

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

Date: 9/11/2013  
API: 47-051-01585

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

LOCATION: Sandhill 17 Elevation: 1,295.73 Quadrangle: Majorsville

District: Sandhill County: MARSHALL  
Latitude: \_\_\_\_\_ Feet South of \_\_\_\_\_ Deg. \_\_\_\_\_ Min. \_\_\_\_\_ Sec. 39.97740600  
Longitude: \_\_\_\_\_ Feet South of \_\_\_\_\_ Deg. \_\_\_\_\_ Min. \_\_\_\_\_ Sec. -80.52952500

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	30	40	40	Cemented In
Agent: Steven Green	13-3/8	1,143.1	1,143.1	1076 sxs (226 bbls) – 20bbls return
Inspector: Bill Hendershot	9-5/8	3,116.9	3,116.9	1140 sxs (229.4 bbls) - 15 bbls return
Date Permit Issued: 12/14/2012	5-1/2	17,541.0	17,541.0	2827 sxs (714 bbls) – 42 bbls to surface
Date Well Work Commenced: 3/29/2013				
Date Well Work Completed: 12/8/2013				
Verbal Plugging:				
Date Permission granted on: 3/29/2013				
Rotary Cable Rig X				
Total Vertical Depth (ft): Original Hole - 6,701.3				
Total Measured Depth (ft): 17,566.0				
Fresh Water Depth (ft): 122'				
Salt Water Depth (ft): 1540'				
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/A				

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

Producing formation Marcellus Pay zone depth (ft) 7148  
Gas: Initial open flow 412 MCF/d Oil: Initial open flow 0 Bbl/d  
Final open flow 2057 MCF/d Final open flow 18.9 Bbl/d  
Time of open flow between initial and final tests 24 Hours  
Static rock Pressure 1400 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]  
Signature  
2-9-14  
Date

03/21/2014

Were core samples taken? Yes\_\_ No\_x\_\_

Were cuttings caught during drilling? Yes\_x\_ No\_\_

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

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**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

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

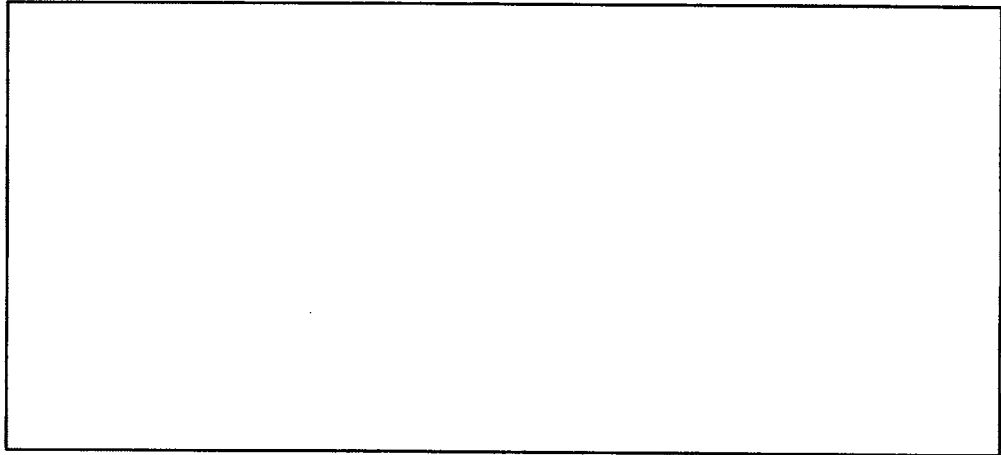
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Surface:

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Formations Encountered: Please See Attached



### 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:	47-051-01585-00-00
Operator Name:	Noble Energy, Inc.
Well Name and Number:	SHL 17B
Longitude:	-80.52932000
Latitude:	39.97748000
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	6,701
Total Base Water Volume (gal):	15,770,204
Total Base Non Water Volume:	0

### 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	88.69602	Density = 8.340
SAND - PREMIUM WHITE	Halliburton	Proppant	Crystalline silica, quartz	14808-60-7	100.00000	8.37007	
SAND - COMMON WHITE	Halliburton	Proppant	Crystalline silica, quartz	14808-60-7	100.00000	2.13472	
HYDROCHLORIC ACID 5-10%	Halliburton	Solvent	Hydrochloric acid	7647-01-0	10.00000	0.06473	
FDP-S-1078-12	Halliburton	Friction Reducer	Hydrotreated light petroleum distillate	54742-47-8	30.00000	0.02457	
			Alcohol, C12-16, ethoxylated	58551-12-2	10.00000	0.00819	
			Ammonium chloride	12125-02-9	10.00000	0.00819	
			9-Octadecenamide, n,n-bis-2-(hydroxy-ethyl)-, (Z)	33-83-4	5.00000	0.00410	
FE-1A ACIDIZING COMPOSITION	Halliburton	Additive	Acetic anhydride	108-24-7	100.00000	0.00335	
			Acetic acid	64-19-7	60.00000	0.00201	





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		Other ingredient(s)	Diethyls	Confidential		0.00001	
			Diethyls	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	17123	17405	48	5406	8114	86.0	3621	1.00	471528	3000	494,371
10/17/2013	2	Marcellus	Slickwater	16823	17077	40	6144	7679	53.3	5307	1.22	27082	3000	333,938
10/17/2013	2RP	Marcellus	Slickwater	16843	16929	32	6747	8236	71.9	3602	0.97	470346	3000	615,481
10/18/2013	3	Marcellus	Slickwater	16523	16777	40	5468	8420	76.2	4244	1.07	391457	3000	444,132
10/18/2013	4	Marcellus	Slickwater	16223	16477	40	6803	7920	71.7	3933	1.02	464963	3000	466,658
10/19/2013	5	Marcellus	Slickwater	15923	16177	40	5921	8262	78.1	4131	1.05	462808	3000	452,579
10/19/2013	6	Marcellus	Slickwater	15623	15877	40	6644	8063	71.1	4274	1.07	466478	3000	539,754
10/20/2013	7	Marcellus	Slickwater	15323	15577	40	6735	8253	71.4	4017	1.03	463799	3000	532,192
10/20/2013	8	Marcellus	Slickwater	15023	15277	40	6775	7816	70.6	4167	1.05	467098	3000	457,386
10/20/2013	9	Marcellus	Slickwater	14723	14977	40	5801	8104	77.6	3855	1.01	471416	3000	466,486
10/21/2013	10	Marcellus	Slickwater	14423	14677	40	6191	8024	78.4	3944	1.02	466802	3000	465,662
10/22/2013	11	Marcellus	Slickwater	14123	14377	40	5723	8045	88.3	3930	1.02	459890	3000	464,935
10/23/2013	12	Marcellus	Slickwater	13823	14077	40	5400	8039	80.5	4224	1.06	457952	3000	444,600
10/23/2013	13	Marcellus	Slickwater	13523	13777	40	6216	8020	78.5	4389	1.09	465323	3000	462,074
10/24/2013	14	Marcellus	Slickwater	13223	13477	40	5922	7977	79.3	4071	1.04	465348	6000	533,748
10/25/2013	15	Marcellus	Slickwater	12923	13177	40	6080	7646	81.7	3979	1.03	464438	3000	454,393
10/25/2013	16	Marcellus	Slickwater	12623	12877	40	6396	7374	82.7	3790	1.00	460881	3000	440,037
10/26/2013	17	Marcellus	Slickwater	12323	12577	40	5805	7890	81.7	3642	0.98	467606	3000	481,760
10/27/2013	18	Marcellus	Slickwater	12075	12277	40	5987	7816	81.7	4060	1.04	467606	3000	481,760
10/27/2013	19	Marcellus	Slickwater	11825	12027	40	5789	7393	80.8	3966	1.02	390542	3000	394,842
10/27/2013	20	Marcellus	Slickwater	11523	11777	40	5788	7478	83.2	3911	1.02	466211	3000	438,201
10/28/2013	21	Marcellus	Slickwater	11223	11477	40	6366	7405	82.9	4379	1.09	468240	3000	446,123
10/28/2013	22	Marcellus	Slickwater	10923	11177	40	5968	7040	83.9	3902	1.02	466252	3000	460,268
10/29/2013	23	Marcellus	Slickwater	10623	10877	40	6080	7367	82.6	3641	0.98	465756	3000	439,071
10/30/2013	24	Marcellus	Slickwater	10323	10577	40	6647	7078	81.0	3879	1.01	466694	3000	450,344
10/31/2013	25	Marcellus	Slickwater	10023	10277	40	6437	7078	82.4	3854	0.99	468648	3000	442,125
11/1/2013	26	Marcellus	Slickwater	9723	9977	40	5896	7049	83.8	3630	0.98	467255	3000	438,479
11/3/2013	27	Marcellus	Slickwater	9423	9677	40	6481	7175	84.3	3865	1.01	466057	3000	436,224
11/3/2013	28	Marcellus	Slickwater	9123	9377	40	5862	7212	89.8	4169	1.05	402274	3000	403,499
11/4/2013	29	Marcellus	Slickwater	8823	9077	40	6569	7074	83.9	4358	1.08	463486	3000	439,273
11/4/2013	30	Marcellus	Slickwater	8523	8777	40	6055	7197	89.9	4427	1.09	457787	3000	425,423
11/5/2013	31	Marcellus	Slickwater	8223	8477	40	6387	7266	83.4	4362	1.08	465964	3000	429,447
11/5/2013	32	Marcellus	Slickwater	7923	8177	40	6442	7262	88.2	4165	1.05	467902	3000	446,453
11/6/2013	33	Marcellus	Slickwater	7623	7877	40	6172	7217	84.0	4132	1.05	467797	3000	429,932
11/7/2013	34	Marcellus	Slickwater	7323	7577	40	6221	6926	84.4	4164	1.05	467616	3000	419,042

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Stage #	Plug Type	Plug Depth
1	No Plug	No Plug
2A, 2B	Composite Frac Plug	17,100
3	Composite Frac Plug	16,800
4	Composite Frac Plug	16,500
5	Composite Frac Plug	16,200
6	Composite Frac Plug	15,900
7	Composite Frac Plug	15,600
8	Composite Frac Plug	15,300
9	Composite Frac Plug	15,000
10	Composite Frac Plug	14,700
11	Composite Frac Plug	14,400
12	Composite Frac Plug	14,100
13	Composite Frac Plug	13,800
14	Composite Frac Plug	13,500
15	Composite Frac Plug	13,200
16	Composite Frac Plug	12,900
17	Composite Frac Plug	12,600
18	Composite Frac Plug	12,300
19	Composite Frac Plug	12,050
20	Composite Frac Plug	11,800
21	Composite Frac Plug	11,500
22	Composite Frac Plug	11,200
23	Composite Frac Plug	10,900
24	Composite Frac Plug	10,600
25	Composite Frac Plug	10,300
26	Composite Frac Plug	10,000
27	Composite Frac Plug	9,700
28	Composite Frac Plug	9,400
29	Composite Frac Plug	9,100
30	Composite Frac Plug	8,800
31	Composite Frac Plug	8,500
32	Composite Frac Plug	8,200
33	Composite Frac Plug	7,900
34	Composite Frac Plug	7,600
	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	4348	
Warren Sand	4346	4366	4348	4634	
Shale	4632	4703	4634	4705	
Java Shale	4703	4797	4705	4901	
Pipe Creek Shale	4899	5496	4901	5515	
Angola Shale	5496	5528	5515	5551	
Rhinestreet	5528	5762	5551	5835	
Cashaqua	5762	5804	5835	5887	
Middlesex	5804	5869	5887	5971	
West River	5869	5895	5971	6005	
Burkett	5895	5897	6005	6008	
Tully Limestone	5897	5899	6008	6011	
Hamilton	5899	5947	6011	6074	
Marcellus	5947	5952	6074	not encountered	Gas
Onondaga	5952	not encoun	not encountered	not encountered	

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Noble Energy SHL17BHS Gyro+MWD 0' to 17566' MD Survey Report



(Dot Survey)

Report Date: August 06, 2013 - 11:00 AM
Client: Noble Energy
Field: WV Marshall County (NAD 27)
Structure / Blo: Noble Energy SHL17 Pad / SHL17BHS
Well: SHL17BHS
Original Borehole: Original Borehole
UWI / APB: Unknown / Untested
Survey Name: Noble Energy SHL17BHS Gyro-MWD 0' to 17566' MD
Survey Date: July 26, 2013
Tort / AND / DOI / ERD Ratio: 310.516' / 118.000' / 24.6' / 0.901' / 1.744'

Survey / DLS Competition: Minimum Curvature / Lukinski
Vertical Section Admin: 330' / 62' \* (Grid North)
Vertical Section Origin: 0.000' N, 0.000' E
TVD Reference Datum: R31
TVD Reference Elevation: 1250.500' N. above NAD
Sealed / Ground Elevation: 1272.000' N. above NAD
Magnetic Declination: -8.470' \*
Total Gravity Field Strength: 985.306mgals (9.80328 Gauss)
Total Magnetic Field Strength: 53184.358 nT
Magnetic Dip Angle: 67.542' \*
Declination Date: July 26, 2013
Magnetic Declination Model: IGRF04.2013
North Reference: 594North
Grid Convergence Used: -0.6596' \*
Total Corr Mag North-Guid North: -7.8132' \*
Local Grid Referenced To: Well Head

Table with columns: Comments, MD (ft), Inci (in), Azim Grid (T), TVD (ft), TVDSS (ft), VSEC (ft), NS (ft), EW (ft), DLS (ft/1000), BR (ft/1000), IR (ft/1000), Northing (ftUS), Easting (ftUS), Latitude (N/S °'"), Longitude (E/W °'"), Directional Difficulty Index. The table contains multiple rows of survey data points.

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Comments	MD (ft)	Incl (°)	Adm Grid (E)	TVD (ft)	TVD030 (ft)	V80C (ft)	NS (ft)	EW (ft)	DLS (ft/100ft)	BR (ft/100ft)	TR (ft/100ft)	Northing (ft)	Easting (ft)	Latitude (N/S)	Longitude (E/W)	Directional Index
	5490.00	22.25	00 07	5435.77	4145.27	18.83	70.77	87.87	5.70	5.82	-7.08	53036.26	1711506.33	N 38 58 39.37 W	80 31 45.17	3.95
	5490.00	24.09	08 20	5478.08	4185.88	18.42	77.20	104.38	6.28	0.23	-1.08	530842.88	1711584.75	N 39 58 30.43 W	80 31 44.04	4.02
	5538.00	28.31	07 50	5518.20	4275.80	13.94	84.50	123.07	7.41	7.38	-1.42	530850.28	1711803.44	N 39 58 35.51 W	80 31 44.72	4.09
	5583.00	31.20	07 50	5555.54	4295.04	11.45	93.31	143.38	4.40	4.30	-1.24	530958.79	1711827.74	N 39 58 36.60 W	80 31 44.40	4.15
	5627.00	32.84	07 46	5592.07	4302.27	8.87	102.18	164.26	5.41	1.30	1.05	530967.07	1711844.01	N 39 58 38.89 W	80 31 44.10	4.21
	5717.00	37.55	07 94	5668.89	4370.10	2.62	121.81	212.41	5.48	5.48	0.53	530987.20	1711882.70	N 39 58 39.89 W	80 31 43.56	4.32
	5807.00	34.58	03 42	5729.46	4448.95	-1.07	143.54	260.98	4.45	-3.32	-5.02	530999.02	1711711.04	N 39 58 40.11 W	80 31 42.07	4.42
	5894.00	38.05	08 08	5810.90	4520.40	-6.60	163.23	308.56	5.55	4.80	5.21	530970.71	1711780.42	N 39 58 40.30 W	80 31 42.25	4.51
	5988.00	40.60	08 75	5880.17	4580.07	-14.28	190.37	352.48	5.32	2.27	0.77	530951.85	1711802.84	N 39 58 40.54 W	80 31 41.68	4.58
	6075.00	40.20	07 03	5947.66	4607.36	-21.74	207.53	418.13	0.93	-4.86	-1.26	530973.31	1711894.40	N 39 58 40.75 W	80 31 40.98	4.64
	6165.00	40.82	06 07	6016.34	4725.84	-28.21	230.51	490.05	0.70	0.37	-1.07	530959.98	1711950.30	N 39 58 40.92 W	80 31 40.20	4.69
	6255.00	38.60	06 45	6085.17	4794.87	-34.05	253.58	573.14	1.14	-1.13	-0.24	540019.06	1712003.40	N 39 58 41.22 W	80 31 39.01	4.74
	6341.00	38.56	07 08	6151.04	4861.44	-39.70	274.80	572.95	1.31	-1.22	0.73	640040.44	1712075.30	N 39 58 41.44 W	80 31 38.05	4.78
	6386.00	39.40	08 18	6221.92	4932.01	-41.25	297.21	508.41	8.40	2.02	-12.95	640052.76	1712078.70	N 39 58 41.67 W	80 31 36.85	4.82
	6431.00	41.46	04 18	6291.17	5002.07	-39.76	322.82	623.06	11.14	4.40	-15.71	640089.39	1712103.40	N 39 58 41.72 W	80 31 35.33	4.85
	6478.00	42.38	07 36	6354.88	5064.10	-34.52	341.92	640.31	10.32	7.00	-15.16	640087.40	1712126.05	N 39 58 41.91 W	80 31 34.04	4.90
	6520.00	42.80	04 23	6423.05	5134.05	-20.00	363.21	607.11	0.34	1.00	-13.70	540109.80	1712147.45	N 39 58 42.13 W	80 31 37.77	4.93
	6565.00	42.80	04 23	6492.05	5204.05	-14.21	391.34	685.89	10.24	0.02	-15.20	540132.81	1712168.23	N 39 58 42.37 W	80 31 37.64	4.97
	6610.00	42.80	04 23	6561.05	5274.05	-8.42	419.47	764.67	9.01	-0.47	-14.22	540158.09	1712188.00	N 39 58 42.63 W	80 31 37.34	5.00
	6655.00	43.08	04 08	6630.05	5344.05	-18.65	447.60	843.45	10.27	-12.07	-12.07	540186.40	1712207.70	N 39 58 42.90 W	80 31 37.17	5.03
	6699.00	43.08	04 08	6700.05	5414.05	-12.86	475.73	922.23	8.30	0.91	-11.81	540215.32	1712225.70	N 39 58 43.19 W	80 31 37.04	5.08
	6744.00	45.07	11 06	6769.73	5483.73	01.29	499.28	733.35	8.79	2.20	-12.13	540245.85	1712243.69	N 39 58 43.49 W	80 31 36.94	5.09
	6789.00	45.83	8 01	6839.28	5553.28	88.16	511.58	733.93	1.21	-0.16	-0.76	540277.45	1712262.04	N 39 58 43.80 W	80 31 36.88	5.17
	6834.00	47.05	3 70	6908.83	5622.83	112.00	544.89	742.25	7.83	3.82	-8.78	540309.05	1712280.39	N 39 58 44.12 W	80 31 36.84	5.18
	6878.00	49.74	0 20	6978.38	5692.38	141.47	577.80	743.39	9.35	7.02	-8.16	540341.32	1712298.74	N 39 58 44.45 W	80 31 36.83	5.19
	6923.00	54.48	356.31	7047.93	5761.93	173.10	610.58	742.27	10.78	8.31	-8.84	540373.04	1712317.09	N 39 58 44.81 W	80 31 36.85	5.20
	6968.00	68.21	052.86	7117.48	5831.48	207.45	690.85	738.71	10.48	8.29	-7.87	540404.81	1712335.44	N 39 58 45.17 W	80 31 36.90	5.23
	7013.00	61.30	050.18	7187.03	5901.03	243.81	699.70	732.90	8.82	6.80	-0.00	540436.53	1712353.79	N 39 58 45.55 W	80 31 37.08	5.26
	7058.00	63.00	047.80	7256.58	5970.58	280.93	727.64	726.48	7.73	8.03	-3.36	540468.25	1712372.14	N 39 58 45.93 W	80 31 37.08	5.29
	7103.00	68.60	044.24	7326.13	6040.13	322.85	767.81	716.55	12.42	10.24	-7.87	540499.97	1712390.49	N 39 58 46.32 W	80 31 37.21	5.32
	7148.00	71.70	041.88	7395.68	6109.68	367.01	808.10	703.24	8.63	8.09	-5.53	540531.69	1712408.84	N 39 58 46.72 W	80 31 37.38	5.34
	7193.00	75.80	038.28	7465.23	6179.23	409.87	848.83	688.87	10.84	9.11	-5.73	540563.41	1712427.19	N 39 58 47.12 W	80 31 37.67	5.37
	7238.00	78.37	035.78	7534.78	6248.78	447.15	898.43	672.44	9.88	5.04	-1.14	540595.13	1712445.54	N 39 58 47.51 W	80 31 37.79	5.40
	7283.00	81.24	031.39	7604.33	6318.33	490.20	948.03	656.04	9.36	-9.58	-6.58	540626.85	1712463.89	N 39 58 47.90 W	80 31 38.04	5.43
	7328.00	84.09	028.38	7673.88	6387.88	531.47	997.63	639.65	10.14	14.76	-0.80	540658.57	1712482.24	N 39 58 48.29 W	80 31 38.34	5.46
	7373.00	87.32	024.87	7743.43	6457.43	572.72	1047.23	623.26	10.67	5.87	-3.64	540690.29	1712500.59	N 39 58 48.67 W	80 31 38.07	5.48
	7418.00	89.48	023.99	7812.98	6526.98	613.97	1096.82	606.87	8.49	4.08	-5.08	540722.01	1712518.94	N 39 58 49.06 W	80 31 38.06	5.51
	7463.00	90.00	023.20	7882.53	6596.53	655.22	1146.41	590.38	0.68	0.68	0.68	540753.73	1712537.29	N 39 58 49.45 W	80 31 38.05	5.54
	7508.00	90.85	022.98	7952.08	6666.08	696.47	1196.00	573.89	0.67	0.82	-0.27	540785.45	1712555.64	N 39 58 49.84 W	80 31 38.05	5.57
	7553.00	90.85	022.98	8021.63	6735.63	737.72	1245.59	557.40	3.74	-0.85	-3.36	540817.17	1712574.00	N 39 58 50.23 W	80 31 38.04	5.60
	7598.00	90.48	019.13	8091.18	6805.18	778.55	1295.14	540.91	1.81	0.57	-1.72	540848.89	1712592.35	N 39 58 50.62 W	80 31 38.04	5.63
	7643.00	90.41	018.06	8160.73	6874.73	819.38	1344.73	524.42	3.28	0.08	-2.26	540880.61	1712610.70	N 39 58 51.01 W	80 31 38.04	5.66
	7688.00	89.79	016.25	8230.28	6944.28	860.21	1394.32	507.93	0.72	-0.72	0.04	540912.33	1712629.05	N 39 58 51.40 W	80 31 38.04	5.69
	7733.00	89.52	015.00	8300.83	7013.83	901.04	1443.91	491.44	0.98	-0.27	0.94	540944.05	1712647.40	N 39 58 51.79 W	80 31 38.04	5.71
	7778.00	89.86	013.82	8370.38	7083.38	941.17	1493.50	474.95	1.22	0.38	1.10	540975.77	1712665.75	N 39 58 52.18 W	80 31 38.04	5.74
	7823.00	90.18	012.62	8440.93	7152.93	981.30	1543.09	458.46	2.68	0.27	2.67	540997.49	1712684.10	N 39 58 52.57 W	80 31 38.04	5.76
	7868.00	90.00	011.44	8510.48	7222.48	1021.43	1592.68	441.97	2.30	-0.10	2.20	541029.21	1712702.45	N 39 58 52.96 W	80 31 38.04	5.79
	7913.00	89.89	010.25	8580.03	7291.03	1061.56	1642.27	425.48	1.96	-1.21	2.20	541060.93	1712720.80	N 39 58 53.35 W	80 31 38.04	5.81
	7958.00	88.49	010.25	8649.58	7360.58	1101.69	1692.86	409.99	1.84	-0.80	0.68	541092.65	1712739.15	N 39 58 53.74 W	80 31 38.04	5.84
	8003.00	88.00	009.06	8719.13	7430.13	1141.82	1743.45	394.50	1.22	0.38	1.10	541124.37	1712757.50	N 39 58 54.13 W	80 31 38.04	5.86
	8048.00	87.32	008.86	8788.68	7500.68	1181.95	1793.94	379.01	0.98	-0.27	0.94	541156.09	1712775.85	N 39 58 54.52 W	80 31 38.04	5.89
	8093.00	86.86	008.86	8858.23	7570.23	1222.08	1844.53	363.52	0.72	-0.72	0.04	541187.81	1712794.20	N 39 58 54.91 W	80 31 38.04	5.91
	8138.00	86.18	008.86	8927.78	7640.78	1260.21	1895.12	348.03	0.58	-0.85	1.33	541219.53	1712812.55	N 39 58 55.30 W	80 31 38.04	5.94
	8183.00	85.70	008.86	9000.00	7710.00	1300.00	1945.71	332.54	0.42	-0.42	-0.79	541251.25	1712830.90	N 39 58 55.69 W	80 31 38.04	5.97
	8228.00	85.30	008.86	9070.00	7780.00	1340.00	1996.30	317.05	0.28	-0.28	-0.28	541282.97	1712849.25	N 39 58 56.08 W	80 31 38.04	5.99
	8273.00	85.00	008.86	9140.00	7850.00	1380.00	2046.89	301.56	0.14	-0.14	-0.79	541314.69	1712867.60	N 39 58 56.47 W	80 31 38.04	6.02
	8318.00	84.80	008.86	9210.00	7920.00	1420.00	2097.48	286.07	0.01	-0.48	-4.80	541346.41	1712886.00	N 39 58 56.86 W	80 31 38.04	6.05
	8363.00	84.70	008.86	9280.00	7990.00	1460.00	2148.07	270.58	0.01	-0.14	-0.79	541378.13	1712904.40	N 39 58 57.25 W	80 31 38.04	6.08
	8408.00	84.70	008.86	9350.00	8060.00	1500.00	2198.66	255.09	0.01	-0.14	-0.79	541409.85	1712922.80	N 39 58 57.64 W	80 31 38.04	6.11
	8453.00	84.70	008.86	9420.00	8130.00	1540.00	2249.25	239.60	0.01	-0.14	-0.79	541441.57	1712941.20	N 39 58 58.03 W	80 31 38.04	6.14
	8498.00	84.70	008.86	9490.00	8200.00	1580.00	2300.84	224.11	0.01	-0.14	-0.79	541473.29	1712959.60	N 39 58 58.42 W	80 31 38.04	6.17
	8543.00	84.70	008.86</													

51-01581

Comments	MD (ft)	Incl (°)	Adm Grid (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	MS (ft)	EW (ft)	DLG (ft/100ft)	BR (ft/100ft)	TR (ft/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' '')	Longitude (E/W ° ' '')	Directional Difficulty Index
	14502.00	88.88	324.35	8994.17	5403.67	7748.13	8928.10	-3521.68	0.81	-0.31	0.88	549973.35	1707050.04	N 39 59 45.52 W	80 32 32.55	6.74
	14682.00	89.07	324.54	6695.01	5404.51	7837.98	6981.37	-3873.81	0.90	-0.88	0.21	549746.51	1707096.71	N 39 59 47.24 W	80 32 25.24	6.75
	14771.00	89.21	324.11	6886.34	5405.84	7926.00	7953.61	-3025.71	0.51	0.18	-0.48	546518.80	1707854.62	N 39 59 47.85 W	80 32 23.91	6.76
	14861.00	89.00	323.87	6997.75	5407.25	8015.34	7126.31	-3678.74	0.64	-0.23	-0.40	546801.49	1707801.70	N 39 59 48.68 W	80 32 34.81	6.77
	14954.00	89.07	323.72	6999.29	5408.75	8103.05	7158.07	-3731.43	0.10	0.68	0.00	546903.20	1707749.10	N 39 59 49.35 W	80 32 35.20	6.77
	15040.00	89.35	323.02	6700.40	5409.90	8192.89	7270.24	-3785.12	0.84	0.21	-0.78	547035.42	1707905.41	N 39 59 50.07 W	80 32 35.99	6.78
	15129.00	89.83	323.21	6701.12	5410.83	8281.10	7341.47	-3836.48	0.63	0.54	0.33	547106.65	1707842.08	N 39 59 50.77 W	80 32 36.69	6.79
	15219.00	90.34	323.41	6702.00	5410.48	8370.47	7414.27	-3891.39	1.01	0.67	1.51	547179.44	1707589.15	N 39 59 51.48 W	80 32 37.38	6.80
	15308.00	90.17	326.38	6700.60	5410.10	8459.01	7487.20	-3942.41	0.82	-0.19	0.80	547252.37	1707538.13	N 39 59 52.20 W	80 32 38.05	6.80
	15398.00	89.93	326.81	6700.52	5410.02	8548.05	7561.50	-3893.10	0.65	-0.27	0.50	547326.68	1707467.35	N 39 59 52.92 W	80 32 38.71	6.81
	15487.00	89.83	326.29	6700.70	5410.20	8637.35	7635.30	-4042.84	0.43	-0.11	0.42	547400.53	1707427.70	N 39 59 53.63 W	80 32 39.38	6.82
	15577.00	89.83	326.81	6700.07	5410.47	8727.11	7710.45	-4092.40	0.59	0.00	0.20	547475.81	1707368.00	N 39 59 54.38 W	80 32 40.01	6.83
	15667.00	89.90	327.30	6701.18	5410.68	8816.82	7785.98	-4141.40	0.58	0.08	0.54	547551.13	1707339.15	N 39 59 55.13 W	80 32 40.65	6.83
	15758.00	90.17	327.77	6701.13	5410.63	8905.77	7861.07	-4190.17	0.61	0.30	0.53	547626.22	1707291.38	N 39 59 55.86 W	80 32 41.27	6.84
	15848.00	90.07	325.00	6700.94	5410.44	8995.30	7936.01	-4238.89	3.08	-0.11	-0.08	547701.16	1707241.58	N 39 59 56.60 W	80 32 41.92	6.85
	15935.00	89.93	326.60	6700.94	5410.44	9084.16	8009.03	-4289.00	1.84	-0.10	1.63	547774.78	1707191.56	N 39 59 57.32 W	80 32 42.58	6.86
	16025.00	90.10	326.40	6700.02	5410.42	9173.02	8084.72	-4338.01	0.27	0.10	-0.19	547848.88	1707141.94	N 39 59 58.08 W	80 32 43.23	6.87
	16114.00	90.14	325.84	6700.73	5410.23	9262.03	8159.84	-4386.19	0.70	0.04	-0.70	547923.78	1707092.37	N 39 59 58.78 W	80 32 43.87	6.87
	16204.00	89.90	324.80	6700.70	5410.20	9352.22	8232.88	-4439.40	1.10	-0.27	-1.10	547997.78	1707041.17	N 39 59 59.51 W	80 32 44.54	6.88
	16293.00	89.86	323.74	6700.88	5410.36	9442.64	8304.88	-4491.37	1.10	-0.04	-1.10	548070.03	1706989.20	N 39 59 60.21 W	80 32 45.22	6.89
	16382.00	89.90	322.55	6701.05	5410.86	9532.88	8379.15	-4544.69	1.23	0.08	-1.22	548141.28	1706935.88	N 40 0 0 0.91 W	80 32 45.82	6.90
	16472.00	89.90	322.26	6701.15	5410.68	9617.81	8447.52	-4599.57	0.41	-0.03	-0.41	548212.85	1706881.05	N 40 0 0 1.61 W	80 32 46.62	6.90
	16562.00	89.79	321.20	6701.45	5410.86	9706.82	8518.26	-4655.13	1.00	-0.10	-0.39	548283.40	1706825.44	N 40 0 0 2.30 W	80 32 47.36	6.91
	16651.00	89.93	321.52	6701.42	5411.00	9794.65	8587.83	-4710.64	0.52	0.46	0.24	548353.05	1706770.03	N 40 0 0 2.98 W	80 32 48.03	6.92
	16741.00	89.93	321.52	6701.42	5410.92	9883.49	8658.42	-4766.49	0.28	-0.27	-0.09	548423.54	1706714.08	N 40 0 0 3.68 W	80 32 48.81	6.92
	16830.00	89.84	321.28	6701.59	5411.09	9971.30	8727.98	-4822.92	0.28	-0.08	-0.27	548493.09	1706658.56	N 40 0 0 4.38 W	80 32 49.63	6.93
	16920.00	89.97	320.94	6701.72	5411.22	10060.02	8788.03	-4878.42	0.40	0.12	-0.38	548563.14	1706602.06	N 40 0 0 5.04 W	80 32 50.27	6.94
	17009.00	90.17	321.77	6701.01	5411.11	10147.81	8867.84	-4934.10	0.96	0.22	0.93	548633.85	1706546.48	N 40 0 0 5.72 W	80 32 50.99	6.94
	17099.00	90.83	321.41	6700.83	5410.33	10237.25	8948.88	-4988.23	0.31	0.73	6.27	548705.06	1706494.36	N 40 0 0 6.44 W	80 32 51.68	6.95
	17188.00	90.17	328.97	6700.95	5409.55	10326.14	9019.36	-5033.23	1.60	-0.74	1.42	548781.46	1706447.25	N 40 0 0 7.18 W	80 32 52.29	6.96
	17278.00	89.93	328.52	6699.97	5409.47	10414.10	9093.68	-5079.50	0.58	-0.27	0.04	548858.68	1706401.03	N 40 0 0 7.94 W	80 32 53.00	6.97
	17367.00	90.10	328.72	6699.95	5409.46	10505.08	9170.35	-5124.87	0.20	0.19	0.22	548935.46	1706350.02	N 40 0 0 8.69 W	80 32 53.49	6.98
	17457.00	89.93	330.13	6699.92	5409.42	10595.07	9248.26	-5169.07	0.40	-0.19	0.48	549013.34	1706310.02	N 40 0 0 9.45 W	80 32 54.08	6.98
Final Survey 05Aug13	17531.00	90.10	330.33	6699.90	5409.40	10686.07	9312.48	-5209.41	0.35	0.23	0.27	549077.57	1706274.18	N 40 0 10 0.09 W	80 32 54.66	6.99
Production to Bl	17560.00	90.10	330.33	6699.84	5409.34	10764.87	9342.80	-5273.74	0.00	0.00	0.00	549107.08	1706269.68	N 40 0 10 0.39 W	80 32 54.70	6.99

Survey Type: Def Survey

Survey Error Model: ISCWSA Row 0 \*\*\* 3-D 95.000% Confidence 2.7056 sigma

Survey Program:

Description	MD From (ft)	MD To (ft)	EOU Freq (ft)	Wells Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	0.000	18.000		Act 8In	30.000	30.000	SLB_NSQ+MSHOT-Depth Only
	18.500	3067.000		Act 8In	30.000	30.000	Original Borehole / Noble Energy SHL17BHS Gyro+MWD 0' to 17568' MD
	3067.000	17531.000		Act 8In	30.000	30.000	Original Borehole / Noble Energy SHL17BHS Gyro+MWD 0' to 17568' MD
	17531.000	17568.000		Act 8In	30.000	30.000	Original Borehole / Noble Energy SHL17BHS Gyro+MWD 0' to 17568' MD