

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

Farm Name: Consolidation Coal Company \_\_\_\_\_ Operator Well No: SHL-8F-HS

LOCATION: Sandhill 8 Elevation: 1,130.66 Quadrangle: Majorsville

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



Company: CNX Gas Company LLC	Casing & Tubing	Used in Drilling	Left in Well	Cement fill up Cu. Ft.
Address: 200 Evergreene Drive Waynesburg, PA 15370	30	40.0	40.0	Cemented in
Agent: Steven Haught	20	452.5	452.5	934 sxs/ 200 bbls cemented to surface
Inspector: Bill Hendershot	13 3/8	1,079.6	1,079.6	852 sxs / 188 bbls cemented to surface
Date Permit Issued: 5/24/2012	9 5/8	3,051	3,051	1112 sxs / 235 bbls cemented to surface
Date Well Work Commenced: _____ 8/25/2012	5 1/2	14,611	14,611	2271 sxs / 561 bbls cemented
Date Well Work Completed: _____ 7/3/2013				
Verbal Plugging:				
Date Permission granted on: _____ 8/25/2012				
Rotary Cable Rig X				
Total Vertical Depth (ft): 6499.59				
Total Measured Depth (ft): 14,636.0				
Fresh Water Depth (ft): 396				
Salt Water Depth (ft): None				
Is coal being mined in the area (N/Y)? Y				
Coal Depths (ft.): 584 - 588 Pittsburgh Seam				
Void(s) encountered (N/Y) Depth(s)				

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

Producing formation Marcellus Pay zone depth (ft) NA  
Gas: Initial open flow 508 MCF/d Oil: Initial open flow N/A Bbl/d  
Final open flow \_\_\_\_\_ MCF/d Final open flow N/A Bbl/d  
Time of open flow between initial and final tests 24 Hours  
Static rock Pressure 1100 psig (surface pressure) after 24 Hours

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JUL 28 2014

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

Environmental Protection

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

[Signature] \_\_\_\_\_ Date 1-27-14  
Laura Wilkins Noble Energy, Inc. 1/21/14

02/28/2014

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

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

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

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

**Perforated Intervals, Fracturing or Stimulating:** Please See Attached

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

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**Surface:**

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**Formations Encountered:** Please See Attached

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02/28/2014  
02/28/2014  
02/28/2014  
02/28/2014

SHL 8F  
47-051-01526

Formations	Top TVD	Base TVD	Top MD	Base MD	Fluid
Shale	0	584	0	584	
Pittsburgh Coal	584	588	584	588	
Shale and Sandstone	588	1058	588	1058	
Dunkard Sand	1058	1076	1058	1076	
Shale	1076	1230	1076	1230	
Gas Sand	1230	1273	1230	2449	
Shale	1273	1345	1273	2452	
1st Salt Sand	1345	1407	1345	2508	
Shale	1407	1464	1407	2511	
2nd Salt Sand	1464	1496	1464	2558	
Shale	1496	1578	1496	2566	
Maxton Sand	1578	1627	1578	2600	
Shale	1627	1654	1627	2610	
Big Lime	1654	1719	1654	2713	
Big Injun	1719	1892	1719	2754	
Price	1892	2242	1892	3145	
Murrysville	2242	2255	2242	3184	
Shale	2255	2449	2255	4222	
50' Sand	2449	2452	2449	4233	
Shale	2452	2508	2452	2508	
30' Sand	2508	2511	2508	2511	
Shale	2511	2558	2511	2558	
Gordon Stray	2558	2566	2558	2566	
Shale	2566	2600	2566	2600	
Gordon	2600	2610	2600	2610	
Shale	2610	2713	2610	2713	
Fifth Sand	2713	2754	2713	2754	
Shale	2754	3145	2754	3145	
Speechley Sand	3145	3184	3145	3184	
Shale	3184	4217	3184	4222	
Warren Sand	4217	4227	4222	4233	
Shale	4227	4907	4233	5055	
Java Shale	4907	5011	5055	5188	
Pipe Creek Shale	5011	5109	5188	5314	
Angola Shale	5109	5743	5314	6126	
Rhinestreet	5743	6180	6126	6690	
Cashaqua	6180	6281	6690	6812	
Middlesex	6281	6312	6812	6850	
West River	6312	6369	6850	6921	
Burkett	6369	6394	6921	6953	
Tully Limestone	6394	6421	6953	6992	
Hamilton	6421	6535	6992	7240	
Marcellus	6535	6584	7240	not encountered	Gas
Cherry Valley	6543	6545	not encountered	not encountered	
Onondaga	6584		not encountered	not encountered	

02/28/2014

SHL 8F  
47-051-01526

Stage #	Plug Type	Plug Depth
1	No Plug	No Plug
2	Composite Frac Plug	14,300
3	Composite Frac Plug	14,000
4	Composite Frac Plug	13,700
5	Composite Frac Plug	13,400
6	Composite Frac Plug	13,100
7	Composite Frac Plug	12,800
8	Composite Frac Plug	12,500
9A,9B	Composite Frac Plug	12,250
10	Composite Frac Plug	12,025
11	Composite Frac Plug	11,750
12	Composite Frac Plug	11,450
13	Composite Frac Plug	11,150
14	Composite Frac Plug	10,850
15	Composite Frac Plug	10,550
16	Composite Frac Plug	10,250
17	Composite Frac Plug	9,950
18	Composite Frac Plug	9,650
19	Composite Frac Plug	9,350
20	Composite Frac Plug	9,050
21	Composite Frac Plug	8,750
22	Composite Frac Plug	8,550
23	Composite Frac Plug	8,250
24	Composite Frac Plug	7,950
25	Composite Frac Plug	7,650
26	Composite Frac Plug	7,450
	Bridge Plug	6,000

02/28/2014

SHL 8F  
47-051-01526

Stimulation Summary

Date	Stage #	Formation	Frac Type	Top Perf	Bottom Perf	# of Perfs	BD Press (psi)	ATP (psi)	Avg Rate (bpm)	ISIP (psi)	Frac Gradient	Sand (lbs)	Acid (gals)	Water (gals)
6/23/2013	1	Marcellus	Slickwater	14324	14586	48	6317	8214	67.7	3860	1.03	304218	3000	307,358
6/24/2013	2	Marcellus	Slickwater	14025	14277	40	5564	8375	77.11	4042	1.05	436261	3000	372,504
6/24/2013	3	Marcellus	Slickwater	13725	13977	40	6262	8117	77.3	4279	1.09	396252	3000	340,318
6/25/2013	4	Marcellus	Slickwater	13425	13677	40	6138	8167	78.1	5232	1.24	436221	6000	412,759
6/25/2013	5	Marcellus	Slickwater	13125	13377	40	6172	8470	81.5	4321	1.10	434326	3000	372,763
6/25/2013	6	Marcellus	Slickwater	12825	13077	40	6355	8154	79.23	4212	1.08	426376	3000	350,786
6/26/2013	7	Marcellus	Slickwater	12525	12777	40	6497	8592	79	4463	1.12	434790	3000	363,922
6/27/2013	8	Marcellus	Slickwater	12275	12477	40	6534	8526	75.5	4561	1.13	320816	3000	325,871
6/27/2013	9	Marcellus	Slickwater	12073	12227	40	6791	8409	9.9	5175	1.08	1117	6000	133,317
6/27/2013	9B	Marcellus	Slickwater	12033	12207	40	6260	8298	78.1	4224	1.08	287030	3000	299,409
6/28/2013	10	Marcellus	Slickwater	11775	12027	40	5907	8268	74.4	4114	1.06	434713	3000	375,159
6/28/2013	11	Marcellus	Slickwater	11475	11727	40	6757	8097	71.1	4291	1.09	432773	3000	401,414
6/28/2013	12	Marcellus	Slickwater	11175	11427	40	6720	7916	73.7	4262	1.09	435001	3000	348,129
6/29/2013	13	Marcellus	Slickwater	10875	11127	40	6373	8046	79.2	4493	1.12	438359	3000	349,735
6/29/2013	14	Marcellus	Slickwater	10575	10827	40	6542	7651	75	4084	1.06	434993	3000	340,040
6/29/2013	15	Marcellus	Slickwater	10275	10527	40	6245	7150	79.5	4408	1.11	435433	3000	337,949
6/30/2013	16	Marcellus	Slickwater	9975	10227	40	6419	7751	70.9	4221	1.08	433572	3000	351,498
7/1/2013	17	Marcellus	Slickwater	9675	9927	40	6637	7651	73.2	4245	1.08	434176	3000	335,686
7/1/2013	18	Marcellus	Slickwater	9375	9627	40	6234	7465	81.1	4348	1.10	436095	3000	342,420
7/1/2013	19	Marcellus	Slickwater	9075	9327	40	6379	7581	81.2	4408	1.11	384030	3000	331,756
7/1/2013	20	Marcellus	Slickwater	8775	9027	40	5851	7499	80.78	4198	1.07	436013	3000	345,707
7/2/2013	21	Marcellus	Slickwater	8573	8727	40	5989	7662	80.2	4144	1.06	287892	3000	258,259
7/2/2013	22	Marcellus	Slickwater	8275	8527	40	5461	7250	82.9	4261	1.07	436357	3000	333,475
7/2/2013	23	Marcellus	Slickwater	7975	8227	40	6260	7205	83.9	4425	1.10	434295	3000	336,213
7/3/2013	24	Marcellus	Slickwater	7675	7927	40	6074	7590	82.3	4486	1.12	434994	3000	331,805
7/3/2013	25	Marcellus	Slickwater	7473	7627	40	6591	7155	81.6	4195	1.06	289928	3000	257,110
7/3/2013	26	Marcellus	Slickwater	7273	7427	40	5866	6575	81.7	4861	1.18	288663	3000	242,992

02/28/2014

SHL 8F

47-051-01526

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				100.00%	86.51734%	Density = 8.340
HYDROCHLORIC ACID 5-10%	Halliburton		Hydrochloric acid	7647-01-0	10.00%	0.09005%	
SAND - PREMIUM - 100 MESH, 100 LB, SK (101213353)	Halliburton	Proppant	Crystalline silica, quartz	14808-60-7	100.00%	1.11351%	
SAND - PREMIUM WHITE	Halliburton	Proppant	Crystalline silica, quartz	14808-60-7	100.00%	11.29933%	
FR-66	Halliburton	Friction Reducer	Hydrotreated light petroleum distillate	64742-47-8	30.00%	0.02257%	
BE-9	Halliburton	Biocide	Tributyl tetradecyl phosphonium chloride	81741-28-8	10.00%	0.00414%	
Scalechek® LP-65 Scale Inhibitor	Halliburton	Scale Inhibitor	Ammonium chloride	12125-02-9	10.00%	0.00254%	
LCA-1	Halliburton	Solvent	Paraffinic solvent	Confidential Business Information	100.00%	0.00038%	
HAI-OS ACID INHIBITOR	Halliburton	Corrosion Inhibitor	Methanol	67-56-1	60.00%	0.00046%	
			Propargyl alcohol	107-19-7	10.00%	0.00008%	
LoSurf-300D	Halliburton	Non-ionic Surfactant	1,2,4 Trimethylbenzene	95-63-6	1.00%	0.00002%	
			Ethanol	64-17-5	60.00%	0.00094%	
			Heavy aromatic petroleum naphtha	64742-94-5	30.00%	0.00047%	
			Naphthalene	91-20-3	5.00%	0.00008%	
			Poly(oxy-1,2-ethanediyl), alpha-(4-nonylphenyl)-omega-hydroxy-, branched	127087-87-0	5.00%	0.00008%	
FE-1A ACIDIZING COMPOSITION	Halliburton	Additive	Acetic acid	64-19-7	60.00%	0.00280%	
			Acetic anhydride	108-24-7	100.00%	0.00467%	
SP BREAKER	Halliburton	Breaker	Sodium persulfate	7775-27-1	100.00%	0.00087%	
WG-36 GELLING AGENT	Halliburton	Gelling Agent	Guar gum	9000-30-0	100.00%	0.01897%	

02/28/2014



# Noble Energy SHL-8F-HS Gyro+MWD 0' to 14636' MD Survey Report

(Def Survey)

**Report Date:** January 02, 2013 - 08:44 AM  
**Client:** Noble Energy  
**Field:** WV Marshall County (NAD 27)  
**Structure / Slot:** CNX/Noble Energy SHL-8 Pad / SHL-8F-HS  
**Well:** SHL-8F-HS  
**Borehole:** Original Borehole  
**UWI / API#:** Unknown / Unknown  
**Survey Name:** Noble Energy SHL-8F-HS Gyro+MWD 0' to 14636' MD  
**Survey Date:** December 21, 2012  
**Tort / AHD / DDI / ERD Ratio:** 262.820 ° / 9349.465 ft / 6.739 / 1.425  
**Coordinate Reference System:** NAD27 West Virginia State Plane, Northern Zone, US Feet  
**Location Lat / Long:** N 39° 57' 19.72743", W 80° 32' 8.07787"  
**Location Grid N/E Y/X:** N 531798.969 ftUS, E 1709692.469 ftUS  
**CRS Grid Convergence Angle:** -0.6605 °  
**Grid Scale Factor:** 0.99995724

**Survey / DLS Computation:** Minimum Curvature / Lubinski  
**Vertical Section Azimuth:** 338.410 ° (Grid North)  
**Vertical Section Origin:** 0.000 ft, 0.000 ft  
**TVD Reference Datum:** KB  
**TVD Reference Elevation:** 1149.160 ft above MSL  
**Seabed / Ground Elevation:** 1131.470 ft above MSL  
**Magnetic Declination:** -8.712 °  
**Total Gravity Field Strength:** 999.3811mgN (9.80665 Based)  
**Total Magnetic Field Strength:** 52763.149 nT  
**Magnetic Dip Angle:** 67.439 °  
**Declination Date:** December 21, 2012  
**Magnetic Declination Model:** BGGM 2012  
**North Reference:** Grid North  
**Grid Convergence Used:** -0.6605 °  
**Total Corr Mag North->Grid North:** -8.0516 °  
**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	-1149.16	0.00	0.00	0.00	N/A	N/A	N/A	531798.97	1709692.47	N 39 57 19.73	W 80 32 8.08	0.00
	106.50	0.36	272.79	106.50	-1042.66	0.14	0.02	-0.33	0.34	0.34	0.00	531798.99	1709692.13	N 39 57 19.73	W 80 32 8.08	0.00
	206.50	0.34	252.79	206.50	-942.66	0.29	-0.06	-0.93	0.12	-0.02	-20.00	531798.91	1709691.54	N 39 57 19.73	W 80 32 8.09	0.00
	306.50	0.18	294.63	306.50	-842.66	0.43	-0.08	-1.36	0.24	-0.16	41.84	531798.89	1709691.11	N 39 57 19.73	W 80 32 8.10	0.00
	406.50	0.17	286.39	406.50	-742.66	0.63	0.03	-1.64	0.03	-0.01	-8.24	531799.00	1709690.83	N 39 57 19.73	W 80 32 8.10	0.10
	506.50	0.21	271.29	506.50	-642.66	0.79	0.07	-1.97	0.06	0.04	-15.10	531799.04	1709690.50	N 39 57 19.73	W 80 32 8.10	0.21
	606.50	0.20	261.32	606.49	-542.67	0.90	0.05	-2.32	0.04	-0.01	-9.97	531799.02	1709690.15	N 39 57 19.73	W 80 32 8.11	0.30
	706.50	0.10	339.95	706.49	-442.67	1.03	0.11	-2.53	0.21	-0.10	78.63	531799.08	1709689.94	N 39 57 19.73	W 80 32 8.11	0.44
	806.50	0.10	246.69	806.49	-342.67	1.11	0.16	-2.64	0.15	0.00	-93.26	531799.12	1709689.83	N 39 57 19.73	W 80 32 8.11	0.52
	906.50	0.12	126.16	906.49	-242.67	1.02	0.06	-2.63	0.19	0.02	-120.53	531799.03	1709689.84	N 39 57 19.73	W 80 32 8.11	0.60
	1006.50	0.24	167.53	1006.49	-142.67	0.73	-0.21	-2.50	0.17	0.12	41.37	531798.76	1709689.97	N 39 57 19.73	W 80 32 8.11	0.69
	1106.50	0.63	128.66	1106.49	-42.67	0.04	-0.75	-2.03	0.47	0.39	-38.87	531798.21	1709690.44	N 39 57 19.72	W 80 32 8.10	0.90
	1206.50	0.38	123.34	1206.49	57.33	-0.70	-1.28	-1.32	0.25	-0.25	-5.32	531797.69	1709691.15	N 39 57 19.71	W 80 32 8.09	1.04
	1306.50	0.59	98.12	1306.48	157.32	-1.23	-1.54	-0.53	0.29	0.21	-25.22	531797.43	1709691.93	N 39 57 19.71	W 80 32 8.08	1.16
	1406.50	0.59	107.58	1406.48	257.32	-1.81	-1.76	0.47	0.10	0.00	9.46	531797.21	1709692.93	N 39 57 19.71	W 80 32 8.07	1.25
	1506.50	0.26	143.91	1506.48	357.32	-2.36	-2.10	1.09	0.41	-0.33	36.33	531796.87	1709693.56	N 39 57 19.71	W 80 32 8.06	1.36
	1606.50	0.52	136.52	1606.47	457.31	-3.00	-2.62	1.54	0.26	0.26	-7.39	531796.35	1709694.01	N 39 57 19.70	W 80 32 8.06	1.43
	1706.50	0.29	168.08	1706.47	557.31	-3.67	-3.19	1.90	0.31	-0.23	31.56	531795.78	1709694.37	N 39 57 19.70	W 80 32 8.05	1.50
	1806.50	0.30	176.24	1806.47	657.31	-4.17	-3.70	1.97	0.04	0.01	8.16	531795.27	1709694.44	N 39 57 19.69	W 80 32 8.05	1.53
	1906.50	0.35	155.20	1906.47	757.31	-4.72	-4.24	2.12	0.13	0.05	-21.04	531794.73	1709694.58	N 39 57 19.69	W 80 32 8.05	1.58
	2006.50	0.24	147.68	2006.47	857.31	-5.23	-4.69	2.36	0.12	-0.11	-7.52	531794.28	1709694.82	N 39 57 19.68	W 80 32 8.05	1.61
	2106.50	0.40	140.45	2106.46	957.30	-5.77	-5.14	2.69	0.16	0.16	-7.23	531793.83	1709695.16	N 39 57 19.68	W 80 32 8.04	1.65
	2206.50	0.28	148.95	2206.46	1057.30	-6.34	-5.62	3.04	0.13	-0.12	8.50	531793.35	1709695.51	N 39 57 19.67	W 80 32 8.04	1.69
	2306.50	0.65	144.58	2306.46	1157.30	-7.13	-6.29	3.49	0.37	0.37	-4.37	531792.68	1709695.96	N 39 57 19.67	W 80 32 8.03	1.75
	2406.50	0.62	139.25	2406.45	1257.29	-8.20	-7.16	4.17	0.07	-0.03	-5.33	531791.81	1709696.64	N 39 57 19.66	W 80 32 8.02	1.80



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
	2506.50	0.27	134.95	2506.45	1357.29	-8.92	-7.74	4.69	0.35	-0.35	-4.30	531791.23	1709697.16	N 39 57 19.65	W 80 32 8.02	1.85
	2606.50	0.10	220.87	2606.45	1457.29	-9.18	-7.97	4.80	0.28	-0.17	85.92	531791.00	1709697.27	N 39 57 19.65	W 80 32 8.02	1.89
	2706.50	0.23	78.55	2706.45	1557.29	-9.26	-8.00	4.94	0.32	0.13	-142.32	531790.97	1709697.41	N 39 57 19.65	W 80 32 8.01	1.92
	2806.50	0.06	146.32	2806.45	1657.29	-9.34	-8.00	5.17	0.21	-0.17	67.77	531790.97	1709697.64	N 39 57 19.65	W 80 32 8.01	1.94
	2906.50	0.19	76.19	2906.45	1757.29	-9.42	-8.00	5.36	0.18	0.13	-70.13	531790.96	1709697.83	N 39 57 19.65	W 80 32 8.01	1.96
	2991.50	0.53	79.87	2991.45	1842.29	-9.51	-7.90	5.88	0.40	0.40	4.33	531791.07	1709696.35	N 39 57 19.65	W 80 32 8.00	2.00
	3261.00	0.55	2.59	3260.94	2111.78	-8.58	-6.39	7.17	0.25	0.01	-28.68	531792.58	1709699.64	N 39 57 19.67	W 80 32 7.98	2.10
	3302.00	0.59	355.63	3301.94	2152.78	-8.20	-5.98	7.16	0.19	0.10	-16.98	531792.99	1709699.63	N 39 57 19.67	W 80 32 7.99	2.11
	3348.00	0.54	340.29	3347.93	2198.77	-7.76	-5.54	7.07	0.35	-0.11	-33.35	531793.43	1709699.54	N 39 57 19.67	W 80 32 7.99	2.13
	3391.00	0.57	332.82	3390.93	2241.77	-7.34	-5.16	6.90	0.18	0.07	-17.37	531793.81	1709699.37	N 39 57 19.68	W 80 32 7.99	2.15
	3436.00	0.62	325.71	3435.93	2286.77	-6.88	-4.76	6.67	0.20	0.11	-15.80	531794.21	1709699.13	N 39 57 19.68	W 80 32 7.99	2.16
	3481.00	0.77	326.81	3480.93	2331.77	-6.35	-4.31	6.36	0.33	0.33	2.44	531794.66	1709698.83	N 39 57 19.69	W 80 32 8.00	2.18
	3525.00	0.70	320.10	3524.92	2375.76	-5.80	-3.85	6.03	0.25	-0.16	-15.25	531795.12	1709698.50	N 39 57 19.69	W 80 32 8.00	2.20
	3570.00	0.77	321.81	3569.92	2420.76	-5.25	-3.41	5.67	0.16	0.16	3.80	531795.56	1709698.13	N 39 57 19.69	W 80 32 8.00	2.22
	3615.00	0.38	355.72	3614.92	2465.76	-4.82	-3.02	5.47	1.11	-0.87	75.36	531795.95	1709697.94	N 39 57 19.70	W 80 32 8.01	2.25
	3660.00	0.54	6.48	3659.92	2510.76	-4.49	-2.66	5.48	0.40	0.36	23.91	531796.31	1709697.95	N 39 57 19.70	W 80 32 8.01	2.27
	3704.00	0.87	356.47	3703.91	2554.75	-3.99	-2.12	5.43	0.80	0.75	-22.75	531796.85	1709697.95	N 39 57 19.71	W 80 32 8.01	2.30
	3749.00	0.86	354.42	3748.91	2599.75	-3.34	-1.44	5.48	0.07	-0.02	-4.56	531797.53	1709697.90	N 39 57 19.71	W 80 32 8.01	2.31
	3796.00	0.71	353.97	3795.90	2646.74	-2.72	-0.80	5.36	0.32	-0.32	-0.96	531798.17	1709697.83	N 39 57 19.72	W 80 32 8.01	2.33
	3844.00	0.97	0.24	3843.90	2694.74	-2.06	-0.10	5.33	0.57	0.54	13.06	531798.87	1709697.80	N 39 57 19.73	W 80 32 8.01	2.36
	3889.00	1.51	24.24	3888.89	2739.73	-1.29	0.82	5.58	1.64	1.20	53.33	531799.79	1709698.05	N 39 57 19.74	W 80 32 8.01	2.41
	3939.00	2.66	41.05	3938.85	2789.69	-0.30	2.30	6.61	2.58	2.30	33.62	531801.27	1709699.08	N 39 57 19.75	W 80 32 7.99	2.49
	3987.00	4.76	51.37	3986.75	2837.59	0.80	4.38	8.90	4.57	4.38	21.50	531803.35	1709701.37	N 39 57 19.77	W 80 32 7.96	2.61
	4033.00	6.92	54.69	4032.51	2883.35	2.02	7.17	12.65	5.86	4.75	7.22	531806.14	1709705.12	N 39 57 19.80	W 80 32 7.92	2.74
	4080.00	9.57	57.28	4079.02	2929.86	3.44	10.92	18.25	5.69	5.64	5.51	531809.89	1709710.72	N 39 57 19.84	W 80 32 7.85	2.89
	4128.00	12.15	60.19	4126.16	2977.00	4.93	15.59	25.99	5.49	5.38	6.06	531814.56	1709718.46	N 39 57 19.88	W 80 32 7.75	3.03
	4175.00	14.88	59.33	4171.85	3022.69	6.59	21.13	35.48	5.82	5.81	-1.83	531820.10	1709727.94	N 39 57 19.94	W 80 32 7.63	3.17
	4223.00	17.64	57.38	4217.93	3068.77	8.96	28.20	46.90	5.86	5.75	-4.06	531827.16	1709739.37	N 39 57 20.01	W 80 32 7.48	3.30
	4271.00	20.42	57.00	4263.30	3114.14	12.01	36.68	60.06	5.80	5.79	-0.79	531835.65	1709752.52	N 39 57 20.10	W 80 32 7.31	3.43
	4317.00	23.09	57.25	4306.02	3156.86	15.34	45.93	74.37	5.81	5.80	0.54	531844.90	1709766.84	N 39 57 20.19	W 80 32 7.13	3.54
	4366.00	25.98	57.18	4350.59	3201.43	19.29	56.95	91.48	5.90	5.90	-0.14	531855.91	1709783.94	N 39 57 20.30	W 80 32 6.91	3.65
	4412.00	27.99	56.16	4391.58	3242.42	23.54	68.42	108.91	4.48	4.37	-2.22	531867.39	1709801.38	N 39 57 20.42	W 80 32 6.69	3.74
	4459.00	30.18	54.91	4432.65	3283.49	28.64	81.36	127.74	4.84	4.66	-2.66	531880.32	1709820.21	N 39 57 20.55	W 80 32 6.45	3.83
	4507.00	33.01	53.58	4473.53	3324.37	34.81	96.06	148.14	6.07	5.90	-2.77	531895.02	1709840.60	N 39 57 20.69	W 80 32 6.19	3.92
	4602.00	37.71	53.11	4550.99	3401.83	49.11	128.88	192.23	4.96	4.95	-0.49	531927.84	1709884.69	N 39 57 21.02	W 80 32 5.63	4.08
	4696.00	36.73	49.00	4625.85	3476.69	66.04	164.58	236.44	2.84	-1.04	-4.37	531963.54	1709928.90	N 39 57 21.38	W 80 32 5.07	4.19
	4791.00	38.69	47.91	4701.00	3551.84	85.88	203.13	279.92	2.18	2.06	-1.15	532002.09	1709972.37	N 39 57 21.77	W 80 32 4.51	4.29
	4886.00	39.07	49.46	4774.96	3625.80	106.00	242.49	324.71	1.10	0.40	1.63	532041.45	1710017.16	N 39 57 22.16	W 80 32 3.94	4.36
	4980.00	38.37	50.60	4848.30	3699.14	124.54	280.26	369.76	1.06	-0.74	1.21	532079.22	1710062.22	N 39 57 22.54	W 80 32 3.37	4.43
	5070.00	38.50	54.03	4918.81	3769.65	140.04	314.45	414.02	2.37	0.14	3.81	532113.41	1710106.47	N 39 57 22.88	W 80 32 2.81	4.49
	5159.00	39.15	54.31	4988.14	3838.98	153.77	347.11	459.26	0.76	0.73	0.31	532146.07	1710151.71	N 39 57 23.21	W 80 32 2.23	4.54
	5249.00	38.39	53.73	5058.31	3909.15	167.77	380.22	504.87	0.94	-0.84	-0.64	532179.32	1710197.32	N 39 57 23.54	W 80 32 1.65	4.59
	5338.00	38.21	55.22	5128.16	3979.00	181.06	412.27	549.76	1.06	-0.20	1.67	532211.22	1710242.20	N 39 57 23.86	W 80 32 1.08	4.63
	5428.00	38.87	55.13	5198.55	4049.39	193.89	444.29	595.79	0.74	0.73	-0.10	532243.24	1710288.23	N 39 57 24.19	W 80 32 0.49	4.67
	5518.00	39.76	53.96	5268.19	4119.03	207.56	477.37	642.23	1.29	0.99	-1.30	532276.32	1710334.67	N 39 57 24.52	W 80 31 59.90	4.71
	5607.00	39.76	53.90	5336.60	4187.44	221.80	510.89	688.24	0.04	0.00	-0.07	532309.83	1710380.68	N 39 57 24.85	W 80 31 59.32	4.74
	5697.00	39.18	53.18	5406.08	4256.92	236.48	544.88	734.26	0.82	-0.64	-0.80	532343.83	1710426.69	N 39 57 25.20	W 80 31 58.73	4.78
	5786.00	37.55	52.13	5475.86	4326.70	251.47	578.38	778.18	1.97	-1.83	-1.18	532377.33	1710470.61	N 39 57 25.53	W 80 31 58.17	4.82

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Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	TVSS (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
	5675.00	34.52	50.87	5547.82	4398.66	266.67	610.95	819.16	3.50	-3.40	-1.42	532409.90	1710511.59	N 39 57 25.86 W	80 31 57.65	4.86
	5965.00	37.79	54.37	5620.49	4471.33	281.05	643.12	861.37	4.30	3.63	3.89	532442.06	1710553.80	N 39 57 26.18 W	80 31 57.11	4.91
	6054.00	41.92	54.82	5688.80	4539.64	294.66	676.15	907.85	4.65	4.64	0.51	532475.09	1710600.28	N 39 57 26.51 W	80 31 56.52	4.96
	6144.00	40.02	54.12	5756.75	4607.59	308.87	710.44	955.87	2.17	-2.11	-0.78	532509.37	1710648.30	N 39 57 26.86 W	80 31 55.91	4.99
	6233.00	39.79	55.27	5825.02	4675.86	322.40	743.43	1002.47	0.87	-0.26	1.29	532542.37	1710694.89	N 39 57 27.19 W	80 31 55.32	5.02
	6323.00	39.35	55.36	5894.40	4745.24	335.39	776.06	1049.61	0.49	-0.49	0.10	532574.99	1710742.03	N 39 57 27.52 W	80 31 54.72	5.04
	6412.00	39.74	54.30	5963.03	4813.87	348.70	808.70	1095.93	0.88	0.44	-1.19	532607.63	1710788.35	N 39 57 27.84 W	80 31 54.13	5.06
	6502.00	39.67	53.80	6032.27	4883.11	362.96	842.45	1142.47	0.36	-0.08	-0.56	532641.38	1710834.89	N 39 57 28.18 W	80 31 53.53	5.08
	6591.00	38.90	52.99	6101.16	4952.00	377.56	876.05	1187.71	1.04	-0.87	-0.91	532674.98	1710880.13	N 39 57 28.52 W	80 31 52.96	5.11
	6681.00	35.32	50.56	6172.92	5023.76	393.05	909.60	1230.38	4.30	-3.98	-2.70	532708.53	1710922.80	N 39 57 28.86 W	80 31 52.41	5.14
	6771.00	34.23	41.85	6246.89	5097.73	412.36	945.01	1267.39	5.65	-1.21	-9.68	532743.94	1710959.80	N 39 57 29.21 W	80 31 51.94	5.18
	6816.00	33.93	35.57	6284.18	5135.02	424.83	964.66	1283.14	7.85	-0.67	-13.96	532763.58	1710975.56	N 39 57 29.41 W	80 31 51.74	5.21
	6856.00	34.26	30.80	6317.31	5168.15	437.76	983.41	1295.41	6.73	0.83	-11.93	532782.34	1710987.82	N 39 57 29.59 W	80 31 51.59	5.23
	6901.00	36.84	26.45	6353.92	5204.76	454.51	1006.38	1307.90	8.03	5.73	-9.67	532805.30	1711000.31	N 39 57 29.82 W	80 31 51.43	5.25
	7170.00	41.99	23.33	6388.68	5239.52	474.21	1032.30	1319.88	12.26	-6.93	-6.93	532831.22	1711012.29	N 39 57 30.08 W	80 31 51.28	5.28
	6990.00	47.53	20.82	6419.91	5270.75	496.63	1061.01	1331.49	13.21	12.59	-5.70	532859.93	1711023.90	N 39 57 30.36 W	80 31 51.14	5.31
	7035.00	52.90	19.09	6448.70	5299.54	522.51	1093.50	1343.27	12.29	11.93	-3.84	532892.42	1711035.68	N 39 57 30.69 W	80 31 50.99	5.35
	7080.00	58.13	15.82	6474.17	5325.01	551.33	1128.88	1354.36	13.07	11.62	-7.27	532927.80	1711046.76	N 39 57 31.04 W	80 31 50.85	5.38
	7125.00	63.01	12.50	6496.28	5347.12	583.13	1166.87	1363.91	12.60	10.84	-7.38	532965.78	1711056.32	N 39 57 31.41 W	80 31 50.74	5.41
	7170.00	68.33	8.33	6514.82	5365.66	617.90	1207.18	1371.29	14.52	11.82	-9.27	533006.09	1711063.70	N 39 57 31.81 W	80 31 50.65	5.44
	7214.00	73.99	5.20	6529.03	5379.87	654.53	1248.51	1376.17	14.52	12.86	-7.11	533047.42	1711068.58	N 39 57 32.22 W	80 31 50.59	5.47
	7259.00	79.67	4.90	6539.28	5390.12	693.68	1292.14	1380.03	12.64	12.62	-0.67	533091.05	1711072.43	N 39 57 32.65 W	80 31 50.55	5.50
	7304.00	83.14	2.91	6546.00	5396.84	733.84	1336.52	1383.05	8.86	7.71	-4.42	533135.43	1711075.46	N 39 57 33.09 W	80 31 50.52	5.52
	7349.00	85.87	357.44	6550.31	5401.15	775.42	1381.29	1383.18	13.53	6.07	-12.16	533180.20	1711075.59	N 39 57 33.53 W	80 31 50.52	5.55
	7394.00	87.56	351.47	6552.89	5403.73	818.58	1429.84	1378.84	13.77	3.76	-13.27	533224.89	1711071.25	N 39 57 33.98 W	80 31 50.58	5.58
	7438.00	87.42	345.33	6554.82	5405.66	861.85	1469.02	1370.01	13.94	-0.32	-13.95	533267.93	1711062.42	N 39 57 34.40 W	80 31 50.70	5.61
	7483.00	87.90	339.40	6556.66	5407.50	906.68	1511.85	1356.39	13.21	1.07	-13.18	533310.75	1711048.80	N 39 57 34.82 W	80 31 50.88	5.64
	7528.00	89.14	332.98	6557.83	5408.67	951.61	1552.99	1338.24	14.53	2.76	-14.27	533351.89	1711030.65	N 39 57 35.23 W	80 31 51.12	5.66
	7573.00	88.83	326.60	6558.62	5409.46	996.07	1591.85	1315.61	14.19	-0.69	-14.18	533390.75	1711008.02	N 39 57 35.61 W	80 31 51.42	5.69
	7617.00	89.28	324.18	6559.35	5410.19	1038.93	1628.05	1290.63	5.59	1.02	-5.50	533426.95	1710983.04	N 39 57 35.96 W	80 31 51.75	5.71
	7654.00	89.38	324.58	6559.78	5410.62	1074.82	1658.13	1269.08	1.11	0.27	1.08	533457.02	1710961.49	N 39 57 36.26 W	80 31 52.03	5.72
	7743.00	90.17	323.12	6560.13	5410.97	1160.96	1729.99	1216.58	1.87	0.89	-1.64	533528.88	1710909.00	N 39 57 36.96 W	80 31 52.71	5.74
	7833.00	90.10	323.43	6559.92	5410.76	1247.84	1802.13	1162.76	0.35	-0.08	0.34	533601.02	1710855.18	N 39 57 37.67 W	80 31 53.41	5.76
	7922.00	90.24	324.37	6559.66	5410.50	1334.00	1874.04	1110.33	1.07	0.16	1.06	533672.92	1710802.75	N 39 57 38.37 W	80 31 54.10	5.79
	8012.00	90.14	324.23	6559.36	5410.20	1421.28	1947.12	1057.81	0.19	-0.11	-0.16	533746.01	1710750.23	N 39 57 39.09 W	80 31 54.78	5.81
	8101.00	90.52	324.76	6558.84	5409.68	1507.67	2019.58	1006.12	0.73	0.43	0.60	533818.45	1710698.54	N 39 57 39.80 W	80 31 55.46	5.83
	8191.00	90.55	324.17	6558.00	5408.84	1595.01	2092.81	953.81	0.66	0.03	-0.66	533891.69	1710646.24	N 39 57 40.52 W	80 31 56.14	5.85
	8280.00	90.48	322.47	6557.20	5408.04	1680.94	2164.18	900.65	1.91	-0.08	-1.91	533963.05	1710593.08	N 39 57 41.22 W	80 31 56.83	5.87
	8370.00	90.62	320.56	6556.34	5407.18	1767.04	2234.62	844.65	2.13	0.16	-2.12	534033.49	1710537.08	N 39 57 41.91 W	80 31 57.56	5.89
	8459.00	91.17	318.97	6554.95	5405.79	1851.36	2302.56	787.17	1.89	0.62	-1.79	534101.42	1710479.61	N 39 57 42.57 W	80 31 58.31	5.91
	8549.00	91.37	319.02	6552.95	5403.79	1936.22	2370.46	728.14	0.23	0.22	0.06	534169.32	1710420.57	N 39 57 43.23 W	80 31 59.08	5.93
	8639.00	91.17	318.97	6550.96	5401.80	2021.08	2438.36	669.10	0.23	-0.22	-0.06	534237.22	1710361.54	N 39 57 43.90 W	80 31 59.85	5.94
	8728.00	90.79	318.89	6549.44	5400.28	2104.98	2505.45	610.64	0.44	-0.43	-0.09	534304.30	1710303.08	N 39 57 44.56 W	80 32 0.61	5.96
	8818.00	90.76	319.21	6548.22	5399.06	2189.88	2573.42	551.66	0.36	-0.03	0.36	534372.27	1710244.10	N 39 57 45.22 W	80 32 1.37	5.98
	8907.00	90.89	320.01	6546.94	5397.78	2274.12	2641.20	493.99	0.91	0.15	0.90	534440.05	1710186.44	N 39 57 45.88 W	80 32 2.13	5.99
	8997.00	90.86	322.16	6545.56	5396.40	2360.02	2711.21	437.47	2.39	-0.03	2.39	534510.06	1710129.92	N 39 57 46.57 W	80 32 2.86	6.01
	9087.00	90.82	323.25	6544.25	5395.09	2446.65	2782.80	382.94	1.21	-0.04	1.21	534581.64	1710075.39	N 39 57 47.27 W	80 32 3.57	6.03
	9176.00	90.93	324.77	6542.89	5393.73	2532.84	2854.80	330.65	1.71	0.12	1.71	534653.64	1710023.10	N 39 57 47.98 W	80 32 4.25	6.05



Comments	MD (ft)	Incl (°)	Azim Grd (°)	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
	13651.00	90.27	324.56	6503.32	5354.16	6855.01	6454.79	-2318.41	0.61	0.22	-0.57	538253.47	1707374.16	N 39 58 23.25	W 80 32 38.81	6.65
	13740.00	90.31	324.82	6502.87	5353.71	6941.47	6527.42	-2369.85	0.30	0.04	0.29	538326.09	1707322.72	N 39 58 23.96	W 80 32 39.48	6.65
	13830.00	90.45	326.37	6502.28	5353.12	7029.23	6601.67	-2420.70	1.73	0.16	1.72	538400.34	1707271.88	N 39 58 24.69	W 80 32 40.15	6.66
	13919.00	90.31	327.90	6501.69	5352.53	7116.50	6676.42	-2469.00	1.73	-0.16	1.72	538475.09	1707223.58	N 39 58 25.42	W 80 32 40.78	6.67
	14008.00	90.07	329.11	6501.39	5352.23	7204.18	6752.31	-2515.49	1.39	-0.27	1.36	538550.97	1707177.09	N 39 58 26.17	W 80 32 41.39	6.68
	14098.00	90.07	328.47	6501.28	5352.12	7292.91	6829.28	-2562.13	0.71	0.00	-0.71	538627.94	1707130.46	N 39 58 26.92	W 80 32 42.00	6.69
	14187.00	90.03	327.70	6501.20	5352.04	7380.47	6904.83	-2609.18	0.87	-0.04	-0.87	538703.49	1707083.41	N 39 58 27.66	W 80 32 42.61	6.70
	14277.00	90.41	327.48	6500.86	5351.70	7468.87	6980.81	-2657.41	0.49	0.42	-0.24	538779.46	1707035.17	N 39 58 28.41	W 80 32 43.24	6.71
	14366.00	90.03	326.53	6500.52	5351.36	7556.11	7055.45	-2705.88	1.15	-0.43	-1.07	538854.10	1706986.71	N 39 58 29.14	W 80 32 43.88	6.72
	14455.00	90.17	326.00	6500.36	5351.20	7643.12	7129.47	-2755.30	0.62	0.16	-0.60	538928.12	1706937.29	N 39 58 29.86	W 80 32 44.52	6.72
Final Survey 01Jan12	14545.00	90.27	325.46	6500.01	5350.85	7730.92	7203.84	-2805.98	0.61	0.11	-0.60	539002.49	1706886.61	N 39 58 30.59	W 80 32 45.18	6.73
Projection to Bit	14636.00	90.27	325.46	6499.59	5350.43	7819.60	7278.80	-2857.58	0.00	0.00	0.00	539077.44	1706835.02	N 39 58 31.33	W 80 32 45.86	6.74

Survey Type: Def Survey

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

Survey Program:

Description	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	0.000	17.690	Act Sins	30.000	30.000	SLB_NSG+MSHOT-Depth Only	Original Borehole / Noble Energy SHL-8F-HS Gyro+MWD 0' to 14636' MD
	17.690	2991.500	Act Sins	30.000	30.000	SLB_NSG+MSHOT	Original Borehole / Noble Energy SHL-8F-HS Gyro+MWD 0' to
	2991.500	14545.000	Act Sins	30.000	30.000	SLB_MWD-STD	Original Borehole / Noble Energy SHL-8F-HS Gyro+MWD 0' to
	14545.000	14636.000	Act Sins	30.000	30.000	SLB_BLIND+TREND	Original Borehole / Noble Energy SHL-8F-HS Gyro+MWD 0' to

02/28/2014

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