

Results of Directional Survey

API number:	30-025-40421		
OGRID:		Operator:	MARSHALL & WINSTON INC
		Property:	TJG 3 FEDERAL COM # 1H

surface	ULSTR:	P	03	T	19S	R	32E
				400	FSL	330	FEL

BH Loc	ULSTR:	M	03	T	19S	R	32E
13885	MD	9466.9	TVD	338	FSL	325	FWL
						4955	FEL

Top Perf/OH	ULSTR:	P	03	T	19S	R	32E
9930	MD	9529.9	TVD	421	FSL	1003	FEL

Bot Perf/OH	ULSTR:	M	03	T	19S	R	32E
13807	MD	9471.0	TVD	342	FSL	402	FWL
						4878	FEL

	MD	N/S	E/W	VD
	9921	21.20	-664.30	9529.9
TOP PERFS/OH	9930	21.48	-673.30	9529.87
	9953	22.20	-696.30	9529.80
	13720	-54.60	-4460.70	9474.90
BOT PERFS/OH	13807	-58.17	-4547.52	9470.96
	13815	-58.50	-4555.50	9470.60

NEXT TO LAST	13835	-59.40	-4575.50	9469.50
LAST READING	13885	-61.70	-4625.40	9466.90
TD	13885	-61.70	-4625.40	9466.90

Surface Location	400	FS	330	FE
Projected BHL	338	FS	4955	FE
Location of				
Top Perfs/OH	421	FS	1003	FE
Bottom Perfs/OH	342	FS	4878	FE

SUMMARY of Subsurface Locations

Surface Location	P-03-19S-32E	400	FS	330	FE	Vert. Depth
Top Perfs/OH	P-03-19S-32E	421	FS	1003	FE	9529.87
Bottom Perfs/OH	M-03-19S-32E	342	FS	4878	FE	9470.96
Projected TD	M-03-19S-32E	338	FS	4955	FE	9466.90

FEB 19 2014



McVAY DRILLING COMPANY
P.O. Box 2450
Hobbs, New Mexico 88241
(575) 397-3311
FAX: 39-DRILL

HOBBS OCD

JAN 06 2014

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Well Name and Num: TJG Federal Com 3-1H
Location: Sec 3, T19S, R32E
Operator: Marshall & Winston
Drilling Contractor: McVay Drilling Company

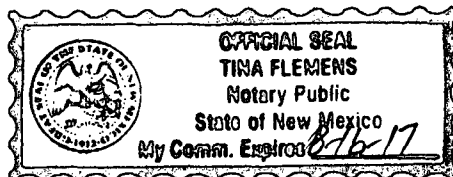
The undersigned certifies that he is an authorized representative of the drilling contractor who drilled the above described well and that he has conducted deviation tests and obtained the following results:

<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>
0.85	234	0.77	6444	89.90	10047
0.45	460	0.46	6943	91.60	10427
0.24	807	1.04	7419	91.10	10807
0.90	1041	1.32	7666	90.00	11155
0.62	1387	1.22	7916	90.10	11373
0.48	1636	0.44	8143	89.20	11746
0.80	2108	0.90	8517	90.50	12122
1.79	2584	1.27	8732	89.60	12499
3.00	2771	1.70	8774	90.60	12689
1.31	2989	16.70	9148	90.20	12970
0.89	3243	23.00	9211	91.40	13254
0.54	3525	52.50	9464	91.10	13532
0.65	3994	59.40	9527	92.30	13720
0.21	4470	65.80	9590		
0.11	4977	68.60	9622		
0.56	5467	72.20	9668		
1.30	5967	86.20	9858		

By: Harold Crowl

Subscribed and sworn to before me this 24th day of October, 2013

Tina Flemens
Notary Public, Lea County, New Mexico



MARSHALL & WINSTON

Lusk

Lea County, NM

TJG Federal Com 3 #1H

VH - Job #321013-KW-1055

HOBBS OCD

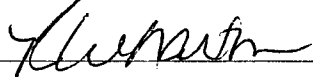
JAN 06 2014

RECEIVED

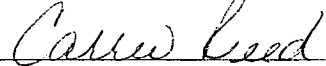
Survey: Gyro

SDI Survey Report

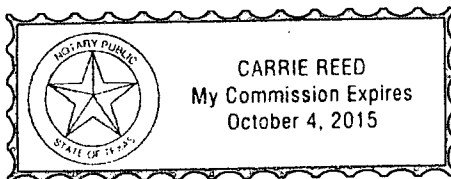
This survey is correct to the best of my knowledge and is supported by actual field data.



Notarized this date Sept of October, 2013.



Notary Signature
County of Midland
State of Texas



SDI

SDI Survey Report

Company: MARSHALL & WINSTON	Local Co-ordinate Reference: Well TJG Federal Com 3 #1H
Project: Lusk	TVD Reference: WELL @ 0.0usft (Original Well Elev)
Site: Lea County, NM	MD Reference: WELL @ 0.0usft (Original Well Elev)
Well: TJG Federal Com 3 #1H	North Reference: Grid
Wellbore: VH - Job #321013-KW-1055	Survey Calculation Method: Minimum Curvature
Design: VH - Job #321013-KW-1055	Database: EDM-Regulatory

Project	Lusk		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	Lea County, NM		
Site Position:	Lat/Long	Northing:	612,735.95 usft
From:	Lat/Long	Easting:	680,681.37 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"
		Latitude:	32° 40' 59.290 N
		Longitude:	103° 44' 45.920 W
		Grid Convergence:	0.32 °

Well	TJG Federal Com 3 #1H, Directional		
Well Position	+N-S	0.0 usft	Northing: 612,735.95 usft
	+E-W	0.0 usft	Easting: 680,681.37 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft
		Latitude:	32° 40' 59.290 N
		Longitude:	103° 44' 45.920 W
		Ground Level:	0.0 usft

Wellbore	VH - Job #321013-KW-1055				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	10/10/2013	7.42	60.52	48,667

Design	VH - Job #321013-KW-1055				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	269.83	

Survey Program	Date 10/25/2013				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.0	8,680.0	Gyro (VH - Job #321013-KW-1055)	KSRG	Keeper Gyro	

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	Closure Azimuth (°)	Closure Distance (usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.0
100.0	0.10	193.35	100.0	-0.1	0.0	193.35	0.1
200.0	0.06	281.95	200.0	-0.2	-0.1	209.93	0.2
300.0	0.10	318.21	300.0	-0.1	-0.2	247.54	0.2
400.0	0.11	255.82	400.0	0.0	-0.4	263.28	0.4
500.0	0.10	273.88	500.0	-0.1	-0.5	263.66	0.5
600.0	0.25	272.95	600.0	0.0	-0.8	267.13	0.8
700.0	0.35	273.56	700.0	0.0	-1.4	269.50	1.4
800.0	0.35	276.09	800.0	0.0	-2.0	271.15	2.0
900.0	0.35	273.74	900.0	0.1	-2.6	272.04	2.6
1,000.0	0.42	262.76	1,000.0	0.1	-3.2	271.16	3.2
1,100.0	0.57	250.78	1,100.0	-0.1	-4.1	267.97	4.1

SDI

SDI Survey Report

Company: MARSHALL & WINSTON	Local Co-ordinate Reference: Well TJG Federal Com 3 #1H
Project: Lusk	TVD Reference: WELL @ 0.0usft (Original Well Elev)
Site: Lea County, NM	MD Reference: WELL @ 0.0usft (Original Well Elev)
Well: TJG Federal Com 3 #1H	North Reference: Grid
Wellbore: VH - Job #321013-KW-1055	Survey Calculation Method: Minimum Curvature
Design: VH - Job #321013-KW-1055	Database: EDM-Regulatory

Survey							
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	Closure Azimuth (°)	Closure Distance (usft)
1,200.0	0.60	252.49	1,200.0	-0.5	-5.0	264.73	5.1
1,300.0	0.63	257.67	1,300.0	-0.7	-6.1	263.06	6.1
1,400.0	0.91	253.49	1,400.0	-1.1	-7.4	261.65	7.5
1,500.0	0.79	262.97	1,500.0	-1.4	-8.8	261.03	8.9
1,600.0	0.60	266.47	1,599.9	-1.5	-10.0	261.44	10.1
1,700.0	0.47	288.96	1,699.9	-1.4	-10.9	262.66	11.0
1,800.0	0.40	311.46	1,799.9	-1.0	-11.6	264.85	11.6
1,900.0	0.36	326.19	1,899.9	-0.6	-12.0	267.37	12.0
2,000.0	0.43	346.45	1,999.9	0.1	-12.3	270.34	12.3
2,100.0	0.47	14.15	2,099.9	0.8	-12.3	273.89	12.3
2,200.0	0.62	30.08	2,199.9	1.7	-11.9	278.13	12.0
2,300.0	0.79	36.89	2,299.9	2.7	-11.2	283.63	11.6
2,400.0	0.93	44.45	2,399.9	3.9	-10.2	290.61	10.9
2,500.0	1.70	39.94	2,499.9	5.6	-8.7	302.55	10.3
2,600.0	2.06	43.82	2,599.8	8.0	-6.5	320.80	10.3
2,700.0	2.24	46.08	2,699.8	10.7	-3.9	340.02	11.3
2,800.0	2.18	44.41	2,799.7	13.4	-1.1	355.15	13.4
2,900.0	1.43	43.87	2,899.6	15.6	1.1	3.88	15.7
3,000.0	1.06	44.38	2,999.6	17.2	2.6	8.51	17.4
3,100.0	1.18	48.59	3,099.6	18.5	4.0	12.16	19.0
3,200.0	1.17	37.30	3,199.6	20.0	5.4	15.05	20.7
3,300.0	0.77	30.15	3,299.6	21.4	6.3	16.49	22.3
3,400.0	0.60	17.54	3,399.5	22.5	6.8	16.90	23.5
3,500.0	0.50	12.76	3,499.5	23.4	7.1	16.84	24.5
3,600.0	0.43	8.32	3,599.5	24.2	7.2	16.64	25.3
3,700.0	0.35	14.06	3,699.5	24.9	7.4	16.49	26.0
3,800.0	0.18	340.01	3,799.5	25.3	7.4	16.26	26.4
3,900.0	0.19	313.76	3,899.5	25.6	7.2	15.74	26.6
4,000.0	0.33	317.88	3,999.5	25.9	6.9	14.91	26.8
4,100.0	0.32	323.84	4,099.5	26.4	6.5	13.94	27.2
4,200.0	0.24	315.59	4,199.5	26.7	6.2	13.12	27.5
4,300.0	0.20	299.02	4,299.5	27.0	5.9	12.41	27.6
4,400.0	0.18	298.84	4,399.5	27.1	5.6	11.75	27.7
4,500.0	0.24	305.35	4,499.5	27.3	5.3	11.05	27.8
4,600.0	0.19	306.39	4,599.5	27.5	5.0	10.35	28.0
4,700.0	0.17	292.99	4,699.5	27.7	4.8	9.75	28.1
4,800.0	0.29	252.12	4,799.5	27.7	4.4	9.00	28.0
4,900.0	0.37	260.37	4,899.5	27.6	3.8	7.90	27.8
5,000.0	0.40	284.26	4,999.5	27.6	3.2	6.55	27.8
5,100.0	0.47	286.97	5,099.5	27.8	2.4	5.01	27.9
5,200.0	0.41	301.71	5,199.5	28.1	1.7	3.54	28.1
5,300.0	0.51	297.64	5,299.5	28.5	1.0	2.09	28.5
5,400.0	0.51	298.30	5,399.5	28.9	0.3	0.51	28.9
5,500.0	0.54	297.91	5,499.5	29.3	-0.6	358.92	29.3

SDI
SDI Survey Report

Company: MARSHALL & WINSTON	Local Co-ordinate Reference: Well TJG Federal Com 3 #1H
Project: Lusk	TVD Reference: WELL @ 0.0usft (Original Well Elev)
Site: Lea County, NM	MD Reference: WELL @ 0.0usft (Original Well Elev)
Well: TJG Federal Com 3 #1H	North Reference: Grid
Wellbore: VH - Job #321013-KW-1055	Survey Calculation Method: Minimum Curvature
Design: VH - Job #321013-KW-1055	Database: EDM-Regulatory

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	Closure Azimuth (°)	Closure Distance (usft)
5,600.0	0.80	307.48	5,599.5	30.0	-1.5	357.09	30.0
5,700.0	1.03	311.50	5,699.5	31.0	-2.8	354.93	31.1
5,800.0	1.13	311.88	5,799.5	32.3	-4.2	352.65	32.5
5,900.0	1.12	316.13	5,899.5	33.6	-5.6	350.59	34.1
6,000.0	1.18	314.94	5,999.4	35.1	-7.0	348.74	35.7
6,100.0	1.04	315.49	6,099.4	36.4	-8.3	347.10	37.4
6,200.0	1.00	314.98	6,199.4	37.7	-9.6	345.72	38.9
6,300.0	0.89	313.49	6,299.4	38.8	-10.8	344.50	40.3
6,400.0	0.85	317.86	6,399.4	39.9	-11.8	343.49	41.6
6,500.0	0.83	318.88	6,499.4	41.0	-12.8	342.66	43.0
6,600.0	0.64	316.03	6,599.4	42.0	-13.7	341.95	44.1
6,700.0	0.62	311.72	6,699.3	42.7	-14.5	341.30	45.1
6,800.0	0.63	303.66	6,799.3	43.4	-15.3	340.55	46.0
6,900.0	0.71	309.51	6,899.3	44.1	-16.3	339.76	47.0
7,000.0	0.80	320.42	6,999.3	45.0	-17.2	339.11	48.2
7,100.0	0.77	324.11	7,099.3	46.1	-18.0	338.65	49.5
7,200.0	0.80	309.12	7,199.3	47.1	-19.0	338.07	50.8
7,300.0	0.51	282.34	7,299.3	47.6	-19.9	337.29	51.6
7,400.0	0.59	260.20	7,399.3	47.6	-20.9	336.33	52.0
7,500.0	0.89	255.20	7,499.3	47.4	-22.1	334.95	52.3
7,600.0	1.07	252.26	7,599.3	46.9	-23.8	333.10	52.6
7,700.0	1.27	250.74	7,699.3	46.2	-25.7	330.91	52.9
7,800.0	1.34	252.39	7,799.2	45.5	-27.9	328.51	53.4
7,900.0	1.41	266.60	7,899.2	45.1	-30.2	326.16	54.3
8,000.0	1.31	268.04	7,999.2	45.0	-32.6	324.07	55.5
8,100.0	0.52	254.22	8,099.2	44.8	-34.2	322.67	56.3
8,200.0	0.15	205.87	8,199.2	44.6	-34.7	322.12	56.5
8,300.0	0.13	168.57	8,299.2	44.3	-34.7	321.95	56.3
8,400.0	0.69	190.46	8,399.2	43.6	-34.8	321.44	55.8
8,500.0	0.96	194.64	8,499.1	42.2	-35.1	320.26	54.9
8,600.0	0.98	205.58	8,599.1	40.6	-35.7	318.72	54.1
8,680.0	1.37	187.33	8,679.1	39.1	-36.1	317.27	53.2



Scientific Drilling

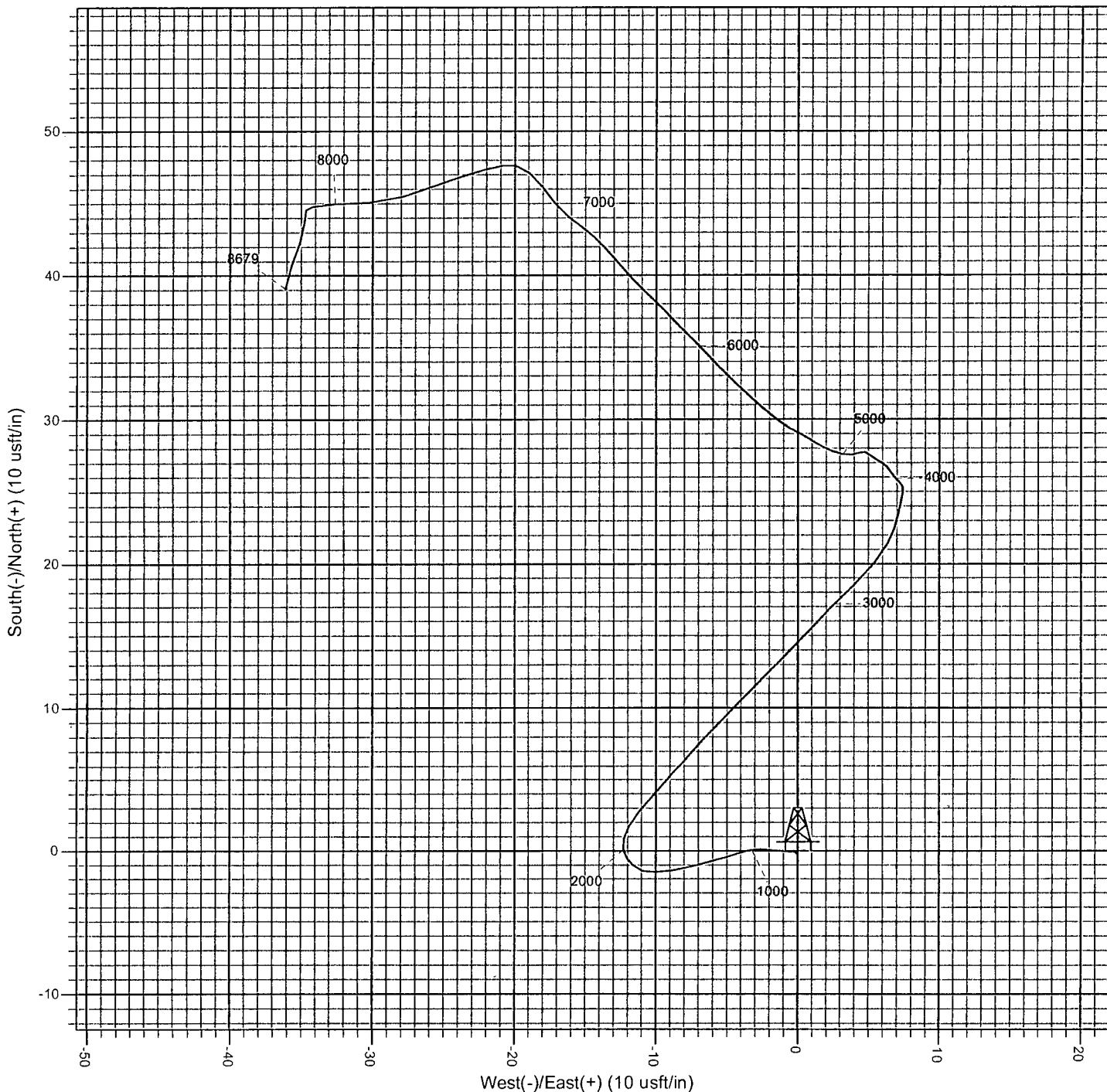
Project: Lusk
Lea County, NM
Well: TJG Federal Com 3 #1H
Wellbore: VH - Job #321013-KW-1055
Design: VH - Job #321013-KW-1055

WELL DETAILS: TJG Federal Com 3 #1H

WELL @ 0.0usft (Original Well Elev)

Ground Level: 0.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	612735.95	680681.37	32° 40' 59.290 N	103° 44' 45.920 W	



PROJECT DETAILS: Lusk	SITE DETAILS: Lea County, NM
Geodetic System: US State Plane 1927 (Exact solution)	Site Centre Latitude: 32° 40' 59.290 N
Datum: NAD 1927 (NADCON CONUS)	Longitude: 103° 44' 45.920 W
Ellipsoid: Clarke 1866	Positional Uncertainty: 0.0
Zone: New Mexico East 3001	Convergence: 0.32
System Datum: Mean Sea Level	Local North: Grid



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JAN 06 2014
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Marshall & Winston, Inc

Lea County, NM

Sec 3, T19-S, R32E

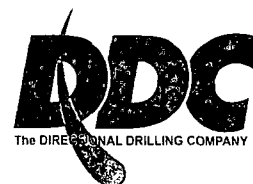
TJG Federal Com 3 #1H

Wellbore #1

Survey: MWD

DDC Survey Report

21 October, 2013





Survey Certification Sheet

Marshall & Winston, Inc
Company

WT-13795
Job Number

10/21/13
Date

Sec3, T19S, R32E
Lease

TJG Federal Com 3 #1H
Well Name

Lea, NM
County & State

API: 30-025-40421

Surveyed from a depth of: 8680 feet to 13885 feet MD

Type of Survey: MWD

Directional Supervisor/Surveyor: Joe Watson

The data and calculations for this survey have been checked by me and conform to the standards and procedures set forth by **The Directional Drilling Company (DDC)**. This report represents a true and correct Directional survey of this well based on the original data obtained at the well site. Wellbore Coordinates are calculated using minimum curvature.

Digitally signed by Larry Wright
DN: cn=Larry Wright, o=The
Directional Drilling Company,
ou=GM of Guidance Services,
email=larryw@directionaldrillers.c
om, c=US
Date: 2013.10.24 10:36:29 -05'00'

Larry Wright
MWD General Manager

Company:	Marshall & Winston, Inc	Local Co-ordinate Reference:	Well TJG Federal Com 3 #1H
Project:	Lea County, NM	TVD Reference:	WELL @ 3674.0usft (McVay #8)
Site:	Sec 3, T19-S, R32E	MD Reference:	WELL @ 3674.0usft (McVay #8)
Well:	TJG Federal Com 3 #1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Project	Lea County, NM		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site		Sec 3, T19-S, R32E			
Site Position:		Northing:	612,736.00 usft	Latitude:	32° 40' 59.290 N
From:	Map	Easting:	680,681.30 usft	Longitude:	103° 44' 45.921 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.32 °

Well	TJG Federal Com 3 #1H					
Well Position	+N/-S	0.0 usft	Northing:	612,736.00 usft	Latitude:	32° 40' 59.290 N
	+E/-W	0.0 usft	Easting:	680,681.30 usft	Longitude:	103° 44' 45.921 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	3,674.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	9/9/2013	7.43	60.53	48,648

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	269.24	

Survey Program		Date	10/21/2013		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
8,774.0	13,885.0	MWD (Wellbore #1)	MWD default	MWD - Standard	

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
Tie In @ 8680' MD / 8679' TVD									
8,680.0	1.37	187.33	8,679.1	39.1	-36.1	35.6	0.00	0.00	0.00
8,774.0	1.70	189.90	8,773.1	36.6	-36.5	36.0	0.36	0.35	2.73
8,899.0	1.90	192.00	8,898.0	32.8	-37.3	36.8	0.17	0.16	1.68
8,960.0	2.00	191.10	8,959.0	30.7	-37.7	37.3	0.17	0.16	-1.48
8,992.0	2.00	195.40	8,991.0	29.6	-38.0	37.6	0.47	0.00	13.44
9,023.0	2.70	232.80	9,021.9	28.7	-38.7	38.3	5.31	2.26	120.65
9,053.0	5.60	262.50	9,051.9	28.1	-40.7	40.3	11.73	9.67	99.00
9,085.0	9.60	271.30	9,083.6	27.9	-44.9	44.5	12.98	12.50	27.50
9,117.0	13.40	268.00	9,114.9	27.8	-51.3	50.9	12.05	11.88	-10.31
9,148.0	16.70	264.50	9,144.9	27.3	-59.3	58.9	11.04	10.65	-11.29

Company:	Marshall & Winston, Inc	Local Co-ordinate Reference:	Well TJG Federal Com 3 #1H
Project:	Lea County, NM	TVD Reference:	WELL @ 3674.0usft (McVay #8)
Site:	Sec 3, T19-S, R32E	MD Reference:	WELL @ 3674.0usft (McVay #8)
Well:	TJG Federal Com 3 #1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,180.0	20.00	265.20	9,175.2	26.4	-69.3	69.0	10.34	10.31	2.19
9,211.0	23.00	267.10	9,204.1	25.6	-80.7	80.3	9.93	9.68	6.13
9,243.0	26.60	269.00	9,233.1	25.2	-94.1	93.7	11.52	11.25	5.94
9,275.0	30.70	269.70	9,261.2	25.0	-109.4	109.1	12.86	12.81	2.19
9,306.0	34.70	270.60	9,287.3	25.1	-126.2	125.8	13.00	12.90	2.90
9,338.0	38.10	270.40	9,313.0	25.2	-145.2	144.8	10.63	10.63	-0.63
9,370.0	41.50	271.10	9,337.6	25.5	-165.6	165.3	10.72	10.63	2.19
9,401.0	44.80	271.10	9,360.2	25.9	-186.8	186.5	10.65	10.65	0.00
9,432.0	48.50	270.10	9,381.5	26.2	-209.4	209.0	12.16	11.94	-3.23
9,464.0	52.50	269.00	9,401.8	26.0	-234.1	233.7	12.78	12.50	-3.44
9,496.0	55.80	269.00	9,420.6	25.5	-260.0	259.6	10.31	10.31	0.00
9,527.0	59.40	269.00	9,437.2	25.0	-286.1	285.8	11.61	11.61	0.00
9,559.0	63.00	269.40	9,452.6	24.7	-314.2	313.8	11.30	11.25	1.25
9,590.0	65.80	269.00	9,466.0	24.3	-342.1	341.8	9.11	9.03	-1.29
9,622.0	68.60	269.70	9,478.4	23.9	-371.6	371.3	8.98	8.75	2.19
9,668.0	72.20	268.50	9,493.8	23.2	-415.0	414.6	8.20	7.83	-2.61
9,700.0	75.10	268.70	9,502.8	22.5	-445.6	445.3	9.08	9.06	0.63
9,731.0	77.70	268.30	9,510.1	21.7	-475.8	475.4	8.48	8.39	-1.29
9,763.0	79.70	268.10	9,516.4	20.7	-507.1	506.8	6.28	6.25	-0.63
9,795.0	82.20	269.70	9,521.4	20.1	-538.7	538.4	9.24	7.81	5.00
9,826.0	83.50	269.40	9,525.3	19.9	-569.5	569.2	4.30	4.19	-0.97
9,858.0	86.20	270.60	9,528.2	19.9	-601.3	601.0	9.23	8.44	3.75
9,890.0	88.80	271.10	9,529.5	20.4	-633.3	633.0	8.27	8.13	1.56
9,921.0	90.00	272.00	9,529.9	21.2	-664.3	663.9	4.84	3.87	2.90
9,953.0	90.40	271.70	9,529.8	22.2	-696.3	695.9	1.56	1.25	-0.94
10,047.0	89.90	271.50	9,529.5	24.8	-790.2	789.8	0.57	-0.53	-0.21
10,142.0	90.50	271.10	9,529.2	27.0	-885.2	884.8	0.76	0.63	-0.42
10,237.0	91.50	271.00	9,527.5	28.7	-980.2	979.7	1.06	1.05	-0.11
10,332.0	90.40	270.40	9,526.0	29.9	-1,075.2	1,074.7	1.32	-1.16	-0.63
10,427.0	91.60	270.10	9,524.3	30.3	-1,170.1	1,169.6	1.30	1.26	-0.32
10,522.0	90.40	269.40	9,522.6	29.9	-1,265.1	1,264.6	1.46	-1.26	-0.74
10,617.0	91.40	269.40	9,521.1	28.9	-1,360.1	1,359.6	1.05	1.05	0.00
10,712.0	92.20	268.10	9,518.2	26.8	-1,455.0	1,454.5	1.61	0.84	-1.37
10,807.0	91.10	266.90	9,515.4	22.7	-1,549.9	1,549.5	1.71	-1.16	-1.26
10,902.0	91.80	266.70	9,513.0	17.4	-1,644.7	1,644.3	0.77	0.74	-0.21
10,997.0	90.90	266.20	9,510.8	11.5	-1,739.5	1,739.2	1.08	-0.95	-0.53
11,092.0	90.10	266.20	9,510.0	5.2	-1,834.3	1,834.1	0.84	-0.84	0.00
11,187.0	89.90	268.50	9,510.0	0.8	-1,929.2	1,929.0	2.43	-0.21	2.42
11,281.0	90.30	268.00	9,509.8	-2.0	-2,023.1	2,023.0	0.68	0.43	-0.53
11,373.0	90.10	269.50	9,509.5	-4.1	-2,115.1	2,115.0	1.64	-0.22	1.63
11,465.0	90.80	269.70	9,508.7	-4.7	-2,207.1	2,207.0	0.79	0.76	0.22
11,558.0	91.30	268.90	9,507.0	-5.8	-2,300.1	2,300.0	1.01	0.54	-0.86
11,652.0	91.30	268.00	9,504.9	-8.4	-2,394.0	2,393.9	0.96	0.00	-0.96

Company:	Marshall & Winston, Inc	Local Co-ordinate Reference:	Well TJG Federal Com 3 #1H
Project:	Lea County, NM	TVD Reference:	WELL @ 3674.0usft (McVay #8)
Site:	Sec 3, T19-S, R32E	MD Reference:	WELL @ 3674.0usft (McVay #8)
Well:	TJG Federal Com 3 #1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
11,746.0	89.20	266.70	9,504.5	-12.7	-2,487.9	2,487.9	2.63	-2.23	-1.38
11,838.0	89.60	266.60	9,505.5	-18.1	-2,579.8	2,579.8	0.45	0.43	-0.11
11,932.0	90.60	267.10	9,505.3	-23.3	-2,673.6	2,673.7	1.19	1.06	0.53
12,027.0	91.20	266.70	9,503.8	-28.4	-2,768.5	2,768.6	0.76	0.63	-0.42
12,122.0	90.50	267.60	9,502.4	-33.1	-2,863.3	2,863.5	1.20	-0.74	0.95
12,216.0	90.40	268.10	9,501.7	-36.6	-2,957.3	2,957.5	0.54	-0.11	0.53
12,310.0	90.70	269.50	9,500.8	-38.6	-3,051.2	3,051.5	1.52	0.32	1.49
12,405.0	91.20	268.70	9,499.2	-40.1	-3,146.2	3,146.5	0.99	0.53	-0.84
12,499.0	89.60	269.90	9,498.5	-41.3	-3,240.2	3,240.5	2.13	-1.70	1.28
12,594.0	90.00	269.50	9,498.9	-41.7	-3,335.2	3,335.5	0.60	0.42	-0.42
12,689.0	90.60	269.00	9,498.4	-43.0	-3,430.2	3,430.5	0.82	0.63	-0.53
12,782.0	90.60	270.40	9,497.4	-43.5	-3,523.2	3,523.4	1.51	0.00	1.51
12,877.0	91.40	269.90	9,495.7	-43.2	-3,618.2	3,618.4	0.99	0.84	-0.53
12,970.0	90.20	270.10	9,494.4	-43.2	-3,711.1	3,711.4	1.31	-1.29	0.22
13,063.0	90.80	269.90	9,493.6	-43.2	-3,804.1	3,804.4	0.68	0.65	-0.22
13,158.0	91.40	269.90	9,491.8	-43.4	-3,899.1	3,899.4	0.63	0.63	0.00
13,252.0	91.40	269.90	9,489.5	-43.6	-3,993.1	3,993.3	0.00	0.00	0.00
13,346.0	92.20	269.20	9,486.5	-44.3	-4,087.0	4,087.3	1.13	0.85	-0.74
13,439.0	91.90	268.70	9,483.2	-46.0	-4,180.0	4,180.2	0.63	-0.32	-0.54
13,533.0	91.10	268.10	9,480.8	-48.6	-4,273.9	4,274.2	1.06	-0.85	-0.64
13,626.0	91.90	268.30	9,478.3	-51.5	-4,366.8	4,367.1	0.89	0.86	0.22
13,720.0	92.30	268.00	9,474.9	-54.6	-4,460.7	4,461.0	0.53	0.43	-0.32
13,815.0	92.90	267.30	9,470.6	-58.5	-4,555.5	4,555.9	0.97	0.63	-0.74
13,835.0	93.00	267.40	9,469.5	-59.4	-4,575.5	4,575.9	0.71	0.50	0.50
TD @ 13885' MD / 9467' TVD									
13,885.0	93.00	267.40	9,466.9	-61.7	-4,625.4	4,625.8	0.00	0.00	0.00

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
8,680.0	8,679.1	39.1	-36.1	Tie In @ 8680' MD / 8679' TVD
13,885.0	9,466.9	-61.7	-4,625.4	TD @ 13885' MD / 9467' TVD

Checked By: _____	Approved By: _____	Date: _____
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Gyroscopic Survey Report
for
MARSHALL & WINSTON

Well Location	LEA COUNTY, TEXAS
Well Name	TJG FEDERAL COM 3 #1H
Rig Number	McVAY #8
Survey Date	10/11/2013
Latitude	32.6830000°N
North Reference	Grid North
Grid Correction	-0.32 deg
Depth Reference	RKB (19.60 ft)
Calculation Method	Minimum Curvature
Section (VS) Ref	0.00N (ft), 0.00E (ft), 269.83Azim (deg)
Definitive Survey	FINAL GYRO SURVEY
Operator(s)	LEO GARZA

Well Notes



Well Name: TJG FEDERAL COM 3 #1H

Survey: FINAL GYRO SURVEY

Survey Date: 10/11/2013

MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS 7100ft	Closure Distance ft	Closure Direction deg
0.00	0.00	0.00	0.00	0.00	0.00	0.00	Invalid	0.00	0.00
100.00	0.10	193.35	100.00	0.02	-0.09	-0.02	0.10	0.09	193.35
200.00	0.06	281.95	200.00	0.10	-0.16	-0.10	0.12	0.19	210.60
300.00	0.10	318.21	300.00	0.21	-0.09	-0.21	0.06	0.22	247.02
400.00	0.11	255.82	400.00	0.35	-0.05	-0.35	0.11	0.36	262.33
500.00	0.10	273.88	500.00	0.53	-0.06	-0.53	0.03	0.54	263.12
600.00	0.25	272.95	600.00	0.84	-0.05	-0.84	0.15	0.84	266.83
700.00	0.35	273.56	700.00	1.37	-0.02	-1.37	0.10	1.37	269.32
800.00	0.35	276.09	800.00	1.98	0.03	-1.98	0.02	1.98	271.01
900.00	0.35	273.74	899.99	2.58	0.09	-2.58	0.01	2.58	271.92
1000.00	0.42	262.76	999.99	3.24	0.06	-3.24	0.10	3.25	271.06
1100.00	0.57	250.78	1099.99	4.08	-0.15	-4.08	0.18	4.08	267.90
1200.00	0.60	252.49	1199.98	5.04	-0.47	-5.04	0.04	5.06	264.68
1300.00	0.63	257.67	1299.98	6.08	-0.74	-6.08	0.07	6.13	263.02
1400.00	0.91	253.49	1399.97	7.38	-1.09	-7.38	0.28	7.46	261.62
1500.00	0.79	262.97	1499.96	8.82	-1.40	-8.82	0.18	8.93	261.00
1600.00	0.60	266.47	1599.95	10.03	-1.51	-10.03	0.19	10.14	261.42
1700.00	0.47	288.96	1699.95	10.95	-1.41	-10.94	0.25	11.03	262.66
1800.00	0.40	311.46	1799.94	11.60	-1.04	-11.60	0.19	11.65	264.86
1900.00	0.36	326.19	1899.94	12.04	-0.55	-12.04	0.11	12.05	267.38
2000.00	0.43	346.45	1999.94	12.30	0.07	-12.30	0.15	12.30	270.33
2100.00	0.47	14.15	2099.93	12.28	0.83	-12.28	0.22	12.31	273.88
2200.00	0.62	30.08	2199.93	11.91	1.70	-11.91	0.21	12.03	278.12
2300.00	0.79	36.89	2299.92	11.22	2.72	-11.23	0.19	11.55	283.61
2400.00	0.93	44.45	2399.91	10.23	3.85	-10.25	0.18	10.95	290.60
2500.00	1.70	39.94	2499.88	8.71	5.57	-8.72	0.77	10.35	302.56
2600.00	2.06	43.82	2599.83	6.50	8.01	-6.52	0.38	10.33	320.83
2700.00	2.24	46.08	2699.76	3.84	10.66	-3.87	0.19	11.34	340.04
2800.00	2.18	44.41	2799.69	1.10	13.37	-1.14	0.09	13.42	355.14
2900.00	1.43	43.87	2899.64	-1.11	15.63	1.06	0.75	15.66	3.88
3000.00	1.06	44.38	2999.61	-2.62	17.19	2.57	0.37	17.38	8.50
3100.00	1.18	48.59	3099.59	-4.05	18.53	3.99	0.15	18.95	12.15
3200.00	1.17	37.30	3199.57	-5.44	20.02	5.38	0.23	20.73	15.05
3300.00	0.77	30.15	3299.56	-6.40	21.42	6.34	0.41	22.33	16.49
3400.00	0.60	17.54	3399.55	-6.90	22.50	6.83	0.22	23.51	16.90
3500.00	0.50	12.76	3499.55	-7.16	23.43	7.09	0.11	24.48	16.84



Well Name: TJG FEDERAL COM 3 #1H
 Survey: FINAL GYRO SURVEY
 Survey Date: 10/11/2013

MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS ft/100ft	Closure Distance ft	Closure Direction deg
3600.00	0.43	8.32	3599.54	-7.31	24.22	7.24	0.08	25.28	16.64
3700.00	0.35	14.06	3699.54	-7.44	24.88	7.37	0.08	25.95	16.49
3800.00	0.18	340.01	3799.54	-7.46	25.33	7.39	0.22	26.38	16.26
3900.00	0.19	313.76	3899.54	-7.29	25.60	7.21	0.09	26.59	15.73
4000.00	0.33	317.88	3999.54	-6.97	25.93	6.89	0.14	26.83	14.89
4100.00	0.32	323.84	4099.54	-6.61	26.37	6.53	0.04	27.17	13.92
4200.00	0.24	315.59	4199.53	-6.30	26.74	6.22	0.09	27.46	13.10
4300.00	0.20	299.02	4299.53	-6.00	26.98	5.92	0.08	27.62	12.38
4400.00	0.18	298.84	4399.53	-5.71	27.14	5.63	0.02	27.72	11.71
4500.00	0.24	305.35	4499.53	-5.40	27.34	5.31	0.07	27.85	11.00
4600.00	0.19	306.39	4599.53	-5.09	27.56	5.01	0.06	28.01	10.30
4700.00	0.17	292.99	4699.53	-4.82	27.72	4.74	0.04	28.12	9.71
4800.00	0.29	252.12	4799.53	-4.44	27.70	4.36	0.20	28.04	8.95
4900.00	0.37	260.37	4899.53	-3.88	27.56	3.80	0.10	27.83	7.84
5000.00	0.40	284.26	4999.53	-3.22	27.60	3.13	0.16	27.77	6.48
5100.00	0.47	286.97	5099.52	-2.48	27.80	2.40	0.07	27.91	4.93
5200.00	0.41	301.71	5199.52	-1.78	28.11	1.70	0.13	28.16	3.46
5300.00	0.51	297.64	5299.52	-1.08	28.51	0.99	0.10	28.53	2.00
5400.00	0.51	298.30	5399.51	-0.29	28.93	0.21	0.01	28.93	0.41
5500.00	0.54	297.91	5499.51	0.52	29.36	-0.60	0.04	29.37	358.82
5600.00	0.80	307.48	5599.50	1.49	30.01	-1.58	0.28	30.05	356.99
5700.00	1.03	311.50	5699.49	2.72	31.03	-2.81	0.24	31.16	354.83
5800.00	1.13	311.88	5799.47	4.12	32.29	-4.22	0.10	32.57	352.55
5900.00	1.12	316.13	5899.45	5.53	33.65	-5.63	0.08	34.12	350.50
6000.00	1.18	314.94	5999.43	6.93	35.08	-7.03	0.07	35.78	348.66
6100.00	1.04	315.49	6099.41	8.29	36.45	-8.40	0.14	37.41	347.03
6200.00	1.00	314.98	6199.40	9.54	37.72	-9.65	0.04	38.93	345.65
6300.00	0.89	313.49	6299.38	10.72	38.87	-10.83	0.11	40.35	344.43
6400.00	0.85	317.86	6399.37	11.78	39.96	-11.90	0.08	41.69	343.42
6500.00	0.83	318.88	6499.36	12.75	41.05	-12.87	0.03	43.02	342.59
6600.00	0.64	316.03	6599.35	13.61	42.00	-13.73	0.19	44.19	341.89
6700.00	0.62	311.72	6699.35	14.40	42.76	-14.52	0.05	45.16	341.24
6800.00	0.63	303.66	6799.34	15.25	43.42	-15.38	0.09	46.06	340.49
6900.00	0.71	309.51	6899.33	16.18	44.12	-16.31	0.11	47.04	339.71
7000.00	0.80	320.42	6999.33	17.10	45.05	-17.24	0.17	48.23	339.06
7100.00	0.77	324.11	7099.32	17.94	46.14	-18.08	0.06	49.55	338.60



Well Name: TJG FEDERAL COM 3 #1H

Survey: FINAL GYRO SURVEY

Survey Date: 10/11/2013

MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS 7100ft	Closure Distance ft	Closure Direction deg
7200.00	0.80	309.12	7199.31	18.88	47.12	-19.02	0.21	50.82	338.02
7300.00	0.51	282.34	7299.30	19.85	47.66	-19.99	0.42	51.68	337.24
7400.00	0.59	260.20	7399.30	20.79	47.67	-20.93	0.23	52.06	336.29
7500.00	0.89	255.20	7499.29	22.05	47.38	-22.19	0.31	52.32	334.90
7600.00	1.07	252.26	7599.27	23.69	46.90	-23.83	0.18	52.61	333.06
7700.00	1.27	250.74	7699.25	25.63	46.25	-25.77	0.20	52.94	330.88
7800.00	1.34	252.39	7799.23	27.79	45.53	-27.93	0.08	53.41	328.48
7900.00	1.41	266.60	7899.20	30.14	45.10	-30.27	0.35	54.32	326.13
8000.00	1.31	268.04	7999.17	32.51	44.99	-32.64	0.10	55.58	324.04
8100.00	0.52	254.22	8099.16	34.09	44.83	-34.22	0.82	56.40	322.64
8200.00	0.15	205.87	8199.15	34.58	44.59	-34.71	0.43	56.51	322.10
8300.00	0.13	168.57	8299.15	34.62	44.36	-34.75	0.09	56.35	321.93
8400.00	0.69	190.46	8399.15	34.70	43.65	-34.83	0.58	55.85	321.41
8500.00	0.96	194.64	8499.14	35.03	42.24	-35.16	0.27	54.96	320.23
8600.00	0.98	205.58	8599.13	35.62	40.66	-35.74	0.19	54.13	318.69
8680.00	1.37	187.33	8679.11	36.04	39.10	-36.15	0.67	53.25	317.24