

# Oil and Gas Production Data and WR-35 Completion Reports Update



west virginia department of environmental protection

John Kearney Environmental Resource Analyst Office of Oil and Gas

> Oil and Gas Workshop Charleston Civic Center October 9, 2014

### **Production Data Reporting**

- Approximately 600 companies report production
- Required annually by March 31<sup>st</sup> for previous year
- We strongly encourage electronic reporting
- Use the WR-39e form
  - READ INSTRUCTIONS
  - DO NOT CHANGE THE FORM
  - Do not use formulas, just data, do not add totals column
  - Cut and paste data if needed
  - Keep it simple
- Blank spaces can be used for zero production
- State tax department sometimes refer to these
- Only numbers in data section, no letters, negative signs, do not need decimals
- If you use formulas, cut and paste numbers only

### WR-29e Form

Form WR-39e, "Report of Monthly Production", West Virginia Department of Environmental Protection, Office of Oil and Gas.

A month with no production, whether oil, gas, or NGL, you may entered 0 (zero), or leave blank. A blank space will register a 0 in the compute Do not after the column headings below. They are required for data processing.

ear/	ot alter the column head Operator_ID	API	Jan_Oil	Jan_Gas	Jan_NGL	Feb_Oil	Feb_Gas	Feb_NGL	Mar_Oil	Mar_Gas	Mar_NGL	Apr_Oil
										<u> </u>		

### WR-29e Example

	Form WR-39e, "Report of Monthly Production", West Virginia Department of Environmental Protection, Office of Oil and Gas.												
	A month with no production, whether oil, gas, or NGL, you may entered 0 (zero), or leave blank. A blank space will register a 0 in the computer.  Do not alter the column headings below. They are required for data processing.												
		gs below. API	Jan Oil		Jan NGL		F-1 C	Feb NGL	Mara Oil	Mar Car	Mar NCI	A Oil	
_	Operator_ID 494507062	3302797	_	Jan_Gas	Jan_NGL	reb_Oii		_	Mar_Oii	211	Mar_NGL	Apr_Oii	
			0	470450	U	_		0	_		0	U 0	
	494507062	3305592	0	179458	0	0		0	0	150382	0	_	
	494507062	3305472	0	128519		0		0	0	98761	0	_	
	494507062	3305473	0	83887	0	0		0	0	94223	0	_	
	494507062	3304467	0	0	0	0		0	0	315	0		
2013	494507062	3305596	0	166525	0	0	136446	0	0	137794	0		
2013	494507062	3305601	0	199303	0	0	171475	0	0	170582	0	0	
2013	494507062	8509963	0	0	0	0	0	0	0	0	0	0	
2013	494507062	3305617	0	0	0	0	484	0	0	299824	0	0	
2013	494507062	3305618	0	0	0	0	42553	0	0	224304	0	0	
2013	494507062	3305590	0	152491	0	0	68016	0	0	117437	0	0	
2013	494507062	1705751	0	124	0	0	352	0	0	609	0	0	
2013	494507062	3305382	0	60136	0	0	53749	0	0	58135	0	0	
2013	494507062	3305327	0	51633	0	0	44077	0	0	45129	0	0	
2013	494507062	1705545	0	365	0	0	330	0	0	345	0	0	
2013	494507062	1703109	0	0	0	0	30	0	0	77	0	0	
2013	494507062	1703139	0	0	0	0	25	0	0	5	0	0	
2013	494507062	3303256	0	201	0	0	36	0	0	0	0	0	
2013	494507062	3303255	0	118	0	0	111	0	0	378	0	0	
2013	494507062	1701476	0	0	0	0	0	0	0	0	0	55	
2013	494507062	3304564	0	286	0	0	262	0	0	0	0	0	
2013	494507062	3300290	0	0	0	0	0	0	0	0	0	0	
2013	494507062	8510036	0	0	0	0	0	0	0	0	0	0	
2013	494507062	3305390	0	134235	0	0	43196	0	0	98664	0	0	
2013	494507062	3305391	0	101673	0	0	68606	0	0	83643	0	0	
2013	494507062	1704843	0	0	0	0	257	0	0	345	0	0	
2013	494507062	1705322	0	0	0	0	318	0	0	365	0	0	
2013	494507062	1704743	0	0	0	0	180	0	0	277	0	0	

### New for 2014 Data:

- Electronic Submission System (ESS)
  - (Formerly known as "E-Permitting"
- Direct import of data by companies
- Will require login ID
- Companies that registered aboveground tanks will now have a login ID
- Your ESS security administrator can assign rights to individuals for submittal
- There will be data validation
- Data validation will require accuracy
- Details to come by January 1<sup>st</sup>.
- See WV DEP OOG web page for instruction:
- http://www.dep.wv.gov/oil-and-gas/rr/Pages/default.aspx





west virginia

### west virginia department of environmental protection

- Promoting a Healthy Environment

DEP Offices | Agency History | News | Outlook Web Access | Text size A A A

General Information

Resources

Annual Production Reporting Requirements

Air Quality - Oil and Gas Related

Database and Map Information

**Horizontal Drilling** 

Pits and Impoundments

Water Management Plans

Home > Office of Oil and Gas > Annual Production Reporting Requirements

Home

**Annual Reporting Requirements** 

\*\*\*\*New Updates January, 2014\*\*\*\*

The Office of Oil and Gas has updated our procedures for reporting production data. New for the 2014 reporting of 2013 production data are the following changes listed below. Further description of the details are dicussed in the Instruction link. The updated procedures are:

- A. Requirement to report natural gas liquids (NGL) for horizontal "H6A" wells.
- B. New file name requirement.
- C. New email address to send production data.
- D. New email subject line requirement.
- E. Preparation for e-Permitting data system for 2014.

Under WV Legislative Rule Title 35 Series 4 Section 15.1, and Title 35 Series 8 Section 11, an annual report of oil, gas, and natural gas liquids (H6A horizontal wells only) production shall be filed with the Chief of the Office of Oil and Gas on or before the succeeding March 31st.

All operators of wells in West Virginia must submit the following to the Office of Oil and Gas:
Between January 1 - March 31, for the previous calendar year, their:

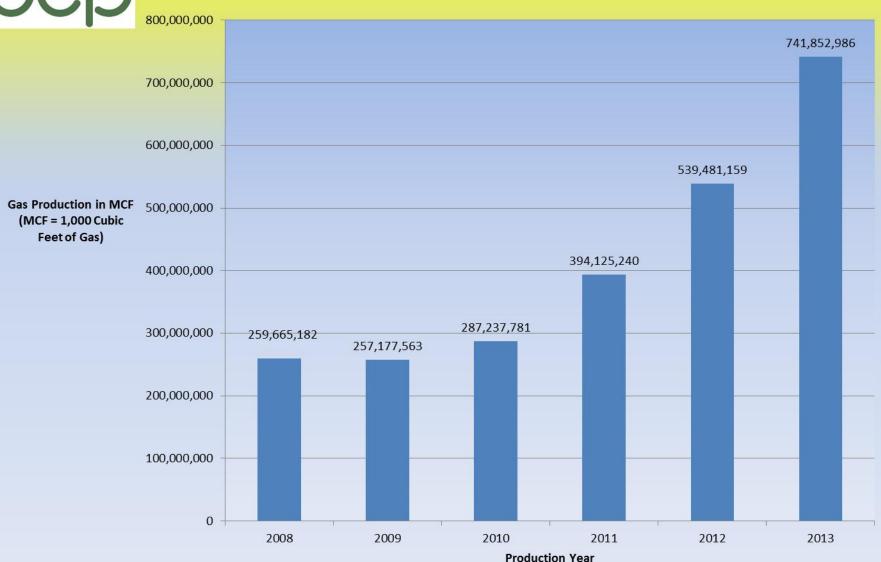
- 1. Annual Production Report
  - Electronic Filing of a WR-39E; (Zipped Excel file) (Instructions with Example) or
  - Paper Filing of a WR-39
- 2. Certification of Annual Inspection WR-99

Please email completed electronic WR-39E files to the Office of Oil and Gas at:

DEPOOGEP@wv.gov

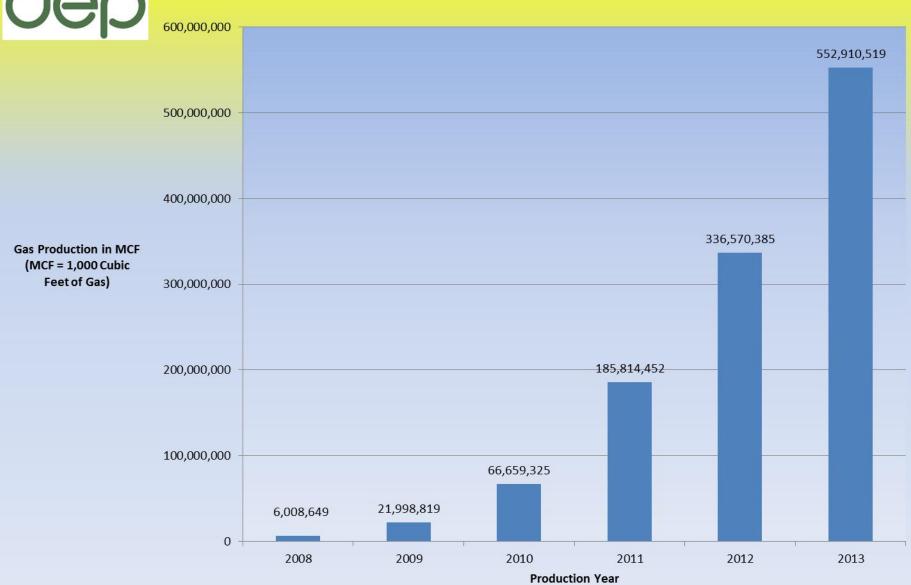


### **Total West Virginia Natural Gas Annual Production (MCF)**





### **Horizontal Well Gas Annual Production (MCF)**



## Overview – Completion Reports H6A Horizontal Wells

- H6A horizontal wells require more information. Required now for all H6A permitted wells
- Required to be submitted 90 days after completion of well
- When is "completion"? When frac plugs are drilled out
- WR-35 form- Complete it properly
- Perforation details
- Frac Details
- Geology log <u>SURFACE TO TD</u> should contain good detail of geologic formations, particularly; coal seams, major lithology types, historic oil and gas zones, lithology near your target formation, i.e. Tully Limestone.
- Directional Survey paper copy. WV DEP is researching best computer file format for well bore description
- Frac Focus file with the online service and a copy to WV DEP
- As-Drilled Plat Profile View, often gotten from Service Company Show proposed profile and as-drilled profile.

### Overview – Completion Reports H6A Horizontal Wells – con't

- As-Drilled Plat On mylar, same as application plat, with proposed borehole well bore path, and as-drill well bore path, and legend explaining, see example.
- MUST BE LEGIBLE. Consider font sizes, reproductions, resizes, etc. They serve no purpose if they are not legible.

**Updated Form** 

Fillable PDF Format

Captures More Information

Available at WVDEP OOG Webpage:

http://www.dep.wv.gov/oilandgas/GI/Forms/Pages/default.a spx

Instructions page is also there for reference.

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

	County	District	
Quad	Pad Name	Field/Pool Name	
Farm name		Well Number	
Operator (as registered with the O	OG)	20 20 20	
Address	City	State	Zip
Type of Operation © Convert  Well Type © Brine Disposal © C	Northing Northing Northing L Type of Well New E Horizontal Horizontal 6A Deepen Drill Plug Back CBM Gas Oil Secondary Reco	Easting Easting Easting Type of Repor Vertical Depth Type Redrilling Rework	t Interim Final Deep Shallow Stimulate
Production hole Air Mud		ermediate hole 🛮 Air 🖶 Mu	id □ Fresh Water □ Brin
Production hole Air Mud		ermediate hole 🛮 Air 🖶 Mu	id □ Fresh Water □ Brit
Production hole Air Mud Mud Type(s) and Additive(s)	□ Fresh Water □ Brine		
Production hole	□ Fresh Water □ Brine	Date drilling	g ceased
	□ Fresh Water □ Brine  Date drilling commenced	Date drilling	g ceased
Production hole Air Mud Mud Type(s) and Additive(s)  Date permit issued  Date completion activities began  Verbal plugging (Y/N)  Please note: Operator is required to	Date drilling commenced  Date com  Date permission granted  to submit a plugging application within	Date drilling pletion activities ceased Granted by  5 days of verbal permission to  (s) (Y/N) depths	g ceased
Production hole Air Mud Mud Type(s) and Additive(s)  Date permit issued  Date completion activities began  Verbal plugging (Y/N)  Please note: Operator is required to  Freshwater depth(s) ft  Saltwater depth(s) ft	Date drilling commenced  Date com  Date permission granted  to submit a plugging application within  Open mine  Void(s) em	Date drilling pletion activities ceased Granted by  5 days of verbal permission to  (s) (Y/N) depths countered (Y/N) depths	g ceasedplug
Production hole Air Mud Mud Type(s) and Additive(s)  Date permit issued  Date completion activities began  Verbal plugging (Y/N)	Date drilling commenced  Date com  Date permis sion granted  to sub mit a plugging application within  Open mine  Void(s) em  Cavem(s) e	Date drilling pletion activities ceased Granted by  5 days of verbal permission to  (s) (Y/N) depths	g ceased

### **Example of WR-35 Completion Report**

Double click the document below to open:

· g^
WR.35
Rev. 8/23/13
State of West Virginia  Department of Environmental Protection - Office of Oil and Gas
Well Operator's Report of Woll Work
API 47-051 01656 County Marshall District Sandhill
Quad Majorsville Pad Name SHL-26 Field/Pool Name
Farm name Russell Lee and Barbara Ann Bennett Well Number SHL26BHS
Operator (as registered with the OOG) Noble Energy Inc.
Address 333 Technology Drive, Suite 116 City Canonsburg State PA Zip 15317
Out out
As Drilled location NAD 83/CTM Attach an as-drilled plat, profile view, and deviation survey
Top bole Northing 424882.534034 Easting 538581.10995 Landing Point of Curve Northing 4426184.726599 Casting 539697.150976
Bottom Hole Northing 4426969,836288 Easting 557993 251574
Elevation (ft) 1308.39 GL Type of Well SiNew : Existing Type of Report Interim Africal
· · · · · · · · · · · · · · · · · · ·
Permit Type D Deviated O Horizontal & Horizontal 6A D Vertical Depth Type U Deep B Shallow
Type of Operation o Convert o Deepen 5 Drill o Play Back o Redrilling o Rework 5 Stimulate
Well Type □ Brine Disposal □ CBM ■ Gas □ Oil □ Secondary Recovery □ Solution Mining □ Storage □ Other
Type of Completion # Single   Multiple   Fluids Produced   Brine   UCas   U NGL   U Other
Drilled with a Cable B Rotary
Dilitica with a cause a stenay
Drilling Media Surface hole B Air ⊆ Mud □Fresh Water Intermediate hole B Air □ (Mud ), Fresh Water □ Brine
Production hole   U Air   S Mind   U Fresh Water   U Brinc
Mud. Type(s) and Additivo(s)
Synthetic Oil Based
Date permit issued 06/26/2013 Date drilling communicated 09/28/2013 Date drilling countries
Date completion activities began 03/27/2014 Date completion activities ceased 6/5/2014
Verbal plugging (Y/N)N Date permission granted Granted by
WEGENTED COS
Please note: Operator is required to submit a plugging application within 5 days of verbal permission to Mus Oil and San
Please subs: Operator is required to submit a plagging application within 5 days of verbal permission of ECENVED CORNER GAS CORNER G
N/A N/A N/A
Salt water depth(s) ft N/A Void(s) excuranteed (Y/N) depths N Profession  Coal depth(s) ft 761 to 771 Pittsburgh  Is coal bring mixed in area (Y/N) Y  Frivironmental Profession
Contraction of the Contraction o
Is coal being mined in area (Y/N) Y Environment by:
see to free log.

### WR-35 Completion Report Take-A-Way

- Provide all required information.
- Tell the story of the well. Don't be afraid to use words.
   Describe what happened, how the well was constructed.
- Add additional sheets for <u>ANY</u> relevant information. If the form doesn't quite have a space for relevant well information, add an additional sheets of paper.
- Everything submitted must be legible. Do not submit information if not legible.
- Provide coordinates in NAD 83, UTM (metric)
- Proofread, Proofread.
- Visit WVDEP OOG Webpage often to look for Updates.
- Finally, think of future generations that will need this information.

Jh.

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	. 01656	County Marsh	all	<sub>District</sub> Sandhill	
Quad Majorsville				Field/Pool Name	
Farm name Russell	Lee and Ba	rbara Ann Benne		Well Number SHL2	26BHS
Operator (as registered	l with the OOG)	Noble Energy II	nc.		<del></del>
Address 333 Techn	ology Drive, S	Suite 116 City Ca	nonsburg	State PA	Zip 15317
Landing Poin	t of Curve 1	Attach an as-drille Northing 4424882.534 Northing 4425164.726 Northing 4426959.838	034 599	w, and deviation survey Easting 538581.10995 Easting 538697.150976 Easting 537393.251574	
Elevation (ft) 1308	3.39 <sub>GL</sub>	Type of Well	BNew □ Existin	g Type of Report	Interim BFinal
Permit Type   De	viated   Ho	orizontal 🛢 Horizon	ital 6A 🛮 Verti	ical Depth Type	□ Deep ■ Shallow
Type of Operation	Convert 🗆 D	eepen 🛢 Drill 🗆	Plug Back 🗆	Redrilling   Rework !	■ Stimulate
Well Type □ Brine D	isposal □ CBM	Gas □ Oil □ Sec	ondary Recovery	□ Solution Mining □ Stora	age 🗆 Other
Type of Completion  Drilled with   Cable	•	tiple Fluids Produ	ced 🗆 Brine 🖸	oGas □ NGL □ Oil □	Other
Drilling Media Surfa Production hole A Mud Type(s) and Add Synthetic Oil Ba	ir ВMud □ litive(s)	□ Mud □Fresh Wa Fresh Water □ Brind		diate hole ■ Air □ Mud	□ Fresh Water □ Brine
	<del>-</del>				
Date permit issued		Date drilling comm 03/27/2014	nenced 09/28	/2013 Date drilling ce	ased 02/07/2014
Date completion activ	N			on activities ceased6	
Verbal plugging (Y/N		Date permission grante			. etc.
Please note: Operator	is required to su	bmit a plugging applic	ation within 5 day	rs of verbal permission to blu Office O	GEIVED FOII and Gas
Freshwater depth(s) f	•	8', 300'	Open mine(s) (Y	(/N) depthsSE	b MI 5014
Salt water depth(s) ft		N/A	Void(s) encount	ered (V/N) denths	14 ~+ \(\gamma\)
Coal depth(s) ft	761' to 771	' Pittsburgh	Cavern(s) encou	intered (Y/N) depths WV [	Depail Protection
Is coal being mined in	area (Y/N)	Υ		Environ	
					Reviewed by:

WR-35									Page _	_ of
Rev. 8/23/13	04050						_			
API 47- 051	01656	Farm name	e Russell Le	e and Barba	ara Ann Be	ennett_Wel	I number_S	3HL26E	BHS	
CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft		Basket Depth(s)		ment circulate	
Conductor	36	30	40	N		5 94#		1	tuo uotano (	<del>/01011</del>
Surface	24	20	415.7	N	+	5 94#			Y	
Coal	17 1/2	13 3/8	1196	N	J-55	54.5#			Y	
Intermediate 1	12 3/8	9 5/8	3218	N	K-5	5 36#		<del>-  </del>	Y	
Intermediate 2			<del></del>	<del></del>						
Intermediate 3										
Production	8 3/4	5 1/2	14672	N	P-1	10 20#			Υ	
Tubing									<del>-</del>	
Packer type and de	epth set	_ <del></del>								
Comment Details	2 Baskets on Sur	rface Casing								
CEMENT DATA Conductor	Class/Type of Cement	Number of Sacks	Slurr wt (pp		Yield ft <sup>3</sup> /sks)	Volume (ft.²)		ment (MD)		OC rs)
Surface	T 4	400	45.0		1.40	404				•
Coal	Type 1	490	15.6	<del></del>	1.19	104		0		8
Intermediate 1	Type 1	1027	15.6		1.2	223		0		8
Intermediate 2	Class A	1170	16.2	2	1.09	227		0		14
Intermediate 3	<del></del>	<del></del>							ļ	
Production	Class A	2470	14.8	<del>,  </del>	1.25	551		087		12
Tubing	Class A	2470	14.0	-	1.25	351_	<del>                                     </del>	007	<u> </u>	12
•	) 14,672 ft. tion penetrated cedure not a pilot				TD (ft) 145	590 ot a Pilot Hole				
Kick off depth	(ft) <u>7389</u>									
Check all wire	line logs run	□ caliper □ neutron	<ul><li>□ density</li><li>□ resistivity</li></ul>		ted/directi na ray		nduction temperature	□son	ic	
Well cored	Yes B No	Convention	al Side	wall	w	ere cutting	s collected	■ Yes	□ No	
4 Centralizers o	n Surface casing. cal, and Intermediate	ZER PLACEMEN 10 Centralizers on Co Strings, the centralizers	oal casing. 38 are on every 3 j	Centralizers of casing.	on Intermed	TRING diate casing.	234 Centraliz	ers on Pro	duction casi	nq.
On the Production	String, they are on e	every 3rd from Surface to	Top of Curve, 1	then every joint	until TD.					
WAS WELL (	COMPLETED 4	AS SHOT HOLE	⊓ Yes 🐧	No D	ETAILS					

DETAILS \_\_\_

TYPE OF TRACER(S) USED \_\_

WAS WELL COMPLETED OPEN HOLE? □ Yes ■ No

WERE TRACERS USED □ Yes ■ No

WR-	35
Rev.	8/23/13

API 47- 051 - 01656 Farm name_Russell Lee and Barbara Ann Bennett Well number SHL2
--

### PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
		EASE SEE ATTACHE			
			<b>.</b>		
	······································				

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 Breakdo Pressure (PS	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
		PLEASE SEE ATTACHED STIMULATION INFORMATION PER STAGE SHEET		ION			

Please insert additional pages as applicable.

### **Perforation Record**

Russell Lee and Barbara

API: <u>47-051-01656</u> Farm name: Ann Bennett

Well Name: SHL-26B-HS

Stage No.	Stim Date	Top Perf	Bottom Perf	# of Perfs	Formation
TOE SLEEVE	3/7/2014	14585	14,587		Marcellus
1	3/18/2014	14426	14,520	48	Marcellus
2	3/27/2014	14275	14,377	40	Marcellus
3	3/28/2014	14125	14,227	40	Marcellus
4	3/28/2014	13975	14,077	40	Marcellus
5	3/29/2014	13825	13,927	40	Marcellus
6	3/30/2014	13675	13,777	40	Marcellus
7	3/30/2014	13525	13,627	40	Marcellus
8	3/31/2014	13375	13,477	40	Marcellus
9	4/1/2014	13225	13,327	40	Marcellus
10	4/1/2014	13075	13,177	40	Marcellus
11	4/1/2014	12925	13,027	40	Marcellus
12	4/1/2014	12775	12,877	40	Marcellus
13	4/2/2014	12625	12,727	40	Marcellus
14	4/2/2014	12475	12,577	40	Marcellus
15	4/3/2014	12325	12,427	40	Marcellus
16	4/3/2014	12175	12,277	40	Marcellus
17	4/4/2014	12025	12,127	40	Marcellus
18	4/4/2014	11875	11,977	40	Marcellus
19	4/7/2014	11725	11,827	40	Marcellus
20	4/8/2014	11575	11,677	40	Marcellus
21	4/8/2014	11425	11,527	40	Marcellus
22	4/9/2014	11275	11,377	40	Marcellus
23	4/9/2014	11125	11,227	40	Marcellus
24	4/9/2014	10975	11,077	40	Marcellus
24 REPERF	4/9/2014	10984	11,018	32	Marcellus
24C	4/10/2014	10825	10,927	40	Marcellus
25	4/10/2014	10675	10,777	40	Marcellus
26	4/10/2014	10525	10,627	40	Marcellus
27	4/11/2014	10375	10,477	40	Marcellus
28	4/12/2014	10225	10,327	40	Marcellus
29	4/12/2014	10075	10,177	40	Marcellus
30	4/12/2014	9925	10,027	40	Marcellus
31	4/13/2014	9775	9,877	40	Marcellus
31C	4/14/2014	9615	9,715	40	Marcellus
32	4/15/2014	9475	9,577	40	Marcellus
32C	4/16/2014	9325	9,427	40	Marcellus
33	4/16/2014	9175	9,277	60	Marcellus
34	4/16/2014	9025	9,127	40	Marcellus
34 REPERF	4/17/2014	9013	9,096	40	Marcellus
35	4/17/2014	8875	8,977	48	Marcellus

#### **Perforation Record**

Russell Lee and Barbara

API: 47-051-01656 Farm name: Ann Bennett Well Name: SHL-26B-HS

Stage No.	Stim Date	Top Perf	Bottom Perf	# of Perfs	Formation
36	4/18/2014	8725	8,827	48	Marcellus
37	4/18/2014	8575	8,677	48	Marcellus
38	4/18/2014	8425	8,527	48	Marcellus
39	4/19/2014	8275	8,377	48	Marcellus
40	4/19/2014	8125	8,227	48	Marcellus
41	4/20/2014	7975	8,077	48	Marcellus
42	4/20/2014	7825	7,927	48	Marcellus
43	4/21/2014	7675	7,777	48	Marcellus
44	4/21/2014	7525	7,627	48	Marcellus
45	4/22/2014	7375	7,477	48	Marcellus

### STIMULATION INFORMATION PER STAGE

Russell Lee and Barbara Ann

API: 47-051-01656 Farm name: Bennett Well Name: SHL-26B-HS

Stage No.	Stim Date	Avg Rate (bpm)	ATP (psi)	Max BD Pressure	ISIP (psi)	Proppant (lbs)	Water (BBLS)	Amount of N <sup>2</sup> /other
1 INJ TEST	3/18/2014		7,086		4,816	-	380.50	
1	3/27/2014	88.9	7,635	•	3,395	301,005	6,951.25	
2	3/27/2014	88.1	7,801	5,874	4,157	305,435	7,125.50	
3	3/28/2014	88.2	8,029	6,305	4,002	303,488	7,025.78	
4	3/28/2014	87.5	7,891	5,885	4,736	295,814	6,961.67	
5	3/29/2014	85.8	7,640	5,800	4,125	295,117	6,792.69	
6	3/30/2014	89.1	7,866	5,933	4,556	303,052	7,261.83	
7	3/30/2014	88.8	7,926	5,723	4,205	295,977	7,007.75	
8	3/31/2014	86.6	7,808	5,863	4,126	292,414	6,917.99	
9	3/31/2014	88.4	7,954	6,712	4,069	302,263	7,480.98	
10	3/31/2014	87.4	8,149	5,871	4,316	302,308	7,256.86	
11	4/1/2014		8,227	6,531	4,095	302,482	6,649.17	
12	4/1/2014	82.2	8,118	5,276	4,255	301,120	8,488.91	
13	4/2/2014	88.6	8,078	5,455	4,541	304,022	6,605.40	
14	4/2/2014	86.2	8,015	5,545	4,330	299,894	7,390.79	
15	4/3/2014	87.6	8,150	5,720	4,100	300,092	7,991.00	
16	4/3/2014	81.7	8,152	5,482	4,170	302,067	9,561.14	
17	4/4/2014	86.8	8,064	5,233	4,640	300,446	7,457.36	
18	4/5/2014	86.8	8,166	5,422	6,096	262,362	6,589.86	
18 Inj Test	4/7/2014	6	9,636		-		1,058.98	
19	4/7/2014	85.2	8,081	5,592	4,096	304,900	8,268.12	
20	4/8/2014	84.7	8,289	5,636	4,229	300,488	9,411.76	
21	4/8/2014	88.3	8,063	6,122	4,229	302,426	6,818.66	
22	4/9/2014	88.6	7,617	5,529	4,557	302,024	6,653.32	
23	4/9/2014	88.6	8,103	5,947	4,216	302,198	6,623.57	
24	4/9/2014	49	8,469	5,515	4,583	5,915	4,262.73	
24 REPERF	4/10/2014	13	8,176	6,672	5,773	3,764	2,811.15	
24C	4/10/2014	86.2	7,602	6,280	4,064	302,219	6,712.29	
25	4/10/2014	87	7,673	5,885	4,046	301,417	7,050.55	
26	4/11/2014	89.4	7,549	6,032	4,175	296,791	6,352.97	
27	4/11/2014		7,501	5,876	4,344	301,791	6,569.03	
28	4/12/2014		7,569	5,990	4,429	297,714	8,035.40	
29	4/12/2014	88.4	7,432	5,666	4,000	302,089	6,530.31	
30	4/13/2014	84.8	7,935	6,120	4,382	300,269	6,673.65	
31A	4/14/2014	61.4	8,516	5,972	4,125	3,543	2,198.04	
31C	4/14/2014	89.4	89.4 7,571 6,0		4,231	301,426	6,600.88	
32	4/15/2014	51	8,554	6,672	5,503	72,130	10,923.48	
32B	4/15/2014	22.4	8,598	6,395	5,122	6,592	5,273.11	
32C	4/16/2014	85.8	7,479	5,687	4,211	600,887	11,999.61	
33	4/16/2014	82.2	7,881	5,681	5,448	250,120	8,267.38	
34	4/17/2014	49.5	8,319	6,170	5,582	1,162	4,508.30	

#### STIMULATION INFORMATION PER STAGE

API: <u>47-051-01656</u>

Farm name:

Russell Lee and Barbara Ann

Bennett

Well Name: SHL-26B-HS

Stage No.	Stim Date	Avg Rate (bpm)	ATP (psi)	Max BD Pressure	ISIP (psi)	Proppant (lbs)	Water (BBLS)	Amount of N <sup>2</sup> / other
34B	4/17/2014	72	7,733	6,552	6,366	352,485	8,483.26	
35	4/18/2014	89.4	7,571	6,073	4,184	283,834	6,235.38	
36	4/18/2014	86.7	7,341	5,908	3,816	317,788	6,286.60	
37	4/18/2014	89.3	7,388	5,771	4,205	300,407	6,115.04	
38	4/19/2014	87.9	7,169	5,320	4,545	306,860	6,239.30	
39	4/19/2014	89.4	7,191	6,067	4,130	302,082	5,962.79	
40	4/20/2014	89.4	7,084	6,701	4,219	301,242	5,987.66	
41	4/20/2014	83.6	7,496	5,825	4,261	299,181	8,006.63	
42	4/20/2014	88.6	7,696	5,974	4,046	302,434	6,199.21	
43	4/21/2014	88.4	7,489	6,733	4,484	302,594	6,132.93	
44	4/22/2014	86.8	6,829	5,623	4,197	300,632	6,130.60	
45	4/22/2014	87.7	6,964	6,079	4,325	303,277	5,770.51	

WR-35 Rev. 8/23/13							Page of
API 47- <u>05</u> 1	01656	Farm	name_Russell Lo	ee and Barb	ara Ann Benr	ett Well number	SHL26BHS
PRODUCING	FORMATIO	N(S)	<u>DEPTHS</u>				
Marcelllus		<u></u>	6629.4	TVD	14672	MD	
				_		IVID	
Dlanca incart o	dditional page	s as applicable.			·. · · · ·	<del></del> ,	
		• • •	-	_			
			■ Open Flow				
SHUT-IN PRE	ESSURE S	urface	psi Botto	m Hole	psi	DURATION (	OF TEST hrs
OPEN FLOW		Oil ncfpd <u>74</u>	NGL bpd 111	bpd <u>1</u>		GAS MEASU	
LITHOLOGY/ FORMATION	TOP DEPTH IN F	BOTTOM  T DEPTH IN FT	TOP DEPTH IN FT	BOTTOM DEPTH IN F	T DESCRIBE	ROCK TYPE AND	RECORD QUANTITYAND
	NAME TVD		MD	MD			TER, BRINE, OIL, GAS, H <sub>2</sub> S, ETC)
<del></del>	0		0				
	<del>                                      </del>			-			<del></del>
	+ PLEA	SE SEE FORM	ATIONS SHEET				
	41						
	+						
	+						
	†						
·							
			<u> </u>				
Please insert a	dditional page	s as applicable.					
		Drilling USA, I	LP				
Address 515 \	Nest Greens F	Rd, Suite 1000	City	Houston		State TX	Zip 77067-4525
Logging Comp	pany Horizon S. Yale Ave. S	Well Logging,		Tulsa		State OK	Zip 74136
Address / 130	o. Tale Ave. v	Suite 4 14	City	luisa		State OK_	Zip
Cementing Co	mpany CalFr	ac				00	00000
Address 717	17th St., Suite	1445	City	Denver	<del>.</del>	State CO	Zip <u>80202</u>
Stimulating Co	ompany Hal	liburton Energy	/ Services				
Address 121 (	Champion Way	y, Suite 210	City	Canonsbu	rg	State PA	<sub>Zip</sub>
Please insert a	dditional page	s as applicable.					
Completed	x Dee Si	كاهماند			Telephone	= 724 - 8	20-3061
Signature	July	7	Title	eg. Ana			8/5/14
• • • • • • • • • • • • • • • • • • • •	<del>-</del> ی.				-		

### **FORMATIONS**

Russell Lee and Barbara

AP	47-051-5101656	Farm Name	Ann Bennett	Well Name	SHL26B
		Bottom Depth in FT			Describe Rock Type and Record Quantity and Type of Fluid
Lithology/Formation	Top Depth in FT TVD	TVD	Top Depth in Ft MD	Bottom Depth in F	(Freshwater, Brine, Oil, Gas, H2S, ETC)
Shale	0	808	0	808	
Pittsburgh Coal	808	817	808		
Shale and Sandstone	817	1264	817	1264	
Dunkard Sand	1264	1275	1264	1275	
Shale	1275	1446	1275	1446	5
Gas Sand	1446	1485	1446	1485	
Shale	1485	1577	1485	1578	
1st Salt Sand	1577	1601	1578	1602	
Shale	1601	1610	1602	1611	
2nd Salt Sand	1610	1655	1611	1656	
Shale	1655	1738	1656	1739	
Maxton Sand	1738	1750	1739	1751	
Shale	1750	1793	1751	1794	
Big Lime	1793	1873	1794	1875	
Big Injun	1873	2067	1875	2069	
Price	2067	2425	2069	2427	
Murrysville	2425	2439	2427	2441	
Shale	2439	2636	2441	2638	
50' Sand	2636	2638	2638	2640	
Shale	2638	2691	2640	2693	
30' Sand	2691	2700	2693	2702	
Shale	2700	2742	2702	2744	
Gordon Stray	2742	2757	2744	2759	
Shale	2757	2793	2759	2795	
Gordon	2793	2806	2795	2808	
Shale	2806	2902	2808	2904	
Fifth Sand	2902	2936	2904	2938	
Shale	2936	3342	2938	3344	
Speechley Sand	3342	3370	3344	3372	
Shale	3370	4378	3372	4380	
Warren Sand	4378	4387	4380	4389	
Shale	4387	5045	4389	5047	
Java Shale	5045	5216	5047	5218	
Pipe Creek Shale	5216	5273	5218	5275	
Angola Shale	5273	5898	5275	5903	
Rhinestreet	5898	6314	5903	6435	
Cashaqua	6314	6405	6435	6576	
Middlesex	6405	6440	6576	6633	
West River	6440	6492	6633	6726	
Burkett	6492	6515	6726	6770	
Tully Limestone	6515	6545	6770	6832	
Hamilton	6545	6656	6832	7148	
Marcellus	6656	6706	7148 <sup>n</sup>	ot encountered	Gas

### Hydraulic Fracturing Fluid Product Component Information Disclosure

3/18/2014	Job Start Date:
4/22/2014	Job End Date:
West Virginia	State:
Marshal	County:
47-051-01656-00-00	API Number:
Noble Energy, Inc	Operator Name:
SHL26 E	Well Name and Number:
-80.54840000	Longitude:
39.97314400	Latitude:
NAD27	Datum:
NO	Federal/Tribal Well:
6,629	True Vertical Depth:
14,828,013	Total Base Water Volume (gal):
	Total Base Non Water Volume:







### 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
resh Water	Operator	Base Fluid					
			Fresh Water	7732-18-5	100.00000	89.02451	Density = 8.400
SAND - PREMIUM WHITE	Halliburton	Proppant					
			Crystalline silica, quartz	14808-60-7	100.00000	7.77870	
SAND - COMMON WHITE	Halliburton	Proppant					
			Crystalline silica, quartz	14808-60-7	100.00000	1.99840	
HYDROCHLORIC ACID 5-10%	Halliburton	Solvent					
			Hydrochloric acid	7647-01-0	10.00000	0.10744	
R-66	Halliburton	Friction Reducer					
			Hydrotreated light petroleum distillate	64742-47-8	30.00000	0.01212	
E-1A ACIDIZING COMPOSITION	Halliburton	Additive					
			Acetic anhydride	108-24-7	100.00000	0.00596	
			Acetic acid	64-19-7	60.00000	0.00357	
DP-S1078-12	Halliburton	Friction Reducer					
			Hydrotreated light petroleum distillate	64742-47-8	30.00000		
			Alcohols, C12-16, ethoxylated	68551-12-2	10.00000	0.00116	

			Ammonium chloride	12125-02-9	10.00000	0.00116	
			9-Octadecenamide, n,n-bis-2 (hydroxy-ethyl)-,(Z)	93-83-4	5.00000	0.00058	
HYDROCHLORIC ACID 10-30%	Halliburton	Solvent					
			Hydrochloric acid	7647-01-0	30.00000	0.00576	
BE-9	Halliburton	Biocide					
			Tributyl tetradecyl phosphonium chloride	81741-28-8	10.00000	0.00384	
LP-65 MC	Halliburton	Scale Inhibitor					
			Ammonium chloride	12125-02-9	10.00000	0.00235	
LOSURF-300 NONIONIC SURFACTANT	Halliburton	Surfactant					
			sopropanol	67-63-0	60.00000	0.00121	
			Light aromatic solvent	64742-95-6	30.00000	0.00061	
			Ethoxylated nonylphenol	Confidential	10.00000	0.00020	Denise Tuck, Halliburton 3000 N. Sam Houston Pkwy E., Houston, TX 77032 281-871-6226
LGC-36 UC	Halliburton	Liquid Gel Concentrate					
			Guar gum	9000-30-0	60.00000	0.00075	
			Naphtha, hydrotreated heavy	64742-48-9	60.00000	0.00075	
LCA-1	Halliburton	Solvent					
			Paraffinic solvent	Confidential	100.00000	0.00141	
HAI-OS ACID INHIBITOR	Halliburton	Corrosion Inhibitor					
	of Parking and Touris		Methanol	67-56-1	60.00000	0.00057	
			Propargyl alcohol	107-19-7	10.00000	0.00010	
SP BREAKER	Halliburton	Breaker			Mark Mark		
			Sodium persulfate	7775-27-1	100.00000	0.00002	
Ingredients shown ab	oove are subject to 29	CFR 1910.1200(i) and app	pear on Material Safety Data She	ets (MSDS). Ingredie	ents shown below are l	Non-MSDS.	
		Other Ingredient(s)					
			Water	7732-18-5		1.17377	
		Other Ingredient(s)					
			Organic phosphonate	Confidential		0.01411	
		Other Ingredient(s)					
			Polyacrylamide copolymer	Confidential		0.01212	
		Other Ingredient(s)					
			Polyacrylate	Confidential		0.00347	
		Other Ingredient(s)					
			Inorganic salt	Confidential		0.00347	
		Other Ingredient(s)					
			Sodium chloride	7647-14-5		0.00202	
		Other Ingredient(s)					
			Ammonium chloride	12125-02-9		0.00202	
		Other Ingredient(s)					

	Alcohols, C12-16, ethoxylated	68551-12-2	0.00202	
Other Ing	redient(s)			
	Fatty acid tall oil amide	Confidential	0.00202	
Other Inc	redient(s)			
	Fatty acid ester	Confidential		Denise Tuck, Halliburton 3000 N. Sam Houston Pkwy E., Houston, TX 77032 281-871-6226
Other Ing	gredient(s)			
	Sorbitan, mono-9- octadecenoate, (Z)	1338-43-8	0.00040	
Other Ing	gredient(s)			
	Sorbitan monooleate polyoxyethylene derivative	9005-65-6	0.00040	
Other Inc	gredient(s)			
	Formaldehyde	50-00-0	0.00024	
Other Inc	gredient(s)			
	Quaternary ammonium compounds, bis(hydrogenated tallow alkyl) dimethyl,salts with bentonite	68953-58-2	0.00006	
Other Inc	gredient(s)			
	Fatty alcohol polyglycol ether surfactant	9043-30-5	0.00001	
Other Inc	gredient(s)			
	Crystalline silica, quartz	14808-60-7	0.00000	
Other Inc	gredient(s)			
	Sodium sulfate	7757-82-6	0.00000	

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)

<sup>\*</sup> 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%





#### Noble Energy SHL-26B-HS Gyro+MWD 0ft to 14627ft MD Survey Report

#### (Def Survey)

Report Date: Client:

Field: Structure / Slot:

Well: SHL-26B-HS Borehole: Original Borehole UWI / API#: Unknown / Unknown

Survey Name:

Noble Energy SHL-26B-HS Gyro+MWD 0ft to 14627ft MD Survey Date: January 22, 2014 Tort / AHD / DDI / ERD Ratio: 220.442 \* / 8574.489 ft / 6.618 / 1.282

Noble Energy

NAD27 West Virginia State Plane, Northern Zone, US Feet Coordinate Reference System: Location Lat / Long: N 39" 58' 23.31726", W 80" 32' 54.23833" N 538274.492 ItUS, E 1706173.176 ItUS

February 10, 2014 - 09:17 AM

WV Marshall County (NAD 27)

Noble Energy SHL-26 Pad / SHL-26B-HS

Location Grid N/E Y/X: CRS Grid Convergence Angle: -0.6686 ° Grid Scale Factor: 0.99995906

Version / Patch: 2.7.1043.0 Survey / DLS Computation: Vertical Section Azimuth: Vertical Section Origin: TVD Reference Datum:

TVD Reference Elevation: Seabed / Ground Elevation: Magnetic Declination:

Total Gravity Field Strength: **Gravity Model:** 

Total Magnetic Field Strength: Magnetic Dip Angle: **Declination Date:** Magnetic Declination Model: North Reference: Grid Convergence Used: Total Corr Mag North->Grid

Minimum Curvature / Lubinski 331.229 ° (Grid North) 0.000 ft, 0.000 ft

1332.180 ft above MSL 1309.180 ft above MSL

-8.418 ° 999.3453mgn (9.80665 Based) GARM

53112.508 nT 67.500 \* January 22, 2014 HDGM 2013 Grid North -0.6686 °

-7.7489° Local Coord Referenced To: Well Head

Comments	MD	Incl	Azim Grid	TVD	TVDSS	VSEC	NS	EW	DLS	BR	TR	Northing	Easting	Latitude	Longitude	Directional
Comments	(ft)	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)	(*/100ft)	(°/100ft)	(°/100ft)	(ftUS)	(ftUS)	(N/S * ' ")	(E/W)	Difficulty Index
SHL	0.00	0.00	0.00	0.00	-1332.18	0.00	0.00	0.00	N/A	N/A	N/A	538274.49	1706173.18	N 39 58 23.32	W 80 32 54.24	0.00
	123.00	0.13	288.51	123.00	-1209.18	0.10	0.04	-0.13	0.11	0.11	0.00	538274.54	1706173.04	N 39 58 23.32	W 80 32 54.24	0.00
	223.00	0.08	304.42	223.00	-1109.18	0.25	0.12	-0.30	0.06	-0.05	15.91	538274.61	1706172.88	N 39 58 23.32 1	W 80 32 54.24	0.00
	323.00	0.06	247.40	323.00	-1009.18	0.32	0.14	-0.40	0.07	-0.02	-57.02	538274.63	1706172.77	N 39 58 23.32 1	W 80 32 54.24	0.00
	423.00	0.15	203.72	423.00	-909.18	0.24	0.00	-0.50	0.11	0.09	-43.68	538274.49	1706172.67	N 39 58 23.32	W 80 32 54.24	0.00
	523.00	0.24	224.29	523.00	-809.18	0.10	-0.27	-0.70	0.11	0.09	20.57	538274.22	1706172.47	N 39 58 23.31	W 80 32 54.25	0.00
	623.00	0.17	213.73	623.00	-709.18	-0.03	-0.54	-0.93	80.0	-0.07	-10.56	538273.95	1706172.24	N 39 58 23.31	W 80 32 54.25	0.00
	723.00	0.24	205.58	723.00	-609.18	-0.22	-0.86	-1.10	0.08	0.07	-8.15	538273.64	1706172.07	N 39 58 23.31	W 80 32 54.25	0.03
	823.00	0.14	251.58	823.00	-509.18	-0.32	-1.08	-1.31	0.17	-0.10	46.00	538273.41	1706171.86	N 39 58 23.31	W 80 32 54.26	0.21
	923.00	0.06	245.72	923.00	-409.18	-0.29	-1.14	-1.47	9.08	-0.08	-5.86	538273.35	1706171.70	N 39 58 23.31	W 80 32 54.26	0.28
	1023.00	0.05	239.29	1023.00	-309.18	-0.29	-1.19	-1.56	0.01	-0.01	-6.43	538273.30	1706171.62	N 39 58 23.31	W 80 32 54.26	0.31
	1123.00	0.08	211.20	1123.00	-209.18	-0.33	-1.27	-1.63	0.04	0.03	-28.09	538273.22	1706171.54	N 39 58 23.30 1	W 80 32 54.26	0.35
	1158.00	0.04	204.12	1158.00	-174.18	-0.35	-1.30	-1.65	0.12	-0.11	-20.23	538273.19	1706171.52	N 39 58 23.30 1	W 80 32 54.26	0.37
	1241.00	0.59	1.68	1241.00	-91.18	0.00	-0.90	-1.65	0.76	0.66	189.83	538273.59		N 39 58 23.31 1		0.66
	1273.00	0.70	10.12	1272.99	-59.19	0.30	-0.54	-1.61	0.45	0.34	26.38	538273.95		N 39 58 23.31		0.75
	1305.00	0.95	30.65	1304.99	-27.19	0.59	-0.12	-1.44	1.20	0.78	64.16	538274.37	1706171 73	N 39 58 23.32	N 80 32 54 26	0.89
	1336.00	1.46	46.03	1335.98	3.80	0.82	0.37	-1.03	1.93	1.65	49.61	538274.86		N 39 58 23.32 1		1.07
	1368.00	2.07	54.66	1367.97	35.79	0.99	0.99	-0.26	2.07	1.91	26.97	538275.48		N 39 58 23.33		1.25
	1399.00	2.72	58.36	1398.94	66.76	1.09	1.70	0.82	2.15	2.10	11.94	538276.19		N 39 58 23.33		1.43
	1431.00	3.31	60.98	1430.90	98.72	1.14	2.55	2.28	1.89	1.84	8.19	538277.04		N 39 58 23.34		1.59
	1462.00	3.64	62.33	1461.84	129.66	1.12	3.44	3.93	1.10	1.06	4.35	538277.93	1706177 11	N 39 58 23.35 N	N 00 22 E4 40	1.71
	1526.00	5.03	74.71	1525.66	193.48	0.43	5.12	8.44	2.61	2.17	19.34	538279.61		N 39 58 23.37 N		2.00
	1620.00	5.32	81.86	1619.27	287.09	-2.07	6.82	16.72	0.75	0.31	7.61	538281.32		N 39 58 23.39 N		
	1715.00	4.68	82.23	1713.91	381.73	-5.01	7.97	24.92	0.67	-0.67	0.39					2.24
	1810.00	4.08	88.62	1808.62	476.44	-8.05	8.58	32.35	0.64	-0.87	6.73	538282.46 538283.07		N 39 58 23.40 N N 39 58 23.41 N		2.41 2.53
		0.05	0.05	4000.04	004.40	44.74	0.04	40.70	0.07	201	240	550000 50	1702010 07			2.07
	1938.00	3.25	84.65	1936.34	604.16	-11.71	9.04	40.79	0.87	-0.84	-3.10	538283.53		N 39 58 23.41 N		2.67
	2033.00	2.06	95.48	2031.23	699.05	-13.74	9.12	45.17	1.35	-1.25	11.40	538283.62		N 39 58 23.41 N		2.76
	2128.00	0.81	109.27	2126.20	794.02	-15.20	8.74	47.51	1.36	-1.32	14.52	538283.23		N 39 58 23.41 V		2.83
	2222.00 2317.00	0.87	122.81 260.93	2220.19 2315.19	888.01 983.01	-16.33 -16.85	8.13 7.69	48.73 49.01	0.22 1.26	0.06 -0.49	14.40 145.39	538282.63 538282.18		N 39 58 23 40 N N 39 58 23 40 N		2.84 2.89
							2.05		0.40	0.00						
	2412.00	0.49	271.86	2410.19	1078.01	-16.53	7.65	48 28	0.13	0.09	11.51	538282.14		N 39 58 23.40 V		2.90
	2506.00	0.76	240.20	2504.18	1172.00	-16.34	7.35	47.34	0.46	0.29	-33.68	538281.85		N 39 58 23.40 V		2.92
	2601.00	0.42	267.47	2599.18	1267.00	-16.19	7.03	46.44	0.45	-0.36	28.71	538281.52		N 39 58 23.39 V		2.94
	2695.00 2790.00	0.62	237.44 238.92	2693.17 2788.17	1360.99 1455.99	-16.08 -16.13	6.74	45.67 44.77	0.35	0.21	-31.95 1.56	538281.23 538280.67		N 39 58 23.39 N N 39 58 23.38 N		2.96 2.96
	2005.00	0.04	200.20	2000.40	4550.00	40.47	F. F.C	40.70	0.40	0.46	0.00					0.00
	2885.00	0.81	239.68	2883.16	1550.98	-16.17	5.56	43.72	0.16	0.16	0.80	538280.05		N 39 58 23.38 \		2.98
	2978.00	0.91	261.42	2976.15	1643.97	-15.93	5.11	42.42	0.36	0.11	23.38	538279.61		N 39 58 23.37 \		3.00
	3073.00	1.19	248.77	3071.13	1738.95	-15.54	4.65	40.76	0.38	0.29	-13.32	538279.14		N 39 58 23.37 \		3.02
	3167.00	1.23	246.34	3165.11	1832.93	-15.33	3.89	38.92	0.07	0.04	-2.59	538278.38	1706212.10	N 39 58 23.36 \	N 80 32 53.74	3.03

Comments	MD (ft)	inci (*)	Azim Grid (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (ft)	EW (h)	DLS (7100ft)	BR (*/100ft)	TR (7100h)	Northing (ftUS)	Easting (RUS)	Latitude (N/S * ' ")	Longitude (E/W * * *)	Directional Difficulty Index
	3190.00	1.33	242.85	3188.11	1855.93	-15.30	3.67	38.46	0.55	0.43	-15.17	538278.16	1706211.63	N 39 58 23.36 W	80 32 53 74	3.04
	3290 00	1.06	215.74	3288.08	1955.90	-15.66	2.39	36.89	0.62	-0.27	-27,11	538276.68	1706210.06	N 39 58 23.35 W	80 32 53 76	3.07
	3385.00	1.44	113.17	3383.07	2050.89	-16.98	1.20	37.47	2.07	0.40	-107.97	538275.69	1706210.64	N 39 58 23.33 W	80 32 53 76	3.13
	3479.00	1.86	98.46	3477.03	2144.85	-18.83	0.51	40.06	0.63	0.45	-15.65	538275.01		N 39 58 23.33 W		3.16
	3574.00	1.51	92.56	3571.99	2239.81	-20 42	0.23	42.84	0.41	-0.37	-6.21	538274.72		N 39 58 23.32 W		3.18
	3668.00	0.98	93.43	3665.97	2333.79	-21.49	0.13	44.88	0.56	-0.56	0.93	538274.62		N 39 58 23.32 W		3.20
	3763.00	0.93	83.17	3760.96	2428.78	-22.21	0.17	48.46	0.19	-0.05	-10.60	538274.66		N 39 58 23.32 W		3 2
	3858.00	0.87	89.50	3855.94	2523.76	-22.84	0.27	47.94	0.12	-0.06	6.66	538274.76		N 39 58 23.33 W		3.2
	3952.00	0.60	75.05	3949.93	2617.75	-23.34	0.44	49.29	0.24	-0.07	-15.37	538274.94		N 39 58 23 33 W		3.2
	4047.00 4142.00	0.69 0.59	43.01 26.46	4044.93 4139.92	2712.75 2807.74	-23.31 -22.88	1.03 1.89	50.32 50.93	0.45 0.22	-0.12 -0.11	-33.73 -17.42	538275.53 538276.38		N 39 58 23.33 W N 39 58 23.34 W		3.2 3.2
	4237.00	0 29	4.29	4234.92	2902.74	-22.38	2.57	51.17	0.36	-0.32	-23.34	538277.06				
	4331.00	0.21	352.03	4328.92	2996.74	-22.02	2.97	51.16	0.10	-0.09	-13.04	538277.06		N 39 58 23.35 W N 39 58 23.35 W		3.2 3.2
	4426.00	0.34	314.44	4423.92	3091.74	-21.58	3.34	50.93	0.23	0.14	-39.57	538277.84	1706224.11	N 39 58 23.36 W	80 32 53.58	3.2
	4520.00	0.29	309.25	4517.91	3185.73	<b>-21.10</b>	3.69	50.55	0.06	-0.05	-5.52	538278.18		N 39 58 23.36 W		3.2
	4615.00	0.45	291.71	4612.91	3280 73	-20.59	3.98	50.02	0.20	0.17	-18.46	538278.47	1706223.19	N 39 58 23.36 W	80 32 53 60	3.2
	4709.00	0.42	280.07	4706.91	3374.73	-20.08	4.18	49.34	0.10	-0.03	-12.38	538278.67	1706222.51	N 39 58 23.36 W	60 32 53 61	3 3
	4804.00	0.52	256.29	4801.91	3469.73	-19.75	4.14	48.57	0.23	0.11	-25.03	538278.63		N 39 58 23.36 W	80 32 53.62	33
	4899.00	0.30	240.37	4896.90	3564.72	-19.65	3.91	47.94	0.26	-0.23	-16.76	538278.40	1706221.11	N 39 58 23.36 W	80 32 53 62	3 3
	4993.00	0.19	214.66	4990.90	3658.72	-19.72	3.66	47.64	0.16	-0.12	-27.35	538278.15		N 39 58 23.36 W		3 3
	5088.00	0.19	232.70	5085 90	3753 72	-19.81	3.44	47.42	0.06	0.00	18.99	538277.93	1706220.60	N 39 58 23.36 W	80 32 53 63	3 32
	5182.00	0.17	256.09	5179 90	3847.72	-19.80	3.31	47.16	0.08	-0.02	24.88	538277.80	1706220.34	N 39 58 23.36 W	80 32 53.63	3 33
	5277.00	0.28	269.50	5274.90	3942.72	-19.65	3 27	46.79	0.13	0.12	14.12	538277.76		N 39 58 23.35 W		3.33
	5372 00	0.28	251.60	5369.90	4037.72	-19.50	3.20	46.34	0.09	0.00	-18.63	538277.69		N 39 58 23.35 W		3 33
	5466 00	0 21	248.63	5463 90	4131 72	-19.44	3.06	45 96	0 08	-0 07	-3.37	538277.55		N 39 58 23.35 W		3 34
	5561.00	0.21	211.39	5558.90	4226.72	-19.50	2.85	45.71	0.14	0.00	-39.20	538277 34	1706218.88	N 39 58 23.35 W	80 32 53 65	3.34
	5645.00	0.22	241.35	5642.90	4310.72	-19.58	2.64	45.49	0.13	0.01	35.67	538277.13		N 39 58 23 35 W		3.34
	5704.00	0.10	46.60	5701.90	4369.72	-19.56	2 62	45.43	0.54	-0.20	280.08	538277.12		N 39 58 23 35 W		3.35
	5751.00	3.88	71.54	5748.86	4416 68	-19.84	3.16	46.96	8.06	8.04	53.06	538277 65		N 39 58 23.35 W		3.42
	5798 00 5846.00	8.81 12.31	72.40 72.43	5795.56 5842.74	4463.38 4510.56	-20 82 -22.53	4.75 7.40	51.91 60.29	10.49 7.29	10.49 7.29	1.83 0.06	538279.24 538281.90		N 39 58 23.37 W N 39 58 23 40 W		3 52 3 60
	#800 00	15.42	20.52	5888.36	4556.18	-24.52	11.00	70.96	6.00							
	5893 00 5940.00	18.82	70.57 68.82	5933.27	4601.09	-24.52 -26.53	15.82	83.93	6.68 7.32	6.62 7.23	-3.96 -3.72	538285.49 538290.31		N 39 58 23.43 W N 39 58 23.48 W		3 68 3 76
	5987.00	22.28	71.10	5933.27 5977.28	4645.10	-20.55 -29.06	21,44	99.43	7.55	7.23 7.36	-3.72 4.85	538295 93		N 39 58 23.54 W		3 70
	6035.00	26.29	70.57	6021.02	4688.84	-32.35	27.93	118.07	8.37	8.35	-1.10	538302.42		N 39 58 23.61 W		3.93
	6082.00	30.40	70.35	6062.38	4730.20	-35.92	35.39	139.10	8.75	8.74	-0.47	538309.88		N 39 58 23.68 W		4 02
	6129.00	34.71	71.10	6101.98	4769.80	-40.11	43.73	162.97	9.21	9.17	1.60	538318.22	1708336 14	N 39 58 23.77 W	80 32 52 15	4 11
	6176.00	39.09	72.26	6139.56	4807.38	-45.24	52.58	189.75	9.44	9.32	2 47	538327.07		N 39 58 23.86 W		4.19
	6224.00	44.00	72.36	6175.47	4843.29	-51.36	62.25	220.07	10.23	10.23	0.21	538336.74		N 39 58 23.96 W		4 28
	6271.00	48.99	71.42	6207.82	4875.64	·57.65	72.86	252.46	10.72	10.62	-2.00	538347.35	1706425.62	N 39 58 24.07 W	80 32 51 01	4.36
	6319.00	50.84	65.50	6238.74	4906.56	·62.24	86.35	286.58	10.19	3.65	-12.33	538360.84		N 39 58 24.20 W		4.44
	6366.00	49.60	57.89	6268.84	4936.66	-62.56	103.44	318.35	12.72	-2.64	-16.19	538377.93	1706491.51	N 39 58 24.38 W	80 32 50.17	4.52
	6413.00	48.77	51.06	6299.58	4967.40	-58.39	124.07	347.27	11.14	-1.77	-14.53	538398.56	1706520.44	N 39 58 24.58 W	80 32 49.80	4.58
	6460.00	48.79	45.24	6330.57	4998.39	-50.40	147.64	373.59	9.31	0.04	-12.38	538422.13		N 39 58 24.82 W		4.64
	6508.00 6555.00	49.42 50.78	40.01 35.68	6362.00 6392.16	5029.82 5059.98	-38.82 -24.50	174.33 202.79	398.14 420.24	8.34 7.64	1.31 2.89	-10.90 -9.21	538448.81 538477 28		N 39 58 25.09 W N 39 58 25.37 W		4.60 4.74
	6555.00	30.76	35.00	0392.10	5059.96	-24.30	202.79	420.24	7.04	2.09	*9.21	530477.20	1700393.40	N 39 30 25.37 W	OU 32 40.07	4.74
	6603 00	52.52	30.71	6421.95	5089.77	-6.81	234.29	440.82	6.89	3.63	-10.35	538508.77		N 39 58 25.68 W		4.79
	6650.00	54.98	26.11	6449.75	5117.57	13.75	267.62	458.82	9.47	5.23	9.79	538542 10	1706631.98	N 39 58 26.01 W	80 32 48.39	4.84
	6697.00	56.35	22.16	6476.27	5144.09	37.15	303.03	474.67	7.53	2.91	-8.40	538577 51	1706647.83	N 39 58 26.37 W	80 32 48.19	4.88
	6744.00	58.12	18.09	6501.71	5169.53	63.14	340.13	488.25	8.20	3.77	-8.66	538614.61		N 39 58 26.73 W		4.92
	6792.00	60.63	14.76	6526.17	5193.99	92.25	379.74	499.92	7.94	5.23	-6.94	538654 22	1706873.07	N 39 58 27.13 W	80 32 47.87	4.96
	6839.00	63.54	10.79	6548.17	5215.99	123.33	420.23	509.08	9.70	6.19	-8.45	538694.71		N 39 58 27.53 W		5.00
	6887 00	66.25	7.14	6568.54	5236.36	157.70	463.16	515.83	8.90	5.65	-7.60	538737.63	1706688.99	N 39 58 27.95 W	80 32 47.68	5 04
	6934 00	67.78	3.46	6588.90	5254.72	193.54	506.23	519.82	7.91	3.26	-7.83	538780.70		N 39 58 28.38 W		5 08
	6982 00	69 61	359.50	6604 35	5272.17	232.16	550 92	520.97	8.58	3.81	-8.25	538825.39		N 39 58 28.82 W		5 12
	7029 00	71.61	355.34	6619 96	5287.78	271.94	595.20	518.96	9 37	4.26	-8.85	538869 66	1706692.11	N 39 58 29 26 W	80 32 47.66	5.15
	7076.00	72.34	351.08	6634.50	5302.32	313.37	639.56	513.67	8.76	1.55	-9.06	538914.03		N 39 58 29 70 W		5.19
	7123 00	72 22	346 73	6648 82	5316 64	356 02	683.48	505.06	8.82	-0 26	-9.26	538957 95	1706678 22	N 39 58 30.13 W	80 32 47 85	5 2
	7171.00	75.12	342.61	6662.32	5330.14	400.80	727.89	492.88	10.21	6.04	-8.58	539002.35		N 39 58 30.57 W		5.26
	7218.00	79.04	338.74	6672.83	5340.65	445.98	771.10	477.71	11.57	8.34	-8.23	539045.56		N 39 58 30.99 W		5.29
	7265 00	81.83	334.71	6680.64	5348.48	492.10	813.65	459.40	10.33	5.94	-8.57	539088.11	1706632.55	N 39 58 31.41 W	80 32 48 46	5.32
	7312 00	84.18	329.96	6688.37	5354.19	538.72	854.95	437.74	11.21	5 00	-10 11	539129 41	1706810.90	N 39 58 31 82 W	80 32 48 74	5.36

Comments	MD (ft)	inci (°)	Azim Grid (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (R)	(ft)	DLS (7100ft)	BR (*/100ft)	TR (*/100ft)	Northing (NUS)	Easting (RUS)	Latitude (N/S * ' ")	Longitude (E/W * * ")	Directional Difficulty Index
	7360.00	09.88	326.50	6689.26	5357.08	588.55	895.67	412.52	12.18	9.83	-7.21	539170.12		N 39 58 32.22 W		5.39
	7389.00	89.90	325.33	6689.57	5357.39	615.42	919.68	396.27	5.31	3.45	-4.03	539194.14	1706569.43	N 39 58 32.45 W	V 80 32 49 29	5.41
	7455.00	90.58	324.82 325.27	6689.29 6688.04	5357.11 5355.86	681.04 775.48	973.80 1051.65	358.49 304.06	1.29 0.60	1.03 0.37	-0.77 0.47	539248.25 539326.10	1706531 65	N 39 58 32 98 W N 39 58 33 74 W	V 80 32 49 78	5.43 5.47
	7550.00	90 93	325.21	0000.04	3335 60	773.40	1031.03	30-100	0.50	0.31	0.47	33340 10	1700477.23	11 39 30 33.74 11	00 32 30 49	347
	7645.00	90.88	325.97	6886.55	5354.37	870.01	1130.05	250.43	0.74	-0.07	0.74	539404.49	1706423.59	N 39 58 34.51 W	80 32 51 19	5.50
	7739.00	90.55	326.39	6685.40	5353.22	963.64	1208.13	198.11	0.56 1.02	-0.33	0.45	539482.57 539560.42	1706371.28	N 39 58 35 28 W	V 80 32 51 87	5.54
	7833.00	90.38 90.45	325.45 325.97	6684.63 6683.95	5352.45 5351.77	1057.23 1151.79	1285.99 1364.47	145.44 91.92	0.55	-0.18 0.07	-1.00 0.55	539638.91		N 39 58 36.04 W N 39 58 36.81 W		5 57 5 60
•	7928.00 8023.00	90.45 90.41	325.53	6683.23	5351.05	1246.35	1443.00	38.46	0.47	-0.04	-0.46	539717.43		N 39 58 37.58 W		5.63
	8118.00	90.58	326.78	6682.41	5350 23	1340.97	1521.89	-14.45	1.33	0.18	1.32	539796.32		N 39 58 38.35 W		5.65
	8212.00	90.41	325.75	6681.60 6680.95	5349.42 5348.77	1434.62 1528.25	1600.06 1678.17	-66.65 -118.95	1.11 0.95	-0.18 -0.03	-1.10 0.95	539874.49 539952.59		N 39 58 39.12 W N 39 58 39.89 W		5 68 5.71
	8306.00 8401.00	90.38 90.58	326.64 324.24	6680.16	5347.98	1622.76	1756.40	-172.83	2.53	0.21	-2.53	540030.81		N 39 58 40.65 W		5 74
	8496.00	90.4B	325.15	6679.28	5347.10	1717.13	1833.92	-227.73	0.96	-0.11	0.96	540108.33	1705945 45	N 39 58 41.41 W	V 80 32 57 44	5 76
	8590.00	90.52	325.16	6678.46	5348.28	1810.60	1911.06	-281.44	0.04	0.04	0.01	540185.47		N 39 58 42.17 W		5.78
	8685.00	90.38	324.29	6677.71	5345 53	1904.99 1998.29	1988.62 2064.93	-336.30 -391.18	0.93 0.08	-0.15 0.07	-0.92 -0.03	540263.02 540339.33		N 39 58 42.93 W N 39 58 43.68 W		5.81
	8779.00 8874.00	90.45 90.48	324.26 324.65	6677.03 6676.26	5344.85 5344.08	2092.63	2142.22	-391.16 -446.41	0.41	0.03	-0.03 0.41	540416.62	1705762.01	N 39 58 44.43 W	/ 80323937 / 8033 030	5.83 5.85
	8969.00	90.58	324.89	6675.38	5343 20	2187.02	2219 82	-501.21	0.27	0.11	0.25	540494.21	1705671.99	N 39 58 45.20 W	V 80 33 1.01	5.87
	0000.00	30.30	a24.00	00.0.00		2.0										***
	9064.00	90.62	324.95	6674.39	5342.21	2281.44	2297.56	-555.80	0.08	0.04	0.06	540571.95		N 39 58 45.96 W		5.89
	9158.00	90.52	324.85	6673.45	5341.27	2374.86	2374.46	-609.85	0.15	-0.11	-0.11	540648.85		N 39 58 48.71 W		5.90
	9253.00	90.45	324.87	6672.65 6671.90	5340.47 5339 72	2469.27 2563.70	2452.14 2529.94	-664.53 -719.04	0.08 0.24	-0.07 0.00	0.02 0.24	540726 53 540804.33		N 39 58 47.47 W N 39 58 48.23 W		5 92 5 94
	9348.00 9442.00	90.45 90.69	325.10 325.11	6670.97	5339 72 5338 79	2657.16	2529.94 2607.04	-719.04 -772.81	0.26	0.00	0.24	540881.42		N 39 58 48.99 W		5 96
	3442.00	30.03	323.71	3373.37	5555 15	2001.10				•		• 1000				
	9537.00	90.55	325.56	6669.94	5337.76	2751 66	2685.17	-826 84	0.50	-0.15	0.47	540959.55		N 39 58 49.76 W		5.97
	9632.00	90.55	325.05	6869.03	5336.85	2846.14	2763.28	-880.91	0.54	0.00	-0.54	541037.65		N 39 58 50 52 W		5 99
	9726.00	90.45	324.38	6668.20	5336.02	2939.53	2840.00 2917.35	-935.21 -990.37	0.72 0.27	-0.11 0.07	-0.71 0.26	541114.37 541191.71		N 39 58 51.27 W		6 01
	9821.00 9916.00	90.52 90.45	324.63 322.90	6667.40 6666.60	5335 22 5334.42	3033 88 3128 06	2917.35 2993.97	-1046 52	1.82	-0.07	-1 82	541268.33		N 39 58 52.03 W N 39 58 52.78 W		6 02 6 04
	9910.00	50.43	322.50	0000.00	3554.42	0.2000	2330.51					511255155	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			• • • • • • • • • • • • • • • • • • • •
	10010.00	90.48	324.48	6665.83	5333 65	3221.25	3069.71	-1102.18	1.68	0.03	1.68	541344.07		N 39 58 53.52 W		6 06
	10105.00	90.52	323.56	6665.00	5332.82	3315.49	3146.58	-1157.99	0.97	0.04	-0.97	541420.94		N 39 58 54 28 W		6 08
	10200.00	90.52 90.58	323.84 324.09	6664.14 6663.24	5331.96 5331.06	3409.67 3502.91	3223.14 3299.15	-1214.23 -1269.52	0.29 0.27	0.00 0.08	0.2 <del>9</del> 0.27	541497.50 541573.50		N 39 58 55.03 W N 39 58 55.77 W		6.09 6.11
	10294.00 10389.00	90.56 90.55	323.93	6662.30	5330.12	3597.15	3376.02	-1325.34	0.17	-0.03	-0.17	541650.36		N 39 58 56 53 W		6.12
	10483.00	90.48	323.88	6661.46	5329.28	3690.38	3451.97	-1380.72	0.09 0.43	-0 07 -0.03	-0.05 -0.43	541726.31 541802.85		N 39 58 57.27 W		6.14
	10578.00	90.45	323.47	6660.69 6659.84	5328 51 5327.66	3784.55 3877.68	3528.50 3604.00	-1436.99 -1493.00	0.43 0.16	-0.03 0.14	-0.43 -0.09	541878 33		N 39 58 58.02 W N 39 58 58 76 W		6 15 6 16
	10672.00 10767.00	90.58 90.48	323.39 324.70	6658.96	5326.78	3971.93	3680.89	-1548.77	1.38	-0.11	1.38	541955.23		N 39 58 59 51 W		6.18
	10861.00	90.48	325.73	6658.18	5326 00	4065.40	3758.09	-1602.40	1.10	0.00	1.10	542032.42		N 39 59 0.27 W		6.19
	10956.00	90.45	325.51	6657.41	5325.23	4159.95	3836.49 3913.98	-1656.04 -1709.25	0.23 0.05	-0.03 0.03	-0.23 0.03	542110.82 542188.30		N 39 59 1.04 W N 39 59 1.80 W		6.21
	11050.00 11145.00	90.48 90.41	325.54 324.97	6656.64 6655.90	5324.46 5323.72	4253.48 4347.96	3992.04	-1763.39	0.60	-0.07	-0.60	542266.38		N 3959 1.50 W		6.22 6.23
	11145.00	90.41	324.87	6655.20	5323 02	4441.39	4068.96	-1817.41	0.11	0.04	-0.11	542343.28		N 39 59 3 32 W		6.24
	11334 00	90.52	325.06	6654.39	5322.21	4535.82	4146.74	-1871.94	0.21	0.07	0.20	542421.06		N 39 59 4.08 W		6.26
					****	405	400.5.	****				£49400.00	47040403-	N 20 50 400		
	11429.00	90.48	324.69	6653.57	5321.39 5320.62	4630.25 4723.72	4224.54 4301.72	-1926.47 -1980.11	0.18 0.66	-0.04 -0.03	-0.18 0.66	542498.85 542576.03		N 39 59 4.84 W N 39 59 5.60 W		6 27 6 28
	11523.00	90.45 90.52	325.51 324.49	6652.80 6652.00	5320.62 5319.82	4723.72 4818.16	4301.72 4379.54	-1980.11 -2034.60	1.08	0.03	-1.07	542653.84		N 3959 636 W		6.29
	11618.00 11712.00	90.52	324.45	6651.24	5319.06	4911.53	4456 16	-2089 04	0.27	-0.12	0.24	542730.46		N 39 59 7.11 W		6.30
	11807.00	90.38	325.08	6650.58	5318 40	5005.95	4533.88	-2143 67	0.38	-0 03	0.38	542808 18		N 39 59 7.87 W		6.32
	11901.00	90.52	325.74	6649.84	5317.66 5316.78	5099.46 5194.03	4611.27 4689.83	-2197.03 -2250.44	0.72 0.11	0.15 0.03	0.70 0.11	542885.56 542964.12		N 39 59 8.63 W N 39 59 9 40 W		6.33 6.34
	11996.00	90.55	325.84	6648.96 6648.04	5316.78 5315.86	5194.03 5288.59	4089.83 4768.33	-2250.44 -2303.93	0.11	0.03	-0.23	542904.12 543042.62		N 3959 940 W		6.35
	12091.00 12185.00	90.55 90.34	325.62 325.57	6647.31	5315.13	5382.13	4845.88	-2357.04	0.23	-0.22	-0.05	543120.17		N 39 59 10.93 W		6.36
	12280.00	90.45	325.24	6646.66	5314.48	5476.64	4924.08	-2410.98	0.37	0.12	-0.35	543198.36		N 39 59 11.70 W		6.37
	12375 00	90.34	325.39	6646.00	5313.82	5571.13	5002.20	-2465.04 -2518.74	0.20 0.50	-0.12 0.04	0.16	543276.48 543353.62		N 39 59 12.46 W		6.38
	12469 00	90 38 90 38	324.92 325.26	6645.41 6644.78	5313 23 5312 60	5664.60 5759.05	5079.34 5157.25	-2518.74 -2573.11	0.36	0.04	-0.50 0.36	543353.62 543431.52		N 39 59 13.22 W N 39 59 13.98 W		6.39 6.40
	12584 00 12659.00	90.89	325.26 325.32	6643.73	5311.55	5853.53	5235.34	-2627.20	0.54	0.54	0.06	543509.60	1703546.09	N 39 59 14.75 W	80 33 28.77	6,41
	12753.00	91.13	325.49	6642.07	5309.89	5947.03	5312.70	-2680.56	0.31	0.26	0.18	543588.97		N 39 59 15.51 W		6.42
							*****						4700 100 10	N 20 50 -2 22 ··		
	12848 00	91.00	325.79 325.13	6640.31 6638.82	5308.13 5306.64	6041.57 6136.07	5391.11 5469.36	-2734.17 -2788.03	0.34 0.73	-0.14 -0.22	0.32 -0.69	543665.37 543743.61		N 39 59 16.27 W N 39 59 17.04 W		6.43 6.44
	12943 00 13037 00	90.79 90.93	325.13 325.72	6638.82 6637.41	5305.23	6229.58	5546.75	-2766.03 -2841.36	0.73	0.15	0.63	543821.00		N 39 59 17 80 W		6.45
	13132 00	90.96	325.63	6635.85	5303.67	6324.12	5625.19	-2894.93	0.10	0.03	-0.09	543899.44		N 39 59 18 57 W		6.46

Comments	MD (ft)	tnet (°)	Azim Grid (*)	TVD (ft)	TVDSS (h)	VSEC (ft)	24 (ft)	EW (ft)	DLS (*/100ft)	BR (*/100 <del>R</del> )	TR (*/100ft)	Northing (RUS)	Easting (RUS)	Latitude (N/S * * ")	Longitude (E/W * ' ")	
	13227.00	91 03	325.64	6634.20	5302.02	6418 66	5703.60	-2948.54	0.07	0.07	0.01	543977.85	1703224.76	N 39 59 19.34 \	W 80 33 32.97	6.47
	13321.00	90.96	326.33	6632.56	5300.38	6512.25	5781.50	-3001.12	0.74	-0.07	0.73	544055.75	1703172.19	N 39 59 20.10 V	W 80 33 33.66	6.48
	13416.00	90.93	325.34	6631.00	5298.82	6606.81	5860.10	-3054.46	1.04	-0.03	-1.04	544134.34	1703118.85	N 39 59 20.87 V	N 80 33 34 38	
	13511.00	90 48	325.33	6629 83	5297.65	6701.30	5938.23	-3108.49	0.47	-0.47	-0.01	544212.46		N 39 59 21.64 1		
	13605 00	90.41	325.81	6629.10	5296.92	6794 84	6015.76	-3161.64	0.52	-0.07	0.51	544289.99		N 39 59 22.40 1		
	13700.00	90.21	325.65	6628.58	5298.40	6889.40	6094.26	-3215.13	0.27	-0.21	-0.17	544368.49		N 39 59 23.17 V		
	13795.00	90.00	324.04	6628.41	5296.23	6983.81	6171.93	-3269.83	1.71	-0.22	-1 69	544446.16	1702903.49	N 39 59 23.93 \	N 80 33 37 17	6.53
	13889.00	89.90	324.16	6628.49	5296.31	7077.08	6248.08	-3324.95	0.17	-0.11	0.13	544522.30		N 39 59 24.67 V		
	13984.00	90 03	324.54	6628.55	5296.37	7171.40	6325.27	-3380.32	0.42	0.14	0.40	544599.49		N 39 59 25.43 V		6.55
	14079.00	89.93	324.51	6628.58	5296.40	7265.75	6402.64	-3435.45	0.11	-0.11	-0.03	544676.85		N 39 59 26.19 \		
	14173.00	89.73	323.65	6628.88	5296.68	7359.02	6478.76	-3490.59	0.94	-0.21	-0.91	544752.97		N 39 59 26.93 \		
	14268.00	89.90	324.40	6629 17	5296.99	7453.27	6555.64	-3546.40	0.81	0.18	0.79	544829.85	1702626 93	N 39 59 27.69 V	N 80 33 40 78	6.58
	14362.00	90.07	324.19	6629.19	5297.01	7546.58	6631.97	-3601.26	0.29	0.18	-0.22	544906.18		N 39 59 28.44 V		6.59
	14457.00	90.00	324.08	6629.14	5296.96	7640.85	6708.96	-3656.92	0.14	-0.07	-0.12	544983 16		N 39 59 29 19 V		6.59
	14551.00	89.90	324.87	6629.22	5297.04	7734.20	6785.46	-3711.54	0.85	-0.11	0.84	545059.66		N 39 59 29 94 V		6.60
Survey 07-Feb-	14590.00	89 93	322.65	6629.28	5297.10	7772.87	6816.96	-3734.53	5.18	0.08						
14	14590.00	99 93	322.65	V029.20	3287.10	1112.01	0010.00	-3134.53	5.16	0.08	-5.18	545091.15	1702438.80	N 39 59 30.25 V	N 80 33 43.24	6.61
PTB	14672.00	89.93	322.85	6629.38	5297.20	7654.00	6882.31	-3784.06	0.00	0.00	0.00	545156.51	1702389.28	N 39 59 30 89 V	N 80 33 43 88	6.62

Survey Type:

Def Survey

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

Description	cription Part		MD To (ft)	EOU Freq (ft)	Hole Size Casi (in)	ng Diameter (in)	Survey Tool Type	Borehole / Survey
	1	0.000	23 000	Act Stns	30.000	30.000	SLB_NSG+MSHOT-Depth Only	Original Borehole / Noble Enorgy SHL-26B-HS Gyro+MWD 0ft to 14627ft MD
	1	23.000	1158 000	Act Stns	30.000	30.000	SLB_NSG+MSHOT	Original Borehole / Noble Energy SHL-268-HS Gyro+MWD 01t to
	1	1158 000	14590.000	Act Stns	30.000	30.000	SLB_MWD-STD	Original Borehole / Noble Energy SHL-26B-HS Gyro+MWD 0ft to
	1	14590.000	14672.000	Act Stns	30 000	30 000	SLB_BLIND+TREND	Onginal Borehole / Noble Energy SHL-26B-HS Gyro+MWD 0ft to



### **Noble Energy**



