

Noble Energy

Weld County, CO (NAD 83)

Sec. 22-T9N-R58W (Gracie LD22 PAD)

Gracie LD22-730

05-123-41562

Plan A

Design: Actual Surveys

Sperry Drilling Services

Final Survey Report

22 September, 2015

Surface UWI : 05-123-41562

Well Coordinates: 1,513,431.77 N, 3,458,277.57 E (40° 43' 51.71" N, 103° 50' 46.93" W)

Ground Level: 4,827.00 usft

Local Coordinate Origin:

Centered on Well Gracie LD22-730

Viewing Datum:

KB = 30' @ 4857.00usft (H&P 321)

TVDs to System:

N

North Reference:

Grid

Unit System:

Dec-Deg - API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 5000.1 Build: 73

HALLIBURTON

Project: Weld County, CO (NAD 83)
 Site: Sec. 22-T9N-R58W (Gracie LD22 PAD)
 Well: Gracie LD22-730
 Wellbore: Plan A
 Design: Actual Surveys



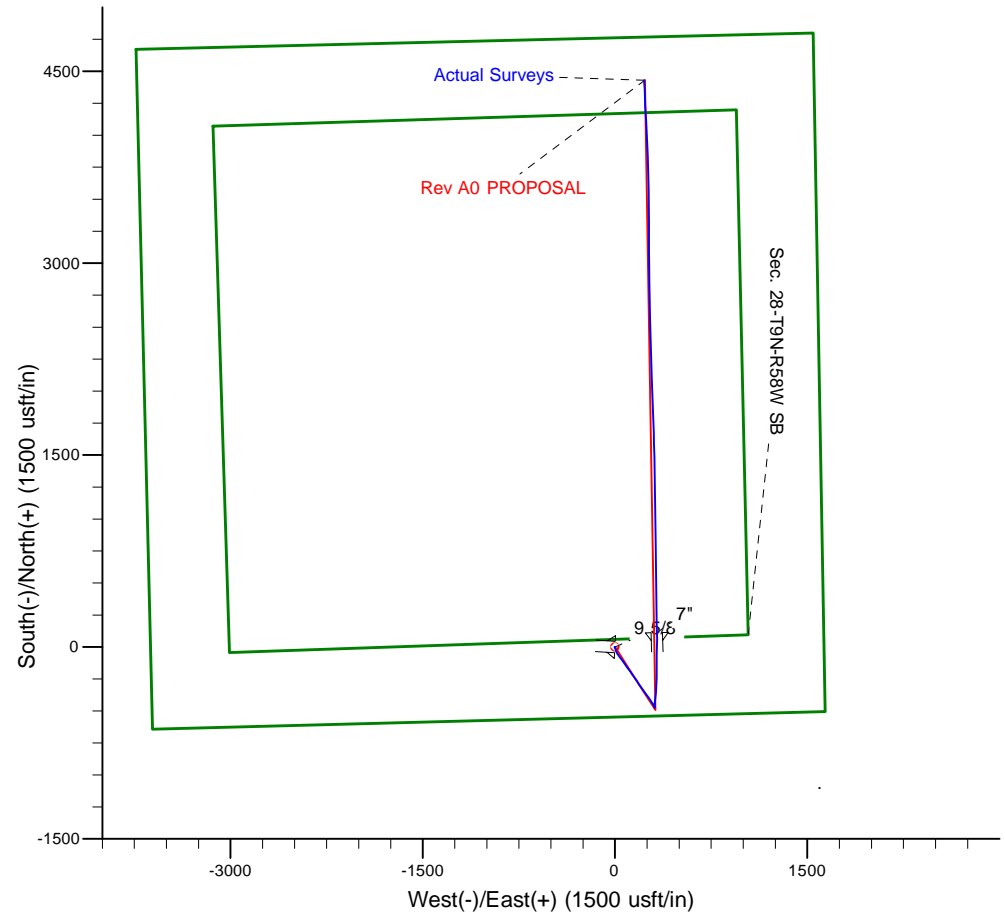
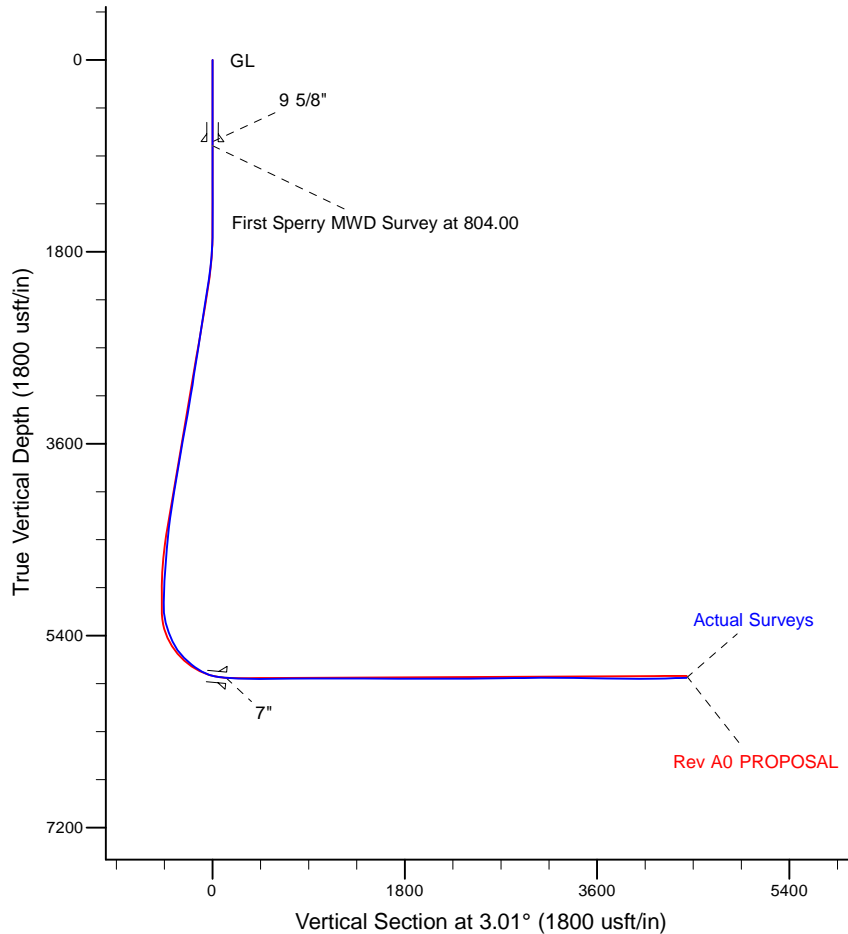
HALLIBURTON

Sperry Drilling

Platted SHL: 550 FSL, 1631' FEL
 Platted Lat/Long: 40.731030, -103.846370
 Location: Sec. 22-T9N-R58W

~7" Casing: 653' FSL, 1299' FEL
 Lat/Long: 40.731318 N, -103.845182 W
 State Planes - CO Northern: 1,513,542.97 N, 3,458,604.80 E
 Location: Sec. 22-T9N-R58W

Platted BHL: 330' FNL, 1320' FEL
 Platted Lat/Long: 40.742992 N, -103.845247 W
 State Planes - CO Northern: 1,517,794.83 N, 3,458,507.58 E
 Location: Sec. 22-T9N-R58W



LEGEND	
	Gracie LD22-730, Plan A, Rev A0 PROPOSAL V0
	Actual Surveys

WELL DETAILS: Gracie LD22-730	
Ground Level:	4827.00
KB = 30' @ 4857.00usft (H&P 321)	
Created By:	Tatiana Gomez
Created On:	9/22/2015

Design Report for Gracie LD22-730 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gracie LD22-730_Rev A0_SHL							
766.00	0.03	93.64	766.00	-0.01	0.19	0.00	0.00
9 5/8"							
804.00	0.03	93.64	804.00	-0.01	0.21	0.00	0.00
First Sperry MWD Survey at 804.00							
925.00	0.40	328.84	925.00	0.35	0.02	0.35	0.35
1,018.00	0.17	301.96	1,018.00	0.70	-0.26	0.68	0.28
1,112.00	0.29	270.71	1,112.00	0.77	-0.62	0.74	0.18
1,212.00	0.26	287.96	1,212.00	0.85	-1.09	0.79	0.09
1,401.00	0.22	266.96	1,400.99	0.96	-1.86	0.86	0.05
1,493.00	0.19	272.07	1,492.99	0.96	-2.19	0.84	0.04
1,586.00	0.22	261.66	1,585.99	0.94	-2.52	0.80	0.05
1,680.00	1.93	173.38	1,679.98	-0.66	-2.51	-0.79	2.06
1,772.00	3.54	166.07	1,771.87	-4.96	-1.65	-5.04	1.79
1,865.00	5.37	157.08	1,864.58	-11.75	0.74	-11.70	2.10
1,957.00	7.15	162.48	1,956.03	-21.18	4.14	-20.93	2.04
2,049.00	8.83	157.23	2,047.14	-33.15	8.59	-32.65	1.99
2,142.00	10.83	151.54	2,138.77	-47.42	15.52	-46.54	2.39
2,235.00	11.58	144.49	2,230.00	-62.70	25.11	-61.29	1.68
2,327.00	11.12	143.18	2,320.20	-77.32	35.79	-75.33	0.57
2,419.00	10.60	143.35	2,410.55	-91.21	46.15	-88.65	0.57
2,511.00	11.41	145.10	2,500.86	-105.46	56.41	-102.35	0.95
2,604.00	11.48	143.59	2,592.01	-120.45	67.17	-116.75	0.33
2,696.00	11.14	143.00	2,682.22	-134.92	77.95	-130.63	0.39
2,789.00	12.17	145.60	2,773.31	-150.18	88.90	-145.30	1.24
2,882.00	11.59	143.07	2,864.31	-165.74	100.05	-160.25	0.84
2,976.00	10.69	142.00	2,956.54	-180.16	111.09	-174.07	0.98
3,070.00	11.25	144.16	3,048.83	-194.46	121.83	-187.79	0.74
3,164.00	11.91	147.53	3,140.91	-210.08	132.40	-202.83	1.01
3,259.00	11.98	146.64	3,233.86	-226.58	143.09	-218.75	0.21
3,353.00	11.98	144.19	3,325.81	-242.64	154.16	-234.20	0.54
3,447.00	12.50	145.06	3,417.67	-258.89	165.69	-249.83	0.59
3,541.00	12.85	146.18	3,509.38	-275.92	177.34	-266.21	0.45
3,635.00	13.25	146.02	3,600.95	-293.53	189.18	-283.18	0.43
3,729.00	13.21	145.63	3,692.46	-311.33	201.26	-300.32	0.10
3,918.00	11.41	144.46	3,877.11	-344.37	224.32	-332.10	0.96
4,012.00	10.95	142.60	3,969.32	-359.03	235.15	-346.17	0.62
4,107.00	11.99	145.20	4,062.42	-374.30	246.26	-360.84	1.22
4,201.00	11.48	145.14	4,154.46	-389.99	257.18	-375.94	0.54
4,295.00	10.57	144.25	4,246.72	-404.67	267.56	-390.04	0.98
4,389.00	9.28	145.05	4,339.31	-417.88	276.94	-402.74	1.38
4,484.00	7.82	146.34	4,433.26	-429.54	284.91	-413.96	1.55
4,578.00	6.25	145.20	4,526.55	-439.06	291.38	-423.14	1.68
4,673.00	5.28	143.60	4,621.06	-446.83	296.92	-430.60	1.03
4,767.00	5.07	144.38	4,714.68	-453.68	301.91	-437.18	0.24
4,861.00	4.53	159.05	4,808.35	-460.53	305.66	-443.82	1.42
4,955.00	4.17	166.10	4,902.08	-467.31	307.80	-450.48	0.69
5,050.00	2.34	165.03	4,996.93	-472.54	309.13	-455.63	1.93
5,144.00	0.84	179.21	5,090.89	-475.08	309.64	-458.15	1.64

Design Report for Gracie LD22-730 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
5,239.00	3.85	3.76	5,185.83	-472.59	309.86	-455.65	4.93
5,333.00	16.57	2.26	5,278.15	-455.98	310.60	-439.02	13.53
5,428.00	18.61	3.12	5,368.70	-427.31	311.96	-410.32	2.16
5,522.00	25.44	5.04	5,455.79	-392.18	314.55	-375.10	7.31
5,616.00	36.43	5.11	5,536.30	-344.12	318.82	-326.88	11.69
5,710.00	43.80	4.44	5,608.14	-283.80	323.83	-266.39	7.85
5,804.00	51.70	1.23	5,671.30	-214.37	327.15	-196.88	8.77
5,899.00	58.63	357.91	5,725.54	-136.47	326.47	-119.12	7.84
5,946.00	64.77	358.85	5,747.81	-95.12	325.31	-77.89	13.18
5,993.00	70.66	1.86	5,765.63	-51.66	325.60	-34.47	13.86
6,040.00	77.39	1.87	5,778.56	-6.52	327.07	10.68	14.32
6,087.00	81.68	0.91	5,787.09	39.67	328.19	56.87	9.35
6,114.00	83.58	358.90	5,790.56	66.45	328.15	83.60	10.20
6,159.00	84.89	358.76	5,795.08	111.21	327.23	128.26	2.92
7"							
6,231.00	86.98	358.54	5,800.18	183.00	325.54	199.86	2.92
6,324.00	89.23	358.85	5,803.26	275.92	323.42	292.54	2.44
6,417.00	89.69	359.40	5,804.14	368.91	322.00	385.32	0.77
6,509.00	89.48	0.15	5,804.80	460.90	321.64	477.17	0.85
6,601.00	89.85	358.53	5,805.34	552.89	320.58	568.98	1.81
6,693.00	90.83	359.37	5,804.79	644.87	318.90	660.74	1.40
6,786.00	91.23	359.67	5,803.12	737.85	318.12	753.56	0.54
6,878.00	90.59	359.01	5,801.66	829.83	317.06	845.35	1.00
6,970.00	89.72	359.46	5,801.41	921.82	315.83	937.15	1.06
7,160.00	90.25	358.69	5,801.46	1,111.80	312.76	1,126.70	0.49
7,254.00	90.34	358.91	5,800.98	1,205.78	310.79	1,220.45	0.25
7,349.00	90.43	359.15	5,800.34	1,300.76	309.19	1,315.22	0.27
7,444.00	89.88	359.94	5,800.08	1,395.76	308.43	1,410.04	1.01
7,539.00	89.17	358.63	5,800.87	1,490.74	307.25	1,504.83	1.57
7,634.00	88.77	358.59	5,802.58	1,585.70	304.94	1,599.54	0.42
7,728.00	89.41	358.33	5,804.07	1,679.65	302.42	1,693.23	0.73
7,823.00	90.34	357.14	5,804.28	1,774.58	298.66	1,787.82	1.59
7,918.00	90.52	357.46	5,803.56	1,869.47	294.19	1,882.35	0.39
8,012.00	90.09	358.32	5,803.06	1,963.40	290.73	1,975.97	1.02
8,107.00	89.91	358.53	5,803.06	2,058.36	288.12	2,070.66	0.29
8,202.00	89.57	358.65	5,803.50	2,153.33	285.78	2,165.38	0.38
8,391.00	90.40	358.00	5,803.54	2,342.25	280.25	2,353.75	0.56
8,485.00	90.55	357.55	5,802.77	2,436.18	276.60	2,447.35	0.50
8,580.00	90.99	358.56	5,801.49	2,531.11	273.38	2,541.98	1.16
8,769.00	90.74	358.82	5,798.64	2,720.04	269.06	2,730.42	0.19
8,864.00	90.55	359.31	5,797.57	2,815.02	267.51	2,825.19	0.55
8,958.00	90.37	359.65	5,796.81	2,909.02	266.66	2,919.01	0.41
9,053.00	90.68	359.79	5,795.94	3,004.01	266.19	3,013.85	0.36
9,148.00	90.74	359.67	5,794.76	3,099.00	265.74	3,108.69	0.14
9,242.00	89.57	359.78	5,794.51	3,193.00	265.29	3,202.53	1.25
9,337.00	89.38	359.73	5,795.38	3,287.99	264.89	3,297.37	0.21
9,431.00	89.48	359.62	5,796.32	3,381.99	264.35	3,391.21	0.16
9,526.00	89.38	358.94	5,797.26	3,476.97	263.16	3,486.00	0.72
9,621.00	89.20	359.47	5,798.44	3,571.96	261.84	3,580.78	0.59
9,716.00	88.49	359.15	5,800.35	3,666.93	260.70	3,675.57	0.82
9,810.00	89.17	358.04	5,802.27	3,760.88	258.39	3,769.26	1.38

Design Report for Gracie LD22-730 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
9,905.00	89.41	357.35	5,803.45	3,855.80	254.57	3,863.85	0.77
10,000.00	89.04	357.30	5,804.73	3,950.68	250.14	3,958.37	0.39
10,095.00	91.23	357.28	5,804.51	4,045.57	245.65	4,052.89	2.31
10,189.00	91.17	356.87	5,802.54	4,139.43	240.85	4,146.37	0.44
10,284.00	91.39	357.27	5,800.42	4,234.28	236.00	4,240.83	0.48
10,379.00	91.36	357.47	5,798.14	4,329.15	231.64	4,335.34	0.21
10,413.00	91.45	357.03	5,797.31	4,363.10	230.01	4,369.16	1.32
Final Sperry MWD Survey at 10413.00ft							
10,481.00	91.45	357.03	5,795.59	4,430.99	226.49	4,436.77	0.00
Straight Line Projection to TD at 10481.00ft - Gracie LD22-730_Rev A0_BHL							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
804.00	804.00	-0.01	0.21	First Sperry MWD Survey at 804.00
10,413.00	5,797.31	4,363.10	230.01	Final Sperry MWD Survey at 10413.00ft
10,481.00	5,795.59	4,430.99	226.49	Straight Line Projection to TD at 10481.00ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	+N/-S (usft)	+E/-W (usft)	Start TVD (usft)
Target	Gracie LD22-730_Rev A0_BHL	3.01	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
804.00	6,114.00	Intermediate Surveys	Flexi-Shot
6,231.00	10,481.00	Production Casing	MWD

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
766.00	766.00	9 5/8"	9-5/8	13-3/4
6,159.00	5,795.08	7"	7	8-3/4

Wellbore Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
Gracie LD22-730_Rev	0.00	0.00	0.00	0.02	0.00	1,513,431.79	3,458,277.57	40.731030	-103.846370
- actual wellpath misses target center by 0.02usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Point									
Gracie LD22-730_Rev	0.00	0.00	5,777.00	4,431.79	233.30	1,517,863.52	3,458,510.87	40.743180	-103.845230
- actual wellpath misses target center by 19.81usft at 10481.00usft MD (5795.59 TVD, 4430.99 N, 226.49 E)									
- Point									

Design Report for Gracie LD22-730 - Actual Surveys

Directional Difficulty Index

Average Dogleg over Survey:	1.54 °/100usft	Maximum Dogleg over Survey:	14.32 °/100usft at 6,040.00 usft
Net Tortosity applicable to Plans:	0.44 °/100usft	Directional Difficulty Index:	6.204

Audit Info

North Reference Sheet for Sec. 22-T9N-R58W (Gracie LD22 PAD) - Gracie LD22-730 - Plan A

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

Vertical Depths are relative to KB = 30' @ 4857.00usft (H&P 321). Northing and Easting are relative to Gracie LD22-730

Coordinate System is US State Plane 1983, Colorado Northern Zone using datum North American Datum 1983, ellipsoid GRS 1980

Projection method is Lambert Conformal Conic (2 parallel)

Central Meridian is -105.500000°, Longitude Origin:0.000000°, Latitude Origin:40.783333°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99999193

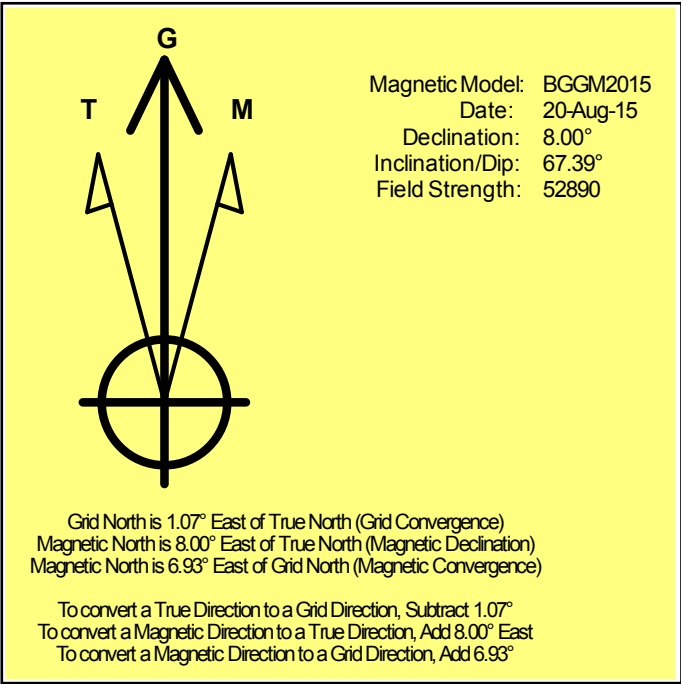
Grid Coordinates of Well: 1,513,431.77 usft N, 3,458,277.57 usft E

Geographical Coordinates of Well: 40° 43' 51.71" N, 103° 50' 46.93" W

Grid Convergence at Surface is: 1.07°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,481.00usft the Bottom Hole Displacement is 4,436.77usft in the Direction of 2.93° (Grid).

Magnetic Convergence at surface is: -6.93° (20 August 2015, , BGGM2015)



Noble Energy

Weld County, CO (NAD 83)

Sec. 22-T9N-R58W (Gracie LD22 PAD)

Gracie LD22-730

05-123-41562

Plan A

Design: Actual Surveys

Sperry Drilling Services

Geodetic Report

22 September, 2015

Well Coordinates: 1,513,431.77 N, 3,458,277.57 E (40° 43' 51.71" N, 103° 50' 46.93" W)

Ground Level: 4,827.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 73

Centered on Well Gracie LD22-730

KB = 30' @ 4857.00usft (H&P 321)

N

Grid

Dec-Deg - API - US Survey Feet - Custom

HALLIBURTON

Design Report for Gracie LD22-730 - Actual Surveys

Measured			Vertical			Local Coordinates		Geographic Coordinates		UTM Coordinates	
Depth (usft)	Inclination (°)	Azimuth (°)	Depth (usft)	+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
0.00	0.00	0.00	0.00	0.00	0.00	40.731030	-103.846370	40.731030	-103.846370	1,513,431.77	3,458,277.57
766.00	0.03	93.64	766.00	-0.01	0.19	40.731030	-103.846370	40.731030	-103.846370	1,513,431.75	3,458,277.76
804.00	0.03	93.64	804.00	-0.01	0.21	40.731030	-103.846370	40.731030	-103.846370	1,513,431.75	3,458,277.78
925.00	0.40	328.84	925.00	0.35	0.02	40.731031	-103.846370	40.731031	-103.846370	1,513,432.11	3,458,277.60
1,018.00	0.17	301.96	1,018.00	0.70	-0.26	40.731032	-103.846371	40.731032	-103.846371	1,513,432.46	3,458,277.31
1,112.00	0.29	270.71	1,112.00	0.77	-0.62	40.731032	-103.846372	40.731032	-103.846372	1,513,432.54	3,458,276.95
1,212.00	0.26	287.96	1,212.00	0.85	-1.09	40.731032	-103.846374	40.731032	-103.846374	1,513,432.61	3,458,276.49
1,401.00	0.22	266.96	1,400.99	0.96	-1.86	40.731033	-103.846377	40.731033	-103.846377	1,513,432.73	3,458,275.72
1,493.00	0.19	272.07	1,492.99	0.96	-2.19	40.731033	-103.846378	40.731033	-103.846378	1,513,432.72	3,458,275.39
1,586.00	0.22	261.66	1,585.99	0.94	-2.52	40.731033	-103.846379	40.731033	-103.846379	1,513,432.70	3,458,275.06
1,680.00	1.93	173.38	1,679.98	-0.66	-2.51	40.731028	-103.846379	40.731028	-103.846379	1,513,431.10	3,458,275.06
1,772.00	3.54	166.07	1,771.87	-4.96	-1.65	40.731017	-103.846377	40.731017	-103.846377	1,513,426.81	3,458,275.92
1,865.00	5.37	157.08	1,864.58	-11.75	0.74	40.730998	-103.846368	40.730998	-103.846368	1,513,420.01	3,458,278.31
1,957.00	7.15	162.48	1,956.03	-21.18	4.14	40.730972	-103.846357	40.730972	-103.846357	1,513,410.59	3,458,281.71
2,049.00	8.83	157.23	2,047.14	-33.15	8.59	40.730939	-103.846341	40.730939	-103.846341	1,513,398.61	3,458,286.17
2,142.00	10.83	151.54	2,138.77	-47.42	15.52	40.730899	-103.846317	40.730899	-103.846317	1,513,384.35	3,458,293.09
2,235.00	11.58	144.49	2,230.00	-62.70	25.11	40.730857	-103.846284	40.730857	-103.846284	1,513,369.07	3,458,302.68
2,327.00	11.12	143.18	2,320.20	-77.32	35.79	40.730816	-103.846246	40.730816	-103.846246	1,513,354.45	3,458,313.36
2,419.00	10.60	143.35	2,410.55	-91.21	46.15	40.730777	-103.846210	40.730777	-103.846210	1,513,340.56	3,458,323.73
2,511.00	11.41	145.10	2,500.86	-105.46	56.41	40.730738	-103.846174	40.730738	-103.846174	1,513,326.31	3,458,333.98
2,604.00	11.48	143.59	2,592.01	-120.45	67.17	40.730696	-103.846136	40.730696	-103.846136	1,513,311.32	3,458,344.74
2,696.00	11.14	143.00	2,682.22	-134.92	77.95	40.730656	-103.846098	40.730656	-103.846098	1,513,296.85	3,458,355.52
2,789.00	12.17	145.60	2,773.31	-150.18	88.90	40.730613	-103.846060	40.730613	-103.846060	1,513,281.59	3,458,366.47
2,882.00	11.59	143.07	2,864.31	-165.74	100.05	40.730570	-103.846020	40.730570	-103.846020	1,513,266.03	3,458,377.62
2,976.00	10.69	142.00	2,956.54	-180.16	111.09	40.730530	-103.845982	40.730530	-103.845982	1,513,251.61	3,458,388.66
3,070.00	11.25	144.16	3,048.83	-194.46	121.83	40.730490	-103.845944	40.730490	-103.845944	1,513,237.31	3,458,399.40
3,164.00	11.91	147.53	3,140.91	-210.08	132.40	40.730447	-103.845907	40.730447	-103.845907	1,513,221.69	3,458,409.97
3,259.00	11.98	146.64	3,233.86	-226.58	143.09	40.730401	-103.845869	40.730401	-103.845869	1,513,205.19	3,458,420.66
3,353.00	11.98	144.19	3,325.81	-242.64	154.16	40.730356	-103.845830	40.730356	-103.845830	1,513,189.13	3,458,431.73
3,447.00	12.50	145.06	3,417.67	-258.89	165.69	40.730311	-103.845790	40.730311	-103.845790	1,513,172.88	3,458,443.27
3,541.00	12.85	146.18	3,509.38	-275.92	177.34	40.730264	-103.845749	40.730264	-103.845749	1,513,155.85	3,458,454.91
3,635.00	13.25	146.02	3,600.95	-293.53	189.18	40.730215	-103.845708	40.730215	-103.845708	1,513,138.24	3,458,466.75
3,729.00	13.21	145.63	3,692.46	-311.33	201.26	40.730165	-103.845665	40.730165	-103.845665	1,513,120.44	3,458,478.83
3,918.00	11.41	144.46	3,877.11	-344.37	224.32	40.730073	-103.845584	40.730073	-103.845584	1,513,087.40	3,458,501.89
4,012.00	10.95	142.60	3,969.32	-359.03	235.15	40.730033	-103.845546	40.730033	-103.845546	1,513,072.74	3,458,512.72
4,107.00	11.99	145.20	4,062.42	-374.30	246.26	40.729990	-103.845507	40.729990	-103.845507	1,513,057.47	3,458,523.83
4,201.00	11.48	145.14	4,154.46	-389.99	257.18	40.729947	-103.845469	40.729947	-103.845469	1,513,041.78	3,458,534.75
4,295.00	10.57	144.25	4,246.72	-404.67	267.56	40.729906	-103.845432	40.729906	-103.845432	1,513,027.10	3,458,545.13
4,389.00	9.28	145.05	4,339.31	-417.88	276.94	40.729869	-103.845399	40.729869	-103.845399	1,513,013.89	3,458,554.51
4,484.00	7.82	146.34	4,433.26	-429.54	284.91	40.729837	-103.845371	40.729837	-103.845371	1,513,002.23	3,458,562.48
4,578.00	6.25	145.20	4,526.55	-439.06	291.38	40.729810	-103.845349	40.729810	-103.845349	1,512,992.71	3,458,568.95
4,673.00	5.28	143.60	4,621.06	-446.83	296.92	40.729789	-103.845329	40.729789	-103.845329	1,512,984.94	3,458,574.49

Design Report for Gracie LD22-730 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
4,767.00	5.07	144.38	4,714.68	-453.68	301.91	40.729770	-103.845312	1,512,978.09	3,458,579.48
4,861.00	4.53	159.05	4,808.35	-460.53	305.66	40.729751	-103.845299	1,512,971.24	3,458,583.23
4,955.00	4.17	166.10	4,902.08	-467.31	307.80	40.729732	-103.845291	1,512,964.46	3,458,585.37
5,050.00	2.34	165.03	4,996.93	-472.54	309.13	40.729717	-103.845287	1,512,959.23	3,458,586.71
5,144.00	0.84	179.21	5,090.89	-475.08	309.64	40.729710	-103.845285	1,512,956.69	3,458,587.21
5,239.00	3.85	3.76	5,185.83	-472.59	309.86	40.729717	-103.845284	1,512,959.18	3,458,587.43
5,333.00	16.57	2.26	5,278.15	-455.98	310.60	40.729763	-103.845280	1,512,975.79	3,458,588.17
5,428.00	18.61	3.12	5,368.70	-427.31	311.96	40.729841	-103.845274	1,513,004.46	3,458,589.53
5,522.00	25.44	5.04	5,455.79	-392.18	314.55	40.729938	-103.845262	1,513,039.59	3,458,592.12
5,616.00	36.43	5.11	5,536.30	-344.12	318.82	40.730069	-103.845243	1,513,087.65	3,458,596.39
5,710.00	43.80	4.44	5,608.14	-283.80	323.83	40.730235	-103.845221	1,513,147.97	3,458,601.40
5,804.00	51.70	1.23	5,671.30	-214.37	327.15	40.730425	-103.845205	1,513,217.39	3,458,604.72
5,899.00	58.63	357.91	5,725.54	-136.47	326.47	40.730639	-103.845202	1,513,295.30	3,458,604.04
5,946.00	64.77	358.85	5,747.81	-95.12	325.31	40.730752	-103.845203	1,513,336.65	3,458,602.88
5,993.00	70.66	1.86	5,765.63	-51.66	325.60	40.730872	-103.845199	1,513,380.11	3,458,603.17
6,040.00	77.39	1.87	5,778.56	-6.52	327.07	40.730995	-103.845191	1,513,425.24	3,458,604.64
6,087.00	81.68	0.91	5,787.09	39.67	328.19	40.731122	-103.845184	1,513,471.44	3,458,605.76
6,114.00	83.58	358.90	5,790.56	66.45	328.15	40.731196	-103.845182	1,513,498.21	3,458,605.72
6,159.00	84.89	358.76	5,795.08	111.21	327.23	40.731318	-103.845182	1,513,542.97	3,458,604.80
6,231.00	86.98	358.54	5,800.18	183.00	325.54	40.731516	-103.845184	1,513,614.77	3,458,603.11
6,324.00	89.23	358.85	5,803.26	275.92	323.42	40.731771	-103.845185	1,513,707.69	3,458,600.99
6,417.00	89.69	359.40	5,804.14	368.91	322.00	40.732026	-103.845184	1,513,800.67	3,458,599.57
6,509.00	89.48	0.15	5,804.80	460.90	321.64	40.732278	-103.845179	1,513,892.66	3,458,599.21
6,601.00	89.85	358.53	5,805.34	552.89	320.58	40.732531	-103.845177	1,513,984.65	3,458,598.15
6,693.00	90.83	359.37	5,804.79	644.87	318.90	40.732783	-103.845176	1,514,076.63	3,458,596.47
6,786.00	91.23	359.67	5,803.12	737.85	318.12	40.733039	-103.845173	1,514,169.61	3,458,595.69
6,878.00	90.59	359.01	5,801.66	829.83	317.06	40.733291	-103.845171	1,514,261.59	3,458,594.63
6,970.00	89.72	359.46	5,801.41	921.82	315.83	40.733544	-103.845169	1,514,353.58	3,458,593.40
7,160.00	90.25	358.69	5,801.46	1,111.80	312.76	40.734065	-103.845167	1,514,543.56	3,458,590.33
7,254.00	90.34	358.91	5,800.98	1,205.78	310.79	40.734323	-103.845168	1,514,637.53	3,458,588.37
7,349.00	90.43	359.15	5,800.34	1,300.76	309.19	40.734584	-103.845167	1,514,732.52	3,458,586.76
7,444.00	89.88	359.94	5,800.08	1,395.76	308.43	40.734845	-103.845164	1,514,827.51	3,458,586.00
7,539.00	89.17	358.63	5,800.87	1,490.74	307.25	40.735105	-103.845161	1,514,922.50	3,458,584.82
7,634.00	88.77	358.59	5,802.58	1,585.70	304.94	40.735366	-103.845163	1,515,017.45	3,458,582.51
7,728.00	89.41	358.33	5,804.07	1,679.65	302.42	40.735624	-103.845166	1,515,111.41	3,458,579.99
7,823.00	90.34	357.14	5,804.28	1,774.58	298.66	40.735885	-103.845173	1,515,206.33	3,458,576.23
7,918.00	90.52	357.46	5,803.56	1,869.47	294.19	40.736145	-103.845183	1,515,301.22	3,458,571.76
8,012.00	90.09	358.32	5,803.06	1,963.40	290.73	40.736403	-103.845189	1,515,395.15	3,458,568.30
8,107.00	89.91	358.53	5,803.06	2,058.36	288.12	40.736664	-103.845192	1,515,490.11	3,458,565.69
8,202.00	89.57	358.65	5,803.50	2,153.33	285.78	40.736925	-103.845194	1,515,585.08	3,458,563.35
8,391.00	90.40	358.00	5,803.54	2,342.25	280.25	40.737443	-103.845202	1,515,774.00	3,458,557.82
8,485.00	90.55	357.55	5,802.77	2,436.18	276.60	40.737701	-103.845208	1,515,867.92	3,458,554.17

Design Report for Gracie LD22-730 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
8,580.00	90.99	358.56	5,801.49	2,531.11	273.38	40.737962	-103.845214	1,515,962.86	3,458,550.95
8,769.00	90.74	358.82	5,798.64	2,720.04	269.06	40.738481	-103.845216	1,516,151.79	3,458,546.63
8,864.00	90.55	359.31	5,797.57	2,815.02	267.51	40.738741	-103.845216	1,516,246.77	3,458,545.08
8,958.00	90.37	359.65	5,796.81	2,909.02	266.66	40.738999	-103.845212	1,516,340.76	3,458,544.23
9,053.00	90.68	359.79	5,795.94	3,004.01	266.19	40.739260	-103.845208	1,516,435.75	3,458,543.76
9,148.00	90.74	359.67	5,794.76	3,099.00	265.74	40.739521	-103.845203	1,516,530.74	3,458,543.32
9,242.00	89.57	359.78	5,794.51	3,193.00	265.29	40.739779	-103.845198	1,516,624.74	3,458,542.86
9,337.00	89.38	359.73	5,795.38	3,287.99	264.89	40.740040	-103.845193	1,516,719.73	3,458,542.46
9,431.00	89.48	359.62	5,796.32	3,381.99	264.35	40.740298	-103.845189	1,516,813.73	3,458,541.93
9,526.00	89.38	358.94	5,797.26	3,476.97	263.16	40.740558	-103.845187	1,516,908.71	3,458,540.73
9,621.00	89.20	359.47	5,798.44	3,571.96	261.84	40.740819	-103.845185	1,517,003.70	3,458,539.41
9,716.00	88.49	359.15	5,800.35	3,666.93	260.70	40.741080	-103.845183	1,517,098.67	3,458,538.27
9,810.00	89.17	358.04	5,802.27	3,760.88	258.39	40.741338	-103.845185	1,517,192.62	3,458,535.97
9,905.00	89.41	357.35	5,803.45	3,855.80	254.57	40.741598	-103.845192	1,517,287.53	3,458,532.14
10,000.00	89.04	357.30	5,804.73	3,950.68	250.14	40.741859	-103.845202	1,517,382.42	3,458,527.71
10,095.00	91.23	357.28	5,804.51	4,045.57	245.65	40.742120	-103.845212	1,517,477.31	3,458,523.22
10,189.00	91.17	356.87	5,802.54	4,139.43	240.85	40.742377	-103.845223	1,517,571.16	3,458,518.42
10,284.00	91.39	357.27	5,800.42	4,234.28	236.00	40.742638	-103.845234	1,517,666.01	3,458,513.57
10,379.00	91.36	357.47	5,798.14	4,329.15	231.64	40.742899	-103.845243	1,517,760.88	3,458,509.21
10,413.00	91.45	357.03	5,797.31	4,363.10	230.01	40.742992	-103.845247	1,517,794.83	3,458,507.58
10,481.00	91.45	357.03	5,795.59	4,430.99	226.49	40.743178	-103.845255	1,517,862.72	3,458,504.06

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
804.00	804.00	-0.01	0.21	First Sperry MWD Survey at 804.00
10,413.00	5,797.31	4,363.10	230.01	Final Sperry MWD Survey at 10413.00ft
10,481.00	5,795.59	4,430.99	226.49	Straight Line Projection to TD at 10481.00ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
Target	Gracie LD22-730_Rev A0_BHL	3.01	Slot	0.00	0.00	0.00

Design Report for Gracie LD22-730 - Actual Surveys

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
804.00	6,114.00	Intermediate Surveys	Flexi-Shot
6,231.00	10,481.00	Production Casing	MWD

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
766.00		9 5/8"	9-5/8	13-3/4
6,159.00	5,795.08	7"	7	8-3/4

Design Targets

Shape	Target Name	TVD ()	Northing ()	Easting ()	+N/-S	+E/-W	Created	Updated
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Directional Difficulty Index

Average Dogleg over Survey:	1.54 °/100usft	Maximum Dogleg over Survey:	14.32 °/100usft at 6,040.00 usft
Net Tortousity applicable to Plans:	0.44 °/100usft	Directional Difficulty Index:	6.204

Audit Info

North Reference Sheet for Sec. 22-T9N-R58W (Gracie LD22 PAD) - Gracie LD22-730 - Plan A

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

Vertical Depths are relative to KB = 30' @ 4857.00usft (H&P 321). Northing and Easting are relative to Gracie LD22-730

Coordinate System is US State Plane 1983, Colorado Northern Zone using datum North American Datum 1983, ellipsoid GRS 1980

Projection method is Lambert Conformal Conic (2 parallel)

Central Meridian is -105.500000°, Longitude Origin:0.000000°, Latitude Origin:40.783333°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99999193

Grid Coordinates of Well: 1,513,431.77 usft N, 3,458,277.57 usft E

Geographical Coordinates of Well: 40° 43' 51.71" N, 103° 50' 46.93" W

Grid Convergence at Surface is: 1.07°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,481.00usft

the Bottom Hole Displacement is 4,436.77usft in the Direction of 2.93° (Grid).

Magnetic Convergence at surface is: -6.93° (20 August 2015, , BGGM2015)

