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

March 07, 2014

STONE ENERGY CORPORATION
6000 HAMPTON CENTER, SUITE B
MORGANTOWN, WV 26505

Re: Permit Modification Approval for API Number 10302789, Well #: ZMBG 8H
Extended lateral

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

WW-6B
(9/13)

MODIFICATION 47-103-02789

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

1) Well Operator: Stone Energy Corporation | 494490923 | Wetzel | Magnolia | New Martinsville
Operator ID | County | District | Quadrangle

2) Operator's Well Number: ZMBG #8H Well Pad Name: ZMBG

3) Farm Name/Surface Owner: Zumpetta, Lawrence et al Public Road Access: Wetzel County Route 22

4) Elevation, current ground: 1,340' Elevation, proposed post-construction: 1,337'

5) Well Type (a) Gas ■ Oil ____ Underground Storage ____
Other ____
(b)If Gas Shallow ■ Deep ____
Horizontal ■

DMH
12-19-17

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Associated Pressure(s):
Target formation is the Marcellus Shale @ 6,815' TVD (-5,460 SL), thickness is 50', with rock pressure between 3,800 & 4,400 psig

8) Proposed Total Vertical Depth: 6,900' TVD @ TD (Down-Dip Well) and 6,840' TVD @ LP

9) Formation at Total Vertical Depth: Marcellus Shale

10) Proposed Total Measured Depth: 13,100' MD @ TVD

11) Proposed Horizontal Leg Length: 5,904' from LP and 7,373' from KOP

12) Approximate Fresh Water Strata Depths: 90' Shallowest and 1,145' Deepest

13) Method to Determine Fresh Water Depths: Depth of bit when water shows in the flowline or when drilling soap is injected

14) Approximate Saltwater Depths: 1,740'

15) Approximate Coal Seam Depths: 1,140'

16) Approximate Depth to Possible Void (coal mine, karst, other): None Anticipated

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**

TYPE	Size	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill-up (Cu. Ft.)
Conductor	20"	New	LS	94.0	80'	80'	77 - CTS
Fresh Water	13.375"	New	J55	54.5	1,320'	1,320'	1,200 - CTS
Coal	13.375"	New	J55	54.5	1,320'	1,320'	1,200 - CTS
Intermediate	9.625"	New	J55	36.0	2,570'	2,570'	653 Lead - 369 Tail CTS
Production	5.5"	New	P110	20.0		13,500'	986 Lead - 2,326 Tail TOC @ 1,570'
Tubing	2.375"	New	J55	4.7		7,000'	N/A
Liners	N/A						

Note: Fresh Water/Coal casing is set just above elevation. At no time will it ever be set below elevation. This setting depth is due to sloughing formation below the Pittsburgh Coal seam.

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TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield (cu. ft./k)
Conductor	20"	24"	0.375"	N/A	Type 1	1.18
Fresh Water	13.375"	17.5"	0.380"	2,730 psi	Class A	1.19
Coal	13.375"	17.5"	0.380"	2,730 psi	Class A	1.19
Intermediate	9.625"	12.25"	0.352"	3,520 psi	Class A	1.28 Lead - 1.19 Tail
Production	5.5"	8.75"	0.361	12,360 psi	Class A	1.28 Lead - 1.19 Tail
Tubing	2.375"	N/A	0.190"	7,700 psi	N/A	N/A
Liners						

PACKERS

Kind:	N/A			
Sizes:				
Depths Set:				

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

MIRU conductor rig and set 20" conductor into solid rock cementing back to surface. Typically the setting depth is 80'. RDMO conductor rig and MIRU top-hole rig. Drill and set 13.375" fresh water/coal casing cementing back to surface. Drill and set 9.625" intermediate casing cementing back to surface. Drill 8-3/4" production hole to just above KOP. This section will be drilled using a slant in order to maintain and reduce anti-collision concerns. Run gyro and displace with KCl fluid back to surface. RDMO top-hole rig and MIRU horizontal rig. Displace KCl fluid out of well bore with salt saturated drilling fluid. Drill to KOP and then drill curve to landing point. Continue drilling horizontal section of well bore to TD. Condition well bore at TD, TOOH, and run 5.5" production casing to TD. Cement production casing to 1000' inside of the 9.625" casing string. RDMO horizontal rig after installing night cap on top of well head.

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

MIRU coil tubing unit or service rig and clean out well bore to PBTD. Run CBL to approximately 30-60 degrees in curve back to surface. Toe prep horizontal for fracturing. RDMO coil tubing unit or service rig. MIRU stimulation equipment. Begin stimulation on first stage. Anticipated maximum treating pressure is 9000 psi. Anticipated maximum pump rate is between 85 and 90 bmp of slick-water with sand. Frac plugs will be pumped down during night-time operations. The number of stages to be pumped will be determined once the well is drilled and log information is reviewed. All other stages will pumped as described above. Once well is fraced the coil tubing unit or service rig (with snubbing unit) will be moved back on site and the frac plugs will be drilled out and the well bore will be cleaned up. Flow back time for the well will be dependent upon fluid return and gas production. All gas will be flared until the well is capable of production.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 29.14

22) Area to be disturbed for well pad only, less access road (acres): 9.89

23) Describe centralizer placement for each casing string: DMH 12-19-13

Fresh Water/Coal string will use bow spring centralizers w/ one just above guide shoe and then every 2nd jt. to surface. Intermediate string will use bow spring centralizers w/ one just above the guide shoe, one just above the float collar and then on every 3rd jt. to surface. One straight vane rigid centralizer will be placed as close as practical to the surface. Production string will use alternating left/right rigid centralizers on every 4th jt. from TD to 500' above KOP and on every 3rd jt. from 500' above KOP to top of slant. Bow spring centralizers every 3rd jt. will be used from this point to top of cement.

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

Fresh Water/Coal cement is typically Class A w/ 0.25 pps Cello-Flake and 1.0% to 3.0% $CaCl_2$. Intermediate cement is a lead/tail blend with the lead being Class A w/ 10% Salt and 0.25 pps Cello-Flake. Tail is Class A w/ 0.25 pps Cello-flake + 1.0% to 3.0% $CaCl_2$ + .02% Anti-Foam. Production cement is a lead/tail blend with the lead being Class "A" w/ 10% Salt blend w/ 0.02% Anti-foam and tail being HES's HALCEM blend w/ 0.65% Retarder and 0.1% Dispersant or SLB with lead/tail with the lead being Class A w/ 10% Salt or Class A w/ FlexSeal and the tail being Class A w/ 0.2% Dispersant, 0.4% Fluid Loss, 0.2% Anti-Foam, 0.15% Retarder, and 0.2% Anti-Settling Agent.

25) Proposed borehole conditioning procedures:

Fresh Water/Coal section will be done by circulating air through the drill string at TD between 30 and 90 minutes or until the well bore clears of cuttings.
Intermediate section will be done by circulating air and/or stiff foam through the drill string at TD between 30 and 120 minutes or until the well bore clears of cuttings.
Production section will be done by circulating drilling fluid through the drill string at TD between 120 to 720 minutes (a minimum of 3 bottoms up) until the shakers are clear of cuttings.

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*Note: Attach additional sheets as needed.

103-02789 MOD

STONE ENERGY - PROPOSED HORIZONTAL - Modification

Revision: 13-Nov-13

Well: ZMBG #8H
State: West Virginia
County: Wetzel
District: Magnolia
Prospect: Mary
Location: Surface: North = 4,387,958 East = 515,404 (UTM NAD 83)
PBHL: North = 4,386,499 East = 516,752 (UTM NAD 83)
PTD: 13500' MD / 6900' TVD

Permit Number: 47-103-02789
Permit Issued: 7/31/2012
AC Ground Elevation: 1337'
Kelly Bushing: 18'
Rig:
Spud Date:
TD Date:
Rig Release Date:

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HOLE SIZE	PILOT HOLE FORMATION TOPS		WELLBORE DIAGRAM	CASING & CEMENTING DATA DIRECTIONAL DATA	MW & FLUID TYPE	HOLE DEV.
24" Hole then Driven		98' KB (80' BGL)		CONDUCTOR PIPE 20" x 3/8" wall L/S PE @ 98' (set in bedrock & grouted to surface)		Vertical
17-1/2" Hole	Shallowest FW	90' TVD			Air / Mist	
	Pittsburgh Coal	1140' TVD				
	Deepest FW	1145' TVD				
		1320' TVD		SURFACE CASING 13-3/8" 54.5# J-55 STC @ 1320' MD/TVD Set through fresh water and coal zones Cemented to surface		Vertical
12-1/4" Hole	Salt Water	1740' TVD			Stiff Foam	
	Little Lime	2180' TVD				
	Big Lime	2210' TVD				
	Top Big Injun	2310' TVD				
	Base of Big Injun	2410' TVD				
		2570' TVD		INTERMEDIATE CASING 9-5/8" 36.0# J-55 LTC @ 2570' MD/TVD Set through potential salt water zones Set below base of Big Injun Cemented to surface		Vertical
	Berea Sandstone	2777' TVD				
	Gordon Sandstone	3000' TVD				
8-3/4" Hole					Air / Dust	
				KOP @ 6127' TVD		
8-3/4" Hole	Rhinestreet Shale	6354' TVD			WBM in Curve	
	Middlesex Shale	6511' TVD				
	West River Shale	6528' TVD				
	Geneseo Shale	6725' TVD				
	Tully Limestone	6755' TVD				
	Hamilton Shale	6780' TVD				
8-3/4" Hole in Lateral	Marcellus Shale	6815' TVD			WBM in Lateral	~89.5°
	Onondaga Limestone	6865' TVD				

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Landing Point (LP) @ 7596' MD / 6840' TVD
~89.5° angle
~151° azimuth

TD @ 13500' MD / 6900' TVD
PRODUCTION CASING
5-1/2" 20.0# P-110 CDC @ 13500' MD
Top of Cement @ 1570' (~1000' inside 9-5/8")

Notes: Formation tops as per vertical pilot hole
Curve & lateral tops will vary due to structural changes
Directional plan based upon best estimate of structure

WW-9
(9/13)

API Number 47 - 103 - 02789 MOD
Operator's Well No. ZMBG 8H

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name STONE ENERGY CORPORATION OP Code 494490923

Watershed (HUC 10) Tributary of Doolin Run Quadrangle New Martinsville

Elevation 1334' County Wetzel District Magnolia

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

Will a pit be used? Yes ☐ No ☑

If so, please describe anticipated pit waste: N/A

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

Proposed Disposal Method For Treated Pit Wastes:

DMH 12-19-13

- ____ Land Application
- ■ Underground Injection (UIC Permit Number 2D0859721, 34-121-24037, 34-121-24086)
- ■ Reuse (at API Number Flow back will be sotres & used for othe stimulations at other pad sites)
- ____ Off Site Disposal (Supply form WW-9 for disposal location)
- ____ Other (Explain ____

Will closed loop system be used? If so, describe: Top hole & horizontal rigs will incorporate the use of the closed-loop system

Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater, oil based, etc. Air, drilling soap & salt brine

-If oil based, what type? Synthetic, petroleum, etc. N/A

Additives to be used in drilling medium? See WW-9 Addendum

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. Drill cuttings will be disposed of in an approved 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 Sanitary Landfill (SWF-1021/WV109185)

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 [signature]

Company Official (Typed Name) Timothy P. McGregor

Company Official Title LAND Coordinator

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Subscribed and sworn before me this 20th day of December, 20 13

Danielle L. Snoderly
Notary Public

OFFICIAL SEAL
NOTARY PUBLIC
STATE OF WEST VIRGINIA
DANIELLE L SNODERLY
RR2 Box 248A, Fairmont, WV 26554
My Commission Expires May 18, 2021

My commission expires 5/18/2021

103-02789 MOD

Form WW-9

Operator's Well No. ZMBG 8H

STONE ENERGY CORPORATION

Proposed Revegetation Treatment: Acres Disturbed 28.79 Prevegetation pH _____

Lime 2.0-3.0 Tons/acre or to correct to pH 6.5

Fertilizer type 10-20-20 or equivalent

Fertilizer amount 500-750 lbs/acre

Mulch 0.5 to 0.75 + straw Tons/acre

Seed Mixtures

Temporary		Permanent	
Seed Type	lbs/acre	Seed Type	lbs/acre
Marcellus Mix	100	Marcellus Mix	100
White or Ladino Clover	10	White or Ladino Clover	10
Orchard Grass	40	Orchard Grass	40
Winter Rye	50	Winter Rye	50

Attach:
Drawing(s) of road, location, pit and proposed area for land application (unless engineered plans including this info have been provided)

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: [signature]

Comments:

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Title: Oil + Gas Inspector Date: 12-19-13

Field Reviewed? (✓) Yes ( ) No

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STONE ENERGY

WW-9 ADDENDUM

Drilling Medium Anticipated for This well

- Vertical section of well bore, down to KOP, will be drilled on air and/or a combination of air and drilling soap.
- From KOP through the curve section and horizontal section of well bore will be drilled on a brine-water based mud system.

Additives to be Used While Drilling

- Common additives when air drilling: KCl *(CAS No. 1302-78-9 & 14808-60-7)*, soda ash *(CAS No. 497-19-8)*, shale stabilizer *(CAS No 67-48-1 & 7732-1835)*, drilling soap *(CAS No. 111-76-2)*, air hammer/motor lubricant.
- Common water based additives for mud drilling: NaCl *(CAS No. 7647-14-5)*, KCl *(CAS No. 7447-40-7)*, barite *(CAS No. 13462-86-7 & 14808-60-7)*, starch *(CAS No. 9005-25-8)*, PAC *(CAS No. 9004-32-4)*, xanthum gum *(CAS No. 11138-66-2)*, PHPA *(CAS No. 64742-47-8)*, polysaccharide *(CAS No. 11138-66-2)*, sulfonated asphaltic material *(CAS No. 269-212-0 & 238-878-4)*, aluminum silicate *(CAS No. 37287-16-4)*, gilsonite *(CAS No. 12002-43-6)*, graphite *(CAS No.14808-60-7 & 7782-42-5)*, shale stabilizer *(CAS No. 67-48-1 & 7732-18-5)*, fluid loss control polymers *(CAS No. 9004-34-6)*, viscosity control polymers *(CAS No. 11138-66-2 & 107-22-2)*, soda ash *(CAS No. 497-19-8)*, sodium bicarbonate *(CAS No. 144-55-8)*, NaOH *(CAS No. 1310-73-2, 7647-14-5, & 7732-18-5)*, lime *(CAS No. 1305-62-0)*, gypsum *(CAS No.778-18-9)* , citric acid *(CAS No. 77-92-9)*, biocide *(CAS No. 52-51-7 or 7732-18-5 + 67-56-1 + 141-43-5)*, $CaCO_3$ *(CAS No. 471-34-1)* , cellulose fibers *(CAS No. 14808-60-7)*, nut plug *(CAS No. 9004-34-6 & 14808-60-7)*, cross-linking polymers *(CAS No. 107-22-2 & 11138-66-2)*, other LCMs, surfactants *(CAS No. 64-17-5)* , ROP enhancer/lubricant *(CAS No. 8002-13-9)*, beads, corrosion inhibitor *(CAS No. 7732-18-5)*, aluminum stearate *(CAS No. 300-92-5)*, defoamer *(CAS No. 246-771-9)*.

MSDS are available upon request.

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WW-9 ADDENDUM

Drill Cuttings Disposal Method

- Closed loop drilling system will be incorporated. No waste pits will be constructed. All drill cuttings are put through a drier system and hauled to and disposed of at approved and permitted landfills.

Landfills or Offsite Names and Permit Numbers

Wetzel County Sanitary Landfill
Rt. 1, Box 156A
New Martinsville, WV 26155
SWF-1021 / WV01909185

Brooke County Sanitary Landfill
Colliers, WV 26035
SWF-1013 / WV0109029

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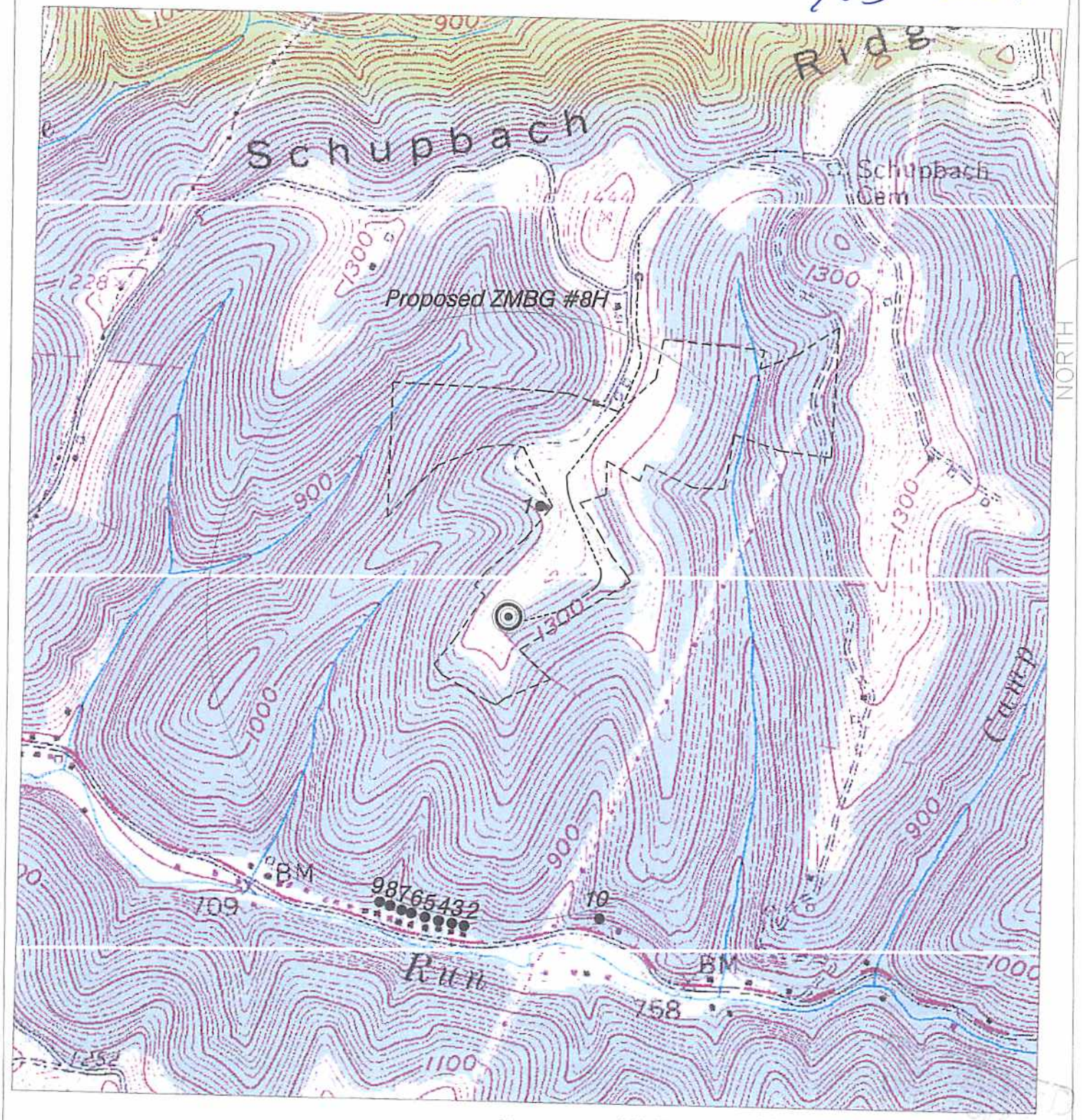
12-19-13

Form W-9

STONE ENERGY CORP.
ZMBG #8H WATER

103-2789



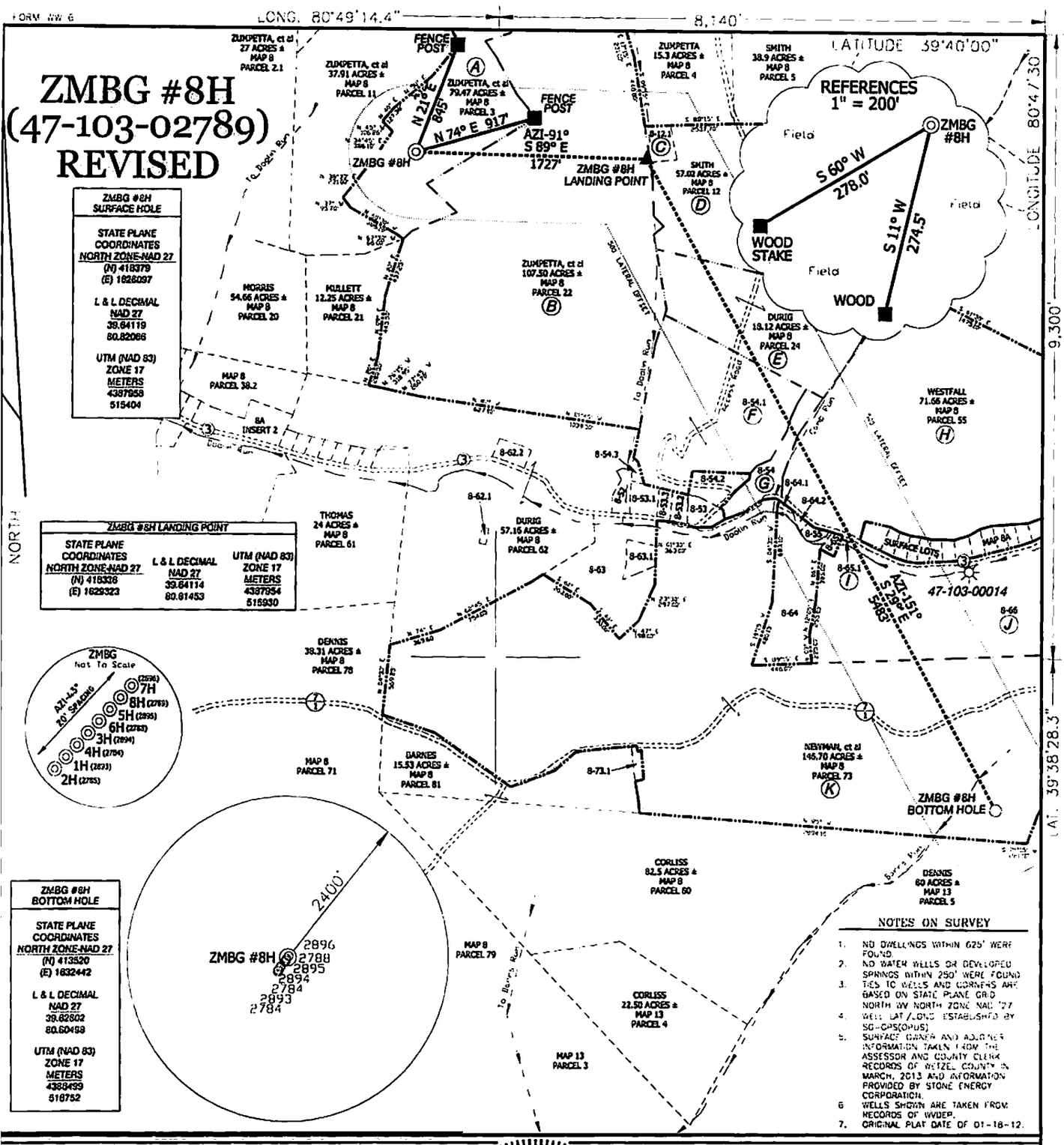
SCALE: 1-INCH = 1000-FEET

0' 1000' 2000' 3000'

HUPP Surveying & Mapping P.O. BOX 647 GRANTSVILLE, WV 26147 PH:(304)354-7035 E-MAIL: hupp@frontiernet.net	1" = 1000' New Martinsville Quad	Stone Energy Corporation PO Box 52807 Lafayette, LA 70508	Existing Access Road 1000' Water Sampling Radius # Possible Water Sources

FORM WW 6

ZMBG #8H (47-103-02789) REVISED



ZMBG #8H SURFACE HOLE
STATE PLANE COORDINATES NORTH ZONE-NAD 27
(N) 418379
(E) 1628097
L & L DECIMAL NAD 27
39.64119
80.82066
UTM (NAD 83) ZONE 17 METERS
4387959
515404

ZMBG #8H LANDING POINT		
STATE PLANE COORDINATES NORTH ZONE-NAD 27	L & L DECIMAL NAD 27	UTM (NAD 83) ZONE 17 METERS
(N) 418326	39.64114	4387954
(E) 1629323	80.81453	515930

ZMBG #8H BOTTOM HOLE
STATE PLANE COORDINATES NORTH ZONE-NAD 27
(N) 413520
(E) 1632442
L & L DECIMAL NAD 27
39.62602
80.60498
UTM (NAD 83) ZONE 17 METERS
4388499
516752

NOTES ON SURVEY

1. NO DWELLINGS WITHIN 625' WERE FOUND.
2. NO WATER WELLS OR DEVELOPED SPRINGS WITHIN 250' WERE FOUND.
3. TIES TO WELLS AND CORNERS ARE BASED ON STATE PLANE GRID NORTH WV NORTH ZONE NAD '27
4. WELL LAT./LONG. ESTABLISHED BY SG-GPS(OPUS)
5. SURFACE OWNER AND ADJOINER INFORMATION TAKEN FROM THE ASSESSOR AND COUNTY CLERK RECORDS OF WETZEL COUNTY IN MARCH, 2013 AND INFORMATION PROVIDED BY STONE ENERGY CORPORATION.
6. WELLS SHOWN ARE TAKEN FROM RECORDS OF WVDEP.
7. ORIGINAL PLAT DATE OF 01-18-12.

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 RULES ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

P.S. 834

HUPP Surveying & Mapping
P.O. Box 647 Grantsville, WV 26147
(304) 354-7035 EMAIL: hupp@frontiernet.net

DOYLE HUPP, JR. LICENSED No. 834 STATE OF WEST VIRGINIA PROFESSIONAL SURVEYOR

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.

DATE NOVEMBER 18, 20 13

OPERATORS WELL NO. ZMBG #8H REVISED MOD

API WELL NO. 47 - 103 - 02789 H6A
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1/2500 FILE NO. W2068 (BK 49-6)

PROVEN SOURCE OF ELEVATION SG-GPS(OPUS) SCALE 1" = 1000'

STATE OF WEST VIRGINIA
DIVISION OF ENVIRONMENTAL PROTECTION
OFFICE OF OIL AND GAS

WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___ IF "GAS" PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X

LOCATION:
ELEVATION 1,340' WATERSHED TRIBUTARY OF DOOLIN RUN
DISTRICT MAGNOLIA COUNTY WETZEL QUADRANGLE NEW MARTINSVILLE 7.5'
SURFACE OWNER LAWRENCE ZUMPETTA, et al ACREAGE 79.47±
ROYALTY OWNER LAWRENCE ZUMPETTA, et al LEASE ACREAGE 619.78±
PROPOSED WORK: LEASE NO. ___
DRILL X CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE X PLUG OFF OLD FORMATION ___ PERFORATE NEW FORMATION ___ PLUG AND ABANDON ___ CLEAN OUT AND REPLUG ___ OTHER PHYSICAL CHANGE IN WELL (SPECIFY) ___ TARGET FORMATION MARCELLUS
ESTIMATED DEPTH TVD 6,900' MD 13,500'

WELL OPERATOR STONE ENERGY CORPORATION DESIGNATED AGENT TIM MCGREGOR
ADDRESS P.O. BOX 52807 LAFAYETTE, LA 70508 ADDRESS 6000 HAMPTON CENTER SUITE B MORGANTOWN WV 26505