



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

February 26, 2014

WELL WORK PERMIT

Horizontal 6A Well

This permit, API Well Number: 47-9101292, issued to TRIANA ENERGY, LLC, is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to all conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas inspector.

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

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

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



James Martin
Chief

Operator's Well No: DUNHAM 5H
Farm Name: DUNHAM, MITCHELL ET AL
API Well Number: 47-9101292
Permit Type: Horizontal 6A Well
Date Issued: 02/26/2014

Promoting a healthy environment.

02/28/2014

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

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

4709101292

CK 11550
5,150

WW-6B
(9/13)

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

91 01 588

1) Well Operator: Triana Energy, LLC 494486431 Taylor Rosemont, Grafton
Operator ID County District Quadrangle

2) Operator's Well Number: Dunham 5H Well Pad Name: Dunham

3) Farm Name/Surface Owner: Carl Mitchell Dunham Public Road Access: CR10

4) Elevation, current ground: 1,420' Elevation, proposed post-construction: 1,420'

5) Well Type (a) Gas Oil Underground Storage
Other

(b) If Gas Shallow Deep
Horizontal

6) Existing Pad: Yes or No Yes (under construction)

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Associated Pressure(s):
Marcellus Shale, 7,800' TVD, Thickness = 110', Associated Pressure = 3,500#

8) Proposed Total Vertical Depth: 7,800

9) Formation at Total Vertical Depth: Marcellus Shale

10) Proposed Total Measured Depth: 13,000'

11) Proposed Horizontal Leg Length: 4,165'

12) Approximate Fresh Water Strata Depths: 50, 350, 530, 790

13) Method to Determine Fresh Water Depths: Well records and USGS data

14) Approximate Saltwater Depths: None indicated

15) Approximate Coal Seam Depths: 400, 455, 530, 565

16) Approximate Depth to Possible Void (coal mine, karst, other): NA

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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Environmental Protection

WW-6B
(9/13)

18)

CASING AND TUBING PROGRAM

TYPE	Size	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill-up (Cu. Ft.)
Conductor	20"	New	LS	55#	80	80	Grout to surface
Fresh Water	13-3/8"	New	H-40	48#	995	936	C.T.S.
Coal	NA						
Intermediate	9-5/8"	New	J-55	40#	2,450	2,450	C.T.S
Production	5-1/2"	New	P-110	20#	13,000	13,000	Top @ 5,500'
Tubing	2-3/8"	New	N-80	4.7#		8,200	None
Liners	NA						

Kenneth Reynolds 1-17-4

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield (cu. ft./k)
Conductor	20"	24"	0.25	340	Class A	NA
Fresh Water	13-3/8"	17-1/2"	0.33	1,730	Class A w/additives	1.18 - 1.54
Coal	NA					
Intermediate	9-5/8"	12-3/8" - 12-1/4"	0.395	3,950	Class A w/additives	1.18 - 1.54
Production	5-1/2"	8-3/4" - 7-7/8"	0.361	12,360	Type 1 w/additives	1.37 - 1.65
Tubing	2-3/8"	NA	1.19	11,200	None	None
Liners						

PACKERS

Kind:				
Sizes:				
Depths Set:				

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Environmental Protection

WW-6B
(9/13)

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

Drill vertical hole to kick-off point, set casing, drill deviated hole to TD and set casing.

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

Perforate the production casing and production zone with perforating guns at predetermined locations, isolate treatment zones in stages and perform high pressure slick-water fracture, introducing proppant to retain fractures.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 14.1

22) Area to be disturbed for well pad only, less access road (acres): Pad and AST Area = 11.8

23) Describe centralizer placement for each casing string:

Centralizers will be used as needed. The number and type is dependent on hole conditions. Rigid-style centralizers will be used in the lateral and curve sections of the well bore.

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

Cement additives will be used as needed. The amount and type is dependent on hole conditions. Possible additives may include: Lost Circulation Material - granular, flake or fibrous, depending on the situation; Accelerant - CaCl₂ up to 2%.

25) Proposed borehole conditioning procedures:

Proposed bore hole conditioning procedures will depend on hole conditions. These may include, but are not limited to: weighted or high viscosity fluid sweeps, mud solvent fluid sweeps, surfactant sweeps, scouring sweeps, high-rate or extended circulation, pipe rotation and reciprocation, short trips and other appropriate methods.

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*Note: Attach additional sheets as needed.

WW-9
(9/13)

API Number 47 - _____ - _____
Operator's Well No. Dunham 5H

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Triana Energy, LLC OP Code 494486431

Watershed (HUC 10) Tributary of Lost Run Quadrangle Rosemont, Grafton

Elevation 1,420 County Taylor District Booth's Creek, Courthouse

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: However, using a AST with two 30-mil liners

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

Proposed Disposal Method For Treated Pit Wastes:

- Land Application
- Underground Injection (UIC Permit Number D0190460)
- Reuse (at API Number Additional Dunham Wells not yet permitted)
- Off Site Disposal (Supply form WW-9 for disposal location)
- Other (Explain _____)

Will closed loop system be used? If so, describe: Yes, mud recycling with centrifuge and cuttings drier/shaker

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

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

Additives to be used in drilling medium? Soap, potassium solution

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

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

-Landfill or offsite name/permit number? Waste Management - Meadowfill Landfill - SWF-1032

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

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this application form and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

Company Official Signature [Signature]

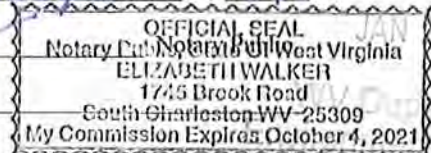
Company Official (Typed Name) Walter C. Showen, III

Company Official Title Manager of Permitting

Subscribed and sworn before me this 20th day of January, 2014

[Signature]

My commission expires 10-4-21



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Form WW-9

Operator's Well No. Dunham 5H

Triana Energy, LLC

Proposed Revegetation Treatment: Acres Disturbed 14.1 ac.+/- Prevegetation pH _____

Lime 2 Tons/acre or to correct to pH approx. 7

Fertilizer type 10-20-20 or equiv.

Fertilizer amount 500 lbs/acre

Mulch 100 bales Tons/acre

Seed Mixtures

Temporary

Permanent

Seed Type	lbs/acre
30% Annual Ryegrass, 20% Penniate Orchard	
10% Alsike Clover, 10% Trefoil Norcen Empire	
15% Climax Timothy N.C., 15% Perennial Ryegrass	

Seed Type	lbs/acre
30% Annual Ryegrass, 20% Penniate Orchard	
10% Alsike Clover, 10% Trefoil Norcen Empire	
15% Climax Timothy N.C., 15% Perennial Ryegrass	

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: *Summit Services*

Comments: _____

Title: Oil INSPECTION

Date: 1-17-14

Field Reviewed? (U) Yes () No

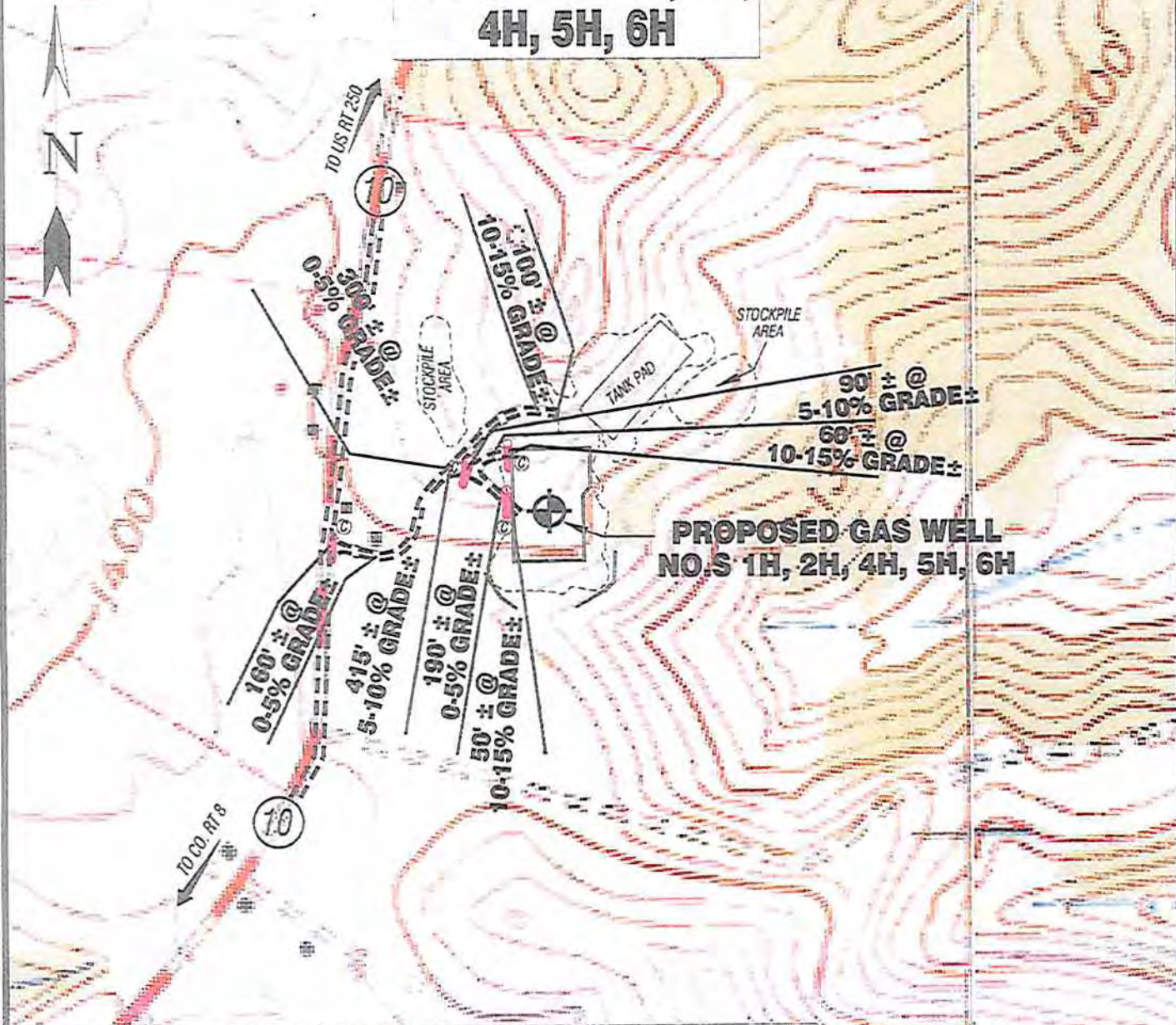
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JAN 30 2014

AVV Division of
ENVIRONMENTAL

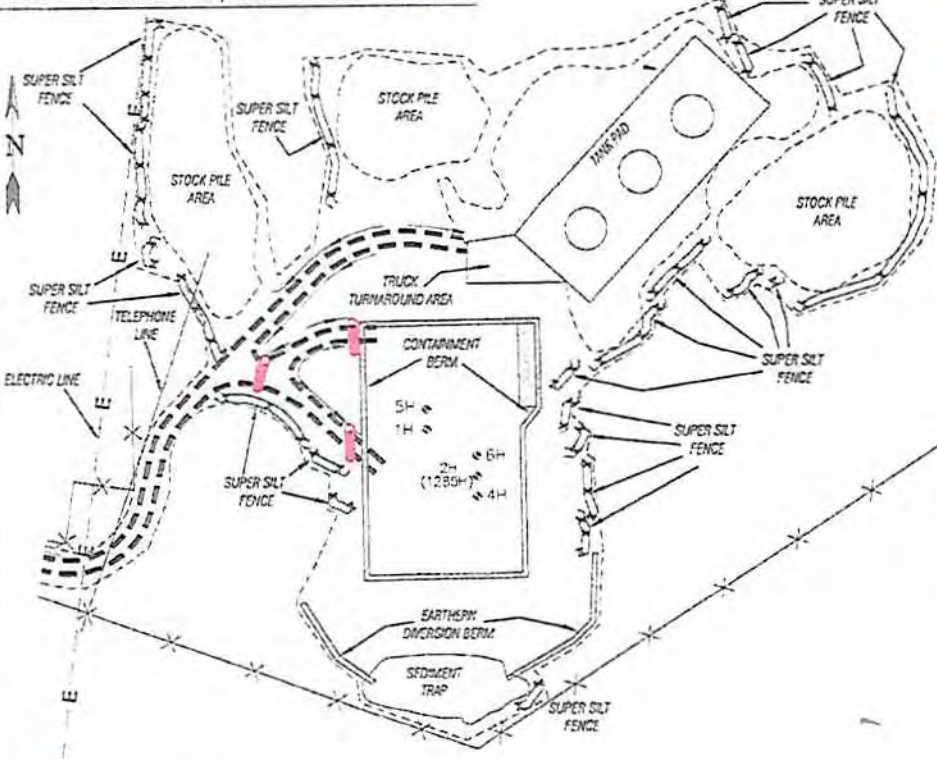
02/28/2014

DUNHAM LEASE WELL NO.S 1H, 2H, 4H, 5H, 6H



Detail Sketch for Proposed Dunham Wells

SCALE: 1"=500'



ALL ROADS SHOWN HEREON ARE EXISTING UNLESS OTHERWISE NOTED AND SHALL BE MAINTAINED IN ACCORDANCE WITH WY D.E.P. OIL AND GAS BMP MANUAL ENTRANCES AT COUNTY/STATE ROADS SHALL BE MAINTAINED IN ACCORDANCE WITH WY D.O.T. REGULATION. SEPARATE PERMITS MAY BE REQUIRED BY THE D.O.T.

SEDIMENT BASINS (TRAPS) AND APPROPRIATE EROSION CONTROL BARRIERS ARE TO BE CONSTRUCTED AT ALL CULVERT AND CROSS DRAIN INLETS AND OUTLETS AS REQUIRED IN THE WY D.E.P. OIL AND GAS BMP MANUAL. FIELD CONDITIONS (ROCK OUTCROPS AND BEDROCK) MAY PROHIBIT INLET TRAPS BEING INSTALLED. WHEN THESE CONDITIONS EXIST ADDITIONAL EROSION CONTROL MEASURES SHALL BE EVALUATED AND UTILIZED AS NEEDED.

EARTHWORK CONTRACTORS ARE RESPONSIBLE FOR NOTIFICATION TO THE OPERATOR AND INSPECTOR PRIOR TO ANY DEVIATION FROM THIS PLAN.

TEMPORARY SEED & MULCH ALL SLOPES AFTER CONSTRUCTION OF LOCATION.

CUT & STACK ALL MARKETABLE TIMBER.

STACKED BRUSH MAY BE USED FOR SEDIMENT CONTROL.

APPLICATIONS FOR SEPARATE PLC PERMITS ON THE ACCESS ROAD STREAM CROSSINGS HAVE BEEN PREPARED (IF APPLIED).

02/28/2014



Professional Energy Consultants
A DIVISION OF SMITH LAND SURVEYING, INC.

SURVEYORS
ENGINEERS
ENVIRONMENTAL
PROJECT MGMT.

Not To Scale

TOPO SECTION OF ROSEMONT 7.5'
USGS TOPO QUADRANGLE

DRAWN BY: K.D.W. FILE NO.: 7754 DATE: 01/14/14 CADD FILE: 7754-01-14.DWG

- EXISTING CULVERT
- PROPOSED CULVERT 15' MIN. UNLESS OTHERWISE NOTED
- PROPOSED STREAM CROSSING
- APPROXIMATE LIMITS OF DISTURBANCE

DUNHAM LEASE DUNHAM 5H

BOTTOM HOLE
DUNHAM 5H
STATE PLANE COORDINATES
NORTH ZONE (NAD 27)

N. 308,646
E. 1,819,133

LAT=(N) 39.34565
LONG=(W) 80.13954

UTM (NAD'83)(METERS)
N. 4,355,498
E. 574,163

LANDING POINT
DUNHAM 5H
STATE PLANE COORDINATES
NORTH ZONE (NAD 27)

N. 306,285
E. 1,822,559

LAT=(N) 39.33923
LONG=(W) 80.12736

UTM (NAD'83)(METERS)
N. 4,354,796
E. 575,218

LATITUDE 39° 22' 30"

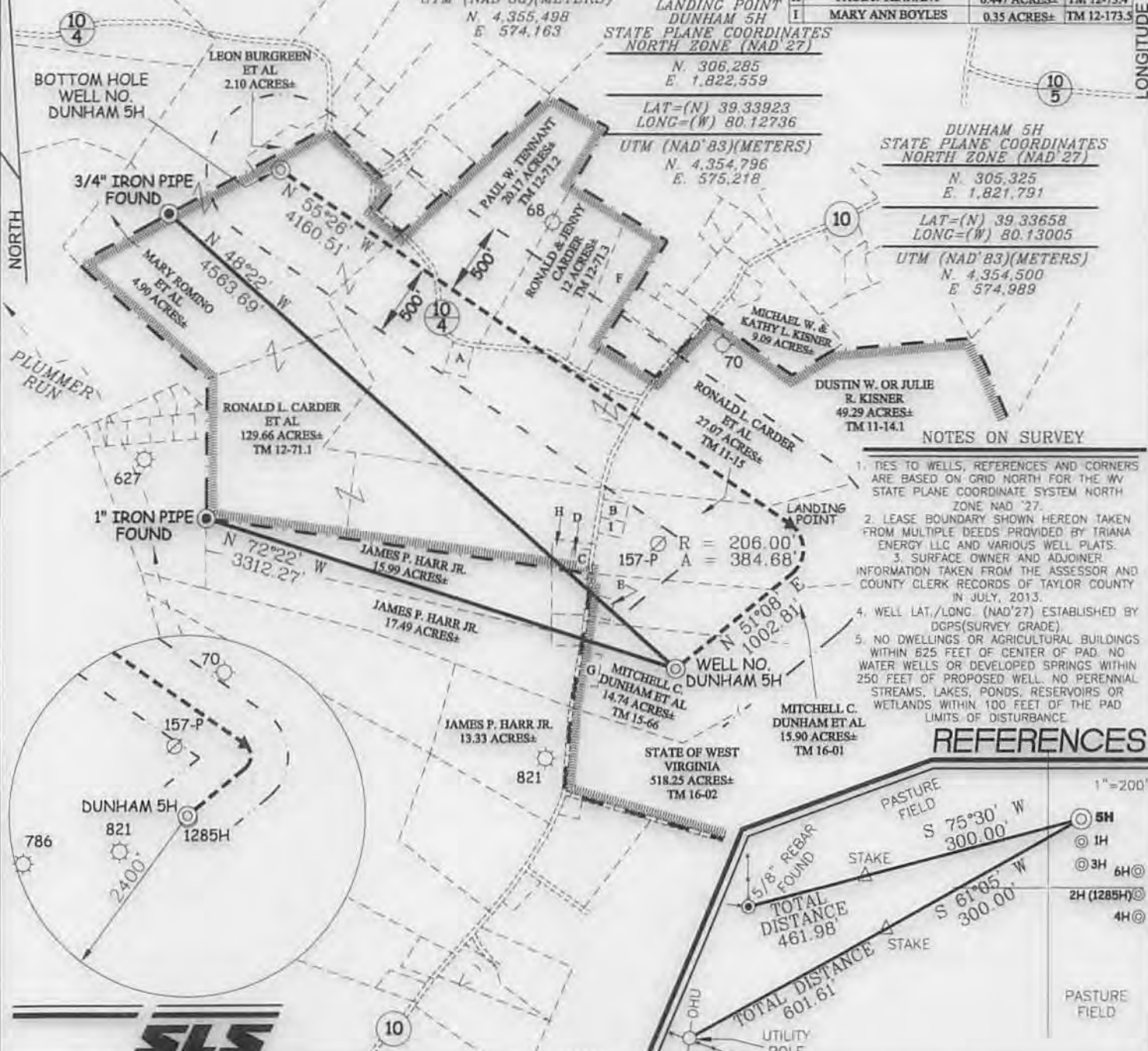
A	ROY R. BAUER ET AL	1 ACRE±	TM 12-72.1
B	EVA HURSEY ET AL	0.65 ACRES±	TM 12-73
C	PAUL J. TENNANT	0.33 ACRES±	TM 12-73.1
D	PAUL J. TENNANT	0.04 ACRES±	TM 12-73.2
E	MITCHELL C. DUNHAM	0.40 ACRES±	TM 15-84
F	RONALD & JENNY CARDER	6 ACRES±	TM 12-71.4
G	RICHARD N. GLASPELL	1.26 ACRES±	TM 15-66.1
H	PAUL J. TENNANT	0.447 ACRES±	TM 12-73.4
I	MARY ANN BOYLES	0.35 ACRES±	TM 12-173.5

DUNHAM 5H
STATE PLANE COORDINATES
NORTH ZONE (NAD 27)

N. 305,325
E. 1,821,791

LAT=(N) 39.33658
LONG=(W) 80.13005

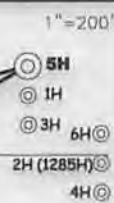
UTM (NAD'83)(METERS)
N. 4,354,500
E. 574,989



NOTES ON SURVEY

- TIES TO WELLS, REFERENCES AND CORNERS ARE BASED ON GRID NORTH FOR THE WV STATE PLANE COORDINATE SYSTEM NORTH ZONE NAD '27.
- LEASE BOUNDARY SHOWN HEREON TAKEN FROM MULTIPLE DEEDS PROVIDED BY TRIANA ENERGY LLC AND VARIOUS WELL PLATS.
- SURFACE OWNER AND ADJOINER INFORMATION TAKEN FROM THE ASSESSOR AND COUNTY CLERK RECORDS OF TAYLOR COUNTY IN JULY, 2013.
- WELL LAT./LONG. (NAD'27) ESTABLISHED BY DGPS(SURVEY GRADE)
- NO DWELLINGS OR AGRICULTURAL BUILDINGS WITHIN 825 FEET OF CENTER OF PAD. NO WATER WELLS OR DEVELOPED SPRINGS WITHIN 250 FEET OF PROPOSED WELL. NO PERENNIAL STREAMS, LAKES, PONDS, RESERVOIRS OR WETLANDS WITHIN 100 FEET OF THE PAD LIMITS OF DISTURBANCE.

REFERENCES



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 DIVISION OF ENVIRONMENTAL PROTECTION.

P.S. 677 *Gregory A. Smith*



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.
DATE DECEMBER 17, 2013
OPERATORS WELL NO. DUNHAM 5H
API WELL NO. 47-091-01292 HMA
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1/200
PROVEN SOURCE OF ELEVATION DGPS (SURVEY GRADE GPS TIES TO COORS)
FILE NO. 7754P5H (391-20)
SCALE 1" = 1000'

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

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

LOCATION: ELEVATION 1,420' WATERSHED TRIBUTARY OF LOST RUN DISTRICT BOOTH'S CREEK COUNTY TAYLOR QUADRANGLE ROSEMONT 7.5'

SURFACE OWNER MITCHELL DUNHAM ET AL ACREAGE 14.74±

ROYALTY OWNER MITCHELL DUNHAM ET AL (14.74 & 15.90 AC.±) / RONALD L. CARDER (27.07, 0.04, 0.33, 129.66, 12 & 6 AC.±) / PAUL W. TENNANT ET AL (0.447 AC.±) / MARY ANN BOYLES (0.35 AC.±) / DUSTIN W. OR JULIE R. KISNER ET AL (49.29 AC.±) / LEASE NO. 02/28/2014

PROPOSED WORK: DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE PLUG OFF OLD FORMATION PERFORATE NEW FORMATION PLUG AND ABANDON CLEAN OUT AND REPLUG OTHER

PHYSICAL CHANGE IN WELL (SPECIFY) TARGET FORMATION MARCELLUS ESTIMATED DEPTH TVD 7,800' / TMD

WELL OPERATOR TRIANA ENERGY, L.L.C. DESIGNATED AGENT RACHELLE A. KING
ADDRESS 900 VIRGINIA STREET EAST, SUITE 400 ADDRESS 900 VIRGINIA STREET EAST, SUITE 400
CHARLESTON, WV 25301 CHARLESTON, WV 25301