ENSIGN Directional

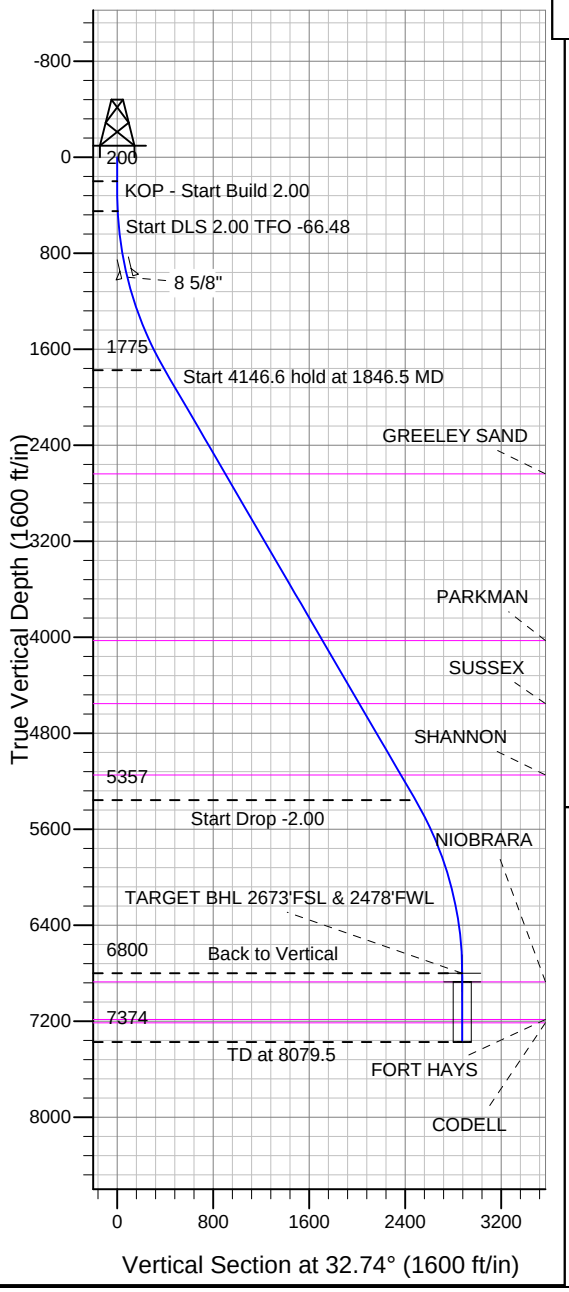
Well Name: Land JG 31-13D

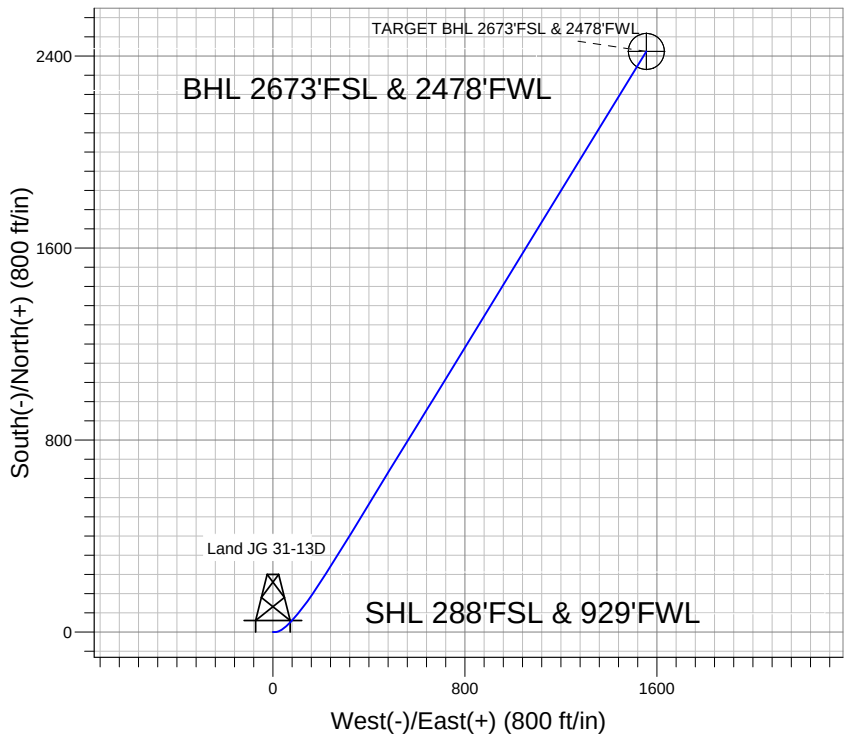
Surface Location: Land JG (East) Pad Sec.31-T2N-R64W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone
Ground Elevation: 4933.0

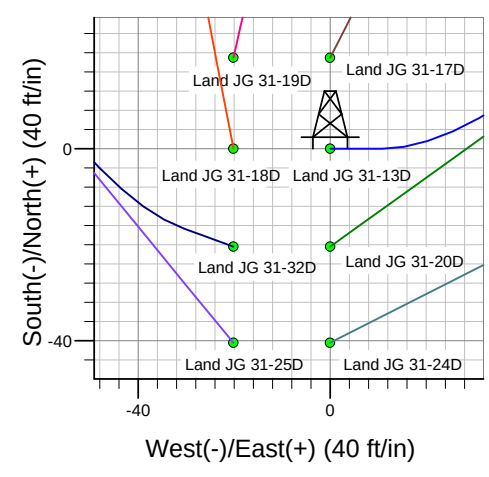
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1276280.03	3251988.58	40.088267	-104.599353	

Original Well Elev WELL @ 4947.0ft (Original Well Elev)

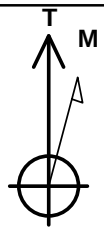
Great Western







Land JG (East) Pad Sec.31-T2N-R64W
Land JG 31-13D
Plan #1 (11-05-12)
15:56, November 08 2012



Azimuths to True North
Magnetic North: 8.56°

Magnetic Field
Strength: 52837.5snT
Dip Angle: 66.78°
Date: 11/5/2012
Model: IGRF2010

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
TARGET BHL 2673'FSL & 2478'FWL	6800.0	2419.3	1555.8	40.094908	-104.593792	Point
TARGET CIRCLE 2673'FSL & 2478'FWL	6872.0	2419.3	1555.8	40.094908	-104.593792	Circle (Radius: 75.0)

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.0	
3	450.0	5.00	90.00	449.7	0.0	10.9	2.00	90.00	5.9	
4	1846.5	30.25	31.50	1774.8	306.0	260.5	2.00	-66.48	398.3	
5	5993.1	30.25	31.50	5356.9	2086.8	1352.0	0.00	0.00	2486.5	
6	7505.5	0.00	0.00	6800.0	2419.3	1555.8	2.00	180.00	2876.4	TARGET BHL 2673'FSL & 2478'FWL
7	8079.5	0.00	0.00	7374.0	2419.3	1555.8	0.00	0.00	2876.4	

Great Western

SEC.31-T2N-R64W
Land JG (East) Pad Sec.31-T2N-R64W
Land JG 31-13D

Wellbore #1

Plan: Plan #1 (11-05-12)

Standard Planning Report

08 November, 2012

Database:	Landmark	**Local Co-ordinate Reference:**	Well Land JG 31-13D
Company:	Great Western	**TVD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Project:	SEC.31-T2N-R64W	**MD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Site:	Land JG (East) Pad Sec.31-T2N-R64W	**North Reference:**	True
Well:	Land JG 31-13D	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (11-05-12)		

Project SEC.31-T2N-R64W, Weld County, CO

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 Land JG (East) Pad Sec.31-T2N-R64W

Site Position:		**Northing:**	1,276,199.91 ft	**Latitude:**	40.088047
From:	Lat/Long	**Easting:**	3,251,989.40 ft	**Longitude:**	-104.599353
Position Uncertainty:	0.0 ft	**Slot Radius:**	"	**Grid Convergence:**	0.58 °

Well Land JG 31-13D

Well Position	**+N/-S**	80.1 ft	**Northing:**	1,276,280.03 ft	**Latitude:**	40.088267
	+E/-W	0.0 ft	**Easting:**	3,251,988.58 ft	**Longitude:**	-104.599353
Position Uncertainty		0.0 ft	**Wellhead Elevation:**	ft	**Ground Level:**	4,933.0 ft

Wellbore Wellbore #1

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	11/5/2012	8.56	66.78	52,837

Design Plan #1 (11-05-12)

Audit Notes:

Version:		**Phase:**	PROTOTYPE	**Tie On Depth:**	0.0

Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	32.74

Plan Sections

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.00	0.00	
450.0	5.00	90.00	449.7	0.0	10.9	2.00	2.00	0.00	90.00	
1,846.5	30.25	31.50	1,774.8	306.0	260.5	2.00	1.81	-4.19	-66.48	
5,993.1	30.25	31.50	5,356.9	2,086.8	1,352.0	0.00	0.00	0.00	0.00	
7,505.5	0.00	0.00	6,800.0	2,419.3	1,555.8	2.00	-2.00	0.00	180.00	TARGET BHL 2673
8,079.5	0.00	0.00	7,374.0	2,419.3	1,555.8	0.00	0.00	0.00	0.00	

Database:	Landmark	**Local Co-ordinate Reference:**	Well Land JG 31-13D
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Project:	SEC.31-T2N-R64W	**MD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Site:	Land JG (East) Pad Sec.31-T2N-R64W	**North Reference:**	True
Well:	Land JG 31-13D	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (11-05-12)		

Planned 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
40.0	0.00	0.00	40.0	0.0	0.0	0.0	0.00	0.00	0.00
80.0	0.00	0.00	80.0	0.0	0.0	0.0	0.00	0.00	0.00
120.0	0.00	0.00	120.0	0.0	0.0	0.0	0.00	0.00	0.00
160.0	0.00	0.00	160.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP - Start Build 2.00									
240.0	0.80	90.00	240.0	0.0	0.3	0.2	2.00	2.00	0.00
280.0	1.60	90.00	280.0	0.0	1.1	0.6	2.00	2.00	0.00
320.0	2.40	90.00	320.0	0.0	2.5	1.4	2.00	2.00	0.00
360.0	3.20	90.00	359.9	0.0	4.5	2.4	2.00	2.00	0.00
400.0	4.00	90.00	399.8	0.0	7.0	3.8	2.00	2.00	0.00
440.0	4.80	90.00	439.7	0.0	10.0	5.4	2.00	2.00	0.00
450.0	5.00	90.00	449.7	0.0	10.9	5.9	2.00	2.00	0.00
Start DLS 2.00 TFO -66.48									
480.0	5.27	84.00	479.6	0.1	13.6	7.5	2.00	0.89	-20.01
520.0	5.70	76.98	519.4	0.8	17.3	10.0	2.00	1.09	-17.56
560.0	6.21	71.02	559.2	1.9	21.3	13.2	2.00	1.27	-14.88
600.0	6.78	66.01	598.9	3.6	25.5	16.8	2.00	1.41	-12.53
640.0	7.39	61.80	638.6	5.8	30.0	21.1	2.00	1.52	-10.54
680.0	8.03	58.23	678.2	8.5	34.6	25.8	2.00	1.61	-8.90
720.0	8.70	55.21	717.8	11.7	39.5	31.1	2.00	1.67	-7.57
760.0	9.39	52.61	757.3	15.4	44.5	37.0	2.00	1.72	-6.48
800.0	10.09	50.38	796.7	19.6	49.8	43.4	2.00	1.76	-5.59
840.0	10.81	48.43	836.1	24.3	55.3	50.4	2.00	1.80	-4.86
880.0	11.54	46.73	875.3	29.5	61.0	57.9	2.00	1.82	-4.26
920.0	12.28	45.22	914.5	35.3	67.0	65.9	2.00	1.84	-3.76
960.0	13.02	43.89	953.5	41.5	73.1	74.5	2.00	1.86	-3.34
1,000.0	13.77	42.70	992.4	48.3	79.5	83.6	2.00	1.88	-2.98
1,007.8	13.92	42.48	1,000.0	49.6	80.7	85.4	2.00	1.89	-2.79
8 5/8"									
1,040.0	14.53	41.62	1,031.2	55.5	86.0	93.2	2.00	1.89	-2.65
1,080.0	15.29	40.66	1,069.8	63.3	92.8	103.4	2.00	1.90	-2.42
1,120.0	16.05	39.78	1,108.4	71.5	99.8	114.1	2.00	1.91	-2.19
1,160.0	16.82	38.98	1,146.7	80.3	107.0	125.4	2.00	1.92	-2.00
1,200.0	17.59	38.25	1,184.9	89.5	114.3	137.1	2.00	1.93	-1.83
1,240.0	18.36	37.58	1,223.0	99.2	121.9	149.4	2.00	1.93	-1.68
1,280.0	19.14	36.96	1,260.9	109.5	129.7	162.2	2.00	1.94	-1.55
1,320.0	19.91	36.39	1,298.6	120.2	137.7	175.6	2.00	1.94	-1.43
1,360.0	20.69	35.86	1,336.1	131.4	145.9	189.4	2.00	1.95	-1.33
1,400.0	21.47	35.36	1,373.4	143.1	154.2	203.8	2.00	1.95	-1.24
1,440.0	22.25	34.90	1,410.5	155.3	162.8	218.7	2.00	1.95	-1.15
1,480.0	23.04	34.47	1,447.4	168.0	171.6	234.1	2.00	1.96	-1.08
1,520.0	23.82	34.07	1,484.1	181.1	180.5	250.0	2.00	1.96	-1.01
1,560.0	24.60	33.68	1,520.6	194.7	189.7	266.4	2.00	1.96	-0.95
1,600.0	25.39	33.33	1,556.9	208.8	199.0	283.3	2.00	1.96	-0.90
1,640.0	26.18	32.99	1,592.9	223.4	208.5	300.7	2.00	1.97	-0.84
1,680.0	26.96	32.67	1,628.7	238.4	218.2	318.6	2.00	1.97	-0.80
1,720.0	27.75	32.37	1,664.2	253.9	228.1	336.9	2.00	1.97	-0.76
1,760.0	28.54	32.08	1,699.5	269.9	238.2	355.8	2.00	1.97	-0.72
1,800.0	29.33	31.81	1,734.5	286.3	248.4	375.2	2.00	1.97	-0.68
1,840.0	30.12	31.55	1,769.2	303.2	258.8	395.0	2.00	1.97	-0.65
1,846.5	30.25	31.50	1,774.8	306.0	260.5	398.3	2.00	1.97	-0.63
Start 4146.6 hold at 1846.5 MD									

Database:	Landmark	**Local Co-ordinate Reference:**	Well Land JG 31-13D
Company:	Great Western	**TVD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Project:	SEC.31-T2N-R64W	**MD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Site:	Land JG (East) Pad Sec.31-T2N-R64W	**North Reference:**	True
Well:	Land JG 31-13D	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (11-05-12)		

Planned 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)
1,880.0	30.25	31.50	1,803.8	320.3	269.3	415.1	0.00	0.00	0.00
1,920.0	30.25	31.50	1,838.3	337.5	279.9	435.3	0.00	0.00	0.00
1,960.0	30.25	31.50	1,872.9	354.7	290.4	455.4	0.00	0.00	0.00
2,000.0	30.25	31.50	1,907.4	371.9	300.9	475.6	0.00	0.00	0.00
2,040.0	30.25	31.50	1,942.0	389.1	311.5	495.7	0.00	0.00	0.00
2,080.0	30.25	31.50	1,976.5	406.2	322.0	515.8	0.00	0.00	0.00
2,120.0	30.25	31.50	2,011.1	423.4	332.5	536.0	0.00	0.00	0.00
2,160.0	30.25	31.50	2,045.6	440.6	343.0	556.1	0.00	0.00	0.00
2,200.0	30.25	31.50	2,080.2	457.8	353.6	576.3	0.00	0.00	0.00
2,240.0	30.25	31.50	2,114.7	475.0	364.1	596.4	0.00	0.00	0.00
2,280.0	30.25	31.50	2,149.3	492.1	374.6	616.6	0.00	0.00	0.00
2,320.0	30.25	31.50	2,183.9	509.3	385.2	636.7	0.00	0.00	0.00
2,360.0	30.25	31.50	2,218.4	526.5	395.7	656.9	0.00	0.00	0.00
2,400.0	30.25	31.50	2,253.0	543.7	406.2	677.0	0.00	0.00	0.00
2,440.0	30.25	31.50	2,287.5	560.9	416.7	697.1	0.00	0.00	0.00
2,480.0	30.25	31.50	2,322.1	578.0	427.3	717.3	0.00	0.00	0.00
2,520.0	30.25	31.50	2,356.6	595.2	437.8	737.4	0.00	0.00	0.00
2,560.0	30.25	31.50	2,391.2	612.4	448.3	757.6	0.00	0.00	0.00
2,600.0	30.25	31.50	2,425.7	629.6	458.9	777.7	0.00	0.00	0.00
2,640.0	30.25	31.50	2,460.3	646.7	469.4	797.9	0.00	0.00	0.00
2,680.0	30.25	31.50	2,494.8	663.9	479.9	818.0	0.00	0.00	0.00
2,720.0	30.25	31.50	2,529.4	681.1	490.5	838.2	0.00	0.00	0.00
2,760.0	30.25	31.50	2,564.0	698.3	501.0	858.3	0.00	0.00	0.00
2,800.0	30.25	31.50	2,598.5	715.5	511.5	878.4	0.00	0.00	0.00
2,840.0	30.25	31.50	2,633.1	732.6	522.0	898.6	0.00	0.00	0.00
2,846.9	30.25	31.50	2,639.0	735.6	523.8	902.0	0.00	0.00	0.00
GREELEY SAND									
2,880.0	30.25	31.50	2,667.6	749.8	532.6	918.7	0.00	0.00	0.00
2,920.0	30.25	31.50	2,702.2	767.0	543.1	938.9	0.00	0.00	0.00
2,960.0	30.25	31.50	2,736.7	784.2	553.6	959.0	0.00	0.00	0.00
3,000.0	30.25	31.50	2,771.3	801.4	564.2	979.2	0.00	0.00	0.00
3,040.0	30.25	31.50	2,805.8	818.5	574.7	999.3	0.00	0.00	0.00
3,080.0	30.25	31.50	2,840.4	835.7	585.2	1,019.4	0.00	0.00	0.00
3,120.0	30.25	31.50	2,874.9	852.9	595.7	1,039.6	0.00	0.00	0.00
3,160.0	30.25	31.50	2,909.5	870.1	606.3	1,059.7	0.00	0.00	0.00
3,200.0	30.25	31.50	2,944.1	887.3	616.8	1,079.9	0.00	0.00	0.00
3,240.0	30.25	31.50	2,978.6	904.4	627.3	1,100.0	0.00	0.00	0.00
3,280.0	30.25	31.50	3,013.2	921.6	637.9	1,120.2	0.00	0.00	0.00
3,320.0	30.25	31.50	3,047.7	938.8	648.4	1,140.3	0.00	0.00	0.00
3,360.0	30.25	31.50	3,082.3	956.0	658.9	1,160.5	0.00	0.00	0.00
3,400.0	30.25	31.50	3,116.8	973.1	669.4	1,180.6	0.00	0.00	0.00
3,440.0	30.25	31.50	3,151.4	990.3	680.0	1,200.7	0.00	0.00	0.00
3,480.0	30.25	31.50	3,185.9	1,007.5	690.5	1,220.9	0.00	0.00	0.00
3,520.0	30.25	31.50	3,220.5	1,024.7	701.0	1,241.0	0.00	0.00	0.00
3,560.0	30.25	31.50	3,255.0	1,041.9	711.6	1,261.2	0.00	0.00	0.00
3,600.0	30.25	31.50	3,289.6	1,059.0	722.1	1,281.3	0.00	0.00	0.00
3,640.0	30.25	31.50	3,324.2	1,076.2	732.6	1,301.5	0.00	0.00	0.00
3,680.0	30.25	31.50	3,358.7	1,093.4	743.2	1,321.6	0.00	0.00	0.00
3,720.0	30.25	31.50	3,393.3	1,110.6	753.7	1,341.8	0.00	0.00	0.00
3,760.0	30.25	31.50	3,427.8	1,127.8	764.2	1,361.9	0.00	0.00	0.00
3,800.0	30.25	31.50	3,462.4	1,144.9	774.7	1,382.0	0.00	0.00	0.00
3,840.0	30.25	31.50	3,496.9	1,162.1	785.3	1,402.2	0.00	0.00	0.00
3,880.0	30.25	31.50	3,531.5	1,179.3	795.8	1,422.3	0.00	0.00	0.00

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Site:	Land JG (East) Pad Sec.31-T2N-R64W	**North Reference:**	True
Well:	Land JG 31-13D	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (11-05-12)		

Planned 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)
3,920.0	30.25	31.50	3,566.0	1,196.5	806.3	1,442.5	0.00	0.00	0.00
3,960.0	30.25	31.50	3,600.6	1,213.6	816.9	1,462.6	0.00	0.00	0.00
4,000.0	30.25	31.50	3,635.2	1,230.8	827.4	1,482.8	0.00	0.00	0.00
4,040.0	30.25	31.50	3,669.7	1,248.0	837.9	1,502.9	0.00	0.00	0.00
4,080.0	30.25	31.50	3,704.3	1,265.2	848.4	1,523.1	0.00	0.00	0.00
4,120.0	30.25	31.50	3,738.8	1,282.4	859.0	1,543.2	0.00	0.00	0.00
4,160.0	30.25	31.50	3,773.4	1,299.5	869.5	1,563.3	0.00	0.00	0.00
4,200.0	30.25	31.50	3,807.9	1,316.7	880.0	1,583.5	0.00	0.00	0.00
4,240.0	30.25	31.50	3,842.5	1,333.9	890.6	1,603.6	0.00	0.00	0.00
4,280.0	30.25	31.50	3,877.0	1,351.1	901.1	1,623.8	0.00	0.00	0.00
4,320.0	30.25	31.50	3,911.6	1,368.3	911.6	1,643.9	0.00	0.00	0.00
4,360.0	30.25	31.50	3,946.1	1,385.4	922.1	1,664.1	0.00	0.00	0.00
4,400.0	30.25	31.50	3,980.7	1,402.6	932.7	1,684.2	0.00	0.00	0.00
4,440.0	30.25	31.50	4,015.3	1,419.8	943.2	1,704.4	0.00	0.00	0.00
4,454.8	30.25	31.50	4,028.0	1,426.1	947.1	1,711.8	0.00	0.00	0.00
PARKMAN									
4,480.0	30.25	31.50	4,049.8	1,437.0	953.7	1,724.5	0.00	0.00	0.00
4,520.0	30.25	31.50	4,084.4	1,454.2	964.3	1,744.6	0.00	0.00	0.00
4,560.0	30.25	31.50	4,118.9	1,471.3	974.8	1,764.8	0.00	0.00	0.00
4,600.0	30.25	31.50	4,153.5	1,488.5	985.3	1,784.9	0.00	0.00	0.00
4,640.0	30.25	31.50	4,188.0	1,505.7	995.8	1,805.1	0.00	0.00	0.00
4,680.0	30.25	31.50	4,222.6	1,522.9	1,006.4	1,825.2	0.00	0.00	0.00
4,720.0	30.25	31.50	4,257.1	1,540.0	1,016.9	1,845.4	0.00	0.00	0.00
4,760.0	30.25	31.50	4,291.7	1,557.2	1,027.4	1,865.5	0.00	0.00	0.00
4,800.0	30.25	31.50	4,326.2	1,574.4	1,038.0	1,885.6	0.00	0.00	0.00
4,840.0	30.25	31.50	4,360.8	1,591.6	1,048.5	1,905.8	0.00	0.00	0.00
4,880.0	30.25	31.50	4,395.4	1,608.8	1,059.0	1,925.9	0.00	0.00	0.00
4,920.0	30.25	31.50	4,429.9	1,625.9	1,069.6	1,946.1	0.00	0.00	0.00
4,960.0	30.25	31.50	4,464.5	1,643.1	1,080.1	1,966.2	0.00	0.00	0.00
5,000.0	30.25	31.50	4,499.0	1,660.3	1,090.6	1,986.4	0.00	0.00	0.00
5,040.0	30.25	31.50	4,533.6	1,677.5	1,101.1	2,006.5	0.00	0.00	0.00
5,063.6	30.25	31.50	4,554.0	1,687.6	1,107.4	2,018.4	0.00	0.00	0.00
SUSSEX									
5,080.0	30.25	31.50	4,568.1	1,694.7	1,111.7	2,026.7	0.00	0.00	0.00
5,120.0	30.25	31.50	4,602.7	1,711.8	1,122.2	2,046.8	0.00	0.00	0.00
5,160.0	30.25	31.50	4,637.2	1,729.0	1,132.7	2,066.9	0.00	0.00	0.00
5,200.0	30.25	31.50	4,671.8	1,746.2	1,143.3	2,087.1	0.00	0.00	0.00
5,240.0	30.25	31.50	4,706.3	1,763.4	1,153.8	2,107.2	0.00	0.00	0.00
5,280.0	30.25	31.50	4,740.9	1,780.6	1,164.3	2,127.4	0.00	0.00	0.00
5,320.0	30.25	31.50	4,775.5	1,797.7	1,174.8	2,147.5	0.00	0.00	0.00
5,360.0	30.25	31.50	4,810.0	1,814.9	1,185.4	2,167.7	0.00	0.00	0.00
5,400.0	30.25	31.50	4,844.6	1,832.1	1,195.9	2,187.8	0.00	0.00	0.00
5,440.0	30.25	31.50	4,879.1	1,849.3	1,206.4	2,208.0	0.00	0.00	0.00
5,480.0	30.25	31.50	4,913.7	1,866.4	1,217.0	2,228.1	0.00	0.00	0.00
5,520.0	30.25	31.50	4,948.2	1,883.6	1,227.5	2,248.2	0.00	0.00	0.00
5,560.0	30.25	31.50	4,982.8	1,900.8	1,238.0	2,268.4	0.00	0.00	0.00
5,600.0	30.25	31.50	5,017.3	1,918.0	1,248.5	2,288.5	0.00	0.00	0.00
5,640.0	30.25	31.50	5,051.9	1,935.2	1,259.1	2,308.7	0.00	0.00	0.00
5,680.0	30.25	31.50	5,086.4	1,952.3	1,269.6	2,328.8	0.00	0.00	0.00
5,720.0	30.25	31.50	5,121.0	1,969.5	1,280.1	2,349.0	0.00	0.00	0.00
5,751.3	30.25	31.50	5,148.0	1,982.9	1,288.4	2,364.7	0.00	0.00	0.00
SHANNON									
5,760.0	30.25	31.50	5,155.6	1,986.7	1,290.7	2,369.1	0.00	0.00	0.00

Database:	Landmark	**Local Co-ordinate Reference:**	Well Land JG 31-13D
Company:	Great Western	**TVD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Project:	SEC.31-T2N-R64W	**MD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Site:	Land JG (East) Pad Sec.31-T2N-R64W	**North Reference:**	True
Well:	Land JG 31-13D	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (11-05-12)		

Planned 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)
5,800.0	30.25	31.50	5,190.1	2,003.9	1,301.2	2,389.3	0.00	0.00	0.00
5,840.0	30.25	31.50	5,224.7	2,021.1	1,311.7	2,409.4	0.00	0.00	0.00
5,880.0	30.25	31.50	5,259.2	2,038.2	1,322.3	2,429.5	0.00	0.00	0.00
5,920.0	30.25	31.50	5,293.8	2,055.4	1,332.8	2,449.7	0.00	0.00	0.00
5,960.0	30.25	31.50	5,328.3	2,072.6	1,343.3	2,469.8	0.00	0.00	0.00
5,993.1	30.25	31.50	5,356.9	2,086.8	1,352.0	2,486.5	0.00	0.00	0.00
Start Drop -2.00									
6,000.0	30.11	31.50	5,362.9	2,089.8	1,353.8	2,490.0	2.00	-2.00	0.00
6,040.0	29.31	31.50	5,397.6	2,106.7	1,364.2	2,509.8	2.00	-2.00	0.00
6,080.0	28.51	31.50	5,432.6	2,123.2	1,374.3	2,529.1	2.00	-2.00	0.00
6,120.0	27.71	31.50	5,467.9	2,139.2	1,384.1	2,548.0	2.00	-2.00	0.00
6,160.0	26.91	31.50	5,503.5	2,154.9	1,393.7	2,566.3	2.00	-2.00	0.00
6,200.0	26.11	31.50	5,539.3	2,170.1	1,403.1	2,584.2	2.00	-2.00	0.00
6,240.0	25.31	31.50	5,575.3	2,184.9	1,412.1	2,601.5	2.00	-2.00	0.00
6,280.0	24.51	31.50	5,611.6	2,199.2	1,420.9	2,618.3	2.00	-2.00	0.00
6,320.0	23.71	31.50	5,648.1	2,213.2	1,429.5	2,634.7	2.00	-2.00	0.00
6,360.0	22.91	31.50	5,684.8	2,226.7	1,437.7	2,650.5	2.00	-2.00	0.00
6,400.0	22.11	31.50	5,721.8	2,239.7	1,445.8	2,665.8	2.00	-2.00	0.00
6,440.0	21.31	31.50	5,758.9	2,252.3	1,453.5	2,680.6	2.00	-2.00	0.00
6,480.0	20.51	31.50	5,796.3	2,264.5	1,460.9	2,694.9	2.00	-2.00	0.00
6,520.0	19.71	31.50	5,833.9	2,276.2	1,468.1	2,708.6	2.00	-2.00	0.00
6,560.0	18.91	31.50	5,871.6	2,287.5	1,475.0	2,721.9	2.00	-2.00	0.00
6,600.0	18.11	31.50	5,909.5	2,298.3	1,481.7	2,734.5	2.00	-2.00	0.00
6,640.0	17.31	31.50	5,947.7	2,308.7	1,488.0	2,746.7	2.00	-2.00	0.00
6,680.0	16.51	31.50	5,985.9	2,318.6	1,494.1	2,758.3	2.00	-2.00	0.00
6,720.0	15.71	31.50	6,024.4	2,328.1	1,499.9	2,769.4	2.00	-2.00	0.00
6,760.0	14.91	31.50	6,062.9	2,337.1	1,505.4	2,780.0	2.00	-2.00	0.00
6,800.0	14.11	31.50	6,101.7	2,345.6	1,510.7	2,790.0	2.00	-2.00	0.00
6,840.0	13.31	31.50	6,140.5	2,353.7	1,515.6	2,799.5	2.00	-2.00	0.00
6,880.0	12.51	31.50	6,179.5	2,361.3	1,520.3	2,808.4	2.00	-2.00	0.00
6,920.0	11.71	31.50	6,218.6	2,368.5	1,524.7	2,816.8	2.00	-2.00	0.00
6,960.0	10.91	31.50	6,257.8	2,375.2	1,528.8	2,824.7	2.00	-2.00	0.00
7,000.0	10.11	31.50	6,297.2	2,381.4	1,532.6	2,832.0	2.00	-2.00	0.00
7,040.0	9.31	31.50	6,336.6	2,387.2	1,536.1	2,838.7	2.00	-2.00	0.00
7,080.0	8.51	31.50	6,376.1	2,392.4	1,539.4	2,844.9	2.00	-2.00	0.00
7,120.0	7.71	31.50	6,415.7	2,397.3	1,542.3	2,850.5	2.00	-2.00	0.00
7,160.0	6.91	31.50	6,455.4	2,401.6	1,545.0	2,855.6	2.00	-2.00	0.00
7,200.0	6.11	31.50	6,495.1	2,405.5	1,547.3	2,860.1	2.00	-2.00	0.00
7,240.0	5.31	31.50	6,534.9	2,408.9	1,549.4	2,864.1	2.00	-2.00	0.00
7,280.0	4.51	31.50	6,574.8	2,411.8	1,551.2	2,867.5	2.00	-2.00	0.00
7,320.0	3.71	31.50	6,614.7	2,414.2	1,552.7	2,870.4	2.00	-2.00	0.00
7,360.0	2.91	31.50	6,654.6	2,416.2	1,553.9	2,872.7	2.00	-2.00	0.00
7,400.0	2.11	31.50	6,694.6	2,417.7	1,554.8	2,874.5	2.00	-2.00	0.00
7,440.0	1.31	31.50	6,734.6	2,418.7	1,555.4	2,875.7	2.00	-2.00	0.00
7,480.0	0.51	31.50	6,774.5	2,419.2	1,555.8	2,876.3	2.00	-2.00	0.00
7,505.5	0.00	0.00	6,800.0	2,419.3	1,555.8	2,876.4	2.00	-2.00	0.00
Back to Vertical - TARGET BHL 2673'FSL & 2478'FWL									
7,520.0	0.00	0.00	6,814.5	2,419.3	1,555.8	2,876.4	0.00	0.00	0.00
7,560.0	0.00	0.00	6,854.5	2,419.3	1,555.8	2,876.4	0.00	0.00	0.00
7,577.5	0.00	0.00	6,872.0	2,419.3	1,555.8	2,876.4	0.00	0.00	0.00
NIOBRARA - TARGET CIRCLE 2673'FSL & 2478'FWL									
7,600.0	0.00	0.00	6,894.5	2,419.3	1,555.8	2,876.4	0.00	0.00	0.00
7,640.0	0.00	0.00	6,934.5	2,419.3	1,555.8	2,876.4	0.00	0.00	0.00

Database:	Landmark	**Local Co-ordinate Reference:**	Well Land JG 31-13D
Company:	Great Western	**TVD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Project:	SEC.31-T2N-R64W	**MD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Site:	Land JG (East) Pad Sec.31-T2N-R64W	**North Reference:**	True
Well:	Land JG 31-13D	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (11-05-12)		

Planned 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)
7,680.0	0.00	0.00	6,974.5	2,419.3	1,555.8	2,876.4	0.00	0.00	0.00
7,720.0	0.00	0.00	7,014.5	2,419.3	1,555.8	2,876.4	0.00	0.00	0.00
7,760.0	0.00	0.00	7,054.5	2,419.3	1,555.8	2,876.4	0.00	0.00	0.00
7,800.0	0.00	0.00	7,094.5	2,419.3	1,555.8	2,876.4	0.00	0.00	0.00
7,840.0	0.00	0.00	7,134.5	2,419.3	1,555.8	2,876.4	0.00	0.00	0.00
7,880.0	0.00	0.00	7,174.5	2,419.3	1,555.8	2,876.4	0.00	0.00	0.00
7,892.5	0.00	0.00	7,187.0	2,419.3	1,555.8	2,876.4	0.00	0.00	0.00
FORT HAYS									
7,919.5	0.00	0.00	7,214.0	2,419.3	1,555.8	2,876.4	0.00	0.00	0.00
CODELL									
7,920.0	0.00	0.00	7,214.5	2,419.3	1,555.8	2,876.4	0.00	0.00	0.00
7,960.0	0.00	0.00	7,254.5	2,419.3	1,555.8	2,876.4	0.00	0.00	0.00
8,000.0	0.00	0.00	7,294.5	2,419.3	1,555.8	2,876.4	0.00	0.00	0.00
8,040.0	0.00	0.00	7,334.5	2,419.3	1,555.8	2,876.4	0.00	0.00	0.00
8,079.5	0.00	0.00	7,374.0	2,419.3	1,555.8	2,876.4	0.00	0.00	0.00
TD at 8079.5									

Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
TARGET BHL 2673'F - plan hits target center - Point	0.00	0.00	6,800.0	2,419.3	1,555.8	1,278,714.94	3,253,519.70	40.094908	-104.593792
TARGET CIRCLE 267 - plan hits target center - Circle (radius 75.0)	0.00	0.00	6,872.0	2,419.3	1,555.8	1,278,714.94	3,253,519.70	40.094908	-104.593792

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
1,007.8	1,000.0	8 5/8"	8-5/8	12-1/4

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,846.9	2,639.0	GREELEY SAND		0.00	
4,454.8	4,028.0	PARKMAN		0.00	
5,063.6	4,554.0	SUSSEX		0.00	
5,751.3	5,148.0	SHANNON		0.00	
7,577.5	6,872.0	NIOBRARA		0.00	
7,892.5	7,187.0	FORT HAYS		0.00	
7,919.5	7,214.0	CODELL		0.00	

Database:	Landmark	**Local Co-ordinate Reference:**	Well Land JG 31-13D
Company:	Great Western	**TVD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Project:	SEC.31-T2N-R64W	**MD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Site:	Land JG (East) Pad Sec.31-T2N-R64W	**North Reference:**	True
Well:	Land JG 31-13D	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (11-05-12)		

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
200.0	200.0	0.0	0.0	KOP - Start Build 2.00
450.0	449.7	0.0	10.9	Start DLS 2.00 TFO -66.48
1,846.5	1,774.8	306.0	260.5	Start 4146.6 hold at 1846.5 MD
5,993.1	5,356.9	2,086.8	1,352.0	Start Drop -2.00
7,505.5	6,800.0	2,419.3	1,555.8	Back to Vertical
8,079.5	7,374.0	2,419.3	1,555.8	TD at 8079.5

ENSIGN Directional

Great Western

SEC.31-T2N-R64W
Land JG (East) Pad Sec.31-T2N-R64W
Land JG 31-13D

Wellbore #1
Plan #1 (11-05-12)

Anticollision Report

08 November, 2012

Company:	Great Western	**Local Co-ordinate Reference:**	Well Land JG 31-13D
Project:	SEC.31-T2N-R64W	**TVD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Reference Site:	Land JG (East) Pad Sec.31-T2N-R64W	**MD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Land JG 31-13D	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #1 (11-05-12)	**Offset TVD Reference:**	Offset Datum

Reference Plan #1 (11-05-12)

Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	Stations	**Error Model:**	ISCWSA
Depth Range:	Unlimited	**Scan Method:**	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 10,000.0ft	**Error Surface:**	Elliptical Conic

Warning Levels Evaluated at: 2.00 **Sigma**

Survey Tool Program **Date** 11/8/2012

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	8,079.4	Plan #1 (11-05-12) (Wellbore #1)	MWD	MWD - Standard

Summary

Site Name / Offset Well - Wellbore - Design	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Land JG (East) Pad Sec.31-T2N-R64W						
Land JG 31-17D - Wellbore #1 - Plan #1 (11-05-12)	200.0	200.0	18.9	18.3	28.093	CC
Land JG 31-17D - Wellbore #1 - Plan #1 (11-05-12)	300.0	300.0	19.0	17.9	17.081	ES
Land JG 31-17D - Wellbore #1 - Plan #1 (11-05-12)	5,100.0	5,101.3	454.0	409.7	10.244	SF
Land JG 31-20D - Wellbore #1 - Plan #1 (11-05-12)	200.0	200.0	20.4	19.7	30.248	CC
Land JG 31-20D - Wellbore #1 - Plan #1 (11-05-12)	300.0	300.0	20.5	19.4	18.380	ES
Land JG 31-20D - Wellbore #1 - Plan #1 (11-05-12)	1,600.0	1,611.0	84.9	74.3	8.016	SF
Land JG (West) Pad Sec.31-T2N-R64W						
Land JG 31-18D - Wellbore #1 - Plan #1 (11-07-12)	200.0	200.0	20.1	19.5	29.877	CC, ES
Land JG 31-18D - Wellbore #1 - Plan #1 (11-07-12)	400.0	399.8	27.1	25.6	17.297	SF
Land JG 31-19D - Wellbore #1 - Plan #1 (11-07-12)	200.0	200.0	27.7	27.0	41.015	CC, ES
Land JG 31-19D - Wellbore #1 - Plan #1 (11-07-12)	1,500.0	1,488.4	157.6	148.0	16.490	SF
Land JG 31-32D - Wellbore #1 - Plan #1 (11-07-12)	200.0	200.0	28.7	28.0	42.520	CC, ES
Land JG 31-32D - Wellbore #1 - Plan #1 (11-07-12)	400.0	398.2	38.2	36.6	24.260	SF

Offset Design Land JG (East) Pad Sec.31-T2N-R64W - Land JG 31-17D - Wellbore #1 - Plan #1 (11-05-12)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD **Offset Well Error:** 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	0.00	18.9	0.0	18.9	18.9	0.00	N/A	
100.0	100.0	100.0	100.0	0.1	0.1	0.00	18.9	0.0	18.9	18.7	0.22	84.280	
200.0	200.0	200.0	200.0	0.3	0.3	0.00	18.9	0.0	18.9	18.3	0.67	28.093	CC
227.6	227.6	227.6	227.6	0.4	0.4	-90.40	18.9	0.0	18.9	18.1	0.80	23.807	
300.0	300.0	300.0	300.0	0.6	0.6	-95.26	18.9	0.0	19.0	17.9	1.11	17.081	ES
400.0	399.8	399.8	399.8	0.8	0.8	-110.18	18.9	0.0	20.2	18.6	1.56	12.935	
450.0	449.7	449.7	449.7	0.9	0.9	-119.83	18.9	0.0	21.9	20.1	1.79	12.195	
500.0	499.5	499.5	499.5	1.0	1.0	-120.00	18.9	0.0	24.1	22.1	2.02	11.932	
600.0	598.9	598.9	598.9	1.3	1.2	-124.82	18.9	0.0	29.8	27.3	2.48	11.997	
700.0	698.0	698.3	698.3	1.6	1.5	-130.31	20.4	0.8	37.7	34.8	2.95	12.801	
800.0	796.7	798.0	797.9	1.9	1.7	-133.45	25.0	3.1	47.0	43.6	3.42	13.761	
900.0	894.9	898.1	897.6	2.3	1.9	-135.34	32.7	7.1	57.0	53.0	3.91	14.563	
1,000.0	992.4	998.6	997.3	2.7	2.2	-136.59	43.6	12.7	67.1	62.7	4.44	15.125	
1,100.0	1,089.1	1,099.3	1,096.8	3.2	2.5	-137.50	57.5	19.9	77.4	72.4	5.01	15.446	

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

Company:	Great Western	**Local Co-ordinate Reference:**	Well Land JG 31-13D
Project:	SEC.31-T2N-R64W	**TVD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Reference Site:	Land JG (East) Pad Sec.31-T2N-R64W	**MD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Land JG 31-13D	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #1 (11-05-12)	**Offset TVD Reference:**	Offset Datum

Offset Design Land JG (East) Pad Sec.31-T2N-R64W - Land JG 31-17D - Wellbore #1 - Plan #1 (11-05-12) **Offset Site Error:** 0.0 ft

Survey Program: 0-MWD **Offset Well Error:** 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
1,200.0	1,184.9	1,200.5	1,196.1	3.7	2.8	-138.22	74.7	28.7	87.6	82.0	5.63	15.549	
1,300.0	1,279.7	1,301.9	1,294.9	4.3	3.2	-138.84	95.0	39.2	97.7	91.4	6.32	15.471	
1,400.0	1,373.4	1,403.8	1,393.3	4.9	3.6	-139.40	118.5	51.3	107.7	100.6	7.06	15.250	
1,500.0	1,465.8	1,506.0	1,490.9	5.6	4.1	-139.93	145.2	65.0	117.5	109.6	7.87	14.923	
1,600.0	1,556.9	1,608.5	1,587.8	6.4	4.7	-140.44	175.1	80.4	127.1	118.3	8.75	14.523	
1,700.0	1,646.5	1,711.4	1,683.7	7.2	5.4	-140.95	208.2	97.5	136.4	126.8	9.69	14.077	
1,800.0	1,734.5	1,814.6	1,778.6	8.1	6.1	-141.45	244.5	116.1	145.6	134.9	10.70	13.605	
1,846.5	1,774.8	1,862.6	1,822.1	8.5	6.5	-141.68	262.3	125.3	149.7	138.5	11.19	13.384	
1,900.0	1,821.0	1,915.8	1,870.3	9.0	6.9	-142.30	282.4	135.7	154.6	142.8	11.75	13.149	
2,000.0	1,907.4	2,015.4	1,960.4	10.0	7.6	-143.35	320.0	155.1	163.6	150.8	12.81	12.770	
2,100.0	1,993.8	2,114.9	2,050.5	11.0	8.4	-144.28	357.7	174.4	172.7	158.9	13.87	12.454	
2,200.0	2,080.2	2,214.5	2,140.6	11.9	9.2	-145.13	395.3	193.8	181.9	167.0	14.92	12.189	
2,300.0	2,166.6	2,314.0	2,230.7	12.9	10.0	-145.89	432.9	213.2	191.1	175.1	15.97	11.963	
2,400.0	2,253.0	2,413.6	2,320.8	13.9	10.8	-146.59	470.5	232.5	200.3	183.3	17.02	11.771	
2,500.0	2,339.4	2,513.1	2,411.0	14.8	11.6	-147.22	508.1	251.9	209.6	191.5	18.06	11.605	
2,600.0	2,425.7	2,612.7	2,501.1	15.8	12.4	-147.80	545.7	271.3	218.8	199.7	19.10	11.460	
2,700.0	2,512.1	2,712.2	2,591.2	16.8	13.2	-148.33	583.3	290.7	228.1	208.0	20.13	11.333	
2,800.0	2,598.5	2,811.7	2,681.3	17.8	14.1	-148.82	621.0	310.0	237.4	216.3	21.16	11.222	
2,900.0	2,684.9	2,911.3	2,771.4	18.8	14.9	-149.27	658.6	329.4	246.8	224.6	22.18	11.123	
3,000.0	2,771.3	3,010.8	2,861.5	19.7	15.7	-149.69	696.2	348.8	256.1	232.9	23.21	11.035	
3,100.0	2,857.7	3,110.4	2,951.6	20.7	16.5	-150.08	733.8	368.1	265.5	241.2	24.23	10.956	
3,200.0	2,944.1	3,209.9	3,041.7	21.7	17.3	-150.45	771.4	387.5	274.8	249.6	25.25	10.885	
3,300.0	3,030.4	3,309.5	3,131.8	22.7	18.1	-150.79	809.0	406.9	284.2	257.9	26.26	10.821	
3,400.0	3,116.8	3,409.0	3,221.9	23.7	19.0	-151.10	846.6	426.3	293.6	266.3	27.28	10.763	
3,500.0	3,203.2	3,508.6	3,312.0	24.7	19.8	-151.40	884.3	445.6	303.0	274.7	28.29	10.710	
3,600.0	3,289.6	3,608.1	3,402.1	25.7	20.6	-151.68	921.9	465.0	312.4	283.1	29.30	10.662	
3,700.0	3,376.0	3,707.7	3,492.2	26.7	21.4	-151.95	959.5	484.4	321.8	291.5	30.31	10.617	
3,800.0	3,462.4	3,807.2	3,582.3	27.6	22.3	-152.20	997.1	503.7	331.2	299.9	31.31	10.576	
3,900.0	3,548.8	3,906.7	3,672.5	28.6	23.1	-152.43	1,034.7	523.1	340.6	308.3	32.32	10.539	
4,000.0	3,635.2	4,006.3	3,762.6	29.6	23.9	-152.65	1,072.3	542.5	350.0	316.7	33.33	10.504	
4,100.0	3,721.5	4,105.8	3,852.7	30.6	24.7	-152.86	1,109.9	561.8	359.5	325.1	34.33	10.472	
4,200.0	3,807.9	4,205.4	3,942.8	31.6	25.6	-153.06	1,147.6	581.2	368.9	333.6	35.33	10.441	
4,300.0	3,894.3	4,304.9	4,032.9	32.6	26.4	-153.26	1,185.2	600.6	378.3	342.0	36.33	10.414	
4,400.0	3,980.7	4,404.5	4,123.0	33.6	27.2	-153.44	1,222.8	620.0	387.8	350.5	37.33	10.387	
4,500.0	4,067.1	4,504.0	4,213.1	34.6	28.0	-153.61	1,260.4	639.3	397.2	358.9	38.33	10.363	
4,600.0	4,153.5	4,603.6	4,303.2	35.6	28.9	-153.77	1,298.0	658.7	406.7	367.4	39.33	10.340	
4,700.0	4,239.9	4,703.1	4,393.3	36.5	29.7	-153.93	1,335.6	678.1	416.1	375.8	40.33	10.319	
4,800.0	4,326.2	4,802.7	4,483.4	37.5	30.5	-154.08	1,373.2	697.4	425.6	384.3	41.33	10.298	
4,900.0	4,412.6	4,902.2	4,573.5	38.5	31.3	-154.22	1,410.8	716.8	435.1	392.7	42.32	10.279	
5,000.0	4,499.0	5,001.8	4,663.6	39.5	32.2	-154.36	1,448.5	736.2	444.5	401.2	43.32	10.261	
5,100.0	4,585.4	5,101.3	4,753.7	40.5	33.0	-154.49	1,486.1	755.5	454.0	409.7	44.32	10.244	SF
5,200.0	4,671.8	5,192.4	4,836.5	41.5	33.7	-154.64	1,520.0	773.0	464.1	418.8	45.22	10.263	
5,300.0	4,758.2	5,279.1	4,916.3	42.5	34.2	-154.93	1,550.2	788.6	476.7	430.7	45.94	10.375	
5,400.0	4,844.6	5,365.1	4,996.3	43.5	34.7	-155.35	1,578.1	802.9	491.9	445.3	46.55	10.568	
5,500.0	4,930.9	5,450.2	5,076.5	44.5	35.1	-155.88	1,603.6	816.0	509.8	462.7	47.04	10.836	
5,600.0	5,017.3	5,534.3	5,156.5	45.5	35.6	-156.50	1,626.6	827.9	530.3	482.8	47.45	11.176	
5,700.0	5,103.7	5,617.3	5,236.1	46.5	35.9	-157.18	1,647.3	838.6	553.4	505.6	47.77	11.584	
5,800.0	5,190.1	5,700.0	5,316.1	47.4	36.3	-157.92	1,665.9	848.2	579.1	531.1	48.03	12.058	
5,900.0	5,276.5	5,779.5	5,393.5	48.4	36.6	-158.68	1,681.8	856.3	607.4	559.2	48.24	12.592	
5,993.1	5,356.9	5,853.0	5,465.6	49.4	36.8	-159.40	1,694.8	863.1	636.1	587.7	48.40	13.143	
6,000.0	5,362.9	5,858.4	5,470.9	49.4	36.9	-159.47	1,695.7	863.5	638.3	589.9	48.40	13.187	
6,100.0	5,450.3	5,936.4	5,547.8	50.2	37.1	-160.43	1,707.6	869.6	669.9	621.4	48.44	13.830	

Company:	Great Western	**Local Co-ordinate Reference:**	Well Land JG 31-13D
Project:	SEC.31-T2N-R64W	**TVD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Reference Site:	Land JG (East) Pad Sec.31-T2N-R64W	**MD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Land JG 31-13D	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #1 (11-05-12)	**Offset TVD Reference:**	Offset Datum

Offset Design Land JG (East) Pad Sec.31-T2N-R64W - Land JG 31-17D - Wellbore #1 - Plan #1 (11-05-12)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
6,200.0	5,539.3	6,013.9	5,624.4	50.9	37.3	-161.29	1,717.5	874.8	700.8	652.4	48.47	14.458	
6,300.0	5,629.8	6,100.0	5,709.9	51.5	37.5	-162.15	1,726.4	879.3	731.2	682.7	48.47	15.085	
6,400.0	5,721.8	6,167.5	5,777.1	52.2	37.6	-162.80	1,731.8	882.1	760.8	712.3	48.50	15.686	
6,500.0	5,815.1	6,243.6	5,853.1	52.7	37.8	-163.46	1,736.2	884.3	789.6	741.2	48.47	16.291	
6,600.0	5,909.5	6,319.3	5,928.7	53.3	37.9	-164.06	1,738.7	885.7	817.8	769.4	48.41	16.893	
6,700.0	6,005.1	6,395.7	6,005.1	53.7	37.9	-164.63	1,739.5	886.1	845.1	796.8	48.30	17.497	
6,800.0	6,101.7	6,492.2	6,101.7	54.2	38.0	-165.22	1,739.5	886.1	870.3	822.2	48.15	18.076	
6,900.0	6,199.0	6,589.6	6,199.0	54.5	38.1	-165.70	1,739.5	886.1	892.3	844.3	48.01	18.588	
7,000.0	6,297.2	6,687.7	6,297.2	54.9	38.1	-166.09	1,739.5	886.1	911.0	863.2	47.86	19.035	
7,100.0	6,395.9	6,786.5	6,395.9	55.2	38.2	-166.40	1,739.5	886.1	926.4	878.7	47.71	19.420	
7,200.0	6,495.1	6,885.7	6,495.1	55.4	38.3	-166.63	1,739.5	886.1	938.5	890.9	47.53	19.743	
7,300.0	6,594.7	6,985.3	6,594.7	55.6	38.4	-166.80	1,739.5	886.1	947.1	899.8	47.34	20.005	
7,400.0	6,694.6	7,085.1	6,694.6	55.7	38.4	-166.90	1,739.5	886.1	952.4	905.3	47.14	20.206	
7,505.5	6,800.0	7,190.6	6,800.0	55.8	38.5	-135.43	1,739.5	886.1	954.3	907.4	46.89	20.350	
7,600.0	6,894.5	7,285.1	6,894.5	55.8	38.6	-135.43	1,739.5	886.1	954.3	907.2	47.13	20.249	
7,700.0	6,994.5	7,385.1	6,994.5	55.9	38.7	-135.43	1,739.5	886.1	954.3	906.9	47.38	20.140	
7,800.0	7,094.5	7,485.1	7,094.5	55.9	38.8	-135.43	1,739.5	886.1	954.3	906.7	47.64	20.031	
7,900.0	7,194.5	7,585.1	7,194.5	56.0	38.8	-135.43	1,739.5	886.1	954.3	906.4	47.90	19.921	
8,000.0	7,294.5	7,685.1	7,294.5	56.1	38.9	-135.43	1,739.5	886.1	954.3	906.1	48.17	19.812	
8,079.5	7,374.0	7,764.6	7,374.0	56.1	39.0	-135.43	1,739.5	886.1	954.3	905.9	48.38	19.725	

Company:	Great Western	**Local Co-ordinate Reference:**	Well Land JG 31-13D
Project:	SEC.31-T2N-R64W	**TVD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Reference Site:	Land JG (East) Pad Sec.31-T2N-R64W	**MD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Land JG 31-13D	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #1 (11-05-12)	**Offset TVD Reference:**	Offset Datum

Offset Design Land JG (East) Pad Sec.31-T2N-R64W - Land JG 31-20D - Wellbore #1 - Plan #1 (11-05-12) **Offset Site Error:** 0.0 ft

Survey Program: 0-MWD **Offset Well Error:** 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	180.00	-20.4	0.0	20.4				
100.0	100.0	100.0	100.0	0.1	0.1	180.00	-20.4	0.0	20.4	20.2	0.22	90.744	
200.0	200.0	200.0	200.0	0.3	0.3	180.00	-20.4	0.0	20.4	19.7	0.67	30.248	CC
227.7	227.7	227.7	227.7	0.4	0.4	90.37	-20.4	0.0	20.4	19.6	0.80	25.630	
300.0	300.0	300.0	300.0	0.6	0.6	94.89	-20.4	0.0	20.5	19.4	1.11	18.380	ES
400.0	399.8	399.8	399.8	0.8	0.8	108.85	-20.4	0.0	21.6	20.0	1.56	13.799	
450.0	449.7	450.0	450.0	0.9	0.9	117.62	-20.1	0.4	22.7	20.9	1.79	12.675	
500.0	499.5	500.3	500.3	1.0	1.0	134.96	-19.4	1.4	24.2	22.2	2.03	11.965	
600.0	598.9	601.0	600.9	1.3	1.2	158.89	-16.3	5.7	28.1	25.7	2.48	11.341	
700.0	698.0	702.0	701.4	1.6	1.5	172.10	-11.1	12.9	32.2	29.3	2.93	10.980	
800.0	796.7	803.1	801.8	1.9	1.7	178.42	-3.9	23.0	36.0	32.6	3.39	10.604	
900.0	894.9	904.3	901.7	2.3	2.1	-179.86	5.4	36.0	39.4	35.6	3.87	10.181	
1,000.0	992.4	1,005.7	1,001.2	2.7	2.4	178.58	16.8	51.8	42.8	38.4	4.39	9.747	
1,100.0	1,089.1	1,107.0	1,099.8	3.2	2.8	174.61	30.2	70.6	46.4	41.5	4.98	9.330	
1,200.0	1,184.9	1,208.3	1,197.6	3.7	3.3	168.97	45.6	92.1	50.8	45.2	5.69	8.937	
1,300.0	1,279.7	1,309.5	1,294.3	4.3	3.9	162.40	63.0	116.4	56.5	49.9	6.59	8.575	
1,400.0	1,373.4	1,410.5	1,389.7	4.9	4.5	155.58	82.3	143.4	63.9	56.1	7.72	8.272	
1,500.0	1,465.8	1,511.3	1,483.7	5.6	5.2	149.04	103.6	173.0	73.2	64.1	9.07	8.065	
1,600.0	1,556.9	1,611.0	1,575.5	6.4	5.9	143.46	126.2	204.6	84.9	74.3	10.59	8.016	SF
1,700.0	1,646.5	1,709.6	1,666.2	7.2	6.7	140.14	148.8	236.1	100.1	88.1	12.08	8.288	
1,800.0	1,734.5	1,807.8	1,756.5	8.1	7.4	138.62	171.3	267.5	118.7	105.1	13.52	8.774	
1,846.5	1,774.8	1,853.3	1,798.3	8.5	7.8	138.36	181.7	282.0	128.3	114.1	14.18	9.050	
1,900.0	1,821.0	1,905.6	1,846.3	9.0	8.2	138.05	193.6	298.7	139.7	124.8	14.95	9.349	
2,000.0	1,907.4	2,003.3	1,936.2	10.0	8.9	137.58	216.0	329.9	161.1	144.7	16.39	9.829	
2,100.0	1,993.8	2,100.9	2,026.0	11.0	9.7	137.23	238.4	361.1	182.5	164.7	17.85	10.227	
2,200.0	2,080.2	2,198.6	2,115.8	11.9	10.5	136.94	260.7	392.3	204.0	184.7	19.31	10.563	
2,300.0	2,166.6	2,296.3	2,205.6	12.9	11.3	136.72	283.1	423.5	225.4	204.6	20.77	10.850	
2,400.0	2,253.0	2,394.0	2,295.4	13.9	12.0	136.53	305.4	454.7	246.8	224.6	22.24	11.098	
2,500.0	2,339.4	2,491.6	2,385.2	14.8	12.8	136.37	327.8	485.9	268.2	244.5	23.71	11.313	
2,600.0	2,425.7	2,589.3	2,475.0	15.8	13.6	136.24	350.2	517.1	289.7	264.5	25.18	11.503	
2,700.0	2,512.1	2,687.0	2,564.9	16.8	14.4	136.12	372.5	548.3	311.1	284.4	26.66	11.670	
2,800.0	2,598.5	2,784.7	2,654.7	17.8	15.2	136.02	394.9	579.5	332.5	304.4	28.13	11.820	
2,900.0	2,684.9	2,882.3	2,744.5	18.8	15.9	135.93	417.2	610.8	353.9	324.3	29.61	11.953	
3,000.0	2,771.3	2,980.0	2,834.3	19.7	16.7	135.85	439.6	642.0	375.4	344.3	31.09	12.074	
3,100.0	2,857.7	3,077.7	2,924.1	20.7	17.5	135.78	461.9	673.2	396.8	364.2	32.57	12.184	
3,200.0	2,944.1	3,175.4	3,013.9	21.7	18.3	135.72	484.3	704.4	418.2	384.2	34.05	12.283	
3,300.0	3,030.4	3,273.0	3,103.8	22.7	19.1	135.66	506.7	735.6	439.7	404.1	35.53	12.374	
3,400.0	3,116.8	3,370.7	3,193.6	23.7	19.9	135.61	529.0	766.8	461.1	424.1	37.01	12.457	
3,500.0	3,203.2	3,468.4	3,283.4	24.7	20.7	135.56	551.4	798.0	482.5	444.0	38.50	12.534	
3,600.0	3,289.6	3,566.1	3,373.2	25.7	21.4	135.52	573.7	829.2	504.0	464.0	39.98	12.605	
3,700.0	3,376.0	3,663.7	3,463.0	26.7	22.2	135.48	596.1	860.4	525.4	483.9	41.46	12.671	
3,800.0	3,462.4	3,761.4	3,552.8	27.6	23.0	135.44	618.5	891.6	546.8	503.9	42.95	12.732	
3,900.0	3,548.8	3,859.1	3,642.7	28.6	23.8	135.41	640.8	922.8	568.3	523.8	44.44	12.788	
4,000.0	3,635.2	3,956.8	3,732.5	29.6	24.6	135.38	663.2	954.0	589.7	543.8	45.92	12.841	
4,100.0	3,721.5	4,054.4	3,822.3	30.6	25.4	135.35	685.5	985.2	611.1	563.7	47.41	12.891	
4,200.0	3,807.9	4,152.1	3,912.1	31.6	26.2	135.32	707.9	1,016.4	632.6	583.7	48.89	12.937	
4,300.0	3,894.3	4,249.8	4,001.9	32.6	26.9	135.30	730.3	1,047.6	654.0	603.6	50.38	12.981	
4,400.0	3,980.7	4,347.5	4,091.7	33.6	27.7	135.27	752.6	1,078.8	675.4	623.6	51.87	13.022	
4,500.0	4,067.1	4,445.2	4,181.6	34.6	28.5	135.25	775.0	1,110.0	696.9	643.5	53.35	13.061	
4,600.0	4,153.5	4,542.8	4,271.4	35.6	29.3	135.23	797.3	1,141.2	718.3	663.4	54.84	13.097	
4,700.0	4,239.9	4,640.5	4,361.2	36.5	30.1	135.21	819.7	1,172.4	739.7	683.4	56.33	13.132	
4,800.0	4,326.2	4,738.2	4,451.0	37.5	30.9	135.19	842.1	1,203.6	761.2	703.3	57.82	13.165	

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

Company:	Great Western	**Local Co-ordinate Reference:**	Well Land JG 31-13D
Project:	SEC.31-T2N-R64W	**TVD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Reference Site:	Land JG (East) Pad Sec.31-T2N-R64W	**MD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Land JG 31-13D	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #1 (11-05-12)	**Offset TVD Reference:**	Offset Datum

Offset Design Land JG (East) Pad Sec.31-T2N-R64W - Land JG 31-20D - Wellbore #1 - Plan #1 (11-05-12)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
4,900.0	4,412.6	4,835.9	4,540.8	38.5	31.7	135.17	864.4	1,234.8	782.6	723.3	59.31	13.196	
5,000.0	4,499.0	4,933.5	4,630.6	39.5	32.5	135.16	886.8	1,266.0	804.0	743.2	60.79	13.225	
5,100.0	4,585.4	5,031.2	4,720.5	40.5	33.2	135.14	909.1	1,297.2	825.5	763.2	62.28	13.253	
5,200.0	4,671.8	5,128.9	4,810.3	41.5	34.0	135.13	931.5	1,328.4	846.9	783.1	63.77	13.280	
5,300.0	4,758.2	5,223.4	4,897.2	42.5	34.8	135.12	953.1	1,358.6	868.4	803.2	65.19	13.321	
5,400.0	4,844.6	5,309.8	4,977.4	43.5	35.3	135.23	971.7	1,384.6	890.8	824.4	66.37	13.422	
5,500.0	4,930.9	5,400.0	5,062.2	44.5	35.8	135.50	989.7	1,409.7	914.4	847.0	67.43	13.561	
5,600.0	5,017.3	5,480.4	5,138.5	45.5	36.2	135.87	1,004.4	1,430.2	939.3	871.0	68.34	13.744	
5,700.0	5,103.7	5,564.4	5,219.0	46.5	36.6	136.38	1,018.4	1,449.8	965.5	896.3	69.15	13.962	
5,800.0	5,190.1	5,647.3	5,299.1	47.4	37.0	136.98	1,030.9	1,467.2	993.0	923.2	69.84	14.218	
5,900.0	5,276.5	5,729.0	5,378.6	48.4	37.3	137.67	1,041.9	1,482.6	1,021.9	951.5	70.43	14.510	
5,993.1	5,356.9	5,800.0	5,448.1	49.4	37.6	138.33	1,050.4	1,494.4	1,050.1	979.2	70.90	14.812	
6,000.0	5,362.9	5,809.4	5,457.3	49.4	37.6	138.46	1,051.4	1,495.8	1,052.2	981.3	70.90	14.841	
6,100.0	5,450.3	5,889.0	5,535.7	50.2	37.8	139.64	1,059.6	1,507.2	1,082.6	1,011.6	71.08	15.230	
6,200.0	5,539.3	5,968.3	5,614.1	50.9	38.0	140.75	1,066.4	1,516.8	1,112.0	1,040.8	71.21	15.617	
6,300.0	5,629.8	6,047.2	5,692.4	51.5	38.2	141.80	1,072.0	1,524.5	1,140.3	1,069.1	71.27	16.000	
6,400.0	5,721.8	6,125.8	5,770.7	52.2	38.4	142.80	1,076.3	1,530.5	1,167.5	1,096.3	71.27	16.382	
6,500.0	5,815.1	6,200.0	5,844.7	52.7	38.5	143.73	1,079.2	1,534.6	1,193.7	1,122.4	71.23	16.759	
6,600.0	5,909.5	6,282.0	5,926.6	53.3	38.6	144.67	1,081.1	1,537.2	1,218.6	1,147.6	71.07	17.148	
6,700.0	6,005.1	6,360.5	6,005.1	53.7	38.7	145.54	1,081.6	1,538.0	1,242.5	1,171.6	70.86	17.535	
6,800.0	6,101.7	6,457.1	6,101.7	54.2	38.7	146.45	1,081.6	1,538.0	1,264.3	1,193.7	70.55	17.920	
6,900.0	6,199.0	6,554.5	6,199.0	54.5	38.8	147.22	1,081.6	1,538.0	1,283.4	1,213.1	70.29	18.259	
7,000.0	6,297.2	6,652.6	6,297.2	54.9	38.9	147.85	1,081.6	1,538.0	1,299.8	1,229.7	70.06	18.552	
7,100.0	6,395.9	6,751.3	6,395.9	55.2	39.0	148.36	1,081.6	1,538.0	1,313.3	1,243.4	69.86	18.797	
7,200.0	6,495.1	6,850.5	6,495.1	55.4	39.0	148.75	1,081.6	1,538.0	1,323.8	1,254.1	69.70	18.994	
7,300.0	6,594.7	6,950.1	6,594.7	55.6	39.1	149.03	1,081.6	1,538.0	1,331.5	1,261.9	69.56	19.142	
7,400.0	6,694.6	7,050.0	6,694.6	55.7	39.2	149.20	1,081.6	1,538.0	1,336.1	1,266.7	69.45	19.239	
7,505.5	6,800.0	7,155.4	6,800.0	55.8	39.3	-179.24	1,081.6	1,538.0	1,337.8	1,268.4	69.36	19.287	
7,600.0	6,894.5	7,250.0	6,894.5	55.8	39.3	-179.24	1,081.6	1,538.0	1,337.8	1,268.3	69.53	19.241	
7,700.0	6,994.5	7,350.0	6,994.5	55.9	39.4	-179.24	1,081.6	1,538.0	1,337.8	1,268.1	69.71	19.191	
7,800.0	7,094.5	7,450.0	7,094.5	55.9	39.5	-179.24	1,081.6	1,538.0	1,337.8	1,267.9	69.90	19.140	
7,900.0	7,194.5	7,550.0	7,194.5	56.0	39.6	-179.24	1,081.6	1,538.0	1,337.8	1,267.7	70.08	19.088	
8,000.0	7,294.5	7,650.0	7,294.5	56.1	39.7	-179.24	1,081.6	1,538.0	1,337.8	1,267.5	70.28	19.037	
8,079.5	7,374.0	7,729.4	7,374.0	56.1	39.8	-179.24	1,081.6	1,538.0	1,337.8	1,267.4	70.43	18.995	

Company:	Great Western	**Local Co-ordinate Reference:**	Well Land JG 31-13D
Project:	SEC.31-T2N-R64W	**TVD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Reference Site:	Land JG (East) Pad Sec.31-T2N-R64W	**MD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Land JG 31-13D	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #1 (11-05-12)	**Offset TVD Reference:**	Offset Datum

Offset Design Land JG (West) Pad Sec.31-T2N-R64W - Land JG 31-18D - Wellbore #1 - Plan #1 (11-07-12) **Offset Site Error:** 0.0 ft

Survey Program: 0-MWD **Offset Well Error:** 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	-90.00	0.0	-20.1	20.1				
100.0	100.0	100.0	100.0	0.1	0.1	-90.00	0.0	-20.1	20.1	19.9	0.22	89.630	
200.0	200.0	200.0	200.0	0.3	0.3	-90.00	0.0	-20.1	20.1	19.5	0.67	29.877	CC, ES
300.0	300.0	300.0	300.0	0.6	0.6	-180.00	0.0	-20.1	21.9	20.8	1.12	19.547	
400.0	399.8	399.8	399.8	0.8	0.8	-180.00	0.0	-20.1	27.1	25.6	1.57	17.297	SF
450.0	449.7	449.7	449.7	0.9	0.9	-180.00	0.0	-20.1	31.0	29.3	1.79	17.303	
500.0	499.5	499.5	499.5	1.0	1.0	-170.95	0.0	-20.1	35.6	33.6	2.02	17.637	
600.0	598.9	598.9	598.9	1.3	1.2	-160.39	0.0	-20.1	45.8	43.3	2.47	18.559	
700.0	698.0	698.0	697.9	1.6	1.5	-154.69	1.6	-20.5	58.1	55.1	2.92	19.856	
800.0	796.7	796.8	796.7	1.9	1.7	-150.28	6.6	-21.4	72.4	69.0	3.39	21.364	
900.0	894.9	895.5	895.0	2.3	1.9	-146.69	15.0	-23.0	88.7	84.8	3.88	22.871	
1,000.0	992.4	993.9	992.6	2.7	2.2	-143.63	26.5	-25.2	106.9	102.5	4.41	24.231	
1,100.0	1,089.1	1,091.9	1,089.5	3.2	2.4	-140.97	41.4	-28.1	127.0	122.0	5.01	25.349	
1,200.0	1,184.9	1,189.5	1,185.4	3.7	2.8	-138.61	59.4	-31.5	148.9	143.3	5.69	26.182	
1,300.0	1,279.7	1,286.7	1,280.2	4.3	3.1	-136.48	80.5	-35.6	172.7	166.2	6.46	26.725	
1,400.0	1,373.4	1,383.5	1,373.7	4.9	3.5	-134.54	104.6	-40.2	198.2	190.9	7.34	27.010	
1,500.0	1,465.8	1,479.7	1,465.9	5.6	4.0	-132.77	131.6	-45.4	225.5	217.2	8.33	27.084	
1,600.0	1,556.9	1,575.4	1,556.6	6.4	4.5	-131.12	161.5	-51.1	254.5	245.1	9.43	26.997	
1,700.0	1,646.5	1,670.5	1,645.7	7.2	5.1	-129.59	194.2	-57.4	285.3	274.6	10.64	26.799	
1,800.0	1,734.5	1,765.1	1,733.4	8.1	5.7	-128.23	229.1	-64.1	317.7	305.7	11.96	26.560	
1,846.5	1,774.8	1,808.9	1,773.9	8.5	6.0	-127.79	245.4	-67.2	333.3	320.7	12.59	26.473	
1,900.0	1,821.0	1,859.2	1,820.5	9.0	6.4	-127.97	264.1	-70.8	351.4	338.1	13.31	26.397	
2,000.0	1,907.4	1,953.2	1,907.5	10.0	7.0	-128.26	299.1	-77.5	385.4	370.7	14.68	26.252	
2,100.0	1,993.8	2,047.3	1,994.5	11.0	7.7	-128.50	334.2	-84.2	419.3	403.2	16.06	26.107	
2,200.0	2,080.2	2,141.3	2,081.5	11.9	8.4	-128.71	369.2	-90.9	453.2	435.8	17.45	25.967	
2,300.0	2,166.6	2,235.4	2,168.6	12.9	9.0	-128.88	404.2	-97.6	487.2	468.3	18.86	25.834	
2,400.0	2,253.0	2,329.4	2,255.6	13.9	9.7	-129.04	439.2	-104.4	521.2	500.9	20.27	25.711	
2,500.0	2,339.4	2,423.5	2,342.6	14.8	10.4	-129.17	474.3	-111.1	555.1	533.4	21.69	25.597	
2,600.0	2,425.7	2,517.5	2,429.7	15.8	11.1	-129.29	509.3	-117.8	589.1	566.0	23.11	25.492	
2,700.0	2,512.1	2,611.6	2,516.7	16.8	11.8	-129.40	544.3	-124.5	623.0	598.5	24.53	25.394	
2,800.0	2,598.5	2,705.6	2,603.7	17.8	12.5	-129.50	579.3	-131.2	657.0	631.0	25.96	25.305	
2,900.0	2,684.9	2,799.7	2,690.7	18.8	13.2	-129.58	614.4	-137.9	691.0	663.6	27.40	25.222	
3,000.0	2,771.3	2,893.7	2,777.8	19.7	13.9	-129.66	649.4	-144.6	724.9	696.1	28.83	25.145	
3,100.0	2,857.7	2,987.8	2,864.8	20.7	14.5	-129.73	684.4	-151.4	758.9	728.6	30.27	25.073	
3,200.0	2,944.1	3,081.8	2,951.8	21.7	15.2	-129.80	719.4	-158.1	792.9	761.2	31.71	25.007	
3,300.0	3,030.4	3,175.9	3,038.8	22.7	15.9	-129.86	754.4	-164.8	826.8	793.7	33.15	24.946	
3,400.0	3,116.8	3,269.9	3,125.9	23.7	16.6	-129.91	789.5	-171.5	860.8	826.2	34.59	24.889	
3,500.0	3,203.2	3,364.0	3,212.9	24.7	17.3	-129.96	824.5	-178.2	894.8	858.8	36.03	24.835	
3,600.0	3,289.6	3,458.0	3,299.9	25.7	18.0	-130.01	859.5	-184.9	928.8	891.3	37.47	24.785	
3,700.0	3,376.0	3,552.1	3,386.9	26.7	18.7	-130.05	894.5	-191.6	962.7	923.8	38.92	24.738	
3,800.0	3,462.4	3,646.1	3,474.0	27.6	19.4	-130.09	929.6	-198.4	996.7	956.4	40.36	24.694	
3,900.0	3,548.8	3,740.2	3,561.0	28.6	20.1	-130.13	964.6	-205.1	1,030.7	988.9	41.81	24.652	
4,000.0	3,635.2	3,834.2	3,648.0	29.6	20.8	-130.17	999.6	-211.8	1,064.7	1,021.4	43.26	24.613	
4,100.0	3,721.5	3,928.3	3,735.0	30.6	21.5	-130.20	1,034.6	-218.5	1,098.6	1,053.9	44.70	24.576	
4,200.0	3,807.9	4,022.3	3,822.1	31.6	22.2	-130.23	1,069.7	-225.2	1,132.6	1,086.5	46.15	24.541	
4,300.0	3,894.3	4,116.4	3,909.1	32.6	22.9	-130.26	1,104.7	-231.9	1,166.6	1,119.0	47.60	24.508	
4,400.0	3,980.7	4,210.4	3,996.1	33.6	23.6	-130.29	1,139.7	-238.6	1,200.6	1,151.5	49.05	24.477	
4,500.0	4,067.1	4,304.5	4,083.2	34.6	24.3	-130.32	1,174.7	-245.4	1,234.5	1,184.0	50.50	24.447	
4,600.0	4,153.5	4,398.5	4,170.2	35.6	25.0	-130.34	1,209.8	-252.1	1,268.5	1,216.6	51.95	24.419	
4,700.0	4,239.9	4,492.6	4,257.2	36.5	25.7	-130.37	1,244.8	-258.8	1,302.5	1,249.1	53.40	24.392	
4,800.0	4,326.2	4,586.6	4,344.2	37.5	26.4	-130.39	1,279.8	-265.5	1,336.5	1,281.6	54.85	24.366	
4,900.0	4,412.6	4,680.7	4,431.3	38.5	27.1	-130.41	1,314.8	-272.2	1,370.4	1,314.1	56.30	24.342	

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

Company:	Great Western	**Local Co-ordinate Reference:**	Well Land JG 31-13D
Project:	SEC.31-T2N-R64W	**TVD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Reference Site:	Land JG (East) Pad Sec.31-T2N-R64W	**MD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Land JG 31-13D	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #1 (11-05-12)	**Offset TVD Reference:**	Offset Datum

Offset Design Land JG (West) Pad Sec.31-T2N-R64W - Land JG 31-18D - Wellbore #1 - Plan #1 (11-07-12)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,000.0	4,499.0	4,774.7	4,518.3	39.5	27.8	-130.43	1,349.9	-278.9	1,404.4	1,346.7	57.75	24.319	
5,100.0	4,585.4	4,868.8	4,605.3	40.5	28.5	-130.45	1,384.9	-285.7	1,438.4	1,379.2	59.20	24.296	
5,200.0	4,671.8	4,962.8	4,692.3	41.5	29.2	-130.47	1,419.9	-292.4	1,472.4	1,411.7	60.65	24.275	
5,300.0	4,758.2	5,056.9	4,779.4	42.5	29.9	-130.49	1,454.9	-299.1	1,506.4	1,444.3	62.11	24.254	
5,400.0	4,844.6	5,150.9	4,866.4	43.5	30.6	-130.50	1,489.9	-305.8	1,540.3	1,476.8	63.56	24.235	
5,500.0	4,930.9	5,244.1	4,952.7	44.5	31.3	-130.53	1,524.4	-312.4	1,574.3	1,509.4	64.96	24.236	
5,600.0	5,017.3	5,336.1	5,038.9	45.5	31.8	-130.65	1,556.0	-318.5	1,608.4	1,542.2	66.22	24.289	
5,700.0	5,103.7	5,427.7	5,125.6	46.5	32.3	-130.88	1,584.9	-324.0	1,642.6	1,575.3	67.36	24.388	
5,800.0	5,190.1	5,518.7	5,212.7	47.4	32.7	-131.20	1,610.8	-329.0	1,677.0	1,608.6	68.41	24.514	
5,900.0	5,276.5	5,609.0	5,299.9	48.4	33.1	-131.60	1,633.8	-333.4	1,711.6	1,642.3	69.38	24.669	
5,993.1	5,356.9	5,692.2	5,380.9	49.4	33.4	-132.05	1,652.6	-337.0	1,744.1	1,673.9	70.21	24.840	
6,000.0	5,362.9	5,700.0	5,388.5	49.4	33.4	-132.14	1,654.3	-337.3	1,746.5	1,676.2	70.27	24.854	
6,100.0	5,450.3	5,787.3	5,474.1	50.2	33.7	-133.17	1,671.3	-340.6	1,780.4	1,709.5	70.92	25.105	
6,200.0	5,539.3	5,876.4	5,561.9	50.9	34.0	-134.15	1,686.0	-343.4	1,812.4	1,740.9	71.49	25.351	
6,300.0	5,629.8	5,965.5	5,650.2	51.5	34.2	-135.10	1,698.1	-345.7	1,842.5	1,770.5	71.99	25.595	
6,400.0	5,721.8	6,054.6	5,738.7	52.2	34.4	-136.00	1,707.4	-347.5	1,870.7	1,798.3	72.40	25.839	
6,500.0	5,815.1	6,143.5	5,827.4	52.7	34.6	-136.86	1,714.0	-348.8	1,896.8	1,824.1	72.72	26.084	
6,600.0	5,909.5	6,232.3	5,916.1	53.3	34.7	-137.69	1,717.9	-349.5	1,921.0	1,848.0	72.95	26.334	
6,700.0	6,005.1	6,321.3	6,005.1	53.7	34.8	-138.49	1,719.1	-349.7	1,943.1	1,870.1	73.09	26.587	
6,800.0	6,101.7	6,417.9	6,101.7	54.2	34.9	-139.25	1,719.1	-349.7	1,963.1	1,889.9	73.16	26.834	
6,900.0	6,199.0	6,515.3	6,199.0	54.5	34.9	-139.90	1,719.1	-349.7	1,980.5	1,907.3	73.22	27.050	
7,000.0	6,297.2	6,613.4	6,297.2	54.9	35.0	-140.45	1,719.1	-349.7	1,995.4	1,922.2	73.27	27.235	
7,100.0	6,395.9	6,712.1	6,395.9	55.2	35.1	-140.89	1,719.1	-349.7	2,007.7	1,934.4	73.31	27.387	
7,200.0	6,495.1	6,811.3	6,495.1	55.4	35.2	-141.24	1,719.1	-349.7	2,017.4	1,944.1	73.34	27.507	
7,300.0	6,594.7	6,910.9	6,594.7	55.6	35.3	-141.48	1,719.1	-349.7	2,024.4	1,951.0	73.37	27.593	
7,400.0	6,694.6	7,010.8	6,694.6	55.7	35.4	-141.63	1,719.1	-349.7	2,028.6	1,955.2	73.39	27.643	
7,505.5	6,800.0	7,116.2	6,800.0	55.8	35.4	-110.18	1,719.1	-349.7	2,030.1	1,956.7	73.40	27.658	
7,600.0	6,894.5	7,210.8	6,894.5	55.8	35.5	-110.18	1,719.1	-349.7	2,030.1	1,956.6	73.55	27.601	
7,700.0	6,994.5	7,310.8	6,994.5	55.9	35.6	-110.18	1,719.1	-349.7	2,030.1	1,956.4	73.72	27.539	
7,800.0	7,094.5	7,410.8	7,094.5	55.9	35.7	-110.18	1,719.1	-349.7	2,030.1	1,956.3	73.89	27.477	
7,900.0	7,194.5	7,510.8	7,194.5	56.0	35.8	-110.18	1,719.1	-349.7	2,030.1	1,956.1	74.06	27.414	
8,000.0	7,294.5	7,610.8	7,294.5	56.1	35.9	-110.18	1,719.1	-349.7	2,030.1	1,955.9	74.23	27.350	
8,079.5	7,374.0	7,690.2	7,374.0	56.1	36.0	-110.18	1,719.1	-349.7	2,030.1	1,955.8	74.37	27.300	

Company:	Great Western	**Local Co-ordinate Reference:**	Well Land JG 31-13D
Project:	SEC.31-T2N-R64W	**TVD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Reference Site:	Land JG (East) Pad Sec.31-T2N-R64W	**MD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Land JG 31-13D	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #1 (11-05-12)	**Offset TVD Reference:**	Offset Datum

Offset Design Land JG (West) Pad Sec.31-T2N-R64W - Land JG 31-19D - Wellbore #1 - Plan #1 (11-07-12) **Offset Site Error:** 0.0 ft

Survey Program: 0-MWD **Offset Well Error:** 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	-46.76	18.9	-20.1	27.7				
100.0	100.0	100.0	100.0	0.1	0.1	-46.76	18.9	-20.1	27.7	27.4	0.22	123.044	
200.0	200.0	200.0	200.0	0.3	0.3	-46.76	18.9	-20.1	27.7	27.0	0.67	41.015	CC, ES
300.0	300.0	300.0	300.0	0.6	0.6	-139.11	18.9	-20.1	29.0	27.8	1.12	25.918	
400.0	399.8	399.8	399.8	0.8	0.8	-145.00	18.9	-20.1	33.1	31.5	1.56	21.148	
450.0	449.7	449.5	449.5	0.9	0.9	-147.86	19.4	-20.1	36.5	34.7	1.79	20.373	
500.0	499.5	499.1	499.1	1.0	1.0	-140.31	20.6	-19.8	40.6	38.6	2.02	20.126	
600.0	598.9	598.3	598.1	1.3	1.2	-129.21	25.6	-18.6	49.4	46.9	2.48	19.878	
700.0	698.0	697.4	696.8	1.6	1.5	-122.18	34.0	-16.7	58.9	55.9	2.98	19.734	
800.0	796.7	796.4	795.2	1.9	1.7	-117.61	45.7	-14.1	69.0	65.5	3.54	19.526	
900.0	894.9	895.4	893.0	2.3	2.0	-114.47	60.6	-10.7	79.9	75.7	4.16	19.188	
1,000.0	992.4	994.4	990.1	2.7	2.4	-112.20	78.9	-6.6	91.3	86.5	4.88	18.717	
1,100.0	1,089.1	1,093.3	1,086.5	3.2	2.8	-110.47	100.4	-1.7	103.4	97.7	5.70	18.141	
1,200.0	1,184.9	1,192.4	1,182.6	3.7	3.2	-109.64	124.1	3.7	115.9	109.3	6.61	17.534	
1,300.0	1,279.7	1,291.4	1,278.5	4.3	3.7	-110.44	147.9	9.1	128.9	121.3	7.57	17.021	
1,400.0	1,373.4	1,390.1	1,374.2	4.9	4.1	-112.43	171.7	14.5	142.6	134.1	8.56	16.659	
1,500.0	1,465.8	1,488.4	1,469.4	5.6	4.6	-115.21	195.3	19.9	157.6	148.0	9.56	16.490	SF
1,600.0	1,556.9	1,586.1	1,564.2	6.4	5.1	-118.49	218.9	25.2	174.2	163.7	10.53	16.539	
1,700.0	1,646.5	1,683.2	1,658.3	7.2	5.5	-122.03	242.2	30.5	193.0	181.5	11.48	16.815	
1,800.0	1,734.5	1,779.6	1,751.6	8.1	6.0	-125.63	265.4	35.8	214.3	202.0	12.38	17.317	
1,846.5	1,774.8	1,824.1	1,794.8	8.5	6.2	-127.28	276.1	38.2	225.2	212.4	12.78	17.625	
1,900.0	1,821.0	1,875.2	1,844.3	9.0	6.5	-129.56	288.4	41.0	238.2	225.0	13.21	18.028	
2,000.0	1,907.4	1,970.6	1,936.8	10.0	7.0	-133.22	311.4	46.2	263.5	249.4	14.02	18.798	
2,100.0	1,993.8	2,066.1	2,029.3	11.0	7.4	-136.25	334.3	51.4	289.5	274.7	14.80	19.560	
2,200.0	2,080.2	2,161.6	2,121.9	11.9	7.9	-138.78	357.3	56.6	316.2	300.7	15.58	20.295	
2,300.0	2,166.6	2,257.1	2,214.4	12.9	8.4	-140.92	380.3	61.8	343.4	327.1	16.36	20.995	
2,400.0	2,253.0	2,352.6	2,306.9	13.9	8.9	-142.74	403.2	67.1	371.0	353.9	17.13	21.654	
2,500.0	2,339.4	2,448.1	2,399.5	14.8	9.3	-144.32	426.2	72.3	398.9	381.0	17.91	22.272	
2,600.0	2,425.7	2,543.6	2,492.0	15.8	9.8	-145.69	449.2	77.5	427.1	408.4	18.69	22.851	
2,700.0	2,512.1	2,639.0	2,584.5	16.8	10.3	-146.89	472.2	82.7	455.4	435.9	19.47	23.391	
2,800.0	2,598.5	2,734.5	2,677.1	17.8	10.8	-147.96	495.1	87.9	483.9	463.6	20.25	23.895	
2,900.0	2,684.9	2,830.0	2,769.6	18.8	11.3	-148.90	518.1	93.1	512.5	491.5	21.03	24.367	
3,000.0	2,771.3	2,925.5	2,862.1	19.7	11.7	-149.75	541.1	98.3	541.3	519.5	21.82	24.807	
3,100.0	2,857.7	3,021.0	2,954.7	20.7	12.2	-150.51	564.1	103.5	570.1	547.5	22.61	25.219	
3,200.0	2,944.1	3,116.5	3,047.2	21.7	12.7	-151.19	587.0	108.8	599.1	575.7	23.40	25.604	
3,300.0	3,030.4	3,212.0	3,139.7	22.7	13.2	-151.82	610.0	114.0	628.1	603.9	24.19	25.966	
3,400.0	3,116.8	3,307.4	3,232.3	23.7	13.7	-152.39	633.0	119.2	657.1	632.2	24.98	26.306	
3,500.0	3,203.2	3,402.9	3,324.8	24.7	14.1	-152.91	655.9	124.4	686.3	660.5	25.78	26.625	
3,600.0	3,289.6	3,498.4	3,417.3	25.7	14.6	-153.39	678.9	129.6	715.4	688.9	26.57	26.926	
3,700.0	3,376.0	3,593.9	3,509.9	26.7	15.1	-153.83	701.9	134.8	744.7	717.3	27.37	27.210	
3,800.0	3,462.4	3,689.4	3,602.4	27.6	15.6	-154.24	724.9	140.0	773.9	745.7	28.17	27.477	
3,900.0	3,548.8	3,784.9	3,695.0	28.6	16.1	-154.62	747.8	145.2	803.2	774.2	28.96	27.730	
4,000.0	3,635.2	3,880.4	3,787.5	29.6	16.6	-154.97	770.8	150.5	832.5	802.7	29.76	27.970	
4,100.0	3,721.5	3,975.8	3,880.0	30.6	17.0	-155.30	793.8	155.7	861.8	831.3	30.57	28.197	
4,200.0	3,807.9	4,071.3	3,972.6	31.6	17.5	-155.60	816.7	160.9	891.2	859.8	31.37	28.412	
4,300.0	3,894.3	4,166.8	4,065.1	32.6	18.0	-155.89	839.7	166.1	920.6	888.4	32.17	28.617	
4,400.0	3,980.7	4,262.3	4,157.6	33.6	18.5	-156.16	862.7	171.3	950.0	917.0	32.97	28.811	
4,500.0	4,067.1	4,357.8	4,250.2	34.6	19.0	-156.41	885.7	176.5	979.4	945.7	33.78	28.996	
4,600.0	4,153.5	4,453.3	4,342.7	35.6	19.5	-156.65	908.6	181.7	1,008.9	974.3	34.58	29.173	
4,700.0	4,239.9	4,548.8	4,435.2	36.5	19.9	-156.88	931.6	186.9	1,038.3	1,002.9	35.39	29.341	
4,800.0	4,326.2	4,644.2	4,527.8	37.5	20.4	-157.09	954.6	192.2	1,067.8	1,031.6	36.19	29.502	
4,900.0	4,412.6	4,733.4	4,614.2	38.5	20.9	-157.28	976.0	197.0	1,097.4	1,060.4	36.97	29.682	

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

Company:	Great Western	**Local Co-ordinate Reference:**	Well Land JG 31-13D
Project:	SEC.31-T2N-R64W	**TVD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Reference Site:	Land JG (East) Pad Sec.31-T2N-R64W	**MD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Land JG 31-13D	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #1 (11-05-12)	**Offset TVD Reference:**	Offset Datum

Offset Design Land JG (West) Pad Sec.31-T2N-R64W - Land JG 31-19D - Wellbore #1 - Plan #1 (11-07-12)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,000.0	4,499.0	4,800.0	4,679.0	39.5	21.1	-157.46	990.8	200.4	1,128.4	1,090.7	37.64	29.975	
5,100.0	4,585.4	4,878.6	4,755.9	40.5	21.4	-157.73	1,006.3	203.9	1,161.2	1,122.9	38.26	30.350	
5,200.0	4,671.8	4,949.4	4,825.7	41.5	21.6	-158.02	1,018.6	206.7	1,195.9	1,157.1	38.83	30.800	
5,300.0	4,758.2	5,019.1	4,894.5	42.5	21.8	-158.34	1,029.1	209.1	1,232.4	1,193.1	39.36	31.314	
5,400.0	4,844.6	5,100.0	4,974.8	43.5	22.0	-158.77	1,039.1	211.3	1,270.9	1,231.0	39.84	31.897	
5,500.0	4,930.9	5,154.6	5,029.1	44.5	22.2	-159.08	1,044.7	212.6	1,310.9	1,270.6	40.31	32.522	
5,600.0	5,017.3	5,220.4	5,094.6	45.5	22.3	-159.48	1,050.0	213.8	1,352.8	1,312.1	40.74	33.207	
5,700.0	5,103.7	5,284.8	5,158.9	46.5	22.4	-159.90	1,053.8	214.7	1,396.4	1,355.3	41.14	33.941	
5,800.0	5,190.1	5,347.8	5,221.9	47.4	22.5	-160.32	1,056.2	215.2	1,441.7	1,400.2	41.52	34.724	
5,900.0	5,276.5	5,409.4	5,283.5	48.4	22.6	-160.75	1,057.1	215.4	1,488.7	1,446.8	41.88	35.545	
5,993.1	5,356.9	5,482.9	5,356.9	49.4	22.7	-161.27	1,057.2	215.4	1,533.6	1,491.4	42.17	36.369	
6,000.0	5,362.9	5,488.8	5,362.9	49.4	22.7	-161.34	1,057.2	215.4	1,536.9	1,494.7	42.19	36.433	
6,100.0	5,450.3	5,576.2	5,450.3	50.2	22.8	-162.22	1,057.2	215.4	1,583.7	1,541.3	42.43	37.327	
6,200.0	5,539.3	5,665.2	5,539.3	50.9	22.9	-163.00	1,057.2	215.4	1,627.6	1,584.9	42.69	38.129	
6,300.0	5,629.8	5,755.7	5,629.8	51.5	23.0	-163.67	1,057.2	215.4	1,668.5	1,625.6	42.95	38.847	
6,400.0	5,721.8	5,847.7	5,721.8	52.2	23.1	-164.26	1,057.2	215.4	1,706.5	1,663.3	43.21	39.491	
6,500.0	5,815.1	5,941.0	5,815.1	52.7	23.2	-164.78	1,057.2	215.4	1,741.3	1,697.9	43.46	40.068	
6,600.0	5,909.5	6,035.5	5,909.5	53.3	23.3	-165.23	1,057.2	215.4	1,773.1	1,729.4	43.69	40.584	
6,700.0	6,005.1	6,131.1	6,005.1	53.7	23.4	-165.62	1,057.2	215.4	1,801.6	1,757.7	43.89	41.045	
6,800.0	6,101.7	6,227.6	6,101.7	54.2	23.5	-165.95	1,057.2	215.4	1,826.9	1,782.9	44.07	41.455	
6,900.0	6,199.0	6,325.0	6,199.0	54.5	23.6	-166.23	1,057.2	215.4	1,849.0	1,804.8	44.21	41.818	
7,000.0	6,297.2	6,423.1	6,297.2	54.9	23.7	-166.46	1,057.2	215.4	1,867.7	1,823.4	44.32	42.138	
7,100.0	6,395.9	6,521.8	6,395.9	55.2	23.9	-166.64	1,057.2	215.4	1,883.1	1,838.7	44.40	42.416	
7,200.0	6,495.1	6,621.1	6,495.1	55.4	24.0	-166.78	1,057.2	215.4	1,895.2	1,850.8	44.43	42.654	
7,300.0	6,594.7	6,720.7	6,594.7	55.6	24.1	-166.88	1,057.2	215.4	1,903.9	1,859.4	44.43	42.853	
7,400.0	6,694.6	6,820.5	6,694.6	55.7	24.2	-166.94	1,057.2	215.4	1,909.1	1,864.8	44.38	43.014	
7,505.5	6,800.0	6,925.9	6,800.0	55.8	24.4	-135.46	1,057.2	215.4	1,911.0	1,866.7	44.30	43.140	
7,600.0	6,894.5	7,020.5	6,894.5	55.8	24.5	-135.46	1,057.2	215.4	1,911.0	1,866.5	44.56	42.887	
7,700.0	6,994.5	7,120.5	6,994.5	55.9	24.6	-135.46	1,057.2	215.4	1,911.0	1,866.2	44.85	42.614	
7,800.0	7,094.5	7,220.5	7,094.5	55.9	24.8	-135.46	1,057.2	215.4	1,911.0	1,865.9	45.13	42.343	
7,900.0	7,194.5	7,320.5	7,194.5	56.0	24.9	-135.46	1,057.2	215.4	1,911.0	1,865.6	45.42	42.072	
8,000.0	7,294.5	7,420.5	7,294.5	56.1	25.0	-135.46	1,057.2	215.4	1,911.0	1,865.3	45.72	41.803	
8,079.5	7,374.0	7,499.9	7,374.0	56.1	25.1	-135.46	1,057.2	215.4	1,911.0	1,865.1	45.95	41.590	

Company:	Great Western	**Local Co-ordinate Reference:**	Well Land JG 31-13D
Project:	SEC.31-T2N-R64W	**TVD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Reference Site:	Land JG (East) Pad Sec.31-T2N-R64W	**MD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Land JG 31-13D	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #1 (11-05-12)	**Offset TVD Reference:**	Offset Datum

Offset Design Land JG (West) Pad Sec.31-T2N-R64W - Land JG 31-32D - Wellbore #1 - Plan #1 (11-07-12) **Offset Site Error:** 0.0 ft

Survey Program: 0-MWD **Offset Well Error:** 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	-135.36	-20.4	-20.1	28.7				
100.0	100.0	100.0	100.0	0.1	0.1	-135.36	-20.4	-20.1	28.7	28.4	0.22	127.559	
200.0	200.0	200.0	200.0	0.3	0.3	-135.36	-20.4	-20.1	28.7	28.0	0.67	42.520	CC, ES
300.0	300.0	299.5	299.4	0.6	0.6	139.85	-19.8	-21.8	30.8	29.6	1.11	27.643	
400.0	399.8	398.2	398.1	0.8	0.8	151.58	-18.1	-26.6	38.2	36.6	1.57	24.260	SF
450.0	449.7	447.1	446.8	0.9	0.9	157.60	-16.8	-30.2	44.4	42.6	1.82	24.440	
500.0	499.5	496.4	495.9	1.0	1.0	172.44	-14.9	-34.3	52.1	50.1	2.05	25.376	
600.0	598.9	594.6	593.5	1.3	1.3	-166.05	-8.8	-43.0	69.8	67.3	2.52	27.745	
700.0	698.0	692.2	690.2	1.6	1.6	-152.11	0.5	-52.3	90.1	87.1	3.00	30.046	
800.0	796.7	789.0	785.7	1.9	1.9	-142.70	13.0	-62.2	112.7	109.2	3.52	31.980	
900.0	894.9	885.2	880.0	2.3	2.3	-136.03	28.5	-72.6	137.4	133.3	4.11	33.429	
1,000.0	992.4	980.5	972.9	2.7	2.7	-131.07	47.0	-83.5	164.2	159.4	4.78	34.379	
1,100.0	1,089.1	1,075.0	1,064.3	3.2	3.1	-127.25	68.2	-95.0	192.8	187.3	5.53	34.885	
1,200.0	1,184.9	1,168.7	1,154.1	3.7	3.6	-124.19	92.2	-106.8	223.3	217.0	6.38	35.032	
1,300.0	1,279.7	1,261.6	1,242.1	4.3	4.2	-121.67	118.9	-119.2	255.6	248.3	7.33	34.894	
1,400.0	1,373.4	1,353.5	1,328.4	4.9	4.8	-119.55	148.0	-131.9	289.7	281.3	8.37	34.591	
1,500.0	1,465.8	1,444.6	1,412.9	5.6	5.4	-117.72	179.6	-144.9	325.3	315.8	9.53	34.153	
1,600.0	1,556.9	1,534.9	1,495.4	6.4	6.1	-116.11	213.4	-158.3	362.6	351.8	10.78	33.647	
1,700.0	1,646.5	1,624.2	1,576.0	7.2	6.8	-114.66	249.4	-172.1	401.4	389.3	12.13	33.102	
1,800.0	1,734.5	1,712.7	1,654.6	8.1	7.6	-113.34	287.5	-186.1	441.7	428.2	13.57	32.546	
1,846.5	1,774.8	1,753.5	1,690.5	8.5	7.9	-112.76	305.9	-192.7	461.0	446.7	14.28	32.277	
1,900.0	1,821.0	1,800.6	1,731.5	9.0	8.4	-112.82	327.8	-200.4	483.4	468.3	15.12	31.980	
2,000.0	1,907.4	1,891.3	1,810.2	10.0	9.2	-112.87	370.3	-215.4	525.4	508.6	16.72	31.416	
2,100.0	1,993.8	1,982.1	1,889.0	11.0	10.1	-112.90	412.8	-230.3	567.3	549.0	18.34	30.926	
2,200.0	2,080.2	2,072.9	1,967.8	11.9	11.0	-112.94	455.3	-245.3	609.3	589.3	19.98	30.498	
2,300.0	2,166.6	2,163.6	2,046.6	12.9	11.8	-112.96	497.9	-260.2	651.3	629.7	21.62	30.122	
2,400.0	2,253.0	2,254.4	2,125.3	13.9	12.7	-112.99	540.4	-275.2	693.3	670.0	23.27	29.789	
2,500.0	2,339.4	2,345.1	2,204.1	14.8	13.6	-113.01	582.9	-290.1	735.2	710.3	24.93	29.494	
2,600.0	2,425.7	2,435.9	2,282.9	15.8	14.5	-113.03	625.4	-305.1	777.2	750.6	26.59	29.231	
2,700.0	2,512.1	2,526.7	2,361.7	16.8	15.4	-113.05	668.0	-320.1	819.2	790.9	28.25	28.994	
2,800.0	2,598.5	2,617.4	2,440.4	17.8	16.3	-113.06	710.5	-335.0	861.2	831.3	29.92	28.781	
2,900.0	2,684.9	2,708.2	2,519.2	18.8	17.2	-113.08	753.0	-350.0	903.2	871.6	31.59	28.587	
3,000.0	2,771.3	2,799.0	2,598.0	19.7	18.0	-113.09	795.6	-364.9	945.1	911.9	33.27	28.412	
3,100.0	2,857.7	2,889.7	2,676.8	20.7	18.9	-113.10	838.1	-379.9	987.1	952.2	34.94	28.251	
3,200.0	2,944.1	2,980.5	2,755.5	21.7	19.8	-113.11	880.6	-394.9	1,029.1	992.5	36.62	28.104	
3,300.0	3,030.4	3,071.2	2,834.3	22.7	20.7	-113.12	923.1	-409.8	1,071.1	1,032.8	38.30	27.968	
3,400.0	3,116.8	3,162.0	2,913.1	23.7	21.6	-113.13	965.7	-424.8	1,113.1	1,073.1	39.98	27.843	
3,500.0	3,203.2	3,252.8	2,991.9	24.7	22.5	-113.14	1,008.2	-439.7	1,155.0	1,113.4	41.66	27.727	
3,600.0	3,289.6	3,343.5	3,070.6	25.7	23.4	-113.15	1,050.7	-454.7	1,197.0	1,153.7	43.34	27.620	
3,700.0	3,376.0	3,434.3	3,149.4	26.7	24.3	-113.15	1,093.2	-469.7	1,239.0	1,194.0	45.02	27.520	
3,800.0	3,462.4	3,525.0	3,228.2	27.6	25.2	-113.16	1,135.8	-484.6	1,281.0	1,234.3	46.71	27.427	
3,900.0	3,548.8	3,615.8	3,307.0	28.6	26.1	-113.17	1,178.3	-499.6	1,322.9	1,274.6	48.39	27.340	
4,000.0	3,635.2	3,706.6	3,385.7	29.6	27.0	-113.17	1,220.8	-514.5	1,364.9	1,314.9	50.07	27.258	
4,100.0	3,721.5	3,797.3	3,464.5	30.6	27.9	-113.18	1,263.4	-529.5	1,406.9	1,355.1	51.76	27.181	
4,200.0	3,807.9	3,888.1	3,543.3	31.6	28.8	-113.18	1,305.9	-544.4	1,448.9	1,395.4	53.45	27.109	
4,300.0	3,894.3	3,978.9	3,622.1	32.6	29.7	-113.19	1,348.4	-559.4	1,490.9	1,435.7	55.13	27.041	
4,400.0	3,980.7	4,069.6	3,700.8	33.6	30.6	-113.19	1,390.9	-574.4	1,532.8	1,476.0	56.82	26.977	
4,500.0	4,067.1	4,160.4	3,779.6	34.6	31.5	-113.20	1,433.5	-589.3	1,574.8	1,516.3	58.51	26.917	
4,600.0	4,153.5	4,251.1	3,858.4	35.6	32.4	-113.20	1,476.0	-604.3	1,616.8	1,556.6	60.20	26.859	
4,700.0	4,239.9	4,341.9	3,937.2	36.5	33.2	-113.21	1,518.5	-619.2	1,658.8	1,596.9	61.88	26.805	
4,800.0	4,326.2	4,432.7	4,015.9	37.5	34.1	-113.21	1,561.0	-634.2	1,700.8	1,637.2	63.57	26.753	
4,900.0	4,412.6	4,523.4	4,094.7	38.5	35.0	-113.22	1,603.6	-649.2	1,742.7	1,677.5	65.26	26.704	

Company:	Great Western	**Local Co-ordinate Reference:**	Well Land JG 31-13D
Project:	SEC.31-T2N-R64W	**TVD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Reference Site:	Land JG (East) Pad Sec.31-T2N-R64W	**MD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Land JG 31-13D	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #1 (11-05-12)	**Offset TVD Reference:**	Offset Datum

Offset Design Land JG (West) Pad Sec.31-T2N-R64W - Land JG 31-32D - Wellbore #1 - Plan #1 (11-07-12)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,000.0	4,499.0	4,614.2	4,173.5	39.5	35.9	-113.22	1,646.1	-664.1	1,784.7	1,717.8	66.95	26.657	
5,100.0	4,585.4	4,705.0	4,252.3	40.5	36.8	-113.22	1,688.6	-679.1	1,826.7	1,758.1	68.64	26.613	
5,200.0	4,671.8	4,795.7	4,331.0	41.5	37.7	-113.23	1,731.2	-694.0	1,868.7	1,798.3	70.33	26.570	
5,300.0	4,758.2	4,886.5	4,409.8	42.5	38.6	-113.23	1,773.7	-709.0	1,910.7	1,838.6	72.02	26.529	
5,400.0	4,844.6	4,977.2	4,488.6	43.5	39.5	-113.23	1,816.2	-723.9	1,952.6	1,878.9	73.71	26.491	
5,500.0	4,930.9	5,068.0	4,567.4	44.5	40.4	-113.23	1,858.7	-738.9	1,994.6	1,919.2	75.40	26.453	
5,600.0	5,017.3	5,158.8	4,646.1	45.5	41.3	-113.24	1,901.3	-753.9	2,036.6	1,959.5	77.09	26.418	
5,700.0	5,103.7	5,249.5	4,724.9	46.5	42.2	-113.24	1,943.8	-768.8	2,078.6	1,999.8	78.78	26.384	
5,800.0	5,190.1	5,340.3	4,803.7	47.4	43.1	-113.24	1,986.3	-783.8	2,120.6	2,040.1	80.47	26.351	
5,900.0	5,276.5	5,433.4	4,884.5	48.4	44.0	-113.24	2,029.9	-799.1	2,162.5	2,080.4	82.18	26.316	
5,993.1	5,356.9	5,551.1	4,988.0	49.4	45.0	-113.32	2,082.8	-817.7	2,200.9	2,117.0	83.85	26.249	
6,000.0	5,362.9	5,559.8	4,995.8	49.4	45.0	-113.39	2,086.6	-819.0	2,203.7	2,119.7	83.97	26.243	
6,100.0	5,450.3	5,688.2	5,111.4	50.2	45.9	-114.32	2,139.3	-837.6	2,242.6	2,157.0	85.64	26.187	
6,200.0	5,539.3	5,818.8	5,231.4	50.9	46.7	-115.20	2,187.8	-854.6	2,278.7	2,191.5	87.21	26.129	
6,300.0	5,629.8	5,951.3	5,355.4	51.5	47.5	-116.05	2,231.7	-870.1	2,311.8	2,223.2	88.67	26.071	
6,400.0	5,721.8	6,085.6	5,483.1	52.2	48.2	-116.85	2,270.7	-883.8	2,341.9	2,251.9	90.03	26.014	
6,500.0	5,815.1	6,221.3	5,614.1	52.7	48.8	-117.62	2,304.3	-895.6	2,369.0	2,277.7	91.24	25.963	
6,600.0	5,909.5	6,358.1	5,747.6	53.3	49.3	-118.35	2,332.2	-905.4	2,392.8	2,300.5	92.32	25.918	
6,700.0	6,005.1	6,495.7	5,883.3	53.7	49.7	-119.07	2,354.1	-913.2	2,413.5	2,320.2	93.26	25.879	
6,800.0	6,101.7	6,633.8	6,020.3	54.2	50.0	-119.75	2,370.0	-918.7	2,430.9	2,336.8	94.03	25.852	
6,900.0	6,199.0	6,772.0	6,158.2	54.5	50.2	-120.42	2,379.6	-922.1	2,445.0	2,350.4	94.65	25.832	
7,000.0	6,297.2	6,910.0	6,296.0	54.9	50.3	-121.07	2,382.9	-923.3	2,455.9	2,360.7	95.11	25.821	
7,100.0	6,395.9	7,009.8	6,395.9	55.2	50.4	-121.53	2,382.9	-923.3	2,464.2	2,368.7	95.45	25.817	
7,200.0	6,495.1	7,109.1	6,495.1	55.4	50.4	-121.88	2,382.9	-923.3	2,470.7	2,375.0	95.73	25.810	
7,300.0	6,594.7	7,208.7	6,594.7	55.6	50.5	-122.14	2,382.9	-923.3	2,475.4	2,379.5	95.95	25.798	
7,400.0	6,694.6	7,308.5	6,694.6	55.7	50.6	-122.29	2,382.9	-923.3	2,478.3	2,382.2	96.13	25.782	
7,505.5	6,800.0	7,413.9	6,800.0	55.8	50.6	-90.84	2,382.9	-923.3	2,479.4	2,383.1	96.26	25.758	
7,600.0	6,894.5	7,508.5	6,894.5	55.8	50.7	-90.84	2,382.9	-923.3	2,479.4	2,383.0	96.37	25.727	
7,700.0	6,994.5	7,608.5	6,994.5	55.9	50.7	-90.84	2,382.9	-923.3	2,479.4	2,382.9	96.49	25.695	
7,800.0	7,094.5	7,708.5	7,094.5	55.9	50.8	-90.84	2,382.9	-923.3	2,479.4	2,382.7	96.62	25.661	
7,900.0	7,194.5	7,808.5	7,194.5	56.0	50.9	-90.84	2,382.9	-923.3	2,479.4	2,382.6	96.74	25.628	
8,000.0	7,294.5	7,908.5	7,294.5	56.1	50.9	-90.84	2,382.9	-923.3	2,479.4	2,382.5	96.87	25.594	
8,079.5	7,374.0	7,987.9	7,374.0	56.1	51.0	-90.84	2,382.9	-923.3	2,479.4	2,382.4	96.98	25.566	

Company:	Great Western	**Local Co-ordinate Reference:**	Well Land JG 31-13D
Project:	SEC.31-T2N-R64W	**TVD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Reference Site:	Land JG (East) Pad Sec.31-T2N-R64W	**MD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Land JG 31-13D	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #1 (11-05-12)	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to WELL @ 4947.0ft (Original Well Elev) Coordinates are relative to: Land JG 31-13D
Offset Depths are relative to Offset Datum Coordinate System is US State Plane 1983, Colorado Northern Zone
Central Meridian is -105.500000 ° Grid Convergence at Surface is: 0.58°

Company:	Great Western	**Local Co-ordinate Reference:**	Well Land JG 31-13D
Project:	SEC.31-T2N-R64W	**TVD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Reference Site:	Land JG (East) Pad Sec.31-T2N-R64W	**MD Reference:**	WELL @ 4947.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Land JG 31-13D	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #1 (11-05-12)	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to WELL @ 4947.0ft (Original Well Elev) Coordinates are relative to: Land JG 31-13D
Offset Depths are relative to Offset Datum Coordinate System is US State Plane 1983, Colorado Northern Zone
Central Meridian is -105.500000 ° Grid Convergence at Surface is: 0.58°