west virginia department of environmental protection

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

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

January 28, 2014

WELL WORK PERMIT

Horizontal 6A Well

This permit, API Well Number: 47-5101692, issued to CHESAPEAKE APPALACHIA, L.L.C., is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to all conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas inspector.

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

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

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

James Martin
Chief

Operator's Well No: MARK EDISON MSH 8H
Farm Name: EDISON, MARK C. & LOIS ANN
API Well Number: 47-5101692
Permit Type: Horizontal 6A Well
Date Issued: 01/28/2014

API Number: 051 01692

PERMIT CONDITIONS

West Virginia Code § 22-6A-8(d) allows the Office of Oil and Gas to place specific conditions upon this permit. Permit conditions have the same effect as law. Failure to adhere to the specified permit conditions may result in enforcement action.

CONDITIONS

1. This proposed activity may require permit coverage from the United States Army Corps of Engineers (USACOE). Through this permit, you are hereby being advised to consult with USACOE regarding this proposed activity.

2. If the operator encounters an unanticipated void, or an anticipated void at an unanticipated depth, the operator shall notify the inspector within 24 hours. Modifications to the casing program may be necessary to comply with W. Va. Code § 22-6A-5a (12), which requires drilling to a minimum depth of thirty feet below the bottom of the void, and installing a minimum of twenty (20) feet of casing. Under no circumstance should the operator drill more than fifty (50) feet below the bottom of the void or install less than twenty (20) feet of casing below the bottom of the void.

3. When compacting fills, each lift before compaction shall not be more than 12 inches in height, and the moisture content of the fill material shall be within limits as determined by the Standard Proctor Density test of the actual soils used in specific engineered fill, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort, to achieve 95 % compaction of the optimum density. Each lift shall be tested for compaction, with a minimum of two tests per lift per acre of fill. All test results shall be maintained on site and available for review.

4. Operator shall install signage per § 22-6A-8g (6) (B) at all source water locations included in their approved water management plan within 24 hours of water management plan activation.

5. Oil and gas water supply wells will be registered with the Office of Oil and Gas and all such wells will be constructed and plugged in accordance with the standards of the Bureau for Public Health set forth in its Legislative rule entitled *Water Well Regulations,* 64 C.S.R. 19. Operator is to contact the Bureau of Public Health regarding permit requirements. In lieu of plugging, the operator may transfer the well to the surface owner upon agreement of the parties. All drinking water wells within fifteen hundred feet of the water supply well shall be flow tested by the operator upon request of the drinking well owner prior to operating the water supply well.

6. Pursuant to the requirements pertaining to the sampling of domestic water supply wells/springs the operator shall, no later than thirty (30) days after receipt of analytical data provide a written copy to the Chief and any of the users who may have requested such analyses.

7. If any explosion or other accident causing loss of life or serious personal injury occurs in or about a well or well work on a well, the well operator or its contractor shall give notice, stating the particulars of the explosion or accident, to the oil and gas inspector and the Chief, within 24 hours of said accident.

8. During the casing and cementing process, in the event cement does not return to the surface, the oil and gas inspector shall be notified within 24 hours.

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

1) Well Operator:	Chesapeake Appalachia, LLC	49447757	51-Marshall	7- Union	486-Moundsville
		Operator ID	County	District	Quadrangle

2) Operator's Well Number: Mark Edison MSH 8H Well Pad Name: Mark Edison MSH Pad

3 Elevation, current ground: 1220' Elevation, proposed post-construction: 1219'

4) Well Type: (a) Gas ■ Oil _____ Underground Storage _____

Other _____

(b) If Gas: Shallow _____ Deep _____

Horizontal ■

5) Existing Pad? Yes or No: No

AJK 10-2-2013

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):

Target formation- Marcellus, Target top TVD- 6,346', Target base TVD- 6,401', Anticipated thickness- 55', Associated Pressure- 4,061

7) Proposed Total Vertical Depth: 6,381'

8) Formation at Total Vertical Depth: Marcellus

9) Proposed Total Measured Depth: 15,800'

10) Approximate Fresh Water Strata Depths: 580'

11) Method to Determine Fresh Water Depth: From analysis of water wells in the area.

12) Approximate Saltwater Depths: 912'

13) Approximate Coal Seam Depths: 734'

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

15) Does proposed well location contain coal seams directly overlying or adjacent to an active mine? If so, indicate name and depth of mine: No.

16) Describe proposed well work: Drill and stimulate any potential zones between and including the Benson to the Marcellus. **If we should encounter a void, place basket above and below void area - balance cement to bottom of void and grout from basket to surface. Run casing not less than 20' below void nor more than 50' below void.

(*If freshwater is encountered deeper than anticipated it must be protected, set casing 50' below and cts)

17) Describe fracturing/stimulating methods in detail:

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.

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18) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 15.4

19) Area to be disturbed for well pad only, less access road (acres): 4.5

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20) **CASING AND TUBING PROGRAM**

TYPE	Size	New or Used	Grade	Weight per ft.	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill -up (Cu. Ft.)
Conductor	20"	New	J-55	94#	100'	100'	CTS
Fresh Water	13 3/8"	New	J-55	54.5#	680'	680'	630 sx/CTS
Coal	9 5/8"	New	J-55	40#	2,140'	2,140'	800 sx/CTS
Intermediate	7"	New	P-110	20#	If Needed	If Needed	If needed/As Possible
Production	5 1/2"	New	P-110	20#	15,800'	15,800'	Lead 1,010sx Tail 1,700sx/100' inside intermediate
Tubing	2 3/8"	New	N-80	4.7#	Approx.6,654'	Approx. 6,654'	
Liners							

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield
Conductor	20"	30"	0.25	2120	Class A	1.19/50% Excess
Fresh Water	13 3/8"	17.5"	0.380	2740	Class A	1.19/50% Excess
Coal	9 5/8"	12 1/4"	0.395	3950	Class A	1.19/50% Excess
Intermediate	7"	8 3/4"	.0317	4360	Class A	1.20/15% Excess
Production	5 1/2"	8 3/4"	0.361	12360	Class H	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:	Approx. 6,197'			

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21) 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.

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

**Please see attached sheets for Chemical Listing of Cement & Additives for Chesapeake Energy wells.

23) 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.

*Note: Attach additional sheets as needed.

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October 31, 2013

Schlumberger
Attn: Daniel L. Sikorski
4600 J Barry Court
Suite 200
Canonsburg, PA 15317

RE: Cement Variance Request

Dear Sir:

This agency has approved a variance request for the cement blend listed below to be used on surface and coal protection casing only. The variance cannot be used without an oil and gas operator requesting its use on a permit application and approved by this agency:

- 2% Accelerator (S001)
- 0.2% Antifoam (D046)
- 0.125 lb/sk Polyester Flake (D0130)

If you have any questions regarding this matter feel free to contact me at 304-926-0499, ext. 1653.

Sincerely,

James Peterson
Environmental Resources Analyst

west virginia department of environmental protection

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601 57th Street, SE
Charleston, WV 25304
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BEFORE THE OFFICE OF OIL AND GAS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OF WEST VIRGINIA

IN THE MATTER OF A VARIANCE FROM REGULATION 35 CSR § 4-11.4/11.5/14.1 AND 35 CSR § 8-9.2.h. 4/5/6/8 OF THE THE OPERATIONAL REGULATIONS OF CEMENTING OIL AND GAS WELLS	))))))	ORDER NO. 2013-78

REPORT OF THE OFFICE

Schlumberger requests approval of a different cement blend for use in cementing surface and coal protection casing of oil and gas wells.

FINDINGS OF FACT

1.) Schlumberger proposes the following cement blend:

- 2% Accelerator (S001)
- 0.2% Antifoam (D046)
- 0.125 lb/sk Polyester Flake (D130)

2.) Schlumberger laboratory testing results indicate that the blend listed in Fact No.1 will achieve a 500 psi compressive strength within 5 hours, 22 minutes and a 1200 psi compressive strength within 10 hours, 29 minutes.

CONCLUSIONS OF LAW

Pursuant to Articles 6 and 6A, Chapter 22 of the Code of West Virginia, the Office of Oil and Gas has jurisdiction over the subject matter embraced in said notice, and the persons interested therein, and jurisdiction to promulgate the hereinafter prescribed Order.

Pursuant to 35 CSR § 4-11.5 and 35 CSR § 8-9.2.h.8 the Chief of the Office of Oil and Gas may approve different cement blends upon the well operator providing satisfactory proof that different cement types are adequate.

ORDER

It is ordered that Schlumberger may use the cement blend listed in Findings of Fact No.1 for the cementing of surface and coal protection casing of oil and gas wells in the State as may be requested by oil and gas operators. The waiting time on the cement blend shall be 8 hours. The cement blend shall be mixed in strict accordance with the specifications for each blend and weight measurements made on-site to assure the cement slurries meet the minimum weight specifications. A sample shall be collected and, if after 8 hours the cement is not set up, additional time will be required. Schlumberger shall keep a record of cement blend jobs in which the cement blend approved under this order is to be used and made available to the Office of Oil and Gas upon request.

Dated this, the 31rth day of October, 2013.

IN THE NAME OF THE STATE OF WEST VIRGINIA

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

James Martin, Chief
Office of Oil and Gas

Schlumberger
East Division Technology Center

Laboratory Cement Test Report- 15.6 PPG SURFACE
Weston District Laboratory

						Signatures
Fluid No	: WES13-364P3	Client	: NOBLE	Location / Rig	: N/A	
Date	: Oct-06-2013	Well Name	: WEST VIRGINIA	Field	: N/A	Mclaughlin

Job Type	SURFACE	Depth	700.0 ft	TVD	700.0 ft
BHST	63 degF	BHCT	78 degF	BHP	494 psi
Starting Temp.	80 degF	Time to Temp.	00:09 hr:mn	Heating Rate	-0.22 degF/min
Starting Pressure	179 psi	Time to Pressure	00:09 hr:mn	Schedule	9.2-1

Composition

Slurry Density	15.60 lb/gal	Yield	1.20 ft3/sk	Mix Fluid	5.252 gal/sk
Solid Vol. Fraction	41.4 %	Porosity	58.6 %	Slurry type	Conventional

Code	Concentration	Sack Reference	Component	Blend Density	Lot Number
D901 - API A		94 lb of BLEND	Blend	197.27 lb/ft3	08-13-13/6-20
Fresh water	5.252 gal/sk		Base Fluid		
S001	2.000 %BWOC		Accelerator		364AJ1632
D046	0.200 %BWOC		Antifoam		TU3G0700A0
D130	0.125 lb/sk		Lost circ		BULK

Rheology

Geometry: R1B1F1.0
S/N 10-1287-003

Temperature	78 degF		
(rpm)	Up (deg)	Down (deg)	Average (deg)
300	63.0	63.0	63.0
200	56.0	57.0	56.5
100	46.0	49.0	47.5
60	41.0	46.0	43.5
30	33.0	43.0	38.0
6	20.6	27.7	24.2
3	16.6	20.5	18.5

10 sec Gel	23 deg - 24.55 lbf/100ft2
10 min Gel	53 deg - 56.57 lbf/100ft2
Rheo. computed	Viscosity: 25.792 cP Yield Point: 38.21 lbf/100ft2

UCA Compressive Strength

S/N 501R

Time	CS
05:22 hr:mn	500 psi
10:29 hr:mn	1200 psi

Free Fluid

1.0 mL/250mL in 2 hrs
At 78 degF and 0 deg incl
Sedimentation : None

Comments

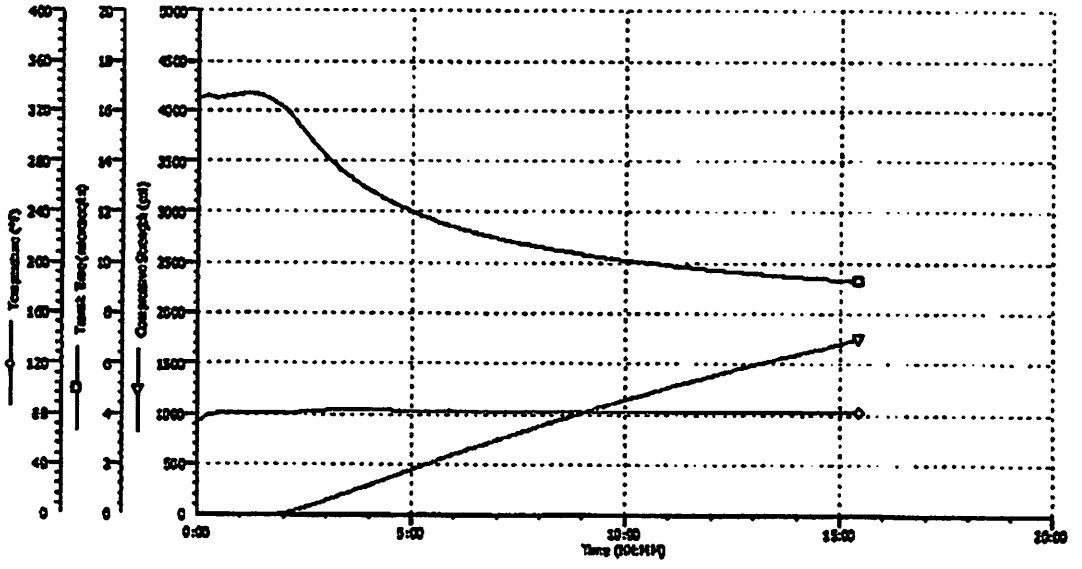
General Comment :

Note: This is a pilot test. Field may differ after testing. Please read field report carefully and compare to pilot report and load out. Contact the laboratory with any questions or concerns.

Schlumberger

UCA Graph

[illegible] NOBLE WV [illegible]
[illegible] CustomerNOBLE [illegible]
[illegible] D901APIA [illegible]
[illegible] 2% S001 + 0.2% CD46+0.125gps D130 [illegible]
[illegible] Surface [illegible]
[illegible] 01 RIGHT301R [illegible]



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SLB Cement Additives

	Product Name	Product Use
Surface	D046	antifoam
	D130	polyester flake - lcm
	S001	calcium chloride
	SPACER	
	D130	polyester flake - lcm
	D020	bentonite extender
Intermediate	D046	antifoam
	D130	polyester flake - lcm
	D044	granulated salt
	D153	Anti-Settling Agent
	SPACER	
	D020	bentonite extender
	D130	polyester flake - lcm
Kick Off Plug	D080	cement liquid dispersant
	D801	mid-temp retarder
	D047	antifoam agent
	SPACER	
	B389	MUDPUSH* Express
	D206	Antifoaming Agent
	D031	barite
	B220	surfactant
Production - Lead	D167	UNIFLAC* S
	D154	low-temperature extender
	D400	EasyBLOK
	D046	antifoam
	D201	basic cements enabler
	D202	low-temperature solid dispersant
	D046	antifoam
	D167	UNIFLAC* S
	D065	TIC* Dispersant

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D201	basic cements enabler
D153	Anti-Settling Agent
SPACER	
B389	MUDPUSH* Express
D206	Antifoaming Agent
D031	barite
B220	surfactant

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Chemical Name	CAS Number	% Concentration Used
Fuller's earth (attapulgite)	8031-18-3	0.2% BWOC
Polypropylene glycol	25322-69-4	
polyethylene terephthalate	25038-59-9	0.125 lb/sk
calcium chloride	10043-52-4	2% BWOC
polyethylene terephthalate	25038-59-9	1 lb/bbl
bentonite	1302-78-9	20 lb/bbl
Fuller's earth (attapulgite)	8031-18-3	0.2% BWOC
Polypropylene glycol	25322-69-4	
polyethylene terephthalate	25038-59-9	0.125 lb/sk
sodium chloride	7647-14-5	10% BWOW
chrystalline silica	14808-60-7	0.15% BWOC
bentonite	1302-78-9	20 lb/bbl
polyethylene terephthalate	25038-59-9	1 lb/bbl
product classified as non-hazardous.		0.05 gal/sk
product classified as non-hazardous		0.01 gal/sk
polypropylene glycol	25322-69-4	0.02 gal/sk
Carbohydrate	proprietary	1 lb/bbl
Silica Organic Polymer	proprietary	0.1 gal/bbl
barium sulfate	7727-43-7	310 lb/bbl
fatty acid amine	proprietary	
ethoxylated alcohol	proprietary	
glycerol	56-81-5	
2.2'-Iminodiethanol	111-42-2	1 gal/bbl
aliphatic amide polymer	proprietary	0.35% BWOC
non-crystalline silica	7631-86-9	6% BWOC
boric acid	10043-35-3	0.8% BWOC
Fuller's earth (attapulgite)	8031-18-3	
Polypropylene glycol	25322-69-4	0.2% BWOC
chrystalline silica	14808-60-7	
metal oxide	proprietary	0.2% BWOC
sulphonated synthetic polymer	proprietary	
formaldehyde (impurity)	50-00-0	0.3% BWOC
Fuller's earth (attapulgite)	8031-18-3	
Polypropylene glycol	25322-69-4	0.2% BWOC
aliphatic amide polymer	proprietary	0.35% BWOC
Sodium Polynaphthalene Sulfonate	9008-63-3	
Sodium Sulfate	7757-82-6	0.25% BWOC

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chrystalline silica	14808-60-7	
metal oxide	proprietary	0.2% BWOC
chrystalline silica	14808-60-7	0.2% BWOC
Carbohydrate	proprietary	proprietary
Silica Organic Polymer	proprietary	proprietary
barium sulfate	7727-43-7	7727-43-7
fatty acid amine	proprietary	proprietary
ethoxylated alcohol	proprietary	proprietary
glycerol	56-81-5	56-81-5
2.2'-Iminodiethanol	111-42-2	111-42-2

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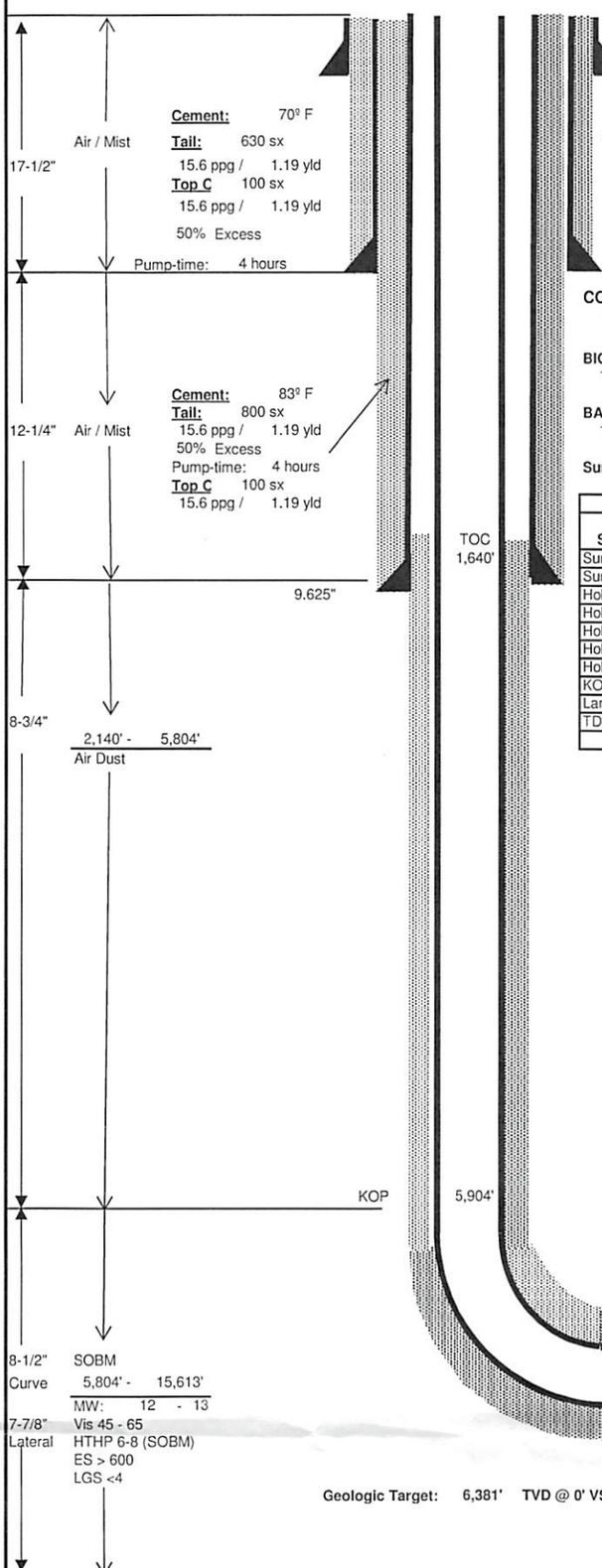
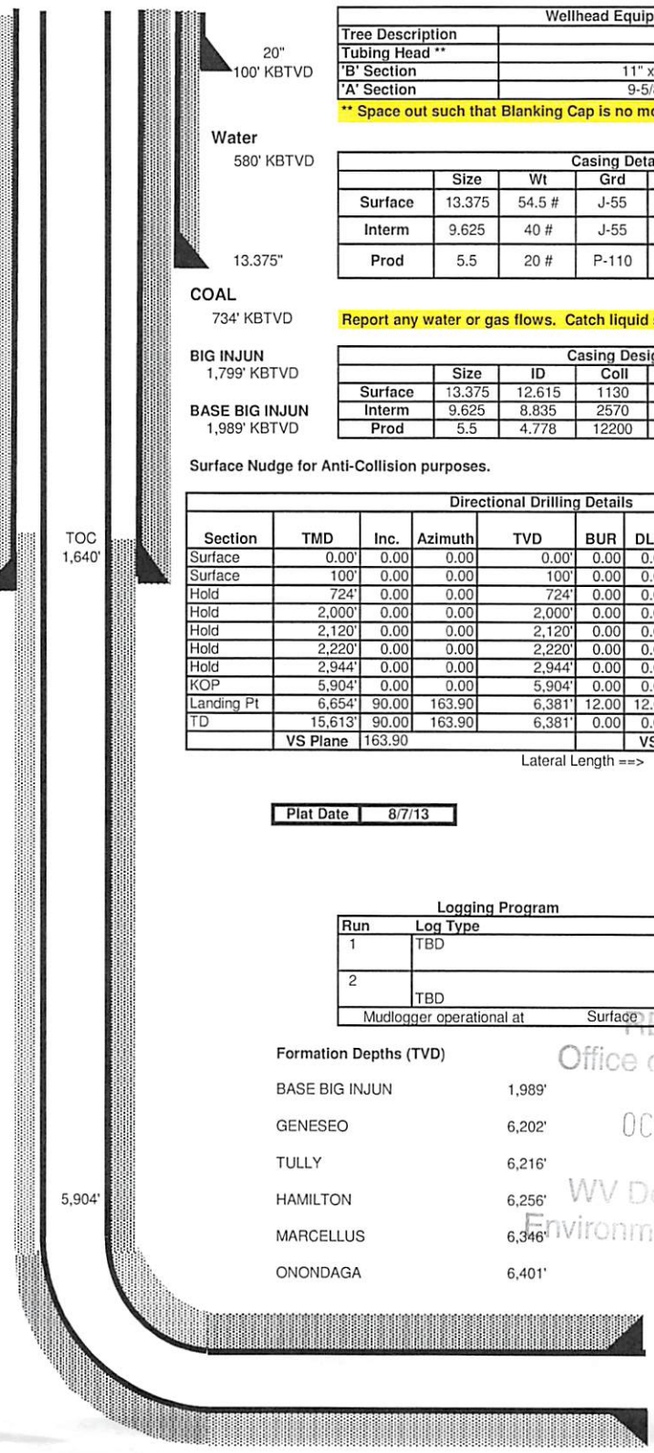
Chesapeake ENERGY

Well Name:	**Mark Edison MSH 8H**			**Drilling Rig:**	**N/A**
				Directional Drilling:	N/A
Drilling Engineer:	TBD	**Formation:**	Marcellus	**Drilling Mud:**	N/A
Superintendent:	N/A	**County, State:**	Marshall, WV	**Cement Surface:**	N/A
Asset Manager:	N/A	**Surface Latitude:**	39.976118	**Surface Longitude:** -80.649871	**Cement Longstrings:** N/A
Geologist:	N/A	**BH Latitude:**	39.952635	**BH Longitude:** -80.640639	**Wellhead:** N/A
Land:	N/A	**KB Elevation:**	1239'	**Ground Elevation:** 1219'	AFE #: N/A





Wellhead Equipment	
Tree Description	
Tubing Head **	Blanking Cap
'B' Section	11" x 5M x 7-1/16" 10M
'A' Section	9-5/8" SOW x 11" 5M

** Space out such that Blanking Cap is no more than 30" above grade.

Casing Detail	Size	Wt	Grd	Conn.	From:	To:
Surface	13.375	54.5 #	J-55	STC	0'	680'
Interm	9.625	40 #	J-55	LTC	0'	2,140'
Prod	5.5	20 #	P-110	GBCD	0'	15,613'

Report any water or gas flows. Catch liquid sample if possible.

Casing Design	Size	ID	Coll	Burst	Tens	MU torq
Surface	13.375	12.615	1130	2740	514	5140
Interm	9.625	8.835	2570	3950	520	5200
Prod	5.5	4.778	12200	12360	641	8530

Surface Nudge for Anti-Collision purposes.

Directional Drilling Details

Section	TMD	Inc.	Azimuth	TVD	BUR	DLS	+N/-S	+E/-W
Surface	0.00'	0.00	0.00	0.00'	0.00	0.00	0.0'	0.0'
Surface	100'	0.00	0.00	100'	0.00	0.00	0.0'	0.0'
Hold	724'	0.00	0.00	724'	0.00	0.00	0.0'	0.0'
Hold	2,000'	0.00	0.00	2,000'	0.00	0.00	0.0'	0.0'
Hold	2,120'	0.00	0.00	2,120'	0.00	0.00	0.0'	0.0'
Hold	2,220'	0.00	0.00	2,220'	0.00	0.00	0.0'	0.0'
Hold	2,944'	0.00	0.00	2,944'	0.00	0.00	0.0'	0.0'
KOP	5,904'	0.00	0.00	5,904'	0.00	0.00	0.0'	0.0'
Landing Pt	6,654'	90.00	163.90	6,381'	12.00	12.00	-458.7'	132.4'
TD	15,613'	90.00	163.90	6,381'	0.00	0.00	-9,066.7'	2,617.0'
	VS Plane	163.90				VS Length	9,436.86'	

Lateral Length ==> 8,959.40'

Plat Date	8/7/13

Logging Program

Run	Log Type	Interval
1	TBD	TBD
2	TBD	TBD
Mudlogger operational at	Surface	

Formation Depths (TVD)

BASE BIG INJUN	1,989'
GENESEO	6,202'
TULLY	6,216'
HAMILTON	6,256'
MARCELLUS	6,346'
ONONDAGA	6,401'

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Cement: 119° F
Lead: 1,010 sx
15.6 ppg / 1.20 yld
Tail: 1,700 sx
15.6 ppg / 1.20 yld
15% Excess
Pump-time: 6 hours

Geologic Target: 6,381' **TVD @ 0' VS w/** 0.00 **degrees/100 ft** **Up-dip**

PBHL 5.5"
TMD: 15,613'
TVD: 6,381'
Inclination: 90.00 deg

Gyro the 1st well on the pad at KOP.
Ensure all Surveys are referenced to Grid North!!

Drawn by: TBD
Date: 10/1/2013

WW-9
(5/13)

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API Number 47 - 51 - _____
Operator's Well No. Mark Edison MSH 8H

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Chesapeake Appalachia, LLC OP Code 49447757

Watershed (HUC 10) Wheeling Creek Quadrangle 486-Moundsville

Elevation 1220' County 51-Marshall District 7- Union

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

Will a pit be used for drill cuttings? Yes _____ No x

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 x If so, what ml.?_____

Proposed Disposal Method For Treated Pit Wastes:

_____ Land Application
■ Underground Injection (UIC Permit Number 2D0072539/ 2D0413175/ 2D0610306/ 2D0610317)
■ 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? Yes

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

-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? Meadowfill SWF-1032, SS Grading SWF-4902, Northwestern SWF-1025, Short Creek 1034/WV0109517/CID28726, Carbon Limestone 28726/CID 28726

Arden Landfill 10072, American 02-12954, Country Wide 38390/CID 38390, Pine Grove 13688

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.

RECEIVED
Office of Oil and Gas
OCT 16 2013
WV Department of
Environmental Protection

Company Official Signature _____

Company Official (Typed Name) Danielle Southall

Company Official Title Regulatory Analyst

Subscribed and sworn before me this 22nd day of August, 2013

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

051 01692

Form WW-9

Operator's Well No. _____

Chesapeake Appalachia, LLC

Proposed Revegetation Treatment: Acres Disturbed 10+/- Prevegetation pH _____

Lime as determined by pH test min. 2 Tons/acre or to correct to pH 6.5

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

Mulch Hay/Straw 2.5 Tons/acre

Seed Mixtures

Area I		Area II	
Seed Type	lbs/acre	Seed Type	lbs/acre
White Clover	15	White Top	15
Red Top	15	Red Top	15
Orchard Grass	20	Orchard Grass	20

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

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: [signature]

Comments: _____

Title: Oil and Gas Inspector Date: 10/2/2013

Field Reviewed? (X) Yes ( ) No

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051 01692

Marcellus Well Drilling Procedures
And Site Safety Plan

Chesapeake Appalachia, LLC

47 - 51 -
Well name Mark Edison MSH 8H
Moundsville, Quad
Union, District
Marshall County, West Virginia

MJK
10-2-2013
JK
10/2/13

Submitted by:

Dee Southall Date: 8/22/2013

Title Regulatory Analyst Chesapeake Appalachia, LLC

Approved by:

Date:

Title:

Approved by:

Date:

Title:

Chesapeake Appalachia, L.L.C. – Confidential

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051 01692

Water Management Plan:
Primary Water Sources

WMP- 01656	API/ID Number:	047-051-01692	Operator:	Chesapeake Energy

Mark Edison MSH 8H - 837626

Important:

For each proposed primary water source (including source intakes for purchased water sources) identified in your water management plan, and summarized herein, DEP has made an evaluation concerning water availability over the specified date range. DEP's assessment is based on the following considerations:

- Statistical analysis of historical USGS stream gauge data (transferred to un-gauged locations as necessary);
- Identification of sensitive aquatic life (endangered species, mussels, etc.);
- Quantification of known existing demands on the water supply (Large Quantity Users);
- Minimum flows required by the Army Corps of Engineers; and
- Designated stream uses.

Based on these factors, DEP has provided, for each intake location (and origination point for purchased water), a reference gauge location and discharge flow reading which must be surpassed prior to withdrawals. Additionally, DEP has established a minimum passby flow at the withdrawal location which must also be surpassed prior to withdrawals. These thresholds are considered terms of the permit and are enforceable as such.

DEP is aware that some intake points will be used for mutiple wells and well sites. In these cases, the thresholds set by the Water Management Plan are to be interepreted as total withdrawal limits for each location over the specified date range regardless of how many wells are supported by that intake.

For all purchased water intakes, determinations of water availability are made at the original source intake location. It is the responsibility of the Oil and Gas Operator, not the seller, to cease withdrawal of water from the seller when flows are less than the minimum gauge reading at the stream gauge referenced by the Water Management Plan in order to protect stream uses.

Note that the determinations made herein are based on the best available data, but it is impossible to predict water availability in the future. While the DEP has carefully established these minimum withdrawal thresholds, it remains the operator's responsibility to protect aquatic life at all times. Approval to withdrawal is contingent upon permission from the land owner. It is the responsibility of the operator to secure and maintain permission prior to any withdrawals.

The operator is reminded that 24-48 hours prior to withdrawing (or purchasing) water, DEP must be notified by email at DEP.water.use@wv.gov.

APPROVED DEC 0 3 2013

WMP- 01656 | API Number: 047-051-01692 | Operator: Chesapeake Energy

Mark Edison MSH 8H - 837626

Stream/River

- Source **Ohio River WP 1 (Beech Bottom Staging Area)** Brooke Owner: **Brownlee Land Ventures**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
2/1/2014	2/1/2015	6,000,000		40.226889	-80.658972

☑ Regulated Stream? Ohio River Min. Flow Ref. Gauge ID: 9999999 Ohio River Station: Willow Island Lock & Dam

Max. Pump rate (gpm): **6,000** **Min. Gauge Reading (cfs):** **6,468.00** **Min. Passby (cfs)**

DEP Comments: Refer to the specified station on the National Weather Service's Ohio River forecast website: http://www.erh.noaa.gov/ohrfc//flows.shtml

- Source **Little Wheeling Creek WP 1 (Rt. 40 Staging Area)** Ohio Owner: **JDS Investments, LLC**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
2/1/2014	2/1/2015	6,000,000		40.078324	-80.591145

☐ Regulated Stream? Ref. Gauge ID: 3112000 WHEELING CREEK AT ELM GROVE, WV

Max. Pump rate (gpm): **2,000** **Min. Gauge Reading (cfs):** **64.80** **Min. Passby (cfs)** **2.83**

DEP Comments:

WMP-01656 API Number: 047-051-01692 Operator: Chesapeake Energy

Mark Edison MSH 8H - 837626

Purchased Water

- Source **Ohio River @ J&R Excavating** Marshall Owner: **J&R Excavating**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
2/1/2014	2/1/2015	6,000,000	1,890,000	39.998509	-80.737336

☑ Regulated Stream? **Ohio River Min. Flow** Ref. Gauge ID: 9999999 **Ohio River Station: Willow Island Lock & Dam**

Max. Pump rate (gpm): **Min. Gauge Reading (cfs): 6,468.00** **Min. Passby (cfs)**

DEP Comments: **Refer to the specified station on the National Weather Service's Ohio River forecast website: http://www.erh.noaa.gov/ohrfc//flows.shtml**

- Source **The Village of Valley Grove** Ohio Owner: **The Village of Valley Grove**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
2/1/2014	2/1/2015	6,000,000	720,000	-	-

☑ Regulated Stream? **Ohio River Min. Flow** Ref. Gauge ID: 9999999 **Ohio River Station: Willow Island Lock & Dam**

Max. Pump rate (gpm): **Min. Gauge Reading (cfs): 6,468.00** **Min. Passby (cfs)**

DEP Comments: **Refer to the specified station on the National Weather Service's Ohio River forecast website: http://www.erh.noaa.gov/ohrfc//flows.shtml**

- Source **Ohio County PSD** Ohio Owner: **Ohio county PSD**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
2/1/2014	2/1/2015	6,000,000	720,000	-	-

☑ Regulated Stream? **Ohio River Min. Flow** Ref. Gauge ID: 9999999 **Ohio River Station: Willow Island Lock & Dam**

Max. Pump rate (gpm): **Min. Gauge Reading (cfs): 6,468.00** **Min. Passby (cfs)**

DEP Comments: **Refer to the specified station on the National Weather Service's Ohio River forecast website: http://www.erh.noaa.gov/ohrfc//flows.shtml**

Source Detail

051 01692

WMP- 01656 | API/ID Number: 047-051-01692 | Operator: Chesapeake Energy

Mark Edison MSH 8H - 837626

Source ID: 30589 | Source Name: Ohio River @ J&R Excavating / J&R Excavating

Source Latitude: 39.998509

Source Longitude: -80.737336

HUC-8 Code: 5030106

Drainage Area (sq. mi.): 25000 | County: Marshall

Anticipated withdrawal start date: 2/1/2014

Anticipated withdrawal end date: 2/1/2015

Total Volume from Source (gal): 6,000,000

Max. Pump rate (gpm):

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm)

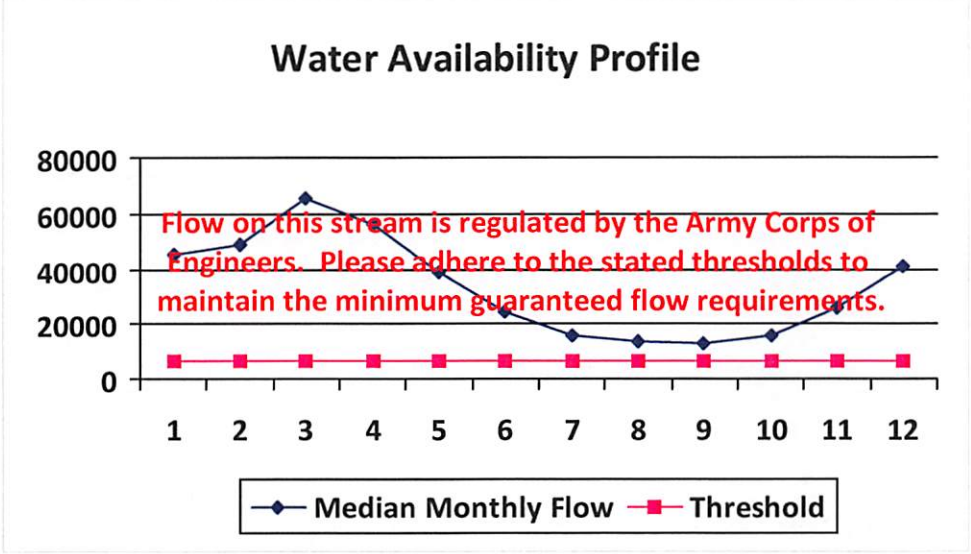
- [ ] Endangered Species?
- [x] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [x] Regulated Stream? — Ohio River Min. Flow
- [ ] Proximate PSD?
- [x] Gauged Stream?

Reference Gaug: 9999999 | Ohio River Station: Willow Island Lock & Dam

Drainage Area (sq. mi.): 25,000.00

Gauge Threshold (cfs): 6468

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	45,700.00	-	-
2	49,200.00	-	-
3	65,700.00	-	-
4	56,100.00	-	-
5	38,700.00	-	-
6	24,300.00	-	-
7	16,000.00	-	-
8	13,400.00	-	-
9	12,800.00	-	-
10	15,500.00	-	-
11	26,300.00	-	-
12	41,300.00	-	-



Water Availability Assessment of Location

Base Threshold (cfs):	-
Upstream Demand (cfs):	0.00
Downstream Demand (cfs):	0.00
Pump rate (cfs):	
Headwater Safety (cfs):	0.00
Ungauged Stream Safety (cfs):	0.00
Min. Gauge Reading (cfs):	-
Passby at Location (cfs):	-

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

051 01692

WMP- 01656 | API/ID Number: 047-051-01692 | Operator: Chesapeake Energy

Mark Edison MSH 8H - 837626

Source ID: 30590 | Source Name: The Village of Valley Grove / The Village of Valley Grove

Source Latitude: - | Source Longitude: -

HUC-8 Code: 5030106

Drainage Area (sq. mi.): 25000 | County: Ohio

Anticipated withdrawal start date: 2/1/2014

Anticipated withdrawal end date: 2/1/2015

Total Volume from Source (gal): 6,000,000

Max. Pump rate (gpm):

Max. Simultaneous Trucks:

Max. Truck pump rate (gpm)

- [ ] Endangered Species?
- [x] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [x] Regulated Stream? — Ohio River Min. Flow
- [x] Proximate PSD? — Wheeling Water Department
- [x] Gauged Stream?

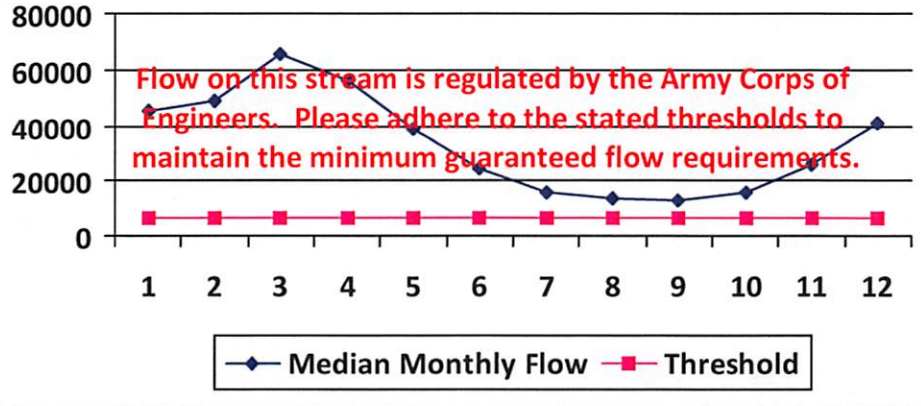
Reference Gaug: 9999999 — Ohio River Station: Willow Island Lock & Dam

Drainage Area (sq. mi.): 25,000.00

Gauge Threshold (cfs): 6468

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	45,700.00	-	-
2	49,200.00	-	-
3	65,700.00	-	-
4	56,100.00	-	-
5	38,700.00	-	-
6	24,300.00	-	-
7	16,000.00	-	-
8	13,400.00	-	-
9	12,800.00	-	-
10	15,500.00	-	-
11	26,300.00	-	-
12	41,300.00	-	-

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs): -

Upstream Demand (cfs):

Downstream Demand (cfs):

Pump rate (cfs):

Headwater Safety (cfs): 0.00

Ungauged Stream Safety (cfs): 0.00

Min. Gauge Reading (cfs): -

Passby at Location (cfs): -

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

051 01692

Source Detail

WMP- 01656 | API/ID Number: 047-051-01692 | Operator: Chesapeake Energy

Mark Edison MSH 8H - 837626

Source ID: 30591 | Source Name: Ohio County PSD / Ohio county PSD | Source Latitude: - | Source Longitude: -

HUC-8 Code: 5030106

Drainage Area (sq. mi.): 25000 | County: Ohio

Anticipated withdrawal start date: 2/1/2014

Anticipated withdrawal end date: 2/1/2015

Total Volume from Source (gal): 6,000,000

Max. Pump rate (gpm):

Max. Simultaneous Trucks:

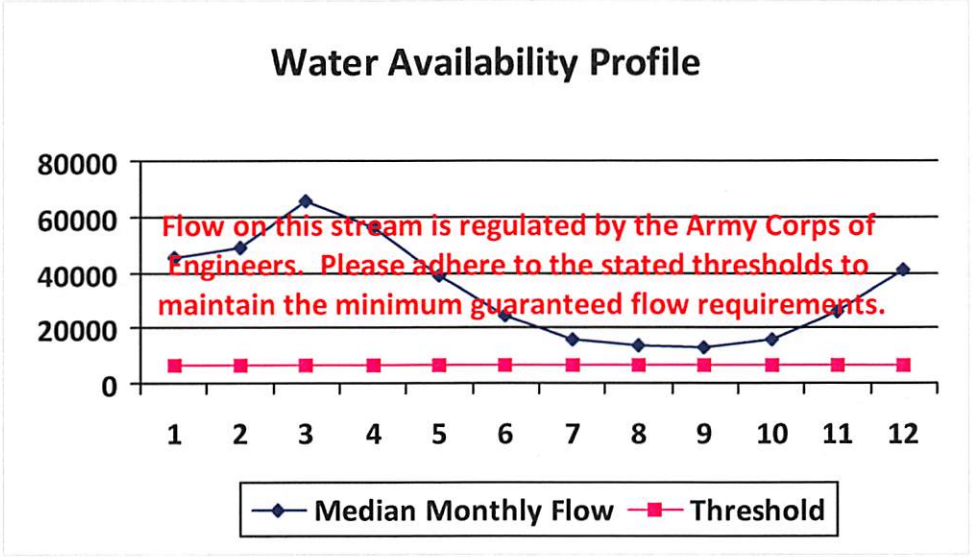
Max. Truck pump rate (gpm)

- [ ] Endangered Species?
- [x] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [x] Regulated Stream? — Ohio River Min. Flow
- [x] Proximate PSD? — Wheeling Water Department
- [x] Gauged Stream?

Reference Gaug: 9999999 — Ohio River Station: Willow Island Lock & Dam

Drainage Area (sq. mi.): 25,000.00 | Gauge Threshold (cfs): 6468

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	45,700.00	-	-
2	49,200.00	-	-
3	65,700.00	-	-
4	56,100.00	-	-
5	38,700.00	-	-
6	24,300.00	-	-
7	16,000.00	-	-
8	13,400.00	-	-
9	12,800.00	-	-
10	15,500.00	-	-
11	26,300.00	-	-
12	41,300.00	-	-



Water Availability Assessment of Location

Base Threshold (cfs): -

Upstream Demand (cfs):

Downstream Demand (cfs):

Pump rate (cfs):

Headwater Safety (cfs): 0.00

Ungauged Stream Safety (cfs): 0.00

Min. Gauge Reading (cfs): -

Passby at Location (cfs): -

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

051 01692

WMP-01656 | API/ID Number: 047-051-01692 | Operator: Chesapeake Energy

Mark Edison MSH 8H - 837626

Source ID: 30587 | Source Name: Ohio River WP 1 (Beech Bottom Staging Area)
Brownlee Land Ventures

Source Latitude: 40.226889
Source Longitude: -80.658972

HUC-8 Code: 5030106

Drainage Area (sq. mi.): 25000 | County: Brooke

Anticipated withdrawal start date: 2/1/2014
Anticipated withdrawal end date: 2/1/2015
Total Volume from Source (gal): 6,000,000
Max. Pump rate (gpm): 6,000
Max. Simultaneous Trucks: 0
Max. Truck pump rate (gpm) 0

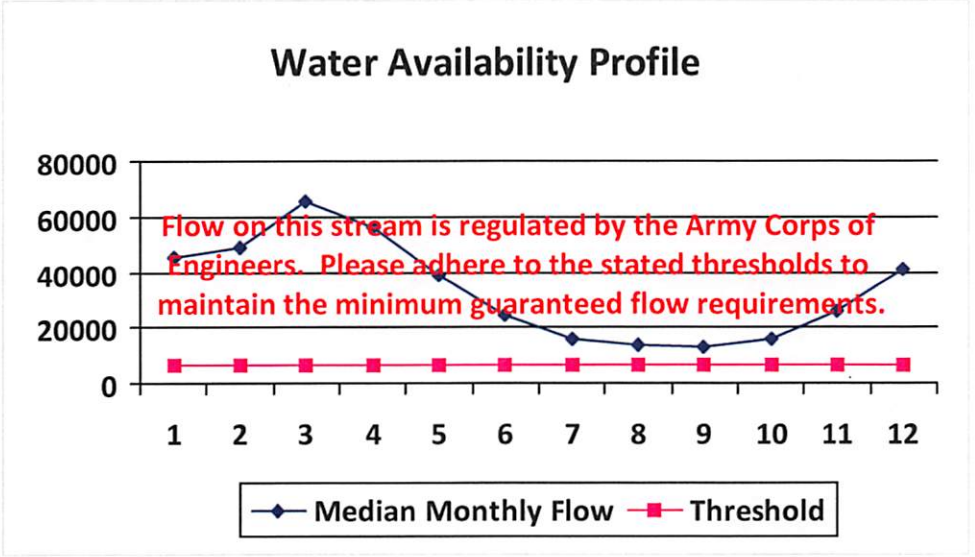
- [ ] Endangered Species?
- [x] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [x] Regulated Stream? — Ohio River Min. Flow
- [x] Proximate PSD? — Beech Bottom Water Dept.
- [x] Gauged Stream?

Reference Gaug: 9999999 | Ohio River Station: Willow Island Lock & Dam

Drainage Area (sq. mi.) 25,000.00

Gauge Threshold (cfs): 6468

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	45,700.00	-	-
2	49,200.00	-	-
3	65,700.00	-	-
4	56,100.00	-	-
5	38,700.00	-	-
6	24,300.00	-	-
7	16,000.00	-	-
8	13,400.00	-	-
9	12,800.00	-	-
10	15,500.00	-	-
11	26,300.00	-	-
12	41,300.00	-	-



Water Availability Assessment of Location

Base Threshold (cfs):	-
Upstream Demand (cfs):	
Downstream Demand (cfs):	
Pump rate (cfs):	13.37
Headwater Safety (cfs):	0.00
Ungauged Stream Safety (cfs):	0.00
Min. Gauge Reading (cfs):	-
Passby at Location (cfs):	-

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

051 01692

WMP- 01656 | API/ID Number: 047-051-01692 | Operator: Chesapeake Energy

Mark Edison MSH 8H - 837626

Source ID: 30588 | Source Name: Little Wheeling Creek WP 1 (Rt. 40 Staging Area)
JDS Investments, LLC

Source Latitude: 40.078324
Source Longitude: -80.591145

HUC-8 Code: 5030106

Drainage Area (sq. mi.): 13.94 | County: Ohio

Anticipated withdrawal start date: 2/1/2014
Anticipated withdrawal end date: 2/1/2015
Total Volume from Source (gal): 6,000,000
Max. Pump rate (gpm): 2,000
Max. Simultaneous Trucks:
Max. Truck pump rate (gpm)

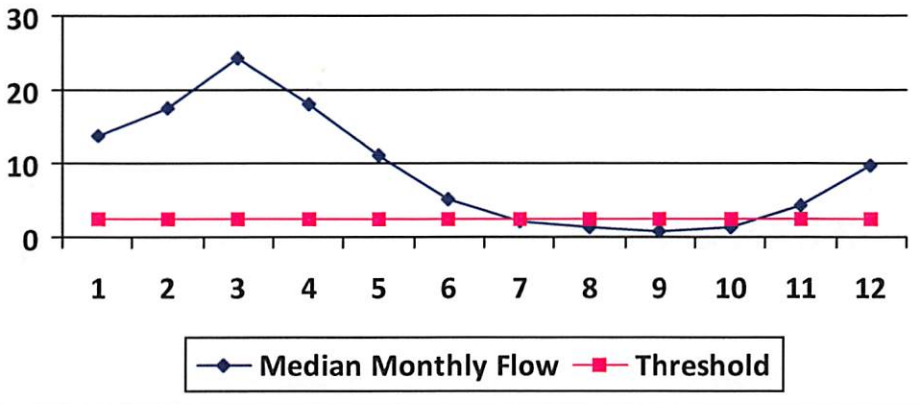
- [ ] Endangered Species?
- [x] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [ ] Regulated Stream?
- [ ] Proximate PSD?
- [ ] Gauged Stream?

Reference Gaug: 3112000 | WHEELING CREEK AT ELM GROVE, WV

Drainage Area (sq. mi.): 281.00 | Gauge Threshold (cfs): 38

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	13.81	10.62	3.55
2	17.62	10.62	7.36
3	24.44	10.62	14.18
4	18.14	10.62	7.88
5	11.06	10.62	0.80
6	5.03	10.62	-5.23
7	2.22	10.62	-8.03
8	1.30	10.62	-8.96
9	0.83	10.62	-9.43
10	1.37	10.62	-8.89
11	4.31	10.62	-5.95
12	9.77	10.62	-0.49

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	1.89
Upstream Demand (cfs):	3.34
Downstream Demand (cfs):	0.00
Pump rate (cfs):	4.46
Headwater Safety (cfs):	0.47
Ungauged Stream Safety (cfs):	0.47
Min. Gauge Reading (cfs):	**64.80**
Passby at Location (cfs):	**2.83**

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Water Management Plan:
Secondary Water Sources

WMP- 01656 | API/ID Number 047-051-01692 | Operator: Chesapeake Energy

Mark Edison MSH 8H - 837626

Important:

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

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

Purchased Water

Source ID: 30592 Source Name: Pennsylvania American Water / Public Water Provider

Source start date: 2/1/2014

Source end date: 2/1/2015

Source Lat: | Source Long: | County:

Max. Daily Purchase (gal): 720,000 | Total Volume from Source (gal): 6,000,000

DEP Comments: Please ensure that the sourcing of this water confirms to all rules and guidance provided by PA DEP.

WMP-01656 | API/ID Number 047-051-01692 | Operator: Chesapeake Energy

Mark Edison MSH 8H - 837626

Important:

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

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

Source ID: 30593 Source Name: Elite Gasfield Services, Midland Borough / Commercial Supplier

Source start date: 2/1/2014
Source end date: 2/1/2015

Source Lat: 40.644598 Source Long: -80.469382 County:

Max. Daily Purchase (gal): 8,640,000 Total Volume from Source (gal): 6,000,000

DEP Comments: Please ensure that the sourcing of this water confirms to all rules and guidance provided by PA DEP.

Recycled Frac Water

Source ID: 30595 Source Name: Various

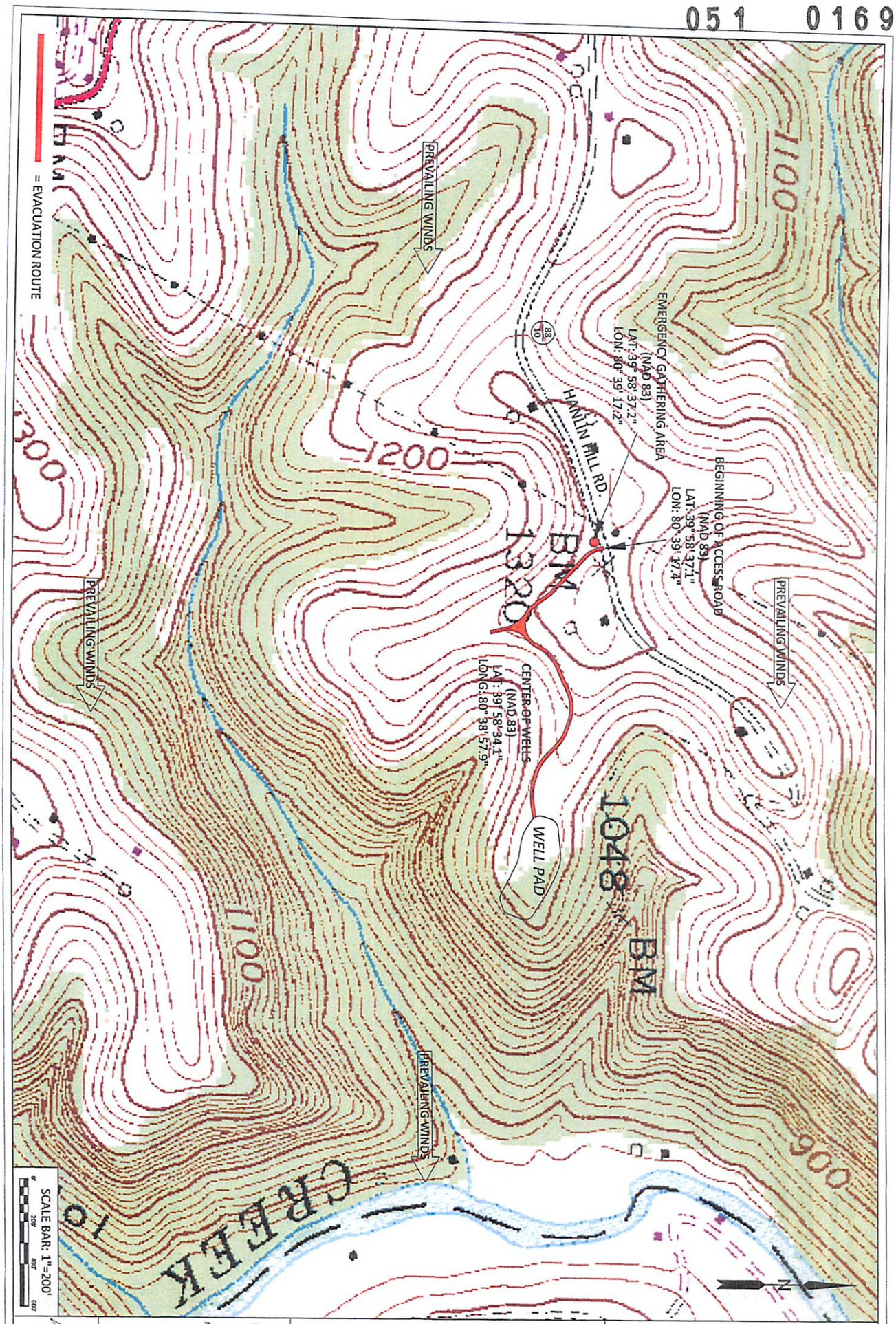
Source start date: 2/1/2014
Source end date: 2/1/2015

Source Lat: Source Long: County:

Max. Daily Purchase (gal): Total Volume from Source (gal): 6,000,000

DEP Comments: Sources include, but are not limited to, Van Aston MSH 5H

051 01692



DATE: SEPTEMBER 2013
MARK EDISON MSH PAD A
UNION DISTRICT, MARSHALL COUNTY, WV

EVACUATION ROUTE/PREVAILING WINDS

THIS DOCUMENT WAS PREPARED BY:
BOORD, BENCHEK AND ASSOC., INC.
FOR: CHESAPEAKE APPALACHIA, LLC.

BOORD, BENCHEK and ASSOC., INC.
Engineering, Surveying, Construction, and Mining Services
Southpointe, PA 15317 Phone: 724-746-1055

SHEET #3

21-2-01

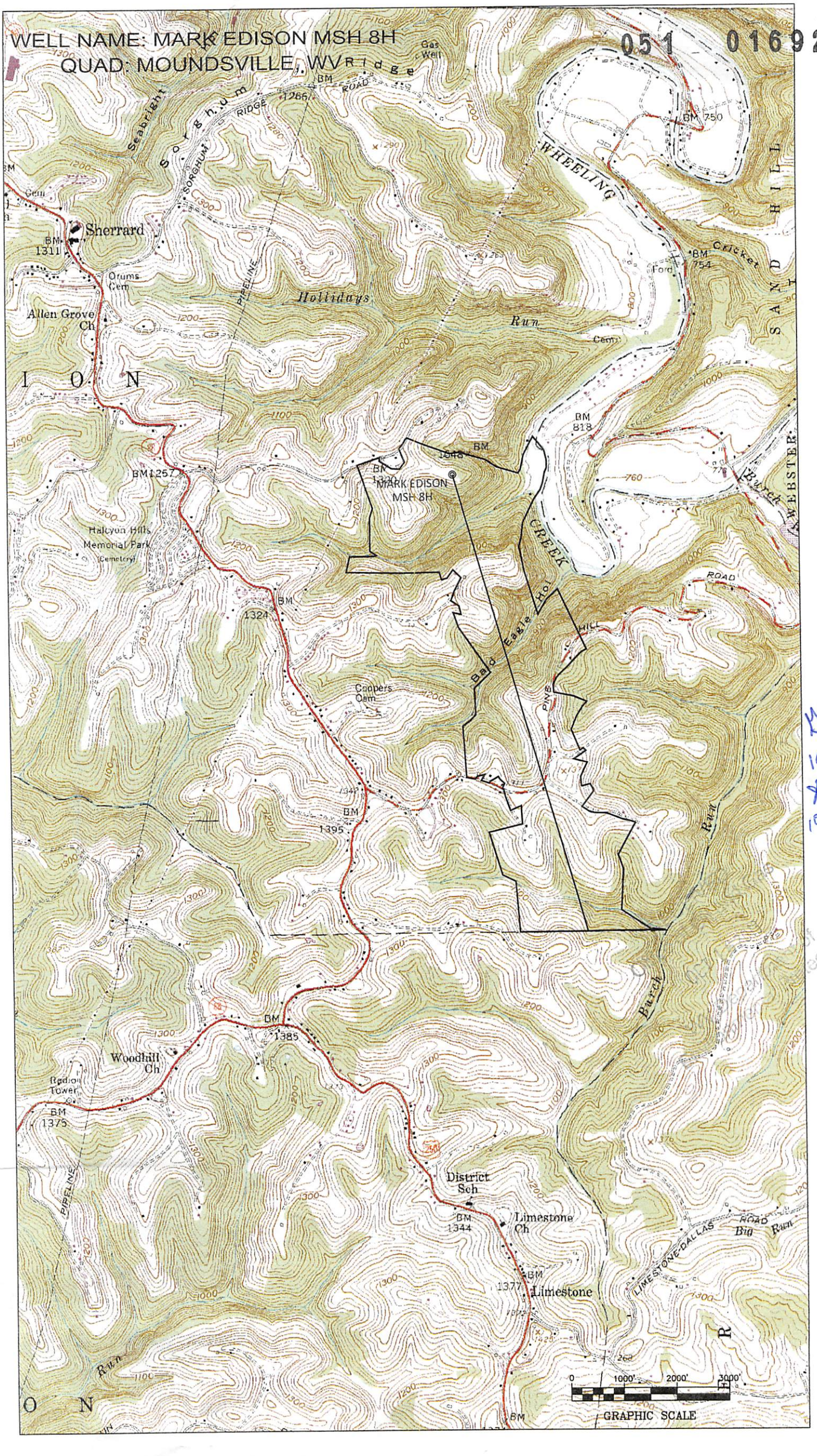
16-2-13

RECE
Office of O
OCT 1 6 2013
WV Department of

WELL NAME: MARK EDISON MSH 8H

QUAD: MOUNDSVILLE, WV

051 01692



UJK 10-2-13

JM 10-2-13

SURFACE HOLE DEC. LONG: 80.649871
SURVEYED LONG: 80° 38' 59.5"

6,980'

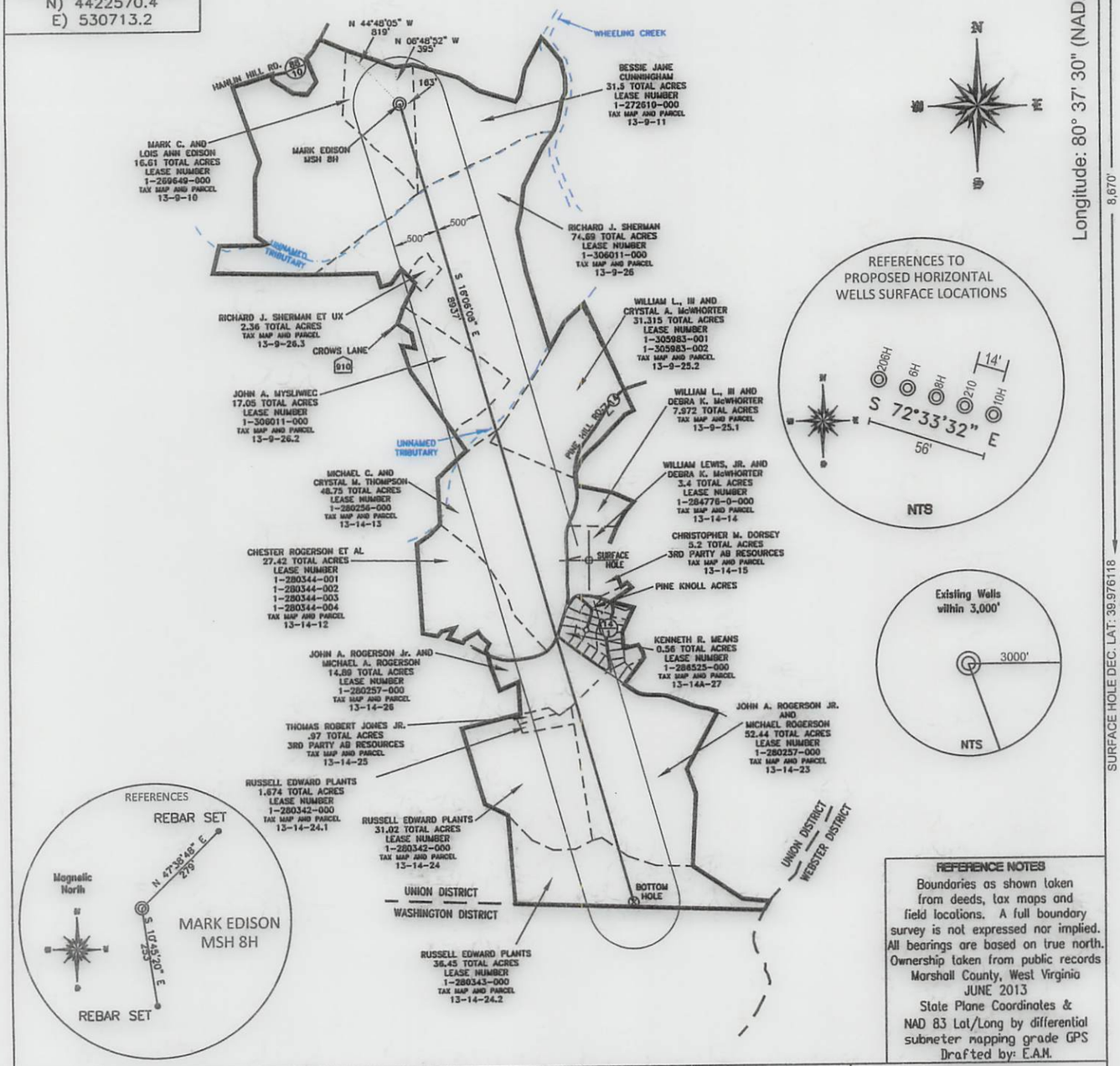
Latitude: 40° 00' 00" (NAD27)

Longitude: 80° 37' 30" (NAD27)

8,670'

SURFACE HOLE DEC. LAT: 39.976118
SURVEYED LAT: 39° 58' 34.0"

TOP HOLE (UTM NAD 83)
N) 4425173.6
E) 529914.3
BOTTOM HOLE (UTM NAD 83)
N) 4422570.4
E) 530713.2



REFERENCE NOTES

Boundaries as shown taken from deeds, tax maps and field locations. A full boundary survey is not expressed nor implied. All bearings are based on true north. Ownership taken from public records Marshall County, West Virginia JUNE 2013 State Plane Coordinates & NAD 83 Lat/Long by differential submeter mapping grade GPS Drafted by: E.A.M.

FILE #: CHE 116
DRAWING #: 2267
SCALE: PLAT - 1" = 1600' / TICK MARK - 1" = 2000'
MINIMUM DEGREE OF ACCURACY: 1/200
PROVEN SOURCE OF ELEVATION: SUBMETER MAPPING GRADE GPS

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

Signed: _____

L.L.S. #2124 : Ernest J. Benchek III

ERNEST J. BENCHEK III LICENSED No. 2124 STATE OF WEST VIRGINIA PROFESSIONAL SURVEYOR

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

WVDEP
OFFICE OF OIL & GAS
601 57TH STREET
CHARLESTON, WV 25304

DATE: AUGUST 21, 2013

OPERATOR'S WELL #: MARK EDISON MSH 8H

API WELL #: 47 (STATE) 51 (COUNTY) 01692H6A (PERMIT)

Well Type: ☐ Oil ☐ Waste Disposal ☐ Production ☐ Deep ☒ Gas ☐ Liquid Injection ☐ Storage ☒ Shallow

WATERSHED: WHEELING CREEK
ELEVATION: 1220'
COUNTY/DISTRICT: MARSHALL COUNTY / UNION DISTRICT
QUADRANGLE: MOUNDSVILLE, WV
SURFACE OWNER: MARK C. AND LOIS ANN EDISON
ACREAGE: 16.61 +/-
OIL & GAS ROYALTY OWNER: MARK C. AND LOIS ANN EDISON
ACREAGE: 323.695 +/-
LEASE NUMBERS:

DRILL ☒ CONVERT ☐ DRILL DEEPER ☐ REDRILL ☐ FRACTURE OR STIMULATE ☒
PLUG OFF FORMATION ☐ PERFORATE NEW FORMATION ☐ PLUG & ABANDON ☐
CLEAN OUT & REPLUG ☐ OTHER CHANGE ☐ (SPECIFY):

TARGET FORMATION: MARCELLUS
ESTIMATED DEPTH: TVD: 6,381' TMD: 15,113'
WELL OPERATOR: CHESAPEAKE APPALACHIA, LLC
DESIGNATED AGENT: ERIC GILLESPIE
ADDRESS: PO BOX 18496
ADDRESS: PO BOX 6070
CITY: OKLAHOMA CITY STATE: OK ZIP CODE: 73154-0496
CITY: CHARLESTON STATE: WV ZIP CODE: 25301