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

December 09, 2014

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

Re: Permit Modification Approval for API Number 3305733 , Well #: GOODWIN 2-2H
Revised surface location

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 Gene Smith
Assistant Chief of Permitting
Office of Oil and Gas

12/12/14

WW - 6B
(1/12)

4703305733MOD

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	Harrison	Sardis	Salem 7.5'
		Operator ID	County	District	Quadrangle

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

3 Elevation, current ground: 1096 Elevation, proposed post-construction: 1384

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

SDW
10/6/2014

5) Existing Pad? Yes or No: Yes

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):
Marcellus Shale is the proposed target formation at a TVD of 7760 ft, a thickness of 58 ft, and a reservoir pressure of 3800 psi, *Intermediate Casing MASP 2300 psi

7) Proposed Total Vertical Depth: 7680 ft
8) Formation at Total Vertical Depth: Marcellus
9) Proposed Total Measured Depth: 16,300 ft
10) Approximate Fresh Water Strata Depths: 45 ft & 645'
11) Method to Determine Fresh Water Depth: Offset wells & 1980 study "Freshwater & Saline Groundwater of WV" by James Foster
12) Approximate Saltwater Depths: 1900 ft
13) Approximate Coal Seam Depths: 803 ft
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 set new casings using API cement in a horizontal well in the Marcellus Formation.
Complete the well in the Marcellus formation in order for Statoil to produce natural gas.

17) Describe fracturing/stimulating methods in detail:
Perforate and fracture 24 separate stages utilizing 8,800,000 gal of water and 9,100,000 lbs of sand.

18) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 12.71

19) Area to be disturbed for well pad only, less access road (acres): 5.48

RECEIVED
Office of Oil and Gas
OCT 14 2014
WV Department of
Environmental Protection

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4703305733 MOD

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#	750'	750'	Cement to surface 738 cu ft
Coal							
Intermediate	9 5/8	New	J-55	36#	2660'	2660'	Cement to surface1099 cu ft
Production	5 1/2	New	P-110	20#	13,740'	13,740'	Cement top @ 1660' 3085 cu ft
Tubing							
Liners							

SDW
10/6/2014

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield
Conductor	20	26	0.438"	1530 psi	Class A	1.3 cu ft/sk
Fresh Water	13 3/8	17 1/2	0.380"	2730 psi	Class A	2.31 cu ft/sk
Coal						
Intermediate	9 5/8	12 1/4	0.352"	3520 psi*	Class A	2.31 cu ft/sk
Production	5 1/2	8 1/2	0.361"	12,640 psi	Class A	1.37 cu ft/sk
Tubing						
Liners						

PACKERS

Kind:				
Sizes:				
Depths Set:				

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(1/12)

4703305733 MOD

21) Describe centralizer placement for each casing string. Surface - 1 centralizer w/stop collar 10' above float shoe. One Single Bow every joint to 100' below surface.

Intermediate - 1 centek centralizer w/stop collar 10' above float shoe, 1 centek centralizer w/stop collar 10' above float collar. 1 centralizer every joint for the first 15 joints. One centralizer every 3 joints to 100' below surface.

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

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

13 3/8" - Class A with 3% Calcium Chloride

9 5/8": BondCem - Class A, 0.05% retarder, 0.25% defoamer, 1% accelerator, 0.25% dispersant, 0.65% retarder, fresh water

5 1/2": Shale Cem - Class A, 10% dispersant, 0.6% fluid loss, 0.4% cement retarder, 0.1% free water control agent 0.25% defoamer, 0.1% fluid loss, fresh water

23) Proposed borehole conditioning procedures. The surface section will be drilled with fresh water. At casing point, prior to tripping to surface, the hole will be circulated clean approximately three hole volumes while rotating the pipe to clean the hole of cuttings. A water based gel spacer will be pumped prior to pumping the cement in order to further clean the annulus and increase the likelihood of a successful cement job. The intermediate section will be drilled with 5% KCL WBM. At casing point, prior to tripping to surface, the hole will be circulated clean approximately three hole volumes while rotating the pipe to clean the hole of cuttings. A water based gel spacer will be pumped prior to pumping cement in order to further clean the annulus and increase and increase the likelihood of a successful cement job. The curve and lateral section will be drilled with a +13.0 lb/gal synthetic based mud. If an excessive amount of sliding is required to control inclination, slides will be performed in short intervals to eliminate a dune of cuttings behind the BHA. Pump rates will be maintained between 450-600 gal/min. Once TD is reached, a clean-up cycle will performed. Bottoms up will be pumped three times or until returns are clean of cuttings. A 50-60 bbl spacer will be pumped prior to the cement in order to prevent contamination.

*Note: Attach additional sheets as needed.

12/12/14

4703305733MOD

Statoil — Marcellus - Drilling Well Schematic

Well Name:	Goodwin 2-2H			GLE (ft):	1,384	TVD(ft):	7,680
Field Name:	Marcellus			DF(ft):	22	TMD(ft):	16,300
County:	Harrison	BHL:	X = 541948.8	Y=	4355410.2	Profile:	Horizontal
API #:	0	SHL:	X = 541130.3	Y=	4357953.7	AFE No.:	0

Formations & Csg Points	Depth, ft MD	Depth, ft TVD	Depth, ft SS	Form. Temp. (F)	Pore Press. (EMW)	Frac Gradient (EMW)	Planned MW	Measure Depth (ft)
Conductor	*100*	*100*	*1,306*	-	-	-	-	100
							FW	
Pittsburgh Coal		0					9.2	
Approximate Fresh Water Strata ~645'								
Casing Point	*750*	*750*	*656*	*65*	-	-		750
							5% KCl	
Red Clay		0					9.2	
1st Salt Sand		0					9.2	
2nd Salt Sand		0					9.2	
3rd Salt Sand		0		-	-	-	9.2	
Maxton Sand		0					9.2	
Keener Sand		0					9.2	TOC @ 1660
Big Lime		0					9.2	
Base Big Injun		2,556					9.2	
Casing Point	*2,660*	*2,660*	*-1,254*	*82*	-	*>18.0*		2,660
							SBM	
Berea Sand		0					8.6	
Gordon Sand		0					8.6	
Java		0					8.6	
Angola		0					8.6	
Rhinestreet		7,573					8.6	
Cashaqua		7,573					8.6	
Middlesex		7,573					8.6	
KOP	**7,018**	**7,010**					13.0	
West River		7,583					13.0	
Genesco		0			-	-	13.0	
Marcellus		7,646					13.0	
Cherry Valley		7,654			-	-	13.0	
Landing point	**8,208**	**7,683**					13.0	
Onondaga		7,699			-	-	13.0	
					-	-		

20" Conductor

17-1/2" Surface

Profile:	Vertical
Bit Type:	17-1/2" Tri-Cone
BHA:	Rotary Assembly
Mud:	9.2 ppg Fresh Water
Surveys:	n/a
Logging:	n/a
Casing:	13.375 54.5 J-55 BTC at 750' MD/750' 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, Collision,

FIT/LOT: 14.0 ppg EMW

12-1/4" Intermediate

Profile:	Vertical
Bit Type:	12-1/4" Kymera 0
BHA:	8in 6:7 Lobe 4.0 Stg 1.5 ABH (0.17 rpg/620 Diff) 0
Mud:	9.2 ppg 5% KCl
Surveys:	Gyro SS, MWD - EM Pulse
Logging:	n/a
Casing/Liner:	9.625 36 J-55 BTC at 2660' MD/2660' TVD
Csg Hanger:	Fluted Mandrel Hanger
Centralizers:	1 centek centralizer w/ stop collar 10 ft above float shoe. 1 centek centralizer w/ stop collar 10 ft above float collar. 1 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 Cleaning , Poor ROP, Buckling,

FIT/LOT: 15.8 ppg EMW

8-1/2" Production

Profile:	
Bit Type:	8-1/2" PDC 0
BHA:	6.75in 6/7 lobe 5.0 stg 1.95 FBH .29 rpg 715 DIFF 0
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 16300 ft MD/7680 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 @ 1660'
Potential Drilling Problems:	Bit Preservation, Hole Cleaning , ,
Notes / Comments:	

TMD: 16,300
TVD: 7,680

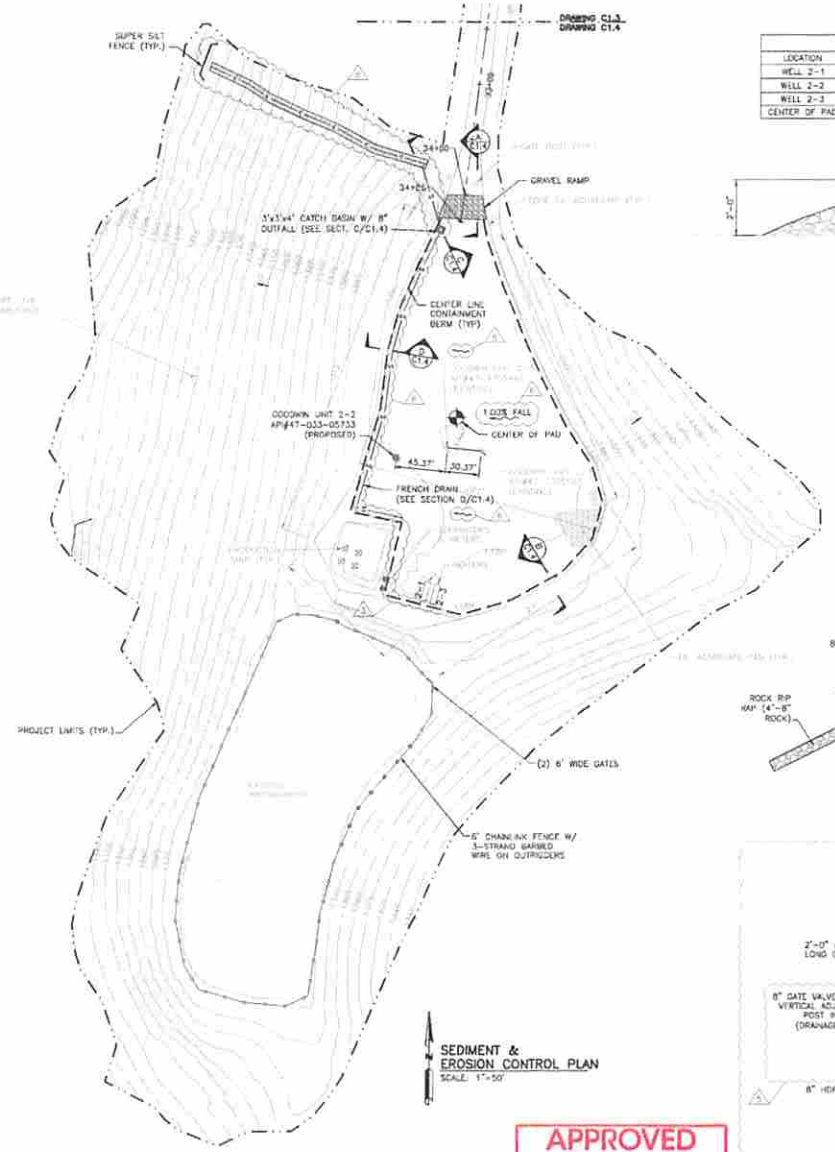
Last Revision Date: 8/6/2014
Revised by: George Manthos

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

Cement Outside Casing

4703305733

12/12/14



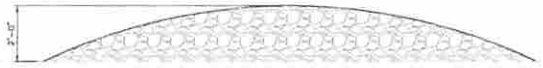
SEDIMENT & EROSION CONTROL PLAN
SCALE: 1"=50'

WELL GEOMETRIC LAYOUT					
LOCATION	NORTHING	EASTING	LATITUDE	LONGITUDE	COMMENTS
WELL 2-1	318517.9168	1710952.4437	N39.3709175°	W80.4110338°	EXISTING
WELL 2-2	318511.4290	1710875.6750	N39.3708976°	W80.4113051°	PROPOSED
WELL 2-3	318520.9368	1710922.2247	N39.3709250°	W80.4111408°	EXISTING
CENTER OF PAD	318548.3294	1710930.0468	N39.3710004°	W80.4111141°	

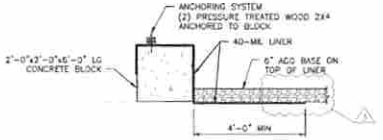
NOTES:
1. DRAWINGS TO.1 AND C1.1 SHALL BE REFERENCED FOR ADDITIONAL NOTES.
2. DRAINAGE VALVES SHALL BE CLOSED PRIOR TO MOBILIZATION OF DRILLING EQUIPMENT ONTO PAD SITE AND DURING DRILLING AND COMPLETION OPERATIONS.
3. EXISTING SLOPES ARE STABILIZED WITH VEGETATION ESTABLISHED. NO AREAS SHALL BE DISTURBED DURING THE DRILLING OF PROPOSED WELL GOODWIN UNIT 2-2.
4. RECLAMATION QUANTITIES (NO ADDITIONAL AREA TO BE RECLAIMED):
   4.1. AS BUILT PAD AGGREGATE AREA = 1.30 ACRES
   4.2. RECLAIMED PAD AGGREGATE AREA = 1.30 ACRES
   4.3. AS BUILT ROAD AGGREGATE AREA = 1.25 ACRES
   4.4. RECLAIMED ROAD AGGREGATE AREA = 1.25 ACRES
   4.5. RECLAIMED EARTHWORK:
      4.5.1. CUT = 0 CY
      4.5.2. FILL = 0 CY
      4.5.3. AREA OF DISTURBANCE = 0.0 ACRES

CODED NOTES:
1.

RECLAMATION NOTES:
1. THE INTENT OF THIS RECLAMATION PLAN IS TO SHOW AREAS WHICH WILL BE RE-GRADED/RECLAIMED ONCE THE SITE OPERATIONS ARE CONSIDERED COMPLETE. THE DRILL PAD AGGREGATE AREA WILL REMAIN THE SAME. THE VALVE WILL BE OPENED ON THE OUTLET END OF THE PIPE FROM THE CATCH BASIN.
2. NO AREAS WILL BE DISTURBED FOR RECLAMATION PURPOSES.
3. RECLAMATION WORK SHALL BE PERFORMED ONLY AFTER THE CONTRIBUTING DRAINAGE AREAS HAVE BEEN STABILIZED FROM INITIAL CONSTRUCTION.
4. ALL RECLAMATION WORK SHALL BE DONE IN ACCORDANCE WITH WVDEP, OFFICE OF OIL & GAS, EROSION AND SEDIMENT CONTROL FIELD MANUAL.
5. ALL FILL PLACED AT RECLAIMED AREAS SHALL BE PLACED IN 2 FOOT THICK MAX LIFTS AND COMPACTED TO 90% STANDARD PROCTOR.
6. SEQUENCE OF WORK:
   6.1. INSTALL SUPER SILT FENCE BELOW CATCHBASIN DISTURBANCE AREA.
   6.2. INSTALL CATCHBASIN, PIPE, CONTAINMENT BERM, SWALES, RIPRAP OUTLET PROTECTION, ETC.
   6.3. PLACE 6" TOPSOIL ON ALL DISTURBED AREAS TO BE VEGETATED.
   6.4. SEED AND MULCH DISTURBED AREAS IN ACCORDANCE WITH WVDEP SEDIMENT AND EROSION CONTROL MANUAL.
   6.5. AFTER SITE IS STABILIZED, REMOVE SUPER SILT FENCE.

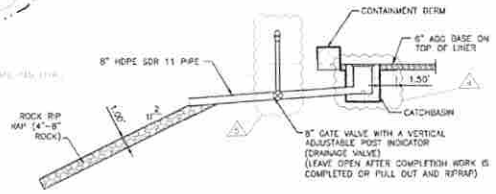


A C1.4 GRAVEL RAMP
SCALE: 1/2"=1'-0"

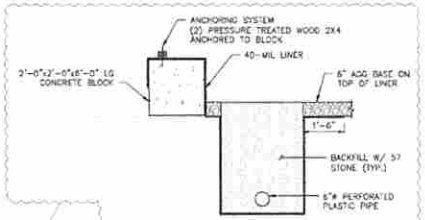


B C1.4 TYPICAL CONTAINMENT BERM
SCALE: 1/2"=1'-0"

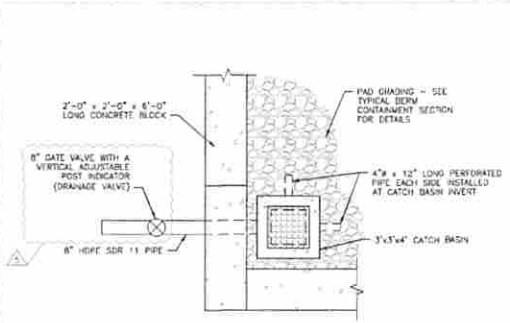
1. ADDED DRAINAGE SWALE AT PERIMETER OF PAD TO DIVERT TO SINGLE CATCH BASIN
2. REMOVED DRAINAGE SWALE AT PERIMETER OF PAD AND ADDED ADDITIONAL CATCH BASINS
3. REMOVED SELECT CATCH BASIN



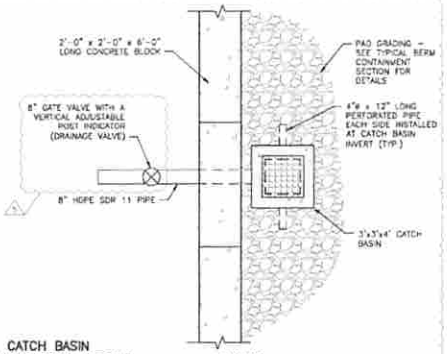
C C1.4 CATCHBASIN OUTLET
SCALE: N.T.S.



D C1.4 TYPICAL CONTAINMENT BERM FRENCH DRAIN
SCALE: 1/2"=1'-0"



CORNER



CENTRAL

1 C1.4 TYPICAL CATCH BASIN CONTAINMENT BERM DETAILS
SCALE: 3/8"=1'-0"

APPROVED
WVDEP OOG
12/9/2014

PICKERING ASSOCIATES
Architects • Engineers • Surveyors
1239 Emerson Avenue
Parkersburg, WV 26101
Phone: (304) 464-8305
Fax: (304) 464-8369

Rev.	Description	Date	By
6	ISSUED FOR PERMIT	12/09/14	MAW

Drawing Description
STATOIL USA ONSHORE PROPERTIES, INC.
HARRISON COUNTY, WEST VIRGINIA
GOODWIN 2 PAD
SEDIMENT & EROSION CONTROL PLAN

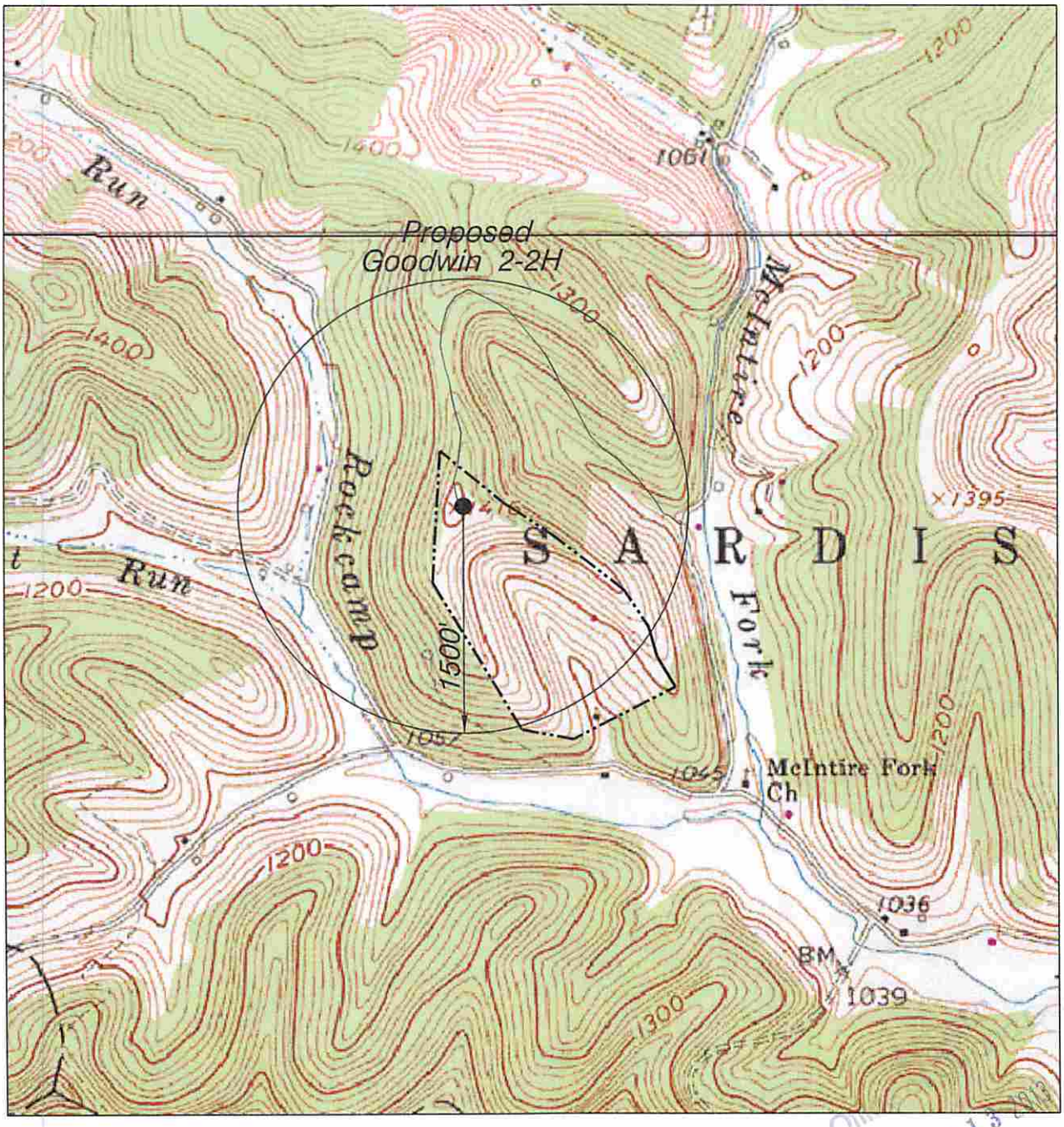
MARK A. WALKER
18088
LICENSED PROFESSIONAL ENGINEER
STATE OF WEST VIRGINIA

Project: 2129230
Designed By: JRB
Drawn By: JRB
Checked By: MAW
Scale: AS SHOWN
Plot Date: 12/08/14
Revision: 6
Drawing Number:
C1.4

Form W-9

Page 1 of 1

STATOIL USA ONSHORE PROPERTIES INC.
GOODWIN 2-2H WATER



NORTH

HUPP Surveying & Mapping P.O. BOX 647 GRANTSVILLE, WV 26147 PH:(304)354-7035 E-MAIL: hupp@frontiernet.net	1" = 1000' Salem Quad	STATOIL USA ONSHORE PROPERTIES INC. 2103 CITYWEST BLVD. SUITE 800 HOUSTON, TX 77042

12/12/14

FORM WW-6

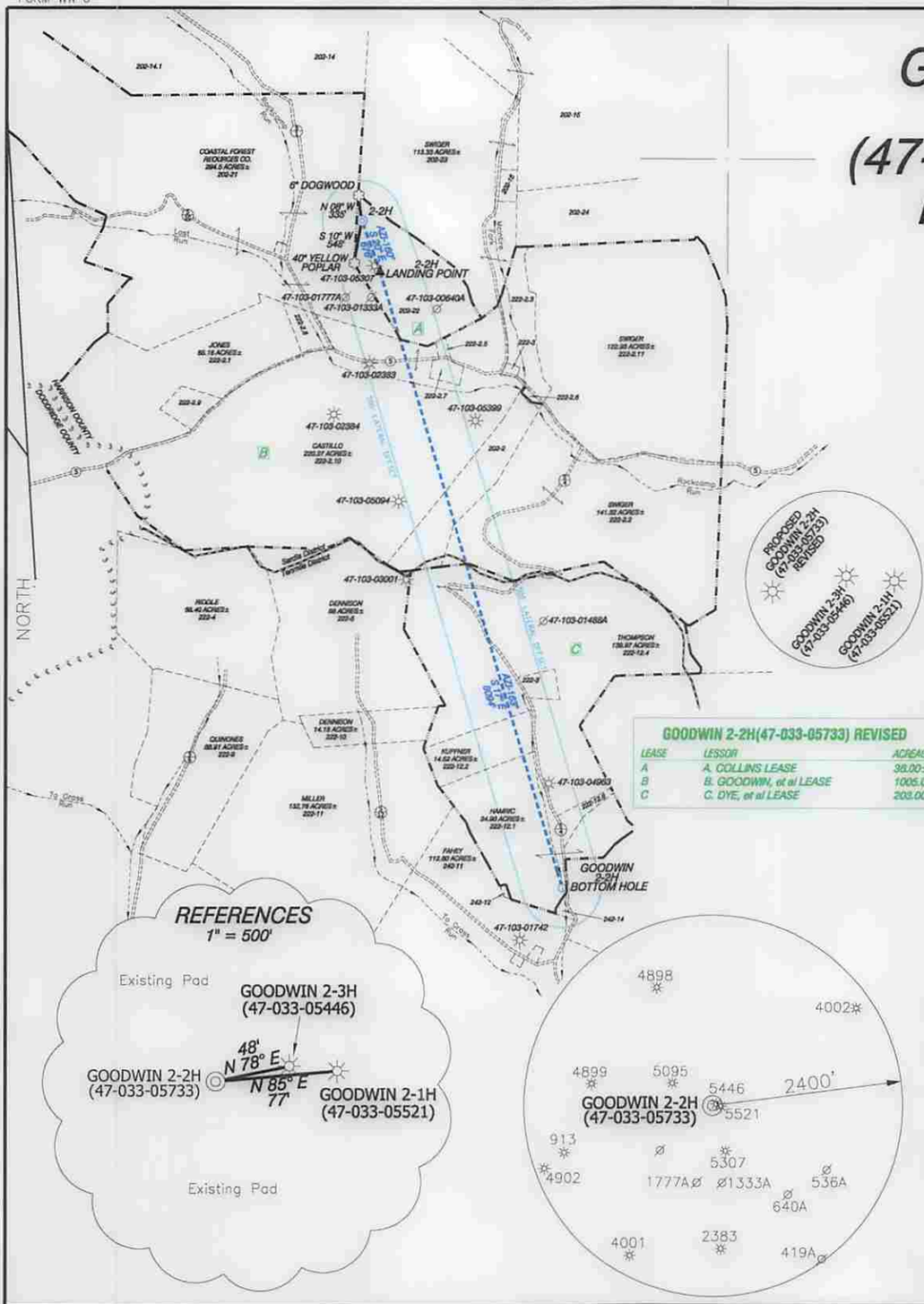
LONG. 80°30'48.1" — 6,410'

LATITUDE 39°22'30"

GOODWIN 2-2H (47-033-05733) REVISED

LONGITUDE 80°30'00" — 1,895'

LAT. 39°22'11.9"



GOODWIN 2-2H SURFACE HOLE	
STATE PLANE COORDINATES NORTH ZONE -NAD 27	L & L DECIMAL NAD 27
(N) 318511	39.369984
(E) 1710875	80.522696
UTM (NAD 27) ZONE 17 US FEET	UTM (NAD 83) ZONE 17 METERS
14297003	4357954
1775310	541130

GOODWIN 2-2H LANDING POINT	
STATE PLANE COORDINATES NORTH ZONE -NAD 27	L & L DECIMAL NAD 27
(N) 317874	39.368242
(E) 1711103	80.521866
UTM (NAD 27) ZONE 17 US FEET	UTM (NAD 83) ZONE 17 METERS
14296370	4357761
1775548	541203

GOODWIN 2-2H BOTTOM HOLE	
STATE PLANE COORDINATES NORTH ZONE -NAD 27	L & L DECIMAL NAD 27
(N) 310120	39.347025
(E) 1713422	80.513354
UTM (NAD 27) ZONE 17 US FEET	UTM (NAD 83) ZONE 17 METERS
14288658	4355410
1777995	541949

GOODWIN 2-2H(47-033-05733) REVISED

LEASE	LESSOR	ACREAGE
A	A. COLLINS LEASE	38.00±
B	B. GOODWIN, et al LEASE	1005.00±
C	C. DYE, et al LEASE	203.00±

LINE LEGEND

LEASE BOUNDARY
SURFACE BOUNDARY
CREEK/STREAM
ROADS
PROPOSED LATERAL
500' LATERAL OFFSET
COUNTY LINE
DISTRICT LINE

NOTES ON SURVEY

1. NO DWELLINGS WITHIN 625' WERE FOUND.
2. NO WATER WELLS OR DEVELOPED SPRINGS WITHIN 250' WERE FOUND.
3. TIES TO WELLS AND CORNERS ARE BASED ON STATE PLANE GRID NORTH WV NORTH ZONE NAD '27.
4. WELL LAT./LONG. ESTABLISHED BY SG-GPS(OPUS).
5. SURFACE OWNER AND ADJOINER INFORMATION TAKEN FROM THE ASSESSOR AND COUNTY CLERK RECORDS OF WETZEL COUNTY IN FEBRUARY, 2014 AND INFORMATION PROVIDED BY PETROEDGE ENERGY LLC.
6. WELLS SHOWN ARE TAKEN FROM RECORDS OF WVDEP.

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 RULES ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

P.S. 834

Doyle Hupp Jr.

HUPP Surveying & Mapping
P.O. Box 647 Grantsville, WV 26147
(304) 354-7035 EMAIL: hupp@frontiernet.net

DOYLE HUPP JR. LICENSED No. 834 STATE OF WEST VIRGINIA PROFESSIONAL SURVEYOR

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.

DATE JULY 16, 20 14

OPERATORS WELL NO. GOODWIN 2-2H REVISED

API WELL NO. 47 — 033 — 05733 HGA MOD

STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1/2500

PROVEN SOURCE OF ELEVATION SG-GPS (OPUS)

FILE NO. W1977 (BK44-39)

SCALE 1" = 2000'

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

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

LOCATION :

ELEVATION 1390' WATERSHED ROCKCAMP RUN

DISTRICT SARDIS COUNTY HARRISON QUADRANGLE SALEM 7.5'

SURFACE OWNER THOMAS & VANESSA COLLINS ACREAGE 35.5±

ROYALTY OWNER THOMAS & VANESSA COLLINS, et al LEASE ACREAGE 369.80± 12/12/14

PROPOSED WORK : LEASE NO. ___

DRILL X CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE X 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- 7680' MD- 16,300'

COUNTY NAME PERMIT

WELL OPERATOR STATOIL USA ONSHORE PROPERTIES INC. DESIGNATED AGENT RICHARD PYLES

ADDRESS 2103 CITYWEST BLVD., SUITE 800, HOUSTON, TX 77042 ADDRESS 803 NASH ROAD MIDDLEBOURNE, WV 26149

WW-6