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

July 18, 2012

WELL WORK PERMIT

Horizontal 6A Well

This permit, API Well Number: 47-5101570, issued to GASTAR EXPLORATION USA, 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 of completion of drilling, 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-SOUTH NO. 5H
Farm Name: SHIELDS, ROBERT L REBECCA A
API Well Number: 47-5101570
Permit Type: Horizontal 6A Well
Date Issued: 07/18/2012

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

1. 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.

2. When compacting fills, each lift before compaction shall not be more than 12 inches in height. After compaction each lift must pass a 95 % compaction based on test results from the standard proctor density test of the actual soils used in specific engineered fill sites. 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.

51-01570

WW - 6B
(1/12)

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:	Gastar Exploration USA, Inc.	494487685	Marshall	Franklin	Powhatan Point 7.5'
		Operator ID	County	District	Quadrangle

2) Operator's Well Number: Hoyt-South No.5H Well Pad Name: Hoyt

3 Elevation, current ground: 1388' Elevation, proposed post-construction: 1364'

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

5) Existing Pad? Yes or No: No

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):
The Marcellus is the target formation at a depth of 5980' (top of formation), an anticipated thickness of 50' and a pressure of 1500 psi.

7) Proposed Total Vertical Depth: 6605'
8) Formation at Total Vertical Depth: Marcellus
9) Proposed Total Measured Depth: ~~12214'~~ 8418'
10) Approximate Fresh Water Strata Depths: 50'
11) Method to Determine Fresh Water Depth: Gastar has drilled several wells in this area and we note where the hole gets wet
12) Approximate Saltwater Depths: 1600'
13) Approximate Coal Seam Depths: 1000' & 1100'
14) Approximate Depth to Possible Void (coal mine, karst, other): None
15) Does land contain coal seams tributary or adjacent to, active mine? No
16) Describe proposed well work: Drill through the Marcellus tagging less than Twenty (20') feet from the top of the Onondaga to get depths and log data. Then plug the well back to proposed kick off point (TBD). Drill the 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.

17) Describe fracturing/stimulating methods in detail:
Gastar Exploration plans to fracture the well using a typical slickwater fracture design. Gastar will pump roughly 8000bbls of water and 400,000 lbs of sand per stage. There will be approximately 18 stages on the fracturing job.

18) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 26.92

19) Area to be disturbed for well pad only, less access road (acres): 5.77

DMH
5-17-12

Check #026599
Amount $ 5,250.00

51-01570

WW - 6B
(1/12)

20) **CASING AND TUBING PROGRAM**

TYPE	Size	New or Used	Grade	Weight per ft.	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill -up (Cu. Ft.)
Conductor	20"	New	PE			110'	Cement to Surface
Fresh Water	13 3/8"	New	H-40	48 #/ft		1150'	Cement to Surface
Coal							
Intermediate	9 5/8"	New	J-55	36 #/ft		2500'	Cement to Surface
Production	5 1/2"	New	P-110	20 #/ft		8418'	Cement to Surface
Tubing	2 3/8"	New	N-80	4.7 #/ft		6675'	
Liners							

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield
Conductor	20"	24"	.25"		Type 1 + 3% CaCl2	1.2 cuft/sack
Fresh Water	13 3/8"	17"	.33"	1,730 psi	See #22	1.2 cuft/sack
Coal						
Intermediate	9 5/8"	12 3/4"	.352"	3,520 psi	See #22	1.2 cuft/sack
Production	5 1/2"	8 3/4"	.361"	12,640 psi	See #22	1.18 cuft/sack
Tubing	2 3/8"		.19"	11,200 psi		
Liners						

PACKERS

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

S1-01570

WW - 6B
(1/12)

21) Describe centralizer placement for each casing string. Gastar will run 3 Centralizers on the Surface casing at an equal distance apart. The Intermediate casing will have 7 Centralizers at 300 ' spacing. 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.

22) Describe all cement additives associated with each cement type.

Type I + 2% CaCl2 + 1/4# Flake - Surface Cement mixed at 15.6 ppg
- CaCl2 (calcium chloride), Flake (cellophane flake)
Type I + 1% CaCl2 + 1/4# Flake - Intermediate Cement mixed at 15.6 ppg
50:50 Class H .2%CD32 1.2%FL62 .1%ASA301 .4%SMS - Long String Lead mixed 14.5 ppg.
- CD32 (cement dispersant), FL 62 (fluid loss), SMS (sodium metasilicate), ASA (minimizes free fluid)
50:50 TYPE 1 .4% R3 1%FL62 .15%ASA301 .3%CD32 - Long String Tail mixed at 14.5 ppg.
-R3 (Retarder), FL62 (fluid loss), CD32 (cement dispersant), ASA (minimizes free fluid)

23) Proposed borehole conditioning procedures. Gastar will circulate the hole for 5 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.

*Note: Attach additional sheets as needed.

WW-9
Rev. 1/12

API No. 47 - 051 - 01570
Operator's Well No. Hoyt-South No.5H

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

CONSTRUCTION AND RECLAMATION PLAN AND SITE REGISTRATION APPLICATION FORM
GENERAL PERMIT FOR OIL AND GAS PIT WASTE DISCHARGE

Operator Name Gastar Exploration USA, Inc. OP Code 494487685

Watershed Tributary of Long Run Quadrangle Powhatan Point 7.5'

Elevation 1364' County Marshall District Franklin

Description of anticipated Pit Waste: Various formation cuttings

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

Will a synthetic liner be used in the pit? Yes . If so, what mil.? 30

Proposed Disposal Method For Treated Pit Wastes:

____ Land Application
■ Underground Injection (UIC Permit Number 3416729685)
____ Reuse (at API Number ____)
■ Off Site Disposal (Supply form WW-9 for disposal location)
____ Other (Explain ____

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

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

Additives to be used? Barite for weight

Will closed loop system be used ? Yes, for everything drilled with synthetic oil base

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. All drill cuttings will be disposed of in Meadowfill Landfill (Permit# SWF-1032)

-If left in pit and plan to solidify what medium will be used? Cement, lime, ____

-Landfill or offsite name/permit number? Wetzel County Landfill SWF-1021/WV0109185, Northwestern Landfill SWF-1025, Meadowfill Landfill SWF-1032 and Arden Landfill SWF-100172 in Washington County, PA

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 Vice President

RECEIVED
Office of Oil & Gas
JUN 07 2012
WV Department of
Environmental Protection

Subscribed and sworn before me this 7th day of May, 20 12

David W. Perkinson Notary Public

My commission expires June 11, 2020

OFFICIAL SEAL
Notary Public, State of West Virginia
DAVID W. PERKINSON
377 Eastview Drive
Parkersburg, WV 26104
My commission expires June 11, 2020

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Rev. 1/12

API No. 47 - 051 -
Operator's Well No. Hoyt-South No.5H

Property Boundary		Diversion	
Road		Spring	
Existing Fence		Wet Spot	
Planned Fence		Drain Pipe w/ size in inches	12
Stream		Waterway	
Open Ditch		Cross Drain	
Rock		Artificial Filter Strip	
North	N	Pit: Cut Walls	
Buildings		Pit: Compacted Fill Walls	
Water Wells	W	Area for Land Application of Pit Waste	
Drill Sites			

Proposed Revegetation Treatment: Acres Disturbed 26.92 Prevegetation pH _____

Lime 3 Tons/acre or to correct to pH 6.5

Fertilizer (10-20-20 or equivalent) 1/3 ton lbs/acre (500 lbs minimum)

Mulch Hay 2 Tons/acre

Seed Mixtures

Area I Seed Type	lbs/acre	Area II Seed Type	lbs/acre
Meadow Mix	40	Orchard Grass	15
Alsike Clover	5	Alsike Clover	5
Annual Rye	15		

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

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: [illegible]

Comments: _____

Title: Oil & Gas Inspector Date: 5-17-12

Field Reviewed? (✓) Yes ( ) No

51-0157

GASTAR EXPLORATION USA, INC.

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

Slot: Slot #5
Well: Hoyt-South 5H
Wellbore: Hoyt-South 5H (PWB)

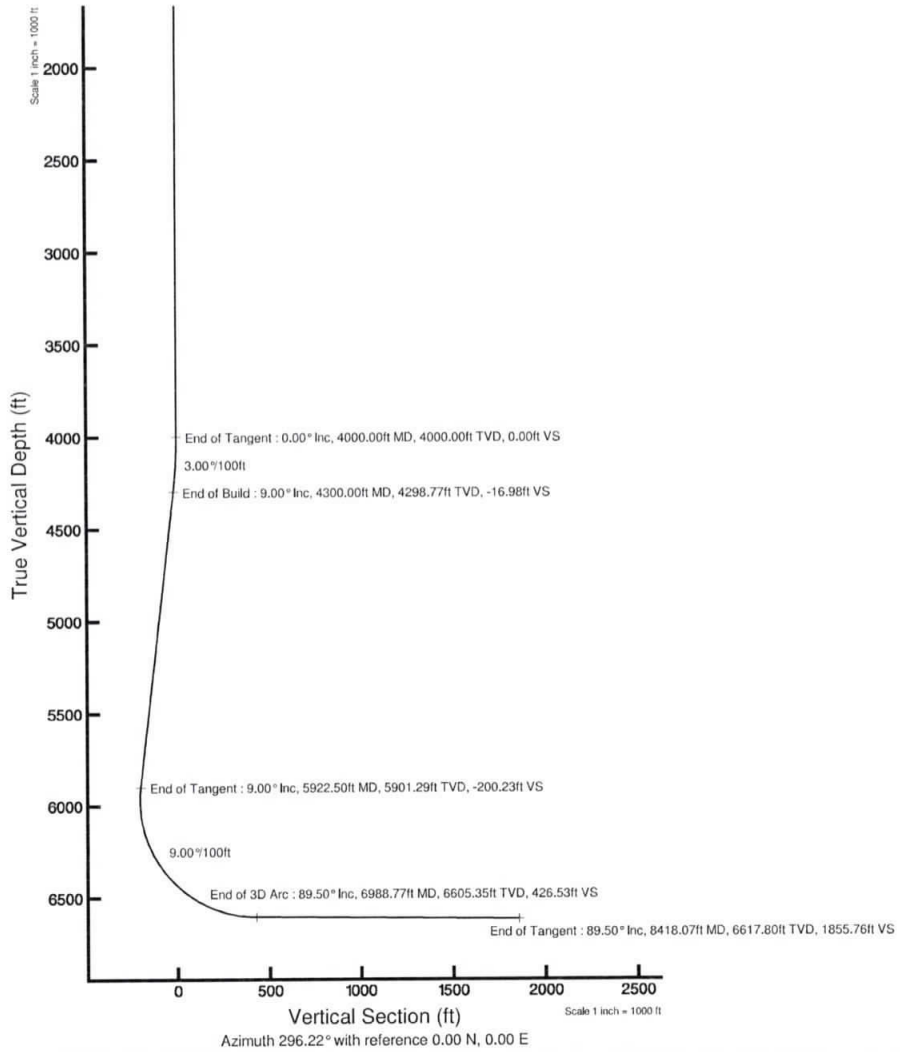
BAKER HUGHES

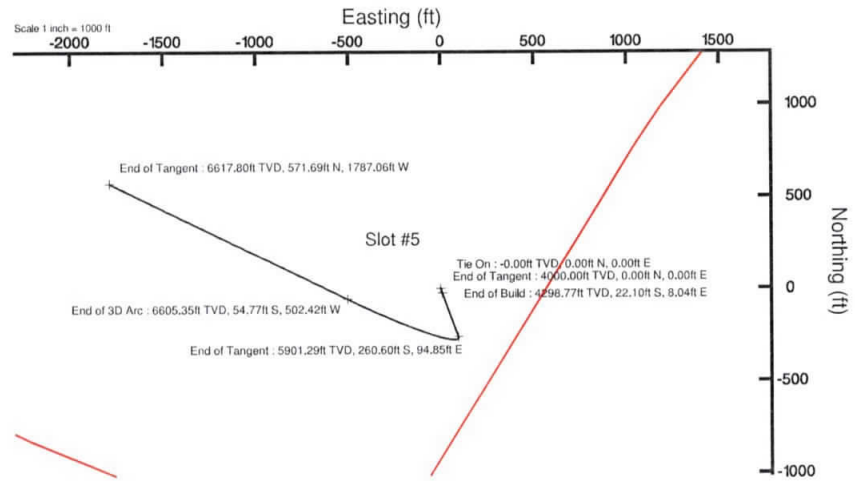
Well Profile Data

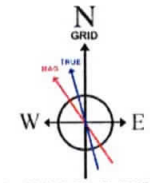
Design Comment	MD (ft)	Inc (°)	Az (°)	TVD (ft)	Local N (ft)	Local E (ft)	DLS (°/100ft)	VS (ft)
Tie On	0.00	0.000	160.000	0.00	0.00	0.00	0.00	0.00
End of Tangent	4000.00	0.000	160.000	4000.00	0.00	0.00	0.00	0.00
End of Build	4300.00	9.000	160.000	4298.77	-22.10	8.04	3.00	-16.98
End of Tangent	5922.50	9.000	160.000	5901.29	-260.60	94.85	0.00	-200.23
End of 3D Arc	6988.77	89.501	295.996	6605.35	-54.77	-502.42	9.00	426.53
End of Tangent	8418.07	89.501	295.996	6617.80	571.69	-1787.06	0.00	1855.76

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 #5	-11.71	-16.21	1698603.180	14444989.730	39°46'31.176"N	80°47'34.462"W
Rig on Slot #5 (RT) to Mud line (At Slot: Slot #5)					0ft	
Mean Sea Level to Mud line (At Slot: Slot #5)					-1364ft	
Rig on Slot #5 (RT) to Mean Sea Level					1364ft	







BGGM (1945.0 to 2013.0) Dip: 67.43° Field: 52799.6 nT
Magnetic North is 8.55 degrees West of True North (at 03/Feb/2012)
Grid North is 0.13 degrees East of True North
To correct azimuth from True to Grid subtract 0.13 degrees
To correct azimuth from Magnetic to Grid subtract 8.68 degrees
For example: if the Magnetic North Azimuth = 90 degs, then the Grid North Azimuth = 90 - 8.68 = 81.32

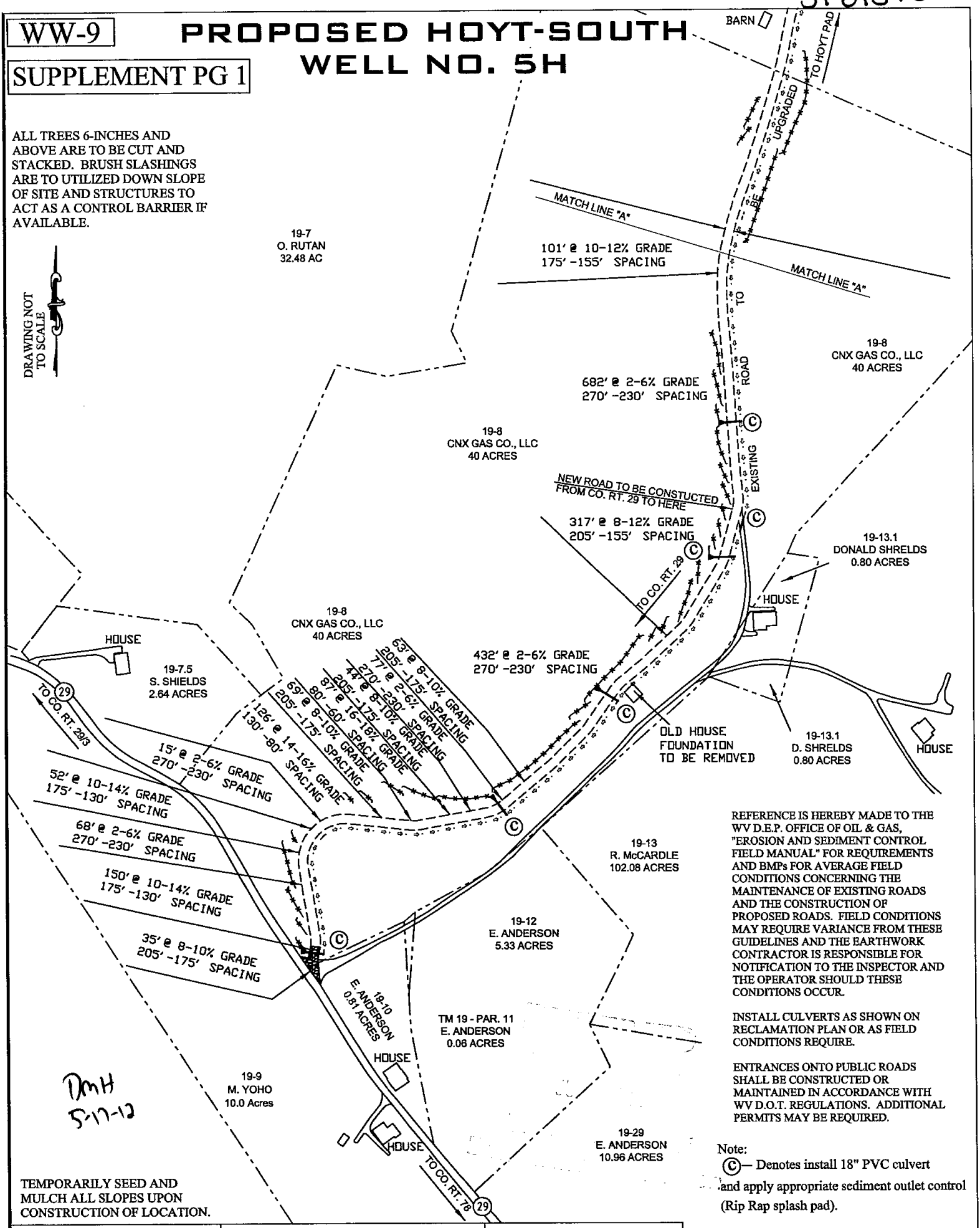
51-01570

WW-9

SUPPLEMENT PG 1

PROPOSED HOYT-SOUTH WELL NO. 5H

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.



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.

DMH
5-17-12

TEMPORARILY SEED AND MULCH ALL SLOPES UPON CONSTRUCTION OF LOCATION.

Note:
Ⓒ— Denotes install 18" PVC culvert and apply appropriate sediment outlet control (Rip Rap splash pad).

-x-x-x-x- Silt Fence and or Sediment and Erosion Control Measure.

DATE: 03/20/12	PROJECT NO: W0100283	DRAWN BY: J.N.W.

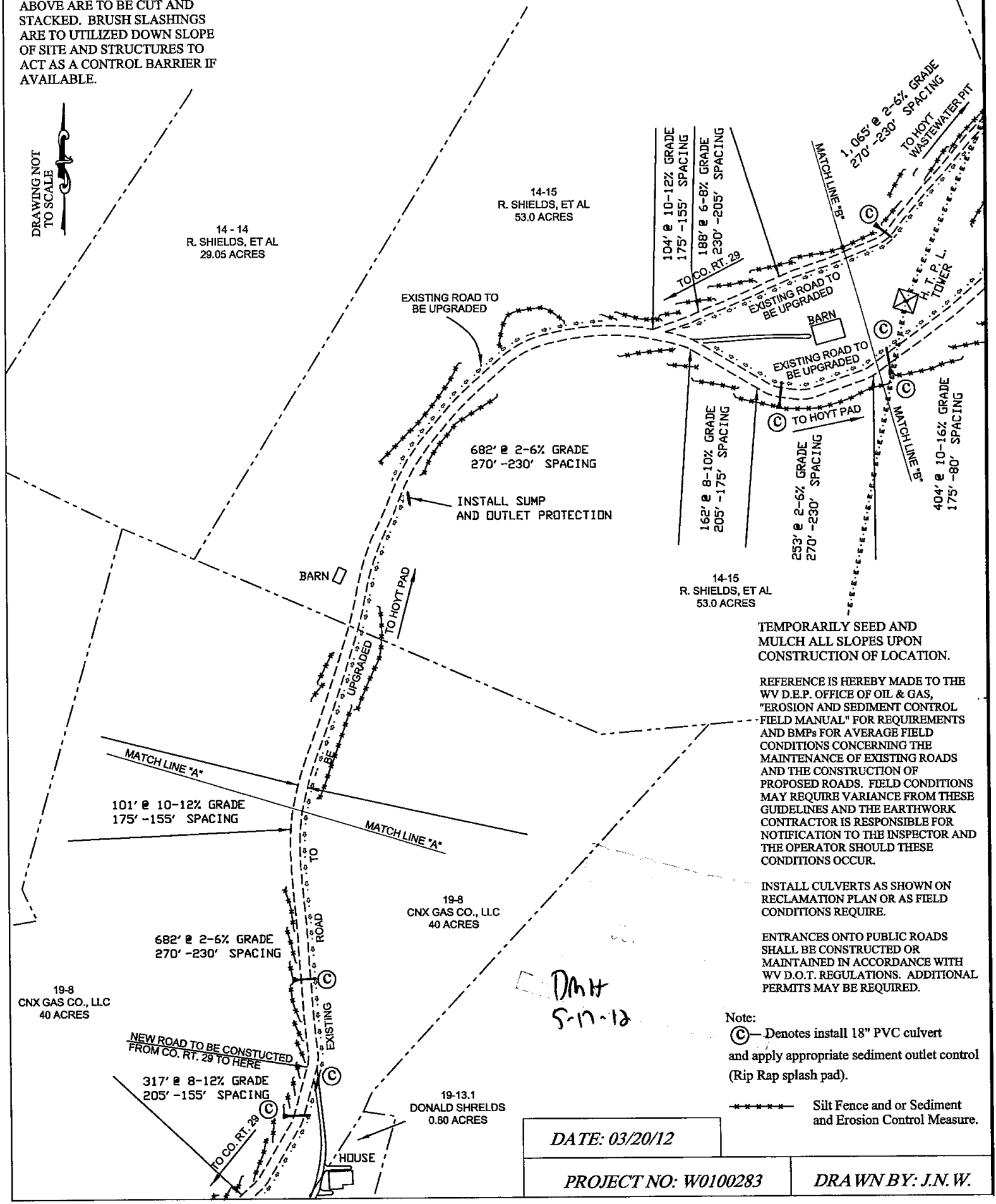
S1-01570

WW-9

PROPOSED HOYT-SOUTH WELL NO. 5H

SUPPLEMENT PG 2

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.



TEMPORARILY SEED AND MULCH ALL SLOPES UPON CONSTRUCTION OF LOCATION.

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DMH
5-17-12

Note:
Ⓒ— Denotes install 18" PVC culvert and apply appropriate sediment outlet control (Rip Rap splash pad).

Silt Fence and or Sediment and Erosion Control Measure.

DATE: 03/20/12	
PROJECT NO: W0100283	DRAWN BY: J.N.W.

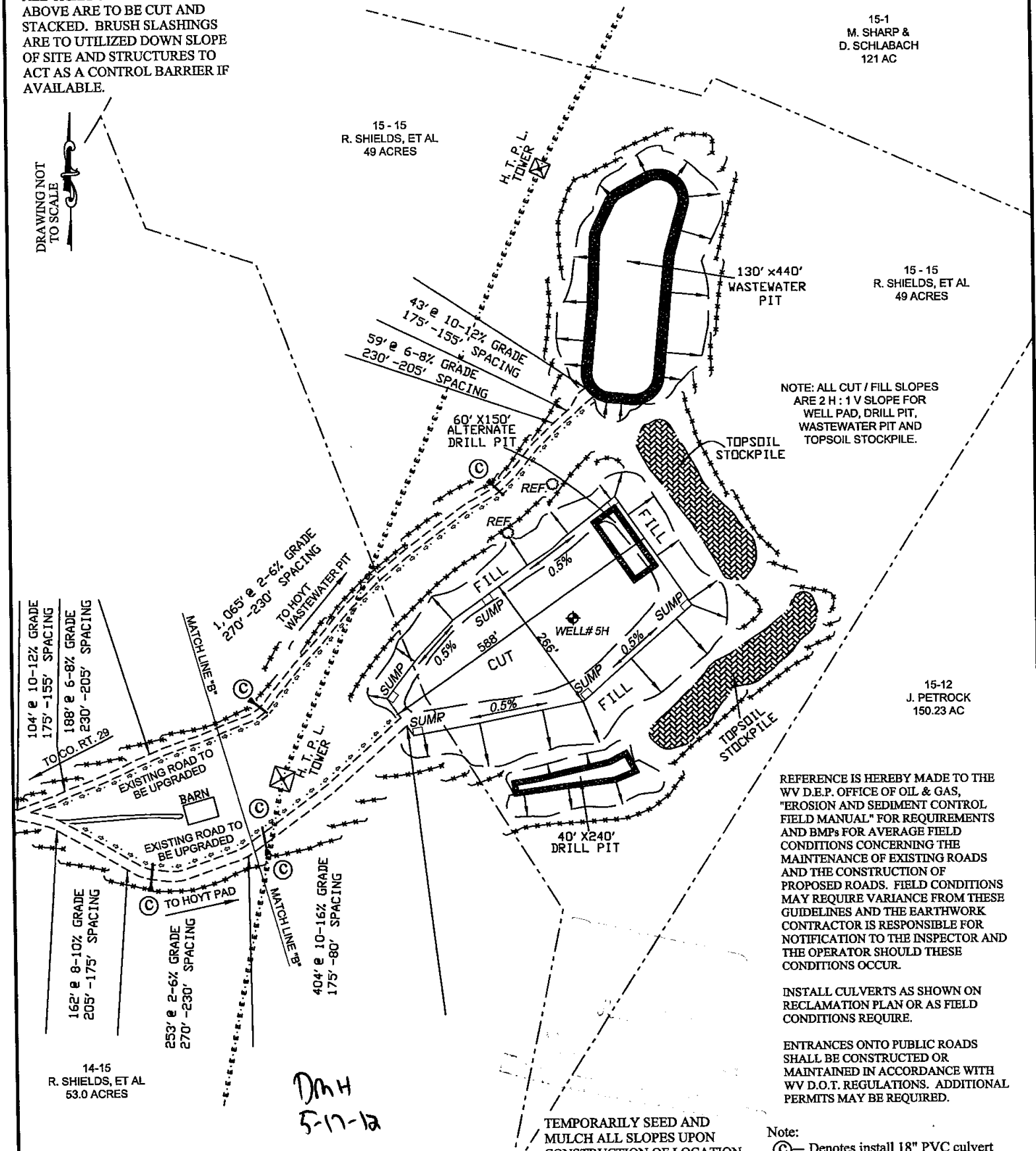
51-01570

WW-9

PROPOSED HOYT-SOUTH WELL NO. 5H

SUPPLEMENT PG 3

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.



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

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.

DMH
5-17-12

TEMPORARILY SEED AND MULCH ALL SLOPES UPON CONSTRUCTION OF LOCATION.

Note:
Ⓒ— Denotes install 18" PVC culvert and apply appropriate sediment outlet control (Rip Rap splash pad).

Silt Fence and or Sediment and Erosion Control Measure.

DATE: 03/20/12	
PROJECT NO: W0100283	DRAWN BY: J.N.W.

4/9/2012

GASTAR EXPLORATION USA

HOYT SOUTH WELL No. 5H

WELL SITE SAFETY PLAN

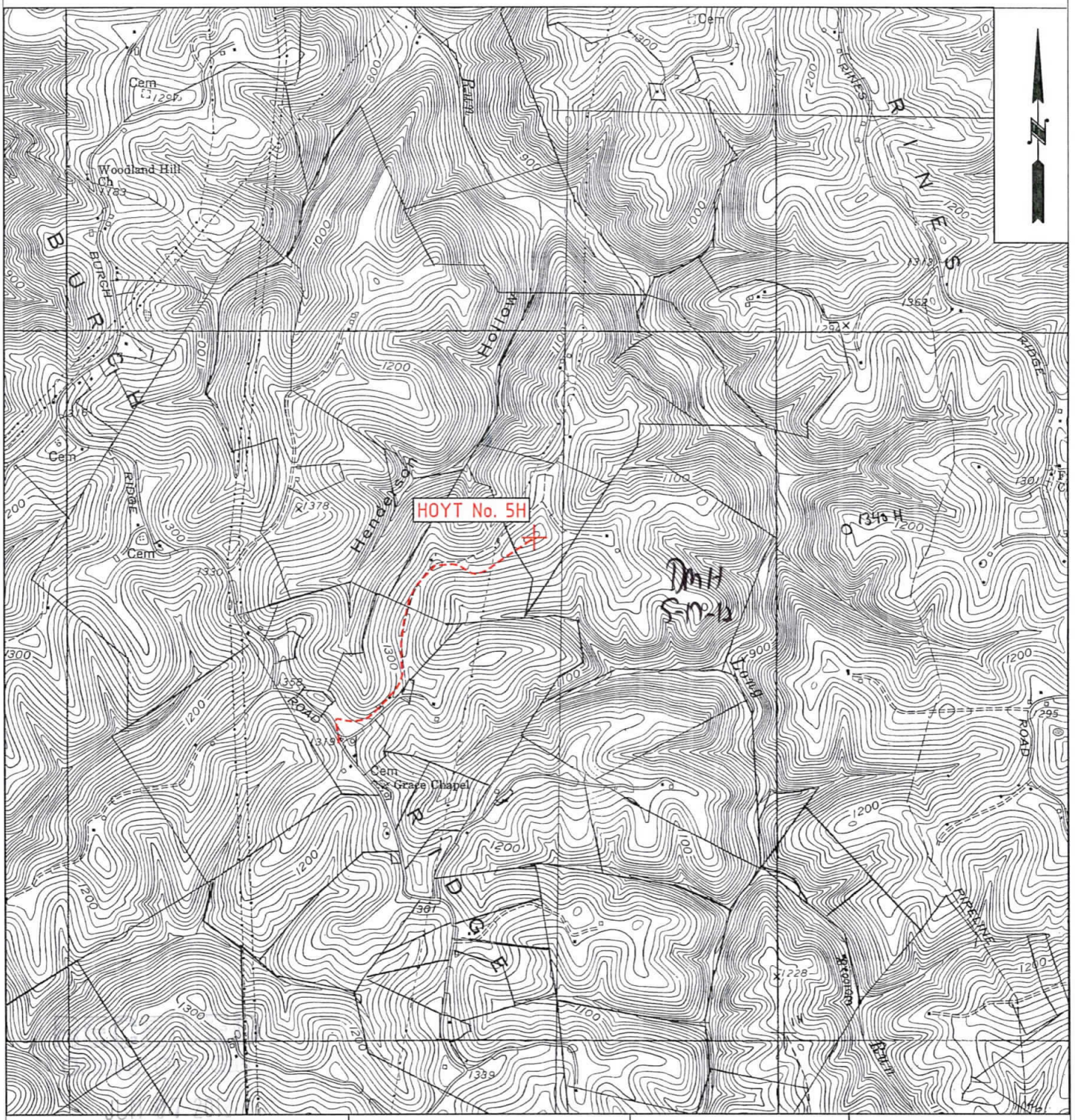
DMH
5-17-12

51-01570

WW-9

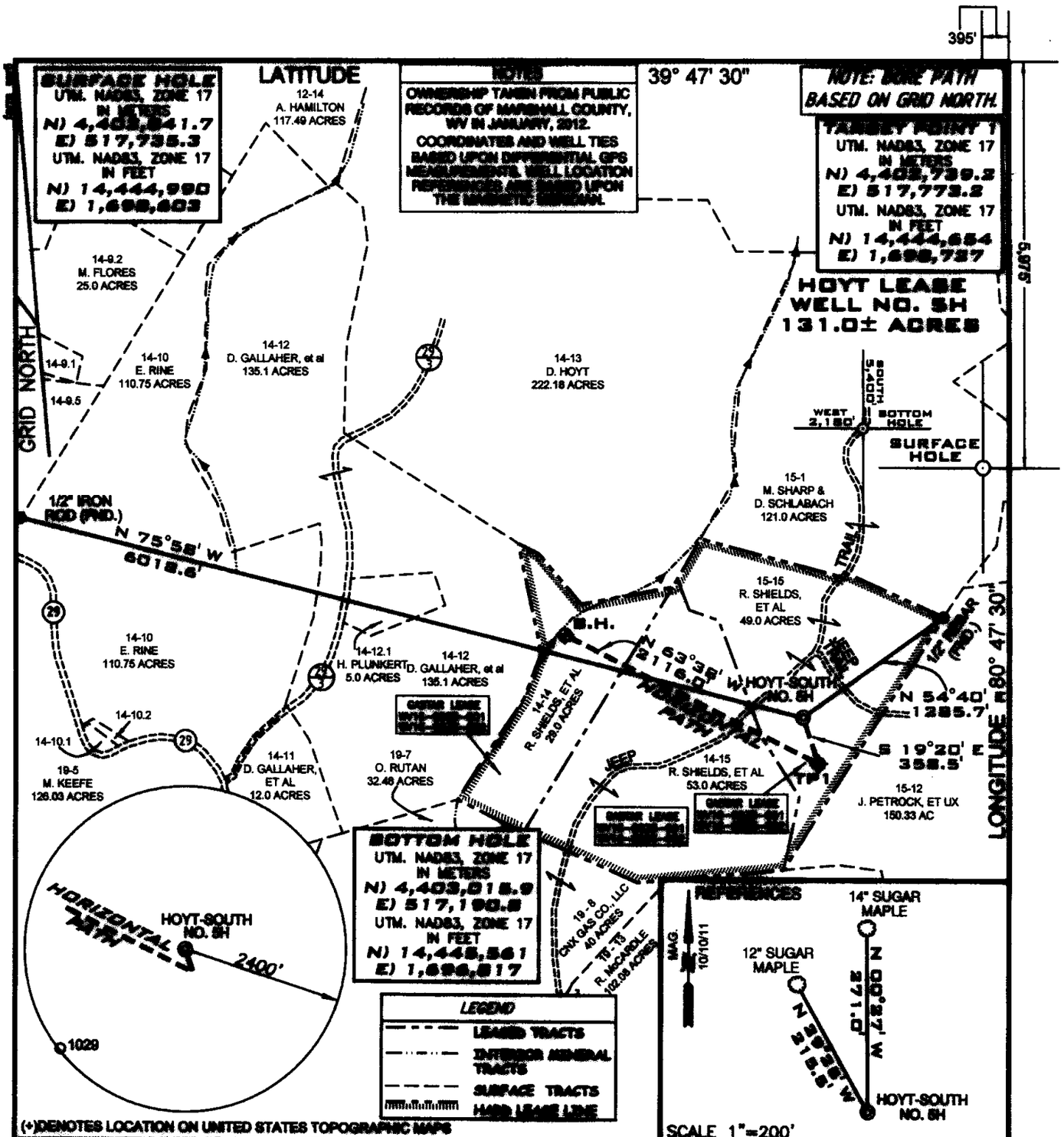
PROPOSED HOYT SOUTH WELL No. 5H

SUPPLEMENT PG 4



OPERATOR	TOPO SECTION	LEASE NAME
GASTAR EXPLORATION USA, Inc. 229 W Main Street, Suite 301 Clarksburg, WV 26301	POWHATAN POINT 7.5'	HOYT
	SCALE:	DATE:
	1"=2000'	DATE: 03/16/12

W0100283



FILE NUMBER W0100283 (WB1-28)

DRAWING NUMBER HOYT_WP_5H_REV1

SCALE 1" = 1000'

MINIMUM DEGREE OF ACCURACY 1/200

PROVEN SOURCE OF ELEVATION SUBMETER MAPPING GRADE GPS

I, THE UNDERSIGNED, HEREBY CERTIFY THIS MAP 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 NO. 2122 STATE OF WEST VIRGINIA PROFESSIONAL SURVEYOR

SEAL

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

DATE: JULY 03, 2012

OPERATORS WELL NO. HOYT-SOUTH NO. 5H

API WELL NO. 47 - 051 - 01570H6A
STATE COUNTY PERMIT

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

LOCATION ELEVATION 1364' WATERSHED TRIBUTARY OF LONG RUN

DISTRICT FRANKLIN COUNTY MARSHALL

QUADRANGLE POWHATAN POINT 7.5' LEASE NUMBER WV18-0035-001, WV18-0035-002

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 131.0

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

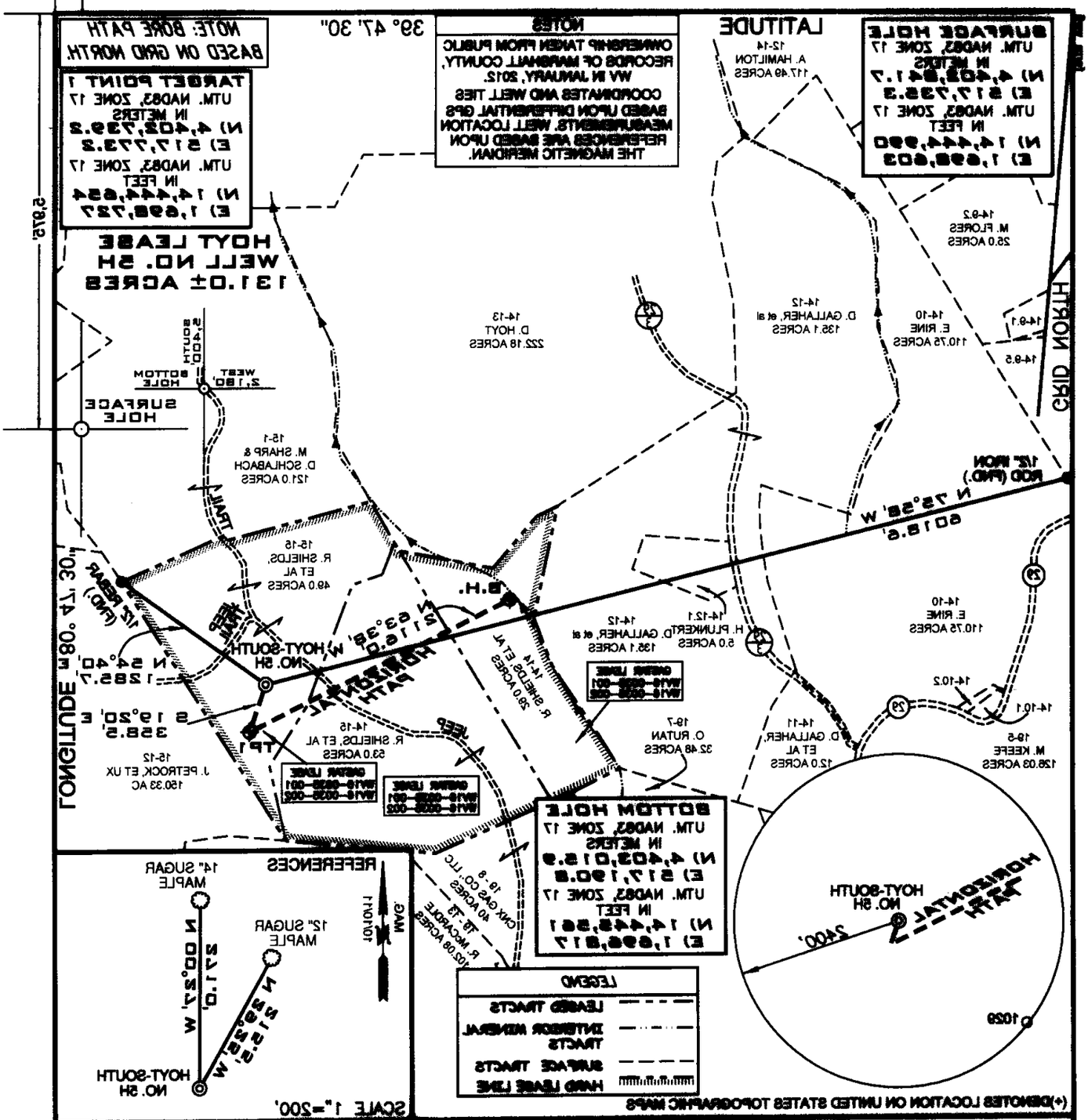
TARGET FORMATION MARCELLUS ESTIMATED DEPTH 6575' + Horizontal Leg

WELL OPERATOR GASTAR EXPLORATION USA, 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

COUNTY NAME

PERMIT



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

SEAL

LICENSED
No. 2122
STATE OF WEST VIRGINIA
Jonathan N. Wells
PROFESSIONAL SURVEYOR

FILE NUMBER WO10028 3 (WB1-28)

DRAWING NUMBER HOYT_WP_5H_REV1

SCALE 1" = 1000'

MINIMUM DEGREE OF ACCURACY 1/200

PROVEN SOURCE OF ELEVATION SUBMETER MAPPING GRADE GPS

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

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

LOCATION ELEVATION 1364' WATERSHED TRIBUTARY OF LONG RUN

DISTRICT FRANKLIN COUNTY MARSHALL

QUADRANGLE POWHATAN POINT 7.5' LEASE NUMBER WV18-0035-001, WV18-0035-002

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 131.0

PROPOSED WORK: DRILL X CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE X PLUG OFF OLD FORMATION ___
PERFORATE NEW FORMATION ___ OTHER PHYSICAL CHANGE (SPECIFY)

PLUG & ABANDON ___ CLEAN OUT & REPLUG ___

TARGET FORMATION MARCELLUS ESTIMATED DEPTH 6575' + Horizontal Leg

WELL OPERATOR GASTAR EXPLORATION USA, 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

PERMIT

COUNTY NAME

API WELL NO.
47 - 051 - 01570HLA
STATE COUNTY PERMIT

OPERATORS WELL NO. HOYT-SOUTH NO. 5H

DATE: JULY 03, 2012

WW-6AC
(1/12)

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE CERTIFICATION

Date of Notice Certification: 05/07/2012

API No. 47- 051 -
Operator's Well No. Hoyt-South No.5H
Well Pad Name: Hoyt

Notice has been given:
Pursuant to the provisions in West Virginia Code § 22-6A, the Operator has provided the required parties with the Notice Forms listed below for the tract of land as follows:

State:	West Virginia	UTM NAD 83	Easting:	517,735.3 Meters
County:	Marshall		Northing:	4,402,841.7 Meters
District:	Franklin	Public Road Access:		County Route 29 (Burch Ridge)
Quadrangle:	Powhatan Point 7.5'	Generally used farm name:		Shields
Watershed:	Tributary of Long Run			

Pursuant to West Virginia Code § 22-6A-7(b), every permit application filed under this section shall be on a form as may be prescribed by the secretary, shall be verified and shall contain the following information: (14) A certification from the operator that (i) it has provided the owners of the surface described in subdivisions (1), (2) and (4), subsection (b), section ten of this article, the information required by subsections (b) and (c), section sixteen of this article; (ii) that the requirement was deemed satisfied as a result of giving the surface owner notice of entry to survey pursuant to subsection (a), section ten of this article six-a; or (iii) the notice requirements of subsection (b), section sixteen of this article were waived in writing by the surface owner; and Pursuant to West Virginia Code § 22-6A-11(b), the applicant shall tender proof of and certify to the secretary that the notice requirements of section ten of this article have been completed by the applicant.

Pursuant to West Virginia Code § 22-6A, the Operator has attached proof to this Notice Certification that the Operator has properly served the required parties with the following: *PLEASE CHECK ALL THAT APPLY	OOG OFFICE USE ONLY
☐ 1. NOTICE OF SEISMIC ACTIVITY or ■ NOTICE NOT REQUIRED BECAUSE NO SEISMIC ACTIVITY WAS CONDUCTED	☑ RECEIVED/ NOT REQUIRED
■ 2. NOTICE OF ENTRY FOR PLAT SURVEY or ☐ NO PLAT SURVEY WAS CONDUCTED	☐ RECEIVED
☐ 3. NOTICE OF INTENT TO DRILL or ■ NOTICE NOT REQUIRED BECAUSE NOTICE OF ENTRY FOR PLAT SURVEY WAS CONDUCTED or	☑ RECEIVED/ NOT REQUIRED
☐ WRITTEN WAIVER BY SURFACE OWNER (PLEASE ATTACH)	
■ 4. NOTICE OF PLANNED OPERATION	☑ RECEIVED
■ 5. PUBLIC NOTICE	☑ RECEIVED
■ 6. NOTICE OF APPLICATION	☑ RECEIVED

Required Attachments:
The Operator shall attach to this Notice Certification Form all Notice Forms and Certifications of Notice that have been provided to the required parties and/or any associated written waivers. For the Public Notice, the operator shall attach a copy of the Class II Legal Advertisement with publication date verification or the associated Affidavit of Publication. The attached Notice Forms and Certifications of Notice shall serve as proof that the required parties have been noticed as required under West Virginia Code § 22-6A. Pursuant to West Virginia Code § 22-6A-11(b), the Certification of Notice to the person may be made by affidavit of personal service, the return receipt card or other postal receipt for certified mailing.

WW-6AC
(1/12)

Certification of Notice is hereby given:

THEREFORE, I Michael McCown, have read and understand the notice requirements within West Virginia Code § 22-6A. I certify that as required under West Virginia Code § 22-6A, I have served the attached copies of the Notice Forms, identified above, to the required parties through personal service, by registered mail or by any method of delivery that requires a receipt or signature confirmation. I certify under penalty of law that I have personally examined and am familiar with the information submitted in this Notice Certification and all attachments, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Well Operator:	Gastar Exploration USA, Inc.	Address:	229 West Main St., Suite 301
By:	Michael McCown Michael McCown		Clarksburg, WV 26301
Its:	Vice President	Facsimile:	304-622-4824
Telephone:	304-622-4796	Email:	dperkinson@gastar.com

NOTARY SEAL
OFFICIAL SEAL
Notary Public, State of West Virginia
DAVID W. PERKINSON
377 Eastview Drive
Parkersburg, WV 26104
My commission expires June 11, 2020

Subscribed and sworn before me this 29th day of May 2012

David W. Perkinson Notary Public

My Commission Expires June 11, 2020

Oil and Gas Privacy Notice:

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.

WW-6A
(1-12)

API NO. 47- 09 - 00131
OPERATOR WELL NO. Mason Cottrell OHI 1H
Well Pad Name: Mason Cottrell OHI Pad

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE OF APPLICATION

Notice Time Requirement: notice shall be provided no later than the **filing date of permit application.**
Date of Notice: 02/28/2012 **Date Permit Application Filed:** 02/29/2012

Notice of:

☒ PERMIT FOR ANY WELL WORK

☐ CERTIFICATE OF APPROVAL FOR THE CONSTRUCTION OF AN IMPOUNDMENT OR PIT

Delivery method pursuant to West Virginia Code § 22-6A-10(b)

☐ PERSONAL SERVICE

☒ REGISTERED MAIL

☐ METHOD OF DELIVERY THAT REQUIRES A RECEIPT OR SIGNATURE CONFIRMATION

Pursuant to W. Va. Code § 22-6A-10(b), no later than the filing date of the application, the applicant for a permit for any well work or for a certificate of approval for the construction of an impoundment or pit as required by this article shall deliver, by personal service or by registered mail or by any method of delivery that requires a receipt or signature confirmation, copies of the application, the erosion and sediment control plan required by section seven of this article, and the well plat to each of the following persons: (1) The owners of record of the surface of the tract on which the well is or is proposed to be located; (2) The owners of record of the surface tract or tracts overlying the oil and gas leasehold being developed by the proposed well work, if the surface tract is to be used for roads or other land disturbance as described in the erosion and sediment control plan submitted pursuant to subsection (c), section seven of this article; (3) The coal owner, operator or lessee, in the event the tract of land on which the well proposed to be drilled is located [sic] is known to be underlain by one or more coal seams; (4) The owners of record of the surface tract or tracts overlying the oil and gas leasehold being developed by the proposed well work, if the surface tract is to be used for the placement, construction, enlargement, alteration, repair, removal or abandonment of any impoundment or pit as described in section nine of this article; (5) Any surface owner or water purveyor who is known to the applicant to have a water well, spring or water supply source located within one thousand five hundred feet of the center of the well pad which is used to provide water for consumption by humans or domestic animals; and (6) The operator of any natural gas storage field within which the proposed well work activity is to take place. (c)(1) If more than three tenants in common or other co-owners of interests described in subsection (b) of this section hold interests in the lands, the applicant may serve the documents required upon the person described in the records of the sheriff required to be maintained pursuant to section eight, article one, chapter eleven-a of this code. (2) Notwithstanding any provision of this article to the contrary, notice to a lien holder is not notice to a landowner, unless the lien holder is the landowner.

Notice is hereby provided to:

☒ SURFACE OWNER(s)
Name: Mason Louis Cottrell Trust % Louis Cottrell Jr. ✓
Address: 648 Gashell Run Road
Tridelphia, WV 26059
Name:
Address:

☐ SURFACE OWNER(s) (Road and/or Other Disturbance)
Name:
Address:
Name:
Address:

☐ SURFACE OWNER(s) (Impoundments/Pits)
Name:
Address:

☒ COAL OWNER OR LESSEE
Name: Alliance Resources GP, LLC ✓
Address: 2596 Battle Run Road
Tridelphia, WV 26059

☐ COAL OPERATOR
Name:
Address:

☒ WATER PURVEYOR(s)
Name: Francis & Daisy Riggs ✓
Address: RR 1 Box 134
Wheeling, WV 26003

☐ OPERATOR OF ANY NATURAL GAS STORAGE FIELD
Name:
Address:

*Please attach additional forms if necessary

WW-6A
(1-12)

API NO. 47- 09 - 00131
OPERATOR WELL NO. Mason Cottrell OHI 1H
Well Pad Name: Mason Cottrell OHI Pad

Notice is hereby given:
Pursuant to West Virginia Code § 22-6A-10(b), notice is hereby given that the undersigned well operator has applied for a permit for well work or for a certificate of approval for the construction of an impoundment or pit.

This Notice Shall Include:
Pursuant to W. Va. Code § 22-6A-10(b), this notice shall include: (1) copies of the application; (2) the erosion and sediment control plan required by section seven of this article; and (3) the well plat.

Pursuant to W. Va. Code § 22-6A-10(f), this notice shall also include: (1) a statement of the time limits for filing written comments; (2) who may file written comments; (3)the name and address of the secretary for the purpose of filing the comments and obtaining additional information; and (4) a statement that the persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water.

Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx.

Water Well Testing:
Pursuant to West Virginia Code § 22-6A-10(d), notification shall be made, with respect to surface landowners identified in subsection (b) or water purveyors identified in subdivision (5), subsection (b) of this section, of the opportunity for testing their water well.

Water Testing Laboratories:
Pursuant to West Virginia Code § 22-6A-10(i), persons entitled to notice pursuant to subsection (b) of this section may contact the department to ascertain the names and locations of water testing laboratories in the subject area capable and qualified to test water supplies in accordance with standard accepted methods. In compiling that list of names the department shall consult with the state Bureau for Public Health and local health departments.

Well Location Restrictions
Pursuant to W. Va. Code § 22-6A-12, Wells may not be drilled within two hundred fifty feet measured horizontally from any existing water well or developed spring used for human or domestic animal consumption. The center of well pads may not be located within six hundred twenty-five feet of an occupied dwelling structure, or a building two thousand five hundred square feet or larger used to house or shelter dairy cattle or poultry husbandry. This limitation is applicable to those wells, developed springs, dwellings or agricultural buildings that existed on the date a notice to the surface owner of planned entry for surveying or staking as provided in section ten of this article or a notice of intent to drill a horizontal well as provided in subsection (b), section sixteen of this article was provided, whichever occurs first, and to any dwelling under construction prior to that date. This limitation may be waived by written consent of the surface owner transmitted to the department and recorded in the real property records maintained by the clerk of the county commission for the county in which such property is located. Furthermore, the well operator may be granted a variance by the secretary from these distance restrictions upon submission of a plan which identifies the sufficient measures, facilities or practices to be employed during well site construction, drilling and operations. The variance, if granted, shall include terms and conditions the department requires to ensure the safety and protection of affected persons and property. The terms and conditions may include insurance, bonding and indemnification, as well as technical requirements. (b) No well pad may be prepared or well drilled within one hundred feet measured horizontally from any perennial stream, natural or artificial lake, pond or reservoir, or a wetland, or within three hundred feet of a naturally reproducing trout stream. No well pad may be located within one thousand feet of a surface or ground water intake of a public water supply. The distance from the public water supply as identified by the department shall be measured as follows: (1) For a surface water intake on a lake or reservoir, the distance shall be measured from the boundary of the lake or reservoir. (2) For a surface water intake on a flowing stream, the distance shall be measured from a semicircular radius extending upstream of the surface water intake. (3) For a groundwater source, the distance shall be measured from the wellhead or spring. The department may, in its discretion, waive these distance restrictions upon submission of a plan identifying sufficient measures, facilities or practices to be employed during well site construction, drilling and operations to protect the waters of the state. A waiver, if granted, shall impose any permit conditions as the secretary considers necessary. (c) Notwithstanding the foregoing provisions of this section, nothing contained in this section prevents an operator from conducting the activities permitted or authorized by a Clean Water Act Section 404 permit or other approval from the United States Army Corps of Engineers within any waters of the state or within the restricted areas referenced in this section. (d) The well location restrictions set forth in this section shall not apply to any well on a multiple well pad if at least one of the wells was permitted prior to the effective date of this article. (e) The secretary shall, by December 31, 2012, report to the Legislature on the noise, light, dust and volatile organic compounds generated by the drilling of horizontal wells as they relate to the well location restrictions regarding occupied dwelling structures pursuant to this section. Upon a finding, if any, by the secretary that the well location restrictions regarding occupied dwelling structures are inadequate or otherwise require alteration to address the items examined in the study required by this subsection, the secretary shall have the authority to propose for promulgation legislative rules establishing guidelines and procedures regarding reasonable levels of noise, light, dust and volatile organic compounds relating to drilling horizontal wells, including reasonable means of mitigating such factors, if necessary.

WW-6A
(1-12)

API NO. 47- 09 - 00131
OPERATOR WELL NO. Mason Cottrell OHI 1H
Well Pad Name: Mason Cottrell OHI Pad

Written Comment:
Pursuant to West Virginia Code § 22-6A-11(a), all persons described in subsection (b), section ten of this article may file written comments with the secretary as to the location or construction of the applicant's proposed well work within thirty days after the application is filed with the secretary. All persons described in West Virginia Code § 22-6A-10(b) may file written comments as to the location or construction of the applicant's proposed well work to the Secretary at:

Chief, Office of Oil and Gas
Department of Environmental Protection
601 57th St. SE
Charleston, WV 25304
(304) 926-0450

Such persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water. **NOTE: YOU ARE NOT REQUIRED TO FILE ANY COMMENT.**

Time Limits and Methods for Filing Comments.
The law requires these materials to be served on or before the date the operator files its Application. You have **THIRTY (30) DAYS** after the filing date to file your comments. Comments must be filed in person or received in the mail by the Chief's office by the time stated above. You may call the Chief's office to be sure of the date. Check with your postmaster to ensure adequate delivery time or to arrange special expedited handling. If you have been contacted by the well operator and you have signed a "voluntary statement of no objection" to the planned work described in these materials, then the permit may be issued at any time.

Pursuant to West Virginia Code § 22-6A-11(c)(2), Any objections of the affected coal operators and coal seam owners and lessees shall be addressed through the processes and procedures that exist under sections fifteen, seventeen and forty, article six of this chapter, as applicable and as incorporated into this article by section five of this article. The written comments filed by the parties entitled to notice under subdivisions (1), (2), (4), (5) and (6), subsection (b), section ten of this article shall be considered by the secretary in the permit issuance process, but the parties are not entitled to participate in the processes and proceedings that exist under sections fifteen, seventeen or forty, article six of this chapter, as applicable and as incorporated into this article by section five of this article.

Comment Requirements
Your comments must be in writing and include your name, address and telephone number, the well operator's name and well number and the approximate location of the proposed well site including district and county from the application. You may add other documents, such as sketches, maps or photographs to support your comments.

Permit Denial or Condition
The Chief has the power to deny or condition a well work permit. Pursuant to West Virginia Code § 22-6A-8(d), the permit may not be issued or be conditioned, including conditions with respect to the location of the well and access roads prior to issuance if the director determines that:

(1) The proposed well work will constitute a hazard to the safety of persons;
(2) The plan for soil erosion and sediment control is not adequate or effective;
(3) Damage would occur to publicly owned lands or resources; or
(4) The proposed well work fails to protect fresh water sources or supplies.

A permit may also be denied under West Virginia Code § 22-6A-7(k), the secretary shall deny the issuance of a permit if the secretary determines that the applicant has committed a substantial violation of a previously issued permit for a horizontal well, including the applicable erosion and sediment control plan associated with the previously issued permit, or a substantial violation of one or more of the rules promulgated under this article, and in each instance has failed to abate or seek review of the violation within the time prescribed by the secretary pursuant to the provisions of subdivisions (1) and (2), subsection (a), section five of this article and the rules promulgated hereunder, which time may not be unreasonable.

Pursuant to West Virginia Code § 22-6A-10(g), any person entitled to submit written comments to the secretary pursuant to subsection (a), section eleven of this article, shall also be entitled to receive from the secretary a copy of the permit as issued or a copy of the order modifying or denying the permit if the person requests receipt of them as a part of the written comments submitted concerning the permit application. Such persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water.

WW-6A
(1-12)

API NO. 47- 09 - 00131
OPERATOR WELL NO. Mason Cottrell OHI 1H
Well Pad Name: Mason Cottrell OHI Pad

Notice is hereby given by:

Well Operator:	Chesapeake Appalachia, LLC	Address:	PO Box 1300
Telephone:	304-517-1416		Jane Lew, WV 26378
Email:	dee.swiger@chk.com	Facsimile:	304-471-2497

Oil and Gas Privacy Notice:

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.

WW-6A5
(1/12)

Operator Well No. Hoyt-South No.5H

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE OF PLANNED OPERATION

Notice Time Requirement: notice shall be provided no later than the **filing date of permit application.**
Date of Notice: 05/07/2012 **Date Permit Application Filed:** 05/14/2012

Delivery method pursuant to West Virginia Code § 22-6A-16(c)

☒ CERTIFIED MAIL RETURN RECEIPT REQUESTED ☐ HAND DELIVERY

Pursuant to W. Va. Code § 22-6A-16(c), no later than the date for filing the permit application, an operator shall, by certified mail return receipt requested or hand delivery, give the surface owner whose land will be used for the drilling of a horizontal well notice of the planned operation. The notice required by this subsection shall include: (1) A copy of this code section; (2) The information required to be provided by subsection (b), section ten of this article to a surface owner whose land will be used in conjunction with the drilling of a horizontal well; and (3) A proposed surface use and compensation agreement containing an offer of compensation for damages to the surface affected by oil and gas operations to the extent the damages are compensable under article six-b of this chapter. (d) The notices required by this section shall be given to the surface owner at the address listed in the records of the sheriff at the time of notice.

Notice is hereby provided to the SURFACE OWNER(s)
(at the address listed in the records of the sheriff at the time of notice):

Name: Robert L. & Rebecca A. Shields
Address: RD 2, Box 53 1/2
Proctor, WV 26055

Name: Donald Shields
Address: RD 2, Box 54-A
Proctor, WV 26055

Notice is hereby given:
Pursuant to West Virginia Code § 22-6A-16(c), notice is hereby given that the undersigned well operator has developed a planned operation on the surface owner's land for the purpose of drilling a horizontal well on the tract of land as follows:

State: West Virginia
County: Marshall
District: Franklin
Quadrangle: Powhatan Point 7.5'
Watershed: Tributary of Long Run

UTM NAD 83 Easting: 517,735.3 Meters
Northing: 4,402,841.7 Meters
Public Road Access: County Route 29 (Burch Ridge)
Generally used farm name: Shields

This Notice Shall Include:
Pursuant to West Virginia Code § 22-6A-16(c), this notice shall include: (1)A copy of this code section; (2) The information required to be provided by **W. Va. Code § 22-6A-10(b)** to a surface owner whose land will be used in conjunction with the drilling of a horizontal well; and (3) A proposed surface use and compensation agreement containing an offer of compensation for damages to the surface affected by oil and gas operations to the extent the damages are compensable under article six-b of this chapter. Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx.

Well Operator: Gastar Exploration USA, Inc.
Telephone: 304-622-4796
Email: dperkinson@gastar.com

Address: 229 West Main St., Suite 301
Clarksburg, WV 26301
Facsimile: 304-622-4824

Oil and Gas Privacy Notice:
The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
Division of Highways
OFFICE OF THE DISTRICT ENGINEER
DISTRICT SIX
1 DOT Drive - Moundsville, WV 26041-2353 • 304/843-4008

Joe Manchin III
Governor

Drilling Operators Permit Conditions & Requirements

1. Applicant must place eight inches of stone aggregate for a distance of 100 feet from the edge of DOH pavement or traveled way.

2. This temporary drilling permit will expire when drilling operations cease. No work may be performed at this site after completion date, without obtaining written permission from District Six Permit Office you may call us at (304)843-4020.

3. The applicant must remove this temporary approach and return DOH right-of-way to its original condition before completion date.

4. This permit is valid only as a temporary access for the purpose of a drilling operation. The property owner must submit a separate application to obtain a permanent approach at this site.

5. Applicant must provide required Traffic Control at all times. Failure to provide Required Traffic Control will void this permit.

6. Applicant will notify County Superintendent, when drilling operations have ceased, for the purpose of a final inspection of this work site and Roadway.

7. At no time, may the drilling operation encroach on DOH right-of-way. Specifically, no operations may be conducted on the traveled way or within DOH right-of-way.

8. Applicant is responsible for immediate removal of mud and debris from roadway caused by any entity involved in this drilling operation.

9. A driveway shall not be approved for parking or loading areas that require backing maneuvers within the state highway right-of-way. Such parking areas must include on-site maneuvering areas and aisles to permit vehicles to enter and exit the site in forward drive without hesitation.

Failure to comply with any condition or requirement will void this permit.

S1-01570

GASTAR

PLANNED ADDITIVES TO BE USED IN FRACTURING OR STIMULATION

Hoyt - North # 1H
Hoyt – North # 2H
Hoyt – North # 3H
Hoyt – North # 4H
Hoyt – South # 5H
Hoyt – South # 6H
Hoyt – South # 7H

PRODUCT NAME:	CHEMICAL DESCRIPTION:	PRODUCT USE:	HAZARDOUS COMPONENT
GBW-20C	Hemicellulase Breaker	Breaker – Water	None
ALPHA 1427		Biocide	Glutaraldehyde - CAS#000111-30-8 Quatemary ammonium chloride CAS # 007173-51-5 Alky dimethyl benzyl ammonium Chloride (C12-16)-CAS#068424-85-1 Ethanol – CAS # 000064-17-5 Water – CAS # 007732-18-5
FRAC SAND	Silica Sand (various mesh sizes)	Proppant	Crystalline silica (quartz) CAS # 14808-60-7
S-8C, Sand	Silica Sand (100 mesh)	Sand	Silica – CAS # 14808-60-7
GW-3LDF		Gellant - Water	Petroleum Distillate Blend - Proprietary Guar gum – CAS # 009000-30-0
FRW-18		Friction Reducer	Hydrotreated light distillate CAS # 064742-47-8
Scaletrol		Scale Inhibitor	Ethylene glycol – CAS#000107-21-1 Diethylene glycol – CAS#000111-46-6

Gastar Exploration LTD.
229 West Main Street, Suite 301 · Clarksburg, WV 26301
Phone: (304) 622-4796 · Fax: (304) 622-4824

51-01570

GASTAR

PLANNED ADDITIVES TO BE USED IN FRACTURING OR STIMULATION

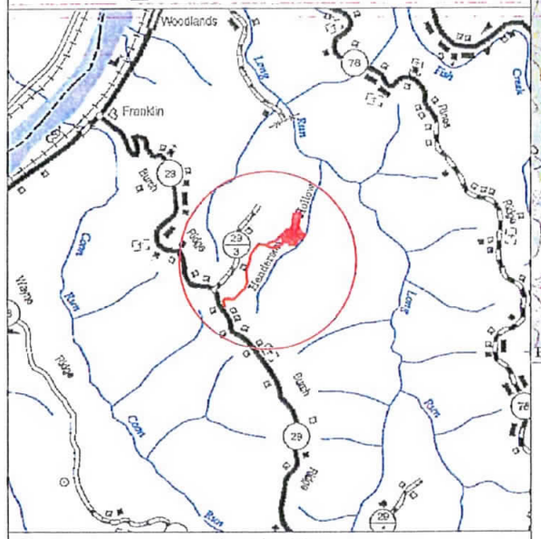
Hoyt - North # 1H
Hoyt – North # 2H
Hoyt – North # 3H
Hoyt – North # 4H
Hoyt – South # 5H
Hoyt – South # 6H
Hoyt – South # 7H

PRODUCT NAME:	CHEMICAL DESCRIPTION:	PRODUCT USE:	HAZARDOUS COMPONENT
GBW-20C	Hemicellulase Breaker	Breaker – Water	None
ALPHA 1427		Biocide	Glutaraldehyde - CAS#000111-30-8 Quatemary ammonium chloride CAS # 007173-51-5 Alky dimethyl benzyl ammonium Chloride (C12-16)-CAS#068424-85-1 Ethanol – CAS # 000064-17-5 Water – CAS # 007732-18-5
FRAC SAND	Silica Sand (various mesh sizes)	Proppant	Crystalline silica (quartz) CAS # 14808-60-7
S-8C, Sand	Silica Sand (100 mesh)	Sand	Silica – CAS # 14808-60-7
GW-3LDF		Gellant - Water	Petroleum Distillate Blend - Proprietary Guar gum – CAS # 009000-30-0
FRW-18		Friction Reducer	Hydrotreated light distillate CAS # 064742-47-8
Scaletrol		Scale Inhibitor	Ethylene glycol – CAS#000107-21-1 Diethylene glycol – CAS#000111-46-6

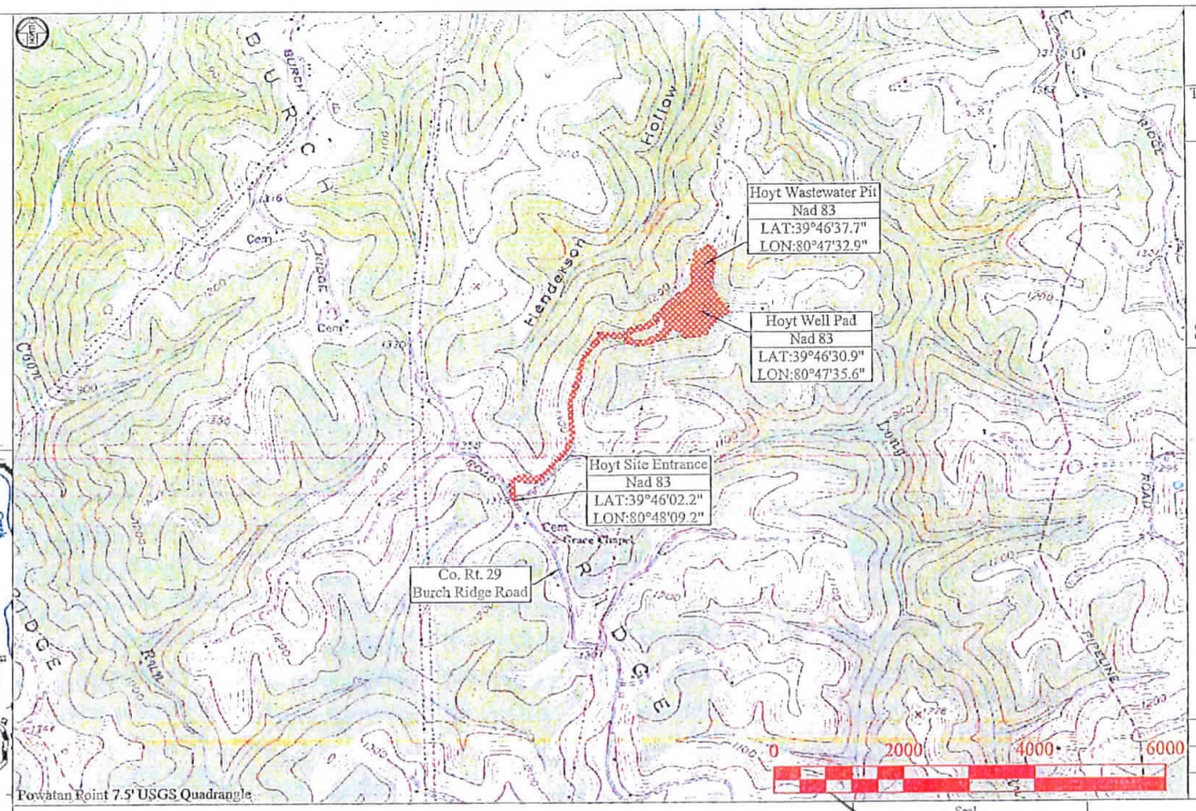
DMH
5-17-12

Gastar Exploration LTD.
229 West Main Street, Suite 301 · Clarksburg, WV 26301
Phone: (304) 622-4796 · Fax: (304) 622-4824

SI-01570



Location Map
Scale: 1" = 1 Mile
USGS 7.5' Quadrangle: New Martinsville
Watershed: Haynes Run - Ohio River



Project Site		Sheet 1 of 30
Hoyt Well Pad Site		
District	County	State
Franklin	Marshall	W.V.

This Pad is not in a flood zone as scaled from
FIRM Insurance Rate Map
Community Panel No.: 54051C 0145E

Gas Wells
- Hoyt - North 1H
- Hoyt - North 2H
- Hoyt - North 3H
- Hoyt - North 4H
- Hoyt - South 5H
- Hoyt - South 6H
- Hoyt - South 7H

Date:	Note:
Mar. 20, 2012	Design

Hoyt Well Pad Site
Construction Plan and
Erosion and Sediment Control Plan
Marshall County
Franklin District
Latitude 39°46'30.9"
Longitude 80°47'35.6"

DMH
5-17-12

Seal

JOHN P. SEE
REGISTERED
006051
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER

Design Certification

The drawings, construction notes and reference diagrams attached hereto have been prepared in accordance with the West Virginia Code of State Rules, Division of Environmental Protection, Office of Oil and Gas §35-4-21

All Plans, Sheets, and/or Reference Diagrams included in this design constitutes a complete set of plans. A complete set of plans is necessary to construct the site in accordance with the design.

John P. See RPE 6051:
Kelly Surveying PLLC
COA: C04232-00

Date: 03/26/12

Seal

As-Built Certification

This as-built certification certifies that the gas well drilling pad and frac pits were constructed in reasonable close conformance with the design drawings. It is recommended this gas well drilling pad and frac pits are included in the existing comprehensive maintenance and inspection program for gas well drilling pads and frac pits or that a comprehensive maintenance and inspection program be developed to monitor the pad and frac pits condition to insure the continued safe operation.

John P. See RPE 6051: _____ Date: _____

MISS UTILITY OF
WEST VIRGINIA
1-800-245-4848
West Virginia State Law
(Section XIV: Chapter 24-C requires that you call two business days before you dig in the state of West Virginia.
IT'S THE LAW

Kelly Surveying
P.O. Box 254
Dailey, WV 26259
(304)338-6985

District: Franklin
County: Marshall
State: West Virginia

GASTAR

51-0157D

Project Site		Sheet 2 of 30
Hoyt Well Pad Site		
District	County	State
Franklin	Marshall	W.V.

1. The Construction Drawings present the proposed lines, grades, and appurtenances to accomplish the intent of the Scope of Work.
2. The Construction Drawings show the construction lines, grades, depths and dimensions on which estimated quantities are based. The construction lines, grades, depths and dimensions are subject to variation necessary to obtain subgrade and/or final grade satisfactory to the Engineer. The Engineer reserves the right to increase or diminish construction lines, grades, depths and dimensions as necessary and according to site conditions.
3. All work performed and all material furnished shall conform to the lines, grades, cross sections, dimensions, and material requirements in reasonable close conformance with the Construction Drawings.
4. The Contractor shall provide all reasonable facilities and furnish the Engineer, the information, assistance, and samples required by the Engineer for proper monitoring and testing of materials and workmanship. The Contractor shall have on the Project at all times, a competent superintendent capable of reading and understanding the Construction Documents and thoroughly experienced in impoundment pond construction and who shall receive information from the Engineer.
5. Clearing shall be completed in accordance with Section 201 of the WVDOH Specifications. Clearing is defined as the removal of trees, brush, down timber, rotten wood, rubbish, and other vegetation, and objectionable materials at or above original ground elevation not designated to be retained. Clearing also includes removal of fences, posts, signs, and demolition or removal of other obstructions interfering with the proposed work.
6. Grubbing shall be completed in accordance with Section 201 of the WVDOH Specifications. Removal all stumps and roots within the cleared area unless otherwise approved by the Engineer. Grubbing is defined as the removal from below the original ground elevation of stumps, roots, stubs, brush, organic materials and debris as well as concrete and brick, and other obstructions interfering with the proposed work.
7. Strip topsoil to whatever depth it may occur from areas to be excavated, filled, or graded and stockpile at a location approved for use in finish grading. The topsoil shall not be used as backfill. Strip topsoil to full depth encountered in areas indicated to be graded in a manner to prevent intermingling with underlying subsoil or waste materials. Stockpile sufficient topsoil material to facilitate seeding and landscaping. Stockpile away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Protect soil stockpiles using erosions and sediment control measures as directed by the Engineer or project manager.
8. DO NOT deposit or bury on the site debris resulting from the clearing and grubbing without written permission from the Engineer or project manager.
9. All earthwork shall be in accordance with WVDOH Standard Specifications, Section 207, unless otherwise specified or altered by the additional specifications herein.
10. Subsequent to the removal of the topsoil, and prior to fill placement, exposed surface should be compacted and/or proof rolled until a relatively unyielding surface is achieved.
11. Suitable soil materials are as those complying with WVDOH Standard Specifications, Section 207.
12. On-site material for use as fill shall consist of excavated soil from other portions of the site. The Contractor shall use the on-site soil judiciously to facilitate the construction schedule including the use of the most readily compactable soil for fill. Topsoil shall not be utilized as engineered fill. Excavated material containing rock, stone or masonry debris smaller than six inches in its largest dimension, may be mixed with suitable material and utilized except in the impoundment pond core.
13. Excavated material containing rock, stone or masonry debris larger that two inches in its largest dimension may NOT be mixed with suitable material and utilized in the impoundment pond core
14. No material greater than six inches in its largest dimension may be utilized inside filling operations.
15. Imported fill shall be free of all hazardous substances. Certification of compliance and, if requested, test results substantiating compliance shall be furnished to the Engineer by the Contractor not less than one week prior to its intended use. The size of rock lifts shall not exceed thirty-six (36) inches. The rock shall not be greater in any dimension than thirty-six (36) inches. Rock is defined as follows:

a. General Excavation - Any material that cannot be excavated with a single-tooth ripper drawn by a crawler tractor having a minimum draw bar pull rated at not less than 71,000 lbs (Caterpillar D9N or equivalent), and occupying an original volume of at least 2 cubic yards or more.

16. Prevent surface water and subsurface water from flowing into excavations and flooding the work. Remove water from excavations to prevent softening of foundation soils and creating soil changes detrimental to the stability of subgrades. Provide and maintain pumps, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from the site. Convey water removed from excavations to collection locations or to runoff areas. During periods of inclimate weather, temporary slope drains may be utilized as necessary.
17. Stockpile excavated materials classified as satisfactory soil material where directed, shape the stockpiles for proper drainage.
18. Notify the engineer if unsuitable soil materials encountered excavate unsuitable soil materials encountered that extend below the required elevations, to the additional depth directed by the Engineer
19. Fill shall be placed in horizontal lifts of maximum loose depth of 12 inches. Compactor for mass earthwork shall be minimum five ton static drum weight vibratory roller or five ton static drum weight sheeps footed compactor as appropriate for the type of soil material at the site or other compactor approved by the Engineer. The impoundment pond core of the embankment shall be compacted using a sheeps foot compactor to provide integration of lifts. Contractor will guarantee 95% compaction.
20. In areas to receive fill and at the final cut subgrade, proof roll and compact the exposed ground surface following clearing and grubbing and any required excavation with a minimum of four passes of an approved compactor and obtain at least the density required for a suitable impoundment pond foundation and as indicated below. Proof rolling shall be under the observation of the engineer as described herein. Immediately following the completion of excavation to proposed subgrades in cut areas, proof rolling shall be performed as specified. Any areas which deflect, rut or pump under the loaded dump truck shall be undercut and replaced with compacted fill material or stone base course as directed by the Engineer. Proof rolling shall be done with one pass of a fully loaded tandem dump truck equal to or exceeding 50,000 lbs or other construction equipment if approved by the Engineer. Proof rolling methods shall be as follows:

a. After the subgrade has been completed the subgrade shall then be proof rolled. The coverage areas and methods will be identified by the Engineer;
b. the equipment shall be operated at a speed that the Engineer can comfortably and slowly walk along side the equipment;
c. If it becomes necessary to take corrective action, such as but not limited to underdrain installation, undercut and backfill of an unsuitable material, and aeration of excessively wet material in areas that have been proof rolled. These areas shall be proof rolled again following the completion of the necessary corrections.

21. Photographic Documentation is required during all phases of construction.

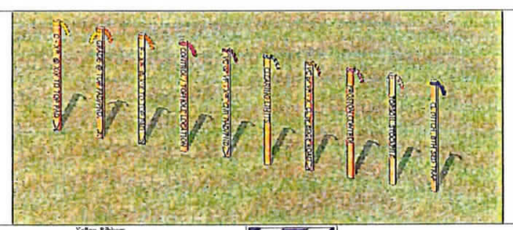
Photo documentation shall include:

The site after clearing and grubbing operations are completed

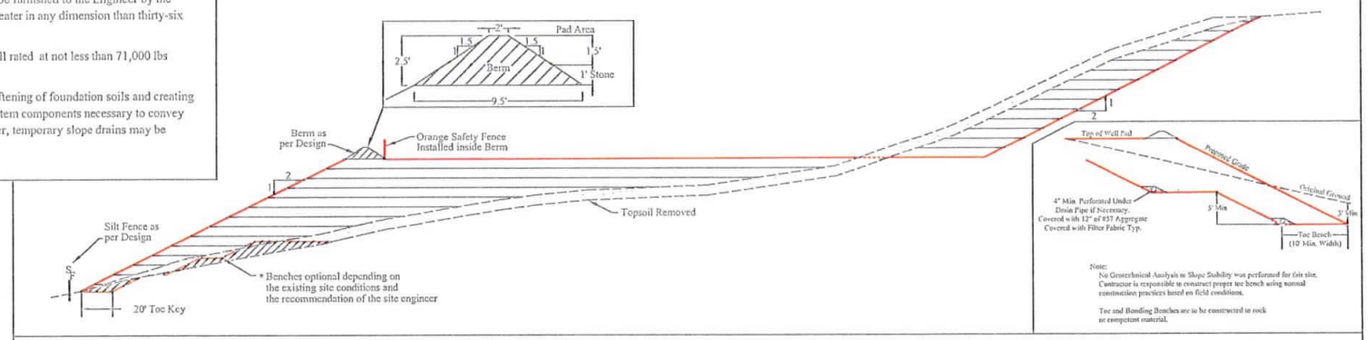
Toe key construction

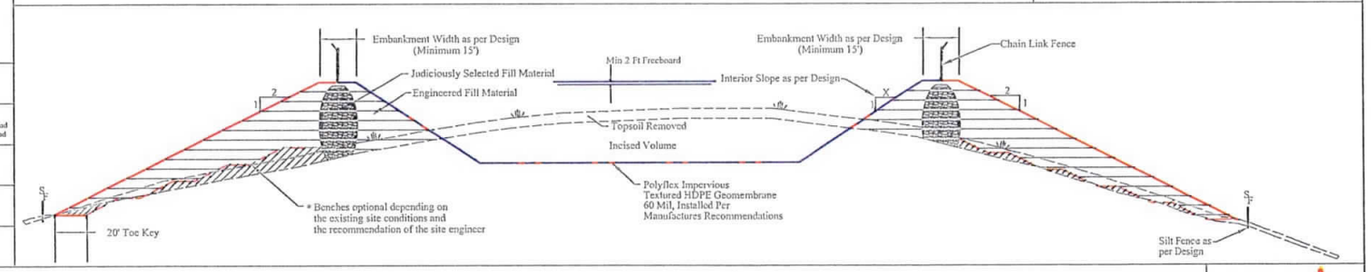
Daily photos of fill and cut operations

22. Before any as-built can be considered certifiable, a complete construction schedule detailing site conditions project areas worked, approximate depth of fill placed and weather conditions will be provided to the design engineer.
23. Prior to the installation of the impervious liner, the design engineer will be contacted to perform a grade verification survey for the as-built. Any variance in grade will be at the engineer's discretion as to the effect on the impoundment.
24. This design to be used in conjunction with the acknowledgement of all regulatory agencies and obtained pertinent permits per current regulations. These plans do not indicate that all pertinent permits have been obtained.



	Yellow Ribbon: Yellow Ribbon used to indicate top of Cuts (C) Cut to be determined at time of stakeout Slope determined by site design		**Blue & White Stripe Ribbon:** Blue & White Stripe Ribbon used to indicate clearing limits/construction limits
	Yellow & Orange Ribbon: Yellow and Orange Ribbon used to indicate Grade at Top of Pad/Pond/Pit		Orange & Black Stripe Ribbon: Orange & Black Stripe Ribbon used to indicate Vertical Cut (VC) at Centerline or edge of access road Orange & Black Stripe Ribbon used to indicate Vertical Fill (VF) at centerline or edge of access road
	Orange Ribbon: Orange Ribbon used to indicate toes of Fills (F) Fill to be determined at time of stakeout Slope determined by site design		Pink & White Stripe Ribbon: Pink & White Stripe Ribbon used to indicate Erosion and Sediment Control Structures Silt Fence (SF) Reinforced Filter Fence (RFF) Super Silt Fence (SSF) Filter Sock (FS)
	Pink Ribbon: Pink Ribbon used to indicate Top Hole Location Pink Ribbon used to indicate Survey Control Location		Orange & White Stripe Ribbon: Orange & White Stripe Ribbon used to indicate Topsoil Stockpile Locations
	Pink & Black Stripe Ribbon: Pink & Black Stripe Ribbon used to indicate Vertical Cut (VC) at Pad/Pond/Pit corner or edge Pink & Black Stripe Ribbon used to indicate Vertical Fill (VF) at Pad/Pond/Pit corner or edge Vertical Cut/Vertical Fill to be determined at time of stakeout		Blue Ribbon: Blue Ribbon used to indicate Centerline (℄) Ditch Blue Ribbon used to indicate Bottom (BTM) Sediment Traps





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District: Franklin
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Specifications

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5-17-13

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