west virginia department of environmental protection

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

PERMIT MODIFICATION APPROVAL

December 16, 2013

HG ENERGY, LLC
5260 DUPONT ROAD
PARKERSBURG, WV 26101

Re: Permit Modification Approval for API Number 10302883, Well #: 409 S-6H
Drilling pilot hole

Oil and Gas Operator:
The Office of Oil and Gas has reviewed the attached permit modification for the above referenced permit. The attached modification has been approved and well work may begin. Please be reminded that the oil and gas inspector is to be notified twenty-four (24) hours before permitted well work is commenced.

Please call James Martin at 304-926-0499, extension 1654 if you have any questions.

Sincerely,

for Gene Smith
Regulatory/Compliance Manager
Office of Oil and Gas

103-02883 MOD

HG Energy, LLC
5260 Dupont Road
Parkersburg, WV 26101
(304) 420-1100 - Office
(304) 863-3172 - Fax

November 4, 2013

Ms. Laura K. Cooper
WVDEP
Division of Oil & Gas
601 57th Street
Charleston, West Virginia 25304

RE: Request for Revision
Long 409 S – 6H (47-103-2883)
Grant District, Wetzel County
West Virginia

Dear Ms. Cooper:

HG Energy is requesting a permit modification for the Long 409 S-6H well to drill a pilot hole to the Onondaga and log the Marcellus formation before drilling the horizontal well. Enclosed are the revised casing program (WW-6B) and the casing schematic identifying the scope of work.

The approach for the requested modification was discussed and tentatively agreed upon by Tim Roush of HG Energy and Gene Smith, DEP on July 23, 2013, resulting in the attached revised forms.

Should you have any questions please call me at (304) 420-1119 or you can reach me at dwhite@hgenergyllc.com.

Very truly yours,

Diane C White

Diane C. White

Enclosures

cc: Gene Smith – DEP Oil & Gas Chief
Tim Roush – HG Energy, LLC
Derek Haught – DEP Inspector

RECEIVED
Office of Oil and Gas

NOV 05 2013

WV Department of
Environmental Protection

WW - 6B
(1/12)

11/4/13

103-02883MOD

Permit Modification for 409 S-6H

TO DRILL PILOT HOLE TO THE ONONDAGA
AND LOG MARCELLUS FORMATION BEFORE
DRILLING HORIZONTAL WELL.

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
W.VA. CODE §22-6A - WELL WORK PERMIT APPLICATION

1) Well Operator: HG Energy, LLC

494497948	Wetzel	Grant	Pine Grove 7.5'
Operator ID	County	District	Quadrangle

2) Operator's Well Number: 409 -S - 6H Well Pad Name: Long 409

3 Elevation, current ground: 1360' Elevation, proposed post-construction: 1340'

4) Well Type: (a) Gas ■ Oil _____
Other _____
(b) If Gas: Shallow ■ Deep _____
Horizontal ■

5) Existing Pad? Yes or No: Yes

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):
Marcellus, Approximate TVD 7300 feet , approximate thickness 50 feet.

7) Proposed Total Vertical Depth: Pilot Hole - 7,450'
8) Formation at Total Vertical Depth: Marcellus
9) Proposed Total Measured Depth: 13,116 feet - TMD
10) Approximate Fresh Water Strata Depths: 470'
11) Method to Determine Fresh Water Depth: Best judgement based on drilling history in nearby wells
12) Approximate Saltwater Depths: 2000'
13) Approximate Coal Seam Depths: 1180'
14) Approximate Depth to Possible Void (coal mine, karst, other): N/A
15) Does land contain coal seams tributary or adjacent to, active mine? N/A
16) Describe proposed well work: Drill, case, cement and complete a horizontal Marcellus well.
Before drilling horizontal section, drill 8 1/2" vertical pilot hole to a depth not greater than 100' into the Onondaga Group (~7,450' TVD). Log well and then plug back pilot hole with solid cement plug to K.O.P. (4,500').

17) Describe fracturing/stimulating methods in detail:
Plan to hydraulically fracture/stimulate the well with "slickwater" frac technique. Will utilize a plug and perforation technique through cased hole.

18) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 10.0 acres

19) Area to be disturbed for well pad only, less access road (acres): 5.4 acres

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DH
3-7-13

103-02883 MOD

WELL: Long 409 S - 6H

Horizontal Marcellus Casing Schematic

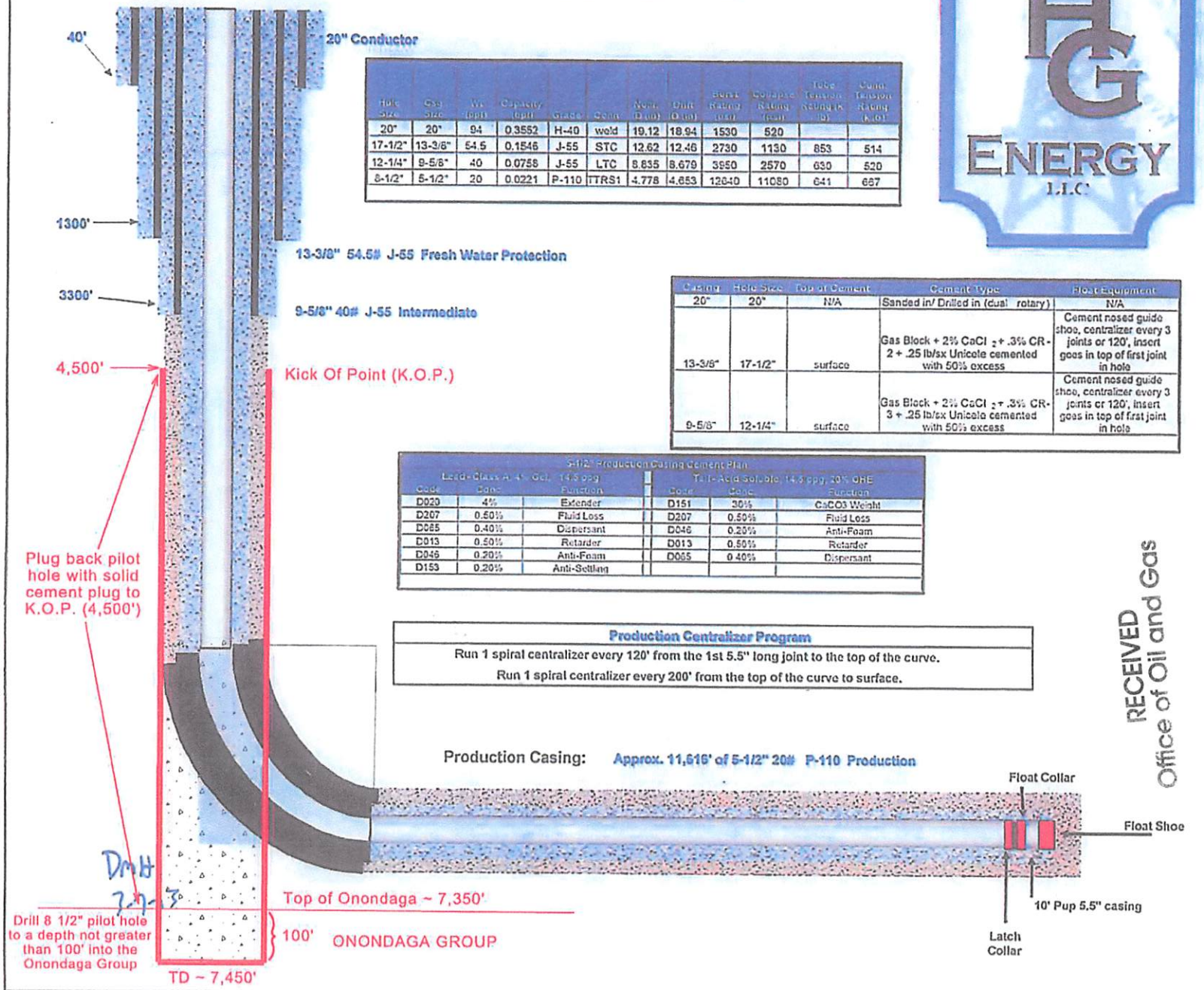
DRAWING NOT TO SCALE

11/4/13

Permit Modification for 409 S-6H

TO DRILL PILOT HOLE TO THE ONONDAGA AND LOG MARCELLUS FORMATION BEFORE DRILLING HORIZONTAL WELL.

HG ENERGY LLC



Hole Size	Csg Size	Wt (ppf)	Capacity (bbl/ft)	Grade	Conn	Nom. ID (in)	Drift ID (in)	Burst Rating (psi)	Collapse Rating (psi)	Joint Tension Strength (k lb)	Joint Tension Rating (k lb)
20"	20"	94	0.3552	H-40	weld	19.12	18.94	1530	520		
17-1/2"	13-3/8"	54.5	0.1546	J-55	STC	12.62	12.46	2730	1130	853	514
12-1/4"	9-5/8"	40	0.0758	J-55	LTC	8.835	8.679	3950	2570	630	520
8-1/2"	5-1/2"	20	0.0221	P-110	TTRS1	4.778	4.653	12640	11080	641	667

Casing	Hole Size	Top of Cement	Cement Type	Float Equipment
20"	20"	N/A	Sanded in/ Drilled in (dual rotary)	N/A
13-3/8"	17-1/2"	surface	Gas Block + 2% $CaCl_2$ + .3% CR-2 + .25 lb/sx Unicele cemented with 50% excess	Cement nosed guide shoe, centralizer every 3 joints or 120', insert goes in top of first joint in hole
9-5/8"	12-1/4"	surface	Gas Block + 2% $CaCl_2$ + .3% CR-3 + .25 lb/sx Unicele cemented with 50% excess	Cement nosed guide shoe, centralizer every 3 joints or 120', insert goes in top of first joint in hole

5-1/2" Production Casing Cement Plan

Lead- Class A, 4% Gel, 14.5 ppg			Tail- Acid Soluble, 14.5 ppg, 20% OHE		
Code	Conc	Function	Code	Conc	Function
D020	4%	Extender	D151	30%	CaCO3 Weight
D207	0.50%	Fluid Loss	D207	0.50%	Fluid Loss
D065	0.40%	Dispersant	D046	0.20%	Anti-Foam
D013	0.50%	Retarder	D013	0.50%	Retarder
D046	0.20%	Anti-Foam	D065	0.40%	Dispersant
D153	0.20%	Anti-Settling			

Production Centralizer Program

Run 1 spiral centralizer every 120' from the 1st 5.5" long joint to the top of the curve.

Run 1 spiral centralizer every 200' from the top of the curve to surface.

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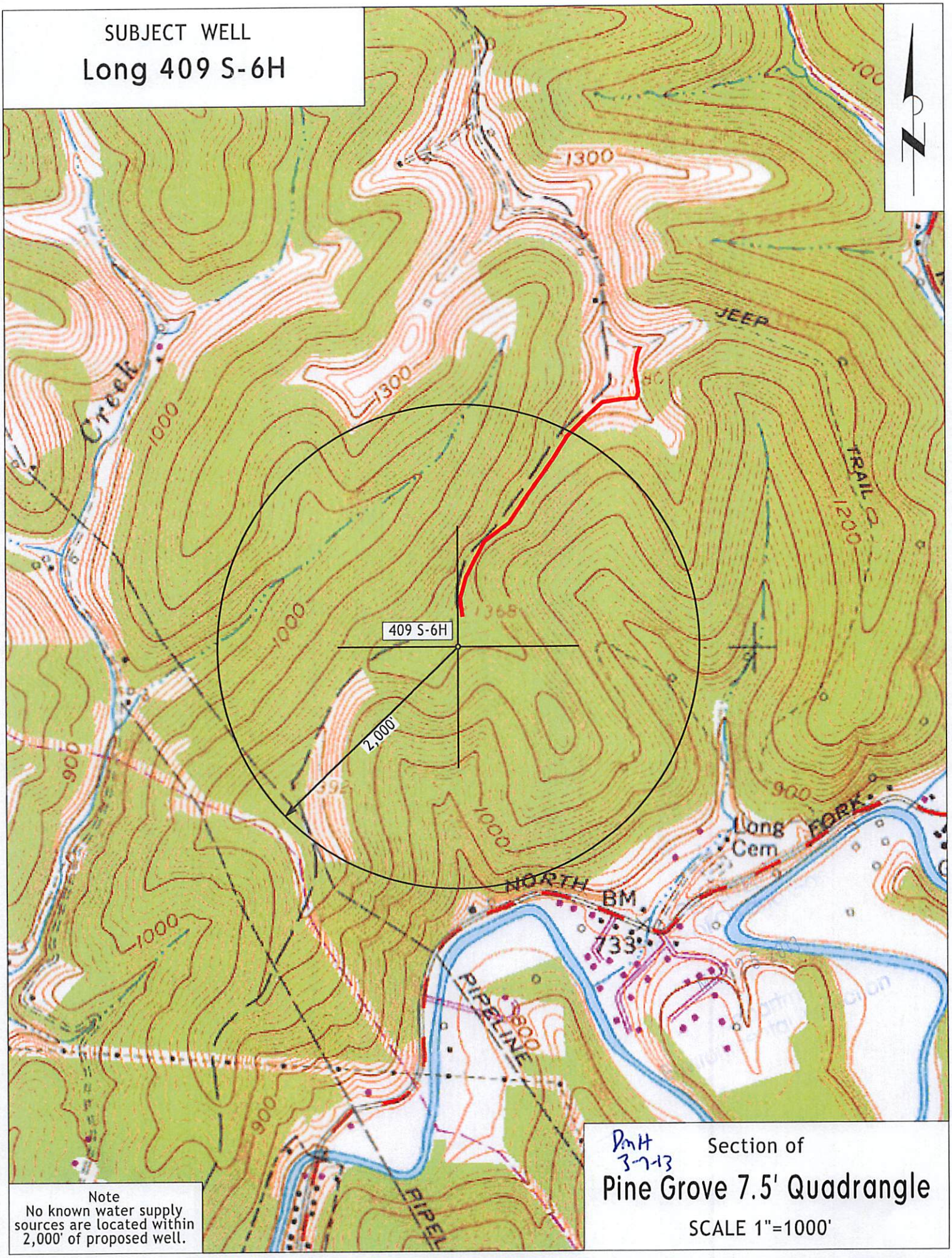
SUBJECT WELL

Long 409 S-6H



Note
No known water supply sources are located within 2,000' of proposed well.

DmH
3-7-13

Section of

Pine Grove 7.5' Quadrangle

SCALE 1"=1000'

103-02883

(BOTTOM HOLE: 80°39'27.0")

LON: -80°40'32.6" — 2551'

LAT: 39°37'30"

LON: 80°40'00"

15,007'

LAT: 39°35'01.7" (BOTTOM HOLE: 39°34'27.7")

SURVEY NOTES

1 - Well ties and Latitude and Longitude were measured by DGPS (Sub-meter Mapping Grade). Bearings are referenced to UTM Grid North (Zone 17 North - NAD 1927).

2 - Surface owners and adjoiners information obtained from the Wetzel County Assessor's tax records.

3 - No Title Opinion was provided to the Surveyor during this survey. This survey is subject to a complete title Opinion.

UTM Coordinates (Zone 17N-NAD 1983)	
Surface	N-4,381,626m. E-527,864m.
Bottom Hole	N-4,380,582m. E-529,431m.

LOCATION REFERENCES
NAD 1983
N 84°19' W 284' UTILITY POLE
N 44°33' E 192' SPIKE

MAP OF H.G. ENERGY, LLC -LONG 409 UNIT-

JOB # 12-025
DRAWING # 12HG409FOLDER
SCALE 1" = 1500'
MINIMUM DEGREE OF ACCURACY SUB-METER
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

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 PERSCRIBED BY THE DEPTARTMENT OF ENVIRONMENTAL PROTECTION.

JOSHUA E. MOODY LICENSED NO. 2020 STATE OF WEST VIRGINIA PROFESSIONAL SURVEYOR

REV.1

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS

MOODY LAND SURVEYING, LLC
ST. MARYS, WV 26170

JOSHUA E. MOODY, P.S. 2020

DATE 10/30/12
OPERATOR'S WELL # 409 S-6H

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION OFFICE OF OIL AND GAS

WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___ HORIZONTAL X
(IF "GAS") PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X
LOCATION: ELEVATION 1340' WATERSHED NORTH FOR, FISHING CREEK
DISTRICT GRANT COUNTY WETZEL
QUADRANGLE PINE GROVE 7.5'

API WELL # 47 - 103 - 02883 H6A
STATE COUNTY PERMIT

SURFACE OWNER FRANCIS D. & FREEDA M. BROWN (surface hole) ACREAGE 103 ACRES +/-
OIL & GAS ROYALTY OWNER ROBERT B. MYERS ET AL LEASE ACREAGE 580 ACRES +/-
PROPOSED WORK: DRILL X CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE X PLUG OFF OLD FORMATION ___ PERFORATE NEW FORMATION ___
OTHER PHYSICAL CHANGE IN WELL (SPECIFY) ___
PLUG & ABANDON ___ CLEAN OUT & REPLUG ___
TARGET FORMATION MARCELLUS ESTIMATED DEPTH TVD= 7,300' MD= 13,116'
WELL OPERATOR H.G. ENERGY, LLC DESIGNATED AGENT MIKE KIRSCH
ADDRESS 5260 DuPONT ROAD ADDRESS 5260 DuPONT ROAD
PARKERSBURG, WV 26101 PARKERSBURG, WV 26101

COUNTY NAME
PERMIT

FORM WW-6

LEASE # 31950-50 et al