Received
Office of Oil & Gas
OCT 29 2014

WR-35
Rev. 8/23/13

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

API 47- 39 - 02736 W County Kanawha District Union
Quad Pocatalico Pad Name _____ Field/Pool Name C.E. Bailey
Farm name Jones, Ralph D. Well Number #2
Operator (as registered with the OOG) Reserve Oil and Gas, Inc.
Address 929 Charleston Road City Spencer State WV Zip 25276

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey
Top hole Northing 519,055 NAD83 / 4253021 UTM NAD83 Easting 1,763,973 NAD83 / 0437680 UTM NAD83
Landing Point of Curve Northing _____ Easting _____
Bottom Hole Northing _____ Easting _____

Elevation (ft) 868 GL Type of Well □New ☒ Existing Type of Report □Interim ☒Final

Permit Type □ Deviated □ Horizontal □ Horizontal 6A ☒ Vertical Depth Type □ Deep ☒ Shallow

Type of Operation □ Convert □ Deepen □ Drill □ Plug Back □ Redrilling ☒ Rework □ Stimulate

Well Type □ Brine Disposal □ CBM ☒ Gas ☒ Oil □ Secondary Recovery □ Solution Mining □ Storage □ Other _____

Type of Completion □ Single □ Multiple Fluids Produced □ Brine ☒Gas □ NGL □ Oil □ Other _____
Drilled with □ Cable ☒ Rotary

Drilling Media Surface hole ☒ Air □ Mud □Fresh Water Intermediate hole ☒ Air □ Mud □ Fresh Water □ Brine
Production hole ☒ Air □ Mud □ Fresh Water □ Brine
Mud Type(s) and Additive(s)
N/A

Date permit issued 02/25/2014 Date drilling commenced 4/19/1976 7/24/2014 Date drilling ceased 5/6/1976 7/31/2014
Date completion activities began 5/7/1976 8/20/2014 Date completion activities ceased 5/7/1976 8/20/2014
Verbal plugging (Y/N) No Date permission granted N/A Granted by N/A

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 95 FT Open mine(s) (Y/N) depths No
Salt water depth(s) ft 1447 FT Void(s) encountered (Y/N) depths No
Coal depth(s) ft 210 FT (8") Cavern(s) encountered (Y/N) depths No
Is coal being mined in area (Y/N) No

Reviewed by:
R.F.

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API 47- 39 - 02736 Farm name Jones, Ralph D. Well number C.E. Bailey #2

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/ N) * Provide details below*
Conductor							
Surface		9 5/8"	229 FT	Existing	H-40 / 32#	N/A	CTS (Existing)
Coal							
Intermediate 1		7"	2415 FT	Existing	K-55 / 20#	N/A	150 sks (Existing)
Intermediate 2							
Intermediate 3							
Production		4 1/2"	4206 FT	New	11.6#		150 sks
Tubing		2 3/8"	4218 FT	Existing	J-55 4.6#	N/A	Removed
Packer type and depth set							

Comment Details clean out existing hole to original TD, and set 4 1/2" production casing, and removed 2 3/8" tubing from well.

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft ^{3}/sks)	Volume (ft ^{3})	Cement Top (MD)	WOC (hrs)
Conductor							
Surface	N/A	100	N/A	N/A	N/A	N/A	N/A
Coal							
Intermediate 1	N/A	200	N/A	N/A	N/A	N/A	N/A
Intermediate 2							
Intermediate 3							
Production	Stronglite 250	150	12.3	2.41	361.5	0	24 hrs
Tubing							

Drillers TD (ft) 4223 FT Loggers TD (ft) 3805 FT
Deepest formation penetrated white shale Plug back to (ft) _____
Plug back procedure _____

Kick off depth (ft) _____

Check all wireline logs run ☐ caliper ☐ density ☐ deviated/directional ☐ induction
☐ neutron ☐ resistivity ☒ gamma ray ☐ temperature ☐ sonic

Well cored ☐ Yes ☒ No ☐ Conventional ☐ Sidewall Were cuttings collected ☐ Yes ☒ No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING
9 5/8" N/A
7" N/A
4 1/2" N/A

WAS WELL COMPLETED AS SHOT HOLE ☒ Yes ☐ No DETAILS _____

WAS WELL COMPLETED OPEN HOLE? ☐ Yes ☒ No DETAILS _____

WERE TRACERS USED ☐ Yes ☒ No TYPE OF TRACER(S) USED _____

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API 47- 39 - 02736 Farm name Jones, Ralph D. Well number C.E. Bailey #2

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
1	5/7/1976	3088	4223	N/A	Brown Shale; Black Shale; White Shale
1	8/20/2014	2756	3796	60	Sand & Shale; Brown Shale

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
1	5/7/1976	N/A	N/A	N/A	N/A	N/A	8200 #	80% Glycerin
1	8/20/2014	43,916	3230	4260	2709	N/A	680 gallon	14,499.85
							15% HCL	CSCF

Please insert additional pages as applicable.

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API 47- 39 - 02736 Farm name Jones, Ralph D. Well number C.E. Bailey #2

PRODUCING FORMATION(S)	DEPTHS			
Sand & Shale	2756	TVD	3033	MD
Brown Shale	3033		3796	

Please insert additional pages as applicable.

GAS TEST □ Build up □ Drawdown ☒ Open Flow OIL TEST □ Flow □ Pump

SHUT-IN PRESSURE Surface 120 psi Bottom Hole _____ psi DURATION OF TEST 24 hrs

OPEN FLOW Gas 189 mcfpd Oil _____ bpd NGL _____ bpd Water _____ bpd GAS MEASURED BY □ Estimated ☒ Orifice □ Pilot

LITHOLOGY/ FORMATION NAME	TOP DEPTH IN FT TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H_2S, ETC)
	0		0		
					See Attachment A for formation info

Please insert additional pages as applicable.

Drilling Contractor Kanawha Valley Drilling
Address 929 Charleston Road City Spencer State WV Zip 25276

Logging Company Nabors Completion and Production Services Inc
Address 515 West Greens Road, Suite 1100 City Houston State TX Zip 77067

Cementing Company Universal Well Services Inc
Address Rt 5 Hall Road City Buckhannon State WV Zip 26201

Stimulating Company Universal Well Services Inc.
Address Rt 5 Hall Road City Buckhannon State WV Zip 26201

Please insert additional pages as applicable.

Completed by Ryan Fields Telephone 304-927-5033
Signature Ryan Fields Title office assistant Date 10/22/2014

Submittal of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Registry

33.02736

C. E. Bailey #2 47-39-02736 Attachment A

Formation	TOP (TVD)	BOTTOM (TVD)	TOP (MD)	BOTTOM (MD)	Remarks
Top Soil			0	15	
Red Rock			15	250	Coal 188
Sand			250	265	
Red Rock			265	275	
Gray Slate			275	325	
Sandy Slate			325	355	
Sand			355	385	
Sandy Shale			385	420	
Slate			420	450	
Sand			450	480	
Sandy Slate			480	505	
Gray Slate			505	1110	
Sand			1110	1270	
Salt Sand			1270	1500	salt water
Sand			1500	1702	
Big Lime			1702	1860	
Slate			1860	1885	
Big Injun			1885	1925	
Slate			1925	2260	
Berea			2260	2275	gas and oil
Slate Shell			2275	2450	
Sand & Shale			2450	3033	
Brown Shale			3033	4200	gas
Black Shale			4200	4209	
White Shale			4209	4223	

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

API 47 - 051 - 01638 County Marshall District Sandhill
Quad Valley Grove Pad Name SHL-13 Field/Pool Name
Farm name Paul H. and Annette Hemsley Well Number SHL13AHS1
Operator (as registered with the OOG) Noble Energy, Inc.
Address 333 Technology Drive, Suite 116 City Canonsburg State PA Zip 15317

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey
Top hole Northing 4428330.66 Easting 539640.09
Landing Point of Curve Northing 4428154.53 Easting 539521.91
Bottom Hole Northing 4426844.42 Easting 540462.64

Elevation (ft) 1290.35 GL Type of Well ■New □ Existing Type of Report □Interim ■Final

Permit Type □ Deviated □ Horizontal ■ Horizontal 6A □ Vertical Depth Type □ Deep ■ Shallow

Type of Operation □ Convert □ Deepen ■ Drill □ Plug Back □ Redrilling □ Rework ■ Stimulate

Well Type □ Brine Disposal □ CBM ■ Gas □ Oil □ Secondary Recovery □ Solution Mining □ Storage □ Other _____

Type of Completion ■ Single □ Multiple Fluids Produced □ Brine □Gas □ NGL □ Oil □ Other _____
Drilled with □ Cable ■ Rotary

Drilling Media Surface hole ■ Air □ Mud □Fresh Water Intermediate hole ■ Air □ Mud □ Fresh Water □ Brine
Production hole □ Air ■ Mud □ Fresh Water □ Brine
Mud Type(s) and Additive(s)
Synthetic Oil Based

Date permit issued 6/13/2013 Date drilling commenced 8/4/2013 Date drilling ceased 12/28/2013
Date completion activities began 5/24/14 Date completion activities ceased 7/16/14
Verbal plugging (Y/N) N Date permission granted _____ Granted by _____

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Environmental Protection

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 561', 763' Open mine(s) (Y/N) depths N
Salt water depth(s) ft 1600' Void(s) encountered (Y/N) depths N
Coal depth(s) ft 763 - 785.04', 1266.74' - 1269.77' Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) Y

Reviewed by:

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Rev. 8/23/13

API 47- 051 - 01638 Farm name Paul H. and Annette Hemsley Well number SHL13AHS1

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/ N) * Provide details below*
Conductor	36	30	40	N	J-55		Y
Surface	24	20	418	N	J-55 94#		Y
Coal							
Intermediate 1	17-1/2	13-3/8	1234	N	J-55 54.5#		Y
Intermediate 2	12-3/8	9-5/8	3231	N	J-55 36#		Y
Intermediate 3							
Production	8-3/4	5-1/2	12305	N	P-110 20#		Y
Tubing							
Packer type and depth set							

Comment Details

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft^3/sks)	Volume (ft^3)	Cement Top (MD)	WOC (hrs)
Conductor							
Surface	Type 1	484	15.6	1.19	103	0	8
Coal							
Intermediate 1	Type 1	1029	15.6	1.19	218	0	8
Intermediate 2	Type 1	1264	15.6	1.19	268	0	8
Intermediate 3							
Production	Class A	1730	14.8	1.4	450	2608	8
Tubing							

Drillers TD (ft) 12320 Loggers TD (ft) 12285

Deepest formation penetrated Marcellus Plug back to (ft) NA

Plug back procedure

Kick off depth (ft) 6140

Check all wireline logs run ☐ caliper ☐ density ☐ deviated/directional ☐ induction ☐ neutron ☐ resistivity ■ gamma ray ☐ temperature ☐ sonic

Well cored ☐ Yes ☐ No ☐ Conventional ☐ Sidewall Were cuttings collected ☐ Yes ☐ No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING

4 Centralizers on Surface (Every third joint), 10 on Intermediate 1 (Every third joint), 56 on Intermediate 2 (Every third joint), and 175 on Production casing (Every third joint, till Curve, then Every Joint).

WAS WELL COMPLETED AS SHOT HOLE ☐ Yes ■ No DETAILS

WAS WELL COMPLETED OPEN HOLE? ☐ Yes ■ No DETAILS

WERE TRACERS USED ☐ Yes ■ No TYPE OF TRACER(S) USED

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API 47- 051 - 01638 Farm name Paul H. and Annette Hemsley Well number SHL13AHS1

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)

PLEASE SEE ATTACHED PERFORATION RECORD

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)

PLEASE SEE ATTACHED STIMULATION INFORMATION PER STAGE SHEET

Please insert additional pages as applicable.

Perforation Record

API: 47-051-01638 Farm name: Paul H & Annette A Hemsley Well Name: SHL-13A-HS

Stage No.	Stim Date	Top Perf	Bottom Perf	# of Perfs	Formation
1	5/24/2014	11975	12129	48	Marcellus
2	5/24/2014	11673	11927	40	Marcellus
3	5/25/2014	11373	11627	40	Marcellus
4	5/27/2014	11073	11327	40	Marcellus
5	5/28/2014	10773	11027	40	Marcellus
6	6/3/2014	10473	10727	40	Marcellus
7	6/4/2014	10173	10427	40	Marcellus
8	6/4/2014	9873	10127	40	Marcellus
9	6/4/2014	9573	9827	40	Marcellus
10	6/5/2014	9273	9527	32	Marcellus
11	6/5/2014	8973	9227	40	Marcellus
11B	6/6/2014	8988	9026	48	Marcellus
12	6/6/2014	8673	8927	40	Marcellus
13	6/6/2014	8373	8627	40	Marcellus
13B	6/7/2014	8396	8481	48	Marcellus
14	6/7/2014	8073	8327	40	Marcellus
14B	6/7/2014	8117	8231	48	Marcellus
14C	6/8/2014	7825	8027	50	Marcellus
15	6/28/2014	7575	7777	50	Marcellus
16	6/29/2014	7325	7527	50	Marcellus
16B	7/5/2014	7350	7452	36	Marcellus
17	7/5/2014	7075	7277	50	Marcellus

STIMULATION INFORMATION PER STAGE

API: 47-051-01638 Farm name: Paul H & Annette A Hemsley Well Name: SHL-13A-HS

Stage No.	Stim Date	Avg Rate (bpm)	ATP (psi)	Max BD Pressure	ISIP (psi)	Proppant (lbs)	Water (BBLS)	Amount of N^2/ other
1.1	5/24/2014	86.8	7733	6455		198,155	5948.24	
1.2	5/24/2014	58.7	8809	7885		207,598	8895.95	
1.3	5/24/2014	70.6	8494	7659	4077	194,260	6947.14	
2.1	5/25/2014	75.6	7326	6095		201,459	6334.55	
2.2	5/25/2014	81.3	7790	5519		199,147	6053.86	
2.3	5/25/2014	80.6	8304	6071	4799	204,082	5728.38	
3.1	5/27/2014	85.5	7311	6328		197,391	5927.67	
3.2	5/27/2014	84.2	7108	5518		200,825	5849.07	
3.3	5/27/2014	82.5	7484	5867	5144	202,142	5723.55	
4.1	5/28/2014	85.5	7667	6622		200,207	6105.42	
4.2	5/28/2014	88.2	8202	7380		201,987	5399.81	
4.3	5/28/2014	87.8	8440	6574	5359	197,166	5462.26	
5.1	6/3/2014	86.7	7717	6920		202,101	5629.81	
5.2	6/3/2014	86.8	7950	6673		199,854	5455.36	
5.3	6/3/2014	87.6	7969	7163	4909	194,578	5499.36	
6.1	6/3/2014	85.0	7372	6647		200,304	5655.23	
6.2	6/3/2014	89.3	7544	5848		199,676	5067.71	
6.3	6/4/2014	89.4	7778	5895	4687	199,014	5068.62	
7.1	6/4/2014	81.4	7457	5995		193,019	5946.33	
7.2	6/4/2014	57.3	8694	9575		206,456	7842.40	
7.3	6/4/2014	52.0	8824	8886	4321	201,024	5668.90	
8.1	6/4/2014	85.5	7204	6407		204,214	5320.93	
8.2	6/4/2014	77.4	7151	7250		206,705	5529.83	
8.3	6/4/2014	75.5	7802	6077	4333	189,144	6650.90	
9.1	6/4/2014	90.2	7206	6236		200,590	5857.42	
9.2	6/4/2014	88.5	7465	5774		202,671	5581.74	
9.3	6/4/2014	88.1	8064	6351	5336	198,291	5519.76	
10.1	6/5/2014	87.9	7108	6191		200,968	5463.50	
10.2	6/5/2014	87.3	7068	5849		197,910	5403.00	
10.3	6/5/2014	89.3	7266	6244	4667	203,748	5137.71	
11.1	6/5/2014	74.6	7653	7020		200,537	7893.85	
11.2	6/5/2014	22.4	9480	9495		-	1404.99	
11.2B	6/6/2014	75.3	7955			199,703	5522.90	
11.3	6/6/2014	88.6	7338	6031	5056	198,036	5546.50	
12.1	6/6/2014	86.1	7229	5852		194,234	5463.12	
12.2	6/6/2014	75.3	7955	9479		207,076	6750.90	
12.3	6/6/2014	90.1	7684	6764	4656	210,655	5055.00	
13.1	6/6/2014	69.0	7586	5512		164,890	6418.57	
13.1	6/7/2014	85.6	7338			33,727	2367.49	
13B.2	6/7/2014	85.9	7503	6752		195,417	5556.98	
13B.3	6/7/2014	73.0	8267	8231	4387	204,080	5352.86	

STIMULATION INFORMATION PER STAGE

API: 47-051-01638 Farm name: Paul H & Annette A Hemsley Well Name: SHL-13A-HS

Stage No.	Stim Date	Avg Rate (bpm)	ATP (psi)	Max BD Pressure	ISIP (psi)	Proppant (lbs)	Water (BBLS)	Amount of N^2/ other
14.1	6/7/2014	28.8	8592	6499		5,587	3294.67	
14.1B	6/8/2014	26.5	8823		4956	70,937	8519.86	
14.1C	6/8/2014	86.6	6926			183,389	5217.71	
14.1C Inj Test	6/18/2014	3.7	6274	0	8233	-	244.02	
14.1D	6/28/2014	80.0	7879	8070		200,001	5201.30	
14.2D	6/28/2014	18.3	8492	7697	7043	3,353	2063.59	
15.1	6/28/2014	80.7	6816	6114		169,752	5323.94	
15.2	6/28/2014	82.7	7211	6144		157,135	4887.21	
15.3	6/28/2014	82.5	7348	6396	4534	175,781	4881.26	
16.1	6/29/2014	79.9	7176	7023		166,409	5149.19	
16.1 Inj #1	6/29/2014	1.2	7768			-	143.71	
16.2	6/29/2014	45.9	8637	6903		65,483	3716.41	
16.1 Inj #2	7/4/2014						229.55	
16.1 Inj #3	7/5/2014	4.7					1171.71	
16.3	7/5/2014	82.7	7370	5804	4856	271,276	6737.19	
17.1	7/5/2014	84.1	8215	6585		169,157	4883.95	
17.2	7/5/2014	83.1	7630	6456		169,175	4583.93	
17.3	7/5/2014	84.0	7386	6318	4458	171,385	4522.00	

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API 47- 051 - 01638 Farm name Paul H. and Annette Hemsley Well number SHL13AHS1

PRODUCING FORMATION(S)	DEPTHS			
Marcellus	6793.0	TVD	12320	MD

Please insert additional pages as applicable.

GAS TEST ☐ Build up ☐ Drawdown ☐ Open Flow OIL TEST ☐ Flow ☐ Pump

SHUT-IN PRESSURE Surface _____ psi Bottom Hole _____ psi DURATION OF TEST _____ hrs

OPEN FLOW	Gas	Oil	NGL	Water	GAS MEASURED BY
	4205 mcfpd	48 bpd	236 bpd	576 bpd	☐ Estimated ■ Orifice ☐ Pilot

LITHOLOGY/ FORMATION NAME	TOP DEPTH IN FT TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H_2S, ETC)
	0		0		
	PLEASE SEE FORMATION SHEET				

Please insert additional pages as applicable.

Drilling Contractor Precision Drilling Company
Address 5400 D Big Tyler Road City Charleston State WV Zip 25313

Logging Company Diversified Well Logging
Address 711 West 10th Street City Reserve State LA Zip 70084

Cementing Company Schlumberger
Address 4600 J. Barry Court, Suite 200 City Canonsburg State PA Zip 15317

Stimulating Company Halliburton Energy SVCS
Address 121 Champion Way, Suite 110 City Canonsburg State PA Zip 15317

Please insert additional pages as applicable.

Completed by Regina A. Logue Telephone 724-820-3559
Signature Regina A Logue Title Regulatory Analyst Date 10/6/14

Submittal of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Registry

SHL 13A

47-051-01638

Formations	Top TVD	Base TVD	Top MD	Base MD	Fluid
Shale	0	732	0	732	
Pittsburgh Coal	732	742	732	742	
Shale and Sandstone	742	1516	742	1516	
Gas Sand	1516	1574	1516	1574	
Shale	1574	1693	1574	1693	
1st Salt Sand	1693	1756	1693	1756	
2nd Salt Sand	1756	1765	1756	1765	
3rd Salt Sand	1765	1815	1765	1815	
Shale	1815	1841	1815	1841	
Maxton Sand	1841	1958	1841	1958	
Shale	1958	1978	1958	2509	
Big Lime	1978	2023	1978	2023	
Big Injun	2023	2165	2023	2165	
Price	2165	2509	2165	2509	
Murrysville	2509	2522	2509	2872	
Shale	2522	2726	2522	2726	
50' Sand	2726	2743	2726	2743	
Shale	2743	2829	2743	2829	
Gordon Stray	2829	2841	2829	2841	
Shale	2841	2872	2841	2872	
Gordon	2872	2890	2872	2890	
Shale	2890	2985	2890	2985	
Fifth Sand	2985	3023	2985	3023	
Shale	3023	3423	3023	3423	
Speechley Sand	3423	3447	3423	3447	
Shale	3447	4331	3447	4331	
Warren Sand	4331	4345	4331	4345	
Shale	4345	5252	4345	5260	
Java Shale	5252	5322	5260	5334	
Pipe Creek Shale	5322	5366	5334	5381	
Angola Shale	5366	5992	5381	6054	
Rhinestreet	5992	6406	6054	6509	
Cashaqua	6406	6498	6509	6617	
Middlesex	6498	6535	6617	6662	
West River	6535	6576	6662	6716	
Burkett	6576	6609	6716	6762	
Tully Limestone	6609	6637	6762	6804	
Hamilton	6637	6751	6804	7061	
Marcellus	6751	6802	7061	not encountered	Gas
Onondaga	6802	not encountered	not encountered	not encountered	
Huntersville	6807	not encountered	not encountered	not encountered	

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	5/24/2014
Job End Date:	7/5/2014
State:	West Virginia
County:	Marshall
API Number:	47-051-01638-00-00
Operator Name:	Noble Energy, Inc.
Well Name and Number:	SHL13 A
Longitude:	-80.53578900
Latitude:	40.00416100
Datum:	NAD27
Federal/Tribal Well:	NO
True Vertical Depth:	6,793
Total Base Water Volume (gal):	12,800,739
Total Base Non Water Volume:	0

FracFocus Chemical Disclosure Registry

GROUNDWATER PROTECTION COUNCIL

Oil & Gas

51-01638

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	90.62513	Density = 8.330
SAND - PREMIUM WHITE	Halliburton	Proppant					
			Crystalline silica, quartz	14808-60-7	100.00000	6.50184	
SSA-2	Halliburton	Proppant					
			Crystalline silica, quartz	14808-60-7	100.00000	1.67097	
HYDROCHLORIC ACID 5-10%	Halliburton	Solvent					
			Hydrochloric acid	7647-01-0	10.00000	0.08941	
HYDROCHLORIC ACID 10-30%	Halliburton	Solvent					
			Hydrochloric acid	7647-01-0	30.00000	0.03883	
FR-66	Halliburton	Friction Reducer					
			Hydrotreated light petroleum distillate	64742-47-8	30.00000	0.02975	
FE-1A ACIDIZING COMPOSITION	Halliburton	Additive					
			Acetic anhydride	108-24-7	100.00000	0.00593	
			Acetic acid	64-19-7	60.00000	0.00356	
BE-9	Halliburton	Biocide					

			Tributyl tetradecyl phosphonium chloride	81741-28-8	10.00000	0.00414	
LP-65	Halliburton	Scale Inhibitor					
			Ammonium chloride	12125-02-9	10.00000	0.00249	
WG-36 GELLING AGENT	Halliburton	Gelling Agent					
			Guar gum	9000-30-0	100.00000	0.00234	
LoSurf-300D	Halliburton	Non-ionic Surfactant					
			Ethanol	64-17-5	60.00000	0.00119	
			Heavy aromatic petroleum naphtha	64742-94-5	30.00000	0.00060	
			Naphthalene	91-20-3	5.00000	0.00010	
			Poly(oxy-1,2-ethanediyl), alpha-(4-nonylphenyl)-omega-hydroxy-, branched	127087-87-0	5.00000	0.00010	
			1,2,4 Trimethylbenzene	95-63-6	1.00000	0.00002	
Biovert NWB	Halliburton	Viscosifier					
			Polylactide resin	Confidential	100.00000	0.00182	
HAI-OS ACID INHIBITOR	Halliburton	Corrosion Inhibitor					
			Methanol	67-56-1	60.00000	0.00056	
			Propargyl alcohol	107-19-7	10.00000	0.00009	
SP BREAKER	Halliburton	Breaker					
			Sodium persulfate	7775-27-1	100.00000	0.00008	
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		1.13934	
		Other Ingredient(s)					
			Polyacrylamide copolymer	Confidential		0.02975	
		Other Ingredient(s)					
			Organic phosphonate	Confidential		0.01493	
		Other Ingredient(s)					
			Ammonium chloride	12125-02-9		0.00496	
		Other Ingredient(s)					
			Alcohols, C12-16, ethoxylated	68551-12-2		0.00496	
		Other Ingredient(s)					
			Sodium chloride	7647-14-5		0.00496	
		Other Ingredient(s)					
			Fatty acid tall oil amide	Confidential		0.00496	
		Other Ingredient(s)					
			Sorbitan, mono-9-octadecenoate, (Z)	1338-43-8		0.00099	
		Other Ingredient(s)					
			Sorbitan monooleate polyoxyethylene derivative	9005-65-6		0.00099	
		Other Ingredient(s)					
			Oxyalkylated phenolic resin	Confidential		0.00060	
		Other Ingredient(s)					

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			Reaction product of acetophenone, formaldehyde, thiourea and oleic acid in dimethyl formamide	68527-49-1		0.00028	
		Other Ingredient(s)					
			Alcohols, C14-C15, ethoxylated	68951-67-7		0.00028	
		Other Ingredient(s)					
			Fatty acids, tall oil	Confidential		0.00028	
		Other Ingredient(s)					
			Formaldehyde	50-00-0		0.00025	
		Other Ingredient(s)					
			Oxyalkylated phenolic resin	Confidential		0.00020	
		Other Ingredient(s)					
			Bentonite, benzyl(hydrogenated tallow alkyl) dimethylammonium stearate complex	121888-68-4		0.00012	
		Other Ingredient(s)					
			Olefins	Confidential		0.00005	
		Other Ingredient(s)					
			Olefins	Confidential		0.00005	
		Other Ingredient(s)					
			Surfactant mixture	Confidential		0.00002	
		Other Ingredient(s)					
			Silica gel	112926-00-8		0.00002	
		Other Ingredient(s)					
			Surfactant mixture	Confidential		0.00002	
		Other Ingredient(s)					
			Olefins	Confidential		0.00001	
		Other Ingredient(s)					
			Olefins	Confidential		0.00001	
		Other Ingredient(s)					
			Crystalline Silica, Quartz	14808-60-7		0.00000	
		Other Ingredient(s)					
			Sodium sulfate	7757-82-6		0.00000	

* 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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PATHFINDER

noble energy

Noble Energy SHL13AHS Gyro+MWD 0ft to 12320ft MD Survey Report

(Def Survey)

Report Date:	January 24, 2014 - 10:27 AM	Survey / DLS Computation:	Minimum Curvature / Lubinski
Client:	Noble Energy	Vertical Section Azimuth:	151.757 ° (Grid North)
Field:	WV Marshall County (NAD 27)	Vertical Section Origin:	0.000 ft, 0.000 ft
Structure / Slot:	Noble Energy SHL13 Pad / SHL13AHS	TVD Reference Datum:	KB
Well:	SHL13AHS	TVD Reference Elevation:	1300.410 ft above MSL
Borehole:	Original Borehole	Seabed / Ground Elevation:	1281.910 ft above MSL
UWI / API#:	Unknown / Unknown	Magnetic Declination:	-8.434 °
Survey Name:	Noble Energy SHL13AHS Gyro+MWD 0ft to 12320ft MD	Total Gravity Field Strength:	999.3498mgn (9.80665 Based)
Survey Date:	December 17, 2013	Gravity Model:	GARM
Tort / AHD / DDI / ERD Ratio:	245.181 ° / 6263.127 ft / 6.444 / 0.921	Total Magnetic Field Strength:	53155.819 nT
Coordinate Reference System:	NAD27 West Virginia State Plane, Northern Zone, US Feet	Magnetic Dip Angle:	67.568 °
Location Lat / Long:	N 40° 0' 14.38105", W 80° 32' 8.84345"	Declination Date:	December 17, 2013
Location Grid N/E Y/X:	N 549531.405 ftUS, E 1709837.305 ftUS	Magnetic Declination Model:	HDGM 2013
CRS Grid Convergence Angle:	-0.6606 °	North Reference:	Grid North
Grid Scale Factor:	0.99996248	Grid Convergence Used:	-0.6606 °
Version / Patch:	2.7.1043.0	Total Corr Mag North->Grid North:	-7.7739 °
		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	-1300.41	0.00	0.00	0.00	N/A	N/A	N/A	549531.41	1709837.31	N 40 0 14.98	W 80 32 8.84	0.00
	118.50	0.76	193.41	118.50	-1181.91	0.59	-0.76	-0.18	0.64	0.64	0.00	549530.64	1709837.12	N 40 0 14.97	W 80 32 8.85	0.00
	218.50	0.73	184.92	218.49	-1081.92	1.62	-2.04	-0.39	0.11	-0.03	-8.49	549529.36	1709836.91	N 40 0 14.96	W 80 32 8.85	0.26
	318.50	0.50	223.07	318.48	-981.93	2.29	-3.00	-0.74	0.46	-0.23	38.15	549528.41	1709836.56	N 40 0 14.95	W 80 32 8.85	0.62
	418.50	0.49	241.79	418.48	-881.93	2.43	-3.52	-1.42	0.16	-0.01	18.72	549527.89	1709835.89	N 40 0 14.95	W 80 32 8.86	0.77
	518.50	0.39	305.82	518.48	-781.93	2.12	-3.52	-2.07	0.47	-0.10	64.03	549527.88	1709835.23	N 40 0 14.95	W 80 32 8.87	0.96
	618.50	0.75	358.14	618.47	-681.94	1.23	-2.67	-2.37	0.60	0.36	52.32	549528.74	1709834.94	N 40 0 14.95	W 80 32 8.87	1.16
	718.50	2.17	48.69	718.44	-581.97	0.22	-0.76	-0.97	1.79	1.42	50.55	549530.64	1709836.34	N 40 0 14.97	W 80 32 8.86	1.54
	818.50	0.96	35.23	818.40	-482.01	-0.59	1.17	0.94	1.26	-1.21	-13.46	549532.57	1709838.24	N 40 0 14.99	W 80 32 8.83	1.78
	918.50	0.59	34.70	918.39	-382.02	-1.20	2.28	1.71	0.37	-0.37	-0.53	549533.68	1709839.02	N 40 0 15.00	W 80 32 8.82	1.86
	1018.50	0.23	49.35	1018.39	-282.02	-1.47	2.83	2.16	0.37	-0.36	14.65	549534.24	1709839.46	N 40 0 15.01	W 80 32 8.82	1.91
	1118.50	0.38	73.50	1118.39	-182.02	-1.45	3.06	2.63	0.19	0.15	24.15	549534.46	1709839.94	N 40 0 15.01	W 80 32 8.81	1.94
	1218.50	0.67	81.50	1218.38	-82.03	-1.18	3.24	3.53	0.30	0.29	8.00	549534.64	1709840.83	N 40 0 15.01	W 80 32 8.80	1.99
	1318.50	0.84	87.01	1318.37	17.96	-0.67	3.36	4.84	0.18	0.17	5.51	549534.77	1709842.14	N 40 0 15.01	W 80 32 8.78	2.04
	1418.50	0.80	88.88	1418.36	117.95	-0.04	3.41	6.27	0.05	-0.04	1.87	549534.82	1709843.57	N 40 0 15.02	W 80 32 8.76	2.08
	1518.50	0.34	106.66	1518.36	217.95	0.49	3.34	7.25	0.49	-0.46	17.78	549534.75	1709844.55	N 40 0 15.01	W 80 32 8.75	2.13
	1618.50	0.36	132.71	1618.36	317.95	0.99	3.04	7.76	0.16	0.02	26.05	549534.45	1709845.07	N 40 0 15.01	W 80 32 8.74	2.16
	1718.50	0.41	151.47	1718.36	417.95	1.65	2.52	8.17	0.13	0.05	18.76	549533.92	1709845.47	N 40 0 15.01	W 80 32 8.74	2.18
	1818.50	0.46	149.77	1818.35	517.94	2.41	1.86	8.54	0.05	0.05	-1.70	549533.26	1709845.84	N 40 0 15.00	W 80 32 8.73	2.20
	1918.50	0.44	135.53	1918.35	617.94	3.18	1.23	9.01	0.11	-0.02	-14.24	549532.64	1709846.31	N 40 0 14.99	W 80 32 8.73	2.22
	2018.50	0.37	140.61	2018.35	717.94	3.86	0.71	9.48	0.08	-0.07	5.08	549532.12	1709846.79	N 40 0 14.99	W 80 32 8.72	2.24
	2118.50	0.35	144.68	2118.34	817.93	4.48	0.21	9.87	0.03	-0.02	4.07	549531.62	1709847.17	N 40 0 14.98	W 80 32 8.72	2.26
	2218.50	0.22	156.81	2218.34	917.93	4.98	-0.21	10.12	0.14	-0.13	12.13	549531.19	1709847.42	N 40 0 14.98	W 80 32 8.71	2.27
	2318.50	0.22	171.84	2318.34	1017.93	5.35	-0.58	10.22	0.06	0.00	15.03	549530.83	1709847.52	N 40 0 14.98	W 80 32 8.71	2.28
	2418.50	0.17	193.34	2418.34	1117.93	5.64	-0.91	10.21	0.09	-0.05	21.50	549530.49	1709847.52	N 40 0 14.97	W 80 32 8.71	2.29
	2518.50	0.20	210.71	2518.34	1217.93	5.84	-1.21	10.09	0.06	0.03	17.37	549530.20	1709847.39	N 40 0 14.97	W 80 32 8.71	2.30
	2618.50	0.28	242.23	2618.34	1317.93	5.93	-1.47	9.78	0.15	0.08	31.52	549529.93	1709847.09	N 40 0 14.97	W 80 32 8.72	2.32
	2718.50	0.27	264.47	2718.34	1417.93	5.83	-1.61	9.33	0.11	-0.01	22.24	549529.80	1709846.64	N 40 0 14.97	W 80 32 8.72	2.33
	2818.50	0.21	269.25	2818.34	1517.93	5.66	-1.63	8.92	0.06	-0.06	4.78	549529.77	1709846.22	N 40 0 14.97	W 80 32 8.73	2.34
	2918.50	0.16	263.67	2918.34	1617.93	5.52	-1.65	8.59	0.05	-0.05	-5.58	549529.75	1709845.90	N 40 0 14.97	W 80 32 8.73	2.35
Final Gyro	2948.50	0.25	253.97	2948.34	1647.93	5.49	-1.67	8.49	0.32	0.30	-32.33	549529.73	1709845.79	N 40 0 14.97	W 80 32 8.73	2.36
	3260.00	0.24	237.42	3259.84	1959.43	5.40	-2.21	7.29	0.02	0.00	-5.31	549529.19	1709844.59	N 40 0 14.96	W 80 32 8.75	2.38
	3304.00	0.35	264.38	3303.83	2003.42	5.35	-2.28	7.08	0.40	0.25	61.27	549529.13	1709844.38	N 40 0 14.96	W 80 32 8.75	2.39
	3349.00	0.76	275.80	3348.83	2048.42	5.13	-2.26	6.64	0.94	0.91	25.38	549529.15	1709843.95	N 40 0 14.96	W 80 32 8.76	2.42
	3393.00	0.59	280.18	3392.83	2092.42	4.83	-2.19	6.13	0.40	-0.39	9.95	549529.21	1709843.43	N 40 0 14.96	W 80 32 8.76	2.44
	3438.00	1.06	351.96	3437.83	2137.42	4.29	-1.74	5.84	2.31	1.04	159.51	549529.67	1709843.15	N 40 0 14.96	W 80 32 8.77	2.49
	3483.00	1.48	335.27	3482.81	2182.40	3.32	-0.80	5.54	1.23	0.93	-37.09	549530.61	1709842.85	N 40 0 14.97	W 80 32 8.77	2.53
	3528.00	1.54	323.97	3527.80	2227.39	2.14	0.22	4.94	0.67	0.13	-25.11	549531.62	1709842.25	N 40 0 14.98	W 80 32 8.78	2.55
	3572.00	1.63	315.59	3571.78	2271.37	0.96	1.14	4.16	0.56	0.20	-19.05	549532.55	1709841.46	N 40 0 14.99	W 80 32 8.79	2.58
	3662.00	1.44	306.33	3661.75	2361.34	-1.29	2.73	2.35	0.35	-0.21	-10.29	549534.13	1709839.65	N 40 0 15.01	W 80 32 8.81	2.62
	3752.00	1.41	301.40	3751.72	2451.31	-3.27	3.98	0.49	0.14	-0.03	-5.48	549535.38	1709837.80	N 40 0 15.02	W 80 32 8.84	2.68
	3841.00	0.27	317.24	3840.71	2540.30	-4.42	4.70	-0.58	1.30	-1.28	17.80	549536.11	1709836.72	N 40 0 15.03	W 80 32 8.85	2.71
	3931.00	0.28	193.63	3930.71	2630.30	-4.46	4.64	-0.78	0.54	0.01	-137.34	549536.05	1709836.53	N 40 0 15.03	W 80 32 8.85	2.73
	4020.00	0.49	194.47	4019.71	2719.30	-4.02	4.06	-0.93	0.24	0.24	0.94	549535.47	1709836.38	N 40 0 15.02	W 80 32 8.86	2.74
	4110.00	0.69	212.87	4109.70	2809.29	-3.47	3.24	-1.32	0.30	0.22	20.44	549534.64	1709835.99	N 40 0 15.01	W 80 32 8.86	2.76
	4200.00	1.00	233.67	4199.69	2899.28	-3.10	2.31	-2.24	0.48	0.34	23.11	549533.72	1709835.06	N 40 0 15.00	W 80 32 8.87	2.79
	4289.00	0.88	234.73	4288.68	2988.27	-2.91	1.46	-3.43	0.14	-0.13	1.19	549532.86	1709833.88	N 40 0 15.00	W 80 32 8.89	2.80
	4379.00	0.80	243.62	4378.67	3078.26	-2.84	0.78	-4.55	0.17	-0.09	9.88	549532.19	1709832.75	N 40 0 14.99	W 80 32 8.90	2.82
	4468.00	0.95	245.70	4467.66	3167.25	-2.91	0.20	-5.78	0.17	0.17	2.34	549531.61	1709831.52	N 40 0 14.98	W 80 32 8.92	2.84
	4558.00	1.08	251.72	4557.65	3257.24	-3.11	-0.37	-7.27	0.19	0.14	6.69	549531.03	1709830.04	N 40 0 14.98	W 80 32 8.94	2.86
	4648.00	1.10	247.61	4647.63	3347.22	-3.35	-0.97	-8.87	0.09	0.02	-4.57	549530.44	1709828.43	N 40 0 14.97	W 80 32 8.96	2.88
	4737.00	1.18	251.80	4736.61	3436.20	-3.59	-1.58	-10.53	0.13	0.09	4.71	549529.83	1709826.77	N 40 0 14.96	W 80 32 8.98	2.90
	4827.00	1.26	262.77	4826.59	3526.18	-4.11	-1.99	-12.39	0.27	0.09	12.19	549529.41	1709824.91	N 40 0 14.96	W 80 32 9.00	2.92
	4916.00	3.76	257.77	4915.50	3615.09	-5.27	-2.73	-16.22	2.82	2.81	-5.62	549528.67	1709821.09	N 40 0 14.95	W 80 32 9.05	3.01
	5005.00	8.44	251.90	5003.97	3703.56	-7.22	-5.38	-25.28	5.30	5.26	-6.60	549526.02	1709812.02	N 40 0 14.92	W 80 32 9.17	3.18
	5094.00	10.67	255.59	5091.73	3791.32	-10.34	-9.46	-39.47	2.60	2.51	4.15	549521.94	1709797.83	N 40 0 14.88	W 80 32 9.35	3.31
	5184.00	14.56	258.32	5179.55	3879.14	-15.56	-13.83	-58.63	4.37	4.32	3.03	549517.58	1709778.68	N 40 0 14.84	W 80 32 9.59	3.47
	5273.00	18.25	254.74	5264.91	3964.50	-21.88	-19.76	-83.04	4.30	4.15	-4.02	549511.64	1709754.27	N 40 0 14.78	W 80 32 9.91	3.62
	5363.00	22.07	255.81	5349.38	4048.97	-29.16	-27.62	-113.04	4.26	4.24	1.19	549503.79	1709724.27	N 40 0 14.70	W 80 32 10.29	3.76
	5452.00	19.89	252.22	5432.48	4132.07	-35.97	-36.34	-143.67	2.84	-2.45	-4.03	549495.06	1709693.64	N 40 0 14.61	W 80 32 10.68	3.87
	5542.00	20.60	253.75	5516.92	4216.51	-42.04	-46.45	-173.45	0.98	0.79	1.70	549485.96	1709663.86	N 40 0 14.51	W 80 32 11.07	3.95
	5631.00	22.98	256.73	5599.56	4299.15	-49.78	-53.82	-205.39	2.95	2.67	3.35	549477.59	1709631.92	N 40 0 14.43	W 80 32 11.47	4.04
	5721.00	22.57	256.63	5682.54	4382.13	-58.76	-61.85	-239.30	0.46	-0.46	-0.11	549469.56	1709598.02	N 40 0 14.34	W 80 32 11.91	4.10
	5810.00	21.69	254.21	5764.98	4464.57	-66.69	-70.27	-271.74	1.42	-0.99	-2.72	549461.14	1709565.57	N 40 0 14.26	W 80 32 12.32	4.16
	5900.00	21.26	253.18	5848.74	4548.33	-73.50	-79.52	-303.36	0.64	-0.48	-1.14	549451.89	1709533.95	N 40 0 14.16	W 80 32 12.73	4.21
	5989.00	21.43	254.23	5931.63	4631.22	-80.21	-88.61	-334.46	0.47	0.19	1.18	549442.80	1709502.86	N 40 0 14.07	W 80 32 13.13	4.25
	6074.00	22.90	256.20	6010.35	4709.94	-87.69	-96.77	-365.46	1.94	1.73	2.32	549434.64	1709471.86	N 40 0 13.98	W 80 32 13.53	4.30
	6165.00	22.65	254.82	6094.25	4793.84	-96.07	-105.58	-399.57	0.65	-0.27	-1.52	549425.83	1709437.75	N 40 0 13.89	W 80 32 13.96	4.34
	6209.00	23.31	246.49	6134.77	4834.36	-98.70	-111.28	-415.73	7.54	1.50	-18.93	549420.13	1709421.59	N 40 0 13.83	W 80 32 14.17	4.39
	6254.00	24.38	236.94	6175.95	4875.54	-98.66	-119.90	-431.69	8.89	2.38	-21.22	549411.51	1709405.64	N 40 0 13.75	W 80 32 14.37	4.44
	6299.00	24.96	228.32	6216.85	4916.44	-95.67	-131.28	-446.57	8.09	1.29	-19.16	549400.13	1709390.76	N 40 0 13.63	W 80 32 14.56	4.48
	6344.00	25.53	217.08	6257.58	4957.17	-89.41	-145.34	-460.51	10.71	1.27	-24.98	549386.07	1709377.81	N 40 0 13.49	W 80 32 14.73	4.53
	6389.00	25.26	205.99	6298.25	4997.84	-79.74	-161.72	-469.57	10.57	-0.60	-24.64	549369.70	1709367.75	N 40 0 13.33	W 80 32 14.85	4.58
	6433.00	25.38	194.62	6338.05	5037.64	-67.34	-179.29	-476.07	11.04	0.27	-25.84	549352.12	1709361.25	N 40 0 13.16	W 80 32 14.93	4.62
	6478.00	26.98	185.63	6378.45	5078.04	-51.81	-198.78	-479.54	9.31	3.56	-19.93	549332.63	1709357.78	N 40 0 12.96	W 80 32 14.98	4.66
	6523.00	29.20	179.11	6418.16	5117.75	-33.59	-219.92	-480.41	8.58	4.93	-14.93	549311.49	1709356.91	N 40 0 12.75	W 80 32 14.98	4.70
	6568.00	30.87	173.09	6457.12	5156.71	-13.09	-242.37	-478.85	7.65	3.71	-13.38	549289.05	1709358.47	N 40 0 12.53	W 80 32 14.96	4.73
	6613.00	33.82	169.76	6495.14	5194.73	9.58	-266.16	-475.23	7.68	6.56	-7.40	549265.26	1709362.09	N 40 0 12.30	W 80 32 14.91	4.77
	6657.00	37.19	167.20	6530.95	5230.54	34.06	-291.18	-470.11	8.37	7.66	-5.82	549240.23	1709367.21	N 40 0 12.05	W 80 32 14.84	4.80
	6702.00	41.16	163.66	6565.83	5265.42	61.67	-318.67	-462.93	10.12	8.82	-7.87	549212.75	1709374.40	N 40 0 11.78	W 80 32 14.74	4.84
	6747.00	44.39	163.84	6598.86	5298.45	91.56	-348.01	-454.38	7.18	7.18	0.40	549183.41	1709382.95	N 40 0 11.49	W 80 32 14.63	4.88
	6792.00	48.92	162.32	6629.74	5329.33	123.64	-379.30	-444.84	10.36	10.07	-3.38	549152.12	1709392.48	N 40 0 11.18	W 80 32 14.50	4.92
	6837.00	53.06	160.97	6658.06	5357.65	158.08	-412.48	-433.82	9.49	9.20	-3.00	549118.94	1709403.50	N 40 0 10.86	W 80 32 14.36	4.95
	6881.00	58.41	158.64	6682.83	5382.42	194.07	-446.56	-421.25	12.92	12.16	-5.30	549084.84	1709416.07	N 40 0 10.52	W 80 32 14.19	5.00
	6926.00	63.56	156.45	6704.65	5404.24	233.21	-482.93	-408.21	12.21	11.44	-4.87	549048.50	1709431.11	N 40 0 10.16	W 80 32 13.99	5.04
	6971.00	68.15	155.10	6723.05	5422.64	274.16	-520.36	-389.36	10.56	10.20	-3.00	549011.07	1709447.96	N 40 0 9.79	W 80 32 13.77	5.08
	7016.00	71.98	154.49	6738.39	5437.98	316.40	-558.63	-371.34	8.61	8.51	-1.36	548972.80	1709465.98	N 40 0 9.42	W 80 32 13.53	5.11
	7061.00	75.50	153.86	6750.95	5450.54	359.56	-597.51	-352.52	8.16	8.04	-1.40	548933.91	1709484.80	N 40 0 9.04	W 80 32 13.28	5.14
	7105.00	79.30	152.28	6760.51	5460.10	402.49	-635.80	-333.07	9.11	8.41	-3.59	548895.63	1709504.25	N 40 0 8.66	W 80 32 13.03	5.18
	7150.00	83.10	149.67	6767.40	5466.99	446.94	-674.67	-311.49	10.21	8.44	-5.80	548856.76	1709525.82	N 40 0 8.28	W 80 32 12.75	5.21
	7195.00	86.94	148.48	6771.30	5470.89	491.72	-713.12	-288.46	8.93	8.53	-2.64	548818.32	1709548.86	N 40 0 7.90	W 80 32 12.44	5.24
	7240.00	89.38	147.16	6772.75	5472.34	536.58	-751.18	-264.51	6.16	5.42	-2.93	548780.26	1709572.81	N 40 0 7.53	W 80 32 12.13	5.27

51-01638

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
	7337.00	89.76	144.90	6773.48	5473.07	633.09	-831.62	-210.31	2.36	0.39	-2.33	548699.62	1709627.00	N 40 0 6.74	W 80 32 11.42	5.32
	7426.00	90.27	144.81	6773.45	5473.04	721.44	-904.39	-159.08	0.58	0.57	-0.10	548627.05	1709678.23	N 40 0 6.03	W 80 32 10.75	5.35
	7516.00	87.49	143.63	6775.21	5474.80	810.64	-977.38	-106.48	3.36	-3.09	-1.31	548554.06	1709730.83	N 40 0 5.31	W 80 32 10.07	5.40
	7605.00	89.62	148.00	6777.46	5477.05	899.11	-1050.96	-56.50	5.46	2.39	4.91	548480.48	1709780.81	N 40 0 4.59	W 80 32 9.41	5.44
	7695.00	90.27	147.97	6777.54	5477.13	988.91	-1127.27	-8.79	0.72	0.72	-0.03	548404.18	1709828.52	N 40 0 3.84	W 80 32 8.79	5.47
	7784.00	90.00	146.13	6777.33	5476.92	1077.61	-1201.95	39.62	2.09	-0.30	-2.07	548329.50	1709876.92	N 40 0 3.11	W 80 32 8.16	5.50
	7874.00	89.28	146.06	6777.90	5477.49	1167.17	-1278.65	89.82	0.80	-0.80	-0.08	548254.81	1709927.12	N 40 0 2.38	W 80 32 7.50	5.53
	7963.00	89.38	146.55	6778.94	5478.53	1255.76	-1350.69	139.19	0.56	0.11	0.55	548180.77	1709976.49	N 40 0 1.65	W 80 32 6.85	5.56
	8053.00	89.35	147.31	6779.94	5479.53	1345.43	-1426.11	188.30	0.85	-0.03	0.84	548105.35	1710025.59	N 40 0 0.91	W 80 32 6.21	5.59
	8143.00	89.69	147.59	6780.69	5480.28	1435.17	-1501.97	236.72	0.49	0.38	0.31	548029.50	1710074.01	N 40 0 0.17	W 80 32 5.58	5.61
	8232.00	89.79	148.43	6781.10	5480.69	1523.98	-1577.45	283.87	0.95	0.11	0.94	547954.02	1710121.18	N 39 59 59.43	W 80 32 4.96	5.64
	8321.00	89.69	148.99	6781.50	5481.09	1612.85	-1653.50	330.09	0.64	-0.11	0.63	547877.97	1710167.38	N 39 59 58.68	W 80 32 4.36	5.66
	8411.00	90.52	146.90	6781.33	5480.92	1702.65	-1729.78	377.85	2.50	0.92	-2.32	547801.70	1710215.14	N 39 59 57.93	W 80 32 3.73	5.69
	8501.00	89.11	142.68	6781.82	5481.21	1791.96	-1803.29	429.73	4.94	-1.57	-4.69	547728.18	1710267.02	N 39 59 57.21	W 80 32 3.05	5.72
	8590.00	89.00	142.59	6783.09	5482.68	1879.82	-1874.02	483.74	0.16	-0.12	-0.10	547657.46	1710321.02	N 39 59 56.52	W 80 32 2.35	5.74
	8680.00	88.59	141.51	6784.99	5484.58	1968.51	-1944.97	539.07	1.26	-0.46	-1.20	547586.51	1710376.35	N 39 59 55.82	W 80 32 1.63	5.76
	8769.00	89.69	143.57	6786.32	5485.91	2056.35	-2015.60	593.19	2.62	1.24	2.31	547515.68	1710430.47	N 39 59 55.13	W 80 32 0.92	5.79
	8859.00	89.69	146.18	6786.81	5486.40	2145.69	-2089.20	644.98	2.88	0.00	2.88	547442.29	1710482.26	N 39 59 54.41	W 80 32 0.25	5.81
	8948.00	89.73	148.14	6787.26	5486.85	2234.40	-2163.96	693.26	2.23	0.04	2.22	547367.53	1710530.53	N 39 59 53.68	W 80 31 59.62	5.84
	9038.00	89.66	148.59	6787.74	5487.33	2324.24	-2240.59	740.46	0.51	-0.08	0.50	547290.91	1710577.74	N 39 59 52.92	W 80 31 59.00	5.85
	9127.00	89.69	148.61	6788.24	5487.83	2413.10	-2316.55	786.83	0.04	0.03	0.02	547214.94	1710624.10	N 39 59 52.18	W 80 31 58.39	5.87
	9217.00	89.38	147.52	6788.97	5488.56	2502.91	-2392.93	834.43	1.26	-0.34	-1.21	547138.57	1710671.71	N 39 59 51.43	W 80 31 57.77	5.89
	9307.00	89.52	146.14	6789.84	5489.43	2592.57	-2468.26	883.67	1.54	0.16	-1.53	547063.25	1710720.94	N 39 59 50.69	W 80 31 57.12	5.91
	9396.00	89.62	146.15	6790.51	5490.10	2681.14	-2542.17	933.25	0.11	0.11	0.01	546989.34	1710770.52	N 39 59 49.97	W 80 31 56.48	5.93
	9486.00	89.76	145.91	6790.99	5490.58	2770.69	-2616.80	983.54	0.31	0.16	-0.27	546914.70	1710820.80	N 39 59 49.23	W 80 31 55.82	5.94
	9575.00	90.17	146.28	6791.05	5490.64	2859.26	-2690.67	1033.16	0.62	0.46	0.42	546840.84	1710870.45	N 39 59 48.51	W 80 31 55.17	5.96
	9664.00	90.31	143.27	6790.67	5490.26	2947.59	-2763.36	1084.51	3.39	0.16	-3.38	546768.15	1710921.77	N 39 59 47.80	W 80 31 54.50	5.98
	9754.00	90.79	139.61	6789.81	5489.40	3036.11	-2833.73	1140.60	4.10	0.53	-4.07	546697.79	1710977.86	N 39 59 47.11	W 80 31 53.77	6.00
	9843.00	90.41	137.15	6788.88	5488.47	3122.69	-2900.25	1199.70	2.80	-0.43	-2.76	546631.27	1711036.96	N 39 59 46.46	W 80 31 53.00	6.02
	9933.00	89.90	138.19	6788.63	5488.22	3209.98	-2966.78	1260.31	1.29	-0.57	1.16	546564.74	1711097.56	N 39 59 45.81	W 80 31 52.21	6.04
	10023.00	89.86	140.06	6788.82	5488.41	3297.79	-3034.83	1319.20	2.08	-0.04	2.08	546496.69	1711156.48	N 39 59 45.14	W 80 31 51.45	6.06
	10112.00	89.76	142.25	6789.12	5488.71	3385.27	-3104.15	1375.02	2.46	-0.11	2.46	546427.38	1711212.27	N 39 59 44.46	W 80 31 50.72	6.08
	10202.00	89.79	143.62	6789.47	5489.06	3474.20	-3175.96	1429.27	1.52	0.03	1.52	546355.57	1711266.51	N 39 59 43.76	W 80 31 50.01	6.09
	10291.00	89.35	141.10	6790.14	5489.73	3562.00	-3246.43	1483.61	2.87	-0.49	-2.83	546285.11	1711320.86	N 39 59 43.07	W 80 31 49.30	6.11
	10381.00	89.42	139.14	6791.11	5490.70	3650.14	-3315.48	1541.31	2.18	0.08	-2.18	546216.05	1711378.56	N 39 59 42.39	W 80 31 48.55	6.13
	10470.00	89.24	140.40	6792.15	5491.74	3737.19	-3383.43	1598.79	1.43	-0.20	1.42	546148.11	1711436.03	N 39 59 41.73	W 80 31 47.80	6.14
	10560.00	89.11	141.21	6793.44	5493.03	3825.54	-3453.17	1655.66	0.91	-0.14	0.90	546078.37	1711492.90	N 39 59 41.05	W 80 31 47.06	6.16
	10649.00	89.26	143.27	6794.69	5494.28	3913.30	-3523.52	1710.15	2.32	0.19	2.31	546008.02	1711547.39	N 39 59 40.36	W 80 31 46.35	6.18
	10739.00	89.31	145.83	6795.80	5495.39	4002.58	-3596.82	1762.34	2.84	0.03	2.84	545934.72	1711599.58	N 39 59 39.64	W 80 31 45.67	6.19
	10829.00	89.31	148.04	6796.88	5496.47	4092.25	-3672.24	1811.44	2.46	0.00	2.46	545859.31	1711648.67	N 39 59 38.90	W 80 31 45.03	6.21
	10919.00	89.79	148.05	6797.59	5497.18	4182.05	-3746.60	1859.07	0.53	0.53	0.01	545782.96	1711696.30	N 39 59 38.15	W 80 31 44.40	6.22
	11008.00	90.14	148.26	6797.65	5497.24	4270.88	-3824.20	1906.03	0.46	0.39	0.24	545707.36	1711743.26	N 39 59 37.41	W 80 31 43.79	6.23
	11098.00	90.17	148.37	6797.40	5496.99	4360.72	-3900.79	1953.30	0.13	0.03	0.12	545630.77	1711790.53	N 39 59 36.66	W 80 31 43.17	6.25
	11187.00	90.07	145.84	6797.22	5496.81	4449.42	-3975.51	2001.63	2.84	-0.11	-2.84	545556.05	1711838.86	N 39 59 35.92	W 80 31 42.54	6.26
	11277.00	90.38	146.51	6796.86	5496.45	4538.99	-4050.26	2051.73	0.82	0.34	0.74	545481.29	1711888.95	N 39 59 35.19	W 80 31 41.88	6.27
	11366.00	90.41	146.02	6796.25	5495.84	4627.58	-4124.29	2101.15	0.55	0.03	-0.55	545407.28	1711938.38	N 39 59 34.46	W 80 31 41.24	6.29
	11456.00	90.03	144.06	6795.90	5495.49	4716.95	-4198.04	2152.72	2.22	-0.42	-2.18	545333.53	1711989.94	N 39 59 33.74	W 80 31 40.57	6.30
	11545.00	90.07	141.32	6795.82	5495.41	4804.83	-4268.82	2206.66	3.08	0.04	-3.08	545262.75	1712043.88	N 39 59 33.05	W 80 31 39.86	6.32
	11635.00	90.14	140.45	6795.66	5495.25	4893.22	-4338.65	2263.44	0.97	0.08	-0.97	545192.92	1712100.66	N 39 59 32.36	W 80 31 39.12	6.33
	11724.00	90.34	142.14	6795.29	5494.88	4980.73	-4408.10	2319.09	1.91	0.22	1.90	545123.48	1712156.30	N 39 59 31.68	W 80 31 38.40	6.34
	11814.00	89.86	145.40	6795.13	5494.72	5069.85	-4480.69	2372.27	3.66	-0.53	3.62	545050.89	1712209.49	N 39 59 30.97	W 80 31 37.70	6.36
	11903.00	89.93	148.90	6795.29	5494.88	5158.55	-4555.45	2420.54	3.93	0.08	3.93	544976.14	1712257.75	N 39 59 30.24	W 80 31 37.07	6.37
	11993.00	90.07	152.01	6795.29	5494.88	5248.51	-4633.74	2464.92	3.46	0.16	3.46	544897.85	1712302.13	N 39 59 29.47	W 80 31 36.49	6.39
	12082.00	90.03	155.04	6795.22	5494.81	5337.46	-4713.39	2504.59	3.40	-0.04	3.40	544818.20	1712341.80	N 39 59 28.69	W 80 31 35.97	6.41
	12172.00	90.21	153.58	6795.03	5494.62	5427.37	-4794.49	2543.61	1.63	0.20	-1.62	544737.10	1712380.81	N 39 59 27.89	W 80 31 35.46	6.42
	12261.00	91.07	148.95	6794.03	5493.62	5516.33	-4872.51	2586.38	5.29	0.97	-5.20	544659.09	1712423.58	N 39 59 27.12	W 80 31 34.90	6.44
Final Survey 26-Dec-13	12285.00	91.13	147.76	6793.57	5493.16	5540.29	-4892.93	2598.97	4.96	0.25	-4.96	544638.66	1712436.17	N 39 59 26.92	W 80 31 34.73	6.44
PTB	12320.00	91.13	147.76	6792.88	5492.47	5575.19	-4922.53	2617.63	0.00	0.00	0.00	544609.07	1712454.84	N 39 59 26.63	W 80 31 34.49	6.44

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 SHL13AHS Gyro+MWD 0ft to 12320ft MD
	1	18.500	2948.500	Act Stns	30.000	30.000	SLB_NSG+MSHOT	Original Borehole / Noble Energy SHL13AHS Gyro+MWD 0ft to
	1	2948.500	3260.000	1/98.425	30.000	30.000	SLB_INC_ONLY<10	Original Borehole / Noble Energy SHL13AHS Gyro+MWD 0ft to
	1	3260.000	3483.000	Act Stns	30.000	30.000	SLB_INC_ONLY<10	Original Borehole / Noble Energy SHL13AHS Gyro+MWD 0ft to
	1	3483.000	12285.000	Act Stns	30.000	30.000	SLB_MWD-STD	Original Borehole / Noble Energy SHL13AHS Gyro+MWD 0ft to
	1	12285.000	12320.000	Act Stns	30.000	30.000	SLB_BLIND+TREND	Original Borehole / Noble Energy SHL13AHS Gyro+MWD 0ft to

51.01638

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Borehole:	Well:	Field:	Structure:
Original Borehole	SHL13AHS	WV Marshall County (NAD 27)	Precision 543

Gravity & Magnetic Parameters

Model:	HDGM 2013	Dip:	67.588°	Date:	17-Dec-2013
MagDec:	-8.434°	FS:	52155.819nT	Gravity FS:	999.35mgs (9.90665 Based)

Surface Location NAD27 West Virginia State Plane, Northern Zone, US Feet

Lat:	N 40 0 14.98	Northing:	549631.405ftUS	Grid Conv:	-0.6606°
Lon:	W 80 32 8.84	Easting:	1709837.305ftUS	Scale Fact:	0.99996248

Miscellaneous

Slot:	SHL13AHS	TVD Ref:	KB(1300.41ft above MSL)
Plan:	Noble Energy SHL13AHS Gyro+MWD 0ft to 12320ft MD		

Surface Location

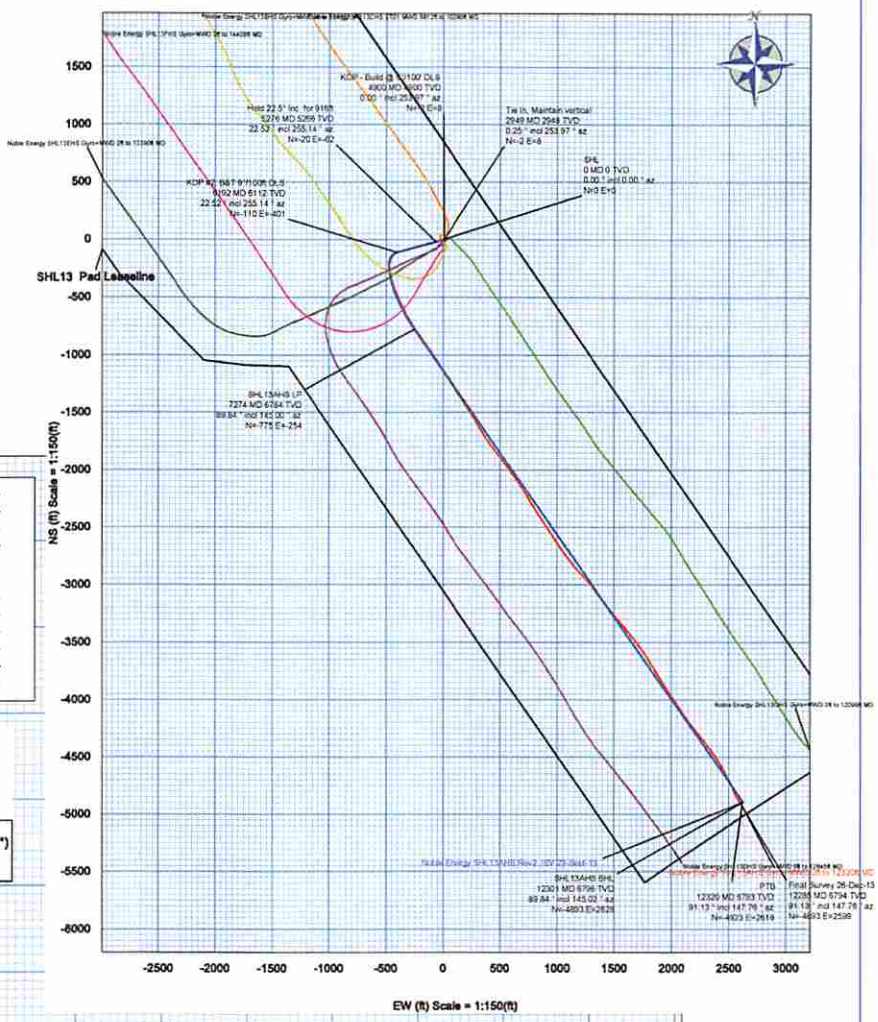
Northing: 549631.405 Easting: 1709837.305 Latitude: N 40 0 14.98 Longitude: W 80 32 8.84 VSec Azimuth: 151.757

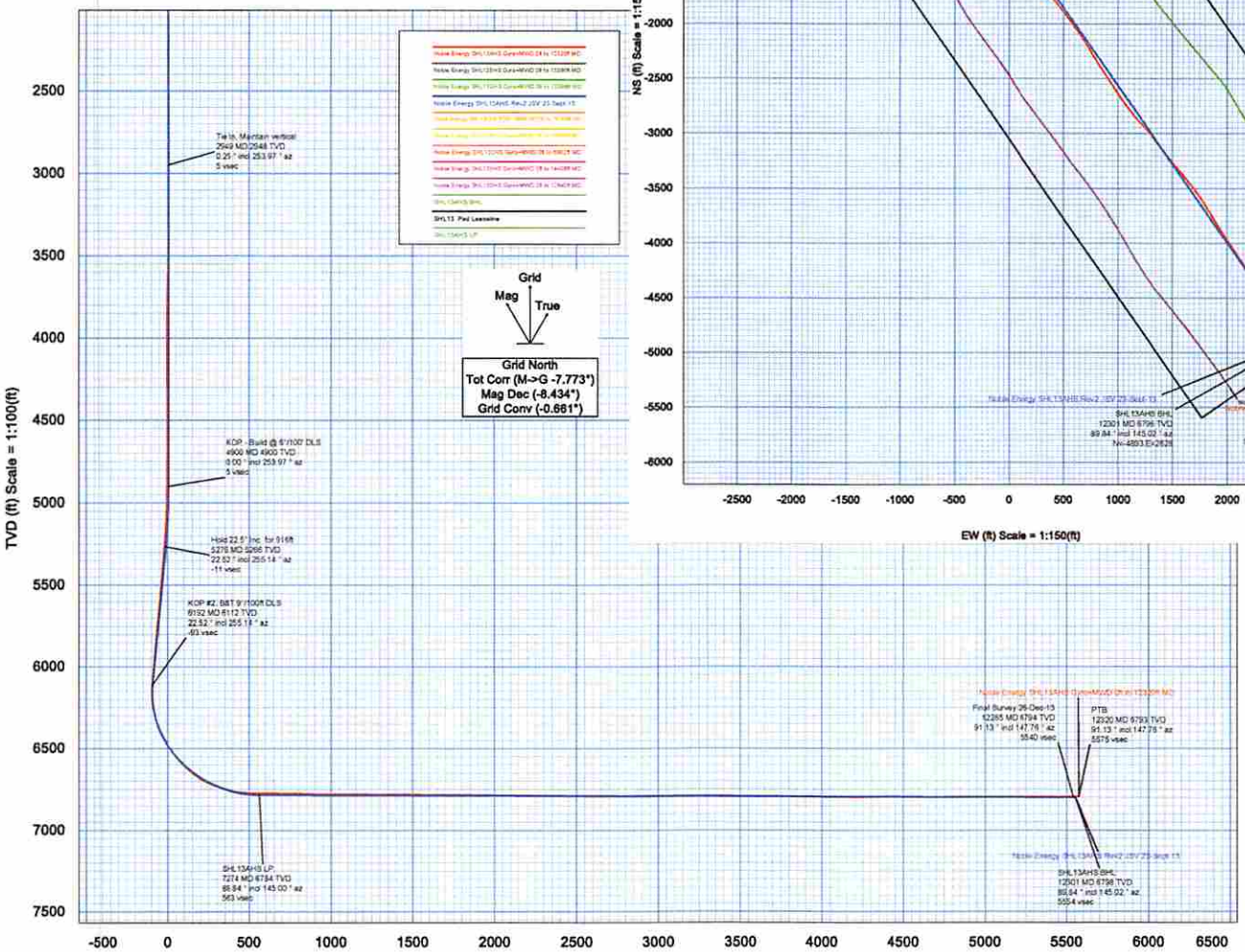
Target Description			Grid Coord						Local Coord	
Target Name	Shape	Dimension	Latitude	Longitude	Northing	Easting	TVD	VSec	N+/S-( )	E+/W-( )
SHL13_Pad Leaseline	Polyline	N/A	N 40 0 14.98	W 80 32 8.85	549631.34	1709836.71	1300.41	0.04	-0.37	-0.59
SHL13AHS BHL	Point	N/A	N 39 58 26.82	W 80 31 34.25	544638.43	1713485.61	6791.00	5554.43	-4893.18	2628.41
SHL13AHS LP	Point	N/A	N 40 0 7.26	W 80 32 11.96	548755.95	1709683.52	6791.00	563.07	-775.48	-253.80

PART	Seq.	Survey Tool Survey Tool Code	Vendor/Tool	Hole Size (in)	Dogleg (°/ft)	MD From (ft)	MD To (ft)	Azimuth Error (°)	Inclination Error (°)	Depth Error (ft)	Comments/ Contingency
1	1	SLB_NOGYRO-NOHOT-Depth Only		30	30	0	19.5	Ad Stmt	1.25	1.25	
1	2	SLB_NOGYRO-NOHOT		30	30	19.5	2948.5	Ad Stmt	3.98	2.8	
1	3	SLB_MD_ONLY+10		30	30	2948.5	3260	MM 425	5.53	4.39	
1	4	SLB_MD_ONLY+10		30	30	3260	5483	Ad Stmt	8.8	8.4	
1	5	SLB_MWD-STD		30	30	5483	12289	Ad Stmt	152.48	15.2	
1	6	SLB_SLIND+TREND		30	30	12289	12320	Ad Stmt	157.81	17.59	

Critical Points

Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLS
SHL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Final Gyro	2948.50	0.25	253.97	2948.34	5.49	-1.97	5.48	0.22
Final Survey 26-Dec-13	12285.00	91.13	147.76	6793.57	5540.39	-4893.33	2588.67	4.06
PTB	12320.00	91.13	147.76	6793.58	5575.18	-4923.53	2617.63	0.00





47-051-01638

Well is located on topo map 13,654' feet south of Latitude: 40° 02' 30"

Well is located on topo map 10,028' feet west of Longitude: 80° 30' 00"

LINE	BEARING	DISTANCE
L1	S 34°24'20" W	270.15'
L2	S 65°42'10" W	233.08'
L3	N 44°01'16" W	168.63'

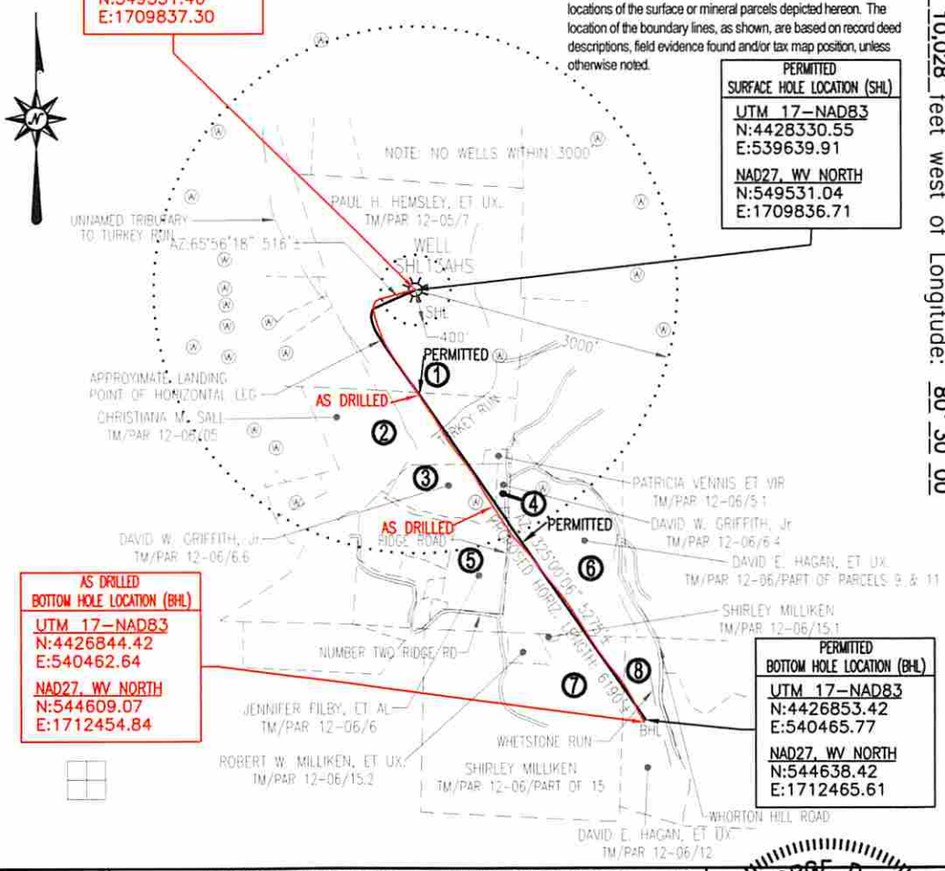
APPROX LANDING POINT
UTM 17-NAD83
~~N:4428154.53~~
~~E:539521.91~~
NAD27, WV NORTH
~~N:548859.93~~
~~E:1709459.63~~

NOTES:

1. There are no water wells or developed springs within 250' of proposed well.
2. There are no existing buildings within 625' of proposed well.
3. Proposed well is greater than 100' from perennial stream, wetland, pond, reservoir or lake.
4. There are no native trout streams within 300' of proposed well.
5. Proposed well is greater than 1000' from surface/groundwater intake or public water supply.
6. It is not the purpose or intention of this plat to represent surveyed locations of the surface or mineral parcels depicted hereon. The location of the boundary lines, as shown, are based on record deed descriptions, field evidence found and/or tax map position, unless otherwise noted.

AS DRILLED
SURFACE HOLE LOCATION (SHL)
UTM 17-NAD83
N:4428330.66
E:539640.09
NAD27, WV NORTH
N:549531.40
E:1709837.30

PERMITTED
SURFACE HOLE LOCATION (SHL)
UTM 17-NAD83
N:4428330.55
E:539639.91
NAD27, WV NORTH
N:549531.04
E:1709836.71



AS DRILLED
BOTTOM HOLE LOCATION (BHL)
UTM 17-NAD83
N:4426844.42
E:540462.64
NAD27, WV NORTH
N:544609.07
E:1712454.84

PERMITTED
BOTTOM HOLE LOCATION (BHL)
UTM 17-NAD83
N:4426853.42
E:540465.77
NAD27, WV NORTH
N:544638.42
E:1712465.61

LEGEND

- TOPO MAP POINT
- WELL
- ALL ART POINTS UNLESS OTHERWISE NOTED
- WATER SOURCE
- LEASE NUMBER BASED ON ATTACHED WW-6A1
- MINERAL TRACT BOUNDARY
- PARCEL LINES
- WELL REFERENCE
- PROPOSED HORIZONTAL WELL
- ROAD
- STREAM CENTER LINE
- AS DRILLED

WELLS WITHIN 3000'

- EXISTING WELLS
- PLUGGED WELLS

Blue Mountain Inc.
11023 MASON DIXON HIGHWAY
BURTON, WV 26562
PHONE: (304) 662-6486

FILE #: SHL13AHS-AS DRILLED

DRAWING #: SHL13AHS-AS DRILLED

SCALE: 1" = 2000'

MINIMUM DEGREE OF ACCURACY: 1/2500

PROVEN SOURCE OF ELEVATION: U.S.G.S. MONUMENT THOMAS 1498.81'

I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE REGULATIONS ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

Signed: George D. Six

R.P.E.: _____ L.L.S.: P.S. No. 2000

GEORGE D. SIX LICENSED No. 2000 STATE OF WEST VIRGINIA PROFESSIONAL SURVEYOR

PLACE SEAL HERE

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS

WVDEP
OFFICE OF OIL & GAS
601 57TH STREET
CHARLESTON, WV 25304

DATE: OCTOBER 2, 2014

OPERATOR'S WELL #: SHL13AHS-AS DRILLED

API WELL #: 47 (STATE) 51 (COUNTY) _____ (PERMIT)

Well Type: ☐ Oil ☐ Waste Disposal ☒ Production ☐ Deep
☒ Gas ☐ Liquid Injection ☐ Storage ☒ Shallow

WATERSHED: TURKEY RUN ELEVATION: 1290.35'

COUNTY/DISTRICT: MARSHALL / SAND HILL QUADRANGLE: VALLEY GROVE, WV 7.5'

SURFACE OWNER: PAUL H. & ANNETTE A. HEMSLEY ACREAGE: 121.65±

OIL & GAS ROYALTY OWNER: SEE ATTACHED WW-6A1 ACREAGE: 424.584±

DRILL ☒ CONVERT ☐ DRILL DEEPER ☐ REDRILL ☐ FRACTURE OR STIMULATE ☐

PLUG OFF OLD FORMATION ☐ PERFORATE NEW FORMATION ☐ PLUG & ABANDON ☐

CLEAN OUT & REPLUG ☐ OTHER CHANGE ☐ (SPECIFY): _____

TARGET FORMATION: MARCELLUS ESTIMATED DEPTH: TVD: 6781'± TMD: 12267'±

WELL OPERATOR NOBLE ENERGY, INC. DESIGNATED AGENT STEVEN M. GREEN

Address 333 TECHNOLOGY DRIVE, SUITE 116 Address 500 VIRGINIA STREET EAST, UNITED CENTER SUITE 590

City CANONSBURG State PA Zip Code 15317 City CHARLESTON State WV Zip Code 25301

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

pm

API 47 - 051 - 01639 County Marshall District Sandhill
Quad Valley Grove Pad Name SHL-13 Field/Pool Name
Farm name Paul H. and Annette Hemsley Well Number SHL13BHS
Operator (as registered with the OOG) Noble Energy, Inc.
Address 333 Technology Drive, Suite 116 City Canonsburg State PA Zip 15317

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey

Top hole	Northing	4428322.04	Easting	539642.75
Landing Point of Curve	Northing	4428313.46	Easting	539408.86
Bottom Hole	Northing	4429869.29	Easting	538236.57

Elevation (ft) 1288.91 GL Type of Well ■New □ Existing Type of Report □Interim ■Final

Permit Type □ Deviated □ Horizontal ■ Horizontal 6A □ Vertical Depth Type □ Deep ■ Shallow

Type of Operation □ Convert □ Deepen ■ Drill □ Plug Back □ Redrilling □ Rework ■ Stimulate

Well Type □ Brine Disposal □ CBM ■ Gas □ Oil □ Secondary Recovery □ Solution Mining □ Storage □ Other _____

Type of Completion ■ Single □ Multiple Fluids Produced □ Brine □Gas □ NGL □ Oil □ Other _____
Drilled with □ Cable ■ Rotary

Drilling Media Surface hole ■ Air □ Mud □Fresh Water Intermediate hole ■ Air □ Mud □ Fresh Water □ Brine
Production hole □ Air ■ Mud □ Fresh Water □ Brine
Mud Type(s) and Additive(s)
Synthetic Oil Based

Date permit issued 6/13/2013 Date drilling commenced 8/11/2013 Date drilling ceased 11/10/2013
Date completion activities began 5/24/14 Date completion activities ceased 7/9/14
Verbal plugging (Y/N) N Date permission granted _____ Granted by _____

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

RECEIVED
Office of Oil and Gas
OCT 0 9 2014
WV Department of
Environmental Protection

Freshwater depth(s) ft 561', 763' Open mine(s) (Y/N) depths N
Salt water depth(s) ft 1600' Void(s) encountered (Y/N) depths N
Coal depth(s) ft 763 - 785.04', 1266.74' - 1269.77' Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) Y

Reviewed by:

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API 47- 051 - 01639 Farm name Paul H. and Annette Hemsley Well number SHL13BHS

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/ N) * Provide details below*
Conductor	36	30	40	N			Y
Surface	24	20	418	N	J-55 94#		Y
Coal							
Intermediate 1	17-1/2	13-3/8	1197	N	J-55 54.5#		Y
Intermediate 2	12-3/8	9-5/8	3191	N	J-55 36#		Y
Intermediate 3							
Production	8-3/4	5-1/2	13664	N	P-110 20#		Y
Tubing							
Packer type and depth set							

Comment Details

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft^3/sks)	Volume (ft^3)	Cement Top (MD)	WOC (hrs)
Conductor							
Surface	Type 1	484	15.6	1.19	110	0	8
Coal							
Intermediate 1	Type 1	1029	15.6	1.19	225	0	8
Intermediate 2	Type 1	1264	15.6	1.19	268	0	8
Intermediate 3							
Production	Class A	2010	14.8	1.39	508	2900	8
Tubing							

Drillers TD (ft) 13685 Loggers TD (ft) 13650

Deepest formation penetrated Marcellus Plug back to (ft)

Plug back procedure

Kick off depth (ft) 6097

Check all wireline logs run ☐ caliper ☐ density ☐ deviated/directional ☐ induction ☐ neutron ☐ resistivity ■ gamma ray ☐ temperature ☐sonic

Well cored ☐ Yes ☐ No ☐ Conventional ☐ Sidewall Were cuttings collected ■ Yes ☐ No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING

4 Contralizers on Surface (Every third joint), 10 on Intermediate 1 (Every third joint), 60 on Intermediate 2 (Every third joint), and 207 on Production casing (Every third joint, till Curve, then Every Joint).

WAS WELL COMPLETED AS SHOT HOLE ☐ Yes ■ No DETAILS

WAS WELL COMPLETED OPEN HOLE? ☐ Yes ■ No DETAILS

WERE TRACERS USED ☐ Yes ■ No TYPE OF TRACER(S) USED

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API 47- 051 - 01639 Farm name Paul H. and Annette Hemsley Well number SHL13BHS

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
		PLEASE SEE ATTACHED			
		PERFORATION RECORD			

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
		PLEASE SEE	ATTACHED					
		STIMULATION	INFORMATION					
		PER STAGE	SHEET					

Please insert additional pages as applicable.

Perforation Record

API: 47-051-01639 Farm name: Paul H & Annette A Hemsley Well Name: SHL-13B-HS

Stage No.	Stim Date	Top Perf	Bottom Perf	# of Perfs	Formation
1	5/24/2014	13363	13517	40	Marcellus
2	5/24/2014	13073	13327	48	Marcellus
3	5/25/2014	12773	13027	40	Marcellus
4	5/27/2014	12536	12727	40	Marcellus
5	5/28/2014	11673	11927	40	Marcellus
6	5/28/2014	11373	11627	40	Marcellus
7	5/29/2014	11125	11327	40	Marcellus
8	5/29/2014	10875	11077	40	Marcellus
9	5/29/2014	10625	10827	40	Marcellus
10	5/30/2014	10323	10577	40	Marcellus
11	5/30/2014	10023	10277	40	Marcellus
12	5/30/2014	9723	9977	40	Marcellus
13	5/31/2014	9423	9677	40	Marcellus
14	5/31/2014	9123	9377	40	Marcellus
15	6/1/2014	8823	9077	40	Marcellus
16	6/1/2014	8523	8777	40	Marcellus
17	6/1/2014	8223	8477	40	Marcellus
18	6/2/2014	7923	8177	40	Marcellus
19	6/2/2014	7623	7877	40	Marcellus
20	6/2/2014	7375	7577	40	Marcellus
21	6/3/2014	7125	7327	40	Marcellus

STIMULATION INFORMATION PER STAGE

API: 47-051-01639 Farm name: Paul H & Annette A Hemsley Well Name: SHL-13B-HS

Stage No.	Stim Date	Avg Rate (bpm)	ATP (psi)	Max BD Pressure	ISIP (psi)	Proppant (lbs)	Water (BBLS)	Amount of N^2/ other
1 Inj Test							-	
1.1	5/24/2014	85.1	8,112	6,921	4,896	7007	7,287.77	
1.2	5/24/2014	89.1	7,976	6,276		6366	5,935.81	
1.3	5/24/2014	88.6	7,689	5,716		5806	5,732.43	
2.1	5/24/2014	86.3	8,178	6,259	3,892	6347	6,248.47	
2.2	5/24/2014	83.1	7,957	6,222		6307	5,636.40	
2.3	5/24/2014	77.4	7,522	5,745		5825	5,433.60	
3.1	5/26/2014	83.4	8,168	6,706	4,249	6793	6,363.06	
3.2	5/26/2014	78.9	8,149	6,974		7056	5,277.95	
3.3	5/26/2014	47.1	8,728	8,333		8383	7,416.90	
4.1	5/27/2014	85.3	7,657	6,498	4,813	6587	6,954.17	
4.2	5/27/2014	80.7	7,596	6,183		6268	5,935.26	
4.3	5/27/2014	77.5	8,025	8,028		8110	5,936.33	
5.1	5/28/2014	84.9	7,880	6,014	4,400	6104	6,429.24	
5.2	5/28/2014	81.4	8,371	5,799		5886	5,910.43	
5.3	5/28/2014	74.1	8,133	9,257		9336	6,463.48	
6.1	5/28/2014	84.4	7,625	5,996	4,307	6087	6,191.26	
6.2	5/28/2014	82	8,449	7,083		7171	5,741.55	
6.3	5/28/2014	62	8,150	7,788		7856	5,906.02	
7.1	5/29/2014	87.1	7,575	6,015	4,358	6109	5,978.98	
7.2	5/29/2014	86.9	8,517	6,792		6886	4,583.50	
7.3	5/29/2014	79.2	8,518	6,880		6967	5,053.57	
8.1	5/29/2014	84.1	7,582	5,477	4,230	5569	6,575.12	
8.2	5/29/2014	86.3	8,173	5,993		6088	5,399.24	
8.3	5/29/2014	81.7	8,307	6,200		6290	4,748.14	
9.1	5/29/2014	84.6	7,531	5,822	4,373	5916	5,305.71	
9.2	5/29/2014	85.7	7,738	6,449		6544	4,785.17	
9.3	5/29/2014	84	7,743	6,325		6418	4,769.45	
10.1	5/30/2014	85.6	7,716	5,717	4,294	5813	6,107.69	
10.2	5/30/2014	88.7	8,188	6,135		6234	5,172.48	
10.3	5/30/2014	89.3	8,078	5,915		6015	5,233.36	
11.1	5/30/2014	86.5	7,669	6,239	4,498	6337	5,476.87	
11.2	5/30/2014	84.6	7,848	7,772		7868	5,402.48	
11.3	5/30/2014	85.8	7,830	6,328		6425	5,360.79	
12.1	5/31/2014	85.8	7,783	6,542	4,236	6640	6,537.44	
12.2	5/31/2014	81.2	7,986	6,210		6303	5,640.57	
12.3	5/31/2014	88.8	8,512	7,272		7373	5,368.74	
13.1	5/31/2014	84.5	7,638	6,354	4,697	6452	5,848.29	
13.2	5/31/2014	87.6	8,247	7,010		7111	5,128.90	
13.3	5/31/2014	86.3	8,404	6,682		6782	5,016.55	
14.1	5/31/2014	82	7,328	5,846	4,164	5942	6,171.79	

STIMULATION INFORMATION PER STAGE

API: 47-051-01639 Farm name: Paul H & Annette A Hemsley Well Name: SHL-13B-HS

Stage No.	Stim Date	Avg Rate (bpm)	ATP (psi)	Max BD Pressure	ISIP (psi)	Proppant (lbs)	Water (BBLS)	Amount of N^2/ other
14.2	5/31/2014	84.3	8,627	7,709		7808	5,137.21	
14.3	6/1/2014	82.7	8,121	7,248		7345	5,556.19	
15.1	6/1/2014	85.1	7,434	5,381	4,703	5481	6,079.21	
15.2	6/1/2014	89.3	8,381	6,067		6172	5,252.19	
15.3	6/1/2014	89.9	7,641	5,792		5897	4,961.02	
16.1	6/1/2014	84.9	7,229	5,829	4,515	5930	5,669.86	
16.2	6/1/2014	86.3	8,220	6,348		6451	4,899.33	
16.3	6/1/2014	83.7	8,308	7,125		7225	5,020.67	
17.1	6/1/2014	85.9	7,409	5,492	4,553	5595	5,975.84	
17.2	6/1/2014	73	8,165	8,599		8689	5,310.31	
17.3	6/1/2014	39.2	8,656	8,403		8460	10,504.36	
18.1	6/2/2014	85.6	7,208	5,423	4,941	5527	6,062.73	
18.2	41792	89.1	8341	5819		5926	5509.1457	
18.3	41792	88.1	9084	6236		6342	5421.7857	
19.1	41792	84.9	7102	6225	4543	6329	5794.3738	
19.2	41792	89.3	7269	5847		5956	5180.3095	
19.3	41792	90	7609	6211		6320	5226.9286	
20.1	41792	85.3	6987	6093	4537	6198	4746.9762	
20.2	41793	88.4	7388	5905		6014	4357.3095	
20.3	41793	86	7636	7359		7465	4497.381	
21.1	41793	84.3	6957	5958	4584	6063	4684.8524	
21.2	41793	83.7	8001	7230		7335	4712.7143	
21.3	41793	70.6	8492	7770		7862	4719.8095	

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API 47- 051 - 01639 Farm name Paul H. and Annette Hemsley Well number SHL13BHS

PRODUCING FORMATION(S)	DEPTHS			
Marcellus	6695.0	TVD	13685	MD

Please insert additional pages as applicable.

GAS TEST □ Build up □ Drawdown □ Open Flow OIL TEST □ Flow □ Pump

SHUT-IN PRESSURE Surface _____ psi Bottom Hole _____ psi DURATION OF TEST _____ hrs

OPEN FLOW	Gas	Oil	NGL	Water	GAS MEASURED BY
	4608 mcfpd	96 bpd	292 bpd	528 bpd	□ Estimated ■ Orifice □ Pilot

LITHOLOGY/ FORMATION NAME	TOP DEPTH IN FT TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H_2S, ETC)
	0		0		
		PLEASE SEE			
		FORMATION	SHEET		

Please insert additional pages as applicable.

Drilling Contractor Precision Drilling
Address 5400 D Big Tyler Road City Charleston State WV Zip 25313

Logging Company Diversified Well Logging
Address 711 West 10th Street City Reserve State LA Zip 70084

Cementing Company Schlumberger
Address 4600 J. Barry Court, Suite 200 City Canonsburg State PA Zip 15317

Stimulating Company Halliburton Energy SRCS
Address 121 Champion Way, Suite 110 City Canonsburg State PA Zip 15317

Please insert additional pages as applicable.

Completed by Regina A. Logue Telephone 724-820-3559
Signature Regina A Logue Title Regulatory Analyst Date 10/6/14

Submittal of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Registry

SHL 13B

47-051-01639

Formations	Top TVD	Base TVD	Top MD	Base MD	Fluid
Shale	0	732	0	732	
Pittsburgh Coal	732	742	732	742	
Shale and Sandstone	742	1516	742	1516	
Gas Sand	1516	1574	1516	1574	
Shale	1574	1693	1574	1693	
1st Salt Sand	1693	1756	1693	1756	
2nd Salt Sand	1756	1765	1756	1765	
3rd Salt Sand	1765	1815	1765	1815	
Shale	1815	1841	1815	1841	
Maxton Sand	1841	1958	1841	1958	
Shale	1958	1978	1958	2509	
Big Lime	1978	2023	1978	2023	
Big Injun	2023	2165	2023	2165	
Price	2165	2509	2165	2509	
Murrysville	2509	2522	2509	2872	
Shale	2522	2726	2522	2726	
50' Sand	2726	2743	2726	2743	
Shale	2743	2829	2743	2829	
Gordon Stray	2829	2841	2829	2841	
Shale	2841	2872	2841	2872	
Gordon	2872	2890	2872	2890	
Shale	2890	2985	2890	2985	
Fifth Sand	2985	3023	2985	3023	
Shale	3023	3423	3023	3423	
Speechley Sand	3423	3447	3423	3447	
Shale	3447	4331	3447	4333	
Warren Sand	4331	4345	4333	4347	
Shale	4345	5252	4347	5255	
Java Shale	5252	5322	5255	5325	
Pipe Creek Shale	5322	5366	5325	5369	
Angola Shale	5366	5992	5369	6012	
Rhinestreet	5992	6406	6012	6522	
Cashaqua	6406	6498	6522	6644	
Middlesex	6498	6535	6644	6697	
West River	6535	6576	6697	6759	
Burkett	6576	6609	6759	6813	
Tully Limestone	6609	6637	6813	6863	
Hamilton	6637	6751	6863	7153	
Marcellus	6751	6802	7153	not encountered	Gas
Onondaga	6802	not encountered	not encountered	not encountered	
Huntersville	6807	not encountered	not encountered	not encountered	

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	5/24/2014
Job End Date:	6/3/2014
State:	West Virginia
County:	Marshall
API Number:	47-051-01639-00-00
Operator Name:	Noble Energy, Inc.
Well Name and Number:	SHL13 B
Longitude:	-80.53576250
Latitude:	40.00410000
Datum:	NAD27
Federal/Tribal Well:	NO
True Vertical Depth:	6,695
Total Base Water Volume (gal):	14,937,224
Total Base Non Water Volume:	0

FracFocus Chemical Disclosure Registry

GROUNDWATER PROTECTION COUNCIL

Oil & Gas

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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	96.45191	Density = 8.340
SAND - COMMON WHITE	Halliburton	Proppant					
			Crystalline silica, quartz	14808-60-7	100.00000	1.89067	
SAND - PREMIUM WHITE	Halliburton	Proppant					
			Crystalline silica, quartz	14808-60-7	100.00000	0.55787	
HYDROCHLORIC ACID 5-10%	Halliburton	Solvent					
			Hydrochloric acid	7647-01-0	10.00000	0.09160	
FR-66	Halliburton	Friction Reducer					
			Hydrotreated light petroleum distillate	64742-47-8	30.00000	0.03052	
FE-1A ACIDIZING COMPOSITION	Halliburton	Additive					
			Acetic anhydride	108-24-7	100.00000	0.00475	
			Acetic acid	64-19-7	60.00000	0.00285	
BE-9	Halliburton	Biocide					
			Tributyl tetradecyl phosphonium chloride	81741-28-8	10.00000	0.00430	
LP-65	Halliburton	Scale Inhibitor					

			Ammonium chloride	12125-02-9	10.00000	0.00262	
Biovert NWB	Halliburton	Viscosifier					
			Polylactide resin	Confidential	100.00000	0.00219	
WG-36 GELLING AGENT	Halliburton	Gelling Agent					
			Guar gum	9000-30-0	100.00000	0.00210	
LoSurf-300D	Halliburton	Non-ionic Surfactant					
			Ethanol	64-17-5	60.00000	0.00096	
			Heavy aromatic petroleum naphtha	64742-94-5	30.00000	0.00048	
			Poly(oxy-1,2-ethanediyl), alpha-(4-nonylphenyl)-omega-hydroxy-, branched	127087-87-0	5.00000	0.00008	
			Naphthalene	91-20-3	5.00000	0.00008	
			1,2,4 Trimethylbenzene	95-63-6	1.00000	0.00002	
LGC-36 UC	Halliburton	Liquid Gel Concentrate					
			Guar gum	9000-30-0	60.00000	0.00047	
			Naphtha, hydrotreated heavy	64742-48-9	60.00000	0.00047	
HAI-OS ACID INHIBITOR	Halliburton	Corrosion Inhibitor					
			Methanol	67-56-1	60.00000	0.00047	
			Propargyl alcohol	107-19-7	10.00000	0.00008	
LCA-1	Halliburton	Solvent					
			Paraffinic solvent	Confidential	100.00000	0.00031	
SP BREAKER	Halliburton	Breaker					
			Sodium persulfate	7775-27-1	100.00000	0.00011	
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		1.03576	
		Other Ingredient(s)					
			Polyacrylamide copolymer	Confidential		0.03052	
		Other Ingredient(s)					
			Organic phosphonate	Confidential		0.01570	
		Other Ingredient(s)					
			Fatty acid tall oil amide	Confidential		0.00509	
		Other Ingredient(s)					
			Sodium chloride	7647-14-5		0.00509	
		Other Ingredient(s)					
			Ammonium chloride	12125-02-9		0.00509	
		Other Ingredient(s)					
			Alcohols, C12-16, ethoxylated	68551-12-2		0.00509	
		Other Ingredient(s)					
			Sorbitan, mono-9-octadecenoate, (Z)	1338-43-8		0.00102	
		Other Ingredient(s)					
			Sorbitan monooleate polyoxyethylene derivative	9005-65-6		0.00102	
		Other Ingredient(s)					

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			Oxyalkylated phenolic resin	Confidential		0.00048	
		Other Ingredient(s)					
			Formaldehyde	50-00-0		0.00026	
		Other Ingredient(s)					
			Reaction product of acetophenone, formaldehyde, thiourea and oleic acid in dimethyl formamide	68527-49-1		0.00024	
		Other Ingredient(s)					
			Alcohols, C14-C15, ethoxylated	68951-67-7		0.00024	
		Other Ingredient(s)					
			Fatty acids, tall oil	Confidential		0.00024	
		Other Ingredient(s)					
			Oxyalkylated phenolic resin	Confidential		0.00016	
		Other Ingredient(s)					
			Bentonite, benzyl(hydrogenated tallow alkyl) dimethylammonium stearate complex	121888-68-4		0.00011	
		Other Ingredient(s)					
			Quaternary ammonium compounds, bis(hydrogenated tallow alkyl) dimethyl,salts with bentonite	68953-58-2		0.00004	
		Other Ingredient(s)					
			Olefins	Confidential		0.00004	
		Other Ingredient(s)					
			Olefins	Confidential		0.00004	
		Other Ingredient(s)					
			Surfactant mixture	Confidential		0.00002	
		Other Ingredient(s)					
			Silica gel	112926-00-8		0.00002	
		Other Ingredient(s)					
			Surfactant mixture	Confidential		0.00002	
		Other Ingredient(s)					
			Fatty alcohol polyglycol ether surfactant	9043-30-5		0.00001	
		Other Ingredient(s)					
			Olefins	Confidential		0.00001	
		Other Ingredient(s)					
			Olefins	Confidential		0.00001	
		Other Ingredient(s)					
			Crystalline silica, quartz	14808-60-7		0.00000	
		Other Ingredient(s)					
			Sodium sulfate	7757-82-6		0.00000	

* 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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PATHFINDER

noble energy

Noble Energy SHL13BHS Gyro+MWD 0ft to 13685ft MD Survey Report

(Def Survey)

Report Date:	November 11, 2013 - 08:09 AM	Survey / DLS Computation:	Minimum Curvature / Lubinski
Client:	Noble Energy	Vertical Section Azimuth:	319.627 ° (Grid North)
Field:	WV Marshall County (NAD 27)	Vertical Section Origin:	0.000 ft, 0.000 ft
Structure / Slot:	Noble Energy SHL13 Pad / SHL13BHS	TVD Reference Datum:	KB
Well:	SHL13BHS	TVD Reference Elevation:	1300.450 ft above MSL
Borehole:	Original Borehole	Seabed / Ground Elevation:	1281.910 ft above MSL
UWI / API#:	Unknown / Unknown	Magnetic Declination:	-8.431 °
Survey Name:	Noble Energy SHL13BHS Gyro+MWD 0ft to 13685ft MD	Total Gravity Field Strength:	999.3498mgn (9.80665 Based)
Survey Date:	October 24, 2013	Gravity Model:	GARM
Tort / AHD / DDI / ERD Ratio:	350.569 ° / 7542.564 ft / 6.728 / 1.113	Total Magnetic Field Strength:	53175.298 nT
Coordinate Reference System:	NAD27 West Virginia State Plane, Northern Zone, US Feet	Magnetic Dip Angle:	67.582 °
Location Lat / Long:	N 40° 0' 14.70105", W 80° 32' 8.73346"	Declination Date:	October 24, 2013
Location Grid N/E Y/X:	N 549502.976 ftUS, E 1709845.537 ftUS	Magnetic Declination Model:	HDGM 2013
CRS Grid Convergence Angle:	-0.6606 °	North Reference:	Grid North
Grid Scale Factor:	0.99996247	Grid Convergence Used:	-0.6606 °
Version / Patch:	2.7.998.0	Total Corr Mag North->Grid North:	-7.7701 °
		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	-1300.45	0.00	0.00	0.00	N/A	N/A	N/A	549502.98	1709845.54	N 40 0 14.70 W	80 32 8.73	0.00
	118.50	0.93	123.63	118.49	-1181.96	-0.92	-0.53	0.80	0.78	0.78	0.00	549502.44	1709846.34	N 40 0 14.70 W	80 32 8.72	0.00
	218.50	0.42	117.10	218.49	-1081.96	-2.04	-1.15	1.80	0.51	-0.51	-6.53	549501.83	1709847.34	N 40 0 14.69 W	80 32 8.71	0.49
	318.50	0.46	101.79	318.48	-981.97	-2.70	-1.40	2.52	0.12	0.04	-15.31	549501.58	1709848.06	N 40 0 14.69 W	80 32 8.70	0.66
	418.50	0.66	96.22	418.48	-881.97	-3.43	-1.54	3.49	0.21	0.20	-5.57	549501.43	1709849.02	N 40 0 14.69 W	80 32 8.69	0.84
	518.50	0.60	100.82	518.47	-781.98	-4.26	-1.70	4.57	0.08	-0.06	4.60	549501.27	1709850.11	N 40 0 14.68 W	80 32 8.67	0.97
	618.50	0.10	90.92	618.47	-681.98	-4.73	-1.80	5.18	0.50	-0.50	-9.90	549501.17	1709850.71	N 40 0 14.68 W	80 32 8.67	1.12
	718.50	0.38	60.95	718.47	-581.98	-4.85	-1.64	5.55	0.30	0.28	-29.97	549501.33	1709851.09	N 40 0 14.69 W	80 32 8.66	1.20
	818.50	0.29	57.88	818.47	-481.98	-4.95	-1.35	6.06	0.09	-0.09	-3.07	549501.63	1709851.59	N 40 0 14.69 W	80 32 8.66	1.26
	918.50	0.38	89.00	918.47	-381.98	-5.20	-1.21	6.60	0.20	0.09	31.12	549501.77	1709852.14	N 40 0 14.69 W	80 32 8.65	1.32
	1018.50	0.11	100.58	1018.47	-281.98	-5.48	-1.22	7.03	0.27	-0.27	11.58	549501.76	1709852.57	N 40 0 14.69 W	80 32 8.64	1.39
	1118.50	0.39	92.69	1118.47	-181.98	-5.79	-1.25	7.46	0.28	0.28	-7.89	549501.72	1709853.00	N 40 0 14.69 W	80 32 8.64	1.45
	1218.50	0.51	47.54	1218.46	-81.99	-6.00	-0.91	8.20	0.43	0.22	-45.15	549502.07	1709853.73	N 40 0 14.69 W	80 32 8.63	1.54
	1318.50	0.40	67.00	1318.46	18.01	-6.09	-0.41	8.91	0.27	-0.21	19.46	549502.56	1709854.45	N 40 0 14.70 W	80 32 8.62	1.61
	1418.50	0.25	85.97	1418.46	118.01	-6.32	-0.26	9.45	0.18	-0.15	18.97	549502.71	1709854.99	N 40 0 14.70 W	80 32 8.61	1.65
	1518.50	0.20	70.00	1518.46	218.01	-6.51	-0.19	9.83	0.08	-0.05	-15.97	549502.79	1709855.37	N 40 0 14.70 W	80 32 8.61	1.68
	1618.50	0.49	96.31	1618.45	318.00	-6.88	-0.17	10.42	0.32	0.29	26.31	549502.80	1709855.96	N 40 0 14.70 W	80 32 8.60	1.73
	1718.50	0.36	154.26	1718.45	418.00	-7.50	-0.50	10.98	0.43	-0.13	57.95	549502.47	1709856.52	N 40 0 14.70 W	80 32 8.59	1.79
	1818.50	0.38	210.65	1818.45	518.00	-7.91	-1.07	10.95	0.35	0.02	56.39	549501.90	1709856.49	N 40 0 14.69 W	80 32 8.59	1.84
	1918.50	0.09	200.31	1918.45	618.00	-8.06	-1.43	10.75	0.29	-0.29	-10.34	549501.54	1709856.29	N 40 0 14.69 W	80 32 8.60	1.88
	2018.50	0.18	198.62	2018.45	718.00	-8.17	-1.65	10.67	0.09	0.09	-1.69	549501.32	1709856.21	N 40 0 14.69 W	80 32 8.60	1.89
	2118.50	0.36	188.09	2118.45	818.00	-8.46	-2.11	10.58	0.19	0.18	-10.53	549500.86	1709856.12	N 40 0 14.68 W	80 32 8.60	1.92
	2218.50	0.45	191.92	2218.44	917.99	-8.91	-2.81	10.46	0.09	0.09	3.83	549500.17	1709855.99	N 40 0 14.67 W	80 32 8.60	1.95
	2318.50	0.52	247.39	2318.44	1017.99	-9.01	-3.37	9.96	0.46	0.07	55.47	549499.61	1709855.49	N 40 0 14.67 W	80 32 8.61	2.01
	2418.50	0.35	256.21	2418.44	1117.99	-8.74	-3.61	9.24	0.18	-0.17	8.82	549499.38	1709854.78	N 40 0 14.67 W	80 32 8.61	2.04
	2518.50	0.38	266.84	2518.44	1217.99	-8.40	-3.71	8.61	0.07	0.03	10.63	549499.27	1709854.15	N 40 0 14.67 W	80 32 8.62	2.06
	2618.50	0.17	250.37	2618.44	1317.99	-8.15	-3.77	8.14	0.22	-0.21	-16.47	549499.20	1709853.68	N 40 0 14.66 W	80 32 8.63	2.09
	2718.50	0.29	241.58	2718.43	1417.98	-8.04	-3.94	7.78	0.12	0.12	-8.79	549499.03	1709853.32	N 40 0 14.66 W	80 32 8.63	2.10
	2818.50	0.50	223.81	2818.43	1517.98	-8.04	-4.38	7.25	0.24	0.21	-17.77	549498.60	1709852.79	N 40 0 14.66 W	80 32 8.64	2.13
	2918.50	0.59	246.67	2918.43	1617.98	-7.93	-4.90	6.48	0.23	0.09	22.86	549498.08	1709852.02	N 40 0 14.65 W	80 32 8.65	2.17
	3018.50	0.61	248.44	3018.42	1717.97	-7.61	-5.30	5.51	0.03	0.02	1.77	549497.68	1709851.05	N 40 0 14.65 W	80 32 8.66	2.19
	3118.50	0.56	260.38	3118.42	1817.97	-7.19	-5.58	4.54	0.12	-0.05	10.94	549497.39	1709850.07	N 40 0 14.65 W	80 32 8.67	2.22
	3173.50	0.56	273.69	3173.41	1872.96	-6.87	-5.62	4.00	0.25	0.00	26.02	549497.36	1709849.54	N 40 0 14.65 W	80 32 8.68	2.24
	3258.00	0.31	221.91	3257.91	1957.46	-6.62	-5.76	3.44	0.52	-0.30	-61.28	549497.22	1709848.98	N 40 0 14.64 W	80 32 8.69	2.28
	3303.00	0.31	214.95	3302.91	2002.46	-6.66	-5.95	3.29	0.08	0.00	-15.47	549497.03	1709848.82	N 40 0 14.64 W	80 32 8.69	2.28
	3392.00	4.02	147.35	3391.84	2091.39	-9.82	-8.78	4.83	4.40	4.17	-75.96	549494.20	1709850.37	N 40 0 14.61 W	80 32 8.67	2.51
	3482.00	5.61	143.65	3481.52	2181.07	-17.33	-14.97	9.14	1.80	1.77	-4.11	549488.00	1709854.68	N 40 0 14.55 W	80 32 8.61	2.67
	3571.00	6.50	147.04	3570.02	2269.57	-26.67	-22.71	14.46	1.08	1.00	3.81	549480.27	1709860.00	N 40 0 14.48 W	80 32 8.54	2.81
	3661.00	6.41	158.32	3659.45	2359.00	-36.48	-31.65	19.09	1.41	-0.10	12.53	549471.33	1709864.63	N 40 0 14.39 W	80 32 8.48	2.93
	3751.00	5.61	163.52	3748.96	2448.51	-45.26	-40.54	22.19	1.07	-0.89	5.78	549462.44	1709867.73	N 40 0 14.30 W	80 32 8.44	3.03
	3840.00	2.92	162.33	3837.70	2537.25	-51.33	-46.87	24.12	3.02	-3.02	-1.34	549456.11	1709869.65	N 40 0 14.24 W	80 32 8.42	3.14
	3930.00	0.49	249.85	3927.66	2627.21	-53.31	-49.19	24.45	3.27	-2.70	97.24	549453.79	1709869.99	N 40 0 14.22 W	80 32 8.41	3.21
	4019.00	0.71	282.90	4016.66	2716.21	-52.74	-49.19	23.56	0.45	0.25	37.13	549453.78	1709869.09	N 40 0 14.22 W	80 32 8.42	3.23
	4109.00	1.09	270.79	4106.65	2806.20	-51.73	-49.06	22.16	0.47	0.42	-13.46	549453.92	1709867.69	N 40 0 14.22 W	80 32 8.44	3.24
	4199.00	0.88	256.70	4196.63	2896.18	-50.85	-49.20	20.63	0.35	-0.23	-15.66	549453.77	1709866.16	N 40 0 14.22 W	80 32 8.46	3.26
	4288.00	1.29	305.87	4285.62	2985.17	-49.56	-48.77	19.15	1.10	0.46	55.25	549454.20	1709864.69	N 40 0 14.22 W	80 32 8.48	3.28
	4378.00	1.53	319.88	4375.59	3075.14	-47.38	-47.26	17.56	0.46	0.27	15.57	549455.72	1709863.09	N 40 0 14.24 W	80 32 8.50	3.30
	4467.00	1.68	321.22	4464.56	3164.11	-44.89	-45.34	15.97	0.17	0.17	1.51	549457.64	1709861.51	N 40 0 14.25 W	80 32 8.52	3.32
	4557.00	1.59	349.13	4554.52	3254.07	-42.48	-43.08	14.91	0.88	-0.10	31.01	549459.90	1709860.45	N 40 0 14.28 W	80 32 8.54	3.34
	4646.00	1.53	339.61	4643.49	3343.04	-40.29	-40.76	14.26	0.30	-0.07	-10.70	549462.22	1709859.80	N 40 0 14.30 W	80 32 8.54	3.36
	4736.00	0.39	17.45	4733.47	3433.02	-39.00	-39.34	13.94	1.38	-1.27	42.04	549463.64	1709859.47	N 40 0 14.31 W	80 32 8.55	3.39
	4826.00	0.17	253.02	4823.47	3523.02	-38.78	-39.08	13.90	0.56	-0.24	-138.26	549463.89	1709859.44	N 40 0 14.32 W	80 32 8.55	3.40
	4915.00	0.18	324.89	4912.47	3612.02	-38.59	-39.01	13.70	0.23	0.01	80.75	549463.97	1709859.23	N 40 0 14.32 W	80 32 8.55	3.40
	5005.00	0.43	232.89	5002.47	3702.02	-38.43	-39.10	13.34	0.52	0.28	-102.22	549463.88	1709858.88	N 40 0 14.32 W	80 32 8.56	3.41
	5094.00	0.57	232.48	5091.47	3791.02	-38.39	-39.57	12.73	0.16	0.16	-0.46	549463.41	1709858.26	N 40 0 14.31 W	80 32 8.56	3.42
	5184.00	0.62	267.73	5181.47	3881.02	-38.07	-39.86	11.89	0.40	0.05	39.17	549463.12	1709857.42	N 40 0 14.31 W	80 32 8.57	3.43
	5273.00	0.74	206.30	5270.46	3970.01	-38.00	-40.39	11.15	0.79	0.13	-69.02	549462.58	1709856.69	N 40 0 14.30 W	80 32 8.58	3.44
	5363.00	1.23	157.19	5360.45	4060.00	-39.15	-41.80	11.27	1.04	0.54	-54.57	549461.17	1709856.80	N 40 0 14.29 W	80 32 8.58	3.46
	5452.00	1.08	138.81	5449.43	4148.98	-40.90	-43.32	12.19	0.45	-0.17	-20.65	549459.66	1709857.73	N 40 0 14.27 W	80 32 8.57	3.48
	5542.00	0.92	145.39	5539.42	4238.97	-42.46	-44.55	13.16	0.22	-0.18	7.31	549458.43	1709858.69	N 40 0 14.26 W	80 32 8.56	3.49
	5586.00	1.56	188.20	5583.41	4282.96	-43.21	-45.43	13.27	2.46	1.45	97.30	549457.54	1709858.81	N 40 0 14.25 W	80 32 8.56	3.50
	5631.00	3.48	198.00	5628.36	4327.91	-44.33	-47.34	12.76	4.36	4.27	21.78	549455.64	1709858.30	N 40 0 14.23 W	80 32 8.56	3.54
	5676.00	7.28	206.21	5673.16	4372.71	-46.18	-51.20	11.08	8.59	8.44	18.24	549451.78	1709856.62	N 40 0 14.20 W	80 32 8.58	3.60
	5721.00	9.93	206.81	5717.64	4417.19	-48.82	-57.22	8.07	5.89	5.89	1.33	549445.76	1709853.61	N 40 0 14.14 W	80 32 8.62	3.66
	5765.00	12.78	206.77	5760.78	4460.33	-52.18	-64.95	4.17	6.48	6.48	-0.09	549438.03	1709849.71	N 40 0 14.06 W	80 32 8.67	3.72
	5810.00	16.14	207.04	5804.35	4503.90	-56.52	-74.97	-0.92	7.47	7.47	0.60	549428.01	1709844.62	N 40 0 13.96 W	80 32 8.73	3.79
	5855.00	18.74	204.65	5847.28	4546.83	-61.98	-87.11	-6.78	5.99	5.78	-5.31	549415.87	1709838.76	N 40 0 13.84 W	80 32 8.81	3.86
	5900.00	20.41	202.40	5889.67	4589.22	-68.62	-100.94	-12.78	4.07	3.71	-5.00	549402.04	1709832.75	N 40 0 13.70 W	80 32 8.88	3.92
	5944.00	23.05	201.60	5930.54	4630.09	-76.18	-115.04	-18.88	6.04	6.00	-1.82	549386.94	1709826.66	N 40 0 13.55 W	80 32 8.96	3.98
	5989.00	26.17	203.62	5971.45	4671.00	-84.67	-133.33	-26.10	7.18	6.93	4.49	549369.65	1709819.44	N 40 0 13.38 W	80 32 9.05	4.05
	6034.00	28.48	208.08	6011.43	4710.98	-92.96	-151.89	-35.13	6.86	5.13	9.91	549351.09	1709810.41	N 40 0 13.20 W	80 32 9.16	4.12
	6079.00	30.16	208.12	6050.67	4750.22	-101.05	-171.33	-45.51	3.73	3.73	0.09	549331.65	1709800.03	N 40 0 13.00 W	80 32 9.29	4.17
	6124.00	32.66	211.05	6089.07	4788.62	-109.06	-191.71	-57.10	6.51	5.56	6.51	549311.28	1709788.44	N 40 0 12.80 W	80 32 9.44	4.23
	6168.00	35.96	215.17	6125.41	4824.96	-116.07	-212.45	-70.67	9.17	7.50	9.36	549290.54	1709774.87	N 40 0 12.59 W	80 32 9.61	4.30
	6258.00	38.95	224.61	6197.88	4897.41	-125.04	-253.34	-104.92	6.32	1.10	10.49	549249.65	1709740.62	N 40 0 12.19 W	80 32 10.04	4.41
	6303.00	36.68	234.51	6233.92	4933.47	-125.08	-270.78	-125.37	13.19	-0.64	22.00	549232.20	1709720.17	N 40 0 12.01 W	80 32 10.30	4.48
	6347.00	37.44	243.35	6269.07	4968.62	-120.79	-284.42	-148.04	12.23	1.77	20.09	549218.57	1709697.51	N 40 0 11.87 W	80 32 10.59	4.54
	6392.00	38.33	251.59	6304.60	5004.15	-112.32	-294.97	-173.52	11.41	1.98	18.31	549208.02	1709672.02	N 40 0 11.77 W	80 32 10.92	4.59
	6437.00	38.34	257.38	6339.91	5039.46	-100.60	-302.43	-200.39	7.98	0.02	12.87	549200.58	1709645.16	N 40 0 11.69 W	80 32 11.26	4.64
	6482.00	38.47	262.87	6375.19	5074.74	-86.42	-307.21	-227.91	7.58	0.29	12.20	549195.77	1709617.64	N 40 0 11.64 W	80 32 11.62	4.68
	6527.00	39.22	269.10	6410.25	5109.80	-69.70	-309.18	-256.03	8.84	1.67	13.84	549193.81	1709589.52	N 40 0 11.62 W	80 32 11.98	4.72
	6572.00	40.67	273.88	6444.78	5144.31	-50.41	-308.41	-284.89	7.54	3.22	10.62	549194.58	1709560.65	N 40 0 11.62 W	80 32 12.35	4.76
	6616.00	42.52	278.37	6477.67	5177.22	-29.23	-305.27	-313.92	7.97	4.20	10.20	549197.72	1709531.63	N 40 0 11.65 W	80 32 12.72	4.80
	6661.00	44.65	281.39	6510.27	5209.82	-5.37	-299.93	-344.47	6.62	4.73	6.71	549203.05	1709501.08	N 40 0 11.70 W	80 32 13.12	4.83
	6706.00	47.61	283.76	6541.45	5241.00	20.53	-292.86	-376.12	7.59	6.58	5.27	549210.13	1709469.43	N 40 0 11.76 W	80 32 13.52	4.87
	6751.00	49.75	288.93	6571.17	5270.72	48.77	-283.33	-408.52	9.85	4.76	11.49	549219.66	1709437.03	N 40 0 11.85 W	80 32 13.94	4.91
	6796.00	53.35	293.39	6599.16	5298.71	79.75	-270.58	-441.36	11.14	8.00	9.91	549232.40	1709404.20	N 40 0 11.98 W	80 32 14.36	4.95
	6840.00	56.28	295.80	6624.51	5324.06	112.33	-255.61	-474.04	8.02	6.66	5.48	549247.38	1709371.51	N 40 0 12.12 W	80 32 14.79	4.99
	6885.00	58.79	298.35	6648.67	5348.22	147.39	-238.32	-507.84	7.35	5.58	5.67	549264.67	1709337.72	N 40 0 12.29 W	80 32 15.22	5.02
	6930.00	61.38	302.00	6671.11	5370.66	184.17	-218.71	-541.53	9.08	5.76	8.11	549284.28	1709304.02	N 40 0 12.48 W	80 32 15.66	5.06
	6975.00	64.38	304.71	6691.63	5391.18	222.61	-196.68	-574.97	8.55	6.67	6.02	549306.30	1709270.59	N 40 0 12.69 W	80 32 16.09	5.09
	7019.00	67.38	307.47	6709.61	5409.16	261.64	-173.02	-607.41	8.90	6.82	6.27	549329.96	1709238.15	N 40 0 12.92 W	80 32 16.51	5.13

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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
	7064.00	70.64	310.65	6725.73	5425.28	302.94	-146.54	-640.02	9.80	7.24	7.07	549356.44	1709205.54	N 40 0 13.18 W	80 32 16.94	5.16
	7109.00	73.27	313.28	6739.67	5439.22	345.33	-117.93	-671.82	8.06	5.84	5.84	549385.05	1709173.74	N 40 0 13.46 W	80 32 17.35	5.19
	7154.00	76.71	315.95	6751.33	5450.88	388.62	-87.41	-702.75	9.55	7.64	5.93	549415.57	1709142.82	N 40 0 13.76 W	80 32 17.75	5.23
	7195.00	80.18	318.87	6759.55	5459.10	428.75	-57.84	-729.92	10.93	8.41	7.12	549445.14	1709115.65	N 40 0 14.05 W	80 32 18.10	5.26
	7240.00	83.21	320.53	6766.05	5465.60	473.27	-23.88	-758.71	7.70	6.78	3.69	549479.09	1709086.86	N 40 0 14.38 W	80 32 18.48	5.29
	7329.00	89.52	324.31	6771.69	5471.24	561.92	46.46	-812.84	8.26	7.09	4.25	549549.44	1709032.73	N 40 0 15.07 W	80 32 19.18	5.34
	7419.00	89.07	329.22	6772.60	5472.35	651.19	121.71	-862.14	5.48	-0.50	5.46	549624.69	1708983.43	N 40 0 15.81 W	80 32 19.83	5.39
	7508.00	88.87	327.01	6774.40	5473.95	739.20	197.27	-909.14	2.49	-0.22	-2.48	549700.24	1708936.43	N 40 0 16.55 W	80 32 20.44	5.43
	7598.00	89.03	324.35	6775.53	5475.09	828.68	271.59	-959.88	3.09	0.91	-2.96	549774.55	1708885.70	N 40 0 17.28 W	80 32 21.11	5.47
	7687.00	90.79	325.03	6775.18	5474.71	917.33	344.21	-1011.32	1.45	1.24	0.76	549847.17	1708834.26	N 40 0 17.99 W	80 32 21.78	5.51
	7777.00	90.69	325.13	6774.00	5473.55	1006.91	418.00	-1062.83	0.16	-0.11	0.11	549920.96	1708782.75	N 40 0 18.71 W	80 32 22.45	5.54
	7866.00	90.72	324.34	6772.90	5472.45	1095.55	490.66	-1114.21	0.89	0.03	-0.89	549993.62	1708731.37	N 40 0 19.42 W	80 32 23.12	5.57
	7956.00	90.72	322.72	6771.77	5471.32	1185.33	563.03	-1167.70	1.80	0.00	-1.80	550065.96	1708677.88	N 40 0 20.13 W	80 32 23.82	5.60
	8045.00	90.24	320.03	6771.03	5470.58	1274.28	632.55	-1223.25	3.07	-0.54	-3.02	550135.50	1708622.33	N 40 0 20.81 W	80 32 24.55	5.63
	8135.00	90.72	318.71	6770.27	5469.82	1364.27	700.85	-1281.85	1.56	0.53	-1.47	550203.80	1708563.73	N 40 0 21.48 W	80 32 25.31	5.66
	8224.00	90.41	314.48	6769.39	5468.94	1453.12	765.49	-1342.99	4.77	-0.35	-4.75	550268.44	1708502.60	N 40 0 22.11 W	80 32 26.10	5.69
	8314.00	90.24	316.09	6768.88	5468.43	1542.86	829.44	-1406.31	1.80	-0.19	1.79	550332.39	1708439.28	N 40 0 22.74 W	80 32 26.93	5.72
	8403.00	90.56	322.33	6768.25	5467.80	1631.81	896.79	-1464.43	7.02	0.38	7.01	550399.73	1708381.17	N 40 0 23.40 W	80 32 27.68	5.75
	8493.00	91.10	326.91	6766.93	5466.48	1721.44	970.14	-1516.52	5.12	0.58	5.09	550473.08	1708329.08	N 40 0 24.11 W	80 32 28.38	5.78
	8583.00	90.38	321.87	6765.76	5465.31	1811.09	1043.28	-1568.90	5.66	-0.80	-5.60	550546.22	1708276.70	N 40 0 24.83 W	80 32 29.05	5.82
	8672.00	90.00	318.32	6765.47	5465.02	1900.07	1111.55	-1625.98	4.01	-0.43	-3.99	550614.48	1708219.62	N 40 0 25.50 W	80 32 29.79	5.84
	8762.00	90.96	324.02	6764.71	5464.26	1990.00	1181.62	-1682.39	6.42	1.07	6.33	550684.55	1708163.21	N 40 0 26.19 W	80 32 30.53	5.87
	8851.00	91.89	326.80	6762.50	5462.05	2078.51	1254.86	-1732.89	3.29	1.04	3.12	550757.79	1708112.71	N 40 0 26.90 W	80 32 31.19	5.90
	8941.00	90.03	330.90	6760.99	5460.54	2167.31	1331.85	-1779.43	5.00	-2.07	4.56	550834.78	1708066.18	N 40 0 27.66 W	80 32 31.80	5.93
	9030.00	89.66	335.66	6761.08	5460.63	2253.77	1411.33	-1819.44	5.35	-0.19	5.35	550914.25	1708026.17	N 40 0 28.44 W	80 32 32.32	5.95
	9120.00	89.76	336.58	6761.38	5460.93	2339.60	1494.24	-1854.42	3.25	-0.11	3.24	550997.15	1707991.19	N 40 0 29.25 W	80 32 32.78	5.98
	9210.00	89.55	336.88	6761.92	5461.47	2425.14	1577.52	-1888.53	1.90	-0.23	-1.89	551080.43	1707957.08	N 40 0 30.07 W	80 32 33.23	6.00
	9299.00	90.34	333.62	6762.00	5461.55	2510.84	1658.33	-1925.78	3.77	0.89	-3.66	551161.24	1707919.83	N 40 0 30.87 W	80 32 33.73	6.02
	9388.00	90.27	332.05	6761.53	5461.08	2597.48	1737.51	-1966.42	1.77	-0.08	-1.76	551240.42	1707879.20	N 40 0 31.65 W	80 32 34.26	6.04
	9478.00	90.27	331.37	6761.10	5460.65	2685.48	1816.76	-2009.07	0.76	0.00	-0.76	551319.66	1707836.55	N 40 0 32.42 W	80 32 34.82	6.06
	9567.00	90.38	330.09	6760.60	5460.15	2772.81	1894.39	-2052.58	1.44	0.12	-1.44	551397.30	1707793.04	N 40 0 33.19 W	80 32 35.39	6.07
	9657.00	90.07	324.18	6760.25	5459.80	2862.00	1969.96	-2101.40	6.58	-0.34	-6.57	551472.85	1707744.22	N 40 0 33.93 W	80 32 36.03	6.10
	9746.00	89.83	320.42	6760.32	5459.87	2950.89	2040.36	-2155.62	4.23	-0.27	-4.22	551543.26	1707689.81	N 40 0 34.62 W	80 32 36.74	6.12
	9836.00	90.55	323.83	6760.03	5459.58	3040.79	2111.39	-2211.06	3.87	0.80	3.79	551614.28	1707634.56	N 40 0 35.31 W	80 32 37.46	6.14
	9925.00	90.52	326.70	6759.19	5458.74	3129.35	2184.52	-2261.76	3.22	-0.03	3.22	551687.41	1707583.86	N 40 0 36.03 W	80 32 38.12	6.16
	10015.00	90.58	325.20	6758.33	5457.88	3218.79	2259.09	-2312.15	1.67	0.07	-1.67	551761.97	1707533.48	N 40 0 36.76 W	80 32 38.78	6.18
	10104.00	90.48	324.95	6757.51	5457.06	3307.39	2332.05	-2363.10	0.30	-0.11	-0.28	551834.94	1707482.53	N 40 0 37.48 W	80 32 39.45	6.19
	10194.00	90.55	326.18	6756.70	5456.25	3396.90	2406.28	-2413.99	1.37	0.08	1.37	551909.16	1707431.64	N 40 0 38.20 W	80 32 40.11	6.21
	10284.00	90.65	325.79	6755.76	5455.31	3486.34	2480.87	-2464.34	0.45	0.11	-0.43	551983.75	1707381.30	N 40 0 38.93 W	80 32 40.77	6.22
	10373.00	89.83	319.04	6755.38	5454.93	3575.18	2551.36	-2518.59	7.64	-0.92	-7.58	552054.23	1707327.05	N 40 0 39.62 W	80 32 41.48	6.24
	10463.00	89.90	315.80	6755.59	5455.14	3665.10	2617.62	-2579.48	3.60	0.08	-3.60	552120.49	1707266.16	N 40 0 40.27 W	80 32 42.27	6.26
	10552.00	89.97	313.12	6755.70	5455.25	3753.73	2679.95	-2642.99	3.01	0.08	-3.01	552182.82	1707202.65	N 40 0 40.88 W	80 32 43.09	6.28
	10642.00	90.10	313.72	6755.64	5455.19	3843.20	2741.81	-2708.36	0.68	0.14	0.67	552244.68	1707137.28	N 40 0 41.49 W	80 32 43.94	6.29
	10732.00	90.52	318.61	6755.15	5454.70	3933.01	2806.71	-2770.68	5.45	0.47	5.43	552309.58	1707074.97	N 40 0 42.12 W	80 32 44.75	6.31
	10821.00	90.72	324.11	6754.19	5453.74	4021.93	2876.20	-2826.23	6.18	0.22	6.18	552379.06	1707019.42	N 40 0 42.80 W	80 32 45.48	6.33
	10911.00	90.58	323.71	6753.17	5452.72	4111.67	2948.92	-2879.24	0.47	-0.16	-0.44	552451.78	1706966.41	N 40 0 43.51 W	80 32 46.17	6.35
	11000.00	90.00	323.82	6752.72	5452.27	4200.44	3020.71	-2931.84	0.66	-0.65	0.12	552523.56	1706913.81	N 40 0 44.22 W	80 32 46.86	6.36
	11090.00	90.07	323.62	6752.60	5452.21	4290.21	3093.26	-2985.10	0.24	0.08	-0.22	552596.11	1706860.56	N 40 0 44.93 W	80 32 47.55	6.37
	11180.00	90.31	327.28	6752.36	5451.91	4379.73	3167.37	-3036.13	4.08	0.27	4.07	552670.22	1706809.52	N 40 0 45.65 W	80 32 48.22	6.39
	11269.00	90.41	334.64	6751.80	5451.35	4466.90	3245.20	-3079.17	8.49	0.11	8.49	552748.05	1706766.49	N 40 0 46.42 W	80 32 48.78	6.41
	11359.00	90.52	341.62	6751.07	5450.62	4552.14	3328.73	-3112.53	7.53	0.12	7.53	552831.58	1706733.13	N 40 0 47.24 W	80 32 49.23	6.43
	11448.00	90.55	338.39	6750.24	5449.79	4635.56	3412.35	-3142.95	3.63	0.03	-3.63	552915.19	1706702.71	N 40 0 48.06 W	80 32 49.63	6.44
	11538.00	89.62	333.14	6750.11	5449.66	4721.98	3494.39	-3179.88	5.92	-1.03	-5.83	552997.23	1706665.78	N 40 0 48.87 W	80 32 50.12	6.46
	11627.00	90.69	331.20	6749.87	5449.42	4806.85	3573.09	-3221.43	2.49	1.20	-2.18	553075.93	1706624.24	N 40 0 49.64 W	80 32 50.66	6.48
	11717.00	90.45	327.77	6748.97	5448.52	4897.51	3650.61	-3267.12	3.82	-0.27	-3.81	553153.44	1706578.55	N 40 0 50.40 W	80 32 51.26	6.49
	11806.00	89.14	324.25	6749.29	5448.84	4985.94	3724.39	-3316.86	4.22	-1.47	-3.96	553227.22	1706528.80	N 40 0 51.12 W	80 32 51.91	6.51
	11896.00	89.73	320.68	6750.18	5449.73	5075.81	3795.74	-3371.69	4.02	0.66	-3.97	553298.57	1706473.98	N 40 0 51.82 W	80 32 52.63	6.52
	11985.00	89.90	317.43	6750.47	5450.02	5164.79	3862.96	-3430.00	3.66	0.19	-3.65	553365.78	1706415.67	N 40 0 52.48 W	80 32 53.39	6.54
	12075.00	89.21	314.76	6751.16	5450.71	5254.61	3927.79	-3492.41	3.06	-0.77	-2.97	553430.61	1706353.27	N 40 0 53.11 W	80 32 54.20	6.55
	12165.00	90.82	314.41	6751.14	5450.69	5344.26	3990.97	-3556.50	1.83	1.79	-0.39	553493.79	1706289.18	N 40 0 53.73 W	80 32 55.03	6.56
	12261.00	90.52	314.99	6750.02	5449.57	5439.90	4058.49	-3624.73	0.68	-0.31	0.60	553561.31	1706220.95	N 40 0 54.39 W	80 32 55.92	6.57
	12350.00	91.82	314.98	6748.20	5447.75	5528.58	4121.39	-3687.67	1.46	1.46	-0.01	553624.20	1706158.01	N 40 0 55.00 W	80 32 56.74	6.58
	12439.00	93.96	316.87	6743.71	5443.26	5617.26	4185.24	-3749.49	3.21	2.40	2.12	553688.05	1706096.19	N 40 0 55.63 W	80 32 57.54	6.60
	12529.00	94.17	318.11	6737.33	5436.88	5706.98	4251.42	-3810.15	1.39	0.23	1.38	553754.23	1706035.53	N 40 0 56.28 W	80 32 58.33	6.61
	12618.00	93.38	319.54	6731.47	5431.02	5795.78	4318.26	-3868.62	1.83	-0.89	1.61	553821.07	1705977.07	N 40 0 56.93 W	80 32 59.09	6.62
	12708.00	92.76	320.45	6726.65	5426.20	5885.65	4387.10	-3926.39	1.22	-0.69	1.01	553889.90	1705919.30	N 40 0 57.60 W	80 32 59.84	6.63
	12797.00	93.16	320.93	6722.06	5421.61	5974.51	4456.87	-3982.70	0.70	0.45	0.54	553958.67	1705863.00	N 40 0 58.28 W	80 33 0.58	6.64
	12886.00	93.34	321.18	6717.01	5416.56	6063.34	4524.98	-4038.55	0.35	0.20	0.28	554027.78	1705807.15	N 40 0 58.95 W	80 33 1.31	6.65
	12976.00	92.96	321.25	6712.07	5411.62	6153.17	4595.03	-4094.84	0.43	-0.42	0.08	554097.82	1705750.86	N 40 0 59.64 W	80 33 2.04	6.66
	13065.00	92.79	321.58	6707.60	5407.15	6242.02	4664.50	-4150.29	0.40	-0.19	0.35	554167.29	1705695.41	N 40 1 0.32 W	80 33 2.78	6.67
	13155.00	92.20	321.97	6703.58	5403.23	6331.87	4735.13	-4205.94	0.80	-0.66	0.46	554237.91	1705639.77	N 40 1 1.01 W	80 33 3.49	6.68
	13244.00	91.82	321.94	6700.56	5400.11	6420.74	4805.17	-4260.75	0.43	-0.43	-0.03	554307.96	1705584.95	N 40 1 1.70 W	80 33 4.20	6.68
	13333.00	91.45	321.98	6698.02	5397.57	6509.63	4875.24	-4315.57	0.42	-0.42	0.04	554378.02	1705530.13	N 40 1 2.38 W	80 33 4.92	6.69
	13423.00	91.03	322.17	6696.08	5395.63	6599.53	4946.22	-4370.88	0.51	-0.47	0.21	554449.00	1705474.83	N 40 1 3.08 W	80 33 5.64	6.70
	13512.00	90.51	322.64	6694.88	5394.43	6688.41	5016.73	-4425.17	0.79	-0.58	0.53	554519.50	1705420.54	N 40 1 3.77 W	80 33 6.35	6.71
	13601.00	89.93	323.12	6694.54	5394.09	6777.27	5087.69	-4478.88	0.85	-0.65	0.54	554590.47	1705366.84	N 40 1 4.46 W	80 33 7.05	6.72
Final Survey 06-Nov-13	13650.00	89.62	322.96	6694.73	5394.28	6826.16	5126.85	-4508.34	0.71	-0.63	-0.33	554629.62	1705337.38	N 40 1 4.85 W	80 33 7.43	6.72
Projection to Bit	13685.00	89.62	322.96	6694.96	5394.51	6861.12	5154.78	-4529.42	0.00	0.00	0.00	554657.55	1705316.29	N 40 1 5.12 W	80 33 7.71	6.73

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	18.540	Act Stns	30.000	30.000	SLB_NSG+MSHOT-Depth Only	Original Borehole / Noble Energy SHL13BHS Gyro+MWD 0ft to 13685ft MD
	1	18.540	3173.500	Act Stns	30.000	30.000	SLB_NSG+MSHOT	Original Borehole / Noble Energy SHL13BHS Gyro+MWD 0ft to
	1	3173.500	3303.000	Act Stns	30.000	30.000	SLB_INC_ONLY+10	Original Borehole / Noble Energy SHL13BHS Gyro+MWD 0ft to
	1	3303.000	13650.000	Act Stns	30.000	30.000	SLB_MWD-STD	Original Borehole / Noble Energy SHL13BHS Gyro+MWD 0ft to
	1	13650.000	13685.000	Act Stns	30.000	30.000	SLB_BLIND+TREND	Original Borehole / Noble Energy SHL13BHS Gyro+MWD 0ft to

51-01639

PATHFINDER
A Schlumberger Company

Noble Energy

noble energy

Borehole:	Well:	Field:	Structure:
Original Borehole	SHL13BHS	WV Marshall County (NAD 27)	Precision 543

Gravity & Magnetic Parameters

Model:	HDGM 2013	Dip:	67.582°	Date:	10/24/2013
MagDec:	-8.431°	FS:	53175.298nT	Gravity FS:	999.35mgn (9.80665 Based)

Surface Location NAD27 West Virginia State Plane, Northern Zone, US Feet

Lat:	N 40 0 14.70	Northing:	549502.976ftUS	Grid Conv:	-0.661°
Lon:	W 80 32 8.73	Easting:	1709845.537ftUS	Scale Fact:	1

Miscellaneous

Slot:	SHL13BHS	TVD Ref:	KB(1300.45ft above MSL)
Plan:	Noble Energy SHL13BHS Gyro+MWD 0ft to 13685ft MD		

Surface Location

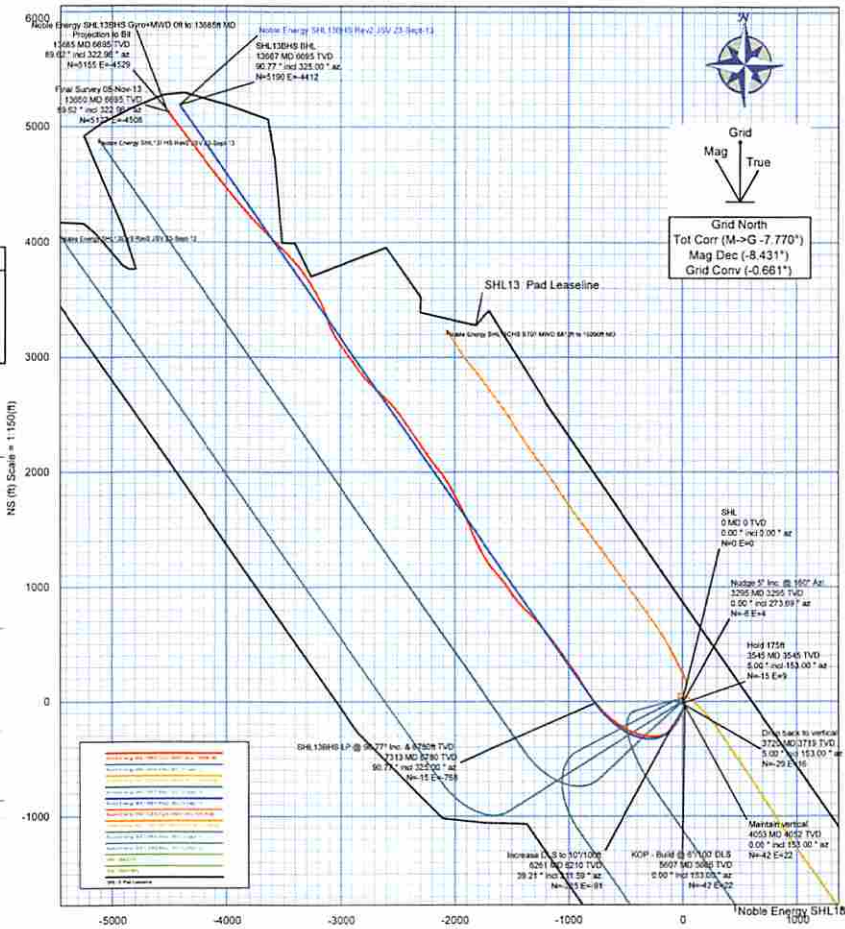
Northing: 549502.976 Easting: 1709845.537 Latitude: N 40 0 14.70 Longitude: W 80 32 8.73 VSec Azimuth: 319.627

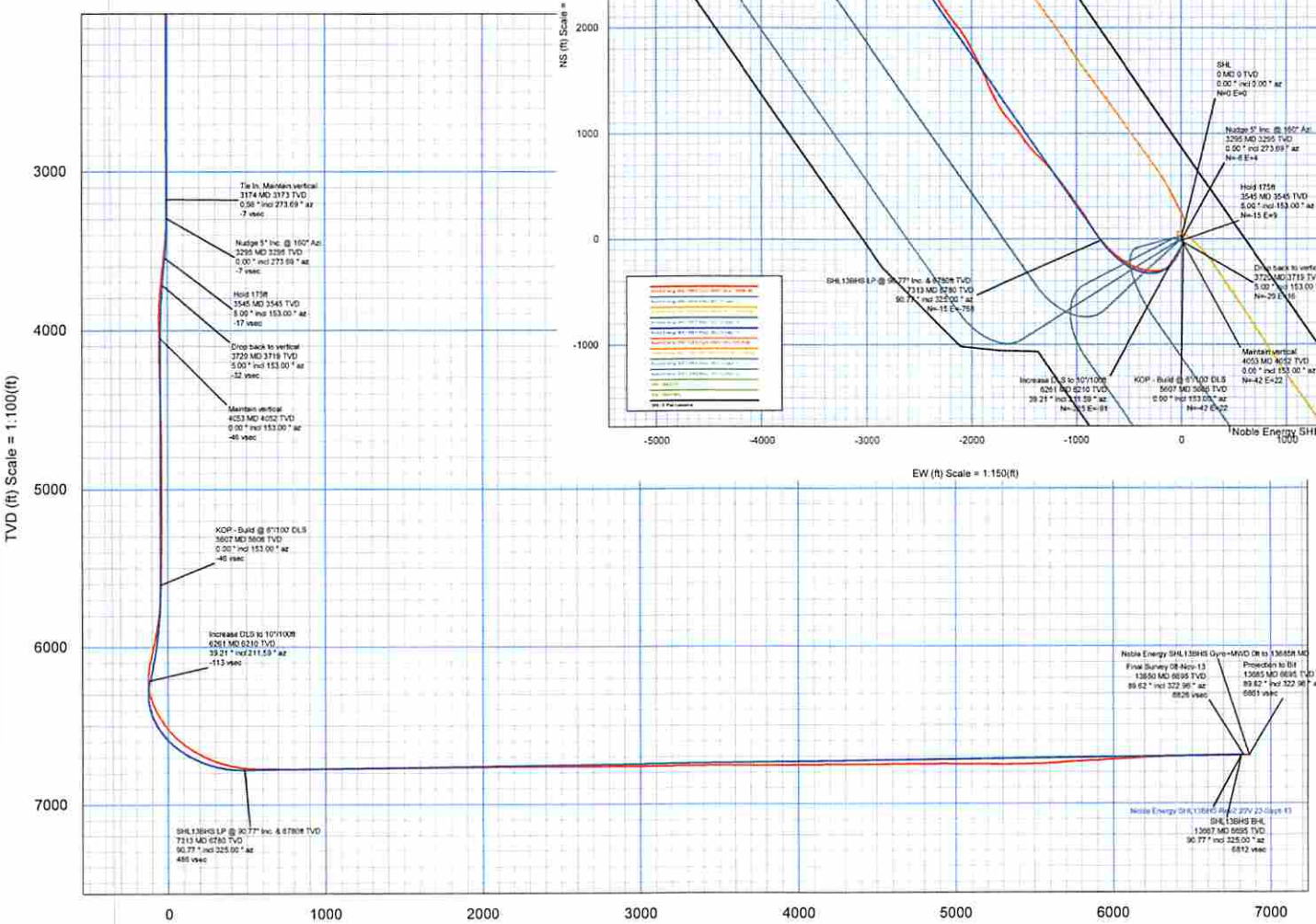
Target Description			Grid Coord					Local Coord	
Target Name	Shape	Dimension	Latitude	Longitude	Northing	Easting	TVD	VSec	N(+)/S(-)	E(+)/W(-)
SHL13 Pad Leaseline	Polyline	N/A	N +0 0 14.58	W 80 32 8.85	549531.91	1709836.71	1300.45	27.08	28.96	-8.82
SHL13BHS BHL	Point	N/A	N +0 1 5.49	W 80 33 5.21	550482.36	1705432.22	6695.00	5811.88	5199.54	-4412.49
SHL13BHS LP	Point	N/A	N +0 0 14.58	W 80 32 18.60	549497.67	1709677.58	6781.00	-488.81	-18.31	-757.06

PART	Seq	Survey Tool / Survey Tool Code	Vendor/Tool	Hole Size (in)	Casing Size (in)	MD From (ft)	MD To (ft)	Survey Frequency	ROV Size (Depth Meters)	ROV Size (Depth Meters)	Comments/ Contingency
1	1	SLB_NSG+MWD+HOT-Depth Only		30	30	0	19.54	Ad Shoc	1.29	1.29	
1	2	SLB_NSG+MS+HOT		30	30	19.54	3173.5	Ad Shoc	4.14	3.06	
1	3	SLB_INC_ONLY+15		30	30	3173.5	3303	Ad Shoc	4.45	3.28	
1	4	SLB_MWD-STG		30	30	3303	13650	Ad Shoc	191.75	8.56	
1	5	SLB_BLIND+TREND		30	30	13650	13685	Ad Shoc	196.12	12.93	

Critical Points

Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLS
SHL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Final Survey 08-Nov-13	13650.00	89.62	322.96	6694.73	5826.14	5125.85	-4508.34	0.71
Projection to Bit	13685.00	89.62	322.96	6694.86	5861.12	5154.79	-4529.12	0.00

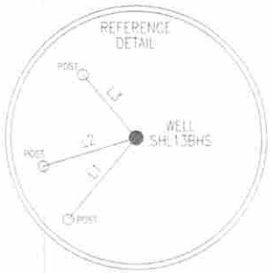




4705109639

Well is located on topo map 13,683' feet south of Latitude: 40° 02' 30"

Well is located on topo map 10,019' feet west of Longitude: 80° 30' 00"



LINE	BEARING	DISTANCE
L1	S 39°46'05" W	252.77'
L2	S 73°05'50" W	231.48'
L3	N 40°06'24" W	195.94'

APPROX. LANDING POINT
UTM 17-NAD83
~~N:4428313.46~~
~~E:539408.86~~
NAD27, WV NORTH
~~N:549487.62~~
~~E:1709877.58~~

NOTES:

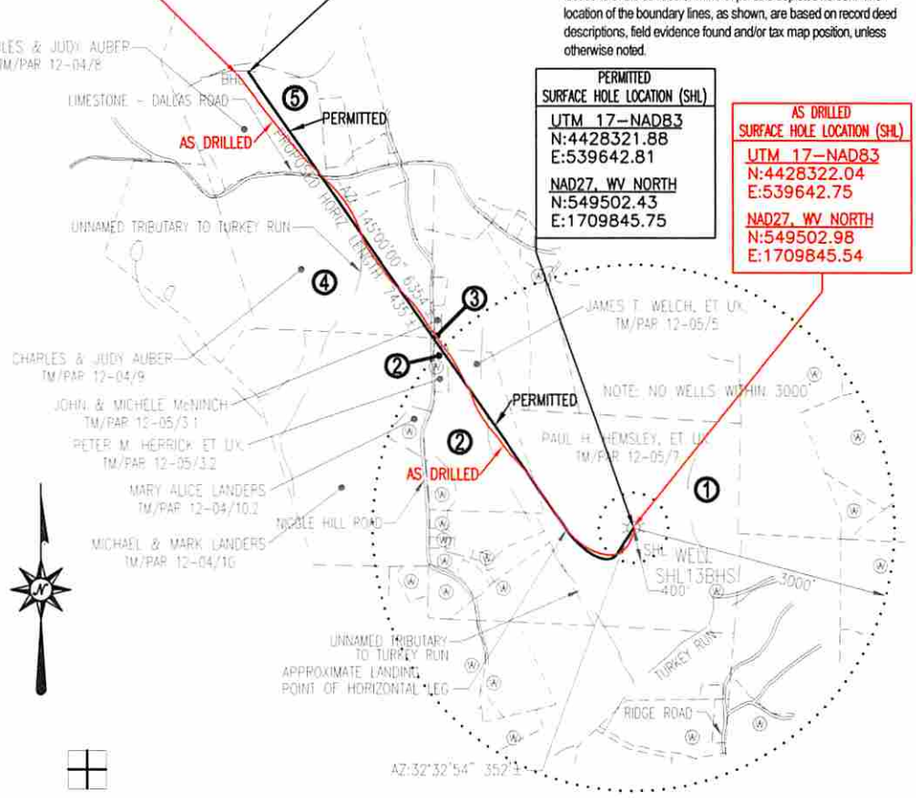
1. There are no water wells or developed springs within 250' of proposed well.
2. There are no existing buildings within 625' of proposed well.
3. Proposed well is greater than 100' from perennial stream, wetland, pond, reservoir or lake.
4. There are no native trout streams within 300' of proposed well.
5. Proposed well is greater than 1000' from surface/groundwater intake or public water supply.
6. It is not the purpose or intention of this plat to represent surveyed locations of the surface or mineral parcels depicted hereon. The location of the boundary lines, as shown, are based on record deed descriptions, field evidence found and/or tax map position, unless otherwise noted.

AS DRILLED BOTTOM HOLE LOCATION (BHL)
UTM 17-NAD83
N:4429869.29
E:538236.57
NAD27, WV NORTH
N:554657.55
E:1705316.29

PERMITTED BOTTOM HOLE LOCATION (BHL)
UTM 17-NAD83
N:4429880.49
E:538272.02
NAD27, WV NORTH
N:554692.36
E:1705433.22

PERMITTED SURFACE HOLE LOCATION (SHL)
UTM 17-NAD83
N:4428321.88
E:539642.81
NAD27, WV NORTH
N:549502.43
E:1709845.75

AS DRILLED SURFACE HOLE LOCATION (SHL)
UTM 17-NAD83
N:4428322.04
E:539642.75
NAD27, WV NORTH
N:549502.98
E:1709845.54



LEGEND

- TOPO MAP POINT
- WELL
- ALL ARE POINTS UNLESS OTHERWISE NOTED
- WATER SOURCE
- LEASE NUMBER BASED ON ATTACHED WW-6A1
- MINERAL TRACT BOUNDARY
- PARCEL LINES
- WELL REFERENCE
- PROPOSED HORIZONTAL WELL
- ROAD
- STREAM CENTER LINE
- AS DRILLED

WELLS WITHIN 3000'

- EXISTING WELLS
- PLUGGED WELLS

Blue Mountain Inc.
11023 MASON DIXON HIGHWAY
BURTON, WV 26562
PHONE: (304) 662-6486

FILE #: SHL13BHS-AS DRILLED

DRAWING #: SHL13BHS-AS DRILLED

SCALE: 1" = 2000'

MINIMUM DEGREE OF ACCURACY: 1/2500

PROVEN SOURCE OF ELEVATION: U.S.G.S. MONUMENT THOMAS 1498.81'

I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE REGULATIONS ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

Signed: George D. Six

R.P.E.: _____ L.L.S.: P.S. No. 2000

GEORGE D. SIX LICENSED No. 2000 STATE OF WEST VIRGINIA PROFESSIONAL SURVEYOR

PLACE SEAL HERE

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS

WVDEP
OFFICE OF OIL & GAS
601 57TH STREET
CHARLESTON, WV 25304

DATE: OCTOBER 2, 2014

OPERATOR'S WELL #: SHL13BHS-AS DRILLED

API WELL #: 47 (STATE) 51 (COUNTY) _____ (PERMIT)

Well Type: ☐ Oil ☐ Waste Disposal ☒ Production ☐ Deep
☒ Gas ☐ Liquid Injection ☐ Storage ☒ Shallow

WATERSHED: TURKEY RUN ELEVATION: 1288.91'

COUNTY/DISTRICT: MARSHALL / SAND HILL QUADRANGLE: VALLEY GROVE, WV 7.5'

SURFACE OWNER: PAUL H. & ANNETTE A. HEMSLEY ACREAGE: 121.65±

OIL & GAS ROYALTY OWNER: SEE ATTACHED WW-6A1 ACREAGE: 386.088±

DRILL ☒ CONVERT ☐ DRILL DEEPER ☐ REDRILL ☐ FRACTURE OR STIMULATE ☐

PLUG OFF OLD FORMATION ☐ PERFORATE NEW FORMATION ☐ PLUG & ABANDON ☐

CLEAN OUT & REPLUG ☐ OTHER CHANGE ☐ (SPECIFY): _____

TARGET FORMATION: MARCELLUS ESTIMATED DEPTH: TVD: 6781'± TMD: 13620'±

WELL OPERATOR NOBLE ENERGY INC. DESIGNATED AGENT STEVEN M. GREEN

Address 333 TECHNOLOGY DRIVE, SUITE 116 Address 500 VIRGINIA STREET EAST, UNITED CENTER SUITE 590

City CANONSBURG State PA Zip Code 15317 City CHARLESTON State WV Zip Code 25301

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

API 47 - 051 - 01641 County Marshall District Sandhill
Quad Valley Grove Pad Name SHL-13 Field/Pool Name
Farm name Paul H. and Annette Hemsley Well Number SHL13EHS
Operator (as registered with the OOG) Noble Energy, Inc.
Address 333 Technology Drive, Suite 116 City Canonsburg State PA Zip 15317

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey
Top hole Northing 4428319.85 Easting 539637.07
Landing Point of Curve Northing 4428102.82 Easting 538996.49
Bottom Hole Northing 4429534.83 Easting 537947.32

Elevation (ft) 1288.25 GL Type of Well ■New □ Existing Type of Report □Interim ■Final

Permit Type □ Deviated □ Horizontal ■ Horizontal 6A □ Vertical Depth Type □ Deep ■ Shallow

Type of Operation □ Convert □ Deepen ■ Drill □ Plug Back □ Redrilling □ Rework ■ Stimulate

Well Type □ Brine Disposal □ CBM ■ Gas □ Oil □ Secondary Recovery □ Solution Mining □ Storage □ Other

Type of Completion ■ Single □ Multiple Fluids Produced □ Brine □Gas □ NGL □ Oil □ Other
Drilled with □ Cable ■ Rotary

Drilling Media Surface hole ■ Air □ Mud □Fresh Water Intermediate hole ■ Air □ Mud □ Fresh Water □ Brine
Production hole □ Air ■ Mud □ Fresh Water □ Brine
Mud Type(s) and Additive(s)
Synthetic Oil Based

Date permit issued 6/19/2013 Date drilling commenced 8/16/2013 Date drilling ceased 12/6/2013
Date completion activities began 5/3/14 Date completion activities ceased 7/25/14
Verbal plugging (Y/N) N Date permission granted Granted by

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

RECEIVED
Office of Oil and Gas
OCT 0 9 2014
WV Department of
Environmental Protection

Freshwater depth(s) ft 561', 763' Open mine(s) (Y/N) depths N
Salt water depth(s) ft 1600' Void(s) encountered (Y/N) depths N
Coal depth(s) ft 763 - 785.04' Pittsburgh, 1266.74' - 1269.77' Mahoning Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) Y

Reviewed by:

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API 47- 051 - 01641 Farm name Paul H. and Annette Hemsley Well number SHL13EHS

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/ N) * Provide details below*
Conductor	36	30	40	N			Y
Surface	24	20	418	N	J-55 94#		Y
Coal							
Intermediate 1	17-1/2	13-3/8	1221	N	J-55 54.5#		Y
Intermediate 2	12-3/8	9-5/8	3228	N	J-55 36#		Y
Intermediate 3							
Production	8-3/4	5-1/2	13369	N	P-110 20#		Y
Tubing							
Packer type and depth set							

Comment Details

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft^3/sks)	Volume (ft^3)	Cement Top (MD)	WOC (hrs)
Conductor							
Surface	Type 1	484	15.6	1.19	103	0	8
Coal							
Intermediate 1	Type 1	1029	15.6	1.19	218	0	8
Intermediate 2	Type 1	1264	15.6	1.19	268	0	8
Intermediate 3							
Production	Class A	1933	14.8	1.41	496	0	8
Tubing							

Drillers TD (ft) 13390 Loggers TD (ft) 13358

Deepest formation penetrated Marcellus Plug back to (ft) NA

Plug back procedure

Kick off depth (ft) 6776

Check all wireline logs run ☐ caliper ☐ density ☐ deviated/directional ☐ induction
☐ neutron ☐ resistivity ■ gamma ray ☐ temperature ☐ sonic

Well cored ☐ Yes ☐ No ☐ Conventional ☐ Sidewall Were cuttings collected ■ Yes ☐ No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING
4 Centralizers on Surface (Every third joint), 10 on Intermediate 1 (Every third joint), 60 on Intermediate 2 (Every third joint),
and 193 on Production casing (Every third joint, till Curve, then Every Joint).

WAS WELL COMPLETED AS SHOT HOLE ☐ Yes ■ No DETAILS

WAS WELL COMPLETED OPEN HOLE? ☐ Yes ■ No DETAILS

WERE TRACERS USED ☐ Yes ■ No TYPE OF TRACER(S) USED

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API 47- 051 - 01641 Farm name Paul H. and Annette Hemsley Well number SHL13EHS

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
	PLEASE SEE ATTACHED				
	PERFORATION RECORD				

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
	PLEASE SEE ATTACHED							
	STIMULATION INFORMATION							
	PER STAGE SHEET							

Please insert additional pages as applicable.

Perforation Record

API: 47-051-01641 Farm name: Paul H & Annette A Hemsley Well Name: SHL-13E-HS

Stage No.	Stim Date	Top Perf	Bottom Perf	# of Perfs	Formation
1	5/4/2014	13072	13214	48	Marcellus
2	5/5/2014	12773	13027	40	Marcellus
3	5/5/2014	12473	12727	40	Marcellus
4	5/6/2014	12173	12427	40	Marcellus
5	5/7/2014	11873	12127	40	Marcellus
6	5/8/2014	11573	11827	40	Marcellus
7	5/8/2014	11273	11527	40	Marcellus
8	5/9/2014	10973	11227	40	Marcellus
08-B Reperf	5/9/2014	10963	11028	24	Marcellus
9	5/10/2014	10673	10927	40	Marcellus
10	5/11/2014	10373	10627	40	Marcellus
11	5/11/2014	10073	10352	40	Marcellus
12	5/12/2014	9773	10027	40	Marcellus
13	5/13/2014	9473	9727	40	Marcellus
14	5/14/2014	9173	9427	40	Marcellus
15	5/15/2014	8873	9127	40	Marcellus
16	5/16/2014	8573	8827	40	Marcellus
17	5/16/2014	8273	8527	40	Marcellus
18	5/17/2014	7973	8227	40	Marcellus
19	5/18/2014	7725	7927	40	Marcellus

STIMULATION INFORMATION PER STAGE

API: 47-051-01641 Farm name: Paul H & Annette A Hemsley Well Name: SHL-13E-HS

Stage No.	Stim Date	Avg Rate (bpm)	ATP (psi)	Max BD Pressure	ISIP (psi)	Proppant (lbs)	Water (BBLS)	Amount of N^2/ other
1	5/3/2014	85.5	8114	6285	3747	602853	15026.00	
2	5/5/2014	88.0	8055	6292	3722	602059	11337.02	
3	5/6/2014	82.4	8008	7323	4308	600114	19284.93	
4	5/6/2014	84.7	8096	6126	4468	579254	12727.07	
5 Inj Test	5/7/2014	5.5	7896		4851	0	388.60	
5	5/8/2014	87.0	7920	5777	4150	620002	11169.83	
6	5/8/2014	87.9	7864	6563	4075	608162	11324.40	
7	5/9/2014	88.3	7640	6363	4309	608471	10936.86	
8	5/9/2014	72.8	8152	6158	5002	0	12778.50	
8 Reperf	5/10/2014	86.6	8302	5804	4201	630366	5707.90	
9	5/10/2014	88.3	8098	6246	4194	570530	11639.26	
10	5/11/2014	87.0	7979	6428	4513	618349	11604.03	
11	5/12/2014	87.2	7689	6504	4748	602494	12358.67	
12	5/12/2014	89.9	7807	7152	4351	600834	10999.70	
12 Inj Test	5/13/2014	4.2	7735		4642	0	659.19	
13	5/14/2014	87.9	7365	5713	4330	603510	11281.26	
14	5/15/2014	90.1	7405	6599	4304	603917	10841.96	
15	5/15/2014	88.7	7428	7175	3926	601852	10524.55	
16	5/16/2014	88.8	7200	6913	4734	595469	11406.00	
17	5/17/2014	88.2	7144	5759	4060	598788	12515.22	
18	5/17/2014	87.9	7207	6075	3825	601233	10589.31	
19	5/18/2014	90.0	7373	7027	4287	495509	9961.40	

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API 47- 051 - 01641 Farm name Paul H. and Annette Hemsley Well number SHL13EHS

PRODUCING FORMATION(S)	DEPTHS			
Marcellus	6709.0	TVD	13390	MD

Please insert additional pages as applicable.

GAS TEST ☐ Build up ☐ Drawdown ☐ Open Flow OIL TEST ☐ Flow ☐ Pump

SHUT-IN PRESSURE Surface _____ psi Bottom Hole _____ psi DURATION OF TEST _____ hrs

OPEN FLOW	Gas	Oil	NGL	Water	GAS MEASURED BY
	4857 mcfpd	36 bpd	232 bpd	820 bpd	☐ Estimated ■ Orifice ☐ Pilot

LITHOLOGY/ FORMATION NAME	TOP DEPTH IN FT TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H_2S, ETC)
	0		0		
	PLEASE SEE ATTACHED FORMATION SHEET				

Please insert additional pages as applicable.

Drilling Contractor Precision Drilling
Address 5400 D Big Tyler Road City Charleston State WV Zip 25313

Logging Company Diversified Well Logging
Address 711 West 10th Street City Reserve State LA Zip 70084

Cementing Company Schlumberger
Address 4600 J. Barry Court, Suite 200 City Canonsburg State PA Zip 15317

Stimulating Company Halliburton Energy SRCS
Address 121 Champion Way, Suite 110 City Canonsburg State PA Zip 15317

Please insert additional pages as applicable.

Completed by Regina A. Logue Telephone 724-820-3559
Signature Regina A Logue Title Regulatory Analyst Date 10/6/14

Submittal of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Registry

SHL 13E

47-051-01641

Formations	Top TVD	Base TVD	Top MD	Base MD	Fluid
Shale	0	732	0	732	
Pittsburgh Coal	732	742	732	742	
Shale and Sandstone	742	1516	742	1516	
Gas Sand	1516	1574	1516	1574	
Shale	1574	1693	1574	1693	
1st Salt Sand	1693	1756	1693	1756	
2nd Salt Sand	1756	1765	1756	1765	
3rd Salt Sand	1765	1815	1765	1815	
Shale	1815	1841	1815	1841	
Maxton Sand	1841	1958	1841	1958	
Shale	1958	1978	1958	2509	
Big Lime	1978	2023	1978	2023	
Big Injun	2023	2165	2023	2165	
Price	2165	2509	2165	2509	
Murrysville	2509	2522	2509	2872	
Shale	2522	2726	2522	2726	
50' Sand	2726	2743	2726	2743	
Shale	2743	2829	2743	2829	
Gordon Stray	2829	2841	2829	2841	
Shale	2841	2872	2841	2872	
Gordon	2872	2890	2872	2890	
Shale	2890	2985	2890	2985	
Fifth Sand	2985	3023	2985	3023	
Shale	3023	3423	3023	3423	
Speechley Sand	3423	3447	3423	3447	
Shale	3447	4331	3447	4349	
Warren Sand	4331	4345	4349	4365	
Shale	4345	5252	4365	5513	
Java Shale	5252	5322	5513	5603	
Pipe Creek Shale	5322	5366	5603	5660	
Angola Shale	5366	5992	5660	6492	
Rhinestreet	5992	6406	6492	7055	
Cashaqua	6406	6498	7055	7206	
Middlesex	6498	6535	7206	7277	
West River	6535	6576	7277	7360	
Burkett	6576	6609	7360	7432	
Tully Limestone	6609	6637	7432	7501	
Hamilton	6637	6751	7501	8257	
Marcellus	6751	6802	8257	not encountered	Gas
Onondaga	6802	6807	not encountered	not encountered	
Huntersville	6807	not encountered	not encountered	not encountered	

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	5/3/2014
Job End Date:	5/18/2014
State:	West Virginia
County:	Marshall
API Number:	47-051-01641-00-00
Operator Name:	Noble Energy, Inc.
Well Name and Number:	SHL13 E
Longitude:	-80.53582500
Latitude:	40.00406400
Datum:	NAD27
Federal/Tribal Well:	NO
True Vertical Depth:	6,709
Total Base Water Volume (gal):	9,872,591
Total Base Non Water Volume:	0

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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	87.30304	Density = 8.340
SAND - PREMIUM WHITE	Halliburton	Proppant					
			Crystalline silica, quartz	14808-60-7	100.00000	9.51876	
SAND - COMMON WHITE	Halliburton	Proppant					
			Crystalline silica, quartz	14808-60-7	100.00000	2.41215	
HYDROCHLORIC ACID 5-10%	Halliburton	Solvent					
			Hydrochloric acid	7647-01-0	10.00000	0.06005	
FR-66	Halliburton	Friction Reducer					
			Hydrotreated light petroleum distillate	64742-47-8	30.00000	0.02403	
FE-1A ACIDIZING COMPOSITION	Halliburton	Additive					
			Acetic anhydride	108-24-7	100.00000	0.00311	
			Acetic acid	64-19-7	60.00000	0.00187	
HYDROCHLORIC ACID 10-30%	Halliburton	Solvent					
			Hydrochloric acid	7647-01-0	30.00000	0.00424	
BE-9	Halliburton	Biocide					

			Tributyl tetradecyl phosphonium chloride	81741-28-8	10.00000	0.00403	
LP-65MC	Halliburton	Scale Inhibitor					
			Ammonium chloride	12125-02-9	10.00000	0.00255	
LoSurf-300D	Halliburton	Non-ionic Surfactant					
			Ethanol	64-17-5	60.00000	0.00063	
			Heavy aromatic petroleum naphtha	64742-94-5	30.00000	0.00031	
			Naphthalene	91-20-3	5.00000	0.00005	
			Poly(oxy-1,2-ethanediyl), alpha-(4-nonylphenyl)-omega-hydroxy-, branched	127087-87-0	5.00000	0.00005	
			1,2,4 Trimethylbenzene	95-63-6	1.00000	0.00001	
LCA-1	Halliburton	Solvent					
			Paraffinic solvent	Confidential	100.00000	0.00051	Denise Tuck, Halliburton 3000 N. Sam Houston Pkwy E., Houston, TX 77032 281-871-6226
HAI-OS ACID INHIBITOR	Halliburton	Corrosion Inhibitor					
			Methanol	67-56-1	60.00000	0.00032	
			Propargyl alcohol	107-19-7	10.00000	0.00005	
WG-36 GELLING AGENT	Halliburton	Gelling Agent					
			Guar gum	9000-30-0	100.00000	0.00030	
SP BREAKER	Halliburton	Breaker					
			Sodium persulfate	7775-27-1	100.00000	0.00001	
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		0.71830	
		Other Ingredient(s)					
			Polyacrylamide copolymer	Confidential		0.02403	
		Other Ingredient(s)					
			Organic phosphonate	Confidential		0.01528	
		Other Ingredient(s)					
			Alcohols, C12-16, ethoxylated	68551-12-2		0.00401	
		Other Ingredient(s)					
			Sodium chloride	7647-14-5		0.00401	
		Other Ingredient(s)					
			Ammonium chloride	12125-02-9		0.00401	
		Other Ingredient(s)					
			Fatty acid tall oil amide	Confidential		0.00401	
		Other Ingredient(s)					
			Sorbitan monooleate polyoxyethylene derivative	9005-65-6		0.00080	
		Other Ingredient(s)					
			Sorbitan, mono-9-octadecenoate, (Z)	1338-43-8		0.00080	

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		Other Ingredient(s)					
			Oxyalkylated phenolic resin	Confidential		0.00031	
		Other Ingredient(s)					
			Formaldehyde	50-00-0		0.00025	
		Other Ingredient(s)					
			Reaction product of acetophenone, formaldehyde, thiourea and oleic acid in dimethyl formamide	68527-49-1		0.00016	
		Other Ingredient(s)					
			Fatty acids, tall oil	Confidential		0.00016	
		Other Ingredient(s)					
			Alcohols, C14-C15, ethoxylated	68951-67-7		0.00016	
		Other Ingredient(s)					
			Oxyalkylated phenolic resin	Confidential		0.00010	
		Other Ingredient(s)					
			Olefins	Confidential		0.00003	
		Other Ingredient(s)					
			Olefins	Confidential		0.00003	
		Other Ingredient(s)					
			Bentonite, benzyl(hydrogenated tallow alkyl) dimethylammonium stearate complex	121888-68-4		0.00002	
		Other Ingredient(s)					
			Olefins	Confidential		0.00001	
		Other Ingredient(s)					
			Olefins	Confidential		0.00001	
		Other Ingredient(s)					
			Surfactant mixture	Confidential		0.00000	
		Other Ingredient(s)					
			Surfactant mixture	Confidential		0.00000	
		Other Ingredient(s)					
			Silica gel	112926-00-8		0.00000	
		Other Ingredient(s)					
			Crystalline Silica, Quartz	14808-60-7		0.00000	
		Other Ingredient(s)					
			Sodium sulfate	7757-82-6		0.00000	

* 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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PATHFINDER

noble energy

Noble Energy SHL13EHS Gyro+MWD 0ft to 13390ft MD Survey Report

(Def Survey)

Report Date:	December 06, 2013 - 09:54 AM	Survey / DLS Computation:	Minimum Curvature / Lubinski
Client:	Noble Energy	Vertical Section Azimuth:	308.839 ° (Grid North)
Field:	WV Marshall County (NAD 27)	Vertical Section Origin:	0.000 ft, 0.000 ft
Structure / Slot:	Noble Energy SHL13 Pad / SHL13EHS	TVD Reference Datum:	KB
Well:	SHL13EHS	TVD Reference Elevation:	1300.450 ft above MSL
Borehole:	Original Borehole	Seabed / Ground Elevation:	1281.910 ft above MSL
UWI / API#:	Unknown / Unknown	Magnetic Declination:	-8.433 °
Survey Name:	Noble Energy SHL13EHS Gyro+MWD 0ft to 13390ft MD	Total Gravity Field Strength:	999.3498mgn (9.80665 Based)
Survey Date:	November 22, 2013	Gravity Model:	GARM
Tort / AHD / DDI / ERD Ratio:	262.909 ° / 8152.491 ft / 6.630 / 1.211	Total Magnetic Field Strength:	53164.777 nT
Coordinate Reference System:	NAD27 West Virginia State Plane, Northern Zone, US Feet	Magnetic Dip Angle:	67.574 °
Location Lat / Long:	N 40° 0' 14.63105", W 80° 32' 8.97345"	Declination Date:	November 22, 2013
Location Grid N/E Y/X:	N 549496.109 ftUS, E 1709826.781 ftUS	Magnetic Declination Model:	HDGM 2013
CRS Grid Convergence Angle:	-0.6606 °	North Reference:	Grid North
Grid Scale Factor:	0.99996247	Grid Convergence Used:	-0.6606 °
Version / Patch:	2.7.998.0	Total Corr Mag North->Grid North:	-7.7719 °
		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	-1300.45	0.00	0.00	0.00	N/A	N/A	N/A	549496.11	1709826.78	N 40 0 14.63	W 80 32 8.97	0.00
	118.50	0.48	233.06	118.50	-1181.95	0.14	-0.30	-0.40	0.41	0.41	0.00	549495.81	1709826.38	N 40 0 14.63	W 80 32 8.98	0.00
	218.50	0.55	275.70	218.49	-1081.96	0.67	-0.50	-1.21	0.38	0.07	42.64	549495.61	1709825.57	N 40 0 14.63	W 80 32 8.99	0.07
	318.50	0.70	278.18	318.49	-981.96	1.61	-0.37	-2.29	0.15	0.15	2.48	549495.74	1709824.49	N 40 0 14.63	W 80 32 9.00	0.39
	418.50	0.60	268.24	418.48	-881.97	2.56	-0.30	-3.42	0.15	-0.10	-9.94	549495.81	1709823.36	N 40 0 14.63	W 80 32 9.02	0.62
	518.50	0.46	247.69	518.48	-781.97	3.17	-0.47	-4.31	0.23	-0.14	-20.55	549495.64	1709822.47	N 40 0 14.63	W 80 32 9.03	0.80
	618.50	0.21	269.12	618.48	-681.97	3.52	-0.62	-4.87	0.28	-0.25	21.43	549495.49	1709821.91	N 40 0 14.62	W 80 32 9.04	0.93
	718.50	0.33	277.72	718.48	-581.97	3.92	-0.58	-5.34	0.13	0.12	8.60	549495.52	1709821.44	N 40 0 14.62	W 80 32 9.04	1.00
	818.50	0.27	257.50	818.47	-481.98	4.33	-0.60	-5.85	0.12	-0.06	-20.22	549495.51	1709820.93	N 40 0 14.62	W 80 32 9.05	1.07
	918.50	0.09	238.97	918.47	-381.98	4.51	-0.69	-6.15	0.19	-0.18	-18.53	549495.42	1709820.63	N 40 0 14.62	W 80 32 9.05	1.13
	1018.50	0.25	100.16	1018.47	-281.98	4.34	-0.77	-6.00	0.32	0.16	-138.81	549495.34	1709820.78	N 40 0 14.62	W 80 32 9.05	1.20
	1118.50	0.35	88.72	1118.47	-181.98	3.91	-0.80	-5.48	0.12	0.10	-11.44	549495.31	1709821.30	N 40 0 14.62	W 80 32 9.04	1.26
	1218.50	0.35	100.89	1218.47	-81.98	3.39	-0.85	-4.88	0.07	0.00	12.17	549495.26	1709821.90	N 40 0 14.62	W 80 32 9.04	1.31
	1318.50	0.38	176.08	1318.47	18.02	2.90	-1.24	-4.55	0.45	0.03	75.19	549494.87	1709822.23	N 40 0 14.62	W 80 32 9.03	1.40
	1418.50	0.17	186.16	1418.47	118.02	2.61	-1.72	-4.55	0.21	-0.21	10.08	549494.39	1709822.23	N 40 0 14.61	W 80 32 9.03	1.46
	1518.50	0.15	169.71	1518.47	218.02	2.44	-1.99	-4.54	0.05	-0.02	-16.45	549494.12	1709822.24	N 40 0 14.61	W 80 32 9.03	1.48
	1618.50	0.24	164.14	1618.47	318.02	2.18	-2.32	-4.46	0.09	0.09	-5.57	549493.79	1709822.32	N 40 0 14.61	W 80 32 9.03	1.51
	1718.50	0.57	171.49	1718.46	418.01	1.66	-3.02	-4.33	0.33	0.33	7.35	549493.09	1709822.45	N 40 0 14.60	W 80 32 9.03	1.58
	1818.50	0.46	142.96	1818.46	518.01	0.92	-3.83	-4.01	0.28	-0.11	-28.53	549492.28	1709822.77	N 40 0 14.59	W 80 32 9.02	1.64
	1918.50	0.81	133.63	1918.45	618.00	-0.17	-4.64	-3.29	0.36	0.35	-9.33	549491.47	1709823.52	N 40 0 14.58	W 80 32 9.01	1.72
	2018.50	0.64	117.20	2018.45	718.00	-1.42	-5.38	-2.25	0.27	-0.17	-16.43	549490.73	1709824.53	N 40 0 14.58	W 80 32 9.00	1.79
	2118.50	0.46	111.75	2118.44	817.99	-2.36	-5.78	-1.38	0.19	-0.18	-5.45	549490.32	1709825.40	N 40 0 14.57	W 80 32 8.99	1.84
	2218.50	0.12	129.83	2218.44	917.99	-2.85	-6.00	-0.93	0.35	-0.34	18.08	549490.11	1709825.85	N 40 0 14.57	W 80 32 8.98	1.89
	2318.50	0.19	231.24	2318.44	1017.99	-2.92	-6.17	-0.98	0.24	0.07	101.41	549489.94	1709825.80	N 40 0 14.57	W 80 32 8.99	1.91
	2418.50	0.59	221.57	2418.44	1117.99	-2.83	-6.66	-1.45	0.40	0.40	-9.67	549489.45	1709825.33	N 40 0 14.57	W 80 32 8.99	1.96
	2518.50	0.72	220.02	2518.43	1217.98	-2.76	-7.53	-2.19	0.13	0.13	-1.55	549488.58	1709824.59	N 40 0 14.56	W 80 32 9.00	2.00
	2618.50	0.55	223.04	2618.42	1317.97	-2.67	-8.36	-2.93	0.17	-0.17	3.02	549487.75	1709823.86	N 40 0 14.55	W 80 32 9.01	2.04
	2718.50	0.45	224.44	2718.42	1417.97	-2.57	-8.99	-3.53	0.10	-0.10	1.40	549487.12	1709823.25	N 40 0 14.54	W 80 32 9.02	2.07
	2818.50	0.47	263.66	2818.42	1517.97	-2.21	-9.32	-4.21	0.31	0.02	39.24	549486.79	1709822.57	N 40 0 14.54	W 80 32 9.03	2.11
	2918.50	0.74	277.04	2918.41	1617.96	-1.36	-9.28	-5.28	0.30	0.27	13.36	549486.83	1709821.52	N 40 0 14.54	W 80 32 9.04	2.15
	3018.50	0.90	260.22	3018.40	1717.95	-0.26	-9.34	-6.67	0.29	0.16	-16.82	549486.77	1709820.11	N 40 0 14.54	W 80 32 9.06	2.20
	3118.50	0.71	247.46	3118.39	1817.94	0.60	-9.71	-8.02	0.26	-0.19	-12.76	549486.40	1709818.76	N 40 0 14.53	W 80 32 9.08	2.24
	3201.50	0.31	258.37	3201.39	1900.94	1.01	-9.95	-8.72	0.49	-0.48	13.14	549486.16	1709818.07	N 40 0 14.53	W 80 32 9.08	2.28
	3260.00	0.57	260.12	3259.89	1959.44	1.31	-10.03	-9.16	0.44	0.44	2.99	549486.08	1709817.62	N 40 0 14.53	W 80 32 9.09	2.30
	3306.00	0.78	251.55	3305.88	2005.43	1.65	-10.17	-9.68	0.51	0.46	-18.63	549485.94	1709817.10	N 40 0 14.53	W 80 32 9.10	2.32
	3350.00	1.79	232.66	3349.87	2049.42	2.01	-10.68	-10.51	2.46	2.30	-42.93	549485.43	1709816.27	N 40 0 14.52	W 80 32 9.11	2.39
	3394.00	2.96	236.18	3393.83	2093.38	2.57	-11.73	-12.00	2.68	2.66	8.00	549484.38	1709814.78	N 40 0 14.51	W 80 32 9.13	2.47
	3439.00	3.12	236.26	3438.77	2138.32	3.36	-13.06	-13.98	0.36	0.36	0.18	549483.05	1709812.80	N 40 0 14.50	W 80 32 9.15	2.51
	3484.00	3.05	233.47	3483.70	2183.25	4.11	-14.45	-15.96	0.37	-0.16	-6.20	549481.66	1709810.82	N 40 0 14.49	W 80 32 9.18	2.55
	3529.00	2.97	233.35	3527.64	2227.19	4.77	-15.83	-17.82	0.18	-0.18	-0.27	549480.28	1709808.96	N 40 0 14.47	W 80 32 9.20	2.59
	3573.00	3.01	232.92	3572.58	2272.13	5.43	-17.23	-19.70	0.10	0.09	-0.96	549478.87	1709807.08	N 40 0 14.46	W 80 32 9.22	2.62
	3663.00	2.85	230.66	3662.47	2362.02	6.62	-20.08	-23.31	0.22	-0.18	-2.51	549476.03	1709803.47	N 40 0 14.43	W 80 32 9.27	2.67
	3753.00	2.75	231.92	3752.36	2451.91	7.72	-22.83	-26.74	0.13	-0.11	1.40	549473.28	1709800.04	N 40 0 14.40	W 80 32 9.31	2.72
	3842.00	2.71	228.09	3841.26	2540.81	8.68	-25.55	-29.99	0.21	-0.04	-4.30	549470.56	1709796.79	N 40 0 14.38	W 80 32 9.36	2.77
	3932.00	5.01	243.11	3931.05	2630.60	10.84	-28.75	-35.08	2.77	2.56	16.69	549467.36	1709791.70	N 40 0 14.34	W 80 32 9.42	2.90
	3976.00	7.74	247.33	3974.77	2674.32	13.19	-30.76	-39.53	6.29	6.20	9.59	549465.35	1709787.26	N 40 0 14.32	W 80 32 9.48	3.01
	4021.00	10.22	246.55	4019.22	2718.77	16.71	-33.52	-45.99	5.52	5.51	-1.73	549462.59	1709780.80	N 40 0 14.29	W 80 32 9.56	3.12
	4066.00	12.22	246.39	4063.36	2762.91	21.04	-37.01	-54.01	4.44	4.44	-0.36	549459.10	1709772.77	N 40 0 14.26	W 80 32 9.66	3.22
	4111.00	13.79	241.21	4107.20	2806.75	25.60	-41.50	-63.08	4.34	3.49	-11.51	549454.61	1709763.71	N 40 0 14.21	W 80 32 9.78	3.31
	4156.00	16.00	237.46	4150.69	2850.24	30.00	-47.42	-73.01	5.36	4.91	-8.33	549448.69	1709753.78	N 40 0 14.15	W 80 32 9.90	3.41
	4201.00	18.32	236.69	4193.68	2893.23	34.58	-54.65	-84.15	5.16	5.16	-1.71	549441.47	1709742.64	N 40 0 14.08	W 80 32 10.05	3.50
	4290.00	22.37	238.55	4277.11	2976.66	45.60	-71.17	-110.30	4.61	4.55	2.09	549424.94	1709716.49	N 40 0 13.92	W 80 32 10.38	3.66
	4380.00	26.41	239.03	4359.06	3058.61	59.50	-90.41	-142.08	4.49	4.49	0.53	549405.70	1709684.70	N 40 0 13.72	W 80 32 10.79	3.82
	4469.00	30.81	239.07	4437.18	3136.73	75.61	-112.32	-178.62	4.94	4.94	0.04	549383.79	1709648.16	N 40 0 13.50	W 80 32 11.25	3.96
	4559.00	35.60	240.25	4512.46	3212.01	94.75	-137.19	-221.16	5.37	5.32	1.31	549358.93	1709605.63	N 40 0 13.25	W 80 32 11.79	4.10
	4648.00	39.51	239.51	4583.00	3282.55	115.96	-164.41	-268.07	4.42	4.39	-0.83	549331.70	1709558.72	N 40 0 12.98	W 80 32 12.39	4.21
	4738.00	39.24	237.11	4652.58	3352.13	136.86	-194.40	-316.64	1.72	-0.30	-2.67	549301.72	1709510.15	N 40 0 12.67	W 80 32 13.01	4.30
	4827.00	39.30	235.34	4721.48	3421.03	155.56	-225.72	-363.47	1.29	0.07	-1.99	549270.40	1709463.33	N 40 0 12.36	W 80 32 13.61	4.37
	4917.00	38.20	235.43	4791.67	3491.22	173.48	-257.72	-409.83	1.22	-1.22	0.10	549238.40	1709416.97	N 40 0 12.04	W 80 32 14.20	4.43
	5007.00	39.24	235.58	4861.89	3561.44	191.49	-289.60	-456.23	1.16	1.16	0.17	549206.52	1709370.57	N 40 0 11.72	W 80 32 14.79	4.49
	5096.00	40.80	241.93	4930.17	3629.72	212.83	-319.15	-505.02	4.82	1.53	7.13	549176.97	1709321.78	N 40 0 11.42	W 80 32 15.42	4.57
	5186.00	40.04	246.12	4998.81	3698.36	239.41	-344.66	-557.34	3.08	-0.62	4.66	549151.47	1709269.46	N 40 0 11.16	W 80 32 16.08	4.63
	5275.00	39.39	244.90	5067.27	3766.82	266.70	-368.22	-609.10	1.14	-0.73	-1.37	549127.90	1709217.71	N 40 0 10.92	W 80 32 16.75	4.67
	5365.00	39.44	242.20	5136.81	3836.36	292.38	-393.67	-660.25	1.91	0.06	-3.00	549102.45	1709166.56	N 40 0 10.67	W 80 32 17.40	4.72
	5454.00	38.88	243.41	5205.82	3905.37	316.98	-419.36	-710.23	1.06	-0.63	1.36	549076.77	1709116.58	N 40 0 10.41	W 80 32 18.04	4.76
	5544.00	38.32	245.06	5276.15	3975.70	342.81	-445.77	-760.79	1.30	-0.62	1.83	549052.36	1709066.02	N 40 0 10.16	W 80 32 18.68	4.79
	5633.00	39.14	245.76	5345.58	4045.13	369.44	-466.94	-811.43	1.04	0.92	0.79	549029.19	1709015.39	N 40 0 9.92	W 80 32 19.33	4.83
	5723.00	41.59	246.09	5414.15	4113.70	397.78	-490.71	-864.64	2.73	2.72	0.37	549005.42	1708962.17	N 40 0 9.68	W 80 32 20.01	4.87
	5812.00	42.85	245.06	5480.17	4179.72	426.47	-515.40	-918.99	1.42	1.19	-1.16	548980.73	1708907.83	N 40 0 9.43	W 80 32 20.71	4.90
	5902.00	41.18	245.32	5547.14	4246.69	455.02	-540.62	-973.56	1.64	-1.63	0.29	548955.51	1708853.26	N 40 0 9.18	W 80 32 21.40	4.94
	5991.00	41.55	248.25	5613.94	4313.49	484.38	-563.80	-1027.60	2.21	0.42	3.29	548932.33	1708799.22	N 40 0 8.94	W 80 32 22.09	4.97
	6081.00	41.53	245.44	5681.31	4380.86	514.22	-587.26	-1082.46	2.07	-0.02	-3.12	548908.87	1708744.36	N 40 0 8.70	W 80 32 22.79	5.01
	6170.00	39.73	247.35	5748.85	4448.40	542.79	-610.48	-1135.56	2.46	-2.02	2.15	548885.65	1708691.27	N 40 0 8.47	W 80 32 23.47	5.04
	6260.00	39.49	248.12	5818.19	4517.74	572.25	-632.22	-1188.66	0.61	-0.27	0.86	548863.91	1708638.17	N 40 0 8.25	W 80 32 24.15	5.06
	6349.00	40.92	247.69	5886.16	4585.71	601.89	-653.84	-1241.89	1.64	1.61	-0.48	548842.30	1708584.94	N 40 0 8.03	W 80 32 24.83	5.09
	6439.00	42.79	246.57	5953.19	4652.74	632.17	-677.18	-1297.21	2.24	2.08	-1.24	548818.95	1708529.62	N 40 0 7.79	W 80 32 25.54	5.12
	6529.00	42.69	244.55	6019.30	4718.85	661.52	-702.45	-1352.81	1.53	-0.11	-2.24	548793.69	1708474.02	N 40 0 7.54	W 80 32 26.25	5.14
	6618.00	43.18	242.54	6084.46	4784.01	688.76	-729.46	-1407.08	1.63	0.55	-2.26	548766.68	1708419.76	N 40 0 7.26	W 80 32 26.94	5.17
	6708.00	40.16	241.69	6151.68	4851.23	714.31	-757.43	-1459.97	3.41	-3.36	-0.94	548738.71	1708366.87	N 40 0 6.98	W 80 32 27.62	5.20
	6791.00	38.06	247.56	6216.10	4915.65	738.64	-779.90	-1507.20	5.13	-2.53	7.07	548716.24	1708319.64	N 40 0 6.75	W 80 32 28.22	5.24
	6835.00	39.81	254.98	6250.35	4949.90	754.28	-788.73	-1533.35	11.31	3.98	16.86	548707.41	1708293.49	N 40 0 6.66	W 80 32 28.56	5.27
	6880.00	42.07	260.82	6284.35	4983.90	773.66	-794.87	-1562.16	9.87	5.02	12.98	548701.27	1708264.68	N 40 0 6.60	W 80 32 28.93	5.29
	6925.00	44.32	265.19	6317.16	5016.71	795.88	-798.60	-1592.72	8.32	5.00	9.71	548697.54	1708234.12	N 40 0 6.56	W 80 32 29.32	5.32
	6970.00	46.12	268.23	6348.86	5048.41	820.30	-800.42	-1624.60	6.24	4.00	6.76	548695.72	1708202.24	N 40 0 6.54	W 80 32 29.73	5.34
	7014.00	47.40	271.60	5379.01	5078.56	845.93	-800.45	-1656.65	6.29	2.91	7.66	548695.69	1708170.20	N 40 0 6.53	W 80 32 30.14	5.36
	7059.00	49.28	275.20	5408.92	5108.47	873.98	-798.45	-1690.19	7.29	4.18	8.00	548697.70	1708136.65	N 40 0 6.55	W 80 32 30.57	5.38
	7104.00	51.14	276.43	5437.72	5137.27	903.61	-794.94	-1724.59	4.64	4.13	2.73	548701.26	1708102.26	N 40 0 6.58	W 80 32 31.01	5.40
	7149.00	53.34	279.63	5465.28	5164.83	934.78	-789.95	-1759.81	7.45	4.89	7.11	548706.19	1708067.04	N 40 0 6.62	W 80 32 31.47	5.42
	7194.00	56.10	280.80	5491.27	5190.82	967.62	-783.43	-1795.95	6.49	6.13	2.60	548712.71	1708030.90	N 40 0 6.68	W 80 32 31.93	5.44
	7238.00	58.38	283.26	6515.08	5214.63	1001.21	-775.71	-1832.13	7.00	5.18	5.59	548720.43	1707994.72	N 40 0 6.76	W 80 32 32.40	5.46
	7283.00	59.75	288.43	6538.22	5237.77	1037.23	-765.17	-1869.24	10.31	3.04	11.49	548730.97	1707957.61	N 40 0 6.86	W 80 32 32.88	5.48
	7328.00	60.38	293.41	6560.69	5260.24	1074.71	-751.25	-1905.65	9.69	1.40	11.07	548744.89	1707921.21	N 40 0 6.99	W 80 32 33.35	5.50

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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
	7373.00	61.72	298.82	6582.48	5282.03	1113.25	-734.59	-1941.32	8.92	2.68	7.13	548761.55	1707885.64	N 40 0 7.15 W	80 32 33.81	5.52
	7418.00	63.60	300.65	6603.06	5302.63	1152.84	-715.41	-1976.42	9.21	4.62	8.00	548780.72	1707850.44	N 40 0 7.34 W	80 32 34.26	5.55
	7462.00	65.66	304.42	6621.80	5321.35	1192.53	-693.99	-2009.98	9.06	4.68	8.57	548802.14	1707816.88	N 40 0 7.54 W	80 32 34.70	5.57
	7507.00	68.45	307.65	6639.27	5338.82	1233.99	-669.59	-2043.50	8.77	5.78	7.18	548826.54	1707783.37	N 40 0 7.78 W	80 32 35.13	5.60
	7552.00	70.18	310.32	6655.17	5354.72	1276.05	-643.11	-2076.21	6.73	3.80	5.93	548853.02	1707750.65	N 40 0 8.04 W	80 32 35.56	5.61
	7597.00	71.24	312.90	6670.05	5369.60	1318.37	-614.91	-2107.96	5.92	2.40	5.73	548881.22	1707718.91	N 40 0 8.31 W	80 32 35.97	5.62
	7641.00	73.65	315.56	6683.32	5382.87	1359.96	-585.65	-2138.01	7.95	5.48	6.05	548910.49	1707688.86	N 40 0 8.60 W	80 32 36.36	5.64
	7686.00	77.29	317.28	6694.61	5394.16	1402.91	-554.09	-2168.03	8.89	8.09	3.82	548942.04	1707658.84	N 40 0 8.91 W	80 32 36.75	5.66
	7731.00	79.95	319.37	6703.49	5403.04	1446.13	-521.15	-2197.35	7.46	5.91	4.64	548974.98	1707629.52	N 40 0 9.23 W	80 32 37.13	5.68
	7776.00	82.39	321.21	6710.40	5409.95	1489.37	-486.94	-2225.76	6.76	5.42	4.09	549009.19	1707001.11	N 40 0 9.56 W	80 32 37.50	5.70
	7820.00	84.71	322.95	6715.34	5414.89	1531.55	-452.45	-2252.62	6.58	5.27	3.95	549043.67	1707574.25	N 40 0 9.90 W	80 32 37.85	5.71
	7865.00	88.04	323.93	6718.19	5417.74	1574.58	-416.38	-2279.37	7.71	7.40	2.18	549079.74	1707547.50	N 40 0 10.26 W	80 32 38.20	5.73
	7910.00	88.11	324.56	6719.70	5419.25	1617.50	-379.89	-2305.65	1.41	0.16	1.40	549116.24	1707521.22	N 40 0 10.61 W	80 32 38.54	5.74
	7961.00	88.05	324.44	6721.41	5420.96	1666.07	-338.39	-2335.25	0.26	-0.12	-0.24	549157.73	1707491.63	N 40 0 11.02 W	80 32 38.93	5.76
	8050.00	88.25	325.36	6724.28	5423.83	1750.63	-265.61	-2386.40	1.06	0.22	1.03	549230.51	1707440.48	N 40 0 11.73 W	80 32 39.60	5.78
	8140.00	88.48	324.90	6726.85	5426.40	1836.05	-191.80	-2437.83	0.57	0.26	-0.51	549304.31	1707389.05	N 40 0 12.46 W	80 32 40.27	5.80
	8229.00	89.74	324.88	6728.23	5427.78	1920.66	-119.01	-2489.01	1.42	1.42	-0.02	549377.11	1707337.87	N 40 0 13.17 W	80 32 40.94	5.82
	8319.00	90.17	324.06	6728.30	5427.85	2006.43	-45.77	-2541.31	1.03	0.48	-0.91	549450.35	1707285.57	N 40 0 13.89 W	80 32 41.62	5.84
	8408.00	89.54	324.13	6728.53	5428.08	2091.42	26.32	-2593.50	0.71	-0.71	0.08	549522.43	1707233.38	N 40 0 14.59 W	80 32 42.30	5.86
	8498.00	88.91	323.68	6729.74	5429.29	2177.45	99.04	-2646.52	0.86	-0.70	-0.50	549595.15	1707180.37	N 40 0 15.31 W	80 32 42.99	5.87
	8588.00	89.58	324.48	6730.85	5430.40	2263.40	171.92	-2699.31	1.23	0.86	0.89	549668.02	1707127.57	N 40 0 16.02 W	80 32 43.68	5.89
	8677.00	90.74	323.88	6730.52	5430.07	2348.35	244.08	-2751.40	1.37	1.19	-0.67	549740.18	1707075.49	N 40 0 16.73 W	80 32 44.36	5.91
	8767.00	91.00	323.61	6729.16	5428.71	2434.45	316.65	-2804.62	0.42	0.29	-0.30	549812.75	1707022.27	N 40 0 17.44 W	80 32 45.06	5.93
	8856.00	90.80	324.86	6727.76	5427.31	2519.37	388.86	-2856.83	1.42	-0.22	1.40	549884.95	1706970.27	N 40 0 18.15 W	80 32 45.74	5.95
	8946.00	90.52	324.99	6726.72	5426.27	2604.92	482.51	-2908.34	0.34	-0.31	0.14	549958.60	1706918.55	N 40 0 18.87 W	80 32 46.41	5.96
	9035.00	90.11	323.76	6726.23	5425.78	2689.78	534.85	-2960.18	1.46	-0.46	-1.38	550030.94	1706866.72	N 40 0 19.58 W	80 32 47.09	5.98
	9125.00	90.23	326.08	6725.97	5425.52	2775.33	608.49	-3011.90	2.58	0.13	2.58	550104.58	1706815.00	N 40 0 20.30 W	80 32 47.77	6.00
	9215.00	89.91	325.48	6725.86	5425.41	2860.46	682.91	-3062.51	0.76	-0.36	-0.67	550179.00	1706764.39	N 40 0 21.03 W	80 32 48.43	6.02
	9304.00	90.14	326.54	6725.82	5425.37	2944.52	756.71	-3112.27	1.22	0.26	1.19	550252.78	1706714.63	N 40 0 21.75 W	80 32 49.08	6.03
	9393.00	90.66	327.57	6725.20	5424.75	3028.03	831.39	-3160.67	1.30	0.58	1.16	550327.47	1706666.24	N 40 0 22.48 W	80 32 49.71	6.05
	9483.00	90.11	329.05	6724.59	5424.14	3111.78	907.97	-3207.94	1.75	-0.61	1.64	550404.04	1706618.96	N 40 0 23.24 W	80 32 50.33	6.06
	9572.00	90.34	331.33	6724.24	5423.79	3193.49	985.19	-3252.19	2.57	0.26	2.56	550481.26	1706574.72	N 40 0 23.99 W	80 32 50.91	6.08
	9662.00	89.83	331.63	6724.11	5423.66	3275.29	1064.26	-3295.16	0.66	-0.57	0.33	550560.33	1706531.75	N 40 0 24.77 W	80 32 51.47	6.10
	9751.00	89.77	330.78	6724.42	5423.97	3356.36	1142.26	-3338.03	0.96	-0.07	-0.96	550638.32	1706488.89	N 40 0 25.54 W	80 32 52.04	6.11
	9841.00	91.29	331.93	6723.59	5423.14	3438.24	1221.23	-3381.17	2.12	1.69	1.28	550717.30	1706445.75	N 40 0 26.31 W	80 32 52.60	6.13
	9930.00	88.68	328.26	6723.61	5423.16	3519.99	1298.36	-3425.53	5.06	-2.93	-4.12	550794.42	1706401.39	N 40 0 27.07 W	80 32 53.18	6.15
	10020.00	87.42	324.53	6726.67	5426.22	3604.73	1373.27	-3475.30	4.37	-1.40	-4.14	550869.32	1706351.62	N 40 0 27.80 W	80 32 53.83	6.17
	10109.00	88.20	321.31	6730.08	5429.63	3690.17	1444.21	-3528.91	3.72	0.88	-3.62	550940.26	1706298.01	N 40 0 28.50 W	80 32 54.53	6.19
	10199.00	90.66	321.98	6730.97	5430.52	3777.17	1514.77	-3584.76	2.63	2.73	0.74	551010.02	1706242.17	N 40 0 29.19 W	80 32 55.26	6.21
	10289.00	90.72	322.32	6729.89	5429.44	3863.97	1585.83	-3639.97	0.38	0.07	0.38	551081.68	1706186.95	N 40 0 29.88 W	80 32 55.98	6.22
	10378.00	90.63	321.88	6728.94	5428.39	3949.83	1655.06	-3694.64	0.50	-0.10	-0.49	551152.10	1706132.29	N 40 0 30.57 W	80 32 56.70	6.23
	10468.00	90.26	322.04	6728.14	5427.69	4036.71	1726.94	-3750.10	0.45	-0.41	0.18	551222.98	1706076.83	N 40 0 31.27 W	80 32 57.42	6.24
	10557.00	90.17	321.22	6727.81	5427.36	4122.76	1796.71	-3805.34	0.93	-0.10	-0.92	551292.75	1706021.59	N 40 0 31.95 W	80 32 58.14	6.26
	10647.00	90.29	321.06	6727.44	5426.99	4209.97	1866.80	-3861.81	0.22	0.13	-0.18	551362.83	1705965.12	N 40 0 32.64 W	80 32 58.87	6.27
	10737.00	90.20	320.96	6727.06	5426.61	4297.23	1936.75	-3918.44	0.15	-0.10	-0.11	551432.78	1705908.50	N 40 0 33.32 W	80 32 59.61	6.28
	10826.00	90.37	323.51	6726.62	5426.17	4383.03	2007.10	-3972.94	2.87	0.19	2.87	551503.13	1705854.00	N 40 0 34.01 W	80 33 0.32	6.29
	10916.00	90.11	325.07	6726.24	5425.79	4468.88	2080.17	-4025.47	1.76	-0.29	1.73	551576.20	1705801.47	N 40 0 34.73 W	80 33 1.01	6.31
	11005.00	89.11	323.60	6726.65	5426.40	4553.76	2152.48	-4077.35	2.00	-1.12	-1.65	551648.50	1705749.59	N 40 0 35.43 W	80 33 1.69	6.32
	11095.00	89.34	320.46	6728.06	5427.81	4640.60	2223.41	-4132.72	3.50	0.26	-3.49	551719.43	1705694.23	N 40 0 36.13 W	80 33 2.41	6.34
	11185.00	90.23	321.94	6728.40	5427.95	4727.78	2293.55	-4189.11	1.92	0.99	1.64	551789.57	1705637.84	N 40 0 36.81 W	80 33 3.14	6.35
	11274.00	89.74	321.24	6728.42	5427.97	4813.85	2363.29	-4244.40	0.96	-0.55	-0.79	551859.30	1705582.55	N 40 0 37.50 W	80 33 3.87	6.36
	11364.00	90.23	319.83	6728.45	5428.00	4901.28	2432.77	-4301.60	1.66	0.54	-1.57	551928.78	1705525.35	N 40 0 38.18 W	80 33 4.61	6.38
	11453.00	90.32	323.01	6728.02	5427.57	4987.41	2502.33	-4357.10	3.57	0.10	3.57	551998.34	1705469.86	N 40 0 38.86 W	80 33 5.33	6.39
	11543.00	90.09	325.31	6727.70	5427.25	5073.32	2575.28	-4409.79	2.57	-0.26	2.56	552071.29	1705417.17	N 40 0 39.57 W	80 33 6.02	6.41
	11632.00	90.86	325.83	6726.96	5426.51	5157.60	2648.69	-4460.11	1.04	0.87	0.58	552144.69	1705366.85	N 40 0 40.29 W	80 33 6.68	6.42
	11722.00	90.49	326.69	6725.90	5425.45	5242.42	2723.61	-4509.96	1.25	-0.41	1.18	552219.61	1705317.00	N 40 0 41.03 W	80 33 7.33	6.43
	11811.00	90.72	327.53	6724.96	5424.51	5325.65	2798.43	-4558.16	0.76	0.26	0.72	552294.42	1705268.80	N 40 0 41.76 W	80 33 7.96	6.44
	11901.00	90.37	328.63	6724.10	5423.65	5409.73	2874.81	-4605.74	1.28	-0.39	1.22	552370.81	1705221.22	N 40 0 42.51 W	80 33 8.59	6.45
	11990.00	90.03	325.70	6723.79	5423.34	5493.18	2949.58	-4653.99	3.31	-0.38	-3.29	552445.58	1705172.97	N 40 0 43.24 W	80 33 9.22	6.46
	12080.00	90.09	325.58	6723.70	5423.25	5578.38	3023.88	-4704.79	0.15	0.07	-0.13	552519.87	1705122.18	N 40 0 43.97 W	80 33 9.88	6.47
	12170.00	90.46	327.22	6723.27	5422.82	5663.18	3098.84	-4754.59	1.87	0.41	1.82	552594.83	1705072.38	N 40 0 44.71 W	80 33 10.53	6.49
	12259.00	90.83	327.27	6722.27	5421.82	5746.59	3173.68	-4802.74	0.42	0.42	0.06	552669.67	1705024.23	N 40 0 45.44 W	80 33 11.16	6.49
	12348.00	91.15	324.51	6720.73	5420.28	5830.69	3247.35	-4852.64	3.12	0.36	-3.10	552743.33	1704974.33	N 40 0 46.16 W	80 33 11.82	6.51
	12438.00	90.60	323.69	6719.35	5418.90	5916.63	3320.25	-4905.41	1.10	-0.61	-0.91	552816.22	1704921.57	N 40 0 46.88 W	80 33 12.50	6.52
	12527.00	90.97	324.07	6718.13	5417.68	6001.71	3392.13	-4957.86	0.60	0.42	0.43	552888.11	1704869.11	N 40 0 47.58 W	80 33 13.19	6.53
	12617.00	91.03	324.34	6716.56	5416.11	6087.59	3465.12	-5010.50	0.31	0.07	0.30	552961.09	1704816.48	N 40 0 48.30 W	80 33 13.88	6.54
	12706.00	91.23	327.13	6714.81	5414.36	6171.77	3538.65	-5060.59	3.14	0.22	3.13	553034.52	1704766.39	N 40 0 49.02 W	80 33 14.53	6.55
	12795.00	91.20	324.36	6712.92	5412.47	6255.95	3612.19	-5110.67	3.11	-0.03	-3.11	553108.16	1704716.31	N 40 0 49.74 W	80 33 15.19	6.56
	12885.00	90.32	321.81	6711.73	5411.28	6342.34	3684.14	-5164.72	3.00	-0.98	-2.83	553180.10	1704662.27	N 40 0 50.44 W	80 33 15.89	6.58
	12974.00	90.69	321.47	6710.94	5410.49	6428.38	3753.92	-5219.95	0.56	0.42	-0.38	553249.88	1704607.04	N 40 0 51.13 W	80 33 16.61	6.58
	13064.00	90.20	321.34	6710.24	5409.79	6515.48	3824.26	-5276.09	0.56	-0.54	-0.14	553320.22	1704550.90	N 40 0 51.81 W	80 33 17.34	6.59
	13153.00	90.09	319.98	6710.02	5409.57	6601.90	3893.09	-5332.51	1.53	-0.12	-1.53	553389.05	1704494.49	N 40 0 52.49 W	80 33 18.08	6.60
	13242.00	90.57	322.81	6709.50	5409.05	6688.04	3962.63	-5388.03	3.23	0.54	3.18	553458.59	1704438.96	N 40 0 53.17 W	80 33 18.80	6.62
Final Survey 05-Dec-13	13358.00	90.14	322.22	6708.79	5408.34	6799.72	4054.68	-5458.62	0.63	-0.37	-0.51	553550.63	1704368.38	N 40 0 54.07 W	80 33 19.72	6.63
PTB	13390.00	90.14	322.22	6708.71	5408.26	6830.57	4079.97	-5478.23	0.00	0.00	0.00	553575.92	1704348.77	N 40 0 54.32 W	80 33 19.98	6.63

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	18.540	Act Stns	30.000	30.000	SLB_NSG+MSHOT-Depth Only	Original Borehole / Noble Energy SHL13EHS Gyro+MWD 0ft to 13390ft MD
	1	18.540	3201.500	Act Stns	30.000	30.000	SLB_NSG+MSHOT	Original Borehole / Noble Energy SHL13EHS Gyro+MWD 0ft to
	1	3201.500	3484.000	Act Stns	30.000	30.000	SLB_INC_ONLY+10	Original Borehole / Noble Energy SHL13EHS Gyro+MWD 0ft to
	1	3484.000	13358.000	Act Stns	30.000	30.000	SLB_MWD-STD	Original Borehole / Noble Energy SHL13EHS Gyro+MWD 0ft to
	1	13358.000	13390.000	Act Stns	30.000	30.000	SLB_BLIND+TREND	Original Borehole / Noble Energy SHL13EHS Gyro+MWD 0ft to

51-0164/

PATHFINDER
A Schlumberger Company

Noble Energy

noble energy

Borehole:	Well:	Field:	Structure:
Original Borehole	SHL13EHS	WV Marshall County (NAD 27)	Precision 543

Gravity & Magnetic Parameters

Model:	HDGM 2013	Dip:	67.574°	Date:	11/22/2013
MagDec:	-8.433°	FS:	53164.777nT	Gravity FS:	999.35mgn (9.80665 Based)

Surface Location NAD27 West Virginia State Plane, Northern Zone, US Feet

Lat:	N 40 0 14.63	Northing:	549496.109ftUS	Grid Conv:	-0.661°
Lon:	W 80 32 8.97	Easting:	1709826.781ftUS	Scale Fact:	1

Miscellaneous

Slot: SHL13EHS TVD Ref: KB(1300.45ft above MSL)

Plan: Noble Energy SHL13EHS Gyro+MWD 0ft to 13390ft MD

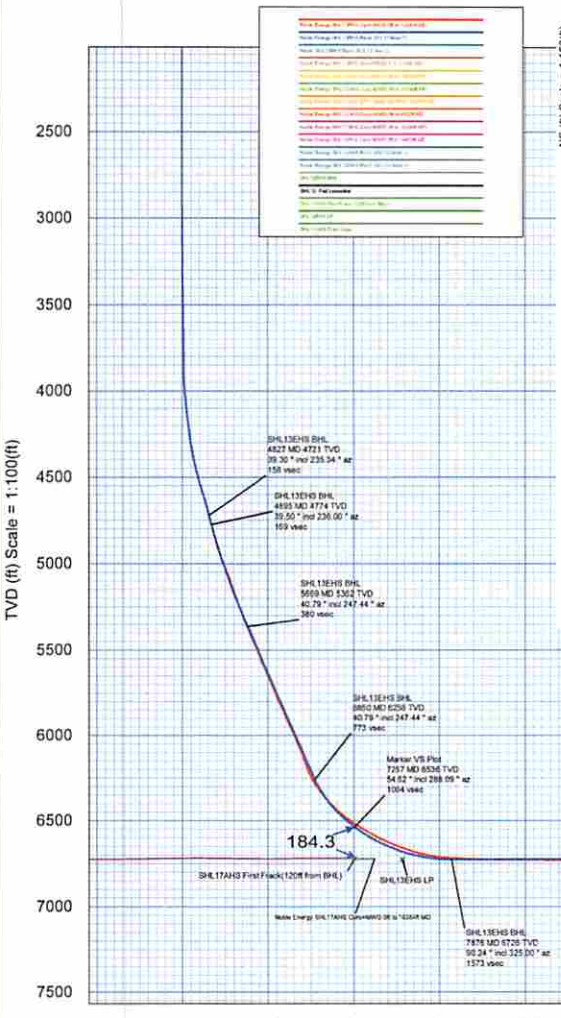
Surface Location — Northing: 549496.109 Easting: 1709826.781 Latitude: N 40 0 14.63 Longitude: W 80 32 8.97 VSec Azimuth: 306.839

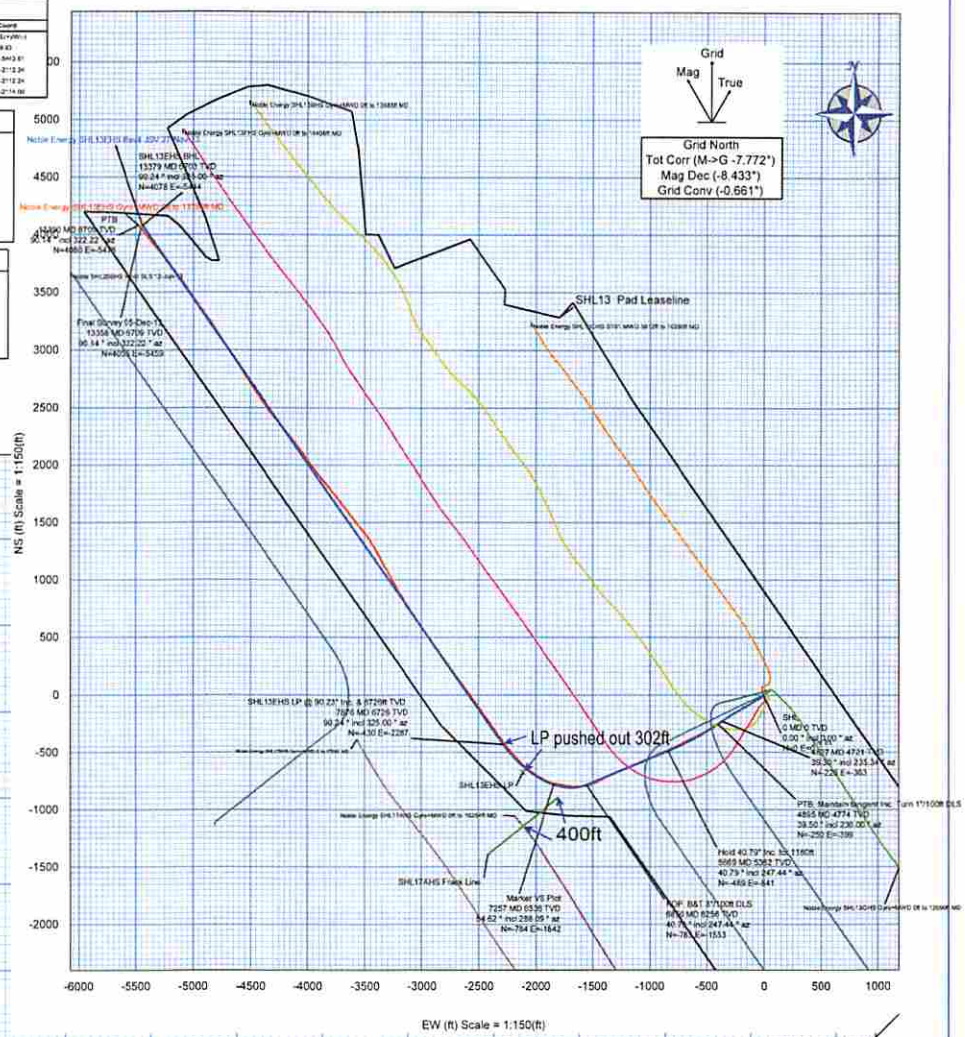
Target Description			Grid Coord					Local Coord	
Target Name	Shape	Dimension	Latitude	Longitude	Northing	Easting	TVD	VSec	N+/S-(-)	E+/W(-)
SHL13 Pad Leaseline	Polyline	N/A	N 40 0 14.38	W 80 32 8.88	549491.04	1709836.71	1300.45	12.84	24.93	9.93
SHL13EHS BHL	Point	N/A	N 40 0 54.30	W 80 32 18.53	553574.12	1709383.38	6703.00	5001.79	4078.18	-5443.81
SHL17AHS First Frack(120ft from BHL)	Point	N/A	N 40 0 3.08	W 80 32 25.94	548281.27	1707714.62	6720.22	1004.04	-1144.88	-2112.24
SHL17AHS Frack Line	Rectangle	800.00 x 0.00	N 40 0 3.08	W 80 32 25.94	548281.27	1707714.62	6720.22	1004.04	-1144.88	-2112.24
SHL13EHS LP	Point	N/A	N 40 0 7.73	W 80 32 26.04	548415.15	1707713.97	6726.00	1283.97	877.01	-2114.98

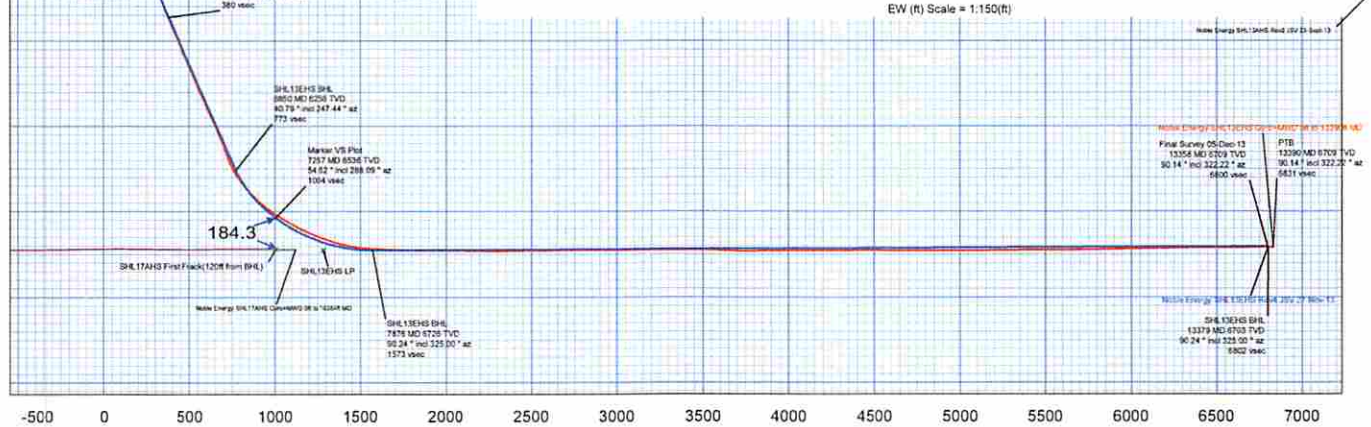
PART	Seq.	Survey Tool/ Survey Tool Code	Vendor/Tool	Hole Size (in)	Casing Size (in)	MD From (ft)	MD To (ft)	Survey Frequency (Sent Major) (ft)	ECU Size (Sent Minor) (ft)	ECU Size (Sent Minor) (ft)	Comments/ Contingency
1	1	SLB_NSG+MSHOT-Depth Only		30	30	0	18.54	Act Shrv	1.25	1.25	
1	2	SLB_NSG+MSHOT		30	30	18.54	3201.5	Act Shrv	2.13	2.13	
1	3	SLB_INC_ONLY+10		30	30	3201.5	3484	Act Shrv	19.14	19.6	
1	4	SLB_MWD-STD		30	30	3484	13358	Act Shrv	191.16	25.16	
1	5	SLB_BLIND+TREND		30	30	13358	13390	Act Shrv	190.63	29.23	

Critical Points

Critical Point	MD	Incl	Azim	TVD	VSec	N+/S-(-)	E+/W(-)	DLS
SHL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Final Survey 05-Dec-13	13358.00	90.14	322.22	6709.71	5700.37	4074.97	-5478.23	0.00
PTB	13390.00	90.14	322.22	6709.71	5730.37	4079.97	-5478.23	0.00





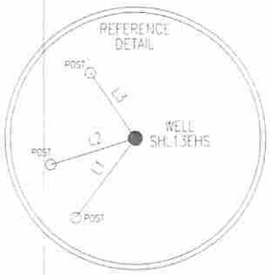


Vertical Section (ft) Azim = 306.839° Scale = 1:100(ft) Origin = 0N/-S, 0E/-W

47-051-01641

Well is located on topo map 13,689' feet south of Latitude: 40° 02' 30"

Well is located on topo map 10,038' feet west of Longitude: 80° 30' 00"



LINE	BEARING	DISTANCE
L1	S 37°08'48" W	236.18'
L2	S 73°09'28" W	211.48'
L3	N 34°30'14" W	189.17'

APPROX. LANDING POINT
UTM 17-NAD83
~~N:4428102.82~~
~~E:538996.49~~
NAD27, WV NORTH
~~N:548819.13~~
~~E:1707712.87~~

AS DRILLED BOTTOM HOLE LOCATION (BHL)
UTM 17-NAD83
N:4429534.83
E:537947.32
NAD27, WV NORTH
N:553575.92
E:1704348.77

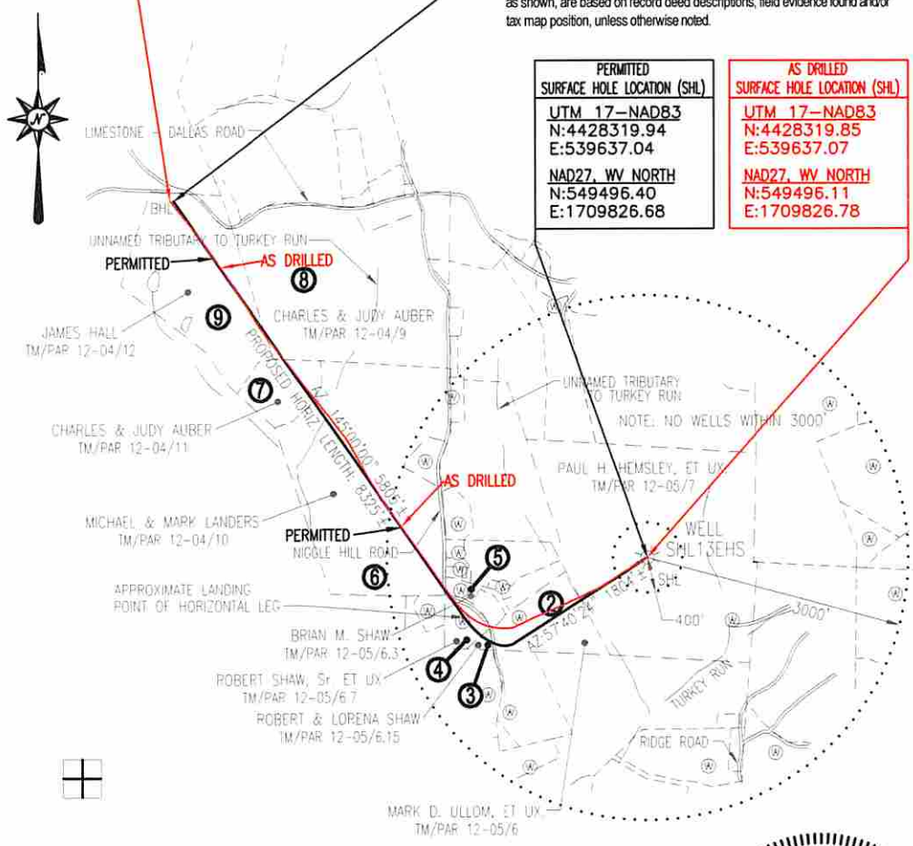
PERMITTED BOTTOM HOLE LOCATION (BHL)
UTM 17-NAD83
N:4429534.46
E:537957.88
NAD27, WV NORTH
N:553574.12
E:1704383.39

NOTES:
1. There are no water wells or developed springs within 250' of proposed well.
2. There are no existing buildings within 625' of proposed well.
3. Proposed well is greater than 100' from perennial stream, wetland, pond, reservoir or lake.
4. There are no native trout streams within 300' of proposed well.
5. Proposed well is greater than 1000' from surface/groundwater intake or public water supply.
6. It is not the purpose or intention of this plat to represent surveyed locations of the surface or mineral parcels depicted hereon. The location of the boundary lines, as shown, are based on record deed descriptions, field evidence found and/or tax map position, unless otherwise noted.

PERMITTED SURFACE HOLE LOCATION (SHL)
UTM 17-NAD83
N:4428319.94
E:539637.04
NAD27, WV NORTH
N:549496.40
E:1709826.68

AS DRILLED SURFACE HOLE LOCATION (SHL)
UTM 17-NAD83
N:4428319.85
E:539637.07
NAD27, WV NORTH
N:549496.11
E:1709826.78

LEGEND
- TOPO MAP POINT
- WELL
- ALL ARE POINTS UNLESS OTHERWISE NOTED
- WATER SOURCE
- LEASE NUMBER BASED ON ATTACHED WW-6A1
- MINERAL TRACT BOUNDARY
- PARCEL LINES
- WELL REFERENCE
- PROPOSED HORIZONTAL WELL
- ROAD
- STREAM CENTER LINE
- AS DRILLED
WELLS WITHIN 3000'
- EXISTING WELLS
- PLUGGED WELLS



Blue Mountain Inc.
11023 MASON DIXON HIGHWAY
BURTON, WV 26562
PHONE: (304) 662-6486

FILE #: SHL13EHS-AS DRILLED
DRAWING #: SHL13EHS-AS DRILLED
SCALE: 1" = 2000'
MINIMUM DEGREE OF ACCURACY: 1/2500
PROVEN SOURCE OF ELEVATION: U.S.G.S. MONUMENT THOMAS 1498.81'

I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE REGULATIONS ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

Signed: George D. Six
R.P.E.: _____ L.L.S.: P.S. No. 2000

GEORGE D. SIX LICENSED No. 2000 STATE OF WEST VIRGINIA PROFESSIONAL SURVEYOR

PLACE SEAL HERE

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS
WVDEP
OFFICE OF OIL & GAS
601 57TH STREET
CHARLESTON, WV 25304

DATE: OCTOBER 2, 2014
OPERATOR'S WELL #: SHL13EHS-AS DRILLED
API WELL #: 47 (STATE) 51 (COUNTY) _____ (PERMIT)

Well Type: [ ] Oil [ ] Waste Disposal [X] Production [ ] Deep
[X] Gas [ ] Liquid Injection [ ] Storage [X] Shallow

WATERSHED: TURKEY RUN ELEVATION: 1288.25'
COUNTY/DISTRICT: MARSHALL / SAND HILL QUADRANGLE: VALLEY GROVE, WV 7.5'
SURFACE OWNER: PAUL H. & ANNETTE A. HEMSLEY ACREAGE: 121.65±
OIL & GAS ROYALTY OWNER: SEE ATTACHED WW-6A1 ACREAGE: 393.282±

DRILL [X] CONVERT [ ] DRILL DEEPER [ ] REDRILL [ ] FRACTURE OR STIMULATE [ ]
PLUG OFF OLD FORMATION [ ] PERFORATE NEW FORMATION [ ] PLUG & ABANDON [ ]
CLEAN OUT & REPLUG [ ] OTHER CHANGE [ ] (SPECIFY): _____

TARGET FORMATION: MARCELLUS ESTIMATED DEPTH: TVD: 6781'± TMD: 13521'±

WELL OPERATOR NOBLE ENERGY INC. DESIGNATED AGENT STEVEN M. GREEN
Address 333 TECHNOLOGY DRIVE, SUITE 116 Address 500 VIRGINIA STREET EAST, UNITED CENTER SUITE 590
City CANONSBURG State PA Zip Code 15317 City CHARLESTON State WV Zip Code 25301

WR-35
Rev. 8/23/13

Page ___ of ___

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

API 47 - 051 - 01642 County Marshall District Sandhill
Quad Valley Grove Pad Name SHL-13 Field/Pool Name
Farm name Paul H. & Annette Hemsley Well Number SHL13FHS
Operator (as registered with the OOG) Noble Energy Inc.
Address 333 Technology Drive, Suite 116 City Canonsburg State PA Zip 15317

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey

Top hole	Northing 442831.55	Easting 539638.51
Landing Point of Curve	Northing 4428180.80	Easting 539222.56
Bottom Hole	Northing 4429790.95	Easting 538059.89

Elevation (ft) 1287.65 GL Type of Well ■New □ Existing Type of Report □Interim ■Final

Permit Type □ Deviated □ Horizontal ■ Horizontal 6A □ Vertical Depth Type □ Deep ■ Shallow

Type of Operation □ Convert □ Deepen ■ Drill □ Plug Back □ Redrilling □ Rework ■ Stimulate

Well Type □ Brine Disposal □ CBM ■ Gas □ Oil □ Secondary Recovery □ Solution Mining □ Storage □ Other _____

Type of Completion ■ Single □ Multiple Fluids Produced □ Brine □Gas □ NGL □ Oil □ Other _____
Drilled with □ Cable ■ Rotary

Drilling Media Surface hole ■ Air □ Mud □Fresh Water Intermediate hole ■ Air □ Mud □ Fresh Water □ Brine
Production hole □ Air ■ Mud □ Fresh Water □ Brine
Mud Type(s) and Additive(s)
Synthetic Oil Based

RECEIVED
Office of Oil and Gas
OCT 09 2014
WV Department of
Environmental Protection

Date permit issued 06/19/2013 Date drilling commenced 7/19/2013 Date drilling ceased 11/21/2013
Date completion activities began 05/06/2014 Date completion activities ceased 05/22/2014
Verbal plugging (Y/N) N Date permission granted _____ Granted by _____

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 561', 763' Open mine(s) (Y/N) depths N
Salt water depth(s) ft N/A Void(s) encountered (Y/N) depths N
Coal depth(s) ft 732' to 742' Pittsburgh Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) Y

Reviewed by:

WR-35
Rev. 8/23/13

API 47- 051 - 01642 Farm name Paul H. & Annette Hemsley Well number SHL13FHS

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/ N) * Provide details below*
Conductor	36	30	40	N			
Surface	24	20	412	N	J-55 94#		Y
Coal							
Intermediate 1	17 1/2	13 3/8	1258	N	J-55 54.5#		Y
Intermediate 2	12 3/8	9 5/8	3224.65	N	J-55 36#		Y
Intermediate 3							
Production	8 3/4	5 1/2	14388	N	P-110 20#		Y
Tubing							
Packer type and depth set							

Comment Details 2 Baskets on Surface Casing

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft^3/sks)	Volume (ft^3)	Cement Top (MD)	WOC (hrs)
Conductor							
Surface	Type 1	500	15.6	1.18	107	0	8
Coal							
Intermediate 1	Type 1	1029	15.6	1.19	219	0	8
Intermediate 2	Type 1	1263	15.6	1.19	245	0	8
Intermediate 3							
Production	Type 1	Lead 401 Tail 1727	14.3 14.8	1.57 1.40	119.0 430.0	3160	
Tubing							

Drillers TD (ft) 14408 Loggers TD (ft) 14372

Deepest formation penetrated Marcellus Plug back to (ft) Not a Pilot Hole

Plug back procedure not a pilot Hole

Kick off depth (ft) 6473

Check all wireline logs run ☐ caliper ☐ density ☐ deviated/directional ☐ induction
☐ neutron ☐ resistivity ■ gamma ray ☐ temperature ☐ sonic

Well cored ☐ Yes ■ No Conventional Sidewall Were cuttings collected ■ Yes ☐ No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING
4 Centralizers on Surface (Every third joint), 10 on Intermediate 1 (Every third joint), 60 on Intermediate 2 (Every third joint),
and 192 on Production casing (Every third joint, till Curve, then Every Joint).

WAS WELL COMPLETED AS SHOT HOLE ■ Yes ☐ No DETAILS Plug and Perforate

WAS WELL COMPLETED OPEN HOLE? ☐ Yes ■ No DETAILS

WERE TRACERS USED ☐ Yes ■ No TYPE OF TRACER(S) USED

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Rev. 8/23/13

API 47- 051 - 01642 Farm name Paul H. & Annette Hemsley Well number SHL13FHS

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)

PLEASE SEE ATTACHED PERFORATION RECORD

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)

PLEASE SEE ATTACHED STIMULATION INFORMATION PER STAGE SHEET

Please insert additional pages as applicable.

Perforation Record

API: 47-051-01642 Farm name: Paul H & Annette A Hemsley Well Name: SHL-13F-HS

Stage No.	Stim Date	Top Perf	Bottom Perf	# of Perfs	Formation
1	5/6/2014	14123	14235	48	Marcellus
2	5/7/2014	13923	14077	40	Marcellus
3	5/7/2014	13723	13877	40	Marcellus
4	5/8/2014	13523	13677	40	Marcellus
5	5/8/2014	13323	13477	40	Marcellus
6	5/9/2014	13123	13277	40	Marcellus
7	5/9/2014	12923	13077	40	Marcellus
8	5/10/2014	12723	12877	40	Marcellus
9	5/10/2014	12523	12677	40	Marcellus
10	5/11/2014	12323	12477	40	Marcellus
11	5/11/2014	12123	12277	40	Marcellus
12	5/12/2014	11923	12077	40	Marcellus
13	5/14/2014	11723	11877	40	Marcellus
14	5/14/2014	11523	11677	40	Marcellus
15	5/15/2014	11323	11477	40	Marcellus
16	5/16/2014	11123	11277	40	Marcellus
17	5/16/2014	10923	11077	40	Marcellus
18	5/17/2014	10723	10877	40	Marcellus
19	5/18/2014	10523	10677	40	Marcellus
20	5/18/2014	10323	10477	40	Marcellus
21	5/18/2014	10123	10277	40	Marcellus
22	5/19/2014	9923	10077	40	Marcellus
23	5/19/2014	9723	9877	40	Marcellus
24	5/19/2014	9523	9677	40	Marcellus
25	5/19/2014	9323	9477	40	Marcellus
26	5/20/2014	9123	9277	40	Marcellus
27	5/20/2014	8923	9077	40	Marcellus
28	5/21/2014	8723	8877	40	Marcellus
29	5/21/2014	8523	8677	40	Marcellus
30	5/21/2014	8323	8477	40	Marcellus
31	5/22/2014	8123	8277	40	Marcellus
31C	5/22/2014	7923	8277	40	Marcellus
32	5/22/2014	7723	7877	40	Marcellus
33	5/22/2014	7523	7677	40	Marcellus

STIMULATION INFORMATION PER STAGE

API: 47-051-01642 Farm name: Paul H & Annette A Hemsley Well Name: SHL-13F-HS

Stage No.	Stim Date	Avg Rate (bpm)	ATP (psi)	Max BD Pressure	ISIP (psi)	Proppant (lbs)	Water (BBLS)	Amount of N^2/ other
1	5/6/2014	69.8	7036	5581	3744	497619	10772.95	
2	5/7/2014	69.3	7549	6178	4256	501968	12381.79	
3	5/7/2014	69.0	7066	5646	4945	502833	10714.26	
4	5/8/2014	69.5	7036	5390	4028	501053	11066.70	
5	5/8/2014	69.5	7084	5532	3789	502405	10973.58	
6	5/9/2014	67.5	7315	6018	4901	503312	10345.16	
7	5/10/2014	69.4	7389	5565	4253	494693	9683.50	
8	5/10/2014	69.8	7336	5715	4711	499586	9863.26	
9	5/11/2014	70.2	7647	6136	4390	499040	13450.07	
10	5/11/2014	70.2	7463	5929	4212	500122	10991.38	
11	5/12/2014	68.0	7352	5993	4742	500315	11163.17	
12	5/13/2014	68.9	6896	5646	4551	502743	10357.49	
13	5/14/2014	70.0	6853	5751	4587	499814	10264.26	
14	5/15/2014	66.6	7011	6049	5917	462091	9805.26	
14 Inj Test	5/15/2014	2.2	7805		5466	0	394.88	
15	5/16/2014	69.9	7129	5973	4437	540986	11960.00	
16	5/16/2014	70.6	7100	5790	4807	499608	10651.83	
17	5/17/2014	70.2	6936	5767	5039	499750	12314.60	
18	5/17/2014	70.3	6878	5488	4386	500804	9965.07	
19	5/18/2014	70.2	6592	5905	4440	499827	11134.83	
20	5/18/2014	70.4	7039	5895	4436	500083	9659.16	
21	5/18/2014	70.2	6831	5821	4764	500056	9663.24	
22	5/19/2014	70.1	7109	6410	4436	501814	11203.83	
23	5/19/2014	70.1	6762	6035	4607	500170	10163.69	
24	5/19/2014	70.1	6672	6047	4139	499974	9896.45	
25	5/20/2014	70.3	6644	6349	4793	500107	9476.33	
26	5/20/2014	70.2	6743	5989	4635	494880	9836.48	
27	5/20/2014	70.3	6794	6489	4559	499383	9603.53	
28	5/21/2014	70.1	6784	6491	4396	505314	9742.73	
29	5/21/2014	70.4	6605	6057	5022	500116	9725.64	
30	5/21/2014	65.6	7246	5772	4452	500190	12114.71	
31	5/22/2014	62.3	7230	6730	5683	298223	9614.88	
31C	5/22/2014	70.2	6738	5804	4857	701441	13509.23	
32	5/22/2014	69.9	6601	5918	4531	500804	12123.48	
33	5/22/2014	69.2	6487	6279	4024	495884	9834.00	

WR-35
Rev. 8/23/13

API 47- 051 - 01642 Farm name Paul H. & Annette Hemsley Well number SHL13FHS

PRODUCING FORMATION(S)	DEPTHS			
Marcelllus	6707	TVD	14408'	MD

Please insert additional pages as applicable.

GAS TEST ☐ Build up ☐ Drawdown ☐ Open Flow OIL TEST ☐ Flow ☐ Pump

SHUT-IN PRESSURE Surface _____ psi Bottom Hole _____ psi DURATION OF TEST _____ hrs

OPEN FLOW Gas 4608 mcfpd Oil 192 bpd NGL 299 bpd Water 624 bpd GAS MEASURED BY ☐ Estimated ■ Orifice ☐ Pilot

LITHOLOGY/ FORMATION NAME	TOP DEPTH IN FT TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H_2S, ETC)
	0		0		

PLEASE SEE FORMATIONS SHEET

Please insert additional pages as applicable.

Drilling Contractor Precision Drilling
Address 5400 D Big Tyler Road City Charleston State WV Zip 25313

Logging Company Diversified Well Logging
Address 711 West 10th Street City Reserve State LA Zip 70084

Cementing Company Schlumberger
Address 4600 J. Barry Court, Suite 200 City Canonsburg State PA Zip 15317

Stimulating Company Halliburton Energy SVCS
Address 121 Champion Way, Suite 110 City Canonsburg State PA Zip 15317

Please insert additional pages as applicable.

Completed by Regina A. Logue Telephone 724-820-3599
Signature Regina A Logue Title Regulatory Analyst Date 10/6/14

Submittal of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Registry

SHL 13F

47-051-01642

Formations	Top TVD	Base TVD	Top MD	Base MD	Fluid
Shale	0	732	0	732	
Pittsburgh Coal	732	742	732	742	
Shale and Sandstone	742	1516	742	1516	
Gas Sand	1516	1574	1516	1574	
Shale	1574	1693	1574	1693	
1st Salt Sand	1693	1756	1693	1756	
2nd Salt Sand	1756	1765	1756	1765	
3rd Salt Sand	1765	1815	1765	1815	
Shale	1815	1841	1815	1841	
Maxton Sand	1841	1958	1841	1958	
Shale	1958	1978	1958	2509	
Big Lime	1978	2023	1978	2023	
Big Injun	2023	2165	2023	2165	
Price	2165	2509	2165	2509	
Murrysville	2509	2522	2509	2872	
Shale	2522	2726	2522	2726	
50' Sand	2726	2743	2726	2743	
Shale	2743	2829	2743	2829	
Gordon Stray	2829	2841	2829	2841	
Shale	2841	2872	2841	2872	
Gordon	2872	2890	2872	2890	
Shale	2890	2985	2890	2985	
Fifth Sand	2985	3023	2985	3023	
Shale	3023	3423	3023	3423	
Speechley Sand	3423	3447	3423	3447	
Shale	3447	4331	3447	4333	
Warren Sand	4331	4345	4333	4347	
Shale	4345	5252	4347	5254	
Java Shale	5252	5322	5254	5324	
Pipe Creek Shale	5322	5366	5324	5368	
Angola Shale	5366	5992	5368	6023	
Rhinestreet	5992	6406	6023	6704	
Cashaqua	6406	6498	6704	6905	
Middlesex	6498	6535	6905	6986	
West River	6535	6576	6986	7079	
Burkett	6576	6609	7079	7155	
Tully Limestone	6609	6637	7155	7224	
Hamilton	6637	6751	7224	7658	
Marcellus	6751	6802	7658	not encountered	Gas
Onondaga	6802	6807	not encountered	not encountered	
Huntersville	6807	not encountered	not encountered	not encountered	

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	5/6/2014
Job End Date:	5/22/2014
State:	West Virginia
County:	Marshall
API Number:	47-051-01642-00-00
Operator Name:	Noble Energy, Inc.
Well Name and Number:	SHL13 F
Longitude:	-80.53580800
Latitude:	40.00402500
Datum:	NAD27
Federal/Tribal Well:	NO
True Vertical Depth:	6,707
Total Base Water Volume (gal):	15,305,700
Total Base Non Water Volume:	0

FracFocus Chemical Disclosure Registry

GROUNDWATER PROTECTION COUNCIL

Oil & Gas

51-01642

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	87.48963	Density = 8.330
SAND - PREMIUM WHITE	Halliburton	Proppant					
			Crystalline silica, quartz	14808-60-7	100.00000	9.33420	
SAND - COMMON WHITE	Halliburton	Proppant					
			Crystalline silica, quartz	14808-60-7	100.00000	2.34575	
HYDROCHLORIC ACID 5-10%	Halliburton	Solvent					
			Hydrochloric acid	7647-01-0	10.00000	0.06811	
FR-66	Halliburton	Friction Reducer					
			Hydrotreated light petroleum distillate	64742-47-8	30.00000	0.02382	
FE-1A ACIDIZING COMPOSITION	Halliburton	Additive					
			Acetic anhydride	108-24-7	100.00000	0.00341	
			Acetic acid	64-19-7	60.00000	0.00205	
BE-9	Halliburton	Biocide					
			Tributyl tetradecyl phosphonium chloride	81741-28-8	10.00000	0.00399	
LP-65 MC	Halliburton	Scale Inhibitor					

			Ammonium chloride	12125-02-9	10.00000	0.00244	
LoSurf-300D	Halliburton	Non-ionic Surfactant					
			Ethanol	64-17-5	60.00000	0.00069	
			Heavy aromatic petroleum naphtha	64742-94-5	30.00000	0.00034	
			Naphthalene	91-20-3	5.00000	0.00006	
			Poly(oxy-1,2-ethanediyl), alpha-(4-nonylphenyl)-omega-hydroxy-, branched	127087-87-0	5.00000	0.00006	
			1,2,4 Trimethylbenzene	95-63-6	1.00000	0.00001	
HAI-OS ACID INHIBITOR	Halliburton	Corrosion Inhibitor					
			Methanol	67-56-1	60.00000	0.00034	
			Propargyl alcohol	107-19-7	10.00000	0.00006	
LCA-1	Halliburton	Solvent					
			Paraffinic solvent	Confidential	100.00000	0.00036	Denise Tuck, Halliburton 3000 N. Sam Houston Pkwy E., Houston, TX 77032 281-871-6226
WG-36 GELLING AGENT	Halliburton	Gelling Agent					
			Guar gum	9000-30-0	100.00000	0.00021	
SP BREAKER	Halliburton	Breaker					
			Sodium persulfate	7775-27-1	100.00000	0.00002	
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		0.78320	
		Other Ingredient(s)					
			Polyacrylamide copolymer	Confidential		0.02382	
		Other Ingredient(s)					
			Organic phosphonate	Confidential		0.01463	
		Other Ingredient(s)					
			Sodium chloride	7647-14-5		0.00397	
		Other Ingredient(s)					
			Alcohols, C12-16, ethoxylated	68551-12-2		0.00397	
		Other Ingredient(s)					
			Fatty acid tall oil amide	Confidential		0.00397	
		Other Ingredient(s)					
			Ammonium chloride	12125-02-9		0.00397	
		Other Ingredient(s)					
			Sorbitan, mono-9-octadecenoate, (Z)	1338-43-8		0.00079	
		Other Ingredient(s)					
			Sorbitan monooleate polyoxyethylene derivative	9005-65-6		0.00079	
		Other Ingredient(s)					
			Oxyalkylated phenolic resin	Confidential		0.00034	

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		Other Ingredient(s)					
			Formaldehyde	50-00-0		0.00024	
		Other Ingredient(s)					
			Alcohols, C14-C15, ethoxylated	68951-67-7		0.00017	
		Other Ingredient(s)					
			Fatty acids, tall oil	Confidential		0.00017	
		Other Ingredient(s)					
			Reaction product of acetophenone, formaldehyde, thiourea and oleic acid in dimethyl formamide	68527-49-1		0.00017	
		Other Ingredient(s)					
			Oxyalkylated phenolic resin	Confidential		0.00011	
		Other Ingredient(s)					
			Olefins	Confidential		0.00003	
		Other Ingredient(s)					
			Olefins	Confidential		0.00003	
		Other Ingredient(s)					
			Bentonite, benzyl(hydrogenated tallow alkyl) dimethylammonium stearate complex	121888-68-4		0.00001	
		Other Ingredient(s)					
			Olefins	Confidential		0.00001	
		Other Ingredient(s)					
			Olefins	Confidential		0.00001	
		Other Ingredient(s)					
			Silica gel	112926-00-8		0.00000	
		Other Ingredient(s)					
			Surfactant mixture	Confidential		0.00000	
		Other Ingredient(s)					
			Surfactant mixture	Confidential		0.00000	
		Other Ingredient(s)					
			Crystalline Silica, Quartz	14808-60-7		0.00000	
		Other Ingredient(s)					
			Sodium sulfate	7757-82-6		0.00000	

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* 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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PATHFINDER

noble energy

Noble Energy SHL13FHS Gyro+MWD 0ft to 14408ft MD Survey Report

(Def Survey)

Report Date:	December 06, 2013 - 11:16 AM	Survey / DLS Computation:	Minimum Curvature / Lubinski
Client:	Noble Energy	Vertical Section Azimuth:	313.888 * (Grid North)
Field:	WV Marshall County (NAD 27)	Vertical Section Origin:	0.000 ft, 0.000 ft
Structure / Slot:	Noble Energy SHL13 Pad / SHL13FHS	TVD Reference Datum:	KB
Well:	SHL13FHS	TVD Reference Elevation:	1300.420 ft above MSL
Borehole:	Original Borehole	Seabed / Ground Elevation:	1281.910 ft above MSL
UWI / API#:	Unknown / Unknown	Magnetic Declination:	-8.432 *
Survey Name:	Noble Energy SHL13FHS Gyro+MWD 0ft to 14408ft MD	Total Gravity Field Strength:	999.349ft/mgn (9.80665 Based)
Survey Date:	November 10, 2013	Gravity Model:	GARM
Tort / AHD / DDI / ERD Ratio:	306.667 * / 8402.657 ft / 6.740 / 1.243	Total Magnetic Field Strength:	53169.093 nT
Coordinate Reference System:	NAD27 West Virginia State Plane, Northern Zone, US Feet	Magnetic Dip Angle:	67.577 *
Location Lat / Long:	N 40* 0' 14.49105", W 80* 32' 8.91345"	Declination Date:	November 10, 2013
Location Grid N/E Y/X:	N 549481.890 ftUS, E 1709831.287 ftUS	Magnetic Declination Model:	HDGM 2013
CRS Grid Convergence Angle:	-0.6606 *	North Reference:	Grid North
Grid Scale Factor:	0.99996247	Grid Convergence Used:	-0.6606 *
Version / Patch:	2.7.998.0	Total Corr Mag North->Grid North:	-7.7712 *
		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	-1300.42	0.00	0.00	0.00	N/A	N/A	N/A	549481.89	1709831.29	N 40 0 14.49	W 80 32 8.91	0.00
	118.50	0.24	128.81	118.50	-1181.92	-0.25	-0.16	0.19	0.20	0.20	0.00	549481.73	1709831.48	N 40 0 14.49	W 80 32 8.91	0.00
	218.50	0.17	240.27	218.50	-1081.92	-0.41	-0.36	0.23	0.34	-0.07	111.46	549481.53	1709831.51	N 40 0 14.49	W 80 32 8.91	0.00
	318.50	0.11	258.09	318.50	-981.92	-0.32	-0.45	0.01	0.07	-0.06	17.82	549481.44	1709831.29	N 40 0 14.49	W 80 32 8.91	0.00
	418.50	0.04	8.38	418.50	-881.92	-0.24	-0.44	-0.08	0.13	-0.07	110.29	549481.45	1709831.20	N 40 0 14.49	W 80 32 8.91	0.00
	518.50	0.06	48.94	518.50	-781.92	-0.23	-0.37	-0.04	0.04	0.02	40.56	549481.52	1709831.25	N 40 0 14.49	W 80 32 8.91	0.00
	618.50	0.27	15.42	618.50	-681.92	-0.12	-0.11	0.06	0.22	0.21	-33.52	549481.78	1709831.35	N 40 0 14.49	W 80 32 8.91	0.11
	718.50	0.18	48.58	718.50	-581.92	-0.02	0.22	0.24	0.15	-0.09	33.16	549482.11	1709831.53	N 40 0 14.49	W 80 32 8.91	0.28
	818.50	0.47	107.97	818.50	-481.92	-0.40	0.20	0.75	0.41	0.29	59.39	549482.09	1709832.04	N 40 0 14.49	W 80 32 8.90	0.54
	918.50	0.45	105.26	918.49	-381.93	-1.12	-0.03	1.52	0.03	-0.02	-2.71	549481.88	1709832.81	N 40 0 14.49	W 80 32 8.89	0.68
	1018.50	0.34	107.21	1018.49	-281.93	-1.73	-0.22	2.18	0.11	-0.11	1.95	549481.67	1709833.47	N 40 0 14.49	W 80 32 8.89	0.80
	1118.50	0.25	105.69	1118.49	-181.93	-2.18	-0.37	2.68	0.09	-0.09	-1.32	549481.52	1709833.96	N 40 0 14.49	W 80 32 8.88	0.88
	1218.50	0.40	52.58	1218.49	-81.93	-2.43	-0.22	3.16	0.32	0.15	-53.31	549481.67	1709834.45	N 40 0 14.49	W 80 32 8.87	1.00
	1318.50	0.15	35.17	1318.49	18.07	-2.46	0.10	3.52	0.26	-0.25	-17.41	549481.99	1709834.80	N 40 0 14.49	W 80 32 8.87	1.10
	1418.50	0.44	357.11	1418.49	118.07	-2.16	0.59	3.57	0.33	0.29	-38.06	549482.48	1709834.86	N 40 0 14.50	W 80 32 8.87	1.19
	1518.50	0.26	352.89	1518.48	218.06	-1.71	1.20	3.52	0.18	-0.18	-4.22	549483.09	1709834.81	N 40 0 14.50	W 80 32 8.87	1.26
	1618.50	0.25	27.42	1618.48	318.06	-1.47	1.62	3.60	0.15	-0.01	34.53	549483.51	1709834.88	N 40 0 14.51	W 80 32 8.87	1.32
	1718.50	0.36	306.60	1718.48	418.06	-1.09	2.00	3.44	0.40	0.11	-80.82	549483.89	1709834.73	N 40 0 14.51	W 80 32 8.87	1.40
	1818.50	0.11	304.82	1818.48	518.06	-0.69	2.24	3.11	0.25	-0.25	-1.78	549484.13	1709834.40	N 40 0 14.51	W 80 32 8.87	1.45
	1918.50	0.02	315.40	1918.48	618.06	-0.58	2.31	3.02	0.09	-0.09	10.58	549484.20	1709834.31	N 40 0 14.51	W 80 32 8.87	1.47
	2018.50	0.20	260.68	2018.48	718.06	-0.45	2.30	2.84	0.19	0.18	-54.72	549484.19	1709834.13	N 40 0 14.51	W 80 32 8.88	1.50
	2118.50	0.13	254.14	2118.48	818.06	-0.29	2.24	2.56	0.07	-0.07	-6.54	549484.13	1709833.84	N 40 0 14.51	W 80 32 8.88	1.52
	2218.50	0.21	267.79	2218.48	918.06	-0.11	2.20	2.26	0.09	0.08	13.65	549484.09	1709833.55	N 40 0 14.51	W 80 32 8.88	1.55
	2318.50	0.28	275.40	2318.48	1018.06	0.21	2.21	1.84	0.08	0.07	7.61	549484.10	1709833.13	N 40 0 14.51	W 80 32 8.89	1.58
	2418.50	0.39	283.23	2418.48	1118.06	0.69	2.31	1.26	0.12	0.11	7.83	549484.20	1709832.55	N 40 0 14.51	W 80 32 8.90	1.62
	2518.50	0.46	271.99	2518.47	1218.05	1.29	2.41	0.53	0.11	0.07	-11.24	549484.30	1709831.82	N 40 0 14.51	W 80 32 8.91	1.66
	2618.50	0.51	259.71	2618.47	1318.05	1.84	2.34	-0.31	0.12	0.05	-12.28	549484.23	1709830.98	N 40 0 14.51	W 80 32 8.92	1.71
	2718.50	0.56	260.55	2718.47	1418.05	2.40	2.18	-1.23	0.05	0.05	0.84	549484.07	1709830.06	N 40 0 14.51	W 80 32 8.93	1.75
	2818.50	0.64	265.49	2818.46	1518.04	3.06	2.06	-2.27	0.10	0.08	4.94	549483.95	1709829.02	N 40 0 14.51	W 80 32 8.94	1.79
	2918.50	0.73	266.19	2918.45	1618.03	3.86	1.97	-3.46	0.09	0.09	0.70	549483.86	1709827.83	N 40 0 14.51	W 80 32 8.96	1.84
	3018.50	0.74	264.75	3018.45	1718.03	4.71	1.87	-4.74	0.02	0.01	-1.44	549483.76	1709826.55	N 40 0 14.51	W 80 32 8.97	1.88
	3118.50	0.74	261.93	3118.44	1818.02	5.53	1.72	-6.02	0.04	0.00	-2.82	549483.61	1709825.27	N 40 0 14.51	W 80 32 8.99	1.91
	3168.50	0.58	265.70	3168.43	1868.01	5.90	1.66	-6.59	0.33	-0.32	7.54	549483.55	1709824.70	N 40 0 14.51	W 80 32 9.00	1.94
	3259.00	0.76	271.98	3258.93	1958.51	6.65	1.64	-7.65	0.21	0.20	6.94	549483.53	1709823.64	N 40 0 14.51	W 80 32 9.01	1.99
	3303.00	0.62	236.73	3302.92	2002.50	6.92	1.52	-8.14	1.00	-0.32	-80.11	549483.41	1709823.15	N 40 0 14.51	W 80 32 9.02	2.03
	3348.00	2.32	190.15	3347.91	2047.49	6.47	0.49	-8.50	4.33	3.78	-103.51	549482.38	1709822.78	N 40 0 14.49	W 80 32 9.02	2.18
	3393.00	4.22	185.77	3392.83	2092.41	4.94	-2.05	-8.83	4.26	4.22	-9.73	549479.84	1709822.46	N 40 0 14.47	W 80 32 9.03	2.33
	3482.00	5.45	179.02	3481.52	2181.10	-0.06	-9.54	-9.09	1.52	1.38	-7.58	549472.35	1709822.20	N 40 0 14.40	W 80 32 9.03	2.52
	3572.00	4.70	167.62	3571.16	2270.74	-6.14	-17.41	-8.22	1.39	-0.83	-12.67	549464.48	1709823.06	N 40 0 14.32	W 80 32 9.02	2.67
	3662.00	5.03	163.50	3660.84	2360.42	-12.64	-24.80	-6.31	0.53	0.37	-4.58	549457.09	1709824.97	N 40 0 14.25	W 80 32 8.99	2.76
	3751.00	4.45	154.79	3749.54	2449.12	-19.28	-31.66	-3.73	1.04	-0.65	-9.79	549450.23	1709827.55	N 40 0 14.18	W 80 32 8.96	2.86
	3841.00	2.33	148.94	3839.37	2538.95	-24.29	-38.39	-1.30	2.38	-2.36	-6.50	549445.50	1709829.98	N 40 0 14.13	W 80 32 8.92	2.96
	3930.00	1.26	190.55	3928.33	2627.91	-26.57	-38.90	-0.55	1.82	-1.20	46.75	549442.99	1709830.74	N 40 0 14.11	W 80 32 8.91	3.02
	4020.00	0.91	195.76	4018.32	2717.90	-27.45	-40.56	-0.92	0.40	-0.39	5.79	549441.33	1709830.36	N 40 0 14.09	W 80 32 8.92	3.05
	4110.00	0.90	200.24	4108.31	2807.89	-28.07	-41.91	-1.36	0.08	-0.01	4.98	549439.98	1709829.92	N 40 0 14.08	W 80 32 8.92	3.06
	4199.00	0.69	183.18	4197.30	2896.88	-28.70	-43.10	-1.63	0.35	-0.24	-19.17	549438.79	1709829.65	N 40 0 14.06	W 80 32 8.93	3.07
	4289.00	0.81	204.89	4287.29	2986.87	-29.21	-44.08	-1.87	0.29	-0.09	24.12	549437.81	1709829.42	N 40 0 14.06	W 80 32 8.93	3.09
	4378.00	0.80	218.21	4376.28	3075.86	-29.43	-45.00	-2.45	0.28	0.21	14.97	549436.90	1709828.84	N 40 0 14.05	W 80 32 8.94	3.10
	4468.00	0.85	230.59	4466.28	3165.86	-29.41	-45.91	-3.35	0.21	0.06	13.76	549435.98	1709827.93	N 40 0 14.04	W 80 32 8.95	3.11
	4558.00	0.63	235.98	4556.27	3255.85	-29.23	-46.61	-4.28	0.26	-0.24	5.99	549435.28	1709827.01	N 40 0 14.03	W 80 32 8.96	3.12
	4647.00	1.02	251.00	4645.26	3344.84	-28.77	-47.16	-5.43	0.50	0.44	16.88	549434.75	1709825.85	N 40 0 14.02	W 80 32 8.98	3.14
	4737.00	0.86	237.79	4735.25	3434.83	-28.24	-47.77	-6.76	0.30	-0.18	-14.68	549434.12	1709824.52	N 40 0 14.02	W 80 32 8.99	3.16
	4826.00	0.92	240.60	4824.24	3523.82	-27.87	-48.47	-7.95	0.08	0.07	3.16	549433.42	1709823.34	N 40 0 14.01	W 80 32 9.01	3.17
	4916.00	1.17	253.48	4914.22	3613.80	-27.21	-49.09	-9.46	0.38	0.28	14.31	549432.80	1709821.83	N 40 0 14.00	W 80 32 9.03	3.18
	5005.00	1.03	246.02	5003.20	3702.78	-26.46	-49.67	-11.06	0.22	-0.16	-8.38	549432.22	1709820.22	N 40 0 14.00	W 80 32 9.05	3.20
	5095.00	1.11	230.70	5093.19	3792.77	-26.05	-50.55	-12.48	0.33	0.09	-17.02	549431.34	1709818.81	N 40 0 13.99	W 80 32 9.07	3.21
	5184.00	1.25	246.66	5182.17	3881.75	-25.58	-51.49	-14.04	0.40	0.16	17.93	549430.41	1709817.25	N 40 0 13.98	W 80 32 9.09	3.23
	5274.00	1.40	247.40	5272.15	3971.73	-24.76	-52.30	-15.95	0.17	0.17	0.82	549429.60	1709815.34	N 40 0 13.97	W 80 32 9.11	3.24
	5363.00	1.45	239.94	5361.12	4060.70	-24.01	-53.28	-17.93	0.22	0.06	-8.38	549428.61	1709813.36	N 40 0 13.96	W 80 32 9.14	3.26
	5453.00	1.79	236.76	5451.08	4150.66	-23.39	-54.62	-20.09	0.39	0.38	-3.53	549427.27	1709811.20	N 40 0 13.95	W 80 32 9.16	3.28
	5498.00	3.65	220.09	5496.03	4195.61	-23.32	-56.10	-21.60	4.45	4.13	-37.04	549425.79	1709809.69	N 40 0 13.93	W 80 32 9.18	3.33
	5542.00	5.42	213.98	5539.89	4239.47	-23.77	-58.90	-23.66	4.18	4.02	-13.89	549423.00	1709807.62	N 40 0 13.91	W 80 32 9.21	3.38
	5587.00	7.95	212.75	5584.58	4284.16	-24.74	-63.28	-26.54	5.63	5.62	-2.73	549418.62	1709804.75	N 40 0 13.86	W 80 32 9.25	3.44
	5632.00	9.82	218.33	5629.04	4328.62	-25.85	-68.96	-30.49	4.33	4.16	7.96	549412.91	1709800.79	N 40 0 13.81	W 80 32 9.30	3.50
	5677.00	12.90	219.47	5673.15	4372.73	-26.74	-75.96	-35.96	6.98	6.84	6.98	549405.94	1709795.33	N 40 0 13.74	W 80 32 9.36	3.58
	5721.00	15.70	218.72	5715.79	4415.37	-27.65	-84.39	-42.81	6.38	6.36	-1.70	549397.50	1709788.48	N 40 0 13.65	W 80 32 9.45	3.65
	5766.00	18.33	216.94	5758.81	4458.39	-29.06	-94.80	-50.87	5.96	5.84	-3.96	549387.09	1709780.42	N 40 0 13.55	W 80 32 9.55	3.73
	5811.00	20.92	214.26	5801.20	4500.78	-31.26	-107.10	-59.65	6.09	5.76	-5.96	549374.79	1709771.64	N 40 0 13.43	W 80 32 9.66	3.80
	5855.00	22.61	210.36	5842.06	4541.64	-34.55	-120.89	-68.35	5.05	3.84	-8.86	549361.00	1709762.94	N 40 0 13.29	W 80 32 9.77	3.87
	5900.00	24.45	208.71	5883.32	4582.90	-39.01	-136.53	-77.19	4.34	4.09	-3.67	549345.37	1709754.10	N 40 0 13.13	W 80 32 9.89	3.93
	5945.00	26.97	208.79	5923.86	4623.44	-44.11	-153.64	-86.58	5.60	5.60	0.18	549328.26	1709744.71	N 40 0 12.96	W 80 32 10.00	4.00
	5990.00	29.59	209.52	5963.48	4663.06	-49.53	-172.25	-96.97	5.87	5.82	1.62	549309.64	1709734.32	N 40 0 12.78	W 80 32 10.13	4.07
	6035.00	31.95	209.79	6002.15	4701.73	-55.18	-192.26	-108.36	5.25	5.24	0.60	549289.64	1709722.93	N 40 0 12.58	W 80 32 10.28	4.13
	6080.00	34.49	211.57	6039.79	4739.37	-60.80	-213.45	-120.95	6.05	5.64	3.96	549268.45	1709710.34	N 40 0 12.37	W 80 32 10.44	4.19
	6124.00	37.42	214.13	6075.41	4774.99	-65.73	-235.14	-134.98	7.48	6.66	5.82	549246.76	1709696.31	N 40 0 12.15	W 80 32 10.61	4.26
	6169.00	40.35	214.92	6110.43	4810.01	-70.32	-258.40	-150.99	6.60	6.51	1.76	549223.50	1709680.30	N 40 0 11.92	W 80 32 10.82	4.32
	6214.00	42.90	213.29	6144.07	4843.65	-75.41	-283.16	-167.74	6.16	5.67	-3.62	549198.75	1709663.55	N 40 0 11.67	W 80 32 11.03	4.37
	6259.00	45.63	210.65	6176.29	4875.87	-81.91	-309.80	-184.35	7.32	6.07	-5.87	549172.10	1709646.94	N 40 0 11.41	W 80 32 11.24	4.43
	6303.00	49.14	209.52	6206.08	4905.66	-89.64	-337.82	-200.57	8.20	7.98	-2.57	549144.08	1709630.72	N 40 0 11.13	W 80 32 11.44	4.49
	6348.00	52.75	209.44	6234.43	4934.01	-98.34	-368.24	-217.77	8.02	8.02	-0.18	549113.67	1709613.53	N 40 0 10.83	W 80 32 11.66	4.55
	6393.00	56.42	210.58	6260.50	4960.08	-107.12	-399.98	-236.11	8.41	8.16	2.53	549081.92	1709595.18	N 40 0 10.51	W 80 32 11.89	4.60
	6433.00	59.62	212.38	6281.68	4981.26	-114.40	-428.91	-253.84	8.86	8.00	4.50	549053.00	1709577.46	N 40 0 10.22	W 80 32 12.11	4.65
	6478.00	62.66	213.60	6303.40	5002.98	-121.85	-461.96	-275.30	7.16	6.76	2.71	549019.95	1709556.00	N 40 0 9.89	W 80 32 12.38	4.70
	6523.00	62.34	216.84	6324.19	5023.77	-127.86	-494.56	-298.31	6.43	-0.71	7.20	548987.35	1709532.99	N 40 0 9.57	W 80 32 12.67	4.75
	6568.00	62.22	221.12	6345.12	5044.70	-131.27	-525.52	-323.36	8.42	-0.27	9.51	548956.39	1709507.94	N 40 0 9.26	W 80 32 12.99	4.79
	6612.00	63.38	224.16	6365.24	5064.82	-132.12	-554.30	-349.87	6.69	2.64	6.91	548927.62	1709481.43	N 40 0 8.97	W 80 32 13.33	4.83
	6658.00	64.07	228.34	6385.61	5085.19	-130.41	-582.81	-379.66	8.28	1.50	9.09	548899.11	1709451.64	N 40 0 8.69	W 80 32 13.71	4.88
	6702.00	63.95	232.09	6404.90	5104.48	-126.06	-608.11	-410.04	7.67	-0.27	8.52	548873.81	1709421.26	N 40 0 8.44	W 80 32 14.09	4.92
	6747.00	63.29	236.28	6424.90	5124.48	-118.86	-631.70	-442.72	8.47	-1.47	9.31	548850.22	1709388.58	N 40 0 8.20	W 80 32 14.51	4.96
	6792.00	62.45	238.51	6445.42	5145.00	-109.51	-653.28	-476.45	4.79	-1.87	4.96	548828.64	1709354.85	N 40 0 7.98	W 80 32 14.94	4.99
	6836.00	62.07	241.68	6465.91	5165.49	-98.64	-672.69	-510.20	6.43	-0.86	7.20	548809.23	1709321.10	N 40 0 7.79	W 80 32 15.37	5.02
	6879.00	61.94	245.50	6486.10	5185.68	-85.84	-689.57	-544.20	7.85	-0.30	8.88	548792.34	1709287.11	N 40 0 7.61	W 80 32 15.80	5.05

51.01642

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
	6926.00	62.64	249.43	6507.96	5207.54	-69.20	-705.51	-582.62	7.55	1.49	8.36	548776.41	1709248.69	N 40 0 7.45 W	80 32 16.29	5.09
	6971.00	63.50	252.23	6528.34	5227.92	-51.02	-718.68	-620.52	5.87	1.91	6.22	548763.24	1709210.80	N 40 0 7.32 W	80 32 16.78	5.11
	7017.00	63.82	256.84	6548.76	5248.34	-30.02	-729.67	-660.23	9.01	0.70	10.02	548752.25	1709171.08	N 40 0 7.21 W	80 32 17.29	5.15
	7060.00	64.08	261.24	6567.65	5267.23	-7.78	-737.01	-698.15	9.21	0.60	10.23	548744.91	1709133.17	N 40 0 7.13 W	80 32 17.77	5.18
	7107.00	63.76	264.43	6588.32	5287.90	18.75	-742.27	-740.02	6.13	-0.68	6.79	548739.65	1709091.29	N 40 0 7.07 W	80 32 18.31	5.21
	7150.00	64.69	267.73	6607.02	5306.60	44.76	-744.92	-778.65	7.24	2.16	7.67	548737.00	1709052.67	N 40 0 7.04 W	80 32 18.81	5.23
	7197.00	66.30	271.10	6626.52	5326.10	75.27	-745.34	-821.40	7.37	3.43	7.17	548736.58	1709009.92	N 40 0 7.03 W	80 32 19.36	5.26
	7239.00	68.11	274.27	6642.79	5342.37	104.40	-743.52	-860.07	8.18	4.31	7.55	548738.40	1708971.25	N 40 0 7.05 W	80 32 19.85	5.29
	7286.00	69.70	278.15	6659.71	5359.29	139.10	-738.77	-903.65	8.41	3.38	8.26	548743.15	1708927.67	N 40 0 7.09 W	80 32 20.41	5.32
	7329.00	71.05	282.08	6674.10	5373.74	172.76	-731.66	-943.51	9.16	3.14	9.14	548750.26	1708887.81	N 40 0 7.15 W	80 32 20.93	5.34
	7376.00	72.14	286.25	6689.01	5388.59	211.48	-720.74	-986.74	8.73	2.32	8.87	548761.18	1708844.59	N 40 0 7.26 W	80 32 21.49	5.37
	7424.00	73.39	290.87	6703.23	5402.81	252.91	-706.15	-1030.18	9.55	2.60	9.63	548775.77	1708801.15	N 40 0 7.40 W	80 32 22.05	5.40
	7465.00	74.47	294.46	6714.59	5414.17	289.63	-690.97	-1066.53	8.82	2.63	8.76	548790.95	1708764.80	N 40 0 7.54 W	80 32 22.51	5.42
	7508.00	75.53	297.99	6725.72	5425.30	329.20	-672.61	-1103.78	8.30	2.47	8.21	548809.30	1708727.55	N 40 0 7.72 W	80 32 23.00	5.45
	7555.00	77.86	301.94	6736.54	5436.12	373.58	-649.77	-1143.39	9.56	4.96	8.40	548832.15	1708687.94	N 40 0 7.94 W	80 32 23.51	5.47
	7598.00	81.59	305.21	6744.21	5443.79	415.20	-626.37	-1178.63	11.45	8.67	7.60	548855.54	1708652.71	N 40 0 8.17 W	80 32 23.96	5.50
	7644.00	84.29	308.19	6749.86	5449.44	460.48	-599.09	-1215.22	8.71	5.87	6.48	548882.82	1708616.12	N 40 0 8.43 W	80 32 24.44	5.52
	7687.00	85.94	311.04	6753.15	5452.73	503.23	-571.76	-1248.24	9.04	6.16	6.63	548910.16	1708583.10	N 40 0 8.70 W	80 32 24.87	5.54
	7733.00	83.97	315.45	6754.79	5454.37	549.18	-540.27	-1281.71	10.55	4.41	9.59	548941.64	1708549.62	N 40 0 9.01 W	80 32 25.30	5.57
	7777.00	88.28	319.25	6755.85	5455.43	593.08	-507.92	-1311.51	8.78	-1.57	8.64	548973.99	1708519.83	N 40 0 9.32 W	80 32 25.69	5.59
	7823.00	87.63	321.65	6757.49	5457.07	638.75	-472.48	-1340.78	5.40	-1.41	5.22	549009.43	1708490.56	N 40 0 9.67 W	80 32 26.07	5.61
	7868.00	88.07	325.55	6759.11	5458.69	681.09	-437.90	-1366.27	9.12	1.02	9.07	549044.01	1708465.07	N 40 0 10.01 W	80 32 26.40	5.63
	7913.00	91.61	326.34	6759.24	5458.82	727.05	-398.97	-1392.59	7.72	7.53	1.68	549082.94	1708438.75	N 40 0 10.39 W	80 32 26.75	5.65
	7956.00	91.89	326.42	6757.92	5457.50	769.01	-363.18	-1416.39	0.68	0.65	0.19	549118.73	1708414.96	N 40 0 10.74 W	80 32 27.06	5.67
	8053.00	90.62	326.06	6755.80	5455.38	863.74	-282.56	-1470.28	1.36	-1.31	-0.37	549199.35	1708361.07	N 40 0 11.53 W	80 32 27.76	5.70
	8142.00	89.76	324.29	6755.50	5455.08	951.02	-209.50	-1521.10	2.21	-0.97	-1.99	549272.40	1708310.25	N 40 0 12.25 W	80 32 28.43	5.72
	8232.00	90.17	326.66	6755.56	5455.14	1039.17	-135.36	-1572.10	2.67	0.46	2.63	549346.54	1708259.24	N 40 0 12.97 W	80 32 29.09	5.75
	8321.00	90.38	326.72	6755.13	5454.71	1125.96	-60.98	-1620.98	0.25	0.24	0.07	549420.91	1708210.37	N 40 0 13.70 W	80 32 29.73	5.77
	8411.00	90.17	325.67	6754.70	5454.28	1213.89	13.80	-1671.05	1.19	-0.23	-1.17	549495.69	1708160.30	N 40 0 14.44 W	80 32 30.39	5.80
	8500.00	90.31	325.18	6754.33	5453.91	1301.09	87.08	-1721.56	0.57	0.16	-0.55	549568.97	1708109.80	N 40 0 15.15 W	80 32 31.05	5.82
	8590.00	90.24	324.69	6753.90	5453.48	1389.42	160.75	-1773.26	0.55	-0.08	-0.54	549642.83	1708058.09	N 40 0 15.88 W	80 32 31.72	5.84
	8680.00	90.24	324.31	6753.52	5453.10	1477.88	234.02	-1825.53	0.42	0.00	-0.42	549715.90	1708005.83	N 40 0 16.59 W	80 32 32.40	5.86
	8769.00	90.31	324.55	6753.09	5452.67	1565.38	306.41	-1877.30	0.28	0.08	0.27	549788.29	1707954.07	N 40 0 17.30 W	80 32 33.06	5.88
	8859.00	90.31	324.34	6752.60	5452.18	1653.85	379.63	-1929.63	0.23	0.00	-0.23	549861.50	1707901.74	N 40 0 18.02 W	80 32 33.76	5.90
	8948.00	90.21	324.73	6752.20	5451.78	1741.32	452.12	-1981.27	0.45	-0.11	0.44	549933.99	1707850.10	N 40 0 18.73 W	80 32 34.44	5.92
	9038.00	90.24	324.29	6751.65	5451.43	1829.78	525.39	-2033.52	0.49	0.03	-0.49	550007.26	1707797.85	N 40 0 19.45 W	80 32 35.12	5.93
	9127.00	90.21	324.93	6751.50	5451.08	1917.22	597.95	-2085.06	0.72	-0.03	0.72	550079.82	1707746.31	N 40 0 20.16 W	80 32 35.79	5.95
	9217.00	90.17	325.13	6751.20	5450.78	2005.53	671.70	-2136.64	0.23	-0.04	0.22	550153.56	1707694.73	N 40 0 20.88 W	80 32 36.47	5.97
	9307.00	90.38	324.16	6750.77	5450.35	2093.94	745.10	-2188.72	1.10	0.23	-1.08	550226.98	1707642.68	N 40 0 21.60 W	80 32 37.15	5.99
	9396.00	90.21	324.57	6750.31	5449.89	2181.48	817.43	-2240.57	0.50	-0.19	0.46	550299.29	1707590.81	N 40 0 22.31 W	80 32 37.82	6.00
	9486.00	90.21	324.99	6749.98	5449.56	2269.84	890.96	-2292.47	0.47	0.00	0.47	550372.81	1707538.90	N 40 0 23.03 W	80 32 38.50	6.02
	9575.00	90.07	324.26	6749.76	5449.34	2357.28	963.53	-2344.00	0.84	-0.16	-0.82	550445.38	1707487.38	N 40 0 23.74 W	80 32 39.18	6.04
	9664.00	90.24	323.32	6749.52	5449.10	2444.95	1035.34	-2396.57	1.07	0.19	-1.06	550517.18	1707434.81	N 40 0 24.45 W	80 32 39.86	6.05
	9754.00	90.62	324.01	6748.85	5448.43	2533.64	1107.83	-2449.90	0.88	0.42	0.77	550589.68	1707381.49	N 40 0 25.16 W	80 32 40.56	6.07
	9843.00	90.89	325.20	6747.67	5447.25	2621.08	1180.38	-2501.44	1.37	0.30	1.34	550662.22	1707329.94	N 40 0 25.87 W	80 32 41.23	6.09
	9933.00	90.69	324.94	6746.43	5446.01	2709.36	1254.16	-2552.97	0.36	-0.22	-0.29	550736.00	1707278.42	N 40 0 26.59 W	80 32 41.90	6.10
	10023.00	90.79	325.26	6745.27	5444.85	2797.63	1327.96	-2604.46	0.37	0.11	0.36	550809.80	1707226.93	N 40 0 27.32 W	80 32 42.56	6.12
	10112.00	89.90	321.92	6744.73	5444.31	2885.35	1399.58	-2657.28	3.88	-1.00	-3.75	550881.41	1707174.12	N 40 0 28.02 W	80 32 43.27	6.14
	10202.00	90.31	322.43	6744.57	5444.15	2974.41	1470.67	-2712.47	0.73	0.46	0.57	550952.50	1707118.93	N 40 0 28.71 W	80 32 43.99	6.15
	10291.00	90.65	322.03	6743.82	5443.40	3062.46	1541.02	-2766.98	0.59	0.38	-0.45	551022.85	1707064.42	N 40 0 29.40 W	80 32 44.70	6.16
	10381.00	90.17	324.32	6743.18	5442.76	3151.27	1613.05	-2820.92	2.60	-0.53	2.54	551094.88	1707010.48	N 40 0 30.11 W	80 32 45.40	6.18
	10470.00	90.14	327.76	6742.94	5442.52	3238.27	1686.86	-2870.62	3.87	-0.03	3.87	551168.68	1706960.78	N 40 0 30.83 W	80 32 46.05	6.20
	10560.00	90.38	326.01	6742.53	5442.11	3325.96	1762.24	-2919.79	1.96	0.27	-1.94	551244.06	1706911.61	N 40 0 31.57 W	80 32 46.69	6.22
	10649.00	89.93	327.40	6742.29	5441.87	3412.74	1835.63	-2968.65	1.64	-0.51	1.56	551318.44	1706862.76	N 40 0 32.30 W	80 32 47.33	6.23
	10739.00	90.58	329.47	6741.89	5441.47	3499.84	1913.31	-3015.75	2.41	0.72	2.30	551395.12	1706815.65	N 40 0 33.05 W	80 32 47.95	6.25
	10829.00	90.28	327.07	6741.21	5440.79	3587.01	1989.85	-3063.08	2.69	-0.33	-2.67	551471.66	1706768.33	N 40 0 33.80 W	80 32 48.57	6.26
	10918.00	89.76	324.51	6741.18	5440.76	3674.09	2063.44	-3113.12	2.94	-0.58	-2.88	551545.25	1706718.29	N 40 0 34.52 W	80 32 49.22	6.28
	11008.00	90.21	326.00	6741.21	5440.79	3762.33	2137.39	-3164.41	1.73	0.50	1.66	551619.20	1706667.00	N 40 0 35.25 W	80 32 49.89	6.29
	11098.00	90.58	327.98	6740.58	5440.16	3849.98	2212.86	-3213.44	2.24	0.41	2.20	551694.66	1706617.98	N 40 0 35.99 W	80 32 50.53	6.31
	11187.00	89.76	326.40	6740.32	5439.90	3936.22	2288.49	-3260.35	1.04	-0.92	0.47	551770.29	1706571.07	N 40 0 36.73 W	80 32 51.15	6.32
	11277.00	90.45	327.09	6740.18	5439.74	4023.59	2364.60	-3308.38	1.65	0.77	-1.46	551846.39	1706523.04	N 40 0 37.48 W	80 32 51.78	6.33
	11366.00	90.41	325.68	6739.49	5439.07	4110.45	2438.80	-3357.52	1.36	-0.04	-1.36	551920.59	1706473.90	N 40 0 38.21 W	80 32 52.42	6.35
	11456.00	89.97	323.66	6739.19	5438.77	4198.82	2512.31	-3409.43	2.51	-0.49	-2.47	551994.10	1706421.99	N 40 0 38.93 W	80 32 53.10	6.36
	11545.00	90.17	324.59	6739.08	5438.66	4286.41	2584.42	-3461.59	1.07	0.22	1.04	552066.21	1706369.84	N 40 0 39.63 W	80 32 53.78	6.37
	11635.00	90.48	326.90	6738.57	5438.15	4374.48	2658.81	-3512.24	2.59	0.34	2.57	552140.59	1706319.19	N 40 0 40.36 W	80 32 54.44	6.39
	11724.00	90.41	324.85	6737.88	5437.46	4461.53	2732.48	-3562.16	2.30	-0.08	-2.30	552214.26	1706269.26	N 40 0 41.08 W	80 32 55.09	6.40
	11814.00	90.34	324.93	6737.29	5436.87	4549.87	2805.10	-3613.93	0.12	-0.08	0.09	552287.88	1706217.50	N 40 0 41.81 W	80 32 55.77	6.41
	11903.00	90.65	327.74	6736.52	5436.10	4636.77	2880.18	-3663.26	3.18	0.35	3.16	552361.94	1706168.18	N 40 0 42.53 W	80 32 56.42	6.43
	11993.00	90.58	334.04	6735.56	5435.13	4722.79	2958.75	-3707.02	7.00	-0.08	7.00	552440.52	1706124.42	N 40 0 43.30 W	80 32 56.99	6.45
	12082.00	90.41	331.22	6734.78	5434.36	4807.06	3037.78	-3747.93	3.17	-0.19	-3.17	552519.55	1706083.51	N 40 0 44.08 W	80 32 57.53	6.46
	12172.00	91.06	328.64	6733.63	5433.21	4893.54	3115.65	-3793.01	2.96	0.72	-2.87	552597.42	1706038.42	N 40 0 44.84 W	80 32 58.12	6.48
	12261.00	89.52	326.19	6733.18	5432.76	4980.06	3190.63	-3840.94	3.25	-1.73	-2.75	552672.40	1706090.50	N 40 0 45.58 W	80 32 58.75	6.49
	12351.00	91.07	323.24	6732.72	5432.30	5068.44	3264.09	-3892.92	3.70	1.72	-3.28	552745.85	1705938.52	N 40 0 46.30 W	80 32 59.42	6.50
	12440.00	91.62	325.12	6730.63	5430.21	5155.98	3336.23	-3944.99	2.20	0.62	2.11	552817.99	1705886.45	N 40 0 47.01 W	80 33 0.10	6.52
	12530.00	89.66	319.97	6729.62	5429.20	5244.92	3407.64	-3999.70	6.12	-2.18	-5.72	552889.40	1705831.75	N 40 0 47.71 W	80 33 0.82	6.53
	12619.00	90.72	323.53	6729.33	5428.91	5333.07	3477.52	-4054.79	4.17	1.19	4.00	552959.27	1705776.66	N 40 0 48.39 W	80 33 1.54	6.55
	12708.00	90.48	321.14	6728.39	5427.97	5421.09	3547.97	-4109.16	2.70	-0.27	-2.69	553029.71	1705722.29	N 40 0 49.06 W	80 33 2.25	6.56
	12798.00	90.79	321.51	6727.40	5426.98	5510.33	3618.22	-4165.40	0.54	0.34	0.41	553099.97	1705666.05	N 40 0 49.77 W	80 33 2.98	6.57
	12887.00	90.62	320.87	6726.30	5425.88	5598.60	3687.57	-4221.18	0.74	-0.19	-0.72	553169.31	1705610.28	N 40 0 50.45 W	80 33 3.71	6.58
	12977.00	90.72	321.68	6725.25	5424.83	5687.84	3757.76	-4277.47	0.91	0.11	0.90	553239.52	1705553.98	N 40 0 51.13 W	80 33 4.44	6.59
	13066.00	90.48	322.53	6724.32	5423.90	5775.92	3828.01	-4332.14	0.99	-0.27	0.96	553309.75	1705499.32	N 40 0 51.82 W	80 33 5.15	6.60
	13155.00	90.65	322.75	6723.44	5423.02	5863.88	3898.74	-4386.14	0.31	0.19	0.25	553380.48	1705445.32	N 40 0 52.51 W	80 33 5.86	6.61
	13245.00	90.65	323.81	6722.42	5422.00	5952.67	3970.88	-4439.95	1.18	0.00	1.18	553452.61	1705391.52	N 40 0 53.22 W	80 33 6.56	6.62
	13334.00	90.28	323.35	6721.70	5421.28	6040.40	4042.49	-4492.78	0.66	-0.42	-0.52	553524.22	1705338.68	N 40 0 53.92 W	80 33 7.25	6.63
	13424.00	90.62	324.47	6720.99	5420.57	6129.02	4115.22	-4545.80	1.30	0.38	1.24	553596.95	1705285.67	N 40 0 54.63 W	80 33 7.94	6.64
	13513.00	90.72	324.34	6719.95	5419.53	6216.52	4187.58	-4597.60	0.18	0.11	-0.15	553669.31	1705233.87	N 40 0 55.34 W	80 33 8.62	6.65
	13602.00	90.75	324.60	6718.81	5418.39	6304.00	4260.01	-4649.31	0.29	0.03	0.29	553741.73	1705182.16	N 40 0 56.05 W	80 33 9.29	6.65
	13691.00	90.65	325.82	6717.72	5417.30	6391.26	4333.09	-4700.09	1.38	-0.11	1.37	553814.81	1705131.39	N 40 0 56.77 W	80 33 9.96	6.66
	13781.00	90.79	325.47	6716.59	5416.17	6479.36	4407.39	-4750.87	0.42	0.16	-0.39	553889.10	1705080.60	N 40 0 57.50 W	80 33 10.62	6.67
	13870.00	90.96	326.17	6715.23	5414.81	6566.43	4481.00	-4800.87	0.81	0.19	0.79	553962.72	1705030.61	N 40 0 58.22 W	80 33 11.28	6.68
	13959.00	90.48	325.19	6714.11	5413.69	6653.54	4554.50	-4851.04	1.23	-0.54	-1.10	554036.21	1704980.44	N 40 0 58.94 W	80 33 11.93	6.69
	14049.00	90.79	325.48	6713.11	5412.69	6741.74	4628.52	-4902.23	0.47	0.34	0.32	554110.23	1704929.25	N 40 0 59.67 W	80 33 12.60	6.70
	14138.00	90.75	326.60	6711.92	5411.50	6828.74	4702.33	-4951.94	1.26	-0.04	1.26	554184.04	1704879.54	N 40 1 0.39 W	80 33 13.25	6.71
	14228.00	91.17	326.07	6710.41	5409.99	6916.61	4777.23	-5001.82	0.75	0.47	-0.59	554258.93	1704829.66	N 40 1 1.12 W	80 33 13.90	6.72
	14317.00	91.65	328.82	6708.22	5407.80	7003.10	4852.21	-5049.69	3.14	0.54	3.09	554333.91	1704781.79	N 40 1 1.86 W	80 33 14.53	6.73
Final Survey 21-Nov-13 PTB	14372.00	90.62	326.21	6707.13	5406.71	7056.53	4898.60	-5079.23	5.10	-1.87	-4.75	554380.29	1704752.26	N 40 1 2.31 W	80 33 14.92	6.74
	14408.00	90.62	326.21	6706.74	5406.32	7091.70	4928.51	-5099.25	0.00	0.00	0.00	554410.21	1704732.24	N 40 1 2.61 W	80 33 15.18	6.74

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	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	1	0.000	18.510	Act Stns	30.000	30.000	SLB_NSG+MSHOT-Depth Only	Original Borehole / Noble Energy SHL13FHS Gyro+MWD 0ft to 14408ft MD
	1	18.510	3168.500	Act Stns	30.000	30.000	SLB_NSG+MSHOT	Original Borehole / Noble Energy SHL13FHS Gyro+MWD 0ft to
	1	3168.500	14372.000	Act Stns	30.000	30.000	SLB_MWD-STD	Original Borehole / Noble Energy SHL13FHS Gyro+MWD 0ft to
	1	14372.000	14408.000	Act Stns	30.000	30.000	SLB_BLIND+TREND	Original Borehole / Noble Energy SHL13FHS Gyro+MWD 0ft to

51-01642

PATHFINDER
A Schlumberger Company

Noble Energy

noble energy

Borehole:	Well:	Field:	Structure:
Original Borehole	SHL13FHS	WV Marshall County (NAD 27)	Precision 543

Gravity & Magnetic Parameters

Model:	HDGM 2013	Dip:	67.577°	Date:	11/10/2013
MagDec:	-8.432°	FS:	53169.093nT	Gravity FS:	999.35mgn (9.80665 Based)

Surface Location NAD27 West Virginia State Plane, Northern Zone, US Feet

Lat:	N 40 0 14.49	Northing:	549481.89ftUS	Grid Conv:	-0.661°
Lon:	W 80 32 8.91	Easting:	1709831.287ftUS	Scale Fact:	1

Miscellaneous

Slot:	SHL13FHS	TVD Ref:	KB(1300.42ft above MSL)
Plan:	Noble Energy SHL13FHS Gyro+MWD 0ft to 14408ft MD		

Surface Location

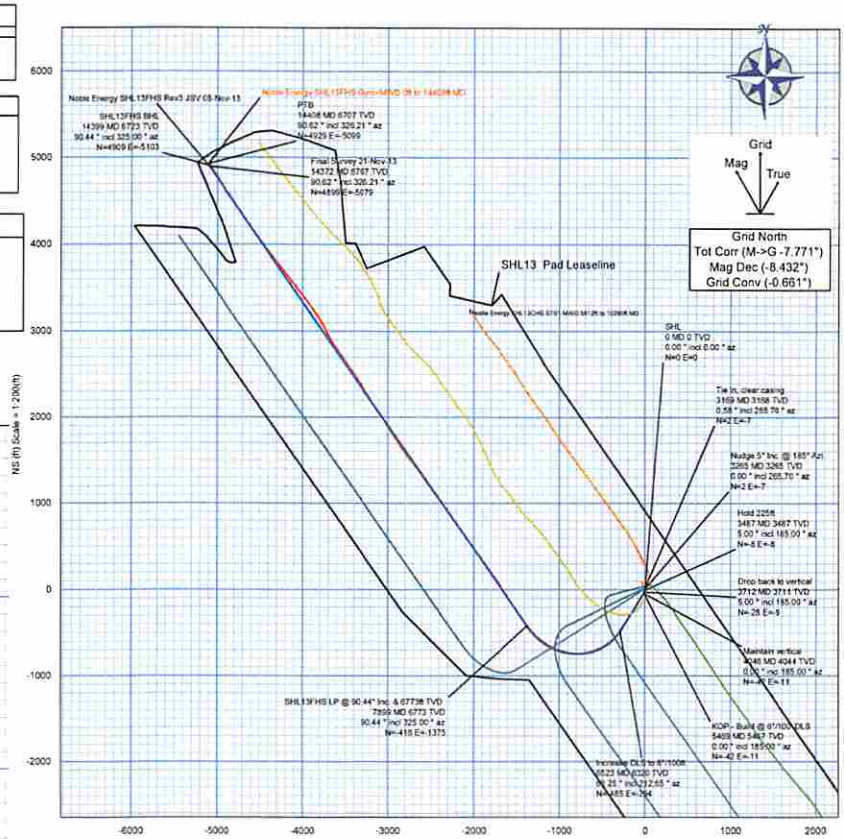
Northing: 549481.89 Easting: 1709831.287 Latitude: N 40 0 14.49 Longitude: W 80 32 8.91 VSec Azimuth: 313.888

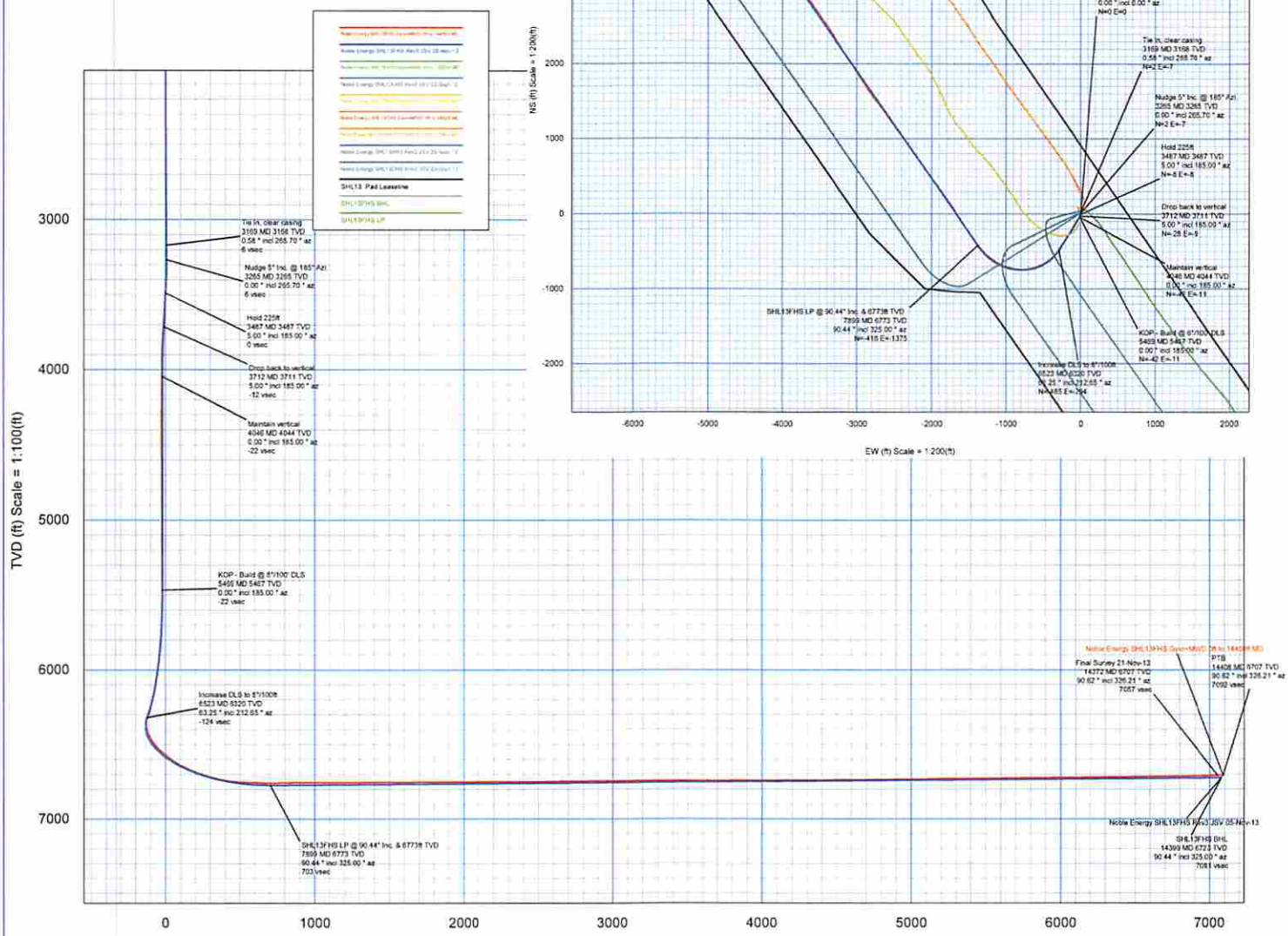
Target Description			Grid Coord						Local Coord	
Target Name	Shape	Dimension	Latitude	Longitude	Northing	Easting	TVD	VSec	N(+)/S(-)	E(+)/W(-)
SHL13 Pad Leaseline	Polyline	N/A	N 40 0 14.49	W 80 32 8.85	549481.84	1709836.71	1300.42	32.16	-16.18	5.43
SHL13FHS BHL	Point	N/A	N 40 1 2.41	W 80 32 15.22	551080.41	1709758.41	6723.00	7090.74	1498.71	-5122.08
SHL13FHS LP	Point	N/A	N 40 0 10.23	W 80 32 25.52	549858.73	1709456.51	6773.00	702.00	-415.78	-1374.83

Part/T	Seq.	Survey Tool / Survey Tool Code	Vendor/Tool	Hole Size (in)	Casing Size (in)	MD From (ft)	MD To (ft)	Survey Frequency	EOU Size (Semi Major) (ft)	EOU Size (Semi Minor) (ft)	Comments/ Contingency
1	1	SLB_MSG+MWD+IFR1 Gogin Only		30	30	0	19.5*	Act Srvy	1.25	1.25	
1	2	SLB_MSG+MWD+IFR1		30	30	19.5*	3166.5	Act Srvy	4.22	3.16	
1	3	SLB_MWD-STD		30	30	3166.5	14372	Act Srvy	198.1	12.1	
1	4	SLB_BLIND+TREND		30	30	14372	14408	Act Srvy	202.41	17.62	

Critical Points

Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLS
SHL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Final Survey 21-Nov-13	14372.00	90.62	326.21	6707.13	7056.33	+4999.00	-5079.23	0.10
PTB	14408.00	90.62	326.21	6706.74	7091.70	+4029.81	-5096.25	0.00

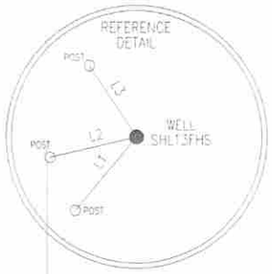




47-051-01642

Well is located on topo map 13,703' feet south of Latitude: 40° 02' 30"

Well is located on topo map 10,033' feet west of Longitude: 80° 30' 00"



LINE	BEARING	DISTANCE
L1	S 40°13'35" W	227.84'
L2	S 77°12'40" W	212.19'
L3	N 33°16'20" W	203.57'

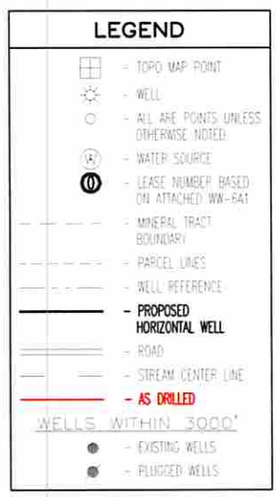
APPROX LANDING POINT
UTM 17-NAD83
~~N:4428180.80~~
~~E:539222.56~~
NAD27, WV NORTH
~~N:549062.59~~
~~E:1708458.99~~

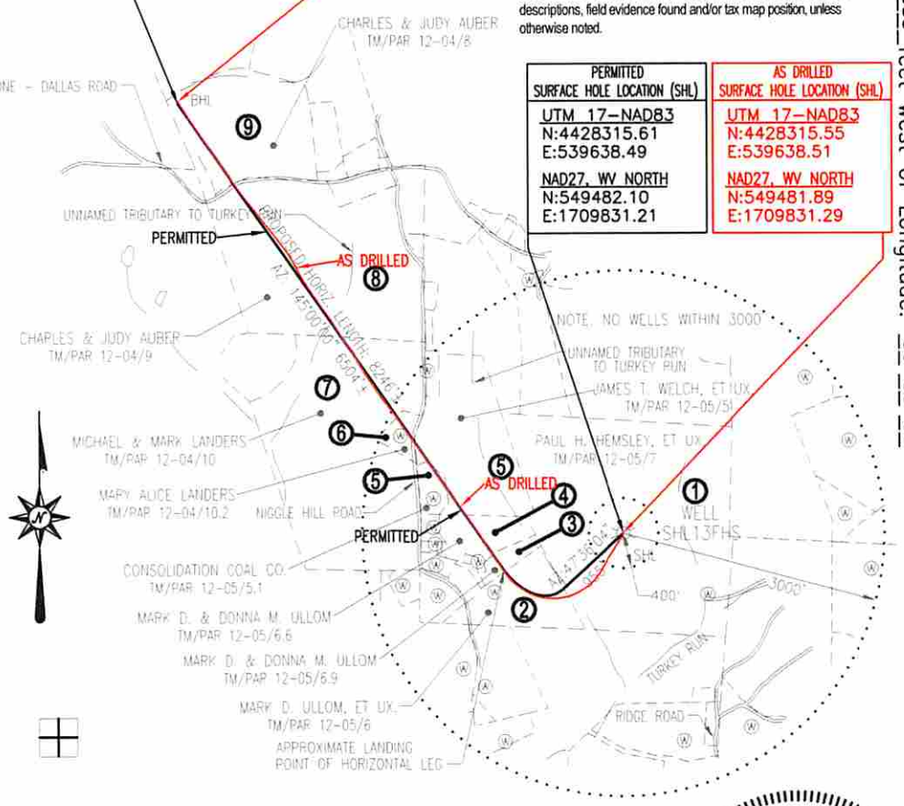
NOTES:

1. There are no water wells or developed springs within 250' of proposed well.
2. There are no existing buildings within 625' of proposed well.
3. Proposed well is greater than 100' from perennial stream, wetland, pond, reservoir or lake.
4. There are no native trout streams within 300' of proposed well.
5. Proposed well is greater than 1000' from surface/groundwater intake or public water supply.
6. It is not the purpose or intention of this plat to represent surveyed locations of the surface or mineral parcels depicted hereon. The location of the boundary lines, as shown, are based on record deed descriptions, field evidence found and/or tax map position, unless otherwise noted.

PERMITTED BOTTOM HOLE LOCATION (BHL)	AS DRILLED BOTTOM HOLE LOCATION (BHL)
UTM 17-NAD83	UTM 17-NAD83
N:4429784.90	N:4429790.95
E:538058.83	E:538059.89
NAD27, WV NORTH	NAD27, WV NORTH
N:554390.41	N:554410.21
E:1704728.41	E:1704732.24

PERMITTED SURFACE HOLE LOCATION (SHL)	AS DRILLED SURFACE HOLE LOCATION (SHL)
UTM 17-NAD83	UTM 17-NAD83
N:4428315.61	N:4428315.55
E:539638.49	E:539638.51
NAD27, WV NORTH	NAD27, WV NORTH
N:549482.10	N:549481.89
E:1709831.21	E:1709831.29





Blue Mountain Inc.
11023 MASON DIXON HIGHWAY
BURTON, WV 26562
PHONE: (304) 662-6486

FILE #: SHL13FHS-AS DRILLED

DRAWING #: SHL13FHS-AS DRILLED

SCALE: 1" = 2000'

MINIMUM DEGREE OF ACCURACY: 1/2500

PROVEN SOURCE OF ELEVATION: U.S.G.S. MONUMENT THOMAS 1498.81'

I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE REGULATIONS ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

Signed: George D. Six

R.P.E.: _____ L.L.S.: P.S. No. 2000

GEORGE D. SIX LICENSED No. 2000 STATE OF WEST VIRGINIA PROFESSIONAL SURVEYOR

PLACE SEAL HERE

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS
WVDEP
OFFICE OF OIL & GAS
601 57TH STREET
CHARLESTON, WV 25304

DATE: OCTOBER 2, 2014

OPERATOR'S WELL #: SHL13FHS-AS DRILLED

API WELL #: 47 (STATE) 51 (COUNTY) _____ (PERMIT)

Well Type: ☐ Oil ☐ Waste Disposal ☒ Production ☐ Deep
☒ Gas ☐ Liquid Injection ☐ Storage ☒ Shallow

WATERSHED: TURKEY RUN ELEVATION: 1287.65'

COUNTY/DISTRICT: MARSHALL / SAND HILL QUADRANGLE: VALLEY GROVE, WV 7.5'

SURFACE OWNER: PAUL H. & ANNETTE A. HEMSLEY ACREAGE: 121.65±

OIL & GAS ROYALTY OWNER: SEE ATTACHED WW-6A1 ACREAGE: 421.282±

DRILL ☒ CONVERT ☐ DRILL DEEPER ☐ REDRILL ☐ FRACTURE OR STIMULATE ☐

PLUG OFF OLD FORMATION ☐ PERFORATE NEW FORMATION ☐ PLUG & ABANDON ☐

CLEAN OUT & REPLUG ☐ OTHER CHANGE ☐ (SPECIFY): _____

TARGET FORMATION: MARCELLUS ESTIMATED DEPTH: TVD: 6781'± TMD: 14105'±

WELL OPERATOR NOBLE ENERGY INC. DESIGNATED AGENT STEVEN M. GREEN

Address 333 TECHNOLOGY DRIVE, SUITE 116 Address 500 VIRGINIA STREET EAST, UNITED CENTER SUITE 590

City CANONSBURG State PA Zip Code 15317 City CHARLESTON State WV Zip Code 25301