WR-35
Rev (9-11)

State of West Virginia
Department of Environmental Protection
Office of Oil and Gas
Well Operator's Report of Well Work

Date: 11/7/2013
API: 47-051-01634

Farm Name: Gray, John A ET UX _____ Operator Well No: SHL-17F-HS

LOCATION: Sandhill Elevation: 1,287.67 Quadrangle: Majorsville

District: Sand Hill County: MARSHALL
Latitude: _____ Feet South of Deg. Min. Sec. 39.97736400
Longitude: Feet South of Deg. Min. Sec. -80.52935000

Company: Noble Energy Inc		Casing & Tubing	Used in Drilling	Left in Well	Cement fill up Cu. Ft.
Address: 333 Technology Drive, Suite 116 Canonsburg, PA 15317		20	40.0	40.0	Cemented In
Agent: Steven Green		13 3/8	1,166.0	1,166.0	1086 sxs (225 bbls) 38 bbls return
Inspector: Bill Hendershot		9 5/8	3,138.0	3,138.0	1071 sxs (227 bbls)
Date Permit Issued: 4/30/2013		5 1/2	17,404.2	17,404.2	2690 sxs (685 bbls)
Date Well Work Commenced:	6/7/2013				
Date Well Work Completed:	12/1/2013				
Verbal Plugging:					
Date Permission granted on:	6/7/2013				
Rotary Cable Rig X					
Total Vertical Depth (ft): Original Hole - 3,159.6					
Total Measured Depth (ft): 3,160.0					
Fresh Water Depth (ft): NA					
Salt Water Depth (ft): NA					
Is coal being mined in the area (N/Y)? Y					
Coal Depths (ft.): 763.9' – 769.5'					
Void(s) encountered (N/Y) Depth(s) N					

OPEN FLOW DATA (If more than two producing formations please include additional data on separate sheet)

Producing formation Marcellus Pay zone depth (ft) 7229
Gas: Initial open flow 1843 MCF/d Oil: Initial open flow 21.6 Bbl/d
Final open flow 4608 MCF/d Final open flow 47.3 Bbl/d
Time of open flow between initial and final tests 24 Hours
Static rock Pressure 1575 psig (surface pressure) after 24 Hours

Second producing formation _____ Pay zone depth (ft) _____
Gas: Initial open flow _____ MCF/d Oil: Initial open flow _____ Bbl/d
Final open flow _____ MCF/d Final open flow _____ Bbl/d
Time of open flow between initial and final tests _____ Hours
Static rock Pressure _____ psig (surface pressure) after _____ Hours

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this document and all the attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information I believe that the information is true, accurate, and complete.

Signature _____ Date 2-4-14

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Were core samples taken? Yes__ No_x__ Were cuttings caught during drilling? Yes_x_ No___ 51-01634

Were Electrical, Mechanical or Geophyisical logs recorded on this well? If yes, please list: Bond Log, Gamma Ray Log

NOTE: IN THE AREA BELOW PUT THE FOLLOWING: 1). DETAILS OF PERFORATED INTERVALS, FRACTURING OR STIMULATING, PHYSICAL CHANGE, ETC. 2). THE WELL LOG WHICH IS A SYSTEMATIC DETAILED GEOLOGICAL RECORD OF THE TOPS AND BOTTOMS OF ALL FORMATIONS, INCLUDING COAL ENCOUNTERED BY THE WELLBORE FROM SURFACE TO TOTAL DEPTH.

Perforated Intervals, Fracturing or Stimulating: Please See Attached

Plug Back Details including Plug Type and Depth(s): Please See Attached

Surface:

Formations Encountered: Please see Attached

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Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	10/16/2013
Job End Date:	11/7/2013
State:	West Virginia
County:	Marshall
API Number:	47-051-01634-00-00
Operator Name:	Noble Energy, Inc.
Well Name and Number:	SHL17 F
Longitude:	-80.52914000
Latitude:	39.97744000
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	6,627
Total Base Water Volume (gal):	15,940,703
Total Base Non Water Volume:	0

FracFocus Chemical Disclosure Registry

GROUNDWATER PROTECTION COUNCIL

Oil & Gas

Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Fresh Water	Operator	Base Fluid					
			Fresh Water	7732-18-5	100.00000	89.61071	Density = 8.330
SAND - PREMIUM WHITE	Halliburton	Proppant					
			Crystalline silica, quartz	14808-60-7	100.00000	7.94809	
SAND - COMMON WHITE	Halliburton	Proppant					
			Crystalline silica, quartz	14808-60-7	100.00000	2.10143	
FR-66	Halliburton	Friction Reducer					
			Hydrotreated light petroleum distillate	64742-47-8	30.00000	0.02292	
HYDROCHLORIC ACID 5-10%	Halliburton	Solvent					
			Hydrochloric acid	7647-01-0	10.00000	0.01924	
FE-1A ACIDIZING COMPOSITION	Halliburton	Additive					
			Acetic anhydride	108-24-7	100.00000	0.00318	
			Acetic acid	64-19-7	60.00000	0.00191	
BE-9	Halliburton	Biocide					
			Tributyl tetradecyl phosphonium chloride	81741-28-8	10.00000	0.00414	
Scalechek® LP-65 Scale Inhibitor	Halliburton	Scale Inhibitor					

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			Ammonium chloride	12125-02-9	10.00000	0.00248	
LoSurf-300D	Halliburton	Non-ionic Surfactant					
			Ethanol	64-17-5	60.00000	0.00064	
			Heavy aromatic petroleum naphtha	64742-94-5	30.00000	0.00032	
			Poly(oxy-1,2-ethanediyl), alpha-(4-nonylphenyl)-omega-hydroxy-, branched	127087-87-0	5.00000	0.00005	
			Naphthalene	91-20-3	5.00000	0.00005	
			1,2,4 Trimethylbenzene	95-63-6	1.00000	0.00001	
HAI-OS ACID INHIBITOR	Halliburton	Corrosion Inhibitor					
			Methanol	67-56-1	60.00000	0.00032	
			Propargyl alcohol	107-19-7	10.00000	0.00005	
Ingredients shown above are subject to 29 CFR 1910.1200(i) and appear on Material Safety Data Sheets (MSDS). Ingredients shown below are Non-MSDS.							
		Other Ingredient(s)					
			Water	7732-18-5		0.29454	
		Other Ingredient(s)					
			Polyacrylamide copolymer	Confidential		0.02292	
		Other Ingredient(s)					
			Organic phosphonate	Confidential		0.01485	
		Other Ingredient(s)					
			Alcohols, C12-16, ethoxylated	68551-12-2		0.00382	
		Other Ingredient(s)					
			Ammonium chloride	12125-02-9		0.00382	
		Other Ingredient(s)					
			Fatty acid tall oil amide	Confidential		0.00382	
		Other Ingredient(s)					
			Sodium chloride	7647-14-5		0.00382	
		Other Ingredient(s)					
			Sorbitan monooleate polyoxyethylene derivative	9005-65-6		0.00076	
		Other Ingredient(s)					
			Sorbitan, mono-9-octadecenoate, (Z)	1338-43-8		0.00076	
		Other Ingredient(s)					
			Oxyalkylated phenolic resin	Confidential		0.00032	
		Other Ingredient(s)					
			Formaldehyde	50-00-0		0.00025	
		Other Ingredient(s)					
			Alcohols, C14-C15, ethoxylated	68951-67-7		0.00016	
		Other Ingredient(s)					
			Fatty acids, tall oil	Confidential		0.00016	
		Other Ingredient(s)					
			Reaction product of acetophenone, formaldehyde, thiourea and oleic acid in dimethyl formamide	68527-49-1		0.00016	
		Other Ingredient(s)					

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			Oxyalkylated phenolic resin	Confidential		0.00011	
		Other Ingredient(s)					
			Olefins	Confidential		0.00003	
		Other Ingredient(s)					
			Olefins	Confidential		0.00003	
		Other Ingredient(s)					
			Olefins	Confidential		0.00001	
		Other Ingredient(s)					
			Olefins	Confidential		0.00001	

* Total Water Volume sources may include fresh water, produced water, and/or recycled water
** Information is based on the maximum potential for concentration and thus the total may be over 100%

Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided.
Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)

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Stimulation Summary

Date	Stage #	Formation	Frac Type	Top Perf	Bottom Perf	# of Perfs	BD Press (psi)	ATP (psi)	Avg Rate (bpm)	ISIP (psi)	Frac Gradient	Sand (lbs)	Acid (gals)	Water (gals)
10/16/2013	1	Marcellus	Slickwater	17023	17265	48	5037	7497	72.3	3160	0.91	388817	3000	465784
10/17/2013	2	Marcellus	Slickwater	16723	16977	40	3438	8028	81.0	3857	1.02	472150	3000	520453
10/18/2013	3	Marcellus	Slickwater	16423	16677	40	5593	8339	80.5	4248	1.07	466441	3000	464020
10/18/2013	4	Marcellus	Slickwater	16123	16377	40	7495	8464	79.8	4155	1.06	464436	3000	636013
10/20/2013	5	Marcellus	Slickwater	15823	16077	40	7752	7955	76.3	3678	0.99	467716	3000	474135
10/21/2013	6	Marcellus	Slickwater	15523	15777	40	7123	7829	88.4	3742	1.00	446786	3000	445806
10/22/2013	7	Marcellus	Slickwater	15223	15477	40	7314	7786	80.6	3877	1.02	442822	3000	445669
10/23/2013	8	Marcellus	Slickwater	14923	15177	40	6855	8228	77.2	6410	1.40	390442	3000	509540
10/23/2013	9	Marcellus	Slickwater	14623	14877	40	6894	7997	77.6	4352	1.09	463252	3000	465530
10/25/2013	10	Marcellus	Slickwater	14323	14577	40	7706	8213	84.8	4611	1.13	403432	3000	462875
10/25/2013	11	Marcellus	Slickwater	14030	14277	40	6707	7853	81.2	3898	1.02	363095	3000	527073
10/25/2013	12	Marcellus	Slickwater	13723	13977	40	6019	7749	81.5	4078	1.05	469079	3000	467539
10/26/2013	13	Marcellus	Slickwater	13423	13677	40	6435	7644	82.2	4132	1.06	466556	3000	476243
10/26/2013	14	Marcellus	Slickwater	13123	13377	40	6289	7817	82.8	4066	1.05	467196	3000	456614
10/26/2013	15	Marcellus	Slickwater	12823	13077	40	6142	8045	78.0	6495	1.41	423886	3000	480690
10/27/2013	16	Marcellus	Slickwater	12523	12777	40	5592	7762	77.1	4344	1.09	410942	3000	495572
10/27/2013	17	Marcellus	Slickwater	12230	12482	40	6277	7572	81.2	4149	1.06	365408	3000	471720
10/27/2013	18	Marcellus	Slickwater	11923	12177	40	5571	7755	81.1	4051	1.04	422268	3000	461843
10/28/2013	19	Marcellus	Slickwater	11623	11877	40	5784	7612	89.9	4531	1.11	427038	3000	439452
10/28/2013	20	Marcellus	Slickwater	11323	11577	40	6508	7532	82.1	3969	1.03	468917	3000	457125
10/28/2013	21	Marcellus	Slickwater	11023	11277	40	5854	7474	83.8	4378	1.09	468300	3000	449108
10/29/2013	22	Marcellus	Slickwater	10723	10977	40	6306	7028	89.9	4221	1.06	469205	3000	460049
10/30/2013	23	Marcellus	Slickwater	10423	10677	40	6454	7691	83.4	4347	1.09	462480	3000	604217
10/31/2013	24	Marcellus	Slickwater	10123	10377	40	5941	7235	90.7	4281	1.08	465290	3000	439609
11/1/2013	25	Marcellus	Slickwater	9825	10079	40	5777	6943	90.5	3555	0.97	465726	3000	459200
11/2/2013	26	Marcellus	Slickwater	9523	9777	40	6218	6874	90.5	4043	1.04	469992	3000	439815
11/2/2013	27	Marcellus	Slickwater	9223	9477	40	6059	7281	90.1	3980	1.03	415531	3000	420821
11/3/2013	28	Marcellus	Slickwater	8975	9177	40	5971	7075	89.6	3614	0.98	388962	3000	376691
11/3/2013	29	Marcellus	Slickwater	8673	8927	40	7112	7457	78.3	4174	1.06	473267	3000	633875
11/4/2013	30	Marcellus	Slickwater	8373	8627	40	5186	6946	90.0	4013	1.04	460794	3000	496221
11/5/2013	31	Marcellus	Slickwater	8073	8327	40	6078	7027	89.5	4208	1.06	467113	3000	473051
11/5/2013	32	Marcellus	Slickwater	7773	8027	40	6160	7103	89.1	5230	1.22	409621	3000	428895
11/6/2013	33	Marcellus	Slickwater	7525	7727	40	5925	6887	89.4	4345	1.08	391178	3000	374585
11/7/2013	34	Marcellus	Slickwater	7275	7477	40	6181	6755	90.0	4484	1.10	394411	3000	365656
														16,045,489

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Stage #	Plug Type	Plug Depth
1	Toe Sleeve	17,267.70 - 17,273.50
2	Composite Frac Plug	17,000
3	Composite Frac Plug	16,700
4	Composite Frac Plug	16,400
5	Composite Frac Plug	16,100
6	Composite Frac Plug	15,795
7	Composite Frac Plug	15,500
8	Composite Frac Plug	15,200
9	Composite Frac Plug	14,900
10	Composite Frac Plug	14,600
11	Composite Frac Plug	14,305
12	Composite Frac Plug	14,000
13	Composite Frac Plug	13,700
14	Composite Frac Plug	13,400
15	Composite Frac Plug	13,100
16	Composite Frac Plug	12,800
17	Composite Frac Plug	12,500
18	Composite Frac Plug	12,200
19	Composite Frac Plug	11,900
20	Composite Frac Plug	11,610
21	Composite Frac Plug	11,300
22	Composite Frac Plug	11,000
23	Composite Frac Plug	10,700
24	Composite Frac Plug	10,400
25	Composite Frac Plug	10,100
26	Composite Frac Plug	9,800
27	Composite Frac Plug	9,500
28	Composite Frac Plug	9,200
29	Composite Frac Plug	8,950
30	Composite Frac Plug	8,650
31	Composite Frac Plug	8,350
32	Composite Frac Plug	8,050
33	Composite Frac Plug	7,750
34	Composite Frac Plug	7,500
	Temporary Bridge Plug	6,500

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Formations	Top TVD	Base TVD	Top MD	Base MD	Fluid
Shale	0	472	0	472	
Pittsburgh Coal	472	533	472	533	
Shale and Sandstone	533	656	533	656	
Gas Sand	656	723	656	723	
Shale	723	769	723	769	
1st Salt Sand	769	788	769	788	
Shale	788	906	788	906	
2nd Salt Sand	906	955	906	955	
Shale	955	989	955	989	
Big Lime	989	1105	989	1105	
Big Injun	1105	1150	1105	1150	
Price	1150	1270	1150	1270	
Murrysville	1270	1305	1270	1305	
Shale	1305	1463	1305	1150	
50' Sand	1150	1270	1150	1270	
Shale	1270	1305	1270	1305	
Gordon	1305	1463	1305	1463	
Shale	1463	1720	1463	1720	
Fifth Sand	1720	1910	1720	1910	
Shale	1910	1962	1910	1962	
Speechley Sand	1962	3197	1962	3197	
Shale	3197	4346	3197	4347	
Warren Sand	4346	4366	4347	4633	
Shale	4632	4703	4633	4704	
Java Shale	4703	4797	4704	4900	
Pipe Creek Shale	4899	5496	4900	5557	
Angola Shale	5496	5528	5557	5598	
Rhinestreet	5528	5762	5598	5907	
Cashaqua	5762	5804	5907	5965	
Middlesex	5804	5869	5965	6054	
West River	5869	5895	6054	6089	
Burkett	5895	5897	6089	6091	
Tully Limestone	5897	5899	6091	6094	
Hamilton	5899	5947	6094	6156	
Marcellus	5947	5952	6156	not encountered	Gas
Onondaga	5952	not encount	not encountered	not encountered	

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PATHFINDER

noble energy

Noble Energy SHL17FHS Gyro+MWD 0ft to 17425ft MD Survey Report

(Def Survey)

Report Date:	September 18, 2013 - 09:15 AM	Survey / DLS Computation:	Minimum Curvature / Lubinski
Client:	Noble Energy	Vertical Section Azimuth:	318.445 ° (Grid North)
Field:	WV Marshall County (NAD 27)	Vertical Section Origin:	0.000 ft, 0.000 ft
Structure / Slot:	Noble Energy SHL17 Pad / SHL 17FHS	TVD Reference Datum:	KB
Well:	SHL17FHS	TVD Reference Elevation:	1299.500 ft above MSL
Borehole:	Original Borehole	Seabed / Ground Elevation:	1272.000 ft above MSL
UWI / API#:	Unknown / Unknown	Magnetic Declination:	-8.473 °
Survey Name:	Noble Energy SHL17FHS Gyro+MWD 0ft to 17425ft MD	Total Gravity Field Strength:	999.4485mgn (9.80665 Based)
Survey Date:	September 07, 2013	Gravity Model:	DOX
Tort / AHD / DDI / ERD Ratio:	245.052 ° / 11706.968 ft / 6.874 / 1.752	Total Magnetic Field Strength:	53169.858 nT
Coordinate Reference System:	NAD27 West Virginia State Plane, Northern Zone, US Feet	Magnetic Dip Angle:	67.531 °
Location Lat / Long:	N 39° 58' 38.50704", W 80° 31' 45.66452"	Declination Date:	September 07, 2013
Location Grid N/E Y/X:	N 539749.622 ftUS, E 1711529.065 ftUS	Magnetic Declination Model:	HDGM 2013
CRS Grid Convergence Angle:	-0.6565 °	North Reference:	Grid North
Grid Scale Factor:	0.99996951	Grid Convergence Used:	-0.6565 °
Version / Patch:	2.7.998.0	Total Corr Mag North->Grid North:	-7.8169 °
		Local Coord Referenced To:	Well Head

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	BR (°/100ft)	TR (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")	Directional Difficulty Index
SHL	0.00	0.00	0.00	0.00	-1299.50	0.00	0.00	0.00	N/A	N/A	N/A	539749.62	1711529.07	N 39 58 38.51	W 80 31 45.66	0.00
	100.00	0.43	71.60	100.00	-1199.50	-0.15	0.12	0.36	0.43	0.43	0.00	539749.74	1711529.42	N 39 58 38.51	W 80 31 45.66	0.00
	200.00	0.44	61.85	200.00	-1099.50	0.51	0.29	1.09	0.08	0.01	10.25	539749.91	1711530.16	N 39 58 38.51	W 80 31 45.65	0.00
	300.00	0.71	99.12	299.99	-999.51	1.13	0.34	2.09	0.26	0.27	6.27	539749.97	1711531.16	N 39 58 38.51	W 80 31 45.64	0.25
	400.00	0.60	95.73	399.98	-899.52	1.98	0.28	3.31	0.07	-0.02	5.61	539749.91	1711532.38	N 39 58 38.51	W 80 31 45.62	0.46
	500.00	0.61	216.74	499.98	-799.52	-2.83	-0.20	3.59	1.13	-0.08	121.01	539749.42	1711532.66	N 39 58 38.51	W 80 31 45.62	0.92
	600.00	1.09	227.45	599.97	-699.53	-1.92	-0.51	2.33	0.55	0.48	69.71	539749.12	1711531.39	N 39 58 38.50	W 80 31 45.63	1.21
	700.00	0.84	262.40	699.96	-599.54	-0.61	-0.23	0.67	0.36	-0.25	4.95	539749.40	1711529.74	N 39 58 38.50	W 80 31 45.64	1.36
	800.00	1.20	280.48	799.94	-499.56	0.80	0.12	-1.07	0.36	0.36	-1.92	539749.74	1711527.99	N 39 58 38.51	W 80 31 45.66	1.51
	900.00	1.35	282.14	899.92	-399.58	2.58	0.56	-3.26	0.15	0.15	1.66	539750.15	1711525.81	N 39 58 38.51	W 80 31 45.71	1.62
	1000.00	1.57	282.85	999.88	-299.62	4.64	1.11	-5.74	0.22	0.22	0.71	539750.73	1711523.32	N 39 58 38.52	W 80 31 45.74	1.73
	1100.00	2.07	276.07	1099.83	-199.67	7.09	1.61	-8.87	0.54	0.50	-6.78	539751.23	1711520.19	N 39 58 38.52	W 80 31 45.78	1.88
	1200.00	2.00	271.07	1199.77	-99.73	9.61	1.83	-12.42	0.16	-0.07	-5.00	539751.45	1711516.65	N 39 58 38.52	W 80 31 45.82	1.98
	1300.00	1.57	275.39	1299.72	-0.22	11.79	1.99	-15.52	0.45	-0.43	4.32	539751.61	1711513.54	N 39 58 38.52	W 80 31 45.86	2.08
	1400.00	1.02	293.45	1399.70	100.20	13.57	2.42	-17.73	0.63	-0.56	14.06	539752.04	1711511.34	N 39 58 38.53	W 80 31 45.89	2.17
	1500.00	1.02	291.05	1499.68	200.18	15.14	3.03	-19.40	0.00	0.00	1.61	539752.65	1711509.67	N 39 58 38.53	W 80 31 45.91	2.20
	1600.00	0.69	308.61	1599.67	300.17	16.62	3.73	-20.70	0.42	-0.33	17.56	539753.35	1711508.37	N 39 58 38.54	W 80 31 45.93	2.26
	1700.00	0.59	302.40	1699.66	400.16	17.61	4.38	-21.60	0.12	-0.10	-6.21	539754.00	1711507.46	N 39 58 38.55	W 80 31 45.94	2.28
	1800.00	0.61	298.44	1799.66	500.16	18.60	4.91	-22.51	0.06	0.02	-3.96	539754.53	1711506.56	N 39 58 38.55	W 80 31 45.95	2.30
	1900.00	0.29	306.31	1899.65	600.15	19.35	5.31	-23.18	0.33	-0.32	7.87	539754.94	1711505.89	N 39 58 38.56	W 80 31 45.96	2.33
	2000.00	0.17	355.34	1999.65	700.15	19.72	5.61	-23.39	0.22	-0.12	49.03	539755.23	1711505.67	N 39 58 38.56	W 80 31 45.97	2.35
	2100.00	0.18	252.07	2099.65	800.15	19.80	5.71	-23.56	0.27	0.01	-103.27	539755.33	1711505.51	N 39 58 38.56	W 80 31 45.97	2.37
	2200.00	0.19	288.55	2199.65	900.15	20.11	5.72	-23.86	0.12	0.01	36.48	539755.34	1711505.20	N 39 58 38.56	W 80 31 45.97	2.39
	2300.00	0.16	352.04	2299.65	1000.15	20.39	5.93	-24.04	0.20	0.00	63.49	539755.55	1711505.02	N 39 58 38.56	W 80 31 45.97	2.40
	2400.00	0.09	292.68	2399.65	1100.15	20.60	6.13	-24.14	0.16	-0.10	-55.36	539755.75	1711504.93	N 39 58 38.56	W 80 31 45.98	2.41
	2500.00	0.23	286.71	2499.65	1200.15	20.84	6.23	-24.45	0.14	0.14	-2.97	539755.85	1711504.67	N 39 58 38.57	W 80 31 45.98	2.42
	2600.00	0.28	297.12	2599.65	1300.15	21.25	6.40	-24.91	0.06	0.05	7.41	539756.03	1711504.26	N 39 58 38.57	W 80 31 45.98	2.43
	2700.00	0.33	322.20	2699.65	1400.15	21.76	6.74	-25.20	0.14	0.05	35.17	539756.37	1711503.87	N 39 58 38.57	W 80 31 45.99	2.44
	2800.00	0.39	316.59	2799.65	1500.15	22.39	7.22	-25.61	0.07	0.06	-5.70	539756.84	1711503.46	N 39 58 38.58	W 80 31 45.99	2.45
	2900.00	0.29	318.38	2899.64	1600.14	22.88	7.65	-26.02	0.10	-0.10	-0.21	539757.27	1711503.05	N 39 58 38.58	W 80 31 46.00	2.47
	3000.00	0.42	318.03	2999.64	1700.14	23.50	8.11	-26.43	0.13	0.13	2.25	539757.73	1711502.63	N 39 58 38.58	W 80 31 46.01	2.48
	3070.00	0.41	327.61	3069.64	1770.14	24.11	8.51	-26.74	0.09	-0.01	12.83	539758.13	1711502.33	N 39 58 38.59	W 80 31 46.01	2.49
	3120.00	0.50	52.02	3119.64	1820.14	24.27	8.80	-26.65	1.23	0.18	168.78	539758.42	1711502.40	N 39 58 38.59	W 80 31 46.01	2.53
	3210.00	3.66	110.85	3209.57	1910.07	21.56	7.56	-23.52	4.03	3.73	65.33	539757.18	1711505.55	N 39 58 38.58	W 80 31 45.97	2.71
	3304.00	3.33	102.66	3303.38	2003.88	16.54	6.23	-17.59	0.77	-0.56	-8.45	539755.85	1711511.17	N 39 58 38.57	W 80 31 45.90	2.79
	3349.00	3.06	91.73	3348.31	2057.81	14.05	5.80	-15.43	1.50	-0.60	-24.73	539755.53	1711513.64	N 39 58 38.56	W 80 31 45.86	2.84
	3384.00	3.11	87.87	3383.25	2102.75	13.05	5.91	-13.91	0.47	0.11	-8.58	539755.53	1711514.96	N 39 58 38.56	W 80 31 45.83	2.87
	3483.00	1.56	89.70	3482.16	2151.66	10.52	6.01	-9.08	1.31	-1.30	2.12	539755.83	1711519.99	N 39 58 38.57	W 80 31 45.78	2.93
	3572.00	0.16	131.74	3571.14	2240.64	9.38	5.92	-7.46	2.05	-1.99	47.17	539755.64	1711521.61	N 39 58 38.56	W 80 31 45.76	2.95
	3662.00	1.12	259.43	3661.13	2330.63	9.82	5.92	-8.23	1.46	1.04	152.69	539755.44	1711520.83	N 39 58 38.56	W 80 31 45.77	3.03
	3751.00	0.09	278.80	3750.12	2419.62	10.08	5.93	-8.86	0.24	-0.15	10.69	539755.55	1711519.20	N 39 58 38.56	W 80 31 45.78	3.05
	3841.00	0.82	268.04	3840.11	2509.61	11.09	6.03	-11.28	0.27	-0.19	-12.02	539755.65	1711517.79	N 39 58 38.57	W 80 31 45.81	3.06
	3930.00	0.84	299.29	3929.10	2598.60	12.80	6.96	-12.56	0.04	0.02	-2.00	539756.58	1711516.50	N 39 58 38.58	W 80 31 45.83	3.07
	4020.00	0.60	291.40	4019.09	2688.59	13.35	6.79	-13.59	0.42	-0.38	-16.44	539756.42	1711515.47	N 39 58 38.58	W 80 31 45.84	3.09
	4109.00	1.15	289.07	4108.08	2817.58	14.99	6.66	-14.85	0.78	0.73	19.78	539755.28	1711514.21	N 39 58 38.56	W 80 31 45.86	3.11
	4199.00	1.03	297.32	4198.07	2907.57	15.18	5.00	-16.57	0.14	-0.13	-1.94	539755.23	1711512.50	N 39 58 38.56	W 80 31 45.88	3.13
	4288.00	0.76	253.04	4287.06	2996.56	15.59	5.39	-17.95	0.36	-0.30	-16.04	539755.62	1711511.14	N 39 58 38.56	W 80 31 45.90	3.14
	4378.00	0.73	239.69	4377.05	3086.55	15.29	4.93	-18.99	0.20	-0.03	-14.83	539754.83	1711510.07	N 39 58 38.55	W 80 31 45.91	3.15
	4467.00	1.30	263.10	4466.04	3175.54	15.03	4.53	-20.41	0.68	0.63	26.29	539754.15	1711508.66	N 39 58 38.55	W 80 31 45.93	3.18
	4557.00	1.40	272.85	4556.01	3265.51	14.73	4.47	-22.44	0.33	0.22	10.61	539754.09	1711506.62	N 39 58 38.55	W 80 31 45.95	3.19
	4647.00	1.11	257.74	4645.99	3355.49	14.42	4.33	-24.39	0.48	-0.32	-16.57	539753.96	1711504.67	N 39 58 38.55	W 80 31 45.98	3.21
	4738.00	1.11	246.48	4736.98	3446.48	13.97	3.84	-26.02	0.26	0.00	-13.57	539753.47	1711503.15	N 39 58 38.54	W 80 31 46.00	3.23
	4826.00	1.04	241.90	4824.96	3534.46	13.53	3.11	-27.44	0.12	-0.08	-5.02	539752.73	1711501.83	N 39 58 38.53	W 80 31 46.02	3.24
	4865.00	2.48	233.76	4863.94	3573.44	12.71	2.34	-28.56	3.24	3.20	-18.18	539751.97	1711500.48	N 39 58 38.53	W 80 31 46.03	3.27
	4956.00	4.67	229.28	4954.85	3664.35	10.83	0.61	-30.71	2.51	4.98	-10.23	539750.24	1711498.39	N 39 58 38.51	W 80 31 46.05	3.33
	4964.00	7.79	231.90	4962.58	3692.98	21.04	-2.46	-34.59	6.96	6.93	5.82	539747.16	1711494.57	N 39 58 38.48	W 80 31 46.11	3.36
	4995.00	11.68	234.50	4993.52	3706.42	21.75	-6.99	-40.61	8.76	8.64	5.78	539742.63	1711488.46	N 39 58 38.43	W 80 31 46.18	3.49
	5044.00	13.87	236.11	5040.81	3750.31	22.80	-12.05	-48.79	4.63	4.67	3.56	539736.98	1711480.27	N 39 58 38.38	W 80 31 46.29	3.57
	5088.00	16.19	235.42	5084.26	3793.76	24.38	-18.22	-58.44	5.17	5.16	-1.63	539730.41	1711470.63	N 39 58 38.31	W 80 31 46.41	3.64
	5133.00	18.75	233.75	5128.23	3837.73	25.78	-26.68	-69.19	5.93	5.82	-3.80	539722.74	1711459.87	N 39 58 38.23	W 80 31 46.55	3.72
	5178.00	22.05	233.51	5168.40	3877.90	27.20	-36.18	-81.82	7.34	7.33	-0.53	539713.44	1711447.25	N 39 58 38.14	W 80 31 46.71	3.80
	5223.00	22.21	233.40	5212.60	3919.50	28.68	-46.27	-95.44	0.36	0.36	-0.11	539703.35	1711433.62	N 39 58 38.04	W 80 31 46.88	3.85
	5268.00	23.07	235.29	5251.82	3961.12	30.48	-56.35	-109.53	2.47	1.91	4.07	539693.27	1711419.54	N 39 58 37.94	W 80 31 47.08	3.91
	5357.00	24.08	238.90	5331.88	4041.38	34.37	-77.12	-141.82	5.80	5.69	4.06	539672.51	1711387.26	N 39 58 37.73	W 80 31 47.47	4.04
	5447.00	25.65	237.93	5398.26	4117.76	41.54	-102.02	-182.74	8.43	8.41	-1.08	539647.61	1711346.63	N 39 58 37.48	W 80 31 47.99	4.19
	5536.00	36.14	234.71	5479.44	4188.94	51.82	-131.68	-226.66	3.54	2.80	-3.62	539617.95	1711302.41	N 39 58 37.18	W 80 31 48.56	4.29
	5581.00	38.32	233.67	5514.70	4224.20	54.01	-147.97	-249.24	1.49	0.48	-2.31	539601.99	1711279.83	N 39 58 37.02	W 80 31 48.84	4.33
	5626.00	39.64	232.93	5549.77	4259.27	57.00	-164.80	-271.94	3.11	2.93	-1.64	539584.74	1711257.14	N 39 58 36.85	W 80 31 49.13	4.38
	5715.00	41.75	235.72	5617.25	4326.75	62.97	-198.70	-319.08	3.13	2.37	3.13	539550.93	1711210.00	N 39 58 36.51	W 80 31 49.73	4.46
	5805.00	40.19	237.03	5685.20	4394.70	71.09	-231.39	-368.20	1.97	-1.73	1.47	539518.24	1711160.88	N 39 58 36.18	W 80 31 50.36	4.53
	5895.00	42.20	235.10	5752.92	4462.42	78.91	-264.51	-417.35	2.63	2.23	-2.11	539485.13	1711111.73	N 39 58 35.85	W 80 31 50.99	4.60
	5984.00	44.08	238.64	5817.87	4527.37	87.66	-297.73	-468.32	3.44	2.11	3.98	539451.91	1711060.77	N 39 58 35.51	W 80 31 51.64	4.99
	6074.00	41.67	242.43	5883.84	4593.34	100.53	-327.89	-521.56	3.92	-2.68	4.21	539421.76	1711007.50	N 39 58 35.21	W 80 31 52.32	5.72
	6163.00	37.88	238.78	5952.23	4661.73	112.89	-355.74	-571.26	5.00	-4.26	-4.09	539393.90	1710957.88	N 39 58 34.93	W 80 31 52.95	4.79
	6253.00	39.79	238.16	6022.34	4731.84	122.52	-385.25	-619.31	2.17	2.12	-0.70	539364.38	1710909.78	N 39 58 34.63	W 80 31 53.56	4.83
	6342.00	37.15	235.18	6092.02	4801.52	130.46	-415.63	-665.97	3.02	-2.97	-3.35	539334.01	1710863.08	N 39 58 34.32	W 80 31 54.15	4.86
	6433.00	36.13	233.73	6164.66	4874.16	137.24	-447.40	-689.64	2.18	-1.44	-2.75	539302.24	1710839.39	N 39 58 34.00	W 80 31 54.59	4.91
	6526.00	35.42	234.26	6161.16	4870.66	135.55	-445.58	-787.91	0.26	-4.73	7.00	539304.05	1710827.08	N 39 58 34.02	W 80 31 54.68	4.92
	6473.00	34.57	234.65	6198.02	4907.52	138.23	-460.61	-728.00	1.92	-1.89	0.66	539289.01	1710801.05	N 39 58 33.87	W 80 31 54.95	4.94
	6517.00	35.14	241.23	6234.15	4943.65	142.47	-473.85	-748.33	9.41	1.29	15.32	539275.79	1710779.26	N 39 58 33.74	W 80 31 55.22	4.96
	6562.00	37.39	248.10	6270.44	4970.94	150.65	-485.09	-773.43	9.75	5.00	14.16	539264.56	1710754.67	N 39 58 33.63	W 80 31 55.53	5.00
	6607.00	35.78	250.99	6305.62	5015.12	159.85	-494.18	-799.66	5.73	5.31	13.09	539255.48	1710729.14	N 39 58 33.53	W 80 31 55.87	5.03
	6652.00	32.44	250.99	6339.54	5049.04	174.97	-500.87	-826.74	10.00	5.91	12.44	539248.77	1710700.36	N 39 58 33.46	W 80 31 56.24	5.06
	6696.00	35.15	265.41	6371.31	5080.81	197.03	-504.76	-858.51	11.29	6.14	13.68	539244.86	1710671.18	N 39 58 33.42	W 80 31 56.62	5.09
	6741.00	38.37	271.44	6402.15	5111.65	213.15	-505.65	-891.65	11.84	7.16	17.96	539244.00	1710637.49	N 39 58 33.41	W 80 31 57.04	5.13
	6786.00	40.03	275.06	6431.50	5141.09	237.14	-503.61	-925.82	7.00	3.69	8.03	539246.04	1710603.40	N 39 58 33.43	W 80 31 57.48	5.16
	6831.00	51.02	282.08	6460.26	5169.76	263.76	-498.42	-960.88	12.25	2.49	15.56	539251.23	1710568.21	N 39 58 33.47	W 80 31 57.92	5.19
	6875.00	52.88	287.04	6487.45	5196.95	292.46	-489.71	-993.26	9.63	3.77	11.27	539259.94	1710535.76	N 39 58 33.56	W 80 31 58.36	5.22
	6920.00	54.88	291.99	6514.12	5223.62	324.26	-477.58	-1027.50	9.59	4.43	11.00	539272.06	1710501.51	N 39 58 33.67	W 80 31 58.78	5.24
	6965.00	57.50	296.51	6539.74	5248.74	358.12	-462.51	-1061.46	9.05	5.81	7.82	539287.11	1710467.45	N 39 58 33.82	W 80 31 59.23	5.27
	7009.00	60.52	300.18	6561.90	5271.40	393.42	-444.00	-1094.88	8.89	6.86	10.04	539304.74	1710434.13	N 39 58 33.99	W 80 31 59.64	5.30
	7055.00	64.44	303.53	6583.16	5292.66	432.58	-423.39	-1129.81	10.68	8.52	7.30	539325.28	1710399.31	N 39 58 34.20	W 80 32 0.11	5.33

03/21/2014

51-01634

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	BR (°/100ft)	TR (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")	Directional Difficulty Index
	7099.00	87.14	306.83	6601.20	6310.70	471.59	-400.23	-1162.39	0.19	6.14	7.50	539349.41	1710366.72	N 39 58 34.42	W 80 32 0.54	5.36
	7144.00	89.58	308.34	6617.79	6327.29	512.70	-374.43	-1195.30	7.50	5.42	5.58	539375.21	1710333.81	N 39 58 34.67	W 80 32 0.90	5.38
	7188.00	72.17	312.26	6632.21	6341.71	553.69	-347.27	-1226.78	8.58	5.80	6.61	539402.37	1710302.36	N 39 58 34.94	W 80 32 1.37	5.41
	7233.00	74.56	314.57	6645.09	6354.59	596.83	-317.64	-1258.08	7.25	5.31	5.16	539432.00	1710271.04	N 39 58 35.23	W 80 32 1.78	5.43
	7278.00	76.24	318.67	6656.82	6366.32	640.23	-286.08	-1287.03	8.71	1.51	8.89	539463.64	1710241.10	N 39 58 35.53	W 80 32 2.16	5.45
	7323.00	78.69	320.48	6667.97	6377.47	684.07	-252.75	-1316.36	8.71	7.67	4.24	539496.98	1710212.74	N 39 58 35.88	W 80 32 2.54	5.48
	7368.00	83.07	321.74	6674.10	6383.60	726.44	-218.17	-1344.27	10.12	9.73	2.80	539531.56	1710184.85	N 39 58 36.20	W 80 32 2.90	5.50
	7412.00	85.87	322.42	6678.34	6387.84	772.14	-183.63	-1371.18	6.55	6.36	1.55	539566.00	1710157.84	N 39 58 36.54	W 80 32 3.25	5.52
	7457.00	89.80	324.38	6680.02	6389.52	816.03	-147.53	-1397.98	9.88	8.87	4.36	539602.00	1710131.14	N 39 58 39.89	W 80 32 3.60	5.55
	7502.00	91.10	328.18	6679.84	6389.14	861.61	-110.55	-1423.61	4.86	2.78	4.00	539639.08	1710105.51	N 39 58 37.26	W 80 32 3.93	5.57
	7604.00	91.10	326.55	6677.68	6387.18	962.82	-25.04	-1480.10	0.36	0.00	0.36	539723.98	1710049.03	N 39 58 38.09	W 80 32 4.67	5.60
	7693.00	91.85	326.86	6675.85	6385.05	1050.67	48.73	-1528.04	0.71	0.62	0.35	539798.35	1710000.19	N 39 58 38.81	W 80 32 5.31	5.62
	7782.00	91.61	327.81	6673.02	6382.62	1138.69	123.54	-1577.09	0.84	-0.04	0.84	539873.15	1709952.04	N 39 58 39.55	W 80 32 6.04	5.65
	7872.00	91.51	325.79	6670.57	6380.07	1227.62	186.73	-1629.48	2.02	-0.11	-2.02	539948.34	1709902.65	N 39 58 40.29	W 80 32 6.58	5.68
	7961.00	91.05	329.20	6668.11	6377.61	1315.90	272.06	-1676.82	0.56	0.16	-0.50	540021.09	1709852.32	N 39 58 41.01	W 80 32 7.24	5.70
	8050.00	91.81	325.70	6665.58	6375.08	1404.19	348.40	-1727.21	0.40	-0.04	0.40	540095.00	1709801.92	N 39 58 41.72	W 80 32 7.90	5.72
	8140.00	91.44	325.81	6663.18	6372.68	1493.45	419.68	-1777.97	0.21	-0.19	-0.10	540169.28	1709751.17	N 39 58 42.45	W 80 32 8.50	5.75
	8220.00	91.56	325.79	6660.84	6370.34	1561.71	493.17	-1828.11	0.26	0.16	0.20	540242.76	1709701.03	N 39 58 43.17	W 80 32 9.22	5.77
	8318.00	91.56	325.70	6658.35	6367.86	1670.94	567.54	-1878.75	0.10	0.00	-0.10	540317.13	1709650.40	N 39 58 43.90	W 80 32 9.88	5.79
	8408.00	89.93	325.20	6657.18	6366.68	1759.26	640.67	-1929.10	1.91	-1.85	-0.46	540390.40	1709599.99	N 39 58 44.62	W 80 32 10.54	5.81
	8497.00	90.14	325.20	6657.13	6366.63	1847.53	714.03	-1979.84	0.24	0.24	0.01	540463.02	1709549.31	N 39 58 45.34	W 80 32 11.20	5.83
	8587.00	90.03	325.90	6657.00	6366.50	1936.97	788.20	-2030.66	0.73	-0.12	0.72	540537.88	1709498.47	N 39 58 46.07	W 80 32 11.86	5.85
	8678.00	90.17	325.51	6656.84	6366.34	2025.21	881.83	-2080.61	0.50	0.16	-0.47	540611.42	1709448.34	N 39 58 46.79	W 80 32 12.52	5.87
	8765.00	90.07	325.12	6656.66	6366.16	2113.67	935.01	-2131.46	0.45	-0.11	-0.44	540684.60	1709397.70	N 39 58 47.50	W 80 32 13.18	5.89
	8855.00	90.38	325.14	6656.30	6365.80	2202.06	1008.85	-2182.01	0.35	0.34	0.02	540758.43	1709348.25	N 39 58 48.23	W 80 32 13.85	5.90
	8945.00	90.56	324.14	6655.57	6365.07	2292.43	1082.25	-2234.99	1.13	0.19	-1.11	540831.82	1709294.17	N 39 58 48.95	W 80 32 14.53	5.92
	9034.00	90.58	325.81	6654.69	6364.19	2380.84	1155.12	-2285.07	1.88	0.03	1.88	540904.70	1709243.09	N 39 58 49.66	W 80 32 15.20	5.94
	9124.00	90.62	325.10	6653.75	6363.25	2470.18	1229.26	-2337.10	0.79	0.04	-0.79	540978.82	1709192.06	N 39 58 50.39	W 80 32 15.87	5.96
	9213.00	90.10	325.12	6653.19	6362.69	2558.56	1302.25	-2388.01	0.58	-0.58	0.02	541051.82	1709141.16	N 39 58 51.10	W 80 32 16.53	5.98
	9303.00	90.34	324.88	6652.95	6362.45	2647.97	1375.08	-2439.03	0.38	0.27	-0.27	541125.84	1709089.54	N 39 58 51.83	W 80 32 17.20	5.99
	9393.00	90.02	325.07	6652.69	6362.19	2737.39	1448.67	-2491.29	0.38	0.31	0.21	541199.23	1709037.89	N 39 58 52.55	W 80 32 17.88	6.01
	9482.00	90.00	324.29	6652.61	6362.11	2825.85	1522.20	-2542.74	1.12	-0.70	-0.88	541271.85	1709086.44	N 39 58 53.26	W 80 32 18.55	6.03
	9572.00	90.48	324.87	6651.23	6360.73	2915.25	1596.54	-2596.02	0.68	0.53	0.42	541345.10	1708934.15	N 39 58 53.98	W 80 32 19.23	6.04
	9662.00	91.07	327.02	6650.02	6359.52	3004.59	1670.01	-2645.64	2.89	0.66	2.61	541419.06	1708883.63	N 39 58 54.71	W 80 32 19.89	6.06
	9751.00	90.65	325.99	6648.76	6358.26	3092.70	1744.22	-2694.65	1.30	-0.66	-1.16	541493.77	1708834.52	N 39 58 55.44	W 80 32 20.53	6.08
	9841.00	90.58	324.81	6647.87	6357.37	3182.03	1818.29	-2745.78	1.31	0.08	-1.31	541567.84	1708783.42	N 39 58 56.18	W 80 32 21.20	6.09
	9930.00	89.90	323.41	6647.90	6357.00	3270.59	1890.39	-2797.03	1.75	-0.76	-1.57	541639.84	1708731.25	N 39 58 56.87	W 80 32 21.88	6.11
	10020.00	90.07	323.16	6647.52	6357.02	3360.27	1962.54	-2851.74	0.34	0.19	-0.28	541712.08	1708677.45	N 39 58 57.58	W 80 32 22.58	6.12
	10110.00	89.97	323.61	6647.49	6359.99	3449.95	2034.73	-2905.48	0.40	-0.11	0.39	541784.27	1708623.71	N 39 58 58.28	W 80 32 23.29	6.14
	10199.00	90.00	323.78	6647.61	6357.01	3538.58	2106.41	-2958.24	0.31	0.03	0.30	541855.94	1708570.90	N 39 58 58.99	W 80 32 23.97	6.15
	10289.00	90.00	323.78	6647.61	6357.01	3628.19	2179.02	-3011.41	0.00	0.00	0.00	541928.55	1708517.78	N 39 58 59.70	W 80 32 24.67	6.16
	10379.00	90.07	323.43	6647.46	6356.96	3717.82	2251.46	-3064.82	0.40	0.08	-0.39	542000.99	1708464.38	N 39 59 0.41	W 80 32 25.36	6.18
	10468.00	90.07	323.20	6647.35	6356.85	3806.50	2322.83	-3117.99	0.26	0.00	-0.26	542072.36	1708411.21	N 39 59 1.11	W 80 32 26.06	6.19
	10558.00	90.10	323.17	6647.22	6356.72	3896.10	2394.89	-3171.82	0.05	0.03	-0.03	542144.41	1708357.28	N 39 59 1.81	W 80 32 26.78	6.20
	10648.00	90.07	323.74	6647.08	6356.58	3985.86	2467.19	-3226.61	0.63	-0.03	0.63	542216.71	1708303.69	N 39 59 2.52	W 80 32 27.48	6.21
	10737.00	90.14	323.21	6646.92	6356.42	4074.51	2538.71	-3278.48	0.60	0.08	-0.60	542288.22	1708250.73	N 39 59 3.22	W 80 32 28.15	6.23
	10827.00	90.10	323.28	6646.73	6356.23	4164.10	2610.82	-3332.33	0.09	-0.04	0.08	542360.33	1708198.87	N 39 59 3.93	W 80 32 28.86	6.24
	10917.00	90.00	323.57	6646.65	6356.15	4253.85	2683.10	-3385.96	0.34	-0.11	0.32	542432.60	1708143.25	N 39 59 4.64	W 80 32 29.55	6.25
	11006.00	90.00	323.43	6646.65	6356.15	4342.91	2754.64	-3438.90	0.16	0.00	-0.16	542504.14	1708090.31	N 39 59 5.34	W 80 32 30.24	6.26
	11096.00	90.14	323.30	6646.54	6356.04	4432.17	2826.89	-3492.57	0.17	0.16	0.08	542576.39	1708036.65	N 39 59 6.04	W 80 32 30.94	6.27
	11186.00	90.00	324.90	6646.43	6355.93	4521.72	2899.82	-3545.30	1.72	-0.16	1.71	542649.32	1708003.91	N 39 59 6.76	W 80 32 31.63	6.28
	11276.00	90.00	325.56	6646.43	6355.93	4610.10	2972.03	-3598.04	0.76	0.00	0.76	542722.43	1707933.17	N 39 59 7.48	W 80 32 32.30	6.30
	11365.00	90.10	325.57	6646.35	6355.85	4699.40	3047.17	-3646.02	0.11	0.11	0.01	542796.86	1707882.30	N 39 59 8.20	W 80 32 32.96	6.31
	11455.00	89.97	325.83	6646.30	6355.80	4788.68	3121.52	-3697.64	0.32	-0.14	0.29	542871.01	1707831.58	N 39 59 8.93	W 80 32 33.62	6.32
	11544.00	90.10	325.23	6646.24	6355.74	4877.00	3194.89	-3748.01	0.69	0.15	-0.67	542944.38	1707781.21	N 39 59 9.65	W 80 32 34.28	6.33
	11634.00	90.07	325.40	6646.11	6355.61	4966.36	3268.90	-3799.23	0.19	-0.03	0.19	543018.38	1707730.00	N 39 59 10.38	W 80 32 34.95	6.34
	11723.00	90.03	325.71	6646.03	6355.53	5054.87	3342.30	-3849.67	0.35	-0.04	0.35	543091.78	1707679.66	N 39 59 11.10	W 80 32 35.61	6.35
	11813.00	90.03	324.61	6646.03	6355.49	5144.05	3416.16	-3900.08	1.22	0.00	-1.22	543165.64	1707628.25	N 39 59 11.82	W 80 32 36.28	6.36
	11902.00	90.07	325.92	6646.91	6355.41	5232.42	3489.30	-3951.69	1.47	0.04	1.47	543238.77	1707577.54	N 39 59 12.54	W 80 32 36.94	6.38
	11992.00	90.07	325.02	6646.80	6355.30	5321.66	3563.84	-4002.12	0.00	0.00	0.00	543313.31	1707527.11	N 39 59 13.27	W 80 32 37.60	6.39
	12082.00	90.14	325.10	6646.63	6355.13	5410.97	3638.05	-4053.05	0.85	0.08	-0.84	543387.52	1707476.19	N 39 59 14.00	W 80 32 38.27	6.40
	12171.00	90.07	325.30	6646.47	6354.97	5499.34	3711.16	-4103.80	0.16	-0.08	0.16	543460.62	1707425.44	N 39 59 14.71	W 80 32 38.93	6.41
	12261.00	90.14	325.81	6646.31	6354.81	5588.67	3785.28	-4154.84	0.35	0.08	0.34	543534.75	1707374.40	N 39 59 15.44	W 80 32 39.60	6.42
	12350.00	90.07	325.56	6646.14	6354.64	5676.96	3858.71	-4205.14	0.10	-0.08	-0.08	543608.17	1707324.11	N 39 59 16.16	W 80 32 40.25	6.42
	12440.00	90.07	325.09	6646.03	6354.53	5766.24	3933.13	-4255.70	0.48	0.00	0.48	543682.58	1707273.49	N 39 59 16.89	W 80 32 40.91	6.43
	12530.00	90.14	325.81	6646.07	6354.57	5855.51	4007.52	-4306.41	0.54	0.08	0.53	543756.97	1707222.84	N 39 59 17.62	W 80 32 41.58	6.44
	12619.00	90.03	325.98	6646.14	6354.64	5943.79	4081.08	-4356.81	0.54	-0.12	0.53	543830.53	1707172.74	N 39 59 18.34	W 80 32 42.23	6.45
	12709.00	89.97	326.02	6646.24	6354.24	6033.01	4155.89	-4408.83	0.08	-0.07	0.04	543905.14	1707122.42	N 39 59 19.07	W 80 32 42.89	6.46
	12798.00	90.00	326.04	6646.76	6354.26	6121.23	4229.50	-4459.56	0.04	0.03	0.02	543978.95	1707072.69	N 39 59 19.79	W 80 32 43.54	6.47
	12888.00	90.07	326.22	6644.70	6354.20	6210.42	4304.23	-4508.72	0.21	0.08	0.20	544053.67	1707022.54	N 39 59 20.53	W 80 32 44.19	6.48
	12978.00	90.10	326.03	6644.57	6354.07	6299.61	4378.95	-4558.80	0.21	0.03	-0.21	544128.39	1706972.37	N 39 59 21.26	W 80 32 44.85	6.49
	13067.00	90.10	326.29	6644.42	6353.92	6387.81	4452.85	-4608.40	0.22	0.00	0.22	544202.28	1706922.78	N 39 59 21.98	W 80 32 45.50	6.50
	13157.00	90.10	326.78	6644.20	6353.70	6477.05	4527.47	-4658.81	0.50	0.00	0.50	544276.90	1706872.46	N 39 59 22.72	W 80 32 46.15	6.51
	13246.00	90.10	326.97	6644.10	6353.60	6565.28	4601.14	-4709.74	0.21	0.00	0.21	544350.57	1706822.53	N 39 59 23.44	W 80 32 46.81	6.52
	13336.00	90.21	326.02	6643.86	6353.36	6654.50	4676.76	-4757.07	0.13	0.12	0.06	544426.19	1706772.20	N 39 59 24.17	W 80 32 47.46	6.52
	13426.00	90.00	325.82	6643.69	6353.19	6743.74	4750.30	-4807.50	0.32	-0.23	-0.22	544499.72	1706721.77	N 39 59 24.90	W 80 32 48.12	6.53
	13516.00	90.00	326.92	6643.69	6353.19	6832.96	4824.79	-4858.00	0.11	0.00	0.11	544574.21	1706671.27	N 39 59 25.63	W 80 32 48.78	6.54
	13605.00	90.17	326.53	6643.56	6353.06	6921.27	4898.34	-4908.12	0.48	0.19	-0.44	544647.75	1706621.18	N 39 59 26.35	W 80 32 49.44	6.55
	13695.00	90.14	326.93	6643.32	6352.82	7010.64	4972.71	-4958.80	0.45	-0.03	0.44	544722.12	1706570.48	N 39 59 27.08	W 80 32 50.10	6.56
	13785.00	90.07	326.04	6643.15	6352.65	7099.78	5047.31	-5009.14	0.14	-0.08	0.12	544796.72	1706520.13	N 39 59 27.81	W 80 32 50.76	6.57
	13874.00	90.21	326.69	6642.94	6352.44	7187.91	5121.41	-5058.44	0.75	0.16	0.73	544870.82	1706470.84	N 39 59 28.54	W 80 32 51.40	6.57
	13964.00	90.21	326.88	6642.61	6352.11	7277.07	5196.28	-5108.30	0.00	0.00	-0.00	544945.68	1706420.89	N 39 59 29.27	W 80 32 52.06	6.58
	14053.00	90.34	326.50	6642.18	6351.68	7365.26	5270.22	-5157.92	0.71	0.15	0.70	545019.62	1706371.37	N 39 59 30.00	W 80 32 52.70	6.59
	14143.00	90.34	325.70	6641.85	6351.16	7454.44	5344.06	-5208.05	0.70	0.00	-0.70	545094.36	1706321.23	N 39 59 30.73	W 80 32 53.36	6.60
	14232.00	90.14	324.00	6641.27	6350.77	7542.87	5417.80	-5259.20	1.08	-0.22	-1.04	545167.19	1706270.09	N 39 59 31.44	W 80 32 54.03	6.61
	14322.00	90.03	322.80	6641.14	6350.64	7632.53	5490.08	-5312.82	1.41	-0.12	-1.40	545239.40	1706216.47	N 39 59 32.15	W 80 32 54.73	6.62
	14411.00	90.07	323.43	6641.06	6350.56	7721.23	5561.26	-5366.24	0.71	0.04	0.71	545310.65	1706163.04	N 39 59 32.85	W 80 32 55.42	6.63
	14501.00	89.76	322.93	6641.19	6350.69	7810.92	5633.31	-5420.17	0.65	-0.34	-0.66	545382.69	1706109.12	N 39 59 33.55	W 80 32 56.13	6.64
	14591.00	90.10	323.71	6641.30	6350.80	7900.80	5705.40	-5473.93	0.95	0.38	0.87	545454.87	1706055.30	N 39 59 34.26	W 80 32 56.83	6.65
	14680.00	90.10	323.92	6641.16	6350.86	7989.21	5777.32	-5528.48	0.24	0.00	0.24	545526.70	1706002.82	N 39 59 34.97	W 80 32 57.51	6.65
	14770.00	89.93	323.10	6641.13	6350.63	8078.85	5849.67	-5580.00	0.93	-0.18	-0.91	545599.05	1705949.30	N 39 59 35.67	W 80 32 58.21	6.66
	14859.00	90.07	323.10	6641.13	6350.63	8167.66	5920.85	-5633.44	0.16	0.16	0.00	545670.22	1705895.87	N 39 59 36.37	W 80 32 58.91	6.67
	14949.00	90.10	323.10	6640.99	6350.49	8257.26	5992.82	-5687.47	0.03	0.03	0.00	545742.19	1705841.83	N 39 59 37.08	W 80 32 59.62	6.68
	15038.00	90.10	323.33	6640.84	6350.34	8345.85	6064.10	-5740.77	0.26	0.00	0.26	545813.46	1705788.54	N 39 59 37.77	W 80 33 0.31	6.68
	15128.00	90.14	324.02	6640.65	6350.15	8435.56	6136.61	-5794.08	0.77	0.04	0.77	545885.97	1705735.23	N 39 59 38.49	W 80 33 1.01	6.69
	15217.00	90.07	324.18	6640.49	6349.99	8524.15	6208.70	-5846.27	0.20	-0.08	0.18	545958.06	1705683.05	N 39 59 39.19	W 80 33 1.69	6.70
	15307.00	90.07	324.53	6640.38	6349.88	8613.67	6281.84	-5898.72	0.39	0.00	0.38	546031.19	1705630.60	N 39 59 39.91	W 80 33 2.37	6.71
	15397.00	90.17	324.32	6640.18	6349.69	8703.18	6355.04	-5951.08	0.26	0.11	-0.23	546104.39	1705578.24	N 39 59 40.63	W 80 33 3.06	6.71
	15486.00	90.10	324.17	6639.98	6349.48	8791.72	6427.27	-6003.08	0.10	-0.08	-0.17	546176.61	1705528.24	N 39 59 41.33	W 80 33 3.74	6.72
	15576.00	90.21	323.75	6639.73	6349.23	8881.30	6500.64	-6056.03	0.48	0.12	-0.47	546249.30	1705473.29	N 39 59 42.05	W 80 33 4.43	6.73
	15665.00	90.58	323.70	6639.12	6348.62	8969.92	6573.79	-6108.09	0.42	0.42	0.06	546321.13	1705420.84	N 39 59 42.75	W 80 33 5.11	6.73
	15755.00	90.58	324.43	6638.21	6347.71	9059.40	6644.66	-6161.50	0.81	0.00	0.81	546393.99	1705367.82	N 39 59 43.46	W 80 33 5.80	6.74
	15844.00	90.65	323.48	6637.33	6346.83	9148.07	6716.61	-6213.87	1.07	0.08	-1.07	546465.95	1705315.46	N 39 59 44.17	W 80 33 6.49	6.75
	15934.00	90.65	324.03	6636.30	6345.80	9237.68	6789.10	-6267.08	0.62	0.11	0.61	546538.53	1705262.25	N 39 59 44.88	W 80 33 7.18	6.76
	16023.00	90.58	324.30	6635.43	6344.93	9326.23	6861.34	-6319.18	0.31	-0.08	0.30	546610.67	1705210.15	N 39 59 45.59	W 80 33 7.86	6.76
	16113.00	90.62	323.73	6634.57	6344.07	9415.80	6934.16	-6372.06	0.64	0.07	-0.63	546683.40	1705157.28	N 39 59 46.30	W 80 33 8.55	6.77
	16202.00	90.58	323.40	6633.72	6343.22	9504.44	7005.76	-6424.91	0.38	0.07	-0.37	546755.00	1705104.42	N 39 59 47.00	W 80 33 9.24	6.78
	16292.00	90.38	324.18	6632.90	6342.46	9594.05	7078.38	-6478.08	0.89	-0.22	0.87	546827.70	1705051.26	N 39 59 47.71	W 80 33 9.94	6.79
	16381.00	90.55	326.41	6632.24	5341.74	9682.40	7151.54	-6528.75	2.51	0.19	2.51	546900.85	1705000.60	N 39 59 48.43	W 80 33 10.60	6.80
	16471.00	90.45	325.85	6631.45	5340.95	9771.59	7226.26	-6578.90	0.63	-0.11	-0.62	546975.58	1704950.44	N 39 59 49.16	W 80 33 11.25	6.80
	16560.00	90.58	325.85	6630.65	5340.15	9859.84	7299.81	-6628.88	0.15	0.15	0.00	547049.22	1704900.49	N 39 59 49.88	W 80 33 11.91	6.81
	16650.00	90.45	326.42	6629.84	5339.34	9949.03	7374.64	-6679.01	0.65	-0.14	0.63	547123.05	1704850.34	N 39 59 50.62	W 80 33 12.58	6.82
	16739.00	90.27	327.02	6629.29	5338.79	10037.10	7448.04	-6727.85	0.70	-0.20	0.67	547198.35	1704801.51	N 39 59 51.35	W 80 33 13.20	6.82
	16829.00	90.14	326.05	6628.94	5338.46	10126.20	7524.12	-6777.47	1.09	-0.14	-1.08	547273.42	1704751.80	N 39 59 52.08	W 80 33 13.85	6.83
	16918.00	90.07	326.20	6628.80	5338.30	10214.41	7598.01	-6827.08	0.19	-0.08	0.17	547347.31	1704702.27	N 39 59 52.81	W 80 33 14.50	6.84
	17008.00	90.31	326.74	6628.60	5338.00	10303.52	7673.04	-6876.79	0.60	0.27	0.60	547422.33	1704652.56	N 39 59 53.54	W 80 33 15.15	6.84
	17097.00	90.27	326.46	6628.05	5337.55	10391.82	7747.34	-6925.79	0.32	-0.04	-0.31	547496.63	1704603.57	N 39 59 54.27	W 80 33 15.79	6.85

03/21/2014

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Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	BR (°/100ft)	TR (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")	Directional Difficulty Index
	17187.00	90.03	326.37	6827.82	5337.32	10480.76	7822.31	-6975.87	0.25	-0.27	-0.10	547571.60	1704553.70	N 39 59 55.01	W 80 33 18.44	6.86
	17276.00	90.14	325.04	6827.68	5337.18	10569.95	7890.23	-7025.14	0.50	0.12	-0.48	547645.52	1704504.22	N 39 59 55.73	W 80 33 17.80	6.86
	17366.00	90.03	326.52	6827.55	5337.05	10659.12	7971.04	-7075.17	0.66	-0.12	0.64	547720.33	1704454.20	N 39 59 56.46	W 80 33 17.74	6.87
Final Survey 17-Sept-13	17389.00	90.21	326.00	6827.50	5337.00	10682.00	7992.17	-7087.04	2.39	0.78	-2.26	547739.45	1704441.43	N 39 59 56.65	W 80 33 17.61	6.87
Projection to Bit	17425.00	90.21	326.00	6827.37	5336.87	10718.59	8026.02	-7108.07	0.00	0.00	0.00	547769.30	1704421.30	N 39 59 56.94	W 80 33 18.17	6.87

Survey Type: Def Survey

Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma
Survey Program:

Description	Part	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	1	0.000	18.500	Act Stns	30.000	30.000	SLB_NSG+MSHOT-Depth Only	Original Borehole / Noble Energy SHL17FHS Gyro+MWD 0ft to 17425ft MD
	1	18.500	3070.000	Act Stns	30.000	30.000	SLB_NSG+MSHOT	[redacted]
	1	3070.000	3210.000	Act Stns	30.000	30.000	SLB_NSG+SSHOT	[redacted]
	1	3210.000	3304.000	Act Stns	30.000	30.000	SLB_MWD-INC_ONLY	[redacted]
	1	3304.000	17389.000	Act Stns	30.000	30.000	SLB_MWD-STD	[redacted]
	1	17389.000	17425.000	Act Stns	30.000	30.000	SLB_BLIND+TREND	[redacted]

51-01634

PATHFINDER
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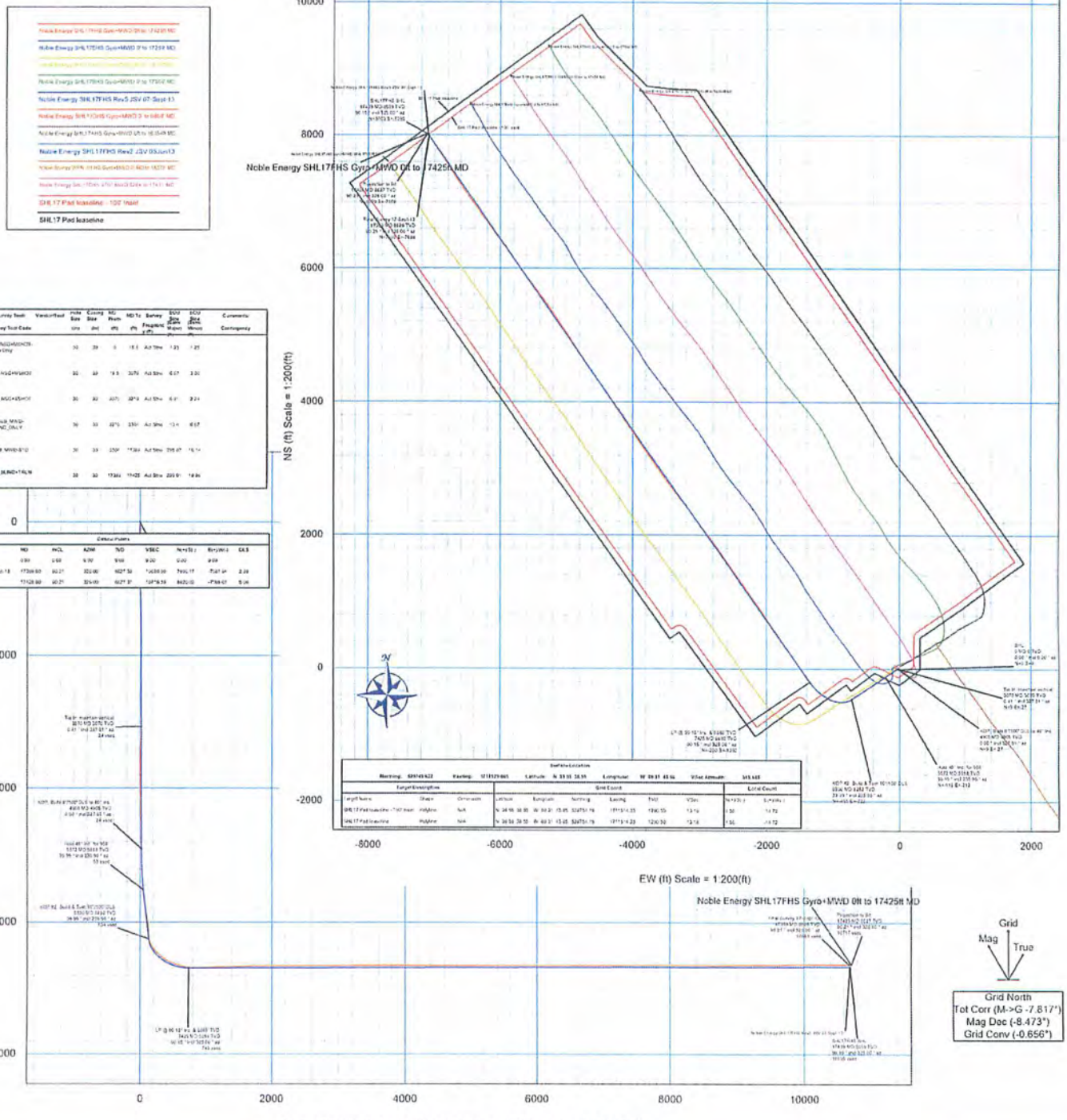
Borehole:	Well:	Field:	Structure:
Original Borehole	SHL17FHS	WV Marshall County (NAD 27)	Noble Energy SHL17 Pad

Gravity & Magnetic Parameters						Surface Location	NAD27 West Virginia State Plane, Northern Zone, US Feet					Miscellaneous			
Model:	HDGM 2013	Dip:	67.531°	Date:	9/7/2013	Lat:	N 39 58 38.51	Northing:	519749.622ftUS	Grid Conv:	-0.656°	Slot:	SHL17FHS	TVD Ref:	KB(1299.5ft above MSL)
MagDec:	-8.473°	FS:	53169.86nT	Gravity FS:	999.449mgn (9.80665 Local)	Lon:	W 80 31 45.66	Easting:	1711529.065ftUS	Scale Fact:	1	Plan:	Noble Energy SHL17FHS Gyro+MWD 0ft to 17425ft MD		



03/21/2014