

97.00

1250

True Vertical Depth (2500 wsft/in)

7500

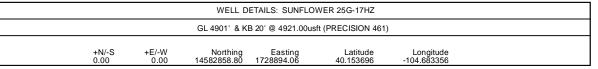
8750-

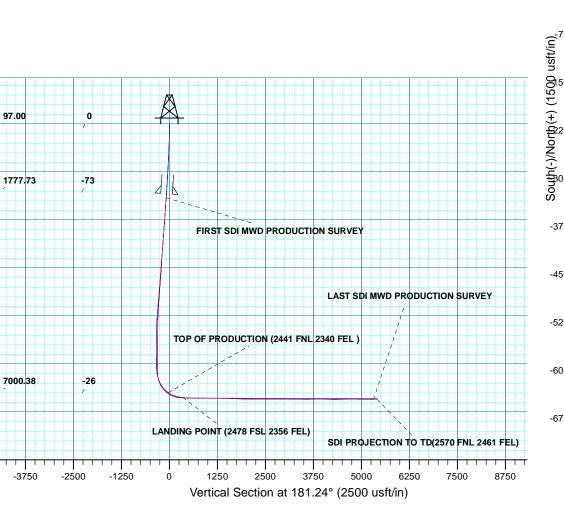
Project: WELD-NAD83-UTMFT13N Site: 2N-65W-08 Sunflower 24-8HZ Pad

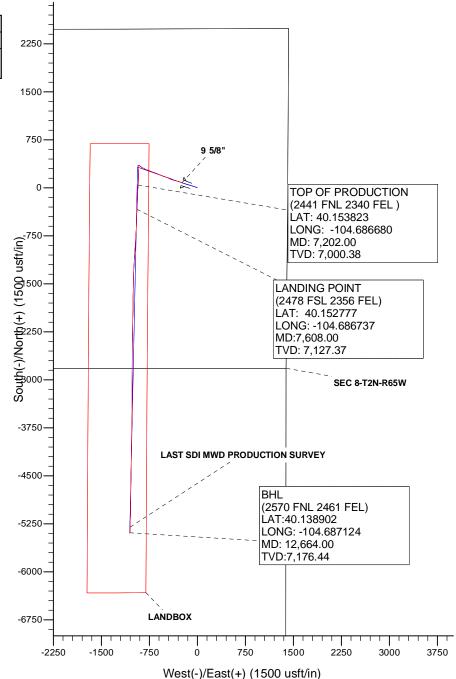
Well: SUNFLOWER 25G-17HZ

Wellbore: Plan A Design: Plan A













Company: US ROCKIES WATTENBERG PLANNING

Project: WELD-NAD83-UTMFT13N

Site: 2N-65W-08 Sunflower 24-8HZ Pad

Well: SUNFLOWER 25G-17HZ

Wellbore: Plan A

Design: Plan A

Site

Local Co-ordinate Reference:

TVD Reference: GL 4901' & KB 20' @ 4921.00usft (PRECISION

461)

MD Reference: GL 4901' & KB 20' @ 4921.00usft (PRECISION

Well SUNFLOWER 25G-17HZ

461)

North Reference: True

Survey Calculation Method: Minimum Curvature

Database: Denver Sales

Project WELD-NAD83-UTMFT13N

Map System: Universal Transverse Mercator (US Survey Feet)

Geo Datum: North American Datum 1983

Map Zone: Zone 13N (108 W to 102 W)

System Datum: Mean Sea Level

2N-65W-08 Sunflower 24-8HZ Pad

Northing: 14,582,858.79 usft Site Position: Latitude: 40.153696 Easting: Lat/Long 1,728,894.06 usft Longitude: -104.683356 From: 13.200 in 0.00 usft 0.20° **Position Uncertainty:** Slot Radius: **Grid Convergence:**

SUNFLOWER 25G-17HZ Well **Well Position** +N/-S 0.00 usft Northing: 14,582,858.79 usft Latitude: 40.153696 +F/-W 0.00 usft Easting: 1,728,894.06 usft Longitude: -104.683356 **Position Uncertainty** 3.28 usft Wellhead Elevation: 0.00 usft Ground Level: 4,901.00 usft

Wellbore Plan A Declination Magnetics Model Name Dip Angle Field Strength Sample Date (°) (°) (nT) HDGM 9/19/2015 8.40 66.68 52,520

Plan A Design Audit Notes: 1.0 ACTUAL 0.00 Version: Phase: Tie On Depth: Direction Vertical Section: Depth From (TVD) +N/-S +E/-W (usft) (usft) (usft) (°) 0.00 0.00 0.00 181.24

Survey Program

Date 11/19/2015

From (usft) (usft) Survey (Wellbore) Tool Name Description

13.00 1,801.00 SDI MWD SURFACE (Plan A) APC_ISCWSA REV 2 MWD Fixed:v2:standard declination APC_ISCWSA REV 2 MWD+ Fixed:v2:crustal field declination

Survey Measured Vertical Vertical Build Dogleg Turn Section Rate Depth Inclination Azimuth Depth +N/-S +E/-W Rate Rate (°/100usft) (°/100usft) (°/100usft) (usft) (°) (°) (usft) (usft) (usft) (usft) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 13.00 0.00 0.00 13.00 0.00 0.00 0.00 0.00 0.00 0.00 97.00 0.62 326.52 97.00 0.38 -0.25 -0.37 0.74 0.74 0.00 FIRST SDI MWD SURFACE SURVEY 187.00 0.99 314.69 186.99 1.33 -1.07 -1.31 0.45 0.41 -13.14 277.00 1.36 305.30 276.97 2.50 -2.50 -2.44 0.46 0.41 -10.43 385.00 1.89 303.41 384.93 4.22 -5.03 -4.11 0.49 0.49 -1.75 474.86 475.00 2.38 301.92 6.02 -7.85 -5.85 0.55 0.54 -1.66





Company: US ROCKIES WATTENBERG PLANNING

Project: WELD-NAD83-UTMFT13N

Site: 2N-65W-08 Sunflower 24-8HZ Pad

Well: SUNFLOWER 25G-17HZ

Wellbore: Plan A

Design: Plan A

Local Co-ordinate Reference:

TVD Reference:
MD Reference:

Well SUNFLOWER 25G-17HZ

GL 4901' & KB 20' @ 4921.00usft (PRECISION

461)

GL 4901' & KB 20' @ 4921.00usft (PRECISION

461) True

North Reference: True
Survey Calculation Method: Minimum Curvature

Database: Denver Sales

rvey										
Meas Der (us	oth	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
•	•							,	•	
	565.00	3.95	293.81	564.72	8.26	-12.28	-7.99	1.81	1.74	-9.01
	656.00	5.68	287.78	655.40	10.90	-19.43	-10.48	1.98	1.90	-6.63
1	745.00	7.36	288.83	743.82	14.09	-29.02	-13.46	1.89	1.89	1.18
8	835.00	8.97	289.03	832.90	18.24	-41.11	-17.34	1.79	1.79	0.22
(925.00	9.74	285.60	921.71	22.57	-55.08	-21.37	1.06	0.86	-3.81
1,0	015.00	10.78	286.32	1,010.27	26.98	-70.49	-25.45	1.16	1.16	0.80
1,	105.00	12.15	287.32	1,098.47	32.17	-87.61	-30.27	1.54	1.52	1.11
1,	195.00	12.18	285.70	1,186.45	37.56	-105.79	-35.26	0.38	0.03	-1.80
1,2	285.00	12.55	286.58	1,274.36	42.92	-124.30	-40.22	0.46	0.41	0.98
1,3	375.00	12.64	288.07	1,362.19	48.76	-143.04	-45.66	0.37	0.10	1.66
1,4	465.00	12.63	288.53	1,450.01	54.94	-161.73	-51.43	0.11	-0.01	0.51
1,5	556.00	12.61	288.40	1,538.82	61.24	-180.58	-57.32	0.04	-0.02	-0.14
1,6	646.00	13.11	286.73	1,626.56	67.28	-199.68	-62.94	0.69	0.56	-1.86
1.7	736.00	12.62	289.81	1,714.30	73.55	-218.71	-68.80	0.94	-0.54	3.42
	801.00	12.64	288.87	1,777.73	78.26	-232.12	-73.22	0.32	0.03	-1.45
,		VD SURFACE S		.,	. 5.25			0.02	2.23	
	842.00	13.13	289.46	1,817.70	81.26	-240.75	-76.03	1.24	1.20	1.44
9 5/8	3"									
1,9	953.00	14.47	290.86	1,925.49	90.40	-265.60	-84.63	1.24	1.21	1.26
FIRS	T SDI M	WD PRODUCTION	ON SURVEY							
	048.00	13.62	289.30	2,017.65	98.32	-287.25	-92.08	0.98	-0.89	-1.64
2.1	142.00	12.74	287.03	2,109.17	105.02	-307.61	-98.33	1.09	-0.94	-2.41
	236.00	13.38	285.84	2,200.74	111.02	-327.98	-103.90	0.74	0.68	-1.27
	331.00	13.03	280.07	2,293.23	115.89	-349.10	-108.31	1.43	-0.37	-6.07
	426.00	12.91	284.97	2,385.81	120.51	-369.90	-112.47	1.16	-0.13	5.16
	521.00	12.43	289.50	2,478.50	126.66	-389.79	-118.20	1.16	-0.51	4.77
2,6	616.00	12.67	294.06	2,571.23	134.32	-408.94	-125.44	1.07	0.25	4.80
2,7	712.00	13.83	294.13	2,664.68	143.31	-429.03	-133.99	1.21	1.21	0.07
2,8	806.00	14.15	290.82	2,755.89	151.98	-450.02	-142.21	0.92	0.34	-3.52
	902.00	13.86	290.06	2,849.04	160.10	-471.79	-149.85	0.36	-0.30	-0.79
2,9	996.00	13.31	288.20	2,940.41	167.34	-492.64	-156.64	0.75	-0.59	-1.98
3,0	092.00	13.32	291.48	3,033.83	174.84	-513.43	-163.69	0.79	0.01	3.42
	187.00	13.53	292.71	3,126.23	183.14	-533.87	-171.54	0.37	0.22	1.29
	282.00	12.50	289.65	3,218.79	190.89	-553.80	-178.86	1.30	-1.08	-3.22
	377.00	12.51	292.97	3,311.54	198.36	-572.96	-185.91	0.76	0.01	3.49
,	472.00	12.16	292.57	3,404.35	206.21	-591.67	-193.36	0.38	-0.37	-0.42
3,5	567.00	11.95	293.65	3,497.25	214.00	-609.92	-200.75	0.32	-0.22	1.14
	662.00	11.85	293.55	3,590.21	221.84	-627.87	-208.20	0.11	-0.11	-0.11
	757.00	12.89	291.80	3,683.00	229.67	-646.65	-215.63	1.16	1.09	-1.84
	853.00	12.09	287.80	3,776.73	236.72	-666.16	-222.25	1.23	-0.83	-4.17
	947.00	12.83	290.70	3,868.52	243.42	-685.30	-228.54	1.03	0.79	3.09
4.0	043.00	13.09	290.51	3,962.07	251.00	-705.45	-235.67	0.27	0.27	-0.20





Company: US ROCKIES WATTENBERG PLANNING

Project: WELD-NAD83-UTMFT13N

Site: 2N-65W-08 Sunflower 24-8HZ Pad

Well: SUNFLOWER 25G-17HZ

Wellbore: Plan A

Design: Plan A

Local Co-ordinate Reference:

TVD Reference:
MD Reference:

Well SUNFLOWER 25G-17HZ

GL 4901' & KB 20' @ 4921.00usft (PRECISION

461)

GL 4901' & KB 20' @ 4921.00usft (PRECISION

461) True

North Reference:

Survey Calculation Method: Minimum Curvature

Database: Denver Sales

urvey										
Measu Dep (ust	th	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4.1	38.00	12.19	289.48	4,054.77	258.11	-724.99	-242.36	0.98	-0.95	-1.08
	233.00	13.89	292.87	4,147.32	265.89	-744.95	-249.71	1.96	1.79	3.57
	328.00	13.33	289.13	4,239.65	273.91	-765.80	-257.27	1.10	-0.59	-3.94
	23.00	12.00	289.59	4,332.34	280.81	-785.46	-263.75	1.40	-1.40	0.48
4,5	18.00	12.24	290.21	4,425.22	287.60	-804.21	-270.13	0.29	0.25	0.65
4,6	14.00	11.05	295.34	4,519.25	295.06	-822.08	-277.20	1.64	-1.24	5.34
4,7	08.80	11.60	299.93	4,611.42	303.63	-838.41	-285.41	1.12	0.59	4.88
4,8	803.00	11.49	300.06	4,704.49	313.13	-854.87	-294.56	0.12	-0.12	0.14
4,8	899.00	10.12	302.29	4,798.79	322.43	-870.28	-303.52	1.49	-1.43	2.32
4,9	92.00	7.85	302.22	4,890.64	330.18	-882.56	-311.00	2.44	-2.44	-0.08
5,0	00.88	6.87	306.79	4,985.85	337.11	-892.71	-317.72	1.19	-1.02	4.76
5,1	82.00	5.91	311.36	5,079.27	343.68	-900.84	-324.10	1.15	-1.02	4.86
5,2	77.00	5.45	309.14	5,173.80	349.76	-908.01	-330.03	0.54	-0.48	-2.34
5,3	371.00	2.76	282.49	5,267.56	353.07	-913.68	-333.21	3.44	-2.86	-28.35
5,4	67.00	2.00	271.00	5,363.48	353.59	-917.62	-333.65	0.93	-0.79	-11.97
5,5	61.00	1.56	281.51	5,457.43	353.88	-920.51	-333.88	0.58	-0.47	11.18
5,6	56.00	1.25	264.13	5,552.40	354.03	-922.81	-333.98	0.55	-0.33	-18.29
5,7	51.00	0.64	301.41	5,647.39	354.20	-924.29	-334.12	0.88	-0.64	39.24
5,8	346.00	0.35	254.72	5,742.39	354.40	-925.02	-334.30	0.50	-0.31	-49.15
5,9	41.00	0.55	296.59	5,837.38	354.53	-925.71	-334.41	0.39	0.21	44.07
6,0	35.00	0.58	284.54	5,931.38	354.85	-926.58	-334.72	0.13	0.03	-12.82
6,1	31.00	0.23	215.72	6,027.38	354.82	-927.16	-334.67	0.56	-0.36	-71.69
6,2	25.00	0.15	271.30	6,121.38	354.67	-927.39	-334.51	0.20	-0.09	59.13
6,3	320.00	0.64	226.74	6,216.37	354.30	-927.90	-334.14	0.57	0.52	-46.91
6,4	15.00	0.23	169.70	6,311.37	353.75	-928.26	-333.58	0.58	-0.43	-60.04
6,5	10.00	2.19	175.72	6,406.35	351.76	-928.09	-331.59	2.06	2.06	6.34
6,6	604.00	8.67	186.64	6,499.88	342.92	-928.77	-322.74	6.95	6.89	11.62
6,6	99.00	17.39	174.43	6,592.36	321.63	-928.22	-301.47	9.58	9.18	-12.85
6,7	95.00	21.19	173.46	6,682.95	290.10	-924.85	-270.02	3.97	3.96	-1.01
	90.00	27.13	175.72	6,769.59	251.41	-921.28	-231.42	6.33	6.25	2.38
6,9	84.00	36.86	181.02	6,849.23	201.72	-920.17	-181.76	10.76	10.35	5.64
7,0	79.00	44.66	182.89	6,921.14	139.79	-922.37	-119.79	8.31	8.21	1.97
7,1	74.00	52.55	184.40	6,983.91	68.73	-926.95	-48.65	8.39	8.31	1.59
7,2	202.00	55.39	184.06	7,000.38	46.15	-928.62	-26.04	10.20	10.15	-1.23
TOP	OF PRO	DUCTION (2441	FNL 2340 FEL)						
7,2	269.00	62.20	183.32	7,035.07	-11.01	-932.29	31.18	10.20	10.16	-1.10
7,3	63.00	69.19	181.26	7,073.74	-96.55	-935.67	116.77	7.70	7.44	-2.19
7,4	57.00	74.87	182.08	7,102.73	-185.89	-938.29	206.15	6.10	6.04	0.87
	52.00	82.62	182.65	7,121.25	-278.91	-942.13	299.23	8.18	8.16	0.60
	00.80	84.85	182.57	7,127.37	-334.51	-944.67	354.88	3.98	3.98	-0.14
LANI	DING PC	DINT (2478 FSL 2								
7.6	347.00	86.40	182.52	7,130.34	-373.36	-946.40	393.75	3.98	3.98	-0.14





US ROCKIES WATTENBERG PLANNING Company:

Project: WELD-NAD83-UTMFT13N

2N-65W-08 Sunflower 24-8HZ Pad Site:

SUNFLOWER 25G-17HZ Well:

Wellbore: Plan A Design: Plan A Local Co-ordinate Reference:

TVD Reference: GL 4901' & KB 20' @ 4921.00usft (PRECISION

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Well SUNFLOWER 25G-17HZ

461)

North Reference: True

Survey Calculation Method: Minimum Curvature Database: Denver Sales

Survey									
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)
7,742.00	86.97	181.33	7,135.83	-468.15	-949.58	488.59	1.39	0.60	-1.25
7,837.00	87.18	180.51	7,140.68	-563.01	-951.11	583.46	0.89	0.22	-0.86
7,932.00	89.16	183.47	7,143.72	-657.89	-954.40	678.39	3.75	2.08	3.12
8,026.00	91.01	183.38	7,143.58	-751.72	-960.02	772.32	1.97	1.97	-0.10
8,121.00	90.34	184.61	7,142.46	-846.48	-966.64	867.20	1.47	-0.71	1.29
8,216.00	90.10	184.72	7,142.09	-941.16	-974.36	962.03	0.28	-0.25	0.12
8,312.00	87.81	183.83	7,143.84	-1,036.87	-981.52	1,057.87	2.56	-2.39	-0.93
8,407.00	88.42	183.23	7,146.97	-1,131.64	-987.36	1,152.74	0.90	0.64	-0.63
8,502.00	89.46	183.02	7,148.73	-1,226.48	-992.54	1,247.67	1.12	1.09	-0.22
8,597.00	89.66	182.41	7,149.46	-1,321.37	-997.04	1,342.64	0.68	0.21	-0.64
8,691.00	89.90	180.93	7,149.82	-1,415.33	-999.78	1,436.63	1.60	0.26	-1.57
8,786.00	88.79	180.90	7,150.90	-1,510.31	-1,001.30	1,531.62	1.17	-1.17	-0.03
8,881.00	88.49	181.08	7,153.16	-1,605.26	-1,002.94	1,626.59	0.37	-0.32	0.19
8,976.00	89.60	180.18	7,154.74	-1,700.24	-1,003.98	1,721.57	1.50	1.17	-0.95
9,071.00	88.49	180.58	7,156.32	-1,795.23	-1,004.61	1,816.55	1.24	-1.17	0.42
9,167.00	87.88	180.98	7,159.36	-1,891.17	-1,005.92	1,912.49	0.76	-0.64	0.42
9,262.00	88.02	180.09	7,162.76	-1,986.10	-1,006.81	2,007.43	0.95	0.15	-0.94
9,356.00	88.96	181.54	7,165.24	-2,080.06	-1,008.14	2,101.39	1.84	1.00	1.54
9,451.00	89.33	180.87	7,166.66	-2,175.02	-1,010.14	2,196.38	0.81	0.39	-0.71
9,546.00	90.03	181.33	7,167.19	-2,270.01	-1,011.96	2,291.37	0.88	0.74	0.48
9,640.00	90.30	181.33	7,166.92	-2,363.98	-1,014.15	2,385.37	0.29	0.29	0.00
9,735.00	90.30	181.11	7,166.42	-2,458.96	-1,016.17	2,480.37	0.23	0.00	-0.23
9,830.00	90.37	180.40	7,165.86	-2,553.95	-1,017.42	2,575.37	0.75	0.07	-0.75
9,925.00	90.27	180.95	7,165.33	-2,648.94	-1,018.54	2,670.36	0.59	-0.11	0.58
10,020.00	90.77	180.53	7,164.47	-2,743.93	-1,019.77	2,765.35	0.69	0.53	-0.44
10,115.00	89.50	180.15	7,164.25	-2,838.92	-1,020.33	2,860.34	1.40	-1.34	-0.40
10,209.00	89.83	177.93	7,164.80	-2,932.90	-1,018.76	2,954.26	2.39	0.35	-2.36
10,304.00	88.46	180.64	7,166.22	-3,027.87	-1,017.57	3,049.18	3.20	-1.44	2.85
10,399.00	88.93	180.36	7,168.38	-3,122.84	-1,018.40	3,144.15	0.58	0.49	-0.29
10,494.00	89.13	180.32	7,169.99	-3,217.83	-1,018.96	3,239.12	0.21	0.21	-0.04
10,587.00	89.46	179.77	7,171.13	-3,310.82	-1,019.03	3,332.10	0.69	0.35	-0.59
10,681.00	88.99	181.59	7,172.40	-3,404.80	-1,020.15	3,426.08	2.00	-0.50	1.94
10,776.00	90.10	181.40	7,173.16	-3,499.76	-1,022.63	3,521.07	1.19	1.17	-0.20
10,871.00	90.40	180.82	7,172.74	-3,594.74	-1,024.47	3,616.07	0.69	0.32	-0.61
10,966.00	91.11	180.25	7,171.49	-3,689.73	-1,025.36	3,711.06	0.96	0.75	-0.60
11,061.00	91.08	181.01	7,169.68	-3,784.71	-1,026.40	3,806.03	0.80	-0.03	0.80
11,153.00	89.83	181.32	7,168.95	-3,876.68	-1,028.27	3,898.03	1.40	-1.36	0.34
11,247.00	88.92	180.81	7,169.97	-3,970.66	-1,030.02	3,992.02	1.11	-0.97	-0.54
11,338.00	88.12	181.57	7,172.32	-4,061.61	-1,031.91	4,082.99	1.21	-0.88	0.84
11,433.00	89.87	181.09	7,173.99	-4,156.56	-1,034.11	4,177.97	1.91	1.84	-0.51
11,527.00	88.22	180.76	7,175.55	-4,250.54	-1,035.63	4,271.95	1.79	-1.76	-0.35
11,717.00	88.55	180.86	7,180.91	-4,440.44	-1,038.31	4,461.87	0.18	0.17	0.05





US ROCKIES WATTENBERG PLANNING Company:

Project: WELD-NAD83-UTMFT13N

Site: 2N-65W-08 Sunflower 24-8HZ Pad

SUNFLOWER 25G-17HZ Well:

Wellbore: Plan A Design: Plan A Local Co-ordinate Reference:

TVD Reference:

MD Reference:

Well SUNFLOWER 25G-17HZ

GL 4901' & KB 20' @ 4921.00usft (PRECISION

GL 4901' & KB 20' @ 4921.00usft (PRECISION

461)

North Reference: True

Survey Calculation Method: Database:

Minimum Curvature Denver Sales

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)
11,812.00 11,907.00	89.13 89.66	180.48 180.67	7,182.83 7,183.84	-4,535.41 -4,630.40	-1,039.42 -1,040.38	4,556.85 4,651.83	0.73 0.59	0.61 0.56	-0.40 0.20
12,003.00	90.74	180.52	7,183.50	-4,726.40	-1,041.37	4,747.83	1.14	1.13	-0.16
12,098.00	91.92	179.96	7,181.30	-4,821.37	-1,041.77	4,842.78	1.37	1.24	-0.59
12,193.00	90.27	180.13	7,179.48	-4,916.35	-1,041.85	4,937.74	1.75	-1.74	0.18
12,288.00	89.83	181.33	7,179.40	-5,011.34	-1,043.06	5,032.74	1.35	-0.46	1.26
12,383.00	91.28	181.19	7,178.48	-5,106.31	-1,045.15	5,127.73	1.53	1.53	-0.15
12,479.00	89.80	181.54	7,177.57	-5,202.27	-1,047.43	5,223.72	1.58	-1.54	0.36
12,574.00	90.54	181.82	7,177.29	-5,297.23	-1,050.22	5,318.72	0.83	0.78	0.29
LAST SDI N	WD PRODUCTIO	N SURVEY							
12,664.00	90.54	181.82	7,176.44	-5,387.18	-1,053.08	5,408.71	0.00	0.00	0.00
SDI PROJE	CTION TO TD(257	70 FNL 2461 FE	L)						

Casing Points						
	Measured	Vertical		Casing	Hole	
	Depth	Depth		Diameter	Diameter	
	(usft)	(usft)	Name	(in)	(in)	
	1,842.00	1,817.70 9 5/8"		9.625	13.500	

Design Annotation	s				
	asured Depth Jusft)	Vertical Depth (usft)	Local Coor +N/-S (usft)	dinates +E/-W (usft)	Comment
	97.00	97.00	0.38	-0.25	FIRST SDI MWD SURFACE SURVEY
	1,801.00	1,777.73	78.26	-232.12	LAST SDI MWD SURFACE SURVEY
	1,953.00	1,925.49	90.40	-265.60	FIRST SDI MWD PRODUCTION SURVEY
	7,202.00	7,000.38	46.15	-928.62	TOP OF PRODUCTION (2441 FNL 2340 FEL)
	7,608.00	7,127.37	-334.51	-944.67	LANDING POINT (2478 FSL 2356 FEL)
1	2,574.00	7,177.29	-5,297.23	-1,050.22	LAST SDI MWD PRODUCTION SURVEY
1	2,664.00	7,176.44	-5,387.18	-1,053.08	SDI PROJECTION TO TD(2570 FNL 2461 FEL)

Approved by.			Approved By:		Date:	
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