



**Job Number:** 12xxx  
**Company:** Black Hills Plateau Production Co.  
**Lease/Well:** HDU 9-41BH  
**Location:** Garfield County, CO  
**Rig Name:** SST Energy #66  
**State/Country:** CO/ Garfield  
**Country:** USA

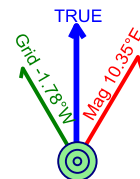
**Elevation GL:** 5482.00 ft **RKB:** 18.00 ft  
**Projection System:** US State Plane 1983  
**Projection Group:** Colorado Central Zone  
**Projection Datum:** GRS80  
**Mag. Declination:** 10.35° (C:\HawkEye\IGRF2010.MIF)  
**Grid Convergence:** -1.78001 W  
**Date:** Tuesday, June 17, 2014

### NOVA Directional Inc. Survey Report

Calculated by HawkEye Software  
Minimum Curvature Method  
Vertical Section Plane 147.21°

Northing (US ft): 1575542.01 Easting (US ft): 2202091.10  
Latitude: 39°22'46.4880" N Longitude: -108°19'23.6280" W

Well Location: 504 FNL, 245 FEL, Section 9, T8S, R98W, Sixth Principal Meridian, Garfield County, CO  
Direction Reference: True North



Measured Depth (Ft)	INC Deg	AZM Deg	TVD (Ft)	Subsea TVD (Ft)	EW (Ft)	NS (Ft)	VS (Ft)	DLS °/100 Ft	Latitude Dec. Deg	Longitude Dec. Deg
<b>Surface</b>										
0.00	0.00	0.00	0.00	5500.00	0.00	0.00	0.00	0.00	39.3795800	-108.3232300
500.00	0.00	0.00	500.00	5000.00	0.00	0.00	0.00	0.00	39.3795800	-108.3232300
<b>Casing 10 3/4"</b>										
1000.00	0.00	0.00	1000.00	4500.00	0.00	0.00	0.00	0.00	39.3795800	-108.3232300
<b>Mesaverde</b>										
1033.00	0.00	0.00	1033.00	4467.00	0.00	0.00	0.00	0.00	39.3795800	-108.3232300
1500.00	0.00	0.00	1500.00	4000.00	0.00	0.00	0.00	0.00	39.3795800	-108.3232300
2000.00	0.00	0.00	2000.00	3500.00	0.00	0.00	0.00	0.00	39.3795800	-108.3232300
2500.00	0.00	0.00	2500.00	3000.00	0.00	0.00	0.00	0.00	39.3795800	-108.3232300
3000.00	0.00	0.00	3000.00	2500.00	0.00	0.00	0.00	0.00	39.3795800	-108.3232300
<b>Cameo</b>										
3033.00	0.00	0.00	3033.00	2467.00	0.00	0.00	0.00	0.00	39.3795800	-108.3232300
<b>Rollins</b>										
3366.00	0.00	0.00	3366.00	2134.00	0.00	0.00	0.00	0.00	39.3795800	-108.3232300
3500.00	0.00	0.00	3500.00	2000.00	0.00	0.00	0.00	0.00	39.3795800	-108.3232300
<b>Cozzette</b>										
3541.00	0.00	0.00	3541.00	1959.00	0.00	0.00	0.00	0.00	39.3795800	-108.3232300
<b>Corcoran</b>										
3752.00	0.00	0.00	3752.00	1748.00	0.00	0.00	0.00	0.00	39.3795800	-108.3232300
4000.00	0.00	0.00	4000.00	1500.00	0.00	0.00	0.00	0.00	39.3795800	-108.3232300
<b>Mancos</b>										
4030.00	0.00	0.00	4030.00	1470.00	0.00	0.00	0.00	0.00	39.3795800	-108.3232300
<b>Mancos A</b>										
4418.00	0.00	0.00	4418.00	1082.00	0.00	0.00	0.00	0.00	39.3795800	-108.3232300
4500.00	0.00	0.00	4500.00	1000.00	0.00	0.00	0.00	0.00	39.3795800	-108.3232300
5000.00	0.00	0.00	5000.00	500.00	0.00	0.00	0.00	0.00	39.3795800	-108.3232300
<b>MOAB</b>										
5178.00	0.00	0.00	5178.00	322.00	0.00	0.00	0.00	0.00	39.3795800	-108.3232300
5500.00	0.00	0.00	5500.00	0.00	0.00	0.00	0.00	0.00	39.3795800	-108.3232300
<b>Mancos B</b>										
5615.00	0.00	0.00	5615.00	-115.00	0.00	0.00	0.00	0.00	39.3795800	-108.3232300
6000.00	0.00	0.00	6000.00	-500.00	0.00	0.00	0.00	0.00	39.3795800	-108.3232300
<b>Casing 7 5/8"</b>										
6470.00	0.00	0.00	6470.00	-970.00	0.00	0.00	0.00	0.00	39.3795800	-108.3232300
6500.00	0.00	0.00	6500.00	-1000.00	0.00	0.00	0.00	0.00	39.3795800	-108.3232300
<b>Niobrara</b>										
6623.00	0.00	0.00	6623.00	-1123.00	0.00	0.00	0.00	0.00	39.3795800	-108.3232300
<b>KOP-Begin Build @ 8.00°/ 100 Ft</b>										
6857.00	0.00	1.27	6857.00	-1357.00	0.00	0.00	0.00	0.00	39.3795800	-108.3232300
6887.00	2.40	155.00	6886.99	-1386.99	0.27	-0.57	0.62	8.00	39.3795784	-108.3232291
6917.00	4.80	155.00	6916.93	-1416.93	1.06	-2.28	2.49	8.00	39.3795737	-108.3232262
6947.00	7.20	155.00	6946.76	-1446.76	2.39	-5.12	5.60	8.00	39.3795659	-108.3232216
6977.00	9.60	155.00	6976.44	-1476.44	4.24	-9.09	9.94	8.00	39.3795550	-108.3232150

Measured Depth (Ft)	INC Deg	AZM Deg	TVD (Ft)	Subsea TVD (Ft)	EW (Ft)	NS (Ft)	VS (Ft)	DLS °/100 Ft	Latitude Dec. Deg	Longitude Dec. Deg
7007.00	12.00	155.00	7005.91	-1505.91	6.61	-14.18	15.51	8.00	39.3795411	-108.3232066
7037.00	14.40	155.00	7035.11	-1535.11	9.51	-20.39	22.29	8.00	39.3795240	-108.3231964
7067.00	16.80	155.00	7064.00	-1564.00	12.92	-27.70	30.29	8.00	39.3795039	-108.3231843
7097.00	19.20	155.00	7092.53	-1592.53	16.84	-36.10	39.47	8.00	39.3794809	-108.3231704
7127.00	21.60	155.00	7120.65	-1620.65	21.26	-45.58	49.83	8.00	39.3794549	-108.3231548
7157.00	24.00	155.00	7148.30	-1648.30	26.17	-56.12	61.35	8.00	39.3794259	-108.3231374
<b>Build and Turn @ 8.00°/100 Ft</b>										
7169.50	25.00	155.00	7159.68	-1659.68	28.36	-60.81	66.48	8.00	39.3794130	-108.3231297
7199.50	27.37	154.21	7186.60	-1686.60	34.04	-72.77	79.61	8.00	39.3793802	-108.3231096
7229.50	29.75	153.53	7212.94	-1712.94	40.36	-85.65	93.86	8.00	39.3793449	-108.3230872
7259.50	32.13	152.94	7238.67	-1738.67	47.31	-99.42	109.20	8.00	39.3793070	-108.3230626
7289.50	34.52	152.43	7263.74	-1763.74	54.87	-114.06	125.60	8.00	39.3792668	-108.3230359
7319.50	36.90	151.98	7288.10	-1788.10	63.04	-129.55	143.04	8.00	39.3792243	-108.3230070
7349.50	39.29	151.57	7311.70	-1811.70	71.79	-145.85	161.49	8.00	39.3791796	-108.3229760
7379.50	41.68	151.20	7334.52	-1834.52	81.12	-162.95	180.92	8.00	39.3791326	-108.3229430
7409.50	44.07	150.87	7356.50	-1856.50	91.01	-180.80	201.28	8.00	39.3790836	-108.3229080
7439.50	46.46	150.56	7377.62	-1877.62	101.43	-199.39	222.55	8.00	39.3790326	-108.3228712
7469.50	48.85	150.28	7397.83	-1897.83	112.37	-218.67	244.69	8.00	39.3789796	-108.3228324
7499.50	51.24	150.02	7417.09	-1917.09	123.82	-238.61	267.65	8.00	39.3789249	-108.3227920
7529.50	53.63	149.77	7435.38	-1935.38	135.75	-259.18	291.40	8.00	39.3788684	-108.3227498
7559.50	56.02	149.54	7452.66	-1952.66	148.14	-280.34	315.90	8.00	39.3788103	-108.3227059
7589.50	58.42	149.32	7468.90	-1968.90	160.96	-302.06	341.10	8.00	39.3787507	-108.3226605
7619.50	60.81	149.11	7484.07	-1984.07	174.21	-324.29	366.96	8.00	39.3786896	-108.3226137
7649.50	63.20	148.92	7498.15	-1998.15	187.85	-347.00	393.44	8.00	39.3786273	-108.3225655
7679.50	65.60	148.73	7511.12	-2011.12	201.85	-370.14	420.48	8.00	39.3785638	-108.3225159
7709.50	67.99	148.54	7522.94	-2022.94	216.20	-393.69	448.04	8.00	39.3784991	-108.3224651
7739.50	70.39	148.37	7533.59	-2033.59	230.87	-417.58	476.08	8.00	39.3784335	-108.3224132
7769.50	72.78	148.19	7543.07	-2043.07	245.84	-441.79	504.53	8.00	39.3783670	-108.3223603
7799.50	75.17	148.03	7551.35	-2051.35	261.07	-466.27	533.36	8.00	39.3782998	-108.3223064
7829.50	77.57	147.86	7558.42	-2058.42	276.54	-490.98	562.51	8.00	39.3782320	-108.3222517
7859.50	79.96	147.70	7564.26	-2064.26	292.23	-515.87	591.93	8.00	39.3781637	-108.3221962
7889.50	82.36	147.54	7568.87	-2068.87	308.10	-540.91	621.58	8.00	39.3780949	-108.3221400
7919.50	84.75	147.39	7572.24	-2072.24	324.13	-566.04	651.38	8.00	39.3780259	-108.3220833
7949.50	87.15	147.23	7574.36	-2074.36	340.29	-591.22	681.31	8.00	39.3779568	-108.3220261
7979.50	89.54	147.08	7575.22	-2075.22	356.56	-616.41	711.29	8.00	39.3778876	-108.3219686
<b>Target - Hold @ 90.75°,147.00° Azm</b>										
7994.60	90.75	147.00	7575.18	-2075.18	364.77	-629.08	726.39	8.00	39.3778528	-108.3219395
8494.60	90.75	147.00	7568.64	-2068.64	637.07	-1048.38	1226.35	0.00	39.3767016	-108.3209763
8994.60	90.75	147.00	7562.09	-2062.09	909.36	-1467.68	1726.30	0.00	39.3755504	-108.3200130
9494.60	90.75	147.00	7555.55	-2055.55	1181.66	-1886.98	2226.25	0.00	39.3743992	-108.3190498
9994.60	90.75	147.00	7549.00	-2049.00	1453.96	-2306.28	2726.21	0.00	39.3732480	-108.3180867
10494.60	90.75	147.00	7542.46	-2042.46	1726.25	-2725.58	3226.16	0.00	39.3720967	-108.3171235
10994.60	90.75	147.00	7535.91	-2035.91	1998.55	-3144.88	3726.11	0.00	39.3709455	-108.3161604
11494.60	90.75	147.00	7529.37	-2029.37	2270.85	-3564.18	4226.07	0.00	39.3697942	-108.3151974
11994.60	90.75	147.00	7522.82	-2022.82	2543.14	-3983.48	4726.02	0.00	39.3686429	-108.3142343
12494.60	90.75	147.00	7516.28	-2016.28	2815.44	-4402.78	5225.98	0.00	39.3674917	-108.3132713
12994.60	90.75	147.00	7509.73	-2009.73	3087.73	-4822.08	5725.93	0.00	39.3663404	-108.3123083
13494.60	90.75	147.00	7503.19	-2003.19	3360.03	-5241.38	6225.88	0.00	39.3651891	-108.3113454
13994.60	90.75	147.00	7496.64	-1996.64	3632.33	-5660.67	6725.84	0.00	39.3640378	-108.3103824
14494.60	90.75	147.00	7490.10	-1990.10	3904.62	-6079.97	7225.79	0.00	39.3628865	-108.3094196
14994.60	90.75	147.00	7483.56	-1983.56	4176.92	-6499.27	7725.74	0.00	39.3617352	-108.3084567
15494.60	90.75	147.00	7477.01	-1977.01	4449.22	-6918.57	8225.70	0.00	39.3605838	-108.3074939
15994.60	90.75	147.00	7470.47	-1970.47	4721.51	-7337.87	8725.65	0.00	39.3594325	-108.3065311
16494.60	90.75	147.00	7463.92	-1963.92	4993.81	-7757.17	9225.61	0.00	39.3582812	-108.3055683
16994.60	90.75	147.00	7457.38	-1957.38	5266.10	-8176.47	9725.56	0.00	39.3571298	-108.3046056

Measured Depth (Ft)	INC Deg	AZM Deg	TVD (Ft)	Subsea TVD (Ft)	EW (Ft)	NS (Ft)	VS (Ft)	DLS °/100 Ft	Latitude Dec. Deg	Longitude Dec. Deg
<b>BH - Proposed End of Lateral</b>										
17144.60	90.75	147.00	7455.41	-1955.41	5347.79	-8302.26	9875.55	0.00	39.3567844	-108.3043168
CASING DATA										
Size (in)	Weight (Lbs/Ft)		ID (in)	OD (in)		Top TVD (Ft)		Set TVD (Ft)		
10 3/4	40.5		10.1	11.8		1000.0		1000.0		
7 5/8	29.7		6.9	8.5		6470.0		6470.0		