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

PM

API 47 - 051 - 01655 County Marshall District Sandhill
Quad Valley Grove Pad Name SHL-13 Field/Pool Name
Farm name Paul H. and Annette Hemsley Well Number SHL13CHS
Operator (as registered with the OOG) Noble Energy, Inc.
Address 333 Technology Drive, Suite 116 City Canonsburg State PA Zip 15317

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

| | | | | |
|---|---|---|---|---|
| Top hole | Northing | 4428334.97 | Easting | 539638.41 |
| Landing Point of Curve | Northing | 4428508.18 | Easting | 539574.41 |
| Bottom Hole | Northing | 4429297.04 | Easting | 538997.70 |

Elevation (ft) 1291.22 GL Type of Well ■New □ Existing Type of Report □Interim ■Final

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

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

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

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

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

Date permit issued 7/16/2013 Date drilling commenced 7/31/2013 Date drilling ceased 10/13/2013
Date completion activities began 6/1/14 Date completion activities ceased 7/19/14
Verbal plugging (Y/N) N Date permission granted _____ Granted by _____

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

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

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

Reviewed by: _____

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API 47- 051 - 01655 Farm name Paul H. and Annette Hemsley Well number SHL13CHS

| CASING STRINGS | Hole Size | Casing Size | Depth | New or Used | Grade wt/ft | Basket Depth(s) | Did cement circulate (Y/ N) * Provide details below* |
|---|---|---|---|---|---|---|---|
| Conductor | 36 | 30 | 40 | N | | | Y |
| Surface | 24 | 20 | 418 | N | J-55 94# | | Y |
| Coal | | | | | | | |
| Intermediate 1 | 17-1/2 | 13-3/8 | 1234 | N | J-55 54.5# | | Y |
| Intermediate 2 | 12-3/8 | 9-5/8 | 3231 | N | J-55 36# | | Y |
| Intermediate 3 | | | | | | | |
| Production | 8-3/4 | 5-1/2 | 10266 | N | P-110 20# | | Y |
| Tubing | | | | | | | |
| Packer type and depth set | | | | | | | |

Comment Details

| CEMENT DATA | Class/Type of Cement | Number of Sacks | Slurry wt (ppg) | Yield ( $ft^3$/sks) | Volume ($ft^3$) | Cement Top (MD) | WOC (hrs) |
|---|---|---|---|---|---|---|---|
| Conductor | | | | | | | |
| Surface | Type 1 | 503 | 15.6 | 1.2 | 108 | 0 | 8 |
| Coal | | | | | | | |
| Intermediate 1 | Type 1 | 1029 | 15.6 | 1.19 | 225 | 0 | 8 |
| Intermediate 2 | Type 1 | 1263 | 15.6 | 1.19 | 266 | 0 | 8 |
| Intermediate 3 | | | | | | | |
| Production | Class A | 1380 | 14.8 | 1.39 | 352 | 1550 | 8 |
| Tubing | | | | | | | |

Drillers TD (ft) 10290 Loggers TD (ft) 10213

Deepest formation penetrated Marcellus Plug back to (ft) 6304

Plug back procedure Cement Plug 1 of 2 from 6885 to 6304, 47.5bbls 17.5 ppg .94 yield Class H Cement. Cement Plug 2 of 2 from 6403 to 5677, 51 bbls 17.5ppg .94 yield Class H Cement

Kick off depth (ft) 5715

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

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

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING
4 Centralizers on Surface (Every third joint), 10 on Intermediate 1 (Every third joint), 56 on Intermediate 2 (Every third joint),
and 134 on Production casing (Every third joint, till Curve, then Every Joint).

WAS WELL COMPLETED AS SHOT HOLE ☐ Yes ■ No DETAILS

WAS WELL COMPLETED OPEN HOLE? ☐ Yes ■ No DETAILS

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

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API 47- 051 - 01655 Farm name Paul H. and Annette Hemsley Well number SHL13CHS

## PERFORATION RECORD

| Stage No. | Perforation date | Perforated from MD ft. | Perforated to MD ft. | Number of Perforations | Formation(s) |
|---|---|---|---|---|---|
| | PLEASE SEE ATTACHED PERFORATION RECORD | | | | |
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Please insert additional pages as applicable.

## STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

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

Perforation Record

API: 47-051-01655 Farm name: Paul H & Annette A Hemsley Well Name: SHL-13C-HS

| Stage No. | Stim Date | Top Perf | Bottom Perf | # of Perfs | Formation |
|---|---|---|---|---|---|
| 1 | 6/19/2014 | 10025 | 10097 | 48 | Marcellus |
| 2 | 6/19/2014 | 9823 | 9977 | 40 | Marcellus |
| 3 | 6/22/2014 | 9623 | 9777 | 40 | Marcellus |
| 4 | 6/22/2014 | 9423 | 9577 | 40 | Marcellus |
| 5 | 6/23/2014 | 9223 | 9377 | 40 | Marcellus |
| 6 | 6/23/2014 | 9023 | 9177 | 40 | Marcellus |
| 7 | 6/23/2014 | 8823 | 8977 | 40 | Marcellus |
| 8 | 6/24/2014 | 8623 | 8777 | 40 | Marcellus |
| 9 | 6/24/2014 | 8423 | 8577 | 40 | Marcellus |
| 10 | 6/24/2014 | 8223 | 8377 | 40 | Marcellus |
| 11 | 6/24/2014 | 8023 | 8177 | 40 | Marcellus |
| 12 | 6/24/2014 | 7823 | 7977 | 40 | Marcellus |
| 13 | 6/25/2014 | 7623 | 7777 | 40 | Marcellus |
| 14 | 6/25/2014 | 7423 | 7577 | 40 | Marcellus |
| 15 | 6/29/2014 | 7223 | 7377 | 40 | Marcellus |
| 16 | 6/30/2014 | 7061 | 7177 | 40 | Marcellus |

STIMULATION INFORMATION PER STAGE

API: 47-051-01655 Farm name: Paul H & Annette A Hemsley Well Name: SHL-13C-HS

| Stage No. | Stim Date | Avg Rate (bpm) | ATP (psi) | Max BD Pressure | ISIP (psi) | Proppant (lbs) | Water (BBLS) | Amount of $N^2$/ other |
|---|---|---|---|---|---|---|---|---|
| 1Inj Test | 6/18/2014 | 17.7 | 8024 | 9277 | 6072 | 0 | 1074.33 | |
| 1 | 6/19/2014 | 69.7 | 6711 | 5959 | 3880 | 497856 | 11113.19 | |
| 2 | 6/22/2014 | 68.7 | 6402 | 6207 | 4514 | 502982 | 9633.79 | |
| 3 | 6/22/2014 | 63.5 | 7519 | 6458 | 4113 | 499908 | 13133.57 | |
| 4 | 6/22/2014 | 68.7 | 6815 | 6042 | 4810 | 502327 | 10760.57 | |
| 5 | 6/23/2014 | 65.8 | 7114 | 6545 | 5353 | 500921 | 10498.18 | |
| 6 | 6/23/2014 | 68.7 | 6843 | 6083 | 4117 | 502262 | 10369.91 | |
| 7 | 6/23/2014 | 68.8 | 6808 | 6193 | 4912 | 501024 | 10468.19 | |
| 8 | 6/24/2014 | 68.7 | 6892 | 6020 | 4701 | 500034 | 11469.67 | |
| 9 | 6/24/2014 | 67.8 | 7041 | 6390 | 4257 | 498214 | 9527.42 | |
| 10 | 6/24/2014 | 68.7 | 6934 | 6015 | 4871 | 502030 | 9158.31 | |
| 11 | 6/24/2014 | 67.8 | 6724 | 6148 | 4439 | 499843 | 11393.65 | |
| 12 | 6/25/2014 | 66.9 | 7102 | 6547 | 3892 | 505235 | 11124.40 | |
| 13 | 6/25/2014 | 69.0 | 6745 | 7008 | | 470387 | 8416.85 | |
| 14 Inj Test | 6/26/2014 | 19.3 | 5246 | | 5434 | 0 | 209.69 | |
| 14 | 6/29/2014 | 67.1 | 7009 | 7064 | 4645 | 501368 | 10187.12 | |
| 15 | 6/29/2014 | 68.3 | 6327 | 6822 | 5180 | 491630 | 9917.31 | |
| 16 | 6/30/2014 | 68.3 | 6331 | 6570 | 4644 | 500064 | 11503.66 | |

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API 47- 051 - 01655 Farm name Paul H. and Annette Hemsley Well number SHL13CHS

| PRODUCING FORMATION(S) | DEPTHS | |
|---|---|---|
| Marcellus | 6784 TVD | 10290 MD |
| | | |
| | | |
| | | |

Please insert additional pages as applicable.

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

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

| OPEN FLOW | Gas | Oil | NGL | Water | GAS MEASURED BY |
|---|---|---|---|---|---|
| | 2448 mcfpd | 48 bpd | 147 bpd | 528 bpd | □ Estimated ■ Orifice □ Pilot |

| LITHOLOGY/ FORMATION NAME | TOP DEPTH IN FT TVD | BOTTOM DEPTH IN FT TVD | TOP DEPTH IN FT MD | BOTTOM DEPTH IN FT MD | DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, $H_2S$, ETC) |
|---|---|---|---|---|---|
| | 0 | | 0 | | |
| | PLEASE SEE FORMATION SHEET | | | | |
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Please insert additional pages as applicable.

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

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

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

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

Please insert additional pages as applicable.

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

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

**SHL 13C**

47-051-01655

| Formations | Top TVD | Base TVD | Top MD | Base MD | Fluid |
|---|---|---|---|---|---|
| Shale | 0 | 732 | 0 | 732 | |
| Pittsburgh Coal | 732 | 742 | 732 | 742 | |
| Shale and Sandstone | 742 | 1516 | 742 | 1516 | |
| Gas Sand | 1516 | 1574 | 1516 | 1574 | |
| Shale | 1574 | 1693 | 1574 | 1693 | |
| 1st Salt Sand | 1693 | 1756 | 1693 | 1756 | |
| 2nd Salt Sand | 1756 | 1765 | 1756 | 1765 | |
| 3rd Salt Sand | 1765 | 1815 | 1765 | 1815 | |
| Shale | 1815 | 1841 | 1815 | 1841 | |
| Maxton Sand | 1841 | 1958 | 1841 | 1958 | |
| Shale | 1958 | 1978 | 1958 | 2509 | |
| Big Lime | 1978 | 2023 | 1978 | 2023 | |
| Big Injun | 2023 | 2165 | 2023 | 2165 | |
| Price | 2165 | 2509 | 2165 | 2509 | |
| Murrysville | 2509 | 2522 | 2509 | 2872 | |
| Shale | 2522 | 2726 | 2522 | 2726 | |
| 50' Sand | 2726 | 2743 | 2726 | 2743 | |
| Shale | 2743 | 2829 | 2743 | 2829 | |
| Gordon Stray | 2829 | 2841 | 2829 | 2841 | |
| Shale | 2841 | 2872 | 2841 | 2872 | |
| Gordon | 2872 | 2890 | 2872 | 2890 | |
| Shale | 2890 | 2985 | 2890 | 2985 | |
| Fifth Sand | 2985 | 3023 | 2985 | 3023 | |
| Shale | 3023 | 3423 | 3023 | 3423 | |
| Speechley Sand | 3423 | 3447 | 3423 | 3447 | |
| Shale | 3447 | 4331 | 3447 | 4333 | |
| Warren Sand | 4331 | 4345 | 4333 | 4347 | |
| Shale | 4345 | 5252 | 4347 | 5254 | |
| Java Shale | 5252 | 5322 | 5254 | 5324 | |
| Pipe Creek Shale | 5322 | 5366 | 5324 | 5368 | |
| Angola Shale | 5366 | 5992 | 5368 | 5997 | |
| Rhinestreet | 5992 | 6406 | 5997 | 6429 | |
| Cashaqua | 6406 | 6498 | 6429 | 6534 | |
| Middlesex | 6498 | 6535 | 6534 | 6579 | |
| West River | 6535 | 6576 | 6579 | 6631 | |
| Burkett | 6576 | 6609 | 6631 | 6675 | |
| Tully Limestone | 6609 | 6637 | 6675 | 6716 | |
| Hamilton | 6637 | 6751 | 6716 | 6950 | |
| Marcellus | 6751 | 6802 | 6950 | 7268 | Gas |
| Onondaga | 6802 | 6807 | 7268 | not encountered | |
| Huntersville | 6807 | not encountered | not encountered | not encountered | |

# Hydraulic Fracturing Fluid Product Component Information Disclosure

| | |
|---|---|
| Job Start Date: | 6/1/2014 |
| Job End Date: | 6/30/2014 |
| State: | West Virginia |
| County: | Marshall |
| API Number: | 47-051-01655-00-00 |
| Operator Name: | Noble Energy, Inc. |
| Well Name and Number: | SHL13 C |
| Longitude: | -80.53581000 |
| Latitude: | 40.00420000 |
| Datum: | NAD27 |
| Federal/Tribal Well: | NO |
| True Vertical Depth: | 6,784 |
| Total Base Water Volume (gal): | 7,138,303 |
| Total Base Non Water Volume: | 0 |

51-016 55

## Hydraulic Fracturing Fluid Composition:

| Trade Name | Supplier | Purpose | Ingredients | Chemical Abstract Service Number (CAS #) | Maximum Ingredient Concentration in Additive (% by mass)** | Maximum Ingredient Concentration in HF Fluid (% by mass)** | Comments |
|---|---|---|---|---|---|---|---|
| Fresh Water | Operator | Base Fluid | | | | | |
| | | | Fresh Water | 7732-18-5 | 100.00000 | 87.52042 | Density = 8.340 |
| SAND - PREMIUM WHITE | Halliburton | Proppant | | | | | |
| | | | Crystalline silica, quartz | 14808-60-7 | 100.00000 | 9.38622 | |
| SAND - COMMON WHITE | Halliburton | Proppant | | | | | |
| | | | Crystalline silica, quartz | 14808-60-7 | 100.00000 | 2.41215 | |
| HYDROCHLORIC ACID 10-30% | Halliburton | Solvent | | | | | |
| | | | Hydrochloric acid | 7647-01-0 | 30.00000 | 0.04144 | |
| HYDROCHLORIC ACID 5-10% | Halliburton | Solvent | | | | | |
| | | | Hydrochloric acid | 7647-01-0 | 10.00000 | 0.03809 | |
| FR-66 | Halliburton | Friction Reducer | | | | | |
| | | | Hydrotreated light petroleum distillate | 64742-47-8 | 30.00000 | 0.02730 | |
| FE-1A ACIDIZING COMPOSITION | Halliburton | Additive | | | | | |
| | | | Acetic anhydride | 108-24-7 | 100.00000 | 0.00336 | |
| | | | Acetic acid | 64-19-7 | 60.00000 | 0.00202 | |
| BE-9 | Halliburton | Biocide | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | Tributyl tetradecyl phosphonium chloride | 81741-28-8 | 10.00000 | 0.00411 | |
| Scalechek® LP-65 Scale Inhibitor | Halliburton | Scale Inhibitor | | | | | |
| | | | Ammonium chloride | 12125-02-9 | 10.00000 | 0.00251 | |
| LoSurf-300D | Halliburton | Non-ionic Surfactant | | | | | |
| | | | Ethanol | 64-17-5 | 60.00000 | 0.00068 | |
| | | | Heavy aromatic petroleum naphtha | 64742-94-5 | 30.00000 | 0.00034 | |
| | | | Naphthalene | 91-20-3 | 5.00000 | 0.00006 | |
| | | | Poly(oxy-1,2-ethanediyl), alpha-(4-nonylphenyl)-omega-hydroxy-, branched | 127087-87-0 | 5.00000 | 0.00006 | |
| | | | 1,2,4 Trimethylbenzene | 95-63-6 | 1.00000 | 0.00001 | |
| HAI-OS ACID INHIBITOR | Halliburton | Corrosion Inhibitor | | | | | |
| | | | Methanol | 67-56-1 | 60.00000 | 0.00033 | |
| | | | Propargyl alcohol | 107-19-7 | 10.00000 | 0.00006 | |
| 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 | | 0.62974 | |
| | | Other Ingredient(s) | | | | | |
| | | | Polyacrylamide copolymer | Confidential | | 0.02730 | |
| | | Other Ingredient(s) | | | | | |
| | | | Organic phosphonate | Confidential | | 0.01503 | |
| | | Other Ingredient(s) | | | | | |
| | | | Ammonium chloride | 12125-02-9 | | 0.00455 | |
| | | Other Ingredient(s) | | | | | |
| | | | Alcohols, C12-16, ethoxylated | 68551-12-2 | | 0.00455 | |
| | | Other Ingredient(s) | | | | | |
| | | | Sodium chloride | 7647-14-5 | | 0.00455 | |
| | | Other Ingredient(s) | | | | | |
| | | | Fatty acid tall oil amide | Confidential | | 0.00455 | Denise Tuck, Halliburton 3000 N. Sam Houston Pkwy E., Houston, TX 77032 281-871-6226 |
| | | Other Ingredient(s) | | | | | |
| | | | Sorbitan monooleate polyoxyethylene derivative | 9005-65-6 | | 0.00091 | |
| | | Other Ingredient(s) | | | | | |
| | | | Sorbitan, mono-9-octadecenoate, (Z) | 1338-43-8 | | 0.00091 | |
| | | Other Ingredient(s) | | | | | |
| | | | Oxyalkylated phenolic resin | Confidential | | 0.00034 | |
| | | Other Ingredient(s) | | | | | |
| | | | Formaldehyde | 50-00-0 | | 0.00025 | |
| | | Other Ingredient(s) | | | | | |

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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | Reaction product of acetophenone, formaldehyde, thiourea and oleic acid in dimethyl formamide | 68527-49-1 | | 0.00017 | |
| | | Other Ingredient(s) | | | | | |
| | | | Alcohols, C14-C15, ethoxylated | 68951-67-7 | | 0.00017 | |
| | | Other Ingredient(s) | | | | | |
| | | | Fatty acids, tall oil | Confidential | | 0.00017 | |
| | | Other Ingredient(s) | | | | | |
| | | | 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 | |

15-016-55

* 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)

51-01655

PATHFINDER
A Schlumberger Company

# Noble Energy SHL13CHS ST01 MWD 5812ft to 10290ft MD Survey Geodetic Report

(Def Survey)

noble energy

| | | | |
|---|---|---|---|
| **Report Date:** | October 11, 2013 - 11.42 AM | **Survey / DLS Computation:** | Minimum Curvature / Lubinski |
| **Client:** | Noble Energy | **Vertical Section Azimuth:** | 327.486 ° (Grid North) |
| **Field:** | WV Marshall County (NAD 27) | **Vertical Section Origin:** | 0.000 ft, 0.000 ft |
| **Structure / Slot:** | Noble Energy SHL13 Pad / SHL13CHS | **TVD Reference Datum:** | KB |
| **Well:** | SHL13CHS | **TVD Reference Elevation:** | 1300.560 ft above MSL |
| **Borehole:** | ST01 | **Seabed / Ground Elevation:** | 1281.910 ft above MSL |
| **UWI / API#:** | Unknown / Unknown | **Magnetic Declination:** | -8.429 ° |
| **Survey Name:** | Noble Energy SHL13CHS ST01 MWD 5812ft to 10290ft MD | **Total Gravity Field Strength:** | 999.4510mgn (9.80665 Based) |
| **Survey Date:** | October 05, 2013 | **Gravity Model:** | DOX |
| **Tort / AHD / DDI / ERD Ratio:** | 204.777 ° / 3966.036 ft / 6.091 / 0.585 | **Total Magnetic Field Strength:** | 53182.243 nT |
| **Coordinate Reference System:** | NAD27 West Virginia State Plane, Northern Zone, US Feet | **Magnetic Dip Angle:** | 67.587 ° |
| **Location Lat / Long:** | N 40° 0' 15.12105", W 80° 32' 8.91346" | **Declination Date:** | October 05, 2013 |
| **Location Grid N/E Y/X:** | N 549545.633 ftUS, E 1709832.021 ftUS | **Magnetic Declination Model:** | HDGM 2013 |
| **CRS Grid Convergence Angle:** | -0.6606 ° | **North Reference:** | Grid North |
| **Grid Scale Factor:** | 0.99996249 | **Grid Convergence Used:** | -0.6606 ° |
| **Version / Patch:** | 2.7.998.0 | **Total Corr Mag North->Grid North:** | -7.7684 ° |
| | | **Local Coord Referenced To:** | Well Head |

| Comments | MD (ft) | Incl (°) | Azim Grid (°) | TVD (ft) | TVDSS (ft) | VSEC (ft) | NS (ft) | EW (ft) | DLS (°/100ft) | BR (°/100ft) | TR (°/100ft) | Northing (ftUS) | Easting (ftUS) | Latitude (N/S ° ' ") | Longitude (E/W ° ' ") |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SHL | 0.00 | 0.00 | 0.00 | 0.00 | -1300.56 | 0.00 | 0.00 | 0.00 | N/A | N/A | N/A | 549545.63 | 1709832.02 | N 40 0 15.12 | W 80 32 8.91 |
| | 106.50 | 0.19 | 191.64 | 106.50 | -1194.06 | -0.13 | -0.17 | -0.04 | 0.18 | 0.18 | 0.00 | 549545.46 | 1709831.99 | N 40 0 15.12 | W 80 32 8.91 |
| | 206.50 | 0.40 | 134.15 | 206.50 | -1094.06 | -0.59 | -0.58 | 0.16 | 0.34 | 0.21 | -57.49 | 549545.05 | 1709832.20 | N 40 0 15.12 | W 80 32 8.91 |
| | 306.50 | 0.22 | 123.08 | 306.50 | -994.06 | -1.10 | -0.93 | 0.59 | 0.19 | -0.18 | -11.07 | 549544.71 | 1709832.61 | N 40 0 15.11 | W 80 32 8.91 |
| | 406.50 | 0.25 | 70.39 | 406.50 | -894.06 | -1.32 | -0.96 | 0.96 | 0.21 | 0.03 | -52.69 | 549544.68 | 1709832.98 | N 40 0 15.11 | W 80 32 8.90 |
| | 506.50 | 0.27 | 115.00 | 506.50 | -794.06 | -1.57 | -0.98 | 1.38 | 0.20 | 0.02 | 44.61 | 549544.65 | 1709833.40 | N 40 0 15.11 | W 80 32 8.90 |
| | 606.50 | 0.11 | 240.51 | 606.50 | -694.06 | -1.76 | -1.13 | 1.51 | 0.35 | -0.16 | 125.51 | 549544.50 | 1709833.53 | N 40 0 15.11 | W 80 32 8.89 |
| | 706.50 | 0.51 | 238.96 | 706.49 | -594.07 | -1.75 | -1.41 | 1.04 | 0.40 | 0.40 | -1.55 | 549544.23 | 1709833.06 | N 40 0 15.11 | W 80 32 8.90 |
| | 806.50 | 0.61 | 318.29 | 806.49 | -494.07 | -1.21 | -1.24 | 0.31 | 0.72 | 0.10 | 79.33 | 549544.39 | 1709832.33 | N 40 0 15.11 | W 80 32 8.91 |
| | 906.50 | 0.82 | 29.97 | 906.48 | -394.08 | -0.35 | -0.22 | 0.31 | 0.85 | 0.21 | 71.68 | 549545.41 | 1709832.33 | N 40 0 15.12 | W 80 32 8.91 |
| | 1006.50 | 0.83 | 101.64 | 1006.48 | -294.08 | -0.53 | 0.25 | 1.38 | 0.97 | 0.01 | 71.67 | 549545.88 | 1709833.40 | N 40 0 15.12 | W 80 32 8.90 |
| | 1106.50 | 1.66 | 160.79 | 1106.45 | -194.11 | -2.44 | -1.26 | 2.56 | 1.43 | 0.83 | 59.15 | 549544.37 | 1709834.58 | N 40 0 15.11 | W 80 32 8.88 |
| | 1206.50 | 2.02 | 207.67 | 1206.41 | -94.15 | -4.73 | -4.19 | 2.22 | 1.50 | 0.36 | 46.88 | 549541.44 | 1709834.24 | N 40 0 15.08 | W 80 32 8.88 |
| | 1306.50 | 2.05 | 213.78 | 1306.35 | 5.79 | -6.32 | -7.24 | 0.41 | 0.22 | 0.03 | 6.11 | 549538.39 | 1709832.43 | N 40 0 15.05 | W 80 32 8.91 |
| | 1406.50 | 1.29 | 209.84 | 1406.30 | 105.74 | -7.57 | -9.70 | -1.15 | 0.77 | -0.76 | -3.94 | 549535.93 | 1709830.88 | N 40 0 15.03 | W 80 32 8.93 |
| | 1506.50 | 1.06 | 217.22 | 1506.28 | 205.72 | -8.41 | -11.42 | -2.27 | 0.27 | -0.23 | 7.38 | 549534.22 | 1709829.76 | N 40 0 15.01 | W 80 32 8.94 |
| | 1606.50 | 1.34 | 217.34 | 1606.26 | 305.70 | -9.13 | -13.08 | -3.53 | 0.28 | 0.28 | 0.12 | 549532.55 | 1709828.49 | N 40 0 14.99 | W 80 32 8.96 |
| | 1706.50 | 1.29 | 224.59 | 1706.23 | 405.67 | -9.79 | -14.81 | -5.03 | 0.17 | -0.05 | 7.25 | 549530.82 | 1709828.99 | N 40 0 14.97 | W 80 32 8.98 |
| | 1806.50 | 0.83 | 211.60 | 1806.22 | 505.66 | -10.35 | -16.23 | -6.20 | 0.52 | -0.46 | -12.99 | 549529.40 | 1709825.82 | N 40 0 14.96 | W 80 32 8.99 |
| | 1906.50 | 0.80 | 201.64 | 1906.21 | 605.65 | -11.08 | -17.50 | -6.84 | 0.14 | -0.03 | -9.96 | 549528.14 | 1709825.18 | N 40 0 14.95 | W 80 32 9.00 |
| | 2006.50 | 0.65 | 216.90 | 2006.20 | 705.64 | -11.69 | -18.60 | -7.44 | 0.24 | -0.15 | 15.26 | 549527.03 | 1709824.58 | N 40 0 14.94 | W 80 32 9.01 |
| | 2106.50 | 0.62 | 224.85 | 2106.19 | 805.63 | -12.00 | -19.44 | -8.16 | 0.09 | -0.03 | 7.95 | 549526.20 | 1709823.86 | N 40 0 14.93 | W 80 32 9.02 |
| | 2206.50 | 0.53 | 240.59 | 2206.19 | 905.63 | -12.10 | -20.05 | -8.94 | 0.18 | -0.09 | 15.74 | 549525.59 | 1709823.08 | N 40 0 14.92 | W 80 32 9.03 |
| | 2306.50 | 0.57 | 242.78 | 2306.18 | 1005.62 | -12.03 | -20.50 | -9.79 | 0.05 | 0.04 | 2.19 | 549525.13 | 1709822.23 | N 40 0 14.92 | W 80 32 9.04 |
| | 2406.50 | 0.66 | 241.78 | 2406.18 | 1105.62 | -11.94 | -21.00 | -10.74 | 0.09 | 0.09 | -1.00 | 549524.63 | 1709821.28 | N 40 0 14.91 | W 80 32 9.05 |
| | 2506.50 | 0.72 | 252.68 | 2506.17 | 1205.61 | -11.73 | -21.46 | -11.85 | 0.14 | 0.06 | 10.90 | 549524.17 | 1709820.17 | N 40 0 14.91 | W 80 32 9.06 |
| | 2606.50 | 0.68 | 244.33 | 2606.16 | 1305.60 | -11.49 | -21.91 | -12.98 | 0.11 | -0.04 | -8.35 | 549523.73 | 1709819.04 | N 40 0 14.90 | W 80 32 9.08 |
| | 2706.50 | 0.64 | 233.69 | 2706.15 | 1405.59 | -11.46 | -22.49 | -13.97 | 0.13 | -0.04 | -10.64 | 549523.14 | 1709818.06 | N 40 0 14.90 | W 80 32 9.09 |
| | 2806.50 | 0.81 | 249.83 | 2806.15 | 1505.59 | -11.35 | -23.07 | -15.08 | 0.26 | 0.17 | 16.14 | 549522.57 | 1709816.94 | N 40 0 14.89 | W 80 32 9.10 |
| | 2906.50 | 0.73 | 248.82 | 2906.14 | 1605.58 | -11.07 | -23.54 | -16.34 | 0.08 | -0.08 | -1.01 | 549522.09 | 1709815.68 | N 40 0 14.89 | W 80 32 9.12 |
| | 3006.50 | 0.67 | 257.74 | 3006.13 | 1705.57 | -10.74 | -23.90 | -17.50 | 0.12 | -0.06 | 8.92 | 549521.74 | 1709814.52 | N 40 0 14.88 | W 80 32 9.13 |
| | 3106.50 | 0.66 | 253.29 | 3106.12 | 1805.56 | -10.38 | -24.19 | -18.64 | 0.05 | 0.01 | -4.45 | 549521.44 | 1709813.38 | N 40 0 14.88 | W 80 32 9.15 |
| | 3196.50 | 0.62 | 246.20 | 3196.12 | 1895.56 | -10.16 | -24.54 | -19.60 | 0.11 | -0.07 | -7.88 | 549521.09 | 1709812.42 | N 40 0 14.88 | W 80 32 9.16 |
| | 3304.00 | 0.37 | 248.98 | 3303.61 | 2003.05 | -10.00 | -24.90 | -20.46 | 0.23 | -0.23 | 2.59 | 549520.73 | 1709811.57 | N 40 0 14.87 | W 80 32 9.17 |
| | 3394.00 | 1.12 | 348.86 | 3393.61 | 2093.05 | -9.13 | -24.14 | -20.90 | 1.38 | 0.83 | 110.98 | 549521.49 | 1709811.12 | N 40 0 14.88 | W 80 32 9.18 |
| | 3483.00 | 2.79 | 345.00 | 3482.55 | 2181.99 | -6.25 | -21.20 | -21.63 | 1.88 | 1.88 | -4.34 | 549524.44 | 1709810.40 | N 40 0 14.91 | W 80 32 9.19 |
| | 3573.00 | 4.09 | 350.04 | 3572.39 | 2271.83 | -1.20 | -15.92 | -22.75 | 1.48 | 1.44 | 5.60 | 549529.72 | 1709809.27 | N 40 0 14.96 | W 80 32 9.20 |
| | 3662.00 | 4.83 | 348.65 | 3661.12 | 2360.56 | 5.23 | -9.12 | -24.03 | 0.84 | 0.83 | -1.56 | 549536.52 | 1709807.99 | N 40 0 15.03 | W 80 32 9.22 |
| | 3752.00 | 4.47 | 353.84 | 3750.82 | 2450.26 | 11.91 | -1.92 | -25.16 | 0.61 | -0.40 | 5.77 | 549543.72 | 1709806.87 | N 40 0 15.10 | W 80 32 9.24 |
| | 3841.00 | 3.68 | 0.17 | 3839.60 | 2539.04 | 17.42 | 4.39 | -25.52 | 1.02 | -0.89 | 7.11 | 549550.02 | 1709806.50 | N 40 0 15.16 | W 80 32 9.24 |
| | 3931.00 | 2.62 | 347.62 | 3929.46 | 2628.90 | 21.78 | 9.29 | -25.95 | 1.40 | -1.18 | -13.94 | 549554.92 | 1709806.07 | N 40 0 15.21 | W 80 32 9.25 |
| | 4021.00 | 1.92 | 3.45 | 4019.39 | 2718.83 | 24.93 | 12.80 | -26.30 | 1.04 | -0.78 | 17.59 | 549558.43 | 1709805.72 | N 40 0 15.24 | W 80 32 9.25 |
| | 4110.00 | 1.36 | 345.74 | 4108.35 | 2807.79 | 27.14 | 15.31 | -26.47 | 0.84 | -0.63 | -19.90 | 549560.94 | 1709805.55 | N 40 0 15.27 | W 80 32 9.26 |
| | 4200.00 | 1.10 | 312.94 | 4198.34 | 2897.78 | 28.99 | 16.94 | -27.37 | 0.82 | -0.29 | -36.44 | 549562.57 | 1709804.65 | N 40 0 15.29 | W 80 32 9.27 |
| | 4289.00 | 0.34 | 317.76 | 4287.33 | 2986.77 | 30.08 | 17.71 | -28.17 | 0.86 | -0.85 | 5.42 | 549563.35 | 1709803.85 | N 40 0 15.29 | W 80 32 9.28 |
| | 4379.00 | 0.47 | 291.76 | 4377.33 | 3076.77 | 30.64 | 18.05 | -28.69 | 0.25 | 0.14 | -28.89 | 549563.68 | 1709803.33 | N 40 0 15.30 | W 80 32 9.28 |
| | 4468.00 | 0.43 | 20.67 | 4466.32 | 3165.76 | 31.14 | 18.50 | -28.91 | 0.71 | -0.04 | 99.90 | 549564.13 | 1709803.11 | N 40 0 15.30 | W 80 32 9.29 |
| | 4558.00 | 1.18 | 13.74 | 4556.31 | 3255.75 | 31.98 | 19.71 | -28.58 | 0.84 | 0.83 | -7.70 | 549565.34 | 1709803.45 | N 40 0 15.31 | W 80 32 9.28 |
| | 4648.00 | 1.17 | 359.53 | 4646.30 | 3345.74 | 33.40 | 21.53 | -28.36 | 0.32 | -0.01 | -15.79 | 549567.16 | 1709803.66 | N 40 0 15.33 | W 80 32 9.28 |
| | 4737.00 | 0.98 | 37.04 | 4735.28 | 3434.72 | 34.44 | 23.05 | -27.91 | 0.80 | -0.21 | 42.15 | 549568.68 | 1709804.11 | N 40 0 15.35 | W 80 32 9.28 |
| | 4828.00 | 0.72 | 62.84 | 4826.27 | 3525.71 | 34.66 | 23.93 | -26.93 | 0.50 | -0.29 | 28.35 | 549569.56 | 1709805.09 | N 40 0 15.35 | W 80 32 9.26 |
| | 4917.00 | 0.45 | 322.69 | 4915.27 | 3614.71 | 34.95 | 24.46 | -26.65 | 1.03 | -0.30 | -112.53 | 549570.09 | 1709805.37 | N 40 0 15.36 | W 80 32 9.26 |
| | 5007.00 | 0.47 | 115.75 | 5005.27 | 3704.71 | 34.99 | 24.58 | -26.53 | 0.99 | 0.02 | 170.07 | 549570.21 | 1709805.49 | N 40 0 15.36 | W 80 32 9.26 |
| | 5096.00 | 0.38 | 87.00 | 5094.26 | 3793.70 | 34.53 | 24.44 | -25.91 | 0.26 | -0.10 | -32.30 | 549570.07 | 1709806.12 | N 40 0 15.36 | W 80 32 9.25 |
| | 5186.00 | 1.88 | 118.02 | 5184.24 | 3883.68 | 33.10 | 23.76 | -24.31 | 1.74 | 1.67 | 34.47 | 549569.39 | 1709807.72 | N 40 0 15.35 | W 80 32 9.23 |
| | 5275.00 | 0.60 | 103.32 | 5273.22 | 3972.66 | 31.50 | 22.97 | -22.56 | 1.47 | -1.44 | -16.52 | 549568.60 | 1709809.46 | N 40 0 15.35 | W 80 32 9.21 |
| | 5365.00 | 0.41 | 228.58 | 5363.22 | 4062.66 | 31.11 | 22.65 | -22.35 | 1.00 | -0.21 | 139.18 | 549568.28 | 1709809.68 | N 40 0 15.34 | W 80 32 9.20 |
| | 5454.00 | 0.56 | 265.68 | 5452.22 | 4151.66 | 31.26 | 22.40 | -23.02 | 0.38 | 0.17 | 41.69 | 549568.04 | 1709809.00 | N 40 0 15.34 | W 80 32 9.21 |
| | 5544.00 | 0.91 | 256.18 | 5542.21 | 4241.65 | 31.70 | 22.20 | -24.15 | 0.41 | 0.39 | -10.56 | 549567.83 | 1709807.87 | N 40 0 15.34 | W 80 32 9.23 |
| Tie-In | 5633.00 | 0.60 | 190.64 | 5631.20 | 4330.64 | 31.59 | 21.57 | -24.92 | 0.96 | -0.35 | -73.64 | 549567.21 | 1709807.10 | N 40 0 15.33 | W 80 32 9.24 |
| | 5722.00 | 1.75 | 96.09 | 5720.19 | 4419.63 | 30.40 | 20.97 | -23.66 | 2.13 | 1.29 | -106.24 | 549566.60 | 1709808.36 | N 40 0 15.33 | W 80 32 9.22 |
| | 5769.00 | 6.79 | 80.57 | 5767.04 | 4466.48 | 28.86 | 21.35 | -20.20 | 10.90 | 10.72 | -33.02 | 549566.98 | 1709811.82 | N 40 0 15.33 | W 80 32 9.18 |
| | 5811.00 | 8.55 | 79.11 | 5808.67 | 4508.11 | 26.74 | 22.35 | -14.69 | 4.22 | 4.19 | -3.48 | 549567.98 | 1709817.34 | N 40 0 15.34 | W 80 32 9.11 |
| | 5856.00 | 7.82 | 74.23 | 5853.21 | 4552.65 | 24.62 | 23.81 | -8.45 | 2.24 | -1.62 | -10.84 | 549569.44 | 1709823.57 | N 40 0 15.36 | W 80 32 9.03 |
| | 5901.00 | 9.20 | 66.69 | 5897.71 | 4597.15 | 23.17 | 26.07 | -2.20 | 3.94 | 3.07 | -16.76 | 549571.70 | 1709829.82 | N 40 0 15.38 | W 80 32 8.95 |
| | 5945.00 | 10.43 | 61.07 | 5941.07 | 4640.51 | 22.35 | 29.39 | 4.51 | 3.54 | 2.80 | -12.77 | 549575.02 | 1709836.53 | N 40 0 15.41 | W 80 32 8.86 |
| | 5990.00 | 9.34 | 57.02 | 5985.40 | 4684.84 | 22.13 | 33.34 | 11.14 | 2.87 | -2.42 | -9.00 | 549578.98 | 1709843.16 | N 40 0 15.45 | W 80 32 8.78 |
| | 6035.00 | 9.56 | 56.83 | 6029.79 | 4729.23 | 22.20 | 37.38 | 17.33 | 0.49 | 0.49 | -0.42 | 549583.01 | 1709849.35 | N 40 0 15.49 | W 80 32 8.70 |
| | 6080.00 | 9.44 | 51.83 | 6074.17 | 4773.61 | 22.61 | 41.70 | 23.36 | 1.85 | -0.27 | -11.11 | 549587.33 | 1709855.38 | N 40 0 15.54 | W 80 32 8.62 |
| | 6125.00 | 11.28 | 48.74 | 6118.44 | 4817.88 | 23.64 | 46.88 | 29.57 | 4.27 | 4.09 | -6.87 | 549592.52 | 1709861.59 | N 40 0 15.59 | W 80 32 8.54 |
| | 6169.00 | 12.42 | 29.70 | 6161.52 | 4860.96 | 26.50 | 53.84 | 35.15 | 9.21 | 2.59 | -43.27 | 549599.47 | 1709867.17 | N 40 0 15.66 | W 80 32 8.47 |
| | 6214.00 | 14.71 | 13.58 | 6205.27 | 4904.71 | 32.72 | 63.60 | 38.89 | 9.78 | 5.09 | -35.82 | 549609.23 | 1709870.91 | N 40 0 15.75 | W 80 32 8.42 |
| | 6259.00 | 17.10 | 11.60 | 6248.55 | 4947.99 | 41.44 | 75.63 | 41.57 | 5.45 | 5.31 | -4.40 | 549621.26 | 1709873.59 | N 40 0 15.87 | W 80 32 8.39 |
| | 6304.00 | 19.13 | 6.75 | 6291.32 | 4990.76 | 51.90 | 89.44 | 43.76 | 5.62 | 4.51 | -10.78 | 549635.07 | 1709875.78 | N 40 0 16.01 | W 80 32 8.36 |
| | 6348.00 | 21.89 | 358.74 | 6333.53 | 5031.97 | 64.50 | 104.80 | 44.43 | 8.93 | 6.27 | -18.20 | 549650.43 | 1709876.45 | N 40 0 16.16 | W 80 32 8.36 |
| | 6393.00 | 24.82 | 350.22 | 6373.85 | 5073.29 | 80.39 | 122.51 | 42.64 | 9.92 | 6.51 | -18.93 | 549668.14 | 1709874.66 | N 40 0 16.34 | W 80 32 8.38 |
| | 6438.00 | 26.80 | 342.96 | 6414.37 | 5113.81 | 98.88 | 141.52 | 38.06 | 8.28 | 4.40 | -16.13 | 549687.15 | 1709870.08 | N 40 0 16.52 | W 80 32 8.45 |
| | 6483.00 | 28.81 | 338.89 | 6454.18 | 5153.62 | 119.29 | 161.34 | 31.18 | 6.14 | 4.47 | -9.04 | 549706.97 | 1709863.20 | N 40 0 16.72 | W 80 32 8.54 |
| | 6528.00 | 31.86 | 334.94 | 6493.02 | 5192.46 | 141.70 | 182.22 | 22.24 | 8.10 | 6.78 | -8.78 | 549727.85 | 1709854.26 | N 40 0 16.92 | W 80 32 8.65 |
| | 6573.00 | 35.06 | 332.31 | 6530.56 | 5230.00 | 166.37 | 204.43 | 11.20 | 7.81 | 7.11 | -5.84 | 549750.06 | 1709843.22 | N 40 0 17.14 | W 80 32 8.80 |
| | 6617.00 | 39.37 | 331.93 | 6565.59 | 5265.03 | 192.88 | 227.95 | -1.24 | 9.81 | 9.80 | -0.86 | 549773.57 | 1709830.78 | N 40 0 17.37 | W 80 32 8.96 |
| | 6662.00 | 42.25 | 334.39 | 6599.65 | 5299.09 | 222.14 | 254.19 | -14.50 | 7.33 | 6.40 | 5.47 | 549799.81 | 1709817.52 | N 40 0 17.63 | W 80 32 9.14 |
| | 6707.00 | 47.53 | 333.43 | 6631.52 | 5330.96 | 253.69 | 282.69 | -28.47 | 11.83 | 11.73 | -2.13 | 549828.32 | 1709803.55 | N 40 0 17.91 | W 80 32 9.32 |

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| Comments | MD (ft) | Incl (°) | Azim Grid (°) | TVD (ft) | TVDSS (ft) | VSEC (ft) | NS (ft) | EW (ft) | DLS (°/100ft) | BR (°/100ft) | TR (°/100ft) | Northing (ftUS) | Easting (ftUS) | Latitude (N/S ° ' ") | Longitude (E/W ° ' ") |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 6752.00 | 52.95 | 332.90 | 6660.29 | 5359.73 | 286.10 | 313.55 | -44.09 | 12.08 | 12.04 | -1.18 | 549859.17 | 1709767.93 | N 40 0 18.21 | W 80 32 9.53 |
| | 6797.00 | 57.87 | 332.47 | 6685.83 | 5385.27 | 324.98 | 346.45 | -61.09 | 10.96 | 10.93 | -0.96 | 549892.07 | 1709770.94 | N 40 0 18.54 | W 80 32 9.75 |
| | 6841.00 | 61.48 | 332.50 | 6708.04 | 5407.48 | 362.61 | 380.13 | -78.63 | 8.20 | 8.20 | 0.07 | 549925.75 | 1709753.40 | N 40 0 18.87 | W 80 32 9.98 |
| | 6886.00 | 65.49 | 331.24 | 6728.12 | 5427.56 | 402.95 | 415.63 | -97.62 | 9.26 | 8.91 | -2.80 | 549961.24 | 1709734.41 | N 40 0 19.22 | W 80 32 10.23 |
| | 6931.00 | 69.69 | 330.03 | 6745.20 | 5444.64 | 444.51 | 451.90 | -118.03 | 10.09 | 9.78 | -2.69 | 549997.51 | 1709713.99 | N 40 0 19.57 | W 80 32 10.50 |
| | 6976.00 | 74.99 | 329.61 | 6758.78 | 5458.22 | 487.36 | 488.97 | -139.59 | 11.37 | 11.33 | -0.93 | 550034.58 | 1709692.43 | N 40 0 19.94 | W 80 32 10.78 |
| | 7020.00 | 79.81 | 328.82 | 6768.37 | 5467.81 | 530.27 | 525.85 | -161.57 | 11.09 | 10.95 | -1.80 | 550071.46 | 1709670.46 | N 40 0 20.30 | W 80 32 11.07 |
| | 7065.00 | 84.40 | 327.23 | 6774.55 | 5473.99 | 574.83 | 563.65 | -185.17 | 10.78 | 10.20 | -3.53 | 550109.26 | 1709646.86 | N 40 0 20.67 | W 80 32 11.38 |
| | 7110.00 | 88.51 | 325.03 | 6777.33 | 5476.77 | 619.72 | 600.93 | -210.19 | 10.35 | 9.13 | -4.89 | 550146.54 | 1709621.84 | N 40 0 21.04 | W 80 32 11.70 |
| | 7155.00 | 88.82 | 324.72 | 6778.38 | 5477.82 | 664.66 | 637.72 | -236.08 | 0.97 | 0.69 | -0.69 | 550183.33 | 1709595.95 | N 40 0 21.40 | W 80 32 12.04 |
| | 7244.00 | 89.70 | 324.41 | 6779.53 | 5478.97 | 753.53 | 710.23 | -287.67 | 1.05 | 0.99 | -0.35 | 550255.83 | 1709544.36 | N 40 0 22.11 | W 80 32 12.72 |
| | 7334.00 | 90.41 | 323.44 | 6779.44 | 5478.88 | 843.36 | 782.97 | -340.67 | 1.34 | 0.79 | -1.08 | 550328.57 | 1709491.37 | N 40 0 22.82 | W 80 32 13.41 |
| | 7424.00 | 90.28 | 325.12 | 6778.90 | 5478.34 | 933.21 | 856.04 | -393.21 | 1.87 | -0.14 | 1.87 | 550401.64 | 1709438.83 | N 40 0 23.54 | W 80 32 14.09 |
| | 7513.00 | 89.58 | 323.53 | 6778.78 | 5478.22 | 1022.07 | 928.33 | -445.11 | 1.84 | -0.45 | -1.79 | 550473.93 | 1709386.93 | N 40 0 24.24 | W 80 32 14.77 |
| | 7602.00 | 89.79 | 323.53 | 6779.03 | 5478.47 | 1110.86 | 999.90 | -498.01 | 0.10 | -0.10 | 0.00 | 550545.50 | 1709334.03 | N 40 0 24.95 | W 80 32 15.46 |
| | 7692.00 | 89.70 | 325.43 | 6779.44 | 5478.88 | 1200.73 | 1073.15 | -550.30 | 2.11 | -0.10 | 2.11 | 550618.74 | 1709281.74 | N 40 0 25.66 | W 80 32 16.14 |
| | 7782.00 | 89.22 | 322.83 | 6780.26 | 5479.72 | 1290.57 | 1146.07 | -603.03 | 2.94 | -0.53 | -2.89 | 550691.66 | 1709229.02 | N 40 0 26.38 | W 80 32 16.83 |
| | 7871.00 | 89.22 | 324.94 | 6781.50 | 5480.94 | 1379.38 | 1217.96 | -655.48 | 2.37 | 0.00 | 2.37 | 550763.54 | 1709176.57 | N 40 0 27.08 | W 80 32 17.52 |
| | 7960.00 | 88.82 | 322.91 | 6783.02 | 5482.46 | 1468.19 | 1289.88 | -707.87 | 2.32 | -0.45 | -2.28 | 550835.46 | 1709124.18 | N 40 0 27.79 | W 80 32 18.20 |
| | 8050.00 | 89.70 | 322.74 | 6784.18 | 5483.62 | 1557.58 | 1361.58 | -762.25 | 1.00 | 0.98 | -0.19 | 550907.16 | 1709069.80 | N 40 0 28.49 | W 80 32 18.91 |
| | 8140.00 | 90.99 | 324.63 | 6783.64 | 5483.08 | 1647.58 | 1434.10 | -815.55 | 2.54 | 1.43 | 2.10 | 550979.67 | 1709016.51 | N 40 0 29.20 | W 80 32 19.61 |
| | 8229.00 | 91.69 | 322.65 | 6781.56 | 5481.00 | 1736.45 | 1505.75 | -868.29 | 2.36 | 0.79 | -2.22 | 551051.32 | 1708963.76 | N 40 0 29.90 | W 80 32 20.29 |
| | 8319.00 | 91.78 | 324.24 | 6778.83 | 5478.27 | 1826.18 | 1578.01 | -921.87 | 1.77 | 0.10 | 1.77 | 551123.58 | 1708910.19 | N 40 0 30.61 | W 80 32 20.99 |
| | 8408.00 | 91.69 | 324.41 | 6776.14 | 5475.58 | 1915.00 | 1650.27 | -973.75 | 0.22 | -0.10 | 0.19 | 551195.84 | 1708858.31 | N 40 0 31.32 | W 80 32 21.67 |
| | 8498.00 | 91.52 | 326.84 | 6773.62 | 5473.06 | 2004.91 | 1724.52 | -1024.54 | 2.71 | -0.19 | 2.70 | 551270.06 | 1708807.52 | N 40 0 32.05 | W 80 32 22.33 |
| | 8587.00 | 91.12 | 325.34 | 6771.57 | 5471.01 | 2093.86 | 1798.36 | -1074.18 | 1.74 | -0.45 | -1.69 | 551343.92 | 1708757.89 | N 40 0 32.77 | W 80 32 22.98 |
| | 8677.00 | 90.59 | 327.45 | 6770.22 | 5469.66 | 2183.83 | 1873.30 | -1123.98 | 2.42 | -0.59 | 2.34 | 551418.86 | 1708708.08 | N 40 0 33.50 | W 80 32 23.63 |
| | 8767.00 | 90.28 | 325.65 | 6769.54 | 5468.98 | 2273.81 | 1948.39 | -1173.59 | 2.03 | -0.34 | -2.00 | 551493.95 | 1708658.48 | N 40 0 34.24 | W 80 32 24.28 |
| | 8856.00 | 90.10 | 322.03 | 6769.24 | 5468.68 | 2362.81 | 2020.24 | -1226.09 | 4.07 | -0.20 | -4.07 | 551565.79 | 1708605.98 | N 40 0 34.94 | W 80 32 24.97 |
| | 8945.00 | 90.10 | 324.32 | 6769.09 | 5468.53 | 2451.36 | 2091.47 | -1279.43 | 2.57 | 0.00 | 2.57 | 551637.02 | 1708552.64 | N 40 0 35.64 | W 80 32 25.66 |
| | 9035.00 | 90.99 | 324.94 | 6768.23 | 5467.67 | 2541.24 | 2164.86 | -1331.53 | 1.21 | 0.99 | 0.69 | 551710.40 | 1708500.55 | N 40 0 36.36 | W 80 32 26.34 |
| | 9125.00 | 90.81 | 326.13 | 6766.82 | 5466.26 | 2631.18 | 2239.05 | -1382.45 | 1.34 | -0.20 | 1.32 | 551784.59 | 1708449.63 | N 40 0 37.09 | W 80 32 27.01 |
| | 9214.00 | 90.90 | 326.62 | 6765.49 | 5464.93 | 2720.15 | 2313.15 | -1431.73 | 0.56 | 0.10 | 0.55 | 551858.69 | 1708400.35 | N 40 0 37.82 | W 80 32 27.65 |
| | 9304.00 | 90.99 | 329.92 | 6764.01 | 5463.45 | 2810.11 | 2389.68 | -1479.05 | 3.67 | 0.10 | 3.67 | 551935.21 | 1708353.03 | N 40 0 38.57 | W 80 32 28.27 |
| | 9393.00 | 90.99 | 325.82 | 6762.47 | 5461.91 | 2899.08 | 2465.02 | -1526.36 | 4.61 | 0.00 | -4.61 | 552010.55 | 1708305.72 | N 40 0 39.31 | W 80 32 28.89 |
| | 9483.00 | 90.72 | 323.53 | 6761.12 | 5460.56 | 2988.96 | 2538.43 | -1578.39 | 2.56 | -0.30 | -2.54 | 552083.97 | 1708253.69 | N 40 0 40.03 | W 80 32 29.57 |
| | 9572.00 | 90.81 | 322.83 | 6759.94 | 5459.38 | 3077.70 | 2609.67 | -1631.73 | 0.79 | 0.10 | -0.79 | 552155.20 | 1708200.36 | N 40 0 40.72 | W 80 32 30.27 |
| | 9661.00 | 91.38 | 324.15 | 6758.24 | 5457.68 | 3166.46 | 2681.19 | -1684.67 | 1.62 | 0.64 | 1.48 | 552226.72 | 1708147.42 | N 40 0 41.42 | W 80 32 30.96 |
| | 9751.00 | 90.81 | 323.05 | 6756.52 | 5455.96 | 3256.24 | 2753.62 | -1738.06 | 1.38 | -0.63 | -1.22 | 552299.14 | 1708094.03 | N 40 0 42.13 | W 80 32 31.66 |
| | 9840.00 | 90.19 | 319.92 | 6755.74 | 5455.18 | 3344.73 | 2823.24 | -1793.48 | 3.59 | -0.70 | -3.52 | 552368.77 | 1708038.61 | N 40 0 42.81 | W 80 32 32.38 |
| | 9930.00 | 91.91 | 321.42 | 6754.09 | 5453.53 | 3434.08 | 2892.84 | -1850.51 | 2.54 | 1.91 | 1.67 | 552438.36 | 1707981.59 | N 40 0 43.50 | W 80 32 33.12 |
| | 10020.00 | 91.21 | 324.94 | 6751.64 | 5451.08 | 3523.78 | 2964.85 | -1904.41 | 3.99 | -0.78 | 3.91 | 552510.37 | 1707927.68 | N 40 0 44.20 | W 80 32 33.83 |
| | 10109.00 | 90.90 | 327.94 | 6750.00 | 5449.44 | 3612.73 | 3039.00 | -1953.60 | 3.39 | -0.35 | 3.37 | 552584.51 | 1707878.50 | N 40 0 44.93 | W 80 32 34.47 |
| Final Survey | 10213.00 | 90.72 | 327.94 | 6748.53 | 5447.97 | 3716.72 | 3127.13 | -2008.60 | 0.17 | -0.17 | 0.00 | 552672.64 | 1707823.30 | N 40 0 45.79 | W 80 32 35.19 |
| Projection to TD | 10290.00 | 90.72 | 327.94 | 6747.56 | 5447.00 | 3793.71 | 3192.36 | -2049.67 | 0.00 | 0.00 | 0.00 | 552737.89 | 1707782.44 | N 40 0 46.43 | W 80 32 35.73 |

**Survey Type:** Def Survey

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

**Survey Program:**

| Description | Part | MD From (ft) | MD To (ft) | EOU Freq (ft) | Hole Size (in) | Casing Diameter (in) | Survey Tool Type | Borehole / Survey |
|---|---|---|---|---|---|---|---|---|
| | 1 | 0.000 | 18.650 | Act Stns | 30.000 | 30.000 | SLB_NSG+MSHOT-Depth Only | Original Borehole / Noble Energy SHL13CHS Gyro+MWD 0ft to 6902ft MD |
| | 1 | 18.650 | 3196.500 | Act Stns | 30.000 | 30.000 | SLB_NSG+MSHOT | Original Borehole / Noble Energy SHL13CHS Gyro+MWD 0ft to |
| | 1 | 3196.500 | 5633.000 | Act Stns | 30.000 | 30.000 | SLB_MWD-STD | Original Borehole / Noble Energy SHL13CHS Gyro+MWD 0ft to |
| | 1 | 5633.000 | 10290.000 | Act Stns | 30.000 | 30.000 | SLB_MWD-STD | ST01 / Noble Energy SHL13CHS ST01 MWD 5812ft to 10290ft MD |

51-01655

# Noble Energy

| Borehole: | Well: | Field: | Structure: |
|---|---|---|---|
| ST01 | SHL13CHS | WV Marshall County (NAD 27) | Precision 543 |

| Gravity & Magnetic Parameters | | | | | | Surface Location | NAD27 West Virginia State Plane, Northern Zone, US Feet | | | | | Miscellaneous | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Model: | HDGM 2013 | Dip: | 67.587° | Date: | 10/5/2013 | Lat: | N 40 0 15.12 | Northing: | 549545.633ftUS | Grid Conv: | -0.661° | Slot: | SHL13CHS | TVD Ref: | KB(1300.56ft above MSL) |
| MagDec: | -8.429° | FS: | 53182.243nT | Gravity FS: | 999.451mgn (9.80665 Based) | Lon: | W 80 32 8.91 | Easting: | 1709832.021ftUS | Scale Fact: | 1 | Plan: | MWD Surveys | | |

Surface Location

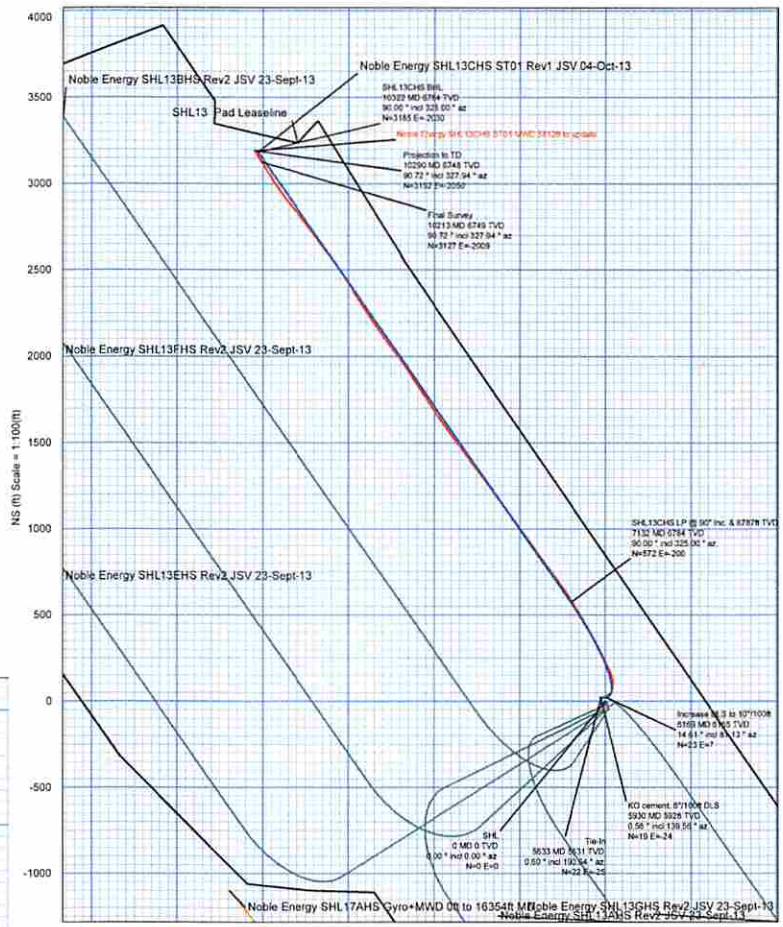
| Northing: | 549545.633 | Easting: | 1709832.021 | Latitude: | N 40 0 15.12 | Longitude: | W 80 32 8.91 | VSec Azimuth: | 327.486 |
|---|---|---|---|---|---|---|---|---|---|

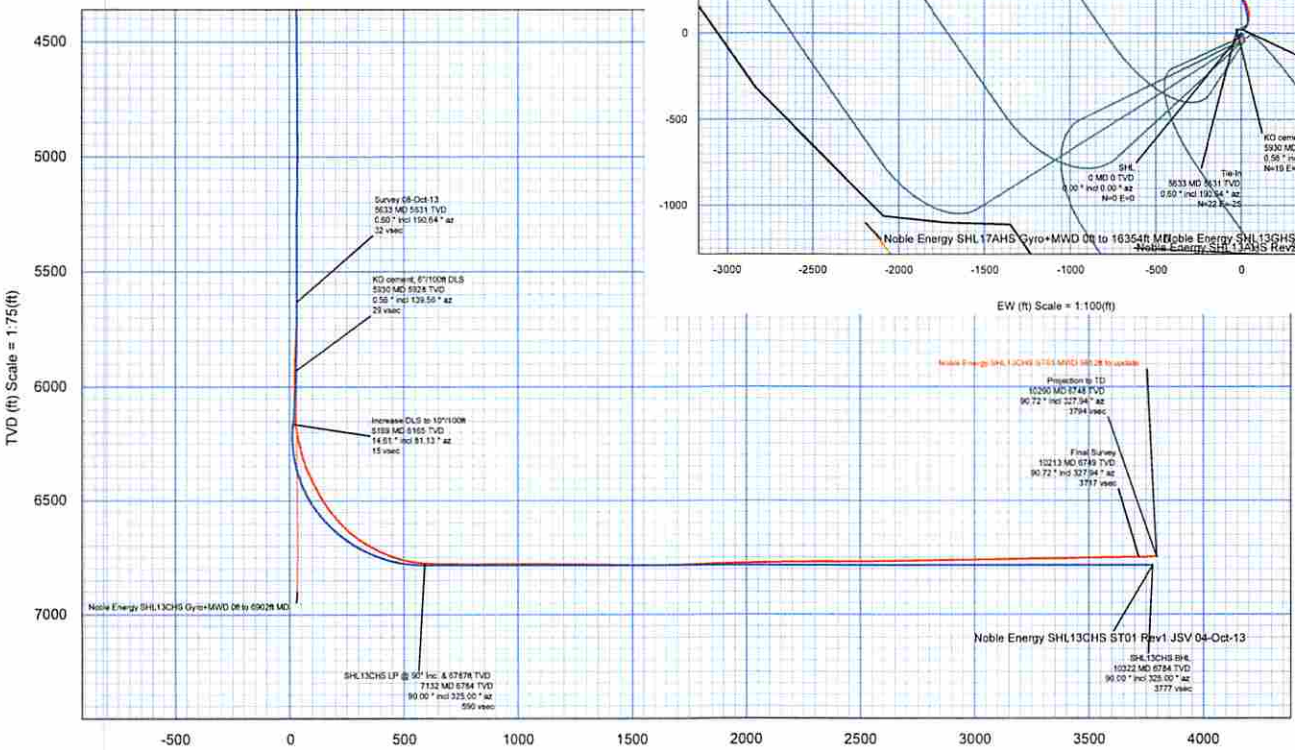
| Target Description | | | Grid Coord | | | | | | Local Coord | |
|---|---|---|---|---|---|---|---|---|---|---|
| Target Name | Shape | Dimension | Latitude | Longitude | Northing | Easting | TVD | VSec | N+/-S(-) | E+/-W(-) |
| SHL13 Pad Leaseline | Polyline | N/A | N 40 0 14.98 | W 80 32 8.85 | 549531.04 | 1709826.71 | 1300.56 | -14.83 | 11.92 | 8.88 |
| SHL13CHS BHL | Point | N/A | N 40 0 16.38 | W 80 32 26.19 | 552730.52 | 1707867.88 | 6790.56 | 3777.05 | 3185.03 | -2030.21 |
| SHL13CHS LP | Point | N/A | N 40 0 20.75 | W 80 32 11.57 | 552117.54 | 1708421.53 | 6787.00 | 590.06 | 571.43 | -200.59 |

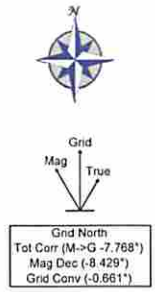
| Part# | Seq. | Survey Tool / Survey Tool Code | Vendor/Tool | Hole Size (in) | Casing Size (in) | MD From (ft) | MD To (ft) | Survey Frequency (ft) | EOU Size (Semi Major) (ft) | EOU Size (Semi Minor) (ft) | Comments/ Contingency |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | SLB_NSG+HRHOT-Depth Only | | 30 | 30 | 0 | 18.00 | Act Srvy | 1.25 | 1.25 | |
| 1 | 2 | SLB_NSG+MSHOT | | 30 | 30 | 18.00 | 3196.5 | Act Srvy | 8.63 | 3.25 | |
| 1 | 3 | SLB_MWD-STD | | 30 | 30 | 3196.5 | 5633 | Act Srvy | 8.79 | 3.53 | |
| 1 | 4 | SLB_MWD-STD | | 30 | 30 | 5633 | 10290 | Act Srvy | 104.98 | 9.4 | |

Critical Points

| Critical Point | MD | INCL | AZIM | TVD | VSEC | N+/-S(-) | E+/-W(-) | DLS |
|---|---|---|---|---|---|---|---|---|
| Tie-in | 5633.00 | 0.00 | 190.64 | 5631.20 | 21.54 | 21.37 | -24.82 | |
| Final Survey | 10213.00 | 90.72 | 327.94 | 6749.52 | 2719.72 | 3127.13 | -2009.80 | 0.17 |
| Projection to TD | 10290.00 | 90.72 | 327.94 | 6747.98 | 2793.71 | 3192.38 | -2049.67 | 0.00 |




Noble Energy SHL

47-051-01655

Well is located on topo map 13,640' feet south of Latitude: 40° 02' 30"

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

| LINE | BEARING | DISTANCE |
|---|---|---|
| L1 | S 31°59'05" W | 279.65' |
| L2 | S 62°04'24" W | 235.32' |
| L3 | N 46°29'18" W | 155.35' |

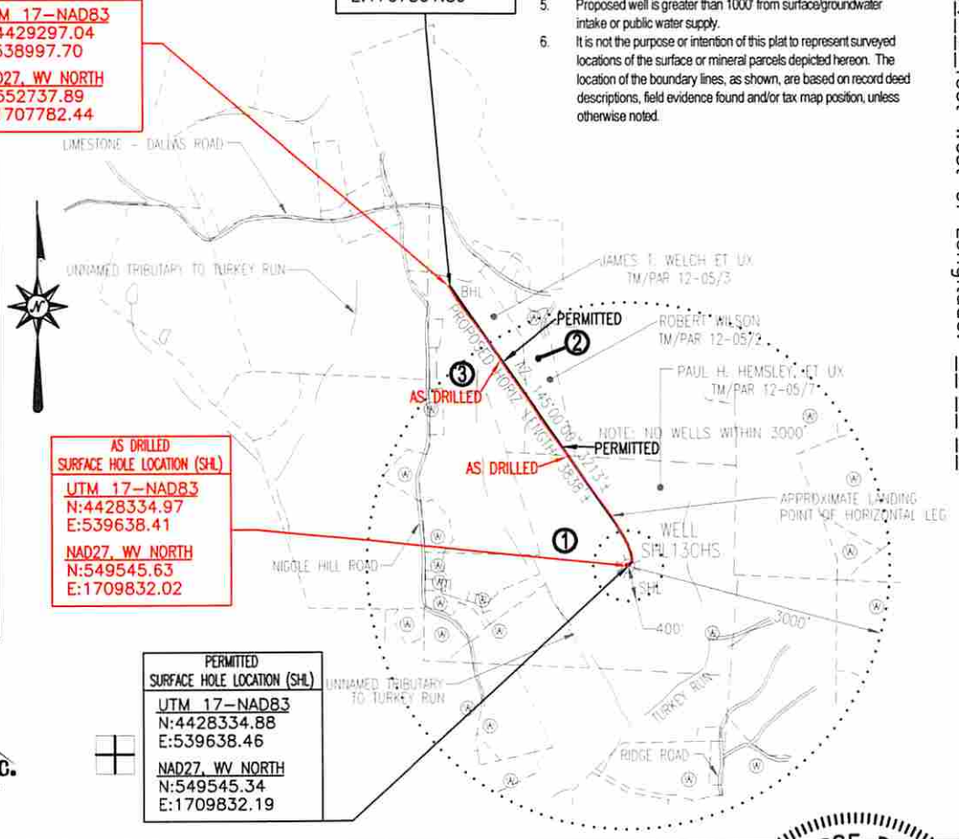
APPROX. LANDING POINT
UTM 17-NAD83
~~N:4428508.18~~
~~E:539574.41~~
NAD27, WV NORTH
~~N:550117.54~~
~~E:1709631.53~~

PERMITTED
BOTTOM HOLE LOCATION (BHL)
UTM 17-NAD83
N:4429294.90
E:539003.66
NAD27, WV NORTH
N:552730.53
E:1707801.89

AS DRILLED
BOTTOM HOLE LOCATION (BHL)
UTM 17-NAD83
N:4429297.04
E:538997.70
NAD27, WV NORTH
N:552737.89
E:1707782.44

NOTES:

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




AS DRILLED
SURFACE HOLE LOCATION (SHL)
UTM 17-NAD83
N:4428334.97
E:539638.41
NAD27, WV NORTH
N:549545.63
E:1709832.02

PERMITTED
SURFACE HOLE LOCATION (SHL)
UTM 17-NAD83
N:4428334.88
E:539638.46
NAD27, WV NORTH
N:549545.34
E:1709832.19

## LEGEND

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

WELLS WITHIN 3000'

- EXISTING WELLS
- PLUGGED WELLS


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


FILE #: SHL13CHS-AS DRILLED

DRAWING #: SHL13CHS-AS DRILLED

SCALE: 1" = 2000'

MINIMUM DEGREE OF ACCURACY: 1/2500

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

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

Signed: George D. Six

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

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

PLACE SEAL HERE

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

DATE: OCTOBER 2, 2014

OPERATOR'S WELL #: SHL13CHS-AS DRILLED

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

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

WATERSHED: TURKEY RUN ELEVATION: 1283.00'

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

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

OIL & GAS ROYALTY OWNER: SEE ATTACHED WW-6A1 ACREAGE: 172.454±

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

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

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

TARGET FORMATION: MARCELLUS ESTIMATED DEPTH: TVD: 6781'± TMD: 10,313'±

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

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

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

WR-35
Rev (9-11)

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

DATE: 9/22/2014
API #: 47-085-10083

Farm name: James T. & Mary Lou Adkins  Operator Well No.: W-1644

LOCATION: Elevation: 1010'  Quadrangle: Harrisville

District: Union  County: Ritchie
Latitude: 14490 Feet South of 39 Deg. 12 Min. 30 Sec.
Longitude 6290 Feet West of 81 Deg. 02 Min. 30 Sec.

Company: Haught Energy Corporation

| Address: 12864 Staunton Turnpike | Casing & Tubing | Used in drilling | Left in well | Cement fill up Cu. Ft. |
|---|---|---|---|---|
| Smithville, WV 26178 | 13-3/8" | 40' | 40' | |
| Agent: Warren R. Haught | 9-5/8" | 338' | 338' | Surface (120 Sks) |
| Inspector: David Cowan | 7" | 2160' | 2160' | Surface (320 Sks) |
| Date Permit Issued: December 11, 2013 | 4-1/2" | 5887' | 5887' | 2926' (250 Sks) |
| Date Well Work Commenced: 4/11/2014 | | | | |
| Date Well Work Completed: 9/17/2014 | | | | |
| Verbal Plugging: | | | | |
| Date Permission granted on: | | | | |
| Rotary ☐ Cable ☐ Rig ☑ | | | | |
| Total Vertical Depth (ft): 5,939' | | | | |
| Total Measured Depth (ft): 5,939' | | | | |
| Fresh Water Depth (ft.): 170' | | | | |
| Salt Water Depth (ft.): None | | | | |
| Is coal being mined in area (N/Y)? No | | | | |
| Coal Depths (ft.): None | | | | |
| Void(s) encountered (N/Y) Depth(s) None | | | | |

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

Producing formation Warren/Benson/Alexander  Pay zone depth (ft) 3300,4400,4950
Gas: Initial open flow show MCF/d Oil: Initial open flow - Bbl/d
Final open flow 200 MCF/d  Final open flow - Bbl/d
Time of open flow between initial and final tests 12 Hours
Static rock Pressure 1000 psig (surface pressure) after 24 Hours

Second producing formation Hamilton Shale  Pay zone depth (ft) 5600'-5880'
Gas: Initial open flow show MCF/d Oil: Initial open flow - Bbl/d
Final open flow 100 MCF/d  Final open flow - Bbl/d
Time of open flow between initial and final tests 12 Hours
Static rock Pressure 1000 psig (surface pressure) after 24 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.

Warren R. Haught
Signature

9/29/14
Date

RECEIVED
Office of Oil and Gas
OCT 01 2014
WV Department of
Environmental Protection

85-10083

Were core samples taken? Yes_____ No X

Were cuttings caught during drilling? Yes_____ No X

Were Electrical, Mechanical or Geophysical logs recorded on this well? If yes, please list Gamma Ray, Neutron, Density, Induction, Temp., Audio

**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:

Perforated by Superior Well Services 4/28/2014

Perforations at: 3210' - 3340' ; 3469' - 3500' ; 4456' - 4486'; 4952' - 4960'; 5608' - 5761'; 5865' - 5875'

Fractured by Universal Well Services 04/28/2014

3 Stage Nitrogen Frac totaling 2,400,000 cubic feet

Plug Back Details Including Plug Type and Depth(s): NA

Formations Encountered: Top Depth / Bottom Depth

Surface:

See attached worksheet

Spruce Grove W-1644
API # 47-085-10083

85-10083

| Formation | Top | Bottom | Remarks |
|---|---|---|---|
| | | | |
| Red Rock & Shale | 0 | 592 | |
| Sand | 592 | 627 | |
| Red Rock | 627 | 707 | |
| Sand | 707 | 727 | |
| Red Rock | 727 | 792 | |
| Slate | 792 | 907 | |
| Dunkard Sand | 907 | 1027 | |
| Slate & Shells | 1027 | 1252 | |
| Gas Sand | 1252 | 1367 | |
| Slate | 1367 | 1427 | |
| 1st Salt Sand | 1427 | 1488 | |
| Shale | 1488 | 1528 | |
| 2nd Salt Sand | 1528 | 1546 | |
| Shale | 1546 | 1572 | |
| 3rd Salt Sand | 1572 | 1687 | |
| Slate | 1687 | 1772 | |
| Maxon Sand | 1772 | 1807 | |
| Shale | 1807 | 1882 | |
| Little lime | 1882 | 1904 | |
| Pencil Cave | 1904 | 1916 | |
| Big Lime | 1916 | 2014 | |
| Big Injun Sand | 2014 | 2062 | |
| Slate Break | 2062 | 2067 | |
| Squaw Sand | 2067 | 2075 | |
| Slate & Shells | 2075 | 2426 | |
| Berea Sand | 2426 | 2452 | |
| Slate & Shells | 2452 | 2800 | |
| Gordon | 2800 | 2826 | |
| Slate & Shells | 2826 | 4457 | |
| Riliey | 4457 | 4482 | |
| Slate & Shells | 4482 | 4654 | |
| Benson Sand | 4654 | 4658 | |
| Slate & Shells | 4658 | 4948 | |
| Alexander Sand | 4948 | 4962 | |
| Slate & Shells | 4962 | 5584 | |
| Hamilton Shale | 5584 | 5620 | |
| Slate & Shells | 5620 | 5660 | |
| Elk | 5660 | 5728 | |
| Slate & Shells | 5728 | 5939 | |
| TD | 5939 | | |
| | | | |

WR-35
Rev (9-11)

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

DATE: 9/22/2014
API #: 47-085-10084

Farm name: James T. & Mary Lou Adkins  Operator Well No.: W-1645

LOCATION: Elevation: 1064'  Quadrangle: Harrisville

District: Union  County: Ritchie
Latitude: 14430 Feet South of 39 Deg. 12 Min. 30 Sec.
Longitude 4870 Feet West of 81 Deg. 02 Min. 30 Sec.

Company: Haught Energy Corporation

| Address: 12864 Staunton Turnpike | Casing & Tubing | Used in drilling | Left in well | Cement fill up Cu. Ft. |
|---|---|---|---|---|
| Smithville, WV 26178 | 13-3/8" | 40' | 40' | |
| Agent: Warren R. Haught | 9-5/8" | 336' | 336' | Surface (120 Sks) |
| Inspector: David Cowan | 7" | 2154' | 2154' | Surface (300 Sks) |
| Date Permit Issued: December 11, 2013 | 4-1/2" | 6088' | 6088' | 2000' (136 Sks) |
| Date Well Work Commenced: 3/24/2014 | | | | |
| Date Well Work Completed: 9/17/2014 | | | | |
| Verbal Plugging: | | | | |
| Date Permission granted on: | | | | |
| Rotary ☐ Cable ☐ Rig ☑ | | | | |
| Total Vertical Depth (ft): 6,115' | | | | |
| Total Measured Depth (ft): 6,158' | | | | |
| Fresh Water Depth (ft.): 175' | | | | |
| Salt Water Depth (ft.): None | | | | |
| Is coal being mined in area (N/Y)? No | | | | |
| Coal Depths (ft.): None | | | | |
| Void(s) encountered (N/Y) Depth(s) None | | | | |

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

Producing formation Benson/Alexander  Pay zone depth (ft) 4400,4950
Gas: Initial open flow show MCF/d Oil: Initial open flow - Bbl/d
Final open flow 300 MCF/d Final open flow - Bbl/d
Time of open flow between initial and final tests 12 Hours
Static rock Pressure 1000 psig (surface pressure) after 24 Hours

Second producing formation Hamilton Shale  Pay zone depth (ft) 5600'-5880'
Gas: Initial open flow show MCF/d Oil: Initial open flow - Bbl/d
Final open flow 300 MCF/d Final open flow - Bbl/d
Time of open flow between initial and final tests 12 Hours
Static rock Pressure 1000 psig (surface pressure) after 24 Hours

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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.

Warren R. Haught  9/29/2014
Signature  Date

85-10084

Were core samples taken? Yes_____ No X

Were cuttings caught during drilling? Yes_____ No X

Were Electrical, Mechanical or Geophysical logs recorded on this well? If yes, please list Gamma Ray, Neutron, Density, Induction, Temp., Audio

**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:

Perforated by Superior Well Services 4/8/2014

Perforations at: 4530' - 4550'; 4690' - 4730'; 5690' - 5814'; 5860' - 5962'

Fractured by Universal Well Services 04/9/2014

3 Stage Nitrogen Frac totaling 2,400,000 cubic feet

Plug Back Details Including Plug Type and Depth(s): NA

Formations Encountered: Top Depth / Bottom Depth

Surface:

See attached worksheet

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Spruce Grove W-1645
API # 47-085-10084

| Formation | Top | Bottom | Remarks |
|---|---|---|---|
| | | | |
| Red Rock & Shale | 0 | 642 | |
| Sand | 642 | 677 | |
| Red Rock | 627 | 757 | |
| Sand | 757 | 777 | |
| Red Rock | 777 | 842 | |
| Slate | 842 | 957 | |
| Dunkard Sand | 957 | 1077 | |
| Slate & Shells | 1077 | 1302 | |
| Gas Sand | 1302 | 1417 | |
| Slate | 1417 | 1477 | |
| 1st Salt Sand | 1477 | 1538 | |
| Shale | 1538 | 1578 | |
| 2nd Salt Sand | 1578 | 1596 | |
| Shale | 1596 | 1622 | |
| 3rd Salt Sand | 1622 | 1737 | |
| Slate | 1737 | 1822 | |
| Maxon Sand | 1822 | 1857 | |
| Shale | 1857 | 1932 | |
| Little lime | 1932 | 1954 | |
| Pencil Cave | 1954 | 1966 | |
| Big Lime | 1966 | 2064 | |
| Big Injun Sand | 2064 | 2112 | |
| Slate Break | 2112 | 2117 | |
| Squaw Sand | 2117 | 2125 | |
| Slate & Shells | 2125 | 2850 | |
| Gordon | 2878 | 2896 | |
| Slate & Shells | 2896 | 4530 | |
| Riley | 4530 | 4550 | |
| Slate & Shells | 4550 | 4687 | |
| Benson Sand | 4687 | 4700 | |
| Slate & Shells | 4700 | 5020 | |
| Alexander Sand | 5020 | 5038 | |
| Slate & Shells | 5038 | 5665 | |
| Hamilton Shale | 5665 | 5704 | |
| Slate & Shells | 5704 | 5740 | |
| Elk | 5740 | 5812 | |
| Slate & Shells | 5812 | 6158 | |
| TD | 6158 | | |
| | | | |

WR-35
Rev (9-11)

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

DATE: 09/29/2014
API #: 47-085-10091

Farm name: Ira M. Haught  Operator Well No.: W-1647

LOCATION: Elevation: 1133'  Quadrangle: Harrisville

District: Union  County: Ritchie
Latitude: 6520 Feet South of 39 Deg. 12 Min. 30 Sec.
Longitude 1360 Feet West of 81 Deg. 02 Min. 30 Sec.

Company: Haught Energy Corporation

| Address: 12864 Staunton Turnpike | Casing & Tubing | Used in drilling | Left in well | Cement fill up Cu. Ft. |
|---|---|---|---|---|
| Smithville, WV 26178 | 13-3/8" | 40' | 40' | |
| Agent: Warren R. Haught | 9-5/8" | 338' | 338' | Surface (205 Sks) |
| Inspector: David Cowan | 7" | 2240' | 2240' | Surface (306 Sks) |
| Date Permit Issued: April 10, 2014 | 4-1/2" | 6289.5' | 6289.5' | 3000' (175 Sks) |
| Date Well Work Commenced: 06/04/2014 | | | | |
| Date Well Work Completed: 9/15/2014 | | | | |
| Verbal Plugging: | | | | |
| Date Permission granted on: | | | | |
| Rotary ☐ Cable ☐ Rig ☑ | | | | |
| Total Vertical Depth (ft): 6,290' | | | | |
| Total Measured Depth (ft): 6,305' | | | | |
| Fresh Water Depth (ft.): 75' | | | | |
| Salt Water Depth (ft.): None | | | | |
| Is coal being mined in area (N/Y)? No | | | | |
| Coal Depths (ft.): None | | | | |
| Void(s) encountered (N/Y) Depth(s) None | | | | |

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

Producing formation Benson/Alexander  Pay zone depth (ft) 4600', 5170'
Gas: Initial open flow show MCF/d Oil: Initial open flow - Bbl/d
Final open flow 200 MCF/d Final open flow - Bbl/d
Time of open flow between initial and final tests 12 Hours
Static rock Pressure 900 psig (surface pressure) after 24 Hours

Second producing formation Hamilton Shale  Pay zone depth (ft) 5750'
Gas: Initial open flow show MCF/d Oil: Initial open flow - Bbl/d
Final open flow 200 MCF/d Final open flow - Bbl/d
Time of open flow between initial and final tests 12 Hours
Static rock Pressure 900 psig (surface pressure) after 24 Hours

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Warren R. Haught  9/29/14
Signature  Date

85-10091

Were core samples taken? Yes_____ No X  Were cuttings caught during drilling? Yes_____ No X

Were Electrical, Mechanical or Geophysical logs recorded on this well? If yes, please list Gamma Ray, Neutron, Density, Induction, Temp., Audio

**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:

Perforated by Superior Well Services 7/01/2014

Perforations at: 4599' - 4619' ; 5175' - 5774' ; 5814' - 6032'

Fractured by Universal Well Services 7/02/2014

3 Stage Nitrogen Frac totaling 2,450,000 cubic feet

Plug Back Details Including Plug Type and Depth(s): NA

Formations Encountered: Top Depth / Bottom Depth

Surface:

See attached worksheet

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IMH W-1647

API # 47-085-10091

| Formation | Top | Bottom | Remarks |
|---|---|---|---|
| | | | |
| Red Rock & Shale | 0 | 712 | |
| Sand | 712 | 747 | |
| Red Rock | 747 | 827 | |
| Sand | 827 | 847 | |
| Red Rock | 847 | 912 | |
| Slate | 912 | 1027 | |
| Dunkard Sand | 1027 | 1147 | |
| Slate & Shells | 1147 | 1372 | |
| Gas Sand | 1372 | 1487 | |
| Slate | 1487 | 1547 | |
| 1st Salt Sand | 1547 | 1608 | |
| Shale | 1608 | 1648 | |
| 2nd Salt Sand | 1648 | 1666 | |
| Shale | 1666 | 1692 | |
| 3rd Salt Sand | 1692 | 1807 | |
| Slate | 1807 | 1892 | |
| Maxon Sand | 1892 | 1927 | |
| Shale | 1927 | 2002 | |
| Little lime | 2002 | 2024 | |
| Pencil Cave | 2024 | 2036 | |
| Big Lime | 2036 | 2134 | |
| Big Injun Sand | 2134 | 2182 | |
| Slate Break | 2182 | 2187 | |
| Squaw Sand | 2187 | 2195 | |
| Slate & Shells | 2195 | 2944 | |
| Gordon | 2944 | 2952 | |
| Slate & Shells | 2952 | 4592 | |
| Riley | 4592 | 4620 | |
| Slate & Shells | 4620 | 4760 | |
| Benson Sand | 4760 | 4773 | |
| Slate & Shells | 4773 | 5100 | |
| Alexander Sand | 5100 | 5111 | |
| Slate & Shells | 5111 | 5736 | |
| Hamilton Shale | 5736 | 5778 | |
| Slate & Shells | 5778 | 5822 | |
| Elk | 5822 | 5915 | |
| Slate & Shells | 5915 | 6210 | |
| Marcellus | 6210 | 6280 | |
| Onandoga lime | 6280 | 6290 | |
| TD | 6290 | | |
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WR-35
Rev (9-11)

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

DATE: 09/25/2014
API #: 47-095-02118

Farm name: Leo M. & Nancy M. Schumacher  Operator Well No.: W-1640

LOCATION: Elevation: 912'  Quadrangle: Center Point

District: McElroy  County: Tyler
Latitude: 5960 Feet South of 39 Deg. 30 Min. 00 Sec.
Longitude 6750 Feet West of 80 Deg. 42 Min. 30 Sec.

Company: Montani Energy LLC.

| Address: 12864 Staunton Turnpike | Casing & Tubing | Used in drilling | Left in well | Cement fill up Cu. Ft. |
|---|---|---|---|---|
| Smithville, WV 26178 | | | | |
| Agent: Brian G. Haught | 9-5/8" | 41' | 41' | Grouted In |
| Inspector: Joe Taylor / Mike Goff | 7" | 885.5' | 885.5' | To Surface |
| Date Permit Issued: July 10, 2013 | 4-1/2" | 3096' | 3096' | 1500' Fill Up(95 SKS) |
| Date Well Work Commenced: 11/12/2013 | | | | |
| Date Well Work Completed: 05/11/2014 | | | | |
| Verbal Plugging: | | | | |
| Date Permission granted on: | | | | |
| Rotary ☐ Cable ☐ Rig ☑ | | | | |
| Total Vertical Depth (ft): 3200' | | | | |
| Total Measured Depth (ft): 3200' | | | | |
| Fresh Water Depth (ft.): N/A | | | | |
| Salt Water Depth (ft.): N/A | | | | |
| Is coal being mined in area (N/Y)? No | | | | |
| Coal Depths (ft.): None | | | | |
| Void(s) encountered (N/Y) Depth(s) None | | | | |

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

Producing formation Gordon  Pay zone depth (ft) 2661' - 2716'
Gas: Initial open flow show MCF/d Oil: Initial open flow - Bbl/d
Final open flow 50 MCF/d Final open flow - Bbl/d
Time of open flow between initial and final tests 72 Hours
Static rock Pressure 200 psig (surface pressure) after 12 Hours

Second producing formation Fifth Sand  Pay zone depth (ft) 2866'-2896'
Gas: Initial open flow show MCF/d Oil: Initial open flow - Bbl/d
Final open flow 50 MCF/d Final open flow - Bbl/d
Time of open flow between initial and final tests 72 Hours
Static rock Pressure 200 psig (surface pressure) after 12 Hours

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

Signature  Date 10/3/14

95-02118

Were core samples taken? Yes_____ No X  Were cuttings caught during drilling? Yes_____ No X

Were Electrical, Mechanical or Geophysical logs recorded on this well? If yes, please list Gamma Ray, Neutron, Density, Induction, Temp., Audio

**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:

Perforated by Nabors Well Services - 21 Perfs from 2661' - 2716' & 16 Perfs from 2886' -2896'

Fractured by Universal Well Services - 146 Bbl's water with 600,000 SCF Nitrogen creating 80 quality foam

Plug Back Details Including Plug Type and Depth(s):

Formations Encountered: Top Depth / Bottom Depth

Surface:

See attached worksheet

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Schumacher W-1640
API # 47-095-02118

| Formation | Top | Bottom | Remarks |
|---|---|---|---|
| | | | |
| Red Rock & Shale | 0 | 252 | |
| Sand | 252 | 273 | |
| Red Rock | 273 | 605 | |
| Sand | 605 | 631 | |
| Red Rock | 631 | 739 | |
| Slate | 739 | 897 | |
| Dunkard Sand | 897 | 918 | |
| Slate & Shells | 918 | 1163 | |
| Gas Sand | 1163 | 1175 | |
| Slate | 1175 | 1239 | |
| Sand | 1239 | 1259 | |
| Shale | 1259 | 1367 | |
| Sand | 1367 | 1389 | |
| Shale | 1389 | 1467 | |
| Sand | 1467 | 1551 | |
| Slate | 1551 | 1647 | |
| Sand | 1647 | 1669 | |
| Shale | 1669 | 1772 | |
| Maxton | 1772 | 1787 | |
| Slate & Shells | 1787 | 1817 | |
| Big Lime | 1817 | 1943 | |
| Big Injun Sand | 1943 | 2095 | |
| Slate Break | 2095 | 2109 | |
| Slate & Shells | 2109 | 2454 | |
| Gantz | 2454 | 2464 | |
| Slate & Shells | 2464 | 2667 | |
| Gordon Stray | 2670 | 2687 | |
| Slate & Shells | 2687 | 2704 | |
| Gordon | 2704 | 2720 | |
| Slate & Shells | 2720 | 2886 | |
| Fifth Sand | 2886 | 2896 | |
| Slate & Shells | 2896 | 3200 | |
| TD | 3200 | | |

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