

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

Farm Name: Gray, John A ET UX Operator Well No: SHL-17D-HS
LOCATION: Sandhill 17 Elevation: 1,296.72 Quadrangle: Majorsville

District: Sandhill County: MARSHALL
Latitude: _____ Feet South of _____ Deg. _____ Min. _____ Sec. 39.97742200
Longitude: _____ Feet South of _____ Deg. _____ Min. _____ Sec. -80.52959200

Company: Noble Energy Inc	Casing & Tubing	Used in Drilling	Left in Well	Cement fill up Cu. Ft.
Address: 333 Technology Drive, Suite 116 Canonsburg, PA 15317	20	40	40	Cemented In
Agent: Steven Green	13-3/8	1,124.60	1,124.60	930 sxs (196 bbls) – 6bbls return to surface
Inspector: Bill Hendershot	9-5/8	3,115.0	3,115.0	1065 sxs (221 bbls) – 24 bbls cement to surface
Date Permit Issued: 1/29/2013	5-1/2	17,421.0	17,421.0	3006 sxs (681 bbls)
Date Well Work Commenced:	3/22/2013			
Date Well Work Completed:	12/1/2013			
Verbal Plugging:				
Date Permission granted on:	3/22/2013			
Rotary Cable Rig X				
Total Vertical Depth (ft): 6,683.8				
Total Measured Depth (ft): 17,431				
Fresh Water Depth (ft): 122'				
Salt Water Depth (ft): 1540'				
Is coal being mined in the area (N/Y)? Y				
Coal Depths (ft.): 763.9' – 769.5'				
Void(s) encountered (N/Y) Depth(s)				

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

Producing formation Marcellus Pay zone depth (ft) 6975
Gas: Initial open flow 1293 MCF/d Oil: Initial open flow 18.3 Bbl/d
Final open flow 1624 MCF/d Final open flow 23.2 Bbl/d
Time of open flow between initial and final tests 24 Hours
Static rock Pressure 1675 psig (surface pressure) after 24 Hours

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

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

[Signature] 2-14-14
Signature Date

Were core samples taken? Yes No

Were cuttings caught during drilling? Yes No

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

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

Perforated Intervals, Fracturing or Stimulating: Please see attached

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

Surface:

Formations Encountered: Please See Attached

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Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date	10/29/2013
Job End Date	11/16/2013
State	West Virginia
County	Marshall
API Number	47-051-01604-00-00
Operator Name	Noble Energy, Inc.
Well Name and Number	SHL 17 D
Longitude	-80.52945000
Latitude	39.97750000
Datum	NAD83
Federal/Tribal Well	NO
True Vertical Depth	6,683
Total Base Water Volume (gal)	16,520,104
Total Base Non Water Volume	0



Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Fresh Water	Operator	Base Fluid	Fresh Water	7732-18-5	100.00000	88.22907	Density = 8.340
SAND - PREMIUM WHITE	Halliburton	Proppant	Crystalline silica, quartz	14808-60-7	100.00000	8.77963	
SAND - COMMON WHITE	Halliburton	Proppant	Crystalline silica, quartz	14808-60-7	100.00000	2.13009	
HYDROCHLORIC ACID 5-10%	Halliburton	Solvent	Hydrochloric acid	7647-01-0	10.00000	0.06924	
FDP-S1078-12	Halliburton	Friction Reducer	Hydrotreated light petroleum distillate	54742-47-8	30.00000	0.02841	
			Ammonium chloride	12125-02-9	10.00000	0.00947	
			Alcohols, C12-16, ethoxylated	58551-12-2	10.00000	0.00947	
			9-Octadecenamide, n,n-bis-2 (hydroxyethyl)-(Z)	93-83-4	5.00000	0.00473	
FE-1A ACIDIZING COMPOSITION	Halliburton	Additive	Acetic anhydride	108-24-7	100.00000	0.00349	
			Acetic acid	64-19-7	60.00000	0.00209	

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LP-65	Halliburton	Scale Inhibitor							
BE-9	Halliburton	Biocide	Ammonium chloride	12125-02-9		10.00000		0.00264	
BE-9W	Halliburton	Biocide	Tributyl tetradecyl phosphonium chloride	81741-28-8		10.00000		0.00236	
oSurf-300D	Halliburton	Non-ionic Surfactant	Tributyl tetradecyl phosphonium chloride	81741-28-8		10.00000		0.00194	
			Ethanol	64-17-5		60.00000		0.00070	
			Heavy aromatic petroleum naphtha	64742-94-5		30.00000		0.00035	
			Poly(oxy-1,2-ethanediyl), alpha-(4-nonylphenyl)-omega-hydroxy-, branched	127087-87-0		5.00000		0.00006	
			Naphthalene	91-20-3		5.00000		0.00006	
CA-1	Halliburton	Solvent	1,2,4 Trimethylbenzene	95-63-6		1.00000		0.00001	
HAI-OS ACID INHIBITOR	Halliburton	Corrosion Inhibitor	Paraffinic solvent	Confidential		100.00000		0.00048	
			Methanol	67-56-1		60.00000		0.00039	
			Propargyl alcohol	107-19-7		10.00000		0.00006	
Ingredients shown above are subject to 29 CFR 1910.1200(f) and appear on Material Safety Data Sheets (MSDS). Ingredients shown below are Non-MSDS.									
		Other Ingredient(s)							
		Other Ingredient(s)	Water	7732-18-5				0.81574	
		Other Ingredient(s)	Polyacrylate	Confidential				0.02841	
		Other Ingredient(s)	Inorganic salt	Confidential				0.02841	
		Other Ingredient(s)	Organic phosphonate	Confidential				0.01586	
		Other Ingredient(s)	Propylene glycol	57-55-6				0.01167	
		Other Ingredient(s)	Fatty acid ester	Confidential				0.00473	
		Other Ingredient(s)	Oxyalkylated phenolic resin	Confidential				0.00035	
		Other Ingredient(s)	Formaldehyde	50-00-0				0.00026	
		Other Ingredient(s)	Alcohols, C14-C15, ethoxylated	68951-67-7				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)							

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			Fatty acids, tall oil	Confidential		0.00017
	Other Ingredient(s)			Confidential		
			Oxyalkylated phenolic resin	Confidential		0.00012
	Other Ingredient(s)			Confidential		
			Olefins	Confidential		0.00003
	Other Ingredient(s)			Confidential		
			Olefins	Confidential		0.00003
	Other Ingredient(s)			Confidential		
			Olefins	Confidential		0.00001
	Other Ingredient(s)			Confidential		
			Olefins	Confidential		0.00001

* Total Water Volume sources may include fresh water, produced water, and/or recycled water
 ** Information is based on the maximum potential for concentration and thus the total may be over 100%
 Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided.
 Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)

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Stimulation Summary

Date	Stage #	Formation	Frac Type	Top Perf	Bottom Perf	# of Perfs	BD Press (psi)	ATP (psi)	Avg Rate (bpm)	ISIP (psi)	Frac Gradient	Sand (lbs)	Acid (gals)	Water (gals)
10/29/2013	1	Marcellus	Slickwater	17035	17285	56	6280	8033	78.4	3711	0.99	467223	3,000	559,287
10/29/2013	2	Marcellus	Slickwater	16723	16977	40	5515	8303	75.7	3793	1.00	411073	3,000	456,955
10/30/2013	3	Marcellus	Slickwater	16423	16677	40	6494	8070	78.2	4103	1.05	463934	3,000	474,922
10/31/2013	4	Marcellus	Slickwater	16123	16377	40	6302	8157	76.7	3831	1.01	468791	3,000	456,074
11/1/2013	5	Marcellus	Slickwater	15823	16077	40	6528	7856	76.6	3739	0.99	462821	3,000	457,429
11/2/2013	6	Marcellus	Slickwater	15523	15777	40	6842	8142	87.2	4005	1.03	454030	3,000	481,530
11/2/2013	7	Marcellus	Slickwater	15223	15477	40	5988	8038	79.2	4278	1.04	462290	3,000	461,432
11/3/2013	8	Marcellus	Slickwater	14923	15177	40	5611	7969	89.7	4192	1.06	427997	3,000	455,655
11/3/2013	9	Marcellus	Slickwater	14675	14877	40	6029	7932	89.3	4299	1.08	389578	3,000	408,965
11/6/2013	10	Marcellus	Slickwater	14425	14627	40	6412	7779	79.2	4431	1.10	385498	3,000	407,063
11/7/2013	11	Marcellus	Slickwater	14175	14377	40	5612	7930	79.5	4443	1.10	386227	3000	414,600
11/8/2013	12	Marcellus	Slickwater	13873	14127	40	6774	8084	80.3	4381	1.09	417357	3000	483,857
11/8/2013	13	Marcellus	Slickwater	13573	13827	40	6313	7561	75.1	4072	1.04	465001	6000	641,033
11/9/2013	14	Marcellus	Slickwater	13273	13527	40	6784	7741	88.9	4331	1.08	464247	3000	585,930
11/9/2013	15	Marcellus	Slickwater	12973	13227	40	6030	7509	80.7	4138	1.05	464987	3000	456,722
11/10/2013	16	Marcellus	Slickwater	12725	12927	40	5798	7527	80.3	4260	1.07	349839	3000	431,395
11/10/2013	17	Marcellus	Slickwater	12423	12677	40	5630	7357	81.6	4246	1.07	463371	3000	457,769
11/10/2013	18	Marcellus	Slickwater	12123	12377	40	5642	7284	81.1	3969	1.03	464880	3000	547,993
11/10/2013	19	Marcellus	Slickwater	11875	12077	40	5801	7712	83.1	4297	1.07	391421	3000	430,984
11/11/2013	20	Marcellus	Slickwater	11625	11827	40	5275	7767	87.7	4216	1.06	389280	3000	419,373
11/11/2013	21	Marcellus	Slickwater	11375	11577	40	5514	7656	81.0	4412	1.09	387611	3000	397,342
11/11/2013	22	Marcellus	Slickwater	10773	11027	40	6378	8159	67.3	4528	1.11	465099	6000	720,867
11/12/2013	23	Marcellus	Slickwater	10773	11027	40	5894	8153	75.5	4483	1.10	410931	3000	454,662
11/12/2013	24	Marcellus	Slickwater	10473	10727	40	5739	7909	73.7	4453	1.10	421289	3000	503,304
11/13/2013	25	Marcellus	Slickwater	10173	10427	40	5811	7421	81.4	4310	1.08	466790	6000	491,603
11/13/2013	26	Marcellus	Slickwater	9925	10127	40	5968	7248	80.6	4525	1.11	391095	3000	379,617
11/13/2013	27	Marcellus	Slickwater	9675	9877	40	5741	7078	78.0	4367	1.09	388010	3000	376,752
11/13/2013	28	Marcellus	Slickwater	9373	9627	40	5542	7143	82.8	4800	1.15	446878	3000	434,438
11/14/2013	29	Marcellus	Slickwater	9073	9327	40	5604	7172	83.6	4309	1.08	465486	3000	447,554
11/14/2013	30	Marcellus	Slickwater	8773	9027	40	6263	7442	80.4	3996	1.03	403952	3000	421,520
11/14/2013	31	Marcellus	Slickwater	8473	8727	40	5936	7017	77.6	4558	1.11	470464	3000	437,495
11/14/2013	32	Marcellus	Slickwater	8173	8427	40	6376	6911	84.3	4289	1.07	466148	3000	436,276
11/15/2013	33	Marcellus	Slickwater	7873	8127	40	5229	6733	83.5	4335	1.08	463596	3000	424,763
11/15/2013	34	Marcellus	Slickwater	7573	7827	40	5468	6721	83.9	4299	1.08	465399	3000	433,473
11/15/2013	35	Marcellus	Slickwater	7273	7527	40	6115	6719	85.0	4469	1.10	467638	3000	427,015
11/16/2013	36	Marcellus	Slickwater	7025	7227	40	6547	6745	83.7	4361	1.08	387838	3000	362,797

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Stage #	Plug Type	Plug Depth
1	Toe Sleeve	17,287.10 -17,290.50
2	Composite Frac Plug	17,000
3	Composite Frac Plug	16,700
4	Composite Frac Plug	16,400
5	Composite Frac Plug	16,100
6	Composite Frac Plug	15,800
7	Composite Frac Plug	15,500
8	Composite Frac Plug	15,200
9	Composite Frac Plug	14,900
10	Composite Frac Plug	14,650
11	Composite Frac Plug	14,400
12	Composite Frac Plug	14,150
13	Composite Frac Plug	13,850
14	Composite Frac Plug	13,550
15	Composite Frac Plug	13,250
16	Composite Frac Plug	12,950
17	Composite Frac Plug	12,700
18	Composite Frac Plug	12,400
19	Composite Frac Plug	12,100
20	Composite Frac Plug	11,850
21	Composite Frac Plug	11,600
22	Composite Frac Plug	11,350
23	Composite Frac Plug	11,050
24	Composite Frac Plug	10,750
25	Composite Frac Plug	10,450
26	Composite Frac Plug	10,150
27	Composite Frac Plug	9,900
28	Composite Frac Plug	9,650
29	Composite Frac Plug	9,350
30	Composite Frac Plug	9,050
31	Composite Frac Plug	8,750
32	Composite Frac Plug	8,450
33	Composite Frac Plug	8,150
34	Composite Frac Plug	7,850
35	Composite Frac Plug	7,550
36	Composite Frac Plug	7,250
	Kill Plug	6,500

PBTD Details:

Pump 10bbls 9.5ppg Mud Push, 54.3bbls 17.5ppg, 0.94yld, 0.9bbl mud push, displace with 99bbls mud. Bottom of plug at 6795' top at 6193'. Pump 10 bbls 9.5ppg mud push, 45.4 bbls 17.5ppg, 0.94yld, 0.9bbl mud push, displace with 89bbls mud. Bottom of at 6193' top at 5607'. Pump 10 bbls 9.5ppg mud push, 41 bbls 17.5ppg, 0.94 yld, 0.8bbl mud push, displace with 80bbls mud. Bottom of plug at 5607' top at 5061'. Plug back from 6795' to 5061' utilizing 3 plugs.

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Formations	Top TVD	Base TVD	Top MD	Base MD	Fluid
Shale	0	472	0	472	
Pittsburgh Coal	472	533	472	533	
Shale and Sandstone	533	656	533	656	
Gas Sand	656	723	656	723	
Shale	723	769	723	769	
1st Salt Sand	769	788	769	788	
Shale	788	906	788	906	
2nd Salt Sand	906	955	906	955	
Shale	955	989	955	989	
Big Lime	989	1105	989	1105	
Big Injun	1105	1150	1105	1150	
Price	1150	1270	1150	1270	
Murrysville	1270	1305	1270	1305	
Shale	1305	1463	1305	1150	
50' Sand	1150	1270	1150	1270	
Shale	1270	1305	1270	1305	
Gordon	1305	1463	1305	1463	
Shale	1463	1720	1463	1720	
Fifth Sand	1720	1910	1720	1910	
Shale	1910	1962	1910	1962	
Speechley Sand	1962	3197	1962	3197	
Shale	3197	4346	3197	4347	
Warren Sand	4346	4366	4347	4633	
Shale	4632	4703	4633	4704	
Java Shale	4703	4797	4704	4900	
Pipe Creek Shale	4899	5496	4900	5502	
Angola Shale	5496	5528	5502	5537	
Rhinestreet	5528	5762	5537	5818	
Cashaqua	5762	5804	5818	5872	
Middlesex	5804	5869	5872	5949	
West River	5869	5895	5949	5979	
Burkett	5895	5897	5979	5981	
Tully Limestone	5897	5899	5981	5983	
Hamilton	5899	5947	5983	6036	
Marcellus	5947	5952	6036	not encountered	Gas
Onondaga	5952	not encount	not encountered	not encountered	

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Noble Energy SHL17DHS Gyro+MWD 0' to 6805' MD Survey Report



(Dof Survey)

Report Date: June 10, 2013 - 10:12 AM
 Client: Noble Energy
 Field: WY Mesquite Canyon (NAD 27)
 Structure / Slot: Noble Energy SHL17 Pad / S/L 17CH5
 Well: S/L 17CH5
 Original Borehole: UREX09 / Unknown
 UWI / API#:
 Survey Name: Noble Energy SHL17DHS Gyro+MWD 0' to 6805' MD
 Survey Date: June 14, 2013
 Tool / AHD / DDI / ERD Ratio: 30.905" / 02.753" / 3.16 / 0.012
 Coordinate Reference System: NAD27 West Virginia State Plane, Northern Zone, US Foot
 Location Lat / Long: N 39°58'38" 71830", W 80°31'40" 53228"
 Location Grid NE YX: N 53871.771 (NUS), E 171461.701 (NUS)
 CRS Grid Convergence Angle: -0.6568"
 Grid Scale Factor: 0.99999991

Survey / DLS Computation: Madsen Casanova / Lutzinski
 Vertical Section Azimuth: 329.804" (Grid North)
 Vertical Section Origin: 0.000 0.0 0.000 0
 TWD Reference Datum: NAD
 TWD Reference Elevation: 1252.500 0' above MSL
 Seabed / Ground Elevation: 1272.500 0' above MSL
 Magnetic Declination: -8.401"
 Total Gravity Field Strength: 9.806 350dmg (9.80695 (Eosys))
 Total Magnetic Field Strength: 53370.649 nT
 Magnetic Dip Angle: 67.553"
 Declination Date: June 14, 2013
 Magnetic Oscillation Model: H0(CM 2013)
 North Reference: Grid North
 Grid Convergence Used: -0.6568"
 Total Corr Mag North-Grid North: -7.8039"
 Local Coord Referenced To: World Mean

Comments	MD (ft)	heel (°)	Azim Grid (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	N5 (ft)	EW (ft)	DLS (ft)	DR (ft)	TR (ft)	Morthing (ft)	Easting (ft)	Northing (ft)	Latitude (N 2011)	Longitude (W 2011)	Directional Difficulty Index
500	0.00	0.00	0.00	0.00	-1290.50	0.00	0.00	0.00	0.00	N/A	N/A	539771.77	171461.76	171461.76	N 39 58 38.72 W	80 31 40 53	0.00
500	0.00	0.00	212.45	50.00	-1240.50	-0.10	-0.11	-0.00	0.00	0.62	0.62	539771.65	171461.66	171461.66	N 39 58 38.72 W	80 31 40 53	0.00
1000	0.00	0.00	192.31	100.00	-1190.50	-0.34	-0.33	-0.16	0.24	0.08	-0.20	539771.20	171461.58	171461.58	N 39 58 38.71 W	80 31 40 53	0.00
1500	0.00	0.00	180.89	150.00	-1140.50	-0.57	-0.61	-0.21	0.34	-0.32	-0.20	539771.19	171461.55	171461.55	N 39 58 38.71 W	80 31 40 53	0.00
2000	0.00	0.00	128.45	200.00	-1090.50	-0.83	-0.83	-0.02	0.04	0.74	-104.82	539770.93	171461.74	171461.74	N 39 58 38.71 W	80 31 40 53	0.01
2500	0.00	0.00	107.57	245.00	-1040.51	-1.12	-1.07	0.40	0.00	0.00	-41.76	539770.70	171462.16	171462.16	N 39 58 38.71 W	80 31 40 53	0.27
3000	0.00	0.00	109.26	290.00	-990.51	-1.40	-1.29	0.96	0.48	0.48	3.64	539770.51	171462.73	171462.73	N 39 58 38.71 W	80 31 40 53	0.49
3500	0.00	0.00	106.64	340.00	-940.51	-1.72	-1.47	1.85	0.13	0.08	-7.50	539770.29	171463.41	171463.41	N 39 58 38.70 W	80 31 40 53	0.64
4000	0.00	0.00	115.02	390.00	-890.52	-2.05	-1.71	2.29	0.07	-0.26	10.02	539770.05	171464.04	171464.04	N 39 58 38.70 W	80 31 40 53	0.25
4500	0.00	0.00	133.02	440.00	-840.52	-2.52	-2.09	2.83	0.50	0.26	34.80	539769.08	171464.56	171464.56	N 39 58 38.70 W	80 31 40 53	0.92
5000	0.00	0.00	119.32	490.00	-790.53	-3.05	-2.52	3.44	0.43	0.12	-27.36	539768.24	171465.20	171465.20	N 39 58 38.69 W	80 31 40 53	1.04
5500	0.00	0.00	149.50	540.00	-740.53	-3.62	-2.89	4.09	0.77	-0.70	-6.60	539767.06	171465.75	171465.75	N 39 58 38.69 W	80 31 40 53	1.16
6000	0.00	0.00	153.23	590.00	-690.53	-4.32	-3.76	4.79	1.38	-0.42	-219.56	539765.98	171466.56	171466.56	N 39 58 38.70 W	80 31 40 53	1.28
6500	0.00	0.00	163.23	640.00	-640.54	-5.10	-4.31	5.56	1.52	1.30	-84.00	539765.46	171467.53	171467.53	N 39 58 38.71 W	80 31 40 53	1.41
7000	0.00	0.00	171.85	690.00	-590.56	-5.95	-4.77	6.44	2.35	2.34	-7.16	539765.50	171468.67	171468.67	N 39 58 38.71 W	80 31 40 53	1.98
7500	0.00	0.00	219.52	740.00	-540.65	-6.92	-5.29	7.57	1.27	1.22	-8.20	539772.05	171469.43	171469.43	N 39 58 38.72 W	80 31 40 53	1.74
8000	0.00	0.00	218.81	790.00	-490.66	-7.98	-5.91	8.74	0.26	0.18	6.58	539773.29	171469.84	171469.84	N 39 58 38.72 W	80 31 40 53	1.87
8500	0.00	0.00	210.51	840.00	-440.76	-9.17	-6.57	10.00	-1.44	-1.44	0.40	539775.29	171469.50	171469.50	N 39 58 38.74 W	80 31 40 53	1.98
9000	0.00	0.00	227.25	890.00	-390.78	-10.50	-7.24	11.34	-0.66	-0.66	16.48	539770.51	171469.28	171469.28	N 39 58 38.74 W	80 31 40 53	2.02
9500	0.00	0.00	323.58	940.00	-340.74	-13.02	-8.00	12.74	0.25	0.14	-7.34	539772.68	171468.78	171468.78	N 39 58 38.75 W	80 31 40 53	2.10
10000	0.00	0.00	329.49	990.00	-290.76	-15.68	-8.80	14.20	0.41	0.20	11.82	539778.84	171467.96	171467.96	N 39 58 38.79 W	80 31 40 53	2.15
10500	0.00	0.00	337.75	1040.00	-240.75	-18.50	-9.71	15.74	0.56	0.56	18.52	539780.28	171467.24	171467.24	N 39 58 38.80 W	80 31 40 53	2.20
11000	0.00	0.00	314.06	1090.00	-190.83	-21.50	-10.71	17.34	1.81	0.00	-47.36	539781.78	171466.30	171466.30	N 39 58 38.81 W	80 31 40 53	2.24
11500	0.00	0.00	301.78	1140.00	-140.84	-24.68	-11.89	19.02	-0.66	-0.74	-24.50	539782.74	171465.10	171465.10	N 39 58 38.83 W	80 31 40 53	2.23
12000	0.00	0.00	297.75	1190.00	-90.85	-28.02	-13.12	20.80	0.40	-0.34	-8.00	539783.29	171463.60	171463.60	N 39 58 38.83 W	80 31 40 53	2.37
12500	0.00	0.00	216.40	1240.00	-40.87	-31.34	-14.54	22.66	0.89	-0.34	35.48	539784.07	171462.33	171462.33	N 39 58 38.84 W	80 31 40 53	2.41
13000	0.00	0.00	213.64	1290.00	9.12	-35.00	-16.00	24.60	0.18	0.18	-3.70	539784.86	171461.23	171461.23	N 39 58 38.85 W	80 31 40 53	2.43
13500	0.00	0.00	330.58	1340.00	59.10	-38.22	-17.74	26.58	0.72	-0.48	-25.32	539785.51	171460.40	171460.40	N 39 58 38.85 W	80 31 40 53	2.40
14000	0.00	0.00	296.27	1390.00	109.10	-41.50	-19.11	28.60	0.87	-0.80	0.42	539785.68	171459.74	171459.74	N 39 58 38.86 W	80 31 40 53	2.49
14500	0.00	0.00	254.14	1440.00	159.10	-44.80	-20.44	30.66	0.50	0.48	15.74	539780.11	171458.33	171458.33	N 39 58 38.86 W	80 31 40 53	2.51
15000	0.00	0.00	333.91	1490.00	209.00	-48.24	-21.84	32.74	0.88	0.68	59.54	539780.51	171457.03	171457.03	N 39 58 38.86 W	80 31 40 53	2.53
15500	0.00	0.00	291.81	1540.00	259.00	-51.74	-23.34	34.84	1.08	-0.89	-84.20	539780.86	171449.74	171449.74	N 39 58 38.87 W	80 31 40 53	2.56
16000	0.00	0.00	341.48	1590.00	309.00	-55.30	-24.90	36.94	0.70	0.20	89.34	539781.10	171448.64	171448.64	N 39 58 38.87 W	80 31 40 53	2.58
16500	0.00	0.00	369.61	1640.00	359.00	-58.90	-26.50	39.04	0.54	0.54	18.54	539782.60	171447.43	171447.43	N 39 58 38.87 W	80 31 40 53	2.59
17000	0.00	0.00	323.50	1690.00	409.00	-62.50	-28.10	41.14	0.07	0.34	84.90	539788.11	171446.51	171446.51	N 39 58 38.88 W	80 31 40 53	2.62
17500	0.00	0.00	6.35	1740.00	459.00	-66.10	-29.70	43.24	0.58	0.18	-83.28	539788.05	171446.07	171446.07	N 39 58 38.88 W	80 31 40 53	2.63
18000	0.00	0.00	340.27	1790.00	509.00	-69.70	-31.30	45.34	0.75	-0.52	17.25	539788.00	171445.63	171445.63	N 39 58 38.89 W	80 31 40 53	2.65
18500	0.00	0.00	338.27	1840.00	559.00	-73.30	-32.90	47.44	0.23	0.22	-8.00	539786.31	171445.00	171445.00	N 39 58 38.89 W	80 31 40 53	2.65
19000	0.00	0.00	344.78	1890.00	609.00	-76.90	-34.50	49.54	0.43	-0.42	16.98	539786.58	171444.42	171444.42	N 39 58 38.89 W	80 31 40 53	2.67
19500	0.00	0.00	353.45	1940.00	659.00	-80.50	-36.10	51.64	0.53	0.62	17.38	539786.91	171443.77	171443.77	N 39 58 38.89 W	80 31 40 53	2.69
20000	0.00	0.00	29.12	1990.00	709.00	-84.10	-37.70	53.74	0.83	-0.74	71.34	539790.21	171443.08	171443.08	N 39 58 38.90 W	80 31 40 53	2.75
20500	0.00	0.00	32.30	2040.00	759.00	-87.70	-39.30	55.84	0.44	0.44	8.54	539790.42	171442.50	171442.50	N 39 58 38.90 W	80 31 40 53	2.71
21000	0.00	0.00	34.41	2090.00	809.00	-91.30	-40.90	57.94	0.09	-0.04	4.04	539790.70	171442.08	171442.08	N 39 58 38.90 W	80 31 40 53	2.71
21500	0.00	0.00	85.10	2140.00	859.00	-94.90	-42.50	60.04	-0.04	-0.04	97.50	539790.85	171441.50	171441.50	N 39 58 38.91 W	80 31 40 53	2.73
22000	0.00	0.00	29.09	2190.00	909.00	-98.50	-44.10	62.14	0.62	0.62	-129.32	539791.01	171440.13	171440.13	N 39 58 38.91 W	80 31 40 53	2.74
22500	0.00	0.00	28.75	2240.00	959.00	-102.10	-45.70	64.24	-0.20	-0.20	17.48	539791.20	171439.24	171439.24	N 39 58 38.91 W	80 31 40 53	2.75
23000	0.00	0.00	30.06	2290.00	1009.00	-105.70	-47.30	66.34	0.29	-0.28	29.07	539791.40	171438.30	171438.30	N 39 58 38.91 W	80 31 40 53	2.76
23500	0.00	0.00	338.28	2340.00	1059.00	-109.30	-48.90	68.44	0.18	0.18	-2.84	539791.51	171437.47	171437.47	N 39 58 38.91 W	80 31 40 53	2.76
24000	0.00	0.00	212.27	2390.00	1109.00	-112.90	-50.50	70.54	0.15	0.09	-36.02	539791.68	171436.52	171436.52	N 39 58 38.91 W	80 31 40 53	2.77
24500	0.00	0.00	62.01	2440.00	1159.00	-116.50	-52.10	72.64	0.28	0.01	61.48	539791.85	171435.63	171435.63	N 39 58 38.92 W	80 31 40 53	2.78
25000	0.00	0.00	37.73	2490.00	1209.00	-120.10	-53.70	74.74	0.41	-0.41	31.44	539791.93	171434.70	171434.70	N 39 58 38.92 W	80 31 40 53	2.78
25500	0.00	0.00	359.60	2540.00	1259.00	-123.70	-55.30	76.84	0.24	0.18	-154.08	539791.60	171433.76	171433.76	N 39 58 38.92 W	80 31 40 53	2.77
26000	0.00	0.00	351.30	2590.00	1309.00	-127.30	-56.90	78.94	0.08	0.08	1.22	539792.12	171432.81	171432.81	N 39 58 38.92 W	80 31 40 53	2.78
26500	0.00	0.00	324.25	2640.00	1359.00	-130.90	-58.50	81.04	0.21	0.10	-54.10	539792.27	171431.98	171431.98	N 39 58 38.92 W	80 31 40 53	2.70
27000	0.00	0															

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Comments	MD (ft)	Incl (°)	Adm Grid (ft)	TVD (ft)	TVD88 (ft)	VSEC (ft)	N8 (ft)	EW (ft)	DLS (ft/100ft)	BR (ft/100ft)	TR (ft/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N8° ' ' '')	Longitude (E-W° ' ' '')	Directional Difficulty Index
	6070.00	0.25	179.70	6000.08	4779.58	42.07	41.43	-7.35	0.07	-0.51	138.27	539812.20	1711454.41	N 39 58 30.12 W	80 31 46.63	3.46
	6160.00	0.40	158.79	6150.08	4808.58	41.57	40.94	-7.24	0.21	0.17	-23.30	539812.71	1711454.52	N 39 58 30.12 W	80 31 46.63	3.47
	6250.00	0.42	106.19	6240.07	4898.57	41.12	40.55	-6.81	0.40	0.02	-58.44	539812.32	1711454.05	N 39 58 30.12 W	80 31 46.63	3.48
	6339.00	0.41	105.75	6338.07	4947.57	40.85	40.38	-6.10	0.01	-0.01	-1.06	539812.15	1711455.57	N 39 58 30.12 W	80 31 46.62	3.48
	6429.00	0.44	80.72	6428.07	5127.57	40.72	40.35	-5.53	0.20	0.03	-27.28	539812.12	1711456.23	N 39 58 30.12 W	80 31 46.61	3.49
	6518.00	0.51	70.48	6517.07	5226.57	40.79	40.54	-4.82	0.12	0.08	-11.51	539812.31	1711456.94	N 39 58 30.12 W	80 31 46.60	3.49
	6608.00	0.62	77.58	6607.06	5316.56	40.89	40.78	-3.07	0.14	0.12	7.89	539812.55	1711457.79	N 39 58 30.12 W	80 31 46.59	3.50
Final Survey 19 Jun 13	6697.00	0.85	82.45	6696.05	5405.55	40.90	40.07	-2.85	0.27	0.26	5.47	539812.74	1711458.91	N 39 58 30.12 W	80 31 46.57	3.51
Production to Bit	6740.00	0.79	92.78	6730.05	5448.55	40.82	40.99	-2.23	0.37	-0.14	24.02	539812.78	1711458.53	N 39 58 30.12 W	80 31 46.57	3.51
	6805.00	0.78	92.70	6804.04	5513.54	40.94	40.95	-1.34	0.00	0.00	0.00	539812.72	1711460.42	N 39 58 30.12 W	80 31 46.56	3.52

Survey Type: Def Survey

Survey Error Model: ISCWBA Rev 0 *** 3.47 05 000% Confidence 2.7865 sigma

Description	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	0.000	18.500		30.000	30.000	SLB_NSQ+MSHOT-Depth Only	Original Borehole / Noble Energy SHL 17DHS Gyro-MWD 0' to 8805' MD
	18.500	2977.000		30.000	30.000	SLB_NSQ+MSHOT	Original Borehole / Noble Energy SHL 17DHS Gyro-MWD 0' to
	2977.000	3101.000		30.000	30.000	SLB_MWD+POOR	Original Borehole / Noble Energy SHL 17DHS Gyro-MWD 0' to
	3101.000	4160.000		30.000	30.000	SLB_MWD-STD	Original Borehole / Noble Energy SHL 17DHS Gyro-MWD 0' to
	4100.000	4279.000		30.000	30.000	SLB_MWD-POOR	Original Borehole / Noble Energy SHL 17DHS Gyro-MWD 0' to
	4270.000	6740.000		30.000	30.000	SLB_MWD-STD	Original Borehole / Noble Energy SHL 17DHS Gyro-MWD 0' to
	6740.000	6805.000		30.000	30.000	SLB_BLIND+TREND	Original Borehole / Noble Energy SHL 17DHS Gyro-MWD 0' to

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Comments	MD (ft)	Incl (°)	Adm Grid (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DL9 (ft)	BR (ft)	TR (ft)	Northing (ft)	Easting (ft)	Latitude (N/S)	Longitude (E/W)	Directional Offshore Index
	5578.00	26.49	120.03	5565.82	4275.32	-28.43	-0.69	50.01	10.34	10.32	-1.70	53871.09	1711512.07	N 38 58 38.72 W	80 31 45.88	3.97
	5623.00	30.82	125.45	5605.31	4314.81	-48.48	-13.13	88.52	0.72	0.71	-0.93	53875.04	1711530.27	N 38 58 38.60 W	80 31 46.05	4.06
	5668.00	33.44	123.82	5643.41	4352.01	-70.04	-26.72	88.21	6.13	5.82	-3.02	53874.06	1711549.97	N 38 58 38.40 W	80 31 45.40	4.14
	5713.00	39.21	122.97	5690.35	4399.85	-84.21	-40.80	109.07	6.26	0.16	-1.89	538730.92	1711571.42	N 38 58 38.33 W	80 31 45.22	4.21
	5757.00	49.61	126.60	5714.98	4424.48	-119.30	-90.21	132.03	9.43	8.62	0.07	538716.56	1711560.79	N 38 58 38.18 W	80 31 44.83	4.29
	5802.00	59.00	128.58	5749.31	4458.81	-149.71	-137.81	155.19	4.17	4.44	6.04	538697.06	1711616.95	N 38 58 38.01 W	80 31 44.60	4.35
	5847.00	37.85	128.43	5784.16	4493.16	-179.38	-177.12	177.21	0.56	-1.13	1.89	538680.06	1711635.96	N 38 58 37.83 W	80 31 44.24	4.41
	5892.00	34.17	130.07	5820.60	4530.00	-109.08	-108.63	197.05	8.22	-8.16	1.42	538663.16	1711695.41	N 38 58 37.67 W	80 31 43.98	4.46
	5937.00	30.60	129.59	5858.90	4563.06	-221.87	-193.44	216.05	9.55	-7.93	-0.96	538648.34	1711878.40	N 38 58 37.52 W	80 31 43.73	4.51
	5982.00	20.31	119.88	5898.01	4607.51	-241.94	-195.00	234.91	11.02	-8.20	-15.36	538632.76	1711896.98	N 38 58 37.41 W	80 31 43.50	4.56
	6027.00	22.32	109.90	5938.02	4647.82	-267.01	-192.02	251.81	13.31	-10.43	-19.05	538619.15	1711915.24	N 38 58 37.34 W	80 31 43.25	4.61
	6071.00	18.81	99.53	5980.16	4689.08	-268.72	-146.72	269.04	11.50	-8.24	-23.04	538605.05	1711928.33	N 38 58 37.20 W	80 31 43.09	4.65
	6116.00	10.00	87.30	6022.10	4732.66	-270.74	-147.02	278.92	0.02	-5.80	-27.18	538594.18	1711941.87	N 38 58 37.20 W	80 31 42.92	4.68
	6161.00	13.72	74.57	6065.58	4776.14	-281.51	-145.01	291.26	6.32	-5.07	-28.23	538582.57	1711953.81	N 38 58 37.21 W	80 31 42.77	4.71
	6206.00	14.14	57.42	6109.38	4818.88	-283.18	-141.62	300.83	0.40	0.05	-38.98	538570.15	1711962.58	N 38 58 37.35 W	80 31 42.85	4.72
	6250.00	17.61	45.40	6152.67	4862.17	-281.87	-133.68	310.31	10.50	7.71	-26.71	538562.00	1711972.06	N 38 58 37.43 W	80 31 42.53	4.76
	6295.00	18.02	32.19	6196.31	4904.61	-277.34	-122.84	318.23	10.50	4.91	-29.28	538549.14	1711980.97	N 38 58 37.64 W	80 31 42.41	4.78
	6340.00	21.67	18.45	6237.43	4946.93	-269.02	-108.33	325.91	11.44	3.80	-30.53	538536.45	1711987.85	N 38 58 37.88 W	80 31 42.33	4.82
	6385.00	24.05	5.50	6278.93	4988.43	-266.72	-91.34	328.42	12.37	5.51	-26.64	538520.44	1711991.77	N 38 58 37.85 W	80 31 42.20	4.86
	6429.00	28.95	357.06	6318.00	5028.10	-241.10	-72.45	329.78	10.58	5.59	-19.25	538508.33	1711993.50	N 38 58 38.04 W	80 31 42.23	4.80
	6474.00	25.30	396.05	6356.33	5067.83	-227.14	-51.58	327.30	0.16	5.42	-15.92	538492.50	1711980.10	N 38 58 38.25 W	80 31 42.32	4.69
	6519.00	32.76	244.47	6396.68	5108.38	-203.38	-29.78	322.10	0.64	7.40	-12.40	538474.01	1711933.03	N 38 58 38.47 W	80 31 42.30	4.06
	6564.00	38.40	348.28	6433.91	5143.41	-175.75	-4.42	314.41	9.83	8.29	-0.31	538457.35	1711978.15	N 38 58 38.71 W	80 31 42.49	4.06
	6609.00	40.67	336.13	6488.30	5177.80	-148.99	21.21	304.65	0.86	0.50	-4.89	538439.88	1711996.39	N 38 58 38.96 W	80 31 42.62	5.01
	6654.00	45.27	325.94	6531.22	5210.82	-118.82	60.54	292.22	10.38	10.22	-2.80	538421.51	1711954.67	N 38 58 39.24 W	80 31 42.78	5.05
	6699.00	45.64	338.08	6581.04	5241.14	-88.15	79.04	279.70	0.81	0.71	-1.91	538403.70	1711941.45	N 38 58 39.54 W	80 31 42.80	5.08
	6742.00	53.61	315.84	6588.96	5269.45	-52.10	111.43	265.65	0.03	0.02	-0.55	538385.20	1711927.40	N 38 58 39.85 W	80 31 43.14	5.11
	6787.00	57.84	334.04	6584.29	5293.70	-16.20	145.00	248.89	0.96	0.40	-4.00	538367.61	1711911.64	N 38 58 40.18 W	80 31 43.34	5.16
	6832.00	61.34	331.78	6607.06	5318.58	23.28	179.64	232.21	8.90	7.78	-5.02	538350.40	1711893.06	N 38 58 40.63 W	80 31 43.88	5.18
	6877.00	64.26	330.23	6627.63	5337.13	83.10	214.63	212.80	7.16	6.47	-2.44	538339.40	1711874.66	N 38 58 40.83 W	80 31 43.83	5.21
	6921.00	69.50	326.47	6645.23	5354.73	150.45	240.49	192.55	0.90	0.88	-1.73	540021.25	1711854.30	N 38 58 41.21 W	80 31 44.10	5.24
	6966.00	73.41	328.82	6669.86	5369.38	145.08	265.07	170.87	10.26	10.71	-1.88	540057.72	1711832.42	N 38 58 41.56 W	80 31 44.38	5.27
	7011.00	78.90	329.24	6691.44	5380.94	180.41	323.21	148.23	7.65	7.53	1.39	540094.97	1711802.28	N 38 58 41.93 W	80 31 44.68	5.30
	7056.00	80.30	328.01	6700.33	5389.88	233.48	360.58	125.47	7.60	7.78	-1.40	540132.74	1711587.22	N 38 58 42.30 W	80 31 44.87	5.33
	7101.00	85.16	327.31	6708.07	5395.57	276.00	368.81	101.70	11.15	10.78	-2.89	540170.55	1711503.55	N 38 58 42.67 W	80 31 45.28	5.37
	7146.00	88.24	328.17	6708.76	5398.20	329.01	425.58	77.71	6.84	6.11	-5.99	540207.28	1711539.48	N 38 58 43.03 W	80 31 45.80	5.39
	7191.00	85.42	325.82	6709.87	5400.37	373.02	477.72	54.02	6.82	6.12	-1.08	540245.07	1711573.03	N 38 58 43.44 W	80 31 45.87	5.42
	7247.00	88.73	325.17	6709.68	5402.08	423.01	519.67	20.19	2.72	2.67	-0.88	540281.42	1711481.95	N 38 58 43.98 W	80 31 46.35	5.44
	7302.00	80.00	324.94	6703.57	5403.07	512.88	562.82	-36.70	1.45	0.27	-0.26	540324.36	1711430.08	N 38 58 44.57 W	80 31 47.01	5.48
	7347.00	90.24	324.63	6701.33	5401.88	604.24	604.24	-82.04	0.67	0.27	-0.61	540371.74	1711362.25	N 38 58 45.25 W	80 31 47.69	5.52
	7391.00	90.21	323.58	6700.03	5401.63	691.68	638.03	-135.17	0.01	-0.03	-0.81	540420.77	1711329.60	N 38 58 46.00 W	80 31 48.38	5.55
	7436.00	90.48	324.55	6699.40	5401.00	781.58	616.50	-187.93	1.12	0.30	1.08	540468.63	1711279.78	N 38 58 46.71 W	80 31 49.07	5.58
	7481.00	90.38	326.77	6691.82	5401.32	870.54	683.04	-239.83	1.38	-0.11	1.37	540516.07	1711222.94	N 38 58 47.43 W	80 31 49.73	5.61
	7536.00	90.31	325.97	6691.29	5400.79	960.52	637.61	-288.78	0.24	-0.08	0.22	540562.94	1711173.01	N 38 58 48.15 W	80 31 50.38	5.64
	7581.00	90.45	325.24	6690.60	5400.19	1049.50	501.87	-339.80	0.83	0.15	-0.81	540610.40	1711122.17	N 38 58 48.88 W	80 31 51.06	5.67
	7626.00	90.07	324.81	6690.29	5399.70	1138.45	350.80	-390.82	0.84	-0.43	-0.48	540658.72	1711071.18	N 38 58 49.60 W	80 31 51.71	5.70
	7671.00	89.60	325.94	6690.25	5399.70	1228.40	1178.46	-441.33	0.50	-0.16	-0.26	540706.17	1711016.45	N 38 58 50.31 W	80 31 52.30	5.72
	7716.00	89.87	325.30	6690.38	5399.86	1317.37	1251.65	-492.11	0.40	0.04	0.39	540753.67	1710966.67	N 38 58 51.03 W	80 31 53.05	5.76
	7771.00	89.20	325.10	6690.48	5399.96	1406.34	1324.70	-543.81	0.27	-0.08	-0.26	540801.14	1710917.98	N 38 58 51.75 W	80 31 53.71	5.77
	7816.00	89.86	324.45	6690.05	5400.15	1496.28	1356.24	-595.88	0.79	-0.04	-0.78	540848.58	1710869.11	N 38 58 52.47 W	80 31 54.39	5.79
	7861.00	89.83	324.26	6690.30	5400.39	1585.29	1476.58	-647.53	0.19	-0.03	-0.19	540896.07	1710814.28	N 38 58 53.18 W	80 31 55.07	5.82
	7906.00	89.79	323.70	6690.10	5400.69	1675.09	1543.38	-700.44	0.65	-0.04	-0.64	540943.56	1710761.35	N 38 58 53.88 W	80 31 55.76	5.84
	7951.00	89.80	324.27	6690.84	5401.34	1763.97	1615.37	-752.77	0.79	-0.46	0.84	540991.07	1710708.02	N 38 58 54.60 W	80 31 56.44	5.86
	7996.00	89.77	323.33	6691.64	5402.14	1852.01	1688.09	-804.07	1.21	0.24	1.19	541038.70	1710653.77	N 38 58 55.34 W	80 31 57.11	5.88
	8041.00	89.38	323.70	6693.45	5402.95	1942.80	1762.27	-858.03	0.47	-0.23	0.41	541086.37	1710600.74	N 38 58 56.04 W	80 31 57.77	5.90
	8086.00	89.52	326.21	6694.30	5403.80	2031.87	1836.61	-908.85	0.59	0.10	0.57	541134.07	1710548.95	N 38 58 56.78 W	80 31 58.43	5.92
	8131.00	89.80	326.52	6694.78	5404.26	2121.87	1910.84	-954.70	0.54	0.42	0.34	541181.83	1710507.10	N 38 58 57.40 W	80 31 59.08	5.94
	8176.00	89.83	326.36	6694.07	5404.47	2211.87	1985.04	-1004.48	0.10	-0.06	-0.18	541229.61	1710457.35	N 38 58 58.23 W	80 31 59.73	5.96
	8231.00	89.86	326.26	6695.21	5404.71	2300.60	2060.00	-1053.80	0.09	0.03	-0.08	541277.40	1710408.00	N 38 58 58.96 W	80 32 0.32	5.98
	8276.00	89.73	326.01	6695.53	5405.03	2390.85	2134.75	-1103.04	0.34	-0.14	-0.31	541325.15	1710358.77	N 38 58 59.60 W	80 32 1.02	6.00
	8321.00	89.92	325.89	6696.04	5405.34	2480.54	2209.23	-1154.49	0.36	-0.12	-0.38	541372.91	1710309.33	N 38 58 60.22 W	80 32 1.69	6.01
	8366.00	89.80	326.													

51-01604

Comments	MD (ft)	Incl (°)	Arith Grid (°)	TVD (ft)	TVD88 (ft)	VSEC (ft)	N8 (ft)	EW (ft)	DL8 (ft/100ft)	BR (ft/100ft)	TR (ft/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N89°E)	Longitude (E/W)	Directional Difficulty Index
	14413.00	90.36	323.50	6676.38	6365.88	7582.02	6384.10	-4062.37	0.66	-0.08	0.09	640165.50	1707300.57	N 30 50 41.34 W	80 32 40.05	6.09
	14640.00	89.84	324.22	6671.19	6386.09	7671.78	6459.84	-4145.17	1.48	-0.58	1.37	646227.33	1707316.77	N 30 50 42.04 W	80 32 40.74	6.58
	14692.00	89.48	326.61	6670.71	6386.21	7761.73	6528.48	-4190.80	1.00	-0.42	1.54	646300.87	1707295.54	N 30 50 42.78 W	80 32 41.41	6.70
	14683.00	89.42	326.10	6677.87	6387.07	7851.69	6603.92	-4248.00	0.87	-0.07	-0.87	646376.01	1707213.88	N 30 50 43.49 W	80 32 42.08	6.71
	14771.00	89.52	325.71	6678.40	6387.90	7940.06	6678.78	-4288.69	0.09	0.11	0.09	646448.27	1707193.30	N 30 50 44.21 W	80 32 42.74	6.72
	14881.00	89.95	325.93	6679.13	6388.03	8030.05	6751.07	-4348.40	1.30	0.03	1.36	646523.18	1707113.45	N 30 50 44.94 W	80 32 43.30	6.73
	14950.00	80.72	327.03	6679.59	6389.10	8110.65	6826.70	-4306.00	0.27	0.10	0.11	646597.77	1707084.08	N 30 50 45.67 W	80 32 44.03	6.74
	15040.00	80.83	328.72	6680.05	6390.55	8200.08	6901.66	-4448.17	0.37	0.12	-0.34	646673.14	1707018.78	N 30 50 46.41 W	80 32 44.67	6.74
	15190.00	90.31	329.06	6679.04	6389.44	8288.95	6970.94	-4465.06	0.54	0.34	-0.07	646747.52	1706965.00	N 30 50 47.14 W	80 32 45.31	6.76
	15219.00	90.41	329.04	6679.37	6388.87	8358.64	7050.92	-4644.88	0.81	0.11	-0.80	646822.39	1706916.07	N 30 50 47.88 W	80 32 45.96	6.76
	15300.00	90.41	329.30	6679.73	6388.23	8478.64	7125.07	-4805.10	0.50	0.00	0.60	646897.14	1706866.88	N 30 50 48.61 W	80 32 46.62	6.77
	15398.00	90.00	327.50	6679.39	6387.80	8587.83	7200.27	-4643.04	1.32	-0.43	1.25	646971.73	1706818.22	N 30 50 49.34 W	80 32 47.25	6.79
	15488.00	89.90	329.20	6678.90	6388.10	8747.66	7253.94	-4737.83	0.83	0.00	0.83	647125.10	1706774.10	N 30 50 50.04 W	80 32 48.49	6.79
	15667.00	89.79	327.31	6678.84	6388.34	8833.62	7429.35	-4784.62	2.10	-0.12	-2.19	647200.81	1706727.35	N 30 50 51.59 W	80 32 49.10	6.80
	16757.00	89.66	329.14	6679.27	6388.77	8979.62	7604.69	-4833.00	1.31	-0.14	-1.30	647276.04	1706677.07	N 30 50 52.23 W	80 32 49.74	6.81
	15846.00	89.79	325.34	6679.70	6389.20	9015.80	7578.15	-4864.10	0.91	0.15	-0.80	647340.60	1706627.87	N 30 50 53.05 W	80 32 50.40	6.82
	16036.00	89.90	325.41	6679.84	6389.44	9105.47	7652.21	-4935.23	0.14	0.12	0.08	647423.95	1706582.74	N 30 50 53.77 W	80 32 51.07	6.82
	16025.00	89.76	324.96	6680.21	6389.71	9104.43	7726.28	-4986.05	0.63	-0.16	-0.51	647498.72	1706546.03	N 30 50 54.49 W	80 32 51.73	6.83
	16115.00	89.70	324.17	6680.58	6390.06	9204.38	7798.61	-5038.23	0.89	0.03	-0.88	647570.05	1706493.76	N 30 50 55.21 W	80 32 52.41	6.84
	16204.00	89.70	323.03	6680.01	6390.41	9373.22	7870.24	-5001.04	1.28	-0.03	-1.28	647641.08	1706437.04	N 30 50 55.91 W	80 32 53.10	6.85
	16294.00	89.87	323.26	6681.12	6390.82	9433.04	7942.70	-5145.01	0.38	0.23	0.28	647713.70	1706383.97	N 30 50 56.61 W	80 32 53.81	6.85
	16383.00	89.83	323.55	6681.28	6390.78	9551.89	8013.73	-5188.05	0.34	-0.16	0.30	647785.18	1706329.03	N 30 50 57.31 W	80 32 54.50	6.86
	16473.00	89.70	324.17	6681.59	6390.80	9641.74	8086.30	-5251.42	0.29	0.22	0.19	647857.03	1706281.67	N 30 50 58.02 W	80 32 55.19	6.87
	16562.00	89.90	323.72	6681.44	6390.94	9730.81	8157.95	-5304.08	0.15	-0.15	0.00	647920.37	1706237.81	N 30 50 58.73 W	80 32 55.88	6.87
	16861.00	89.86	324.57	6681.63	6391.13	9819.61	8230.08	-5368.21	0.98	-0.04	0.93	648001.50	1706186.78	N 30 50 59.43 W	80 32 56.60	6.88
	16741.00	90.10	325.86	6681.69	6391.16	9909.47	8303.98	-5407.65	1.40	0.27	1.43	648076.41	1706135.44	N 30 50 60.10 W	80 32 57.23	6.88
	16831.00	89.86	329.86	6681.69	6391.10	9990.47	8378.82	-5467.41	1.14	-0.27	1.11	648150.34	1706084.88	N 30 50 60.80 W	80 32 57.80	6.90
	16920.00	89.73	329.53	6682.01	6391.51	10068.47	8453.20	-5500.28	0.40	-0.15	-0.37	648224.72	1706035.72	N 30 50 61.52 W	80 32 58.52	6.90
	17010.00	89.70	328.51	6682.28	6391.89	10178.48	8528.37	-5555.83	0.07	0.07	-0.02	648299.78	1705988.07	N 30 50 62.26 W	80 32 59.17	6.91
	17099.00	89.63	329.00	6682.68	6392.18	10267.48	8602.41	-5605.31	0.47	0.04	-0.47	648373.92	1705939.69	N 30 50 63.00 W	80 32 59.82	6.91
	17189.00	80.72	325.81	6683.04	6392.54	10357.48	8678.98	-5655.70	0.33	-0.12	-0.31	648448.38	1705890.30	N 30 50 63.74 W	80 32 60.48	6.92
	17279.00	90.10	327.85	6683.18	6392.88	10447.44	8752.31	-5704.04	2.31	0.42	2.27	648523.71	1705841.07	N 30 50 64.53 W	80 32 61.12	6.93
	17368.00	90.07	330.80	6683.04	6392.84	10538.33	8828.77	-5750.47	3.09	-0.03	3.09	648600.17	1705791.53	N 30 50 65.26 W	80 32 61.72	6.94
Final Survey 03Jan13	17396.00	90.31	331.77	6682.95	6392.45	10594.28	8883.31	-5783.07	4.77	0.86	4.18	648674.70	1705840.04	N 30 50 66.00 W	80 32 62.40	6.94
Projection to Bit	17431.00	90.31	331.77	6682.76	6392.26	10599.14	8884.14	-5780.52	0.00	0.00	0.00	648655.54	1705881.48	N 30 50 66.73 W	80 32 63.11	6.95

Survey Type:

Def Survey

Survey Error Model:
Survey Program:

ISOWSA Rev 0 "" 3-D 05 000% Curvature 2.7D55 sigma

Description	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hoist Size (ft)	Casing Diameter (ft)	Survey Tool Type	Borehole / Survey
	0.000	18.500		Act Strs	30.000	SLB_NSG+MSHOT-Depth Only	Original Borehole / Noble Energy SHL 17DHS Gyro+MWD 0' to 6805' MD
	18.500	2077.000		Act Strs	30.000	SLB_NSG+MSHOT	Original Borehole / Noble Energy SHL 17DHS Gyro+MWD 0' to 6805' MD
	2077.000	3161.000		Act Strs	30.000	SLB_MWD+POOR	Original Borehole / Noble Energy SHL 17DHS Gyro+MWD 0' to 6805' MD
	3161.000	4190.000		Act Strs	30.000	SLB_MWD+STD	Original Borehole / Noble Energy SHL 17DHS Gyro+MWD 0' to 6805' MD
	4190.000	4978.000		Act Strs	30.000	SLB_MWD+POOR	Original Borehole / Noble Energy SHL 17DHS Gyro+MWD 0' to 6805' MD
	4978.000	5264.000		Act Strs	30.000	SLB_MWD+STD	Original Borehole / Noble Energy SHL 17DHS Gyro+MWD 0' to 6805' MD
	5264.000	17390.000		Act Strs	30.000	SLB_MWD+STD	STO1 / Noble Energy SHL 17DHS STO1 MWD 5264' to 17431' MD
	17390.000	17431.000		Act Strs	30.000	SLB_GLIND+TREND	STO1 / Noble Energy SHL 17DHS STO1 MWD 5264' to 17431' MD