

ENSIGN Directional

123-26143



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Well Name: **STARCK 31-18**
 Surface Location: STARCK PAD SEC.18-T4N-R67W
 North American Datum 1983, US State Plane 1983, Colorado Northern Zone
 Ground Elevation: 4819.0
 +N/-S +E/-W Northing Easting Latitude Longitude Slot
 0.0 0.0 1358153.91 3156132.01 40° 18' 54.648 N 104° 56' 24.360 W
 Original Well Elev WELL @ 4833.0ft (Original Well Elev)

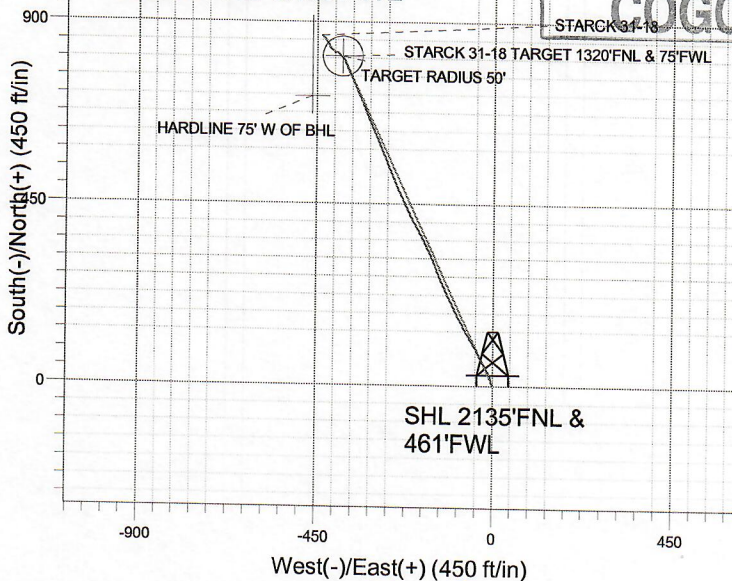
KERR MCGEE Weld County CO

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AUG 21 2008

COGCC

Projected BHL 867.44'N &
 438.84'W of surface
 1267.6'FNL & 22'FWL

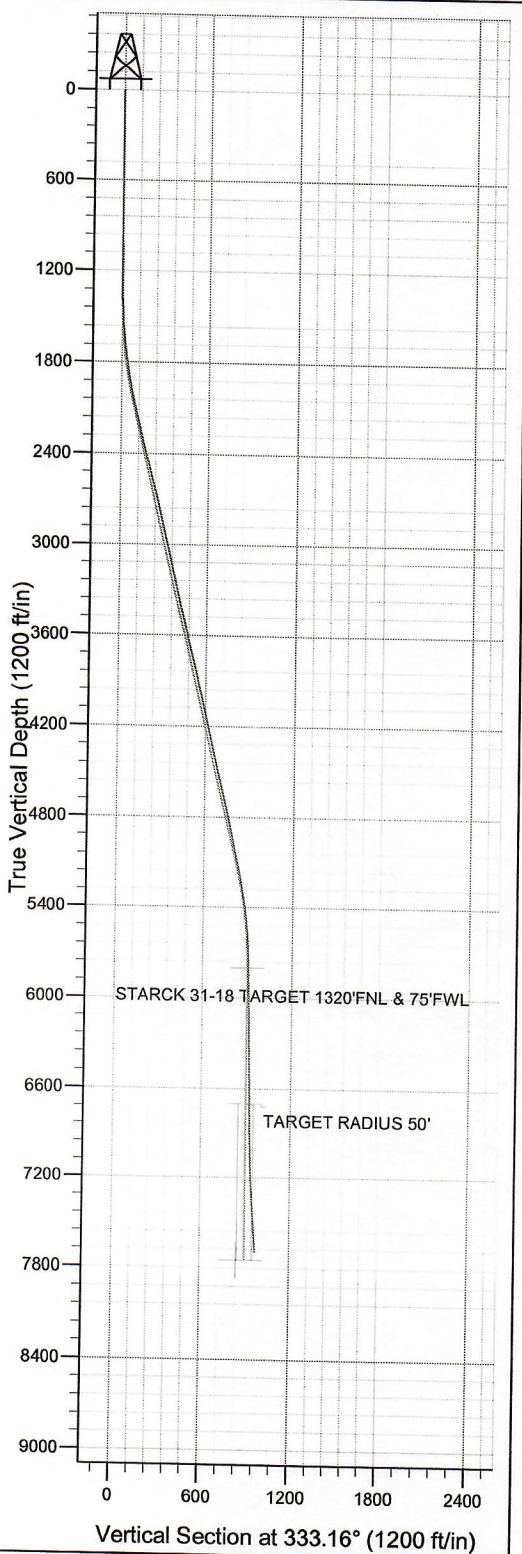


LEGEND

- STARCK 31-18, Wellbore #1, Design #1 V0
- Wellbore #1

Final Survey Plot

Projected Final Survey -
 7800'MD & 7696.55'TVD
 @ 971.8' VS
 4.3 deg Inc 316.3 deg AZ



Project: SEC.18-T4N-R67W
 Site: STARCK PAD SEC.18-T4N-R67W
 Well: STARCK 31-18
 Plan: Wellbore #1

ENSIGN Directional

Ensign Directional Survey Report



Company:	KERR MCGEE Weld County CO	Local Co-ordinate Reference:	Well STARCK 31-18
Project:	SEC.18-T4N-R67W	TVD Reference:	WELL @ 4833.0ft (Original Well Elev)
Site:	STARCK PAD SEC.18-T4N-R67W	MD Reference:	WELL @ 4833.0ft (Original Well Elev)
Well:	STARCK 31-18	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

Project	SEC.18-T4N-R67W		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		Using Well Reference Point
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site	STARCK PAD SEC.18-T4N-R67W		
Site Position:		Northing:	1,358,153.92 ft
From:	Lat/Long	Easting:	3,156,132.01 ft
Position Uncertainty:	0.0 ft	Slot Radius:	"
		Latitude:	40° 18' 54.648 N
		Longitude:	104° 56' 24.360 W
		Grid Convergence:	0.36 °

Well	STARCK 31-18		
Well Position	+N/-S	0.0 ft	Northing:
	+E/-W	0.0 ft	Easting:
Position Uncertainty		0.0 ft	Wellhead Elevation:
			ft
			Latitude:
			Longitude:
			Ground Level:

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination (°)
	User Defined	2/11/2008	0.00
			Dip Angle (°)
			0.00
			Field Strength (nT)
			0

Design	Wellbore #1		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(ft)	(ft)	(ft)
	0.0	0.0	0.0
			Direction (°)
			333.16

Survey Program	Date 3/12/2008		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name
772.0	7,800.0	Final Survey #1 (Wellbore #1)	MWD
			Description
			MWD - Standard

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	
772.0	0.00	0.00	772.0	0.0	0.0	0.0	0.00	0.00	0.00	
826.0	0.04	128.70	826.0	0.0	0.0	0.0	0.07	0.07	0.00	
920.0	0.30	112.10	920.0	-0.1	0.3	-0.2	0.28	0.28	-17.66	
1,013.0	0.30	192.20	1,013.0	-0.5	0.4	-0.6	0.42	0.00	86.13	
1,107.0	0.20	10.50	1,107.0	-0.5	0.4	-0.7	0.53	-0.11	189.68	
1,200.0	0.04	270.80	1,200.0	-0.4	0.4	-0.5	0.23	-0.17	-107.20	
1,293.0	0.30	306.80	1,293.0	-0.2	0.2	-0.3	0.29	0.28	38.71	
1,387.0	1.50	311.20	1,387.0	0.7	-0.9	1.1	1.28	1.28	4.68	
1,480.0	3.10	345.00	1,479.9	4.0	-2.5	4.7	2.19	1.72	36.34	
1,573.0	5.20	348.20	1,572.7	10.5	-4.0	11.2	2.27	2.26	3.44	
1,667.0	6.40	341.80	1,666.2	19.7	-6.5	20.5	1.45	1.28	-6.81	
1,759.0	7.90	332.10	1,757.5	30.1	-11.1	31.9	2.09	1.63	-10.54	

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Site:	STARCK PAD SEC.18-T4N-R67W	MD Reference:	WELL @ 4833.0ft (Original Well Elev)
Well:	STARCK 31-18	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
1,853.0	9.60	330.70	1,850.4	42.7	-17.9	46.2	1.82	1.81	-1.49
1,946.0	11.20	329.70	1,941.8	57.2	-26.3	62.9	1.73	1.72	-1.08
2,040.0	12.40	331.70	2,033.8	74.0	-35.7	82.1	1.35	1.28	2.13
2,133.0	14.10	330.80	2,124.4	92.7	-45.9	103.4	1.84	1.83	-0.97
2,226.0	13.20	329.00	2,214.7	111.7	-56.9	125.3	1.07	-0.97	-1.94
2,320.0	14.50	330.00	2,306.0	131.1	-68.4	147.8	1.41	1.38	1.06
2,413.0	15.50	332.50	2,395.8	152.2	-79.9	171.9	1.28	1.08	2.69
2,507.0	15.30	332.00	2,486.5	174.3	-91.5	196.8	0.26	-0.21	-0.53
2,600.0	14.90	332.00	2,576.3	195.7	-102.9	221.0	0.43	-0.43	0.00
2,693.0	14.90	335.70	2,666.1	217.1	-113.4	244.9	1.02	0.00	3.98
2,787.0	14.00	335.00	2,757.2	238.4	-123.2	268.4	0.98	-0.96	-0.74
2,880.0	13.50	334.10	2,847.5	258.4	-132.7	290.5	0.58	-0.54	-0.97
2,973.0	13.80	337.70	2,937.9	278.4	-141.7	312.4	0.97	0.32	3.87
3,067.0	13.90	336.50	3,029.1	299.1	-150.4	334.8	0.32	0.11	-1.28
3,161.0	13.10	334.50	3,120.5	319.1	-159.5	356.8	0.99	-0.85	-2.13
3,254.0	13.30	333.60	3,211.1	338.2	-168.8	378.0	0.31	0.22	-0.97
3,347.0	12.80	334.00	3,301.7	357.0	-178.1	399.0	0.55	-0.54	0.43
3,441.0	12.70	333.40	3,393.4	375.6	-187.3	419.7	0.18	-0.11	-0.64
3,534.0	13.90	329.50	3,483.9	394.4	-197.5	441.1	1.61	1.29	-4.19
3,627.0	14.20	331.30	3,574.1	414.0	-208.7	463.6	0.57	0.32	1.94
3,720.0	14.50	334.20	3,664.2	434.5	-219.2	486.7	0.84	0.32	3.12
3,814.0	14.40	333.70	3,755.2	455.6	-229.5	510.1	0.17	-0.11	-0.53
3,907.0	13.80	334.10	3,845.4	475.9	-239.5	532.8	0.65	-0.65	0.43
4,003.0	13.60	338.30	3,938.7	496.7	-248.7	555.5	1.06	-0.21	4.38
4,096.0	13.80	336.60	4,029.0	517.1	-257.1	577.5	0.48	0.22	-1.83
4,190.0	13.20	336.10	4,120.4	537.2	-265.9	599.4	0.65	-0.64	-0.53
4,283.0	13.60	337.70	4,210.9	557.0	-274.4	620.9	0.59	0.43	1.72
4,377.0	12.90	338.60	4,302.4	577.0	-282.4	642.3	0.78	-0.74	0.96
4,470.0	13.30	337.70	4,393.0	596.6	-290.2	663.3	0.48	0.43	-0.97
4,562.0	13.20	336.40	4,482.5	616.0	-298.4	684.4	0.34	-0.11	-1.41
4,656.0	13.80	337.00	4,573.9	636.1	-307.1	706.3	0.66	0.64	0.64
4,749.0	13.30	336.60	4,664.3	656.2	-315.7	728.0	0.55	-0.54	-0.43
4,842.0	12.30	334.80	4,755.0	674.9	-324.2	748.6	1.16	-1.08	-1.94
4,936.0	12.70	337.50	4,846.8	693.5	-332.4	768.9	0.75	0.43	2.87
5,029.0	12.50	338.40	4,937.6	712.3	-340.0	789.1	0.30	-0.22	0.97
5,122.0	13.00	337.10	5,028.3	731.3	-347.8	809.6	0.62	0.54	-1.40
5,216.0	12.00	336.50	5,120.0	750.0	-355.8	829.9	1.07	-1.06	-0.64
5,310.0	10.50	334.10	5,212.2	766.7	-363.4	848.2	1.67	-1.60	-2.55
5,403.0	8.90	334.10	5,303.9	780.8	-370.3	863.9	1.72	-1.72	0.00
5,496.0	8.10	335.70	5,395.9	793.2	-376.1	877.6	0.90	-0.86	1.72
5,590.0	6.70	334.40	5,489.1	804.2	-381.2	889.7	1.50	-1.49	-1.38
5,684.0	4.00	318.80	5,582.7	811.6	-385.7	898.4	3.24	-2.87	-16.60
5,779.0	3.40	311.30	5,677.5	816.0	-390.0	904.2	0.81	-0.63	-7.89
5,872.0	1.20	299.30	5,770.4	818.3	-393.0	907.6	2.41	-2.37	-12.90
5,966.0	1.00	332.80	5,864.4	819.5	-394.2	909.2	0.70	-0.21	35.64
6,059.0	1.50	328.60	5,957.4	821.3	-395.2	911.2	0.55	0.54	-4.52
6,153.0	2.20	305.10	6,051.3	823.4	-397.3	914.0	1.08	0.74	-25.00
6,247.0	3.40	263.00	6,145.2	824.0	-401.6	916.6	2.45	1.28	-44.79
6,340.0	1.90	233.10	6,238.1	822.8	-405.5	917.2	2.14	-1.61	-32.15
6,434.0	1.50	19.90	6,332.1	823.0	-406.4	917.8	3.47	-0.43	156.17
6,526.0	1.80	359.40	6,424.1	825.6	-406.0	919.9	0.71	0.33	-22.28
6,619.0	1.30	336.20	6,517.0	828.0	-406.4	922.3	0.85	-0.54	-24.95
6,712.0	0.40	294.80	6,610.0	829.1	-407.1	923.6	1.11	-0.97	-44.52
6,806.0	1.00	316.20	6,704.0	829.8	-408.0	924.7	0.69	0.64	22.77

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Ensign Directional Survey Report



Company: KERR MCGEE Weld County CO
Project: SEC.18-T4N-R67W
Site: STARCK PAD SEC.18-T4N-R67W
Well: STARCK 31-18
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well STARCK 31-18
TVD Reference: WELL @ 4833.0ft (Original Well Elev)
MD Reference: WELL @ 4833.0ft (Original Well Elev)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: Landmark

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
6,899.0	1.30	296.50	6,797.0	830.9	-409.5	926.3	0.53	0.32	-21.18
6,992.0	1.20	288.10	6,890.0	831.7	-411.4	927.8	0.22	-0.11	-9.03
7,086.0	1.80	316.00	6,983.9	833.0	-413.3	929.9	0.99	0.64	29.68
7,179.0	2.00	322.50	7,076.9	835.4	-415.3	932.9	0.32	0.22	6.99
7,272.0	2.80	324.70	7,169.8	838.5	-417.6	936.7	0.87	0.86	2.37
7,368.0	3.50	325.40	7,265.7	842.8	-420.6	942.0	0.73	0.73	0.73
7,463.0	4.10	337.90	7,360.4	848.4	-423.6	948.2	1.07	0.63	13.16
7,556.0	4.00	323.50	7,453.2	854.1	-426.7	954.7	1.10	-0.11	-15.48
7,650.0	4.30	317.40	7,547.0	859.3	-431.1	961.4	0.57	0.32	-6.49
7,743.0	4.30	315.80	7,639.7	864.4	-435.9	968.0	0.13	0.00	-1.72
7,800.0	4.30	316.30	7,696.5	867.4	-438.8	972.1	0.07	0.00	0.88

Checked By: _____ Approved By: _____ Date: _____



ENSIGN

Directional

KERR MCGEE Weld County CO

SEC.18-T4N-R67W

STARCK PAD SEC.18-T4N-R67W

STARCK 31-18

Wellbore #1

Design: Wellbore #1

Standard Survey Report

17 March, 2008