



west virginia department of environmental protection

Office of Oil and Gas
601 57th Street SE
Charleston, WV 25304
(304) 926-0450
(304) 926-0452 fax

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

PERMIT MODIFICATION APPROVAL

September 11, 2014

STATOIL USA ONSHORE PROPERTIES, INC.
2103 CITYWEST BOULEVARD - SUITE 800
HOUSTON, TX 77042

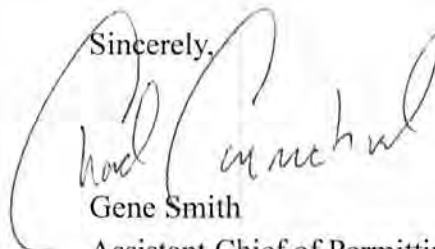
Re: Permit Modification Approval for API Number 10302931, Well #: JOE JOLLIFFE UNIT 1 5H
modify fresh water casing depth

Oil and Gas Operator:

The Office of Oil and Gas has reviewed the attached permit modification for the above referenced permit. The attached modification has been approved and well work may begin. Please be reminded that the oil and gas inspector is to be notified twenty-four (24) hours before permitted well work is commenced.

Please call James Martin at 304-926-0499, extension 1654 if you have any questions.

Sincerely,



for G.S

Gene Smith
Assistant Chief of Permitting
Office of Oil and Gas

Mod 1



August 6, 2014

West Virginia Department of Environmental Protection
Office of Oil and Gas
601 57th Street, SE
Charleston, WV 25304-2345

Attention: Ashley LeMasters

Reference: Joe Jolliffe Unit 1 5H (API No. 47-103-02931)
Casing Revision

Ms. LeMasters:

Attached please find revised WW-6B and Wellbore Schematic for the Joe Jolliffe Unit 1 5H (API No. 47-103-02931) revising the freshwater casing setting depth (signed by the inspector). Statoil is preparing to commence drilling operations on the Jolliffe wells on or about September 29, 2014 after drilling the Michael Kuhn 2H.

Currently the freshwater casing is permitted to 500'; however, there was a study done by the state of WV (1980 Fresh & Saline Groundwater of WV by James B. Foster) that indicates the freshwater depth is actually deeper, at 587' in lieu of 320'. Though there is no evidence other than the study that the freshwater is deeper, as a prudent operator Statoil would like approval to set the casing deeper than originally permitted. Since a revision to the freshwater casing was required, Statoil took the opportunity to also revise the intermediate casing depth to set through the Big Injun.

If you have any questions or require additional information, please contact the undersigned at 713-485-2640 or at BEKW@statoil.com.

Sincerely,

A handwritten signature in blue ink, appearing to read "Bekki Winfree".

Bekki Winfree
Sr. Regulatory Advisor – Marcellus
Attachment

Received

AUG 7 2014

Office of Oil and Gas
WV Dept. of Environmental Protection

09/12/2014

Mod 1

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: Statoil USA Onshore Properties Inc. 494505083 Wetzel Center Littleton 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Joe Jolliffe Unit I 5H Well Pad Name: Jolliffe Unit I

3 Elevation, current ground: 1336' Elevation, proposed post-construction: 1336' **already built**

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

5) Existing Pad? Yes or No: Yes

DMH 8-5-14

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):
Marcellus Shale; Formation Top - 7304' TVD, 50' Thick, 0.67 psi/ft

7) Proposed Total Vertical Depth: 7480'

8) Formation at Total Vertical Depth: Marcellus Shale

9) Proposed Total Measured Depth: 13,534'

10) Approximate Fresh Water Strata Depths: 130' - 320' , 587'

11) Method to Determine Fresh Water Depth: Local water well data & 1980 study "Freshwater & Saline Groundwater of WV" by James Foster

12) Approximate Saltwater Depths: 2150'

13) Approximate Coal Seam Depths: 755'

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

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

16) Describe proposed well work: Drill and stimulate a horizontal well in the Marcellus Shale.

17) Describe fracturing/stimulating methods in detail:
The well will be stimulated by multi-stage fracturing using a slickwater fluid.

18) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 4.79 ac **pad already built**

19) Area to be disturbed for well pad only, less access road (acres): 1.94 ac **pad already built**

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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	H-40	94#	100'	100'	Grouted to surface 120 cu. ft.
Fresh Water	13-3/8"	New	J-55	54.5#	650'	650'	Cement to surface 644 cu. ft.
Coal	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Intermediate	9-5/8"	New	J-55	36#	2,700'	2,700'	Cement to surface 1120 cu. ft.
Production	5-1/2"	New	P-110	20#	13,534'	13,534'	Cement to 1685 ft, 3023 cu. ft.
Tubing							
Liners							

DMH 8-5-14

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield
Conductor	20"	26"	.438"	1530 psi	Class "A"	1.3 cuft/sk
Fresh Water	13-3/8"	17-1/2"	.38"	2730 psi	Class "A"	2.31 cuft/sk
Coal	N/A	N/A	N/A	N/A	N/A	N/A
Intermediate	9-5/8"	12-1/4"	.352"	3520 psi	Class "A"	2.31 cuft/sk
Production	5-1/2"	8-1/2"	.361"	12,640 psi	Class "A"	1.37 cuft/sk
Tubing	2-3/8"		.19	7700 psi		
Liners						

PACKERS

Kind:				
Sizes:				
Depths Set:				

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21) Describe centralizer placement for each casing string.

Conductor - None

Fresh Water - 1 bow spring centralizer 10' from shoe, 1 bow spring centralizer every 4 joints to surface

Intermediate - 1 bow spring centralizer 10' from shoe, 1 bow spring centralizer every 3 joints to surface

Production - 1 spiroglide centralizer 10' from shoe, 1 spiroglide centralizer mid joint on second joint

1 spiroglide centralizer every joint to 45 deg, 1 bowspring centralizer every other joint to KOP, double bow spring centralizers every fourth joint to 2000'.

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

DMH 8-5-14

Conductor - None

Fresh Water - Class A Cement with 3% Calcium Chloride

Intermediate - Accelerator (CaCl₂), Expansion / Thixotropic (W-60), Retarder (HR-7)

Production (lead) - Gel / Extender (Bentonite), Fluid Loss / Gas Migration (CFL-117), Retarder (HR-7), Defoamer

Production (tail) - Gel / Extender (Bentonite), Fluid Loss / Gas Migration (CFL-117), Retarder (HR-7), solubility enhancer (for acid solubility)

Note Names and types of additives may vary depending on vendor availability

23) Proposed borehole conditioning procedures.

Note Names and types of additives may vary depending on vendor availability

Fresh Water - Circ. hole clean at TD, Fill casing with water, Pump 20 bbl water, 25 bbl gel spacer, and 5 bbl water.

Fresh Water - Circ. hole clean at TD, Fill casing with water, Pump 20 bbl water, 25 bbl gel spacer, and 5 bbl water.

Production - Circ. hole clean at TD, Pump 50 bbl tuned spacer, 5 bbl water

Note tuned spacer is a combination gelled / weighted mud flush spacer, can be substituted with alternating gelled spacers and weighted mud flushes. Borehole conditioning will be dictated by hole conditions.

*Note: Attach additional sheets as needed.

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Office of Oil and Gas
WV Dept. of Environmental Protection

09/12/2014

Mod 1

Marcellus - Drilling Well Schematic

Well Name: Joe Jolliffe 5H	GLE (R): 1358	TVD(R): 7480
Field Name: Marcellus	DF(R): 22	TMD(R): 13,534
County: Wetzel	BHL: X = 539252.0 Y = 4387262.7	Profile: Horizontal
API10 #: 4710302931	SHL: X = 538099.8 Y = 4388675.2	AFE No.: 0

Formations & Csg Points	Depth, ft			Form. Temp. (F)	Pore Press. (EMW)	Frac Gradient (EMW)	Planned MW	Measure Depth (ft)	Program	Details
	MD	TVD	SS							
Conductor	100	100	1,280	-	-	-	-	100		20" Conductor
Pittsburgh Coal		0		-	-	-	9.1			17-1/2" Surface
Approximate Fresh Water Strata ~587'										
Casing Point	650	650	730	65	-	-14.8		650		
Red Clay		0		-	-	-	9.1			5% KCl
1st Salt Sand		0		-	-	-	9.1			
2nd Salt Sand		0		-	-	-	9.1			
3rd Salt Sand		2,243		-	-	-	9.1			
Maxton Sand				-	-	-	9.1			
Keener Sand		0		-	-	-	9.1	TOC @ 1700		
Big Lime		0		-	-	-	9.1			
Base Big Injun		2,556		-	-	-	9.1			
Casing Point	2,700	2,700	-1,320	82	-	>18.0		2,700		
Berea Sand		2,903		-	-	-	8.6			SBM
Gordon Sand		3,132		-	-	-	8.6			
Java		5,237		-	-	-	8.6			
Angola		0		-	-	-	8.6			
Rhinestreet		0		-	-	-	8.6			
Cashaqua		0		-	-	-	8.6			
KOP	6,832	6,822		-	-	-	8.6			
Middlesex		0		-	-	-	13.0			
West River		7,184		-	-	-	13.0			
Genesco		7,293		-	-	-	13.0			
Marcellus		7,439		-	-	-	13.0			
Cherry Valley		7,470		-	-	-	13.0			
Landing point	8,233	7,462		-	-	-	13.0			
Onondaga		7,490		-	-	-	13.0			

20" Conductor

17-1/2" Surface

Profile: Vertical

Bit Type: 17-1/2" Tri-Cone

BHA: Rotary Assembly

Mud: 9.1 ppg Fresh Water

Surveys: n/a

Logging: n/a

Casing: 13.375 54.5 J-55 BTC at 650' MD/650' TVD

Centralizers: 1 centralizer w/ stop collar 10 ft above float shoe. One Single Bow every joint to 100ft below surface.

Cement: 15.8 ppg Tail slurry w/ TOC @ Surface

Potential Drilling Problems: Stuck Pipe, Floating Collison.

12-1/4" Intermediate

Profile: Vertical

Bit Type: HCC 12-1/4" Kymera 533

BHA: Bin 6:7 Lobe 4.0 Stg 1.5 ABH (0.17 rpg/620 Diff)

Mud: 9.1 ppg 5% KCl

Surveys: Gyro SS, MWD - EM Pulse

Logging: n/a

Casing/Liner: 9.625 36 J-55 BTC at MD/ TVD

Csg Hanger: Fluted Mandrel Hanger

Centralizers: 1 centek centralizer w/ stop collar 10 ft above float shoe. 1 centek centralizer every joint for the first 15 joints. One centralizer every 3 jnts to 100ft below surface.

Cement: 15.8 ppg Tail slurry w/ TOC @ Surface

Potential Drilling Problems: Hole Bloating, Poor ROF,

8-1/2" Production

Profile: 1/2" - KOP @ 5848' md @ 13.95 deg inc w/ 10 DLS

Bit Type: 8-1/2" 5-blade 13mm PDC

BHA: 6.75in 6:7 lobe 5.0 stg 1.95 FBH .29 rpg 715 DIFF

Mud: 8.6 - 13 ppg SBM

Surveys: MWD - EM Pulse w/ 30ft surveys in curve, 100ft surveys in lateral

Logging: GR

Casing/Liner: 5.5 20 P110EC VAM TOP HT at ft MD/ ft TVD

Csg Hanger: Fluted Mandrel Hanger

Centralizers: 1 centek centralizer w/ stop collar 10ft above shoe. 1 centek centralizer 10ft above float collar. 1 centek centralizer every joint (floating) until KOP. 1 centek centralizer every 3 joints (floating) until 200ft inside intermediate shoe. 1 centek centralizer 50ft below mandrel hanger.

Cement: 15 ppg Tail slurry w/ TOC @ 1700'

Potential Drilling Problems: Bit Preservation, Hole Cleaning, Wellbore Instability, High Torque, High standpipe pressure

Notes / Comments:

Last Revision Date: 7/28/2014
 Revised by: George Manthos

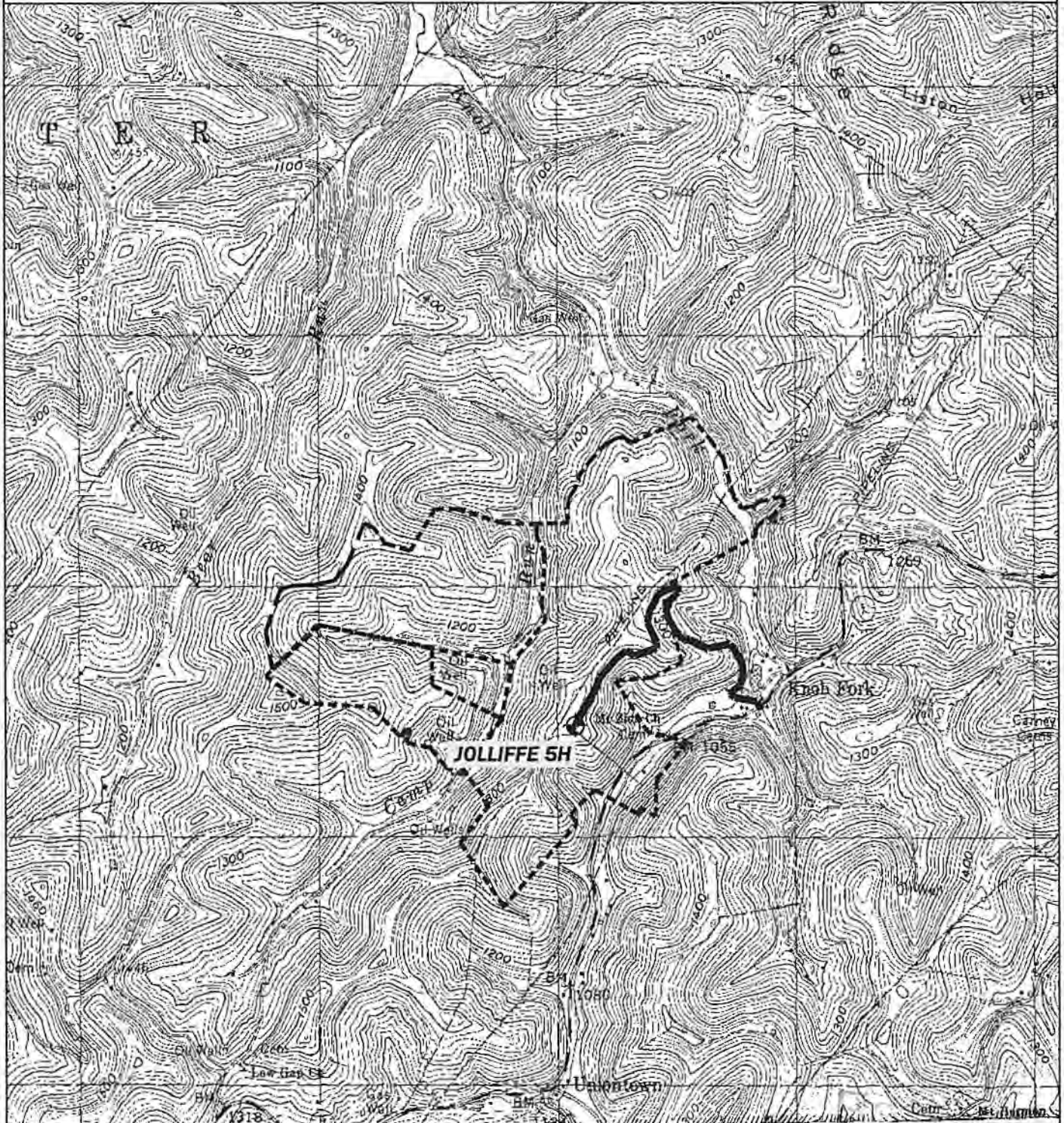
Note: Depths are referenced to RKB
 Note: Not Drawn to Scale

Cement Outside Casing

Received

AUG 7 2014

JOLLIFFE 5H



PREPARED BY: DMH 0-2-17	OPERATOR STATOIL USA ONSHORE PROPERTIES INC. 2103 CITYWEST BLVD., STE. 800 HOUSTON, TX 77042	TOPO SECTION LITTLETON 7.5'	WELL NAME JOLLIFFE 5H
ANGLE RIGHT LAND SURVEYING, LLC PO BOX 681 GRANTSVILLE, WV 26147 (304) 354-0085 G100479		SCALE: 1"=2000'	DATE: 04/30/2013

09/12/2014

4,095'

LATITUDE 39° 40' 00"

JOE JOLLIFFE UNIT I WELL NO. 5H

JOLLIFFE SH MINERAL OWNERSHIP	
UNIT TRACT 4	JAMES T. TALKINGTON, MARTHA JOLLIFFE, ACROPOLIS, INC., P/O T.M. 01-12-16 267.00 AC
UNIT TRACT 9	ACROPOLIS, INC., SPARTAN EXPLORATION CO., ENCLID & GOLDIE CRIMFIELD, CHESAPEAKE APPALACHIA, INC., P/O T.M. 01-16-21, 9.75 AC
UNIT TRACT 10	ERNEST & EVELYN PHILLIPS, HELEN M. POWELL, MICHAEL RAY & REBEKAH POWELL, SHIRLEY PHILLIP, RICHARD & VICTORIA M. EVANS, GEORGE W. & PRISCILLA GRIMM, P/O T.M. 01-16-13, 13.1, 30.16 AC
UNIT TRACT 11	ACROPOLIS, INC., RICHARD & JEFFREY HILL, P/O T.M. 01-16-86, 23.40 AC
UNIT TRACT 12	RICHARD & JEFFREY HILL, P/O T.M. 01-16-86, 5.15 AC
UNIT TRACT 13	RICHARD & JEFFREY HILL, P/O T.M. 01-16-86, 3.00 AC
UNIT TRACT 17	JOSEPHINE PERSINGER WOLFE, LIFE ESTATE JOHN K. PERSINGER, REMAINDERMAN INTEREST, P/O T.M. 01-16-26, 12.00 AC
UNIT TRACT 19	RAY STANLEY SAPP, P/O T.M. 01-16-42, 19.63 AC
UNIT TRACT 20	ACROPOLIS, INC., P/O T.M. 01-16-43, 22.00 AC
UNIT TRACT 21	ED BROOME, INC. & DOUGLAS BROOME, SHIBEN ESTATES, P/O T.M. 01-16-41, 44, 45, 46, 60, 81, 82, 83, 1.63, 77.10 AC
UNIT TRACT 24	ED BROOME, INC. & DOUGLAS BROOME, PAUL E. & CECILIA M. WENDT, P/O T.M. 01-16-44, 15.75 AC

form 946

NAD27 W/ NORTH ZONE GRID NORTH

7,190'

SURFACE HOLE
NAD 83 UTM COORDINATES IN METERS
N) 4,388,675.2 M
E) 538,099.8 M
NAD 83
LAT: 39.64703
LONG: 80.55593

REFERENCE NOTES

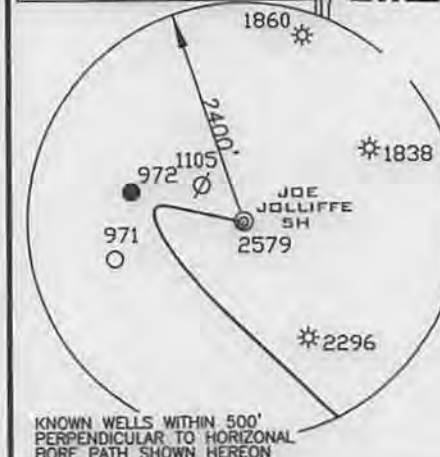
LEASE AS SHOWN TAKEN FROM DESCRIPTION RECORDED IN DEED BOOK 126 PAGE 472 AND OTHERS.
OWNERSHIP TAKEN FROM PUBLIC RECORDS OF WETZEL COUNTY, WV IN OCTOBER, 2010
NAD 83 STATE PLANE COORDINATES & NAD 83 LAT./LONG. BY DIFFERENTIAL SUBMETER MAPPING GRADE GPS DRAFTED BY: T.A.S.

LANDING POINT
NAD 83
LAT: 39.64414
LONG: 80.55639

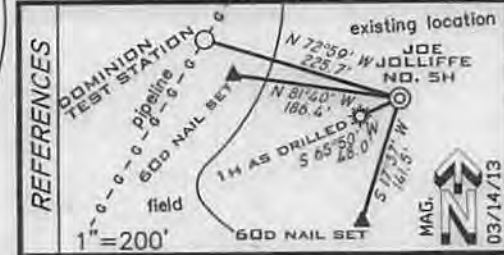
NO DWELLINGS OR AGRICULTURAL BUILDINGS WITHIN 625' OF CENTER OF PAD. NO WATER WELLS OR DEVELOPED SPRINGS WITHIN 250' OF PROPOSED WELL.

SURFACE HOLE

API 2253
TODD & CAROLYN HARRY
T.M. 01-16-28
93 AC
T. HARRY
P/O T.M. 01-16-28
0.5 AC



LEGEND
- - - LEASED AREAS
- - - SURFACE LINES



BOTTOM HOLE
NAD 83 UTM COORDINATES IN METERS
N) 4,387,262.7 M
E) 539,251.9 M
NAD 83
LAT: 39.63424
LONG: 80.54259

FILE NUMBER G100479(WB9-74)
DRAWING NUMBER G100479WP5H.dwg
SCALE 1" = 1000'
MINIMUM DEGREE OF ACCURACY 1/2500
PROVEN SOURCE OF ELEVATION SUBMETER MAPPING GRADE GPS

I THE UNDERSIGNED HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE REGULATIONS ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.S. 1006



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

REVISED DATE: NOVEMBER 4, 2013
DATE: JULY 8, 2013

OPERATORS WELL NO. UNIT 1 WELL #5H
API WELL NO. REV
47-103-02931H6A
STATE COUNTY PERMIT

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL
(IF "GAS") PRODUCTION STORAGE DEEP SHALLOW
LOCATION ELEVATION 1336' WATERSHED TRIBUTARY OF KNOB FORK

DISTRICT CENTER COUNTY WETZEL
QUADRANGLE LITTLETON 7.5' LEASE NUMBER

SURFACE OWNER Nancy E. Jolliffe, Executrix of the estate of Joe Jolliffe ACREAGE P/O 308.8±
OIL & GAS ROYALTY OWNER Martha Jolliffe et al LEASE ACREAGE SEE MINERAL OWNERSHIP TABLE

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

TARGET FORMATION MARCELLUS ESTIMATED DEPTH 7330' + Horizontal Leg

WELL OPERATOR STATOIL USA ONSHORE PROPERTIES INC. DESIGNATED AGENT WILLIAM T. FAHEY II
ADDRESS 2103 CITYWEST BLVD., STE. 800 HOUSTON, TX 77042 ADDRESS 2116 PENNSYLVANIA AVE., WEIRTON, WV 26062

A.R.L.B

COUNTY NAME PERMIT

09/12/2014