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**west virginia** department of environmental protection

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Office of Oil and Gas  
601 57th Street SE  
Charleston, WV 25304  
(304) 926-0450  
(304) 926-0452 fax

Earl Ray Tomblin, Governor  
Randy C. Huffman, Cabinet Secretary  
[www.dep.wv.gov](http://www.dep.wv.gov)

November 15, 2013

**WELL WORK PERMIT**

**Horizontal 6A Well**

This permit, API Well Number: 47-10302936, issued to DAC ENERGY, LLC, is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to all conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas inspector.

Please be advised that form WR-35, Well Operators Report of Well Work is to be submitted to this office within 90 days completion of permitted well work, as should form WR-34 Discharge Monitoring Report within 30 days of discharge of pits, if applicable. Failure to abide by all statutory and regulatory provisions governing all duties and operations hereunder may result in suspension or revocation of this permit and, in addition, may result in civil and/or criminal penalties being imposed upon the operators.

In addition to the applicable requirements of this permit, and the statutes and rules governing oil and gas activity in WV, this permit may contain specific conditions which must be followed. Permit conditions are attached to this cover letter.

Per 35CSR-4-5.2.g this permit will expire in two (2) years from the issue date unless permitted well work is commenced. If there are any questions, please feel free to contact me at (304) 926-0499 ext. 1654.



James Martin  
Chief

Operator's Well No: SHUMAN HAYNES 1H  
Farm Name: HAYNES, SHUMAN

**API Well Number: 47-10302936**

**Permit Type: Horizontal 6A Well**

Date Issued: 11/15/2013

**Promoting a healthy environment.**

## PERMIT CONDITIONS

West Virginia Code § 22-6A-8(d) allows the Office of Oil and Gas to place specific conditions upon this permit. Permit conditions have the same effect as law. Failure to adhere to the specified permit conditions may result in enforcement action.

### CONDITIONS

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1. This proposed activity may require permit coverage from the United States Army Corps of Engineers (USACOE). Through this permit, you are hereby being advised to consult with USACOE regarding this proposed activity.
2. If the operator encounters an unanticipated void, or an anticipated void at an unanticipated depth, the operator shall notify the inspector within 24 hours. Modifications to the casing program may be necessary to comply with W. Va. Code § 22-6A-5a (12), which requires drilling to a minimum depth of thirty feet below the bottom of the void, and installing a minimum of twenty (20) feet of casing. Under no circumstance should the operator drill more than fifty (50) feet below the bottom of the void or install less than twenty (20) feet of casing below the bottom of the void.
3. When compacting fills, each lift before compaction shall not be more than 12 inches in height, and the moisture content of the fill material shall be within limits as determined by the Standard Proctor Density test of the actual soils used in specific engineered fill, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort, to achieve 95 % compaction of the optimum density. Each lift shall be tested for compaction, with a minimum of two tests per lift per acre of fill. All test results shall be maintained on site and available for review.
4. Operator shall install signage per § 22-6A-8g (6) (B) at all source water locations included in their approved water management plan within 24 hours of water management plan activation.
5. Oil and gas water supply wells will be registered with the Office of Oil and Gas and all such wells will be constructed and plugged in accordance with the standards of the Bureau for Public Health set forth in its Legislative rule entitled *Water Well Regulations*, 64 C.S.R. 19. Operator is to contact the Bureau of Public Health regarding permit requirements. In lieu of plugging, the operator may transfer the well to the surface owner upon agreement of the parties. All drinking water wells within fifteen hundred feet of the water supply well shall be flow tested by the operator upon request of the drinking well owner prior to operating the water supply well.
6. Pursuant to the requirements pertaining to the sampling of domestic water supply wells/springs the operator shall, no later than thirty (30) days after receipt of analytical data provide a written copy to the Chief and any of the users who may have requested such analyses.
7. If any explosion or other accident causing loss of life or serious personal injury occurs in or about a well or well work on a well, the well operator or its contractor shall give notice, stating the particulars of the explosion or accident, to the oil and gas inspector and the Chief, within 24 hours of said accident.
8. During the casing and cementing process, in the event cement does not return to the surface, the oil and gas inspector shall be notified within 24 hours.

WW-6B  
(9/13)

STATE OF WEST VIRGINIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS  
WELL WORK PERMIT APPLICATION

1) Well Operator: DAC Energy, LLC.

<u>494496257</u>	<u>Wetzel</u>	<u>Center</u>	<u>Pine Grove 7.5'</u>
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Operator ID County District Quadrangle

2) Operator's Well Number: Shuman Haynes 1H Well Pad Name: Shuman Haynes

3) Farm Name/Surface Owner: Shuman Haynes Public Road Access: State Route 7

4) Elevation, current ground: 837' Elevation, proposed post-construction: 842'

5) Well Type (a) Gas  Oil  Underground Storage

Other \_\_\_\_\_

(b) If Gas Shallow  Deep

Horizontal

6) Existing Pad: Yes or No No *DMH 9-23-13*

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Associated Pressure(s):  
Formation: Marcellus Shale Depths: 6824'-6874' Anticipated Thickness: Approx. 50' Associate Pressures: Approx. 4000 psi

8) Proposed Total Vertical Depth: 6974' TVD

9) Formation at Total Vertical Depth: Onondaga

10) Proposed Total Measured Depth: 14,500' TMD

11) Proposed Horizontal Leg Length: 6734'

12) Approximate Fresh Water Strata Depths: 75'

13) Method to Determine Fresh Water Depths: Landowner Water Wells (2)

14) Approximate Saltwater Depths: 1502'

15) Approximate Coal Seam Depths: 695'

16) Approximate Depth to Possible Coal Seam Depths: 695'

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes  No

(a) If Yes, provide Mine Info: Name: \_\_\_\_\_  
Depth: \_\_\_\_\_  
Seam: \_\_\_\_\_  
Owner: \_\_\_\_\_

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18)

**CASING AND TUBING PROGRAM**

<b>TYPE</b>	<b>Size</b>	<b>New or Used</b>	<b>Grade</b>	<b>Weight per ft. (lb/ft)</b>	<b>FOOTAGE: For Drilling</b>	<b>INTERVALS: Left in Well</b>	<b>CEMENT: Fill-up (Cu. Ft.)</b>
Conductor	26"	New	N/A	85	40'	40'	CTS
Fresh Water	16"	New	A-252	58	300'	300'	CTS
Coal	11 3/4"	New	AT-50	42	1,140'	1,140'	CTS
Intermediate	8 5/8"	New	J-55	32	2,212'	2,212'	CTS
Production	5 1/2"	New	P-110	20	14,500'	14,500'	CTS
Tubing							
Liners							

DMH 9-23-13

<b>TYPE</b>	<b>Size</b>	<b>Wellbore Diameter</b>	<b>Wall Thickness</b>	<b>Burst Pressure</b>	<b>Cement Type</b>	<b>Cement Yield (cu. ft./k)</b>
Conductor	26"	30"	.312	N/A	N/A	N/A
Fresh Water	16"	20"	.312	1,360	Class A	1.21
Coal	11 3/4"	14 3/4"	.333	2,480	Class A	1.21
Intermediate	8 5/8"	10 5/8"	.352	3,430	Class A	1.19
Production	5 1/2"	7 7/8"	.361	12,640	Class A/H	1.43/2.43
Tubing						
Liners						

**PACKERS**

Kind:				
Sizes:				
Depths Set:				

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(9/13)

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19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

Drill pilot hole to no more than 99' into the Onondaga, log, plug back to kick off point using 2 balanced cement plugs made up of Class H Cement creating a solid cement plug from T.D. of the vertical hole section to the kickoff point of the horizontal Marcellus well (see additives of cement in section 24). Drill a horizontal Marcellus Shale well, run P-110 production casing, cement, perforate, stimulate, and produce a horizontal Marcellus shale well.

20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:

Hydraulically fracture/stimulate the Marcellus Shale by perforating, slickwater fracturing/stimulating, plugging, starting at the bottom hole section and working back towards the curve. The job should consist of approximately 16-20 stages with a spacing of 350'-400' between each stage section.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 6.45

22) Area to be disturbed for well pad only, less access road (acres): 4.60

23) Describe centralizer placement for each casing string:

Conductor:	None Used	
Freshwater:	Every third joint and top 2 joints	Coal: Every third joint and top 2 joints
Intermediate:	Every third joint and top 2 joints	
Production:	Every third joint in the horizontal section through the top of the curve; Every 5th joint from the top of the curve to surface.	

24) Describe all cement additives associated with each cement type:

\*see attached sheet\*

25) Proposed borehole conditioning procedures:

Freshwater: Circulate Air/Foam at T.D. of hole section for 1/2 hour to 1 hour or until hole is clean.  
 Coal: Circulate Air/Foam at T.D. of hole section for 1/2 hour to 1 hour or until hole is clean.  
 Intermediate: Circulate Air/Foam at T.D. of hole section for 1/2 hour to 1 hour or until hole is clean.  
 Production: Circulate drilling fluid through the drill string for 1 to 10 hours or until shaker screens are clear and drill string can be pulled freely.

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\*Note: Attach additional sheets as needed.

SEP 24 2013

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WV Department of  
Environmental Protection

## Cement & Fracturing/Stimulation Additives

### Cement:

#### Surface:

- ✓ • 15.6 ppg Class A
- Accelerator
- Flake LCM

#### Intermediate:

- 15.6 ppg Class A
- Gas Migration Additive
- Friction Reducer
- Defoamer
- Flake LCM

#### KOP:

- 17.5 ppg Class H
- Friction Reducer
- Defoamer
- Cement Retarder Additive

#### Production:

- **Lead** → 14.2 Class A/ Pozzolan Cement
- Gel
- Fluid Loss Additive
- Cement Retarder Additive

- **Tail** → 15.2 Class H
- Acid Solubility Aid
- Clay Control
- Fluid Loss Additive
- Defoamer
- Suspending Agent
- Cement Retarder Additive

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9-23-13

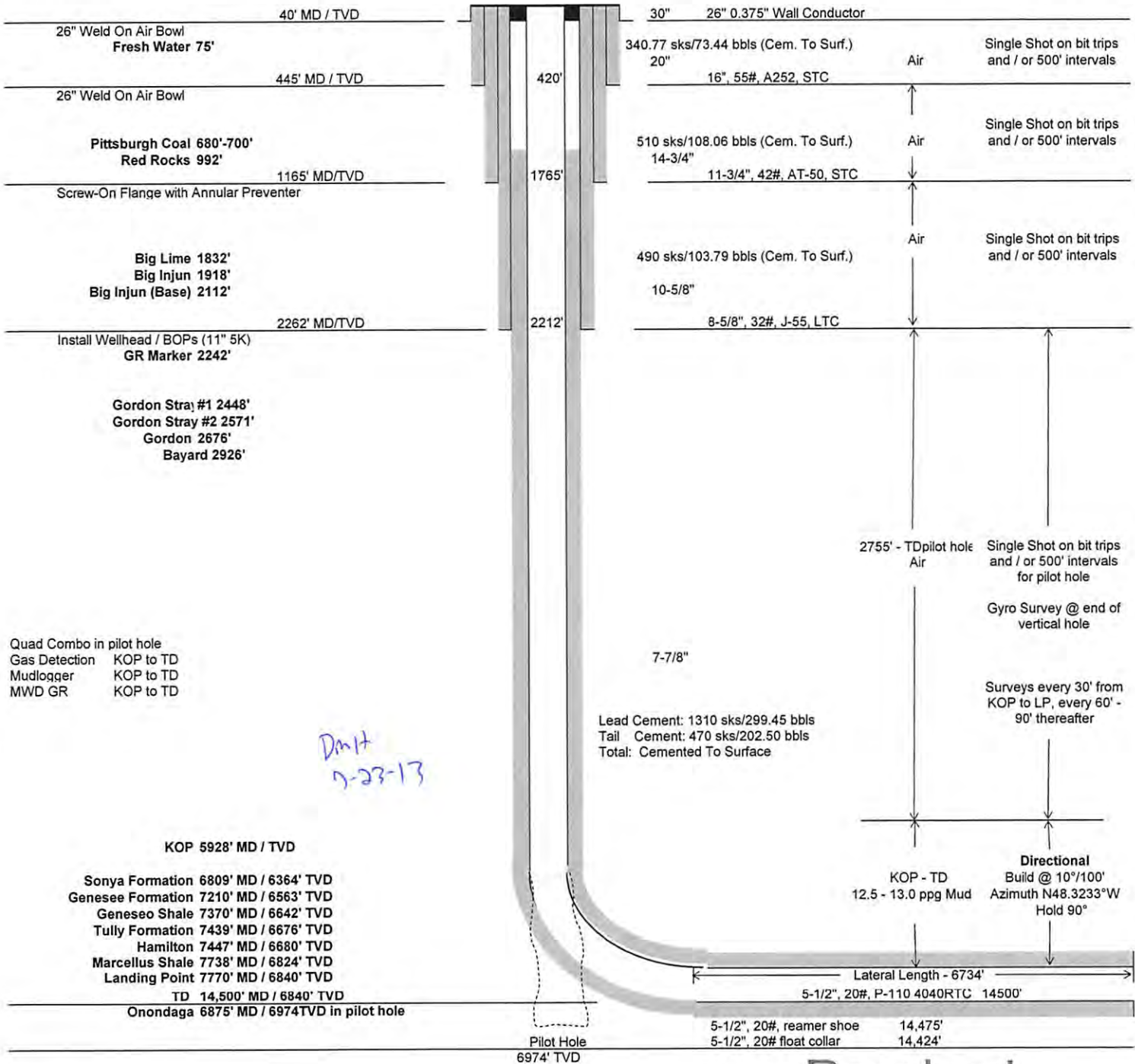
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## Shuman Haynes 1H Well Schematic

Well: Shuman Haynes Unit 1H  
 Well Type: Horizontal  
 County / District: Wetzel County, West Virginia, Center District  
 Geo Datum: NAD 27  
 Permit Landing Point Lat/Lon: Lat: 39.623719; Lon: 80.65535  
 Permitted Penetration Pt: Lat: 39.622397; Lon: 80.6538  
 Permitted TMD/TD Lat/Lon: Lat: 39.637417; Lon: 80.671408  
 TD: 14,500' MD / 6974' TVD

AFE #  
 Field: Marcellus Shale  
 API Well Number: 47-103-00000  
 GL (ft): 842'  
 KB to GL (ft): 10'-20'  
 Objectives: Drill, Eval, Run Prod Csg on Marcellus Shale

Evaluation Program	Geology (ft, TVD)	Actual Casing Depths	Drill Depth (ft, TVD)	Hole Size	Casing and Cement	Mud	Directional & Surveys Drig / Csg Point
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STATE OF WEST VIRGINIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
OFFICE OF OIL AND GAS

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name D.A.C. Energy, LLC. OP Code 494496257

Watershed (HUC 10) Little Fishing Creek Quadrangle Pine Grove 7.5'

Elevation 842' County Wetzel District Center

Do you anticipate using more than 5,000 bbls of water to complete the proposed well work? Yes  No

Will a pit be used for drill cuttings? Yes  No

If so, please describe anticipated pit waste: \_\_\_\_\_

Will a synthetic liner be used in the pit? Yes  No  If so, what ml.? \_\_\_\_\_

Proposed Disposal Method For Treated Pit Wastes:

- Land Application
- Underground Injection ( UIC Permit Number 3416727401; 3416727958; 3400922704; see attached )
- Reuse (at API Number \_\_\_\_\_)
- Off Site Disposal (Supply form WW-9 for disposal location)
- Other (Explain \_\_\_\_\_)

Will closed loop system be used? Yes

Drilling medium anticipated for this well? Air, freshwater, oil based, etc. Air, Freshwater, Oil Based

-If oil based, what type? Synthetic, petroleum, etc. Synthetic Oil Based

Additives to be used in drilling medium? Synvert L1; Synvert L2; Synvert Wa; Synvert Lem1; Synvert Tw; Synvert Clay; Synvert Base Fluid; Bante; Nutshell; Calcium Chloride; Calcium Carbonate; Lime; Lo-20; Gilsonite

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. Landfill

-If left in pit and plan to solidify what medium will be used? (cement, lime, sawdust) N/A

-Landfill or offsite name/permit number? Wetzel County Landfill

I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on August 1, 2005, by the Office of Oil and Gas of the West Virginia Department of Environmental Protection. I understand that the provisions of the permit are enforceable by law. Violations of any term or condition of the general permit and/or other applicable law or regulation can lead to enforcement action.

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this application form and all attachments thereto 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. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

Company Official Signature *Kenneth Mason*

Company Official (Typed Name) Kenneth Mason

Company Official Title President of Drilling Appalachian Corp, Its: Member

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Subscribed and sworn before me this 23<sup>rd</sup> day of July, 202013

*Dani Morris* Notary Public

Office of Oil and Gas  
WV Dept. of Environmental Protection

My commission expires April 6, 2015

Dmit  
7-23-13



Form WW-9

Operator's Well No. \_\_\_\_\_

**DAC Energy**

Proposed Revegetation Treatment: Acres Disturbed \_\_\_\_\_ Prevegetation pH \_\_\_\_\_ \*

Lime X Tons/acre or to correct to pH 7.0

\*Determined at time of Reclamation.

Fertilizer (10-20-20 or equivalent) \_\_\_\_\_ lbs/acre (500 lbs minimum)

Mulch 2 (two) Tons/acre PAH

Seed Mixtures

Seed Type	Area I lbs/acre	Seed Type	Area II lbs/acre
<b>Per Table 4A and 4B of the "West Virginia Erosion and Sedimentation Control Manual (attached) <u>ckc</u></b>			

Attach:  
Drawing(s) of road, location, pit and proposed area for land application.

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: [Signature]

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Title: Oil + Gas Inspector Date: 7-23-12

Field Reviewed? (  ) Yes (  ) No

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Table 4a. Permanent seeding mixtures suitable for establishment in WV.

Species/Mixture	Seeding Rate (lbs/acre)	Soil Drainage Preference	pH Range
Crownvetch/ Tall Fescue	10 - 15 30	Well - Mod. Well	5.0 - 7.5
Crownvetch/ Perennial Ryegrass	10 - 15 20	Well - Mod. Well	5.0 - 7.5
<b>Flatpea or Perennial Pea/ Tall Fescue</b>	20 15	Well - Mod. Well	4.0 - 8.0
Ladino Clover/ Sericea Lespedeza/ Tall Fescue	30 25 2	Well - Mod. Well	4.5 - 7.5
<i>Tall Fescue/ Ladino Clover/ Redtop</i>	40 3 3	<i>Well - Mod. Well</i>	5.0 - 7.5
Crownvetch/ Tall Fescue/ Redtop	10 20 3	Well - Mod. Well	5.0 - 7.5
Tall Fescue/ Birdsfoot Trefoil/ Redtop	40 10 3	Well - Mod. Well	5.0 - 7.5
Sericea Lespedeza/ Tall Fescue/ Redtop	25 30 3	Well - Mod. Well	4.5 - 7.5
Redtop/ Tall Fescue/ Creeping Red	30 3 50	Well - Mod. Well	5.0 - 7.5
<i>Tall Fescue</i>	50	<i>Well - Poorly</i>	4.5 - 7.5
<b>Perennial Ryegrass/ Tall Fescue/ Lathco Flatpea *</b>	10 15 20	<b>Well - Poorly</b>	<b>5.0 - 8.0</b>

Tables IV 1-4 taken from Natural Resources Conservation Service Manual *Critical Area Planting*

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Table 4b. Mixtures in the table below are more wildlife and farm friendly.

Species/Mixture	Seeding Rate (lbs/acre)	Soil Drainage Preference	pH Range
KY Bluegrass/ Redtop/ Ladino Clover or Birdsfoot Trefoil	20 3 2 /10	Well – Mod. Well	5.5 - 7.5
Timothy/ Alfalfa	5 12	Well – Mod. Well	6.5 - 8.0
Timothy/ Birdsfoot Trefoil	5 8	Well - Poorly	5.5 - 7.5 8
<i>Orchardgrass/ Ladino Clover/ Redtop</i>	<i>10 2 3</i>	<i>Well - Mod. Well</i>	<i>5.5 - 7.5</i>
<i>Orchardgrass/ Ladino Clover</i>	<i>10 2</i>	<i>Well - Mod. Well</i>	<i>5.5 - 7.5</i>
<i>Orchardgrass/ Perennial Ryegrass</i>	<i>20 10</i>	<i>Well - Mod. Well</i>	<i>5.5 - 7.5</i>
<b>Creeping Red Fescue/ Perennial Ryegrass</b>	<b>30 10</b>	<b>Well - Mod. Well</b>	<b>5.5 - 7.5</b>
Orchardgrass or Kentucky Bluegrass	20	Well - Mod. Well	6.0 - 7.5
Birdsfoot Trefoil/ Redtop/ Orchardgrass	10 5 20	Well - Mod. Well	5.5 - 7.5
<b>Lathco Flat Pea/ Perennial Ryegrass</b>	<b>30 20</b>	<b>Well - Mod. Well</b>	<b>5.5 - 7.5</b>
Lathco Flat Pea/ Orchardgrass	30 20	Well - Mod. Well	5.5 - 7.5

Mixtures listed in bold are suitable for use in shaded woodland settings; those in italics are suitable for use in filter strips.

\* 'Lathco' Flatpea is potentially poisonous to some livestock. All legumes should be planted with proper inoculants prior to seeding. For unprepared seedbeds or seeding outside the optimum timeframes, add 50% more seed to the specified rate.

Table IV-5 Lime and Fertilizer Application Table

pH of Soil	Lime in Tons Per Acre	Fertilizer, Lbs., per Acre	10-20-20- or Equivalent
Above 6.0	2		500
5.0 to 6.0	3		500
Below 5.0	4		500

The pH can be determined with a portable pH testing kit or by sending the soil samples to a soil testing laboratory. When 4 tons of lime per acre are applied it must be incorporated into the soil by disking, backblading or tracking up and down the slope.

Table IV-6 Mulch Materials Rates and Uses

Material	Minimum Rates Per Acre	Coverage	Remarks
Hay or Straw	2 to 3 Tons 100 to 150 Bales	Cover 75% to 90% of Surface	Subject to Wind blowing or washing unless tied down
Wood Fiber Pulp Fiber Wood-Cellulose Recirculated Paper	1000 to 1500 lbs	Cover all Disturbed Areas	For Hydroseeding

Office of Oil and Gas  
WV Dept. of Environment

**UIC Permit Numbers**

- **3412123390**
- **3400922704**
- **3416727401**
- **3416729577**
- **3412123995**
- **3416729658**
- **3416729685**
- **4707302523**

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**Drilling Fluid Additives & M.S.D.S.**

- Synvert LI
- Synvert LII
- Synvert Wa
- Synvert Lem\
- Synvert Twa
- Synvert Clay
- Synvert Base Fluid
- Barite
- Nutshell
- Calcium Chloride
- Calcium Carbonate
- Lime
- Lc-20
- Gilsonite

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7-23-13

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WV Dept. of Environmental Protection



# Water Management Plan: Primary Water Sources



WMP-01524

API/ID Number: 047-103-02936

Operator:

D.A.C. Energy, LLC.

Shuman Haynes 1H

**Important:**

For each proposed primary water source (including source intakes for purchased water sources) identified in your water management plan, and summarized herein, DEP has made an evaluation concerning water availability over the specified date range. DEP's assessment is based on the following considerations:

- Statistical analysis of historical USGS stream gauge data (transferred to un-gauged locations as necessary);
- Identification of sensitive aquatic life (endangered species, mussels, etc.);
- Quantification of known existing demands on the water supply (Large Quantity Users);
- Minimum flows required by the Army Corps of Engineers; and
- Designated stream uses.

Based on these factors, DEP has provided, for each intake location (and origination point for purchased water), a reference gauge location and discharge flow reading which must be surpassed prior to withdrawals. Additionally, DEP has established a minimum passby flow at the withdrawal location which must also be surpassed prior to withdrawals. These thresholds are considered terms of the permit and are enforceable as such.

**DEP is aware that some intake points will be used for mutiple wells and well sites. In these cases, the thresholds set by the Water Management Plan are to be interepreted as total withdrawal limits for each location over the specified date range regardless of how many wells are supported by that intake.**

For all purchased water intakes, determinations of water availability are made at the original source intake location. It is the responsibility of the Oil and Gas Operator, not the seller, to cease withdrawal of water from the seller when flows are less than the minimum gauge reading at the stream gauge referenced by the Water Management Plan in order to protect stream uses.

Note that the determinations made herein are based on the best available data, but it is impossible to predict water availability in the future. While the DEP has carefully established these minimum withdrawal thresholds, it remains the operator's responsibility to protect aquatic life at all times. Approval to withdrawal is contingent upon permission from the land owner. It is the responsibility of the operator to secure and maintain permission prior to any withdrawals.

The operator is reminded that 24-48 hours prior to withdrawing (or purchasing) water, DEP must be notified by email at DEP.water.use@wv.gov.

**APPROVED OCT 25 2013**

## Source Summary

WMP- 01524

API Number:

047-103-02936

Operator:

D.A.C. Energy, LLC.

Shuman Haynes 1H

### Stream/River

Source: **Little Fishing Creek @ Haynes Withdrawal Site**      Wetzel      Owner: **Shuman Haynes**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
3/22/2014	3/22/2015	8,400,000		39.622417	-80.655402

Regulated Stream?      Ref. Gauge ID: **3114500**      MIDDLE ISLAND CREEK AT LITTLE, WV

Max. Pump rate (gpm):	<b>2,300</b>	Min. Gauge Reading (cfs):	<b>72.62</b>	Min. Passby (cfs)	<b>1.73</b>
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DEP Comments:

## Source Detail

WMP-01524

API/ID Number: 047-103-02936

Operator: D.A.C. Energy, LLC.

Shuman Haynes 1H

Source ID: 27171 Source Name: Little Fishing Creek @ Haynes Withdrawal Site  
Shuman Haynes

Source Latitude: 39.622417  
Source Longitude: -80.655402

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 5.65 County: Wetzel

- Endangered Species?
- Trout Stream?
- Regulated Stream?
- Proximate PSD?
- Gauged Stream?
- Mussel Stream?
- Tier 3?

Anticipated withdrawal start date: 3/22/2014

Anticipated withdrawal end date: 3/22/2015

Total Volume from Source (gal): 8,400,000

Max. Pump rate (gpm): 2,300

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm): 0

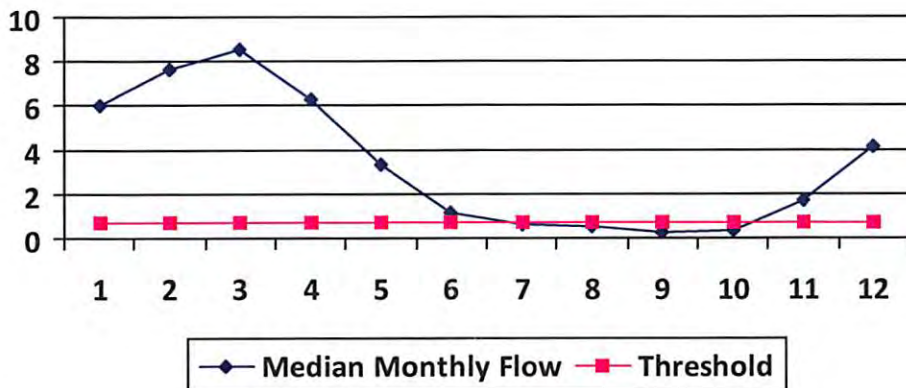
Reference Gaug: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.): 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	6.06	5.96	0.21
2	7.62	5.96	1.77
3	8.53	5.96	2.68
4	6.33	5.96	0.48
5	3.34	5.96	-2.51
6	1.17	5.96	-4.69
7	0.66	5.96	-5.19
8	0.54	5.96	-5.31
9	0.28	5.96	-5.57
10	0.35	5.96	-5.50
11	1.71	5.96	-4.14
12	4.17	5.96	-1.68

### Water Availability Profile



### Water Availability Assessment of Location

Base Threshold (cfs): 0.56

Upstream Demand (cfs): 0.00

Downstream Demand (cfs): 0.89

Pump rate (cfs): 5.12

Headwater Safety (cfs): 0.14

Ungauged Stream Safety (cfs): 0.14

Min. Gauge Reading (cfs): 72.62

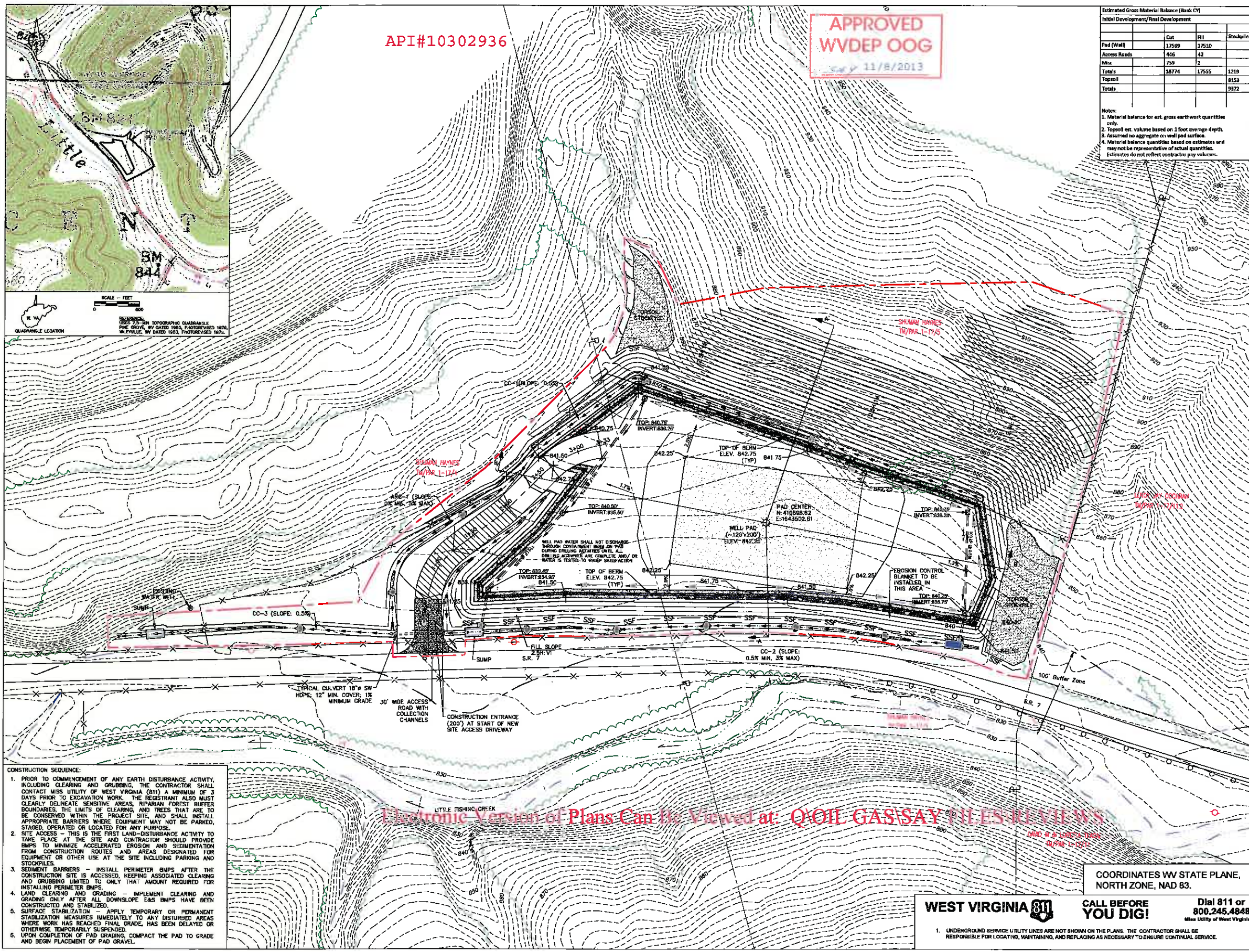
Passby at Location (cfs): 1.72

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.



API#10302936

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WVDEP OOG  
11/8/2013



Estimated Gross Material Balance (Bank  $\infty$ )

Initial Development/Final Development	Cut	Fill	Stockpile
Pad (Wall)	17509	17510	
Access Roads	456	42	
Misc.	739	2	
Totals	18704	17555	1219
Topsoil			8153
Totals			3972

SHEET SET LIST

SHT. NO.	DESCRIPTION
1	SITE CONSTRUCTION PLAN WITH E&S CONTROLS
2	WELL PAD CROSS SECTIONS
3	ACCESS ROAD PROFILE AND SECTIONS
4	CONSTRUCTION NOTES
5-7	CONSTRUCTION DETAILS
8	SITE RECLAMATION PLAN

- Notes:
1. Material balance for est. gross earthwork quantities only.
  2. Topsoil est. volume based on 3 foot average depth.
  3. Assumed no aggregate on well pad surface.
  4. Material balance quantities based on estimates and may not be representative of actual quantities. Estimates do not reflect contractor pay volumes.

LEGEND

	COLLECTION CHANNEL
	APPROXIMATE LIMITS OF DISTURBANCE
	CULVERT
	WELL PAD FLAT/SOIL STOCKPILE
	DRIVEWAY CENTERLINE
	EXISTING TREELINE
	APPROXIMATE PROPERTY LINE
	EXISTING INDEX CONTOUR
	EXISTING INTERMEDIATE CONTOUR
	PROPOSED INDEX CONTOUR
	PROPOSED INTERMEDIATE CONTOUR
	WELL HEAD
	STREAM
	ROCK CHECK DAM
	12" STRAW WATTLE
	SUPER SILT FENCE
	EXISTING FENCE

- GENERAL NOTES:
1. REFERENCE THIS SHEET WITH THE CONSTRUCTION NOTES AND DETAILS.
  2. SITE TO BE CONSTRUCTED IN ACCORDANCE WITH WELL DRILLING PERMIT. CONTRACTOR RESPONSIBLE TO OBTAIN ALL OTHER ANCILLARY PERMITS/APPROVALS REQUIRED TO CONSTRUCT SITE INCLUDING BUT NOT LIMITED TO FEDERAL, STATE, AND LOCAL REQUIREMENTS.
  3. CONTRACTOR IS RESPONSIBLE TO CONSTRUCT PROPER TOE AND BONDING BENCHES USING STANDARD CONSTRUCTION PRACTICES BASED ON FIELD CONDITIONS TO PREPARE SURFACES FOR FILL PLACEMENT ON STEEP SLOPES.
  4. ESTABLISH EROSION AND SEDIMENTATION CONTROL BMPs PRIOR TO EARTHWORK. REMOVE AND STOCKPILE AVAILABLE TOPSOIL FROM WITHIN THE LIMIT OF DISTURBANCE.
  5. NO EMBANKMENT FILL SHALL BE PLACED ON FROZEN MATERIAL. FILL MATERIAL SHALL BE FREE OF ORGANICS, LARGE ROCKS, FROZEN SOIL OR OTHER OBJECTIONABLE MATERIAL.
  6. CUT/FILL SLOPES SHALL BE CONSTRUCTED TO A MAXIMUM SLOPE OF 2H:1V UNLESS NOTED OTHERWISE.
  7. FILL MATERIAL WILL BE PLACED IN LIFTS OR LAYERS OVER THE LENGTH OF THE FILL. LIFT THICKNESS OF THE SOIL SHALL BE AS THIN AS THE SUITABLE RANDOM EXCAVATED MATERIAL WILL PERMIT, TYPICALLY, 6-12 INCHES THICK. THE SIZE OF ROCK LIFTS SHALL NOT EXCEED 36 INCHES. THE ROCK SHALL NOT BE GREATER IN ANY DIMENSION THAN 36 INCHES. COMPACTION SHALL BE OBTAINED BY COMPACTION EQUIPMENT, SHEEP'S FOOT OR PAD ROLLER, DEPENDING ON MATERIAL. WITH COMPACTION TO VISIBLE NON-MOVEMENT OF THE EMBANKMENT MATERIAL. COMPACTION EFFORT SHALL NOT EXCEED OPTIMUM MOISTURE LIMITS. EACH LIFT SHALL BE COMPACTED TO A STANDARD PROCTOR DENSITY OF AT LEAST 95% BEFORE BEGINNING THE NEXT LIFT. QC TESTING SHALL BE PERFORMED AT A RATE OF 2 TESTS/ACRE/LIFT.
  8. CULVERT PIPING SHALL CONSIST OF SMOOTH WALLED 18 INCH HOPE PIPE. THE PIPE SHALL HAVE A MINIMUM OF 18 INCH SOIL COVER. OUTLET PROTECTION SHALL BE USED TO PREVENT EROSION FROM THE DISCHARGE.
  9. ALL SEDIMENT CONTROL MEASURES SHALL REMAIN IN PLACE UNTIL DISTURBED AREAS ARE STABILIZED AND THE VEGETATIVE GROUND COVER HAS ACHIEVED A UNIFORM 70% GROWTH. ANY AREAS NOT ACHIEVING A 70% VEGETATIVE COVER SHALL BE RESEED AND MULCHED WITHIN 24 HOURS OF DETECTION.

REFERENCE:

1. TOPOGRAPHIC MAPPING PROVIDED BY BLUE MOUNTAIN AERIAL MAPPING. DATE OF PHOTOGRAPHY: 4-10-11.

THIS DRAWING IS CONSIDERED THE DRAWING IS A TRADE SECRET AND ONLY ENTITLED TO THE REGISTER FOR HIS PERSONAL USE. WITHOUT THE WRITTEN CONSENT OF PENN ENVIRONMENTAL & RECLAMATION, IT MUST NOT BE COPIED, REPRODUCED, OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM. ANY UNLAWFUL USE OF THIS DRAWING OR THE INFORMATION CONTAINED HEREIN SHALL BE CONSIDERED A VIOLATION OF TRADE SECRET LAWS AND THE DRAWING MUST BE RETURNED TO ACQUIROR OF THE COMPANY.

- CONSTRUCTION SEQUENCE:
1. PRIOR TO COMMENCEMENT OF ANY EARTH DISTURBANCE ACTIVITY, INCLUDING CLEARING AND GRUBBING, THE CONTRACTOR SHALL CONTACT MISS UTILITY OF WEST VIRGINIA (811) A MINIMUM OF 3 DAYS PRIOR TO EXCAVATION WORK. THE CONTRACTOR MUST CLEARLY DELINEATE SENSITIVE AREAS, RIPARIAN FOREST BUFFER BOUNDARIES, THE LIMITS OF CLEARING, AND TREES THAT ARE TO BE CONSERVED WITHIN THE PROJECT SITE, AND SHALL INSTALL APPROPRIATE BARRIERS WHERE EQUIPMENT MAY NOT BE PARKED, STAGED, OPERATED OR LOCATED FOR ANY PURPOSE.
  2. SITE ACCESS - THIS IS THE FIRST LAND-DISTURBANCE ACTIVITY TO TAKE PLACE AT THE SITE AND CONTRACTOR SHOULD PROVIDE BMPs TO MINIMIZE ACCELERATED EROSION AND SEDIMENTATION FROM CONSTRUCTION ROUTES AND AREAS DESIGNATED FOR EQUIPMENT OR OTHER USE AT THE SITE INCLUDING PARKING AND STOCKPILES.
  3. SEDIMENT BARRIERS - INSTALL PERIMETER BMPs AFTER THE CONSTRUCTION SITE IS ACCESSED, KEEPING ASSOCIATED CLEARING AND GRUBBING LIMITED TO ONLY THAT AMOUNT REQUIRED FOR INSTALLING PERIMETER BMPs.
  4. LAND CLEARING AND GRADING - IMPLEMENT CLEARING AND GRADING ONLY AFTER ALL DOWNSLOPE E&S BMPs HAVE BEEN CONSTRUCTED AND STABILIZED.
  5. SURFACE STABILIZATION - APPLY TEMPORARY OR PERMANENT STABILIZATION MEASURES IMMEDIATELY TO ANY DISTURBED AREAS WHERE WORK HAS REACHED FINAL GRADE, HAS BEEN DELAYED OR OTHERWISE TEMPORARILY SUSPENDED.
  6. UPON COMPLETION OF PAD GRADING, COMPACT THE PAD TO GRADE AND BEGIN PLACEMENT OF PAD GRAVEL.

Electronic Version of Plans Can Be Viewed at: [OILGASISAYFILES.REVIEW5.COM](http://OILGASISAYFILES.REVIEW5.COM)

COORDINATES WV STATE PLANE, NORTH ZONE, NAD 83.

**WEST VIRGINIA 811** CALL BEFORE YOU DIG! Dial 811 or 800.245.4848

APPROVED MSK 11/5/2013  
CHECKED MSK 11/5/2013  
DRAWN CAF 11/5/2013  
PROJECT No. NMO06089

DRAWING NUMBER: NMO06089-04  
SHEET 1 OF 8

1. UNDERGROUND SERVICE UTILITY LINES ARE NOT SHOWN ON THE PLANS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING, MAINTAINING, AND REPLACING AS NECESSARY TO ENSURE CONTINUAL SERVICE.

REVISION DATE DESCRIPTION

1"=50'

SITE CONSTRUCTION PLAN WITH EROSION AND SEDIMENTATION CONTROL HAYNES WELL PAD CENTER DISTRICT WETZEL COUNTY, WEST VIRGINIA

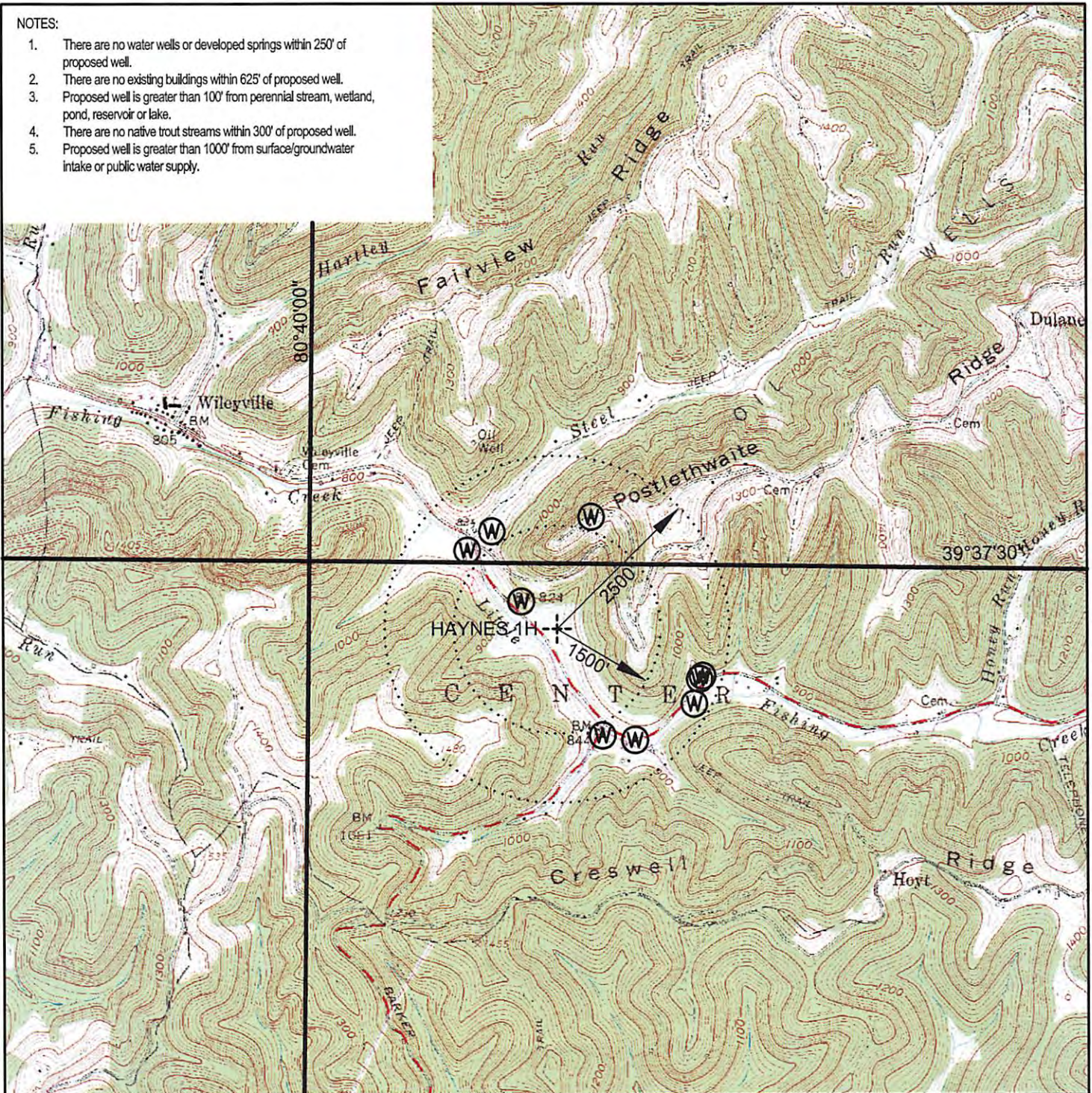
PREPARED FOR: DAC ENERGY, LLC ALMA, WEST VIRGINIA

APPROVED MSK 11/5/2013  
CHECKED MSK 11/5/2013  
DRAWN CAF 11/5/2013  
PROJECT No. NMO06089

**Penn E&R**  
Environmental & Reclamation, Inc.  
323 N. MAIN STREET, NEW MARTINSVILLE, WV 26156; 304-455-0213

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.



**BLUE MOUNTAIN ENGINEERING**

11023 MASON DIXON HIGHWAY  
BURTON, WV 26562-9656



PREPARED FOR:

DAC ENERGY, LLC  
C.R. 18/7  
ALMA, WV 26320

LEGEND

- WATER PURVEYOR
- EXISTING WELLS

**HAYNES 1H  
LOCATION MAP  
WETZEL COUNTY  
CENTER DISTRICT  
WEST VIRGINIA**

TOPO QUAD: PINE GROVE, WV

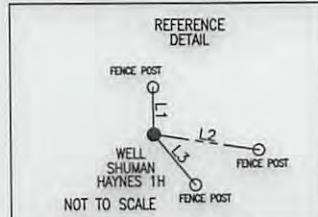
SCALE: 1" = 2000'

DATE: JULY 19, 2013

Well is located on topo map 948 feet south of Latitude: 39° 37' 30"

Well is located on topo map 8.112 feet west of Longitude: 80° 37' 30"

MAP	PARCEL	SURFACE OWNER
13	8	PATRICK L. MORRIS
13	13	PHILLIP J. MORRIS
13	24	JUNE POSTLETHWAIT
13	25	LEONARD FORDYCE
13	33	EARL & MARY HUGGINS
13	33.2	SHUMAN E. HAYNES
13	47	JOHN A. HAYNES
17	4	SHUMAN E. HAYNES
17	5	SHUMAN E. HAYNES



LINE	BEARING	DISTANCE
L1	N 00°24'41" W	243.08'
L2	S 81°20'00" E	555.42'
L3	S 39°42'02" E	339.37'

**LEGEND**

- ⊕ - TOPO MAP POINT
- ⊙ - PROPOSED GAS WELL
- - ALL ARE POINTS UNLESS OTHERWISE NOTED.
- ⊙ - WATER SOURCE
- - LEASE BOUNDARY
- - - - - PARCEL LINES
- - - - - WELL REFERENCE
- - - - - PROPOSED HORIZONTAL WELL
- - - - - ROAD
- - - - - STREAM CENTER LINE
- WELLS WITHIN 2,400'
- - EXISTING WELLS
- ⊙ - PLUGGED WELLS

LEASE NO.	AC.	GAS ROYALTY OWNER
23	144.41	SHUMAN HAYNES
30	2.0938	JOHN A. HAYNES
22	99.25	CAROLYN SUE & JOHN C. HEIMLICH, et al
3	45.625	ROCK CAMP, et al
36, 37	46.5	JANICE L. WHIPKEY
39	77.37	DRILLING APPALACHIAN CORPORATION,



- NOTES:**
- There are no water wells or developed springs within 250' of proposed well.
  - There are no existing buildings within 625' of proposed well.
  - Proposed well is greater than 100' from perennial stream, wetland, pond, reservoir or lake.
  - There are no native trout streams within 300' of proposed well.
  - Proposed well is greater than 1000' from surface/groundwater intake or public water supply.
  - 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.

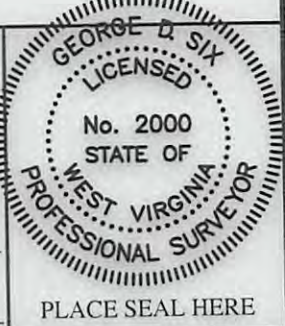
BOTTOM HOLE LOCATION (BHL)	APPROX. LANDING POINT	SURFACE HOLE LOCATION (SHL)
UTM 17-NAD83 N:4387586.71 E:528196.23 LAT/LON DATUM-WGS84 LAT:39°38'14.70" LON:80°40'17.07"	UTM 17-NAD83 N:4386051.87 E:529580.16 LAT/LON DATUM-WGS84 LAT:39°37'25.39" LON:80°39'19.26"	UTM 17-NAD83 N:4385905.65 E:529713.75 LAT/LON DATUM-WGS84 LAT:39°37'20.63" LON:80°39'13.68"

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

FILE #: SHUMAN HAYNES 1H  
 DRAWING #: SHUMAN HAYNES 1H  
 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: [Signature]  
 R.P.E.: \_\_\_\_\_ L.L.S.: P.S. No. 2000



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

DATE: JULY 26, 2013  
 OPERATOR'S WELL #: SHUMAN HAYNES 1H  
 API WELL #: 47 103 02936 H5A  
 STATE COUNTY PERMIT

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

WATERSHED: LITTLE FISHING CREEK ELEVATION: 842.00'  
 COUNTY/DISTRICT: WETZEL/CENTER QUADRANGLE: PINE GROVE, WV 7.5'  
 SURFACE OWNER: SHUMAN HAYNES ACREAGE: 27.50±  
 OIL & GAS ROYALTY OWNER: SEE ABOVE CHART ACREAGE: 415.2488±

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: 6,974'± TMD: 14,500'±  
 WELL OPERATOR DAC ENERGY, LLC DESIGNATED AGENT KENNETH R. MASON  
 Address P.O. BOX 99 Address P.O. BOX 99  
 City ALMA State WV Zip Code 26320 City ALMA State WV Zip Code 26320