



NM OIL CONSERVATION
ARTESIA DISTRICT

DEC 05 2016

RECEIVED

COG Operating LLC

Eddy County, NM (NAD-27 2015)

Clydesdale 1 Fee #6H

API #: 30-015-43396

SHL: 1650' FSL, 150' FEL, Sec 1, T19S, R25E, Unit I

PP: 1675' FSL, 330' FEL, Sec 1, T19S, R25E, Unit I

BHL: 1666' FSL, 354' FWL, Sec 1, T19S, R25E, Unit L

Design: Lateral 1

Standard Survey Report

17 August, 2016





TDS
Survey Report



Company: COG Operating LLC
Project: Eddy County, NM (NAD-27 2015)
Site: Clydesdale 1 Fee #6H
Well: SHL: 1650' FSL, 150' FEL, Sec 1, T19S, R25E, Unit I
Wellbore: BHL: 1666' FSL, 354 FWL, Sec 1, T19S, R25E, Unit L
Design: Lateral 1

Local Co-ordinate Reference: Well SHL: 1650' FSL, 150' FEL, Sec 1, T19S, R25E, Unit I
TVD Reference: KB @ 3416.00usft (Silver Oak 3)
MD Reference: KB @ 3416.00usft (Silver Oak 3)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Project Eddy County, NM (NAD-27 2015)
Map System: US State Plane 1927 (Exact solution)
Geo Datum: NAD 1927 (NADCON CONUS)
Map Zone: New Mexico East 3001
System Datum: Mean Sea Level

Site Clydesdale 1 Fee #6H
Site Position: Map
From: Map
Position Uncertainty: 0.00 usft

Northing: 613,567.70 usft
Easting: 470,377.80 usft
Slot Radius: 13.20 in

Latitude: 32° 41' 12.335 N
Longitude: 104° 25' 46.614 W
Grid Convergence: -0.05 °

Well SHL: 1650' FSL, 150' FEL, Sec 1, T19S, R25E, Unit I
Well Position +N/-S 0.00 usft
+E/-W 0.00 usft
Position Uncertainty 0.00 usft

Northing: 613,567.70 usft
Easting: 470,377.80 usft
Wellhead Elevation: 0.00 usft

Latitude: 32° 41' 12.335 N
Longitude: 104° 25' 46.614 W
Ground Level: 3,398.00 usft

Wellbore BHL: 1666' FSL, 354 FWL, Sec 1, T19S, R25E, Unit L

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	7/7/2016	7.49	60.36	48,217

Design Lateral 1
Audit Notes:
Version: 1.0
Phase: ACTUAL
Tie On Depth: 0.00

Vertical Section:

Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
0.00	0.00	0.00	270.26

Survey Program Date 8/17/2016

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
119.00	7,672.00	TDS MWD #1 (BHL: 1666' FSL, 354 FWL,	MWD	MWD - Standard

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)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
119.00	0.50	236.30	119.00	-0.29	-0.43	0.43	0.42	0.42	0.00
First TDS MWD Survey									
152.00	0.50	249.40	152.00	-0.42	-0.69	0.68	0.35	0.00	39.70
242.00	1.10	19.30	241.99	0.26	-0.77	0.77	1.64	0.67	144.33
333.00	3.10	48.90	332.93	2.70	1.37	-1.36	2.43	2.20	32.53
425.00	3.60	60.50	424.77	5.76	5.76	-5.74	0.91	0.54	12.61
513.00	4.00	67.90	512.58	8.27	11.01	-10.97	0.72	0.45	8.41



TDS
Survey Report



Company: COG Operating LLC

Local Co-ordinate Reference: Well SHL: 1650' FSL, 150' FEL, Sec 1, T19S, R25E, Unit I

Project: Eddy County, NM (NAD-27 2015)

TVD Reference: KB @ 3416.00usft (Silver Oak 3)

Site: Clydesdale 1 Fee #6H

MD Reference: KB @ 3416.00usft (Silver Oak 3)

Well: SHL: 1650' FSL, 150' FEL, Sec 1, T19S, R25E, Unit I

North Reference: Grid

Wellbore: BHL: 1666' FSL, 354 FWL, Sec 1, T19S, R25E, Unit L

Survey Calculation Method: Minimum Curvature

Design: Lateral 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)
602.00	4.10	81.50	601.36	9.91	17.03	-16.99	1.08	0.11	15.28
689.00	4.10	93.80	688.14	10.17	23.21	-23.17	1.01	0.00	14.14
779.00	4.10	88.00	777.91	10.06	29.64	-29.59	0.46	0.00	-6.44
840.00	4.10	86.50	838.75	10.27	34.00	-33.95	0.18	0.00	-2.46
902.00	4.20	86.60	900.59	10.54	38.47	-38.43	0.16	0.16	0.16
995.00	4.40	85.10	993.33	11.05	45.43	-45.38	0.25	0.22	-1.61
1,089.00	4.60	89.20	1,087.04	11.41	52.79	-52.74	0.40	0.21	4.36
1,182.00	4.70	90.40	1,179.73	11.44	60.33	-60.28	0.15	0.11	1.29
1,272.00	5.00	92.60	1,269.41	11.23	67.93	-67.88	0.39	0.33	2.44
1,303.00	5.10	91.20	1,300.29	11.14	70.66	-70.61	0.51	0.32	-4.52
1,397.00	4.00	69.20	1,394.00	12.22	77.90	-77.85	2.17	-1.17	-23.40
1,490.00	3.80	69.70	1,486.78	14.44	83.83	-83.76	0.22	-0.22	0.54
1,583.00	3.90	67.60	1,579.57	16.71	89.64	-89.56	0.19	0.11	-2.26
1,676.00	3.90	63.60	1,672.36	19.33	95.40	-95.31	0.29	0.00	-4.30
1,769.00	3.90	83.50	1,765.15	21.09	101.37	-101.28	1.45	0.00	21.40
1,862.00	3.70	82.90	1,857.94	21.82	107.49	-107.39	0.22	-0.22	-0.65
1,955.00	3.70	82.20	1,950.75	22.60	113.44	-113.34	0.05	0.00	-0.75
2,048.00	3.80	79.30	2,043.55	23.58	119.45	-119.34	0.23	0.11	-3.12
2,142.00	1.80	68.00	2,137.43	24.71	123.88	-123.76	2.20	-2.13	-12.02
2,235.00	0.40	9.80	2,230.42	25.58	125.28	-125.17	1.75	-1.51	-62.58
2,328.00	0.40	122.70	2,323.41	25.72	125.61	-125.49	0.72	0.00	121.40
2,359.00	0.50	119.20	2,354.41	25.60	125.82	-125.70	0.33	0.32	-11.29
2,390.00	0.70	263.10	2,385.41	25.51	125.75	-125.63	3.69	0.65	464.19
2,421.00	4.20	271.10	2,416.38	25.51	124.43	-124.31	11.32	11.29	25.81
2,452.00	7.10	273.00	2,447.23	25.63	121.38	-121.26	9.37	9.35	6.13
2,483.00	10.00	279.80	2,477.88	26.19	116.81	-116.69	9.89	9.35	21.94
2,514.00	12.80	281.60	2,508.26	27.34	110.80	-110.67	9.10	9.03	5.81
2,546.00	16.10	277.90	2,539.25	28.66	102.93	-102.79	10.70	10.31	-11.56
2,576.00	19.60	276.00	2,567.80	29.76	93.80	-93.66	11.83	11.67	-6.33
2,608.00	22.70	274.00	2,597.64	30.75	82.30	-82.16	9.95	9.69	-6.25
2,639.00	26.60	275.40	2,625.81	31.82	69.42	-69.27	12.72	12.58	4.52
2,670.00	30.30	274.30	2,653.06	33.06	54.70	-54.55	12.05	11.94	-3.55
2,701.00	34.90	273.60	2,679.17	34.20	38.05	-37.89	14.89	14.84	-2.26
2,731.00	38.20	271.50	2,703.27	34.99	20.20	-20.04	11.76	11.00	-7.00
2,762.00	40.90	270.00	2,727.17	35.24	0.47	-0.31	9.24	8.71	-4.84
2,794.00	43.60	269.40	2,750.86	35.12	-21.04	21.21	8.53	8.44	-1.88
2,825.00	47.60	267.90	2,772.54	34.59	-43.18	43.34	13.36	12.90	-4.84
2,856.00	51.30	266.80	2,792.69	33.49	-66.71	66.86	12.24	11.94	-3.55
2,887.00	55.30	265.90	2,811.21	31.91	-91.50	91.65	13.11	12.90	-2.90
2,918.00	59.10	264.90	2,828.00	29.81	-117.47	117.61	12.55	12.26	-3.23
2,949.00	62.50	265.70	2,843.13	27.60	-144.44	144.56	11.20	10.97	2.58
2,981.00	65.90	267.40	2,857.05	25.87	-173.19	173.31	11.65	10.63	5.31



TDS
Survey Report



Company: COG Operating LLC

Local Co-ordinate Reference: Well SHL: 1650' FSL, 150' FEL, Sec 1, T19S, R25E, Unit I

Project: Eddy County, NM (NAD-27 2015)

TVD Reference: KB @ 3416.00usft (Silver Oak 3)

Site: Clydesdale 1 Fee #6H

MD Reference: KB @ 3416.00usft (Silver Oak 3)

Well: SHL: 1650' FSL, 150' FEL, Sec 1, T19S, R25E, Unit I

North Reference: Grid

Wellbore: BHL: 1666' FSL, 354 FWL, Sec 1, T19S, R25E, Unit L

Survey Calculation Method: Minimum Curvature

Design: Lateral 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)
2,988.23	66.62	267.73	2,859.96	25.59	-179.80	179.92	10.83	9.98	4.60
As-Drilled PP									
3,012.00	69.00	268.80	2,868.94	24.93	-201.80	201.91	10.83	10.00	4.49
3,043.00	72.00	268.80	2,879.29	24.31	-231.01	231.12	9.68	9.68	0.00
3,073.00	75.00	268.50	2,887.81	23.64	-259.77	259.87	10.05	10.00	-1.00
3,105.00	78.10	269.80	2,895.25	23.18	-290.88	290.98	10.46	9.69	4.06
3,136.00	81.90	270.70	2,900.63	23.31	-321.40	321.51	12.59	12.26	2.90
3,167.00	85.00	272.10	2,904.17	24.07	-352.19	352.29	10.96	10.00	4.52
3,198.00	88.40	272.10	2,905.95	25.20	-383.11	383.22	10.97	10.97	0.00
3,260.00	89.10	271.50	2,907.30	27.15	-445.06	445.18	1.49	1.13	-0.97
3,353.00	90.30	270.30	2,907.79	28.61	-538.05	538.17	1.82	1.29	-1.29
3,446.00	90.30	270.50	2,907.30	29.26	-631.05	631.17	0.22	0.00	0.22
3,539.00	89.50	269.90	2,907.47	29.58	-724.04	724.17	1.08	-0.86	-0.65
3,632.00	91.20	270.50	2,906.90	29.91	-817.04	817.17	1.94	1.83	0.65
3,726.00	90.80	270.40	2,905.26	30.64	-911.02	911.15	0.44	-0.43	-0.11
3,820.00	90.30	270.00	2,904.36	30.97	-1,005.01	1,005.15	0.68	-0.53	-0.43
3,913.00	90.00	269.80	2,904.11	30.81	-1,098.01	1,098.14	0.39	-0.32	-0.22
4,005.00	92.00	270.90	2,902.51	31.37	-1,189.99	1,190.12	2.48	2.17	1.20
4,099.00	91.70	270.90	2,899.47	32.85	-1,283.93	1,284.07	0.32	-0.32	0.00
4,192.00	91.10	270.20	2,897.20	33.74	-1,376.90	1,377.04	0.99	-0.65	-0.75
4,254.00	91.60	270.70	2,895.74	34.23	-1,438.88	1,439.02	1.14	0.81	0.81
4,314.00	92.30	270.50	2,893.70	34.85	-1,498.84	1,498.98	1.21	1.17	-0.33
4,407.00	92.30	270.40	2,889.96	35.58	-1,591.76	1,591.91	0.11	0.00	-0.11
4,501.00	92.40	269.90	2,886.11	35.83	-1,685.68	1,685.83	0.54	0.11	-0.53
4,595.00	91.70	270.90	2,882.75	36.49	-1,779.62	1,779.77	1.30	-0.74	1.06
4,689.00	91.60	270.20	2,880.04	37.39	-1,873.57	1,873.73	0.75	-0.11	-0.74
4,782.00	91.80	269.70	2,877.28	37.31	-1,966.53	1,966.68	0.58	0.22	-0.54
4,875.00	91.60	269.90	2,874.52	36.98	-2,059.49	2,059.64	0.30	-0.22	0.22
4,969.00	91.60	269.30	2,871.90	36.33	-2,153.45	2,153.60	0.64	0.00	-0.64
5,062.00	91.60	269.40	2,869.30	35.27	-2,246.41	2,246.55	0.11	0.00	0.11
5,156.00	91.60	268.80	2,866.68	33.79	-2,340.36	2,340.49	0.64	0.00	-0.64
5,249.00	92.00	271.20	2,863.76	33.79	-2,433.31	2,433.44	2.61	0.43	2.58
5,341.00	92.00	270.30	2,860.54	35.00	-2,525.24	2,525.38	0.98	0.00	-0.98
5,435.00	91.90	270.40	2,857.35	35.57	-2,619.19	2,619.32	0.15	-0.11	0.11
5,529.00	91.80	270.30	2,854.31	36.15	-2,713.14	2,713.27	0.15	-0.11	-0.11
5,622.00	91.50	269.70	2,851.63	36.15	-2,806.10	2,806.23	0.72	-0.32	-0.65
5,716.00	92.10	270.60	2,848.68	36.39	-2,900.05	2,900.19	1.15	0.64	0.96
5,809.00	91.90	270.20	2,845.44	37.04	-2,992.99	2,993.13	0.48	-0.22	-0.43
5,902.00	91.60	270.20	2,842.60	37.37	-3,085.95	3,086.09	0.32	-0.32	0.00
5,995.00	91.40	270.20	2,840.16	37.69	-3,178.91	3,179.05	0.22	-0.22	0.00
6,088.00	91.70	269.30	2,837.64	37.28	-3,271.88	3,272.01	1.02	0.32	-0.97
6,182.00	91.90	270.80	2,834.69	37.37	-3,365.83	3,365.96	1.61	0.21	1.60



TDS
Survey Report



Company: COG Operating LLC

Local Co-ordinate Reference:

Well SHL: 1650' FSL, 150' FEL, Sec 1, T19S, R25E, Unit I

Project: Eddy County, NM (NAD-27 2015)

TVD Reference:

KB @ 3416.00usft (Silver Oak 3)

Site: Clydesdale 1 Fee #6H

MD Reference:

KB @ 3416.00usft (Silver Oak 3)

Well: SHL: 1650' FSL, 150' FEL, Sec 1, T19S, R25E, Unit I

North Reference:

Grid

Wellbore: BHL: 1666' FSL, 354 FWL, Sec 1, T19S, R25E, Unit L

Survey Calculation Method:

Minimum Curvature

Design: Lateral 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)
6,276.00	91.60	270.30	2,831.82	38.27	-3,459.78	3,459.92	0.62	-0.32	-0.53
6,368.00	91.60	270.20	2,829.25	38.67	-3,551.74	3,551.88	0.11	0.00	-0.11
6,462.00	92.20	270.00	2,826.14	38.83	-3,645.69	3,645.83	0.67	0.64	-0.21
6,555.00	92.00	269.90	2,822.73	38.75	-3,738.63	3,738.77	0.24	-0.22	-0.11
6,648.00	92.40	270.30	2,819.16	38.91	-3,831.56	3,831.70	0.61	0.43	0.43
6,742.00	92.00	270.60	2,815.55	39.65	-3,925.49	3,925.63	0.53	-0.43	0.32
6,836.00	91.90	270.50	2,812.35	40.55	-4,019.43	4,019.57	0.15	-0.11	-0.11
6,930.00	91.60	269.80	2,809.48	40.80	-4,113.38	4,113.53	0.81	-0.32	-0.74
7,022.00	92.00	270.30	2,806.59	40.88	-4,205.34	4,205.48	0.70	0.43	0.54
7,116.00	92.10	269.80	2,803.23	40.96	-4,299.28	4,299.42	0.54	0.11	-0.53
7,209.00	92.10	270.30	2,799.82	41.04	-4,392.21	4,392.36	0.54	0.00	0.54
7,302.00	91.90	270.00	2,796.57	41.29	-4,485.16	4,485.30	0.39	-0.22	-0.32
7,395.00	91.60	270.50	2,793.73	41.69	-4,578.11	4,578.26	0.63	-0.32	0.54
7,490.00	91.30	270.50	2,791.33	42.52	-4,673.08	4,673.22	0.32	-0.32	0.00
7,584.00	92.30	270.10	2,788.38	43.01	-4,767.03	4,767.18	1.15	1.06	-0.43

Final TDS MWD Survey

7,672.00	92.30	270.10	2,784.85	43.17	-4,854.96	4,855.11	0.00	0.00	0.00
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Projection to Bit/TD

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Comment
119.00	119.00	-0.29	-0.43	First TDS MWD Survey
2,988.23	2,859.96	25.59	-179.80	As-Drilled PP
7,584.00	2,788.38	43.01	-4,767.03	Final TDS MWD Survey
7,672.00	2,784.85	43.17	-4,854.96	Projection to Bit/TD

Checked By:

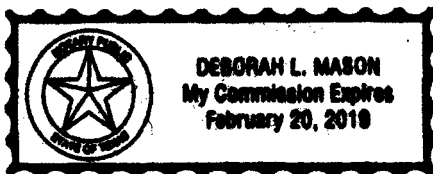
Deborah L. Mason

Approved By:

Samuel H.

Date:

11/2/2016





11/2/16

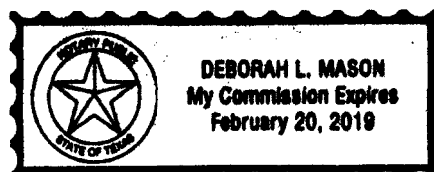
State of New Mexico
County of Eddy

I, Donald D. Mason, certify that: I am employed by Terra Directional Services LLC; that I did on the day(s) of 07/27/2016 through 08/03/2016 conduct or supervise the taking of a MWD survey from a depth of 119 feet to a depth of 7672 feet; that the data is true, correct, complete and within the limitations of the tool as set forth by Terra Directional Services LLC; that I am authorized and qualified to make this report; that this survey was conducted at the request of COG Operating LLC for the Clydesdale 1 Fee #6H Well API 30-015-43396 in Eddy County, New Mexico; and that I have reviewed this report and find that it conforms to the principles and procedures as set forth by Terra Directional Services LLC.

Donald D. Mason
President

State of Texas
County of Burnet

Before me, a notary public, on this day personally appeared Donald D Mason, known to me to be the person whose name is subscribed to the foregoing document and, being by me first duly sworn, declared that the statements therein contained are true and correct.



Notary Public's Signature



PO Box 1370
Artesia, NM 88211-1370
(575) 748-1288

August 5, 2016

COG, LLC
One Concho Center
600 W. Illinois Ave.
Midland, TX 79701

RE: Clydesdale 1 Fee #6H
1650' FSL & 150' FEL
Sec. 1, T19S, R25E
Eddy County, New Mexico

Dear Sir,

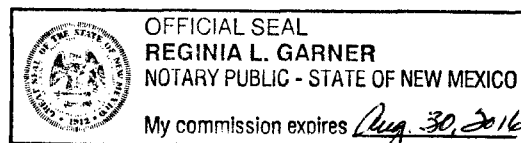
The attached is the Deviation Survey for the above captioned well.

Very truly yours,

Chris Graham
Drilling Superintendent

State of New Mexico }
County of Eddy }

The foregoing was acknowledged before me this 5th day of August, 2016.

Notary Public

Clydesdale 1 Fee 6H

Date	Depth	Deviation	Direction
7/28/2016	152	0.50	249.40
7/28/2016	241	1.10	19.30
7/28/2016	333	3.10	332.90
7/28/2016	513	4.00	67.90
7/28/2016	602	4.10	81.50
7/28/2016	689	4.10	93.80
7/28/2016	840	4.10	86.50
7/28/2016	902	4.20	86.60
7/28/2016	995	4.40	85.10
7/28/2016	1089	4.60	89.20
7/28/2016	1182	4.70	90.40
7/29/2016	1272	5.00	92.60
7/29/2016	1303	5.10	91.20
7/29/2016	1397	4.00	69.20
7/30/2016	1490	3.80	69.70
7/30/2016	1583	3.90	67.60
7/30/2016	1676	3.90	63.60
7/30/2016	1769	3.90	83.50
7/30/2016	1862	3.70	82.90
7/30/2016	1955	3.70	82.20
7/30/2016	2048	3.80	79.30
7/30/2016	2142	1.80	
7/30/2016	2235	0.40	9.80
7/30/2016	2359	0.50	119.20
7/30/2016	2424	4.20	271.10
7/30/2016	2514	12.80	281.60
7/31/2016	2576	19.60	276.00
7/31/2016	2670	30.30	274.30
7/31/2016	2731	38.20	271.50
7/31/2016	2825	47.60	267.90
7/31/2016	2887	55.30	265.90
7/31/2016	2918	59.10	264.90
7/31/2016	2949	62.50	265.70
7/31/2016	3043	72.00	268.80
7/31/2016	3073	75.00	268.50
7/31/2016	3136	81.90	270.70
7/31/2016	3260	89.10	271.50
7/31/2016	3353	90.30	270.30
8/1/2016	3446	90.30	270.50
8/1/2016	3539	89.50	269.90
8/1/2016	3632	91.20	270.50
8/1/2016	3726	90.80	270.40

Date	Depth	Deviation	Direction
8/1/2016	3820	90.30	270.00
8/1/2016	4005	92.00	270.90
8/1/2016	4079	91.70	270.90
8/1/2016	4254	91.60	270.70
8/1/2016	4314	92.30	270.50
8/1/2016	4407	92.30	270.40
8/1/2016	4501	92.40	269.90
8/1/2016	4595	91.70	270.90
8/1/2016	4689	91.60	270.20
8/2/2016	4782	91.80	269.70
8/2/2016	4875	91.60	269.90
8/2/2016	4969	91.60	269.30
8/2/2016	5062	91.60	269.40
8/2/2016	5156	91.60	268.80
8/2/2016	5249	92.00	271.20
8/2/2016	5341	92.00	270.30
8/2/2016	5435	91.90	270.40
8/2/2016	5529	91.80	270.30
8/2/2016	5622	91.50	269.70
8/2/2016	5716	92.10	270.60
8/2/2016	5809	91.90	270.20
8/2/2016	5902	91.60	270.20
8/2/2016	5995	91.40	270.20
8/2/2016	6088	91.70	269.30
8/2/2016	6182	91.90	270.80
8/2/2016	6276	91.60	270.30
8/3/2016	6368	91.60	270.20
8/3/2016	6462	92.20	270.00
8/3/2016	6555	92.00	269.90
8/3/2016	6648	92.40	270.30
8/3/2016	6742	92.00	270.60
8/3/2016	6836	91.90	270.50
8/3/2016	6930	91.60	268.80
8/3/2016	7022	92.00	270.30
8/3/2016	7116	92.10	269.80
8/3/2016	7209	92.10	270.30
8/3/2016	7302	91.90	270.00
8/3/2016	7395	91.60	270.50
8/3/2016	7490	91.30	270.50
8/3/2016	7584	92.30	270.10