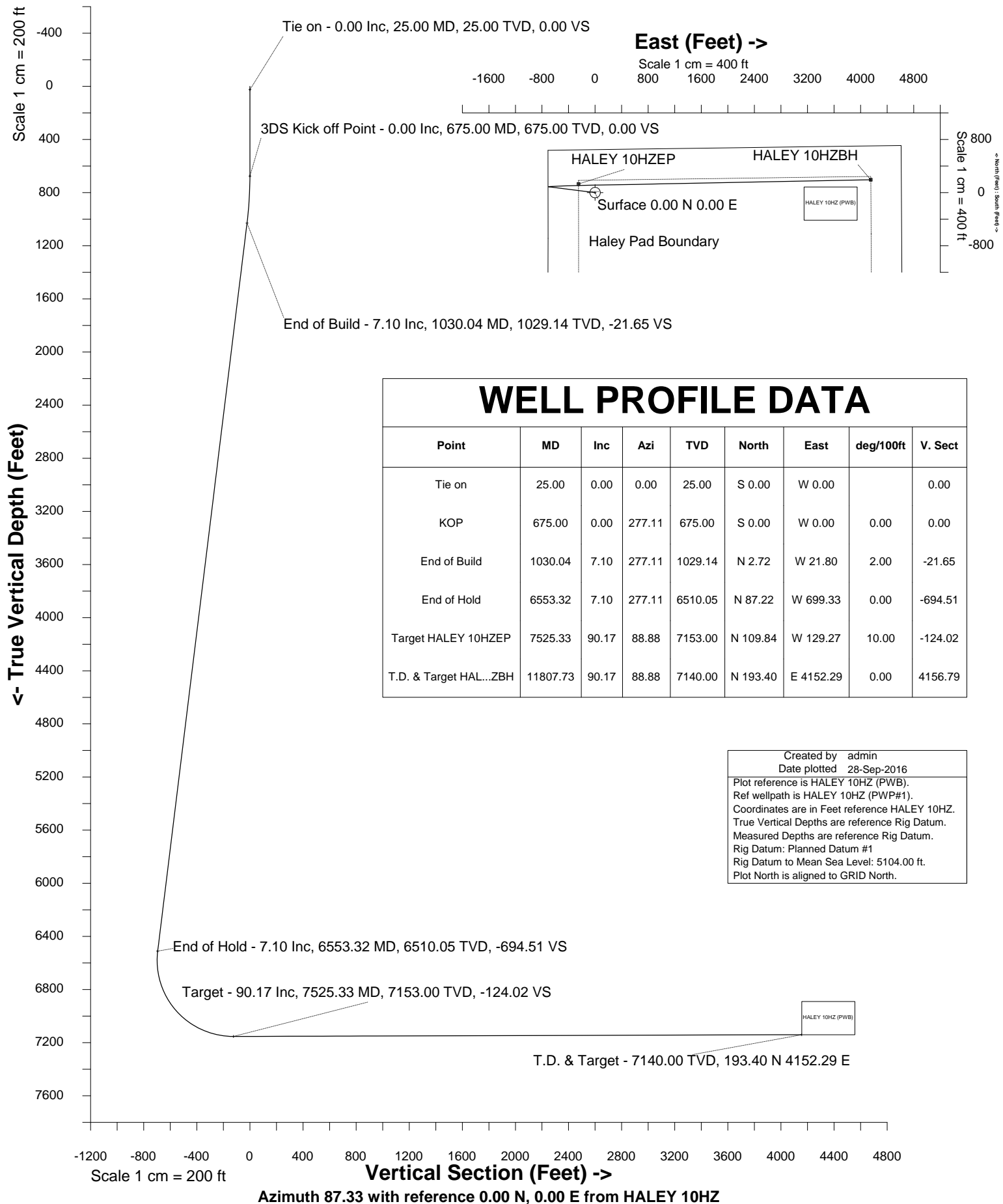




Cub Creek Energy, LLC



Location	Weld County, CO	Slot	HALEY 10HZ
Field	WATTENBERG	Well	HALEY 10HZ
Installation	Haley	Wellbore	HALEY 10HZ (PWB)





SYSDRILL
Well Design Combined Report
Wellbore: HALEY 10HZ (PWB)



Wellhead Details							
Name	Latitude	Longitude	Northing	Easting	North	East	Slot Elevation Above Ground
HALEY 10HZ	40.20936000	-105.03382000	1319454.3970	3130200.4605	11.09N	30.67E	0.00

Declination		
Date	Source	Time
Oct-19-2015	IGRF Model [1900.0-2020.0]	09:07

Installation Details						
Name	Installation Position (Latitude)	Installation Position (Longitude)	Northing	Easting	Coord System Name	North Alignment
Haley	40.20933000	-105.03393000	1319443.3072	3130169.7961	CO83-NF on NORTH AMERICAN DATUM 1983 datum	Grid

Summary Wellpath									
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	Northing	Easting
25.00	0.00	0.000	25.00	0.00N	0.00E		0.00	1319454.40	3130200.46
675.00	0.00	277.110	675.00	0.00N	0.00E	==>	0.00	1319454.40	3130200.46
1030.04	7.10	277.110	1029.14	2.72N	21.80W	2.00	-21.65	1319457.12	3130178.66
6553.32	7.10	277.110	6510.05	87.22N	699.33W	==>	-694.51	1319541.61	3129501.17
7525.33	90.17	88.880	7153.00	109.84N	129.27W	10.00	-124.02	1319564.23	3130071.20
11807.73	90.17	88.880	7140.00	193.40N	4152.29E	==>	4156.79	1319647.79	3134352.57

Interpolated Wellpath								
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	All Station Comments
0.00	0.00	0.000	0.00	0.00N	0.00E		0.00	Rig Datum
25.00	0.00	0.000	25.00	0.00N	0.00E	==>	0.00	Slot Datum
100.00	0.00	0.000	100.00	0.00N	0.00E	==>	0.00	
200.00	0.00	0.000	200.00	0.00N	0.00E	==>	0.00	
300.00	0.00	0.000	300.00	0.00N	0.00E	==>	0.00	
400.00	0.00	0.000	400.00	0.00N	0.00E	==>	0.00	
500.00	0.00	0.000	500.00	0.00N	0.00E	==>	0.00	
600.00	0.00	0.000	600.00	0.00N	0.00E	==>	0.00	
700.00	0.50	277.110	700.00	0.01N	0.11W	2.00	-0.11	
800.00	2.50	277.110	799.96	0.34N	2.71W	2.00	-2.69	
900.00	4.50	277.110	899.77	1.09N	8.76W	2.00	-8.70	
1000.00	6.50	277.110	999.30	2.28N	18.27W	2.00	-18.15	
1100.00	7.10	277.110	1098.56	3.79N	30.39W	==>	-30.18	
1200.00	7.10	277.110	1197.79	5.32N	42.65W	==>	-42.36	
1300.00	7.10	277.110	1297.02	6.85N	54.92W	==>	-54.54	
1400.00	7.10	277.110	1396.25	8.38N	67.19W	==>	-66.72	
1500.00	7.10	277.110	1495.49	9.91N	79.45W	==>	-78.90	
1600.00	7.10	277.110	1594.72	11.44N	91.72W	==>	-91.09	
1700.00	7.10	277.110	1693.95	12.97N	103.99W	==>	-103.27	
1800.00	7.10	277.110	1793.19	14.50N	116.25W	==>	-115.45	
1900.00	7.10	277.110	1892.42	16.03N	128.52W	==>	-127.63	
2000.00	7.10	277.110	1991.65	17.56N	140.79W	==>	-139.82	
2100.00	7.10	277.110	2090.89	19.09N	153.05W	==>	-152.00	
2200.00	7.10	277.110	2190.12	20.62N	165.32W	==>	-164.18	
2300.00	7.10	277.110	2289.35	22.15N	177.59W	==>	-176.36	
2400.00	7.10	277.110	2388.58	23.68N	189.85W	==>	-188.54	
2500.00	7.10	277.110	2487.82	25.21N	202.12W	==>	-200.73	
2600.00	7.10	277.110	2587.05	26.74N	214.39W	==>	-212.91	
2700.00	7.10	277.110	2686.28	28.27N	226.65W	==>	-225.09	
2800.00	7.10	277.110	2785.52	29.80N	238.92W	==>	-237.27	
2900.00	7.10	277.110	2884.75	31.33N	251.19W	==>	-249.46	

All data is in Feet unless otherwise stated
Coordinates are from Slot MD's are from Rig (Planned Datum #1 5104.0ft above Mean Sea Level)
Vertical Section is from 0.00N 0.00E on azimuth 87.330 degrees
Bottom hole distance is 4156.79 Feet on azimuth 87.33 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by IPT
Date Printed: 28-Sep-2016



SYSDRILL
Well Design Combined Report
Wellbore: HALEY 10HZ (PWB)



Interpolated Wellpath								
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	All Station Comments
3000.00	7.10	277.110	2983.98	32.86N	263.45W	==>	-261.64	
3100.00	7.10	277.110	3083.22	34.39N	275.72W	==>	-273.82	
3200.00	7.10	277.110	3182.45	35.92N	287.99W	==>	-286.00	
3300.00	7.10	277.110	3281.68	37.45N	300.25W	==>	-298.18	
3400.00	7.10	277.110	3380.91	38.98N	312.52W	==>	-310.37	
3500.00	7.10	277.110	3480.15	40.51N	324.79W	==>	-322.55	
3600.00	7.10	277.110	3579.38	42.04N	337.05W	==>	-334.73	
3700.00	7.10	277.110	3678.61	43.57N	349.32W	==>	-346.91	
3800.00	7.10	277.110	3777.85	45.10N	361.59W	==>	-359.10	
3900.00	7.10	277.110	3877.08	46.62N	373.85W	==>	-371.28	
4000.00	7.10	277.110	3976.31	48.15N	386.12W	==>	-383.46	
4100.00	7.10	277.110	4075.55	49.68N	398.39W	==>	-395.64	
4200.00	7.10	277.110	4174.78	51.21N	410.65W	==>	-407.82	
4300.00	7.10	277.110	4274.01	52.74N	422.92W	==>	-420.01	
4400.00	7.10	277.110	4373.24	54.27N	435.19W	==>	-432.19	
4500.00	7.10	277.110	4472.48	55.80N	447.45W	==>	-444.37	
4600.00	7.10	277.110	4571.71	57.33N	459.72W	==>	-456.55	
4700.00	7.10	277.110	4670.94	58.86N	471.99W	==>	-468.74	
4800.00	7.10	277.110	4770.18	60.39N	484.25W	==>	-480.92	
4900.00	7.10	277.110	4869.41	61.92N	496.52W	==>	-493.10	
5000.00	7.10	277.110	4968.64	63.45N	508.79W	==>	-505.28	
5100.00	7.10	277.110	5067.88	64.98N	521.05W	==>	-517.46	
5200.00	7.10	277.110	5167.11	66.51N	533.32W	==>	-529.65	
5300.00	7.10	277.110	5266.34	68.04N	545.59W	==>	-541.83	
5400.00	7.10	277.110	5365.57	69.57N	557.85W	==>	-554.01	
5500.00	7.10	277.110	5464.81	71.10N	570.12W	==>	-566.19	
5600.00	7.10	277.110	5564.04	72.63N	582.39W	==>	-578.38	
5700.00	7.10	277.110	5663.27	74.16N	594.65W	==>	-590.56	
5800.00	7.10	277.110	5762.51	75.69N	606.92W	==>	-602.74	
5900.00	7.10	277.110	5861.74	77.22N	619.19W	==>	-614.92	
6000.00	7.10	277.110	5960.97	78.75N	631.45W	==>	-627.10	
6100.00	7.10	277.110	6060.21	80.28N	643.72W	==>	-639.29	
6200.00	7.10	277.110	6159.44	81.81N	655.98W	==>	-651.47	
6300.00	7.10	277.110	6258.67	83.34N	668.25W	==>	-663.65	
6400.00	7.10	277.110	6357.90	84.87N	680.52W	==>	-675.83	
6500.00	7.10	277.110	6457.14	86.40N	692.78W	==>	-688.01	
6600.00	2.57	292.280	6556.55	87.97N	703.16W	10.00	-698.31	
6700.00	7.71	81.310	6656.30	89.84N	698.59W	10.00	-693.66	
6800.00	17.67	85.670	6753.74	92.00N	676.78W	10.00	-671.76	
6900.00	27.66	86.930	6845.90	94.40N	638.37W	10.00	-633.29	
7000.00	37.65	87.550	6929.99	96.95N	584.54W	10.00	-579.40	
7100.00	47.65	87.950	7003.45	99.59N	516.93W	10.00	-511.73	
7200.00	57.65	88.230	7064.04	102.22N	437.58W	10.00	-432.35	
7300.00	67.64	88.460	7109.93	104.77N	348.91W	10.00	-343.66	
7400.00	77.64	88.650	7139.73	107.17N	253.62W	10.00	-248.35	
7500.00	87.64	88.840	7152.52	109.34N	154.59W	10.00	-149.33	
7600.00	90.17	88.880	7152.77	111.30N	54.61W	==>	-49.38	
7700.00	90.17	88.880	7152.47	113.25N	45.37E	==>	50.59	
7800.00	90.17	88.880	7152.17	115.20N	145.35E	==>	150.55	
7900.00	90.17	88.880	7151.86	117.15N	245.33E	==>	250.51	
8000.00	90.17	88.880	7151.56	119.10N	345.31E	==>	350.47	
8100.00	90.17	88.880	7151.26	121.05N	445.29E	==>	450.44	
8200.00	90.17	88.880	7150.95	123.00N	545.27E	==>	550.40	
8300.00	90.17	88.880	7150.65	124.96N	645.25E	==>	650.36	
8400.00	90.17	88.880	7150.34	126.91N	745.23E	==>	750.33	
8500.00	90.17	88.880	7150.04	128.86N	845.21E	==>	850.29	
8600.00	90.17	88.880	7149.74	130.81N	945.19E	==>	950.25	

All data is in Feet unless otherwise stated
Coordinates are from Slot MD's are from Rig and TVD's are from Rig (Planned Datum #1 5104.0ft above Mean Sea Level)
Vertical Section is from 0.00N 0.00E on azimuth 87.330 degrees
Bottom hole distance is 4156.79 Feet on azimuth 87.33 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by IPT
Date Printed: 28-Sep-2016



SYSDRILL
Well Design Combined Report
Wellbore: HALEY 10HZ (PWB)



Interpolated Wellpath								
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	All Station Comments
8700.00	90.17	88.880	7149.43	132.76N	1045.17E	==>	1050.22	
8800.00	90.17	88.880	7149.13	134.71N	1145.15E	==>	1150.18	
8900.00	90.17	88.880	7148.83	136.66N	1245.13E	==>	1250.14	
9000.00	90.17	88.880	7148.52	138.62N	1345.11E	==>	1350.10	
9100.00	90.17	88.880	7148.22	140.57N	1445.09E	==>	1450.07	
9200.00	90.17	88.880	7147.92	142.52N	1545.07E	==>	1550.03	
9300.00	90.17	88.880	7147.61	144.47N	1645.05E	==>	1649.99	
9400.00	90.17	88.880	7147.31	146.42N	1745.03E	==>	1749.96	
9500.00	90.17	88.880	7147.01	148.37N	1845.01E	==>	1849.92	
9600.00	90.17	88.880	7146.70	150.32N	1945.00E	==>	1949.88	
9700.00	90.17	88.880	7146.40	152.27N	2044.98E	==>	2049.85	
9800.00	90.17	88.880	7146.09	154.23N	2144.96E	==>	2149.81	
9900.00	90.17	88.880	7145.79	156.18N	2244.94E	==>	2249.77	
10000.00	90.17	88.880	7145.49	158.13N	2344.92E	==>	2349.73	
10100.00	90.17	88.880	7145.18	160.08N	2444.90E	==>	2449.70	
10200.00	90.17	88.880	7144.88	162.03N	2544.88E	==>	2549.66	
10300.00	90.17	88.880	7144.58	163.98N	2644.86E	==>	2649.62	
10400.00	90.17	88.880	7144.27	165.93N	2744.84E	==>	2749.59	
10500.00	90.17	88.880	7143.97	167.88N	2844.82E	==>	2849.55	
10600.00	90.17	88.880	7143.67	169.84N	2944.80E	==>	2949.51	
10700.00	90.17	88.880	7143.36	171.79N	3044.78E	==>	3049.48	
10800.00	90.17	88.880	7143.06	173.74N	3144.76E	==>	3149.44	
10900.00	90.17	88.880	7142.76	175.69N	3244.74E	==>	3249.40	
11000.00	90.17	88.880	7142.45	177.64N	3344.72E	==>	3349.36	
11100.00	90.17	88.880	7142.15	179.59N	3444.70E	==>	3449.33	
11200.00	90.17	88.880	7141.84	181.54N	3544.68E	==>	3549.29	
11300.00	90.17	88.880	7141.54	183.49N	3644.66E	==>	3649.25	
11400.00	90.17	88.880	7141.24	185.45N	3744.64E	==>	3749.22	
11500.00	90.17	88.880	7140.93	187.40N	3844.62E	==>	3849.18	
11600.00	90.17	88.880	7140.63	189.35N	3944.61E	==>	3949.14	
11700.00	90.17	88.880	7140.33	191.30N	4044.59E	==>	4049.11	
11800.00	90.17	88.880	7140.02	193.25N	4144.57E	==>	4149.07	
11807.73	90.17	88.880	7140.00	193.40N	4152.29E	==>	4156.79	

All data is in Feet unless otherwise stated
Coordinates are from Slot MD's are from Rig and TVD's are from Rig (Planned Datum #1 5104.0ft above Mean Sea Level)
Vertical Section is from 0.00N 0.00E on azimuth 87.330 degrees
Bottom hole distance is 4156.79 Feet on azimuth 87.33 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by IPT
Date Printed: 28-Sep-2016



SYS DRILL
Well Design Combined Report
Wellbore: HALEY 10HZ (PWB)



Targets							
Name	North[ft]	East[ft]	TVD[ft]	Latitude	Longitude	Northing	Easting
HALEY 10HZBH	193.40N	4152.29E	7140.00	40.20983000	-105.01895000	1319647.79	3134352.57
HALEY 10HZEP	129.84N	249.27W	7148.00	40.20972000	-105.03471000	1319584.23	3129951.20

Survey Tool Program						
Reference	Survey Name	MD[ft]	TVD[ft]	Survey Tool	Error Model	
419714	Planned	11807.73	7140.00	ISCWSA MWD	Rev 3 + ROT	

Notes
<div></div>



SYSDRILL
Closest Approach + Clearance Factor Summary Report
Wellbore: HALEY 10HZ (PWB)



Ellipse separations are reported ONLY if BOTH wells have uncertainty data
Only Depth and Magnetic Reference Field error terms are correlated across tie points
Scan limit is calculated on CENTRE to CENTRE distance
Summary data uses Closest Approach clearance calculation for all minima
Hole size/Casings ARE included
Hole size/Casings are NOT subtracted from Centre-Centre distance
Confidence limit of 95.00% / 2.80 SD.

Wellbore		
Name	Created	Last Revised
HALEY 10HZ (PWB)	Oct-19-2015	Sep-28-2016

Well		
Name	Government ID	Last Revised
HALEY 10HZ		Oct-19-2015

Slot						
Name	Latitude	Longitude	Grid Northing	Grid Easting	North	East
HALEY 10HZ	40.20936000	-105.03382000	1319454.3970	3130200.4605	11.09N	30.67E

Installation						
Name	Installation Position (Latitude)	Installation Position (Longitude)	Easting	Northing	Coord System Name	North Alignment
Haley	40.20933000	-105.03393000	3130169.7961	1319443.3072	CO83-NF on NORTH AMERICAN DATUM 1983 datum	Grid

Clearance Summary							
Offset WellName	Separation [ft]	MD[ft]	Diverging From[ft]	Ellipse Separation [ft]	Ellipse MD[ft]	Clearance Factor	Clearance MD[ft]
HALEY #1	0.46	1463.41	7577.73	-14.63	1463.41	0.03	1463.41
HALEY 9HZ	8.38	670.00	7526.13	3.76	960.04	1.18	11807.73
HALEY 4HZ	10.93	651.00	651.00	7.20	681.17	2.83	697.57
HALEY 11HZ	11.17	675.00	9572.24	-0.77	2961.35	0.96	2879.33
HALEY 3HZ	15.63	626.00	626.00	12.06	648.36	4.11	730.38
HALEY 5HZ	15.63	675.00	675.00	11.73	700.00	3.04	11807.73
HALEY 8HZ	19.55	625.00	625.00	15.98	648.36	1.60	11807.73
HALEY 12HZ	19.55	675.00	11807.73	15.65	697.57	1.29	11807.73
HALEY 2HZ	22.40	551.00	551.00	19.26	582.74	4.16	11807.73
HALEY 6HZ	22.40	675.00	675.00	18.50	697.57	2.41	11807.73
HALEY 7HZ	30.72	425.00	425.00	28.31	451.51	1.51	11807.73
HALEY 1HZ	32.61	500.72	500.72	29.72	525.00	5.51	11807.73
Haley #3	47.98	615.55	8231.45	44.21	681.17	9.26	1030.04
Haley #10	53.57	24.00	6619.49	53.40	41.40	24.31	878.02
HALEY #2	75.10	29.00	8842.49	74.40	107.02	11.88	9358.99
HALEY #6-4-20	593.27	10939.49	10939.49	408.64	10933.79	3.21	10925.00

