

# US ROCKIES WATTENBERG PLANNING

WELD-NAD83-UTMFT13N  
2N-65W-08 Sunflower Pad  
SUNFLOWER 25G-17HZ

Plan A

Plan: Permit Rev-2

## Sperry Drilling Services Proposal Report

27 April, 2015

Well Coordinates: 14,582,858.80 N, 1,728,894.06 E (40° 09' 13.31" N, 104° 41' 00.08" W)  
Ground Level: 4,901.00 usft

Local Coordinate Origin:	Centered on Well SUNFLOWER 25G-17HZ
Viewing Datum:	RKB = 17' @ 4918.00usft (D Rig)
TVDs to System:	N
North Reference:	True
Unit System:	Dec-Deg - API - US Survey Feet - Custom

Version: 5000.1 Build: 70

**HALLIBURTON**

Project: WELD-NAD83-UTMFT13N  
Site: 2N-65W-08 Sunflower Pad  
Well: SUNFLOWER 25G-17HZ  
Wellbore: Plan A  
Design: Permit Rev-2

# US ROCKIES WATTENBERG PLANNING

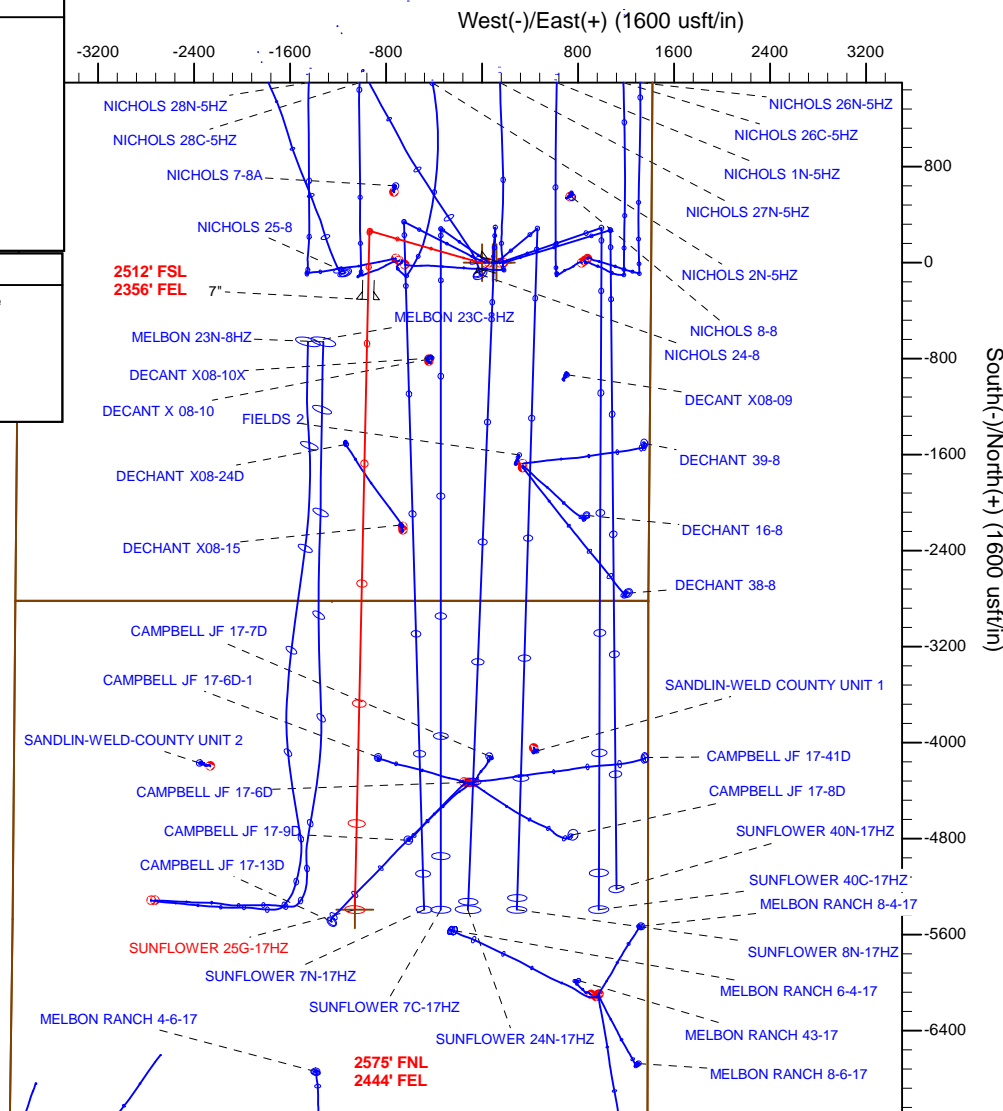
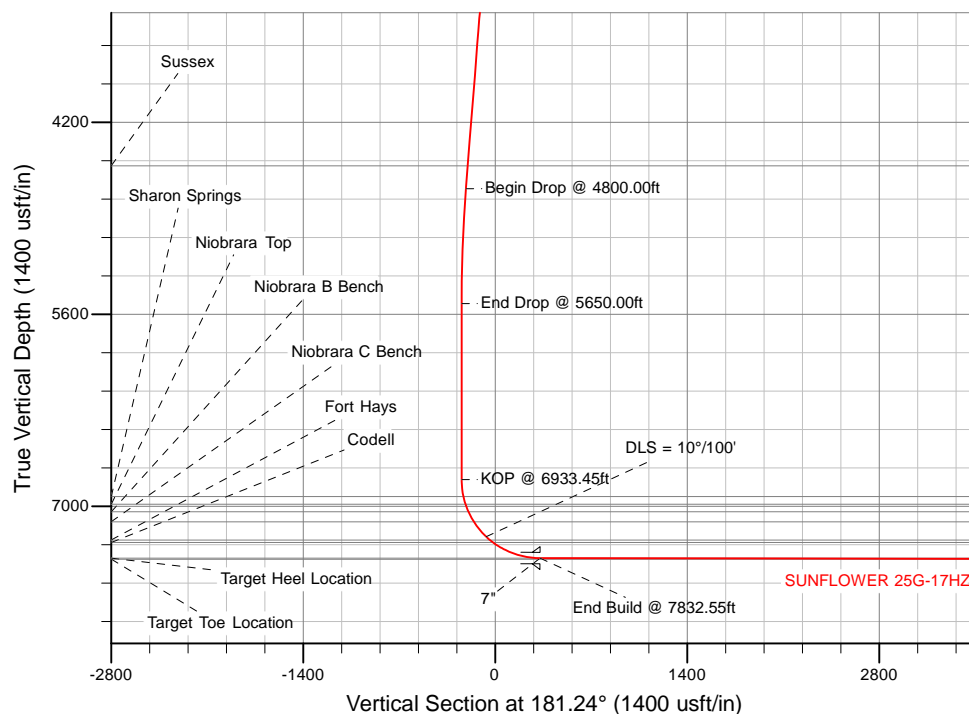
**HALLIBURTON**  
Sperry Drilling

## SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	250.00	0.00	0.00	250.00	0.00	0.00	0.00	0.00	0.00	
3	350.00	1.50	270.00	349.99	0.00	-1.31	1.50	270.00	0.03	
4	850.00	1.50	270.00	849.82	0.00	-14.40	0.00	0.00	0.31	
5	877.83	1.50	286.00	877.64	0.10	-15.11	1.50	98.00	0.23	
6	1665.00	1.50	286.00	1664.54	5.78	-34.92	0.00	0.00	-5.02	
7	2440.00	17.00	286.00	2427.13	40.01	-154.30	2.00	0.00	-36.66	
8	4800.00	17.00	286.00	4684.01	230.20	-817.57	0.00	0.00	-212.46	
9	5650.00	0.00	0.00	5521.59	264.71	-937.90	2.00	180.00	-244.35	
10	6933.45	0.00	0.00	6805.04	264.71	-937.90	0.00	0.00	-244.35	
11	7832.55	89.91	181.24	7378.00	-307.22	-950.23	10.00	181.24	327.71	
12	12917.78	89.91	181.24	7386.00	-5391.26	-1059.86	0.00	0.00	5412.93	SUNFLOWER 25G-17HZ_BHL

## WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
SUNFLOWER 25G-17HZ_SHL	0.00	0.00	0.00	40.153696	-104.683356	Point
SUNFLOWER 25G-17HZ_BHL	7386.00	-5391.26	-1059.86	40.138891	-104.687148	Point



## WELL DETAILS: SUNFLOWER 25G-17HZ

Ground Level: 4901.00

RKB = 17' @ 4918.00usft (D Rig)

Plan: Permit Rev-2 (SUNFLOWER 25G-17HZ/Plan A)

Created By: Clint Eshelman

Date: 4/27/2015

Reviewed:

Date:

TVD MD

6805.04 6933.45 KOP @ 6933.45ft

## Plan Report for SUNFLOWER 25G-17HZ - Permit Rev-2

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	Toolface Azimuth (°)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>2N-R65W-Sec. 17_Section lines - SUNFLOWER 25G-17HZ_SHL - 2N-R65W-Sec. 8_Section lines</b>										
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
250.00	0.00	0.00	250.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Begin Nudge @ 250.00ft</b>										
300.00	0.75	270.00	300.00	0.00	-0.33	0.01	1.50	1.50	0.00	270.00
350.00	1.50	270.00	349.99	0.00	-1.31	0.03	1.50	1.50	0.00	0.00
<b>End Nudge @ 350.00ft</b>										
400.00	1.50	270.00	399.97	0.00	-2.62	0.06	0.00	0.00	0.00	0.00
500.00	1.50	270.00	499.94	0.00	-5.24	0.11	0.00	0.00	0.00	0.00
600.00	1.50	270.00	599.90	0.00	-7.85	0.17	0.00	0.00	0.00	0.00
700.00	1.50	270.00	699.87	0.00	-10.47	0.23	0.00	0.00	0.00	0.00
800.00	1.50	270.00	799.83	0.00	-13.09	0.28	0.00	0.00	0.00	0.00
850.00	1.50	270.00	849.82	0.00	-14.40	0.31	0.00	0.00	0.00	0.00
<b>Begin Nudge @ 850.00ft</b>										
877.83	1.50	286.00	877.64	0.10	-15.11	0.23	1.50	0.00	57.49	98.00
<b>End Nudge @ 877.83ft</b>										
900.00	1.50	286.00	899.80	0.26	-15.67	0.08	0.00	0.00	0.00	82.00
1,000.00	1.50	286.00	999.77	0.98	-18.19	-0.59	0.00	0.00	0.00	0.00
1,100.00	1.50	286.00	1,099.73	1.70	-20.70	-1.26	0.00	0.00	0.00	0.00
1,200.00	1.50	286.00	1,199.70	2.42	-23.22	-1.92	0.00	0.00	0.00	0.00
1,300.00	1.50	286.00	1,299.66	3.15	-25.73	-2.59	0.00	0.00	0.00	0.00
1,315.00	1.50	286.00	1,314.66	3.25	-26.11	-2.69	0.00	0.00	0.00	0.00
<b>9 5/8"</b>										
1,400.00	1.50	286.00	1,399.63	3.87	-28.25	-3.26	0.00	0.00	0.00	0.00
1,500.00	1.50	286.00	1,499.59	4.59	-30.77	-3.92	0.00	0.00	0.00	0.00
1,600.00	1.50	286.00	1,599.56	5.31	-33.28	-4.59	0.00	0.00	0.00	0.00
1,665.00	1.50	286.00	1,664.54	5.78	-34.92	-5.02	0.00	0.00	0.00	0.00
<b>Begin Nudge @ 1665.00ft</b>										
1,700.00	2.20	286.00	1,699.52	6.09	-36.01	-5.31	2.00	2.00	0.00	0.00
1,800.00	4.20	286.00	1,799.36	7.63	-41.37	-6.73	2.00	2.00	0.00	0.00
1,900.00	6.20	286.00	1,898.94	10.13	-50.08	-9.04	2.00	2.00	0.00	0.00
2,000.00	8.20	286.00	1,998.15	13.58	-62.13	-12.23	2.00	2.00	0.00	0.00
2,100.00	10.20	286.00	2,096.86	17.99	-77.50	-16.31	2.00	2.00	0.00	0.00
2,200.00	12.20	286.00	2,194.95	23.34	-96.17	-21.26	2.00	2.00	0.00	0.00
2,300.00	14.20	286.00	2,292.30	29.64	-118.12	-27.07	2.00	2.00	0.00	0.00
2,400.00	16.20	286.00	2,388.80	36.86	-143.32	-33.75	2.00	2.00	0.00	0.00
2,440.00	17.00	286.00	2,427.13	40.01	-154.30	-36.66	2.00	2.00	0.00	0.00
<b>End Nudge @ 2440.00ft</b>										
2,500.00	17.00	286.00	2,484.51	44.85	-171.17	-41.13	0.00	0.00	0.00	0.00
2,600.00	17.00	286.00	2,580.14	52.91	-199.27	-48.58	0.00	0.00	0.00	0.00
2,700.00	17.00	286.00	2,675.77	60.97	-227.38	-56.03	0.00	0.00	0.00	0.00
2,800.00	17.00	286.00	2,771.40	69.03	-255.48	-63.48	0.00	0.00	0.00	0.00
2,900.00	17.00	286.00	2,867.03	77.08	-283.59	-70.93	0.00	0.00	0.00	0.00
3,000.00	17.00	286.00	2,962.66	85.14	-311.69	-78.38	0.00	0.00	0.00	0.00
3,100.00	17.00	286.00	3,058.29	93.20	-339.79	-85.83	0.00	0.00	0.00	0.00
3,200.00	17.00	286.00	3,153.92	101.26	-367.90	-93.28	0.00	0.00	0.00	0.00
3,300.00	17.00	286.00	3,249.55	109.32	-396.00	-100.72	0.00	0.00	0.00	0.00
3,400.00	17.00	286.00	3,345.18	117.38	-424.11	-108.17	0.00	0.00	0.00	0.00
3,500.00	17.00	286.00	3,440.81	125.44	-452.21	-115.62	0.00	0.00	0.00	0.00
3,600.00	17.00	286.00	3,536.44	133.50	-480.32	-123.07	0.00	0.00	0.00	0.00
3,700.00	17.00	286.00	3,632.07	141.55	-508.42	-130.52	0.00	0.00	0.00	0.00
3,800.00	17.00	286.00	3,727.70	149.61	-536.53	-137.97	0.00	0.00	0.00	0.00
3,900.00	17.00	286.00	3,823.33	157.67	-564.63	-145.42	0.00	0.00	0.00	0.00
4,000.00	17.00	286.00	3,918.97	165.73	-592.74	-152.87	0.00	0.00	0.00	0.00
4,100.00	17.00	286.00	4,014.60	173.79	-620.84	-160.31	0.00	0.00	0.00	0.00
4,200.00	17.00	286.00	4,110.23	181.85	-648.94	-167.76	0.00	0.00	0.00	0.00

## Plan Report for SUNFLOWER 25G-17HZ - Permit Rev-2

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	Toolface Azimuth (°)
4,300.00	17.00	286.00	4,205.86	189.91	-677.05	-175.21	0.00	0.00	0.00	0.00
4,400.00	17.00	286.00	4,301.49	197.97	-705.15	-182.66	0.00	0.00	0.00	0.00
4,500.00	17.00	286.00	4,397.12	206.03	-733.26	-190.11	0.00	0.00	0.00	0.00
4,600.00	17.00	286.00	4,492.75	214.08	-761.36	-197.56	0.00	0.00	0.00	0.00
4,626.41	17.00	286.00	4,518.00	216.21	-768.78	-199.53	0.00	0.00	0.00	0.00
<b>Sussex</b>										
4,700.00	17.00	286.00	4,588.38	222.14	-789.47	-205.01	0.00	0.00	0.00	0.00
4,800.00	17.00	286.00	4,684.01	230.20	-817.57	-212.46	0.00	0.00	0.00	0.00
<b>Begin Drop @ 4800.00ft</b>										
4,900.00	15.00	286.00	4,780.13	237.80	-844.07	-219.48	2.00	-2.00	0.00	180.00
5,000.00	13.00	286.00	4,877.16	244.47	-867.32	-225.64	2.00	-2.00	0.00	180.00
5,100.00	11.00	286.00	4,974.96	250.20	-887.31	-230.94	2.00	-2.00	0.00	180.00
5,200.00	9.00	286.00	5,073.44	254.98	-904.00	-235.36	2.00	-2.00	0.00	180.00
5,300.00	7.00	286.00	5,172.46	258.82	-917.37	-238.91	2.00	-2.00	0.00	180.00
5,400.00	5.00	286.00	5,271.91	261.70	-927.42	-241.57	2.00	-2.00	0.00	180.00
5,500.00	3.00	286.00	5,371.66	263.62	-934.13	-243.35	2.00	-2.00	0.00	180.00
5,600.00	1.00	286.00	5,471.59	264.59	-937.48	-244.24	2.00	-2.00	0.00	180.00
5,650.00	0.00	0.00	5,521.59	264.71	-937.90	-244.35	2.00	-2.00	148.00	180.00
<b>End Drop @ 5650.00ft</b>										
5,700.00	0.00	0.00	5,571.59	264.71	-937.90	-244.35	0.00	0.00	0.00	0.00
5,800.00	0.00	0.00	5,671.59	264.71	-937.90	-244.35	0.00	0.00	0.00	0.00
5,900.00	0.00	0.00	5,771.59	264.71	-937.90	-244.35	0.00	0.00	0.00	0.00
6,000.00	0.00	0.00	5,871.59	264.71	-937.90	-244.35	0.00	0.00	0.00	0.00
6,100.00	0.00	0.00	5,971.59	264.71	-937.90	-244.35	0.00	0.00	0.00	0.00
6,200.00	0.00	0.00	6,071.59	264.71	-937.90	-244.35	0.00	0.00	0.00	0.00
6,300.00	0.00	0.00	6,171.59	264.71	-937.90	-244.35	0.00	0.00	0.00	0.00
6,400.00	0.00	0.00	6,271.59	264.71	-937.90	-244.35	0.00	0.00	0.00	0.00
6,500.00	0.00	0.00	6,371.59	264.71	-937.90	-244.35	0.00	0.00	0.00	0.00
6,600.00	0.00	0.00	6,471.59	264.71	-937.90	-244.35	0.00	0.00	0.00	0.00
6,700.00	0.00	0.00	6,571.59	264.71	-937.90	-244.35	0.00	0.00	0.00	0.00
6,800.00	0.00	0.00	6,671.59	264.71	-937.90	-244.35	0.00	0.00	0.00	0.00
6,900.00	0.00	0.00	6,771.59	264.71	-937.90	-244.35	0.00	0.00	0.00	0.00
6,933.45	0.00	0.00	6,805.04	264.71	-937.90	-244.35	0.00	0.00	0.00	0.00
<b>KOP @ 6933.45ft</b>										
7,000.00	6.65	181.24	6,871.44	260.85	-937.98	-240.49	10.00	10.00	-268.62	-178.76
7,058.72	12.53	181.24	6,929.32	251.07	-938.19	-230.71	10.00	10.00	0.00	0.00
<b>Sharon Springs</b>										
7,100.00	16.65	181.24	6,969.26	240.67	-938.42	-220.31	10.00	10.00	0.00	0.00
7,115.79	18.23	181.24	6,984.32	235.94	-938.52	-215.58	10.00	10.00	0.00	0.00
<b>Niobrara Top</b>										
7,175.28	24.18	181.24	7,039.76	214.43	-938.98	-194.06	10.00	10.00	0.00	0.00
<b>Niobrara B Bench</b>										
7,200.00	26.65	181.24	7,062.08	203.83	-939.21	-183.46	10.00	10.00	0.00	0.00
7,258.65	32.52	181.24	7,113.06	174.89	-939.84	-154.51	10.00	10.00	0.00	0.00
<b>Niobrara C Bench</b>										
7,300.00	36.65	181.24	7,147.10	151.43	-940.34	-131.04	10.00	10.00	0.00	0.00
7,400.00	46.65	181.24	7,221.72	85.06	-941.77	-64.66	10.00	10.00	0.00	0.00
<b>DLS = 10°/100'</b>										
7,436.74	50.33	181.24	7,246.06	57.56	-942.37	-37.15	10.00	10.00	0.00	0.00
<b>Fort Hays</b>										
7,464.02	53.06	181.24	7,262.97	36.16	-942.83	-15.75	10.00	10.00	0.00	0.00
<b>Codell</b>										
7,500.00	56.65	181.24	7,283.68	6.75	-943.46	13.67	10.00	10.00	0.00	0.00
7,600.00	66.65	181.24	7,331.10	-81.13	-945.36	101.57	10.00	10.00	0.00	0.00
7,700.00	76.65	181.24	7,362.53	-175.90	-947.40	196.36	10.00	10.00	0.00	0.00
7,800.00	86.65	181.24	7,377.02	-274.70	-949.53	295.18	10.00	10.00	0.00	0.00
7,832.55	89.91	181.24	7,378.00	-307.22	-950.23	327.71	10.00	10.00	0.00	0.00
<b>End Build @ 7832.55ft - Target Heel Location - 7"</b>										

## Plan Report for SUNFLOWER 25G-17HZ - Permit Rev-2

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	Toolface Azimuth (°)
7,900.00	89.91	181.24	7,378.11	-374.65	-951.69	395.16	0.00	0.00	0.00	0.00
8,000.00	89.91	181.24	7,378.26	-474.63	-953.84	495.16	0.00	0.00	0.00	0.00
8,100.00	89.91	181.24	7,378.42	-574.61	-956.00	595.16	0.00	0.00	0.00	0.00
8,200.00	89.91	181.24	7,378.58	-674.58	-958.15	695.16	0.00	0.00	0.00	0.00
8,300.00	89.91	181.24	7,378.73	-774.56	-960.31	795.16	0.00	0.00	0.00	0.00
8,400.00	89.91	181.24	7,378.89	-874.54	-962.47	895.16	0.00	0.00	0.00	0.00
8,500.00	89.91	181.24	7,379.05	-974.51	-964.62	995.16	0.00	0.00	0.00	0.00
8,600.00	89.91	181.24	7,379.21	-1,074.49	-966.78	1,095.16	0.00	0.00	0.00	0.00
8,700.00	89.91	181.24	7,379.36	-1,174.47	-968.93	1,195.16	0.00	0.00	0.00	0.00
8,800.00	89.91	181.24	7,379.52	-1,274.44	-971.09	1,295.16	0.00	0.00	0.00	0.00
8,900.00	89.91	181.24	7,379.68	-1,374.42	-973.24	1,395.16	0.00	0.00	0.00	0.00
9,000.00	89.91	181.24	7,379.84	-1,474.40	-975.40	1,495.16	0.00	0.00	0.00	0.00
9,100.00	89.91	181.24	7,379.99	-1,574.37	-977.56	1,595.16	0.00	0.00	0.00	0.00
9,200.00	89.91	181.24	7,380.15	-1,674.35	-979.71	1,695.16	0.00	0.00	0.00	0.00
9,300.00	89.91	181.24	7,380.31	-1,774.33	-981.87	1,795.16	0.00	0.00	0.00	0.00
9,400.00	89.91	181.24	7,380.47	-1,874.30	-984.02	1,895.16	0.00	0.00	0.00	0.00
9,500.00	89.91	181.24	7,380.62	-1,974.28	-986.18	1,995.16	0.00	0.00	0.00	0.00
9,600.00	89.91	181.24	7,380.78	-2,074.26	-988.34	2,095.16	0.00	0.00	0.00	0.00
9,700.00	89.91	181.24	7,380.94	-2,174.23	-990.49	2,195.16	0.00	0.00	0.00	0.00
9,800.00	89.91	181.24	7,381.09	-2,274.21	-992.65	2,295.16	0.00	0.00	0.00	0.00
9,900.00	89.91	181.24	7,381.25	-2,374.19	-994.80	2,395.16	0.00	0.00	0.00	0.00
10,000.00	89.91	181.24	7,381.41	-2,474.16	-996.96	2,495.16	0.00	0.00	0.00	0.00
10,100.00	89.91	181.24	7,381.57	-2,574.14	-999.11	2,595.16	0.00	0.00	0.00	0.00
10,200.00	89.91	181.24	7,381.72	-2,674.12	-1,001.27	2,695.16	0.00	0.00	0.00	0.00
10,300.00	89.91	181.24	7,381.88	-2,774.09	-1,003.43	2,795.16	0.00	0.00	0.00	0.00
10,400.00	89.91	181.24	7,382.04	-2,874.07	-1,005.58	2,895.16	0.00	0.00	0.00	0.00
10,500.00	89.91	181.24	7,382.20	-2,974.05	-1,007.74	2,995.16	0.00	0.00	0.00	0.00
10,600.00	89.91	181.24	7,382.35	-3,074.02	-1,009.89	3,095.16	0.00	0.00	0.00	0.00
10,700.00	89.91	181.24	7,382.51	-3,174.00	-1,012.05	3,195.16	0.00	0.00	0.00	0.00
10,800.00	89.91	181.24	7,382.67	-3,273.98	-1,014.21	3,295.16	0.00	0.00	0.00	0.00
10,900.00	89.91	181.24	7,382.83	-3,373.95	-1,016.36	3,395.16	0.00	0.00	0.00	0.00
11,000.00	89.91	181.24	7,382.98	-3,473.93	-1,018.52	3,495.16	0.00	0.00	0.00	0.00
11,100.00	89.91	181.24	7,383.14	-3,573.91	-1,020.67	3,595.16	0.00	0.00	0.00	0.00
11,200.00	89.91	181.24	7,383.30	-3,673.88	-1,022.83	3,695.16	0.00	0.00	0.00	0.00
11,300.00	89.91	181.24	7,383.45	-3,773.86	-1,024.98	3,795.16	0.00	0.00	0.00	0.00
11,400.00	89.91	181.24	7,383.61	-3,873.84	-1,027.14	3,895.16	0.00	0.00	0.00	0.00
11,500.00	89.91	181.24	7,383.77	-3,973.81	-1,029.30	3,995.16	0.00	0.00	0.00	0.00
11,600.00	89.91	181.24	7,383.93	-4,073.79	-1,031.45	4,095.16	0.00	0.00	0.00	0.00
11,700.00	89.91	181.24	7,384.08	-4,173.77	-1,033.61	4,195.16	0.00	0.00	0.00	0.00
11,800.00	89.91	181.24	7,384.24	-4,273.74	-1,035.76	4,295.16	0.00	0.00	0.00	0.00
11,900.00	89.91	181.24	7,384.40	-4,373.72	-1,037.92	4,395.16	0.00	0.00	0.00	0.00
12,000.00	89.91	181.24	7,384.56	-4,473.70	-1,040.07	4,495.16	0.00	0.00	0.00	0.00
12,100.00	89.91	181.24	7,384.71	-4,573.67	-1,042.23	4,595.16	0.00	0.00	0.00	0.00
12,200.00	89.91	181.24	7,384.87	-4,673.65	-1,044.39	4,695.16	0.00	0.00	0.00	0.00
12,300.00	89.91	181.24	7,385.03	-4,773.63	-1,046.54	4,795.15	0.00	0.00	0.00	0.00
12,400.00	89.91	181.24	7,385.19	-4,873.60	-1,048.70	4,895.15	0.00	0.00	0.00	0.00
12,500.00	89.91	181.24	7,385.34	-4,973.58	-1,050.85	4,995.15	0.00	0.00	0.00	0.00
12,600.00	89.91	181.24	7,385.50	-5,073.56	-1,053.01	5,095.15	0.00	0.00	0.00	0.00
12,700.00	89.91	181.24	7,385.66	-5,173.53	-1,055.17	5,195.15	0.00	0.00	0.00	0.00
12,800.00	89.91	181.24	7,385.81	-5,273.51	-1,057.32	5,295.15	0.00	0.00	0.00	0.00
12,900.00	89.91	181.24	7,385.97	-5,373.49	-1,059.48	5,395.15	0.00	0.00	0.00	0.00
12,917.77	89.91	181.24	7,386.00	-5,391.25	-1,059.86	5,412.92	0.00	0.00	0.00	0.00
Target Toe Location										
12,917.78	89.91	181.24	7,386.00	-5,391.26	-1,059.86	5,412.93	0.01	0.00	0.00	0.00
TD Well @ 12917.78ft - SUNFLOWER 25G-17HZ_BHL										

## Plan Report for SUNFLOWER 25G-17HZ - Permit Rev-2

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
250.00	250.00	0.00	0.00	Begin Nudge @ 250.00ft
350.00	349.99	0.00	-1.31	End Nudge @ 350.00ft
850.00	849.82	0.00	-14.40	Begin Nudge @ 850.00ft
877.83	877.64	0.10	-15.11	End Nudge @ 877.83ft
1,665.00	1,664.54	5.78	-34.92	Begin Nudge @ 1665.00ft
2,440.00	2,427.13	40.01	-154.30	End Nudge @ 2440.00ft
4,800.00	4,684.01	230.20	-817.57	Begin Drop @ 4800.00ft
5,650.00	5,521.59	264.71	-937.90	End Drop @ 5650.00ft
6,933.45	6,805.04	264.71	-937.90	KOP @ 6933.45ft
7,400.00	7,221.72	85.06	-941.77	DLS = 10°/100'
7,832.55	7,378.00	-307.22	-950.23	End Build @ 7832.55ft
12,917.78	7,386.00	-5,391.26	-1,059.86	TD Well @ 12917.78ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
User	No Target (Freehand)	181.24	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
0.00	7,832.55	Permit Rev-2	APC_ISCWSA REV 2 MWD+IFR1
7,832.55	12,917.78	Permit Rev-2	APC_ISCWSA REV 2 MWD+IFR1

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,315.00	1,314.66	9 5/8"	9-5/8	13-1/2
7,832.55	7,378.00	7"	7	8-3/4

Formation Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,626.41	4,518.00	Sussex		0.00	
7,058.72	6,929.32	Sharon Springs		0.00	
7,115.79	6,984.32	Niobrara Top		0.00	
7,175.28	7,039.76	Niobrara B Bench		0.00	
7,258.65	7,113.06	Niobrara C Bench		0.00	
7,436.74	7,246.06	Fort Hays		0.00	
7,464.02	7,262.97	Codell		0.00	
7,832.55	7,378.00	Target Heel Location		0.00	
12,917.77	7,386.00	Target Toe Location		0.00	

**Plan Report for SUNFLOWER 25G-17HZ - Permit Rev-2**

*Targets associated with this wellbore*

Target Name	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Shape
SUNFLOWER 25G-17HZ_BHL	7,386.00	-5,391.26	-1,059.86	Point
2N-R65W-Sec. 17_Section lines	0.00	-0.36	120.15	Polygon
SUNFLOWER 25G-17HZ_SHL	0.00	0.00	0.00	Point
2N-R65W-Sec. 8_Section lines	0.00	-0.36	89.97	Polygon

## North Reference Sheet for 2N-65W-08 Sunflower Pad - SUNFLOWER 25G-17HZ - Plan A

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to True North Reference.

Vertical Depths are relative to RKB = 17' @ 4918.00usft (D Rig). Northing and Easting are relative to SUNFLOWER 25G-17HZ

Coordinate System is Universal Transverse Mercator (US Survey Feet), Zone 13N (108 W to 102 W) using datum North American Datum 1983, ellipsoid

Projection method is Transverse Mercator (Gauss-Kruger)

Central Meridian is -105.00°, Longitude Origin:0.000000°, Latitude Origin:0.000000°

False Easting: 1,640,416.67usft, False Northing: 0.00usft, Scale Reduction: 0.99960895

Grid Coordinates of Well: 14,582,858.80 usft N, 1,728,894.06 usft E

Geographical Coordinates of Well: 40° 09' 13.31" N, 104° 41' 00.08" W

Grid Convergence at Surface is: 0.20°

Based upon Minimum Curvature type calculations, at a Measured Depth of 12,917.78usft  
the Bottom Hole Displacement is 5,494.45usft in the Direction of 191.12° (True).

Magnetic Convergence at surface is: -8.10° (17 February 2015, , IGRF2010)

