



**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

November 14, 2014

**WELL WORK PERMIT**  
**Rework/Horizontal 6A Well**

This permit, API Well Number: 47-5101567, issued to GASTAR EXPLORATION INC., 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: HOYT-NORTH NO. 2H  
Farm Name: SHIELDS, ROBERT L REBECCA A  
**API Well Number: 47-5101567**  
**Permit Type: Rework/Horizontal 6A Well**  
Date Issued: 11/14/2014

# 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. Prior to initiation of any fracturing operations, the operator shall establish a minimum break-down and surface treatment pressure to assist in identification of possible geologic anomalies which could create a communication conduit and an adverse impact. Pressures, encountered during operations, which are below the established thresholds, will require an immediate shut-down. The operator shall contact the oil and gas inspector and initiate emergency flow back procedures.
2. This proposed activity may require permit coverage from the United States Army Corps of Engineers (USACE). Through this permit, you are hereby being advised to consult with USACE regarding this proposed activity.
3. 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.
4. 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.
5. 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.
6. 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.
7. 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.

## **PERMIT CONDITIONS**

- 8. 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.**
- 9. 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.**
- 10. Operator shall provide the Office of Oil & Gas notification of the date that drilling commenced on this well. Such notice shall be provided by sending an email to [DEPOOGNotify@wv.gov](mailto:DEPOOGNotify@wv.gov) within 30 days of commencement of drilling.**

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

1) Well Operator: Gastar Exploration Inc. 494487685 Marshall Franklin Powhatan Point 7.5'  
Operator ID County District Quadrangle

51 3 558

2) Operator's Well Number: Hoyt-North 2H Well Pad Name: Hoyt

3) Farm Name/Surface Owner: Robert L. & Rebecca Shields and Donald Shields Public Road Access: Burch Ridge Co. Rt. 29

4) Elevation, current ground: 1368' Elevation, proposed post-construction: 1368'

5) Well Type (a) Gas  Oil  Underground Storage

Other

(b) If Gas Shallow  Deep

Horizontal

John 8/28/14

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Associated Pressure(s):  
The Marcellus is the target formation at at depth of 6,597' (top of formation), an anticipated thickness of 55' and a pressure of 3000 psi.

8) Proposed Total Vertical Depth: 6,752'

9) Formation at Total Vertical Depth: Onondaga

10) Proposed Total Measured Depth: 11,845'

11) Proposed Horizontal Leg Length: 4502'

12) Approximate Fresh Water Strata Depths: 60'

13) Method to Determine Fresh Water Depths: Gastar has drilled several wells in this area

14) Approximate Saltwater Depths: 2000'

15) Approximate Coal Seam Depths: 932' & 1160'

16) Approximate Depth to Possible Void (coal mine, karst, other): N/A

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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WW-6B  
(9/13)

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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	A500	52.75 #/ft		120'	Cemented to Surface
Fresh Water	13 3/8"	New	H-40	48 #/ft		1230'	Cemented to Surface
Coal							
Intermediate	9 5/8"	New	J-55	36 #/ft		2610'	Cemented to Surface
Production	5 1/2"	New	P-110	20 #/ft		11,845'	Cement to Surface
Tubing	2 3/8"	New	N-80	4.7 #/ft		6,950'	
Liners							

\*\*Well Drilled to 5934' with an 8 7/8" hole\*\*

*ju 9/28/14*

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield (cu. ft./k)
Conductor	20"	30"	.25"	880 psi	See #24	1.2
Fresh Water	13 3/8"	17 1/2"	.33"	1730 psi	See #24	1.2
Coal						
Intermediate	9 5/8"	12 1/4"	.352"	3520 psi	See #24	1.2
Production	5 1/2"	8 7/8" & 8 3/4"	.361"	12,640 psi	See #24	1.21
Tubing	2 3/8"		.19"	11,200 psi		
Liners						

PACKERS

Kind:	n/a			
Sizes:	n/a			
Depths Set:	n/a			

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

**\*\*Well has been drilled to KOP at 5934\*\*** Drill through the Marcellus tagging less than One Hundred (100') feet from the top of the Onondaga to get depths and log data. Then plug the well back to proposed kick off point (6291'). Drill the curve and horizontal section to planned and proposed TD. Run casing and cement back to surface. Run a bond log on part of the curve and vertical section, pressure test casing and set a master valve. Make a clean out run on the casing and perforate then stimulate.

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

Gastar Exploration plans to fracture the well using a typical slickwater fracture design. Gastar will pump roughly 5700bbls of water and 200,000 lbs of sand per stage. There will be approximately 21 stages on the fracturing job.

Anticipated maximum surface pressure while fracing will be approximately 8500 psi with an anticipated maximum rate of 90 bbls/min.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 5.24 (Wastewater pit and stockpile area)

22) Area to be disturbed for well pad only, less access road (acres): 0 (Well pad is existing)

23) Describe centralizer placement for each casing string:

Surface String Centralizers at 952', 681' & 401'. Basket is at 79'.  
Intermediate String Centralizers at 2310', 2010', 1710', 1410', 1140', 840', 540', 240'. Basket at 81'.  
The production casing will have one centralizer every other joint in the lateral, one centralizer per joint through the curve and one centralizer every other joint in the the vertical section.

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

See attached.

25) Proposed borehole conditioning procedures:

Gastar will circulate the hole a minnimum of 3 hours upon TD. We will then pull out to the bottom of the curve and circulate for another 2 hours. Then come out of the hole.

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\*Note: Attach additional sheets as needed.

Hoyt-North No. 2H  
WW6B # 24 Attachment

24) 13 3/8" Casing Cement - Class A + 3% CaCl<sub>2</sub> + 1/4# Flake - Surface Cement mixed at 15.6 ppg

CaCl<sub>2</sub> (calcium chloride), Flake (cellophane flake)

9 5/8" Casing Cement – Class A + 1% EC-1 + .75 gals/100 sacks FP-12L + .5% SMS + .55% BA-10A + 1/4# Flake - Intermediate Cement mixed at 15.6 ppg

CaCl<sub>2</sub> (calcium chloride), Flake (cellophane flake), EC-1 (Low Temp Bonding Agent), BA-10A (Bonding Agent/Pseudo-latex), SMS (Sodium Metasilicate, accelerator), FP-12L (Foam Preventor)

5 1/2" Casing Lead Cement - 50:50 Class H .2%CD32 1.2%FL62 .1%ASA301 .4%SMS - mixed 14.5 ppg.

- CD32 (cement dispersant), FL 62 (fluid loss), SMS (sodium metasilicate), ASA (minimizes free fluid)

5 1/2" Casing Tail Cement - 50:50 Class A + 3 #/sk BA-90 + .2% MPA-170 + .4% R-3 - mixed at 14.5 ppg.

-R3 (Retarder), BA-90(Bonding Agent), MPA-170 (Gas Migration)

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Hoyt-North 2H  
Marshall County, WV

WELLBORE 30"  
2.75# A500 SET @ 120'

Cemented to Surface

Centralizers @ Even Spacing  
WELLBORE 17.5"  
13 3/8" 48# H-40 ST&C  
Set @ 1230' MD

Cemented to Surface

Cemented to Surface

Wellbore 12.25"

Centralizers @ 300' Spacing

9 5/8" 36# J-55  
Set @ 2,610' MD

6 7/8" wellbore

5 1/2" 20# P-110

Set @ 11,845' MD

LP @ 7,343.6' MD

One Centralizer every other jt from toe to bot. of the curve and

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# GASTAR EXPLORATION USA, INC.

Location: Marshall County, WV  
Field: Marshall  
Facility: Hoyt

Slot: Slot #02  
Well: Hoyt-North 2H  
Wellbore: Hoyt-North 2H (PWB)



## Location Information

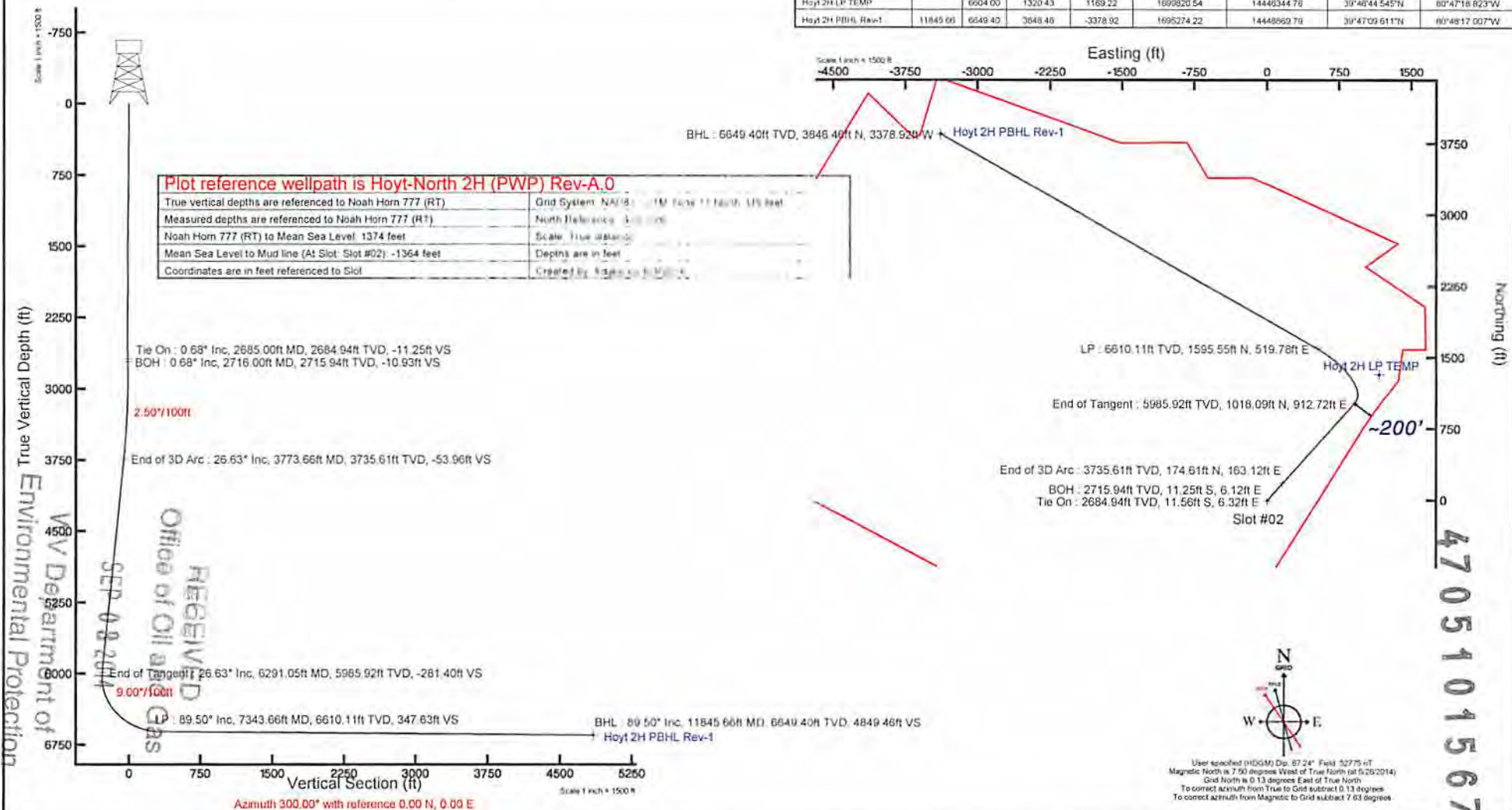
Facility Name		Grid East (US ft)	Grid North (US ft)	Latitude	Longitude	
Hoyt		1698619.380	14445001.440	39°46'31.292"N	80°47'34.254"W	
Slot	Local N (ft)	Local E (ft)	Grid East (US ft)	Grid North (US ft)	Latitude	Longitude
Slot #02	23.43	32.42	1698651.790	14445024.860	39°46'31.522"N	80°47'33.838"W
Noah Horn 777 (RT) to Mud line (At Slot: Slot #02)				10ft		
Mean Sea Level to Mud line (At Slot: Slot #02)				-1364ft		
Noah Horn 777 (RT) to Mean Sea Level				1374ft		

## Well Profile Data

Design Comment	MD (ft)	Inc (")	Az (°)	TVD (ft)	Local N (ft)	Local E (ft)	DLS (*/100ft)	VS (ft)
Tie On	2685.00	0.680	328.550	2684.94	-11.56	6.32	0.00	-11.25
BOH	2716.00	0.680	328.550	2715.94	-11.25	6.12	0.00	-10.93
End of 3D Arc	3773.66	26.632	41.628	3735.61	174.61	163.12	2.50	-53.96
End of Tangent	6291.05	26.632	41.628	5985.92	1018.09	912.72	0.00	-281.40
LP	7343.66	89.500	300.000	6610.11	1595.55	519.78	9.00	347.63
BHL	11845.66	89.500	300.000	6649.40	3846.46	-3378.92	0.00	4849.46

## Targets

Name	MD (ft)	TVD (ft)	Local N (ft)	Local E (ft)	Grid East (US ft)	Grid North (US ft)	Latitude	Longitude
Hoyt 2H LP TEMP	6604.00	1320.43	1169.22	1699820.54	14446344.78	39°40'44.545"N	80°47'18.823"W	
Hoyt 2H PBHL Rev-1	11845.66	6649.40	3648.40	-3378.92	1695274.22	14448669.79	39°47'09.611"N	80°48'17.007"W



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# ADVANTAGE Final Survey Listing

470510 67

INTEQ

Operator Gastar Exploration	Fields Marshall	API No 47051015670000	
Well Hoyt 2H	Wellbore Hoyt-North 2H (PWB)	Rig Noah Horn 777	Job 6357049

### Well Origin

Latitude	39.78 deg	Longitude	-80.79 deg
North Reference	Grid	Drill Depth Zero	Rig Floor
Vertical Datum is	Ground Level	Vertical Datum to DDZ	10.00 ft
Vertical Section North	0.00 ft	Vertical Section East	0.00 ft
Vertical Section Azimuth	300.00 deg	Vertical Section Depth	0.00 ft
Grid Convergence	-0.13 deg	Magnetic Declination	-7.50 deg
Total Correction	-7.63 deg	TVD Calculation Method	Minimum Curvature
D-raw Calculation	None	Local Magnetic Field	52775 nT
Local Magnetic Dip Angle	67.24 deg	Local Gravity Field	9.801 m/s^2

Tie In	MD ft	Incl deg	Azim deg	North ft	East ft	TVD ft	VS ft	Temperature degF	CRS LEN ft	DLS deg/100ft	Build deg/100ft	Turn deg/100ft
U	10.00	0.00	158.73	0.00	0.00	10.00	0.00		10.00	0.00	0.00	0.00
	100.00	0.27	158.73	-0.20	0.08	100.00	-0.17		90.00	0.30	0.30	-0.00
	200.00	0.41	162.20	-0.76	0.27	200.00	-0.61		100.00	0.14	0.14	3.47
	300.00	0.52	172.68	-1.55	0.44	299.99	-1.15		100.00	0.14	0.11	10.48
	400.00	0.52	150.68	-2.39	0.72	399.99	-1.82		100.00	0.20	0.00	-22.00
	500.00	0.15	137.45	-2.89	1.03	499.99	-2.33		100.00	0.38	-0.37	-13.23
	600.00	0.40	117.30	-3.14	1.43	599.99	-2.81		100.00	0.26	0.25	-20.15
	700.00	0.45	123.72	-3.52	2.07	699.98	-3.55		100.00	0.07	0.05	6.42
	800.00	0.56	124.63	-4.02	2.79	799.98	-4.43		100.00	0.11	0.11	0.91
	900.00	0.56	126.09	-4.58	3.59	899.98	-5.40		100.00	0.11	0.00	1.46
	1000.00	0.78	148.58	-5.45	4.34	999.97	-6.48		100.00	0.14	0.22	22.49
	1100.00	0.57	169.43	-6.52	4.79	1099.96	-7.41		100.00	0.11	-0.21	20.85
	1200.00	0.62	159.73	-7.52	5.07	1199.96	-8.15		100.00	0.11	0.05	-9.70
	1300.00	0.07	155.79	-8.08	5.28	1299.95	-8.61		100.00	0.11	-0.55	-3.94
	1400.00	0.52	147.70	-8.52	5.55	1399.95	-9.06		100.00	0.11	0.45	-8.09
	1500.00	0.40	145.42	-9.19	5.99	1499.95	-9.78		100.00	0.11	-0.12	-2.28
	1600.00	0.21	149.27	-9.64	6.28	1599.95	-10.25		100.00	0.11	-0.19	3.85
	1700.00	0.22	150.26	-9.96	6.47	1699.95	-10.58		100.00	0.11	0.01	0.99
	1800.00	0.29	152.44	-10.35	6.68	1799.95	-10.96		100.00	0.11	0.07	2.18
	1900.00	0.29	146.93	-10.79	6.93	1899.95	-11.40		100.00	0.11	0.00	-5.51
	2000.00	0.29	138.62	-11.19	7.24	1999.94	-11.86		100.00	0.11	0.00	-8.31
	2100.00	0.20	142.78	-11.52	7.51	2099.94	-12.27		100.00	0.11	-0.09	4.16
	2200.00	0.06	143.98	-11.70	7.65	2199.94	-12.47		100.00	0.11	-0.14	1.20
	2300.00	0.20	193.18	-11.91	7.64	2299.94	-12.57		100.00	0.11	0.14	49.20
	2400.00	0.26	237.71	-12.20	7.41	2399.94	-12.52		100.00	0.11	0.06	44.53
	2500.00	0.17	272.14	-12.32	7.07	2499.94	-12.28		100.00	0.11	-0.09	34.43
	2600.00	0.29	313.39	-12.14	6.74	2599.94	-11.90		100.00	0.11	0.12	41.25
	2685.00	0.68	328.55	-11.56	6.32	2684.94	-11.25		85.00	0.11	0.46	17.84
	2735.00	1.22	17.47	-10.80	6.32	2734.93	-10.87	77.0	50.00	0.11	1.08	97.84
	2766.00	2.21	30.87	-9.97	6.73	2765.92	-10.81	77.0	31.00	0.11	3.19	43.23
	2797.00	3.41	38.01	-8.73	7.60	2796.88	-10.95	77.0	31.00	0.11	3.87	23.03
	2829.00	4.57	39.60	-7.00	9.00	2828.80	-11.30	74.8	32.00	0.11	3.62	4.97
	2860.00	5.80	41.54	-4.88	10.83	2859.67	-11.81	77.0	31.00	0.11	3.97	6.26
	2892.00	6.81	39.98	-2.21	13.12	2891.48	-12.47	77.0	32.00	0.11	3.16	-4.87
	2923.00	7.76	38.33	0.84	15.60	2922.23	-13.09	77.0	31.00	0.11	3.06	-5.32
	2954.00	8.74	37.74	4.34	18.34	2952.91	-13.71	77.0	31.00	0.11	3.16	-1.90
	2986.00	9.62	38.07	8.37	21.47	2984.50	-14.41	77.0	32.00	0.11	2.75	2.75
	3017.00	10.50	38.89	12.61	24.84	3015.02	-15.21	77.0	31.00	0.11	2.88	2.84
	3048.00	11.35	40.94	17.11	28.62	3045.46	-16.23	77.0	31.00	0.11	2.74	6.61
	3080.00	12.41	42.75	22.01	33.01	3076.77	-17.58	77.0	32.00	0.11	3.31	5.66
	3111.00	12.86	44.95	26.90	37.71	3107.02	-19.21	77.0	31.00	0.11	1.45	7.10
	3142.00	13.47	45.62	31.87	42.73	3137.21	-21.07	77.0	31.00	0.11	1.97	2.16
	3174.00	13.18	45.74	37.02	48.01	3168.35	-23.06	77.0	32.00	0.11	-0.91	0.37
	3205.00	12.91	44.22	41.97	52.95	3198.55	-24.87	77.0	31.00	0.11	-0.87	-4.90
	3237.00	12.90	40.69	47.24	57.77	3229.74	-26.41	77.0	32.00	0.11	0.03	-11.03
	3268.00	13.07	39.17	52.58	62.24	3259.95	-27.61	77.0	32.00	0.11	0.55	-4.90
	3300.00	13.59	38.46	58.33	66.87	3291.08	-28.74	77.0	32.00	0.11	1.63	-2.22
	3330.00	14.10	38.40	63.95	71.33	3320.21	-29.80	77.0	30.00	0.11	1.70	-0.20
	3362.00	14.77	37.72	70.24	76.25	3351.20	-30.91	77.0	32.00	0.11	2.09	-2.13
	3394.00	15.61	38.39	76.84	81.42	3382.08	-32.09	77.0	32.00	0.11	2.63	2.09

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# ADVANTAGE Final Survey Listing

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Operator Gastar Exploration				Fields Marshall		API No 47051015670000						
Well Hoyt 2H				Wellbore Hoyt-North 2H (PWB)		Rlg Noah Horn 777		Job 6357049				
Tie In	MD ft	Incl deg	Azlm deg	North ft	East ft	TVD ft	VS ft	Temperature degF	CRS LEN ft	DLS deg/100ft	Build deg/100ft	Turn deg/100ft
	3425.00	16.34	37.89	83.55	86.69	3411.89	-33.30	77.0	31.00	2.40	2.35	-1.61
	3457.00	17.13	37.58	90.83	92.32	3442.53	-34.54	79.3	32.00	2.48	2.47	-0.97
	3488.00	17.83	37.74	98.21	98.01	3472.10	-35.78	79.3	31.00	2.26	2.26	0.52
	3520.00	18.45	38.09	106.07	104.14	3502.51	-37.15	79.3	32.00	1.97	1.94	1.09
	3550.00	19.02	38.52	113.63	110.11	3530.92	-38.54	79.3	30.00	1.95	1.90	1.43
	3582.00	19.56	39.01	121.87	116.73	3561.12	-40.15	79.3	32.00	1.76	1.69	1.53
	3614.00	20.42	39.75	130.32	123.67	3591.19	-41.94	79.3	32.00	2.80	2.69	2.31
	3645.00	21.35	40.86	138.75	130.82	3620.16	-43.92	79.3	31.00	3.26	3.00	3.58
	3677.00	23.30	41.88	147.87	138.86	3649.76	-46.32	79.3	32.00	6.21	6.09	3.19
	3708.00	25.10	43.18	157.23	147.45	3678.03	-49.08	79.3	31.00	6.06	5.81	4.19
	3739.00	26.09	43.34	166.98	156.63	3705.99	-52.15	79.3	31.00	3.20	3.19	0.52
	3771.00	26.68	43.01	177.35	166.36	3734.66	-55.39	81.5	32.00	1.90	1.84	-1.03
	3803.00	27.12	42.41	187.99	176.18	3763.19	-58.58	81.5	32.00	1.62	1.37	-1.87
	3835.00	27.18	41.65	198.84	185.95	3791.67	-61.62	81.5	32.00	1.10	0.19	-2.37
	3898.00	27.33	41.07	220.49	205.02	3847.67	-67.30	101.0	63.00	0.48	0.24	-0.92
	3961.00	27.19	39.85	242.44	223.74	3903.68	-72.54	83.8	63.00	0.91	-0.22	-1.94
	4025.00	27.15	39.51	264.94	242.40	3960.61	-77.46	83.8	64.00	0.25	-0.06	-0.53
	4088.00	27.12	38.62	287.25	260.51	4016.68	-81.98	83.8	63.00	0.65	-0.05	-1.41
	4151.00	27.14	39.22	309.60	278.56	4072.75	-86.44	86.0	63.00	0.44	0.33	0.95
	4215.00	26.90	40.86	331.86	297.26	4129.76	-91.51	86.0	64.00	1.22	-0.37	0.56
	4279.00	26.12	42.68	353.16	316.28	4187.04	-97.33	88.3	64.00	1.76	-0.22	0.34
	4341.00	24.98	45.08	372.44	334.80	4242.97	-103.73	88.3	62.00	2.48	-1.34	0.57
	4405.00	24.89	44.86	391.53	353.87	4301.01	-110.70	86.0	64.00	0.20	-0.14	0.34
	4468.00	26.12	44.88	410.76	373.01	4357.87	-117.66	88.3	63.00	1.95	0.95	0.33
	4531.00	27.98	43.83	431.25	393.03	4413.97	-124.75	88.3	63.00	3.05	0.95	0.33
	4594.00	28.06	42.21	452.88	413.22	4469.59	-131.42	88.3	63.00	1.21	0.13	0.11
	4657.00	28.28	40.42	475.22	432.85	4525.13	-137.25	90.5	63.00	1.39	0.35	-0.84
	4720.00	28.62	38.80	498.34	451.99	4580.52	-142.26	90.5	63.00	1.34	0.54	0.57
	4783.00	27.52	39.65	521.31	470.73	4636.11	-147.01	90.5	63.00	1.86	-0.75	0.55
	4845.00	27.77	38.12	543.70	488.79	4691.03	-151.45	90.5	62.00	1.21	0.40	0.47
	4909.00	28.28	39.19	567.18	507.57	4747.53	-155.98	90.5	64.00	1.12	0.50	0.57
	4970.00	28.46	44.00	588.84	526.80	4801.21	-161.80	90.5	61.00	3.76	0.30	0.39
	5033.00	27.89	43.86	610.26	547.44	4856.74	-168.96	92.8	63.00	0.91	0.40	0.22
	5097.00	25.36	43.37	631.02	567.22	4913.95	-175.72	92.8	64.00	3.97	0.95	0.77
	5160.00	23.14	44.00	649.73	585.09	4971.39	-181.84	95.0	63.00	3.55	0.70	0.50
	5224.00	24.97	44.83	668.36	603.35	5029.83	-188.34	97.3	64.00	2.91	0.56	0.20
	5288.00	27.53	44.30	688.53	623.21	5087.22	-195.45	99.5	64.00	4.02	0.30	0.23
	5350.00	27.29	41.21	709.48	642.58	5142.27	-201.75	99.5	62.00	2.33	-0.39	0.48
	5414.00	27.08	37.66	732.05	661.15	5199.20	-206.55	99.5	64.00	2.55	-0.33	0.55
	5478.00	25.65	42.11	753.86	679.34	5256.55	-211.39	99.5	64.00	3.81	-2.23	0.95
	5542.00	24.70	45.12	773.58	698.10	5314.47	-217.79	99.5	64.00	2.49	-1.48	4.70
	5605.00	25.40	44.78	792.46	716.95	5371.54	-224.67	99.5	63.00	1.13	1.11	-0.54
	5667.00	25.89	43.88	811.65	735.70	5427.44	-231.31	101.8	62.00	1.01	0.79	-1.45
	5728.00	25.97	41.98	831.18	753.86	5482.30	-237.27	99.5	61.00	1.37	0.13	-3.11
	5791.00	27.90	40.63	852.62	772.69	5538.46	-242.86	104.0	63.00	3.21	3.06	-2.14
	5854.00	28.18	40.40	875.14	791.93	5594.07	-248.26	104.0	63.00	0.48	0.44	-0.37

Projection to TD												
	5934.00	28.18	40.40	903.91	816.41	5664.58	-255.08		80.00	0.00	0.00	0.00

**Tie Column Legend: I - interpolated tie-point, S - survey station, U - user-defined, T - Surface**

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 WV Department of  
 Environmental Protection  
11/14/2014

WW-9  
(9/13)

API Number 47 - 051 - 01567 (Drill Deeper)  
Operator's Well No. 2H

4705101567

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Gastar Exploration Inc. OP Code 494487685

Watershed (HUC 10) Fish Creek (undefined) Quadrangle Powhatan Point 7.5'

Elevation 1,368' County Marshall District Franklin

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: Fresh water for frac and flow back water

Will a synthetic liner be used in the pit? Yes  No  If so, what ml.? 60

Proposed Disposal Method For Treated Pit Wastes:

- Land Application
- Underground Injection ( UIC Permit Number UIC-359; UIC 2D0732540; UIC 2D0732523 )
- Reuse (at API Number \_\_\_\_\_)
- Off Site Disposal (Supply form WW-9 for disposal location)
- Other (Explain \_\_\_\_\_)

Will closed loop system be used? If so, describe: Yes - for vertical and horizontal drilling

Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater, oil based, etc. Air for vertical / Oil for horizontal

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

Additives to be used in drilling medium? Barite for weight

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. All Drill Cuttings to be disposed of in Wetzel County Sanitary Landfill

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

-Landfill or offsite name/permit number? Wetzel County Sanitary Landfill (SWF-1021 / WV 0109185)

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 Michael McCown

Company Official (Typed Name) Michael McCown

Company Official Title Senior VP & COO

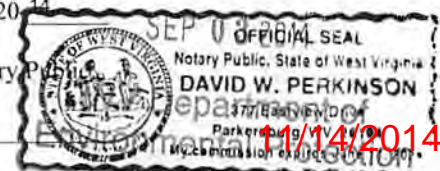
Subscribed and sworn before me this 15th day of August, 2014

David W. Perkinson

Notary Public

My commission expires 06/11/2020

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Office of Oil and Gas



4705101567

Form WW-9

Operator's Well No. 2H

Gastar Exploration Inc.

Proposed Revegetation Treatment: Acres Disturbed 26.92 Prevegetation pH \_\_\_\_\_

Lime 3 Tons/acre or to correct to pH 6.0

Fertilizer type 10-20-20

Fertilizer amount 500 lbs/acre

Mulch 2 to 3 Tons/acre

Seed Mixtures

Temporary		Permanent	
Seed Type	lbs/acre	Seed Type	lbs/acre
Annual Ryegrass	40	Kentucky Bluegrass	20
Spring Oats	96	Orchard Grass	12
Rye Grain	140	Tall Fescue	40

Note: See page 3 of the Hoyt Well Pad Site As-Built Plans for detailed temporary & permanent seeding preparations.

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: Jane Wulfsberg

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

Title: Oil & Gas Inspector

Date: 8/28/14

Field Reviewed? (  ) Yes (  ) No

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SEP 03 2014

WV Department of  
Environmental Protection  
11/14/2014

WW-9

HOYT NORTH WELL No. 2H

API# 47-051-01567

BARN

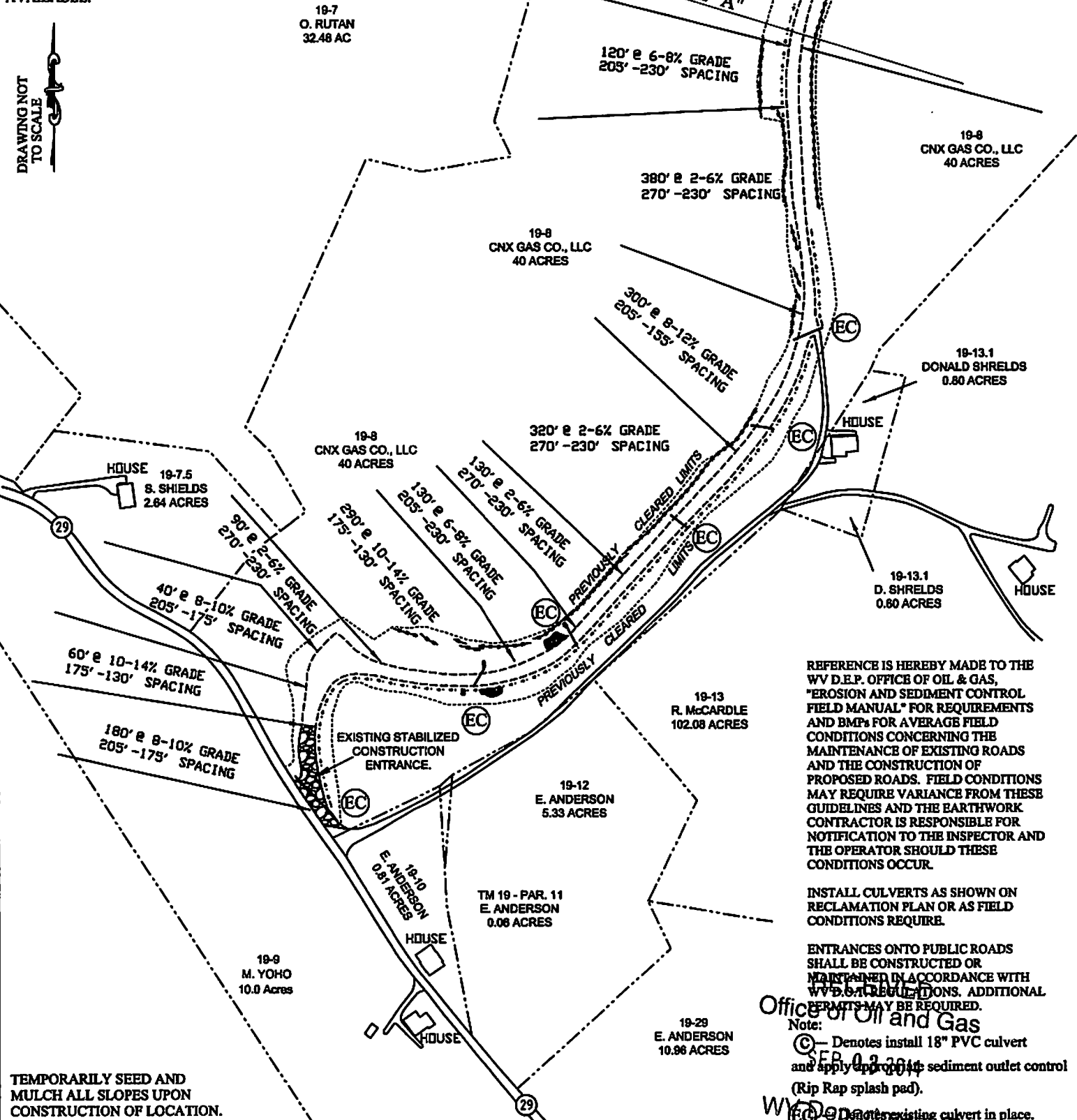
47-051-01567

SUPPLEMENT PG 1A

ALL TREES 6-INCHES AND ABOVE ARE TO BE CUT AND STACKED. BRUSH SLASHINGS ARE TO UTILIZED DOWN SLOPE OF SITE AND STRUCTURES TO ACT AS A CONTROL BARRIER IF AVAILABLE.



DRAWING NOT TO SCALE



REFERENCE IS HEREBY MADE TO THE WV D.E.P. OFFICE OF OIL & GAS, "EROSION AND SEDIMENT CONTROL FIELD MANUAL" FOR REQUIREMENTS AND BMPs FOR AVERAGE FIELD CONDITIONS CONCERNING THE MAINTENANCE OF EXISTING ROADS AND THE CONSTRUCTION OF PROPOSED ROADS. FIELD CONDITIONS MAY REQUIRE VARIANCE FROM THESE GUIDELINES AND THE EARTHWORK CONTRACTOR IS RESPONSIBLE FOR NOTIFICATION TO THE INSPECTOR AND THE OPERATOR SHOULD THESE CONDITIONS OCCUR.

INSTALL CULVERTS AS SHOWN ON RECLAMATION PLAN OR AS FIELD CONDITIONS REQUIRE.

ENTRANCES ONTO PUBLIC ROADS SHALL BE CONSTRUCTED OR MAINTAINED IN ACCORDANCE WITH WV D.E.P. REGULATIONS. ADDITIONAL PERMITS MAY BE REQUIRED.

Note:  
© - Denotes install 18" PVC culvert and apply rip rap sediment outlet control (Rip Rap splash pad).

Office of Oil and Gas  
WV Department of Environmental Protection  
Environmental

TEMPORARILY SEED AND MULCH ALL SLOPES UPON CONSTRUCTION OF LOCATION.

DATE: 08/04/14

PROJECT NO: W0100283

DRAWN BY: J.N.W.

47-051-01567  
10/14/2014  
Site Fence and/or Sediment and Erosion Control Measure.

ALL TREES 6-INCHES AND ABOVE ARE TO BE CUT AND STACKED. BRUSH SLASHINGS ARE TO UTILIZED DOWN SLOPE OF SITE AND STRUCTURES TO ACT AS A CONTROL BARRIER IF AVAILABLE.



14-14  
R. SHIELDS, ET AL  
29.05 ACRES

14-15  
R. SHIELDS, ET AL  
53.0 ACRES

104' e 10-12% GRADE  
175' -155' SPACING  
188' e 6-8% GRADE  
230' -205' SPACING

MATCHLINE "B"  
1.065' e 2-6% GRADE  
270' -230' SPACING

CLEARED LIMITS  
PREVIOUSLY

1200' e 2-6% GRADE  
270' -230' SPACING

240' e 9-10% GRADE  
205' -175' SPACING

380' e 2-6% GRADE  
270' -230' SPACING

420' e 9-10% GRADE  
205' -175' SPACING

14-15  
R. SHIELDS, ET AL  
53.0 ACRES

TEMPORARILY SEED AND MULCH ALL SLOPES UPON CONSTRUCTION OF LOCATION.

REFERENCE IS HEREBY MADE TO THE WV D.E.P. OFFICE OF OIL & GAS, "EROSION AND SEDIMENT CONTROL FIELD MANUAL" FOR REQUIREMENTS AND BMPs FOR AVERAGE FIELD CONDITIONS CONCERNING THE MAINTENANCE OF EXISTING ROADS AND THE CONSTRUCTION OF PROPOSED ROADS. FIELD CONDITIONS MAY REQUIRE VARIANCE FROM THESE GUIDELINES AND THE EARTHWORK CONTRACTOR IS RESPONSIBLE FOR NOTIFICATION TO THE INSPECTOR AND THE OPERATOR SHOULD THESE CONDITIONS OCCUR.

INSTALL CULVERTS AS SHOWN ON RECLAMATION PLAN OR AS FIELD CONDITIONS REQUIRE.

ENTRANCES ONTO PUBLIC ROADS SHALL BE CONSTRUCTED OR MAINTAINED IN ACCORDANCE WITH WV D.O.T. REGULATIONS. ADDITIONAL PERMITS MAY BE REQUIRED.

MATCHLINE "A"

120' e 6-8% GRADE  
205' -230' SPACING

380' e 2-6% GRADE  
270' -230' SPACING

19-8  
CNX GAS CO., LLC  
40 ACRES

19-8  
CNX GAS CO., LLC  
40 ACRES

300' e 9-12% GRADE  
205' -155' SPACING

320' e 2-6% GRADE  
270' -230' SPACING

19-13.1  
DONALD SHIELDS  
0.80 ACRES

HOUSE

Note: **RECEIVED**  
Office of Oil and Gas  
Denotes install 18" PVC culvert and apply appropriate sediment outlet control (Rip Rap splash pad).  
SEP 08 2014

(EC) - Denotes existing culvert in place.

Silt Fence and or Sediment and Erosion Control Measure.

DATE: 08/04/14

PROJECT NO: W0100283

DRAWN BY: JAW

ALL TREES 6-INCHES AND ABOVE ARE TO BE CUT AND STACKED. BRUSH SLASHINGS ARE TO UTILIZED DOWN SLOPE OF SITE AND STRUCTURES TO ACT AS A CONTROL BARRIER IF AVAILABLE.

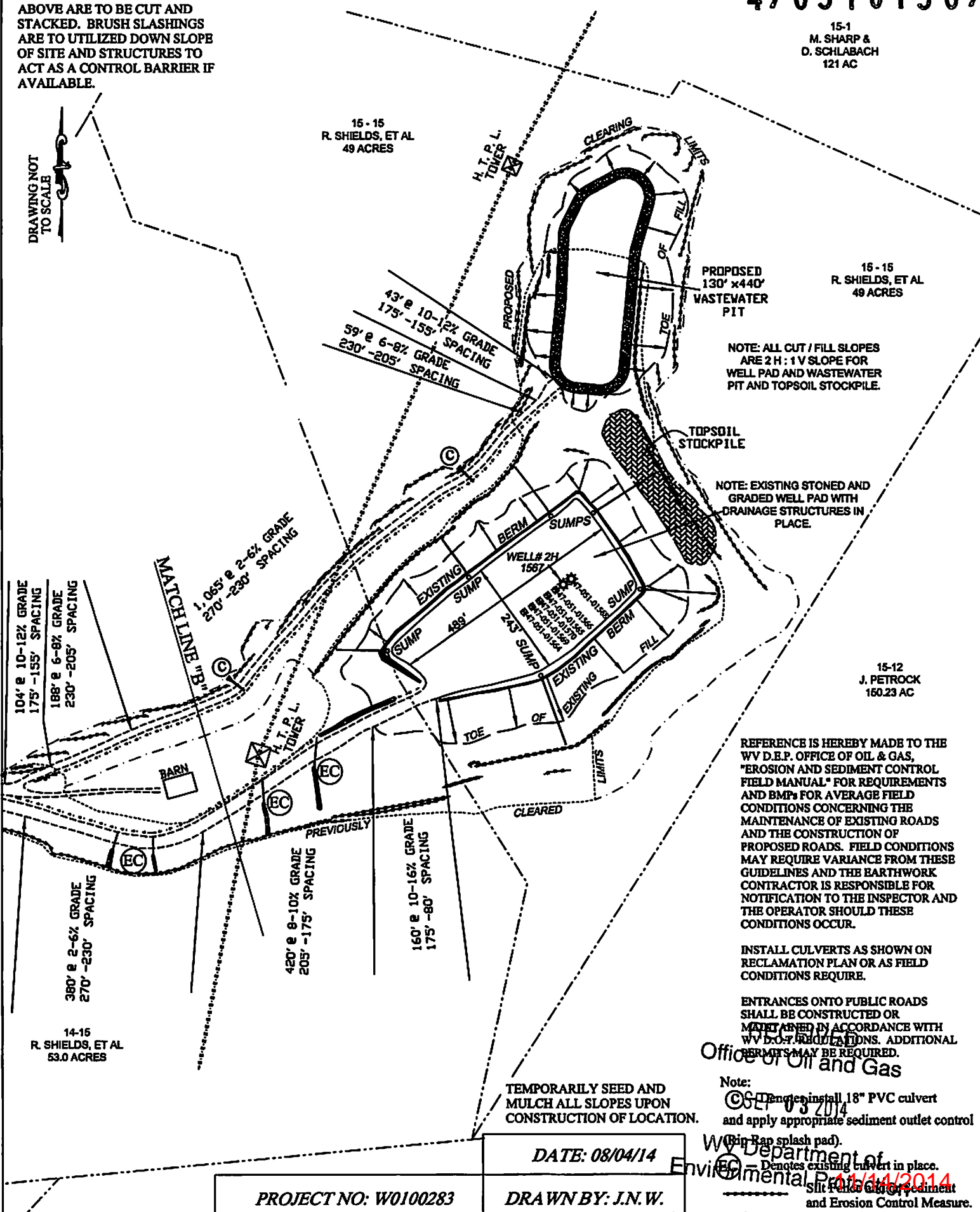
15-1  
M. SHARP &  
D. SCHLABACH  
121 AC

15-15  
R. SHIELDS, ET AL  
49 ACRES

16-15  
R. SHIELDS, ET AL  
49 ACRES

15-12  
J. PETROCK  
160.23 AC

DRAWING NOT TO SCALE



NOTE: ALL CUT / FILL SLOPES ARE 2 H : 1 V SLOPE FOR WELL PAD AND WASTEWATER PIT AND TOPSOIL STOCKPILE.

NOTE: EXISTING STONED AND GRADED WELL PAD WITH DRAINAGE STRUCTURES IN PLACE.

REFERENCE IS HEREBY MADE TO THE WV D.E.P. OFFICE OF OIL & GAS, "EROSION AND SEDIMENT CONTROL FIELD MANUAL" FOR REQUIREMENTS AND BMPs FOR AVERAGE FIELD CONDITIONS CONCERNING THE MAINTENANCE OF EXISTING ROADS AND THE CONSTRUCTION OF PROPOSED ROADS. FIELD CONDITIONS MAY REQUIRE VARIANCE FROM THESE GUIDELINES AND THE EARTHWORK CONTRACTOR IS RESPONSIBLE FOR NOTIFICATION TO THE INSPECTOR AND THE OPERATOR SHOULD THESE CONDITIONS OCCUR.

INSTALL CULVERTS AS SHOWN ON RECLAMATION PLAN OR AS FIELD CONDITIONS REQUIRE.

ENTRANCES ONTO PUBLIC ROADS SHALL BE CONSTRUCTED OR MAINTAINED IN ACCORDANCE WITH WV D.O.T. REGULATIONS. ADDITIONAL PERMITS MAY BE REQUIRED.

Office of Oil and Gas

TEMPORARILY SEED AND MULCH ALL SLOPES UPON CONSTRUCTION OF LOCATION.

Note:  
① Denotes install 18" PVC culvert and apply appropriate sediment outlet control

(Bin-Rap splash pad).  
② Denotes existing culvert in place.  
③ Silt Fence with Sediment and Erosion Control Measure.

DATE: 08/04/14

PROJECT NO: W0100283

DRAWN BY: J.N.W.

WV Department of Environmental Protection  
08/03/2014



4705101567



global environmental solutions

# Well Site Safety Plan

## Gastar Exploration USA, Inc.

*glu 8/28/14*

**Well Name:** Hoyt – North 2H

**Pad Location:** Hoyt Pad

Marshall County, West Virginia

**UTM (meters), NAD 83, Zone 17:**

Northing – 4,402,852.1

Easting – 517,750.0

SLR Ref: 116.01034.00016

RECEIVED  
Office of Oil and Gas  
August 2014

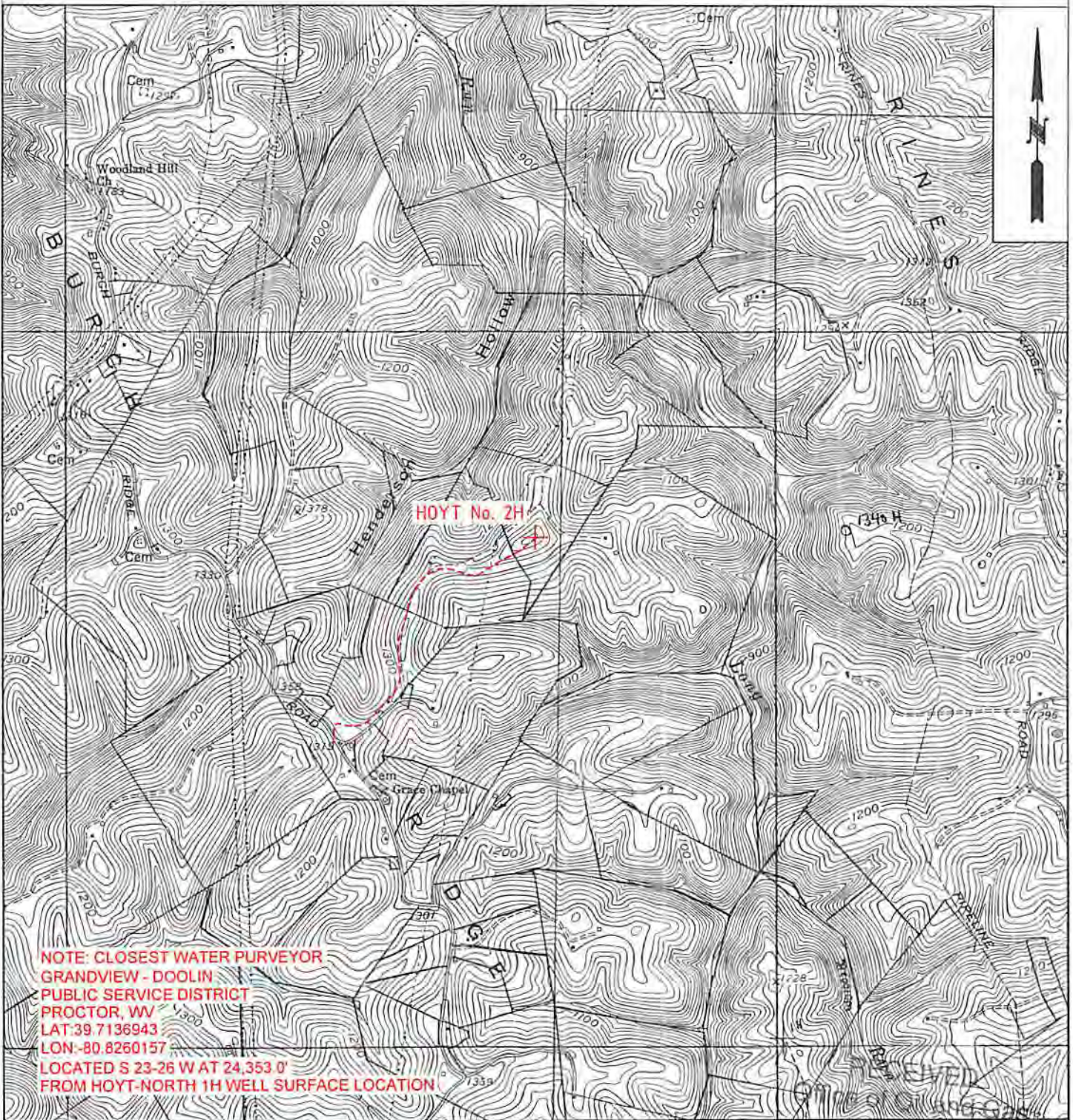
SEP 08 2014

WV Department of  
Environmental Protection  
11/14/2014

WW-9

# HOYT NORTH WELL No. 2H 47 SUPPLEMENT PG 67

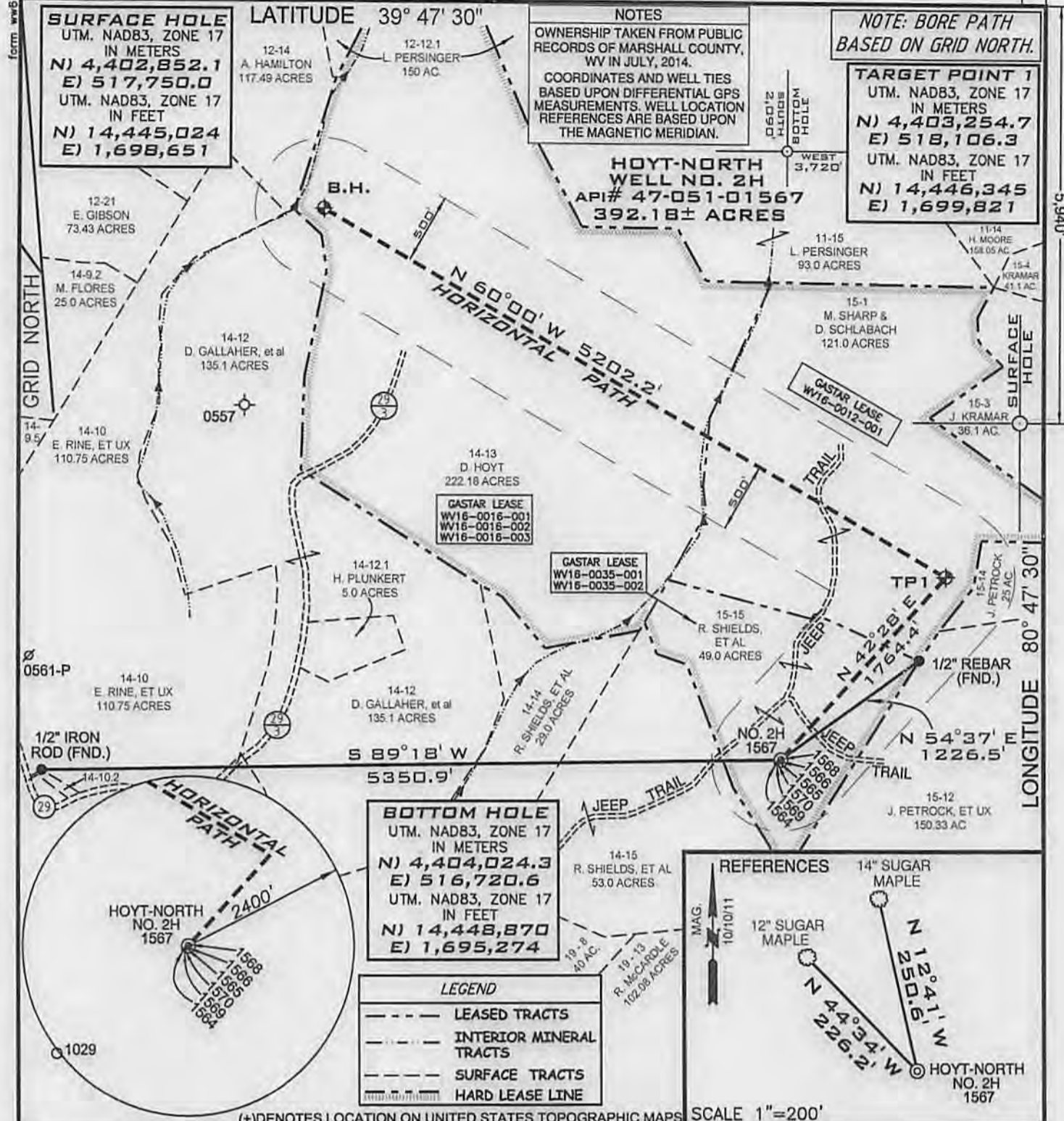
## API# 47-051-01567



**NOTE: CLOSEST WATER PURVEYOR**  
**GRANDVIEW - DOOLIN**  
**PUBLIC SERVICE DISTRICT**  
**PROCTOR, WV**  
**LAT: 39.7136943**  
**LOX: -80.8260157**  
**LOCATED S 23-26 W AT 24,353.0'**  
**FROM HOYT-NORTH 1H WELL SURFACE LOCATION**

W0100283	OPERATOR	TOPO SECTION	LEASE NAME
	GASTAR EXPLORATION Inc. 229 W Main Street, Suite 301 Clarksburg, WV 26301	POWHATAN POINT 7.5'	HOYT
	SCALE:	1"=2000'	DATE: 08/06/14

11/14/2014



FILE NUMBER W0100283 (WB1-28)  
 DRAWING NUMBER HOYT\_WP\_2H\_rev3  
 SCALE 1" = 1000'  
 MINIMUM DEGREE OF ACCURACY 1/200  
 PROVEN SOURCE OF ELEVATION 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 PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.S. 2122  
*Jonathan N. White*  
 Jonathan N. White  
 LICENSED PROFESSIONAL SURVEYOR  
 STATE OF WEST VIRGINIA



WVDEP  
 OFFICE OF OIL & GAS  
 601 57TH STREET  
 CHARLESTON, WV 25304

DATE: August 04, 2014  
 OPERATORS WELL NO. HOYT-NORTH NO. 2H  
 API WELL NO. 47-051-01567  
 STATE WV COUNTY MARSHALL PERMIT 1174/2014

WELL TYPE: OIL  GAS  LIQUID INJECTION  WASTE DISPOSAL   
 (IF "GAS") PRODUCTION  STORAGE  DEEP  SHALLOW

LOCATION ELEVATION 1368' WATERSHED (HUC 10) FISH CREEK (UNDEFINED)  
 DISTRICT FRANKLIN COUNTY MARSHALL  
 QUADRANGLE POWHATAN POINT 7.5' LEASE NUMBER WV16-0012-001, WV16-0035-001, WV16-0035-002, WV16-0016-001, WV16-0016-002, WV16-0016-003

SURFACE OWNER ROBERT L. & REBECCA SHIELDS AND DONALD SHIELDS ACREAGE 49.0  
 OIL & GAS ROYALTY OWNER ROBERT L. & REBECCA SHIELDS AND DONALD SHIELDS LEASE ACREAGE 392.18

PROPOSED WORK: DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE  PLUG OFF OLD FORMATION   
 PERFORATE NEW FORMATION  OTHER PHYSICAL CHANGE (SPECIFY) \_\_\_\_\_  
 PLUG & ABANDON  CLEAN OUT & REPLUG

TARGET FORMATION MARCELLUS ESTIMATED DEPTH TVD: 6752' TMD: 11,845'  
 WELL OPERATOR GASTAR EXPLORATION INC. DESIGNATED AGENT MICHAEL McCOWN  
 ADDRESS 229 W MAIN STREET, SUITE 301 CLARKSBURG WV, 26301 ADDRESS 229 W MAIN STREET, SUITE 301 CLARKSBURG WV, 26301