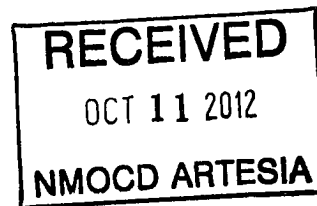
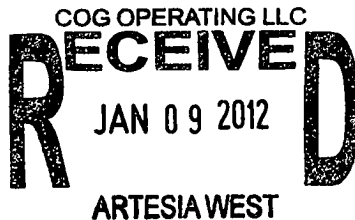




PO Box 1370
Artesia, NM 88211-1370
(575) 748-1288



December 28, 2011

15-39542

COG, LLC
Fasken Center, Tower II
550 West Texas Ave, Suite 1300
Midland, TX 79701

RE: Copperhead 30 Fee #1H
480' FNL & 480' FEL
Sec. 30, T26S, R29E
Eddy County, New Mexico

Dear Sir,

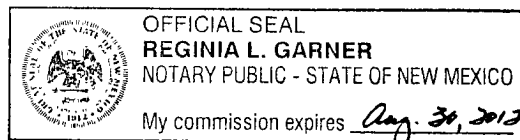
The attached is the Deviation Survey for the above captioned well.

Very truly yours,

Eddie C. LaRue
Operations Manager

State of New Mexico }
County of Eddy }

The foregoing was acknowledged before me this 28th day of December, 2011.

Notary Public

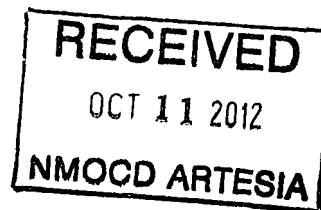
Pason DataHub Deviation Survey

Well Dossier 1322614018 - COPPERHEAD 30 FEE #1H

#

#	Date	Depth	Deviation	Direction	TVD
	11/30/2011	155	0.1	0	0
	11/30/2011	311	0.8	0	0
	12/1/2011	448	1.9	0	0
	12/3/2011	680	1.5	0	0
	12/3/2011	1052	1.9	0	0
	12/3/2011	1175	0.1	0	0
	12/4/2011	1536	1.2	0	0
	12/4/2011	1937	1.2	0	0
	12/5/2011	2140	1.4	0	0
	12/5/2011	2560	2.7	0	0
	12/8/2011	2868	2.9	0	0
	12/8/2011	3132	3.0	0	0
	12/9/2011	3764	1.2	0	0
	12/9/2011	4165	0.4	0	0
	12/9/2011	4549	1.2	0	0
	12/10/2011	4970	1.6	0	0
	12/10/2011	5433	2.1	0	0
	12/10/2011	5909	2.2	0	0
	12/11/2011	6396	0.1	0	0
	12/12/2011	6873	2.4	0	0
	12/12/2011	7148	3.0	0	0
	12/12/2011	7274	2.2	0	0
	12/12/2011	7433	2.8	0	0
	12/16/2011	6566	5.3	256.6	0
	12/16/2011	6846	29.0	266.8	6851
	12/18/2011	7005	30.9	277.1	0
	12/19/2011	7163	46.1	280.5	0
	12/19/2011	7342	81.2	274.8	0
	12/20/2011	7576	96.7	270.9	0
	12/20/2011	7993	96.5	271.5	0
	12/21/2011	8813	89.8	269.4	0
	12/21/2011	9171	93.0	270.7	9223
	12/24/2011	9862	88.5	272.8	7086
	12/24/2011	9957	89.0	272.1	7088
	12/25/2011	10812	93.4	271.3	7061
	12/25/2011	11002	90.9	272.7	7054
	12/25/2011	11193	90.3	272.2	7052
	12/26/2011	11372	90.5	271.8	7051

EOF



COG OPERATING

WC Bone Spring
Eddy County, NM
Copperhead "30" Fee #1H
VH - Job #32K12111207

Survey: Gyro

SDI Standard Survey Report

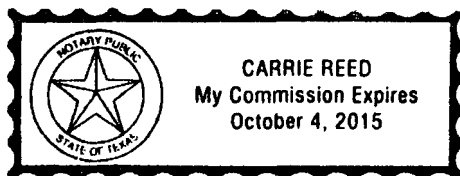
This survey is correct to the best of my knowledge and is supported by actual field data.

K. L. Martin

Notarized this date 31st of December, 2011.

Carrie Reed

Notary Signature
County of Midland
State of Texas



Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well Copperhead "30" Fee #1H
Project:	WC Bone Spring	TVD Reference:	WELL @ 0.0usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0.0usft (Original Well Elev)
Well:	Copperhead "30" Fee #1H	North Reference:	Grid
Wellbore:	VH - Job #32K12111207	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K12111207	Database:	EDM-Regulatory

Project	WC Bone Spring		
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	Eddy County, NM		
Site Position:		Northing:	391,811.97 usft
From:	Lat/Long	Easting:	572,493.48 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"
		Latitude:	32° 4' 37.166 N
		Longitude:	104° 5' 57.422 W
		Grid Convergence:	0.12 °

Well	Copperhead "30" Fee #1H, Directional (Phoenix)		
Well Position	+N/-S	0.0 usft	Northing: 370,981.53 usft
	+E/-W	0.0 usft	Easting: 598,118.03 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft
		Latitude:	32° 1' 10.370 N
		Longitude:	104° 1' 0.306 W
		Ground Level:	0.0 usft

Wellbore	VH - Job #32K12111207				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	12/13/2011	7.71	59.91	48,419

Design	VH - Job #32K12111207			
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	272.19

Survey Program	Date	1/22/2012		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.0	7,672.0	Gyro (VH - Job #32K12111207)	Keeper	Keeper Gyro

Survey								
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)	
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.0	
100.0	0.24	288.19	100.0	0.1	-0.2	288.19	0.2	
200.0	0.43	344.30	200.0	0.5	-0.5	314.57	0.7	
300.0	1.67	344.47	300.0	2.3	-1.0	336.29	2.5	
400.0	1.89	353.45	399.9	5.3	-1.6	343.50	5.5	
500.0	1.96	354.64	499.9	8.6	-1.9	347.49	8.9	
600.0	1.87	352.93	599.8	12.0	-2.3	349.22	12.2	
700.0	1.69	349.70	699.8	15.0	-2.7	349.66	15.3	
800.0	1.63	332.01	799.7	17.7	-3.7	348.30	18.1	
900.0	1.56	316.53	899.7	20.0	-5.3	345.21	20.7	
1,000.0	1.51	307.43	999.7	21.8	-7.3	341.56	22.9	
1,100.0	1.35	296.35	1,099.6	23.1	-9.4	337.93	24.9	

Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well Copperhead "30" Fee #1H
Project:	WC Bone Spring	TVD Reference:	WELL @ 0 0usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0 0usft (Original Well Elev)
Well:	Copperhead "30" Fee #1H	North Reference:	Grid
Wellbore:	VH - Job #32K12111207	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K12111207	Database:	EDM-Regulatory

Survey								
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)	
1,200 0	1 12	281 14	1,199 6	23 8	-11 4	334 46	26 4	
1,300 0	1 03	252 63	1,299 6	23 7	-13 2	330 92	27 1	
1,400 0	1 03	253 47	1,399 6	23 2	-14 9	327 27	27 6	
1,500 0	1 26	282 87	1,499 5	23 2	-16 8	324 01	28 7	
1,600 0	1 73	299 26	1,599 5	24 2	-19 2	321 49	30 9	
1,700 0	1 61	304 17	1,699.5	25 7	-21 7	319 81	33 6	
1,800 0	1.38	296 10	1,799 4	27 0	-24 0	318 44	36 1	
1,900 0	1 12	294 16	1,899 4	28 0	-25 9	317 15	38.1	
2,000 0	0 89	292 08	1,999 4	28 6	-27 5	316 12	39 7	
2,100 0	1 43	65 22	2,099 4	29 5	-27 1	317 36	40 0	
2,200 0	2 71	88.81	2,199 3	30 0	-23 6	321 80	38 2	
2,300 0	2 92	91 06	2,299 2	30 0	-18 7	328 06	35 4	
2,400 0	4.52	92 04	2,399 0	29 8	-12 2	337 70	32.3	
2,500 0	5 71	96 88	2,498 6	29 1	-3 4	353 41	29 3	
2,600 0	5 05	98 41	2,598 1	27 9	5 9	12 02	28 5	
2,700 0	4.48	100 04	2,697 8	26 5	14 1	28 03	30 1	
2,800 0	3 89	102 07	2,797 5	25 2	21 3	40 25	33 0	
2,900.0	3 82	102 50	2,897.3	23 7	27 9	49 59	36.6	
3,000 0	3 54	101 15	2,997.1	22.4	34 1	56 73	40 8	
3,100 0	3 30	99 74	3,096 9	21 3	40 0	61 95	45 3	
3,200.0	3 15	100 41	3,196 8	20 3	45 6	65 94	49 9	
3,300 0	2 89	101 40	3,296 6	19 3	50 7	69 13	54.3	
3,400 0	2 61	102 17	3,396 5	18 4	55 4	71 67	58 4	
3,500 0	2 52	101 98	3,496 4	17.4	59 8	73 75	62 3	
3,600 0	2 07	100 01	3,596 3	16 7	63 7	75 35	65 9	
3,700 0	1 70	95 57	3,696 3	16 2	67 0	76 40	68 9	
3,800 0	1 65	95 20	3,796 2	15 9	69 9	77 16	71 7	
3,900 0	1 43	91 03	3,896 2	15 8	72 6	77 74	74 3	
4,000 0	1 25	87 48	3,996 2	15.8	74 9	78 09	76 6	
4,100 0	1 09	89 73	4,096 2	15 9	77 0	78 36	78 6	
4,200 0	0 85	85 94	4,196 1	15 9	78 6	78 56	80 2	
4,300 0	0 78	87 14	4,296 1	16 0	80 1	78 70	81 6	
4,400 0	0 51	83 13	4,396 1	16 1	81 2	78 80	82 8	
4,500 0	0 28	80 71	4,496 1	16 2	81 9	78 82	83 4	
4,600 0	0 18	98 91	4,596 1	16 2	82 3	78 87	83 8	
4,700 0	0 31	159 25	4,696 1	15 9	82 5	79 08	84 0	
4,800 0	0 47	186 93	4,796 1	15 3	82 6	79 53	84 0	
4,900 0	0 48	187 02	4,896 1	14 4	82 5	80 07	83 7	
5,000.0	0 53	183 75	4,996 1	13 6	82 4	80 66	83 5	
5,100 0	0 95	192 36	5,096 1	12.3	82 2	81 50	83 1	
5,200 0	1 16	206 68	5,196 1	10 6	81 5	82 62	82 2	
5,300 0	1 18	209 85	5,296 1	8 8	80 6	83 79	81 0	
5,400 0	1 14	217 08	5,396 0	7 1	79 5	84 91	79 8	
5,500 0	1 18	217 48	5,496 0	5 5	78 2	86 00	78.4	

Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well Copperhead "30" Fee #1H
Project:	WC Bone Sprng	TVD Reference:	WELL @ 0 0usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0 0usft (Original Well Elev)
Well:	Copperhead "30" Fee #1H	North Reference:	Grid
Wellbore:	VH - Job #32K12111207	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K12111207	Database:	EDM-Regulatory

Survey								
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)	
5,600.0	1.30	215.69	5,596.0	3.7	76.9	87.22	77.0	
5,700.0	1.35	219.88	5,696.0	1.9	75.5	88.55	75.6	
5,800.0	1.42	221.31	5,795.9	0.1	74.0	89.94	74.0	
5,900.0	1.48	219.90	5,895.9	-1.8	72.3	91.46	72.3	
6,000.0	1.35	218.77	5,995.9	-3.8	70.7	93.04	70.8	
6,100.0	1.37	217.53	6,095.8	-5.6	69.3	94.64	69.5	
6,200.0	1.34	219.81	6,195.8	-7.5	67.8	96.29	68.2	
6,300.0	1.42	218.19	6,295.8	-9.3	66.3	98.02	66.9	
6,400.0	1.47	218.33	6,395.8	-11.3	64.7	99.92	65.7	
6,500.0	1.45	225.42	6,495.7	-13.2	63.0	101.84	64.4	
6,600.0	1.95	255.29	6,595.7	-14.5	60.5	103.52	62.2	
6,700.0	2.46	264.18	6,695.6	-15.2	56.7	104.99	58.7	
6,800.0	2.57	264.20	6,795.5	-15.6	52.3	106.63	54.6	
6,900.0	2.70	263.58	6,895.4	-16.1	47.8	108.65	50.4	
7,000.0	3.09	263.04	6,995.3	-16.7	42.7	111.35	45.9	
7,100.0	3.24	263.20	7,095.1	-17.4	37.3	114.99	41.1	
7,200.0	3.53	268.11	7,195.0	-17.8	31.4	119.57	36.1	
7,300.0	3.45	265.12	7,294.8	-18.2	25.3	125.67	31.2	
7,400.0	3.39	246.78	7,394.6	-19.6	19.6	134.99	27.7	
7,500.0	3.22	243.06	7,494.4	-22.0	14.4	146.88	26.3	
7,600.0	2.93	235.39	7,594.3	-24.7	9.8	158.47	26.6	
7,672.0	2.59	235.94	7,666.2	-26.7	6.9	165.51	27.6	



Scientific Drilling
Directional Drilling Operations

Project: WC Bone Spring
Eddy County, NM
Well: Copperhead "30" Fee #1H
Wellbore: VH - Job #32K12111207
Design: VH - Job #32K12111207

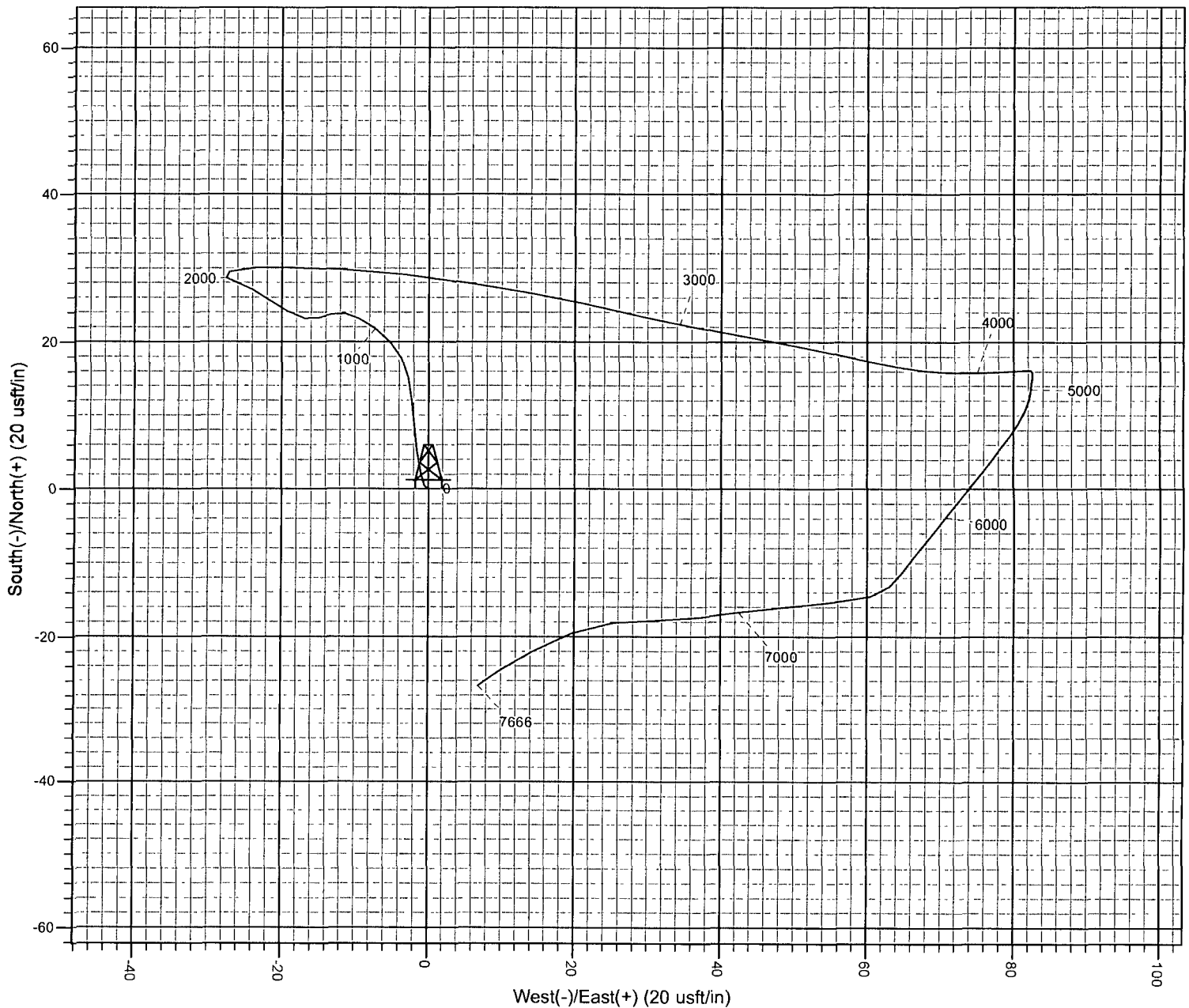


Azimuths to Grid North
True North: -0 17°
Magnetic North: 7 55°

Magnetic Field
Strength: 48418.9 nT
Dip Angle: 59.91°
Date: 12/13/2011
Model: IGRF2010

WELL DETAILS: Copperhead "30" Fee #1H
WELL @ 0.0usft (Original Well Elev)
Ground Level: 0.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	370981.53	598118.03	32° 1' 10.370 N	104° 1' 0.306 W	



PROJECT DETAILS: WC Bone Spring
Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: New Mexico East 3001
System Datum: Mean Sea Level

SITE DETAILS: Eddy County, NM
Site Centre Latitude: 32° 4' 37.166 N
Longitude: 104° 5' 57.422 W
Positional Uncertainty: 0 0
Convergence: 0.12
Local North: Grid

Job Number: 1110717

State/Country: NM

Company: Concho

Declination: 7.56

Lease/Well: Cooperhead 30 Fee 1H

Grid: □

Location: Eddy Co. NM

File name: C:\WINSERVE\CFE1H.SVY

Rig Name: Silver Oak Rig 11

Date/Time: 26-Dec-11 / 01:03

RKB: 17

Curve Name: □

G.L. or M.S.L.: □

WINSERVE SURVEY CALCULATIONS
 Minimum Curvature Method
 Vertical Section Plane 271.70
 Vertical Section Referenced to Wellhead
 Rectangular Coordinates Referenced to Wellhead

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	CLOSURE Distance FT	Direction Deg	Dogleg Severity Deg/100
Tie In									
6450.00	1.46	221.85	6445.74	-12.30	63.90	-64.24	65.07	100.90	.00
6496.00	1.50	227.60	6491.72	-13.14	63.06	-63.43	64.42	101.77	.33
6528.00	2.00	237.30	6523.71	-13.73	62.29	-62.67	63.78	102.43	1.81
6560.00	5.30	256.60	6555.64	-14.37	60.38	-60.78	62.06	103.39	10.86
6592.00	10.50	263.60	6587.33	-15.04	56.04	-56.46	58.02	105.02	16.50
6624.00	15.20	260.00	6618.52	-16.09	49.01	-49.46	51.58	108.18	14.89
6655.00	17.70	263.10	6648.25	-17.37	40.32	-40.82	43.90	113.30	8.54
6687.00	17.00	262.80	6678.79	-18.54	30.85	-31.39	35.99	121.00	2.21
6719.00	20.10	264.00	6709.12	-19.70	20.74	-21.32	28.60	133.52	9.76
6750.00	23.60	264.70	6737.89	-20.83	9.26	-9.87	22.79	156.03	11.32
6782.00	26.40	263.00	6766.89	-22.29	-4.18	3.52	22.68	190.63	9.03
6814.00	27.70	264.00	6795.39	-23.93	-18.64	17.92	30.33	217.91	4.30
6846.00	29.00	266.80	6823.55	-25.14	-33.78	33.02	42.11	233.34	5.81
6877.00	27.90	265.50	6850.81	-26.13	-48.52	47.72	55.11	241.69	4.07
6909.00	28.50	267.60	6879.01	-27.04	-63.61	62.78	69.12	246.97	3.62
6941.00	27.70	265.90	6907.24	-27.89	-78.66	77.79	83.45	250.48	3.54
6973.00	28.00	271.80	6935.54	-28.18	-93.58	92.71	97.74	253.24	8.66
7005.00	30.90	277.10	6963.41	-26.93	-109.25	108.41	112.52	256.15	12.18
7036.00	31.60	280.30	6989.91	-24.50	-125.14	124.36	127.52	258.92	5.81
7068.00	34.20	282.70	7016.78	-21.02	-142.17	141.48	143.71	261.59	9.09
7100.00	38.00	282.00	7042.63	-16.99	-160.58	160.01	161.48	263.96	11.94
7131.00	41.50	282.40	7066.46	-12.80	-179.96	179.50	180.41	265.93	11.32
7163.00	46.10	280.50	7089.55	-8.42	-201.66	201.32	201.83	267.61	14.95
7195.00	51.90	279.80	7110.54	-4.17	-225.42	225.20	225.46	268.94	18.20
7227.00	57.50	279.00	7129.02	.08	-251.18	251.07	251.18	270.02	17.62

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	C L O S U R E Distance FT	Direction Deg	Dogleg Severity Deg/100
7258.00	63.60	278.30	7144.25	4.14	-277.85	277.85	277.88	270.85	19.78
7290.00	70.10	277.00	7156.83	8.04	-307.00	307.10	307.10	271.50	20.65
7322.00	76.70	275.30	7165.97	11.32	-337.47	337.66	337.66	271.92	21.24
7353.00	83.80	274.40	7171.21	13.90	-367.90	368.15	368.16	272.16	23.08
7385.00	90.40	273.00	7172.83	15.96	-399.77	400.07	400.09	272.29	21.08
7480.00	91.80	270.40	7171.01	18.78	-494.70	495.04	495.06	272.17	3.11
7575.00	96.70	270.90	7163.97	19.85	-589.40	589.73	589.74	271.93	5.18
7670.00	96.70	271.10	7152.88	21.50	-683.74	684.08	684.08	271.80	.21
7766.00	96.60	270.60	7141.77	22.91	-779.08	779.42	779.42	271.68	.53
7861.00	96.70	270.40	7130.77	23.73	-873.44	873.76	873.76	271.56	.23
7956.00	96.50	271.50	7119.85	25.30	-967.80	968.12	968.13	271.50	1.17
8051.00	92.80	271.80	7112.15	28.02	-1062.43	1062.79	1062.80	271.51	3.91
8147.00	92.40	272.20	7107.79	31.37	-1158.27	1158.69	1158.69	271.55	.59
8242.00	92.80	272.20	7103.48	35.01	-1253.10	1253.59	1253.59	271.60	.42
8337.00	91.20	271.90	7100.17	38.41	-1347.98	1348.53	1348.53	271.63	1.71
8432.00	91.20	271.50	7098.18	41.23	-1442.92	1443.51	1443.51	271.64	.42
8528.00	91.00	271.10	7096.33	43.41	-1538.87	1539.49	1539.49	271.62	.47
8623.00	91.40	270.70	7094.34	44.90	-1633.84	1634.45	1634.46	271.57	.60
8719.00	90.20	269.80	7093.00	45.32	-1729.83	1730.41	1730.42	271.50	1.56
8814.00	89.80	269.40	7093.00	44.65	-1824.83	1825.35	1825.37	271.40	.60
8909.00	89.20	268.60	7093.83	43.00	-1919.81	1920.24	1920.29	271.28	1.05
9004.00	89.20	268.20	7095.16	40.34	-2014.76	2015.07	2015.16	271.15	.42
9100.00	93.70	269.80	7092.73	38.67	-2110.69	2110.91	2111.04	271.05	4.97
9195.00	92.20	271.00	7087.84	39.33	-2205.55	2205.75	2205.91	271.02	2.02
9291.00	92.00	270.80	7084.32	40.84	-2301.48	2301.68	2301.84	271.02	.29
9411.00	90.50	272.30	7081.71	44.08	-2421.40	2421.64	2421.80	271.04	1.77
9481.00	89.80	271.60	7081.52	46.46	-2491.36	2491.64	2491.79	271.07	1.41
9576.00	89.80	271.30	7081.85	48.87	-2586.33	2586.64	2586.79	271.08	.32
9671.00	89.30	270.40	7082.60	50.28	-2681.31	2681.62	2681.78	271.07	1.08
9766.00	88.60	270.60	7084.34	51.11	-2776.29	2776.59	2776.76	271.05	.77
9862.00	88.50	272.80	7086.77	53.95	-2872.21	2872.55	2872.72	271.08	2.29
9957.00	89.00	272.10	7088.84	58.01	-2967.10	2967.52	2967.67	271.12	.91
10053.00	89.40	271.70	7090.18	61.20	-3063.04	3063.51	3063.65	271.14	.59
10148.00	91.00	271.90	7089.85	64.18	-3157.99	3158.50	3158.64	271.16	1.70
10243.00	91.30	271.70	7087.95	67.16	-3252.92	3253.48	3253.62	271.18	.38
10337.00	91.00	271.70	7086.06	69.95	-3346.86	3347.46	3347.59	271.20	.32
10432.00	92.60	272.30	7083.08	73.26	-3441.75	3442.41	3442.53	271.22	1.80
10526.00	93.30	271.30	7078.24	76.21	-3535.58	3536.29	3536.40	271.23	1.30
10622.00	93.30	271.50	7072.71	78.56	-3631.39	3632.13	3632.24	271.24	.21
10717.00	93.50	271.00	7067.08	80.62	-3726.20	3726.96	3727.08	271.24	.57
10812.00	93.40	271.30	7061.36	82.53	-3821.01	3821.78	3821.90	271.24	.33
10907.00	91.80	272.00	7057.05	85.26	-3915.87	3916.68	3916.80	271.25	1.84
11002.00	90.90	272.70	7054.81	89.15	-4010.76	4011.64	4011.75	271.27	1.20
11097.00	90.50	272.80	7053.65	93.71	-4105.65	4106.62	4106.72	271.31	.43
11193.00	90.30	272.40	7052.98	98.07	-4201.55	4202.61	4202.69	271.34	.47

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	C L O S U R E		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
11287.00	90.50	272.10	7052.33	101.76	-4295.47	4296.60	4296.68	271.36	.38
11372.00	90.50	271.80	7051.58	104.65	-4380.42	4381.59	4381.67	271.37	.35
TD PTB									
11430.00	90.50	271.80	7051.08	106.47	-4438.39	4439.59	4439.66	271.37	.00