west virginia department of environmental protection

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

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

Tuesday, August 09, 2016
WELL WORK PERMIT
Horizontal 6A / Rework/Horizontal 6A Well - 2

SWN PRODUCTION COMPANY, LLC
POST OFFICE BOX 12359

SPRING, TX 773914954

Re: Permit approval for MICHAEL DUNN MSH 10H
47-051-01581-00-00

This well work permit 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 any additional specific 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 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.

Per 35 CSR 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- 0450.

James A. Martin
Chief

Operator's Well Number: MICHAEL DUNN MSH 10H
Farm Name: DUNN, MICHAEL A.
U.S. WELL NUMBER: 47-051-01581-00-00
Horizontal 6A / Rework/Horizontal 6A Well - 2
Date Issued: 8/9/2016

API Number: 051-01581F

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. 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.

2. 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.

3. 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.

4. The operator shall provide to the Office of Oil and Gas the dates of each of the following within 30 days of their occurrence: completion of construction of the well pad, commencement of drilling, cessation of drilling, completion of any other permitted well work, and completion of the well. Such notice shall be provided by sending an email to DEPOOGNotify@wv.gov.

WW-6B
(10/14)

Rework

API NO. 47- 51 - 01581F
OPERATOR WELL NO. Michael Dunn MSH 10H
Well Pad Name: Michael Dunn Pad

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

1) Well Operator:	SWN Production Co., LLC	49447757	51-Marshall	9- Webst	453-Majorsville
		Operator ID	County	District	Quadrangle

2) Operator's Well Number: Michael Dunn MSH 10H Well Pad Name: Michael Dunn Pad

3) Farm Name/Surface Owner: Michael Dunn Public Road Access: Wolf Run- Popular Springs Road

4) Elevation, current ground: 1256' Elevation, proposed post-construction: 1256'

5) Well Type (a) Gas x Oil _____ Underground Storage _____
Other _____
(b)If Gas Shallow x Deep _____
Horizontal x

6) Existing Pad: Yes or No yes

JR 6/22/16

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Associated Pressure(s):
Target Formation- Marcellus, Target Top TVD- 6803', Target Base TVD- 6841', Anticipated Thickness- 38', Associated Pressure- 4438

8) Proposed Total Vertical Depth: 6842'

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 14,273'

11) Proposed Horizontal Leg Length: Already Drilled

12) Approximate Fresh Water Strata Depths: 331'

13) Method to Determine Fresh Water Depths: from log analysis and nearby water wells

14) Approximate Saltwater Depths: 1184'

15) Approximate Coal Seam Depths: 670'

16) Approximate Depth to Possible Void (coal mine, karst, other): None that we are aware of.

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes _____ No x

(a) If Yes, provide Mine Info: Name: _____
Depth: _____
Seam: _____
Owner: _____

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JUL 14 2016

WW-6B
(10/14)

API NO. 47- 51 - 01581 F
OPERATOR WELL NO. Michael Dunn MSH 10H
Well Pad Name: Michael Dunn Pad

18) **CASING AND TUBING PROGRAM**

All casing is existing ja

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	20"	New	J-55	94#	117'	117'	CTS
Fresh Water	13 3/8"	New	J-55	54.5#	429'	429'	416 sx/CTS
Coal	9 5/8"	New	J-55	40#	2308'	2308'	869 sx/CTS
Intermediate	7"	New	J-55	20#	If Needed	If Needed	If Needed/As Needed
Production	5 1/2"	New	P-110	20#	14,273'	14,273'	Lead 936 sx tail 1844 sx/100' inside
Tubing	2 3/8'	New	P-110	4.7#	Approx. 6824'	Approx. 6824'	
Liners							

ja 6/22/16

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Max. Associated Surface Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	20"	30"	0.25	2120	81	Class A	1.19/50% Excess
Fresh Water	13 3/8"	17.5"	0.380	2740	633	Class A	1.19/50% Excess
Coal	9 5/8"	12 1/4"	0.395	3950	1768	Class A	1.19/50% Excess
Intermediate	7"	8 3/4"	0.317	4360	3250	Class A	1.20/15% Excess
Production	5 1/2"	8 3/4"	0.361	12360	9500	Class A	1.20/15% Excess
Tubing	2 3/8"	4.778"	0.190				
Liners							

PACKERS

Kind:	10K Arrowset AS1-X			
Sizes:	5 1/2"			
Depths Set:				

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JUL 14 2016

WW-6B
(10/14)

API NO. 47- 51 - 01581 F
OPERATOR WELL NO. Michael Dunn MSH 10H
Well Pad Name: Michael Dunn Pad

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

Clean out existing well bore and run an expandable liner to isolate all existing perfs in the Marcellus.

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

Well will be perforated within the target formation and stimulated with a slurry of water, sand, and chemical additives at a high rate. This will be performed in stages with the plug and perf method along the wellbore until the entire lateral has been stimulated within the target formation. All stage plugs are then drilled out and the well is flowed back to surface. The well is produced through surface facilities consisting of high pressure production unites, vertical separation units, water and oil storage tanks. Max press and anticipated max rate- 9000 lbs @ 80 barrels a minute.

JM 6/22/16

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

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

23) Describe centralizer placement for each casing string:

All casing strings will be ran with a centralizer at a minimum of 1 per every 3 joints of casing.

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

See Attachment ***

25) Proposed borehole conditioning procedures:

All boreholes will be conditioned with circulation and rotation for a minimum of one bottoms up and continuing until operator is satisfied with borehole conditions.

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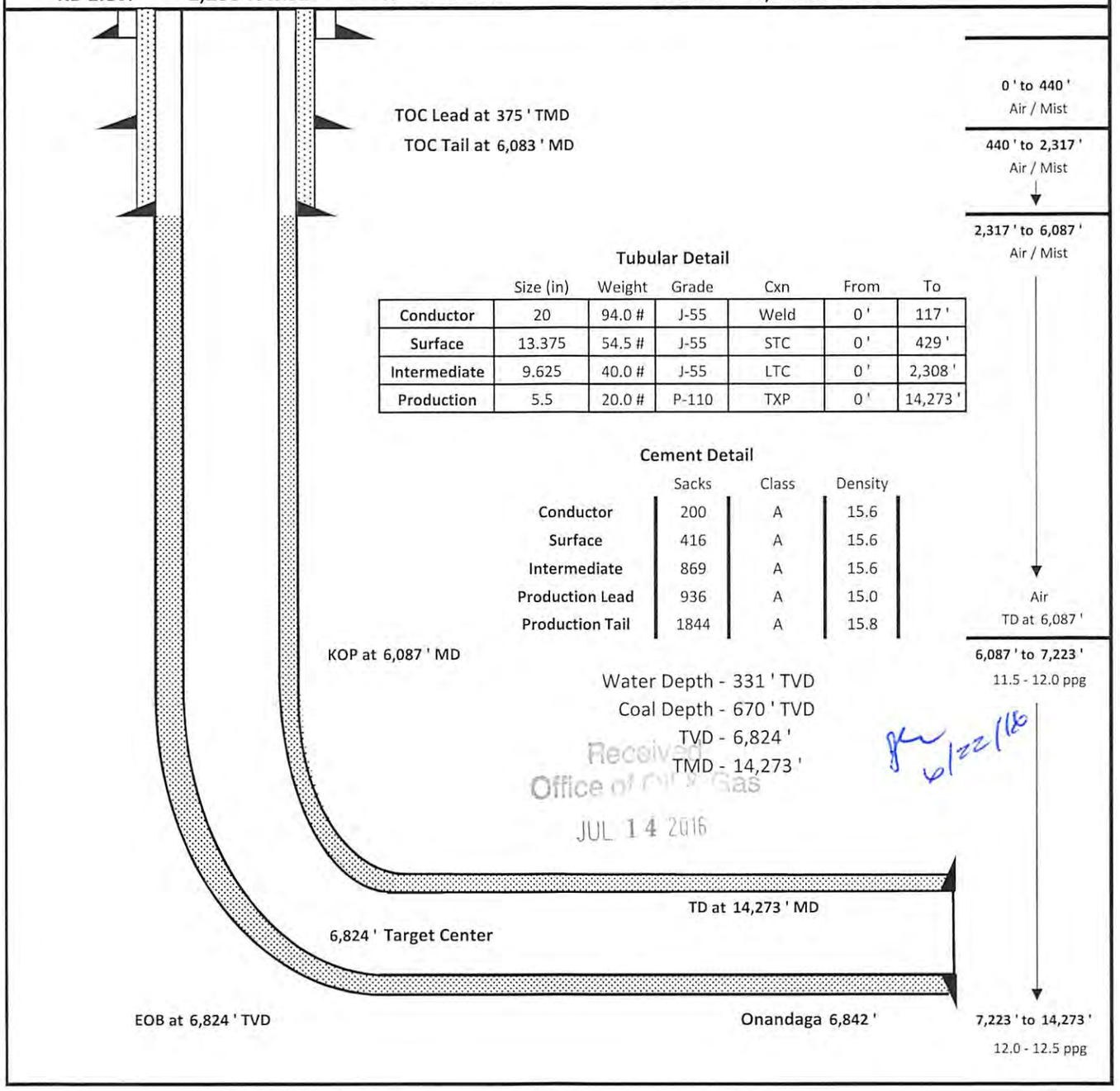
*Note: Attach additional sheets as needed.

SI-01581

Southwestern Energy Company | As Built Drilling Program

Well:	MICHAEL DUNN MSH 10	Re-entry Rig:	Nomac 25
Field:	NORTH VICTORY FIELD	Prospect:	VICTORY
County:	MARSHALL	State:	WV
SHL:	39.8972 Latitude	-80.5540 Longitude	
BHL:	39.8794 Latitude	-80.5403 Longitude	
KB Elev:	1,280 ft MSL	KB 22 ft AGL	GL Elev: 1,258 ft MSL



Tubular Detail

	Size (in)	Weight	Grade	Cxn	From	To
Conductor	20	94.0 #	J-55	Weld	0 '	117 '
Surface	13.375	54.5 #	J-55	STC	0 '	429 '
Intermediate	9.625	40.0 #	J-55	LTC	0 '	2,308 '
Production	5.5	20.0 #	P-110	TXP	0 '	14,273 '

Cement Detail

	Sacks	Class	Density
Conductor	200	A	15.6
Surface	416	A	15.6
Intermediate	869	A	15.6
Production Lead	936	A	15.0
Production Tail	1844	A	15.8

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JUL 14 2016

6/22/16

51-01581F

Schlumberger Cement Additives

	Product Name	Product Use	Chemical Name	CAS Number
Surface	S001	accelerator	calcium chloride	10043-52-4
Intermediate	S001	accelerator	calcium chloride	10043-52-4
Kick Off Plug	D080	dispersant	sodium polynaphthalene sulfonate	9008-63-3
	D801	retarder	aromatic polymer derivative	propriatary
	D047	antifoam	polypropylene glycol	25322-69-4
Production-Lead	D167	fluid loss	aliphatic amide polymer	propriatary
	D154	extender	non-crystalline silica	7631-86-9
	D400	gas migration	boric acid	10043-35-3
	D046	antifoam	polypropylene glycol	25322-69-4
			fullers earth (attapulgite)	8031-18-3
	D201	retarder	chrystalline silica	14808-60-7
			metal oxide	propriatary
	D202	dispersant	sulphonated synthetic polymer	propriatary
			formaldehyde (impurity)	propriatary
Production-Tail	D046	antifoam	polypropylene glycol	25322-69-4
			fullers earth (attapulgite)	8031-18-3
	D167	fluid loss	aliphatic amide polymer	propriatary
	D065	dispersant	sodium polynaphthalene sulfonate	9008-63-3
			sodium sulfate	7757-82-6
	D201	retarder	chrystalline silica	14808-60-7
			metal oxide	propriatary
	D153	anti-settling	chrystalline silica	14808-60-7

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JUL 14 2016

WW-9
(4/16)

API Number 47 - 51 - 01581F
Operator's Well No. Micheal Dunn MSH 10H

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name SWN Production Company, LLC OP Code 494512924

Watershed (HUC 10) Upper Ohio South Quadrangle 453- Majorsville

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: closed loop system in place at this time- cuttings will be taken to a permitted landfill

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)
■ Reuse (at API Number at next anticipated well, API # will be included with the WR-34/DDMR &/or permit addendum)
_____ Off Site Disposal (Supply form WW-9 for disposal location)
■ Other (Explain flow back fluids will be put in steel tanks and reused or taken to a permitted disposal facility

Will closed loop system be used? If so, describe: yes

Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater, oil based, etc. at drill to KOP, fluid drill with SOBM from KOP to TD

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

Additives to be used in drilling medium? see attached sheets

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? meadow SWF-1032, SS grading SWF-4902, Northwestern SWF-1025, Short Creek 1034/WV0109517/CID28726, Carbon Limeston 28726-CID28726
Arden Landfill 10072, American 02-12954, Country Wide 38390/CID38390, Pine Grove 13688

Permittee shall provide written notice to the Office of Oil and Gas of any load of drill cuttings or associated waste rejected at any West Virginia solid waste facility. The notice shall be provided within 24 hours of rejection and the permittee shall also disclose where it was properly disposed.

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

Company Official (Typed Name) Dee Southall

Company Official Title Regulatory Supervisor

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JUL 14 2016

Subscribed and sworn before me this 17th day of June, 2016

Brittany R Woody Notary Public

My commission expires 11/27/22

OFFICIAL SEAL
Notary Public, State of West Virginia
BRITTANY R WOODY
3302 Old Elkins Road
Buckhannon, WV 26201
My commission expires November 27, 2022

WVD Seeding Specification

To Order Seed contact Lyndsi Eddy Flippo office 570-996-4271 cell 501-269-5451 lyndsi_eddy@swn.com (please allow 7 to 10 days for delivery)

NON-ORGANIC PROPERTIES

Seed Mixture: ROW Mix	SWN Supplied
Orchardgrass	40%
Timothy	15%
Annual Ryegrass	15%
Brown Top Millet	5%
Red Top	5%
Medium Red Clover	5%
White Clover	5%
Birdsfoot Trefoil	5%
Rough Bluegrass	5%

All legumes are innoculated at 5x normal rate

Apply @ 100lbs per acre
April 16th- Oct. 14th

Apply @ 200lbs per acre
Oct. 15th- April 15th PLUS
50lbs per acre of Winter Wheat

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SOIL AMENDMENTS

10-20-20 Fertilizer	*Apply @ 500lbs per Acre
Pelletized Lime	Apply @ 2 Tons per Acre

*unless otherwise dictated by soil test results

Seeding Calculation Information:

1452' of 30' ROW/LOD is One Acre
871' of 50' ROW/LOD is One Acre
622' of 70' ROW/LOD is One Acre

Synopsis:

Every 622 linear feet in a 70' ROW/LOD, you should be using (2) 50lb bags of seed, (4) 50lb bags of fertilizer and (80) 50lb bags of Lime (2x seed in winter months + 50lb Winter Wheat/ac).

Special Considerations:

Landowner Special Considerations including CREP program participants require additional guidance that is not given here. Discuss these requirements with SWN supervision at the beginning of the project to allow time for special seed delivery.

ORGANIC PROPERTIES

Seed Mixture: SWN Production Organic Mix	SWN Supplied
Organic Timothy	50%
Organic Red or White Clover	50%
OR	
Organic Perennial Ryegrass	50%
Organic Red or White Clover	50%

Apply @ 100lbs per acre
April 16th- Oct. 14th

Organic Fertilizer @ 200lbs per Acre

Apply @ 200lbs per acre
Oct. 15th- April 15th

Pelletized Lime @ 2 Tons per Acre

WETLANDS (delineated as jurisdictional wetlands)

Seed Mixture: Wetland Mix	SWN Supplied
VA Wild Ryegrass	20%
Annual Ryegrass	20%
Fowl Bluegrass	20%
Cosmos 'Sensation'	10%
Redtop	5%
Golden Tickseed	5%
Maryland Senna	5%
Showy Tickseed	5%
Fox Sedge	2.5%
Soft Rush	2.5%
Woolgrass	2.5%
Swamp Verbena	2.5%

Apply @ 25lbs per acre
April 16th- Oct. 14th

Apply @ 50lbs per acre
Oct. 15th- April 15th

NO FERTILIZER OR LIME INSIDE WETLAND LIMITS

51-01581F

51-01581 F

Form WW-9

Operator's Well No. Micheal Dunn MSH 10H

SWN Production Company, LLC

Proposed Revegetation Treatment: Acres Disturbed 13.7 Prevegetation pH _____

Lime as determined by pH test min. 2 Tons/acre or to correct to pH 7.2

Fertilizer type 10-20-20

Fertilizer amount 600 lbs/acre

Mulch Hay/Straw 2.5 Tons/acre

Seed Mixtures

Temporary		Permanent	
Seed Type	lbs/acre	Seed Type	lbs/acre
**See Attachment			

Attach:
Maps(s) of road, location, pit and proposed area for land application (unless engineered plans including this info have been provided). If water from the pit will be land applied, include dimensions (L x W x D) of the pit, and dimensions (L x W), and area in acreage, of the land application area.

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: [signature]

Comments: _____

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Title: oil and gas inspector Date: 6/22/16

Field Reviewed? (✓) Yes ( ) No

Marcellus Well Drilling Procedures
And Site Safety Plan

SWN Production Co., LLC

47 - 51 - 01581F
Well name: Michael Dunn MSH 10H
Majorsville, Quad
Webster, District
Marshall County, West Virginia

Submitted by: Danielle Southall Date: 6/16/16

Title Regulatory Supervisor SWN Production Co., LLC

Approved by: Date: 6/22/16

Title: Oil & Gas Inspector

Approved by:

Date:

Title:

SWN Production Co., LLC – Confidential

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1. Contacts, Schedules, and Meetings

A. SWN Production Company, LLC. 24 Hour Hotline: **1-877-879-0376**

B(a). Emergency Telephone Numbers:

Agency Type	Name	Phone Number	Cell
County Police	Marshall County	911 or 304-843-1500	
State Police	Marshall County	304-843-4100	
Ambulance Service	Marshall County	911 or 304-843-1500	
Hospital		304-845-3211	
Fire Department	Marshall County	911 or 304-842-1500	
Dicky Hall	Drilling Engineer Manager	832-796-7139	
Bill Igou	Drilling Superintendent	570-996-4272	501-654-4161
Danny Brooks	Drilling Superintendent	570-996-4298	501-269-2946
Peter Cain	HSE Field Specialist	281-217-4552	
Derek Cutright	Operations General Manager	281-618-7473	
Chris Flanagan	Production Field Manager	832-796-1626	
Michelle McCracken	Manager HSE	281-618-6284	
Jim Nicholson	WV Oil and Gas Inspector		304-552-3874
Joe McCourt	Inspector Supervisor		304-380-2467
James Martin	Chief	304-926-0499 x 1654	
OEM			
WV DEP	**Emergency Pollution and Spills**	**1-800-642-3074**	
Contractor's	**Company**	**Phone**	
Well Control Co's	Boots & Coots	1-800-256-9688	
	Halliburton	1-800-409-6479	
Earthwork/Equipment	Triple J Contractors	304-472-3962	
Remediation/Cleanup	Weaverton Environmental	724-746-4850	
Remediation/Cleanup	Ryan Environmental	304-842-5578	
Remediation/Cleanup	Central Environmental Services	304-863-8867	
Heavy Equipment	Kanawha Stone	304-755-8271	
Heavy Equipment/Rouster	Arvilla Pipeline	304-665-2652	
Heavy Equipment	Hoy Contracting	724-627-0272	
Cleanup Supplies	McJunkin Supply	304-472-3565	

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B(b). All Schools and Public Facilities within 1 Mile Radius:

Name:	Address:	Phone:
Rosenberger School (Historical)	**Wolf Run Cameron, WV 2603**	**Marshall County Historical Society 304-845-3692**
Wolf Run Baptist Church	**Upper Wolf Run Cameron, WV 26033**	**Marshall County Historical Society 304-845-3692**

C. A formal pre-spud meeting will be held prior to this well being drilled. Discussions between the drilling rig toolpusher and SWN representatives will be held weekly regarding general safety and environmental issues.

Drilling Superintendents: Charlie Amato 501-358-1583
Danny Brooks 501-269-2946
Rick Harless 304-644-9129
Bill Igou 501-654-4161

1. Inspector: Jim Nicholson

2. Personnel in attendance for pre-spud meeting:

   Drilling
   Land
   Regulatory
   Coal
   Geology
   Field

D. HSE meetings will be conducted once per tour and will include all personnel working on location. HSE meetings will cover upcoming operations, JSAs for critical operations, recent HSE incidents, and requirements for safe and healthy operations during current weather conditions. Corporate HSE alerts and rig fleet corrective actions in response to recent HSE incidents will also be discussed when applicable.

1. The highest ranking drilling contractor representative present shall keep an accurate count of all drilling personnel on the drilling location at all times. All non-drilling (i.e., non-SWN and non-drilling contractor) personnel will be required to sign the attached ACCESS CONTROL REPORT (see attachment #1). All non-essential persons will be kept off the drilling location at all times, and such access will be enforced by the highest ranking drilling contractor representative present.

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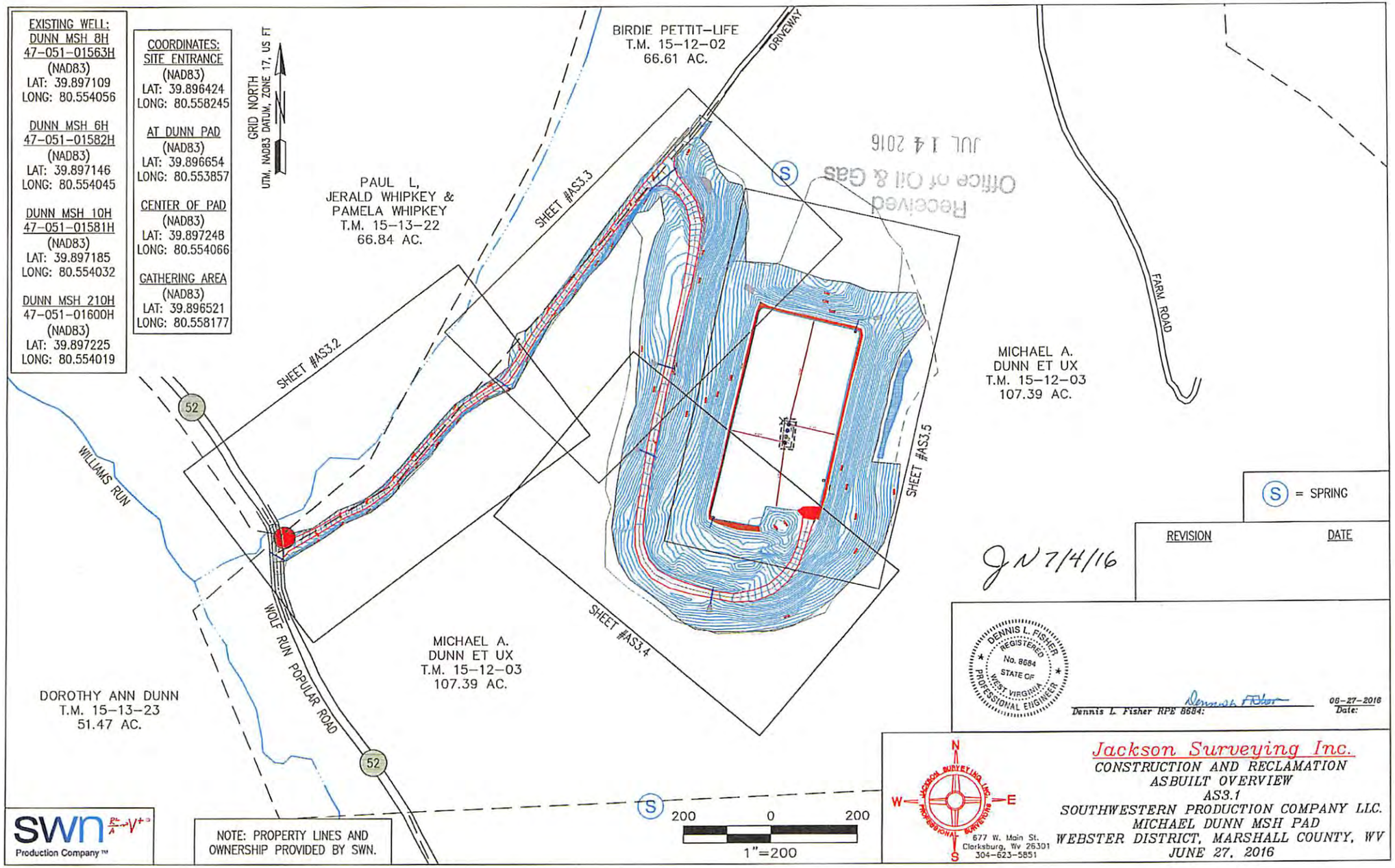
Attachment #3



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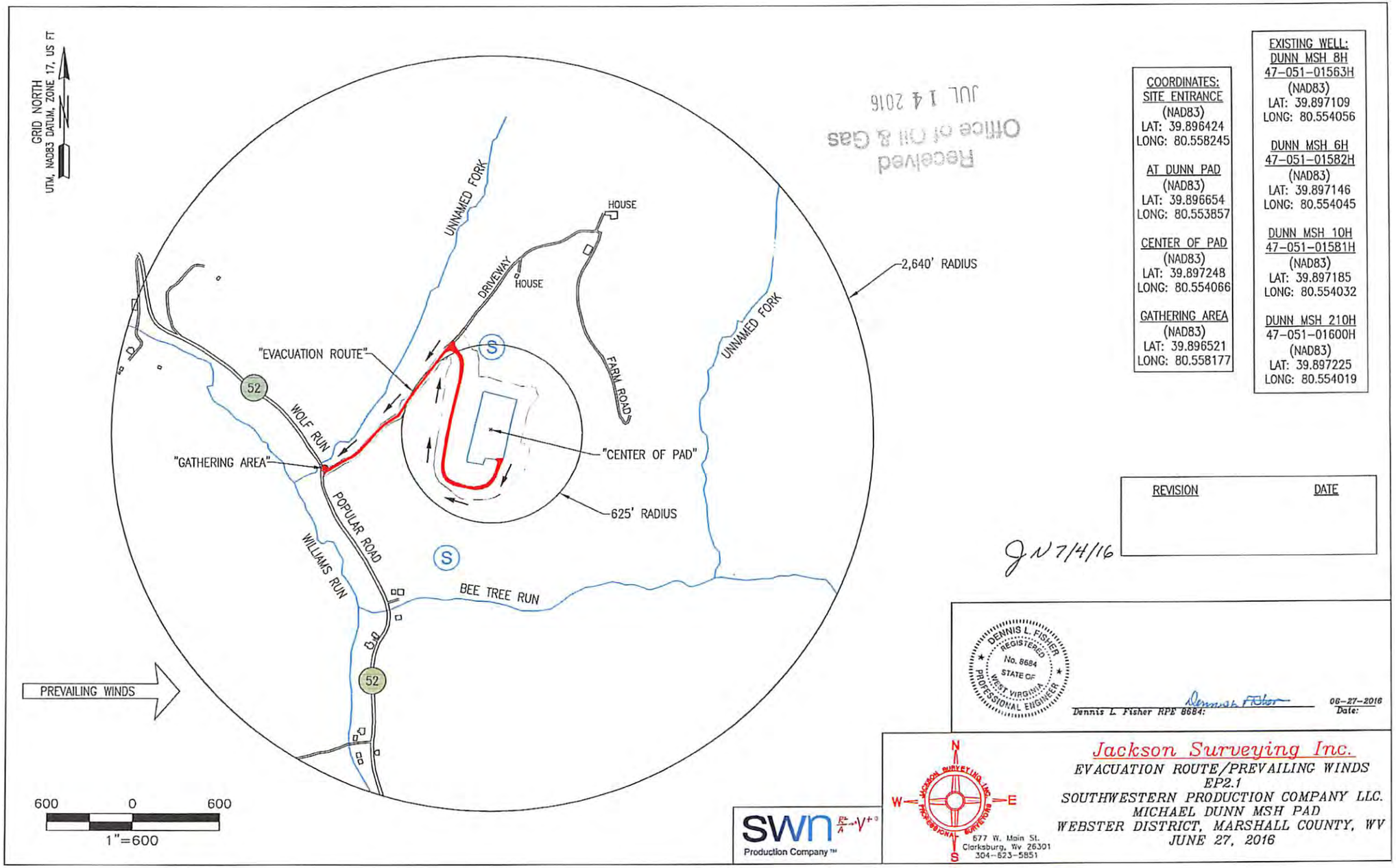
Attachment #5



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JUL 14 2016

COORDINATES:
SITE ENTRANCE
(NAD83)
LAT: 39.896424
LONG: 80.558245

AT DUNN PAD
(NAD83)
LAT: 39.896654
LONG: 80.553857

CENTER OF PAD
(NAD83)
LAT: 39.897248
LONG: 80.554066

GATHERING AREA
(NAD83)
LAT: 39.896521
LONG: 80.558177

EXISTING WELL:
DUNN MSH 8H
47-051-01563H
(NAD83)
LAT: 39.897109
LONG: 80.554056

DUNN MSH 6H
47-051-01582H
(NAD83)
LAT: 39.897146
LONG: 80.554045

DUNN MSH 10H
47-051-01581H
(NAD83)
LAT: 39.897185
LONG: 80.554032

DUNN MSH 210H
47-051-01600H
(NAD83)
LAT: 39.897225
LONG: 80.554019

REVISION	DATE

JN 7/4/16

DENNIS L. FISHER REGISTERED No. 8684 STATE OF WEST VIRGINIA PROFESSIONAL ENGINEER

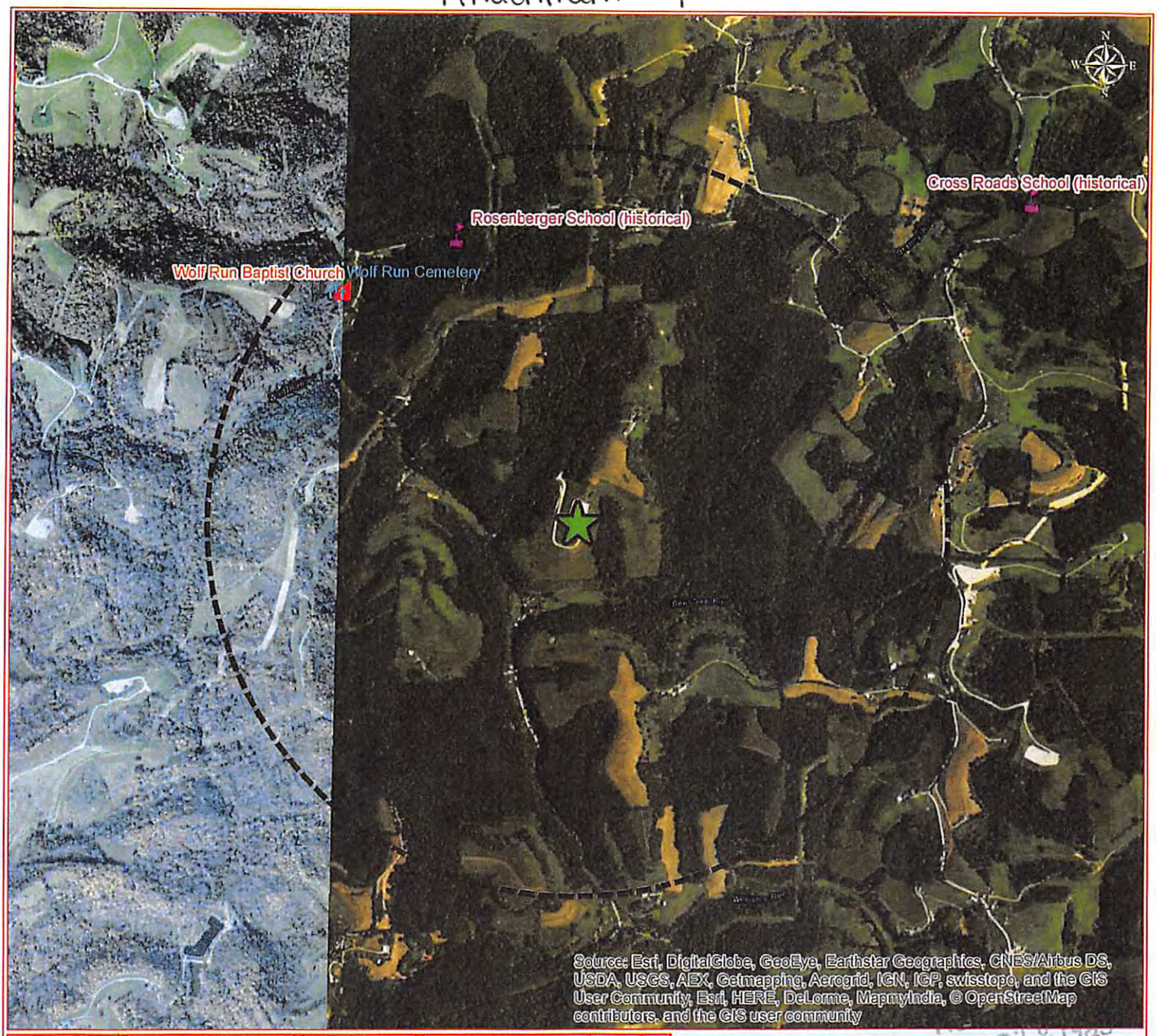
Dennis L Fisher RPE 8684: Dennis L Fisher 06-27-2016 Date:

SWN Production Company™

Jackson Surveying Inc.
677 W. Main St.
Clarksburg, Wv 26301
304-623-5851

EVACUATION ROUTE/PREVAILING WINDS
EP2.1
SOUTHWESTERN PRODUCTION COMPANY LLC.
MICHAEL DUNN MSH PAD
WEBSTER DISTRICT, MARSHALL COUNTY, WV
JUNE 27, 2016

Attachment #4



Legend

- Dunn_Pad
- Dunn_Pad_1_Mile_Buffer
- sde.GISPUB.bmp_Cemeteries
- sde.GISPUB.bmp_Churches
- sde.GISPUB.bmp_Schools

Office of Oil & Gas
JUL 14 2016

Michael Dunn-1Mile
Marshall County, West Virginia

1,000 500 0 1,000 Feet
1:24,000 Absolute Scale

Coordinate System: NAD 1983 StatePlane West Virginia North FIPS 4701 Feet

Path: K:\EandP\WVD\Team Data\GIS\Kalab\1Mile maps\Michael Dunn\Michael Dunn-1Mile.mxd

Attachment #2

ACCESS CONTROL REPORT
Well Name: Michael Dunn MSH 10H

DATE	NAME	TIME IN	TIME OUT

2. Maps and Diagrams

A. Plan View Map--See Attachment #3

B. 1 Mile Map-- See Attachment #4

C. Evacuation Plan--See Attachment #5

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3. Well Work

A. Well Work and Procedures

1. -Well Work Detail: Drill and stimulate the Marcellus formation. If we should encounter a void, place a basket above and below the void area – balance cement to bottom of void and grout from basket to surface. Run casing not less than 50' below void nor more than 100' below void. If freshwater is encountered deeper than anticipated it must be protected, set casing at least 50' below but not more than 100' below freshwater and cts.

2. -All casing cemented will not be disturbed for at least 8 hours after cementing operations.

3. -Surface, Coal, and Intermediate strings will be pressure tested at a pressure 20% greater than what is expected to be exerted on each string throughout the remainder of the well operations.

4. -No oil or gas production or pressure should exist on the surface or coal protection strings.

5. -A Formation Integrity Test (FIT) will be performed immediately following the drill out of intermediate casing.

6. -Centralizers will be used in the well. However, the placement of the centralizers will be contingent on the final well log and directional data.

7. -Production casing will be pressure tested at a pressure 20% greater than what is expected to be exerted upon it during fracturing operations. Upon completion of fracturing operations the production casing will be pressure tested at a pressure 20% greater than expected shut in pressure.

8. -Well will be perforated within the target formation and stimulated with a slurry of water, sand, and chemical additives at a high rate. This will be performed in stages with the plug and perf method along the wellbore until the entire lateral has been stimulated within the target formation. All stage plugs are then drilled out and the well is flowed back to surface. The well is produced through surface facilities consisting of high pressure production units, vertical separation units, water and oil storage tanks.

9. See Attachment #1

B. A copy of the Site Safety Plan will be provided to the local county emergency office at least 7 days before dirt work or well work commences

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4. Chemical Inventory & MSDS

A. MSDS- please refer to CD

B. MSDS sheets will be available in the tool- pusher's office.
C. Please see below:

Schlumberger Cement Additives

	Product Name	Product Use	Chemical Name	CAS Number
Surface	S001	accelerator	calcium chloride	10043-52-4
Intermediate	S001	accelerator	calcium chloride	10043-52-4
Kick Off Plug	D080	dispersant	sodium polynaphthalene sulfonate	9008-63-3
	D801	retarder	aromatic polymer derivative	propriatary
	D047	antifoam	polypropylene glycol	25322-69-4
Production-Lead	D167	fluid loss	aliphatic amide polymer	propriatary
	D154	extender	non-crystalline silica	7631-86-9
	D400	gas migration	boric acid	10043-35-3
	D046	antifoam	polypropylene glycol	25322-69-4
			fullers earth (attapulgite)	8031-18-3
	D201	retarder	chrystalline silica	14808-60-7
			metal oxide	propriatary
	D202	dispersant	sulphonated synthetic polymer	propriatary
			formaldehyde (impurity)	propriatary
Production-Tail	D046	antifoam	polypropylene glycol	25322-69-4
			fullers earth (attapulgite)	8031-18-3
	D167	fluid loss	aliphatic amide polymer	propriatary
	D065	dispersant	sodium polynaphthalene sulfonate	9008-63-3
			sodium sulfate	7757-82-6
	D201	retarder	chrystalline silica	14808-60-7
			metal oxide	propriatary
	D153	anti-settling	chrystalline silica	14808-60-7

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5. BOP and Well Control

A. The following is a list of the blow-out prevention equipment that will be utilized at various times during the drilling of the well:

13-3/8" Casing String

13- 5/8" Annular 13-5/8"
10,000 psi BOP Stack

B. The BOP stack will be pressure upon installation and every 21 days. The BOP stack will be function tested upon installation, weekly, and after every bit trip. All pressure tests shall be performed for thirty (30) minutes. Annular preventers should be tested to seventy percent (70%) of the rated capacity and ram preventers should be tested to eighty percent (80%) of the rated capacity.

C. BOP equipment:

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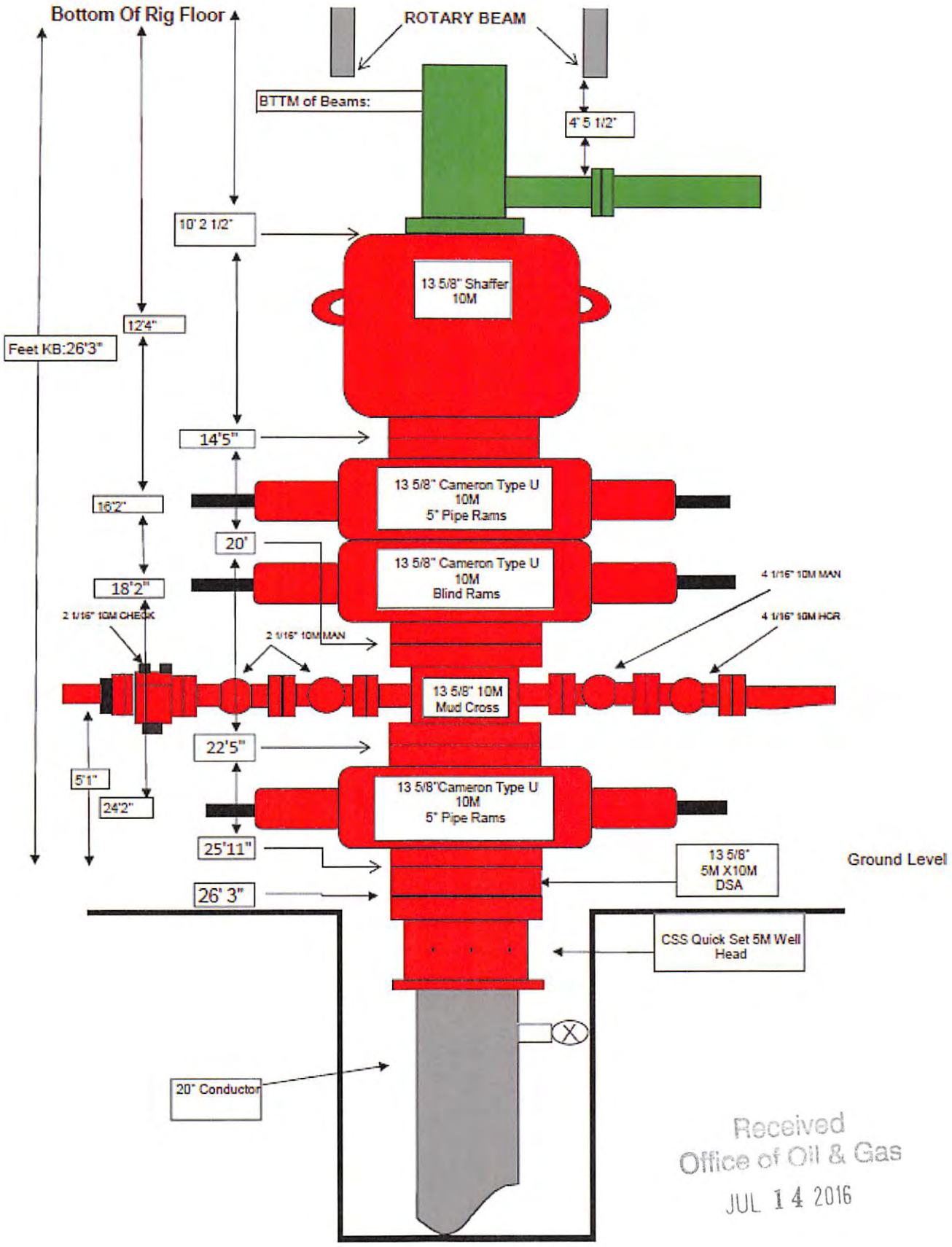

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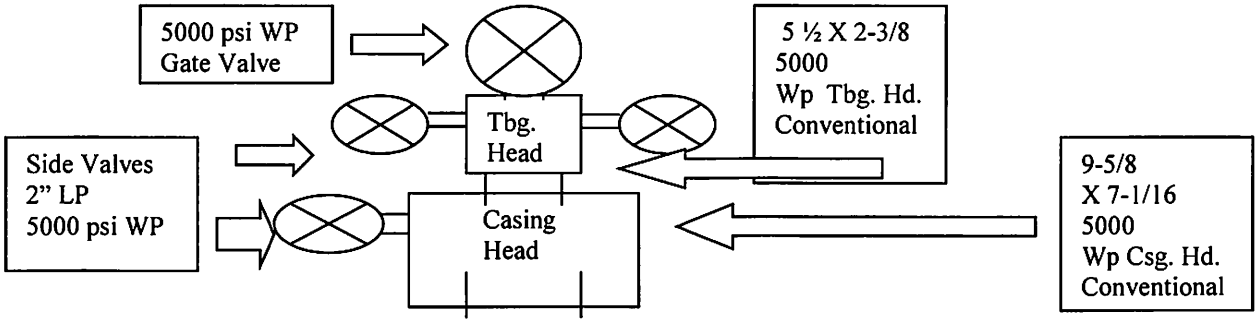
D. The following persons that will be involved in the drilling operations are BOP certified:

Rig Toolpusher
Rig Morning Tour Driller
Rig Evening Tour Driller

E-G. See diagram below:



H. Well Killing Operations Method and Type

1. Barite and saturated brine will be available if necessary to weight up beyond the proposed compositions.

2. Once it is confirmed that a significant gas flow has occurred, the appropriate kill procedure will be employed. The mud weight required to kill the well will be calculated and the surface mud system density will be increased to the required weight. A pumping schedule to circulate the kick out of the well will be calculated and followed once the surface mud system is of proper density.

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6. Hydrogen Sulfide (H2S)

When the risk of exposure to H2S exists based on offset wells drilled in the same formation, H2S monitoring equipment will be installed at the rig floor, shakers, cellar, and pits. If an alarm is presented from any of the sensors, drill operations will cease and all personnel will gather at the appropriate muster area. Properly trained and equipped personnel will determine the validity of the alarm. If the presence of H2S is confirmed, Southwestern Energy's H2S Contingency plan will be activated. A copy of this plan is available upon request and details the equipment, training, and procedures required for operation in an H2S environment.

After the contingency plan is activated the following procedures will be implemented:

A. In addition to the H2S monitoring equipment mentioned above, two safety area signs, one H2S condition sign and two wind socks will be mobilized to location.

B. Training programs covering the topics below will be initiated:

1. Basic awareness training (either video or booklet review) will occur on-site and may require two trips in order to train all rig crew members.
2. Each crew member will be given certification test to verify his competence to respond in an H2S situation.
3. Physically show members how to properly don a mask and perform a qualitative fit test (banana oil) if utilizing a tight fitting mask as an escape unit.
4. Identify and discuss the location of escape units, SCBA's and location of H2S monitors and sensors.

C. In the unlikely event that hydrogen sulfide would be present, all affected residents and agencies would be notified by telephone or in person by a SWN Production Company, LLC representative, and access would be controlled by a sign, color coded flags and a sign-in sheet. The Oil and Gas Inspector of the appropriate county will be contacted by phone.

D. In case of an emergency on the drilling site, all persons on location will exit via the access road and meet at the evacuation meeting area designated on the attached EVACUATION PLAN. The highest ranking drilling contractor representative will be responsible for comparing the persons that were present on location to those persons gathered at the designated evacuation meeting area. Protection Zones will be established while drilling that will be located at the predetermined muster points furthest upwind of the location of the H2S.

E. PPE Available

1. (10) 5 – minute escape packs will be installed on the rig floor for a quick escape.
2. (1) 10 – minute escape pack will be installed on the board.
3. (4) 30 – minutes SCBA's will be on-site. Two SCBA's will be placed at the entrance to the location (Muster Point #1) and the other two placed at Muster Point #2 on the other side of the location. This will allow either equipment to be in area that is upwind.

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7. Flaring

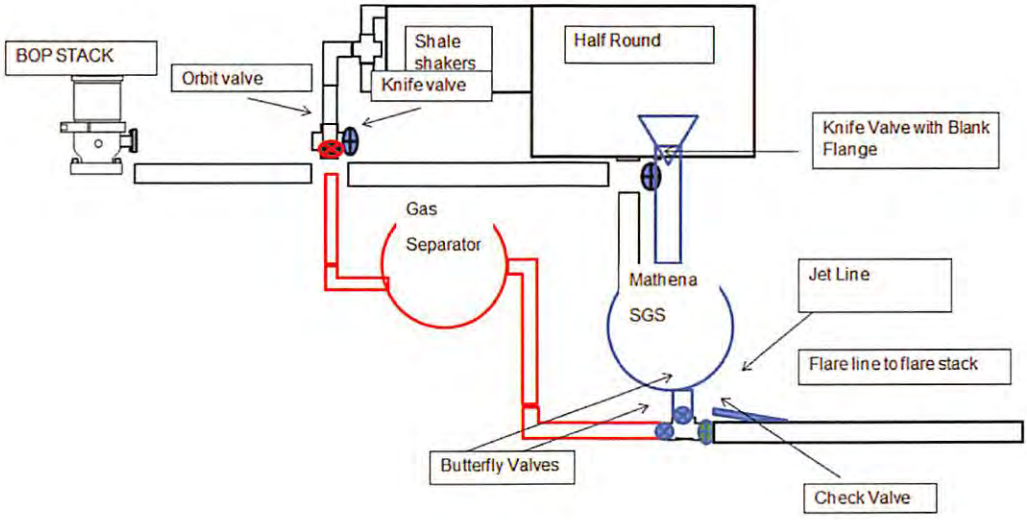
A. Well Flaring

1. If a significant show is encountered the gas would be flared through the 10" flanged flowline to a flare stack.

2. The fire department will be notified immediately prior to flaring if possible.

3. The duration of flaring typically should not last more than 10 days.

6. Schematic:



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8. Collision Avoidance

Wellbore Anti-Collision and Directional Surveying

1. Survey Requirements

a. All wells shall be surveyed from the wellhead to a total depth using the guidelines specified in this document.

b. Survey tool selection shall be based on the anti-collision requirements, survey tool accuracy, target size, and depth.

c. SWN preferred method of survey calculations shall be the Minimum Radius of Curvature method.

d. All survey data shall be required to have azimuths pre-corrected to Grid North. The values for convergence and declinations and depth datum details used shall be reported on all definitive surveys. Additionally, survey tool accuracy should be specified on all surveys presented to SWN.

e. During collision scans all offset well surveys will be evaluated for accuracy.

1.1 General Requirements

In all development wells, regularly spaced MWD or Magnetic Single Shot Surveys shall be taken at a frequency not to exceed 300'. Additional surveys may be taken at the discretion of the directional driller, Drilling Representative, Drilling Superintendent, or Drilling Engineer to ensure accuracy and minimize the potential for collision.

1.2 Survey Quality Control and Reporting

1.2.1 Deviation calculations shall be performed on the rig by the directional driller and independently verified by Southwestern's 24-hour operations support center. The calculations shall be performed using a company approved program. The directional drilling contractor is responsible for the accurate reporting of all wellbore positioning data. The directional drilling contractor will present the definitive surveys utilizing data from any of SWN's surveying contractors.

1.2.2 The SWN representative will check tie-in data before drilling out of each hole section. Projected surveys will never be used to tie-in subsequent surveys.

1.2.3 The Drilling Engineer and directional drilling contractor will ensure all directional drilling proposals include the

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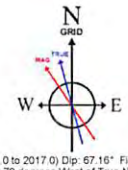
SOUTHWESTERN ENERGY

Location:	Marshall County, WV	Slot:	Slot #07
Field:	Marshall	Well:	Michael Dunn UP MSH 7H
Facility:	Michael Dunn MSH Pad	Wellbore:	Michael Dunn UP MSH 7H PWB

Plot reference wellpath is Michael Dunn UP MSH 7H PWP Ex-00	
True vertical depths are referenced to Rig on Slot #07 (RKB)	Grid System: NAD83 / UTM Zone 17 North, US feet
Measured depths are referenced to Rig on Slot #07 (RKB)	North Reference: Grid north
Rig on Slot #07 (RKB) to Mean Sea Level: 1284 feet	Scale: True distance
Mean Sea Level to Mud line (At Slot: Slot #07): -1258 feet	Depths are in feet
Coordinates are in feet referenced to Slot	Created by: edsaryar on 25/Nov/2015

Well Data

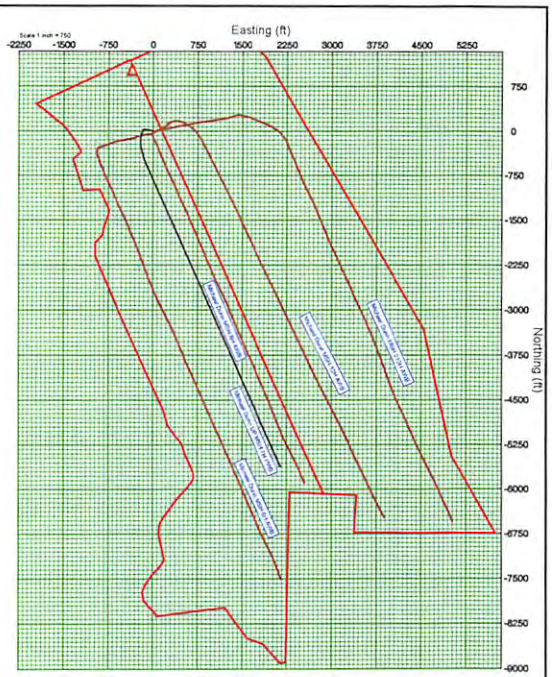
Slot	Well	Wellbore	Wellpath
Slot #06	Michael Dunn MSH 6H	Michael Dunn MSH 6H AWB	Michael Dunn MSH 6H AWP Proj. 14582'
Slot #07	Michael Dunn UP MSH 7H	Michael Dunn UP MSH 7H PWB	Michael Dunn UP MSH 7H PWP Ex-00
Slot #08	Michael Dunn MSH 8H	Michael Dunn MSH 8H AWB	Michael Dunn MSH 8H AWP Proj. 12987'
Slot #10	Michael Dunn MSH 10H	Michael Dunn MSH 10H AWB	Michael Dunn MSH 10H AWP Proj.
Slot #210	Michael Dunn MSH 210H	Michael Dunn MSH 210H AWB	Michael Dunn MSH 210H AWP Proj. 14825'

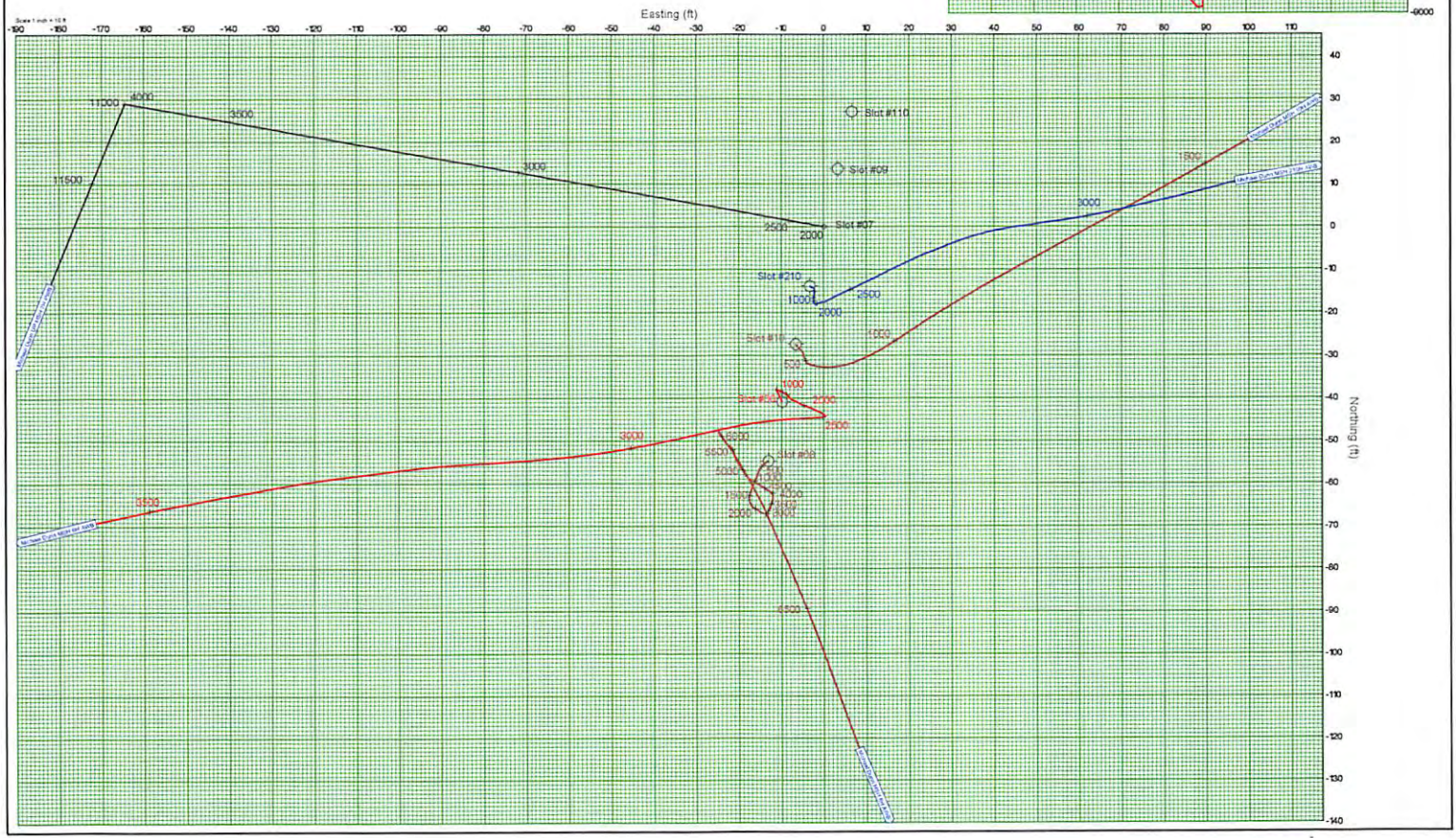


BGGM (1945.0 to 2017.0) Dip: 67.16° Field: 52409.3 nT
Magnetic North is 8.79 degrees West of True North (at 23/Nov/2015)
Grid North is 0.29 degrees East of True North
To correct azimuth from True to Grid subtract 0.29 degrees
To correct azimuth from Magnetic to Grid subtract 9.08 degrees

swn Southwestern Energy

BAKER HUGHES





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correct tie-in data and clearly identify the projection to which the plan is tied. This projection will be replaced with a survey once drilling commences.

2. Well Planning Requirements

2.1.1 No two wellbores should be designed to be closer than 10' once drilling commences. In the event that two surface locations are closer than 10' apart then directional equipment will be required below conductor and greater than 10' of separation shall be achieved as soon as possible.

2.1.2 During the well planning process a clearance scan will be performed and validated. The Directional Drilling Contractor and the Drilling Engineer shall calculate a Separation Factor for all potential collision risk wells identified in the clearance scan.

2.1.3 All wells planned with a S.F. of less than 1.5 or at any point closer than 10' planned center to center separation will be reviewed with the Drilling Engineering Manager prior to pre-spud meetings.

2.1.4 After completion of location and prior to setting the conductor the land survey company will resurvey the stakes for each surface location and drive a steel stake in the ground identifying each individual well. An as-built will be created and circulated to the Drilling Engineer and Drilling Superintendent identifying each well and the appropriate X and Y locations.

3. Well Execution Requirements

3.1 General Requirements

The Drilling Representative shall have overall responsibility for the maintenance of safe operations when drilling in close proximity to other wells. The lead directional driller is responsible for the accurate reporting of the wellbore positioning and projection and calculation of bit position and uncertainty at the bit.

3.2 Drilling and Survey Procedure Guidelines

The following guidelines and procedures detail the typical responses to be enacted in the event of drilling with close proximity to existing wells.

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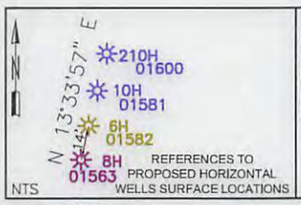
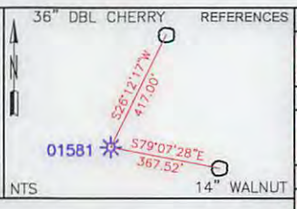
SURFACE HOLE 3,469'

Latitude: 39°55'00" BOTTOM HOLE 395'

Longitude: 80°32'30" 13,575' 7,097' SURFACE HOLE BOTTOM HOLE

JACKSON SURVEYING INC.
P.O. Box 1460
677 W. Main St.
Clarksburg, WV 26302
304-623-5851



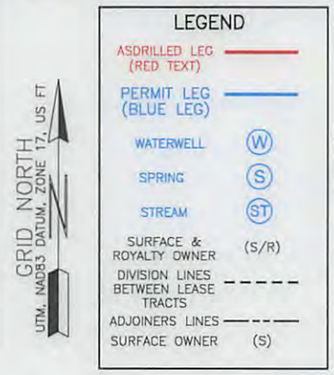


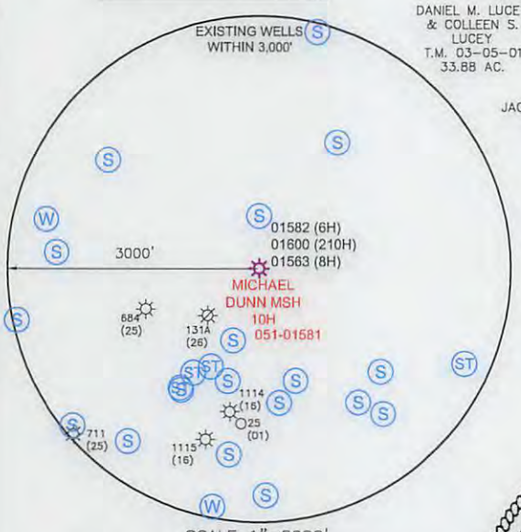
SURFACE HOLE LOCATION (SHL):
UTM (NAD83, ZONE 17, METERS): NORTHING: 4,416,441.005 EASTING: 538,124.758
"LANDING POINT" LOCATION (LPL):
UTM (NAD83, ZONE 17, METERS): NORTHING: 4,416,362.936 EASTING: 538,395.296
BOTTOM HOLE LOCATION (BHL):
UTM (NAD83, ZONE 17, METERS): NORTHING: 4,414,473.346 EASTING: 539,312.335

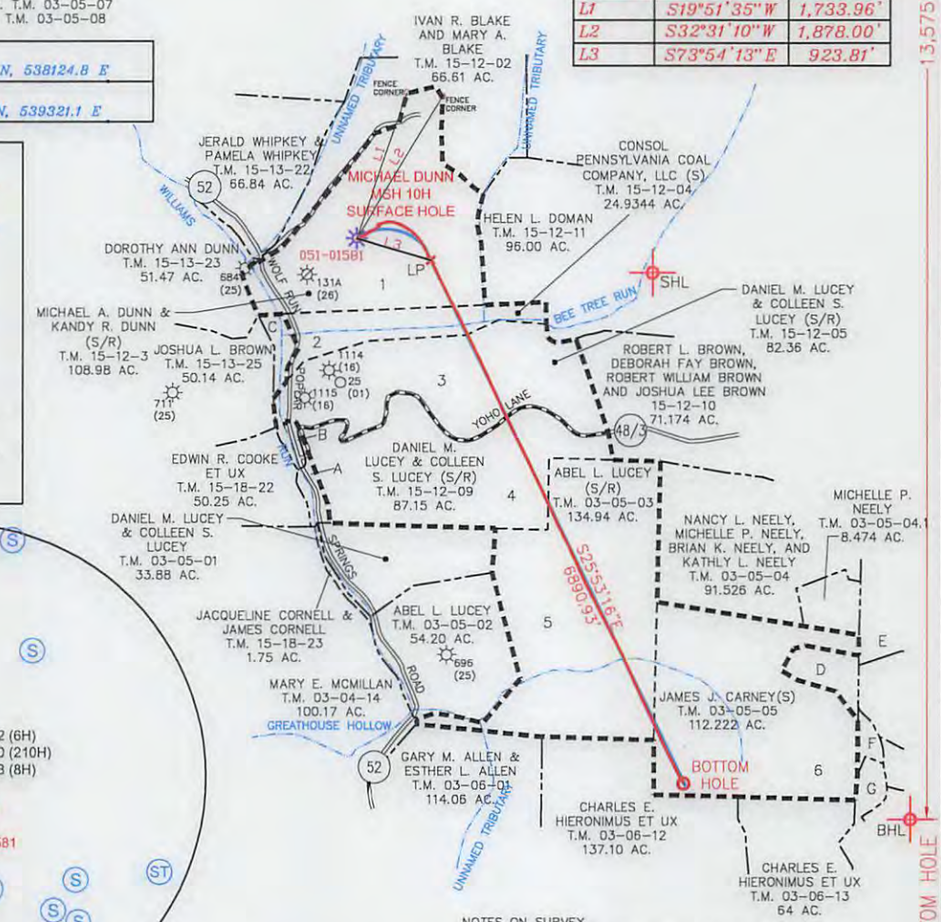
A–GARY L. MITCHELL & MONA S. MITCHELL 4.258 AC. T.M. 15–12–08
B–ROBERT WILLIAM BROWN 3.695 AC. 15–12–07
C–CONSOL PENNSYLVANIA COAL COMPANY, LLC 4.643 AC. T.M. 15–12–06
D–STEVEN L. ROBINSON ET UX 9.4 AC. T.M. 03–05–05.1
E–LINDA L. MCCRACKEN 66.33 AC. T.M. 03–05–09
F–MILTON E. & LINDA MCCRACKEN 3.906 AC. T.M. 03–05–07
G–MILTON E. & LINDA MCCRACKEN 6.00 AC. T.M. 03–05–08

NUMBER	DIRECTION	DISTANCE
L1	S19°51'35"W	1,733.96'
L2	S32°31'10"W	1,878.00'
L3	S73°54'13"E	923.81'

SURFACE HOLE LOCATION
UTM NAD 83 (METERS)–4416440.7 N, 538124.8 E
BOTTOM HOLE LOCATION
UTM NAD 83 (METERS)–4414464.1 N, 539321.1 E







NOTES ON SURVEY
1. NO DWELLINGS OR AGRICULTURAL BUILDINGS GREATER THAN 2,500 SQUARE FEET WITHIN 625 FEET OF PROPOSED CENTER OF PAD.
2. NO WATER WELLS OR DEVELOPED SPRINGS WITHIN 250 FEET OF PROPOSED WELL.
3. ALL WELLS WITHIN 500' OF THE HORIZONTAL LEG ARE SHOWN ON THIS PLAT BASED UPON INFORMATION TAKEN FROM DEP MAPPING, WELL PLATS AND AERIAL PHOTOS.
4. COORDINATES SYSTEM IS UTM, NAD 83 DATUM, ZONE 17, U.S. FOOT AND WELL COORDINATES ESTABLISHED USING SURVEY GRADE GPS.

PLAT SCALE 1"=2000'

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 REGULATIONS ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

P.S. 708 David L Jackson

COMPANY: SWN Production Company, LLC — SWN Production Company™

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

WVDEP
OFFICE OF OIL & GAS
601 57TH STREET
CHARLESTON, WV 25034

MINIMUM DEGREE OF ACCURACY: 1/200

PROVEN SOURCE OF ELEVATION: SURVEY GRADE GPS (NAVD 88, US FT)

OPERATOR'S WELL #: MICHAEL DUNN MSH 10H

API WELL #: 47 (STATE) 051 (COUNTY) 01581F (PERMIT)

WELL TYPE: OIL ☐ WASTE DISPOSAL ☐ PRODUCTION ☐ DEEP ☐ GAS ☒ LIQUID INJECTION ☐ STORAGE ☐ SHALLOW ☒

WATERSHED: WILLIAMS RUN OF UPPER OHIO SOUTH ELEVATION: 1,258'

DISTRICT: WEBSTER COUNTY: MARSHALL QUADRANGLE: MAJORSVILLE

SURFACE OWNER: MICHAEL A. DUNN AND KANDY R. DUNN ACREAGE: 108.98

OIL & GAS ROYALTY OWNER: MICHAEL A. DUNN AND KANDY R. DUNN ACREAGE: 108.98

DRILL ☐ DRILL DEEPER ☐ REDRILL ☐ FRACTURE OR STIMULATE ☒ PLUG OFF OLD FORMATION ☐ PERFORATE NEW FORMATION ☐

CONVERT ☐ PLUG & ABANDON ☐ CLEAN OUT & REPLUG ☐ OTHER CHANGE ☒ (SPECIFY) ASDRILLED

TARGET FORMATION: MARCELLUS ESTIMATED DEPTH: 6,833' TVD 12,987' TMD

WELL OPERATOR: SWN PRODUCTION COMPANY, LLC
ADDRESS: P.O. BOX 1300
CITY: JANE LEW STATE: WV ZIP CODE: 26378

DESIGNATED AGENT: DEE SOUTHALL
ADDRESS: P.O. BOX 1300
CITY: JANE LEW STATE: WV ZIP CODE: 26378

LEGEND:
- PROPOSED SURFACE HOLE / BOTTOM HOLE
- EXISTING / PRODUCING WELLHEAD
- ABANDONED WELL
- PLUGGED & ABANDONED WELL
- CUT CONDUCTOR
- LEASE BOUNDARY
- PERMIT DHP
- MARCELLUS DHP
- ABANDONED PATH

REVISIONS:

DATE: 07–12–2016
DRAWN BY: N. MANO
SCALE: 1" = 2000'
DRAWING NO:
WELL LOCATION PLAT

\\D7W3HRL1\1–04–16 DJ\SWN\MICHAEL DUNN MSH\WELL PLAT\10H ASDRILLED\MICHAEL DUNN MSH 10H ASDRILLED 07–12–2016.DWG
TUESDAY JULY 12 2016 02:22PM

PROPERTY NUMBER 2501160322
PAD ID 3001155648

51-01581

JACKSON SURVEYING
INC.
P.O. Box 1460
677 W. Main St.
Clarksburg, WV 26302
304-623-5851

A-GARY L. MITCHELL & MONA S. MITCHELL 4.258 AC. T.M. 15-12-08
B-ROBERT WILLIAM BROWN 3.695 AC. 15-12-07
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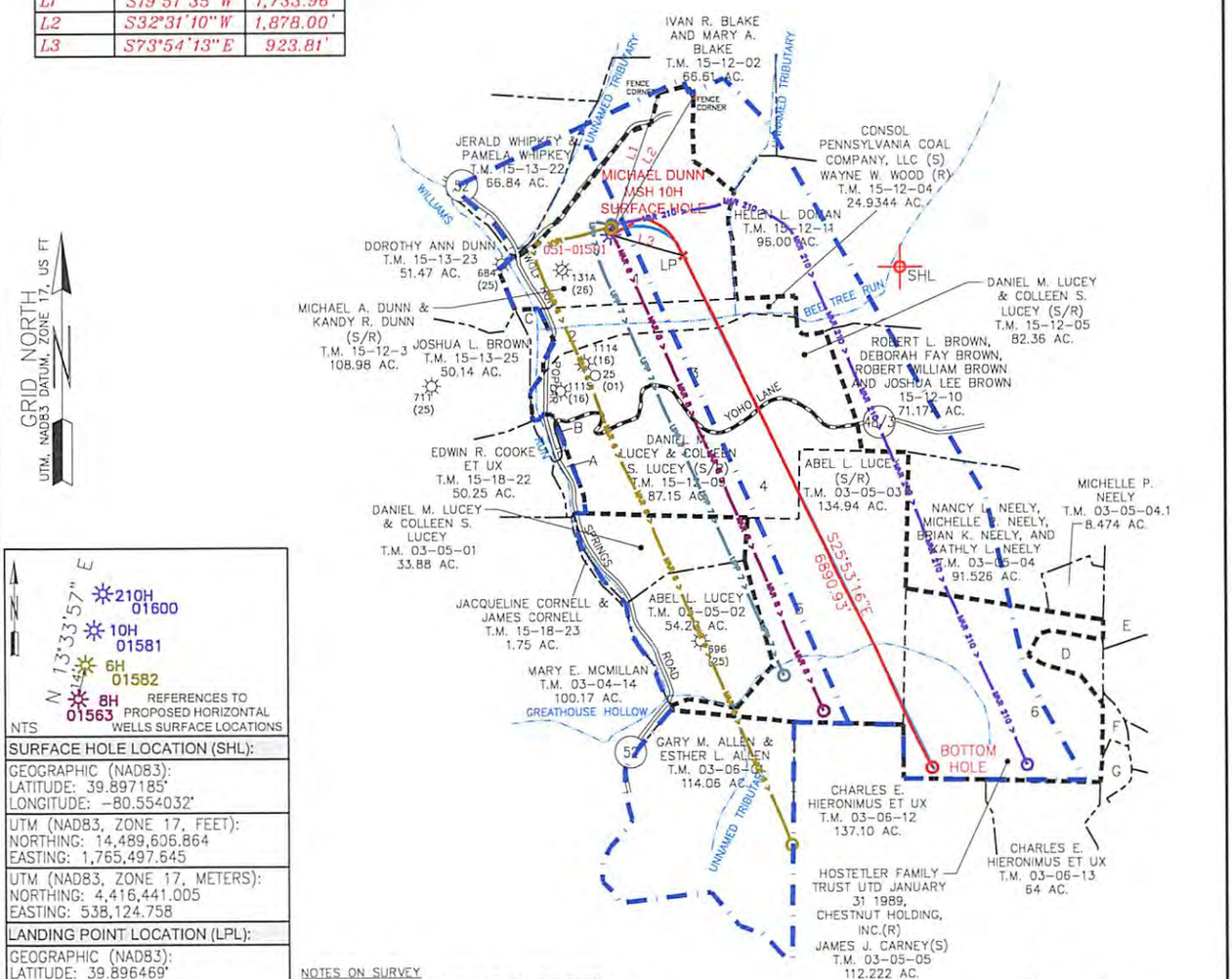

SURFACE HOLE LOCATION (SHL):
GEOGRAPHIC (NAD83): LATITUDE: 39.897185° LONGITUDE: -80.554032°
UTM (NAD83, ZONE 17, FEET): NORTHING: 14,489,606.864 EASTING: 1,765,497.645
UTM (NAD83, ZONE 17, METERS): NORTHING: 4,416,441.005 EASTING: 538,124.758
LANDING POINT LOCATION (LPL):
GEOGRAPHIC (NAD83): LATITUDE: 39.896469° LONGITUDE: -80.550872°
UTM (NAD83, ZONE 17, FEET): NORTHING: 14,489,350.734 EASTING: 1,766,385.235
UTM (NAD83, ZONE 17, METERS): NORTHING: 4,416,362.936 EASTING: 538,395.296
BOTTOM HOLE LOCATION (BHL):
GEOGRAPHIC (NAD83): LATITUDE: 39.879403° LONGITUDE: -80.540260°
UTM (NAD83, ZONE 17, FEET): NORTHING: 14,483,151.304 EASTING: 1,769,393.885
UTM (NAD83, ZONE 17, METERS): NORTHING: 4,414,473.346 EASTING: 539,312.335

NOTES ON SURVEY
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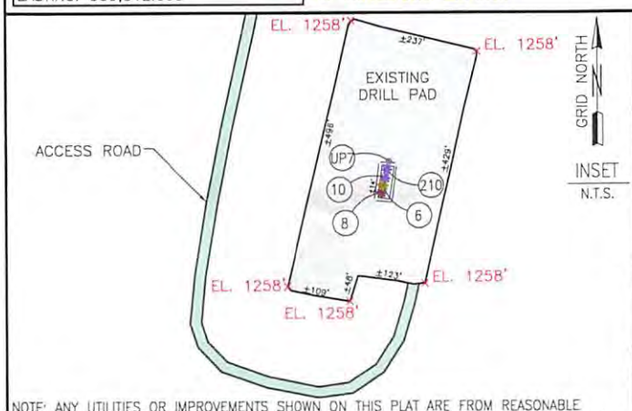
4. COORDINATES SYSTEM IS UTM, NAD 83 DATUM, ZONE 17, U.S. FOOT AND WELL COORDINATES ESTABLISHED USING SURVEY GRADE GPS.

SWN PRODUCTION COMPANY, LLC
SURFACE HOLES
1. "MICHAEL DUNN MSH 6H"
2. "MICHAEL DUNN UP MSH 7H"
3. "MICHAEL DUNN MSH 8H"
4. "MICHAEL DUNN MSH 10H"
5. "MICHAEL DUNN MSH 210H"

2000 0 2000
GRAPHIC SCALE IN FEET

Received
Office of Oil & Gas
JUL 14 2016



NOTE: ANY UTILITIES OR IMPROVEMENTS SHOWN ON THIS PLAT ARE FROM REASONABLE VISUAL OBSERVATIONS. NO UTILITY COMPANIES WERE CONTACTED FOR UTILITY LINE LOCATIONS.

LEGEND:
- PROPOSED SURFACE HOLE / BOTTOM HOLE
- EXISTING / PRODUCING WELLHEAD
- ABANDONED WELL
- PLUGGED & ABANDONED WELL
- CUT CONDUCTOR
- DRILLING UNIT
- LEASE BOUNDARY
- 500' DHP BUFFER
- MARCELLUS DHP
- ABANDONED PATH

COMPANY: SWN Production Company, LLC — SWN Production Company™

OPERATOR'S WELL #:	MICHAEL DUNN MSH 10H
LOCATION:	WEBSTER DISTRICT, MARSHALL COUNTY, WEST VIRGINIA

SURFACE HOLE LOCATION:
GEOGRAPHIC (NAD83): LATITUDE: 39.897185° LONGITUDE: -80.554032°
BOTTOM HOLE LOCATION:
GEOGRAPHIC (NAD83): LATITUDE: 39.879403° LONGITUDE: -80.540260°

REVISIONS:	DATE: 07-12-2016
	DRAWN BY: N. MANO
	SCALE: 1" = 2000'
	DRAWING NO:
	INTERNAL WELL PLAT

\\D7W3HRL1\1-04-16 DJ\SWN\MICHAEL DUNN MSH\WELL PLAT\10H ASDRILLED\MICHAEL DUNN MSH 10H ASDRILLED 07-12-2016.DWG
TUESDAY JULY 12 2016 02:27PM

PROPERTY NUMBER 2501160322
PAD ID 3001155648

51-01581F

WW-6A1
(5/13)

Operator's Well No. Michael Dunn MSH 10H

INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
Chapter 22, Article 6A, Section 5(a)(5)
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)

Under the oath required to make the verification on page 1 of this Notice and Application, I depose and say that I am the person who signed the Notice and Application for the Applicant, and that –

(1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;

(2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page

Acknowledgement of Possible Permitting/Approval
In Addition to the Office of Oil and Gas

The permit applicant for the proposed well work addressed in this application hereby acknowledges the possibility of the need for permits and/or approvals from local, state, or federal entities in addition to the DEP, Office of Oil and Gas, including but not limited to the following:

- WV Division of Water and Waste Management
- WV Division of Natural Resources WV Division of Highways
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- County Floodplain Coordinator

The applicant further acknowledges that any Office of Oil and Gas permit in no way overrides, replaces, or nullifies the need for other permits/approvals that may be necessary and further affirms that all needed permits/approvals should be acquired from the appropriate authority before the affected activity is initiated.

Well Operator: SWN Production Company, LLC
By: (Gary Nuckolls)
Its: Staff Landman

Received
Office of Oil & Gas
JUL 14 2016

SI-01581F

EXHIBIT "A"
Attached to and made a part of the State of West Virginia Oil and Gas Permit Form, WW-6A1, by SWN Production Company, L.L.C., Operator
Michael Dunn MSH 10H
Marshall County, West Virginia

Tract #	Tax Parcel	Lease Number	Lessor	Lessee	Royalty	BK/PG	Surface Owner	Book/Page Must describe The Parcel	Deeded Acreage	Leased
1	15-12-3	730020/000	Michael A. Dunn and Kandy R. Dunn, husband and wife	Great Lakes Energy Partners, L.L.C.	12.50%	658/174	Michael A. Dunn and Kandy R. Dunn, husband and wife	543/369	108.980000	108.980000
			Great Lakes Energy Partners, L.L.C.	Range Resources-Appalcahia, LLC		19/443				
			Range Resources-Appalcahia, LLC	Chesapeake Appalachia, L.L.C.		23/368				
			Chesapeake Appalachia, L.L.C.	SWN Production Company, LLC		33/110				
2	15-12-4	744430/000	Wayne W. Wood, a widower	SWN Production Company, LLC	18.00%	867/645	Consol Pennsylvania Coal Company, LLC	836/368	24.934400	24.934400
3	15-12-5	730194/000	Daniel M. Lucey and Colleen S. Lucey, husband and wife	Great Lakes Energy Partners, L.L.C.	12.50%	656/3	Daniel M. Lucey and Colleen S. Lucey, husband and wife	476/510	82.360000	82.360000
			Great Lakes Energy Partners, L.L.C.	Range Resources-Appalcahia, LLC		19/443				
			Range Resources-Appalcahia, LLC	Chesapeake Appalachia, L.L.C.		23/368				
			Chesapeake Appalachia, L.L.C.	SWN Production Company, LLC		33/110				
4	15-12-9	730194/000	Daniel M. Lucey and Colleen S. Lucey, husband and wife	Great Lakes Energy Partners, L.L.C.	12.50%	656/3	Daniel M. Lucey and Colleen S. Lucey, husband and wife	476/510	87.150000	87.150000
			Great Lakes Energy Partners, L.L.C.	Range Resources-Appalcahia, LLC		19/443				
			Range Resources-Appalcahia, LLC	Chesapeake Appalachia, L.L.C.		23/368				
			Chesapeake Appalachia, L.L.C.	SWN Production Company, LLC		33/110				
5	03-5-3	730196/000	Abel L. Lucey, a single man	Great Lakes Energy Partners, L.L.C.	12.50%	656/504	Abel L. Lucey, a single man	653/635	134.940000	134.940000
			Great Lakes Energy Partners, L.L.C.	Range Resources-Appalcahia, LLC		19/443				
			Range Resources-Appalcahia, LLC	Chesapeake Appalachia, L.L.C.		23/368				
			Chesapeake Appalachia, L.L.C.	SWN Production Company, LLC		33/110				
6	03-5-5	734140/001	Hostetler Family Trust UTD January 31 1989	CNX Gas Company LLC	15.00%	699/193	James J. Carney	642/606	112.222000	112.222000
			CNX Gas Company LLC	Noble Energy, Inc.		26/225				
			CNX Gas Company LLC and Noble Energy, Inc.	Chesapeake Appalachia, L.L.C.		31/381				
			Chesapeake Appalachia, L.L.C.	SWN Production Company, LLC		33/110				
6	03-5-5	728482/001	Hayhurst Company (Chestnut Holdings, Inc.)	Chesapeake Appalachia, L.L.C.	17.00%	719/442	James J. Carney	642/606	112.222000	112.222000
			Chesapeake Appalachia, L.L.C.	SWN Production Company, LLC		33/110				

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JUL 14 2016

SL-0155IF

EXHIBIT "A"
Attached to and made a part of the State of West Virginia Oil and Gas Permit Form, WW-6A1, by SWN Production Company, L.L.C., Operator
Michael Dunn MSH 10H
Marshall County, West Virginia

Tract #	Tax Parcel	Lease Number	Lessor	Lessee	Royalty	BK/PG	Surface Owner	Book/Page Must describe The Parcel	Deeded Acreage	Leased

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JUL 14 2016

WW-6AC
(1/12)

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

Date of Notice Certification: 7/13/16

API No. 47- 51 - 01581F
Operator's Well No. Michael Dunn MSH 10H
Well Pad Name: Michael Dunn Pad

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:	WV	UTM NAD 83 Easting:	538125
County:	51-Marshall	Northing:	4416441
District:	9- Webster	Public Road Access:	Wolf Run- Popular Springs Road
Quadrangle:	453-Majorsville	Generally used farm name:	Michael Dunn
Watershed:	Upper Ohio South		

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 ☐ WRITTEN WAIVER BY SURFACE OWNER (PLEASE ATTACH)	☐ RECEIVED/ NOT REQUIRED
☑ 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.

Received
Office of Oil & Gas
JUL 14 2016

WW-6AC
(1/12)

51-01581 F

Certification of Notice is hereby given:

THEREFORE, I _____, 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:	SWN Production Co., LLC	Address:	P.O. Box 1300
By:	Dee Southall		Jane Lew, WV 26378
Its:	Regulatory Supervisor	Facsimile:	304-471-2497
Telephone:	832-796-1610	Email:	Dee_Southall@swn.com

OFFICIAL SEAL
NOTARY SEAL
Notary Public, State of West Virginia
BRITTANY R WOODY
3302 Old Elkins Road
Buckhannon, WV 26201
My commission expires November 27, 2022

Subscribed and sworn before me this 17th day of June 2016.

Brittany R Woody Notary Public

My Commission Expires 11/27/22

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.

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Office of Oil & Gas
JUL 14 2016

WW-6A
(9-13)

API NO. 47- 51 - 01581 F
OPERATOR WELL NO. Michael Dunn MSH 10H
Well Pad Name: Michael Dunn 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: 7/13/16 **Date Permit Application Filed:** 7/13/16

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. W. Va. Code R. § 35-8-5.7.a requires, in part, that the operator shall also provide the Well Site Safety Plan ("WSSP") to the surface owner and any water purveyor or surface owner subject to notice and water testing as provided in section 15 of this rule.

☑ Application Notice ☑ WSSP Notice ☑ E&S Plan Notice ☑ Well Plat Notice is hereby provided to:

☑ SURFACE OWNER(s)
Name: Michael & Kandy Dunn ✓
Address: 504 Dunns Drive
Cameron, WV 26033
Name:
Address:

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

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

☑ COAL OWNER OR LESSEE
Name: Consol Energy, Inc. Attn: Casey Saunders ✓
Address: 6126 Energy Road
Moundsville, WV 26041

☐ COAL OPERATOR
Name:
Address:

☑ SURFACE OWNER OF WATER WELL AND/OR WATER PURVEYOR(s)
Name:
Address: See Attachment #1

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

*Please attach additional forms if necessary

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JUL 14 2016

WW-6A
(8-13)

API NO. 47- 51 - 0158F
OPERATOR WELL NO. Michael Dunn MSH 10H
Well Pad Name: Michael Dunn 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 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.

Pursuant to W. Va. Code R. § 35-8-5.7.a, the operator shall provide the Well Site Safety Plan to the surface owner and any water purveyor or surface owner subject to notice and water testing as provided in section 15 of this rule.

Pursuant to W. Va. Code R. § 35-8-15.2.c, this notice shall: (1) contain a statement of the surface owner's and water purveyor's right to request sampling and analysis; (2) advise the surface owner and water purveyor of the rebuttable presumption for contamination or deprivation of a fresh water source or supply; advise the surface owner and water purveyor that refusal to allow the operator to conduct a pre-drilling water well test constitutes a method to rebut the presumption of liability; (3) advise the surface owner and water purveyor of his or her independent right to sample and analyze any water supply at his or her own expense; advise the surface owner and water purveyor whether or not the operator will utilize an independent laboratory to analyze any sample; and (4) advise the surface owner and or water purveyor that he or she can obtain from the Chief a list of water testing laboratories in the subject area capable of and qualified to test water supplies in accordance with standard acceptable methods.

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 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

Office of Oil & Gas
JUL 14 2016

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.

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. The operator shall provide an analysis to such surface landowner or water purveyor at their request.

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. A surface owner and water purveyor has an independent right to sample and analyze any water supply at his or her own expense. The laboratory utilized by the operator shall be approved by the agency as being certified and capable of performing sample analyses in accordance with this section.

Rebuttable Presumption for Contamination or Deprivation of a Fresh Water Source or Supply:

W. Va. Code § 22-6A-18 requires that (b) unless rebutted by one of the defenses established in subsection (c) of this section, in any action for contamination or deprivation of a fresh water source or supply within one thousand five hundred feet of the center of the well pad for horizontal well, there is a rebuttable presumption that the drilling and the oil or gas well or either was the proximate cause of the contamination or deprivation of the fresh water source or supply. (c) In order to rebut the presumption of liability established in subsection (b) of this section, the operator must prove by a preponderance of the evidence one of the following defenses: (1) The pollution existed prior to the drilling or alteration activity as determined by a predrilling or prealteration water well test. (2) The landowner or water purveyor refused to allow the operator access to the property to conduct a predrilling or prealteration water well test. (3) The water supply is not within one thousand five hundred feet of the well. (4) The pollution occurred more than six months after completion of drilling or alteration activities. (5) The pollution occurred as the result of some cause other than the drilling or alteration activity. (d) Any operator electing to preserve its defenses under subdivision (1), subsection (c) of this section shall retain the services of an independent certified laboratory to conduct the predrilling or prealteration water well test. A copy of the results of the test shall be submitted to the department and the surface owner or water purveyor in a manner prescribed by the secretary. (e) Any operator shall replace the water supply of an owner of interest in real property who obtains all or part of that owner's supply of water for domestic, agricultural, industrial or other legitimate use from an underground or surface source with a comparable water supply where the secretary determines that the water supply has been affected by contamination, diminution or interruption proximately caused by the oil or gas operation, unless waived in writing by that owner. (f) The secretary may order the operator conducting the oil or gas operation to: (1) Provide an emergency drinking water supply within twenty-four hours; (2) Provide temporary water supply within seventy-two hours; (3) Within thirty days begin activities to establish a permanent water supply or submit a proposal to the secretary outlining the measures and timetables to be used in establishing a permanent supply. The total time in providing a permanent water supply may not exceed two years. If the operator demonstrates that providing a permanent replacement water supply cannot be completed within two years, the secretary may extend the time frame on case-by-case basis; and (4) Pay all reasonable costs incurred by the real property owner in securing a water supply. (g) A person as described in subsection (b) of this section aggrieved under the provisions of subsections (b), (e) or (f) of this section may seek relief in court... (i) Notwithstanding the denial of the operator of responsibility for the damage to the real property owner's water supply or the status of any appeal on determination of liability for the damage to the real property owner's water supply, the operator may not discontinue providing the required water service until authorized to do so by the secretary or a court of competent jurisdiction.

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

Received
Office of Oil & Gas
JUL 14 2016

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.**

WW-6A
(8-13)

API NO. 47- 51 - 01581F
OPERATOR WELL NO. Michael Dunn MSH 10H
Well Pad Name: Michael Dunn Pad

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.

Disclaimer: All comments received will be placed on our web site http://www.dep.wv.gov/oil-and-gas/Horizontal-Permits/Pages/default.aspx and the applicant will automatically be forwarded an email notice that such comments have been submitted. The applicant will be expected to provide a response to comments submitted by any surface owner, water purveyor or natural gas storage operator noticed within the application.

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.

Received
Office of Oil & Gas
JUL 14 2016

WW-6A
(8-13)

API NO. 47- 51 - 01581 F
OPERATOR WELL NO. Michael Dunn MSH 10H
Well Pad Name: Michael Dunn Pad

Notice is hereby given by:

Well Operator: SWN Production Co., LLC
Telephone: 832-796-1610
Email: Dee_Southall@swn.com

Address: P.O. Box 1300
Jane Lew, WV 26378
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.

OFFICIAL SEAL
Notary Public, State of West Virginia
BRITTANY R WOODY
3302 Old Elkins Road
Buckhannon, WV 26201
My commission expires November 27, 2022

Subscribed and sworn before me this 17th day of June 2016

Brittany R Woody Notary Public

My Commission Expires 11/27/22

Received
Office of Oil & Gas
JUL 14 2016

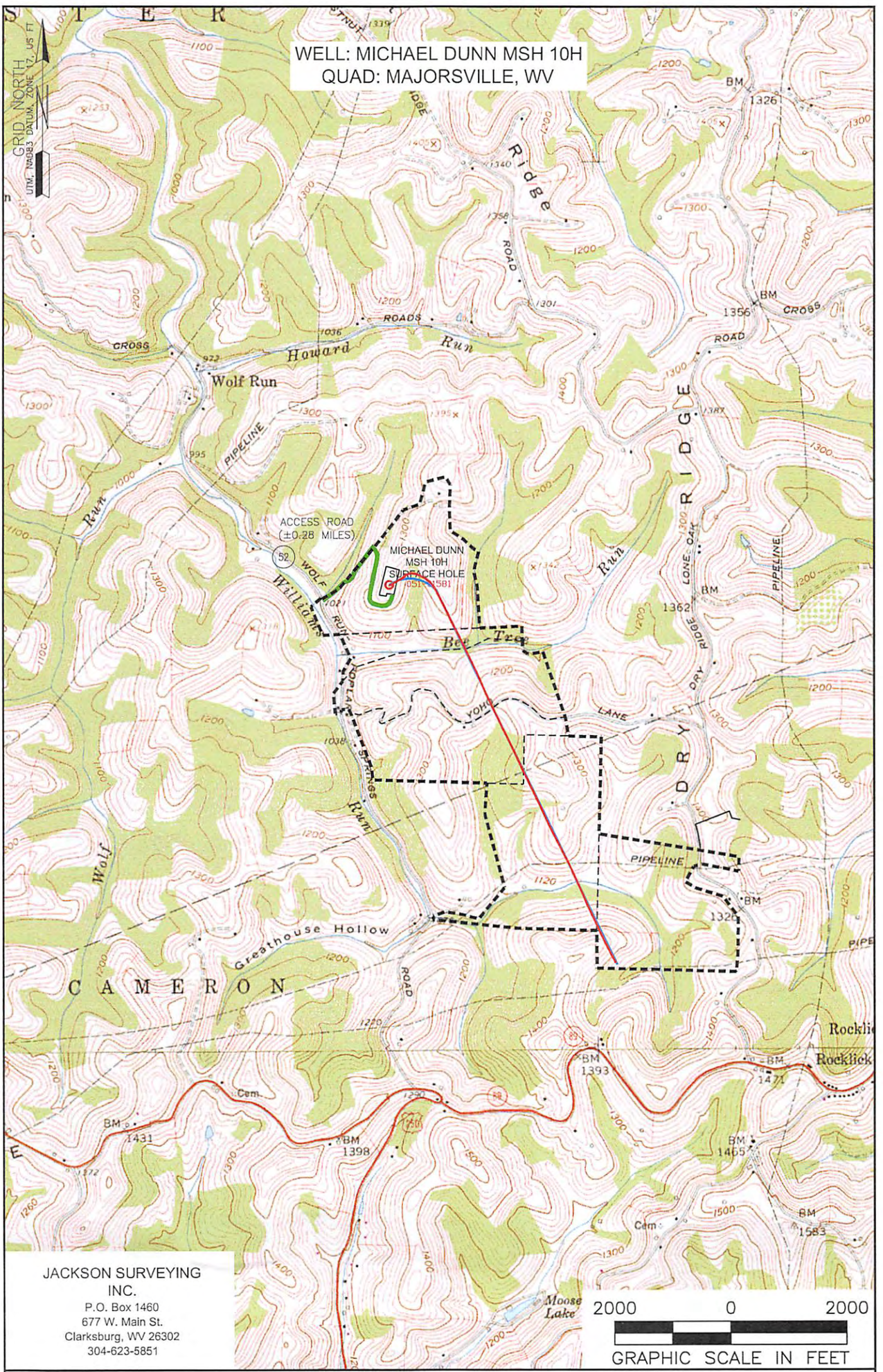
Attachment #1

51-01581

LANDOWNER	SOURCE	LATITUDE	LONGITUDE	WELL DEPTH	Address
Michael Dunn	Spring	39.89883107	-80.55403815		502 Dunns Drive, Cameron WV 26033
Wayne Wood	Spring	39.89347608	-80.55558944		Rt. 4 Box 57, Cameron WV 26033
Wayne Wood	Spring	39.8947842	-80.55516984		Rt. 4 Box 57, Cameron WV 26033
Daniel Lucy	Spring	39.893476	-80.552524		RR 4 Box 78, Cameron WV 26033

Received
Office of Oil & Gas
JUL 14 2016

SI-01581F



JACKSON SURVEYING INC.
P.O. Box 1460
677 W. Main St.
Clarksburg, WV 26302
304-623-5851

NOTE:
THE PURPOSE OF THIS PLAT IS FOR THE LOCATION OF PROPOSED GAS WELLS AND DOES NOT REPRESENT A CLOSED BOUNDARY SURVEY. PROPERTY LINES AND OWNERS WERE OBTAINED FROM VARIOUS FIELD EVIDENCE, TAX RECORDS, AND AERIAL MAPPING.

LEGEND:
EXTERNAL BOUNDARY

Applicant/Well Operator Name SWN PRODUCTION COMPANY, LLC	Well (Farm) Name MICHAEL DUNN MSH 10H	Well# 10H (051-01581)
Address PO BOX 1300 JANE LEW, WV 26378	County MARSHALL	District WEBSTER
Surface Landowner/ Lessor MICHAEL A. DUNN ET UX	USGS 7 1/2 Quadrangle Map Name MAJORSVILLE	

\\D7W3HRL1\1-04-16 DJ\SWN\MICHAEL DUNN MSH\WELL PLAT\10H ASDRILLED\MICHAEL DUNN MSH 10H ASDRILLED 07-12-2016.DWG
TUESDAY JULY 12 2016 02:26PM

51-01581F

WW-6A4
(1/12)

Operator Well No. Michael Dunn MSH 210H

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE OF INTENT TO DRILL

Pursuant to W. Va. Code § 22-6A-16(b), the Notice of Intent to Drill is only required if the notice requirements of W. Va. Code § 22-6A-10(a) have NOT been met or if the Notice of Intent to Drill requirement has NOT been waived in writing by the surface owner.

Notice Time Requirement: Notice shall be provided at least **TEN (10)** days prior to filing a permit application.
Date of Notice: 06/20/2016 **Date Permit Application Filed:** 7/13/16

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

☐ HAND DELIVERY ☒ CERTIFIED MAIL RETURN RECEIPT REQUESTED

Pursuant to W. Va. Code § 22-6A-16(b), at least ten days prior to filing a permit application, an operator shall, by certified mail return receipt requested or hand delivery, give the surface owner notice of its intent to enter upon the surface owner's land for the purpose of drilling a horizontal well: *Provided,* That notice given pursuant to subsection (a), section ten of this article satisfies the requirements of this subsection as of the date the notice was provided to the surface owner: *Provided, however,* That the notice requirements of this subsection may be waived in writing by the surface owner. The notice, if required, shall include the name, address, telephone number, and if available, facsimile number and electronic mail address of the operator and the operator's authorized representative.

Notice is hereby provided to the SURFACE OWNER(s):

Name: Michael A. Dunn and Kandy R. Dunn
Address: 502 Dunn's Drive
Cameron, WV 26033

Name:
Address:

Notice is hereby given:
Pursuant to West Virginia Code § 22-6A-16(b), notice is hereby given that the undersigned well operator has an intent to enter upon 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: Webster
Quadrangle: Majorsville
Watershed: Upper Ohio South

UTM NAD 83 Easting: 538,126
Northing: 4,416,445
Public Road Access: Wolf Run - Popular Springs Road
Generally used farm name:

This Notice Shall Include:
Pursuant to West Virginia Code § 22-6A-16(b), this notice shall include the name, address, telephone number, and if available, facsimile number and electronic mail address of the operator and the operator's authorized representative. 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.

Notice is hereby given by:

Well Operator: SWN Production Company, LLC
Address: PO Box 1300, 179 Innovation Drive
Jane Lew, WV 26378
Telephone: 304-884-1615
Email: Steve_Perkins@swn.com
Facsimile:

Authorized Representative: Steve Perkins
Address: PO Box 1300, 179 Innovation Drive
Jane Lew, WV 26378
Telephone: 304-884-1615
Email: Steve_Perkins@swn.com
Facsimile:

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.

Received
Office of Oil & Gas
JUL 14 2016

51-0158F

WW-6A5
(1/12)

Operator Well No. Michael Dunn MSH 210H

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: 06/20/2016 **Date Permit Application Filed:** 7/13/16

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: Michael A. Dunn and Kandy R. Dunn
Address: 502 Dunn's Drive
Cameron, WV 26033

Name:
Address:

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: Webster
Quadrangle: Majorsville
Watershed: Upper Ohio South

UTM NAD 83 Easting: 538,126
Northing: 4,416,445
Public Road Access: Wolf Run - Popular Springs Road
Generally used farm name:

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: SWN Production Company, LLC
Telephone: 304-884-1615
Email: Steve_Perkins@swn.com

Address: PO Box 1300, 179 Innovation Drive
Jane Lew, WV 26378
Facsimile: 304-472-4225

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.

Received
Office of Oil & Gas
JUL 14 2016

51-01581F

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
Division of Highways
1900 Kanawha Boulevard East • Building Five • Room 110
Charleston, West Virginia 25305-0430 • (304) 558-3505

Earl Ray Tomblin
Governor

Paul A. Mattox, Jr., P. E.
Secretary of Transportation/
Commissioner of Highways

June 23, 2016

James A. Martin, Chief
Office of Oil and Gas
Department of Environmental Protection
601 57th Street, SE
Charleston, WV 25304

Subject: DOH Permit for the Michael Dunn Pad, Marshall County
Michael Dunn MSH 10H

Dear Mr. Martin,

The West Virginia Division of Highways has transferred Permit #06-2012-0396 for the subject site to Southwestern Energy for access to the State Road for the well site located off of Marshall County Route 52 SLS.

The operator has signed an OIL AND GAS ROAD MAINTENANCE BONDING AGREEMENT and provided the required Bond. This operator is currently in compliance with the DOH OIL AND GAS POLICY dated January 3, 2012.

Very Truly Yours,

Gary K. Clayton

Gary K. Clayton, P.E.
Regional Maintenance Engineer
Central Office Oil &Gas Coordinator

Cc: Brittany Woody
Southwestern Energy
CH, OM, D-6
File

Received
Office of Oil & Gas
JUL 14 2016

51-01581F

Supplier Name	Product Name	Product Use	Chemical Name	CAS Number
NALCO ONESOURCE	EC6110A	Biocide	Ethanol	000064-17-5
			Glutaraldehyde (Pentanediol)	000111-30-8
			Quaternary Ammonium Compounds	N/A-063
	EC6629A	Biocide	No Hazardous Components	NONE
WEATHERFORD	WBK-133 OXIDIZER	Breaker	Ammonium Persulfate	007727-54-0
	WBK-134	Breaker	Ammonium Persulfate	007727-54-0
			Crystalline Silica (Quartz Sand, Silicon Dioxide)	014808-60-7
	WCS-631LC	Clay Stabilizer	Proprietary Non Hazardous Salt	N/A-229
			Water	007732-18-5
	WFR-55LA	Friction Reducer	No Hazardous Components	NONE
	WGA-15L	Gel	Petroleum Distillate Hydrotreated Light	064742-47-8
	WPB-584-L	Buffer	Potassium Carbonate	000584-08-7
			Potassium Hydroxide	001310-58-3
	WXL-101LE	Corsslinker	No Hazardous Components	NONE
	WXL-101LM	Crosslinker	Petroleum Distillate Hydrotreated Light	064742-47-8
	WXL-105L	Crosslinker	Water	007732-18-5
			Ethylene Glycol	000107-21-1
			Boric Acid	010043-35-3
			Ethanolamine	000141-43-5
SCHLUMBERGER	B244 Green-Cide 25G	Biocide	Glutaraldehyde	111-30-8
	L071 Temporary Clay Stabilizer	Clay Stabilizer	Cholinium Chloride	67-48-1
	Breaker J218	Breaker	Diammonium Peroxidisulphate	7727-54-0
	EB-Clean* J475 Breaker		Diammonium Peroxidisulphate	7727-54-0
	Friction Reducer B315	Friction Reducer	Distillates (petroleum), Hydrotreated light Aliphatic Alcohol Glycol Ether	64742-47-8 Proprietary
	Friction Reducer J609		Ammonium Sulfate	7783-20-2

Received
Office of Oil & Gas
JUL 14 2016

51-01581F

Supplier Name	Product Name	Product Use	Chemical Name	CAS Number
SCHLUMBERGER	Water Gelling Agent J580	Gel	Carbohydrate Polymer	Proprietary
	Scale Inhibitor B317	Scale Inhibitor	Trisodium ortho phosphate Ethane-1, 2-diol	7601-54-9 107-21-1
	Borate Crosslinker J532	Crosslinker	Aliphatic polyol Sodium tetraborate decahydrate	Proprietary 1303-96-4
	Crosslinker J610		Aliphatic polyol Potassium hydroxide	Proprietary 1310-58-3

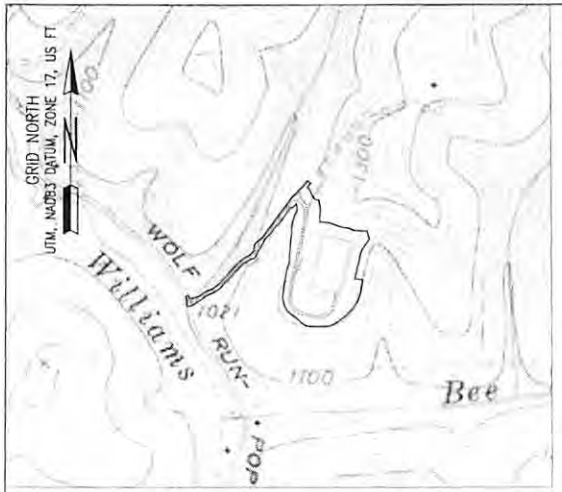
Received
Office of Oil & Gas
JUL 14 2016

51-015811F

Supplier Name	Product Name	Product Use	Chemical Name	CAS Number
BAKER HUGHES	ALPHA 1427	Biocide	Didecyl Dimethyl Ammonium Chloride	007173-51-1
			Ethanol	000064-17-5
			Glutaraldehyde (Pentanediol)	000111-30-8
			Quaternary Ammonium Compound	068424-85-1
			Water	007732-18-5
	BF-7L	Buffer	Potassium Carbonate	000584-08-7
	ClayCare	Clay Stabilizer	Choline Chloride	000067-48-1
			Water	007732-18-5
	Enzyme G-I	Breaker	No Hazardous Components	NONE
	ENZYME G-NE	Breaker	No Hazardous Components	NONE
	FRW-18	Friction Reducer	Petroleum Distillate Hydrotreated Light	064742-47-8
	GW-3LDF	Gel	Petroleum Distillate Blend	N/A-014
			Polysaccharide Blend	N/A-021
	SCALETROL 720	Scale Inhibitor	Diethylene Glycol	000111-46-6
			Ethylene Glycol	000107-21-1
	XLW-32	Crosslinker	Boric Acid	010043-35-3
			Methanol (Methyl Alcohol)	000067-56-1
FRAC TECH SERVICES	APB01 (AMMONIUM PERSUFATE BREAKER)	Breaker	Ammonium Persulfate	007727-54-0
	B05 (LOW PH BUFFER)	Buffer	Acetic acid	000064-19-7
	BXL03 Borate XL Delayed High Temp	Crosslinker	No Hazardous Components	NONE
	FRW-200	Friction Reducer	No Hazardous Components	NONE
	HVG01 (TURQUOISE-1 BULK)	Gelling Agent	Petroleum Distillate Hydrotreated Light	064742-47-8
	KCLS-4	Clay Stabilizer	No Hazardous Components	NONE
	LTB-1	Breaker	Ammonium Persulfate	N/A

Received
Office of Oil & Gas
JUL 14 2016

MICHAEL DUNN MSH PAD
CONSTRUCTION AND RECLAMATION PLAN
AS-BUILT
WEBSTER DISTRICT, MARSHALL COUNTY, WV
JUNE 2016



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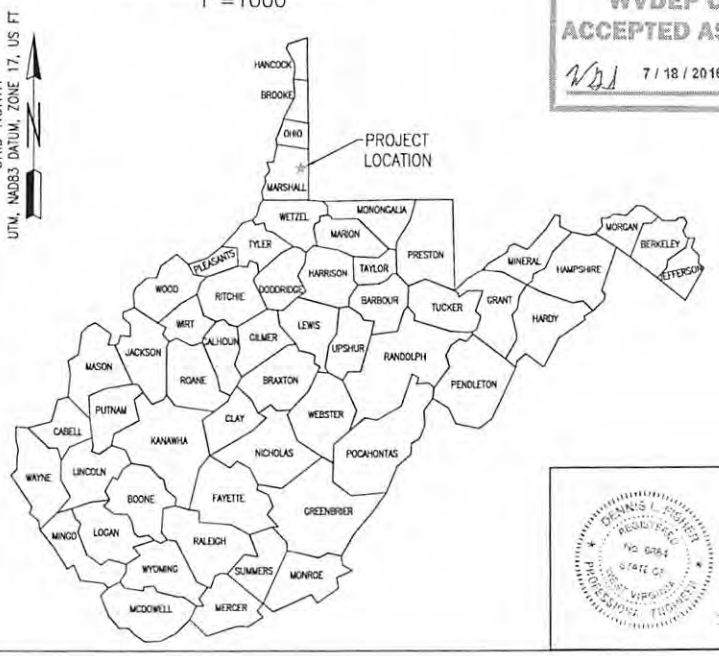


WVDEP OOG
ACCEPTED AS-BUILT
7 / 18 / 2016

COORDINATES:
SITE ENTRANCE
(NAD83)
LAT: 39.896424
LONG: 80.558245

AT DUNN PAD
(NAD83)
LAT: 39.896654
LONG: 80.553857

CENTER OF PAD
(NAD83)
LAT: 39.897248
LONG: 80.554066

GATHERING AREA
(NAD83)
LAT: 39.896521
LONG: 80.558177

PERMIT LOD

TOTAL DISTURBED AREA: 14.7 ACRES
ROAD DISTURBED AREA: 6.9 ACRES
PAD DISTURBED AREA: 7.8 ACRES
ADDITIONAL AREA: 0.74 ACRES

MODIFIED LOD #2

TOTAL DISTURBED AREA: 13.4 ACRES
ROAD DISTURBED AREA: 6.6 ACRES
PAD DISTURBED AREA: 6.8 ACRES

EXISTING WELL:
DUNN MSH 8H
47-051-01563H
(NAD83)
LAT: 39.897109
LONG: 80.554056

DUNN MSH 6H
47-051-01582H
(NAD83)
LAT: 39.897146
LONG: 80.554045

DUNN MSH 10H
47-051-01581H
(NAD83)
LAT: 39.897185
LONG: 80.554032

DUNN MSH 210H
47-051-01600H
(NAD83)
LAT: 39.897225
LONG: 80.554019

SHEET INDEX

TS1. TITLE SHEET
EP2.1 EVACUATION ROUTE/ PREVAILING WIND
EP2.2 EVACUATION ROUTE/ PREVAILING WIND
AS3.1 ASBUILT OVERVIEW
AS3.2 ASBUILT
AS3.3 ASBUILT
AS3.4 ASBUILT
AS3.5 ASBUILT
ASR4.1 CONSTRUCTION AND RECLAMATION ACCESS ROAD PROFILE
MRD5.1 RECLAMATION PLAN OVERVIEW
MRD5.2 RECLAMATION PLAN
MRD5.3 RECLAMATION PLAN
MRD5.4 RECLAMATION PLAN
MRD5.5 RECLAMATION PLAN
MRD6.3 RECLAMATION DETAILS
MRD6.4 RECLAMATION DETAILS

REVISION	DATE

WEST VIRGINIA 811
CALL BEFORE YOU DIG! Dial 811 or 800.245.4848

JN 7/14/16

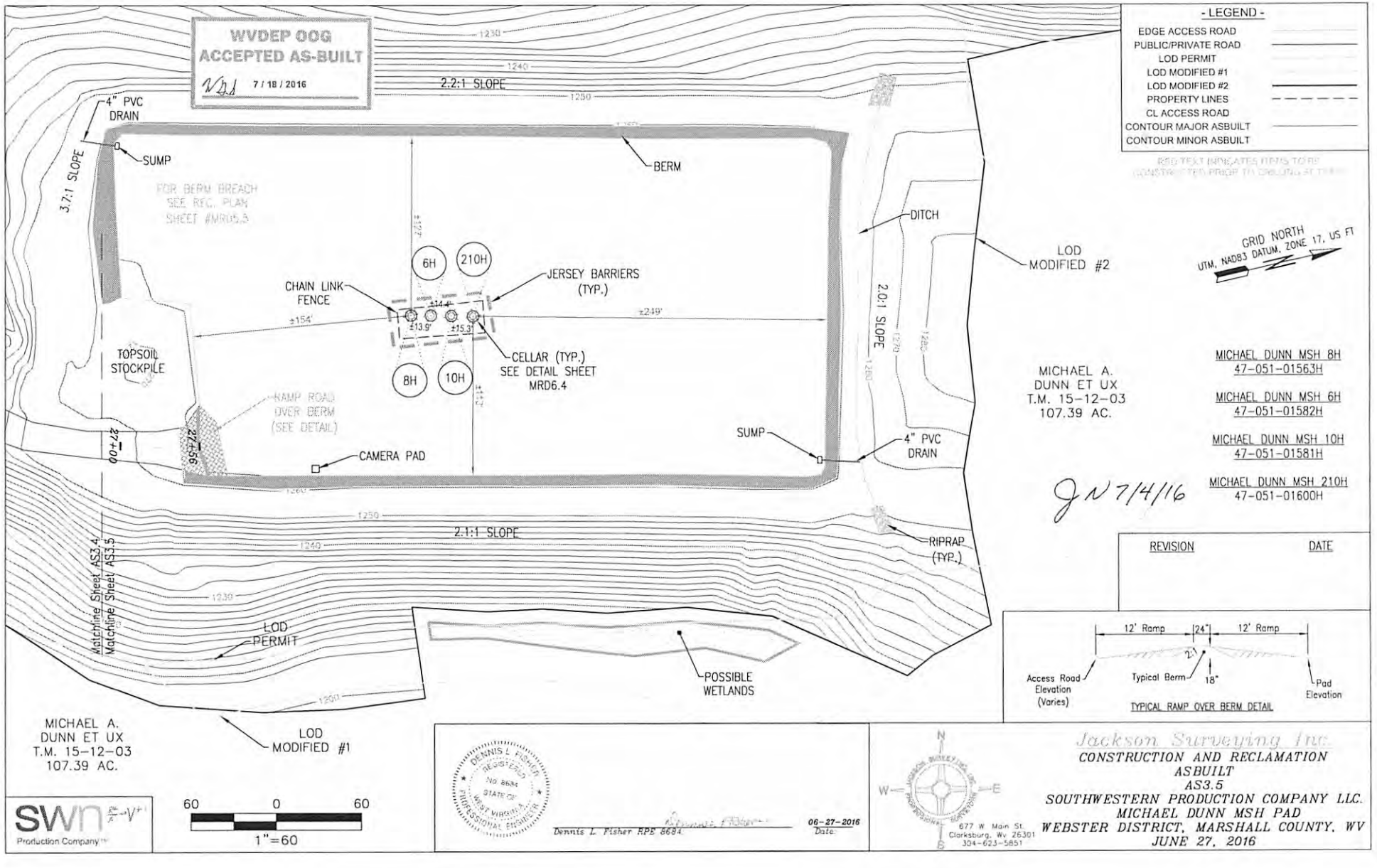
SWN Production Company™

DENNIS L. FISHER
REGISTERED
NO. 2684
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER

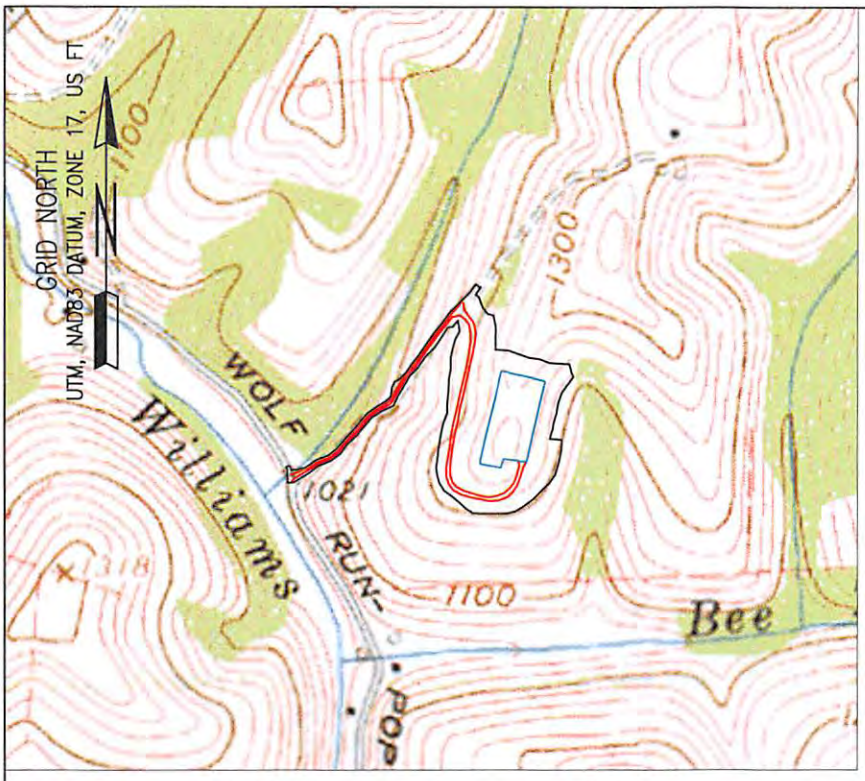
Dennis L. Fisher RPE 2684 — 06-27-2016 Date:

Jackson Surveying Inc
677 W. Main St.
Clarksburg, Wv 26301
304-623-5851

TITLE SHEET
TS.1
SOUTHWESTERN PRODUCTION COMPANY LLC.
MICHAEL DUNN MSH PAD
WEBSTER DISTRICT, MARSHALL COUNTY, WV
JUNE 27, 2016


WVDEP OOG
ACCEPTED AS-BUILT
VDJ 7/18/2016
- LEGEND -
EDGE ACCESS ROAD
PUBLIC/PRIVATE ROAD
LOD PERMIT
LOD MODIFIED #1
LOD MODIFIED #2
PROPERTY LINES
CL ACCESS ROAD
CONTOUR MAJOR ASBUILT
CONTOUR MINOR ASBUILT
RED TEXT INDICATES ITEMS TO BE CONSTRUCTED PRIOR TO DRILLING ST
GRID NORTH
UTM, NAD83 DATUM, ZONE 17, US FT
2.2:1 SLOPE
4" PVC DRAIN
SUMP
3.7:1 SLOPE
FOR BERM BREACH SEE REC. PLAN SHEET #MRD5.3
BERM
DITCH
LOD MODIFIED #2
6H
210H
CHAIN LINK FENCE
JERSEY BARRIERS (TYP.)
±154'
±14.4'
±13.9'
±15.3'
±249'
2.0:1 SLOPE
TOPSOIL STOCKPILE
CELLAR (TYP.) SEE DETAIL SHEET MRD6.4
8H
10H
RAMP ROAD OVER BERM (SEE DETAIL)
CAMERA PAD
SUMP
4" PVC DRAIN
MICHAEL A. DUNN ET UX T.M. 15-12-03 107.39 AC.
MICHAEL DUNN MSH 8H 47-051-01563H
MICHAEL DUNN MSH 6H 47-051-01582H
MICHAEL DUNN MSH 10H 47-051-01581H
MICHAEL DUNN MSH 210H 47-051-01600H
JN 7/14/16
2.1:1 SLOPE
RIPRAP (TYP.)
Matchline Sheet AS3.4
Matchline Sheet AS3.5
LOD PERMIT
POSSIBLE WETLANDS
MICHAEL A. DUNN ET UX T.M. 15-12-03 107.39 AC.
LOD MODIFIED #1
REVISION
DATE
12' Ramp
24"
12' Ramp
2:1
Access Road Elevation (Varies)
Typical Berm
18"
Pad Elevation
TYPICAL RAMP OVER BERM DETAIL
DENNIS L. FISHER REGISTERED No. 8684 STATE OF WEST VIRGINIA PROFESSIONAL ENGINEER
Dennis L. Fisher PE 8684
06-27-2016
Date
SWN Production Company
60 0 60
1"=60
677 W. Main St. Clarksburg, Wv 26301 304-623-5851
Jackson Surveying Inc.
CONSTRUCTION AND RECLAMATION
ASBUILT
AS3.5
SOUTHWESTERN PRODUCTION COMPANY LLC.
MICHAEL DUNN MSH PAD
WEBSTER DISTRICT, MARSHALL COUNTY, WV
JUNE 27, 2016

MICHAEL DUN
CONSTRUCTION AND
AS-BU
WEBSTER DISTRICT, MA
JUNE



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1"=1000

PERMIT LOD

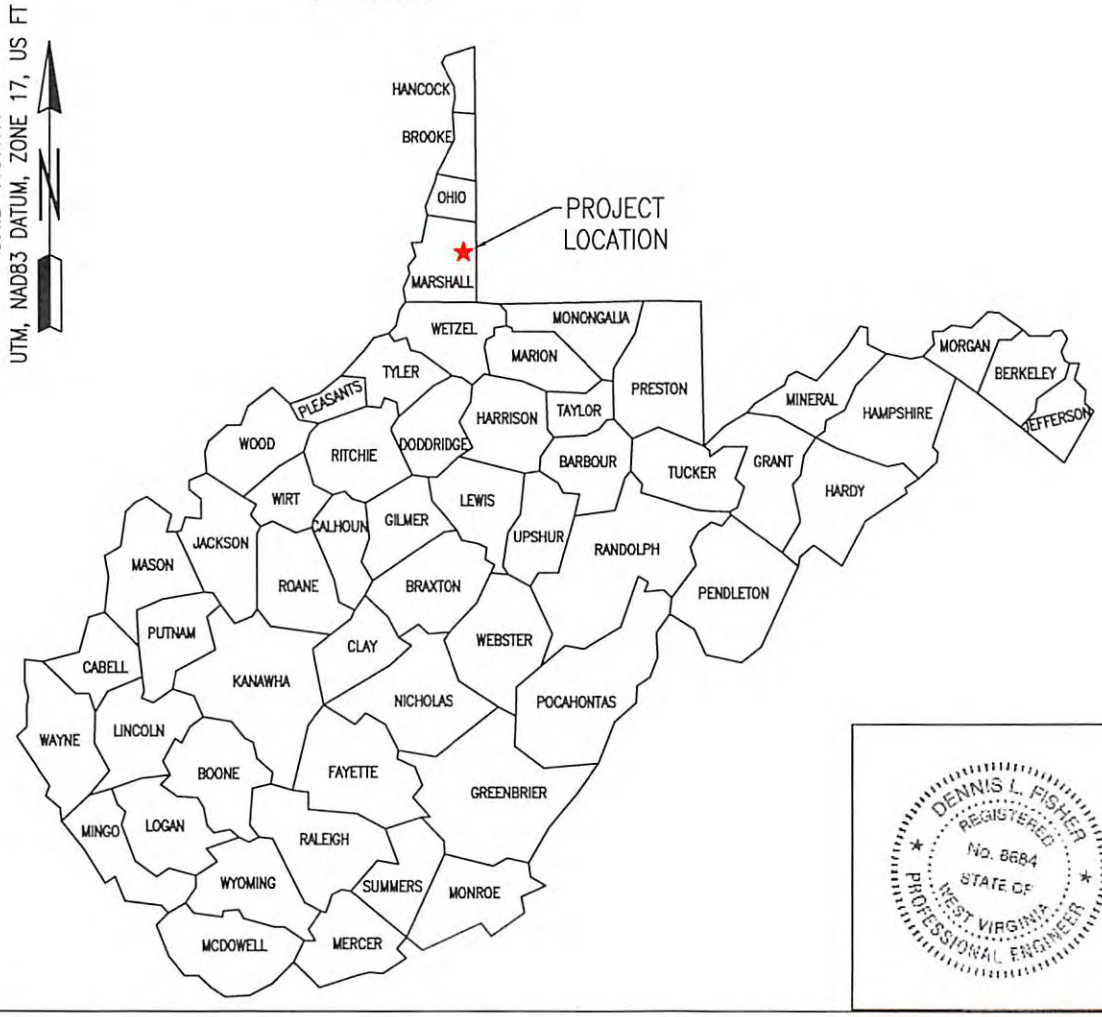
TOTAL DISTURBED AREA: 14.7 ACRES
ROAD DISTURBED AREA: 6.9 ACRES
PAD DISTURBED AREA: 7.8 ACRES
ADDITIONAL AREA: 0.74 ACRES

COORDIN
SITE ENT
(NADI
LAT: 39.8
LONG: 80.

AT DUNI
(NADI
LAT: 39.8
LONG: 80.

CENTER
(NADI
LAT: 39.8
LONG: 80.

GATHERIN
(NADI
LAT: 39.8
LONG: 80.



Dennis L. Fisher RPE 8684

51-01581F

N MSH PAD
RECLAMATION PLAN
UILT
RSHALL COUNTY, WV
2016

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MODIFIED LOD #2

OTAL DISTURBED AREA: 13.4 ACRES
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PAD DISTURBED AREA: 6.8 ACRES

REVISION	DATE

TES:
ANCE
)
6424
58245

PAD
)
6654
53857

PAD
)
7248
54066

AREA
)
6521
58177

EXISTING WELL:
DUNN MSH 8H
47-051-01563H
(NAD83)
LAT: 39.897109
LONG: 80.554056

DUNN MSH 6H
47-051-01582H
(NAD83)
LAT: 39.897146
LONG: 80.554045

DUNN MSH 10H
47-051-01581H
(NAD83)
LAT: 39.897185
LONG: 80.554032

DUNN MSH 210H
47-051-01600H
(NAD83)
LAT: 39.897225
LONG: 80.554019

WEST VIRGINIA 811
CALL BEFORE YOU DIG! Dial 811 or 800.245.4848
www.WV811.com

JN 7/14/16

swn Production Company™

$\frac{R^2}{A} \rightarrow V+$ ®

Received
Office of Oil & Gas
JUL 14 2016

06-27-2016
Date:

Jackson Surveying Inc.
677 W. Main St.
Clarksburg, Wv 26301
304-623-5851

TITLE SHEET
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