

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

LOCATION: Sandhill Elevation: 1,290.53 Quadrangle: Majorsville

District: Sandhill County: MARSHALL  
Latitude: \_\_\_\_\_ Feet South of \_\_\_\_\_ Deg. \_\_\_\_\_ Min. \_\_\_\_\_ Sec. 39.97737500  
Longitude: \_\_\_\_\_ Feet South of \_\_\_\_\_ Deg. \_\_\_\_\_ Min. \_\_\_\_\_ Sec. -80.52940600



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	1,144.0	1,144.0	Cemented w/ 1200 sxs (150 bbls) Cement - 21 bbls of returns
Inspector: Bill Hendershot	9 5/8	3,117.0	3,117.0	Cemented w/ 1139 sxs (221 bbls) Cement - 27 bbls of returns
Date Permit Issued: 4/30/2013	5 1/2	16,339.0	16,339.0	Cemented w/ 2472 sxs ( 671 bbls) Cement - 40 bbls of returns
Date Well Work Commenced:	5/22/2013			
Date Well Work Completed:	12/4/2013			
Verbal Plugging:				
Date Permission granted on:	5/22/2013			
Rotary Cable Rig X				
Total Vertical Depth (ft): Original Hole – 6711.44				
Total Measured Depth (ft): 16354.00				
Fresh Water Depth (ft): NA				
Salt Water Depth (ft): NA				
Is coal being mined in the area (N/Y)? Y				
Coal Depths (ft.): 763.9'-769.5'				
Void(s) encountered (N/Y) Depth(s) N				

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

Producing formation Marcellus Pay zone depth (ft) 7304  
Gas: Initial open flow 722 MCF/d Oil: Initial open flow 7.5 Bbl/d  
Final open flow 1944 MCF/d Final open flow 29.8 Bbl/d  
Time of open flow between initial and final tests 24 Hours  
Static rock Pressure 1700 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] 2-4-14  
Signature Date

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

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

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

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

**Perforated Intervals, Fracturing or Stimulating:**

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

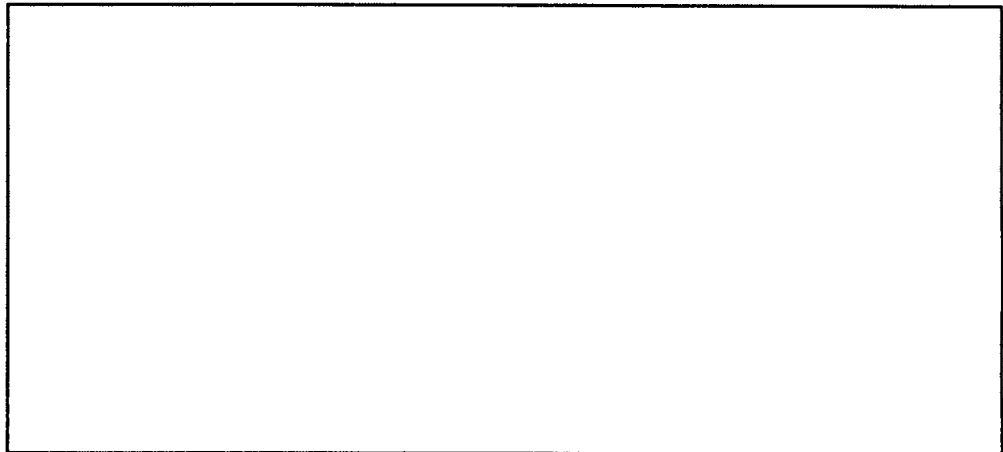
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**Surface:**

**Formations Encountered: Please See Attached**



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## Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	10/16/2013
Job End Date:	11/7/2013
State:	West Virginia
County:	Marshall
API Number:	47-051-01635-00-00
Operator Name:	Noble Energy, Inc.
Well Name and Number:	SHL17 A
Longitude:	-80.52920000
Latitude:	39.97745000
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	6,711
Total Base Water Volume (gal):	13,676,815
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	88.91965	Density = 8.330
SAND - PREMIUM WHITE	Halliburton	Proppant	Crystalline silica, quartz	14808-60-7	100.00000	8.01975	
SAND - COMMON WHITE	Halliburton	Proppant	Crystalline silica, quartz	14808-60-7	100.00000	2.14010	
3rd Party Surfactant	Operator	3rd Party Additive	*Supplied by Operator	Confidential	100.00000	0.12449	Density = 8.260
HYDROCHLORIC ACID 5-10%	Halliburton	Solvent	Hydrochloric acid	7647-01-0	10.00000	0.06271	
FR-66	Halliburton	Friction Reducer	Hydrotreated light petroleum distillate	64742-47-8	30.00000	0.02358	
FE-1A ACIDIZING COMPOSITION	Halliburton	Additive	Acetic anhydride	108-24-7	100.00000	0.00325	
			Acetic acid	64-19-7	60.00000	0.00195	
BE-9	Halliburton	Biocide					

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			Tributyl tetradecyl phosphonium chloride	81741-28-8	10.00000	0.00400
Scalechek® LP-65 Scale Inhibitor	Halliburton	Scale Inhibitor				
			Ammonium chloride	12125-02-9	10.00000	0.00241
BE-9W	Halliburton	Biocide				
			Tributyl tetradecyl phosphonium chloride	81741-28-8	10.00000	0.00212
LoSurf-300D	Halliburton	Non-ionic Surfactant				
			Ethanol	64-17-5	60.00000	0.00066
			Heavy aromatic petroleum naphtha	64742-94-5	30.00000	0.00033
			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
HAI-OS ACID INHIBITOR	Halliburton	Corrosion Inhibitor				
			Methanol	67-56-1	60.00000	0.00032
			Propargyl alcohol	107-19-7	10.00000	0.00005
Ingredients shown above are subject to 29 CFR 1910.1200(i) and appear on Material Safety Data Sheets (MSDS). Ingredients shown below are Non-MSDS.						
		Other ingredient(s)				
			Water	7732-18-5		0.75004
		Other ingredient(s)				
			Polyacrylamide copolymer	Confidential		0.02358
		Other ingredient(s)				
			Organic phosphonate	Confidential		0.01446
		Other ingredient(s)				
			Propylene glycol	57-55-6		0.01274
		Other ingredient(s)				
			Sodium chloride	7647-14-5		0.00393
		Other ingredient(s)				
			Alcohols, C12-16, ethoxylated	68551-12-2		0.00393
		Other ingredient(s)				
			Ammonium chloride	12125-02-9		0.00393
		Other ingredient(s)				
			Fatty acid tall oil amide	Confidential		0.00393
		Other ingredient(s)				
			Sorbitan monooleate polyoxyethylene derivative	9005-65-6		0.00079
		Other ingredient(s)				
			Sorbitan, mono-9-octadecenoate, (Z)	1338-43-8		0.00079
		Other ingredient(s)				
			Oxyalkylated phenolic resin	Confidential		0.00033
		Other ingredient(s)				
			Formaldehyde	50-00-0		0.00024
		Other ingredient(s)				

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		Fatty acids, tall oil	Confidential		0.00016	
		Other ingredient(s)				
		Reaction product of acetophenone, formaldehyde, thiourea and oleic acid in dimethyl formamide	88527-49-1		0.00016	
		Other ingredient(s)				
		Alcohols, C14-C15, ethoxylated	88951-67-7		0.00016	
		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)				
		Olefins	Confidential		0.00001	
		Other ingredient(s)				
		Olefins	Confidential		0.00001	

\* Total Water Volume sources may include fresh water, produced water, and/or recycled water

\*\* Information is based on the maximum potential for concentration and thus the total may be over 100%

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

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## Stimulation Summary

Date	Stage #	Formation	Frac Type	Top Perf	Bottom	# of Perfs	BD Press	Avg Rate			Frac		Water (gals)	
					Perf		(psi)	ATP (psi)	(bpm)	ISIP (psi)	Gradient	Sand (lbs)		Acid (gals)
10/16/2013	1	Marcellus	Slickwater	15925	16202	48	5337	8594	75.0	3739	0.99	378619	3000	447087
10/17/2013	2	Marcellus	Slickwater	15623	15877	40	6196	8645	88.2	3894	1.01	467658	3000	474600
10/18/2013	3	Marcellus	Slickwater	15375	15577	40	6225	8525	74.7	3924	1.02	388460	3000	517154
10/18/2013	4	Marcellus	Slickwater	15125	15327	40	6070	8602	72.1	3969	1.02	391795	3000	393897
10/18/2013	5	Marcellus	Slickwater	14823	15077	40	5867	8315	82.7	4097	1.04	466988	3000	449914
10/19/2013	6	Marcellus	Slickwater	14523	14777	40	6278	8564	74.6	5353	1.23	414545	3000	438303
10/19/2013	7	Marcellus	Slickwater	14223	14477	40	6457	8558	88.7	4039	1.03	466630	3000	504077
10/20/2013	8	Marcellus	Slickwater	13923	14177	40	5637	7921	80.1	4474	1.10	404620	3000	437230
10/21/2013	9	Marcellus	Slickwater	13623	13877	40	6486	8094	77.7	3845	1.01	466538	3000	656627
10/22/2013	10	Marcellus	Slickwater	13323	13577	40	5865	7364	81.9	4689	1.13	427779	3000	441040
10/23/2013	11	Marcellus	Slickwater	13023	13277	40	6093	8285	88.2	4026	1.03	466463	3000	448722
10/24/2013	12	Marcellus	Slickwater	12723	12977	40	6599	8116	74.6	4352	1.08	460314	3000	474546
10/24/2013	13	Marcellus	Slickwater	12423	12677	40	6648	8183	75.9	3952	1.02	463459	3000	618299
10/26/2013	14	Marcellus	Slickwater	12123	12377	40	6425	7778	79.3	4151	1.05	467733	3000	473876
10/27/2013	15	Marcellus	Slickwater	11823	12077	40	6227	7849	80.4	5537	1.26	406673	3000	429540
10/29/2013	16	Marcellus	Slickwater	11523	11777	40	6861	7774	78.1	6710	1.43	429577	3000	457472
10/29/2013	17	Marcellus	Slickwater	11223	11477	40	6192	7837	80.8	4307	1.07	467108	3000	451108
10/30/2013	18	Marcellus	Slickwater	10923	11177	40	6054	7467	82.1	4317	1.08	467078	3000	447557
10/31/2013	19	Marcellus	Slickwater	10623	10877	40	6183	7190	90.4	4108	1.04	438150	3000	434702
11/1/2013	20	Marcellus	Slickwater	10323	10577	40	5928	7267	90.2	3940	1.02	465112	3000	442877
11/2/2013	21	Marcellus	Slickwater	10023	10277	40	6746	7678	90.4	4434	1.09	466495	3000	441114
11/3/2013	22	Marcellus	Slickwater	9723	9977	40	6671	7563	89.6	6162	1.35	383697	6000	425003
11/3/2013	23	Marcellus	Slickwater	9423	9677	40	6398	7669	89.8	5303	1.22	349365	3000	485037
11/4/2013	24	Marcellus	Slickwater	9123	9377	40	6677	7365	89.8	4335	1.08	467096	3000	450232
11/4/2013	25	Marcellus	Slickwater	8823	9077	40	6638	7400	89.4	3964	1.02	400900	3000	406966
11/5/2013	26	Marcellus	Slickwater	8523	8777	40	5908	7346	79.5	4111	1.05	434121	3000	484761
11/6/2013	27	Marcellus	Slickwater	8223	8477	40	5809	7162	90.0	4381	1.09	472057	3000	431425
11/6/2013	28	Marcellus	Slickwater	7923	8177	40	6766	6824	89.6	4429	1.09	449827	3000	427541
11/6/2013	29	Marcellus	Slickwater	7675	7877	40	7042	7214	90.2	5020	1.18	313694	3000	347702
11/7/2013	30	Marcellus	Slickwater	7373	7627	40	7260	7428	91.2	3928	1.12	465520	3000	428494

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Stage #	Plug Type	Plug Depth
1	No Plug	No Plug
2	Composite Frac Plug	15,900
3	Composite Frac Plug	15,600
4	Composite Frac Plug	15,350
5	Composite Frac Plug	15,100
6	Composite Frac Plug	14,800
7	Composite Frac Plug	14,500
8	Composite Frac Plug	14,200
9	Composite Frac Plug	13,900
10	Composite Frac Plug	13,600
11	Composite Frac Plug	13,300
12	Composite Frac Plug	13,000
13	Composite Frac Plug	12,700
14	Composite Frac Plug	12,400
15	Composite Frac Plug	12,100
16	Composite Frac Plug	11,800
17	Composite Frac Plug	11,500
18	Composite Frac Plug	11,200
19	Composite Frac Plug	10,900
20	Composite Frac Plug	10,600
21	Composite Frac Plug	10,300
22	Composite Frac Plug	10,000
23	Composite Frac Plug	9,700
24	Composite Frac Plug	9,400
25	Composite Frac Plug	9,100
26	Composite Frac Plug	8,800
27	Composite Frac Plug	8,500
28	Composite Frac Plug	8,200
29	Composite Frac Plug	7,900
30	Composite Frac Plug	7,650
	Temporary Bridge Plug	6,500

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Formations	Top TVD	Base TVD	Top MD	Base MD	Fluid
Shale	0	472	0	472	
Pittsburgh Coal	472	533	472	533	
Shale and Sandstone	533	656	533	656	
Gas Sand	656	723	656	723	
Shale	723	769	723	769	
1st Salt Sand	769	788	769	789	
Shale	788	906	789	907	
2nd Salt Sand	906	955	907	956	
Shale	955	989	956	991	
Big Lime	989	1105	991	1107	
Big Injun	1105	1150	1107	1152	
Price	1150	1270	1152	1273	
Murrysville	1270	1305	1273	1308	
Shale	1305	1463	1308	1152	
50' Sand	1150	1270	1152	1273	
Shale	1270	1305	1273	1308	
Gordon	1305	1463	1308	1466	
Shale	1463	1720	1466	1724	
Fifth Sand	1720	1910	1724	1914	
Shale	1910	1962	1914	1966	
Speechley Sand	1962	3197	1966	3203	
Shale	3197	4346	3203	4352	
Warren Sand	4346	4366	4352	4638	
Shale	4632	4703	4638	4709	
Java Shale	4703	4797	4709	4905	
Pipe Creek Shale	4899	5496	4905	5527	
Angola Shale	5496	5528	5527	5564	
Rhinestreet	5528	5762	5564	5877	
Cashaqua	5762	5804	5877	5946	
Middlesex	5804	5869	5946	6280	
West River	5869	5895	6280	6493	
Burkett	5895	5897	6493	6515	
Tully Limestone	5897	5899	6515	6539	
Hamilton	5899	5947	6539	7270	
Marcellus	5947	5952	7270	not encountered	Gas
Onondaga	5952	not encountered	not encountered	not encountered	

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Noble Energy SHL17AHS Gyro+MWD 0ft to 16354ft MD Survey Report



(Dof Survey)

Report Date: August 22, 2013 - 08:49 AM
Client: Noble Energy
Field: WV Marshall County (NAD 27)
Structure / Plot: Noble Energy SHL17 Pad/SHL17AHS
Well: SHL17AHS
Borehole: Gagne Borehole
DST/APR: Unknown / Unknown
Survey Name: Noble Energy SHL17AHS Gyro+MWD 0ft to 16354ft MD
Survey Date: August 15, 2013
Tert / AHD / DOI / ERD Ratio: 200.685 / 11071.890 N / 6.602 / 1.647
Coordinate Reference System: NAD27 West Virginia State Plane, Northern Zone, US Feet
Location Lat / Long: N 39° 56' 35.55058", W 107° 31' 45.85824"
Location Grid NE YK: N 390754 209 NUS, E 1711514 051 NUS
CRS Grid Convergence Angle: -0.0566°
Grid Scale Factor: 0.99999551

Survey / DLS Computation: Minimum Gravity / Local
Vertical Scales Assumed: 395.923 / 0.34 (Heavy)
Vertical Scales Origin: 0.000 R 0.000 H
TVD Reference Datum: KG
TVR Reference Elevation: 1290.500 N above MSL
Seasid / Ground Elevation: 1272.000 N above MSL
Magnetic Declination: -6.471°
Total Gravity Field Strength: 969.305 (mg (D 86005 (Loaded)
Total Magnetic Field Strength: 53176.102 nT
Magnetic Dip Angle: 67.53°
Declination Date: August 15, 2013
Magnetic Declination Model: IIGM 2013
North Reference: Grid North
Grid Convergence Used: -0.0566°
Total Corr Mag North->Grid North: -7.8189°
Local Coord Referenced To: Well Head

Table with columns: Comemarks, MD (ft), Incl (°), Azim Grid (°), TVD (ft), TVDSS (ft), VSEC (ft), NS (ft), EW (ft), DLS (ft/100ft), BR (ft/100ft), TR (ft/100ft), Northing (ftUS), Easting (ftUS), Latitude (N/S °'"), Longitude (E/W °'"), Directional Difficulty Index

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Table with columns: Comments, MD (ft), Incl (ft), Azim Grid (°), TVD (ft), TVD99 (ft), V8EC (ft), NS (ft), EW (ft), DR (ft), DR (%1000), TR (ft), Northing (ft), Easting (ft), Latitude (DD°MM'S), Longitude (DD°MM'S), Directional Drift/Incl (ft/ft)

03/27/2014

Comments	MD (ft)	Incl (°)	Azlm Grid (°)	TVD (ft)	TVD99 (ft)	VSEC (ft)	N8 (ft)	EW (ft)	DLG (°/100ft)	GR (°/100ft)	TR (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ° ' '')	Longitude (E/W ° ° ' '')	Directional Difficulty Index
	14772.00	80.96	325.50	8714.30	8423.80	7956.34	7372.22	-3003.85	2.84	1.18	2.82	647126.11	17086516.62	N 30 50 51.03 W	80 32 25.53	6.75
	14862.00	80.53	328.16	8713.12	8422.82	8045.20	7447.88	-3052.83	2.89	-0.48	2.89	647201.47	17084611.35	N 30 50 51.80 W	80 32 26.18	6.78
	14951.00	81.34	327.81	8711.85	8421.18	8133.33	7523.03	-3100.00	0.97	0.89	-0.29	647270.92	1708414.18	N 30 50 52.54 W	80 32 26.70	6.77
	15041.00	82.76	328.10	8710.00	8419.50	8272.44	7569.35	-3147.60	0.77	-0.84	-0.42	647352.22	1708358.50	N 30 50 53.29 W	80 32 27.42	6.78
	15130.00	80.41	328.22	8709.09	8418.99	8310.83	7674.08	-3194.68	0.30	-0.39	0.03	647428.88	1708319.61	N 30 50 54.03 W	80 32 28.03	6.79
	15220.00	80.02	328.80	8708.28	8417.78	8399.85	7751.08	-3241.98	0.87	0.73	0.52	647505.55	1708272.53	N 30 50 54.78 W	80 32 28.65	6.70
	15310.00	80.35	328.11	8708.21	8417.81	8489.17	7828.75	-3288.15	1.40	-1.41	0.47	647582.81	1708229.04	N 30 50 55.54 W	80 32 29.20	6.80
	15399.00	80.55	320.35	8708.16	8418.08	8577.66	7906.21	-3333.98	0.55	0.22	-0.27	647659.08	1708180.52	N 30 50 56.29 W	80 32 29.85	6.81
	15489.00	80.35	328.28	8710.02	8419.62	8668.85	7982.20	-3380.28	1.21	-0.22	-1.19	647734.00	1708133.02	N 30 50 57.04 W	80 32 30.40	6.82
	15578.00	80.26	327.07	8711.03	8420.83	8754.02	8067.41	-3427.88	1.36	0.00	-1.36	647811.28	1708086.23	N 30 50 57.78 W	80 32 31.08	6.82
	15668.00	80.31	326.87	8712.09	8421.60	8843.81	8132.85	-3476.92	0.73	-0.04	-0.22	647888.71	1708039.28	N 30 50 58.52 W	80 32 31.73	6.83
	15758.00	81.17	326.64	8711.71	8421.21	8932.65	8208.12	-3526.26	2.08	2.07	-0.20	647961.07	1707997.05	N 30 50 59.28 W	80 32 32.37	6.84
	15847.00	80.79	320.72	8710.19	8419.88	9020.47	8282.48	-3576.14	0.44	-0.43	0.09	648036.33	1707959.07	N 30 50 60.09 W	80 32 33.01	6.85
	15930.00	80.38	326.85	8709.28	8418.78	9108.30	8356.85	-3624.82	0.47	-0.40	-0.08	648110.69	1707880.10	N 40 0 0.72 W	80 32 33.65	6.85
	16020.00	80.24	328.80	8708.70	8418.29	9196.98	8431.58	-3674.20	1.22	-0.16	-1.21	648185.39	1707840.00	N 40 0 1.45 W	80 32 34.31	6.88
	16115.00	80.53	322.80	8708.95	8418.45	9284.10	8503.71	-3726.20	3.20	-0.78	-3.10	648264.56	1707787.62	N 40 0 2.10 W	80 32 34.99	6.87
	16205.00	80.24	321.53	8709.90	8419.40	9371.60	8574.70	-3781.48	1.45	-0.24	-1.41	648328.62	1707732.73	N 40 0 2.85 W	80 32 35.71	6.88
	16294.00	80.48	320.51	8710.00	8420.40	9457.48	8643.97	-3837.47	1.18	0.27	-1.15	648397.80	1707678.76	N 40 0 3.53 W	80 32 36.44	6.80
Final Survey 22-Aug 13	16318.00	80.48	319.88	8711.17	8420.02	9480.58	8692.40	-3852.83	2.02	0.00	-2.03	648416.24	1707681.38	N 40 0 3.71 W	80 32 36.64	6.80
Projection to Bt	16354.00	80.48	319.88	8711.44	8420.04	9516.17	8889.03	-3870.03	0.00	0.00	0.00	648443.78	1707638.19	N 40 0 3.98 W	80 32 36.84	6.80

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)	EQI Freq (ft)	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	0.000	18.000		Act Sins	30.000	SLB_NSQ+MSHOT-Depth Only	Original Borehole / Noble Energy SHL17AHS Gyro+MWD Off to 1835ft MD
	18.000	3095.000		Act Sins	30.000	SI_R_N8G+MSHOT	Original Borehole / Noble Energy SHL17AHS Gyro+MWD Off to
	3035.000	16318.000		Act Sins	30.000	SI_R_MWD-BTD	Original Borehole / Noble Energy SHL17AHS Gyro+MWD Off to
	16318.000	16354.000		Act Sins	30.000	SI_R_BLIND+TREND	Original Borehole / Noble Energy SHL17AHS Gyro+MWD Off to