.00	190	6223.99	1761.89	1727.49	N	346.79	W	0.16	0.2	3.2	
69	MWD	6747	1.30	301.90	189	6412.96	1763.52	1728.58	N	349.76	W	0.43	0.3	17.9	
70	MWD	6936	0.80	321.80	189	6601.93	1766.15	1730.75	N	352.40	W	0.32	-0.3	10.5	
71	MWD	7125	1.70	88.50	189	6790.91	1766.86	1731.86	N	350.41	W	1.20	0.5	-123.4	
72	MWD	7312	0.90	62.30	187	6977.86	1766.84	1732.62	N	346.34	W	0.52	-0.4	-14.0	
73	MWD	7501	0.90	351.50	189	7166.84	1768.75	1734.78	N	345.24	W	0.55	0.0	153.0	
74	MWD	7659	0.60	356.30	158	7324.83	1770.81	1736.83	N	345.48	W	0.19	-0.2	3.0	TD SURVEY
75	PRJ	7709	0.60	356.30	50	7374.82	1771.33	1737.35	N	345.51	W	0.00	0.0	0.0	PROJECTION TO BIT