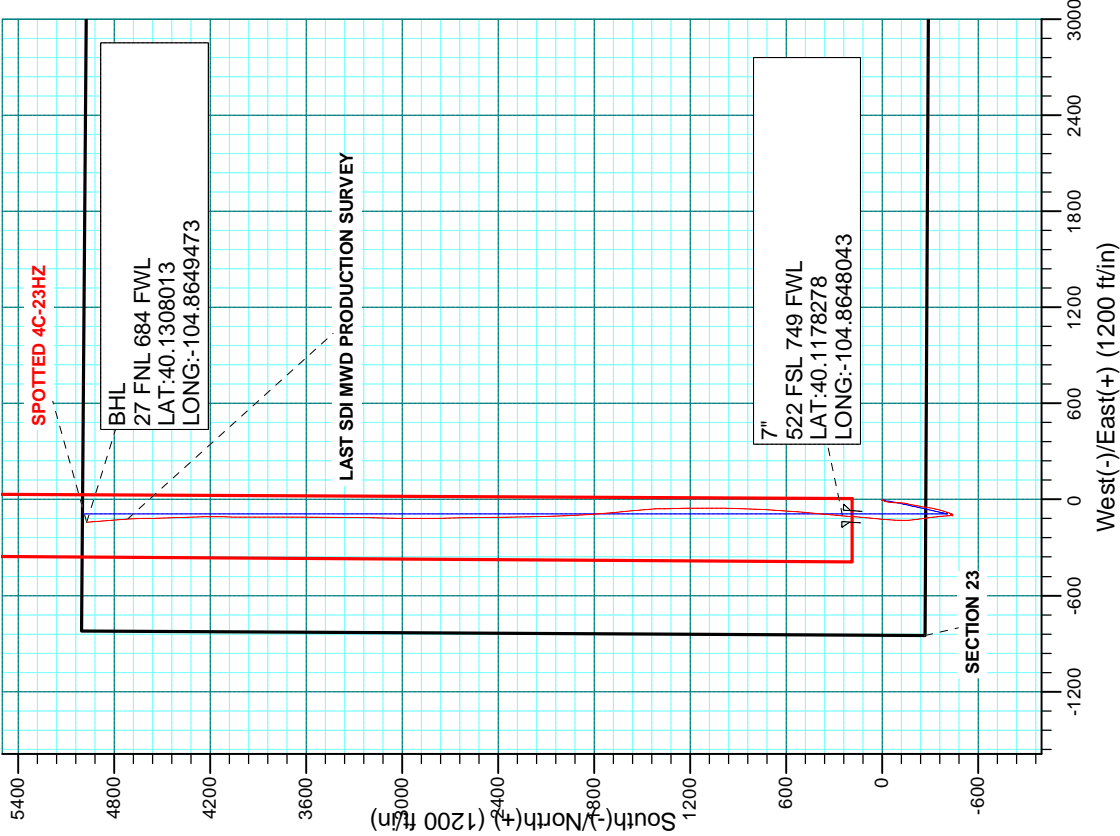
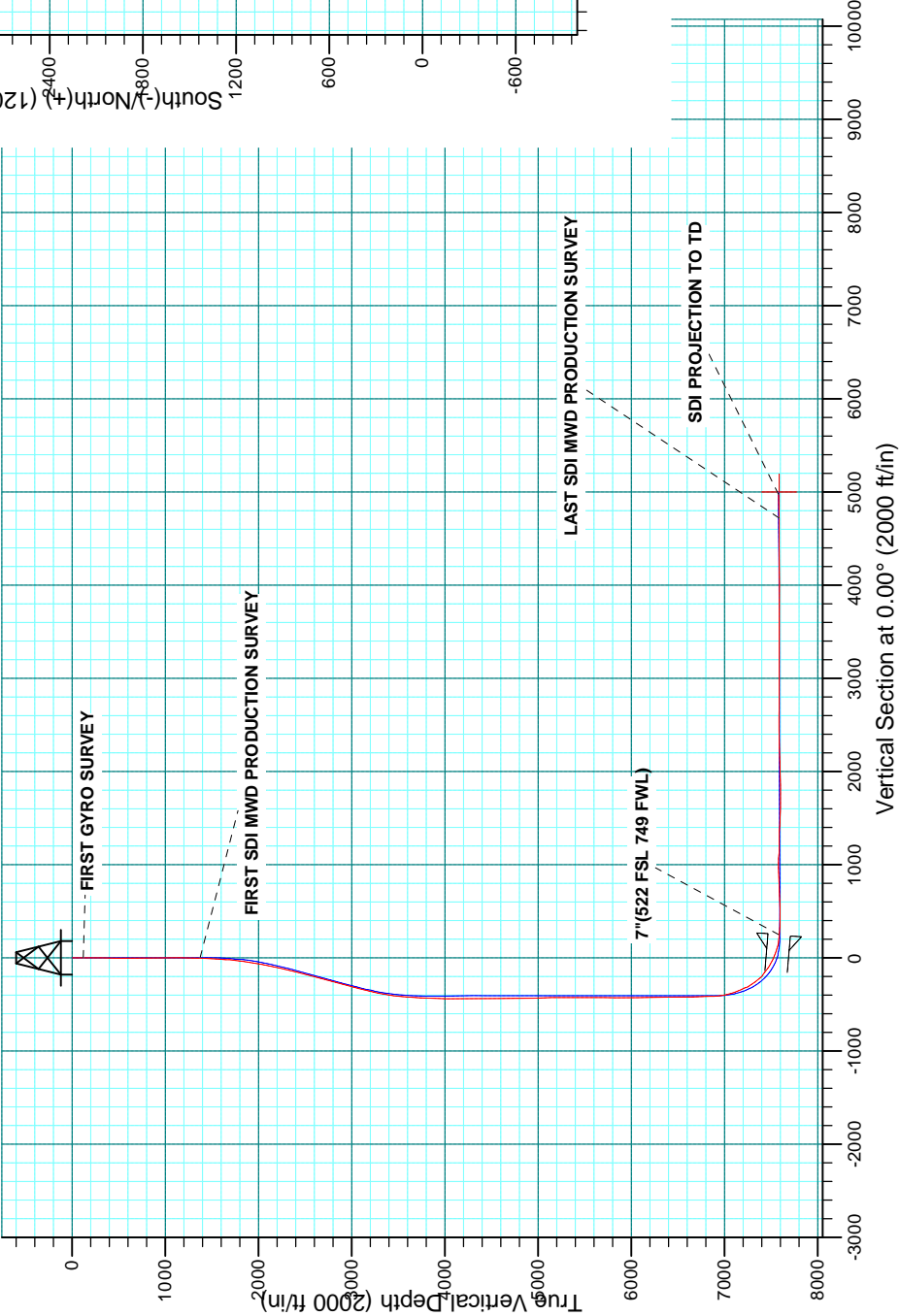




Project: COLORADO NORTHERN ZONE - 83
Site: SPOTTED 35-23HZ PAD
Well: SPOTTED 4C-23HZ
Wellbore: OH
Design: OH



WELL DETAILS: SPOTTED 4C-23HZ					
GL 4966 & KB 25 @ 4981.00ft (H&P 311)					
+N/-S 0.00	+E/-W 0.00	Northing 1286160.56	Easting 3177745.06	Latitude 40.1171549	Longitude -104.8644470





Scientific Drilling

US ROCKIES REGION PLANNING

COLORADO NORTHERN ZONE - 83

SPOTTED 35-23HZ PAD

SPOTTED 4C-23HZ

OH

Design: OH

Standard Survey Report

23 June, 2014

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well SPOTTED 4C-23HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	GL 4966 & KB 25 @ 4991.00ft (H&P 311)
Site:	SPOTTED 35-23HZ PAD	MD Reference:	GL 4966 & KB 25 @ 4991.00ft (H&P 311)
Well:	SPOTTED 4C-23HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Denver Sales

Project	COLORADO NORTHERN ZONE - 83, KERR MCGEE OIL & GAS ONSHORE LP		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site						SPOTTED 35-23HZ PAD, SWSW SECTION 23 T2N R67W																				
Site Position:			Northing:			1,286,160.43			usft			Latitude:			40.1171540											
From:			Lat/Long			Easting:			3,177,774.99			usft			Longitude:			-104.8643400								
Position Uncertainty:			0.00			ft			Slot Radius:			13.200			in			Grid Convergence:			0.41			°		

Well	SPOTTED 4C-23HZ, 275' FSL 850' FWL					
Well Position	+N/-S	0.00 ft	Northing:	1,286,160.56 usft	Latitude:	40.1171550
	+E/-W	0.00 ft	Easting:	3,177,745.06 usft	Longitude:	-104.8644470
Position Uncertainty		0.00 ft	Wellhead Elevation:	0.00 ft	Ground Level:	4,966.00 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2013	5/22/2014	8.55	66.69	52,577

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

Survey Program	Date	6/23/2014			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
25.00	1,225.00	Survey #1 SURFACE GYRO (OH)	NS-GYRO-MS	North sensing gyrocompassing m/s	
1,378.00	12,730.00	Survey #2 SDI MWD PRODUCTION (OH)	SDI_MWD+CRUST_1.0	SDI MWD + Crustal anomaly, Version 1.0	

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
25.00	0.00	0.00	25.00	0.00	0.00	0.00	0.00	0.00	0.00	
125.00	0.17	300.34	125.00	0.07	-0.13	0.07	0.17	0.17	0.00	
FIRST GYRO SURVEY										
225.00	0.38	343.11	225.00	0.47	-0.35	0.47	0.28	0.21	42.77	
325.00	0.54	309.56	325.00	1.08	-0.81	1.08	0.31	0.16	-33.55	
425.00	0.39	288.35	424.99	1.49	-1.50	1.49	0.23	-0.15	-21.21	
525.00	0.45	194.36	524.99	1.22	-1.92	1.22	0.62	0.06	-93.99	
625.00	0.62	155.96	624.99	0.34	-1.80	0.34	0.39	0.17	-38.40	
725.00	0.38	121.53	724.98	-0.32	-1.29	-0.32	0.37	-0.24	-34.43	

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well SPOTTED 4C-23HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	GL 4966 & KB 25 @ 4991.00ft (H&P 311)
Site:	SPOTTED 35-23HZ PAD	MD Reference:	GL 4966 & KB 25 @ 4991.00ft (H&P 311)
Well:	SPOTTED 4C-23HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Denver Sales

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
825.00	0.13	61.99	824.98	-0.44	-0.91	-0.44	0.33	-0.25	-59.54
925.00	0.25	279.63	924.98	-0.35	-1.02	-0.35	0.36	0.12	-142.36
1,025.00	0.49	224.89	1,024.98	-0.62	-1.54	-0.62	0.40	0.24	-54.74
1,125.00	0.27	173.11	1,124.98	-1.16	-1.82	-1.16	0.39	-0.22	-51.78
1,225.00	0.14	122.90	1,224.98	-1.46	-1.68	-1.46	0.21	-0.13	-50.21
LAST GYRO SURVEY									
1,378.00	0.40	234.93	1,377.98	-1.87	-1.96	-1.87	0.31	0.17	73.22
FIRST SDI MWD PRODUCTION SURVEY									
1,560.00	5.13	202.79	1,559.72	-9.74	-5.64	-9.74	2.64	2.60	-17.66
1,744.00	8.59	198.28	1,742.37	-30.38	-13.14	-30.38	1.90	1.88	-2.45
1,927.00	8.97	181.64	1,923.26	-57.62	-17.83	-57.62	1.40	0.21	-9.09
2,018.00	9.43	182.49	2,013.09	-72.16	-18.36	-72.16	0.53	0.51	0.93
2,200.00	11.70	181.91	2,191.99	-105.50	-19.62	-105.50	1.25	1.25	-0.32
2,292.00	12.99	186.14	2,281.86	-125.10	-21.04	-125.10	1.71	1.40	4.60
2,383.00	13.95	189.36	2,370.36	-146.10	-23.92	-146.10	1.34	1.05	3.54
2,475.00	14.66	193.23	2,459.51	-168.37	-28.39	-168.37	1.29	0.77	4.21
2,657.00	14.86	191.05	2,635.50	-213.70	-38.13	-213.70	0.32	0.11	-1.20
2,749.00	16.76	192.01	2,724.02	-238.25	-43.15	-238.25	2.08	2.07	1.04
2,841.00	14.84	190.07	2,812.54	-262.83	-47.97	-262.83	2.16	-2.09	-2.11
3,212.00	14.37	190.42	3,171.55	-354.89	-64.61	-354.89	0.13	-0.13	0.09
3,495.00	7.96	202.05	3,449.08	-407.65	-78.33	-407.65	2.39	-2.27	4.11
3,589.00	5.70	203.45	3,542.41	-417.97	-82.63	-417.97	2.41	-2.40	1.49
3,872.00	3.35	246.92	3,824.58	-434.11	-95.84	-434.11	1.41	-0.83	15.36
3,967.00	1.76	222.48	3,919.49	-436.27	-99.38	-436.27	1.99	-1.67	-25.73
4,061.00	0.88	189.16	4,013.46	-438.05	-100.47	-438.05	1.21	-0.94	-35.45
4,155.00	0.55	154.19	4,107.46	-439.17	-100.38	-439.17	0.57	-0.35	-37.20
4,249.00	0.50	176.55	4,201.45	-439.98	-100.16	-439.98	0.22	-0.05	23.79
4,532.00	1.65	80.57	4,484.41	-440.55	-96.07	-440.55	0.63	0.41	-33.92
4,626.00	1.60	73.69	4,578.37	-439.96	-93.47	-439.96	0.21	-0.05	-7.32
4,815.00	2.28	61.26	4,767.26	-437.41	-87.65	-437.41	0.42	0.36	-6.58
4,910.00	1.68	46.64	4,862.21	-435.54	-84.98	-435.54	0.82	-0.63	-15.39
5,004.00	0.68	8.92	4,956.19	-434.05	-83.89	-434.05	1.29	-1.06	-40.13
5,193.00	1.04	323.92	5,145.17	-431.55	-84.72	-431.55	0.39	0.19	-23.81
5,569.00	0.67	227.70	5,521.14	-430.27	-88.36	-430.27	0.34	-0.10	-25.59
5,758.00	1.06	258.60	5,710.12	-431.36	-90.89	-431.36	0.31	0.21	16.35
5,853.00	0.94	274.27	5,805.10	-431.48	-92.53	-431.48	0.31	-0.13	16.49
5,947.00	0.72	284.38	5,899.09	-431.27	-93.87	-431.27	0.28	-0.23	10.76
6,041.00	1.04	297.56	5,993.08	-430.73	-95.20	-430.73	0.40	0.34	14.02
6,136.00	1.31	307.97	6,088.06	-429.67	-96.82	-429.67	0.36	0.28	10.96
6,230.00	1.04	325.31	6,182.04	-428.30	-98.15	-428.30	0.47	-0.29	18.45
6,607.00	1.08	4.91	6,558.98	-421.95	-99.79	-421.95	0.19	0.01	10.50
6,701.00	1.15	356.86	6,652.97	-420.13	-99.77	-420.13	0.18	0.07	-8.56
6,890.00	0.61	330.96	6,841.94	-417.35	-100.36	-417.35	0.35	-0.29	-13.70

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well SPOTTED 4C-23HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	GL 4966 & KB 25 @ 4991.00ft (H&P 311)
Site:	SPOTTED 35-23HZ PAD	MD Reference:	GL 4966 & KB 25 @ 4991.00ft (H&P 311)
Well:	SPOTTED 4C-23HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Denver Sales

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
6,937.00	2.75	10.67	6,888.92	-416.03	-100.28	-416.03	4.92	4.55	84.49
6,984.00	7.58	2.12	6,935.72	-411.82	-99.95	-411.82	10.38	10.28	-18.19
7,031.00	10.77	357.18	6,982.11	-404.33	-100.05	-404.33	6.98	6.79	-10.51
7,079.00	14.53	354.27	7,028.94	-393.86	-100.88	-393.86	7.94	7.83	-6.06
7,126.00	17.16	355.36	7,074.15	-381.08	-102.02	-381.08	5.63	5.60	2.32
7,173.00	19.11	354.30	7,118.81	-366.51	-103.35	-366.51	4.21	4.15	-2.26
7,220.00	22.26	353.27	7,162.78	-350.01	-105.16	-350.01	6.75	6.70	-2.19
7,267.00	23.22	353.21	7,206.12	-331.97	-107.30	-331.97	2.04	2.04	-0.13
7,314.00	26.14	351.14	7,248.83	-312.53	-109.99	-312.53	6.48	6.21	-4.40
7,361.00	31.75	349.25	7,289.94	-290.14	-113.89	-290.14	12.09	11.94	-4.02
7,408.00	37.22	349.67	7,328.67	-263.98	-118.75	-263.98	11.65	11.64	0.89
7,456.00	42.82	353.46	7,365.42	-233.47	-123.22	-233.47	12.72	11.67	7.90
7,503.00	47.57	356.86	7,398.53	-200.25	-125.99	-200.25	11.33	10.11	7.23
7,550.00	51.23	357.51	7,429.11	-164.62	-127.73	-164.62	7.86	7.79	1.38
7,597.00	54.49	358.47	7,457.49	-127.18	-129.04	-127.18	7.12	6.94	2.04
7,645.00	59.41	2.34	7,483.66	-86.97	-128.72	-86.97	12.27	10.25	8.06
7,692.00	63.27	3.96	7,506.20	-45.80	-126.44	-45.80	8.75	8.21	3.45
7,739.00	66.50	5.28	7,526.15	-3.39	-123.01	-3.39	7.33	6.87	2.81
7,786.00	69.54	5.64	7,543.74	39.99	-118.86	39.99	6.51	6.47	0.77
7,833.00	72.39	5.91	7,559.07	84.19	-114.39	84.19	6.09	6.06	0.57
7,880.00	75.34	5.31	7,572.13	129.12	-109.98	129.12	6.40	6.28	-1.28
7,927.00	80.16	4.70	7,582.09	174.86	-105.98	174.86	10.33	10.26	-1.30
7,958.00	83.65	5.15	7,586.46	205.43	-103.34	205.43	11.35	11.26	1.45
7,998.00	85.15	4.68	7,590.36	245.09	-99.93	245.09	3.92	3.74	-1.16
7"(522 FSL 749 FWL)									
8,039.00	86.68	4.21	7,593.29	285.86	-96.76	285.86	3.92	3.74	-1.16
8,134.00	89.02	5.21	7,596.85	380.47	-88.96	380.47	2.68	2.46	1.05
8,228.00	90.71	5.50	7,597.07	474.05	-80.19	474.05	1.82	1.80	0.31
8,323.00	91.51	3.79	7,595.23	568.72	-72.50	568.72	1.99	0.84	-1.80
8,417.00	92.58	4.04	7,591.88	662.44	-66.08	662.44	1.17	1.14	0.27
8,511.00	92.42	2.84	7,587.78	756.18	-60.45	756.18	1.29	-0.17	-1.28
8,700.00	89.87	1.16	7,584.00	945.00	-53.86	945.00	1.62	-1.35	-0.89
8,889.00	88.05	359.73	7,587.43	1,133.95	-52.39	1,133.95	1.22	-0.96	-0.76
9,077.00	89.39	358.93	7,591.63	1,321.89	-54.59	1,321.89	0.83	0.71	-0.43
9,171.00	87.11	356.23	7,594.50	1,415.74	-58.55	1,415.74	3.76	-2.43	-2.87
9,360.00	87.41	354.36	7,603.54	1,603.88	-74.04	1,603.88	1.00	0.16	-0.99
9,437.00	89.02	354.79	7,605.93	1,680.50	-81.31	1,680.50	2.16	2.09	0.56
9,549.00	91.85	356.58	7,605.08	1,792.16	-89.74	1,792.16	2.99	2.53	1.60
9,643.00	92.89	356.46	7,601.20	1,885.91	-95.44	1,885.91	1.11	1.11	-0.13
9,832.00	91.21	357.67	7,594.44	2,074.53	-105.11	2,074.53	1.10	-0.89	0.64
9,926.00	90.87	359.32	7,592.73	2,168.48	-107.58	2,168.48	1.79	-0.36	1.76
10,020.00	91.41	359.12	7,590.86	2,262.45	-108.86	2,262.45	0.61	0.57	-0.21
10,114.00	90.67	359.53	7,589.15	2,356.43	-109.96	2,356.43	0.90	-0.79	0.44
10,209.00	89.90	359.84	7,588.68	2,451.42	-110.49	2,451.42	0.87	-0.81	0.33

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well SPOTTED 4C-23HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	GL 4966 & KB 25 @ 4991.00ft (H&P 311)
Site:	SPOTTED 35-23HZ PAD	MD Reference:	GL 4966 & KB 25 @ 4991.00ft (H&P 311)
Well:	SPOTTED 4C-23HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Denver Sales

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
10,303.00	90.88	359.89	7,588.04	2,545.42	-110.71	2,545.42	1.04	1.04	0.05	
10,492.00	88.52	357.47	7,589.03	2,734.34	-115.06	2,734.34	1.79	-1.25	-1.28	
10,681.00	89.73	0.80	7,591.92	2,923.27	-117.91	2,923.27	1.87	0.64	1.76	
10,775.00	90.03	1.68	7,592.12	3,017.24	-115.88	3,017.24	0.99	0.32	0.94	
10,964.00	90.07	0.77	7,591.95	3,206.20	-111.84	3,206.20	0.48	0.02	-0.48	
11,058.00	90.27	0.35	7,591.67	3,300.19	-110.92	3,300.19	0.49	0.21	-0.45	
11,185.00	90.30	0.18	7,591.04	3,427.19	-110.33	3,427.19	0.14	0.02	-0.13	
11,247.00	88.79	0.17	7,591.53	3,489.19	-110.14	3,489.19	2.44	-2.44	-0.02	
11,341.00	89.80	0.89	7,592.69	3,583.17	-109.27	3,583.17	1.32	1.07	0.77	
11,435.00	90.50	1.07	7,592.44	3,677.16	-107.66	3,677.16	0.77	0.74	0.19	
11,529.00	90.13	0.01	7,591.93	3,771.15	-106.78	3,771.15	1.19	-0.39	-1.13	
11,718.00	89.39	359.25	7,592.72	3,960.14	-108.00	3,960.14	0.56	-0.39	-0.40	
11,813.00	91.01	0.70	7,592.39	4,055.14	-108.04	4,055.14	2.29	1.71	1.53	
11,907.00	91.18	0.83	7,590.59	4,149.11	-106.79	4,149.11	0.23	0.18	0.14	
12,096.00	88.96	357.58	7,590.36	4,338.06	-109.41	4,338.06	2.08	-1.17	-1.72	
12,190.00	90.57	358.42	7,590.74	4,431.99	-112.69	4,431.99	1.93	1.71	0.89	
12,284.00	90.27	358.93	7,590.05	4,525.97	-114.86	4,525.97	0.63	-0.32	0.54	
12,379.00	91.21	357.08	7,588.83	4,620.89	-118.17	4,620.89	2.18	0.99	-1.95	
12,473.00	91.64	356.35	7,586.49	4,714.71	-123.55	4,714.71	0.90	0.46	-0.78	
LAST SDI MWD PRODUCTION SURVEY										
12,730.00	91.64	356.35	7,579.13	4,971.08	-139.91	4,971.08	0.00	0.00	0.00	
SDI PROJECTION TO TD										

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)	
7,998.00	7,590.36	7"(522 FSL 749 FWL)	7.000	8.750	

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment	
		+N/-S (ft)	+E/-W (ft)		
125.00	125.00	0.07	-0.13	FIRST GYRO SURVEY	
1,225.00	1,224.98	-1.46	-1.68	LAST GYRO SURVEY	
1,378.00	1,377.98	-1.87	-1.96	FIRST SDI MWD PRODUCTION SURVEY	
12,473.00	7,586.49	4,714.71	-123.55	LAST SDI MWD PRODUCTION SURVEY	
12,730.00	7,579.13	4,971.08	-139.91	SDI PROJECTION TO TD	

Checked By: _____	Approved By: _____	Date: _____
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