



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

October 04, 2013

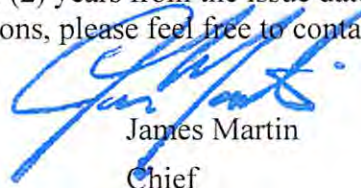
WELL WORK PERMIT
Horizontal 6A Well

This permit, API Well Number: 47-9101285, 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 2H
Farm Name: DUNHAM, MITCHELL .., ET AL
API Well Number: 47-9101285
Permit Type: Horizontal 6A Well
Date Issued: 10/04/2013

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.

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: Triana Exploration, LLC 494486431 Taylor Booths Creek, Court House Rosemont, Graffon 7.5'
Operator ID County District Quadrangle

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

3 Elevation, current ground: 1,420 Elevation, proposed post-construction: 1,420

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):
Marcellus Shale, 7800 TVD, Thickness = 110', Anticipated Pressure = 3,800

7) Proposed Total Vertical Depth: 7,800'

8) Formation at Total Vertical Depth: Marcellus Shale

9) Proposed Total Measured Depth: 13,500'

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

11) Method to Determine Fresh Water Depth: Well records and USGS data

12) Approximate Saltwater Depths: None indicated

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

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

15) Does land contain coal seams tributary or adjacent to, active mine? No

16) Describe proposed well work: drill vertical hole to kick-off point, set casing, drill deviated hole to TD and set casing.
Complete well in Marcellus Formation.

17) Describe fracturing/stimulating methods in detail:
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.

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

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

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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	LS	55#	80	80	Cement to surface
Fresh Water	13-3/8"	New	H-40	48#	995	936	C.T.S.
Coal							
Intermediate	9-5/8"	New	J-55	40#	2,450	2,450	C.T.S.
Production	5-1/2"	New	P-110	20#	13,500	13,500	Top @ 5,000'
Tubing	2-3/8"	New	N-80	4.7#	7,700		None
Liners							

ACS 10/4/13

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield
Conductor	20"	24"	0.25	340	Class A	N/A
Fresh Water	13-3/8"	17-1/2"	0.33	1,730	Class A w/additives	1.18 - 1.54
Coal						
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"	N/A	1.19	11,200	None	None
Liners						

PACKERS

Kind:				
Sizes:				
Depths Set:				

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21) 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.

22) 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%

23) Proposed borehole conditioning procedures. _____

Proposed borehole 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 methods.

*Note: Attach additional sheets as needed.

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WV Department of
Environmental Protection

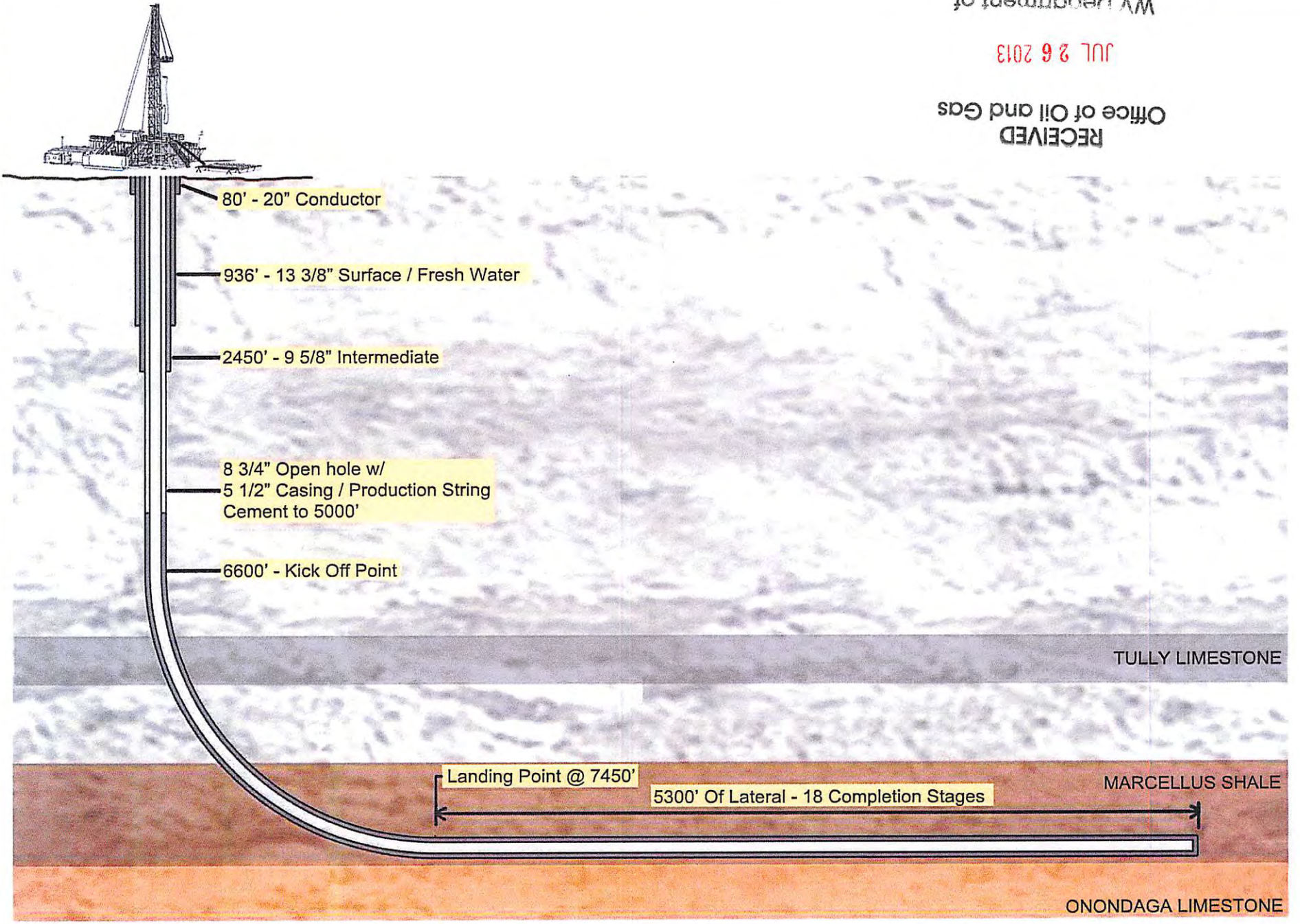
10/04/2013

91-01285

WV Department of Environmental Protection

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Casing Diagram
not to scale

Dunham 2H Taylor County, WV



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 Triana Exploration, LLC OP Code 494486431

Watershed Tributary of Lost Run Quadrangle Rosemont, Grafton 7.5'

Elevation 1,422' County Taylor District Booths Creek, Court House

Description of anticipated Pit Waste: N/A - Closed loop system. Well waste will be stored in tanks, pending reuse or disposal.

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

Will a synthetic liner be used in the pit? For fresh water. If so, what mil.? 30 mil, at a minimum

Proposed Disposal Method For Treated Pit Wastes:

- Land Application
- Underground Injection (UIC Permit Number D0190460)
- Reuse (at API Number Additional Dunham wells (4H or 6H) not yet permitted)
- Off Site Disposal (Supply form WW-9 for disposal location)
- Other (Explain _____)

Drilling medium anticipated for this well? Air, freshwater, oil based, etc. Air and oil-based drilling mud

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

Additives to be used? Soap, potassium Solution

Will closed loop system be used? Yes

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. Solidified and transported to landfill.

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

-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.

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JUL 26 2013

Company Official Signature Walter C. Showen, III

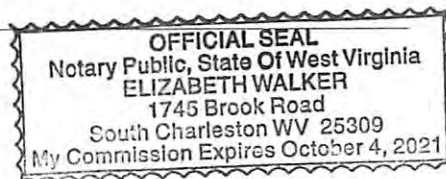
Company Official (Typed Name) Walter C. Showen, III

Company Official Title Permitting Manager

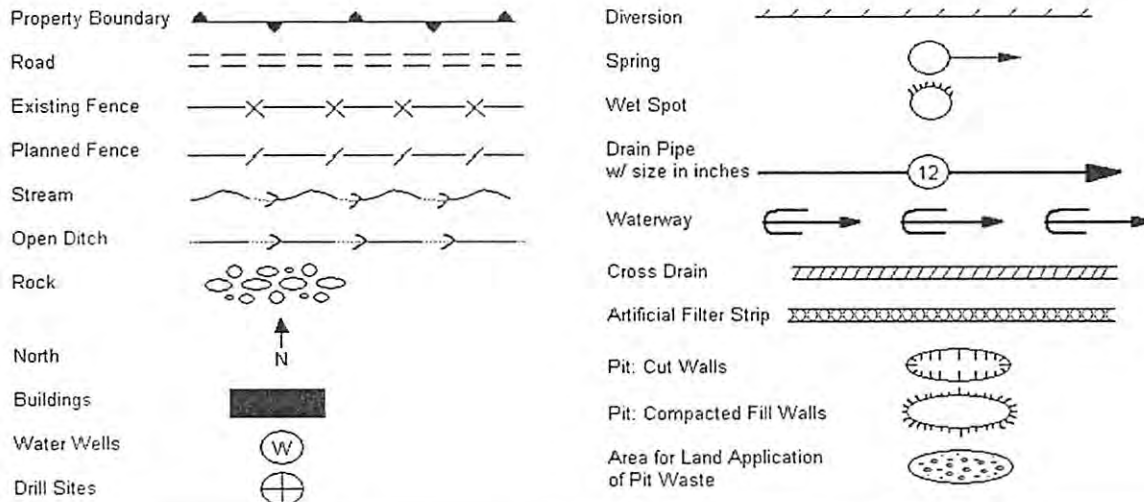
WV Department of
Environmental Protection

Subscribed and sworn before me this 18th day of July, 20 13

Elizabeth Walker Notary Public
My commission expires 10-4-21



10/04/2013



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

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

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

Mulch 100 bales Tons/acre

Seed Mixtures

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

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

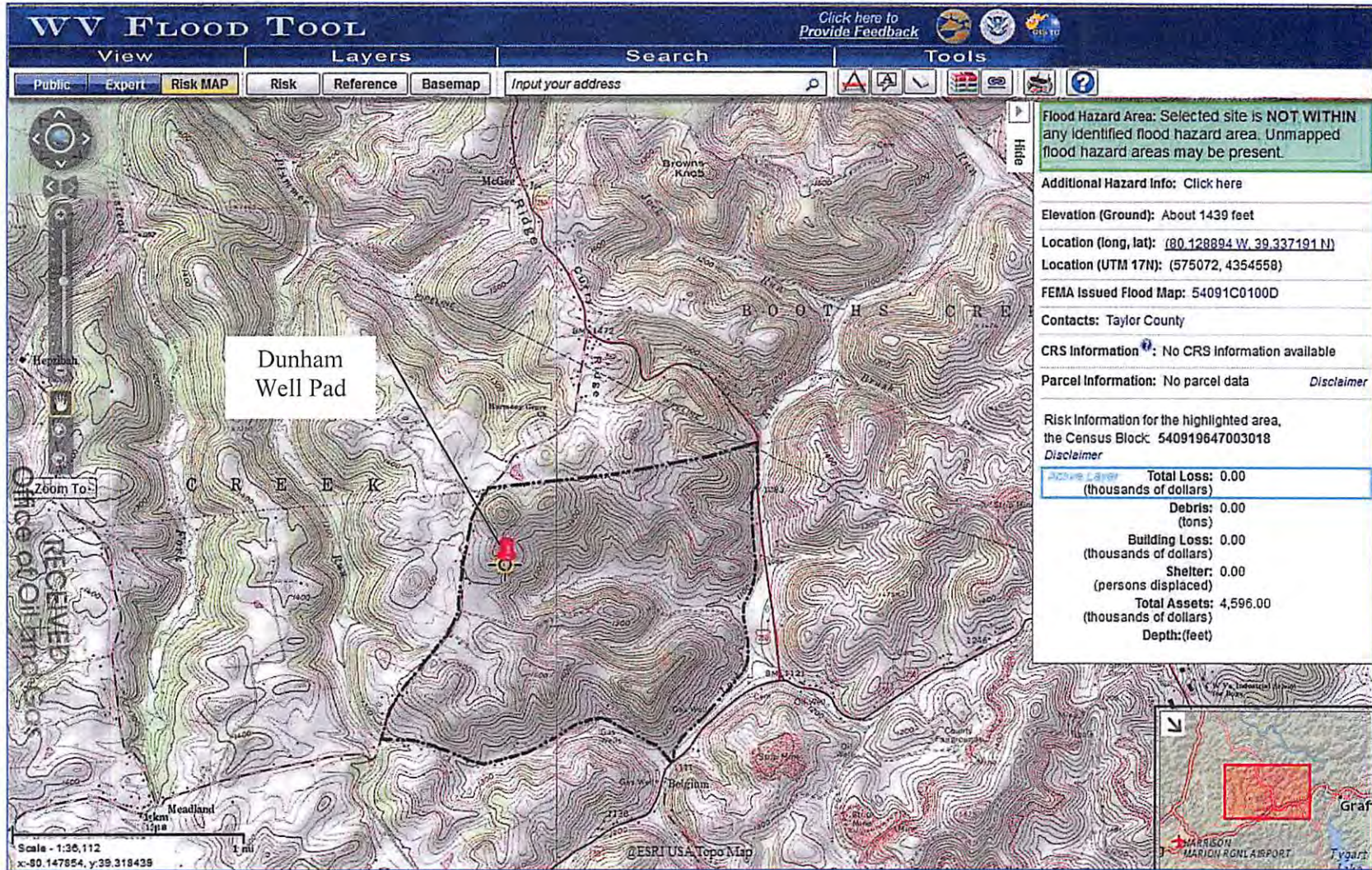
Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: Dypp Harris
Comments: _____

Title: Oil & Gas Inspector Date: 7-23-13
Field Reviewed? Yes No

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Dunham Pad Flood Information -- Data supplied by Surveyor (see attached pad design drawings): The proposed limits of disturbance for this project is located in FEMA Flood Zone X, per the Flood Insurance Rate Map (FIRM) Number 54091C0100D, dated September 25, 2009.

JUL 26 2013



Water Management Plan: Secondary Water Sources



WMP- 01490

API/ID Number: 047-091-01285

Operator:

Triana Energy, LLC

Dunham 2H

Important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Multi-site impoundment

Source ID:	26186	Source Name:	Lantz Water Farm	Source start date:	3/1/2013
				Source end date:	10/10/2013
Source Lat:	39.362389	Source Long:	-80.099389	County:	Taylor
Max. Daily Purchase (gal)		Total Volume from Source (gal):			6,700,000

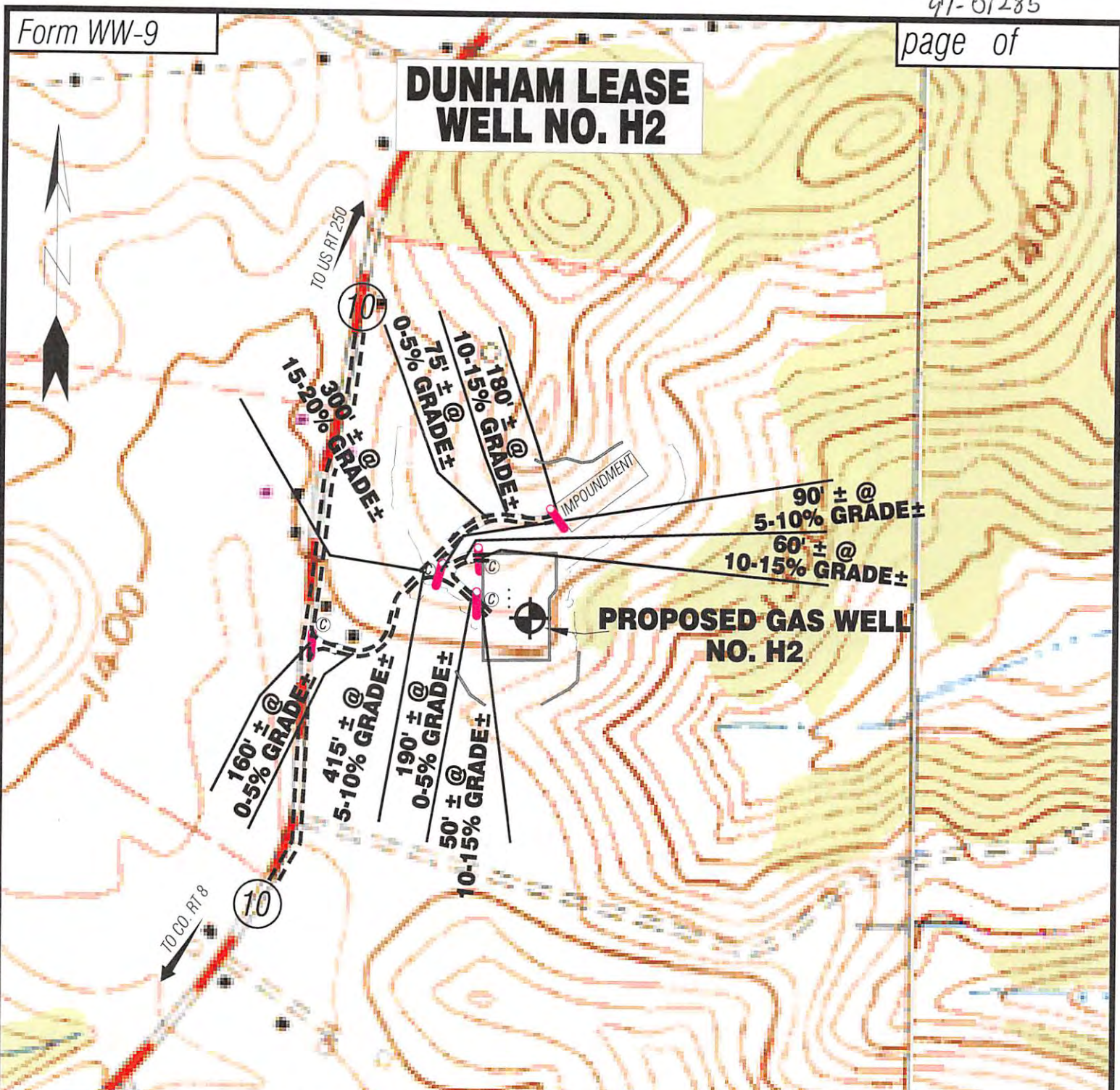
DEP Comments:

The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.

Reference: WMP-814

APPROVED SEP 27 2013

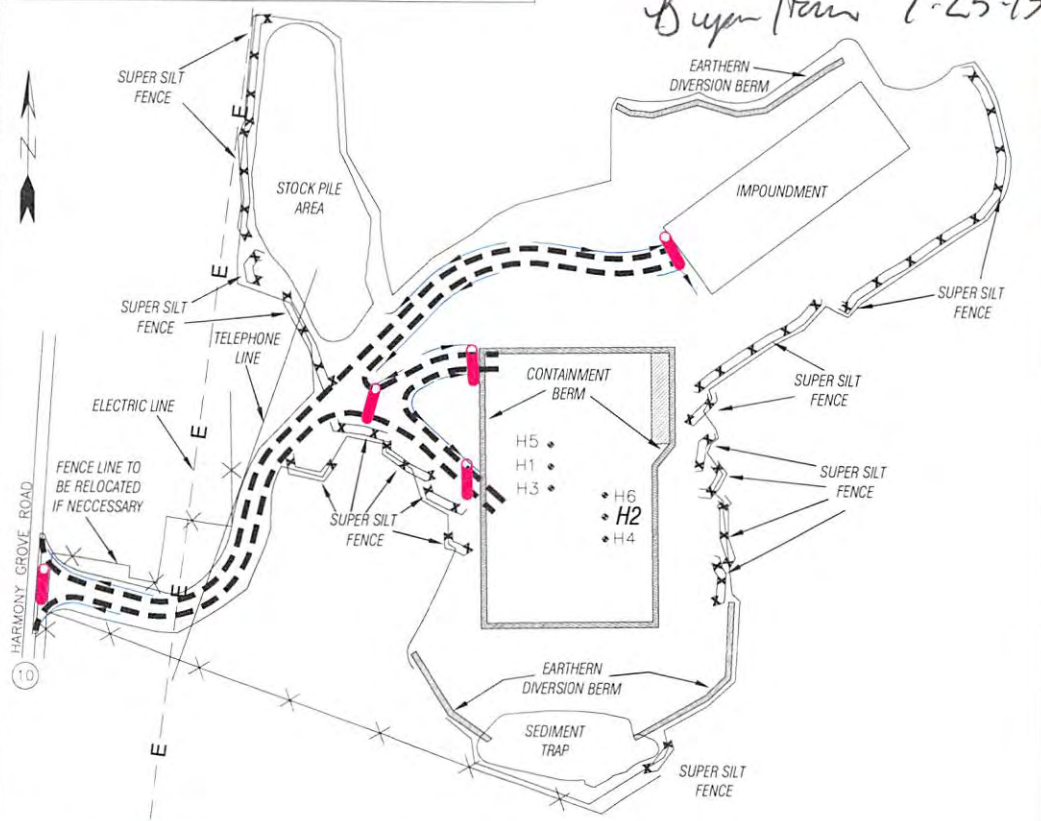
DUNHAM LEASE WELL NO. H2



Detail Sketch for Proposed Well H2

Super Horn 7-23-13

SCALE: 1"=500'



ALL ROADS SHOWN HEREON ARE EXISTING UNLESS OTHERWISE NOTED AND SHALL BE MAINTAINED IN ACCORDANCE WITH WV D.E.P. OIL AND GAS BMP MANUAL ENTRANCES AT COUNTY/STATE ROADS SHALL BE MAINTAINED IN ACCORDANCE WITH WV 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 WV 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 APPLIES).

10/04/2013

Professional Energy Consultants
A DIVISION OF SMITH LAND SURVEYING, INC.
SLS
SURVEYORS
ENGINEERS
ENVIRONMENTAL
PROJECT MGMT.

Not To Scale

TOPO SECTION OF ROSEMONT 7.5'
USGS TOPO QUADRANGLE

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

DUNHAM LEASE DUNHAM H2

A	JAMES P. HARR JR.	15.99 ACRES±	TM 15-65
B	JAMES P. HARR JR.	17.49 ACRES±	TM 15-64
C	JAMES P. HARR JR.	13.33 ACRES±	TM 15-63

LATITUDE 39° 22' 30"

DUNHAM H2
STATE PLANE COORDINATES
NORTH ZONE (NAD'27)

N. 305,226
E. 1,821,868

LAT=(N) 39.33631
LONG=(W) 80.12978

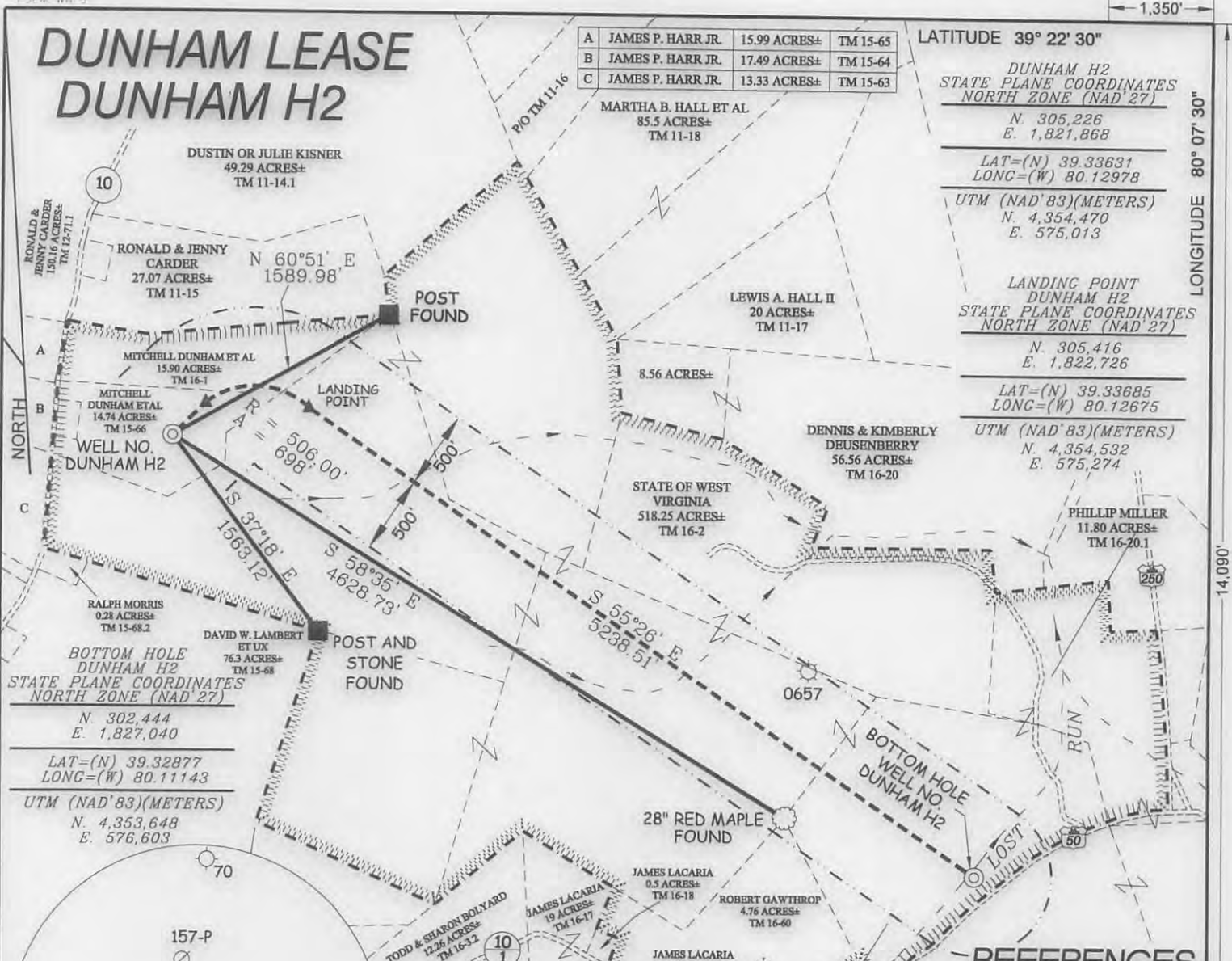
UTM (NAD'83)(METERS)
N. 4,354,470
E. 575,013

LANDING POINT
DUNHAM H2
STATE PLANE COORDINATES
NORTH ZONE (NAD'27)

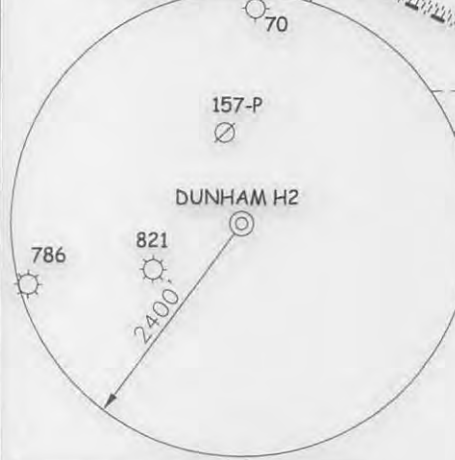
N. 305,416
E. 1,822,726

LAT=(N) 39.33685
LONG=(W) 80.12675

UTM (NAD'83)(METERS)
N. 4,354,532
E. 575,274

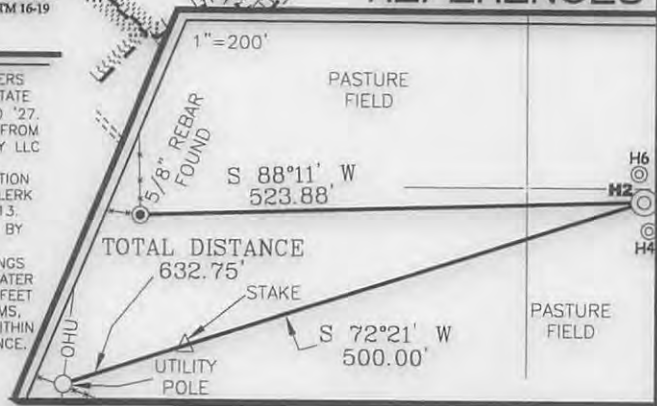


BOTTOM HOLE
DUNHAM H2
STATE PLANE COORDINATES
NORTH ZONE (NAD'27)
N. 302,444
E. 1,827,040
LAT=(N) 39.32877
LONG=(W) 80.11143
UTM (NAD'83)(METERS)
N. 4,353,648
E. 576,603



NOTES ON SURVEY

1. TIES TO WELLS, REFERENCES AND CORNERS ARE BASED ON GRID NORTH FOR THE WV STATE PLANE COORDINATE SYSTEM NORTH ZONE NAD '27.
2. LEASE BOUNDARY SHOWN HEREON TAKEN FROM MULTIPLE DEEDS PROVIDED BY TRIANA ENERGY LLC AND VARIOUS WELL PLATS.
3. SURFACE OWNER AND ADJOINER INFORMATION TAKEN FROM THE ASSESSOR AND COUNTY CLERK RECORDS OF TAYLOR COUNTY IN JULY, 2013.
4. WELL LAT./LONG. (NAD'27) ESTABLISHED BY DGPS(SUBMETER MAPPING GRADE).
5. 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 OCTOBER 1, 20 13
OPERATORS WELL NO. DUNHAM H2
API WELL NO. 47 91 01285 H6A
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 200 FILE NO. 7754P2HR5 (391-20)
PROVEN SOURCE OF ELEVATION DGPS (SURVEY GRADE GPS TIES TO COORS) 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 1,422' 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 AND WV DEPT. AGR. 518.25 AC

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 _____

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

10/04/2013

COUNTY NAME
PERMIT