OOG Public Hearing Sign-In Sheet

Proposed Revisions to 35CSR8, 2016
July 23, 2015, 6 p.m., DEP headquarters

The Department of Environmental Protection asks for the information below so that agency staff may provide responses and information about decisions to you. The information you voluntarily provide on this sheet becomes part of the public record related to this topic and may be released, if requested, under the Freedom of Information Act.

Name (please print)	Address	Organization	Phone/Fax	E-mail	Comment Yes/No
Josh Roberts	P.O. Box 6070, Charleston, 25362	Chesapeake	304-353-5136	Josh.Roberts@chk.com	No
ROGER VARNER	8050 ROWAN RD, CRANBERRY PA 16066	LARSON DESIGN GROUP	724-650-8756	rvarner@larsondesigngroup.com	NO
Mark D. Clark	P.O. Box 273 Charleston	Spilman Thomas & Battle	304 3403876	mclark@spilmanlaw.com	
Dave Yaussy	5301 Virginia Ave Chas	Spilman	304 552 6657	dyaussy@spilmanlaw.com	No
(Connie Lewis) Connie Lewis	PO Box 1007 Charleston 25324	WV Council	304-543-5811	conniglecad.com	YES
M. Mc	1624 Kenwood Rd Charleston WV 25314	w			YES
Armando Beninasa	PO Box 1588 Charleston WV 25326	Steptoe & Johnson	304 353-8147	armando.beninasa@steptoe-johnson.com	NO
BRETT LOFLIN	707 VA. ST. E CHAS, WV 25301	NNE	3044147063	bloflin@me-llc.com	No/ WRITTEN
Ashlie Steele	1615 Wynkoop St. Denver CO 80212	Antero Resources	303-357-7310	asteele@anteroresources.com	NO
Andrew Wood	1615 Wynkoop St Denver	Antero	303-357-7310	awood@anteroresources.com	NO
Ken Ward JR	1001 VA St Chas 25301	Gazette	348-1707	KWard@wvgazette.com	NO

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Name (please print)	Address	Organization	Phone/Fax	E-mail	Comment Yes/No
Diane Carwin		Stone			
Roger Cutwright		Stone			

BEFORE THE DEPARTMENT OF ENVIRONMENTAL PROTECTION

IN RE:

OIL AND GAS PUBLIC
HEARING ON 35CSR8

HELD JULY 23, 2015

6:00 P.M.

Donna H. Miller
Court Reporter

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A P P E A R A N C E S

ON BEHALF OF THE DEP:

KELLEY GILLENWATER
Public Information Office

JAMES MARTIN

JASON HARMON

P R O C E E D I N G S

MS. GILLENWATER: Welcome to DEP. I'm Kelley Gillenwater with the West Virginia Department of Environmental Protection's Public Information Office. I would like to welcome you to tonight's public hearing on the Office of Oil and Gas proposed revisions to Legislative Rule 35CSR8, Rules Governing Horizontal Well Development, which is to go before the Legislature in 2016.

Also here tonight from the DEP are James Martin and Jason Harmon, from the Office of Oil and Gas.

The purpose of tonight's hearing is to give you the opportunity to share your comments with the DEP about the proposed rule changes.

This hearings is being recorded by a court reporter so that the comments shared can be part of the public rulemaking record.

To ensure that we successfully achieve the purpose of this hearing, we ask that everyone be respectful and considerate by refraining from interrupting others while they are speaking and also keeping your comments on topic so that our time together is used efficiently.

We only have two speakers signed up tonight, but I will give everyone the opportunity if you have changed your mind after hearing other comments, if you want to come up at the end.

So when I call you up, if you can state your name and state if you are representing any groups or organizations.

Also, if you have written comments that you would like to submit in addition to or in lieu of your spoken comments, please hand them to me after you speak or at the conclusion of the hearing, and we already have had one set of comments turned in, so thank you for that.

MR. MCMAHON: Is the deadline not next Monday.

MS. GILLENWATER: July 27th, we will be taking public comments up until that point. So, if there are no questions about the format, we'll go ahead and start with our first speaker, which is Connie Lewis, is that correct? Connie, do you want the microphone? I tend to project, but if you would rather speak into the microphone, I can get it.

MS. LEWIS: I didn't have a microphone the other night. I'm fine. I'm Connie Graytop Lewis.

I'm with the West Virginia Environmental Council, and basically, we want to say that we generally support the proposed rule changes to the horizontal well drilling rules. We only wish it had been done three years ago.

We especially appreciate that DEP is addressing the deficiencies in the existing rule as regards drilling, the testing of water wells, the protection of water from excessive withdrawals, efforts to control future migrations and the plugging language.

We think it's a great step forward, and that's all we have.

MS. GILLENWATER: Thank you very much, Connie. Okay, next up, we have David McMahon. David, the same goes for you if you want the microphone on.

MR. McMAHON: I don't want all these people in the audience to hear me.

My name is David McMahon. I'm an attorney and a co-founder of the West Virginia Surface Owners Rights Organization.

I want to apologize first that we don't have our written comments already prepared to hand

in.

MS. GILLENWATER: That's fine.

MR. McMAHON: I have been out of the country and my cohort has been ill, but we will have extensive written comments that we will get to you by Monday.

Our first comment is that when the horizontal well act passed, the water protections for surface owners were deferred until studies were done, and the DEP followed through and had studies done by the WVU Health Department, the Health Sciences Division of the University's educational system, and they recommended that there were a number of problems, the example I always use is noise, and does that statute empower the DEP to do rules to ameliorate those problems, take care of those problems? The DEP didn't do rules and merely suggested that the Legislature might want to change the setback distance from the limit of disturbance -- from the center of the well pad to the limit of disturbance, which is something we thought should have been done, but there were lots of other things we thought that the DEP should have done to protect people from noise. For example, placing sensors at

people's homes near well pads with standards that would protect their health and their hearing and their sleep, and require drillers if they were exceeding those, to take steps to mitigate those things.

Unfortunately, those rules were not done then. What I suggested then, there are still none of these rules, and that is probably one of our biggest points as surface owners. Those changes still need done.

There are some things in this rule that we do applaud. The closed loop system. Most companies are doing it anyway. It is an important thing. The pits have been a problem. I do note that there might be a technical flaw in that eliminating the ability for companies to do -- drilling pits. They took out the inspection requirements that may be applicable to pits that already exist, and that should be fixed.

We applaud the monitoring for potential conduits for unintended fractured propagation. Looking at the surrounding wells to make sure that there's no pressure there, et cetera. We figure it probably it should be more mandatory than it is. It

shouldn't be optional.

We have always advocated that after the drilling, and after the cementing of the surface casing, that there should be a bonding law done to make sure that the surface casing actually adhered to the rock and will protect from problems further down.

We applaud that the rule includes a formation integrity test. We think it should be all the time, not just when the DEP requests it, and we think it should be a bond law and not a formation integrity test, but we do applaud that at least that much is in there.

The pad berm requirement is another example of most companies are now lining their pads and putting berms around for most pollution that did occur. There were some spills on the pad and soaked down into the ground water. So we applaud that. It's kind of what the industry does in most cases, but we applaud that everyone will be required to do that.

I would mention that when we commented on the previous rules there were things we wanted done, and again, some of those were not included,

and our written comments will suggest that those still need to be done.

When a surface owner gets the notice of the hearing, it's this inch or two thick thing of materials. Buried somewhere in there is the notice to surface owners. If they knew there was one in there, they'd have trouble finding it. I have trouble finding it when I looked at them. We think that when the printed application is given to someone, the top page should be a table of contents or even just a checklist that the DEP does on what has to be in there so they will know what to look for.

There should be more notification to surface owners. Clearly the most important -- pollution is most likely to occur, but when a problem is most likely to occur is if the surface casing is not cemented to the surface, the cement does not mature, and if the driller has not waited an appropriate period of time for the cement to harden, and for that reason, the rules require the driller to notify the DEP when the surface cementing is about to occur so they have the opportunity at least to be there to be sure the cement hardens, and

to be sure that they wait the appropriate period of time. If the driller can make a phone call to the inspector, if the driller can make a phone call to the surface owner, if he's requested it, if she's requested it, and say this is going on now. You might want to know that. Yes, we would. The same thing with the cement job.

Those are the kinds of things that we will talk about in our written comments. Generally, we think that there are some changes that are good, and generally, we think that they should go further.

Thank you very much.

MS. GILLENWATER: Thank you, David. If you two wouldn't mind signing in, and actually we just concluded with our second speaker. Would either of you like to speak?

UNIDENTIFIED SPEAKER: We don't plan to speak.

MS. GILLENWATER: All right. Is there anybody else who did not sign up to speak that would like to do so now?

I'm sorry about the rotten timing for our few newcomers, but this concludes the speaking portion of our public hearing this evening. If you

have written comments that you would like to share, we'll still take those comments through 5:00 p.m. on July 27th. You can mail them to DEP, Office of Oil and Gas, Attention Jason Harmon, or you can email them to dep.comments@wv.gov. If you need the specific DEP address, just let me know and I'll supply that for you.

This concludes the public hearing on the West Virginia DEP's proposed revisions to Legislative Rule 35CSR8, Rules Governing Horizontal Well Development. The agency again will accept written comments through 5:00 p.m. on July 27th.

Thank you for coming and participating in the process. Have a nice evening and a safe trip home.

* * * *

CONCLUDED AT 6:15 P.M.

* * * *

REPORTER'S CERTIFICATE

STATE OF WEST VIRGINIA,

COUNTY OF KANAWHA, to wit:

I, Donna H. Miller, Notary Public in and for the State of West Virginia, duly commissioned and qualified, do hereby certify that the foregoing was duly taken by and before me, under the West Virginia Rules of Civil Procedure, at the time and place and for the purpose specified in the caption thereof.

I do certify that the said hearing was correctly taken by me by means of the Stenomask; that the same was transcribed by me, and that the said transcript is a true record of proceedings had.

I further certify that I am not connected by blood or marriage with any of the parties to this action, am not a relative or employee or attorney or counsel of any of the parties, nor am I a relative or employee of such attorney or counsel, or financially interested in the action, or interested, directly or indirectly, in the matter in controversy.

Given under my hand this 27th day of July, 2015.

Donna H. Miller
Notary Public

OFFICIAL SEAL
Notary Public, State Of West Virginia
DONNA H MILLER
1439 Dog Fork Rd
Kenna, WV 25248
My Commission Expires October 1, 2023

My commission expires October 1, 2023.

OFFICE OF OIL AND GAS RESPONSE TO DRAFT 35CSR8 COMMENTS

Table of Contents

West Virginia Rivers Coalition and WVSORO

§35- 8 -5.6.b.6. and 5.6.d. Water Management Plans: Aquifer testing and use of aquifer test data to evaluate appropriateness of water withdrawal rates.

We support the requirement that water management plans include an aquifer test to demonstrate the feasibility of using a water supply well for groundwater withdrawals. We also support the agency's review and use of the aquifer test data to evaluate the appropriateness of water withdrawal rates and maintain minimum stream flow.

§35- 8 -9.1.a.4. and 9.1.a.5 Water supply wells: Aquifer test and drinking water well testing.

In addition to registering the wells, we support and appreciate the proposed requirement to conduct a detailed aquifer test to ensure that groundwater resources are adequate and that proposed withdrawals from water supply wells will not adversely impact water resources. However, section 9.1.a.4. of the rule uses the phrase "without significant adverse impact." This suggests that some adverse impacts to water resources are acceptable. Our position is that efforts should be made to avoid any adverse impacts.

We also strongly support the requirement that all drinking water wells within 1,500 feet of a water supply well be flow and quality tested by the operator upon request of the drinking well owner and the specifications for how the flow test will be conducted. In the first sentence of section 9.1.a.5. there appears to be a stay "or" after "All drinking water wells." Was it the intention to also include developed springs? If so, we would support this addition to the rule.

We have some additional comments and questions regarding how a drinking well owner would know to request the testing, as there is no requirement in statute or rule that they be notified about the drilling of the supply well (see comments on §35- 8 -15.1. and 15.2 below.)

§35- 8 -15. Water Supply Testing.

We strongly support the requirement that all drinking water wells within 1,500 feet of a water supply well be flow and quality tested by the operator upon request of the drinking well owner. However, the way that this section is written and organized, it is not clear how a drinking well owner would receive notice and know to request the testing, as the notice section (15.2) only refers back to subsection 15.1.a. which pertains to water wells or developed springs located within 1,500 feet from the center of a proposed well pad and discusses methods to providing notice to occupied dwellings or other locations located within 1,500 feet of the center of the pad.. Additionally, it seems that some provisions similar to subsections 15.1.b. through 15.1.d. should be applied to require flow and quality testing of water wells located within 1,500 feet of a water supply well, in the event that no request is made of the operator pursuant to subsection 15.1.e.

§35- 8 -15.1. Water supply testing.

Testing and presumption of liability should include possible pollution from the lateral/horizontal legs of the well bore, which can go 3,000, 5,000 or even 10,000 feet horizontally past thousands of old wells that need to be plugged, and others that are still producing, all with uncemented annuli between the bottom of the surface/intermediate well casing and the formation cement job.

The distance from the horizontal legs is an issue, as the new sections and provisions establishing an area of review (5.11) and requiring monitoring of potential conduits for unintended fracture propagation (9.4) indicate. It is irresponsible not to do this where there are other gas well boreholes that penetrate the target formation, particularly if the annuli are not cemented through the formation.

The rule should require water supply testing (and the presumption of liability should apply) within the area of review. Most horizontal legs are spaced 500 feet apart parallel to each other. So the fractures extend at least 250 feet or maybe more. At a minimum, the rule should require testing (and the presumption of liability should apply) within 500 feet of a horizontal well bore or within the projected length of the fractures, whichever is greater.

Office of Oil and Gas Response:
The Office of Oil and Gas acknowledges the comment supporting aquifer tests as part of water management plan review.

WVRC and WVSORO provide comment requesting the incorporation of developed springs into the rule governing water supply testing. Additional comments request the expansion of the water well testing radius to include the entire area of review, as defined in Section 5.11. W. Va. Code § 22-6A-8(g)(5)(D) explicitly requires the agency to propose legislative rules to identify appropriate methods for testing water flow and quality to any drinking water well owner within 1,500 feet of the water supply well.

WVRC, SORO, WVONGA and CONSOL request modification to the definition of "adverse impacts" in Section 9.1.a.4. Specifically, the language that describes the need to ensure the presence of adequate resources without "significant adverse impacts." Comments received state that the inclusion of the word "significant" is inappropriate. The Office of Oil and Gas agrees and has removed the word. Additionally, comments were received to limit the "lowering of groundwater or stream flow levels" as an adverse impact to cases where such lowering is injurious to any existing or potential uses. The Office of Oil and Gas agrees and has adjusted the definition accordingly.

WVRC and SORO also comment that the draft language related to mandated flow testing of drinking water wells upon owner request neglects to include a requirement for notification. The Office of Oil and Gas agrees and has included language instructing the operator to file notice with qualifying landowners to provide an opportunity for request of drinking water well flow and/or quality testing.

George Monk

35CSR8-9 Operational Criteria

9.1.a.4 The water well supply requirements in 35CSR8 are excellent.

Office of Oil and Gas Response:
The Office of Oil and Gas acknowledges the comment.

IOGA

5. Groundwater supply well aquifer and hydrogeologic delineation and drawdown testing requirements discriminate against oil and gas operators and are unduly burdensome and costly

The Proposed Amendments to §§ 9.1.a.4. and 9.1.a.5. contain extensive and expensive requirements that exceed the value of developing a water supply well, thereby effectively prohibiting the use of water supply wells in the development of horizontal wells pursuant to the Horizontal Well Control Act. These extensive requirements are limited to water supply wells under the Horizontal Well Control Act which constitutes an unreasonable burden on the oil and gas well operators. IOGA requests that the Proposed Amendments to §§ 9.1.a.4 and 9.1.a.5 be deleted and incorporated into a legislative rule applicable to all water supply wells developed for commercial use.

Office of Oil and Gas Response:
IOGA comments that the proposed aquifer test discriminates against oil and gas operators and are unduly burdensome and costly. They further suggest that the proposed details from Sections 9.1.a.4. and 9.1.a.5 be removed and incorporated into a rule covering water supply wells for all commercial uses. The Office of Oil and Gas contends that the drinking water well testing rules (Section 9.1.a.5) are a legislative mandate and therefore must be included in this rule. Also note that the details of the aquifer test (Section 9.1.a.4.) were modeled after requirements established by the Susquehanna River Basin Commission and reviewed by experts in the field of high-volume groundwater supply well installation. The Office of Oil and Gas feels that due to the complex and fragmented aquifer system in the state, this approach is necessary for the creation of viable groundwater wells.

WVONGA

9. Groundwater Withdrawals [§§ 9.1.a.4, 9.1.a.5]

The Proposed Rule would impose significant new requirements relating to groundwater withdrawals, including aquifer tests and hydrogeologic delineation. WVONGA believes that these extensive—and costly—requirements are not justified, as there have been no incidents of adverse impacts to groundwater as a result of its use by industry for water supply purposes. While WVONGA would encourage the deletion of these requirements in their entirety as unnecessary, to the extent that they are retained WVONGA is concerned by the final sentence of Section 9.1.a.4, which suggests that any "lowering of groundwater or stream flow levels" should be considered "adverse impacts, for the purpose of water supply well suitability consideration." At a minimum, this language should be modified to include a qualifier that would exclude minor, natural fluctuations or lowering in groundwater levels from qualifying as an "adverse impact." WVONGA suggests the following language as an alternative: "lowering of groundwater or stream flow levels to an extent that may be injurious to any existing or potential uses."

11. Water Supply Testing [§ 15.1.e]

The Proposed Rule would add a new subsection stating that "[i]n accordance with W. Va. Code § 22-6A-8(g)(5)(D), owners of drinking water wells located within [1500] feet of a water supply well used to support activities permitted under this article may request well flow and quality testing." § 15.1.e. For consistency with the referenced provision of the Horizontal Well Act, WVONGA suggests inserting the phrase "prior to operating the water supply well" at the end of this subsection.

Office of Oil and Gas Response:

WVONGA comments state these proposed revisions are unnecessary as there have been no incidents of adverse impacts to groundwater as a result of groundwater supply wells. It is true that there have been no documented cases of water deprivation due to groundwater supply well use, but that is owed largely to the fact that groundwater supply wells are seldom used in this state, and those existing wells that exist are primarily drilled into the alluvium deposits underlying major river systems. The reason for the lack of abundance of groundwater supply wells is that the aquifers of this state are typically localized and do not have high capacity necessary to support oil and gas operations. That said, The Office of Oil and Gas does support the use of groundwater as a supply where feasible, and the proposed amendments will ensure that

it can be done in a reliable manner that does not adversely impact the citizens who rely on that resource.

WVONGA's comments regarding modification of the definition of adverse impacts in Section 9.1.a.4. have been addressed in SORO's comment responses.

The Office of Oil and Gas agrees with WVONGA's request to append the phrase "prior to operating the water supply well" to the end of Section 15.1.e. for consistency with the statute.

Northeast Natural Energy

Section 9.1.a.4 – 5. Groundwater supply well aquifer and hydrogeological delineation and drawdown testing requirements, along with minimum of one groundwater monitoring station, most likely renders use of groundwater well supply sources uneconomic and, thus, useless.

Office of Oil and Gas Response:

NNE comments that the requirements set forth in Sections 9.1.a.4-5 likely render groundwater supply wells uneconomic and useless. The Office of Oil and Gas contends that it is not the intent of the draft regulations to add cost to an already expensive process. Rather The Office of Oil and Gas's aim is to establish a framework to determine a sustainable withdrawal rate for groundwater supply wells while ensuring the protection of downstream users' riparian rights.

Noble

7. **Sections 9.1.a.4 through 9.1.a.5 of the Proposed Rule dealing with water quality and quantity. Noble supports the following position of the IOGA regarding Sections 9.1.a.4 and 9.1.a.5:**

   "The Proposed Amendments to § 9.1.a.4. and § 9.1.a.5. contain extensive and expensive requirements that exceed the value of developing a water supply well, thereby effectively prohibiting the use of water supply wells in the development of horizontal wells pursuant to the Horizontal Well Control Act. These extensive requirements are limited to water supply wells under the Horizontal Well Control Act which constitutes an unreasonable burden on the oil and gas well operators. IOGA requests that the Proposed Amendments to § 9.1.a.4 and § 9.1.a.5 be deleted and incorporated into a legislative rule applicable to all water supply wells developed for commercial use."

16. **Section 15.1.e states that, "[i]n accordance with W. Va. Code § 22-6A-8(g)(5)(D), owners of drinking water wells located within one thousand five hundred (1,500) feet of a water supply well used to support activities permitted under this article may request well flow and quality testing."**

    Noble believes that the requirement to provide flow testing upon request is excessive, could be costly for sites where there are a lot of residents within 1,500 feet, and provides little value to the residential owner of the well. Noble suggests that this requirement be removed or revised to state that flow testing will be required for a well within 1,500 feet upon request of the department. Noble believes that having WVDEP involvement will minimize homeowners requesting flow testing simply because it is available.

Office of Oil and Gas Response:
Noble's agreement with IOGA's provided comment is addressed under the IOGA response above.

Noble states that the requirement to provide flow testing upon request of the owner is excessive and provides little value to the residential owner of the well. The proposed rules in Section 9.1.a.5. are statutory mandates. W. Va. Code § 22-6A-8(g)(5)(D) explicitly requires the agency to propose legislative rules to identify appropriate methods for testing water flow and quality to any drinking water well owner. Further, the Office of Oil and Gas would argue that the inherent value of this evaluation to the residential owner is a baseline upon which to determine if the operation of the water supply well has impacted their riparian right to groundwater.

American Energy Appalachia

4) The regulations fail to set forth the standards by which the WVDEP will make the determination establishing the minimum flow requirement that must be maintained from a groundwater withdrawal location.

Proposed Amended Rule 35-8-5.6.d. requires maintenance of a minimum stream flow requirements but fails to identify how the Department will make the determination regarding stream a minimum stream flow requirement that must be maintained from a groundwater withdrawal location. It is suggested that language or guidance be provided on this justification.

9) The proposed groundwater testing requirements stray well beyond the bounds of reasonable interpretation for the protection of the water resource and fail to consider cost.

WVDEP should eliminate the proposed amendments to 35-8-9.1.a.4. through 35-8.9.1.b.2. The rule is a change in the common law reasonable use doctrine for groundwater and inconsistent with existing state policy on water use. The West Virginia Water Resources Protection and Management Act regards the use of water by the oil and gas industry as a "beneficial use." W. Va. Code § 22-26-2(b). This rule makes the West Virginia Department of Environmental Protection (WVDEP) the arbiter of reasonable use of the resource; however, it fails to take into account the existing state policy supporting the beneficial use of water by the oil and gas industry. To AEA's knowledge, there are no incidents of groundwater levels being endangered because of use by industry and there is no documented need for this regulation.

The proposed requirements are overly broad and a comparison with oil and gas regulations in Oklahoma, Pennsylvania and Texas do not identify this type of requirement for oil and gas permitting in any of those states. This regulation is emblematic of the requirements that place West Virginia at a competitive disadvantage.

Current regulations for the installation of a groundwater source used as a public water supply requires a West Virginia certified well driller (CWD) involved in the drilling and testing aspects of the water supply. This section needs better definition, as the CWD needs to be involved, but this section implies that a qualified hydrogeologist would be needed to oversee and review the drilling and testing data from the proposed groundwater source. Additionally, this regulation attempts to apply a detailed, highly technical hydrogeologic investigation to all hydrogeologic settings that can be encountered in the Appalachian basin. It is beyond the ability of any such investigation described in these regulations to define all potential hydrologic consequences prior to drilling of a well, with any type of reasonable cost. This regulation is applying a very specialized hydrogeologic investigation to every horizontal well location with a groundwater well or developed spring within 1,500 feet of the proposed well.

AEA offers the following specific comments to the groundwater testing subsections.

a) Proposed rule 35-8-9.1.a.4.C. references a minimum of a 72-hour constant rate drawdown test. Current regulations for the completion of aquifer testing of public water supplies in West Virginia only requires 24 hours as a minimum standard. It is arbitrary and capricious for the agency to hold the oil and gas industry to a higher standard. AEA recognizes that the Susquehanna River Basin Commission (SRBC) utilizes the 72-hour minimum standard for constant rate tests. However, if appropriate water table stabilization occurs in the 24-hour timeframe, the additional 48 hours of pumping is unnecessary.

b) AEA urges the agency to clarify the definition of "monitoring station" for the aquifer testing procedures (see 35-8-9.1.a.4.E.) AEA proposes that existing water supplies be considered as a "monitoring station."

c) Proposed amended rule 35-8-9.1.a.5. states that the operator shall complete flow and quality testing of drinking water wells within 1500 feet of the proposed groundwater source. AEA suggests this section include springs as well. AEA urges the agency to clarify what the Department would deem as adequate testing procedures for quantity and quality in this section. Further technical guidance from the Department rather than

details in the regulations is needed to clarify the necessary steps. These steps generally go beyond what is required from the testing procedures outlined for permitting a public water supply well.

d) AEA recognizes the value in collecting the technical details of the drinking water supply of a homeowner as part of the requirements, it is likely that most homeowners will not be capable of providing the details illustrated in 35-8-9.1.a.5.B.1 and 2. If the Department requires the operator to make intrusive attempts to gain this information, this could create relationship issues with the property owner.

e) Rather than having these details in the proposed regulation Sections 35-8-9.1.a.5.D. through Sections 35-8-9.1.a.5.G., it is suggested that a technical guidance document (TGD) be issued to detail the procedures to be followed and any necessary adjustment that can be made as part of this procedure. The TGD also needs to outline testing procedures for drinking water springs as well. This TGD will allow for further clarification of the expected process and keep confusing technical language out of the regulation. In addition to this suggestion, there are generally numerous concerns of low yielding domestic water supplies. With the procedures stated as written, the operator is exposed to the possibility of pumping a water supply well dry, potentially causing damage to the well pumping equipment or the well itself. This consideration needs to be given as part of the technical language in this regulation.

Office of Oil and Gas Response:
AEA requests clarification on when a groundwater well may be provided a minimum streamflow requirement in an approved Water Management Plan. Groundwater and surface water are inherently related. In fact, the threshold basis used in the approval of surface water sources in Water Management Plans is the point at which steam flow consists of only groundwater discharge. Some groundwater supply wells are clearly influenced by surface water. It is in these cases that streamflow minimums are appropriate.

AEA and Antero have provided comments on these topics that assert that the proposed amendments change common law doctrine, fail to take into account beneficial use of water, and attempt to establish the Office of Oil and Gas as the "arbiter" of reasonable use. These comments are incorrect. As background, West Virginia is a common law riparian state which has adopted the "reasonable use" doctrine granting each riparian landowner on a given watercourse an equal and correlative right to a reasonable consumptive use of the natural flow. A riparian landowner may make such reasonable, consumptive use provided that the use does not materially diminish the same rights of the downstream riparian landowners or impair certain public rights. The proposed aquifer testing program for groundwater supply wells detailed in Section 9.1.a.4. (and that well's eventual incorporation into an approved water management plan) in no way constitutes a change in that common law doctrine. The output of the proposed analysis is a scientifically determined pump rate that will provide sustainable access to groundwater without impacting other users. Despite the assertions made by Antero, the Office of Oil and Gas is making no attempt to regulate quantity of groundwater withdrawn. The only limitation to groundwater access would be the point at which other users would be detrimentally

impacted. The Office of Oil and Gas maintains that this approach reinforces the state's policy on water use.

AEA further stated that "this regulation is emblematic of the requirements that place West Virginia at a competitive disadvantage." To support this case, references are made to a lack of similar regulatory oversight in Oklahoma, Texas and Pennsylvania. The Office of Oil and Gas would inform the commenter that we are actively involved in the regulatory community. We frequently visit with and discuss issues with other states, particularly those in the Appalachian basin. With specific regard to the commenter's claim, the proposed aquifer test is modeled after the requirements created by the Susquehanna River Basin Commission, which also forms the basis used by PADEP in approving groundwater supply wells for this industry.

AEA also states that these regulations exceed the requirements for installation of groundwater sources used as public water supplies. As stated in a previous comment, the Office of Oil and Gas consulted with experts in the field of high-volume groundwater supply well installation during the development of the draft amendments. AEA further states that this regulation is applying a very specialized hydrogeologic investigation to every horizontal well location with a groundwater well within 1,500 feet of a proposed groundwater supply well. It appears as though the commenter is referencing Section 9.1.a.5. and the testing of drinking water supply wells. The Office of Oil and Gas maintains that the specific details of the testing procedure are not unduly onerous or burdensome on the operator. In essence the proposed methods include a site description, a step-rate drawdown test, and a recharge analysis. The Office of Oil and Gas even offers the flexibility to modify the procedure if specific conditions necessitate such changes.

AEA comments on specific technical details related to groundwater testing include a challenge a perceived minimum 72-hour constant rate drawdown test defined in Section 9.1.a.4.C. In that section, the Office of Oil and Gas clearly states that 72 hours is a recommendation and that the actual duration need only be of sufficient duration to establish hydrologic changes and trend characteristics. AEA further proposes that existing water supplies, which the Office of Oil and Gas interprets to mean existing drinking water wells, be considered as suitable monitoring stations for purposes of satisfying Section 9.1.a.4.E. The Office of Oil and Gas agrees that this would be permissible. AEA comments that the Office of Oil and Gas needs to clarify what procedures would be adequate to determine quantity and quality in Section 9.1.a.5. The Office of Oil and Gas contends that the entirety of that section addresses that issue. AEA mentions that homeowners may not be able to provide the extensive detail mentioned in Sections 9.1.a.5.B.1-2. The Office of Oil and Gas would call attention to the language in those sections that expressly asks for "known characteristics." There is no expectation or desire for an operator to make "intrusive attempts" to gain this information. AEA discusses the possibility of damaging a drinking water well owner's well due to excessive pumping during this analysis. The Office of Oil and Gas has anticipated that and provided in Section 9.1.a.5.D. a statement that any testing procedure may be modified as necessary to minimize impact to the well. Lastly, AEA requests that all technical details be withdrawn from the draft rule and incorporated into a technical guidance document. The Office of Oil and Gas feels that the creation of such a document is unnecessary.

Antero

8. Groundwater Withdrawals. 35 CSR, Series 8-9.1.a.4 through 9.1.b.2.

WVDEP should eliminate the proposed amendments to 35 CSR, Series 8-9.1.a.4. through 9.1.b.2. The rule proposes a significant regulatory regime to address and regulate the use of groundwater by the oil and gas industry. The rule further makes the WVDEP the arbiter of what are the reasonable uses of groundwater and places the agency in a position to make policy decisions, which clearly do not fall within the expertise of the agency. The rule as structured is evidence that these provisions are ill conceived. Specifically, the West Virginia Water Resources Protection and Management Act regards the use of water by the oil and gas industry as a "beneficial use." W. Va. Code § 22-26-2(b).

Most importantly, Antero is unaware of a factual basis supporting the need to promulgate such prescription regulations over the quantity of groundwater withdrawn. Prior to such amendments, the agency should demonstrate a nexus between oil and gas operations and the loss in the quantity of groundwater.

Finally, the rule does not address whether in fact it is the purpose of the rule to amend and supersede existing common law rights and remedies available to private parties which have been well-established for generations regarding the reasonable uses of groundwater in matters involving the use of such resources by the oil and gas industry and has undoubtedly not considered what potential impacts these changes may have to contractual rights which may be impacted.

12. Water Supply Testing. 35 CSR, Series 8-15.1.

Antero maintains a series of separate comments related to this specific section:

A. The proposed rule at 35 CSR, Series 8.15.1.a through 15.1.d, contains inconsistent terminology regarding the use of the terms "springs" and "developed springs". It is assumed that all references to springs in this context should be to "developed springs" and Antero urges the agency to modify the rule accordingly.

B. The proposed rule at 35 CSR, Series 8.15.1.e. authorizes owners of drinking water wells to request well flow and water quality testing. Antero questions how to validate the baseline performance of the existing drinking water well absent historical information regarding the well. If no such information exists, the data developed by the regulated entity is of little if any value. Antero would propose that this provision is either premature and should be removed or that such baseline testing be limited to those issues for which existing and qualified historical data exists.

Office of Oil and Gas Response:
Antero's comments on common law doctrine, beneficial use and reasonable use have been addressed in the AEA comment section.

The Office of Oil and Gas appreciates Antero's request to resolve terminology discrepancies in Sections 15.1.a-d, however, the comment involves language (or a concept) that is beyond the scope of the proposed revisions and, therefore, requires no response.

Antero comments regarding lack of value in providing water flow and quality testing to drinking water well owners has been addressed in the Noble response section.

CONSOL

9.1.a.4. Registering all Water Supply Wells

CONSOL would suggest the Department amend the language "Adverse impacts, for the purpose of water supply well suitability considerations, shall include: lowering of groundwater or stream flow levels" to read as follows.

- **"Adverse impacts, for the purpose of water supply well suitability considerations, shall include: lowering of groundwater or decrease in stream flow levels such that adequate pass-by flow is not obtained".**
- **Pumping a groundwater well will induce the lowering of groundwater, creating a cone of depression in the water table. A groundwater well cannot be utilized without, at least temporarily and locally, lowering the groundwater level. Therefore, this part of the rule would effectively prohibit the use of any groundwater well. This is likely an unintended consequence that could be avoided by the proposed language above.**

Most groundwater wells partially source water from or capture water prior to discharge to a surface water body. As with surface water withdrawals, adverse effects are prevented if adequate pass-by flow is maintained while water is withdrawn. Therefore, groundwater that potentially lowers stream flow (like surface water withdrawals) can also be used without adversely affecting the water body.

9.1.a.4.B. Step-Drawdown Test over a Range of Pumping Rates

CONSOL would suggest the Department amend the language "The step-drawdown test should be performed...and progress to higher rates...until the water level fails to stabilize over the step period." to read as follows.

- **"The step-drawdown test should be performed...and progress to higher rates...until the water level fails to stabilize over the step period or the anticipated yield is reached."**

9.1.a.5.D.2. Water Level Measurement

CONSOL would suggest the Department amend the language "The water level shall be measured at thirty (30), ten (1) and five (5) minutes before..." to read as follows.

- **"The water level shall be measured at thirty (30), ten (10) and five (5) minutes before..."**

9.1.a.5.F. Drinking Water Well Flow Test

This rule describes procedures for aquifer testing of private well supplies in which the water level cannot be measured. CONSOL recommends striking the entirety of 9.1.a.5.F from the proposed amendments for the following reason.

- **The yield of a groundwater well cannot be determined without measuring the change in water level induced from pumping. The basic tenant of groundwater flow (Darcy flow equation) and its derivations used to calculate groundwater yields requires knowing the change in head.**

Office of Oil and Gas Response:

CONSOL's comments regarding modification of the definition of adverse impacts in Section 9.1.a.4. have been addressed in SORO's comment responses.

CONSOL's comments regarding modification of the definition of adverse impacts in Section 9.1.a.4. have been addressed in SORO's comment responses.

The Office of Oil and Gas agrees with CONSOL's suggestion to append the phrase "or the anticipated yield is reached" in Section 9.1.a.4.B. as there is no need to continue testing a well at rates exceeding the target.

CONSOL identifies a typographic error in Section 9.1.a.5.D.2. which has been corrected.

CONSOL comments that Section 9.1.a.5.F. should be removed because quantitative yield calculations are not possible without measuring water levels and recovery rates inside the well itself. The Office of Oil and Gas understands (and essentially agrees with) the central issue, but must nevertheless develop a rule that describes a flow testing procedure to water well owners as entitled by statute. Therefore the Office of Oil and Gas has removed the proposed constant rate drawdown test for inaccessible water wells but retained the language referencing a qualitative analysis. The Office of Oil and Gas encourages the operator to discuss with the owner the complicating factors and come to agreement on a qualitative test procedure.

West Virginia Rivers Coalition and WVSORO

§35- 8 -11. Reports.

We do not understand why the term "natural gas liquids" was eliminated and replaced with the term "condensate."

Office of Oil and Gas Response

WVRC and WVSORO ask for additional context to describe why the term "natural gas liquids" was changed to "condensate" in the proposed amendments. The terminology was changed to more accurately describe the most common types of liquids collected at well locations. While there are no universally accepted definitions of these terms, common industry usage more often uses natural gas liquids to describe liquids extracted from the pipeline, downstream of wellheads as compressed gases and liquids, such as propane, butane, etc. Condensate is used to describe light liquid hydrocarbons that are extracted at well locations at atmospheric or pipeline pressures. We feel the use of the term condensate more accurately describes the liquid fraction collected at the well locations, under the control of the operator.

George Monk

35CSR8-11 Reports

11.1 Produced needs to be added before Water.

Office of Oil and Gas Response

Monk recommends inserting the word "produced" before "water" in Section 11.1. The Office of Oil and Gas feels that the phrasing is adequate and correct as written.

IOGA

§ 11.1.a – requires reporting of "condensate" instead of "natural gas liquids" on Form WR-39 "Report of Annual Production." However, Form WR-39 is on the Office of Oil and Gas' website as "Report of Monthly Production" which should be changed to conform to the name of the form. Also, Form WR-39e appears to be an option for reporting monthly production as well. In addition, in the fourth sentence because "natural gas liquids" is changed to "condensate" the word "those" should be changed to "the amount."

§ 11.1.b. – IOGA requests that the first sentence and the ending phrase of the second sentence "and shall be acceptable 'pipeline quality'" be deleted as an unnecessary qualification on the condensate measurement and quality. Condensate need not be measured according to common carrier standards or be of pipeline quality at the production site since processing can occur at a centralized collection location.

§ 11.1.d – is a new requirement regarding "produced water." IOGA requests that the words "of common carriers in the State of West Virginia" be deleted and replaced with "in the industry." Because produced water may be recycled and reused at the same location the practices of common carriers should not be imposed on the operator and estimates of volume should be acceptable. More importantly, the distinction between when flowback water ends and produced water begins requires greater clarity. A bright line approach of declaring all water produced after ninety (90) days following completion work on the well to be "produced water" and measured accordingly is more appropriate.

Office of Oil and Gas Response

IOGA, WVONGA and Noble recommend several updates to Sections 11.1.a-d. relating to reporting requirements to better describe the handling and accounting of condensate and produced water. The draft language had stipulated that condensate had to be of pipeline quality and measured using standard practices of common carriers. The Office of Oil and Gas agrees that these qualifiers are unnecessary for the purposes of reporting and have been edited as recommended. The Office of Oil and Gas also agrees with the suggestion to replace the word "those" with "the amount" in Section 11.1.a. and edit the incorrectly named Form WR-39 from "Report of Annual Production" to "Report of Monthly Production." These commenters also request clarification of the definition of flowback water as it relates to produced water reporting in Section 11.1.d. To provide clarification on this section, the Office of Oil and Gas is utilizing the same definition of flowback as presented in Section 9.1.b.3.A—water recovered during the first 30 days of the flowback period.

WVONGA

10. Annual Production Reporting

a. Standard Practices of Common Carriers (§§ 11.1.b, 11.1.d). The Proposed Rule would require the volume of oil and condensate (§ 11.1.b) and produced water (§ 11.1.d) to be "determined through the standard practices of common carriers in the State of West Virginia." This requirement is stated as an absolute. If a facility has a means of measuring the volume of oil, condensate or produced water produced on-site, it is unclear why that method should not also be acceptable for purposes of reporting.

b. Measurement of Produced Water (§ 11.1.d). While WVONGA does not object to excluding flowback water from reporting under this section, because the distinction between produced water and flowback water can be subject to varying interpretation, WVONGA requests that the agency provide some clarification regarding how it will interpret "flowback water" for purposes of this section. One option would be to state that flowback water encompasses all water recovered as part of well completion activities.

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b. Annual Production Reporting (§ 11.1.a). Consistent with the substitution of "natural gas liquids" for "condensate," WVONGA suggests the following revision to Section 11.1.a: "The volume of ~~natural gas liquids~~ condensate reported shall be ~~those~~ the amount separated under the control of the well operator."

Office of Oil and Gas Response
WVONGA's comments regarding language modification related to annual production reporting in Sections 11.1.a,b,d in IOGA's comment responses.

Noble

13. **Sections 11.1.b and 11.1.d cover standard practices of common carriers and measurement of produced water. Noble supports the following position of the WVONGA regarding these sections:**

"The Proposed Rule would require the volume of oil and condensate (§ 11.1.b) and produced water (§ 11.1.d) to be 'determined through the standard practices of common carriers in the State of West Virginia.' This requirement is stated as an absolute. If a facility has a means of measuring the volume of oil, condensate or produced water produced on-site, it is unclear why that method should not also be acceptable for purposes of reporting."

"Measurement of Produced Water (§ 11.1.d). While WVONGA does not object to excluding flowback water from reporting under this section, because the distinction between produced water and flowback water can be subject to varying interpretation, WVONGA requests that the agency provide some clarification regarding how it will interpret 'flowback water' for purposes of this section. One option would be to state that flowback water encompasses all water recovered as part of well completion activities."

In addition, Noble supports the position of the IOGA regarding § 11.1.b that "the first sentence and the ending phrase of the second sentence 'and shall be acceptable 'pipeline quality" be deleted as an unnecessary qualification on the condensate measurement and quality. Condensate need not be measured according to common carrier standards or be of pipeline quality at the production site since processing can occur at a centralized collection location."

Office of Oil and Gas Response
Noble's comments regarding language modification related to annual production reporting in Sections 11.1.a,b,d in IOGA's comment responses.

West Virginia Rivers Coalition and WVSORO

§35- 8 -5.6.e. Water Management Plans: Signage at water withdrawal locations.
We support the additional signage requirements for water withdrawal locations and the inclusion of the phone number for the OOG.

§35- 8 -9.1.b.2. Signage for water withdrawal locations.
Regarding signage at water withdrawal locations, this section and/or section 5.6, which also addresses signage should be amended so that they are consistent with each other. For example, section 5.6. say the signage shall include the website address for the Office, but this is not mentioned in section 9.1.b.2. Additionally, section 5.6 says the signage shall include "the telephone number of the company conducting the withdrawal" while section 9.1.b.2. says the "telephone number for the operator for which the water withdrawn will be utilized." Since the company conducting the withdrawal may not be the well operator, both should be required at both places.

Office of Oil and Gas Response
WVRC and WVSORO state that they support the requirement to include the Office of Oil and Gas telephone number on water withdrawal signage. The Office of Oil and Gas wishes to clarify that the only proposed changes to the rule are the addition of a requirement to identify the location with a name and to allow for substitution of well pad name(s) for individual API numbers. The Office of Oil and Gas has learned through experience that such identifications are a necessary tools for accurate communication between the office and field inspection staff, the public and the operators themselves.

WVONGA

5. Water Management Plan Signage [§§ 5.6.e, 9.1.b.2]

WVONGA notes that the requirements in Sections 5.6.e and 9.1.b.2 relating to signage to be posted at water withdrawal sites are inconsistent (although similar). To illustrate:

- **Section 5.6.e requires the sign to include:**
  - **Information regarding how to obtain the Water Management Plan (not required in § 9.1.b.2)**
  - **The water withdrawal site identification name**
  - **The well pad name[4] as set forth in the approved Water Management Plan**
  - **The telephone number of the company conducting the withdrawal**
  - **The Office's telephone number**
  - **The Office's web site address (not required in § 9.1.b.2)**

- **Section 9.1.b.2 requires the sign to include:**
  - **A disclosure that the location is a water withdrawal point (not required in § 5.6.e)**
  - **The water withdrawal site identification**
  - **The well pad names as defined in the approved water management plan (similar to § 5.6.e, with minor language differences)**
  - **The name of the operator for which the water withdrawn will be utilized (not required in § 5.6.e)**
  - **The telephone number of the operator for which the water withdrawn will be utilized (similar to the requirement in § 5.6.e for the telephone number of the company conducting the withdrawal, but not identical, and the company conducting the withdrawal could possibly be different than the operator for which the water withdrawn will be utilized)**
  - **The telephone number for the Office of Oil and Gas**

To avoid confusion, WVDEP either should consolidate all of these requirements in a single section or should revise both sections to ensure that the requirements are completely identical.

Furthermore, Section 9.1.b.2 would require signage to be erected within 24 hours of a notification of an intent to withdraw water. WVONGA believes that requiring the postage of signage within 24 hours is excessive and may prove infeasible in practice. In the alternative, WVONGA suggests that the regulations be revised to require that appropriate signage be posted prior to active water withdrawal. Finally, WVONGA requests clarification as to when the erosion and sediment controls referenced in this section must be implemented at water withdrawal locations—for example, would such controls be required at a temporary water withdrawal location where no earth disturbance takes place?

[4] WVONGA notes that this should properly state "well pad name(s)" as Section 5.6.b authorizes the preparation of water management plans on a watershed basis, encompassing multiple wells or well pads.

Office of Oil and Gas Response

WVONGA comments that the amended signage requirements detailed in Sections 5.6.e. and 9.1.b.2. are inconsistent, and as requested, corrective replacement language has been inserted to each section.

WVONGA and Noble state that the requirement to install appropriate signage within 24 hours of submitting notice of intent to withdrawal is unreasonable or infeasible in practice. It would appear as though these comments are driven by a misunderstanding of the notification process. Section 9.1.b.1. currently requires notice be sent 48 hours prior to water withdrawal. In order to streamline the process (and reduce administrative burdens on the operator), the Office of Oil and Gas allows operators to notify the Office of Oil and Gas through a one-time email declaring that their water management plan has been activated. The draft language, which has notably existed as a permit condition for some time, was added to the rule to establish a timeframe by which signage must be installed. The draft language effectively defers the installation date until a withdrawal site's activation thereby giving the operator maximum flexibility while minimizing unnecessary sign clutter at approved withdrawal locations. Functionally this language is equivalent to the commenters' suggestion to allow signage to be installed prior to active withdrawals.

Noble

3. **Section 5.6.a** states that "[s]ignage shall be posted at each water withdrawal site that provides information regarding how to obtain the Water Management Plan, the withdrawal site identification name, and the well pad name as set forth in the approved Water Management Plan,....."

   Noble is concerned that without further clarification, this provision could be interpreted as imposing new signage requirements retroactively to existing water withdrawal sites. To do so would generate additional costs to operators without providing material benefit to the public or

the environment. Existing sites would already have been constructed to adhere to current requirements of 35 C.S.R. 8 which includes the development of water management plans and signage at every withdrawal location. Changing existing signage would do nothing to increase public safety or provide environmental benefit. Therefore, Noble requests that the Proposed Rule be modified to specifically state that the new signage requirements shall apply only to prospective sites and not to existing sites.

8. **Section 9.1.b.2** covers signage requirements for water withdrawal and use of erosion and sediment controls. Noble believes that requiring signage within 24 hours of notification is excessive and suggests revising the Proposed Rule to state that signage must be installed prior to active water withdrawal. This change would still ensure that necessary information is provided to the public prior to withdrawal without creating undue burden on operators. In addition, Noble requests that the Proposed Rule be clarified to identify the circumstances in which erosion and sediment controls are required and whether they are required for temporary withdrawals where no earth disturbance took place or at sites where earth disturbance involves less than 3 acres.

Office of Oil and Gas Response

Noble states that water withdrawal site signs that already exist should be exempt from new regulations because updating them is a cost burden with no benefit to the environment or public safety. The Office of Oil and Gas maintains that transitioning away from API numbers in favor of well pad name designation can only decrease operators' burden to frequently update signage. Current regulations already require that these signs be updated to include every new API number

associated with that location. By creating signage with pad names, the signs will be updated less frequently, which inherently reduces operational costs.

Noble's comments related to signage at water withdrawal sites has been addressed in WVONGA's comment response section.

Noble and AEA also provide comments rejecting the use of the Erosion and Sediment Control Field Manual at water withdrawal sites. The draft language includes stipulations that require operators to employ best management practices for erosion and sediment control at withdrawal locations. Experience has shown that withdrawal sites need routine maintenance, particularly those sites that receive heavy truck traffic. These sites frequently have stability issues and problems with mud. Rather than mandate specific E&S controls at these sites, the draft language requires operators to regularly inspect the site and maintain it in a condition that does not create pollution using the field manual as guidance. Noble seems to suggest that such controls are not necessary for temporary withdrawals at sites with no earth disturbance less than 3 acres. The Office of Oil and Gas contends that these controls are most necessary in areas used for temporary withdrawals as more developed locations exceeding one acre in size fall under the jurisdiction of the Division of Water and Waste Management's Oil and Gas Construction Stormwater General Permit. Additionally, AEA incorrectly states that the requirements from the Field Manual have been incorporated into this rule and can thus be rendered obsolete as the manual is updated. This is not the case, the field manual is incorporated by reference and is thus dynamic.

American Energy Appalachia

10) The requirement to include historical well pad names on the signs at water withdrawal site (35-8-9.1.b.2.) is redundant and unnecessary.

AEA suggests only the well pad currently utilizing the water withdrawal site should be on the sign. The proposed requirement to include all well pad names would include historical well pads and may create confusion at many well sites for vendors and visitors not familiar with the site.

11) It is improper to incorporate the Office of Oil and Gas Erosion and Sediment Control Field Manual (field manual) into the rules.

The proposed requirement in 35-8-9.1.b.2 for erosion and sedimentation control structures to adhere to the Office of Oil and Gas Erosion and Sediment Control Field Manual (field manual) incorporates the field manual into the regulations and eliminates the opportunity for input from the industry, legislature and the public regarding field manual requirements. While the

Erosion and Sediment Control Plan must adhere to the field manual pursuant to statute, this extension by rule to the water quality and quantity protection provisions is unwarranted. Additionally, a change in the field manual could render an approved sediment and erosion control plan obsolete. Any reference to the field manual in these regulations goes beyond legislative intent and must be eliminated.

12) The proposed rule unreasonably extends the power of the Chief without administrative remedy.

The proposed regulation 35-8-9.1.b.2 states that when the withdrawal location is no longer being utilized, or at the direction of the Chief, the operator shall notify the Chief, remove all signage and requires the reclamation of the location. The provision gives the unprecedented authority to Chief to determine that a water withdraw location can no longer be utilized and to unilaterally determine when a water withdrawal site must be reclaimed. The provision for the Chief to declare a water withdrawal site can no longer be utilized and must be reclaimed must be eliminated. Reclamation should be a condition of the water management plan.

Office of Oil and Gas Response

AEA challenges the requirement to include historic well pad names on signage. The Office of Oil and Gas wishes to clarify that there is no requirement (or need) to provide historic well pads names on signage. In fact, it is highly recommended that out-of-date information be removed as soon as possible to minimize sign clutter and preserve the location aesthetics to the greatest extent possible.

AEA's comments related to erosion and sediment control practices at water withdrawal sites has been addressed in Noble's comment response section.

AEA states that the reclamation of a withdrawal site should be a condition of the water management plan. The Office of Oil and Gas fails to understand the distinction between requiring reclamation of a water withdrawal site as an operational requirement in this rule versus the water management plan itself, which is a part of the well work permit issued under this same rule.

AEA claims that the language giving the Chief the discretion to discontinue a withdrawal sites for cause is an unreasonable extension of power and represents unprecedented authority in the ability to mandate site closures. The Office of Oil and Gas strongly disagrees with this interpretation and also notes that this discretion exists in the current rule language and is thus outside the scope of these proposed revisions.

Response to comments related to berm requirements for well pads

West Virginia Rivers Coalition and WVSORO

§35- 8 -5.5.C.9. Compaction, acceptable moisture range requirements for embankments.

We support the minimum compaction requirements for embankments and the requirement for soil tests to determine an acceptable moisture range.

Office of Oil and Gas Response
Thank you for your comment

George Monk

35CSR8-5 Permits, Notice, Review

5.5.c.12 We heartily approve of the requirement for a berm surrounding the well pad and for the access road entering the well pad crossing a mountable berm structure.

Office of Oil and Gas Response
Thank you for your comment

EQT

4. Berms [§ 5.5.c.12]

EQT generally supports the requirements that berms be installed at pads during drilling and completion activities and, where employed, berms should be designed, installed and maintained to manage fluids from flowing off the well pad and while allowing rainwater and snowmelt to captured and release through a sump system. As such, it may not be necessary to install berms the entire perimeter of the well pad. Additionally, it may not be prudent to install berms where the access road enters the well pad because of access and safety issues and the fact that the fluid handling activities are typically located on a different part of the pad. Lastly, berms are removed once drilling and completion activities are completed and the site is reclaimed. Once reclaimed, the production pad has tanks that are equipped with secondary containment. Therefore, the requirement should not extend to production pads. As such, EQT proposes the following revisions to Section 5.5.c.12:

5.5.c.12 Well pads shall be ~~equipped with fully-enclosed by~~ berm structures to ~~prevent offsite migration of fluids used during drilling and completions activities.~~ Berms shall be installed in areas of the pad where offsite migration of such fluids is possible. If an earthen berm is employed, the berm shall be a minimum of two feet (2') in height with a two foot (2') top. *Minimum* compaction requirements for raised earthen berms shall be the same as those for embankment fills as set forth in subdivision 5.5.c.9 above and have maximum side slopes of one and one-half horizontal to one vertical (1.5:1). The berms can be removed when the well pad is reclaimed. ~~The area where the access road meets the well pad shall be equipped with a mountable berm structure.~~

Office of Oil and Gas Response

The well pad berm, mountable berm and the compaction spec have been a requirement for the engineering plans for nearly 3 years (Fall 2012). None of these requirements are new to the industry; the rule will now replace portions of the engineering guidance document. Well pad berms serve as the last line of defense before a spilled fluid leaves the pad area. While most stationary items on the pad have their own containment, there is a chance for those to fail and for any mobile equipment, such as fuel trucks, that have no containment if there were a leak to occur the berm would serve as a barrier. The engineering plans typically state that the sumps located on the pad remain closed during drilling and completion activities. If a spill were to occur during times other than those activities where there is no secondary containment the sumps can be shut and full containment can be achieved. Mountable berms are essential to full containment. If the entrance to the pad has no means of stopping a spill, the constructed berm is useless.

IOGA

6. Wellpad berm and compaction requirements impose unnecessary and unreasonable additional costs and operational burden to the applicant without any related protection of water resources.

Section 5.5.c.12 imposes a new requirement that the well pad be "fully enclosed by berm structures," subject to the same compaction requirements as embankment fills described in § 5.5.c.9., including a moisture range specified by an engineer. The requirement to utilize a professional engineer for compaction requirements and moisture range is unduly burdensome in light of industry experience with erosion and sediment control in well work operations. Existing regulations require oil and gas operators to comply with existing requirements for spill containment and control that have proven adequate in protecting waters of the State. See, 35 C.S.R. 1 §§ 7 and 8, and 35 C.S.R. 8 §§ 5.4, 9.1.a.3 and 18. This requirement results in significant water management logistical issues and may cause wellpad integrity issues without any demonstrated benefit to the environment. In addition, the mandated collection of precipitation on a wellpad may create safety issues related to pooling of water and icy conditions during winter periods.

Office of Oil and Gas Response

The well pad berm, mountable berm and the compaction spec have been a requirement for the engineering plans for nearly 3 years (Fall 2012). None of these requirements are new to the industry; the rule will now replace portions of the engineering guidance document. Well pad berms serve as the last line of defense before a spilled fluid leaves the pad area. While most stationary items on the pad have their own containment, there is a chance for those to fail and for any mobile equipment, such as fuel trucks, that have no containment if there were a leak to occur the berm would serve as a barrier. The engineering plans typically state that the sumps located on the pad remain closed during drilling and completion activities. If a spill were to occur during times other than those activities where there is no secondary containment the sumps can be shut and full containment can be achieved. Well placed sumps will also aide in the removal of excess storm water thus decreasing the risk of pooling during wintery conditions.

WVONGA

4. Berms [§ 5.5.c.12]

A new subsection of the Proposed Rule would require well pads to be "fully enclosed by berm structures." § 5.5.c.12. WVONGA is concerned that this requirement will impose additional operational concerns and costs on operators without providing meaningful additional protections for water resources.

While many oil and gas production sites are bermed already, some operators will decide to control releases in other ways. Extensive requirements for spill containment and control are established by existing state and federal rules and regulations, and those programs have been demonstrated to be adequate over time. Mandating the installation of berms that completely surround well pads could have the potential to create significant logistical issues with regard to water management, as well as potential pad integrity concerns that do not appear to be justified by any demonstrated need from WVDEP. Furthermore, the specified width requirements would be expected to increase the overall environmental impact of the site due to widening, whereas Section 5.5.c.1 of the Proposed Rule would require the cleared area to be kept to the minimum necessary for proper construction. The prescriptive language of this section also would appear to preclude the use of an engineering equivalent such as jersey barriers that provide traffic and release mitigation.

WVONGA urges WVDEP to delete Section 5.5.b.12 in its entirety, or, in the alternative, to authorize equivalent methods that will provide operators with flexibility in determining design standards for well pad berms. WVONGA also would suggest including some timing limitation in this provision, as berms may not be necessary or appropriate during the life of the pad (versus during the well work process). Berms are removed at many sites after well work is completed, and as written this rule might require maintenance of a berm where none is needed, or other measures (e.g., SPCC controls) are as effective.

Office of Oil and Gas Response

The well pad berm, mountable berm and the compaction spec have been a requirement for the engineering plans for nearly 3 years (Fall 2012). None of these requirements are new to the industry; the rule will now replace portions of the engineering guidance document. Well pad berms serve as the last line of defense before a spilled fluid leaves the pad area. While most stationary items on the pad have their own containment, there is a chance for those to fail and for any mobile equipment, such as fuel trucks, that have no containment if there were a leak to occur the berm would serve as a barrier. The engineering plans typically state that the sumps located on the pad remain closed during drilling and completion activities. If a spill were to occur during times other than those activities where there is no secondary containment the sumps can be shut and full containment can be achieved. Language has been added to 35-8-5.5.c.12 to include an engineered berm equivalent that can be approved by the chief.

Northeast Natural Energy

Section 5.5.c.12. Well pad berm and compaction requirements impose unnecessary and unreasonable additional costs and operational burden to the well work without related protection of water resources. The requirement to utilize a professional engineer for compaction requirements and

moisture range is unduly burdensome in light of industry experience with erosion and sediment control in well work operations. However, I do feel the requirement for the berm is warranted.

5.5.c.9 states that a one point proctor has to be used. Even though we are currently complying with this requirement through permit conditions I would submit the following. In ASTM D-698 1.2 it states "These test methods apply only to soils (materials) that have 30 % or less by mass of particles retained on the $^{3}/_{4}$-in. (19.0-mm) sieve and have not been previously compacted in the laboratory; that is, do not reuse compacted soil." When we place rock lifts which are allowed by section 5.5.c.8, you will not be able to perform a one point proctor. First, most of the time you bend the driving rod to open the hole for the nuclear gauge. Secondly you will be above the ¾ allowance listed above in ASTM D-698 1.2. The department of highways allows you to proof roll all lifts when you have more than 30% ¾ material. Our suggestion is to allow for this alternate method when warranted and specifically approved by the Chief.

Office of Oil and Gas Response

The well pad berm, mountable berm and the compaction spec have been a requirement for the engineering plans for nearly 3 years (Fall 2012). None of these requirements are new to the industry; the rule will now replace portions of the engineering guidance document. Well pad berms serve as the last line of defense before a spilled fluid leaves the pad area. While most stationary items on the pad have their own containment, there is a chance for those to fail and for any mobile equipment, such as fuel trucks, that have no containment if there were a leak to occur the berm would serve as a barrier. The engineering plans typically state that the sumps located on the pad remain closed during drilling and completion activities. If a spill were to occur during times other than those activities where there is no secondary containment the sumps can be shut and full containment can be achieved.

Plans certified by a West Virginia Professional Engineer are required per 35-8-5.5.a., therefore the berm would already fall under those items designed and specifications were already set forth in the engineered plans. No extra expenditure would be necessary; this should be part of the contracted engineering plans.

Section 35-8-5.5.c.9 states that ASTM D-698 to be followed in regard to the Standard Proctor tests, it would be prudent to follow the recommendations of how the tests be performed in ASTM D-698.

Noble

2. **<u>Section 5.5.c.12</u> states that "[w]ell pads shall be fully enclosed by berm structures. If an earthen berm is employed, the berm shall be a minimum of two feet in height with a two foot top....and have maximum side slopes of one and one-half horizontal to one vertical (1.5:1)...."**

   Noble is concerned that the prescriptive nature of the berm requirements, including the berm width and slope, included in this Proposed Rule will increase the overall [illegible] impact

of the site due to a widening of the footprint. These berms can become difficult to construct as proposed and they are often steepened and narrowed to help eliminate large fill slopes on the pad and access road (e.g., 1:1 slope with 1 foot top width). Moreover, the requirement appears contrary to § 5.5.c.1 which calls for the cleared area be kept to the minimum necessary for proper construction. Additionally, the provision precludes the use of an engineering equivalent as an alternative to berm structures, such as jersey barriers which can also provide traffic flow and release mitigation measures.

Operators are presently subject to extensive requirements for spill containment and control under federal and state regulations. Therefore, the need for this provision in § 5.5.b.12 and its benefit to the public and the environment remain unclear. Noble is concerned these requirements could unintentionally result in logistical issues with regard to water management and potentially create well-pad integrity concerns by limiting the ability to have surface water run off location. At a minimum, Noble believes the Proposed Rule could be greatly improved by adding language to allow for equivalent measures which would provide operator's flexibility in determining the design standards for the well pad berms. Noble suggests the following language change:

> "[w]ell pads shall be fully enclosed by berm structures or an engineering equivalent certified by a professional engineer. If an earthen berm is employed, the berm shall be constructed with sound engineering design and be of proper height and slope to allow for appropriate environmental protections."

In addition, Noble supports the following position of the IOGA regarding this section:

> "Existing regulations require oil and gas operators to comply with existing requirements for spill containment and control that have proven adequate in protecting waters of the State. See, 35 C.S.R. 1 §§ 7 and 8, and 35 C.S.R. 8 §§ 5.4, 9.1.a.3 and 18. This requirement results in significant water management logistical issues and may cause well pad integrity issues without any demonstrated benefit to the environment. In addition, the mandated collection of precipitation on a well pad may create safety issues related to pooling of water and icy conditions during winter periods."

Office of Oil and Gas Response

The well pad berm, mountable berm and the compaction spec have been a requirement for the engineering plans for nearly 3 years (Fall 2012). None of these requirements are new to the industry; the rule will now replace portions of the engineering guidance document. Well pad berms serve as the last line of defense before a spilled fluid leaves the pad area. While most stationary items on the pad have their own containment, there is a chance for those to fail and for any mobile equipment, such as fuel trucks, that have no containment if there were a leak to occur the berm would serve as a barrier. The engineering plans typically state that the sumps located on the pad remain closed during drilling and completion activities. If a spill were to occur during times other than those activities where there is no secondary containment the sumps can be shut and full containment can be achieved. Language has been added to 35-8-5.5.c.12 to include an engineered berm equivalent that can be approved by the chief.

3) The requirement to berm the entire location throughout the lifecycle of the wellpad is not warranted.

Proposed amended rule 35-8-5.5.c.12 provides: ***Well pads shall be fully enclosed by berm structures. If an earthen berm is employed, the berm shall be a minimum of two feet (2') in height with a two foot (2') foot top. Minimum compaction requirements for raised earthen berms shall be the same as those for embankment fills as set forth in subdivision 5.5.c.9 above and have maximum side slopes of one and one haft horizontal to one vertical (1.5:1). The area where the access road meets the well pad shall be equipped with a mountable berm structure.***

The requirement to fully enclose the wellpad with a berm throughout the life of the wellpad may potentially create instability of the wellpad due to standing water. AEA urges DEP to reconsider the requirement to fully enclose the wellpad with a berm. AEA suggests that the requirement to fully enclose the wellpad with a berm be limited to the drilling and completions phase of the well, as opposed to the life of the wellpad. The requirement to berm the entire location is not warranted during the production phase because, the potential water quality risks onsite during the production phase (i.e. condensate, produced water, and crude oil) are already managed under the federal Oil Pollution Control Act and associated regulation 40 CFR Section 112 (SPCC program) and the federally regulated tanks are already required to be within secondary containment.

At a minimum, WVDEP should address the increased stormwater issues associated with fully berming the site throughout the life cycle of the well. The collection of stormwater due to total capture by the enclosed wellpad berm presents a slip and fall safety hazard to site workers.

Office of Oil and Gas Response

The well pad berm, mountable berm and the compaction spec have been a requirement for the engineering plans for nearly 3 years (Fall 2012). None of these requirements are new to the industry; the rule will now replace portions of the engineering guidance document. Well pad berms serve as the last line of defense before a spilled fluid leaves the pad area. While most stationary items on the pad have their own containment, there is a chance for those to fail and for any mobile equipment, such as fuel trucks, that have no containment if there were a leak to occur the berm would serve as a barrier. The engineering plans typically state that the sumps located on the pad remain closed during drilling and completion activities. If a spill were to occur during times other than those activities where there is no secondary containment the sumps can be shut and full containment can be achieved. Well placed sumps will also aide in the removal of excess storm water thus decreasing the risk of pooling on the well pad. Also during times of inactivity on the pad the berm can be breached, but must be repaired and in place prior to drilling and completion activities.

Antero

3. Site construction plan. 35 CSR, Series 8-5.5.c.

Antero maintains a series of separate comments related to this specific section:

A. The proposed rule at 35 CSR, Series 8-5.5.c.6 fails to provide an engineering alternative to construction slopes steeper than 2:1. Antero proposes the inclusion of the opportunity to construct slopes steeper than 2:1 if soil treatment or geo-synthetics can be applied to reliably achieve the required factor of safety;

B. The proposed rule at 35 CSR, Series 8-5.5.c.10 requires surface water diversion ditches be placed above the disturbed area. Diversion ditches above cut slopes may cause soil saturation and lead to slope stability issues, especially if the cut slope has colluviums present or remaining. Antero proposes the inclusion of the opportunity for an exemption from this requirement, if the P.E. certifying the plans concludes the inclusion of a diversion ditch as set forth in the rule would be unsafe or potentially a hindrance to the site;

C. The proposed rule at 35 CSR, Series 8-5.5.c.12 requires the well pad to be fully bermed throughout the life of the well pad and contains minimum compaction requirements for earthen berms. This proposal fails to recognize that it is very difficult to achieve compaction on a raised earthen berm due to the limited lateral confinement of material and small footprint of the area. Further, complete enclosure of the well pad may potentially create instability due to standing water that would inevitably be trapped within the site. Antero urges WVDEP to reconsider the requirement to fully enclose the well pad with a berm.

Antero suggests that if such a requirement must be included in the rules that it be limited to the drilling and completions phase of the well, as opposed to the life of the well pad. The requirement to berm the entire location is not warranted during the production phase of the well because the potential water quality risks onsite during the production phase (i.e. condensate, produced water, and crude oil) are already managed under the federal Oil Pollution Control Act and associated regulation 40 CFR, Part 112 (SPCC program) and the federally regulated tanks are already required to be within secondary containment.

WVDEP should also address the increased stormwater issues associated with fully berming the site throughout the life cycle of the well. The collection of stormwater due to total capture by the enclosed well pad berm presents a slip and fall safety hazard to site workers. Antero urges WVDEP to modify these requirements accordingly.

Office of Oil and Gas Response

Office of Oil and Gas appreciates comments A and B, however, the comments involve language (or a concept) that are beyond the scope of the proposed revisions and, therefore, require no response.

The well pad berm, mountable berm and the compaction spec have been a requirement for the engineering plans for nearly 3 years (Fall 2012). None of these requirements are new to the industry; the rule will now replace portions of the engineering guidance document. Well pad

berms serve as the last line of defense before a spilled fluid leaves the pad area. While most stationary items on the pad have their own containment, there is a chance for those to fail and for any mobile equipment, such as fuel trucks, that have no containment if there were a leak to occur the berm would serve as a barrier. The engineering plans typically state that the sumps located on the pad remain closed during drilling and completion activities. If a spill were to occur during times other than those activities where there is no secondary containment the sumps can be shut and full containment can be achieved. Well placed sumps will also aide in the removal of excess storm water thus decreasing the risk of pooling on the well pad.

Consol Energy

§35-8-5. Permits, Notice, Review.

5.5.c.9. and 5.5.c.12. Compaction and Berms
CONSOL questions the need for compaction of earthen berms to the same standard of ninety-five percent (95%) as that of constructed embankment fills, including a moisture range specified by an engineer. The requirement to utilize a professional engineer for compaction requirements and moisture range is unduly burdensome considering that existing regulations already require oil and gas operators to comply with requirements for spill containment and control that have proven adequate in protecting waters of the State. (35 C.S.R. 1 §§ 7 and 8, and 35 C.S.R. 8 §§ 5.4, 9.1.a.3 and 18).

The Standard Proctor density as established in the American Society for Testing and Materials' "Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort" (ASTM D-698) is intended for use when soil is utilized as engineering fill (embankments, foundation pads, road bases). This soil is compacted to achieve engineering properties that are intended to support structures or equipment. This standard and the 95% compaction were not intended for earthen berms since they do not support any structure or equipment. Given that industry standard practices also include the use of best management practices (BMPs) such as synthetic liner footprints that continue over synthetic lined berms, it would seem that the ASTM D-698 is unnecessary to ensure containment of any spill to the site, if that is what the Department intends by this requirement.

- **It also seems a redundant requirement to compact earthen berms to 95% since the average area of a pad included within a berm 2 foot in height would hold over 4 million gallons of fluids. If the largest tank or containment vessel on the facility is 1 million gallons, a catastrophic failure would still not result in any significant pressure outward from the released fluids to the earthen berms.**

Office of Oil and Gas Response
The well pad berm, mountable berm and the compaction spec have been a requirement for the engineering plans for nearly 3 years (Fall 2012). None of these requirements are new to the industry; the rule will now replace portions of the engineering guidance document. Well pad berms serve as the last line of defense before a spilled fluid leaves the pad area. While most

stationary items on the pad have their own containment, there is a chance for those to fail and for any mobile equipment, such as fuel trucks, that have no containment if there were a leak to occur the berm would serve as a barrier. The engineering plans typically state that the sumps located on the pad remain closed during drilling and completion activities. If a spill were to occur during times other than those activities where there is no secondary containment the sumps can be shut and full containment can be achieved.

Plans certified by a West Virginia Professional Engineer are required per 35-8-5.5.a., therefore the berm would already fall under those items designed and specifications were already set forth in the engineered plans. No extra expenditure would be necessary; this should be part of the contracted engineering plans.

David McMahon

The pad berm requirement is another example of most companies are now lining their pads and putting berms around for most pollution that did occur. There were some spills on the pad and soaked down into the ground water. So we applaud that. It's kind of what the industry does in most cases, but we applaud that everyone will be required to do that.

Office of Oil and Gas Response
Thank you for your comment

Response to comments related to closed loop drilling and associated waste pit prohibition

West Virginia Rivers Coalition and WVSORO

§35 - 8 - 9.3. Closed-loop drilling systems.
We strongly support and appreciate the transition to pitless or closed-loop drilling systems and that open pits will no longer be used to store drilling waste on site or within the permitted limit of disturbance.

§35- 8 -12.4. Pits and Impoundments Associated with a Well Work Permit.

As noted previously, we support and appreciate that under the proposed rule drillers must use closed-loop drilling systems and that the use of open, on-site pits associated with a well work permit would be eliminated. In keeping with this change, language related to the pits that would no longer be allowed is removed from this section. However, we are concerned about existing permits and pits allowed under permits issued prior to the effective date of the proposed changes. This section (and other sections of the rule pertaining to pits associated with a well work permit) should be written so it is clear that existing/previously permitted pits must meet the requirements specified in the rule, must have proper inspections, must be properly reclaimed and waste stored in the pits must be disposed of properly.

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Office of Oil and Gas Response
See EQT response under closed loop drilling and associated pit prohibition.

George Monk

9.3 We are happy to see that closed loop drilling systems are deemed the only appropriate systems for horizontal wells. We are pleased to see an end of waste pits at these sites.

35CSR8-12 Reclamation; Notification; Production and Gathering Pipelines; and Operating in Designated Mining Areas

12.4 We support the removal of onsite pits from the revised rule, but there is an error in 35CSR8-12.4.g. The wording there should read: All impoundments pits and alternative . . . etc.

Office of Oil and Gas Response
See EQT response under closed loop drilling and associated pit prohibition.

EQT

1. Requirement to Utilize Closed-loop/Pitless Drilling Systems

EQT objects to the prohibition on use of completion and flowback pits for the management and collection of completion fluids. These prohibitions are inconsistent with the Horizontal Well Act, W. Va. Code §§ 22-6A-1 *et seq.*, which expressly contemplates the use of such pits associated with a valid well work permit. As a practical matter, despite the authority to do so under the Horizontal Well Act, closed loop drilling systems are commonly used when drilling an unconventional well and as such drilling pits are not commonly used when closed loop drilling systems are used. However, during completion activities pits are commonly used to temporarily store and manage flowback water for the wells on that pad. These pits are engineered and have liners to ensure that they are protective of the environment. The use of a properly engineered and managed completion pit has several advantages over the use of multiple above ground storage tanks including, but not limited to, a smaller footprint and less disturbance, fewer connections and hoses that are potential sources of leaks, and less truck traffic. Accordingly, the Proposed Rule should be revised to authorize the continued use of waste pits for completion activities as part of the application for a well work permit, subject to reasonable terms and conditions designed to ensure protection of human health and the environment. EQT welcomes the opportunity to discuss with WVDEP any additional safeguards on the continued use of on-site completion pits that the agency may deem necessary or appropriate.

Office of Oil and Gas Response

The Office of Oil and Gas agrees to change the language back to the existing language on this issue, allowing the use of pits. Additionally, language will be added requiring these pits to meet the requirements of section 17.2.b. through 17.2.h.

IOGA

3. Section 9.3 "Closed-Loop Drilling Systems" should be deleted.

Imposing the exclusive use of closed-loop/pitless drilling is outside the scope of DEP's authority. The Natural Gas Horizontal Well Control Act, W. Va. Code § 22-6A-1 *et seq.* ("Horizontal Well Control Act") anticipates and authorizes the use of pits for collection of waste fluids and drill cuttings resulting from drilling and completion operations. The elimination of waste pits as part of the well work permit is an arbitrary and capricious prohibition that conflicts with the Horizontal Well Control Act. The Horizontal Well Development Rule must continue to authorize the use of waste pits as part of the well work application upon reasonable terms and conditions. The West Virginia Legislature expressly authorized the use of pits (defined as "a man-made excavation or diked area that contains or is intended to contain an accumulation of process waste fluids, drill cuttings or any other liquid substance generated in the development of a horizontal well and which could impact surface or groundwater." W. Va. Code § 22-6A-4(b)(10)) when it stated that "[t]his section does not apply to large pits or impoundments authorized under a well work permit." W. Va. Code § 22-6A-9(a). The elimination of pits for the collection of waste fluids and drill cuttings requires legislative action to amend the Horizontal Well Control Act. All pit deletion conforming changes contained in the Proposed Amendments should be reversed as well. However, the DEP may encourage the use of "closed-loop drilling systems" by way of guidance or other non-binding regulatory vehicle, but such a requirement is inconsistent with the language of the Horizontal Well Control Act.

Office of Oil and Gas Response

See EQT response under closed loop drilling and associated pit prohibition.

1. Requirement to Utilize Closed-loop/Pitless Drilling Systems

As drafted, from the effective date of the final Proposed Rule forward, closed-loop (i.e., pitless) drilling systems would be required for all permitted well work, and the construction of waste storage pits associated with permitted well work would be prohibited within the permitted limit of disturbance. §§ 9.3.a, 9.3.b. Consistent with this new requirement, corresponding references to pits—other than centralized pits and impoundments—have been deleted throughout the Proposed Rule. *See, e.g.*, §§ 12.4, 16.

WVONGA objects to this blanket prohibition on the use of pits for the collection of process waste fluids, drill cuttings or any other liquids generated in conjunction with drilling and completion operations. These prohibitions are inconsistent with the Horizontal Well Act, W. Va. Code §§ 22-6A-1 *et seq.*, which expressly contemplates the use of such pits associated with a valid well work permit. Thus, the currently proposed amendments to the Horizontal Well Rule that would require the wholesale elimination of these pits exceed the agency's authority under its governing statute and are therefore legally improper.

In many situations drilling is completed in a closed loop system, with cuttings and other waste being managed in containers. In some situations, however, fracking wastes can be better managed by use of flowback pits. As a practical matter, eliminating on-site pits as a viable alternative for the storage of waste fluids has the potential to create significant logistical concerns for operators. Due to the steep terrain in certain operating areas, available land space for frac tank storage may be limited, while constructing and using an off-site centralized impoundment has the potential to be cost-prohibitive and to generate additional truck traffic. Accordingly, the Proposed Rule should be revised to authorize the continued use of waste pits as part of the application for a well work permit, subject to reasonable terms and conditions designed to ensure protection of human health and the environment.[1]

WVONGA welcomes the opportunity to discuss with WVDEP any additional safeguards on the continued use of on-site waste pits that the agency may deem necessary or appropriate.

[1] To the extent that WVDEP rejects WVONGA's comments and retains the proposed prohibition on waste pits associated with well work permits, at a minimum the Proposed Rule should be revised to state expressly that existing pits may continue to be used pending final reclamation of the drilling s

Office of Oil and Gas Response
See EQT response under closed loop drilling and associated pit prohibition.

Northeast Natural Energy

Section 9.3.a. requires that all horizontal wells be drilled utilizing closed loop drilling. The horizontal well act anticipates and authorizes the use of pits for collection of waste fluids and cuttings. Although most horizontal drilling operations utilize closed loop there should not be a total prohibition regarding using other methods that may require a reserve pit. Top hole rigs (drilling the vertical section of the well bore) may not be equipped to drill closed loop, there may be times when safety dictates that conventional drilling be utilized, etc., therefore the proposed rule should authorize the use of waste pits as part of the well work permit upon reasonable terms and conditions.

Office of Oil and Gas Response
See EQT response under closed loop drilling and associated pit prohibition.

Antero

9. Use of Existing Pits Associated with Well Work Permits. 35 CSR, Series 8-9.3.

The proposed rule disallows the construction of pits associated with well work permitting. While it is not the present practice of Antero to utilize these structures, the inclusion of this provision provides a dangerous precedent with regard to rule making by the WVDEP.

The inclusion of this provision is in fact clearly inconsistent with the Natural Gas Horizontal Well Control Act, which anticipates and authorizes the use of pits for collection of waste fluids and drill cuttings resulting from drilling and completion operations. The elimination of waste pits (see 35-8- 9.3.a. and 9.3.b.) as part of the well work permit is an arbitrary and capricious prohibition that conflicts with the statute and such a fundamental change should be made by the legislature. The rule should authorize the use of waste pits as part of the well work application upon reasonable terms and conditions as has been common practice.

Should the above comment to allow pits for collection of waste fluids and drilling cuttings be rejected, at a minimum, the proposed rule should be amended to provide that existing pits continue in operation pending final reclamation of any site.

Office of Oil and Gas Response
See EQT response under closed loop drilling and associated pit prohibition.

George Monk

35CSR8-19 Plugging, Abandonment, and Reclamation

The plugging section in this rule is required by §22-6A-13 and we are happy to see it present at last. It is based primarily on §22-6-23.

35CSR8-20 Plugging Methods

The plugging methods are adapted from §22-6-24. The classification of water as nonporous in 35CSR8-20.3.a and an acceptable plugging material for the horizontal segment of a well is an obvious mistake and needs to be corrected. We believe cement should be the only acceptable material for plugging a horizontal well's lateral.

20.3.f There *is* a typo in the last line: <u>ofthe</u> should be <u>of the</u>.

Office of Oil and Gas Response
The Office of Oil and Gas acknowledges the comment.

This language addresses the lateral portion of the wellbore. The operator may elect to not fill the lateral portion of the wellbore and merely place a bridge plug at the top target formation to begin sealing the hole. Absent use of such equipment, to begin sealing the wellbore at the top of the target formation, a fluid must be pumped to fill the void so that the cement plug can be set. This can be accomplished by water. The water is not intended to act as the plug.

The suggested change will be made to address the typo.

EQT

7. Plugging – Retrieving Casing and Completing a Seal (§ 19.6)

The proposed rule requires the permittee to make reasonable efforts to pull all recoverable casing. In some cases this may not be possible so EQT requests that the office make provisions to allow some portions of the casing to remain in the borehole. For instance, on some of the older packer seal assemblies ran there was a 7"x 4 ½" packer ran in the hole. In this case, EQT recommends that if the 7" x 4 ½" packer cannot be pulled then the permittee should be allowed to shoot the casing off above the packer and pull the pipe.

Office of Oil and Gas Response
The Office of Oil and Gas believes it is extremely important to pull all casing that can be pulled. However, the Office of Oil and Gas recognizes that in some instances, operators won't be able to pull casing, hence the reasonable effort language. The Office of Oil and Gas believes that the current language is appropriate and actually allows for flexibility as requested by the commenter.

IOGA

§ 19.1 – contains multiple subdivisions "b," "c" and "d" and the designations should be corrected to eliminate duplicate references to the same subdivision.

§ 19.1.c – (the second one) should be limited to "such logs as may be reasonably necessary to the plugging of said well."

§ 19.3 – references § 22-6A-19 which relates to civil and criminal penalties. The code reference should be corrected to § 22-6-19.

§ 19.5 – references "section 18 below" but section 18 is above section 19 and does not relate to variances.

§ 20.2.b – in the second sentence following the phrase "hearing date" insert the word "and."

Office of Oil and Gas Response
The suggested changes will be made to correct the duplicate references.

Proper well plugging is critically important for protection of the environment and mineral resources. The submittal of logs is not required in all instances, but rather, only to be submitted upon specific request by the chief and further, mirrors existing language contained in 35 CSR 4 for vertical wells. The Office of Oil and Gas believes that various logs could be helpful at times to determine the best plugging methodology for a given well.

The suggested change will be made to correct the reference.

The rule will be changed to correct the reference to section 14.

The suggested change will be made to correct the omission.

WVONGA

e. **Presumed Abandonment (§ 19.3). It appears that the reference to W. Va. Code § 22-6A-19 in the first sentence of this subsection properly should reference W. Va. Code § 22-6-19.**

f. **Variance for Plug Lengths (§ 19.5). This provision states that "[a]ll cement plugs, other than those across coal seams, shall be at least [100 feet] in length unless a variance from such a requirement is granted pursuant to section 18 below." This reference to "section 18" is unclear and should be clarified and/or corrected.**

g. **Objections to Application to Clean Out and Replug (§ 20.2.b). The second sentence of this section should be revised as follows: "If such an objection is filed or made, the Chief shall set a hearing date and give notice . . . ."**

Office of Oil and Gas Response
See IOGA response under plugging.

American Energy Appalachia

21) WVDEP should follow a verbal authorization with a written approval through email or letter within 24 hours of granting verbal authorization.

AEA appreciates the speed at which a verbal authorization may be granted pursuant to 35-8-19.7.a. However, AEA suggests that written follow-up by the agency would be beneficial and proposes to add another sentence at the end of this subsection that would provide "The Office shall verify to the operator by email, fax or letter that verbal authorization was granted within 24 hours of granting the verbal authorization."

22) Typographical errors associated with 35-8-19 should be corrected.

Proposed amended rule 35-8-19.1. contains numerous duplicative subsections and should be corrected.

Proposed amended rule 35-8-19.7.b. states in part, "Unless the well operator proposes to plug the well in a manner allowed by paragraph 20.3.d.3. of this rule..." The regulations do not contain paragraph 20.3.d.3. This appears to be a typographical error and correction is recommended.

Office of Oil and Gas Response
The language providing for verbal permission to plug is similar to existing language that is contained in 35 CSR 4 for vertical wells and has provided an acceptable method for such operation. The Office of Oil and Gas believes it is unnecessary to make the suggested change.

See IOGA response under plugging.

The rule will be changed to correct the reference to 20.3.d.2.

West Virginia Rivers Coalition and WVSORO

§35- 8 -2.15. "Karst terrain" definition.

The defined term "karst terrain" does not appear anywhere in the rule. Also, the definition uses the word "topography," which generally refers to features on the surface rather than geologic substrata. We suggest that the rule define "karst region" as an area of the state, generally underlain by limestone ... in which the subterranean features are formed ... ."

§35- 8 -5.1.l. Karst region testing.

We support the requirement that testing to be conducted to identify caves and other subterranean features in karst regions be determined and approved by the West Virginia Geologic and Economic Survey. However, we believe that the rule needs to go further and require study and experimentation with drilling techniques before it is permitted in karst areas.

§35- 8 -5.3.e. Notice provisions for permits in karst regions.

We support the requirement that operators applying for permits in karst regions provide notice to the West Virginia Cave Conservancy and the West Virginia Speleological Society either prior to or at the time of filing the application with the OOG. Ideally, notice should be given to these organizations prior to the permit being filed so that they have ample opportunity to provide input and share their knowledge and expertise regarding the protection of these sensitive regions.

§35- 8 -9.1.h. Baseline water testing in karst regions.

We support the requirement that baseline water quality testing be conducted in karst regions prior to commencement of any site construction or well work. Because water resources in karst regions could more easily be disrupted by drilling or surface disturbances than water resources in other areas of the state, these resources should also be flow tested.

Office of Oil and Gas Response

The term "karst terrain" is used in the statute. Consequently, the Office of Oil and Gas will leave the term as is, to be consistent.

The Office of Oil and Gas believes the language as drafted provides the necessary safeguards, if followed, to provide protection in the karst regions.

See IOGA response under karst.

The Office of Oil and Gas believes that water quality is more susceptible to impacts than quantity and such quality testing is adequate protection at this time.

§35 - 8 - 9.2.d.2. Freshwater casing standards; Use of additives, risk of damage.

As we commented when the rule was initially enacted, we appreciate the requirements to drill the freshwater casing well bore using only air, fresh water or freshwater based drilling fluids However, we do not know what a freshwater-based drilling fluid is. We presume that is drilling mud. Because there is no casing that is cemented in, this is well known to be the most common time for groundwater pollution to occur. Therefore, we oppose any additives being allowed.

We are concerned about language that says the operator shall use, "practices that minimize damage or disturbance or the possibility of unnecessary damage or disturbance to the un cased strata/formations and groundwater...." We do not think damages should be minimized, they should be prevented. The risk of damage should be minimized, not the damage itself.

Similarly, "unnecessary damage or disturbance" seems to assume that damage may be necessary. We do not accept that assumption. There should be no damage to groundwater except perhaps temporary drainage out of a suspended water table into the borehole.

We support the proposed prohibition on using additives in karst regions when drilling the wellbore for the fresh water casing. We also support the requirement that a cement basket or similar device be used to allow for cementing of the annular space when a well is drilled through a cave void.

Office of Oil and Gas Response

The Office of Oil and Gas appreciates the comment, however, the comment involves language (or a concept) that is beyond the scope of the proposed revisions and, therefore, requires no response.

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Office of Oil and Gas Response
See West Virginia Rivers Coalition and WVSORO responses above.

See West Virginia Rivers Coalition and WVSORO responses above.

See West Virginia Rivers Coalition and WVSORO responses above.

See West Virginia Rivers Coalition and WVSORO responses above.

George Monk
35CSR8-2 Definitions
2.15 We approve of incorporating rules governing development on karst terrain which are based on §22-6A-3a.

Office of Oil and Gas Response
The Office of Oil and Gas acknowledges the comment.

7. Karst areas are not sufficiently mapped and designated.

Karst terrain or regions have not been sufficiently identified and mapped by the West Virginia Geological and Economic Survey ("WVGES") to form the basis of a geographic area to apply extensive regulatory requirements. Karst is a subsurface geology that is not and will not be adequately mapped by the WVGES in the near future. Instead of relying on verified data regarding the actual location of subterranean karst voids or formations, DEP proposes to use a broad brush to designate wide areas of West Virginia as subject to extensive and costly regulations. Indeed, the definition of karst region and karst terrain is simply too vague to be reasonably applied. Thus, designating any area as "karst" is an arbitrary and capricious limitation on the right to develop and produce oil and gas resources. In addition, imposing a special requirement to provide notice of a well work permit application to special interest groups such as the West Virginia Cave Conservancy and West Virginia Speleological Society for all counties containing karst topography is an improper delegation of DEP's regulatory responsibility. Such groups have no property rights or interests in such applications, rather they can monitor well work permit applications through the DEP's public records which is publicly available.

§ 2.15 – the term "Karst Terrain" is defined but not used elsewhere in the Rule. IOGA requests that the specific geographic areas that are subject to the additional regulatory requirements be designated by county and tax districts within each county to allow well work applicants to know what requirements are applicable to the application. If the WVGES maps referenced in the definition have been developed, such maps are not readily available to the public. The "karst" terminology contained in the Proposed Amendments is simply vaguely defined and not workable in practice. In addition, the word "Geologic" should be "Geological" in the name West Virginia Geological and Economic Survey.

§ 5.1.c2 - makes a reference to "subdivision 19.1.*c*" but there are two subdivisions designated as 19.1.c. The reference should be corrected based upon the proper subdivision labels in § 19.1.

§ 5.1.i - requires pre-application testing to be submitted with the well work permit application. However, W. Va. Code § 22-6A-3a(b)(1) appears to permit pre-drilling testing rather than pre-application testing. Applicants should be provided the flexibility to perform testing after the issuance of a permit but prior to drilling the well.

§ 5.3.e - requires notice to two special interest groups for well work applications in counties containing karst regions. It is inappropriate to elevate these groups to special status in the absence of a specific interest in the property impacted by the well work. In addition, any notice should be limited to well work applications in a karst region and not expanded to the entire county in which a karst region may be located. Finally, one organization is not registered with the West Virginia Secretary of State and may not be a legal entity. A website having the name "West Virginia Speleological Survey" states "WVASS is as unorganized an organization as is possible to have and still get things done. WVASS is basically a voluntary association of cavers and caving groups, each of which pursues its own interests. We have participants, but no members. Initially there was no constitution, no dues, and few rules. There is cooperation because we have a common desire: to gather and maintain information about West Virginia caves and karst." An organization that is not registered with the West Virginia Secretary of State's office and with no legal notice address should not receive special treatment for notices of well work applications as it has no legal status.

§ 9.1.c - requires baseline testing prior to commencement of any site construction work on "water resources adjacent to the site." The phrase "water resources adjacent to the site" is vague and does not adequately inform the applicant of its regulatory obligation. The baseline testing should be limited to water quality testing by at least one sample taken within 1,500 feet of the well location.

§ 12.4.h – prohibits freshwater impoundments in "any area designated as a karst region." This prohibition is overbroad and an unreasonable restriction on oil and gas operations. The requirement for pre-drilling testing may determine whether construction of a freshwater impoundment is safe or not. Thus, the option of constructing a freshwater impoundment should be retained for such conditions as may support such construction. As noted in A.7 above, the definition of karst region is too vague to impose a complete ban on freshwater impoundments as this proposed subdivision does.

Office of Oil and Gas Response

See West Virginia Rivers Coalition and WVSORO responses above. Additionally, the change to "Geological" is appropriate and will be made. Additionally, the Office of Oil and Gas agrees that identifying the applicable regions by county and district would be effective manner to provide the delineations and will coordinate with the WVGES to provide that information.

The Office of Oil and Gas agrees that the references need changed for clarification. The correct reference will be 19.1.f.

The Office of Oil and Gas believes that the testing may be necessary to provide information needed to develop the permit application and therefore should be done prior to application submittal.

The Office of Oil and Gas agrees to change the language by removing the requirements to notice the two groups. Any interested parties can request to be notified when any permit applications are received. These groups may provide comment during the comment period if they desire to do so.

The Office of Oil and Gas agrees clarification is needed and will change the language. However, due to the hydrology associated with karst, establishing a specific distance requirement is not practical but should rather be related to connectivity.

The Office of Oil and Gas recognizes the necessity for adequate water storage, however, we also believe that construction of pits and impoundments in these areas may not be prudent, due to the uncertainties of water extents associated with karst.

WVONGA

2. Karst Terrain

a. **Availability of Karst Terrain Designations.** The Proposed Rule would adopt various new requirements and prohibitions specifically directed to operations located in karst terrain. "Karst terrain," in turn, is proposed to be defined as "a topography, generally underlain by limestone or dolomite, in which the topography is formed chiefly by the dissolving of rock and which may be characterized by sinkholes, sinking streams, closed depressions, subterranean drainage, and caves, as such areas (known as 'karst regions') have been identified and mapped by the West Virginia Geologic [sic] and Economic Survey." § 2.15.[2] As far as WVONGA is aware, karst regions have not been comprehensively identified and mapped by the West Virginia Geological and Economic Survey—and the information that has been gathered is not readily publicly available to operators. To the extent that WVDEP has more specific information regarding how and where to obtain definitive information about karst areas, it should provide that information with the Proposed Rule and on its website. In the absence of such information, however, WVONGA submits that the provisions in the Proposed Rule relating to karst terrain designations are premature.

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[2] A couple of minor notes on this definition: (1) the reference to the "West Virginia Geologic and Economic Survey" should be to the "West Virginia Geological and Economic Survey," and (2) for consistency with the corresponding statutory definition of "karst terrain," W. Va. Code § 22-6A-4(b)(8), WVONGA suggests that the definition should state "'Karst terrain' means a terrain," rather than a "topography."

b. **Inconsistent Terminology (§ 2.15).** WVONGA notes that the defined term "karst terrain" is not used elsewhere in the Proposed Rule; instead, the agency appears to have used the term "karst region" or, in one instance, "karst feature" (*see* § 5.5.b.2.D). WVONGA encourages WVDEP to revise the Proposed Rule to ensure that consistent terminology is adopted throughout.

c. **Karst Region Testing (§ 5.1.i).** The Proposed Rule would require an operator in any defined karst region "to conduct testing at the proposed drilling site in order to identify caves and other voids, faults and relevant features in the strata as determined by the West Virginia Geological and Economic Survey. The operator shall also conduct testing to identify surface features such as sinkholes." § 5.1.i. The operator would be required to conduct this testing "prior to submitting its application," and include the results of the tests with its permit application. *Id.* These timing requirements conflict with the language of the Horizontal Well Act, however, which requires operators to perform "predrilling testing"—not pre-application testing—to identify relevant features within designated karst areas. W. Va. Code § 22-6A-3A(b)(1). For consistency with the statute, therefore, WVONGA encourages WVDEP to revise the Proposed Rule to require that this testing be performed (and the results submitted) prior to the commencement of drilling, but authorize the well work permit to be issued without this information. This would allow the operator to assume the business risk of deferring the testing, if so inclined, while still ensuring that the analyses will be completed prior to drilling.

d. **Required Notifications (§ 5.3.e).** The Proposed Rule would require an applicant for a well work permit in a county containing karst regions to provide notice to the West Virginia Cave Conservancy and the West Virginia Speleological Society prior to or at the time of filing its application with the Office of Oil and Gas. § 5.3.e. Requiring applicants to provide individualized notice to special interest groups is both improper and unnecessary. To the extent that these groups are interested in proposed oil and gas development within karst (or other) regions, they can monitor applications for well

work permits through WVDEP's electronic mailing lists and obtain publicly available information relating to such applications through requests filed pursuant to the West Virginia Freedom of Information Act.[2]

e. **Baseline Water Testing (§ 9.1.e).** The Proposed Rule would require the operator "to conduct baseline water testing prior to commencement of any site construction or well work in any karst region. Testing shall be conducted on the water resources adjacent to the site and in accordance with the requirements of subsection 15.3 of this rule." § 9.1.e. It is unclear as to whether this requirement is intended to encompass both groundwater and surface water, as well as how "adjacent" is to be interpreted.

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[2] It is also unclear why the proposed notification should extend to all applications to be filed for a county containing a karst region, rather than limited to those applications to drill in (defined) karst terrain. WVONGA objects to this notification requirement in its entirety, but even as drafted it is overbroad.

Office of Oil and Gas Response
See IOGA response under karst. Additionally, known karst areas will be established and web accessible.

See West Virginia Rivers Coalition and WVSORO responses above.

See IOGA response under karst.

See IOGA response under karst.

See IOGA response under karst.

Noble

1. **Section 5.1.i** covers Karst region testing. Noble supports the following position of the IOGA regarding this section:

"Karst terrain or regions have not been sufficiently identified and mapped by the West Virginia Geological and Economic Survey ("WVGES") to form the basis of a geographic area to apply extensive regulatory requirements. Karst is a subsurface geology that is not and will not be adequately mapped by the WVGES in the near future. Instead of relying on verified data regarding the actual location of subterranean karst voids or formations, DEP proposes to use a broad brush to designate wide areas of West Virginia as subject to extensive and costly regulations. Indeed, the definition of karst region and karst terrain is simply too vague to be reasonably applied. Thus, designating any area as "karst" is an arbitrary and capricious limitation on the right to develop and produce oil and gas resources. In addition, imposing a special requirement to provide notice of a well work permit application to special interest groups such as the West Virginia Cave Conservancy and West Virginia Speleological Society for all counties containing karst topography is an improper delegation of DEP's regulatory responsibility. Such groups have no property rights or interests in such applications, rather they can monitor well work permit applications through the DEP's public records which is publicly available."

Noble also supports the following position of the WVONGA regarding this section:

"The Proposed Rule would require an operator in any defined karst region 'to conduct testing at the proposed drilling site in order to identify caves and other voids, faults and relevant features in the strata as determined by the West Virginia Geological and Economic Survey. The operator shall also conduct testing to identify surface features such as sinkholes.' § 5.1.i. The operator would be required to conduct this testing 'prior to submitting its application,' and include the results of the tests with its permit application. These timing requirements conflict with the language of the Horizontal Well Act, however, which requires operators to perform 'predrilling testing'—not pre-application testing—to identify relevant features within designated karst areas. W. Va. Code § 22-6A-3A(b)(1). For consistency with the statute, therefore, WVONGA encourages WVDEP to revise the Proposed Rule to require that this testing be performed (and the results submitted) prior to the commencement of drilling, but authorize the well work permit to be issued without this information. This would allow the operator to assume the business risk of deferring the testing, if so inclined, while still ensuring that the analyses will be completed prior to drilling."

9. **Section 9.1.c** covers baseline water testing. Noble supports the following position of the WVONGA regarding this section:

"The Proposed Rule would require the operator 'to conduct baseline water testing prior to commencement of any site construction or well work in any karst region. Testing shall be conducted on the water resources adjacent to the site and in accordance with the requirements of subsection 15.3 of this rule.' § 9.1.c. It is unclear as to whether this requirement is intended to encompass both groundwater and surface water, as well as how 'adjacent' is to be interpreted."

15. **Section 12.4.h** prohibits freshwater impoundments in "any area designated as a karst region." Noble is concerned that this prohibition is overly broad and will establish an undue restriction on oil and gas operations. The requirement for pre-drilling testing determines whether construction of a freshwater impoundment is safe or not. Thus, the option of constructing a freshwater impoundment should be retained for such conditions as are determined by pre-drilling testing to as able to support such construction. Similarly, as noted in our earlier Comment No. 1 above, Noble believes the definition of karst region is too vague. Thus to impose a broad ban on freshwater impoundments based on a vague definition, as this proposed subdivision does, can create an unjustified restriction on oil and gas operations. Noble recommends that the department modify the Proposed Rule to indicate that a geologic study be conducted in any karst region to determine whether the area is suitable for a freshwater impoundment without prohibiting the use of these impoundments in all cases.

Office of Oil and Gas Response

See IOGA response under karst.

See IOGA response under karst.

See IOGA response under karst.

American Energy Appalachia

1) **Karst terrain has not been properly identified and mapped by the West Virginia Geologic and Economic Survey thus these requirements are premature.**

The proposed rule contains several new provisions related to permitting and/or operations in "karst" regions. The term karst is not a defined term and there has been no map or document produced identifying the areas of the state which are deemed to be "karst" and would be subject to these provisions. As a result, it is not possible to determine whether AEA is in agreement with the manner and area which will be identified as "karst" areas and AEA is unable to measure the potential impacts of that designation and these requirements upon industry and AEA's specific operations. AEA would suggest that these requirements be removed until such time as "karst" areas are defined and identified.

2) **It is arbitrary and capricious to require separate notice requirements for special interest groups.**

Amended Rule 35-8-5.3.e. provides: *In a county containing karst regions, the applicant well operator shall provide notice to the WV Cave Conservancy and the West Virginia Speleological Survey either prior to or at the time of filing of the application with the Office of Oil and Gas.*

Special interest groups have no property rights or statutorily protected interest in such applications. These groups can monitor well work permit applications through the DEP's public records and the provisions contained in 35-8-5.3.e. should be deleted.

Office of Oil and Gas Response

See IOGA response under karst.

See IOGA response under karst.

Antero

1. **Application for Permit; Issuance, Conditions and Modifications (Karst region). 35 CSR, Series 8-5.1.i**

The proposed requirement to conduct testing in any defined karst region prior to submitting the permit application is premature. According to the Plans for Geologic Mapping in West Virginia, October 2009, and the West Virginia Geologic and Economic Survey's current mapping web site, karst terrain or regions have not been sufficiently identified and mapped to form the basis of a geographic area to which to apply regulatory requirements. Karst is a subsurface geology that is not and will not be adequately mapped and designated until 2019.

As a result, it is premature to promulgate and impossible for Antero to assess the potential impacts of rules and regulations which would propose to be applicable to karst regions. Antero would suggest that the term "karst region" be defined to include those areas identified and mapped by the West Virginia Geologic and Economic Survey as of July 27, 2015. This provides certainty to the industry while also protecting known "karst regions" and avoids the potential for conflict regarding what areas may or may not be labelled as karst regions.

2. **Notice. 35 CSR, Series 8-5.3.e**

Amended Rule 35 CSR, Series 8-5.3.e requires separate notice to the West Virginia Cave Conservancy and the West Virginia Speleological Survey either prior to or at the time of filing of an application for a well work permit in a "karst" region with the WVDEP. Antero does not challenge the expertise of these organizations, but these groups have no presumed property rights or statutorily protected interests in such applications. These groups can monitor well work permit applications through the WVDEP's public records and the extensive public notice process, which was established by the Act.

Further, the inclusion of these groups by rule, at the expense of other special interest groups, would establish a precedent by which any other group with may request and maintain a right to specific individual notice. As a result, 35 CSR, Series 8-5.3.e should be deleted.

Office of Oil and Gas Response
See IOGA response under karst.

See IOGA response under karst.

West Virginia Rivers Coalition and WVSORO

§35- 8 -8.3.a.3. Transfer of Title and Operator Status; Transfer of liabilities and obligations.

The following language should be added to this section: "As further clarification, this language does not apply to liability to third parties."

Office of Oil and Gas Response

The particular language in the rule has existed for several years and seems to have been sufficient. The Office of Oil and Gas believes that clarification is not necessary.

American Energy Appalachia

8) Transfer time of well work permit and bonds should be minimized.

The transfer of an existing well or well work permit does not involve technical issues or impact operational issues. Due to business considerations and because this is an entirely administrative procedure, the time frames for both reviews by the Chief should be limited to 45 days. Proposed rule 35-8- 8.4.e. should be revised as follows: "Upon receipt of an application to transfer an existing well or well work permit from one operator or permittee to another or an existing well work permit from one bond to another bond, the Chief will review the submitted data along with other information and approve or disapprove the application within ~~60 day or 90~~ 45 days, ~~respectively~~..."

Office of Oil and Gas Response

The Office of Oil and Gas believes that the language as written is appropriate for the review and decision process. For well transfers, it is consistent with existing rule language for the review process under 35 CSR 4. Additionally, the recently passed statute change (SB 280) allowing for transfer of permits provides 90 days for a transferee to notice (an administrative procedure) certain entities upon receipt of approval by the secretary.

West Virginia Rivers Coalition and WVSORO

§35- 8 -5.6.f. Water Management Plans: Wastewater storage.
We support the requirement that wastewater generated from drilling, fracturing, stimulation and production being re-used for similar purposes at another location must be stored in tanks or in centralized pits subject to more detailed and stringent design and construction standards and operational criteria. In particular, we appreciate the transition to pitless or closed-loop drilling systems and that open pits will no longer be used to store drilling waste on site.

Office of Oil and Gas Response
The Office of Oil and Gas appreciates the comments regarding wastewater generated and handling. For the closed loop drilling system comment, see the Closed Loop "response" to the EQT comment.

IOGA

§ 12.4.f – should be modified to permit beneficial use of fluids from the impoundment as follows: "All material in the pit/freshwater impoundment, including the liner shall be beneficially used or disposed of in an appropriate manner." The disposition of the material will not always be pursuant to a permit. Of course, IOGA opposes the elimination of "pits" as explained at A.3 above.

Office of Oil and Gas Response
The Office of Oil and Gas is supportive of the beneficial reuse and changes the proposed revisions accordingly. For the elimination of "pits" comment, see the Closed Loop "response" to the EQT comment.

Noble

14. Section 12.4.d covers freshwater impoundment lining, and would delete "pits" from this section of the Proposed Rule. Noble supports the general position of the IOGA regarding this section:

"12.4.d – should be modified to permit beneficial use of fluids from the impoundment as follows: 'All material in the pit/freshwater impoundment, including the liner shall be beneficially used or disposed of in an appropriate manner. The disposition of the material will not always be pursuant to a permit.

Office of Oil and Gas Response
The Office of Oil and Gas is supportive of the beneficial reuse and changes the proposed revisions accordingly. For the elimination of "pits" comment, see the Closed Loop "response" to the EQT comment.

Antero

11. Freshwater Impoundments. 33 CSR, Series 8-12.4.f

The proposed rule at 33 CSR, Series 8-12.4.f, appears to require disposal of the liner under an approved permit. This would apparently, and Antero is certain, unknowingly, preclude the recycling of the liner. In the interest of environmental stewardship, Antero recommends modification of this provision to authorize the recycling/re-use of the liner in appropriate circumstances.

Office of Oil and Gas Response

The Office of Oil and Gas is supportive of the recycling recommendation and changes the proposed revisions accordingly.

West Virginia Rivers Coalition and WVSORO

§35- 8 - 17. Construction of Centralized Pits and Impoundments.

We commend the OOG for proposing additional safeguards for centralized pits that store waste generated by natural gas drilling operations and the steps the OOG has taken in this rule to reduce the use of pits and the problems associated with them. More detailed and stringent design and construction standards and operational criteria for all pits and impoundments are long overdue. However, drilling pits are not necessary and their use poses an unnecessary risk to human health and the environment, no matter how well they are constructed. We strongly encourage the Department to eliminate the use of pits for the storage of drilling and hydraulic fracturing fluids and other drilling waste.

Absent a strict prohibition on the use of pits, we appreciate that the proposed design and construction standards impose restrictions on where centralized waste pits can be located. We also appreciate that the standards acknowledge the threats pits pose to surface and ground water by requiring dual liners with leak detection and requiring companies to install water quality monitoring wells near the pits. Nevertheless, we have identified a number of shortcomings with the proposed standards. The following comments are drawn from WV-SORO's 2012 comments on the OOG's Design and Construction Standards for Centralized Pits, on which many of the additions to these sections appear to be based. These comments were prepared with the input of surface owners who have experienced problems with pits, including torn liners and leaking of potentially toxic liquids into soils, surface water and groundwater.

§35- 8 -17.2.a. Siting Requirements.

We appreciate the proposed siting restrictions. Such restrictions are long overdue, and we particularly applaud the prohibition of locating pits in karst areas. Although we recognize that the proposed prohibitions are more stringent than most other jurisdictions, with a few exceptions, we are concerned about their limited applicability and question whether they are protective enough. Some states apply the distance from homes to hospitals, nursing homes, schools, places of worship and other places people gather, which is appropriate. Such restrictions are important because, in addition to soil and water contamination, pits can produce odors and toxic air contaminants.

We are concerned about the growing number of instances where proposed standards and regulations provide more protection for public water supplies and intakes than they do for private water wells and springs. This pattern is reflected in both the proposed pit standards, as well as in the recently passed Horizontal Well Control Act. While, we share the concerns of public water supply managers and users that want their water protected, we believe it is unfair and unjust not to extend the same protections to those whose water supplies are most likely to be affected and who have fewer resources available to them to deal with the contamination if it occurs. Adequate setbacks are needed for the protection of all water supplies (public and private).

While the proposed standards place restrictions on the location and construction of pits relative to perennial streams, consideration should also be given to construction around or the filling of intermittent or ephemeral streams.

Furthermore, the prohibitions should clarify that pits cannot be constructed unless the company has an agreement with the surface owner. The notification provided to the surface owner in section 17.4 is important and good. However, beyond that the rules should clarify that centralized pits cannot be constructed unless the company has a written agreement with the surface owner. Proof of such agreement should be provided to the OOG.

§35- 8 -17.2.g. Monitoring.

We particularly appreciate the water quality monitoring provisions of the proposed standards, as the majority of our members are rural and rely on groundwater aquifers for their drinking water. However, in addition to establishing monitoring wells to monitor general groundwater quality over the life of the pits, the standards should also require evaluation of baseline water quality of nearby water wells and developed springs.

§35- 8 -17.2.g.2. Water Quality Monitoring System Components and Location

These standards were modeled after Pennsylvania, and while they are stronger in some respects, such as the location restrictions, it was disappointing that they require less than Pennsylvania in terms of water quality monitoring. The PA standards require a minimum of one monitoring well up gradient and three monitoring wells down gradient. Under the PA standards, monitoring wells must be within 200 feet of the impoundment and at least 100 feet closer than the nearest drinking water well. The proposed WV standards have the former but not the latter. It is necessary to have monitoring wells close, as well as further away.

§35- 8 -17.2. g.4. Data Analysis, Water Sampling and Testing Parameters.

The proposed standards require the collection of water samples once per calendar quarter. A more frequent sampling schedule would be more meaningful. Conductivity and pH in particular can be easily measured in the field and relatively inexpensive monitors (compared to the cost of establishing the monitoring well) can be deployed to measure and record these parameters on a continuous basis.

In addition to the OOG, a copy of the data analysis should be provided to the surface owner and owners of water wells and developed springs.

Although the minimum parameters are good indicators of possible contamination, they are not regulated by primary drinking water standards. The list of testing parameters should be expanded to include constituents

such as heavy metals, chemicals or chemical compounds used in hydraulic fracturing and naturally occurring radioactive materials (NORMs) known to exist in the Marcellus Shale – constituents DEP's own sampling has shown are present in drilling wastewater.

At a minimum, non-seasonal changes in the parameters specified in the proposed standards should immediately trigger additional sampling and more extensive testing for heavy metals, BTEX and radioactivity. If changes occur, owners of nearby drinking water wells and springs should be notified immediately, and their wells and springs should be sampled and tested for potential contaminants.

§35- 8 -17.5.b. Conformance with Plans, Engineer Certification

We support and appreciate the additional certification requirements in this section to help ensure that pits and impoundments are constructed in accordance to plan. The Horizontal Well Control Act required that the plans and specifications for high-volume pits and impoundments be prepared by a registered professional engineer. However, one of the problems identified in the pit and impoundment study mandated by the Act was that more than half of the pits examined as part of the study were not built according to the specifications in the plans.

The surface owner should receive a copy of the final certification report submitted to the Office and be notified prior to filling.

Office of Oil and Gas Response

Anytime a centralized pit application comes to our office instances of any impact to homes and businesses along with other places people gather are given extra scrutiny. Recommendations are often given to add precautions for the protection of such places. Similarly we also comment on the proximity of all types of streams and plan accordingly for their protection. Both public and

private water source set backs are addressed in the amended rule, 500' for the private wells and 1000' for the public water intakes.

Section 7 of the IMP-1B, the Centralized Impoundment/Pit application contains language that certifies the operator has a surface use agreement in place. This is in conjunction with the surface owner notification (WW-6A) provides proof that the property owner is in agreement with the operator. Property owners can request a water well survey from the operator when they send them notice of a pit being constructed in their area. Also at any time the property owner can request monitoring well test results from the operator. In an instance a monitoring well does show a reading that differs from the baseline results they should immediately contact their county inspector.

The location and number of down gradient are reviewed during centralized pit application review. Both items are dependent upon topography and design of the individual project site.

The testing parameters included in 35-8-17.2.g.4 act as an initial indicator. When a sample is tested and the results show differences between current and baseline samples, this will alert the operator to perform more in-depth water analysis and contact the local county inspector.

The surface owner can request the as-built of the pit constructed on their property at any time. There are times that plans are changed in the field, this can happen in any earthwork job. Those changes are to be documented on the as-built and certified by the engineer that they are still acceptable.

George Monk

17.2.a.2 We question why perched groundwater zones should be exempt from groundwater protection. Since the permit application does not require the report of a hydrogeologist, the rule is allowing operators to make this determination on their own, putting at risk all groundwater (perched or not) which must be protected under law.

The rule should read: "... or in or within twenty inches (20") of the seasonal high of the groundwater table, ~~except perched groundwater zones.~~"

17.2.g Groundwater and surface water monitoring is an excellent addition to the centralized pits portion of the rule. We wish, however, that the constituents monitored under 35CSR8-17.2.g.4 were not just those with unenforceable secondary MCLs. Either include enforceable criteria such as barium and arsenic or include wording in the rule stating which concentrations (acute or chronic) under 47CSR2 are the maximum allowable.

17.8.b The additions to the security section are excellent.

Office of Oil and Gas Response

Perched water tables are determined by ground water studies performed during plan development. The operator must provide geological data to prove that the water table is perched.

When the water table is found to be truly perched, it will be removed or drained during construction, therefore little or no risk to groundwater.

The testing parameters included in 35-8-17.2.g.4 act as an initial indicator. When a sample is tested and the results show differences between current and baseline samples, this will alert the operator to perform more in-depth water analysis and contact the local county inspector.

Thank you for your comment

IOGA

§ 17.1.a – references "'centralized pit or impoundment' . . . as that term is defined above." However neither term is defined in the Proposed Amendments. Because requirements imposed by the Proposed Amendments differ between "centralized pits" and "centralized impoundments" those terms should be clearly and separately defined.

§ 17.2.a.2 – the term "public water source" is not defined in the Proposed Amendments and should be replaced with "public water system surface water intake."

§ 17.9.b – the first sentence should be modified by deleting the words "During initial filling operations" and inserting following the word "continuously" the words "during active filling operations."

Office of Oil and Gas Response

The definition of a centralized pit or impoundment is defined in the title as "a structure with capacity of greater than 5000 barrels", hence the defined above reference in the rule.

The wording "public water source" has been modified to "public water system intake source".

Initial filling operation is the first water that fills the pit or impoundment. This is the most critical time in a pit or impoundment life since it's the first time it holds weight; therefore we require continuous monitoring until filling is complete

WVONGA

12. Centralized Pits and Impoundments

a. Definitions (§ 17.1.a). Section 17.1.a of the Proposed Rule establishes a definition of "centralized pit or impoundment" that references "a pit or impoundment, as that term is defined above . . . ." The Horizontal Well Rule does not define these terms, however. WVONGA suggests incorporating the definitions of "pit" and "impoundment" as set forth in the Horizontal Well Act either *verbatim* or by reference. *See* W. Va. Code §§ 22-6A-4(b)(7) and 22-6A-4(b)(10).

b. **Siting Requirements (§ 17.2).** Because the siting requirements of the Proposed Rule would eliminate anything within the 100-year floodplain, operators will required to undertake large and extremely costly excavation projects in areas of steep terrain to provide an area large enough for construction of a centralized waste pit or impoundment. The proposed maximum 2:1 horizontal to vertical slope requirements would present additional challenges in this limited area. WVONGA is concerned that these rules will effectively disincentivize and render cost-prohibitive and uneconomical the water recycling/reduction efforts that have been implemented by the industry, thereby resulting in the need for more freshwater to be used instead.

WVONGA suggests that WVDEP revise this section to establish a waiver procedure for the setback distances from perennial streams and wetlands (of 500 feet and 100 feet, respectively) if the operator makes a sufficient demonstration that additional controls or other measures will be implemented to ensure the protection of the relevant perennial stream(s) and/or wetland(s).[7] Finally, WVONGA also requests clarification that the proposed setbacks should be calculated from the centralized pit or impoundment itself (i.e., the bank of the pit or impoundment), rather than from the limit of disturbance.

[7] WVONGA also notes that the proposed 500-foot setback from a perennial stream measured horizontally from the limit of disturbance is excessive, and suggests that a 100-foot setback would be more appropriate and provide adequate protection of the water feature from erosion and sedimentation.

c. **Compaction of Centralized Pits and Impoundments (§ 17.2).** The Proposed Rule requires fills to be constructed in horizontal lifts with a maximum thickness of nine inches and with no individual particle greater than three inches. § 17.2.d. Common practice in the industry allows for the use of particles up to six inches in length, and horizontal lifts of 12 inches. WVONGA is unaware of any technical reason to establish the alternative limitations set forth in Section 17.2.d of the Proposed Rule.

d. **Leak Detection System Requirements (§ 17.2.f).** Section 17.2.f.2 provides that "[e]ach centralized pit shall have its own sump(s). The design of each sump and removal system shall provide a method for measuring and recording the volume of liquids present in the sump and the volume of liquids removed." WVONGA notes that the volume of liquids present in the sump may be difficult to measure accurately and does not provide any assurance as to the integrity of the pit; rather, monitoring the volume of liquids removed should provide adequate information as to pit integrity for purposes of this section.

e. **Design Standards (§ 17.2.h).** The Proposed Rule would require a centralized pit or impoundment to be "designed, constructed, maintained and operated to prevent overtopping resulting from normal or abnormal operations; overfilling; wind; rainfall; run-on; malfunction of level controllers, alarms, and other equipment; and human error . . . ." § 17.2.h. WVONGA notes that, while it is possible to minimize these risks, it is not possible to design, maintain and operate a pit or impoundment against all possible equipment malfunctions, anomalous nature events or human error. Accordingly, we suggest substituting the term "prevent" in this subsection with the phrase "minimize to the degree possible the risk of."

d. **Security Requirements (§ 17.2.b).** Because fencing specifications are now proposed to be incorporated into the rule, it is no longer necessary for the first sentence of this section to state that fencing must secure the site "from access by the public and wildlife." This language arguably suggests that additional measures beyond those specified may be required. For purposes of clarity, therefore, WVONGA suggests the following revision to this provision: "All centralized pits and impoundments shall be enclosed by adequate fencing to secure the site ~~from access by the public and wildlife~~ as specified in this subdivision."

The definition of a centralized pit or impoundment is defined in the title as "a structure with capacity of greater than 5000 barrels", hence the defined above reference in the rule.

Office of Oil and Gas Response
The definition of a centralized pit or impoundment is defined in the title as "a structure with capacity of greater than 5000 barrels", hence the defined above reference in the rule.

The definition of a centralized pit or impoundment is defined in the title as "a structure with capacity of greater than 5000 barrels", hence the defined above reference in the rule.

Many counties limit the construction of any structure within the floodplain. If a pit or impoundment were to be constructed in the floodplain it would likely be unable to meet the incised volume criteria set forth in the due do excavation below groundwater level.

A 2:1 horizontal to vertical slope is considered to be maximum slope allowable without some form of engineered fill.

At this time there is no waiver process for the restrictions on the centralized pits, the rule will stand as it is written. Restrictions shall be measured from the limit of disturbance of the pit itself, not the LOD surrounding the soil stockpiles, access road, etc.

The amount of embankment on a mostly incised pit is limited; the intention of this specification is to ensure little to no movement of the embankment and no voids are present. Keep in mind these limits are for the construction of the pit/impoundment only. All other constructed items such as access roads, stockpiles, etc. will fall under the 35-8-17.5.5 criteria.

The Office of Oil and Gas recognize the lack of clarity in the wording for 35-8-17.2.f.2, therefore the language has been modified from "measuring and recording the volume of liquids present in the sump" to "monitoring".

Leak prevention is the absolute goal for any well designed, constructed and operated centralized pit. It is understood that there will always be circumstances that are out of the operators control; at that point the facility should have been engineered in such a way that the impacts are minimal.

The sentence "All centralized pits and impoundments shall be enclosed by adequate fencing to secure the site from access by the public and wildlife." alone may appear as if its inferring more is necessary. In reading the rule as a whole its clear what the fencing is used for and what the rule requires.

17. Section 17.2.a.2 states that "[c]entralized pits and impoundments may not be constructed with the one hundred year floodplain of water of the state; in or within 100 feet of a wetland as measured horizontally from the limit of disturbance;...within 500 feet of a perennial stream as measure horizontally from the limit of disturbance..."

    Noble requests a revision to clarify that the setback requirements, e.g., 100 feet for a wetland and 500 feet from a perennial stream, are to be from the impoundment/pit itself (i.e., the impoundment bank) and not the limit of disturbance ("LOD"). Access roads and other features associated with the centralized pit are often are included within the LOD and are often located in close proximity to wetlands and perennial streams. With proper E&S controls, these site features can be implemented with appropriate environmental protections within the regulations currently in place which provide setbacks from top of centralized pit berm, not LOD. In addition, Noble recommends that the WVDEP include language to allow for a waiver process to deviate from the 100 foot setback for wetlands and 500 feet from a perennial stream if the operator is able to demonstrate that additional measures to be set in place will be protective of the wetlands or streams.

18. Section 17.2.f.2 deals with leak detection system requirements for centralized pits and impoundments. It states that "[e]ach centralized pit shall have its own sumps. The design of each sump and removal system shall provide a method for measuring and recording the volume of liquids present in the sump and the volume of liquids removed."

    Noble is concerned that the volume of liquids present in the sump may be difficult to accurately measure, do not provide any assurance of the integrity of the pit, and suggests that monitoring the volume of liquids removed should provide adequate pit integrity information. Therefore, Noble recommends the language be modified as follows:

    > "[e]ach centralized pit shall have its own sumps. The design of each sump and removal system shall provide a method for monitoring the volume of liquids removed."

19. Section 17.2.h states that "[a] centralized pit or impoundment shall be designed, constructed, maintained, and operated to prevent overtopping resulting from normal or abnormal operations; overfilling; wind; rainfall run-on; malfunctions of level controllers, alarms, and other equipment; and human error and have at a minimum two feet of freeboard maintained at all times. To verify the two feet of freeboard the elevation of two feet below the crest of the centralized pit or impoundment shall be permanently marked on the liner."

    Noble suggests revising the phrase "overfilling, wind, rainfall, run-on, malfunctions of level controllers, alarms, and other equipment, and human error" from this section because it is not possible to design, maintain and operate a pit/impoundment against all of these potential

concerns. Design can minimize the potential for this, but cannot totally remove the potential making it impossible for an operator to fully comply. Noble suggests that the rule be modified to state the following:

> "[a] centralized pit or impoundment shall be designed and constructed to minimize the potential for overfilling; wind; rainfall run-on; malfunctions of level controllers, alarms, and other equipment; [a] centralized pit or impoundment shall be maintained and operated to prevent overtopping resulting from normal or abnormal operations and have at a minimum two feet of freeboard maintained at all times."

20. Section 17.5.b states "[u]pon completion of construction of a centralized pit or impoundment, the operator shall submit to the Chief certification from a WV registered professional engineer that the centralized pit or impoundment was constructed in accordance with the approved plan. Once this certification and an as-built plan have been received by the Chief the centralized pit or impoundment may be filled. This final certification shall be maintained by the operator for a minimum of five years after the reclamation of the structure and site...."

Noble requests that the department clarify what phase of reclamation is involved for the purpose of the requirement to maintain final certification. In an effort to minimize and mitigate impacts to surrounding areas, operators often employ partial reclamation of areas that are not needed after construction is complete. However, it is unclear whether the WVDEP intends such partial reclamation to trigger this requirement in § 17.5.b. Similarly, § 17.3.e describes two phases, "post-construction" and "post-use," which Noble would also request that the department clarify for the purpose of requirements under this Proposed Rule.

21. Section 17.8.b states regarding security that "[a]ll centralized pits and impoundments shall be enclosed by adequate fencing to secure the site from access by the public and wildlife. A six foot minimum height perimeter fence that is suitable to limit unauthorized entry to the site shall be installed prior to placing any fluid in the centralized pit or impoundment. At least one strand of barbed wire shall be installed at the top of the perimeter security fence to discourage unauthorized entry. This security fence shall be maintained for the life of the centralized pit or impoundment. Orange construction barrier fence and barbed wire only fence shall not be considered adequate for limiting unauthorized access. A lifeline throw ring safety device attached to a rope shall be kept available at all time in case someone accidentally falls into the pit or impoundment. The safety device shall be attached in a readily available location adjacent to the centralized pit or impoundment."

Noble requests that WVDEP clarify that these requirements are to apply for only new impoundments installed after the effective date of the rule and that it is not necessary for operators to retrofit existing pits/impoundments with different fencing. Additionally, Noble is concerned that this this regulation is unnecessarily prescriptive because it does not allow for a

safety equivalent. As previously stated, Noble believes strongly in performance-based regulation that allows for operators to innovate and realize efficiencies provided they can meet certain performance standards. For example, Noble believes its current application of fencing and bird netting completely enclosing the impoundment from all sides and the top that provide as equivalent a safety measure as a 6 feet high fence with barbed wire and with added benefit to avian species. For this reason, Noble would recommend the agency add language to specify that "equivalent fencing measures could be utilized upon approval by the Department."

22. **Section 17.9.f** requires that "[p]ipeline transporting any wastewaters (e.g. drilling or hydraulic fracturing fluids) to or from the pit shall have pressure monitored at the pump. The discharge end of the pipeline shall be visibly inspected to ensure that flow does not decrease or change in a manner that could indicate that leakage is occurring in the pipeline. Personnel at both the intake and discharge end of the pipeline shall maintain constant communication during flowback or pumping operations when filling a centralized pit. In the event of a leak or suspected leak, the operator shall cease operation of the pipeline until leaks are found and corrected."

Noble requests a revision to clarify that it is not necessary for personnel to be present during pumping. Most systems can be automated and protections such as high level alarms at pits and impoundments are in place. Automation can be installed to monitor flow and pressure at both ends of the pipeline. Noble therefore suggests revising the Proposed Rule to state that precautions much be implemented during pumping operations to monitor and alert in the event of an overflow, leak or suspected leak.

Office of Oil and Gas Response

At this time there is no waiver process for the restrictions on the centralized pits, the rule will stand as it is written. Restrictions shall be measured from the limit of disturbance of the pit itself, not the LOD surrounding the soil stockpiles, access road, etc.

The Office of Oil and Gas recognizes the lack of clarity in the wording for 35-8-17.2.f.2 and has been modified from "measuring and recording the volume of liquids present in the sump" to "monitoring".

Leak prevention is the absolute goal for any well designed, constructed and operated centralized pit. It is understood that there will always be circumstances that are out of the operators control; at that point the facility should have been engineered in such a way that the impacts are minimal.

The intent of the 35-8-17.5.b amendments is to maintain a file for 5 years after final reclamation. Post-construction can be defined as after construction is completed, how the site will look during its years of use, this could also be called partial reclamation. Post-use is considered to be after final reclamation once the property is in its final condition and the property owner can regain its use.

There will be an additional sentence that allows an alternative fencing to be used if approved by the chief.

The Office of Oil and Gas recognizes the lack of flexibility to use an automated system for filing and extracting fluids from a centralized pit therefore automated monitoring has been added to 35-5-17.9.f

17) The fill construction requirements do not comport with industry practice.

Proposed rule 35-8-17.2.d. requires fill to be constructed in lifts with a maximum thickness of 9 inches with no individual particle being grater than 3 inches. Common practice in the construction industry, including oil and gas operations, allows for use of particles up to 6 inches in length and horizontal lifts of 12 inches in thickness. Industry is unaware of any technical reason to mandate particles no greater than 3 inches in length or horizontal lifts no greater than 9 inches. This section should be revised accordingly.

18) The groundwater monitoring requirements of 35-8-17.2.g. should be eliminated.

The provision for detailed groundwater monitoring under 35-8-17.2.g. appears to be hastily prepared based upon factors including the fact that there are no groundwater quality standards for any of the parameters to be monitored and the fact that groundwater flow can take years to move 10 feet or more beneath the ground surface. Proposed amended rule 35-8-17.2.g.2.

requires a minimum of one monitoring well be installed downgradient from the proposed pit area.

This provision of the rule appears to provide a simple solution to a complicated situation that would involve significantly more money to accurately detail the groundwater quality for very little reliable groundwater information. This provision should be removed from the rules. In the alternative, the groundwater monitoring requirements of section 17.2.g should only apply to centralized pits containing wastewater. These groundwater monitoring requirements should not extend to freshwater impoundments.

19) Inspection requirements for pits and impoundments should vary based on potential for harm.

The inspection requirements for pits and impoundments should vary based on potential for harm. These inspection requirements should only apply to wastewater pits or impoundments and should not apply to freshwater storage.

The proposed rule 35-8-17.9.d. requires inspection by a professional engineer for pits and impoundments that have not been utilized for their intended purpose for at least six months should apply only to pits or impoundments that store wastewater, to include flow-back water and produced water from the well. A company representative, as opposed to a professional engineer, should conduct this inspection.

20) 35-8-17.9.g should be limited to wastewater pits or impoundments.

35-8-17.9.g. requires "Loading and unloading stations, including but not limited to drums, trucks, and railcars, shall have spill prevention and control facilities and procedures as well as secondary containment, if appropriate or otherwise required....." This regulation is located in 35-8-17.9. Inspection of Centralized Pits or Impoundments. In order that others not misinterpret this requirement for spill prevention and control facilities and procedures, it is necessary to insert that this subsection 35-8-17.9.g. is specific to centralized pits and/or impoundments and the handling of wastewater.

Office of Oil and Gas Response
The amount of embankment on a mostly incised pit is limited; the intention of this specification is to ensure little to no movement of the embankment and no voids are present. Keep in mind these limits are for the construction of the pit/impoundment only. All other constructed items such as access roads, stockpiles, etc. will fall under the 35-8-17.5.5 criteria.

Ground water monitoring shall be for pits only, and the language has been changed to reflect this amendment. The testing parameters included in 35-8-17.2.g.4 act as an initial indicator. When a sample is tested and the results show differences between current and baseline samples, this will alert the operator to perform more in-depth water analysis and contact the local county inspector.

Inspection of both impoundments and pits are equally important. Impoundments must be inspected as frequently in order to watch for liner damage and slippage. While impoundments do not contain waste material a breach of any kind could be detrimental to the local residents.

This small section of the rule simply serves as a reminder to be mindful during handling fluids while operating a pit.

Antero

14. Construction of Centralized Pits and Impoundments. 33 CSR, Series 8-17.2.

Antero maintains a series of separate comments related to this specific section:

A. The proposed rule at 33 CSR, Series 8-17.2, requires fill to be constructed in lifts with a maximum thickness of 9 inches with no individual particle being greater than 3 inches. Common practice in the industry allows for use of particles up to 6 inches in length and horizontal lifts of 12 inches in thickness. Antero is unaware of any technical reason to mandate particles no greater than 3 inches in length or horizontal lifts no greater than 9 inches. This section should be revised accordingly.

B. The proposed rule at 33 CSR, Series 8-17.2.a.2 addresses offsets from perennial streams. Antero urges WVDEP to reduce the 500' offset to perennial streams from freshwater impoundments contained in the rule. As the WVDEP is aware, the United States Environmental Protection Agency and the United States Army Corps of Engineers recently issued its final rule regarding the definition of waters of the United States, which greatly increases the scope of the definition to include many new waters that would now be identified as "perennial" streams.

This change is also consistent with the basic notion that centralized freshwater impoundment pose little to any environmental risk. Antero specifically proposes that 33 CSR, Series 8-17.2.a.2 be bifurcated to allow for lesser-offset requirements from perennial streams for a centralized freshwater impoundment.

C. With regard to the proposed rule at 33 CSR, Series 8-17.2.b, Antero urges WVDEP to define what loading requirements are needed for a factor of safety of 1.5 or clearly state this is left to the professional engineer's judgment. Antero requests WVDEP clarify whether FS=1.5 at freeboard with pit full at static conditions is required, or can it assume liner reduces phreatic surface within the adjacent embankment.

D. Proposed rule at 33 CSR, Series 8-17.2.d, restricts the size of individual particles used for fill during the construction of certain centralized pits and impoundments to three inches. This particle size restriction seemingly arbitrarily imposes more stringent requirements than found within the remainder of the rule with regard to the size of particles used for fill. Antero recommends that the particle size be left to the discretion

of the professional engineer. Further, Antero would propose that 1.5:1 slopes on all fill embankments be authorized by rule, if properly designed by a professional engineer with appropriate geotechnical stabilization mechanisms. This would make this slope requirement consistent with ratio that is authorized in 33 CSR, Series 8-17.2.c.

E. With regard to the proposed rule at 33 CSR, Series 8-17.2.g.1, the rule imposes inspection and monitoring requirements, which are equal for pits and centralized impoundments. Given that, freshwater impoundments have little if any potential for harm to human health and the environment, Antero proposes that WVDEP clarify that the requirements of the section related to inspections and monitoring applies only to pits.

15. Certificate of Approval for Construction of Centralized Pits and Impoundments. 33 CSR, Series 8-17.3

The term "emergency situation" as it is used in 33 CSR, Series 8—17.3.g.4.b is ambiguous, undefined and may conflict with "emergency condition" which is a specifically defined term. To prevent confusion and promote clarity, Antero proposes that the term "emergency situation" should be changed to "dangerous condition" as that term is defined in 33 CSR, Series 8-17.1.c.

16. Inspection of centralized pits or impoundments. 33 CSR, Series 8-17.9.d

Antero proposes the term "scouring" in the content it is used in 33 CSR, Series 8-17.9.d, should be replaced with the term "internal erosion." Antero also recommends the addition of a provision to certify that the liner can still serve its initial intended purposes via an inspection or other mechanism.

Office of Oil and Gas Response

The amount of embankment on a mostly incised pit is limited; the intention of this specification is to ensure little to no movement of the embankment and no voids are present. Keep in mind these limits are for the construction of the pit/impoundment only. All other constructed items such as access roads, stockpiles, etc. will fall under the 35-8-17.5.5 criteria.

At this time there is no waiver process for the restrictions on the centralized pits, the rule will stand as it is written. Restrictions shall be measured from the limit of disturbance of the pit itself, not the LOD surrounding the soil stockpiles, access road, etc.

The 1.5 factor of safety is an accepted practice for earthen retaining structures. The safest assumption for slope stability analysis of the structure is the static/full condition. The Office of Oil and Gas recognizes the lack of clarity in the phrase "required loads" therefore it has been changed to read "loading determined by the engineer".

The Office of Oil and Gas realizes the 1.5:1 referenced in 17.2.c was in error and it should be 2:1 that is referenced in 35-8-17.5.5.c.6. The reduction in particle size is to fit the smaller lift thickness of 9".

Ground water monitoring shall be for pits only, and the language has been changed to reflect this amendment.

The Office of Oil and Gas appreciates the comment, however, the comment involves language (or a concept) that is beyond the scope of the proposed revisions and, therefore, requires no response.

The Office of Oil and Gas recognizes the lack of clarity in section 35-8-17.9.d thus the word scour has been changed to internal erosion.

Consol Energy

17.2.c. Minimum Compaction Requirements
The proposed rule does not allow for the use of individual particles greater than 3 inches and horizontal lifts with a maximum thickness of 9 inches.

- **Common practice in the industry allows for use of particles up to 6 inches in length and horizontal lifts of 12 inches in thickness. CONSOL is unaware of any technical reason to mandate particles no greater than 3 inches in length or horizontal lifts no greater than 9 inches.**

Office of Oil and Gas Response
The amount of embankment on a mostly incised pit is limited; the intention of this specification is to ensure little to no movement of the embankment and no voids are present. Keep in mind these limits are for the construction of the pit/impoundment only. All other constructed items such as access roads, stockpiles, etc. will fall under the 35-8-17.5.5 criteria.

West Virginia Rivers Coalition and WVSORO

§35- 8 -6.2.i. Topographic Map Location of Well: Top hole and bottom hole location.

Although we understand this is already being done, including it as a requirement in the rule is good.

Office of Oil and Gas Response
Thank you for your comment.

IOGA

§ 6.1.b - the reference to § 22-6A-5(a)(7) should probably be to § 22-6A-5(a)(6).

§ 6.2.k.2 - adds the term "public buildings" to the list of surface features required to be identified on a plat, but the term is not defined. The term is too general for reasonable application in the context of a large area plat. Whether a building is publicly owned or not is not always reasonably apparent from external appearances. The requirement should be limited to readily identifiable buildings owned by state or local governmental entities and used for public gatherings.

Office of Oil and Gas Response
The Office of Oil and Gas agrees that the reference to 22-6A-5(a)(7) should read 22-6A-5(a)(6) and will amend accordingly.

The Office of Oil and Gas recognizes that the term "public buildings" may be too general for reasonable application and will remove the requirement from the proposed rule.

WVONGA

7. Identification of Public Buildings [§ 6.2.k.2]

The Proposed Rule would add a new requirement to identify "public buildings" in the applicant's plat. However, "public buildings" is not a defined term under the Horizontal Well Act or the current rule. WVONGA suggests adding a definition consistent with other areas of the Code. *See, e.g.*, W. Va. Code § 49-5-10(g)(5).

14. Typographical Errors and Clarifications

a. Plat Requirement (§ 5.1.c.2). It appears that the reference to subdivision 19.1.c in this section should be to subdivision 19.1.f instead. (A review of the subdivisions of

Section 19.1 reveals an apparent numbering error, with duplicate provisions being numbered 19.1.a, 19.1.b and 19.1.c.)

h. **Forms.** As a general comment, WVONGA notes that certain references to forms throughout the Proposed Rule are either outdated (*see, e.g.*, Section 11.1.a, which references Form WR-39, the "Report of Annual Production," whereas the website provides Form WR-39e, entitled "Report of Monthly Production") or utilize the incorrect form name (*see, e.g.*, Section 20.2.a, referring to Form WW-4 as the "Notice of Intention and Application to Plug and Abandon a Well," although the Form WW-4A on the website is titled "Notice of Application to Plug and Abandon a Well"). Though relatively minor, discrepancies like these should be corrected to minimize the potential for confusion.

Office of Oil and Gas Response

The Office of Oil and Gas recognizes that the term "public buildings" may be too general for reasonable application and will remove the requirement from the proposed rule.

The Office of Oil and Gas acknowledges comments related to discrepancies in section numbering and will correct accordingly.

The Office of Oil and Gas recognizes that the proposed rule refers to Form WR-39 as the "Report of Annual Production" while it should read "Report of Monthly Production." Comments related to Form WR-39 as being outdated are not accurate. WR-39 Report of Monthly Production is available on the Office of Oil and Gas's website as well as WR-39e, the electronic format for reporting monthly production.

The Office of Oil and Gas recognizes that Form WW-4A Notice of Application to Plug and Abandon was inaccurately labeled in the Proposed Rule as WW-4. The Office of Oil and Gas will correct accordingly.

Noble

6. Section 6.2.k.6 requires that cemeteries be shown on the plat. Noble is concerned that the provision lacks the clarity required for regulation. Noble requests that the WVDEP provide clarification on determining the dimensions of a cemetery and how it is to be shown on the plat for the purposes of this rule.

   In addition, Noble supports the following position of the IOGA regarding Section 6.2.k.2:

"§ 6.2.k.2 - adds the term 'public buildings' to the list of surface features required to be identified on a plat, but the term is not defined. The term is too general for reasonable application in the context of a large area plat. Whether a building is publicly owned or not is not always reasonably apparent from external appearances. The requirement should be limited to readily identifiable buildings owned by state or local governmental entities and used for public gatherings."

Office of Oil and Gas Response

Upon review by the Office of Oil and Gas it has been determined that the requirement to show cemeteries within the scope of the plat lacks clarity and will remove the requirement from the proposed rule. The Office of Oil and Gas notes that cemetery information is provided on site construction plans.

The Office of Oil and Gas recognizes that the term "public buildings" may be too general for reasonable application and will remove the requirement from the proposed rule.

American Energy Appalachia

7) The proposed rule should provide guidance on the identification of additional surface features (public buildings and cemeteries) not previously required on the plat.

The proposed rule adds to the type of surface features to be identified on the plat (see proposed rule 35-8-6.2. through 6.2.k.6) to include public buildings and cemeteries. These surface features may be difficult identify. The rule as written does not provide a definition for public buildings, and fails to provide a readily available resource to verify cemeteries that will be acceptable to meet the conditions for the plat. In order to provide guidance and assurance to the industry, it is recommended to add to Section 6.2.k. that the permit applicant may rely on available U.S.G.S. topographic mapping and a physical inspection of the proposed limits of disturbance area to achieve compliance with this requirement.

Office of Oil and Gas Response

Upon review by the Office of Oil and Gas it has been determined that the requirement to show cemeteries within the scope of the plat lacks clarity and will remove the requirement from the proposed rule. The Office of Oil and Gas notes that cemetery information is provided on site construction plans.

The Office of Oil and Gas recognizes that the term "public buildings" may be too general for reasonable application and will remove the requirement from the Proposed Rule.

Antero

7. Form and Contents of Plats.

The proposed rule adds to the type of surface features to be identified on the plat at 35 CSR, Series 8-6.2 and 35 CSR, Series 8-6.2.k.6. The proposed rule would require the additional identification of public buildings and cemeteries. Antero urges the agency to delete the additional surface features as the inclusions of such features are not supported by the language of W. Va. Code § 22-6-12, which is incorporated by reference into W. Va. Code § 22-6A-5. Furthermore, the rule as written does not provide a definition for public buildings and fails to provide a readily available resource to verify cemeteries that will be acceptable to meet the conditions for the plat. Antero is not aware of any reliable database for identifying cemeteries and public buildings.

Office of Oil and Gas Response

Upon review by the Office of Oil and Gas it has been determined that the requirement to show cemeteries within the scope of the plat lacks clarity and will remove the requirement from the proposed rule. The Office of Oil and Gas notes that cemetery information is provided on site construction plans.

The Office of Oil and Gas recognizes that the term "public buildings" may be too general for reasonable application and will remove the requirement from the proposed rule.

Response to comments related to the fiscal note

WVONGA

13. Fiscal Note

The Fiscal Note included with the Proposed Rule fails to address the economic impact of the agency's proposal on persons affected by the rules and regulations as required by the West Virginia Administrative Procedures Act (the "WVAPA"). Specifically, the WVAPA requires a proposed legislative rule to "have a fiscal note attached itemizing the cost of implementing the rules as they relate to this state and to persons affected by the rules." W. Va. Code §§ 29A-3-4(b) and 29A-3-5 (emphasis supplied). The Fiscal Note accompanying the Proposed Rule contains no evaluation of its impacts to those "persons affected by the rules," including the regulated community. Accordingly, WVDEP should undertake a reasoned evaluation of the economic impact imposed by the Proposed Rule as required by the WVAPA and resubmit the proposed rule together with this analysis.

Office of Oil and Gas Response:
THE OFFICE OF OIL AND GAS appreciates the comment, however, the comment involves language (or a concept) that is beyond the scope of the proposed revisions and, therefore, requires no response.

Noble

23. Fiscal Note: Noble supports the following position of the WVONGA regarding the Fiscal Note provided with the Proposed Rule:

"The Fiscal Note included with the Proposed Rule fails to address the economic impact of the agency's proposal on persons affected by the rules and regulations as required by the West Virginia Administrative Procedures Act (the "WVAPA"). Specifically, the WVAPA requires a proposed legislative rule to "have a fiscal note attached itemizing the cost of implementing the rules as they relate to this state and to persons affected by the rules." W. Va. Code §§ 29A-3-4(b) and 29A-3-5 (emphasis supplied). The Fiscal Note accompanying the Proposed Rule contains no evaluation of its impacts to those "persons affected by the rules," including the regulated community. Accordingly, WVDEP should undertake a reasoned evaluation of the economic impact imposed by the Proposed Rule as required by the WVAPA and resubmit the Proposed Rule together with this analysis.

Office of Oil and Gas Response:
Comments related to the fiscal note are outside the scope of the draft changes to 35CSR8

IOGA

§ 16 – changes "pits and impoundments" to "freshwater impoundments" which IOGA urges remain unchanged. As noted in A.3 above, IOGA urges the retention of pits as an option for oil and gas operations consistent with the Horizontal Well Control Act. In the event that section 16 is limited to freshwater impoundments the requirements should be modified for the lower risk to waters from freshwater only impoundments compared to waste pits.

Office of Oil and Gas Response:
The prohibition on associated pits has been changed to allow them but they must follow the same rules and regulations as the centralized pits in 35 CSR 8-17.b-h.

WVONGA

c. Scope of Section 16. The title of Section 16 limits its applicability to freshwater impoundments with a capacity greater than 5000 barrels that are included in a specific well work permit, but this limitation is not always clear in the regulatory text of the subsections. For purposes of clarity, therefore, WVONGA suggests the following revisions:

- **§ 16.1: "Notice of construction of all such ~~pits and~~ freshwater impoundments shall be provided to the oil and gas inspector and the Chief prior to construction."**
- **§ 16.3: "In constructing the dike or embankment for a freshwater impoundment subject to this section, the operator shall . . . ."**
- **§ 16.4: "A ~~pit or~~ freshwater impoundment subject to this section that is constructed in such a manner . . . ."**
- **§ 16.5: "Any freshwater impoundment subject to this section that does not meet the criteria . . . ."**
- **§ 16.6.a: "After construction and prior to the placement of any fluid, all ~~pits and~~ freshwater impoundments with a capacity of greater than [5000] barrels included in a specific well work permit shall be inspected . . . ."**

Office of Oil and Gas Response:
The prohibition on associated pits has been changed to allow them but they must follow the same rules and regulations as the centralized pits in 35 CSR 8-17.b-h.

Antero

13. Freshwater Impoundments. 33 CSR, Series 8-16

The title of the section 33 CSR, ~~Series~~ 8-16 references that the section relates to the regulation of freshwater impoundments. There are also references to "pits" and "fluids" contained in the section, which do not relate to freshwater impoundments, and should be removed.

Office of Oil and Gas Response:
The prohibition on associated pits has been changed to allow them but they must follow the same rules and regulations as the centralized pits in 35 CSR 8-17.b-h.

West Virginia Rivers Coalition and WVSORO

§35- 8 -5.11. Area of Review.
We support and appreciate the addition of this requirement to investigate existing active, plugged and abandoned wells surrounding the proposed well to identify and evaluate potential conduits for fracture propagation and help prevent gas migration. Gas migration can occur because of problems with fracturing, because of initial problems with casing and cementing, and because of deterioration of casing and cementing of existing and new wells over time. The Office needs to investigate and determine the cause of gas migration (including contamination of drinking water supplies, not just "plugged" wells venting) if it occurs, but it's more important to put in place pro-active measures to evaluate existing nearby wells (active, plugged and abandoned) to prevent migration from happening in the first place.

Office of Oil and Gas Response
The Office of Oil and Gas believes the current rule changes requiring an "area of review" (AOR) are pro-active measures to evaluate wells and gas migration events. Wells within a specified radius of the surface location and the lateral wellbore are going to be asked to be monitored during the completion phase of each well.

§35- 8 -9.4. Monitoring of potential conduits for unintended fracture propagation, communication.
We support and appreciate the addition of this section requiring operators to identify and monitor potential conduits for unintended fracture propagation during the hydraulic fracturing process, and to cease operations if pressures indicate communication has occurred. As noted previously, gas migration can occur because of problems with fracturing, because of initial problems with casing and cementing, and because of deterioration of casing and cementing over time. It is important to monitor potential conduits for unintended fracture propagation to determine if communication or gas migration has occurred, which should also be part of the rule, but it's more important to put in place pro-active measures to evaluate existing nearby wells (active, plugged and abandoned) to prevent communication (and especially contamination of drinking water supplies) from happening in the first place.

Office of Oil and Gas Response
The THE OFFICE OF OIL AND GAS believes it is very important to monitor potential conduits and the reason the AOR section is being suggested to be added to the rule. Language has been added to this section to address the monitoring of potential conduits by the operator of the conduits within the boundary of the AOR.

George Monk

5.11 We approve of an area review as being part of the permit application.

9.4 Fracture propagation requirements in this rule are excellent. Since incidents of this sort are most often indicated by gas migrations investigations are required by state code. We believe results of incident investigations should be available to the public on the Office's website.

Office of Oil and Gas Response

The Office of Oil and Gas will strive to continue to make data, including incident investigations, available on the website.

EQT

2. Area of Review (§ 5.11).

The requirement to identify *potential* conduits for unintended fracture propagation should be clarified by specifically stating that wells within the vertical or horizontal distance identified in this section are potential conduits. Additionally, the requirement to identify existing active, plugged and abandoned wells should be limited to a review of public records. As such, EQT proposes the following revision:

> **5.11 Area of Review – The operator shall review the area surrounding the proposed well pad so as to identify and evaluate potential conduits for unintended fracture propagation, a report of which the operator shall provide to the Office. All existing active, plugged and abandoned wells that are documented in records maintained by the Office within one thousand two hundred feet (1,200') of the surface location of the well that is the subject of the new application and within one thousand (1,000') feet vertically or horizontally of the lateral section of the wellbore shall be potential conduits for ~~considered for the potential of~~ unintended fracture propagation.**

Office of Oil and Gas Response

In determining the boundary of the AOR the the Office of Oil and Gas did not use the terms "vertical" or "horizontal" distances. The Office of Oil and Gas used "radius" around the surface location and the lateral section of the wellbore. This change has been suggested in this section.

3. **Fracture Propagation (Section 9.4)**

The requirement to monitor *potential conduits* and plug abandoned wells establishes an impossible condition because in most cases the permittee does not have the right to enter property where third party wells are located, does not have the right to install monitoring equipment on third party wells, and does not have the right to plug abandoned wells that are orphans of the state. In cases where a permittee identifies a *potential conduit*, the permittee should notify the owner or operator of that well of the pending drilling activities and request that the owner/operator inform the permittee if any unsafe conditions are observed. Unsafe conditions are pressures that could exceed the designed pressure ratings of the equipment on the third party well. With regard to abandoned wells, the Office has an abandoned well program which establishes authority to enter property to plug abandoned wells and a funding mechanism to plug abandoned wells. As such, the Office should plug any abandoned wells identified by the permittee as *potential conduits* under the authority of the abandoned well program. Moreover, the state has no authority impose a well plugging obligation on new permittees as a condition to obtaining a well work permit. EQT proposes the following revisions to Section 9.4:

> 9.4 Fracture Propagation - - The permittee shall provide notice to all known owners and/or operators of potential conduits, as determined by Section 5.11. of the permittees' planned completion activities prior to commencement of completion activities. Such notice shall include information on the timing and duration of the well completion activities and the permittee's contact information so that the owner and/or operator can contact the permittee if any unsafe conditions are observed in the potential conduit. ~~Monitor all potential conduits for unintended fracture propagation throughout the entirety of the hydraulic fracturing operation.~~ Unsafe conditions are conditions where the wellhead pressure increases to a point where the pressure could exceed the maximum design pressure rating of the wellhead equipment on the potential conduit.

Office of Oil and Gas Response

The Office of Oil and Gas acknowledges the comments and has suggested rule changes pertaining to monitoring of potential conduits by the owner/operator of the conduits within the AOR. Changes have also been suggested to notice all known owners/operators with potential conduits within the AOR and their need to monitor prior to the commencement of planned completion operations. The Office of Oil and Gas has suggested this rule change based upon your comment to 9.4. above. The language provided for 9.4 above will be used for the change with some edits.

The Office of Oil and Gas does have an Abandoned Well Program and funds are made available from fees collected from well work permits. This funding is available to the Office of Oil and Gas to plug those select few abandoned wells per year that are ranked highest according to their overall need to be plugged. Operators, per Legislative Rule 22-10-7 can plug and abandoned any well as an interested party. A well work permit issued by the Office of Oil and Gas will be required prior to the plugging operation of any well.

9.4.a If the permittee is notified of an unsafe condition, the permittee shall suspend the completion activities and review if fracture communications have occurred and caused the unsafe conditions and whether the unsafe conditions can be managed or prevented by modifying the completion activities. Upon suspending the completion activities, the permittee shall notify the oil and gas inspector. If the completion activities caused the unsafe conditions, the permittee may resume completion activities upon a demonstration that they can be managed to prevent a reoccurrence of the unsafe conditions. For ~~every oil and gas~~ producing wells within the area of review established in Section 5.11 above that may serve as a conduit for unintended fracture propagation during hydraulic fracturing activities. Any observed pressure changes shall be reviewed to determine if the fracture communications of detrimental nature has occurred into these offset wells. If the review indicates such communications has occurred the permittee shall terminate the fracturing activities and relieve the associated pressure. Upon fracture termination, the operator shall notify the oil and gas inspector immediately.

9.4.b The Office shall plug or replug, if necessary, ~~permittee shall identify and plug or replug, if necessary,~~ any existing abandoned wells

Office of Oil and Gas Response
The Office of Oil and Gas has suggested a rule change based upon your comment 9.4.a above. The language provided for 9.4.a above will be used for the change with some edits. The Office of Oil and Gas is suggesting also that the demonstration be approved by the Chief of the Office of Oil and Gas before being allowed to resume completion activities.

The Office of Oil and Gas has reviewed your comment pertaining to 9.4.b and do not agree that "Office" should replace "permittee" in this section. Operators, per Legislative Rule 22-10-7 can plug and abandoned well as an interested party. The Office of Oil and Gas has however suggested a rule change, which would add "monitor" as an option should plugging or replugging not be necessary.

that may serve as a potential conduit for unintended fracture propagation during completion hydraulic fracturing activities.

9.4.c. ~~The permittee shall monitor all associated fracturing treatment pressures throughout the entirety of the hydraulic fracturing operations. If data monitoring indicates that communication has occurred, the permittee shall terminate the fracturing operations and relive the associated pressure. Upon fracture termination the operator shall contact the oil and gas inspector immediately.~~

Office of Oil and Gas Response
The Office of Oil and Gas agrees that this section be removed.

IOGA

4. The fracture propagation requirements are vague and unduly burdensome.

Section 5.11 requires the "operator" (rather than "permittee" as referenced in § 9.4) to "review the area surrounding the proposed well pad so as to identify and evaluate potential conduits for unintended fracture propagation, a report of which the operator shall provide to the Office." This requirement is vague and unduly burdensome because the language fails to adequately inform the well work applicant of the extent or nature of information or facts to be reviewed and evaluated. If "potential conduits" means "all existing, active, plugged and abandoned wells" within the prescribed distances then the term "potential conduit" should be so defined and limited.

The "area of review" includes active, plugged and abandoned wells within 1,200 feet of the surface location of the well and within 1,000 feet of the lateral section of the wellbore for consideration of the potential for unintended fracture propagation. Since most vertical wellbores in horizontal wells are not "fractured" in the completion process, it is unnecessary to review an area 1,200 feet west of the well location where the first fracture operation occurs 1,000 feet east of the well location. The area of review should be based on a 1,000 foot radius determined from the location of the fracture operations not the surface location of the well. IOGA suggests that the area of review require identification of active, plugged and abandoned wells having a wellbore that is within 1,000 feet of the lateral wellbore located in the target formation, which is where fracture operations will occur. For example, a plugged vertical well drilled to a depth of 2,500 feet should not be part of the area of review of a Marcellus well having a lateral wellbore 6,000 feet below the surface and 3,500 feet below the bottom of the plugged vertical well.

Moreover, fracture propagation requirements impose obligations beyond the control and legal authority of the well work permittee. For example, § 9.4.a. requires a permittee to "identify and monitor any producing wells within the area of review . . . that may serve as a conduit for unintended fracture propagation during hydraulic fracturing activities" and § 9.4.b. requires that the permittee "identify and plug or replug, if necessary, any existing abandoned wells that may serve as a conduit for unintended fracture propagation during hydraulic fracturing activities." The requirements do not address under what authority the permittee could monitor third party producing wells or plug or replug other third party wells in the area of review. Any fracture propagation well monitoring or plugging responsibility should be expressly limited to such wells as the permittee owns or has the right to operate and control. Otherwise, DEP should be responsible for requiring the owner or operator of any wells located within the area of review to monitor, or plug or replug such wells. The permittee simply lacks the legal authority to monitor or plug wells for which it has no ownership or operating rights and the Proposed Amendments should be so limited with regard to the permittee obligations.

An alternative approach is to require as part of the Well Site Safety Plan (§ 5.7) the inclusion of an "unintended fracture propagation survey plan" based upon relevant factors and consideration as determined by the applicant, which Well Site Safety Plan would be subject to review by the Office of Oil and Gas.

Office of Oil and Gas Response
In section 5.11 the Office of Oil and Gas is suggesting a rule change to remove "operator" and replace it with "permittee" per your comment. The Office of Oil and Gas is also suggesting a rule change to include some minimum data that is to be included in the AOR report listing those conduits the permittee identifies within the AOR. Also being suggested is that the report will detail those conduits that are known or reasonably expected to penetrate a depth that could be within the range of the fracture propagation.

In reference to comments concerning the AOR boundary the Office of Oil and Gas is suggesting a rule change to use a "radius" instead of vertical or horizontal. The distances from the surface location and the lateral section are changed from 1200' and 1000' respectively to 500' feet for both to conform to the scope of the plat.

See response to EQT on Fracture Propagation.

The comment to include as part of the Well Site Safety Plan an "unintended fracture propagation survey plan" has been acknowledged and the Office of Oil and Gas believes the language suggested in 9.4 is adequate.

§ 9.4 - the first sentence should be deleted because the specific requirements imposed on the permittee are described in §§ 9.4.a, 9.4.b and 9.4.c. The phrase "all potential conduits" is vague and overbroad and unnecessary in light of the more specific requirements described therein.

§ 9.4.c – uses the word "communication" in the second sentence. IOGA suggests inserting the phrase "with unintended conduits" following the word "communication" in the second sentence to modify and clarify the word "communication."

Office of Oil and Gas Response

The Office of Oil and Gas has deleted 9.4 and has reworded it as a suggested rule change.

The Office of Oil and Gas has deleted 9.4.c and suggested new language as a rule change to address the communication with unintended conduits.

3. **Fracture Propagation**

a. Authority to Comply (§§ 9.4.a, 9.4.b). The Proposed Rule would add significant new requirements relating to the identification of potential conduits for unintended fracture propagation that are likely to impose obligations beyond the control of the permittee. Specifically, the well work permittee would be required to "identify and monitor any producing wells within the area of review . . . that may serve as a conduit for unintended fracture propagation during hydraulic fracturing activities . . . ." § 9.4.a. The permittee would also be required to "identify and plug or replug, if necessary, any existing abandoned wells that may serve as a conduit for unintended fracture propagation during hydraulic fracturing activities." § 9.4.b. These significant new requirements extend to producing and/or abandoned wells within the area of review that may not be owned or operated by the applicant/permittee. Imposing affirmative obligations beyond the legal authority of the permittee is inappropriate, and WVDEP

Office of Oil and Gas Response
See response to EQT on Fracture Propagation.

wholly fails to acknowledge this issue or to provide guidance to an applicant who may be subject to a requirement to monitor and/or plug wells that the applicant does not own and for which no authorization is provided for right of entry (or release of liability).

b. **Requirement to Plug Wells (§ 9.4.b).** The Proposed Rule would require the permittee to "identify and plug or replug, if necessary, any existing abandoned wells that may serve as a conduit for unintended fracture propagation during hydraulic fracturing activities." § 9.4.b (emphasis supplied). This language is extremely vague—it is entirely unclear how the permittee or WVDEP would determine whether plugging is "necessary" within the meaning of this provision. If the Office of Oil and Gas has information on any abandoned wells located within the applicable area of review that would indicate that plugging or replugging is necessary, then those can be addressed on a case-by-case basis through the existing abandoned well program.

The regulatory "default" currently proposed—that the permittee is automatically responsible for plugging or replugging any abandoned well(s) within the designated area of review, regardless of whether the permittee has any interest in the abandoned well—is unduly burdensome and would improperly shift liability. An operator who is engaged in drilling and fracturing its own wells does not necessarily have the right to enter someone else's property to investigate and plug wells. The Proposed Rule is establishing a requirement that will be a legal impossibility in many respects. Plugging should only be required where the permittee has the clear legal right to do so.

Accordingly, WVONGA suggests that the permittee's obligation with regard to abandoned wells within the area of review be limited to monitoring identified wells that may serve as a conduit for unintended fracture propagation—subject to constraints

Office of Oil and Gas Response
See response to EQT on Fracture Propagation.

on the permittee's right of access discussed above—and mandate termination of fracturing operations and relief of the associated pressure in the event that monitoring indicates that communication has occurred. To the extent that WVDEP retains language requiring the plugging or replugging of wells on the permittee's lease, however, the Proposed Rule should expressly allow the Office of Oil and Gas to issue a combined well work permit that would include authorization to perform plugging activities as well as new well work activities.

c. **Area of Review (§ 5.11).** The operator would be required to "review the area surrounding the proposed well pad so as to identify and evaluate potential conduits for unintended fracture propagation" and then provide a report on the same to the Office of Oil and Gas. Specifically, "[a]ll existing active, plugged, and abandoned wells within [1,200] feet of the surface location of the well that is the subject of the new application and within [1,000] feet of the lateral section of the wellbore shall be considered for the potential of unintended fracture propagation." § 5.11. It is unclear as to how the agency intends the applicant to measure the 1,000-foot distance from the lateral section of the wellbore—vertically, horizontally or both? Regardless, any requirement to identify nearby wells should be limited to those wells that are known or reasonably expected to penetrate to a sufficient depth that could be within the range of fracture propagation, as the identification and evaluation of wells shallower than such depths is unnecessary for purposes of assessing potential fracture propagation. WVDEP also has not provided any rationale for the seemingly arbitrary 1,200-foot radius surface location area of review. Because the fractures in a horizontal well will occur in the lateral section, a 1,000-foot distance from the surface location should be adequate.

Office of Oil and Gas Response
See response to EQT on Fracture Propagation.

See response to IOGA on Area of Review 5.11 and the response on AOR boundary.

Furthermore, for the reasons set forth above, some acknowledgement should be made in the Proposed Rule regarding the limitations on this analysis (and associated report) that may arise due to the inability of the applicant/permittee to obtain a right of access to perform an evaluation of wells within the designated area of review that the applicant/permittee does not own or operate. WVONGA also assumes that WVDEP intends the applicant to provide the report referenced in this section to the Office of Oil and Gas together with the well work permit application; if so, that should be stated explicitly.

To address these issues, as well as to render the language more streamlined and to clarify that the focus of this section is on well to well communication through unintended fracture propagation, WVONGA recommends revising Section 5.11 as follows:

5.11. Area of Review – The operator shall review the area surrounding the proposed well pad so as to identify ~~and evaluate potential conduits for unintended fracture propagation, a report of which the operator shall provide to the Office.~~ All existing active, plugged, and abandoned wells within one thousand ~~two hundred~~ feet (1,000' ~~1,200'~~) of the surface location of the well that is the subject of the new application and within one thousand feet (1,000') of the lateral section of the wellbore, which are known from public records and are reasonably expected to penetrate within one thousand feet (1,000') measured vertically from the formation intended to be stimulated. The operator shall be considered those wells for the potential of unintended fracture propagation, and provide a report summarizing those findings to the Office together with its well work application. The operator shall note in this report any limitations resulting from the inability of the operator to obtain rights of entry to perform the evaluation required by this section.

d. **Resumption of Activities (§ 9.4.c).** The Proposed Rule would require the cessation of fracturing operations in the event of communication with an off-set well, §§ 9.4.a, 9.4.c, but provides no procedure for restarting operations following the resolution of the issue. Accordingly, WVONGA proposes adding the following as new Section 9.4.d: "No

Office of Oil and Gas Response

The Office of Oil and Gas acknowledges your comment concerning the inability to gain access to perform evaluation. If the permittee notices an operator that completion activities are about to start and even offers to assist and still is denied the rights to monitor then the permittee should document it and place it in their file. The Office of Oil and Gas does not believe that the rule should be changed to reflect this.

See response to EQT on Fracture Propagation.

later than ten days following a showing by the permittee that it has reestablished control of the permitted well and that the well is no longer in communication with any unintended conduit(s), WVDEP shall authorize the re-starting of drilling activities."

Finally, WVONGA suggests that the language of Section 9.4.c be clarified as follows: "The permittee shall monitor all associated fracturing treatment pressures throughout the entirety of the hydraulic fracturing operation. If data monitoring reasonably indicates that communication with unintended conduits has occurred, the permittee shall terminate the fracturing operations . . . ." Pressure changes occur throughout fracturing operations, and it is unclear from the Proposed Rule what data will be deemed to indicate the presence of an unintended conduit. This is something that must, of necessity, be left to the best judgment of the operator. The operator has every incentive to avoid having a fracturing operation extend to another well, and the rule need not specify in detail how those unintended conduits are identified.

e. Introductory Language (§ 9.4). WVONGA notes that the introductory sentence of Section 9.4 is superfluous, as the detailed requirements relating to fracture propagation are set forth fully in the subsequent subsections. For clarity as to the scope of applicable requirements, therefore, WVONGA requests the deletion of this sentence in its entirety.

Office of Oil and Gas Response

The Office of Oil and Gas has deleted 9.4.c and suggested new language as a rule change to address the communication with unintended conduits.

See response to EQT on Fracture Propagation.

The Office of Oil and Gas has deleted 9.4 and has reworded it as a suggested rule change.

Northeast Natural Energy

Section 5.11, 9.4.a. and 9.4.b regarding unintended fracture propagation impose obligations beyond the control of the well work permittee. The requirements do not address under what authority the permittee could monitor non-operated producing wells or plug or re-plug other wells in the area of review. Any fracture propagation analysis should be geographically related to the proposed hydraulic fracturing locations and be limited to actions within the legal authority of the permittee. In addition there is concern that the rule would force the operator to shut in producing wells due to the 1200 foot requirement. There is really no need to shut-in wells with laterals on the same pad that are drilled in the opposite direction.

Office of Oil and Gas Response

See response to EQT on Fracture Propagation.

The Office of Oil and Gas acknowledges your concern that the AOR rule would force the operator to shut in wells. The Office of Oil and Gas does not see how the 1200 foot requirement could force a shut in and the Office of Oil and Gas certainly did not intend for wells to be shut per this requirement.

Noble

4. **Section 5.11 regarding fracture propagation requirements. Noble supports the following position of the IOGA regarding this section:**

"Section 5.11 requires the 'operator' (rather than 'permittee' as referenced in § 9.4) to 'review the area surrounding the proposed well pad so as to identify and evaluate potential conduits for unintended fracture propagation, a report of which the operator shall provide to the Office.' This requirement is vague and unduly burdensome because the language fails to adequately inform the well work applicant of the extent or nature of information or facts to be reviewed and evaluated. If 'potential conduits' means 'all existing, active, plugged and abandoned wells' within the prescribed distances then the term 'potential conduit' should be so defined and limited.

The 'area of review' includes active, plugged and abandoned wells within 1,200 feet of the surface location of the well and within 1,000 feet of the lateral section of the wellbore for consideration of the potential for unintended fracture propagation. Since most vertical wellbores in horizontal wells are not 'fractured' in the completion process, it is unnecessary to review an area 1,200 feet west of the well location where the first fracture operation occurs 1,000 feet east of the well location. The area of review should be based on a 1,000 foot radius determined from the location of the fracture operations not the surface location of the well. IOGA suggests that the area of review require identification of active, plugged and abandoned wells having a wellbore that is within 1,000 feet of the lateral wellbore located in the target formation, which is where fracture operations will occur. For example, a plugged vertical well drilled to a depth of 2,500 feet should not be part of the area of review of a Marcellus well having a lateral wellbore 6,000 feet below the surface and 3,500 feet below the bottom of the plugged vertical well.

Moreover, fracture propagation requirements impose obligations beyond the control and legal authority of the well work permittee. For example, § 9.4.a. requires a permittee to 'identify and monitor any producing wells within the area of review . . . that may serve as a conduit for unintended fracture propagation during hydraulic fracturing activities' and § 9.4.b. requires that the permittee 'identify and plug or replug, if necessary, any existing abandoned wells that may serve as a conduit for unintended fracture propagation during hydraulic fracturing activities.' The requirements do not address under what authority the permittee could monitor third party producing wells or plug or replug other third party wells in the area of review. Any fracture propagation well monitoring or plugging responsibility should be expressly limited to such wells as the permittee owns or has the right to operate and control. Otherwise, DEP should be responsible for requiring the owner or operator of any wells located within the area of review to monitor, or plug or replug such wells. The permittee simply lacks the legal authority to monitor or plug wells for which it has no ownership or operating rights and the Proposed Amendments should be so limited with regard to the permittee obligations."

Office of Oil and Gas Response
See response to IOGA

12. **Section 9.4.** Fracture Propagation, states that "[t]he permittee shall monitor all potential conduits...;"

Noble is concerned that in this provision the term "monitor" is not defined and could therefore be interpreted inconsistently. Later in §§ 9.4a, 9.4b and 9.4c., the Proposed Rule does provide some tailored requirements for monitoring but it falls short of specifically identifying them as the means to meet the broader mandate to monitor. Noble strongly recommends that regulation be internally consistent in order to avoid unintended consequences and counterproductive results. For this reason, Noble recommends that the agency modify the Proposed Rule to provide clarity and consistency with these subsections. As such, Noble suggests revising the Proposed Rule to state the following:

"[t]he permittee shall identify and/or monitor, per subsections 9.4a, 9.4b and 9.4c, all potential conduits for unintended fracture propagation..."

a. **Section 9.4a** states that "[t]he permittee shall identify and monitor any producing wells within the area of review established in subsection 5.11 above that may serve as a conduit for unintended fracture propagation during hydraulic fracturing activities. Any observed pressure changes shall be reviewed to determine if fracture communication of a detrimental nature has occurred into these offset wells. If the review indicates such communicating has occurred, the permittee shall terminate the fracturing operations and relieve the associated pressure. Upon fracture termination, the operator shall contact the oil and gas inspector immediately."

Office of Oil and Gas Response

See response to EQT on Fracture Propagation

Noble requests that the department clarify the conditions that will be considered "detrimental" to a given well. At what measurement is a potential fracture communication considered detrimental in nature? Because the Proposed Rule requires certain actions set in motion upon determination that potential fracture communication has been "detrimental in nature," Noble requests clarity on this definition. In addition, Noble requests clarification regarding the process to be followed if a communication occurs. Assuming subsequent courses of action will vary depending on given situations, Noble would argue that terminating fracture operations should not be a uniform next step to be taken after a communication occurs. For instance, in the case of the same operator experiencing horizontal well to horizontal well communication, based on the surface facility capabilities of the communicated offset horizontal well, it may be a reasonable course of action to continue monitoring pressures/production and continue to stimulate the active well. This would allow clean up from communication to occur after fracturing is complete without generating any safety concern. As such, Noble recommends that the department revise the Proposed Rule to state:

> "[I]f the review indicates such communication has occurred, the operator shall contact the oil and gas inspector immediately."

Lastly, Noble requests that the department clarify its expectations for observation of wells that are not within a company's operating authority and the procedure to be followed if a third party does not allow it to monitor. Noble suggests that WVDEP define a process regarding this situation for when it occurs.

b. Section 9.4.b states that "[t]he permittee shall identify and plug or replug, if necessary, any existing abandoned wells that may serve as a conduit for unintended fracture propagation during hydraulic fracturing activities."

Noble is concerned that this section does not account for those situations where an operator is denied access to private property that may contain an abandoned well or where an operator may lack the authority to execute the proposed action. The permittee lacks the legal authority to monitor or plug wells for which it has no ownership or operating rights. For wells located within the area of review, the WVDEP should be enforcing the responsibility of the third party owner/operator. Noble believes it would be inappropriate for the agency to impose those obligations beyond the legal authority of a permittee to comply. Noble recommends the department modify the language to limit fracture propagation well monitoring or plugging responsibility to such wells as the permittee owns or has the right to operate and control and provide. In addition, Noble supports IOGA's suggestion that "An alternative approach is to require as part of the Well Site Safety Plan (§ 5.7) the inclusion of an "unintended fracture propagation survey plan" based upon relevant factors and consideration as determined

Office of Oil and Gas Response
See response to EQT on Fracture Propagation

See response to IOGA

by the applicant, which Well Site Safety Plan would be subject to review by the Office of Oil and Gas."

c. Section 9.4.c states that "[t]he permittee shall monitor all associated fracturing treatment pressures throughout the entirety of the hydraulic fracturing operation. If data monitoring indicates that communication has occurred, the permittee shall terminate the fracturing operations and relieve the associated pressure. Upon fracture termination the operator shall contact the oil and gas inspector immediately."

Noble agrees with the proposed concept but requests clarification regarding which well is to be monitored. Noble suggests that the proposal be revised to state:

> "[t]he permittee shall monitor all associated fracturing treatment pressures on the stimulated lateral..."

Noble also requests clarification regarding the process for relieving pressure inasmuch as the pathways to the shallow wells are likely only open while pumping. Finally, Noble supports the following position of the WVONGA regarding this section as modified per Noble's previous suggestion:

> "The Proposed Rule would require the cessation of fracturing operations in the event of communication with an off-set well, § 9.4.c, but provides no procedure for restarting operations following the resolution of the issue. Accordingly, WVONGA proposes adding the following as new Section 9.4.d: 'No later than ten days following a showing by the permittee that it has reestablished control of the permitted well and that the well is no longer in communication with any unintended conduit(s), WVDEP shall authorize the re-starting of drilling activities.'"

Office of Oil and Gas Response

The Office of Oil and Gas has deleted 9.4.c and suggested new language as a rule change to address the communication with unintended conduits.

See response to EQT on Fracture Propagation.

American Energy Appalachia

5) The proposed Area of Review is inconsistent with the scope of the proposed plat.

Proposed Rule 35-8-5.11 Area of Review provides: *The operator shall review the area surrounding the proposed well pad so as to identify and evaluate potential conduits for unintended fracture propagation, a report of which the operator shall provide to the Office. All existing active, plugged, and abandoned wells within one thousand two hundred feet (1,200) of the surface location of the well that is the subject of a new application and within on thousand feet (1,000') of the lateral section of the well bore shall be considered for the potential of unintended fracture propagation.*

The proposed Area of Review is inconsistent with the scope of the proposed plat. WVDEP should amend 35-8-5.11 to be in concert with the conditions of the scope of the plat; therefore, requiring only a five hundred feet (500') of the lateral/horizontal wellbore.

Office of Oil and Gas Response
The Office of Oil and Gas agrees with your comment concerning the AOR distance and have suggested a rule change. See response to IOGA.

14) Any fracture propagation analysis should be geographically related to the proposed hydraulic fracturing locations and be limited to actions within the legal authority of the permittee.

The proposed requirements to monitor fracture propagation (35-8-9.4) do not address under what authority the permittee could monitor producing wells in the area of review. Moreover, the description of the area of review is not reasonably designed to address potential fracture propagation in that the a 1,200 foot radius around the surface location of a wellbore is not reasonably related to hydraulic fracturing that may commence more than 1,200 feet from the surface location of the well.

As previously mentioned, the area of review should be consistent with the plat as identified in section 6.2.j.

Office of Oil and Gas Response
See response to EQT on Fracture Propagation.

15) WVDEP fails to provide a process to restart operations after fracturing operations are terminated due to well communications.

Proposed rule 35-8-9.4. requires the permittee to terminate fracturing operations should a well come into communication with an off-set well, but does not provide for a process to re-start operations. AEA propose the following section 9.4.d. "Upon showing that permittee has re-established control of the permitted well and the well is no longer in communication with the off-set well, permittee may, and WVDEP shall no later than ten days following such showing, allow for the re-starting of fracturing operations."

16) The requirements do not address under what authority the permittee could plug or replug wells in the area of review.

Proposed rule 35-8-9.4.b. requires "The permittee shall identify and plug or replug, if necessary, any existing abandoned wells that may serve as a conduit for unintended fracture propagation during hydraulic fracturing activities."The requirements do not address under what authority the permittee could plug or replug wells in the area of review. The proposed rule insinuates, if not requires, that as a prerequisite for issuance of a well work permit, the WVDEP has the authority and the permittee has the duty to plug any abandoned well which "may" serve as a conduit for communication with a proposed well. Such a standard is vague and provides no guidance to operators faced with the task of plugging abandoned wells not owned or operated by the operator and for which there is no authority granted for right of entry or release of liability with regard to such a requirement.

Office of Oil and Gas Response
See response to EQT on Fracture Propagation.

Antero

4. **Plugging of Abandoned Wells as Prerequisite to Permitting. 35 CSR, Series 8-5.11 and 9.4.b.**

The proposed rule at 35 CSR, Series 8-5.11 and 9.4.b. insinuates, if not requires, that as a prerequisite for issuance of a well work permit, the WVDEP has the authority and the permittee has the duty to plug any abandoned well which "may" serve as a conduit for communication with a proposed well.

The regulation appears to apply to conventional shallow or vertical wells and/or neighboring horizontal wells in and around a proposed horizontal well. Such a standard is vague and provides no guidance or standards for making any determination that a third party well "may"

communicate with the proposed well. Further, the proposed rule does not address basic issues regarding ownership of wells and rights of entry related to any demand that abandoned wells which are not owned or operated by the operator be plugged and does not address circumstances with regard to existing wells.

The proposed rule fails to consider the cost of compliance and ownership of these wells. The proposed rules imply that one owner or leaseholder would have ownership rights to both the shallow and deep formations. It is Antero's experience that more often than not, shallow formations and the shallow wells drilled in these formations are not owned or leased by the Marcellus drillers. Thus, the Marcellus operators have no ownership or control over these formations and associated wells. Requiring Marcellus operators to plug these shallow wells would result in ownership, access and control issues, not to mention considerable expense.

Office of Oil and Gas Response

See response to EQT on Fracture Propagation.

See response to IOGA

5. **Area of Review/Abandoned Wells and Conduits for Communication. 35 CSR, Series 8-5.11.**

The proposed rule requires the permittee to file a "report" with WVDEP regarding potential conduits (wells) for unintended fracture propagation. First, the term "unintended fracture propagation" should be replaced by "unintended communication," as it may not be possible to identify that an induced fracture has actually intersected a wellbore, and that pressure increase is via natural fractures. Second, the proposed rule requires the permittee to evaluate wells located within 1,200 feet of the surface location and 1,000 feet of the lateral section of the wellbore and to evaluate whether such wells must be plugged. The proposed rule does not differentiate between conventional shallow or vertical wells nor whether it would apply to a neighboring horizontal well. Antero suggests these issues above must be addressed and further that the rule be amended to include the following modifications:

a. **Any report should be filed with the application for a well work permit;**

b. **The rule should acknowledge that the report may be limited based upon the ability of the permittee to obtain rights of entry to perform the evaluation of wells; and**

c. **The rule should allow a combined well work permit application to include authorization to perform plugging activities as well as new well work activities to address potential need to plug well.**

Office of Oil and Gas Response

The Office of Oil and Gas acknowledges your comment concerning the term "unintended fracture propagation" and wanting to replace it with "unintended communication". The Office of Oil and Gas believes the current language "unintended fracture propagation" is the correct term because the completion activities are what's being monitored and if an incident occurs the completion activities will be suspended.

The Office of Oil and Gas acknowledges your comment concerning the rule not differentiating between well types. The Office of Oil and Gas believes the language in 5.11 refers to all wells no matter the well type. The suggested change to this section that the report will detail those conduits that are known or reasonably expected to penetrate a depth that could be within the range of the fracture propagation would mean any well type.

The Office of Oil and Gas acknowledges your comment concerning the report being filed with the application for permit and agree to suggest this be added to the rule in section 5.11.

See response to EQT on Fracture Propagation.

10. Fracture Propagation. 35 CSR, Series 8-9.4.

In addition to the prior Comments Nos. 3 and 4 above, relating to the identification and plugging of abandoned wells related to well communication, the proposed rule at 35 CSR, Series 8-9.4, related to monitoring and identification are overly broad and place unreasonable burdens on the permittee. Specifically, the proposed rule requires the cessation of activities should a well come into communication with an offset well, but does not provide for a process to re-start operations. The inclusion of such a process is vital again to provide the parties with certainty. Antero would propose the following section 35 CSR, Series 8-9.4.d:

> **Upon showing, that permittee has re-established control of the permitted well and the well is no longer in communication with the offset well, permittee may, and WVDEP shall no later than ten days following such showing, allow for the re-starting of operations.**

Office of Oil and Gas Response

See response to EQT on Fracture Propagation.

CONSOL

9.4. Fracture Propagation

CONSOL understands and supports the need for the permittee to monitor all potential conduits for unintended fracture propagation throughout the entirety of the hydraulic fracturing operation and identify and monitor any producing wells within the area of review established in subsection 5.11 above that may serve as a conduit for unintended fracture propagation during hydraulic fracturing activities. However, CONSOL would like to suggest the following to the Department.

- **The Department should include language to provide for a process to re-start operations and cessation. CONSOL would suggest the following language, "Having informed the Department that fracture communication is not of a detrimental nature, the permittee shall be allowed to restart well activities immediately upon Department approval, but no later than ten days after notifying the Department."**
- **There should be a mechanism where the operator can show the Department that fracture communication with an identified producing or abandoned well is unlikely and monitoring is not required. In most areas, confining layer formations such as the Tully Limestone and the Onondaga Limestone are adequate for hydraulic fracturing vertical containment. There is almost no possibility of vertical communication between deeper horizontal wells in formations such as the Marcellus or Utica and shallow wells of the sort. Therefore, continued monitoring of these wells is overly burdensome to the operator and unnecessary.**
- **Here again, CONSOL feels that the Department needs to plan for the eventuality that an operator will not be granted access by a property owner or permission by a well owner to monitor wells located in the surrounding area. The Department needs to develop guidance or mechanism where an operator can show they have made a**

Office of Oil and Gas Response

See response to EQT on Fracture Propagation.

The Office of Oil and Gas acknowledges your comment concerning communication between formations not being possible. The Office of Oil and Gas believes that all wells that penetrate the target formation or are known or reasonably expected to penetrate a depth that could be within the range of the fracture propagation should be monitored.

The Office of Oil and Gas acknowledges your comment concerning developing guidance where rights to monitor wells will not be granted. If the permittee notices an operator that completion activities are about to start and even offers to assist and still is denied the rights to monitor then the permittee shall document it and place it in their file.

good faith effort to obtain the rights to monitor the wells identified the area review, but were not granted the rights and can continue with well activities.

- An alternative approach is to require as part of the Well Site Safety Plan (§ 5.7) the inclusion of an "unintended fracture propagation survey plan" based upon relevant factors and consideration as determined by the applicant, which Well Site Safety Plan would be subject to review by the Office of Oil and Gas.

Office of Oil and Gas Response
See response to IOGA

5.11. Area of Review (Abandoned Wells and Conduits for Communication)
CONSOL understands the importance of this requirement, but would recommend the following amendments.

- **The Department should include the possibility that a property owner or well owner may not grant the permittee right to enter the property or inspect and evaluate the well and develop guidance or mechanism where an operator can show they have made a good faith effort to obtain the rights to monitor the wells identified the area review, but were not granted the rights and can continue with well activities.**

5.11 (and 9.4.b.) Plugging of Abandoned Wells as Prerequisite to Permitting
CONSOL feels that the Department needs to plan for the eventuality that an operator will not be granted access by a property or permission a well owner to plug or replug a well that "may" serve as a conduit for unintended fracture propagation during hydraulic fracturing activities. The Department needs to develop guidance for operators that may be faced with the requirement to plug or replug wells where rights are not granted or abandoned wells where there is no party with authority to grant the right to plug or replug the well or release the liability with regard to such a requirement.

Office of Oil and Gas Response
The Office of Oil and Gas acknowledges your comment concerning developing guidance where rights to monitor wells will not be granted. If the permittee notices an operator that completion activities are about to start and even offers to assist and still is denied the rights to monitor then the permittee should document it and place it in their file. The Office of Oil and Gas does not believe that the rule should be changed to reflect this.

Operators, per Legislative Rule 22-10-7 can plug and abandoned any well as an interested party. A well work permit issued by the Office of Oil and Gas will be required prior to the plugging operation of any well.

Response to comments relating to casing changes

Noble

10. <u>Section 9.2.d.1</u> covers freshwater casing standards. Noble supports this revision to the Proposed Rule and appreciates the WVDEP making this modification to address operator concerns regarding unstable wellbore conditions.

Office of Oil and Gas Response
Thank you for your comment.

Response to comments related to drilling accuracy and borehole deviations

West Virginia Rivers Coalition and WVSORO

§35- 8 -5.1.h. New borehole, no notice.

One sentence of this provision says that if the driller fouls up one borehole and needs to drill another one, the surface owner gets no notice. We take the position that the statute does not allow for this. True, it will make no difference in the soil erosion and sediment control plan. But it may well be that the fouled borehole stems from a problem that the surface owner should know about.

Another sentence says the replacement borehole permit shall be identical to the original well work permit application. It may well be that the problem that the driller ran into requires a change in the casing and cementing plan that must be included with the permit.

Again, the statute does not permit this. This manner of dealing with the issue has many problems.

WV-SORO commented on this subject when these rules were originally enacted. The OOG response did not satisfy us that the surface owner does not need to be notified of the changed plans if a downhole problem occurs in a borehole on their land.

Office of Oil and Gas Response

The Office of Oil and Gas appreciates the comment, however, the comment involves language (or a concept) that is beyond the scope of the proposed revisions and, therefore, requires no response.

§35- 8 -6.2.c. Physical Location of Well: Borehole deviation prohibition.

We support this addition, which prohibits borehole deviation.

Office of Oil and Gas Response

The Office of Oil and Gas appreciates the comment regarding borehole deviation.

EQT

5. Well Location and Target Formation (§ 6.2.c)

Limiting the deviation of the well bore path to less than fifty feet is impracticable and unworkable. The well permitting process identifies the location of the top hole, the target formation and the end of the well. The permit does not specify and exact corridor but rather specifies these three points for the simple reason that deviations occur when drilling long vertical and horizontal distances. Obviously, the permittee's goal is to drill as efficiently as possible and limit deviations but sometimes geologic conditions dictate otherwise. The key is to keep the borehole within the boundaries of the leases identified in the permit and to keep the borehole in target formations. The permittee continuously monitors the drilling by evaluating drill cuttings and through this analysis the permittee can determine if the borehole deviates outside the target formation. If it does the permittee will steer the drill back into the target formation but this takes time and it is unlikely that the drill can be steered back into the target zone within the fifty foot deviation standard. EQT recommends that the Office revise the strict deviation standard to require the permittee to stay within the lease boundaries and require the permittee to correct the path of the borehole as soon as reasonably possible if the borehole deviates outside the target formation. As such, EQT proposes the following revisions to Section 6.2.c

6.2.c Physical Location of Well – Every well shall be drilled within ten feet (10') of the exact well location designated on the plat. At no point shall the path of the drilled borehole deviate ~~from the permitted borehole by more than fifty feet (50') or deviate outside the target formation subsequent to the intersection of that formation~~ outside the boundaries of the leases identified in the well work application. If the borehole deviates outside the lease boundaries or outside of the target formation, as soon as reasonably possible, the permittee shall correct the path and return the borehole into the lease boundaries and the target formation.

Office of Oil and Gas Response

The Office of Oil and Gas appreciates the comment to the well bore path threshold however, based on communications with several directional drilling companies, the Office of Oil and Gas considers the fifty feet (50') limitation a reasonable path when drilling activities experience stable conditions in the borehole and penetrate consistent geological formations. The Office of Oil and Gas supports the comment that unforeseen conditions may exist in geological formations causing unexpected deviation out-of-formation and beyond the 50' limitation and therefore changes the proposed revisions accordingly. Also these changes reflect prudent actions necessary to reasonable regain the target formation.

2. The proposed amendment to § 6.2.c. prohibiting borehole deviation of more than 50 feet or outside the target formation should be deleted.

The proposed new sentence in § 6.2.c. is unnecessary and unreasonably restricts safe and efficient operations of oil and gas development. The precise path of a borehole is not part of the permit requirements. Rather, only the top-hole and bottom-hole locations of a well are proposed to be identified on a well plat pursuant to the Proposed Amendments. The full length of the borehole between top-hole and bottom-hole is not intended to be a limitation of the precise location of the borehole. Geologic and operating conditions vary from well to well and deviations from the planned borehole necessarily occur, including deviations greater than 50 feet. (See Appendix A for more detailed discussion of the technical problems with the proposed change, including financial consequences.) In light of the statutory requirement that the permit application contain the "approximate total depth . . . the actual or the approximate depth at which the well to be drilled deviates from the vertical, the angle and direction of the nonvertical well bore until the well reaches its total target depth or its actual final depth and the length and direction of any actual or proposed horizontal lateral or well bore," the DEP has provided no reason or explanation for such a restrictive limitation given the approximations expressly permitted in the statutory requirements. W. Va. Code § 22-6A-7(b)(5). Because the Well Record Completion Form (Form WR-35) requires "an as-drilled plat, profile view, and deviation report" be submitted as part of the report, the 50 foot deviation restriction should be eliminated. At minimum, the Proposed Amendments should be revised to simply require notification to the Office of Oil and Gas upon the occurrence of deviations of more than 100 feet from the borehole or deviations outside the target formation and identifying the corrective action taken to maintain the borehole in the target formation. The proposed language is simply too inflexible in light of the uncertainties involved in drilling a well of more than 10,000 feet in total length.

Office of Oil and Gas Response

The Office of Oil and Gas appreciates comment to the proposed revisions in §6.2.c and 'see responses to the EQT comments that addresses the fifty feet (50') limitation'. The Office of Oil and Gas considers this (50') limitation a combined effort to §5.7.c.7. on well bore accuracy and collision avoidance protocols, and with this combination identifies safe and efficient drilling means in both the vertical and lateral sections of the borehole path. Guidelines to §5.7.c.7 are identified and presented in site safety plans required in the well application process. The Office of Oil and Gas appreciates comment to the "approximate total depth" and the "as-drilled plat" however with the unexpected deviation identified in the EQT response, and with the possibilities in nudging for collision avoidance, the Office of Oil and Gas recognizes the needs for as-drilled-plats in record keeping obligations and future borehole spacing. The Office of Oil and Gas appreciates comment to the one-hundred feet (100') proposal however the Office of Oil and Gas considers the fifty feet (50') limitation a reasonable path. Again the response to the EQT comments identifies unexpected deviation and corrective measure when outside the target formation. And the Office of Oil and Gas recognizes the lateral lengths drilling of more than 10,000 feet in total length.

Supplemental Comments regarding proposed new sentence in § 6.2.c.

- Formation drift & faulting
  - Upper borehole sections: Directional steering tools are not always used. Hammer bits are used on air and deviation is monitored at short intervals. It is not uncommon for the hole to deviate more than 50 ft by the time the kickoff point is reached due to regional geology.
  - Curve and lateral: Formations are not mapped within 50 ft. of accuracy. Formation dip cannot be accurately planned over a 7,000 ft. lateral since at just 1° of inclination the formation could rise or drop ~120 ft. alone.
    - Also, build rates are not always predictable due to irregularities in the formation. This regularly causes deviation from the original plan, which deviations vary from well to well.
  - While drilling the lateral, faults are sometimes encountered which are difficult to predict and can easily throw the borehole off plan by more than 50 ft.
- Uncertainty and Anti-collision
  - The tools used to monitor wellbore deviation come with a reasonable amount of uncertainty. That uncertainty builds upon itself the deeper the well is drilled. By the time a 7,000 ft. TVD well is landed, it is not uncommon to have a 20 or 30 ft. radius of uncertainty (40-60 ft. diameter).
  - On multi-well pads, due to tool error and ellipse of uncertainty, wells often must be steered away from each other to avoid collisions. On a ten well pad, with 10 ft surface well spacing (90 ft. from first well to the last), if all wells are required to be in a 50 ft. radius from their surface location, significant anti-collision concerns would exist at the kickoff point. Nudging to avoid collision requires changes to the well path based upon conditions encountered during drilling.

Office of Oil and Gas Response

The Office of Oil and Gas appreciates comment to formation faulting in the vertical top-hole and lateral section of the borehole and supports changes as identified in the response to EQT comments. The Office of Oil and Gas recognizes and supports air drilling practices in the vertical top-hole section and also supports that unexpected drift may occur using drilling tools other than directional bottom-hole assemblies and changes the proposed revisions accordingly however the Office of Oil and Gas identifies the need for. The Office of Oil and Gas supports that unexpected formation dips occur and changes the proposed revisions accordingly.

The Office of Oil and Gas supports the uncertainty and anti-collision comments and changes the proposed revisions accordingly.

- Financial Effects
  - A 50 foot deviation limitation would require additional tools to steer the top hole section of the well at a cost of approximately $8,000/day. Since average drilling time for a well is 10 days to drill the top hole, the Proposed Amendment may require an additional drilling cost of $80,000.
    - Steering wells to within a 50-foot degree of accuracy would significantly slow down the drilling process resulting in another three days to top hole drilling (~$14k/day without steering +$8k for directional = $22k/day) ~$66,000 for the additional 3 days.
    - Total estimated cost additions for just top hole: $146,000
  - Conventional motors for directional drilling would not be accurate enough to maintain the margin of error. A change to rotary steerable equipment for every well would cost approximately $10,000/day more than conventional tools. For an 8 day curve and lateral using rotary steerable equipment would add another $80,000 to the cost of drilling a well.
  - Total well steering cost equipment use would add approximately $226,000/well, with no appreciable benefit to the environment.

Office of Oil and Gas Response

The Office of Oil and Gas appreciates comment regarding the financial effects and the steering equipment cost however the Office of Oil and Gas recognizes the necessities and the changes proposed that are identified in the responses provided to the IOGA and EQT comments.

6. Well Location and Target Formation (§ 6.2.c)

Proposed revisions to Section 6.2.c state that "[a]t no point shall the path of the drilled borehole deviate from the permitted borehole by more than [50] feet or deviate outside the target formation subsequent to intersection of that formation." § 6.2.c.[5] Such strict prohibitions are unworkable in practice, and should be deleted from the Proposed Rule. As a practical matter, deviation from the permitted borehole is a three-dimensional concept, but the "permitted borehole" as planned and depicted on documentation provided to the Office of Oil and Gas is not a detailed three-dimensional representation; rather, the planned borehole is shown on the plat in plan view, with the planned surface location, landing point/turning point, and bottom hole location coordinates, along with the direction of the lateral. At any point along the vertical or horizontal borehole, other than the landing point/turning point or bottom hole location, there is not an actual "permitted" point in space from which to measure the drilled deviation. Moreover, neither the permit application requirements of the Horizontal Well Act nor the Office of Oil and Gas's Form WW-6B of the permit application require all points along the borehole plan to be predetermined and permitted. *See* W. Va. Code § 22-6A-7(b)(5) (authorizing "approximate" representations of the planned well, with no 50-foot limitation). In practice, such deviations would not be uncommon due to formation drift, faulting and other geographical complexities, and the cost of the technology and additional drilling time needed to steer wells to the degree of accuracy required by the Proposed Rule have been estimated by one WVONGA member to exceed $225,000 per well. Simply put, these unrealistically precise new requirements are without rational basis and are unwarranted, particularly where the operator must include the "exact location of the as-drilled wellbore" with Form WR-35 in accordance with Section 10.2.a. WVONGA urges the deletion of this provision in its entirety.[6]

[5] It is unclear why WVDEP has proposed to insert this requirement in Section 6.2.c, which is a subsection dealing with the form and content of plats and not with operational criteria like borehole deviations.

[4] WVONGA strongly objects to this requirement. To the extent that some requirement relating to borehole deviation is retained, however, at most operators should be limited to providing notification to the agency that a deviation has occurred and a general requirement that a drilled borehole that deviates outside of the target formation should return to the target formation as expeditiously as possible.

WVONGA also notes that the permittee should be authorized to modify the target formation where it maintains legal rights to that formation. WVONGA further suggests modification to Section 5.1.h to delete requirements relating to notice to the coal owner, operator or lessee when requesting authorization to drill a new or replacement borehole. Notification to the coal owner, operator or lessee of a change in the location of a borehole within the confines of the well pad is unnecessary and created unneeded delays.

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Office of Oil and Gas Response

The Office of Oil and Gas appreciates these comments and changes are proposed as identified in the responses provided to the IOGA and EQT comments.

Northeast Natural Energy

Section 6.2.c that limits wellbore deviation to no more than 50' of what was permitted is impractical and at times impossible to comply with. Formations may be shallower than anticipated, unknown minor faulting and regional dip will often times cause a change in wellbore location in excess of 50' from the permitted location. Not being able to adjust to formation conditions may render many wells uneconomical. The Marcellus can be 125' thick or greater. In addition, not being able to adjust the wellbore when drilling a three dimensional curve adds more risk, more time and cost. If the intent is to limit deviation to no more than 50 feet in the X Y plane to ensure that the well is drilled within lease or unit boundaries then the language needs to be revised to more clearly define when more than a fifty foot deviation is allowed.

Office of Oil and Gas Response

The Office of Oil and Gas appreciates these comments and changes are proposed as identified in the responses provided to the IOGA and EQT comments.

Noble

5. **Section 6.2.c** prohibiting borehole deviation of more than 50 feet or outside the target formation. Noble supports the following position of the IOGA regarding this section:

"The proposed new sentence in § 6.2.c. is unnecessary and unreasonably restricts safe and efficient operations of oil and gas development. The precise path of a borehole is not part of the permit requirements. Rather, only the top-hole and bottom-hole locations of a well are proposed to be identified on a well plat pursuant to the Proposed Amendments. The full length of the borehole between top-hole and bottom-hole is not intended to be a limitation of the precise location of the borehole. Geologic and operating conditions vary from well to well and deviations from the planned borehole necessarily occur, including deviations greater than 50 feet. (See Appendix A for more detailed discussion of the technical problems with the proposed change, including financial consequences.) In light of the statutory requirement that the permit contain the 'approximate total depth . . . the actual or the approximate depth at which the well to be drilled deviates from the vertical, the angle and direction of the non-vertical well bore until the well reaches its total target depth or its actual final depth and the length and direction of any actual or proposed horizontal lateral or well bore,' the DEP has provided no reason or explanation for such a restrictive limitation in light of the approximations expressly permitted in the statutory requirements. W. Va. Code § 22-6A-7(b)(5). Because the Well Record Completion Form (Form WR-35) requires 'an as-drilled plat, profile view, and deviation report' be submitted as part of the report, the 50 foot deviation restriction should be eliminated. At minimum, the Proposed Amendments should be revised to simply require notification to the Office of Oil and Gas upon the occurrence of deviations of more than 100 feet from the borehole or deviations outside the target formation and identifying the corrective action taken to maintain the borehole in the target formation. The proposed language is simply too inflexible in light of the uncertainties involved in drilling a well of more than 10,000 feet in total length."

As a result of these concerns, Noble supports IOGA's assertion that the provision be deleted.

Office of Oil and Gas Response

The Office of Oil and Gas appreciates these comments and changes are proposed as identified in the responses provided to the IOGA and EQT comments.

American Energy Appalachia

6) The proposed borehole limitations (see 35-8- 6.2.c.) are unduly restrictive.

Proposed rule 35-8-6.2.c Physical Location of Well provides – *Every well shall be drilled within ten feet (10') of the exact well location designated on the plat. At no point shall the path of the drilled borehole deviate from the permitted borehole by more than fifty feet (50') or deviate outside the target formation subsequent to intersection of that formation...*

The proposed borehole limitations (see 35-8-6.2.c.) are unduly restrictive. Oil and gas operators seek to drill in the intended formation and in the intended location as depicted in the well work permit. AEA urges WVDEP to delete and/or provide alternatives to the proposed language added to section 6.2.c. Any number of factors, including faults or other deviations in the formation and equipment malfunction, can cause the drifting of the borehole. In instances where the location of the borehole deviates slightly from the location contained in the well work permit, unless the location of the borehole results in a threat to human health and the environment, such deviation should be addressed through the issuance of field modification to

Office of Oil and Gas Response
The Office of Oil and Gas appreciates these comments and changes are proposed as identified in the responses provided to the IOGA and EQT comments. Also, the Office of Oil and Gas considers this (50') limitation a combined effort to §5.7.c.7. on well bore accuracy and collision avoidance protocols, and with this combination identifies safe and efficient drilling means in both the vertical and lateral sections of the borehole path. And guidelines to §5.7.c.7 are identified and presented in site safety plans required in the well application process; the health-safety and the environment (HSE) risk are identified and such plans and its purpose is prevention means.

Antero

6. Well Location and Target Formation. 35 CSR, Series 8-6.2.c. and Notice. 35 CSR, Series 8-5.1.h

The proposed rule does not allow the borehole location to deviate more than 50 feet from its permitted location and prohibits a well from deviating outside the target formation. Antero understands the need of the WVDEP to assure that it has complete information regarding the location of wells drilled and completed in the state.

However, the rule as written does not take into account that once approved, actual field conditions sometimes require modifications to these locations. The rule should provide flexibility for field modification of the borehole location where it remains on the existing pad. Further, the rule should allow for modification of the target formation where the permittee maintains legal rights to that formation. Antero proposes the following language:

> "In the event that it is necessary to sidetrack the lateral, due to drilling problems or geologic conditions, that a variance of 100 ft be allowed. Once the sidetrack hole has been established, the operator should endeavor to return to the permitted wellbore location in a reasonable distance. A variance of 100 ft should also be allowed for deviation due to the anti-collision protocol specified in the Site Safety Plan."

The borehole may enter formations outside of the targeted formation due to reasonable drilling circumstances (inability to maintain inclination) or geologic conditions (faulting or dip changes). Antero proposes the following language:

> "In the event that the borehole has entered a formation other than the target formation, the operator shall endeavor to re-enter the target formation within a reasonable distance. Should the operator not have rights to deeper formations, the operator will not be permitted to complete in the non-target formation. Should the operator have rights to a shallower formation, the operator shall be permitted to modify the drilling permit to allow completion in the shallower formation."

These proposed modifications would assure that WVDEP maintains current information and knowledge regarding drilling activities while also providing the necessary flexibility to the regulated community to address field conditions.

Antero would further propose and additional modification to this section with regard to notice, specifically:

> . . . .The notice and comment periods provided by W. Va. Code 22-6A-10 that accompanied the original borehole shall satisfy the notice and comment requirements for the new replacement borehole permit application, ~~except that the operator shall provide notice to the coal owner, operator or lessee as required by W. Va. Code 22-6A-10(b)(3). The objection period associated with the notice to the coal owner, operator or lessee may be waived pursuant to the provisions of W. Va. Code 22-6A-3(b).~~ . . .

Notification to the coal owner, operator or lessee of a change in location of a borehole within the confines of the well pad is unnecessary and results in unneeded delays.

Office of Oil and Gas Response

The Office of Oil and Gas appreciates these comments and changes are proposed as identified in the responses provided to the IOGA and EQT comments. In reference to the 35CSR 8-5.1.h., the Office of Oil and Gas appreciates the comment, however, the comment involves language (or a concept) that is beyond the scope of the proposed revisions and, therefore, requires no response.

Response to general comments regarding draft rule changes

Connie Graytop Lewis

MS. LEWIS: I didn't have a microphone the other night. I'm fine. I'm Connie Graytop Lewis.

I'm with the West Virginia Environmental Council, and basically, we want to say that we generally support the proposed rule changes to the horizontal well drilling rules. We only wish it had been done three years ago.

We especially appreciate that DEP is addressing the deficiencies in the existing rule as regards drilling, the testing of water wells, the protection of water from excessive withdrawals, efforts to control future migrations and the plugging language.

We think it's a great step forward, and that's all we have.

Office of Oil and Gas Response
Thank you for your comment.

Response to comments out of scope of draft rule changes

Office of Oil and Gas Response
For all comments identified below, Office of Oil and Gas appreciates the comment, however, the comment involves language (or a concept) that is beyond the scope of the proposed revisions and, therefore, requires no response.

West Virginia Rivers Coalition

§35- 8 -9.2.c.3. Conductor drilling fluid.
Conductor boreholes are so shallow that they do not need to put anything but fresh water down the hole.

§35- 8 -9.2.h.7. Notification of cementing operations.
The most crucial action for the protection of groundwater is the cementing of the fresh water casing. The most common violation of cementing standards by operators is to fail to wait long enough for the cement to harden before the operator starts drilling again – therefore causing many mini-annuli in the cement job. This provision wisely requires the operator to give notice of the commencement of any casing installation to the inspector.

§35- 8 -9.2.j. Monitoring for leaks and deterioration.
In addition to annual inspections, there should be mandated monitoring for and reporting of leaks and deterioration of casings over time. The current language only requires the operator to conduct an inspection at the surface but does not specify that any type of integrity test be conducted.

§35- 8 -9.2.k. Results of tests should also be available for interested parties.
Surface owners and other interested parties should have access to these tests.

§35- 8 -12.2. Access roads and sedimentation.
Access roads should be constructed and maintained to prevent any sedimentation, not "minimize" sedimentation.

§35- 8 -12.3. Well sites and sedimentation.
Well sites should be constructed and maintained to prevent any sedimentation, not "excessive" sedimentation.

§35- 8 -15.3.b. Water testing parameters.
We recommend that the following should be added to the list of testing parameters:

-Magnesium, Lead, Strontium, and Potassium: Metals that can help determine whether water quality has been impacted by fracing fluid or brine (in addition to the other metals

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on the list). Also, Potassium in particular has been proposed as a possible tracer for fracing fluid contamination.

-Acrylonitrile: An ingredient in fracing fluid and therefore a possible signature of pollution from fracing fluid.

-Acidity, Alkalinity, Hardness: General water chemistry parameters that help provide a general characterization of the water. In addition, some surface water quality criteria are hardness-dependent.

-Gross alpha, Gross beta, Radium-226, Radium-228: Radiological parameters that can help determine whether naturally occurring radioactive materials (NORMs) have made it to the surface. The Department's own sampling has confirmed the presence of NORMs in wastewater from Marcellus Shale wells.

The lack of metals testing is curious since the EPA names them as a test parameter on this page (http://water.epa.gov/drink/info/well/faq.cfm) for when there are gas drilling operations nearby. Lead and the other heavy metals are also listed in an academic study: Swistock, Bryan. 2008. Gas Well Drilling and Your Private Water Supply, Water Facts #28. University Park, PA; The Pennsylvania State University, College of Agricultural Sciences, Cooperative Extension, School of Forest Resources. http://resources.cas.psu.edu/WaterResources/pdfs/gasdrilling.pdf.

§35- 8 -15. Replacement of water supplies.

The rule should include procedures for requiring the operator to replace water supplies that are contaminated, diminished or interrupted by oil and gas operations as specified by the W.Va. Code §22-6A-18.

§35- 8 -18.3. Spill Pollution Prevention and Control Measures.

This section is permissive on the use of "linings, feltings, paddings, and support boardings of adequate quality." The use of these prevention and control measures should be required ("shall use" rather than "may utilize"). And all the plans should be submitted to the State, not just in the event of prior problems.

WVSORO

§35- 8 -4. Report inspectors' findings of violation to complainant.

The findings and orders of any inspection conducted in response to a citizen complaint should be reported to the person filing the complaint. When WV-SORO commented on this issue previously the COG stated that it "believes that it is appropriate to provide information regarding enforcement actions taken in response to the complainant," but did not change the rule accordingly. This requirement should be included in the rule.

§35- 8 -5.3. Notice to surface owners occupying surface.

Where there are more than three surface owners of record, the statute and the rule allow the operator to serve notice of the permit application on only one of the surface owners, the one who's name and address appears on the Sheriff's tax bill. Usually that is also the person actually occupying the land, but not always. The rule should require an additional notice to be served on a residence or other occupied structure if the address on the Sheriff's records is not the same as the location of the surface property. A new section requiring this should be added after 5.3.c.

§35- 8 -5.3. Content of notice to surface owners, publication notice.

The rule should spell out what documents are included in the notice to surface owners. Surface owners should receive a complete copy of the permit application submitted to the Office with a listing or table of contents or something similar to the OOG checklist for permit approval explaining what documents are included and what the documents are for. A new section requiring this should be added. As an example, the notice to surface owners included in the new permit applications is buried in the middle and most surface owners will not even know to look for it.

A similar section should be added detailing the content and form of the publication notice required under W.Va. Code §22-6A-10(e). The notice should include a vicinity map showing the proposed well site in relation to the surrounding area and roads, the address of the access road intersection or nearest residence, the names of the surface owner(s) and commonly used farm name, if different, of the land where the well site will be located and other identifying information that will make it easy for people to determine location of the proposed well.

The OOG response when WV-SORO commented on this issue previously assumes that a surface owner will get the coordinates of every notice in the paper and use the DEP conversion tool in order to see whether the well site of every well proposed might be near them. That hides the notice around the corner of further investigation. The map is needed so people can tell whether a particular well pad is proposed near them by looking quickly at each notice in the paper.

§35- 8 -6.2.1. Names of surface owners on plats.

It is good that the plat has to show the surface tract boundary lines. However, the rule should also require the plat to show the known surface owner's name for all surface tracts within the scope of the plat, including those tracts that lie above the lateral/horizontal legs of the well and adjacent tracts in accordance with W.Va. Code §22-6-12and W.Va. Code §22-6A-5(6).

When WV-SORO commented on this issue when the rules were initially enacted, OOG responded that the purpose is to identify the actual surface owners at the well location and adjacent tracts. That may be the purpose, but that is not what the rule says. Most plats we see already have this, so it should be no problem to include this requirement in the rule. It is very useful.

§35- 8 -9.2.b.5. Notification of casing and cementing.

See comment to 9.2.h.7. and 9.

§35- 8 -9.2.c. Conductor/blowout preventer.

Since the biggest fire in West Virginia occurred when a well blew gas as it penetrated a worked out coal

seam that lay a few hundred feet below the surface, shouldn't West Virginia require a conductor set that is capable of housing a blowout preventer – certainly in the vicinity of worked out coal seams.

§35- 8 -9.2.c.3. Conductor drilling fluid.

Conductor boreholes are so shallow that they do not need to put anything but fresh water down the hole.

§35- 8 -9.2.d.4 and 5. Water cement circulation.

When cement does not return to the surface, the oil and gas inspector should be notified immediately. Additionally, when cement does not circulate, the rule allows sound engineering practices and electric logs to attempt to locate the top of the cement and to attempt to grout the casing in. When that occurs, a bond log needs to be run on that casing before proceeding to further drilling in order to make sure those techniques actually worked. If those measures in fact did not work, then curative measures should be required, beginning with the filing of a new casing and cementing plan for the permit in question.

§35- 8 -9.2.d.5. Actions when cement does not return to the surface.

If cement does not return to surface on fresh water casing, not just the inspector but the surface owner should be notified. In addition, an extra cement seal should be put in place below the surface casing.

§35- 8 -9.2.h.7. Notification of cementing operations.

The most crucial action for the protection of groundwater is the cementing of the fresh water casing. Th most common violation of cementing standards by operators is to fail to wait long enough for the cement to harden before the operator starts drilling again – therefore causing many mini-annuli in the cement job.

This provision wisely requires the operator to give notice of the commencement of any casing installation to the inspector.

Similar notice should be given to the surface owner for the freshwater cement job and the production string cement job! This section should be amended to require the operator to send a letter to the surface owner giving the surface owner the right to be notified if the surface owner will return a letter to the operator with a phone number, e-mail or texting address for this notice. Notice will be complete upon texting, e-mailing or leaving a message on any voice mail.

It is of particular importance for the protection of groundwater that the surface owner know the exact time the cementing was complete, and the set up time for the cement begins to run. The second sentence of this section should be amended by adding, "and the date and time of completion of the circulation or attempts to circulate the cement."

In addition to notifying the surface owner of the commencement of the cement job, the cement ticket should be part of the record of the casing on the rig and should be available to the inspector, as well as "the surface owner and other interested parties."

§35- 8 -9.2.h.9. Cementing records available.

See comment to 9.2.h.7.

§35- 8 -9.2.i. Notice to surface owners of defective casing or cementing.

The rule should include a provision for notifying surface owners and nearby water supply owners of the problems encountered. Additionally, the Chief or his designee should have the authority to order testing and monitoring of nearby water supplies if warranted depending on the nature of the casing or cementing failure.

§35- 8 -9.2.j. Monitoring for leaks and deterioration.

In addition to annual inspections, there should be mandated monitoring for and reporting of leaks and deterioration of casings over time. The current language only requires the operator to conduct an inspection at the surface but does not specify that any type of integrity test be conducted.

§35- 8 -9.2.k. Results of tests should also be available for interested parties.

Again, surface owners and other interested parties should have access to these tests.

§35- 8 -12.2. Access roads and sedimentation.

Access roads should be constructed and maintained to prevent any sedimentation, not "minimize" sedimentation.

§35- 8 -12.3. Well sites and sedimentation.

Well sites should be constructed and maintained to prevent any sedimentation, not "excessive" sedimentation.

§35- 8 -15.3.b. Water testing parameters.

We recommend that the following should be added to the list of testing parameters:

-Magnesium, Lead, Strontium, and Potassium: Metals that can help determine whether water quality has been impacted by fracing fluid or brine (in addition to the other metals on the list). Also, Potassium in particular has been proposed as a possible tracer for fracing fluid contamination.

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§35- 8 -15. Replacement of water supplies.

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This section is permissive on the use of "linings, foltings, paddings, and support boardings of adequate quality." The use of these prevention and control measures should be required ("shall use" rather than "may utilize"). And all the plans should be submitted to the State, not just in the event of prior problems.

David McMahon

Our first comment is that when the horizontal well act passed, the water protections for surface owners were deferred until studies were done, and the DEP followed through and had studies done by the WVU Health Department, the Health Sciences Division of the University's educational system, and they recommended that there were a number of problems, the example I always use is noise, and does that statute empower the DEP to do rules to ameliorate those problems, take care of those problems? The DEP didn't do rules and merely suggested that the Legislature might want to change the setback distance from the limit of disturbance -- from the center of the well pad to the limit of disturbance, which is something we thought should have been done, but there were lots of other things we thought that the DEP should have done to protect people from noise. For example, placing sensors at

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people's homes near well pads with standards that would protect their health and their hearing and their sleep, and require drillers if they were exceeding those, to take steps to mitigate those things.

Unfortunately, those rules were not done then. What I suggested then, there are still none of these rules, and that is probably one of our biggest points as surface owners. Those changes still need done.

We have always advocated that after the drilling, and after the cementing of the surface casing, that there should be a bonding law done to make sure that the surface casing actually adhered to the rock and will protect from problems further down.

When a surface owner gets the notice of the hearing, it's this inch or two thick thing of materials. Buried somewhere in there is the notice to surface owners. If they knew there was one in there, they'd have trouble finding it. I have trouble finding it when I looked at them. We think that when the printed application is given to someone, the top page should be a table of contents or even just a checklist that the DEP does on what has to be in there so they will know what to look for.

There should be more notification to surface owners. Clearly the most important -- pollution is most likely to occur, but when a problem is most likely to occur is if the surface casing is not cemented to the surface, the cement does not mature, and if the driller has not waited an appropriate period of time for the cement to harden, and for that reason, the rules require the driller to notify the DEP when the surface cementing is about to occur so they have the opportunity at least to be there to be sure the cement hardens, and

to be sure that they wait the appropriate period of time. If the driller can make a phone call to the inspector, if the driller can make a phone call to the surface owner, if he's requested it, if she's requested it, and say this is going on now. You might want to know that. Yes, we would. The same thing with the cement job.

George Monk

Gas Migrations

The code in §22-6A-24(c)(2) requires rules to prevent gas migration and in §22-6A-24(e)(5) the rules "shall provide procedures" for "investigation of natural gas migration, including requirements that the operator promptly notify the secretary and conduct an investigation of the incident."[1]

The rule requires in 35CSR8-9.2.a that the operator conduct casing and cementing so as to prevent gas migration but that does not satisfy the legislative requirements and the rule needs to be revised. As citizens of West Virginia we believe it is important that serious study of the causes of gas migration should be undertaken and that results of incident investigations be made available to the public on the Office of Oil and Gas' website.

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[1] 35CSR8-9.4 Fracture Propagation obliquely covers one cause of gas migration. Another cause would be improper casing and cementing where gas migration is affecting local drinking water sources.

Explosions and Fires

The code in §22-6A-24(c)(4) requires rules for prevention of blowouts, explosions and fires due to loss of well control. What exists in 35CSR8-5.7.f.3 is a requirement for reporting if an explosion or other incident has caused loss of life or serious injury.

Since no investigations by the Office have been published on their website we have to go on sketchy news reports. Our understanding is that most explosions and fires on well pads do not occur because of loss of control of a well but instead because of emissions on the site during fracture fluid flowback.[2]

The legislature in §22-6A-22 wanted the DEP to create new rules to protect human health and the environment if there were a need due to emissions.

We believe there is a pressing need for rules governing site activities during fracture fluid flowback, especially rules for the management of explosive emissions from the well that are produced along with the flowback and the explosive emissions resulting from agitation or outgassing of the fluid.

We also believe that results of incident investigations by the Office must be made available to the public on the Office's website. This is especially important when these investigations can help modify or correct operations in the field prior to revisions of this rule.

9.2 A copy of the casing and cementing program must be kept on the site according to §22-6A-24(d)(3). This requirement needs to appear in 35CSR8-5 or here in 35CSR8-9.2

9.2.d.1 This section requires freshwater casing be set at least 50 feet below the deepest freshwater horizon. This does not conform to the API's own guidance of 100 feet.[3]

We believe that using the API guidance provides more cement between the casing shoe and aquifer and creates a situation where it is more likely there will be a good seal along at least part of the cemented annulus.

We are concerned that 35CSR8 has no mechanism for the protection of Underground Sources of Drinking Water (USDW). There is no approved method in 35CSR8-5.1.b.2 for determining anticipated groundwater zones. If drillers' reports from area wells are used to determine "fresh" water depths, waters considered not fresh, or even salt by drillers, are not receiving protections required by the Safe Drinking Water Act (SDWA) because subjective judgement is being used instead of quantitative analysis required by the SDWA.

We understand that it is too late to incorporate protections for USDW in this version of the rule but they are necessary in the next revision.

9.2.d.8 This section needs to be reworded to conform to §22-6A-24(f)(5):

> There shall be no oil or gas production <u>or pressure</u> through the freshwater casing <u>or the casing annulus.</u>

There needs to be an additional section between 35CSR8-9.2.e.3 and 9.2.e.4 to conform to §22-6A-24(f)(5):

> <u>There shall be no oil or gas production or pressure on the coal protection casing annulus.</u>

9.2.h Cementing Standards does not have all the minimum standards found in §22-6A-24(g)(1): "All cement used in the well must . . . secure the casing to the wellbore, isolate the wellbore from all fluids, contain all pressures during all phases of drilling and operation of the well, ..." According to §22-6A-24(g)(2) "cement used in conjunction with surface and coal protection casing must provide zonal isolation in the casing annulus."

A revision to the rule is required to incorporate these legislative requirements.

9.2.j Annual Inspection. The rule reads "During inspection, if the operator detects evidence of more than de minimus leakage or other indications of casing integrity failure, . . ." The law in §22-6A-24(f)(5) desires no pressure on the freshwater or coal protection casing annuli. There may be de minimus pressures for other casing annuli, but for the freshwater or coal protection casing annuli no leakage is allowed. The rule needs to be revised in this section.

Reporting in 35CSR8-11 fulfills only part of the code in §22-6A. §22-6A-24(c)(5) requires rules to accomplish the "*appropriate* disposition of brines and discharges from the drilling or operation of horizontal well [our emphasis]." 35CSR8-9.1.b.3 and its subsections conforms to the requirements of §22-6A-8(g)(6)(C).[4] But the

[4] The rule is for operator recordkeeping, not reporting, and lasts only for the last water withdrawal.

annual reporting in 35CSR8-11 is the logical place for operators to report appropriate management of produced water. The operator in their permit application on WW-9 provides information about the location of disposal but that may change over the years. Properly designed, a produced water reporting method would also provide a check for UIC IID WR-40 reporting in those instances where the fluid is being injected underground.[5]

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WV Department of
Environmental Protection

July 27, 2015

Jason Harmon
Department of Environmental Protection - Office of Oil and Gas
601 57th Street, S.E. p
Charleston, WV 25304

Re: Comments to Proposed Rules Governing Horizontal Well Development §35-8

Dear Mr. Harmon:

American Energy Appalachia LLC (AEA) appreciates the opportunity to comment upon the draft regulations for horizontal well development, 35 Code of State Rules, Series 8 ("rules"), proposed by the West Virginia Department of Environmental Protection ("WVDEP"). AEA is a private independent oil and gas exploration and production company with significant holdings in both the Marcellus and Utica formations in West Virginia and Ohio. AEA employs 230 persons in West Virginia and is committed to the safe and efficient development of natural gas in West Virginia.

AEA is supportive of reasonable regulations that provide the industry clear rules and guidance, but do not result in unreasonable impediments to future growth and development. Overall, these proposed regulations appear to be significantly more stringent and costly when compared to similar regulatory requirements in Texas, Oklahoma, and Pennsylvania placing the oil and gas industry in West Virginia at a competitive disadvantage from operations in other states. AEA urges the agency to amend the proposed regulations to provide clear, consistent guidance to encouraging economic development and protect human health and the environment.

AEA makes the following specific comments and suggestions regarding the West Virginia Department of Environmental Protection's (DEP) Proposed Amendment to the Horizontal Well Development Rule, 35-8, filed with the Secretary of State's Office on June 24, 2015:

1) **Karst terrain has not been properly identified and mapped by the West Virginia Geologic and Economic Survey thus these requirements are premature.**

The proposed rule contains several new provisions related to permitting and/or operations in "karst" regions. The term karst is not a defined term and there has been no map or document produced identifying the areas of the state which are deemed to be "karst" and would be subject to these provisions. As a result, it is not possible to determine whether AEA is in

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agreement with the manner and area which will be identified as "karst" areas and AEA is unable to measure the potential impacts of that designation and these requirements upon industry and AEA's specific operations. AEA would suggest that these requirements be removed until such time as "karst" areas are defined and identified.

2) It is arbitrary and capricious to require separate notice requirements for special interest groups.

Amended Rule 35-8-5.3.e. provides: *In a county containing karst regions, the applicant well operator shall provide notice to the WV Cave Conservancy and the West Virginia Speleological Survey either prior to or at the time of filing of the application with the Office of Oil and Gas.*

Special interest groups have no property rights or statutorily protected interest in such applications. These groups can monitor well work permit applications through the DEP's public records and the provisions contained in 35-8-5.3.e. should be deleted.

3) The requirement to berm the entire location throughout the lifecycle of the wellpad is not warranted.

Proposed amended rule 35-8-5.5.c.12 provides: *Well pads shall be fully enclosed by berm structures. If an earthen berm is employed, the berm shall be a minimum of two feet (2') in height with a two foot (2') foot top. Minimum compaction requirements for raised earthen berms shall be the same as those for embankment fills as set forth in subdivision 5.5.c.9 above and have maximum side slopes of one and one haft horizontal to one vertical (1.5:1). The area where the access road meets the well pad shall be equipped with a mountable berm structure.*

The requirement to fully enclose the wellpad with a berm throughout the life of the wellpad may potentially create instability of the wellpad due to standing water. AEA urges DEP to reconsider the requirement to fully enclose the wellpad with a berm. AEA suggests that the requirement to fully enclose the wellpad with a berm be limited to the drilling and completions phase of the well, as opposed to the life of the wellpad. The requirement to berm the entire location is not warranted during the production phase because, the potential water quality risks onsite during the production phase (i.e. condensate, produced water, and crude oil) are already managed under the federal Oil Pollution Control Act and associated regulation 40 CFR Section 112 (SPCC program) and the federally regulated tanks are already required to be within secondary containment.

At a minimum, WVDEP should address the increased stormwater issues associated with fully berming the site throughout the life cycle of the well. The collection of stormwater due to total capture by the enclosed wellpad berm presents a slip and fall safety hazard to site workers.

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4) The regulations fail to set forth the standards by which the WVDEP will make the determination establishing the minimum flow requirement that must be maintained from a groundwater withdrawal location.

Proposed Amended Rule 35-8-5.6.d. requires maintenance of a minimum stream flow requirements but fails to identify how the Department will make the determination regarding stream a minimum stream flow requirement that must be maintained from a groundwater withdrawal location. It is suggested that language or guidance be provided on this justification.

5) The proposed Area of Review is inconsistent with the scope of the proposed plat.

Proposed Rule 35-8-5.11 Area of Review provides: *The operator shall review the area surrounding the proposed well pad so as to identify and evaluate potential conduits for unintended fracture propagation, a report of which the operator shall provide to the Office. All existing active, plugged, and abandoned wells within one thousand two hundred feet (1,200) of the surface location of the well that is the subject of a new application and within on thousand feet (1,000') of the lateral section of the well bore shall be considered for the potential of unintended fracture propagation.*

The proposed Area of Review is inconsistent with the scope of the proposed plat. WVDEP should amend 35-8-5.11 to be in concert with the conditions of the scope of the plat; therefore, requiring only a five hundred feet (500') of the lateral/horizontal wellbore.

6) The proposed borehole limitations (see 35-8- 6.2.c.) are unduly restrictive.

Proposed rule 35-8-6.2.c Physical Location of Well provides – *Every well shall be drilled within ten feet (10') of the exact well location designated on the plat. At no point shall the path of the drilled borehole deviate from the permitted borehole by more than fifty feet (50') or deviate outside the target formation subsequent to intersection of that formation...*

The proposed borehole limitations (see 35-8-6.2.c.) are unduly restrictive. Oil and gas operators seek to drill in the intended formation and in the intended location as depicted in the well work permit. AEA urges WVDEP to delete and/or provide alternatives to the proposed language added to section 6.2.c. Any number of factors, including faults or other deviations in the formation and equipment malfunction, can cause the drifting of the borehole. In instances where the location of the borehole deviates slightly from the location contained in the well work permit, unless the location of the borehole results in a threat to human health and the environment, such deviation should be addressed through the issuance of field modification to

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JUL 27 2015

WV Department of
Environmental Protection

the well work permit where the borehole remains on the existing pad. Furthermore, the rule should allow for modification of the target formation where the permittee maintains legal rights to that formation.

7) The proposed rule should provide guidance on the identification of additional surface features (public buildings and cemeteries) not previously required on the plat.

The proposed rule adds to the type of surface features to be identified on the plat (see proposed rule 35-8-6.2. through 6.2.k.6) to include public buildings and cemeteries. These surface features may be difficult identify. The rule as written does not provide a definition for public buildings, and fails to provide a readily available resource to verify cemeteries that will be acceptable to meet the conditions for the plat. In order to provide guidance and assurance to the industry, it is recommended to add to Section 6.2.k. that the permit applicant may rely on available U.S.G.S. topographic mapping and a physical inspection of the proposed limits of disturbance area to achieve compliance with this requirement.

8) Transfer time of well work permit and bonds should be minimized.

The transfer of an existing well or well work permit does not involve technical issues or impact operational issues. Due to business considerations and because this is an entirely administrative procedure, the time frames for both reviews by the Chief should be limited to 45 days. Proposed rule 35-8- 8.4.e. should be revised as follows: "Upon receipt of an application to transfer an existing well or well work permit from one operator or permittee to another or an existing well work permit from one bond to another bond, the Chief will review the submitted data along with other information and approve or disapprove the application within ~~60 day or 90~~ 45 days~~, respectively~~..."

9) The proposed groundwater testing requirements stray well beyond the bounds of reasonable interpretation for the protection of the water resource and fail to consider cost.

WVDEP should eliminate the proposed amendments to 35-8-9.1.a.4. through 35-8.9.1.b.2. The rule is a change in the common law reasonable use doctrine for groundwater and inconsistent with existing state policy on water use. The West Virginia Water Resources Protection and Management Act regards the use of water by the oil and gas industry as a "beneficial use." W. Va. Code § 22-26-2(b). This rule makes the West Virginia Department of Environmental Protection (WVDEP) the arbiter of reasonable use of the resource; however, it fails to take into account the existing state policy supporting the beneficial use of water by the oil and gas industry. To AEA's knowledge, there are no incidents of groundwater levels being endangered because of use by industry and there is no documented need for this regulation.

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JUL 27 2015

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The proposed requirements are overly broad and a comparison with oil and gas regulations in Oklahoma, Pennsylvania and Texas do not identify this type of requirement for oil and gas permitting in any of those states. This regulation is emblematic of the requirements that place West Virginia at a competitive disadvantage.

Current regulations for the installation of a groundwater source used as a public water supply requires a West Virginia certified well driller (CWD) involved in the drilling and testing aspects of the water supply. This section needs better definition, as the CWD needs to be involved, but this section implies that a qualified hydrogeologist would be needed to oversee and review the drilling and testing data from the proposed groundwater source. Additionally, this regulation attempts to apply a detailed, highly technical hydrogeologic investigation to all hydrogeologic settings that can be encountered in the Appalachian basin. It is beyond the ability of any such investigation described in these regulations to define all potential hydrologic consequences prior to drilling of a well, with any type of reasonable cost. This regulation is applying a very specialized hydrogeologic investigation to every horizontal well location with a groundwater well or developed spring within 1,500 feet of the proposed well.

AEA offers the following specific comments to the groundwater testing subsections.

a) Proposed rule 35-8-9.1.a.4.C. references a minimum of a 72-hour constant rate drawdown test. Current regulations for the completion of aquifer testing of public water supplies in West Virginia only requires 24 hours as a minimum standard. It is arbitrary and capricious for the agency to hold the oil and gas industry to a higher standard. AEA recognizes that the Susquehanna River Basin Commission (SRBC) utilizes the 72-hour minimum standard for constant rate tests. However, if appropriate water table stabilization occurs in the 24-hour timeframe, the additional 48 hours of pumping is unnecessary.

b) AEA urges the agency to clarify the definition of "monitoring station" for the aquifer testing procedures (see 35-8-9.1.a.4.E.) AEA proposes that existing water supplies be considered as a "monitoring station."

c) Proposed amended rule 35-8-9.1.a.5. states that the operator shall complete flow and quality testing of drinking water wells within 1500 feet of the proposed groundwater source. AEA suggests this section include springs as well. AEA urges the agency to clarify what the Department would deem as adequate testing procedures for quantity and quality in this section. Further technical guidance from the Department rather than

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JUL 27 2015

WV Department of
Environmental Protection

details in the regulations is needed to clarify the necessary steps. These steps generally go beyond what is required from the testing procedures outlined for permitting a public water supply well.

d) AEA recognizes the value in collecting the technical details of the drinking water supply of a homeowner as part of the requirements, it is likely that most homeowners will not be capable of providing the details illustrated in 35-8-9.1.a.5.B.1 and 2. If the Department requires the operator to make intrusive attempts to gain this information, this could create relationship issues with the property owner.

e) Rather than having these details in the proposed regulation Sections 35-8-9.1.a.5.D. through Sections 35-8-9.1.a.5.G., it is suggested that a technical guidance document (TGD) be issued to detail the procedures to be followed and any necessary adjustment that can be made as part of this procedure. The TGD also needs to outline testing procedures for drinking water springs as well. This TGD will allow for further clarification of the expected process and keep confusing technical language out of the regulation. In addition to this suggestion, there are generally numerous concerns of low yielding domestic water supplies. With the procedures stated as written, the operator is exposed to the possibility of pumping a water supply well dry, potentially causing damage to the well pumping equipment or the well itself. This consideration needs to be given as part of the technical language in this regulation.

10) The requirement to include historical well pad names on the signs at water withdrawal site (35-8-9.1.b.2.) is redundant and unnecessary.

AEA suggests only the well pad currently utilizing the water withdrawal site should be on the sign. The proposed requirement to include all well pad names would include historical well pads and may create confusion at many well sites for vendors and visitors not familiar with the site.

11) It is improper to incorporate the Office of Oil and Gas Erosion and Sediment Control Field Manual (field manual) into the rules.

The proposed requirement in 35-8-9.1.b.2 for erosion and sedimentation control structures to adhere to the Office of Oil and Gas Erosion and Sediment Control Field Manual (field manual) incorporates the field manual into the regulations and eliminates the opportunity for input from the industry, legislature and the public regarding field manual requirements. While the

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JUL 27 2015

WV Department of
Environmental Protection

Erosion and Sediment Control Plan must adhere to the field manual pursuant to statute, this extension by rule to the water quality and quantity protection provisions is unwarranted. Additionally, a change in the field manual could render an approved sediment and erosion control plan obsolete. Any reference to the field manual in these regulations goes beyond legislative intent and must be eliminated.

12) The proposed rule unreasonably extends the power of the Chief without administrative remedy.

The proposed regulation 35-8-9.1.b.2 states that when the withdrawal location is no longer being utilized, or at the direction of the Chief, the operator shall notify the Chief, remove all signage and requires the reclamation of the location. The provision gives the unprecedented authority to Chief to determine that a water withdraw location can no longer be utilized and to unilaterally determine when a water withdrawal site must be reclaimed. The provision for the Chief to declare a water withdrawal site can no longer be utilized and must be reclaimed must be eliminated. Reclamation should be a condition of the water management plan.

13) The proposed rule should include a definition of a formation integrity test (FIT) if it is to be required by rule.

The proposed rule 35-8-9.2. references the requirement for a formation integrity test (FIT) but fails to define it. Due to a variety of requirements for FITs, the rule should provide a definition in order to achieve consistency for the procedure. AEA offers the following definition: "A Formation Integrity Test (FIT) is a test of the strength and integrity of a new formation and it is the first step after drilling a casing shoe track. A FIT is conducted by increasing Bottom Hole Pressure (BHP) to a predetermined pressure or equivalent mud weight."

14) Any fracture propagation analysis should be geographically related to the proposed hydraulic fracturing locations and be limited to actions within the legal authority of the permittee.

The proposed requirements to monitor fracture propagation (35-8-9.4) do not address under what authority the permittee could monitor producing wells in the area of review. Moreover, the description of the area of review is not reasonably designed to address potential fracture propagation in that the a 1,200 foot radius around the surface location of a wellbore is not reasonably related to hydraulic fracturing that may commence more than 1,200 feet from the surface location of the well.

As previously mentioned, the area of review should be consistent with the plat as identified in section 6.2.j.

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WV Department of
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15) WVDEP fails to provide a process to restart operations after fracturing operations are terminated due to well communications.

Proposed rule 35-8-9.4. requires the permittee to terminate fracturing operations should a well come into communication with an off-set well, but does not provide for a process to re-start operations. AEA propose the following section 9.4.d. "Upon showing that permittee has re-established control of the permitted well and the well is no longer in communication with the off-set well, permittee may, and WVDEP shall no later than ten days following such showing, allow for the re-starting of fracturing operations."

16) The requirements do not address under what authority the permittee could plug or replug wells in the area of review.

Proposed rule 35-8-9.4.b. requires "The permittee shall identify and plug or replug, if necessary, any existing abandoned wells that may serve as a conduit for unintended fracture propagation during hydraulic fracturing activities."The requirements do not address under what authority the permittee could plug or replug wells in the area of review. The proposed rule insinuates, if not requires, that as a prerequisite for issuance of a well work permit, the WVDEP has the authority and the permittee has the duty to plug any abandoned well which "may" serve as a conduit for communication with a proposed well. Such a standard is vague and provides no guidance to operators faced with the task of plugging abandoned wells not owned or operated by the operator and for which there is no authority granted for right of entry or release of liability with regard to such a requirement.

17) The fill construction requirements do not comport with industry practice.

Proposed rule 35-8-17.2.d. requires fill to be constructed in lifts with a maximum thickness of 9 inches with no individual particle being grater than 3 inches. Common practice in the construction industry, including oil and gas operations, allows for use of particles up to 6 inches in length and horizontal lifts of 12 inches in thickness. Industry is unaware of any technical reason to mandate particles no greater than 3 inches in length or horizontal lifts no greater than 9 inches. This section should be revised accordingly.

18) The groundwater monitoring requirements of 35-8-17.2.g. should be eliminated.

The provision for detailed groundwater monitoring under 35-8-17.2.g. appears to be hastily prepared based upon factors including the fact that there are no groundwater quality standards for any of the parameters to be monitored and the fact that groundwater flow can take years to move 10 feet or more beneath the ground surface. Proposed amended rule 35-8-17.2.g.2.

requires a minimum of one monitoring well be installed downgradient from the proposed pit area.

This provision of the rule appears to provide a simple solution to a complicated situation that would involve significantly more money to accurately detail the groundwater quality for very little reliable groundwater information. This provision should be removed from the rules. In the alternative, the groundwater monitoring requirements of section 17.2.g should only apply to centralized pits containing wastewater. These groundwater monitoring requirements should not extend to freshwater impoundments.

19) Inspection requirements for pits and impoundments should vary based on potential for harm.

The inspection requirements for pits and impoundments should vary based on potential for harm. These inspection requirements should only apply to wastewater pits or impoundments and should not apply to freshwater storage.

The proposed rule 35-8-17.9.d. requires inspection by a professional engineer for pits and impoundments that have not been utilized for their intended purpose for at least six months should apply only to pits or impoundments that store wastewater, to include flow-back water and produced water from the well. A company representative, as opposed to a professional engineer, should conduct this inspection.

20) 35-8-17.9.g should be limited to wastewater pits or impoundments.

35-8-17.9.g. requires "Loading and unloading stations, including but not limited to drums, trucks, and railcars, shall have spill prevention and control facilities and procedures as well as secondary containment, if appropriate or otherwise required....." This regulation is located in 35-8-17.9. Inspection of Centralized Pits or Impoundments. In order that others not misinterpret this requirement for spill prevention and control facilities and procedures, it is necessary to insert that this subsection 35-8-17.9.g. is specific to centralized pits and/or impoundments and the handling of wastewater.

21) WVDEP should follow a verbal authorization with a written approval through email or letter within 24 hours of granting verbal authorization.

AEA appreciates the speed at which a verbal authorization may be granted pursuant to 35-8-19.7.a. However, AEA suggests that written follow-up by the agency would be beneficial and proposes to add another sentence at the end of this subsection that would provide "The Office

shall verify to the operator by email, fax or letter that verbal authorization was granted within 24 hours of granting the verbal authorization."

22) Typographical errors associated with 35-8-19 should be corrected.

Proposed amended rule 35-8-19.1. contains numerous duplicative subsections and should be corrected.

Proposed amended rule 35-8-19.7.b. states in part, "Unless the well operator proposes to plug the well in a manner allowed by paragraph 20.3.d.3. of this rule..." The regulations do not contain paragraph 20.3.d.3. This appears to be a typographical error and correction is recommended.

Very truly yours,

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Re: Comments of Antero Resources to the Proposed Amendments to 35CSR8

Dear Mr. Harmon:

Antero Resources Corporation ("Antero") offers the following timely filed comments with regard to the draft regulations for horizontal well development, 35 Code of State Rules, Series 8 ("rules" or "proposed rule(s)"), proposed by the West Virginia Department of Environmental Protection ("WVDEP") and filed with the Secretary of State's Office on June 24, 2015. Antero is an independent exploration and production company engaged in the development and acquisition of natural gas, NGLs and oil properties located in the Appalachia Basin. Antero has over 410,000 net acres of leasehold located in northern West Virginia and southwestern Pennsylvania, all in the southwestern core of the Marcellus Shale Play. Antero has 413 completed and on line horizontal wells and is currently operating 7 drilling rigs, including 2 intermediate rigs in West Virginia.

Since beginning production and exploration activities in West Virginia, Antero has worked with the WVDEP to help regulators understand industry issues to most effectively regulate the operating techniques used throughout the industry. Antero has continually balanced its interests with those of the environment and the health and safety of the citizens of West Virginia. Similarly, WVDEP must balance the interests of the state with those of the regulated community to insure the health and safety of the citizens of West Virginia while also fostering a healthy business environment that insures and secures the many benefits brought to the state by the Marcellus Shale. Among the most basic needs of the industry is a regulatory program that provides regulatory certainty both in its permitting and in enforcement.

Part of that certainty is the development of legislative rules in support of the Natural Gas Horizontal Well Control Act. It is worth noting and is sometimes forgotten that the legislature, in passing the Act, stated that the purpose of the Act was to assure that "the responsible development of our state's natural gas resources will enhance the economy of our state and the quality of life for our citizens while assuring the longterm protection of the environment." (See W. Va. Code § 22-6A-2(a)(8)). It is only by striking this proper balance can the goals of the legislature be fulfilled. To that end, while Antero applauds and supports many of the proposed amendments proposed by WVDEP, some of the provisions potentially conflict with the Act itself and would only lead to greater as opposed to lesser uncertainty for the regulated community.

Prior to addressing its specific comments, Antero voices its support with regard to the comments of both the West Virginia Oil and Natural Gas Association and Independent Oil and Gas Association of West Virginia, Inc. and incorporates the same by reference. Antero also offers the following specific comments:

Specific Comments to Proposed Amendments to 35 CSR, Series 8

1. **Application for Permit; Issuance, Conditions and Modifications (Karst region). 35 CSR, Series 8-5.1.i**

The proposed requirement to conduct testing in any defined karst region prior to submitting the permit application is premature. According to the Plans for Geologic Mapping in West Virginia, October 2009, and the West Virginia Geologic and Economic Survey's current mapping web site, karst terrain or regions have not been sufficiently identified and mapped to form the basis of a geographic area to which to apply regulatory requirements. Karst is a subsurface geology that is not and will not be adequately mapped and designated until 2019.

As a result, it is premature to promulgate and impossible for Antero to assess the potential impacts of rules and regulations which would propose to be applicable to karst regions. Antero would suggest that the term "karst region" be defined to include those areas identified and mapped by the West Virginia Geologic and Economic Survey as of July 27, 2015. This provides certainty to the industry while also protecting known "karst regions" and avoids the potential for conflict regarding what areas may or may not be labelled as karst regions.

2. **Notice. 35 CSR, Series 8-5.3.e**

Amended Rule 35 CSR, Series 8-5.3.e requires separate notice to the West Virginia Cave Conservancy and the West Virginia Speleological Survey either prior to or at the time of filing of an application for a well work permit in a "karst" region with the WVDEP. Antero does not challenge the expertise of these organizations, but these groups have no presumed property rights or statutorily protected interests in such applications. These groups can monitor well work permit applications through the WVDEP's public records and the extensive public notice process, which was established by the Act.

Further, the inclusion of these groups by rule, at the expense of other special interest groups, would establish a precedent by which any other group with may request and maintain a right to specific individual notice. As a result, 35 CSR, Series 8-5.3.e should be deleted.

3. **Site construction plan. 35 CSR, Series 8-5.5.c.**

Antero maintains a series of separate comments related to this specific section:

A. The proposed rule at 35 CSR, Series 8-5.5.c.6 fails to provide an engineering alternative to construction slopes steeper than 2:1. Antero proposes the inclusion of the opportunity to construct slopes steeper than 2:1 if soil treatment or geo-synthetics can be applied to reliably achieve the required factor of safety;

B. The proposed rule at 35 CSR, Series 8-5.5.c.10 requires surface water diversion ditches be placed above the disturbed area. Diversion ditches above cut slopes may cause soil saturation and lead to slope stability issues, especially if the cut slope has colluviums present or remaining. Antero proposes the inclusion of the opportunity for an exemption from this requirement, if the P.E. certifying the plans concludes the inclusion of a diversion ditch as set forth in the rule would be unsafe or potentially a hindrance to the site;

C. The proposed rule at 35 CSR, Series 8-5.5.c.12 requires the well pad to be fully bermed throughout the life of the well pad and contains minimum compaction requirements for earthen berms. This proposal fails to recognize that it is very difficult to achieve compaction on a raised earthen berm due to the limited lateral confinement of material and small footprint of the area. Further, complete enclosure of the well pad may potentially create instability due to standing water that would inevitably be trapped within the site. Antero urges WVDEP to reconsider the requirement to fully enclose the well pad with a berm.

Antero suggests that if such a requirement must be included in the rules that it be limited to the drilling and completions phase of the well, as opposed to the life of the well pad. The requirement to berm the entire location is not warranted during the production phase of the well because the potential water quality risks onsite during the production phase (i.e. condensate, produced water, and crude oil) are already managed under the federal Oil Pollution Control Act and associated regulation 40 CFR, Part 112 (SPCC program) and the federally regulated tanks are already required to be within secondary containment.

WVDEP should also address the increased stormwater issues associated with fully berming the site throughout the life cycle of the well. The collection of stormwater due to total capture by the enclosed well pad berm presents a slip and fall safety hazard to site workers. Antero urges WVDEP to modify these requirements accordingly.

4. Plugging of Abandoned Wells as Prerequisite to Permitting. 35 CSR, Series 8-5.11 and 9.4.b.

The proposed rule at 35 CSR, Series 8-5.11 and 9.4.b. insinuates, if not requires, that as a prerequisite for issuance of a well work permit, the WVDEP has the authority and the permittee has the duty to plug any abandoned well which "may" serve as a conduit for communication with a proposed well.

The regulation appears to apply to conventional shallow or vertical wells and/or neighboring horizontal wells in and around a proposed horizontal well. Such a standard is vague and provides no guidance or standards for making any determination that a third party well "may"

communicate with the proposed well. Further, the proposed rule does not address basic issues regarding ownership of wells and rights of entry related to any demand that abandoned wells which are not owned or operated by the operator be plugged and does not address circumstances with regard to existing wells.

The proposed rule fails to consider the cost of compliance and ownership of these wells. The proposed rules imply that one owner or leaseholder would have ownership rights to both the shallow and deep formations. It is Antero's experience that more often than not, shallow formations and the shallow wells drilled in these formations are not owned or leased by the Marcellus drillers. Thus, the Marcellus operators have no ownership or control over these formations and associated wells. Requiring Marcellus operators to plug these shallow wells would result in ownership, access and control issues, not to mention considerable expense.

5. **Area of Review/Abandoned Wells and Conduits for Communication. 35 CSR, Series 8-5.11.**

The proposed rule requires the permittee to file a "report" with WVDEP regarding potential conduits (wells) for unintended fracture propagation. First, the term "unintended fracture propagation" should be replaced by "unintended communication," as it may not be possible to identify that an induced fracture has actually intersected a wellbore, and that pressure increase is via natural fractures. Second, the proposed rule requires the permittee to evaluate wells located within 1,200 feet of the surface location and 1,000 feet of the lateral section of the wellbore and to evaluate whether such wells must be plugged. The proposed rule does not differentiate between conventional shallow or vertical wells nor whether it would apply to a neighboring horizontal well. Antero suggests these issues above must be addressed and further that the rule be amended to include the following modifications:

a. Any report should be filed with the application for a well work permit;

b. The rule should acknowledge that the report may be limited based upon the ability of the permittee to obtain rights of entry to perform the evaluation of wells; and

c. The rule should allow a combined well work permit application to include authorization to perform plugging activities as well as new well work activities to address potential need to plug well.

6. **Well Location and Target Formation. 35 CSR, Series 8-6.2.c. and Notice. 35 CSR, Series 8-5.1.h**

The proposed rule does not allow the borehole location to deviate more than 50 feet from its permitted location and prohibits a well from deviating outside the target formation. Antero understands the need of the WVDEP to assure that it has complete information regarding the location of wells drilled and completed in the state.

However, the rule as written does not take into account that once approved, actual field conditions sometimes require modifications to these locations. The rule should provide flexibility for field modification of the borehole location where it remains on the existing pad. Further, the rule should allow for modification of the target formation where the permittee maintains legal rights to that formation. Antero proposes the following language:

> "In the event that it is necessary to sidetrack the lateral, due to drilling problems or geologic conditions, that a variance of 100 ft be allowed. Once the sidetrack hole has been established, the operator should endeavor to return to the permitted wellbore location in a reasonable distance. A variance of 100 ft should also be allowed for deviation due to the anti-collision protocol specified in the Site Safety Plan."

The borehole may enter formations outside of the targeted formation due to reasonable drilling circumstances (inability to maintain inclination) or geologic conditions (faulting or dip changes). Antero proposes the following language:

> "In the event that the borehole has entered a formation other than the target formation, the operator shall endeavor to re-enter the target formation within a reasonable distance. Should the operator not have rights to deeper formations, the operator will not be permitted to complete in the non-target formation. Should the operator have rights to a shallower formation, the operator shall be permitted to modify the drilling permit to allow completion in the shallower formation."

These proposed modifications would assure that WVDEP maintains current information and knowledge regarding drilling activities while also providing the necessary flexibility to the regulated community to address field conditions.

Antero would further propose and additional modification to this section with regard to notice, specifically:

> . . . .The notice and comment periods provided by W. Va. Code 22-6A-10 that accompanied the original borehole shall satisfy the notice and comment requirements for the new replacement borehole permit application~~, except that the operator shall provide notice to the coal owner, operator or lessee as required by W. Va. Code 22-6A-10(b)(3). The objection period associated with the notice to the coal owner, operator or lessee may be waived pursuant to the provisions of W. Va. Code 22-6A-8(b).~~ . . .

Notification to the coal owner, operator or lessee of a change in location of a borehole within the confines of the well pad is unnecessary and results in unneeded delays.

7. Form and Contents of Plats.

The proposed rule adds to the type of surface features to be identified on the plat at 35 CSR, Series 8-6.2 and 35 CSR, Series 8-6.2.k.6. The proposed rule would require the additional identification of public buildings and cemeteries. Antero urges the agency to delete the

additional surface features as the inclusions of such features are not supported by the language of W. Va. Code § 22-6-12, which is incorporated by reference into W. Va. Code § 22-6A-5. Furthermore, the rule as written does not provide a definition for public buildings and fails to provide a readily available resource to verify cemeteries that will be acceptable to meet the conditions for the plat. Antero is not aware of any reliable database for identifying cemeteries and public buildings.

8. Groundwater Withdrawals. 35 CSR, Series 8-9.1.a.4 through 9.1.b.2.

WVDEP should eliminate the proposed amendments to 35 CSR, Series 8-9.1.a.4. through 9.1.b.2. The rule proposes a significant regulatory regime to address and regulate the use of groundwater by the oil and gas industry. The rule further makes the WVDEP the arbiter of what are the reasonable uses of groundwater and places the agency in a position to make policy decisions, which clearly do not fall within the expertise of the agency. The rule as structured is evidence that these provisions are ill conceived. Specifically, the West Virginia Water Resources Protection and Management Act regards the use of water by the oil and gas industry as a "beneficial use." W. Va. Code § 22-26-2(b).

Most importantly, Antero is unaware of a factual basis supporting the need to promulgate such prescription regulations over the quantity of groundwater withdrawn. Prior to such amendments, the agency should demonstrate a nexus between oil and gas operations and the loss in the quantity of groundwater.

Finally, the rule does not address whether in fact it is the purpose of the rule to amend and supersede existing common law rights and remedies available to private parties which have been well-established for generations regarding the reasonable uses of groundwater in matters involving the use of such resources by the oil and gas industry and has undoubtedly not considered what potential impacts these changes may have to contractual rights which may be impacted.

9. Use of Existing Pits Associated with Well Work Permits. 35 CSR, Series 8-9.3.

The proposed rule disallows the construction of pits associated with well work permitting. While it is not the present practice of Antero to utilize these structures, the inclusion of this provision provides a dangerous precedent with regard to rule making by the WVDEP.

The inclusion of this provision is in fact clearly inconsistent with the Natural Gas Horizontal Well Control Act, which anticipates and authorizes the use of pits for collection of waste fluids and drill cuttings resulting from drilling and completion operations. The elimination of waste pits (see 35-8- 9.3.a. and 9.3.b.) as part of the well work permit is an arbitrary and capricious prohibition that conflicts with the statute and such a fundamental change should be made by the legislature. The rule should authorize the use of waste pits as part of the well work application upon reasonable terms and conditions as has been common practice.

Should the above comment to allow pits for collection of waste fluids and drilling cuttings be rejected, at a minimum, the proposed rule should be amended to provide that existing pits continue in operation pending final reclamation of any site.

10. Fracture Propagation. 35 CSR, Series 8-9.4.

In addition to the prior Comments Nos. 3 and 4 above, relating to the identification and plugging of abandoned wells related to well communication, the proposed rule at 35 CSR, Series 8-9.4, related to monitoring and identification are overly broad and place unreasonable burdens on the permittee. Specifically, the proposed rule requires the cessation of activities should a well come into communication with an offset well, but does not provide for a process to re-start operations. The inclusion of such a process is vital again to provide the parties with certainty. Antero would propose the following section 35 CSR, Series 8-9.4.d:

> Upon showing, that permittee has re-established control of the permitted well and the well is no longer in communication with the offset well, permittee may, and WVDEP shall no later than ten days following such showing, allow for the re-starting of operations.

11. Freshwater Impoundments. 33 CSR, Series 8-12.4.f

The proposed rule at 33 CSR, Series 8-12.4.f, appears to require disposal of the liner under an approved permit. This would apparently, and Antero is certain, unknowingly, preclude the recycling of the liner. In the interest of environmental stewardship, Antero recommends modification of this provision to authorize the recycling/re-use of the liner in appropriate circumstances.

12. Water Supply Testing. 33 CSR, Series 8-15.1.

Antero maintains a series of separate comments related to this specific section:

A. The proposed rule at 33 CSR, Series 8.15.1.a through 15.1.d, contains inconsistent terminology regarding the use of the terms "springs" and "developed springs". It is assumed that all references to springs in this context should be to "developed springs" and Antero urges the agency to modify the rule accordingly.

B. The proposed rule at 33 CSR, Series 8.15.1.e. authorizes owners of drinking water wells to request well flow and water quality testing. Antero questions how to validate the baseline performance of the existing drinking water well absent historical information regarding the well. If no such information exists, the data developed by the regulated entity is of little if any value. Antero would propose that this provision is either premature and should be removed or that such baseline testing be limited to those issues for which existing and qualified historical data exists.

13. Freshwater impoundments. 33 CSR, Series 8-16

The title of the section 33 CSR, Series 8-16 references that the section relates to the regulation of freshwater impoundments. There are also references to "pits" and "fluids" contained in the section, which do not relate to freshwater impoundments, and should be removed.

14. Construction of Centralized Pits and Impoundments. 33 CSR, Series 8-17.2.

Antero maintains a series of separate comments related to this specific section:

A. The proposed rule at 33 CSR, Series 8-17.2, requires fill to be constructed in lifts with a maximum thickness of 9 inches with no individual particle being greater than 3 inches. Common practice in the industry allows for use of particles up to 6 inches in length and horizontal lifts of 12 inches in thickness. Antero is unaware of any technical reason to mandate particles no greater than 3 inches in length or horizontal lifts no greater than 9 inches. This section should be revised accordingly.

B. The proposed rule at 33 CSR, Series 8-17.2.a.2 addresses offsets from perennial streams. Antero urges WVDEP to reduce the 500' offset to perennial streams from freshwater impoundments contained in the rule. As the WVDEP is aware, the United States Environmental Protection Agency and the United States Army Corps of Engineers recently issued its final rule regarding the definition of waters of the United States, which greatly increases the scope of the definition to include many new waters that would now be identified as "perennial" streams.

   This change is also consistent with the basic notion that centralized freshwater impoundment pose little to any environmental risk. Antero specifically proposes that 33 CSR, Series 8-17.2.a.2 be bifurcated to allow for lesser-offset requirements from perennial streams for a centralized freshwater impoundment.

C. With regard to the proposed rule at 33 CSR, Series 8-17.2.b, Antero urges WVDEP to define what loading requirements are needed for a factor of safety of 1.5 or clearly state this is left to the professional engineer's judgment. Antero requests WVDEP clarify whether FS=1.5 at freeboard with pit full at static conditions is required, or can it assume liner reduces phreatic surface within the adjacent embankment.

D. Proposed rule at 33 CSR, Series 8-17.2.d, restricts the size of individual particles used for fill during the construction of certain centralized pits and impoundments to three inches. This particle size restriction seemingly arbitrarily imposes more stringent requirements than found within the remainder of the rule with regard to the size of particles used for fill. Antero recommends that the particle size be left to the discretion

of the professional engineer. Further, Antero would propose that 1.5:1 slopes on all fill embankments be authorized by rule, if properly designed by a professional engineer with appropriate geotechnical stabilization mechanisms. This would make this slope requirement consistent with ratio that is authorized in 33 CSR, Series 8-17.2.c.

E. With regard to the proposed rule at 33 CSR, Series 8-17.2.g.1, the rule imposes inspection and monitoring requirements, which are equal for pits and centralized impoundments. Given that, freshwater impoundments have little if any potential for harm to human health and the environment, Antero proposes that WVDEP clarify that the requirements of the section related to inspections and monitoring applies only to pits.

15. Certificate of Approval for Construction of Centralized Pits and Impoundments. 33 CSR, Series 8-17.3

The term "emergency situation" as it is used in 33 CSR, Series 8—17.3.g.4.b is ambiguous, undefined and may conflict with "emergency condition" which is a specifically defined term. To prevent confusion and promote clarity, Antero proposes that the term "emergency situation" should be changed to "dangerous condition" as that term is defined in 33 CSR, Series 8-17.1.c.

16. Inspection of centralized pits or impoundments. 33 CSR, Series 8-17.9.d

Antero proposes the term "scouring" in the context it is used in 33 CSR, Series 8-17.9.d, should be replaced with the term "internal erosion." Antero also recommends the addition of a provision to certify that the liner can still serve its initial intended purposes via an inspection or other mechanism.

Antero thanks the WVDEP for the opportunity to comment on these very important modifications to the 35 CSR, Series 8 and for its consideration to the comments contained herein. Antero looks forward to continuing to work with WVDEP in the future to assist in the safe and environmentally sound development of the oil and gas industry in West Virginia.

Should you have any questions regarding the content of this letter, the individual comments or any other issue related to the proposed rule, please do not hesitate to contact us.

Sincerely,

Randy Kloberdanz

Randy Kloberdanz
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STEVEN A. BUFFONE
Regulatory Assistance & Training Supervisor

27 July 2015

WV Department of Environmental Protection
Jason Harmon, Office of Oil and Gas
601 57th Street, SE
Charleston, WV 25304

RE: Horizontal Well Development Rule (Proposed Rule Amendments to Title 35 CSR, Series 8)

To Whom It May Concern:

CONSOL Energy Inc. and its affiliates (CONSOL) appreciate the opportunity to submit comments to the West Virginia Department of Environmental Protection (Department) in regards to the proposed amendment to the Horizontal Well Development Rule (Title 35 CSR, Series 8). CONSOL is a leading diversified energy company headquartered in the Appalachian Basin. CONSOL recognizes the importance of safe and efficient oil and gas exploration and production activities. CONSOL is pleased to submit the following comments.

Proposed Amendments to Title 35 CSR Series 8 Comments

§35-8-5. Permits, Notice, Review.

5.5.c.9. and 5.5.c.12. Compaction and Berms

CONSOL questions the need for compaction of earthen berms to the same standard of ninety-five percent (95%) as that of constructed embankment fills, including a moisture range specified by an engineer. The requirement to utilize a professional engineer for compaction requirements and moisture range is unduly burdensome considering that existing regulations already require oil and gas operators to comply with requirements for spill containment and control that have proven adequate in protecting waters of the State (35 C.S.R. 1 §§ 7 and 8, and 35 C.S.R. 8 §§ 5.4, 9.1.a.3 and 18).

The Standard Proctor density as established in the American Society for Testing and Materials' "Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort" (ASTM D-698) is intended for use when soil is utilized as engineering fill (embankments, foundation pads, road bases). This soil is compacted to achieve engineering properties that are intended to support structures or equipment. This standard and the 95% compaction were not intended for earthen berms since they do not support any structure

or equipment. Given that industry standard practices also include the use of best management practices (BMPs) such as synthetic liner footprints that continue over synthetic lined berms, it would seem that the ASTM D-698 is unnecessary to ensure containment of any spill to the site, if that is what the Department intends by this requirement.

- It also seems a redundant requirement to compact earthen berms to 95% since the average area of a pad included within a berm 2 foot in height would hold over 4 million gallons of fluids. If the largest tank or containment vessel on the facility is 1 million gallons, a catastrophic failure would still not result in any significant pressure outward from the released fluids to the earthen berms.

5.11. Area of Review (Abandoned Wells and Conduits for Communication)
CONSOL understands the importance of this requirement, but would recommend the following amendments.

- The Department should include the possibility that a property owner or well owner may not grant the permittee right to enter the property or inspect and evaluate the well and develop guidance or mechanism where an operator can show they have made a good faith effort to obtain the rights to monitor the wells identified the area review, but were not granted the rights and can continue with well activities.

5.11 (and 9.4.b.) Plugging of Abandoned Wells as Prerequisite to Permitting
CONSOL feels that the Department needs to plan for the eventuality that an operator will not be granted access by a property or permission a well owner to plug or replug a well that "may" serve as a conduit for unintended fracture propagation during hydraulic fracturing activities. The Department needs to develop guidance for operators that may be faced with the requirement to plug or replug wells where rights are not granted or abandoned wells where there is no party with authority to grant the right to plug or replug the well or release the liability with regard to such a requirement.

§35-8-6. Plats; Form and Contents.

6.2.c. Physical Location of Well
The Department proposes to add the amendment: "At no point shall the path of the drilled borehole deviate from the permitted borehole by more than 50 feet or deviate outside the target formation subsequent to intersection of that formation."

- CONSOL feels that this is an unnecessary addition and should be struck from the proposed amendments. This addition would unreasonably restrict safe and efficient oil and gas drilling activities. The permit of a well includes the proposed top- and bottom-hole locations of the well as well as the desired lateral path. It is not intended to include a precise path for the borehole. Geologic and operating conditions vary from well to well and deviations from the planned borehole necessarily occur, including deviations greater than 50 feet.
- The proposed amendment does not take into account the existing requirement that the permit contain the "approximate total depth the actual or the approximate

depth at which the well to be drilled deviates from the vertical, the angle and direction of the nonvertical well bore until the well reaches its total target depth or its actual final depth and the length and direction of any actual or proposed horizontal lateral or well bore," or the requirements of the W. Va. Code § 22-6A-7(b)(5), which requires a Well Record Completion Form (Form WR-35) be submitted by the operator and include "an as-drilled plat, profile view, and deviation report". This language is too inflexible (considering the lengths of the verticals) and will interfere with operator's ability to adjust path of the drilled borehole as needed and to complete well drilling activities.

- Alternatively CONSOL would recommend that a notification process be established by the Department where the operator reports the occurrence of deviations of more than 100 feet from the borehole or deviations outside the target formation to the Office of Oil and Gas. The operator can then identify the corrective action taken to maintain the borehole in the target formation.

§35-8-9. Operational Criteria.

9.1.a.4. Registering all Water Supply Wells

CONSOL would suggest the Department amend the language "Adverse impacts, for the purpose of water supply well suitability considerations, shall include: lowering of groundwater or stream flow levels" to read as follows.

- "Adverse impacts, for the purpose of water supply well suitability considerations, shall include: lowering of groundwater or <u>decrease in</u> stream flow levels <u>such that adequate pass-by flow is not obtained</u>".
- Pumping a groundwater well will induce the lowering of groundwater, creating a cone of depression in the water table. A groundwater well cannot be utilized without, at least temporarily and locally, lowering the groundwater level. Therefore, this part of the rule would effectively prohibit the use of any groundwater well. This is likely an unintended consequence that could be avoided by the proposed language above.

Most groundwater wells partially source water from or capture water prior to discharge to a surface water body. As with surface water withdrawals, adverse effects are prevented if adequate pass-by flow is maintained while water is withdrawn. Therefore, groundwater that potentially lowers stream flow (like surface water withdrawals) can also be used without adversely affecting the water body.

9.1.a.4.B. Step-Drawdown Test over a Range of Pumping Rates

CONSOL would suggest the Department amend the language "The step-drawdown test should be performed...and progress to higher rates...until the water level fails to stabilize over the step period." to read as follows.

- "The step-drawdown test should be performed...and progress to higher rates...until the water level fails to stabilize over the step period <u>or the anticipated yield is reached</u>."

- The reason is that there is no need to test the well at rates at which it will not be pumped.

9.1.a.5.D.2. Water Level Measurement

CONSOL would suggest the Department amend the language "The water level shall be measured at thirty (30), ten (1) and five (5) minutes before..." to read as follows.

- "The water level shall be measured at thirty (30), ten (10) and five (5) minutes before..."

9.1.a.5.F. Drinking Water Well Flow Test

This rule describes procedures for aquifer testing of private well supplies in which the water level cannot be measured. CONSOL recommends striking the entirety of 9.1.a.5.F from the proposed amendments for the following reason.

- The yield of a groundwater well cannot be determined without measuring the change in water level induced from pumping. The basic tenant of groundwater flow (Darcy flow equation) and its derivations used to calculate groundwater yields requires knowing the change in head.

9.4. Fracture Propagation

CONSOL understands and supports the need for the permittee to monitor all potential conduits for unintended fracture propagation throughout the entirety of the hydraulic fracturing operation and identify and monitor any producing wells within the area of review established in subsection 5.11 above that may serve as a conduit for unintended fracture propagation during hydraulic fracturing activities. However, CONSOL would like to suggest the following to the Department.

- The Department should include language to provide for a process to re-start operations and cessation. CONSOL would suggest the following language. "Having informed the Department that fracture communication is not of a detrimental nature, the permittee shall be allowed to restart well activities immediately upon Department approval, but no later than ten days after notifying the Department."
- There should be a mechanism where the operator can show the Department that fracture communication with an identified producing or abandoned well is unlikely and monitoring is not required. In most areas, confining layer formations such as the Tully Limestone and the Onondaga Limestone are adequate for hydraulic fracturing vertical containment. There is almost no possibility of vertical communication between deeper horizontal wells in formations such as the Marcellus or Utica and shallow wells of the sort. Therefore, continued monitoring of these wells is overly burdensome to the operator and unnecessary.
- Here again, CONSOL feels that the Department needs to plan for the eventuality that an operator will not be granted access by a property owner or permission by a well owner to monitor wells located in the surrounding area. The Department needs to develop guidance or mechanism where an operator can show they have made a

good faith effort to obtain the rights to monitor the wells identified the area review, but were not granted the rights and can continue with well activities.

- An alternative approach is to require as part of the Well Site Safety Plan (§ 5.7) the inclusion of an "unintended fracture propagation survey plan" based upon relevant factors and consideration as determined by the applicant, which Well Site Safety Plan would be subject to review by the Office of Oil and Gas.

§35-8-17. Construction of Centralized Pits and Impoundments with Capacity (>5,000 Barrels)

17.2.c. Minimum Compaction Requirements

The proposed rule does not allow for the use of individual particles greater than 3 inches and horizontal lifts with a maximum thickness of 9 inches.

- Common practice in the industry allows for use of particles up to 6 inches in length and horizontal lifts of 12 inches in thickness. CONSOL is unaware of any technical reason to mandate particles no greater than 3 inches in length or horizontal lifts no greater than 9 inches.

CONSOL supports the Departments efforts to strengthen the regulatory framework and decision making process for unconventional horizontal well development. If you have any questions, comments, or would like to discuss further, please do not hesitate to contact me.

Regards,

Steven A. Buffone

Steven A. Buffone
Supervisor – Regulatory Assistance and Training
CONSOL Energy Inc.

cc: Frank Calderon, General Manager, Environmental Compliance and Regulatory Affairs – CONSOL
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July 27, 2015

Mr. James Martin
Chief, Office of Oil and Gas
West Virginia Department of Environmental Protection,
601 57th St., S.E.,
Charleston, WV, 25304

Re: Comments on Proposed Horizontal Well Rules, 35 C.S.R. 8

Dear Mr. Martin:

EQT Corporation appreciates the opportunity to provide the following comments on the West Virginia Department of Environmental Protection's ("WVDEP") proposed amendments to the "Rules Governing Horizontal Well Development, 35 C.S.R. 8 (the "Proposed Rule"), which were filed with the West Virginia Secretary of State on June 24, 2015.

1. **Requirement to Utilize Closed-loop/Pitless Drilling Systems**

EQT objects to the prohibition on use of completion and flowback pits for the management and collection of completion fluids. These prohibitions are inconsistent with the Horizontal Well Act, W. Va. Code §§ 22-6A-1 *et seq.*, which expressly contemplates the use of such pits associated with a valid well work permit. As a practical matter, despite the authority to do so under the Horizontal Well Act, closed loop drilling systems are commonly used when drilling an unconventional well and as such drilling pits are not commonly used when closed loop drilling systems are used. However, during completion activities pits are commonly used to temporarily store and manage flowback water for the wells on that pad. These pits are engineered and have liners to ensure that they are protective of the environment. The use of a properly engineered and managed completion pit has several advantages over the use of multiple above ground storage tanks including, but not limited to, a smaller footprint and less

disturbance, fewer connections and hoses that are potential sources of leaks, and less truck traffic. Accordingly, the Proposed Rule should be revised to authorize the continued use of waste pits for completion activities as part of the application for a well work permit, subject to reasonable terms and conditions designed to ensure protection of human health and the environment. EQT welcomes the opportunity to discuss with WVDEP any additional safeguards on the continued use of on-site completion pits that the agency may deem necessary or appropriate.

2. Area of Review (§ 5.11).

The requirement to identify *potential conduits* for unintended fracture propagation should be clarified by specifically stating that wells within the vertical or horizontal distance identified in this section are potential conduits. Additionally, the requirement to identify existing active, plugged and abandoned wells should be limited to a review of public records. As such, EQT proposes the following revision:

> 5.11 Area of Review – The operator shall review the area surrounding the proposed well pad so as to identify and evaluate potential conduits for unintended fracture propagation, a report of which the operator shall provide to the Office. All existing active, plugged and abandoned wells that are documented in records maintained by the Office within one thousand two hundred feet (1,200') of the surface location of the well that is the subject of the new application and within one thousand (1,000') feet vertically or horizontally of the lateral section of the wellbore shall be potential conduits for ~~considered for the potential of~~ unintended fracture propagation.

3. Fracture Propagation (Section 9.4)

The requirement to monitor *potential conduits* and plug abandoned wells establishes an impossible condition because in most cases the permittee does not have the right to enter property where third party wells are located, does not have the right to install monitoring equipment on third party wells, and does not have the right to plug abandoned wells that are orphans of the state. In cases where a permittee identifies a *potential conduit*, the permittee should notify the owner or operator of that well of the pending drilling activities and request that the owner/operator inform the permittee if any unsafe conditions are observed. Unsafe conditions are pressures that could exceed the designed pressure ratings of the equipment on the third party well. With regard to abandoned wells, the Office has an abandoned well program which establishes authority to enter property to plug abandoned wells and a funding mechanism to plug abandoned wells. As such, the Office should plug any abandoned wells identified by the permittee as *potential*

conduits under the authority of the abandoned well program. Moreover, the state has no authority impose a well plugging obligation on new permittees as a condition to obtaining a well work permit. EQT proposes the following revisions to Section 9.4:

9.4 Fracture Propagation - - The permittee shall provide notice to all known owners and/or operators of potential conduits, as determined by Section 5.11, of the permittees' planned completion activities prior to commencement of completion activities. Such notice shall include information on the timing and duration of the well completion activities and the permittee's contact information so that the owner and/or operator can contact the permittee if any unsafe conditions are observed in the potential conduit. ~~Monitor all potential conduits for unintended fracture propagation throughout the entirety of the hydraulic fracturing operation.~~ Unsafe conditions are conditions where the wellhead pressure increases to a point where the pressure could exceed the maximum design pressure rating of the wellhead equipment on the potential conduit.

9.4.a If the permittee is notified of an unsafe condition, the permittee shall suspend the completion activities and review if fracture communications have occurred and caused the unsafe conditions and whether the unsafe conditions can be managed or prevented by modifying the completion activities. Upon suspending the completion activities, the permittee shall notify the oil and gas inspector. If the completion activities caused the unsafe conditions, the permittee may resume completion activities upon a demonstration that they can be managed to prevent a reoccurrence of the unsafe conditions. ~~The permittee shall and monitor any producing wells within the area of review established in Section 5.11 above that may serve as a conduit for unintended fracture propagation during hydraulic fracturing activities. Any observed pressure changes shall be reviewed to determine if the fracture communications of detrimental nature has occurred into these offset wells. If the review indicates such communications has occurred, the permittee shall terminate the fracturing activities and relieve the associated pressure. Upon fracture termination, the operator shall notify the oil and gas inspector immediately.~~

9.4.b The Office shall plug or replug, if necessary, ~~permittee shall identify and plug or replug, if necessary,~~ any existing abandoned wells

that may serve as a potential conduit for unintended fracture propagation during completion ~~hydraulic fracturing~~ activities.

9.4.c. ~~The permittee shall monitor all associated fracturing treatment pressures throughout the entirety of the hydraulic fracturing operations. If data monitoring indicates that communication has occurred, the permittee shall terminate the fracturing operations and relive the associated pressure. Upon fracture termination the operator shall contact the oil and gas inspector immediately.~~

4. Berms [§ 5.5.c.12]

EQT generally supports the requirements that berms be installed at pads during drilling and completion activities and, where employed, berms should be designed, installed and maintained to manage fluids from flowing off the well pad and while allowing rainwater and snowmelt to captured and release through a sump system. As such, it may not be necessary to install berms the entire perimeter of the well pad. Additionally, it may not be prudent to install berms where the access road enters the well pad because of access and safety issues and the fact that the fluid handling activities are typically located on a different part of the pad. Lastly, berms are removed once drilling and completion activities are completed and the site is reclaimed. Once reclaimed, the production pad has tanks that are equipped with secondary containment. Therefore, the requirement should not extend to production pads. As such, EQT proposes the following revisions to Section 5.5.c.12:

5.5.c.12 Well pads shall be equipped with ~~fully enclosed~~ by berm structures to prevent offsite migration of fluids used during drilling and completions activities. Berms shall be installed in areas of the pad where offsite migration of such fluids is possible. If an earthen berm is employed, the berm shall be a minimum of two feet (2') in height with a two foot (2') top. Minimum compaction requirements for raised earthen berms shall be the same as those for embankment fills as set forth in subdivision 5.5.c.9 above and have maximum side slopes of one and one-half horizontal to one vertical (1.5:1). The berms can be removed when the well pad is reclaimed. ~~The area where the access road meets the well bad shall be equipped with a mountable berm structure.~~

5. Well Location and Target Formation (§ 6.2.c)

Limiting the deviation of the well bore path to less than fifty feet is impracticable and unworkable. The well permitting process identifies the location of the top hole, the target formation and the end of the well. The permit does not specify and exact corridor but rather specifies these three points for the simple reason that deviations occur when drilling long vertical and horizontal distances. Obviously, the permittee's goal is to drill as efficiently as possible and limit deviations but sometimes geologic conditions dictate otherwise. The key is to keep the borehole within the boundaries of the leases identified in the permit and to keep the borehole in target formations. The permittee continuously monitors the drilling by evaluating drill cuttings and through this analysis the permittee can determine if the borehole deviates outside the target formation. If it does the permittee will steer the drill back into the target formation but this takes time and it is unlikely that the drill can be steered back into the target zone within the fifty foot deviation standard. EQT recommends that the Office revise the strict deviation standard to require the permittee to stay within the lease boundaries and require the permittee to correct the path of the borehole as soon as reasonably possible if the borehole deviates outside the target formation. As such, EQT proposes the following revisions to Section 6.2.c

> 6.2.c Physical Location of Well – Every well shall be drilled within ten feet (10') of the exact well location designated on the plat. At no point shall the path of the drilled borehole deviate ~~from the permitted borehole by more than fifty feet (50') or deviate outside the target formation subsequent to the intersection of that formation~~ outside the boundaries of the leases identified in the well work application. If the borehole deviates outside the lease boundaries or outside of the target formation, as soon as reasonably possible, the permittee shall correct the path and return the borehole into the lease boundaries and the target formation.

6. Formation Integrity Testing [§§ 9.2.d.10, 9.2.e.4, 9.2.f.2]

The proposed rule authorizes the Chief to require a formation integrity (FIT) test but does not establish any criteria or conditions for this requirement. A FIT test is typically conducted when the characteristics of the formation are unknown and it is unknown whether the formation can withstand the hydrostatic pressure of the drilling fluid. The formation characteristics are unknown when drilling in a new area or a new target formation. EQT recommends that the Office establish criteria for when a FIT test should

be required. As such, EQT proposes the following revisions to Sections 9.2.d.10, 9.2.e.4, 9.2.f.2.

> The Chief may require a FIT test if it is unknown whether the area of the wellbore that is fifty feet (50') below the shoe cannot withstand the equivalent hydrostatic pressure of the heaviest expected mud weight in that section of the well.

7. Plugging – Retrieving Casing and Completing a Seal (§ 19.6)

The proposed rule requires the permittee to make reasonable efforts to pull all recoverable casing. In some cases this may not be possible so EQT requests that the office make provisions to allow some portions of the casing to remain in the borehole. For instance, on some of the older packer seal assemblies ran there was a 7"x 4 ½" packer ran in the hole. In this case, EQT recommends that if the 7" x 4 ½" packer cannot be pulled then the permittee should be allowed to shoot the casing off above the packer and pull the pipe.

EQT greatly appreciates the opportunity to comment on the proposed rule and welcomes the opportunity for further dialogue with the Office of Oil and Gas to ensure that the proposed rules are both practicable and protective of the environment.

Sincerely,

Joseph M Dawley

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Comments 35CSR8 Rules Governing Horizontal Well Development

We appreciate the work that creating the revisions to the rule required. We are pleased to see new sections of the rule fulfilling requirements in §22-6A for rules. Additions to the rule also include new regulations based on the agency's experience with events in the field. We have indicated our support for these changes throughout our comments. What we really appreciate is evidence that the agency is learning from experience and adapting its regulatory program in order to better protect human health and the environment.

We'll be commenting on the rule as items appear in the rule except for the first items of concern which are missing from the rule.

Gas Migrations

The code in §22-6A-24(c)(2) requires rules to prevent gas migration and in §22-6A-24(e)(5) the rules "shall provide procedures" for "investigation of natural gas migration, including requirements that the operator promptly notify the secretary and conduct an investigation of the incident."[1]

The rule requires in 35CSR8-9.2.a that the operator conduct casing and cementing so as to prevent gas migration but that does not satisfy the legislative requirements and the rule needs to be revised. As citizens of West Virginia we believe it is important that serious study of the causes of gas migration should be undertaken and that results of incident investigations be made available to the public on the Office of Oil and Gas' website.

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[1] 35CSR8-9.4 Fracture Propagation obliquely covers one cause of gas migration. Another cause would be improper casing and cementing where gas migration is affecting local drinking water sources.

Explosions and Fires

The code in §22-6A-24(c)(4) requires rules for prevention of blowouts, explosions and fires due to loss of well control. What exists in 35CSR8-5.7.f.3 is a requirement for reporting if an explosion or other incident has caused loss of life or serious injury.

Since no investigations by the Office have been published on their website we have to go on sketchy news reports. Our understanding is that most explosions and fires on well pads do not occur because of loss of control of a well but instead because of emissions on the site during fracture fluid flowback.[2]

The legislature in §22-6A-22 wanted the DEP to create new rules to protect human health and the environment if there were a need due to emissions.

We believe there is a pressing need for rules governing site activities during fracture fluid flowback, especially rules for the management of explosive emissions from the well that are produced along with the flowback and the explosive emissions resulting from agitation or outgassing of the fluid.

We also believe that results of incident investigations by the Office must be made available to the public on the Office's website. This is especially important when these investigations can help modify or correct operators' practices in the field prior to revisions of this rule.

35CSR8-2 Definitions

2.15 We approve of incorporating rules governing development on karst terrain which are based on §22-6A-3a.

35CSR8-5 Permits, Notice, Review

5.5.c.12 We heartily approve of the requirement for a berm surrounding the well pad and for the access road entering the well pad crossing a mountable berm structure.

5.11 We approve of an area review as being part of the permit application.

35CSR8-9 Operational Criteria

9.1.a.4 The water well supply requirements in 35CSR8 are excellent.

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[2] For example, for the 2013 fire on the Ruddy Alt pad (well 47-017-06102) see Office of Oil and Gas orders 2013-52, 2013-61, and 2013-64.

9.2 A copy of the casing and cementing program must be kept on the site according to §22-6A-24(d)(3). This requirement needs to appear in 35CSR8-5 or here in 35CSR8-9.2

9.2.d.1 This section requires freshwater casing be set at least 50 feet below the deepest freshwater horizon. This does not conform to the API's own guidance of 100 feet.[3]

We believe that using the API guidance provides more cement between the casing shoe and aquifer and creates a situation where it is more likely there will be a good seal along at least part of the cemented annulus.

We are concerned that 35CSR8 has no mechanism for the protection of Underground Sources of Drinking Water (USDW). There is no approved method in 35CSR8-5.1.b.2 for determining anticipated groundwater zones. If drillers' reports from area wells are used to determine "fresh" water depths, waters considered not fresh, or even salt by drillers, are not receiving protections required by the Safe Drinking Water Act (SDWA) because subjective judgement is being used instead of quantitative analysis required by the SDWA.

We understand that it is too late to incorporate protections for USDW in this version of the rule but they are necessary in the next revision.

9.2.d.8 This section needs to be reworded to conform to §22-6A-24(f)(5):

> There shall be no oil or gas production <u>or pressure</u> through the freshwater casing <u>or the casing annulus.</u>

9.2.d.10 We approve of the Formation Integrity Test for surface casing here and for coal protection casing in 35CSR8-9.2.e.5. These tests should be mandatory in order to conform to API's *Hydraulic Fracturing Operations – Well Construction and Integrity Guidelines*.

There needs to be an additional section between 35CSR8-9.2.e.3 and 9.2.e.4 to conform to §22-6A-24(f)(5):

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[3] API, 2009, *Hydraulic Fracturing Operations – Well Construction and Integrity Guidelines*. API Guidance Document HF-1. http://www.shalegas.energy.gov/resources/HF1.pdf

There shall be no oil or gas production or pressure on the coal protection casing annulus.

9.2.h Cementing Standards does not have all the minimum standards found in §22-6A-24(g)(1): "All cement used in the well must . . . secure the casing to the wellbore, isolate the wellbore from all fluids, contain all pressures during all phases of drilling and operation of the well, ..." According to §22-6A-24(g)(2) "cement used in conjunction with surface and coal protection casing must provide zonal isolation in the casing annulus."

A revision to the rule is required to incorporate these legislative requirements.

9.2.j Annual Inspection. The rule reads "During inspection, if the operator detects evidence of more than de minimus leakage or other indications of casing integrity failure, . . ." The law in §22-6A-24(f)(5) desires no pressure on the freshwater or coal protection casing annuli. There may be de minimus pressures for other casing annuli, but for the freshwater or coal protection casing annuli no leakage is allowed. The rule needs to be revised in this section.

9.3 We are happy to see that closed loop drilling systems are deemed the only appropriate systems for horizontal wells. We are pleased to see an end of waste pits at these sites.

9.4 Fracture propagation requirements in this rule are excellent. Since incidents of this sort are most often indicated by gas migrations investigations are required by state code. We believe results of incident investigations should be available to the public on the Office's website.

35CSR8-11 Reports

11.1 Produced needs to be added before Water.

Reporting in 35CSR8-11 fulfills only part of the code in §22-6A. §22-6A-24(c)(5) requires rules to accomplish the "*appropriate* disposition of brines and discharges from the drilling or operation of horizontal well [our emphasis]." 35CSR8-9.1.b.3 and its subsections conforms to the requirements of §22-6A-8(g)(6)(C).[4] But the

[4] The rule is for operator recordkeeping, not reporting, and lasts only for three years after last water withdrawal.

annual reporting in 35CSR8-11 is the logical place for operators to report appropriate management of produced water. The operator in their permit application on WW-9 provides information about the location of disposal but that may change over the years. Properly designed, a produced water reporting method would also provide a check for UIC IID WR-40 reporting in those instances where the fluid is being injected underground.[5]

35CSR8-12 Reclamation; Notification; Production and Gathering Pipelines; and Operating in Designated Mining Areas

12.4 We support the removal of onsite pits from the revised rule, but there is an error in 35CSR8-12.4.g. The wording there should read: All <u>impoundments</u> ~~pits~~ and alternative . . . etc.

35CSR8-17 Construction of Centralized Pits and Impoundments with Capacity of Greater Than Five Thousand (5000) Barrels

We approve of most of the additions to the rule with these exceptions.

17.2.a.2 We question why perched groundwater zones should be exempt from groundwater protection. Since the permit application does not require the report of a hydrogeologist, the rule is allowing operators to make this determination on their own, putting at risk all groundwater (perched or not) which must be protected under law.

The rule should read: ". . . or in or within twenty inches (20") of the seasonal high of the groundwater table~~, except perched groundwater zones~~."

17.2.g Groundwater and surface water monitoring is an excellent addition to the centralized pits portion of the rule. We wish, however, that the constituents monitored under 35CSR8-17.2.g.4 were not just those with unenforceable secondary MCLs. Either include enforceable criteria such as barium and arsenic or include wording in the rule stating which concentrations (acute or chronic) under 47CSR2 are the maximum allowable.

17.8.b The additions to the security section are excellent.

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[5] The WW-9 form is appropriate for vertical wells. Many of the items on the first page of the form dealing with disposal of waste are inappropriate for wells covered in 35CSR8. We suggest a special form based on WW-9 be created for horizontal wells.

35CSR8-19 Plugging, Abandonment, and Reclamation

The plugging section in this rule is required by §22-6A-13 and we are happy to see it present at last. It is based primarily on §22-6-23.

35CSR8-20 Plugging Methods

The plugging methods are adapted from §22-6-24. The classification of water as nonporous in 35CSR8-20.3.a and an acceptable plugging material for the horizontal segment of a well is an obvious mistake and needs to be corrected. We believe cement should be the only acceptable material for plugging a horizontal well's lateral.

20.3.f There is a typo in the last line: ofthe should be of the .

COMMENTS OF IOGA TO PROPOSED AMENDMENTS TO RULE GOVERNING HORIZONTAL WELL DEVELOPMENT - 35 C.S.R. 8

These comments are filed on behalf of the Independent Oil and Gas Association of West Virginia, Inc. ("IOGA") on the proposed amendments to the Horizontal Well Development Rule 35 C.S.R. 8 (the "Proposed Amendments"). Formed in 1959, IOGA is a statewide nonprofit trade association that represents companies engaged in the extraction and production of natural gas and oil in West Virginia and the companies that support these extraction and production activities. IOGA was formed to promote and protect a strong, competitive and capable independent natural gas and oil producing industry in West Virginia, as well as the natural environment of our state. IOGA has been in existence during times of boom and bust and its members have a long history of driving innovation in exploration and development of West Virginia's oil and gas reserves. Our members also have a longstanding tradition of working with WVDEP and its predecessor agencies to help regulators understand these innovations and how to regulate new techniques in a manner that protects the environment while promoting the economic development so crucial to West Virginia. It is in this spirit of innovation and partnership that IOGA offers these comments.

On June 24, 2015, the West Virginia Department of Environmental Protection Office of Oil and Gas ("DEP") filed the Proposed Amendments with the West Virginia Secretary of State along with a notice of public hearing on the Proposed Amendments to be held on July 23, 2015, at 6:00 p.m. IOGA appreciates the opportunity to provide these comments on the Proposed Amendments.

A. General Comments

1. The Importance of Appropriate Rules Governing Shale Wells Drilled Using Horizontal Technology

As an initial matter, IOGA would like to emphasize that its members recognize the critical importance of safe and effective exploration, drilling and operation of oil and gas wells, including wells drilled using horizontal technology to develop the shale formations. IOGA member companies have decades of experience in developing oil and gas resources in West Virginia and have demonstrated that wells can be drilled in a safe and efficient manner that <u>will not</u> adversely impact health and the environment, including our valuable water resources.

IOGA supports reasoned and focused regulation of permitting and operation of shale drilling, fracturing and production activities, including the use of horizontal well technology and in the comments, recommendations and requests for clarification that follow offer the expertise and experience of our member companies in assessing the effectiveness of the Proposed Amendments.

2. **The proposed amendment to § 6.2.c. prohibiting borehole deviation of more than 50 feet or outside the target formation should be deleted.**

The proposed new sentence in § 6.2.c. is unnecessary and unreasonably restricts safe and efficient operations of oil and gas development. The precise path of a borehole is not part of the permit requirements. Rather, only the top-hole and bottom-hole locations of a well are proposed to be identified on a well plat pursuant to the Proposed Amendments. The full length of the borehole between top-hole and bottom-hole is not intended to be a limitation of the precise location of the borehole. Geologic and operating conditions vary from well to well and deviations from the planned borehole necessarily occur, including deviations greater than 50 feet. (See Appendix A for more detailed discussion of the technical problems with the proposed change, including financial consequences.) In light of the statutory requirement that the permit application contain the "approximate total depth . . . the actual or the approximate depth at which the well to be drilled deviates from the vertical, the angle and direction of the nonvertical well bore until the well reaches its total target depth or its actual final depth and the length and direction of any actual or proposed horizontal lateral or well bore," the DEP has provided no reason or explanation for such a restrictive limitation given the approximations expressly permitted in the statutory requirements. W. Va. Code § 22-6A-7(b)(5). Because the Well Record Completion Form (Form WR-35) requires "an as-drilled plat, profile view, and deviation report" be submitted as part of the report, the 50 foot deviation restriction should be eliminated. At minimum, the Proposed Amendments should be revised to simply require notification to the Office of Oil and Gas upon the occurrence of deviations of more than 100 feet from the borehole or deviations outside the target formation and identifying the corrective action taken to maintain the borehole in the target formation. The proposed language is simply too inflexible in light of the uncertainties involved in drilling a well of more than 10,000 feet in total length.

3. **Section 9.3 "Closed-Loop Drilling Systems" should be deleted.**

Imposing the exclusive use of closed-loop/pitless drilling is outside the scope of DEP's authority. The Natural Gas Horizontal Well Control Act, W. Va. Code § 22-6A-1 *et seq.* ("Horizontal Well Control Act") anticipates and authorizes the use of pits for collection of waste fluids and drill cuttings resulting from drilling and completion operations. The elimination of waste pits as part of the well work permit is an arbitrary and capricious prohibition that conflicts with the Horizontal Well Control Act. The Horizontal Well Development Rule must continue to authorize the use of waste pits as part of the well work application upon reasonable terms and conditions. The West Virginia Legislature expressly authorized the use of pits (defined as "a man-made excavation or diked area that contains or is intended to contain an accumulation of process waste fluids, drill cuttings or any other liquid substance generated in the development of a horizontal well and which could impact surface or groundwater." W. Va. Code § 22-6A-4(b)(10)) when it stated that "[t]his section does not apply to large pits or impoundments authorized under a well work permit." W. Va. Code § 22-6A-9(a). The elimination of pits for the collection of waste fluids and drill cuttings requires legislative action to amend the Horizontal Well Control Act. All pit deletion conforming changes contained in the Proposed Amendments should be reversed as well. However, the DEP may encourage the use of "closed-loop drilling systems" by way of guidance or other non-binding regulatory vehicle, but such a requirement is inconsistent with the language of the Horizontal Well Control Act.

4. **The fracture propagation requirements are vague and unduly burdensome.**

Section 5.11 requires the "operator" (rather than "permittee" as referenced in § 9.4) to "review the area surrounding the proposed well pad so as to identify and evaluate potential conduits for unintended fracture propagation, a report of which the operator shall provide to the Office." This requirement is vague and unduly burdensome because the language fails to adequately inform the well work applicant of the extent or nature of information or facts to be reviewed and evaluated. If "potential conduits" means "all existing, active, plugged and abandoned wells" within the prescribed distances then the term "potential conduit" should be so defined and limited.

The "area of review" includes active, plugged and abandoned wells within 1,200 feet of the surface location of the well **and** within 1,000 feet of the lateral section of the wellbore for consideration of the potential for unintended fracture propagation. Since most vertical wellbores in horizontal wells are not "fractured" in the completion process, it is unnecessary to review an area 1,200 feet west of the well location where the first fracture operation occurs 1,000 feet east of the well location. The area of review should be based on a 1,000 foot radius determined from the location of the fracture operations not the surface location of the well. IOGA suggests that the area of review require identification of active, plugged and abandoned wells having a wellbore that is within 1,000 feet of the lateral wellbore located in the target formation, which is where fracture operations will occur. For example, a plugged vertical well drilled to a depth of 2,500 feet should not be part of the area of review of a Marcellus well having a lateral wellbore 6,000 feet below the surface and 3,500 feet below the bottom of the plugged vertical well.

Moreover, fracture propagation requirements impose obligations beyond the control and legal authority of the well work permittee. For example, § 9.4.a. requires a permittee to "identify and monitor any producing wells within the area of review . . . that may serve as a conduit for unintended fracture propagation during hydraulic fracturing activities" and § 9.4.b. requires that the permittee "identify and plug or replug, if necessary, any existing abandoned wells that may serve as a conduit for unintended fracture propagation during hydraulic fracturing activities." The requirements do not address under what authority the permittee could monitor third party producing wells or plug or replug other third party wells in the area of review. Any fracture propagation well monitoring or plugging responsibility should be expressly limited to such wells as the permittee owns or has the right to operate and control. Otherwise, DEP should be responsible for requiring the owner or operator of any wells located within the area of review to monitor, or plug or replug such wells. The permittee simply lacks the legal authority to monitor or plug wells for which it has no ownership or operating rights and the Proposed Amendments should be so limited with regard to the permittee obligations.

An alternative approach is to require as part of the Well Site Safety Plan (§ 5.7) the inclusion of an "unintended fracture propagation survey plan" based upon relevant factors and consideration as determined by the applicant, which Well Site Safety Plan would be subject to review by the Office of Oil and Gas.

5. **Groundwater supply well aquifer and hydrogeologic delineation and drawdown testing requirements discriminate against oil and gas operators and are unduly burdensome and costly**

The Proposed Amendments to §§ 9.1.a.4. and 9.1.a.5. contain extensive and expensive requirements that exceed the value of developing a water supply well, thereby effectively prohibiting the use of water supply wells in the development of horizontal wells pursuant to the Horizontal Well Control Act. These extensive requirements are limited to water supply wells under the Horizontal Well Control Act which constitutes an unreasonable burden on the oil and gas well operators. IOGA requests that the Proposed Amendments to §§ 9.1.a.4 and 9.1.a.5 be deleted and incorporated into a legislative rule applicable to all water supply wells developed for commercial use.

6. **Wellpad berm and compaction requirements impose unnecessary and unreasonable additional costs and operational burden to the applicant without any related protection of water resources.**

Section 5.5.c.12 imposes a new requirement that the well pad be "fully enclosed by berm structures," subject to the same compaction requirements as embankment fills described in § 5.5.c.9., including a moisture range specified by an engineer. The requirement to utilize a professional engineer for compaction requirements and moisture range is unduly burdensome in light of industry experience with erosion and sediment control in well work operations. Existing regulations require oil and gas operators to comply with existing requirements for spill containment and control that have proven adequate in protecting waters of the State. See, 35 C.S.R. 1 §§ 7 and 8, and 35 C.S.R. 8 §§ 5.4, 9.1.a.3 and 18. This requirement results in significant water management logistical issues and may cause wellpad integrity issues without any demonstrated benefit to the environment. In addition, the mandated collection of precipitation on a wellpad may create safety issues related to pooling of water and icy conditions during winter periods.

7. **Karst areas are not sufficiently mapped and designated.**

Karst terrain or regions have not been sufficiently identified and mapped by the West Virginia Geological and Economic Survey ("WVGES") to form the basis of a geographic area to apply extensive regulatory requirements. Karst is a subsurface geology that is not and will not be adequately mapped by the WVGES in the near future. Instead of relying on verified data regarding the actual location of subterranean karst voids or formations, DEP proposes to use a broad brush to designate wide areas of West Virginia as subject to extensive and costly regulations. Indeed, the definition of karst region and karst terrain is simply too vague to be reasonably applied. Thus, designating any area as "karst" is an arbitrary and capricious limitation on the right to develop and produce oil and gas resources. In addition, imposing a special requirement to provide notice of a well work permit application to special interest groups such as the West Virginia Cave Conservancy and West Virginia Speleological Society for all counties containing karst topography is an improper delegation of DEP's regulatory responsibility. Such groups have no property rights or interests in such applications, rather they

can monitor well work permit applications through the DEP's public records which is publicly available.

8. **A fiscal note regarding persons affected by the Proposed Amendments should be developed and included as required by statute.**

Finally, the fiscal note included with the Proposed Amendments fails to address the economic impact of the Proposed Amendments on persons affected by the rules and regulations as required by statute. W. Va. Code § 29A-3-5 by reference to § 29A-3-4(b) requires a proposed rule to have "a fiscal note attached itemizing the cost of implementing the rules as they relate to this state **and to persons affected by the rules**." (emphasis added). The DEP should evaluate the economic impact imposed by the Proposed Amendments on "persons affected by the rules," including the regulated community. The failure to consider and evaluate the economic impact on the regulated community can be expected to result in unreasonably costly regulatory requirements compared to the perceived benefit to be created. IOGA urges DEP to perform the statutorily required economic analysis and resubmit the Proposed Amendments with an appropriate fiscal note. Appendix A provides a starting point for estimating the economic impact to the regulated community of the Proposed Amendments. IOGA is not aware of any communications or inquiries to its members regarding the technical or financial feasibility of the Proposed Amendments.

B. Specific Comments

The following are comments to specific sections of the Proposed Amendments and are intended as supplemental to the general comments offered above and not in derogation of the general comments.

§ 2.15 – the term "Karst Terrain" is defined but not used elsewhere in the Rule. IOGA requests that the specific geographic areas that are subject to the additional regulatory requirements be designated by county and tax districts within each county to allow well work applicants to know what requirements are applicable to the application. If the WVGES maps referenced in the definition have been developed, such maps are not readily available to the public. The "karst" terminology contained in the Proposed Amendments is simply vaguely defined and not workable in practice. In addition, the word "Geologic" should be "Geological" in the name West Virginia Geological and Economic Survey.

§ 5.1.c.2 - makes a reference to "subdivision 19.1.c" but there are two subdivisions designated as 19.1.c. The reference should be corrected based upon the proper subdivision labels in § 19.1.

§ 5.1.i - requires pre-application testing to be submitted with the well work permit application. However, W. Va. Code § 22-6A-3a(b)(1) appears to permit pre-drilling testing rather than pre-application testing. Applicants should be provided the flexibility to perform testing after the issuance of a permit but prior to drilling the well.

§ 5.3.e - requires notice to two special interest groups for well work applications in counties containing karst regions. It is inappropriate to elevate these groups to special status in the absence of a specific interest in the property impacted by the well work. In addition, any notice should be limited to well work applications in a karst region and not expanded to the entire county in which a karst region may be located. Finally, one organization is not registered with the West Virginia Secretary of State and may not be a legal entity. A website having the name "West Virginia Speleological Survey" states "WVASS is as unorganized an organization as is possible to have and still get things done. WVASS is basically a voluntary association of cavers and caving groups, each of which pursues its own interests. We have participants, but no members. Initially there was no constitution, no dues, and few rules. There is cooperation because we have a common desire: to gather and maintain information about West Virginia caves and karst." An organization that is not registered with the West Virginia Secretary of State's office and with no legal notice address should not receive special treatment for notices of well work applications as it has no legal status.

§ 6.1.b - the reference to § 22-6A-5(a)(7) should probably be to § 22-6A-5(a)(6).

§ 6.2.k.2 - adds the term "public buildings" to the list of surface features required to be identified on a plat, but the term is not defined. The term is too general for reasonable application in the context of a large area plat. Whether a building is publicly owned or not is not always reasonably apparent from external appearances. The requirement should be limited to readily identifiable buildings owned by state or local governmental entities and used for public gatherings.

§ 9.1.a.5 - contains the word "or" which should be deleted.

§ 9.1.a.5.D.2 - should be corrected to insert the numeral "10" instead of "1."

§ 9.1.c - requires baseline testing prior to commencement of any site construction work on "water resources adjacent to the site." The phrase "water resources adjacent to the site" is vague and does not adequately inform the applicant of its regulatory obligation. The baseline testing should be limited to water quality testing by at least one sample taken within 1,500 feet of the well location.

§§ 9.2.d.10, 9.2.e.4 and 9.2.f.2 - each authorize DEP to require formation integrity test for well casing. The authorization contains no standards for determining whether or not a formation integrity test should be required and how such requirement will be communicated to the person responsible for performing such test. IOGA requests that objective standards be established for when and under what circumstances a formation integrity test may be required. IOGA estimates that each formation integrity test will cost from $5,000 to $8,300, so the decision to require such tests should be based upon a sound factual basis.

§ 9.4 - the first sentence should be deleted because the specific requirements imposed on the permittee are described in §§ 9.4.a, 9.4.b and 9.4.c. The phrase "all potential conduits" is vague and overbroad and unnecessary in light of the more specific requirements described therein.

§ 9.4.c – uses the word "communication" in the second sentence. IOGA suggests inserting the phrase "with unintended conduits" following the word "communication" in the second sentence to modify and clarify the word "communication."

§ 11.1.a – requires reporting of "condensate" instead of "natural gas liquids" on Form WR-39 "Report of Annual Production." However, Form WR-39 is on the Office of Oil and Gas' website as "Report of Monthly Production" which should be changed to conform to the name of the form. Also, Form WR-39e appears to be an option for reporting monthly production as well. In addition, in the fourth sentence because "natural gas liquids" is changed to "condensate" the word "those" should be changed to "the amount."

§ 11.1.b. – IOGA requests that the first sentence and the ending phrase of the second sentence "and shall be acceptable 'pipeline quality'" be deleted as an unnecessary qualification on the condensate measurement and quality. Condensate need not be measured according to common carrier standards or be of pipeline quality at the production site since processing can occur at a centralized collection location.

§ 11.1.d – is a new requirement regarding "produced water." IOGA requests that the words "of common carriers in the State of West Virginia" be deleted and replaced with "in the industry." Because produced water may be recycled and reused at the same location the practices of common carriers should not be imposed on the operator and estimates of volume should be acceptable. More importantly, the distinction between when flowback water ends and produced water begins requires greater clarity. A bright line approach of declaring all water produced after ninety (90) days following completion work on the well to be "produced water" and measured accordingly is more appropriate.

§ 12.4.f – should be modified to permit beneficial use of fluids from the impoundment as follows: "All material in the pit/freshwater impoundment, including the liner shall be beneficially used or disposed of in an appropriate manner." The disposition of the material will not always be pursuant to a permit. Of course, IOGA opposes the elimination of "pits" as explained at A.3 above.

§ 12.4.h – prohibits freshwater impoundments in "any area designated as a karst region." This prohibition is overbroad and an unreasonable restriction on oil and gas operations. The requirement for pre-drilling testing may determine whether construction of a freshwater impoundment is safe or not. Thus, the option of constructing a freshwater impoundment should be retained for such conditions as may support such construction. As noted in A.7 above, the definition of karst region is too vague to impose a complete ban on freshwater impoundments as this proposed subdivision does.

§ 16 – changes "pits and impoundments" to "freshwater impoundments" which IOGA urges remain unchanged. As noted in A.3 above, IOGA urges the retention of pits as an option for oil and gas operations consistent with the Horizontal Well Control Act. In the event that section 16 is limited to freshwater impoundments the requirements should be modified for the lower risk to waters from freshwater only impoundments compared to waste pits.

§ 17.1.a – references "'centralized pit or impoundment' . . . as that term is defined above." However neither term is defined in the Proposed Amendments. Because requirements imposed by the Proposed Amendments differ between "centralized pits" and "centralized impoundments" those terms should be clearly and separately defined.

§ 17.2.a.2 – the term "public water source" is not defined in the Proposed Amendments and should be replaced with "public water system surface water intake."

§ 17.9.b – the first sentence should be modified by deleting the words "During initial filling operations" and inserting following the word "continuously" the words "during active filling operations."

§ 17.9.e – the words "or impoundment" should be deleted because the dual liner system and pump related to a leak detection system is only required for centralized pits.

§ 19.1 – contains multiple subdivisions "b," "c" and "d" and the designations should be corrected to eliminate duplicate references to the same subdivision.

§ 19.1.c – (the second one) should be limited to "such logs as may be reasonably necessary to the plugging of said well."

§ 19.3 – references § 22-6A-19 which relates to civil and criminal penalties. The code reference should be corrected to § 22-6-19.

§ 19.5 – references "section 18 below" but section 18 is above section 19 and does not relate to variances.

§ 20.2.b – in the second sentence following the phrase "hearing date" insert the word "and."

C. Conclusion

Because the Proposed Amendments will have a very significant impact on the development of the shale formations in West Virginia, we believe it is critical that DEP immediately initiate an open dialog with operators and service companies with the goal of modifying and developing regulations that are effective and practical, and do not unnecessarily impede the development of the incredibly valuable resource for all West Virginians.

We appreciate the opportunity to provide these comments to DEP and are hopeful that they will be given due consideration by DEP.

Respectfully Submitted,

INDEPENDENT OIL AND GAS ASSOCIATION
OF WEST VIRGINIA

July 27, 2015

APPENDIX A

Supplemental Comments regarding proposed new sentence in § 6.2.c.

- Formation drift & faulting
  - Upper borehole sections: Directional steering tools are not always used. Hammer bits are used on air and deviation is monitored at short intervals. It is not uncommon for the hole to deviate more than 50 ft by the time the kickoff point is reached due to regional geology.
  - Curve and lateral: Formations are not mapped within 50 ft. of accuracy. Formation dip cannot be accurately planned over a 7,000 ft. lateral since at just 1° of inclination the formation could rise or drop ~120 ft. alone.
    - Also, build rates are not always predictable due to irregularities in the formation. This regularly causes deviation from the original plan, which deviations vary from well to well.
  - While drilling the lateral, faults are sometimes encountered which are difficult to predict and can easily throw the borehole off plan by more than 50 ft.
- Uncertainty and Anti-collision
  - The tools used to monitor wellbore deviation come with a reasonable amount of uncertainty. That uncertainty builds upon itself the deeper the well is drilled. By the time a 7,000 ft. TVD well is landed, it is not uncommon to have a 20 or 30 ft. radius of uncertainty (40-60 ft. diameter).
  - On multi-well pads, due to tool error and elipse of uncertainty, wells often must be steered away from each other to avoid collisions. On a ten well pad, with 10 ft surface well spacing (90 ft. from first well to the last), if all wells are required to be in a 50 ft. radius from their surface location, significant anti-collision concerns would exist at the kickoff point. Nudging to avoid collision requires changes to the well path based upon conditions encountered during drilling.
- Financial Effects
  - A 50 foot deviation limitation would require additional tools to steer the top hole section of the well at a cost of approximately $8,000/day. Since average drilling time for a well is 10 days to drill the top hole, the Proposed Amendment may require an additional drilling cost of $80,000.
    - Steering wells to within a 50-foot degree of accuracy would significantly slow down the drilling process resulting in another three days to top hole drilling (~$14k/day without steering +$8k for directional = $22k/day) ~$66,000 for the additional 3 days.
    - Total estimated cost additions for just top hole: $146,000
  - Conventional motors for directional drilling would not be accurate enough to maintain the margin of error. A change to rotary steerable equipment for every well would cost approximately $10,000/day more than conventional tools. For an 8 day curve and lateral using rotary steerable equipment would add another $80,000 to the cost of drilling a well.

- Total well steering cost equipment use would add approximately $226,000/well, with no appreciable benefit to the environment.

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July, 27, 2015

Department of Environmental Protection
Jason Harmon, Office of Oil & Gas
601 57th Street, SE
Charleston, WV 25034
Re: Proposed Amendments to 35 CSR, Series 8

Dear Mr. Harmon:

Noble Energy, Inc., (Noble) appreciates the opportunity to comment on the draft regulations for horizontal well development, 35 Code of State Rules, Series 8 (Proposed Rule), promulgated by the West Virginia Department of Environmental Protection (WVDEP). Noble Energy, Inc. (Noble) is a leading independent energy company engaged in worldwide oil and gas exploration and production. We operate primarily in the Appalachian Basin, Rocky Mountains, and deepwater Gulf of Mexico areas in the United States, with key international operations offshore in Israel and West Africa. At Noble, we are driven by our values and purpose – Energizing the World, Bettering People's Lives®. We are proud of the strong commitment to the protection of human health and the environment that we bring to our activities, and we support regulatory programs that ensure that responsible exploration activities and energy development can take place in states like West Virginia.

Noble supports reasonable regulations that provide clear rules and guidance addressing important characteristics of oil and gas development, but are performance-based rather than prescriptive, leaving room for efficiency and innovation. Noble is concerned, however, that the Proposed Rule puts forth, in some cases, unnecessarily prescriptive requirements that will bring significant uncertainty to operations and timetables, and increase costs without providing material benefit to the public. Noble would request that the agency reconsider some provisions of this Proposed Rule to provide clear, consistent direction, preserve the competitiveness of West Virginia for energy development, and protect human health and the environment.

Specific concerns and suggestions discussed in this letter are intended to help improve the Proposed Rule to better meet regulatory intentions to promote industry safety, protect the environment, and improve efficiencies. In addition to providing these comments below, Noble also indicates its support of many of the positions of the Independent Oil and Gas Association of West Virginia, Inc. ("IOGA") and the West Virginia Oil & Gas Association ("WVONGA") as expressed in comments filed with the WVDEP.

Following are specific comments regarding the WVDEP's Proposed Amendments to the Horizontal Well Development Rule, 35 CSR, Series 8:

1. **Section 5.1.i** covers Karst region testing. Noble supports the following position of the IOGA regarding this section:

   "Karst terrain or regions have not been sufficiently identified and mapped by the West Virginia Geological and Economic Survey ("WVGES") to form the basis of a geographic area to apply extensive regulatory requirements. Karst is a subsurface geology that is not and will not be adequately mapped by the WVGES in the near future. Instead of relying on verified data regarding the actual location of subterranean karst voids or formations, DEP proposes to use a broad brush to designate wide areas of West Virginia as subject to extensive and costly regulations. Indeed, the definition of karst region and karst terrain is simply too vague to be reasonably applied. Thus, designating any area as "karst" is an arbitrary and capricious limitation on the right to develop and produce oil and gas resources. In addition, imposing a special requirement to provide notice of a well work permit application to special interest groups such as the West Virginia Cave Conservancy and West Virginia Speleological Society for all counties containing karst topography is an improper delegation of DEP's regulatory responsibility. Such groups have no property rights or interests in such applications, rather they can monitor well work permit applications through the DEP's public records which is publicly available."

   Noble also supports the following position of the WVONGA regarding this section:

   "The Proposed Rule would require an operator in any defined karst region 'to conduct testing at the proposed drilling site in order to identify caves and other voids, faults and relevant features in the strata as determined by the West Virginia Geological and Economic Survey. The operator shall also conduct testing to identify surface features such as sinkholes.' § 5.1.i. The operator would be required to conduct this testing 'prior to submitting its application,' and include the results of the tests with its permit application. These timing requirements conflict with the language of the Horizontal Well Act, however, which requires operators to perform 'predrilling testing'—not pre-application testing—to identify relevant features within designated karst areas. W. Va. Code § 22-6A-3A(b)(1). For consistency with the statute, therefore, WVONGA encourages WVDEP to revise the Proposed Rule to require that this testing be performed (and the results submitted) prior to the commencement of drilling, but authorize the well work permit to be issued without this information. This would allow the operator to assume the business risk of deferring the testing, if so inclined, while still ensuring that the analyses will be completed prior to drilling."

2. **Section 5.5.c.12** states that "[w]ell pads shall be fully enclosed by berm structures. If an earthen berm is employed, the berm shall be a minimum of two feet in height with a two foot top....and have maximum side slopes of one and one-half horizontal to one vertical (1.5:1)...."

   Noble is concerned that the prescriptive nature of the berm requirements, including the berm width and slope, included in this Proposed Rule will increase the overall environmental impact

of the site due to a widening of the footprint. These berms can become difficult to construct as proposed and they are often steepened and narrowed to help eliminate large fill slopes on the pad and access road (e.g., 1:1 slope with 1 foot top width). Moreover, the requirement appears contrary to § 5.5.c.1 which calls for the cleared area be kept to the minimum necessary for proper construction. Additionally, the provision precludes the use of an engineering equivalent as an alternative to berm structures, such as jersey barriers which can also provide traffic flow and release mitigation measures.

Operators are presently subject to extensive requirements for spill containment and control under federal and state regulations. Therefore, the need for this provision in § 5.5.b.12 and its benefit to the public and the environment remain unclear. Noble is concerned these requirements could unintentionally result in logistical issues with regard to water management and potentially create well-pad integrity concerns by limiting the ability to have surface water run off location. At a minimum, Noble believes the Proposed Rule could be greatly improved by adding language to allow for equivalent measures which would provide operator's flexibility in determining the design standards for the well pad berms. Noble suggests the following language change:

> **"[w]ell pads shall be fully enclosed by berm structures or an engineering equivalent certified by a professional engineer. If an earthen berm is employed, the berm shall be constructed with sound engineering design and be of proper height and slope to allow for appropriate environmental protections."**

In addition, Noble supports the following position of the IOGA regarding this section:

"Existing regulations require oil and gas operators to comply with existing requirements for spill containment and control that have proven adequate in protecting waters of the State. See, 35 C.S.R. 1 §§ 7 and 8, and 35 C.S.R. 8 §§ 5.4, 9.1.a.3 and 18. This requirement results in significant water management logistical issues and may cause well pad integrity issues without any demonstrated benefit to the environment. In addition, the mandated collection of precipitation on a well pad may create safety issues related to pooling of water and icy conditions during winter periods."

3. **<u>Section 5.6.e</u>** states that "[s]ignage shall be posted at each water withdrawal site that provides information regarding how to obtain the Water Management Plan, the withdrawal site identification name, and the well pad name as set forth in the approved Water Management Plan,....."

   Noble is concerned that without further clarification, this provision could be interpreted as imposing new signage requirements retroactively to existing water withdrawal sites. To do so would generate additional costs to operators without providing material benefit to the public or

the environment. Existing sites would already have been constructed to adhere to current requirements of 35 C.S.R. 8 which includes the development of water management plans and signage at every withdrawal location. Changing existing signage would do nothing to increase public safety or provide environmental benefit. Therefore, Noble requests that the Proposed Rule be modified to specifically state that the new signage requirements shall apply only to prospective sites and not to existing sites.

4. **Section 5.11** regarding fracture propagation requirements. Noble supports the following position of the IOGA regarding this section:

"Section 5.11 requires the 'operator' (rather than 'permittee' as referenced in § 9.4) to 'review the area surrounding the proposed well pad so as to identify and evaluate potential conduits for unintended fracture propagation, a report of which the operator shall provide to the Office.' This requirement is vague and unduly burdensome because the language fails to adequately inform the well work applicant of the extent or nature of information or facts to be reviewed and evaluated. If 'potential conduits' means 'all existing, active, plugged and abandoned wells' within the prescribed distances then the term 'potential conduit' should be so defined and limited.

The 'area of review' includes active, plugged and abandoned wells within 1,200 feet of the surface location of the well and within 1,000 feet of the lateral section of the wellbore for consideration of the potential for unintended fracture propagation. Since most vertical wellbores in horizontal wells are not 'fractured' in the completion process, it is unnecessary to review an area 1,200 feet west of the well location where the first fracture operation occurs 1,000 feet east of the well location. The area of review should be based on a 1,000 foot radius determined from the location of the fracture operations not the surface location of the well. IOGA suggests that the area of review require identification of active, plugged and abandoned wells having a wellbore that is within 1,000 feet of the lateral wellbore located in the target formation, which is where fracture operations will occur. For example, a plugged vertical well drilled to a depth of 2,500 feet should not be part of the area of review of a Marcellus well having a lateral wellbore 6,000 feet below the surface and 3,500 feet below the bottom of the plugged vertical well.

Moreover, fracture propagation requirements impose obligations beyond the control and legal authority of the well work permittee. For example, § 9.4.a. requires a permittee to 'identify and monitor any producing wells within the area of review . . . that may serve as a conduit for unintended fracture propagation during hydraulic fracturing activities' and § 9.4.b. requires that the permittee 'identify and plug or replug, if necessary, any existing abandoned wells that may serve as a conduit for unintended fracture propagation during hydraulic fracturing activities.' The requirements do not address under what authority the permittee could monitor third party producing wells or plug or replug other third party wells in the area of review. Any fracture propagation well monitoring or plugging responsibility should be expressly limited to such wells

as the permittee owns or has the right to operate and control. Otherwise, DEP should be responsible for requiring the owner or operator of any wells located within the area of review to monitor, or plug or replug such wells. The permittee simply lacks the legal authority to monitor or plug wells for which it has no ownership or operating rights and the Proposed Amendments should be so limited with regard to the permittee obligations."

5. **Section 6.2.c**, prohibiting borehole deviation of more than 50 feet or outside the target formation. Noble supports the following position of the IOGA regarding this section:

"The proposed new sentence in § 6.2.c. is unnecessary and unreasonably restricts safe and efficient operations of oil and gas development. The precise path of a borehole is not part of the permit requirements. Rather, only the top-hole and bottom-hole locations of a well are proposed to be identified on a well plat pursuant to the Proposed Amendments. The full length of the borehole between top-hole and bottom-hole is not intended to be a limitation of the precise location of the borehole. Geologic and operating conditions vary from well to well and deviations from the planned borehole necessarily occur, including deviations greater than 50 feet. (See Appendix A for more detailed discussion of the technical problems with the proposed change, including financial consequences.) In light of the statutory requirement that the permit contain the 'approximate total depth . . . the actual or the approximate depth at which the well to be drilled deviates from the vertical, the angle and direction of the non-vertical well bore until the well reaches its total target depth or its actual final depth and the length and direction of any actual or proposed horizontal lateral or well bore,' the DEP has provided no reason or explanation for such a restrictive limitation in light of the approximations expressly permitted in the statutory requirements. W. Va. Code § 22-6A-7(b)(5). Because the Well Record Completion Form (Form WR-35) requires 'an as-drilled plat, profile view, and deviation report' be submitted as part of the report, the 50 foot deviation restriction should be eliminated. At minimum, the Proposed Amendments should be revised to simply require notification to the Office of Oil and Gas upon the occurrence of deviations of more than 100 feet from the borehole or deviations outside the target formation and identifying the corrective action taken to maintain the borehole in the target formation. The proposed language is simply too inflexible in light of the uncertainties involved in drilling a well of more than 10,000 feet in total length."

As a result of these concerns, Noble supports IOGA's assertion that the provision be deleted.

6. **Section 6.2.k.6** requires that cemeteries be shown on the plat. Noble is concerned that the provision lacks the clarity required for regulation. Noble requests that the WVDEP provide clarification on determining the dimensions of a cemetery and how it is to be shown on the plat for the purposes of this rule.

In addition, Noble supports the following position of the IOGA regarding Section 6.2.k.2:

"§ 6.2.k.2 - adds the term 'public buildings' to the list of surface features required to be identified on a plat, but the term is not defined. The term is too general for reasonable application in the context of a large area plat. Whether a building is publicly owned or not is not always reasonably apparent from external appearances. The requirement should be limited to readily identifiable buildings owned by state or local governmental entities and used for public gatherings."

7. **Sections 9.1.a.4 through 9.1.a.5** of the Proposed Rule dealing with water quality and quantity. Noble supports the following position of the IOGA regarding Sections 9.1.a.4 and 9.1.a.5:

"The Proposed Amendments to § 9.1.a.4. and § 9.1.a.5. contain extensive and expensive requirements that exceed the value of developing a water supply well, thereby effectively prohibiting the use of water supply wells in the development of horizontal wells pursuant to the Horizontal Well Control Act. These extensive requirements are limited to water supply wells under the Horizontal Well Control Act which constitutes an unreasonable burden on the oil and gas well operators. IOGA requests that the Proposed Amendments to § 9.1.a.4 and § 9.1.a.5 be deleted and incorporated into a legislative rule applicable to all water supply wells developed for commercial use."

8. **Section 9.1.b.2** covers signage requirements for water withdrawal and use of erosion and sediment controls. Noble believes that requiring signage within 24 hours of notification is excessive and suggests revising the Proposed Rule to state that signage must be installed prior to active water withdrawal. This change would still ensure that necessary information is provided to the public prior to withdrawal without creating undue burden on operators. In addition, Noble requests that the Proposed Rule be clarified to identify the circumstances in which erosion and sediment controls are required and whether they are required for temporary withdrawals where no earth disturbance took place or at sites where earth disturbance involves less than 3 acres.

9. **Section 9.1.c** covers baseline water testing. Noble supports the following position of the WVONGA regarding this section:

"The Proposed Rule would require the operator 'to conduct baseline water testing prior to commencement of any site construction or well work in any karst region. Testing shall be conducted on the water resources adjacent to the site and in accordance with the requirements of subsection 15.3 of this rule.' § 9.1.c. It is unclear as to whether this requirement is intended to encompass both groundwater and surface water, as well as how 'adjacent' is to be interpreted."

10. **Section 9.2.d.1** covers freshwater casing standards. Noble supports this revision to the Proposed Rule and appreciates the WVDEP making this modification to address operator concerns regarding unstable wellbore conditions.

11. **Sections 9.2.d.10, 9.2.e.5, and 9.2.f.2** all deal with FIT test requirement and subsequent installation and cementing of the coal protection casing and state that a FIT test may be required by the Chief. Noble is concerned that these provisions lack the clarity needed for regulation. Therefore, Noble shares the concern expressed by WVONGA regarding these sections:

    "Sections 9.2.d.10, 9.2.e.4 and 9.2.f.2 of the Proposed Rule authorize the Office of Oil and Gas to require a formation integrity test to establish cement and formation integrity. These sections provide no details, however, on how the agency will notify the operator that such a test is required, or establish any applicable limitations on the timeframe within which such a notification may be given."

    Noble requests that the WVDEP clarify when and how an operator will be notified by the department if a FIT test is required.

12. **Section 9.4,** Fracture Propagation, states that "[t]he permittee shall monitor all potential conduits...;"

    Noble is concerned that in this provision the term "monitor" is not defined and could therefore be interpreted inconsistently. Later in §§ 9.4a, 9.4b and 9.4c., the Proposed Rule does provide some tailored requirements for monitoring but it falls short of specifically identifying them as the means to meet the broader mandate to monitor. Noble strongly recommends that regulation be internally consistent in order to avoid unintended consequences and counterproductive results. For this reason, Noble recommends that the agency modify the Proposed Rule to provide clarity and consistency with these subsections. As such, Noble suggests revising the Proposed Rule to state the following:

    "[t]he permittee shall identify and/or monitor, per subsections 9.4a, 9.4b and 9.4c, all potential conduits for unintended fracture propagation..."

    a. **Section 9.4.a** states that "[t]he permittee shall identify and monitor any producing wells within the area of review established in subsection 5.11 above that may serve as a conduit for unintended fracture propagation during hydraulic fracturing activities. Any observed pressure changes shall be reviewed to determine if fracture communication of a detrimental nature has occurred into these offset wells. If the review indicates such communicating has occurred, the permittee shall terminate the fracturing operations and relieve the associated pressure. Upon fracture termination, the operator shall contact the oil and gas inspector immediately."

Noble requests that the department clarify the conditions that will be considered "detrimental" to a given well. At what measurement is a potential fracture communication considered detrimental in nature? Because the Proposed Rule requires certain actions set in motion upon determination that potential fracture communication has been "detrimental in nature," Noble requests clarity on this definition. In addition, Noble requests clarification regarding the process to be followed if a communication occurs. Assuming subsequent courses of action will vary depending on given situations, Noble would argue that terminating fracture operations should not be a uniform next step to be taken after a communication occurs. For instance, in the case of the same operator experiencing horizontal well to horizontal well communication, based on the surface facility capabilities of the communicated offset horizontal well, it may be a reasonable course of action to continue monitoring pressures/production and continue to stimulate the active well. This would allow clean up from communication to occur after fracturing is complete without generating any safety concern. As such, Noble recommends that the department revise the Proposed Rule to state:

> **"[i]f the review indicates such communication has occurred, the operator shall contact the oil and gas inspector immediately."**

Lastly, Noble requests that the department clarify its expectations for observation of wells that are not within a company's operating authority and the procedure to be followed if a third party does not allow it to monitor. Noble suggests that WVDEP define a process regarding this situation for when it occurs.

b. **Section 9.4.b** states that "[t]he permittee shall identify and plug or replug, if necessary, any existing abandoned wells that may serve as a conduit for unintended fracture propagation during hydraulic fracturing activities."

Noble is concerned that this section does not account for those situations where an operator is denied access to private property that may contain an abandoned well or where an operator may lack the authority to execute the proposed action. The permittee lacks the legal authority to monitor or plug wells for which it has no ownership or operating rights. For wells located within the area of review, the WVDEP should be enforcing the responsibility of the third party owner/operator. Noble believes it would be inappropriate for the agency to impose those obligations beyond the legal authority of a permittee to comply. Noble recommends the department modify the language to limit fracture propagation well monitoring or plugging responsibility to such wells as the permittee owns or has the right to operate and control and provide. In addition, Noble supports IOGA's suggestion that "An alternative approach is to require as part of the Well Site Safety Plan (§ 5.7) the inclusion of an "unintended fracture propagation survey plan" based upon relevant factors and consideration as determined

by the applicant, which Well Site Safety Plan would be subject to review by the Office of Oil and Gas."

c. **Section 9.4.c** states that "[t]he permittee shall monitor all associated fracturing treatment pressures throughout the entirety of the hydraulic fracturing operation. If data monitoring indicates that communication has occurred, the permittee shall terminate the fracturing operations and relieve the associated pressure. Upon fracture termination the operator shall contact the oil and gas inspector immediately."

Noble agrees with the proposed concept but requests clarification regarding which well is to be monitored. Noble suggests that the proposal be revised to state:

"[t]he permittee shall monitor all associated fracturing treatment pressures on the stimulated lateral..."

Noble also requests clarification regarding the process for relieving pressure inasmuch as the pathways to the shallow wells are likely only open while pumping. Finally, Noble supports the following position of the WVONGA regarding this section as modified per Noble's previous suggestion:

"The Proposed Rule would require the cessation of fracturing operations in the event of communication with an off-set well, § 9.4.c, but provides no procedure for restarting operations following the resolution of the issue. Accordingly, WVONGA proposes adding the following as new Section 9.4.d: 'No later than ten days following a showing by the permittee that it has reestablished control of the permitted well and that the well is no longer in communication with any unintended conduit(s), WVDEP shall authorize the re-starting of drilling activities.'"

13. **Sections 11.1.b and 11.1.d** cover standard practices of common carriers and measurement of produced water. Noble supports the following position of the WVONGA regarding these sections:

"The Proposed Rule would require the volume of oil and condensate (§ 11.1.b) and produced water (§ 11.1.d) to be 'determined through the standard practices of common carriers in the State of West Virginia.' This requirement is stated as an absolute. If a facility has a means of measuring the volume of oil, condensate or produced water produced on-site, it is unclear why that method should not also be acceptable for purposes of reporting."

"Measurement of Produced Water (§ 11.1.d). While WVONGA does not object to excluding flowback water from reporting under this section, because the distinction between produced water and flowback water can be subject to varying interpretation, WVONGA requests that the agency provide some clarification regarding how it will interpret 'flowback water' for purposes

of this section. One option would be to state that flowback water encompasses all water recovered as part of well completion activities."

In addition, Noble supports the position of the IOGA regarding § 11.1.b that "the first sentence and the ending phrase of the second sentence 'and shall be acceptable 'pipeline quality'' be deleted as an unnecessary qualification on the condensate measurement and quality. Condensate need not be measured according to common carrier standards or be of pipeline quality at the production site since processing can occur at a centralized collection location."

14. **Section 12.4.d** covers freshwater impoundment lining, and would delete "pits" from this section of the Proposed Rule. Noble supports the general position of the IOGA regarding this section:

"12.4.d – should be modified to permit beneficial use of fluids from the impoundment as follows: 'All material in the pit/freshwater impoundment, including the liner shall be beneficially used or disposed of in an appropriate manner. The disposition of the material will not always be pursuant to a permit.

15. **Section 12.4.h** prohibits freshwater impoundments in "any area designated as a karst region." Noble is concerned that this prohibition is overly broad and will establish an undue restriction on oil and gas operations. The requirement for pre-drilling testing determines whether construction of a freshwater impoundment is safe or not. Thus, the option of constructing a freshwater impoundment should be retained for such conditions as are determined by pre-drilling testing to as able to support such construction. Similarly, as noted in our earlier Comment No. 1 above, Noble believes the definition of karst region is too vague. Thus to impose a broad ban on freshwater impoundments based on a vague definition, as this proposed subdivision does, can create an unjustified restriction on oil and gas operations. Noble recommends that the department modify the Proposed Rule to indicate that a geologic study be conducted in any karst region to determine whether the area is suitable for a freshwater impoundment without prohibiting the use of these impoundments in all cases.

16. **Section 15.1.e** states that, "[i]n accordance with W. Va. Code § 22-6A-8(g)(5)(D), owners of drinking water wells located within one thousand five hundred (1,500) feet of a water supply well used to support activities permitted under this article may request well flow and quality testing."

Noble believes that the requirement to provide flow testing upon request is excessive, could be costly for sites where there are a lot of residents within 1,500 feet, and provides little value to the residential owner of the well. Noble suggests that this requirement be removed or revised to state that flow testing will be required for a well within 1,500 feet upon request of the department. Noble believes that having WVDEP involvement will minimize homeowners requesting flow testing simply because it is available.

17. **Section 17.2.a.2** states that "[c]entralized pits and impoundments may not be constructed with the one hundred year floodplain of water of the state; in or within 100 feet of a wetland as measured horizontally from the limit of disturbance;...within 500 feet of a perennial stream as measure horizontally from the limit of disturbance..."

    Noble requests a revision to clarify that the setback requirements, e.g., 100 feet for a wetland and 500 feet from a perennial stream, are to be from the impoundment/pit itself (i.e., the impoundment bank) and not the limit of disturbance ("LOD"). Access roads and other features associated with the centralized pit are often are included within the LOD and are often located in close proximity to wetlands and perennial streams. With proper E&S controls, these site features can be implemented with appropriate environmental protections within the regulations currently in place which provide setbacks from top of centralized pit berm, not LOD. In addition, Noble recommends that the WVDEP include language to allow for a waiver process to deviate from the 100 foot setback for wetlands and 500 feet from a perennial stream if the operator is able to demonstrate that additional measures to be set in place will be protective of the wetlands or streams.

18. **Section 17.2.f.2** deals with leak detection system requirements for centralized pits and impoundments. It states that "[e]ach centralized pit shall have its own sumps. The design of each sump and removal system shall provide a method for measuring and recording the volume of liquids present in the sump and the volume of liquids removed."

    Noble is concerned that the volume of liquids present in the sump may be difficult to accurately measure, do not provide any assurance of the integrity of the pit, and suggests that monitoring the volume of liquids removed should provide adequate pit integrity information. Therefore, Noble recommends the language be modified as follows:

    > **"[e]ach centralized pit shall have its own sumps. The design of each sump and removal system shall provide a method for monitoring the volume of liquids removed."**

19. **Section 17.2.h** states that "[a] centralized pit or impoundment shall be designed, constructed, maintained, and operated to prevent overtopping resulting from normal or abnormal operations; overfilling; wind; rainfall run-on; malfunctions of level controllers, alarms, and other equipment; and human error and have at a minimum two feet of freeboard maintained at all times. To verify the two feet of freeboard the elevation of two feet below the crest of the centralized pit or impoundment shall be permanently marked on the liner."

    Noble suggests revising the phrase "overfilling, wind, rainfall, run-on, malfunctions of level controllers, alarms, and other equipment, and human error" from this section because it is not possible to design, maintain and operate a pit/impoundment against all of these potential

concerns. Design can minimize the potential for this, but cannot totally remove the potential making it impossible for an operator to fully comply. Noble suggests that the rule be modified to state the following:

> **"[a] centralized pit or impoundment shall be designed and constructed to minimize the potential for overfilling; wind; rainfall run-on; malfunctions of level controllers, alarms, and other equipment; [a] centralized pit or impoundment shall be maintained and operated to prevent overtopping resulting from normal or abnormal operations and have at a minimum two feet of freeboard maintained at all times."**

20. **Section 17.5.b** states "[u]pon completion of construction of a centralized pit or impoundment, the operator shall submit to the Chief certification from a WV registered professional engineer that the centralized pit or impoundment was constructed in accordance with the approved plan. Once this certification and an as-built plan have been received by the Chief the centralized pit or impoundment may be filled. This final certification shall be maintained by the operator for a minimum of five years after the reclamation of the structure and site...."

    Noble requests that the department clarify what phase of reclamation is involved for the purpose of the requirement to maintain final certification. In an effort to minimize and mitigate impacts to surrounding areas, operators often employ partial reclamation of areas that are not needed after construction is complete. However, it is unclear whether the WVDEP intends such partial reclamation to trigger this requirement in § 17.5.b. Similarly, § 17.3.e describes two phases, "post-construction" and "post-use," which Noble would also request that the department clarify for the purpose of requirements under this Proposed Rule.

21. **Section 17.8.b** states regarding security that "[a]ll centralized pits and impoundments shall be enclosed by adequate fencing to secure the site from access by the public and wildlife. A six foot minimum height perimeter fence that is suitable to limit unauthorized entry to the site shall be installed prior to placing any fluid in the centralized pit or impoundment. At least one strand of barbed wire shall be installed at the top of the perimeter security fence to discourage unauthorized entry. This security fence shall be maintained for the life of the centralized pit or impoundment. Orange construction barrier fence and barbed wire only fence shall not be considered adequate for limiting unauthorized access. A lifeline throw ring safety device attached to a rope shall be kept available at all time in case someone accidentally falls into the pit or impoundment. The safety device shall be attached in a readily available location adjacent to the centralized pit or impoundment."

    Noble requests that WVDEP clarify that these requirements are to apply for only new impoundments installed after the effective date of the rule and that it is not necessary for operators to retrofit existing pits/impoundments with different fencing. Additionally, Noble is concerned that this this regulation is unnecessarily prescriptive because it does not allow for a

safety equivalent. As previously stated, Noble believes strongly in performance-based regulation that allows for operators to innovate and realize efficiencies provided they can meet certain performance standards. For example, Noble believes its current application of fencing and bird netting completely enclosing the impoundment from all sides and the top that provide as equivalent a safety measure as a 6 feet high fence with barbed wire and with added benefit to avian species. For this reason, Noble would recommend the agency add language to specify that "equivalent fencing measures could be utilized upon approval by the Department."

22. **Section 17.9.f** requires that "[p]ipeline transporting any wastewaters (e.g. drilling or hydraulic fracturing fluids) to or from the pit shall have pressure monitored at the pump. The discharge end of the pipeline shall be visibly inspected to ensure that flow does not decrease or change in a manner that could indicate that leakage is occurring in the pipeline. Personnel at both the intake and discharge end of the pipeline shall maintain constant communication during flowback or pumping operations when filling a centralized pit. In the event of a leak or suspected leak, the operator shall cease operation of the pipeline until leaks are found and corrected."

    Noble requests a revision to clarify that it is not necessary for personnel to be present during pumping. Most systems can be automated and protections such as high level alarms at pits and impoundments are in place. Automation can be installed to monitor flow and pressure at both ends of the pipeline. Noble therefore suggests revising the Proposed Rule to state that precautions much be implemented during pumping operations to monitor and alert in the event of an overflow, leak or suspected leak.

23. **Fiscal Note:** Noble supports the following position of the WVONGA regarding the Fiscal Note provided with the Proposed Rule:

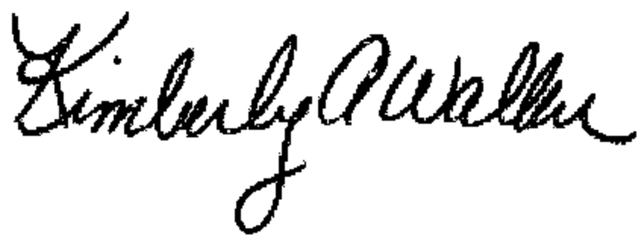
    "The Fiscal Note included with the Proposed Rule fails to address the economic impact of the agency's proposal on persons affected by the rules and regulations as required by the West Virginia Administrative Procedures Act (the "WVAPA"). Specifically, the WVAPA requires a proposed legislative rule to "have a fiscal note attached itemizing the cost of implementing the rules as they relate to this state and to persons affected by the rules." W. Va. Code §§ 29A-3-4(b) and 29A-3-5 (emphasis supplied). The Fiscal Note accompanying the Proposed Rule contains no evaluation of its impacts to those "persons affected by the rules," including the regulated community. Accordingly, WVDEP should undertake a reasoned evaluation of the economic impact imposed by the Proposed Rule as required by the WVAPA and resubmit the Proposed Rule together with this analysis.

In conclusion, Noble believes that an effective regulatory program for West Virginia oil and gas operations needs to thoughtfully address certain characteristics of development, including the economics of shale exploration and development and the importance of preserving competitiveness in the state of West Virginia in addition to promoting safety and protecting the environment. The large

capital costs and expansive scale of planning, drilling and development activities involved in shale development require a regulatory regime that is efficient, consistent and timely while maintaining safe and environmentally responsible operations. Additionally, a program that aims to spur continuous improvement of the industry must incorporate processes that are flexible and performance-based, thus allowing for the frequent use of new technologies and practices. As explained above, Noble is concerned that many of the proposed regulations challenge these fundamental ideals, and their adoption could have unintended consequences that do not serve the public interest, hinder progress and reduce the competitiveness of the West Virginia as a development market. This is a critical deficiency given the acknowledged importance of energy production to the state.

Noble's suggestions above are intended to help improve the proposed regulations to better meet regulatory intentions to promote industry safety, protect the environment, and improve efficiencies. Noble appreciates the opportunity to participate in the process looks forward to working with the WVDEP to finalize rules that are both protective of the environment and encourage economic growth in the state of West Virginia.

Sincerely,



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JUL 23 2015

WV Department of
Environmental Protection

July 23, 2015

WVDEP, Office of Oil and Gas
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Charleston, WV 25304-2345

RE: Proposed Horizontal Well Rules

Thank you for the opportunity to comment on the proposed horizontal well rule 35CSR8. Please find the comments below.

Section 6.2.c that limits wellbore deviation to no more than 50' of what was permitted is impractical and at times impossible to comply with. Formations may be shallower than anticipated, unknown minor faulting and regional dip will often times cause a change in wellbore location in excess of 50' from the permitted location. Not being able to adjust to formation conditions may render many wells uneconomical. The Marcellus can be 125' thick or greater. In addition, not being able to adjust the wellbore when drilling a three dimensional curve adds more risk, more time and cost. If the intent is to limit deviation to no more than 50 feet in the X Y plane to ensure that the well is drilled within lease or unit boundaries then the language needs to be revised to more clearly define when more than a fifty foot deviation is allowed.

Section 9.3.a. requires that all horizontal wells be drilled utilizing closed loop drilling. The horizontal well act anticipates and authorizes the use of pits for collection of waste fluids and cuttings. Although most horizontal drilling operations utilize closed loop there should not be a total prohibition regarding using other methods that may require a reserve pit. Top hole rigs (drilling the vertical section of the well bore) may not be equipped to drill closed loop, there may be times when safety dictates that conventional drilling be utilized, etc., therefore the proposed rule should authorize the use of waste pits as part of the well work permit upon reasonable terms and conditions.

Section 5.11, 9.4.a. and 9.4.b regarding unintended fracture propagation impose obligations beyond the control of the well work permittee. The requirements do not address under what authority the permittee could monitor non-operated producing wells or plug or re-plug other wells in the area of review. Any fracture propagation analysis should be geographically related to the proposed hydraulic fracturing locations and be limited to actions within the legal authority of the permittee. In addition there is concern that the rule would force the operator to shut in producing wells due to the 1200 foot requirement. There is really no need to shut-in wells with laterals on the same pad that are drilled in the opposite direction.

Section 9.1.a.4 – 5. Groundwater supply well aquifer and hydrogeological delineation and drawdown testing requirements, along with minimum of one groundwater monitoring station, most likely renders use of groundwater well supply sources uneconomic and, thus, useless.
Section 5.5.c.12. Well pad berm and compaction requirements impose unnecessary and unreasonable additional costs and operational burden to the well work without related protection of water resources. The requirement to utilize a professional engineer for compaction requirements and

moisture range is unduly burdensome in light of industry experience with erosion and sediment control in well work operations. However, I do feel the requirement for the berm is warranted.

5.5.c.9 states that a one point proctor has to be used. Even though we are currently complying with this requirement through permit conditions I would submit the following. In ASTM D-698 1.2 it states "These test methods apply only to soils (materials) that have 30 % or less by mass of particles retained on the $^{3}/_{4}$-in. (19.0-mm) sieve and have not been previously compacted in the laboratory; that is, do not reuse compacted soil." When we place rock lifts which are allowed by section 5.5.c.8, you will not be able to perform a one point proctor. First, most of the time you bend the driving rod to open the hole for the nuclear gauge. Secondly you will be above the ¾ allowance listed above in ASTM D-698 1.2. The department of highways allows you to proof roll all lifts when you have more than 30% ¾ material. Our suggestion is to allow for this alternate method when warranted and specifically approved by the Chief.

Thank you again for the opportunity to comment.

Sincerely,

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July 27, 2015

Jason Harmon, Office of Oil and Gas
Department of Environmental Protection
601 57th Street S.E.
Charleston, WV 25304

Comments on §35CSR8 Proposed Rules Governing Horizontal Well Development
(Submitted via Email to Henry.J.Harmon@wv.gov)

Dear Mr. Harmon,

Please accept the following comments on the Office of Oil and Gas's (OOG) proposed changes to the rules governing horizontal well development. The West Virginia Surface Owners' Rights Organization (WV-SORO) submits these comments in collaboration with the organizations listed on the signatory page of this document. We appreciate the opportunity to provide input on these proposed rule changes.

In general, we support many of the proposed changes to the rule and commends the agency for its efforts to fill in the gaps in areas such as drilling in karst terrain/areas, quality and flow testing of water wells near supply wells, and procedures for investigation of migration, where it was given rule-making authority under the Horizontal Well Control Act, but chose to forgo using this authority when these rules where initially proposed in 2012. Yet, despite the many positive changes proposed, we are disappointed that, with the exception of some changes to the sections of the rule regarding construction of centralized pits and impoundments, the agency did not take advantage of this opportunity to implement any of the recommendations mandated by the Act. We recognize that DEP made a recommendation to the Legislature that the distance from occupied dwellings be measured from the "limit of disturbance" rather than the center of the pad and that that requires a statutory change. However there were a number of other rules that could have been proposed that were not, including rules establishing guidelines and procedures regarding reasonable levels of noise, light, dust and volatile organic compounds related to drilling horizontal wells, and reasonable means of controlling and mitigating these factors. Nevertheless, these proposed changes do some things that are very good, and that have been needed for some time. The comments below point out some of the best of these, in addition to comments on problems and shortcomings of the proposed rule.

Comments are in the order in which the subject appears (or should appear) in the rule. The sequence of the comments is not an indication of their relative importance.

§35- 8 -2.15. "Karst terrain" definition.

The defined term "karst terrain" does not appear anywhere in the rule. Also, the definition uses the word "topography," which generally refers to features on the surface rather than geologic substrata. We suggest that the rule define "karst region" as an area of the state, generally underlain by limestone … in which the subterranean features are formed … ."

§35- 8 -4. Report inspectors' findings of violation to complainant.

The findings and orders of any inspection conducted in response to a citizen complaint should be reported to the person filing the complaint. When WV-SORO commented on this issue previously the OOG stated that it "believes that it is appropriate to provide information regarding enforcement actions taken in response to the complainant," but did not change the rule accordingly. This requirement should be included in the rule.

§35- 8 -5.1.h. New borehole, no notice.

One sentence of this provision says that if the driller fouls up one borehole and needs to drill another one, the surface owner gets no notice. We take the position that the statute does not allow for this. True, it will make no difference in the soil erosion and sediment control plan. But it may well be that the fouled borehole stems from a problem that the surface owner should know about.

Another sentence says the replacement borehole permit shall be identical to the original well work permit application. It may well be that the problem that the driller ran into requires a change in the casing and cementing plan that must be included with the permit.

Again, the statute does not permit this. This manner of dealing with the issue has many problems.

WV-SORO commented on this subject when these rules were originally enacted. The OOG response did not satisfy us that the surface owner does not need to be notified of the changed plans if a downhole problem occurs in a borehole on their land.

§35- 8 -5.1.i. Karst region testing.

We support the requirement that testing to be conducted to identify caves and other subterranean features in karst regions be determined and approved by the West Virginia Geologic and Economic Survey. However, we believe that the rule needs to go further and require study and experimentation with drilling techniques before it is permitted in karst areas.

§35- 8 -5.3. Notice to surface owners occupying surface.

Where there are more than three surface owners of record, the statute and the rule allow the operator to serve notice of the permit application on only one of the surface owners, the one who's name and address appears on the Sheriff's tax bill. Usually that is also the person actually occupying the land, but not always. The rule should require an additional notice to be served on a residence or other occupied structure if the address on the Sheriff's records is not the same as the location of the surface property. A new section requiring this should be added after 5.3.c.

§35- 8 -5.3. Content of notice to surface owners, publication notice.

The rule should spell out what documents are included in the notice to surface owners. Surface owners should receive a complete copy of the permit application submitted to the Office with a listing or table of contents or something similar to the OOG checklist for permit approval explaining what documents are included and what the documents are for. A new section requiring this should be added. As an example, the notice to surface owners included in the new permit applications is buried in the middle and most surface owners will not even know to look for it.

A similar section should be added detailing the content and form of the publication notice required under W.Va. Code §22-6A-10(e). The notice should include a vicinity map showing the proposed well site in relation to the surrounding area and roads, the address of the access road intersection or nearest residence, the names of the surface owner(s) and commonly used farm name, if different, of the land where the well site will be located and other identifying information that will make it easy for people to determine location of the proposed well.

The OOG response when WV-SORO commented on this issue previously assumes that a surface owner will get the coordinates of every notice in the paper and use the DEP conversion tool in order to see whether the well site of every well proposed might be near them. That hides the notice around the corner of further investigation. The map is needed so people can tell whether a particular well pad is proposed near them by looking quickly at each notice in the paper.

§35- 8 -5.3.e. Notice provisions for permits in karst regions.

We support the requirement that operators applying for permits in karst regions provide notice to the West Virginia Cave Conservancy and the West Virginia Speleological Society either prior to or at the time of filing the application with the OOG. Ideally, notice should be given to these organizations prior to the permit being filed so that they have ample opportunity to provide input and share their knowledge and expertise regarding the protection of these sensitive regions.

§35- 8 -5.5.C.9. Compaction, acceptable moisture range requirements for embankments.

We support the minimum compaction requirements for embankments and the requirement for soil tests to determine an acceptable moisture range.

§35- 8 -5.6.b.6. and 5.6.d. Water Management Plans: Aquifer testing and use of aquifer test data to evaluate appropriateness of water withdrawal rates.

We support the requirement that water management plans include an aquifer test to demonstrate the feasibility of using a water supply well for groundwater withdrawals. We also support the agency's review and use of the aquifer test data to evaluate the appropriateness of water withdrawal rates and maintain minimum stream flow.

§35- 8 -5.6.e. Water Management Plans: Signage at water withdrawal locations.

We support the additional signage requirements for water withdrawal locations and the inclusion of the phone number for the OOG.

§35- 8 -5.6.f. Water Management Plans: Wastewater storage.

We support the requirement that wastewater generated from drilling, fracturing, stimulation and production being re-used for similar purposes at another location must be stored in tanks or in centralized pits subject to more detailed and stringent design and construction standards and operational criteria. In particular, we appreciate the transition to pitless or closed-loop drilling systems and that open pits will no longer be used to store drilling waste on site.

§35- 8 -5.11. Area of Review.

We support and appreciate the addition of this requirement to investigate existing active, plugged and abandoned wells surrounding the proposed well to identify and evaluate potential conduits for fracture propagation and help prevent gas migration. Gas migration can occur because of problems with fracturing, because of initial problems with casing and cementing, and because of deterioration of casing and cementing of existing and new wells over time. The Office needs to investigate and determine the cause of gas migration (including contamination of drinking water supplies, not just "plugged" wells venting) if it occurs, but it's more important to put in place pro-active measures to evaluate existing nearby wells (active, plugged and abandoned) to prevent migration from happening in the first place.

§35- 8 -5.12. Compliance with permit provisions and associated plans.

We support the addition of this section, which appears to clarify that associated plans are enforceable conditions of the well work permit.

§35- 8 -6.2.c. Physical Location of Well: Borehole deviation prohibition.

We support this addition, which prohibits borehole deviation.

§35- 8 -6.2.i. Topographic Map Location of Well: Top hole and bottom hole location.

Although we understand this is already being done, including it as a requirement in the rule is good.

§35- 8 -6.2.l. Names of surface owners on plats.

It is good that the plat has to show the surface tract boundary lines. However, the rule should also require the plat to show the known surface owner's name for all surface tracts within the scope of the plat, including those tracts that lie above the lateral/horizontal legs of the well and adjacent tracts in accordance with W.Va. Code §22-6-12and W.Va. Code §22-6A-5(6).

When WV-SORO commented on this issue when the rules were initially enacted, OOG responded that the purpose is to identify the actual surface owners at the well location and adjacent tracts. That may be the purpose, but that is not what the rule says. Most plats we see already have this, so it should be no problem to include this requirement in the rule. It is very useful.

§35- 8 -8.3.a.3. Transfer of Title and Operator Status; Transfer of liabilities and obligations.

The following language should be added to this section: "As further clarification, this language does not apply to liability to third parties."

§35- 8 -9.1.a.4. and 9.1.a.5 Water supply wells: Aquifer test and drinking water well testing.

In addition to registering the wells, we support and appreciate the proposed requirement to conduct a detailed aquifer test to ensure that groundwater resources are adequate and that proposed withdrawals from water supply wells will not adversely impact water resources. However, section 9.1.a.4. of the rule uses the phrase "without significant adverse impact." This suggests that some adverse impacts to water resources are acceptable. Our position is that efforts should be made to avoid any adverse impacts.

We also strongly support the requirement that all drinking water wells within 1,500 feet of a water supply well be flow and quality tested by the operator upon request of the drinking well owner and the specifications for how the flow test will be conducted. In the first sentence of section 9.1.a.5. there appears to be a stay "or" after "All drinking water wells." Was it the intention to also include developed springs? If so, we would support this addition to the rule.

We have some additional comments and questions regarding how a drinking well owner would know to request the testing, as there is no requirement in statute or rule that they be notified about the drilling of the supply well (see comments on §35- 8 -15.1. and 15.2 below.)

§35- 8 -9.1.b.2. Signage for water withdrawal locations.

Regarding signage at water withdrawal locations, this section and/or section 5.6, which also addresses signage should be amended so that they are consistent with each other. For example, section 5.6. say the signage shall include the website address for the Office, but this is not mentioned in section 9.1.b.2. Additionally, section 5.6 says the signage shall include "the telephone number of the company conducting the withdrawal" while section 9.1.b.2. says the "telephone number for the operator for which the water withdrawn will be utilized." Since the company conducting the withdrawal may not be the well operator, both should be required at both places.

§35- 8 -9.1.b. Baseline water testing in karst regions.

We support the requirement that baseline water quality testing be conducted in karst regions prior to commencement of any site construction or well work. Because water resources in karst regions could more easily be disrupted by drilling or surface disturbances than water resources in other areas of the state, these resources should also be flow tested.

§35- 8 -9.2.b.5. Notification of casing and cementing.

See comment to 9.2.h.7. and 9.

§35- 8 -9.2.c. Conductor/blowout preventer.

Since the biggest fire in West Virginia occurred when a well blew out as it penetrated a worked out coal

seam that lay a few hundred feet below the surface, shouldn't West Virginia require a conductor set that is capable of housing a blowout preventer – certainly in the vicinity of worked out coal seams.

§35- 8 -9.2.c.3. Conductor drilling fluid.

Conductor boreholes are so shallow that they do not need to put anything but fresh water down the hole.

§35 - 8 - 9.2.d.2. Freshwater casing standards; Use of additives, risk of damage.

As we commented when the rule was initially enacted, we appreciate the requirements to drill the freshwater casing well bore using only air, fresh water or freshwater based drilling fluids However, we do not know what a freshwater-based drilling fluid is. We presume that is drilling mud. Because there is no casing that is cemented in, this is well known to be the most common time for groundwater pollution to occur. Therefore, we oppose any additives being allowed.

We are concerned about language that says the operator shall use, "practices that minimize damage or disturbance or the possibility of unnecessary damage or disturbance to the un cased strata/formations and groundwater...." We do not think damages should be minimized, they should be prevented. The risk of damage should be minimized, not the damage itself.

Similarly, "unnecessary damage or disturbance" seems to assume that damage may be necessary. We do not accept that assumption. There should be no damage to groundwater except perhaps temporary drainage out of a suspended water table into the borehole.

We support the proposed prohibition on using additives in karst regions when drilling the wellbore for the fresh water casing. We also support the requirement that a cement basket or similar device be used to allow for cementing of the annular space when a well is drilled through a cave void.

§35- 8 -9.2.d.4 and 5. Water cement circulation.

When cement does not return to the surface, the oil and gas inspector should be notified immediately. Additionally, when cement does not circulate, the rule allows sound engineering practices and electric logs to attempt to locate the top of the cement and to attempt to grout the casing in. When that occurs, a bond log needs to be run on that casing before proceeding to further drilling in order to make sure those techniques actually worked. If those measures in fact did not work, then curative measures should be required, beginning with the filing of a new casing and cementing plan for the permit in question.

§35- 8 -9.2.d.5. Actions when cement does not return to the surface.

If cement does not return to surface on fresh water casing, not just the inspector but the surface owner should be notified. In addition, an extra cement seal should be put in place below the surface casing.

§35 - 8 - 9.2.d.10., 9.2.e.5., and 9.2.f.2. Formation Integrity Testing (FIT).

We support the new provisions indicating that a Formation Integrity Test (FIT) may be required by the Chief after the setting of the fresh water protection, coal seam and intermediate casings to establish cement and formation integrity. While this is definitely an improvement to the current casing and cementing standards, FIT

should be mandatory, at least for the fresh water casing, rather than leaving it to the discretion of the Chief. In fact, the American Petroleum Institute (API) recommends the FIT tests for all wells that are hydraullically fractured. We think a bond log should be run on every well – again at least for the surface casing. We understand that the rule contains a number of provisions that are designed and intended to result in a protective casing properly cemented through the fresh water zones. However, nothing in the rule requires a check to see if the goal has been accomplished.

§35- 8 -9.2.h.7. Notification of cementing operations.

The most crucial action for the protection of groundwater is the cementing of the fresh water casing. The most common violation of cementing standards by operators is to fail to wait long enough for the cement to harden before the operator starts drilling again – therefore causing many mini-annuli in the cement job.

This provision wisely requires the operator to give notice of the commencement of any casing installation to the inspector.

Similar notice should be given to the surface owner for the freshwater cement job and the production string cement job! This section should be amended to require the operator to send a letter to the surface owner giving the surface owner the right to be notified if the surface owner will return a letter to the operator with a phone number, e-mail or texting address for this notice. Notice will be complete upon texting, e-mailing or leaving a message on any voice mail.

It is of particular importance for the protection of groundwater that the surface owner know the exact time the cementing was complete, and the set up time for the cement begins to run. The second sentence of this section should be amended by adding, "and the date and time of completion of the circulation or attempts to circulate the cement."

In addition to notifying the surface owner of the commencement of the cement job, the cement ticket should be part of the record of the casing on the rig and should be available to the inspector, as well as "the surface owner and other interested parties."

§35- 8 -9.2.h.9. Cementing records available.

See comment to 9.2.h.7.

§35- 8 -9.2.i. Notice to surface owners of defective casing or cementing.

The rule should include a provision for notifying surface owners and nearby water supply owners of the problems encountered. Additionally, the Chief or his designee should have the authority to order testing and monitoring of nearby water supplies if warranted depending on the nature of the casing or cementing failure.

§35- 8 -9.2.j. Monitoring for leaks and deterioration.

In addition to annual inspections, there should be mandated monitoring for and reporting of leaks and deterioration of casings over time. The current language only requires the operator to conduct an inspection at the surface but does not specify that any type of integrity test be conducted.

§35- 8 -9.2.k. Results of tests should also be available for interested parties.

Again, surface owners and other interested parties should have access to these tests.

§35 - 8 - 9.3. Closed-loop drilling systems.

As noted previously, we strongly support and appreciate the transition to pitless or closed-loop drilling systems and that open pits will no longer be used to store drilling waste on site or within the permitted limit of disturbance.

§35- 8 -9.4. Monitoring of potential conduits for unintended fracture propagation, communication.

We support and appreciate the addition of this section requiring operators to identify and monitor potential conduits for unintended fracture propagation during the hydraulic fracturing process, and to cease operations if pressures indicate communication has occurred. As noted previously, gas migration can occur because of problems with fracturing, because of initial problems with casing and cementing, and because of deterioration of casing and cementing over time. It is important to monitor potential conduits for unintended fracture propagation to determine if communication or gas migration has occurred, which should also be part of the rule, but it's more important to put in place pro-active measures to evaluate existing nearby wells (active, plugged and abandoned) to prevent communication (and especially contamination of drinking water supplies) from happening in the first place.

§35- 8 -11. Reports.

We do not understand why the term "natural gas liquids" was eliminated and replaced with the term "condensate."

§35- 8 -12.2. Access roads and sedimentation.

Access roads should be constructed and maintained to prevent any sedimentation, not "minimize" sedimentation.

§35- 8 -12.3. Well sites and sedimentation.

Well sites should be constructed and maintained to prevent any sedimentation, not "excessive" sedimentation.

§35- 8 -12.4. Pits and Impoundments Associated with a Well Work Permit.

As noted previously, we support and appreciate that under the proposed rule drillers must use closed-loop drilling systems and that the use of open, on-site pits associated with a well work permit would be eliminated. In keeping with this change, language related to the pits that would no longer be allowed is removed from this section. However, we are concerned about existing permits and pits allowed under permits issued prior to the effective date of the proposed changes. This section (and other sections of the rule pertaining to pits associated with a well work permit) should be written so it is clear that existing/previously permitted pits must meet the requirements specified in the rule, must have proper inspections, must be properly reclaimed and waste stored in the pits must be disposed of properly.

We support the prohibition on construction of impoundments in karst regions.

§35- 8 -15. Water Supply Testing.

We strongly support the requirement that all drinking water wells within 1,500 feet of a water supply well be flow and quality tested by the operator upon request of the drinking well owner. However, the way that this section is written and organized, it is not clear how a drinking well owner would receive notice and know to request the testing, as the notice section (15.2) only refers back to subsection 15.1.a. which pertains to water wells or developed springs located within 1,500 feet from the center of a proposed well pad and discusses methods to providing notice to occupied dwellings or other locations located within 1,500 feet of the center of the pad.. Additionally, it seems that some provisions similar to subsections 15.1.b. through 15.1.d. should be applied to require flow and quality testing of water wells located within 1,500 feet of a water supply well, in the event that no request is made of the operator pursuant to subsection 15.1.e.

§35- 8 -15.1. Water supply testing.

Testing and presumption of liability should include possible pollution from the lateral/horizontal legs of the well bore, which can go 3,000, 5,000 or even 10,000 feet horizontally past thousands of old wells that need to be plugged, and others that are still producing, all with uncemented annuli between the bottom of the surface/intermediate well casing and the formation cement job.

The distance from the horizontal legs is an issue, as the new sections and provisions establishing an area of review (5.11) and requiring monitoring of potential conduits for unintended fracture propagation (9.4) indicate. It is irresponsible not to do this where there are other gas well boreholes that penetrate the target formation, particularly if the annuli are not cemented through the formation.

The rule should require water supply testing (and the presumption of liability should apply) within the area of review. Most horizontal legs are spaced 500 feet apart parallel to each other. So the fractures extend at least 250 feet or maybe more. At a minimum, the rule should require testing (and the presumption of liability should apply) within 500 feet of a horizontal well bore or within the projected length of the fractures, whichever is greater.

§35- 8 -15.3.b. Water testing parameters.

We recommend that the following should be added to the list of testing parameters:

-Magnesium, Lead, Strontium, and Potassium: Metals that can help determine whether water quality has been impacted by fracing fluid or brine (in addition to the other metals on the list). Also, Potassium in particular has been proposed as a possible tracer for fracing fluid contamination.

-Acrylonitrile: An ingredient in fracing fluid and therefore a possible signature of pollution from fracing fluid.

-Acidity, Alkalinity, Hardness: General water chemistry parameters that help provide a general characterization of the water. In addition, some surface water quality criteria are hardness-dependent.

-Gross alpha, Gross beta, Radium-226, Radium-228: Radiological parameters that can help determine whether naturally occurring radioactive materials (NORMs) have made it to the surface. The Department's own sampling has confirmed the presence of NORMs in wastewater from Marcellus Shale wells.

The lack of metals testing is curious since the EPA names them as a test parameter on this page (http://water.epa.gov/drink/info/well/faq.cfm) for when there are gas drilling operations nearby. Lead and the other heavy metals are also listed in an academic study: Swistock, Bryan. 2008. Gas Well Drilling and Your Private Water Supply, Water Facts #28. University Park, PA: The Pennsylvania State University, College of Agricultural Sciences, Cooperative Extension, School of Forest Resources. http://resources.cas.psu.edu/WaterResources/pdfs/gasdrilling.pdf

§35- 8 -15. Replacement of water supplies.

The rule should include procedures for requiring the operator to replace water supplies that are contaminated, diminished or interrupted by oil and gas operations as specified by the W.Va. Code §22-6A-18.

§35- 8 - 17. Construction of Centralized Pits and Impoundments.

We commend the OOG for proposing additional safeguards for centralized pits that store waste generated by natural gas drilling operations and the steps the OOG has taken in this rule to reduce the use of pits and the problems associated with them. More detailed and stringent design and construction standards and operational criteria for all pits and impoundments are long overdue. However, drilling pits are not necessary and their use poses an unnecessary risk to human health and the environment, no matter how well they are constructed. We strongly encourage the Department to eliminate the use of pits for the storage of drilling and hydraulic fracturing fluids and other drilling waste.

Absent a strict prohibition on the use of pits, we appreciate that the proposed design and construction standards impose restrictions on where centralized waste pits can be located. We also appreciate that the standards acknowledge the threats pits pose to surface and ground water by requiring dual liners with leak detection and requiring companies to install water quality monitoring wells near the pits. Nevertheless, we have identified a number of shortcomings with the proposed standards. The following comments are drawn from WV-SORO's 2012 comments on the OOG's Design and Construction Standards for Centralized Pits, on which many of the additions to these sections appear to be based. These comments were prepared with the input of surface owners who have experienced problems with pits, including torn liners and leaking of potentially toxic liquids into soils, surface water and groundwater.

§35- 8 -17.2.a. Siting Requirements.

We appreciate the proposed siting restrictions. Such restrictions are long overdue, and we particularly applaud the prohibition of locating pits in karst areas. Although we recognize that the proposed prohibitions are more stringent than most other jurisdictions, with a few exceptions, we are concerned about their limited applicability and question whether they are protective enough. Some states apply the distance from homes to hospitals, nursing homes, schools, places of worship and other places people gather, which is appropriate. Such restrictions are important because, in addition to soil and water contamination, pits can produce odors and toxic air contaminants.

We are concerned about the growing number of instances where proposed standards and regulations provide more protection for public water supplies and intakes than they do for private water wells and springs. This pattern is reflected in both the proposed pit standards, as well as in the recently passed Horizontal Well Control Act. While, we share the concerns of public water supply managers and users that want their water protected, we believe it is unfair and unjust not to extend the same protections to those whose water supplies are most likely to be affected and who have fewer resources available to them to deal with the contamination if it occurs. Adequate setbacks are needed for the protection of all water supplies (public and private).

While the proposed standards place restrictions on the location and construction of pits relative to perennial streams, consideration should also be given to construction around or the filling of intermittent or ephemeral streams.

Furthermore, the prohibitions should clarify that pits cannot be constructed unless the company has an agreement with the surface owner. The notification provided to the surface owner in section 17.4 is important and good. However, beyond that the rules should clarify that centralized pits cannot be constructed unless the company has a written agreement with the surface owner. Proof of such agreement should be provided to the OOG.

§35- 8 -17.2.g. Monitoring.

We particularly appreciate the water quality monitoring provisions of the proposed standards, as the majority of our members are rural and rely on groundwater aquifers for their drinking water. However, in addition to establishing monitoring wells to monitor general groundwater quality over the life of the pits, the standards should also require evaluation of baseline water quality of nearby water wells and developed springs.

§35- 8 -17.2.g.2. Water Quality Monitoring System Components and Location

These standards were modeled after Pennsylvania, and while they are stronger in some respects, such as the location restrictions, it was disappointing that they require less than Pennsylvania in terms of water quality monitoring. The PA standards require a minimum of one monitoring well up gradient and three monitoring wells down gradient. Under the PA standards, monitoring wells must be within 200 feet of the impoundment and at least 100 feet closer than the nearest drinking water well. The proposed WV standards have the former but not the latter. It is necessary to have monitoring wells close, as well as further away.

§35- 8 -17.2. g.4. Data Analysis, Water Sampling and Testing Parameters.

The proposed standards require the collection of water samples once per calendar quarter. A more frequent sampling schedule would be more meaningful. Conductivity and pH in particular can be easily measured in the field and relatively inexpensive monitors (compared to the cost of establishing the monitoring well) can be deployed to measure and record these parameters on a continuous basis.

In addition to the OOG, a copy of the data analysis should be provided to the surface owner and owners of water wells and developed springs.

Although the minimum parameters are good indicators of possible contamination, they are not regulated by primary drinking water standards. The list of testing parameters should be expanded to include constituents

such as heavy metals, chemicals or chemical compounds used in hydraulic fracturing and naturally occurring radioactive materials (NORMs) known to exist in the Marcellus Shale – constituents DEP's own sampling has shown are present in drilling wastewater.

At a minimum, non-seasonal changes in the parameters specified in the proposed standards should immediately trigger additional sampling and more extensive testing for heavy metals, BTEX and radioactivity. If changes occur, owners of nearby drinking water wells and springs should be notified immediately, and their wells and springs should be sampled and tested for potential contaminants.

§35- 8 -17.5.b. Conformance with Plans, Engineer Certification

We support and appreciate the additional certification requirements in this section to help ensure that pits and impoundments are constructed in accordance to plan. The Horizontal Well Control Act required that the plans and specifications for high-volume pits and impoundments be prepared by a registered professional engineer. However, one of the problems identified in the pit and impoundment study mandated by the Act was that more than half of the pits examined as part of the study were not built according to the specifications in the plans.

The surface owner should receive a copy of the final certification report submitted to the Office and be notified prior to filling.

§35- 8 -18.3. Spill Pollution Prevention and Control Measures.

This section is permissive on the use of "linings, feltings, paddings, and support boardings of adequate quality." The use of these prevention and control measures should be required ("shall use" rather than "may utilize"). And all the plans should be submitted to the State, not just in the event of prior problems.

Conclusion.

Finally, in addition to the above comments, we are specifically supportive of the comments on this rule being submitted by WV-SORO members George Monk and Molly Schaffnit.

Thank you for the opportunity to provide comments on the rule.

Sincerely,

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WVONGA
WEST VIRGINIA OIL AND NATURAL GAS ASSOCIATION

July 27, 2015

By Hand Delivery and E-mail

Jason Harmon, Office of Oil and Gas
West Virginia Department of Environmental Protection
601 57th Street, S.E.
Charleston, WV 25304

Re: Comments on Proposed Amendments to Rules Governing Horizontal Well Development, 35 C.S.R. 8

Mr. Harmon,

Please find enclosed comments by the West Virginia Oil and Natural Gas Association on the West Virginia Department of Environmental Protection's proposed amendments to the Rules Governing Horizontal Well Development, 35 C.S.R. 8. Should you have any questions, please do not hesitate to contact me.

Very truly yours,

Nicholas DeMarco
Executive Director

RECEIVED
Office of Oil and Gas
JUL 27 2015
WV Department of
Environmental Protection

P.O. Box 3231 ⊛ Charleston, West Virginia 25332 ⊛ (304) 343-1609 ● wvonga.com

West Virginia Oil and Natural Gas Association
Comments Regarding Proposed Amendments to 35 C.S.R. 8
"Rules Governing Horizontal Well Development"
July 27, 2015

The West Virginia Oil and Natural Gas Association ("WVONGA") appreciates the opportunity to provide the following comments on the West Virginia Department of Environmental Protection's ("WVDEP") proposed amendments to the "Rules Governing Horizontal Well Development, 35 C.S.R. 8 (the "Proposed Rule"), which were filed with the West Virginia Secretary of State on June 24, 2015. Chartered in 1915, WVONGA is one of the oldest trade organizations in the State, and is the only association that serves the entire oil and gas industry. The activities of our members include construction, environmental services, drilling, completion, gathering, transporting, distribution and processing. WVONGA members operate in almost every county in West Virginia and employ thousands of people across the State, with payrolls totaling hundreds of millions of dollars annually. Our members have cumulative investment of nearly ten billion dollars in West Virginia, account for 80% of the production and 90% of the permits, operate more than 20,000 miles of pipeline across the state and provide oil and natural gas to more than 300,000 West Virginia homes and businesses.

Specific Comments

WVONGA offers the following specific comments on the Proposed Rule for the agency's consideration:

1. Requirement to Utilize Closed-loop/Pitless Drilling Systems

As drafted, from the effective date of the final Proposed Rule forward, closed-loop (i.e., pitless) drilling systems would be required for all permitted well work, and the construction of waste storage pits associated with permitted well work would be prohibited within the permitted limit of disturbance. §§ 9.3.a, 9.3.b. Consistent with this new requirement, corresponding

references to pits—other than centralized pits and impoundments—have been deleted throughout the Proposed Rule. *See, e.g.*, §§ 12.4, 16.

WVONGA objects to this blanket prohibition on the use of pits for the collection of process waste fluids, drill cuttings or any other liquids generated in conjunction with drilling and completion operations. These prohibitions are inconsistent with the Horizontal Well Act, W. Va. Code §§ 22-6A-1 *et seq.*, which expressly contemplates the use of such pits associated with a valid well work permit. Thus, the currently proposed amendments to the Horizontal Well Rule that would require the wholesale elimination of these pits exceed the agency's authority under its governing statute and are therefore legally improper.

In many situations drilling is completed in a closed loop system, with cuttings and other waste being managed in containers. In some situations, however, fracking wastes can be better managed by use of flowback pits. As a practical matter, eliminating on-site pits as a viable alternative for the storage of waste fluids has the potential to create significant logistical concerns for operators. Due to the steep terrain in certain operating areas, available land space for frac tank storage may be limited, while constructing and using an off-site centralized impoundment has the potential to be cost-prohibitive and to generate additional truck traffic. Accordingly, the Proposed Rule should be revised to authorize the continued use of waste pits as part of the application for a well work permit, subject to reasonable terms and conditions designed to ensure protection of human health and the environment.[1]

WVONGA welcomes the opportunity to discuss with WVDEP any additional safeguards on the continued use of on-site waste pits that the agency may deem necessary or appropriate.

2. Karst Terrain

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[1] To the extent that WVDEP rejects WVONGA's comments and retains the proposed prohibition on waste pits associated with well work permits, at a minimum the Proposed Rule should be revised to state expressly that existing pits may continue to be used pending final reclamation of the drilling si

a. **Availability of Karst Terrain Designations.** The Proposed Rule would adopt various new requirements and prohibitions specifically directed to operations located in karst terrain. "Karst terrain," in turn, is proposed to be defined as "a topography, generally underlain by limestone or dolomite, in which the topography is formed chiefly by the dissolving of rock and which may be characterized by sinkholes, sinking streams, closed depressions, subterranean drainage, and caves, as such areas (known as 'karst regions') have been identified and mapped by the West Virginia Geologic [sic] and Economic Survey." § 2.15.[2] As far as WVONGA is aware, karst regions have not been comprehensively identified and mapped by the West Virginia Geological and Economic Survey—and the information that has been gathered is not readily publicly available to operators. To the extent that WVDEP has more specific information regarding how and where to obtain definitive information about karst areas, it should provide that information with the Proposed Rule and on its website. In the absence of such information, however, WVONGA submits that the provisions in the Proposed Rule relating to karst terrain designations are premature.

b. **Inconsistent Terminology (§ 2.15).** WVONGA notes that the defined term "karst terrain" is not used elsewhere in the Proposed Rule; instead, the agency appears to have used the term "karst region" or, in one instance, "karst feature" (*see* § 5.5.b.2.D). WVONGA encourages WVDEP to revise the Proposed Rule to ensure that consistent terminology is adopted throughout.

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[2] A couple of minor notes on this definition: (1) the reference to the "West Virginia Geologic and Economic Survey" should be to the "West Virginia **Geological** and Economic Survey," and (2) for consistency with the corresponding statutory definition of "karst terrain," W. Va. Code § 22-6A-4(b)(8), WVONGA suggests that the definition should state "'Karst terrain' means a **terrain**," rather than a "topography."

c. **Karst Region Testing (§ 5.1.i).** The Proposed Rule would require an operator in any defined karst region "to conduct testing at the proposed drilling site in order to identify caves and other voids, faults and relevant features in the strata as determined by the West Virginia Geological and Economic Survey. The operator shall also conduct testing to identify surface features such as sinkholes." § 5.1.i. The operator would be required to conduct this testing "prior to submitting its application," and include the results of the tests with its permit application. *Id.* These timing requirements conflict with the language of the Horizontal Well Act, however, which requires operators to perform "predrilling testing"—not **pre-application** testing—to identify relevant features within designated karst areas. W. Va. Code § 22-6A-3A(b)(1). For consistency with the statute, therefore, WVONGA encourages WVDEP to revise the Proposed Rule to require that this testing be performed (and the results submitted) prior to the commencement of drilling, but authorize the well work permit to be issued without this information. This would allow the operator to assume the business risk of deferring the testing, if so inclined, while still ensuring that the analyses will be completed prior to drilling.

d. **Required Notifications (§ 5.3.e).** The Proposed Rule would require an applicant for a well work permit in a county containing karst regions to provide notice to the West Virginia Cave Conservancy and the West Virginia Speleological Society prior to or at the time of filing its application with the Office of Oil and Gas. § 5.3.e. Requiring applicants to provide individualized notice to special interest groups is both improper and unnecessary. To the extent that these groups are interested in proposed oil and gas development within karst (or other) regions, they can monitor applications for well

work permits through WVDEP's electronic mailing lists and obtain publicly available information relating to such applications through requests filed pursuant to the West Virginia Freedom of Information Act.[3]

e. **Baseline Water Testing (§ 9.1.c).** The Proposed Rule would require the operator "to conduct baseline water testing prior to commencement of any site construction or well work in any karst region. Testing shall be conducted on the water resources adjacent to the site and in accordance with the requirements of subsection 15.3 of this rule." § 9.1.c. It is unclear as to whether this requirement is intended to encompass both groundwater and surface water, as well as how "adjacent" is to be interpreted.

3. **Fracture Propagation**

a. **Authority to Comply (§§ 9.4.a, 9.4.b).** The Proposed Rule would add significant new requirements relating to the identification of potential conduits for unintended fracture propagation that are likely to impose obligations beyond the control of the permittee. Specifically, the well work permittee would be required to "identify and monitor any producing wells within the area of review . . . that may serve as a conduit for unintended fracture propagation during hydraulic fracturing activities . . . ." § 9.4.a. The permittee would also be required to "identify and plug or replug, if necessary, any existing abandoned wells that may serve as a conduit for unintended fracture propagation during hydraulic fracturing activities." § 9.4.b. These significant new requirements extend to producing and/or abandoned wells within the area of review that may not be owned or operated by the applicant/permittee. Imposing affirmative obligations beyond the legal authority of the permittee is inappropriate, and WVDEP

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[3] It is also unclear why the proposed notification should extend to **all** applications to be filed for a county containing a karst region, rather than limited to those applications to drill in (defined) karst terrain. WVONGA objects to this notification requirement in its entirety, but even as drafted it is overbroad.

wholly fails to acknowledge this issue or to provide guidance to an applicant who may be subject to a requirement to monitor and/or plug wells that the applicant does not own and for which no authorization is provided for right of entry (or release of liability).

b. **Requirement to Plug Wells (§ 9.4.b).** The Proposed Rule would require the permittee to "identify and plug or replug, **if necessary**, any existing abandoned wells that may serve as a conduit for unintended fracture propagation during hydraulic fracturing activities." § 9.4.b (emphasis supplied). This language is extremely vague—it is entirely unclear how the permittee or WVDEP would determine whether plugging is "necessary" within the meaning of this provision. If the Office of Oil and Gas has information on any abandoned wells located within the applicable area of review that would indicate that plugging or replugging is necessary, then those can be addressed on a case-by-case basis through the existing abandoned well program.

The regulatory "default" currently proposed—that the permittee is automatically responsible for plugging or replugging any abandoned well(s) within the designated area of review, regardless of whether the permittee has any interest in the abandoned well—is unduly burdensome and would improperly shift liability. An operator who is engaged in drilling and fracturing its own wells does not necessarily have the right to enter someone else's property to investigate and plug wells. The Proposed Rule is establishing a requirement that will be a legal impossibility in many respects. Plugging should only be required where the permittee has the clear legal right to do so.

Accordingly, WVONGA suggests that the permittee's obligation with regard to abandoned wells within the area of review be limited to **monitoring** identified wells that may serve as a conduit for unintended fracture propagation—subject to constraints

on the permittee's right of access discussed above—and mandate termination of fracturing operations and relief of the associated pressure in the event that monitoring indicates that communication has occurred. To the extent that WVDEP retains language requiring the plugging or replugging of wells on the permittee's lease, however, the Proposed Rule should expressly allow the Office of Oil and Gas to issue a combined well work permit that would include authorization to perform plugging activities as well as new well work activities.

c. **Area of Review (§ 5.11).** The operator would be required to "review the area surrounding the proposed well pad so as to identify and evaluate potential conduits for unintended fracture propagation" and then provide a report on the same to the Office of Oil and Gas. Specifically, "[a]ll existing active, plugged, and abandoned wells within [1,200] feet of the surface location of the well that is the subject of the new application and within [1,000] feet of the lateral section of the wellbore shall be considered for the potential of unintended fracture propagation." § 5.11. It is unclear as to how the agency intends the applicant to measure the 1,000-foot distance from the lateral section of the wellbore—vertically, horizontally or both? Regardless, any requirement to identify nearby wells should be limited to those wells that are known or reasonably expected to penetrate to a sufficient depth that could be within the range of fracture propagation, as the identification and evaluation of wells shallower than such depths is unnecessary for purposes of assessing potential fracture propagation. WVDEP also has not provided any rationale for the seemingly arbitrary 1,200-foot radius surface location area of review. Because the fractures in a horizontal well will occur in the lateral section, a 1,000-foot distance from the surface location should be adequate.

Furthermore, for the reasons set forth above, some acknowledgement should be made in the Proposed Rule regarding the limitations on this analysis (and associated report) that may arise due to the inability of the applicant/permittee to obtain a right of access to perform an evaluation of wells within the designated area of review that the applicant/permittee does not own or operate. WVONGA also assumes that WVDEP intends the applicant to provide the report referenced in this section to the Office of Oil and Gas together with the well work permit application; if so, that should be stated explicitly.

To address these issues, as well as to render the language more streamlined and to clarify that the focus of this section is on well to well communication through unintended fracture propagation, WVONGA recommends revising Section 5.11 as follows:

5.11. Area of Review – The operator shall review the area surrounding the proposed well pad so as to identify ~~and evaluate potential conduits for unintended fracture propagation, a report of which the operator shall provide to the Office.~~ A<u>a</u>ll existing active, plugged, and abandoned wells within one thousand ~~two hundred~~ feet (1,000' ~~1,200'~~) of the surface location of the well that is the subject of the new application and within one thousand feet (1,000') of the lateral section of the wellbore<u>, which are known from public records and are reasonably expected to penetrate within one thousand feet (1,000') measured vertically from the formation intended to be stimulated. The operator</u> shall ~~be~~ considered <u>those wells</u> for the potential of unintended fracture propagation<u>, and provide a report summarizing those findings to the Office together with its well work application</u>. <u>The operator shall note in this report any limitations resulting from the inability of the operator to obtain rights of entry to perform the evaluation required by this section.</u>

d. Resumption of Activities (§ 9.4.c). The Proposed Rule would require the cessation of fracturing operations in the event of communication with an off-set well, §§ 9.4.a, 9.4.c, but provides no procedure for restarting operations following the resolution of the issue. Accordingly, WVONGA proposes adding the following as new Section 9.4.d: "No

later than ten days following a showing by the permittee that it has reestablished control of the permitted well and that the well is no longer in communication with any unintended conduit(s), WVDEP shall authorize the re-starting of drilling activities."

Finally, WVONGA suggests that the language of Section 9.4.c be clarified as follows: "The permittee shall monitor all associated fracturing treatment pressures throughout the entirety of the hydraulic fracturing operation. If data monitoring reasonably indicates that communication with unintended conduits has occurred, the permittee shall terminate the fracturing operations . . . ." Pressure changes occur throughout fracturing operations, and it is unclear from the Proposed Rule what data will be deemed to indicate the presence of an unintended conduit. This is something that must, of necessity, be left to the best judgment of the operator. The operator has every incentive to avoid having a fracturing operation extend to another well, and the rule need not specify in detail how those unintended conduits are identified.

e. **Introductory Language (§ 9.4).** WVONGA notes that the introductory sentence of Section 9.4 is superfluous, as the detailed requirements relating to fracture propagation are set forth fully in the subsequent subsections. For clarity as to the scope of applicable requirements, therefore, WVONGA requests the deletion of this sentence in its entirety.

4. Berms [§ 5.5.c.12]

A new subsection of the Proposed Rule would require well pads to be "fully enclosed by berm structures." § 5.5.c.12. WVONGA is concerned that this requirement will impose additional operational concerns and costs on operators without providing meaningful additional protections for water resources.

While many oil and gas production sites are bermed already, some operators will decide to control releases in other ways. Extensive requirements for spill containment and control are established by existing state and federal rules and regulations, and those programs have been demonstrated to be adequate over time. Mandating the installation of berms that completely surround well pads could have the potential to create significant logistical issues with regard to water management, as well as potential pad integrity concerns that do not appear to be justified by any demonstrated need from WVDEP. Furthermore, the specified width requirements would be expected to increase the overall environmental impact of the site due to widening, whereas Section 5.5.c.1 of the Proposed Rule would require the cleared area to be kept to the minimum necessary for proper construction. The prescriptive language of this section also would appear to preclude the use of an engineering equivalent such as jersey barriers that provide traffic and release mitigation.

WVONGA urges WVDEP to delete Section 5.5.b.12 in its entirety, or, in the alternative, to authorize equivalent methods that will provide operators with flexibility in determining design standards for well pad berms. WVONGA also would suggest including some timing limitation in this provision, as berms may not be necessary or appropriate during the life of the pad (versus during the well work process). Berms are removed at many sites after well work is completed, and as written this rule might require maintenance of a berm where none is needed, or other measures (e.g., SPCC controls) are as effective.

5. Water Management Plan Signage [§§ 5.6.e, 9.1.b.2]

WVONGA notes that the requirements in Sections 5.6.e and 9.1.b.2 relating to signage to be posted at water withdrawal sites are inconsistent (although similar). To illustrate:

- **Section 5.6.e requires the sign to include:**
  - Information regarding how to obtain the Water Management Plan (not required in § 9.1.b.2)
  - The water withdrawal site identification name
  - The well pad name[4] as set forth in the approved Water Management Plan
  - The telephone number of the company conducting the withdrawal
  - The Office's telephone number
  - The Office's web site address (not required in § 9.1.b.2)

- **Section 9.1.b.2 requires the sign to include:**
  - A disclosure that the location is a water withdrawal point (not required in § 5.6.e)
  - The water withdrawal site identification
  - The well pad names as defined in the approved water management plan (similar to § 5.6.e, with minor language differences)
  - The name of the operator for which the water withdrawn will be utilized (not required in § 5.6.e)
  - The telephone number of the operator for which the water withdrawn will be utilized (similar to the requirement in § 5.6.e for the telephone number of the company conducting the withdrawal, but not identical, and the company conducting the withdrawal could possibly be different than the operator for which the water withdrawn will be utilized)
  - The telephone number for the Office of Oil and Gas

To avoid confusion, WVDEP either should consolidate all of these requirements in a single section or should revise both sections to ensure that the requirements are completely identical.

Furthermore, Section 9.1.b.2 would require signage to be erected within 24 hours of a notification of an intent to withdraw water. WVONGA believes that requiring the postage of signage within 24 hours is excessive and may prove infeasible in practice. In the alternative, WVONGA suggests that the regulations be revised to require that appropriate signage be posted prior to active water withdrawal. Finally, WVONGA requests clarification as to when the erosion and sediment controls referenced in this section must be implemented at water withdrawal

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[4] WVONGA notes that this should properly state "well pad name(s)," as Section 5.6.b authorizes the preparation of water management plans on a watershed basis, encompassing multiple wells or well pads.

locations—for example, would such controls be required at a temporary water withdrawal location where no earth disturbance takes place?

6. Well Location and Target Formation (§ 6.2.c)

Proposed revisions to Section 6.2.c state that "[a]t no point shall the path of the drilled borehole deviate from the permitted borehole by more than [50] feet or deviate outside the target formation subsequent to intersection of that formation." § 6.2.c.[5] Such strict prohibitions are unworkable in practice, and should be deleted from the Proposed Rule. As a practical matter, deviation from the permitted borehole is a three-dimensional concept, but the "permitted borehole" as planned and depicted on documentation provided to the Office of Oil and Gas is not a detailed three-dimensional representation; rather, the planned borehole is shown on the plat in plan view, with the planned surface location, landing point/turning point, and bottom hole location coordinates, along with the direction of the lateral. At any point along the vertical or horizontal borehole, other than the landing point/turning point or bottom hole location, there is not an actual "permitted" point in space from which to measure the drilled deviation. Moreover, neither the permit application requirements of the Horizontal Well Act nor the Office of Oil and Gas's Form WW-6B of the permit application require all points along the borehole plan to be predetermined and permitted. *See* W. Va. Code § 22-6A-7(b)(5) (authorizing "approximate" representations of the planned well, with no 50-foot limitation). In practice, such deviations would not be uncommon due to formation drift, faulting and other geographical complexities, and the cost of the technology and additional drilling time needed to steer wells to the degree of accuracy required by the Proposed Rule have been estimated by one WVONGA member to exceed $225,000 per well. Simply put, these unrealistically precise new requirements are without rational basis and are

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[5] It is unclear why WVDEP has proposed to insert this requirement in Section 6.2.c, which is a subsection dealing with the form and content of plats and not with operational criteria like borehole deviations.

unwarranted, particularly where the operator must include the "exact location of the as-drilled wellbore" with Form WR-35 in accordance with Section 10.2.a. WVONGA urges the deletion of this provision in its entirety.[6]

7. Identification of Public Buildings [§ 6.2.k.2]

The Proposed Rule would add a new requirement to identify "public buildings" in the applicant's plat. However, "public buildings" is not a defined term under the Horizontal Well Act or the current rule. WVONGA suggests adding a definition consistent with other areas of the Code. *See, e.g.,* W. Va. Code § 49-5-10(g)(5).

8. Formation Integrity Testing [§§ 9.2.d.10, 9.2.e.4, 9.2.f.2]

Sections 9.2.d.10, 9.2.e.4 and 9.2.f.2 of the Proposed Rule authorize the Office of Oil and Gas to require a formation integrity test to establish cement and formation integrity. These sections provide no details, however, on how the agency will notify the operator that such a test is required, or establish any applicable limitations on the timeframe within which such a notification may be given.

9. Groundwater Withdrawals [§§ 9.1.a.4, 9.1.a.5]

The Proposed Rule would impose significant new requirements relating to groundwater withdrawals, including aquifer tests and hydrogeologic delineation. WVONGA believes that these extensive—and costly—requirements are not justified, as there have been no incidents of adverse

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[6] WVONGA strongly objects to this requirement. To the extent that some requirement relating to borehole deviation is retained, however, **at most** operators should be limited to providing notification to the agency that a deviation has occurred and a general requirement that a drilled borehole that deviates outside of the target formation should return to the target formation as expeditiously as possible.

WVONGA also notes that the permittee should be authorized to modify the target formation where it maintains legal rights to that formation. WVONGA further suggests modification to Section 5.1.h to delete requirements relating to notice to the coal owner, operator or lessee when requesting authorization to drill a new or replacement borehole. Notification to the coal owner, operator or lessee of a change in the location of a borehole within the confines of the well pad is unnecessary and creates unneeded delays.

impacts to groundwater as a result of its use by industry for water supply purposes. While WVONGA would encourage the deletion of these requirements in their entirety as unnecessary, to the extent that they are retained WVONGA is concerned by the final sentence of Section 9.1.a.4, which suggests that any "lowering of groundwater or stream flow levels" should be considered "adverse impacts, for the purpose of water supply well suitability consideration." At a minimum, this language should be modified to include a qualifier that would exclude minor, natural fluctuations or lowering in groundwater levels from qualifying as an "adverse impact." WVONGA suggests the following language as an alternative: "lowering of groundwater or stream flow levels to an extent that may be injurious to any existing or potential uses."

10. Annual Production Reporting

a. **Standard Practices of Common Carriers (§§ 11.1.b, 11.1.d).** The Proposed Rule would require the volume of oil and condensate (§ 11.1.b) and produced water (§ 11.1.d) to be "determined through the standard practices of common carriers in the State of West Virginia." This requirement is stated as an absolute. If a facility has a means of measuring the volume of oil, condensate or produced water produced on-site, it is unclear why that method should not also be acceptable for purposes of reporting.

b. **Measurement of Produced Water (§ 11.1.d).** While WVONGA does not object to excluding flowback water from reporting under this section, because the distinction between produced water and flowback water can be subject to varying interpretation, WVONGA requests that the agency provide some clarification regarding how it will interpret "flowback water" for purposes of this section. One option would be to state that flowback water encompasses all water recovered as part of well completion activities.

11. Water Supply Testing [§ 15.1.e]

The Proposed Rule would add a new subsection stating that "[i]n accordance with W. Va. Code § 22-6A-8(g)(5)(D), owners of drinking water wells located within [1500] feet of a water supply well used to support activities permitted under this article may request well flow and quality testing." § 15.1.e. For consistency with the referenced provision of the Horizontal Well Act, WVONGA suggests inserting the phrase "prior to operating the water supply well" at the end of this subsection.

12. Centralized Pits and Impoundments

a. **Definitions (§ 17.1.a).** Section 17.1.a of the Proposed Rule establishes a definition of "centralized pit or impoundment" that references "a pit or impoundment, as that term is defined above . . . ." The Horizontal Well Rule does not define these terms, however. WVONGA suggests incorporating the definitions of "pit" and "impoundment" as set forth in the Horizontal Well Act either *verbatim* or by reference. *See* W. Va. Code §§ 22-6A-4(b)(7) and 22-6A-4(b)(10).

b. **Siting Requirements (§ 17.2).** Because the siting requirements of the Proposed Rule would eliminate anything within the 100-year floodplain, operators will required to undertake large and extremely costly excavation projects in areas of steep terrain to provide an area large enough for construction of a centralized waste pit or impoundment. The proposed maximum 2:1 horizontal to vertical slope requirements would present additional challenges in this limited area. WVONGA is concerned that these rules will effectively disincentivize and render cost-prohibitive and uneconomical the water recycling/reduction efforts that have been implemented by the industry, thereby resulting in the need for more freshwater to be used instead.

WVONGA suggests that WVDEP revise this section to establish a waiver procedure for the setback distances from perennial streams and wetlands (of 500 feet and 100 feet, respectively) if the operator makes a sufficient demonstration that additional controls or other measures will be implemented to ensure the protection of the relevant perennial stream(s) and/or wetland(s).[7] Finally, WVONGA also requests clarification that the proposed setbacks should be calculated from the centralized pit or impoundment itself (i.e., the bank of the pit or impoundment), rather than from the limit of disturbance.

c. **Compaction of Centralized Pits and Impoundments (§ 17.2).** The Proposed Rule requires fills to be constructed in horizontal lifts with a maximum thickness of nine inches and with no individual particle greater than three inches. § 17.2.d. Common practice in the industry allows for the use of particles up to six inches in length, and horizontal lifts of 12 inches. WVONGA is unaware of any technical reason to establish the alternative limitations set forth in Section 17.2.d of the Proposed Rule.

d. **Leak Detection System Requirements (§ 17.2.f).** Section 17.2.f.2 provides that "[e]ach centralized pit shall have its own sump(s). The design of each sump and removal system shall provide a method for measuring and recording the volume of liquids present in the sump and the volume of liquids removed." WVONGA notes that the volume of liquids present in the sump may be difficult to measure accurately and does not provide any assurance as to the integrity of the pit; rather, monitoring the volume of liquids removed should provide adequate information as to pit integrity for purposes of this section.

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[7] WVONGA also notes that the proposed 500-foot setback from a perennial stream measured horizontally from the limit of disturbance is excessive, and suggests that a 100-foot setback would be more appropriate and provide adequate protection of the water feature from erosion and sedimentation.

e. **Design Standards (§ 17.2.h).** The Proposed Rule would require a centralized pit or impoundment to be "designed, constructed, maintained and operated to prevent overtopping resulting from normal or abnormal operations; overfilling; wind; rainfall; run-on; malfunction of level controllers, alarms, and other equipment; and human error . . . ." § 17.2.h. WVONGA notes that, while it is possible to **minimize** these risks, it is not possible to design, maintain and operate a pit or impoundment against all possible equipment malfunctions, anomalous nature events or human error. Accordingly, we suggest substituting the term "prevent" in this subsection with the phrase "minimize to the degree possible the risk of."

13. Fiscal Note

The Fiscal Note included with the Proposed Rule fails to address the economic impact of the agency's proposal on persons affected by the rules and regulations as required by the West Virginia Administrative Procedures Act (the "WVAPA"). Specifically, the WVAPA requires a proposed legislative rule to "have a fiscal note attached itemizing the cost of implementing the rules as they relate to this state **and to persons affected by the rules.**" W. Va. Code §§ 29A-3-4(b) and 29A-3-5 (emphasis supplied). The Fiscal Note accompanying the Proposed Rule contains no evaluation of its impacts to those "persons affected by the rules," including the regulated community. Accordingly, WVDEP should undertake a reasoned evaluation of the economic impact imposed by the Proposed Rule as required by the WVAPA and resubmit the proposed rule together with this analysis.

14. Typographical Errors and Clarifications

a. **Plat Requirement (§ 5.1.c.2).** It appears that the reference to subdivision 19.1.c in this section should be to subdivision 19.1.f instead. (A review of the subdivisions of

Section 19.1 reveals an apparent numbering error, with duplicate provisions being numbered 19.1.a, 19.1.b and 19.1.c.)

b. **Annual Production Reporting (§ 11.1.a).** Consistent with the substitution of "natural gas liquids" for "condensate," WVONGA suggests the following revision to Section 11.1.a: "The volume of ~~natural gas liquids~~ condensate reported shall be ~~those~~ the amount separated under the control of the well operator."

c. **Scope of Section 16.** The title of Section 16 limits its applicability to freshwater impoundments with a capacity greater than 5000 barrels that are included in a specific well work permit, but this limitation is not always clear in the regulatory text of the subsections. For purposes of clarity, therefore, WVONGA suggests the following revisions:

- **§ 16.1:** "Notice of construction of all such ~~pits and~~ freshwater impoundments shall be provided to the oil and gas inspector and the Chief prior to construction."
- **§ 16.3:** "In constructing the dike or embankment for a freshwater impoundment subject to this section, the operator shall . . . ."
- **§ 16.4:** "A ~~pit or~~ freshwater impoundment subject to this section that is constructed in such a manner . . . ."
- **§ 16.5:** "Any freshwater impoundment subject to this section that does not meet the criteria . . . ."
- **§ 16.6.a:** "After construction and prior to the placement of any fluid, all ~~pits and~~ freshwater impoundments with a capacity of greater than [5000] barrels included in a specific well work permit shall be inspected . . . ."

d. **Security Requirements (§ 17.8.b).** Because fencing specifications are now proposed to be incorporated into the rule, it is no longer necessary for the first sentence of this section to state that fencing must secure the site "from access by the public and wildlife." This language arguably suggests that additional measures beyond those

specified may be required. For purposes of clarity, therefore, WVONGA suggests the following revision to this provision: "All centralized pits and impoundments shall be enclosed by adequate fencing to secure the site ~~from access by the public and wildlife~~ as specified in this subdivision."

e. **Presumed Abandonment (§ 19.3).** It appears that the reference to W. Va. Code § 22-6A-19 in the first sentence of this subsection properly should reference W. Va. Code § 22-6-19.

f. **Variance for Plug Lengths (§ 19.5).** This provision states that "[a]ll cement plugs, other than those across coal seams, shall be at least [100 feet] in length unless a variance from such a requirement is granted pursuant to section 18 below." This reference to "section 18" is unclear and should be clarified and/or corrected.

g. **Objections to Application to Clean Out and Replug (§ 20.2.b).** The second sentence of this section should be revised as follows: "If such an objection is filed or made, the Chief shall set a hearing date and give notice . . . ."

h. **Forms.** As a general comment, WVONGA notes that certain references to forms throughout the Proposed Rule are either outdated (*see, e.g.,* Section 11.1.a, which references Form WR-39, the "Report of Annual Production," whereas the website provides Form WR-39e, entitled "Report of Monthly Production") or utilize the incorrect form name (*see, e.g.,* Section 20.2.a, referring to Form WW-4 as the "Notice of Intention and Application to Plug and Abandon a Well," although the Form WW-4A on the website is titled "Notice of Application to Plug and Abandon a Well"). Though relatively minor, discrepancies like these should be corrected to minimize the potential for confusion.

WEST VIRGINIA RIVERS COALITION

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July 27, 2015

Jason Harmon, Office of Oil and Gas
Department of Environmental Protection
601 57th Street S.E.
Charleston, WV 25304

Comments on §35CSR8 Proposed Rules Governing Horizontal Well Development
(Submitted via Email to Henry.J.Harmon@wv.gov)

Dear Mr. Harmon,

Please accept the following comments on the Office of Oil and Gas's (OOG) proposed changes to the rules governing horizontal well development.

We support, and these comments are intended to reinforce, the technical comments of The West Virginia Surface Owners' Rights Organization (WV-SORO) and of George Monk and Molly Schaffnit.

In general, we support many of the proposed changes to the rule and commends the agency for its efforts to fill in the gaps in areas such as drilling in karst terrain/areas, promotion of closed-loop systems, and procedures for investigation of migration.

However, we are disappointed that, with the exception of some changes to the sections of the rule regarding construction of centralized pits and impoundments, the agency did not take advantage of this opportunity to implement any of the recommendations mandated by the Act.

We offer the following comments (that reinforce input provided by WV-SORO et. al.) relating to the rule's potential in better protecting water supplies from impacts of horizontal well development activities:

§35- 8 -2.15. "Karst terrain" definition.
The defined term "karst terrain" does not appear anywhere in the rule. Also, the definition uses the word "topography," which generally refers to features on the surface of the earth.

geologic substrata. We suggest that the rule define "karst region" as an area of the state, generally underlain by limestone ... in which the subterranean features are formed ... ."

§35- 8 -5.1.i. Karst region testing.
We support the requirement that testing to be conducted to identify caves and other subterranean features in karst regions be determined and approved by the West Virginia Geologic and Economic Survey. However, we believe that the rule needs to go further and require study and experimentation with drilling techniques before it is permitted in karst areas.

§35- 8 -5.3.e. Notice provisions for permits in karst regions.
We support the requirement that operators applying for permits in karst regions provide notice to the West Virginia Cave Conservancy and the West Virginia Speleological Society either prior to or at the time of filing the application with the OOG. Ideally, notice should be given to these organizations prior to the permit being filed so that they have ample opportunity to provide input and share their knowledge and expertise regarding the protection of these sensitive regions.

§35- 8 -5.5.C.9. Compaction, acceptable moisture range requirements for embankments.
We support the minimum compaction requirements for embankments and the requirement for soil tests to determine an acceptable moisture range.

§35- 8 -5.6.b.6. and 5.6.d. Water Management Plans: Aquifer testing and use of aquifer test data to evaluate appropriateness of water withdrawal rates.
We support the requirement that water management plans include an aquifer test to demonstrate the feasibility of using a water supply well for groundwater withdrawals. We also support the agency's review and use of the aquifer test data to evaluate the appropriateness of water withdrawal rates and maintain minimum stream flow.

§35- 8 -5.6.e. Water Management Plans: Signage at water withdrawal locations.
We support the additional signage requirements for water withdrawal locations and the inclusion of the phone number for the OOG.

§35- 8 -5.6.f. Water Management Plans: Wastewater storage.
We support the requirement that wastewater generated from drilling, fracturing, stimulation and production being re-used for similar purposes at another location must be stored in tanks or in centralized pits subject to more detailed and stringent design and construction standards and operational criteria. In particular, we appreciate the transition to pitless or closed-loop drilling systems and that open pits will no longer be used to store drilling waste on site.

§35- 8 -5.11. Area of Review.

We support and appreciate the addition of this requirement to investigate existing active, plugged and abandoned wells surrounding the proposed well to identify and evaluate potential conduits for fracture propagation and help prevent gas migration. Gas migration can occur because of problems with fracturing, because of initial problems with casing and cementing, and because of deterioration of casing and cementing of existing and new wells over time. The Office needs to investigate and determine the cause of gas migration (including contamination of drinking water supplies, not just "plugged" wells venting) if it occurs, but it's more important to put in place pro-active measures to evaluate existing nearby wells (active, plugged and abandoned) to prevent migration from happening in the first place.

§35- 8 -9.1.a.4. and 9.1.a.5 Water supply wells: Aquifer test and drinking water well testing.

In addition to registering the wells, we support and appreciate the proposed requirement to conduct a detailed aquifer test to ensure that groundwater resources are adequate and that proposed withdrawals from water supply wells will not adversely impact water resources. However, section 9.1.a.4. of the rule uses the phrase "without significant adverse impact." This suggests that some adverse impacts to water resources are acceptable. Our position is that efforts should be made to avoid any adverse impacts.

We also strongly support the requirement that all drinking water wells within 1,500 feet of a water supply well be flow and quality tested by the operator upon request of the drinking well owner and the specifications for how the flow test will be conducted. In the first sentence of section 9.1.a.5. there appears to be a stay "or" after "All drinking water wells." Was it the intention to also include developed springs? If so, we would support this addition to the rule.

We have some additional comments and questions regarding how a drinking well owner would know to request the testing, as there is no requirement in statute or rule that they be notified about the drilling of the supply well (see comments on §35- 8 -15.1. and 15.2 below.)

§35- 8 -9.1.b.2. Signage for water withdrawal locations.

Regarding signage at water withdrawal locations, this section and/or section 5.6, which also addresses signage should be amended so that they are consistent with each other. For example, section 5.6. say the signage shall include the website address for the Office, but this is not mentioned in section 9.1.b.2. Additionally, section 5.6 says the signage shall include "the telephone number of the company conducting the withdrawal" while section 9.1.b.2. says the "telephone number for the operator for which the water withdrawn will be utilized." Since the

company conducting the withdrawal may not be the well operator, both should be required at both places.

§35- 8 -9.1.b. Baseline water testing in karst regions.
We support the requirement that baseline water quality testing be conducted in karst regions prior to commencement of any site construction or well work. Because water resources in karst regions could more easily be disrupted by drilling or surface disturbances than water resources in other areas of the state, these resources should also be flow tested.

§35- 8 -9.2.c.3. Conductor drilling fluid.
Conductor boreholes are so shallow that they do not need to put anything but fresh water down the hole.

§35 - 8 - 9.2.d.2. Freshwater casing standards; Use of additives, risk of damage.
We appreciate the requirements to drill the freshwater casing well bore using only air, fresh water or freshwater based drilling fluids However, we do not know what a freshwater-based drilling fluid is. We presume that is drilling mud. Because there is no casing that is cemented in, this is well known to be the most common time for groundwater pollution to occur. Therefore, we oppose any additives being allowed.

We are concerned about language that says the operator shall use, "practices that minimize damage or disturbance or the possibility of unnecessary damage or disturbance to the un cased strata/formations and groundwater...." We do not think damages should be minimized, they should be prevented. The risk of damage should be minimized, not the damage itself.

Similarly, "unnecessary damage or disturbance" seems to assume that damage may be necessary. We do not accept that assumption. There should be no damage to groundwater except perhaps temporary drainage out of a suspended water table into the borehole.

We support the proposed prohibition on using additives in karst regions when drilling the wellbore for the fresh water casing. We also support the requirement that a cement basket or similar device be used to allow for cementing of the annular space when a well is drilled through a cave void.

§35 - 8 - 9.2.d.10., 9.2.e.5., and 9.2.f.2. Formation Integrity Testing (FIT).
We support the new provisions indicating that a Formation Integrity Test (FIT) may be required by the Chief after the setting of the fresh water protection, coal seam and intermediate casings to establish cement and formation integrity. While this is definitely an improvement to the

current casing and cementing standards, FIT should be mandatory, at least for the fresh water casing, rather than leaving it to the discretion of the Chief. In fact, the American Petroleum Institute (API) recommends the FIT tests for all wells that are hydraullically fractured. We think a bond log should be run on every well – again at least for the surface casing. We understand that the rule contains a number of provisions that are designed and intended to result in a protective casing properly cemented through the fresh water zones. However, nothing in the rule requires a check to see if the goal has been accomplished.

§35- 8 -9.2.h.7. Notification of cementing operations.

The most crucial action for the protection of groundwater is the cementing of the fresh water casing. The most common violation of cementing standards by operators is to fail to wait long enough for the cement to harden before the operator starts drilling again – therefore causing many mini-annuli in the cement job. This provision wisely requires the operator to give notice of the commencement of any casing installation to the inspector.

§35- 8 -9.2.j. Monitoring for leaks and deterioration.

In addition to annual inspections, there should be mandated monitoring for and reporting of leaks and deterioration of casings over time. The current language only requires the operator to conduct an inspection at the surface but does not specify that any type of integrity test be conducted.

§35- 8 -9.2.k. Results of tests should also be available for interested parties.

Surface owners and other interested parties should have access to these tests.

§35 - 8 - 9.3. Closed-loop drilling systems.

We strongly support and appreciate the transition to pitless or closed-loop drilling systems and that open pits will no longer be used to store drilling waste on site or within the permitted limit of disturbance.

§35- 8 -9.4. Monitoring of potential conduits for unintended fracture propagation, communication.

We support and appreciate the addition of this section requiring operators to identify and monitor potential conduits for unintended fracture propagation during the hydraulic fracturing process, and to cease operations if pressures indicate communication has occurred. As noted previously, gas migration can occur because of problems with fracturing, because of initial problems with casing and cementing, and because of deterioration of casing and cementing over time. It is important to monitor potential conduits for unintended fracture propagation to determine if communication or gas migration has occurred, which should also be part of the

rule, but it's more important to put in place pro-active measures to evaluate existing nearby wells (active, plugged and abandoned) to prevent communication (and especially contamination of drinking water supplies) from happening in the first place.

§35- 8 -12.2. Access roads and sedimentation.
Access roads should be constructed and maintained to prevent any sedimentation, not "minimize" sedimentation.

§35- 8 -12.3. Well sites and sedimentation.
Well sites should be constructed and maintained to prevent any sedimentation, not "excessive" sedimentation.

§35- 8 -12.4. Pits and Impoundments Associated with a Well Work Permit.
We support and appreciate that under the proposed rule drillers must use closed-loop drilling systems and that the use of open, on-site pits associated with a well work permit would be eliminated. In keeping with this change, language related to the pits that would no longer be allowed is removed from this section. However, we are concerned about existing permits and pits allowed under permits issued prior to the effective date of the proposed changes. This section (and other sections of the rule pertaining to pits associated with a well work permit) should be written so it is clear that existing/previously permitted pits must meet the requirements specified in the rule, must have proper inspections, must be properly reclaimed and waste stored in the pits must be disposed of properly.

We support the prohibition on construction of impoundments in karst regions.

§35- 8 -15. Water Supply Testing.
We strongly support the requirement that all drinking water wells within 1,500 feet of a water supply well be flow and quality tested by the operator upon request of the drinking well owner.

Testing and presumption of liability should include possible pollution from the lateral/horizontal legs of the well bore.

§35- 8 -15.3.b. Water testing parameters.
We recommend that the following should be added to the list of testing parameters:

-Magnesium, Lead, Strontium, and Potassium: Metals that can help determine whether water quality has been impacted by fracing fluid or brine (in addition to the other metals

on the list). Also, Potassium in particular has been proposed as a possible tracer for fracing fluid contamination.

-Acrylonitrile: An ingredient in fracing fluid and therefore a possible signature of pollution from fracing fluid.

-Acidity, Alkalinity, Hardness: General water chemistry parameters that help provide a general characterization of the water. In addition, some surface water quality criteria are hardness-dependent.

-Gross alpha, Gross beta, Radium-226, Radium-228: Radiological parameters that can help determine whether naturally occurring radioactive materials (NORMs) have made it to the surface. The Department's own sampling has confirmed the presence of NORMs in wastewater from Marcellus Shale wells.

The lack of metals testing is curious since the EPA names them as a test parameter on this page (http://water.epa.gov/drink/info/well/faq.cfm) for when there are gas drilling operations nearby. Lead and the other heavy metals are also listed in an academic study: Swistock, Bryan. 2008. Gas Well Drilling and Your Private Water Supply, Water Facts #28. University Park, PA: The Pennsylvania State University, College of Agricultural Sciences, Cooperative Extension, School of Forest Resources. http://resources.cas.psu.edu/WaterResources/pdfs/gasdrilling.pdf.

§35- 8 -15. Replacement of water supplies.

The rule should include procedures for requiring the operator to replace water supplies that are contaminated, diminished or interrupted by oil and gas operations as specified by the W.Va. Code §22-6A-18.

§35- 8 - 17. Construction of Centralized Pits and Impoundments.

We commend the OOG for proposing additional safeguards for centralized pits that store waste generated by natural gas drilling operations and the steps the OOG has taken in this rule to reduce the use of pits and the problems associated with them. More detailed and stringent design and construction standards and operational criteria for all pits and impoundments are long overdue. However, drilling pits are not necessary and their use poses an unnecessary risk to human health and the environment, no matter how well they are constructed. ***We strongly encourage the Department to eliminate the use of pits for the storage of drilling and hydrauiic fracturing fluids and other drilling waste.***

Absent a strict prohibition on the use of pits, we appreciate that the proposed design and construction standards impose restrictions on where centralized waste pits can be located. We also appreciate that the standards acknowledge the threats pits pose to surface and ground water by requiring dual liners with leak detection and requiring companies to install water quality monitoring wells near the pits. Nevertheless, we have identified a number of shortcomings with the proposed standards. The following comments are drawn from WV-SORO's 2012 comments on the OOG's Design and Construction Standards for Centralized Pits, on which many of the additions to these sections appear to be based. These comments were prepared with the input of surface owners who have experienced problems with pits, including torn liners and leaking of potentially toxic liquids into soils, surface water and groundwater.

§35- 8 -17.2.a. Siting Requirements.

We appreciate the proposed siting restrictions. Such restrictions are long overdue, and we particularly applaud the prohibition of locating pits in karst areas.

Adequate setbacks are needed for the protection of all water supplies (public and private).

While the proposed standards place restrictions on the location and construction of pits relative to perennial streams, consideration should also be given to construction around or the filling of intermittent or ephemeral streams.

§35- 8 -17.2.g. Monitoring.

We appreciate the water quality monitoring provisions of the proposed standards, keeping in mind residents in rural areas who rely on groundwater aquifers for their drinking water. However, in addition to establishing monitoring wells to monitor general groundwater quality over the life of the pits, the standards should also require evaluation of baseline water quality of nearby water wells and developed springs.

§35- 8 -17.2. g.4. Data Analysis, Water Sampling and Testing Parameters.

The proposed standards require the collection of water samples once per calendar quarter. A more frequent sampling schedule would be more meaningful. Conductivity and pH in particular can be easily measured in the field and relatively inexpensive monitors (compared to the cost of establishing the monitoring well) can be deployed to measure and record these parameters on a continuous basis.

Although the minimum parameters are good indicators of possible contamination, they are not regulated by primary drinking water standards. The list of testing parameters should be expanded to include constituents such as heavy metals, chemicals or chemical compounds used

in hydraulic fracturing and naturally occurring radioactive materials (NORMs) known to exist in the Marcellus Shale – constituents DEP's own sampling has shown are present in drilling wastewater.

At a minimum, non-seasonal changes in the parameters specified in the proposed standards should immediately trigger additional sampling and more extensive testing for heavy metals, BTEX and radioactivity. If changes occur, owners of nearby drinking water wells and springs should be notified immediately, and their wells and springs should be sampled and tested for potential contaminants.

§35- 8 -17.5.b. Conformance with Plans, Engineer Certification

We support the additional certification requirements in this section to help ensure that pits and impoundments are constructed in accordance to plan.

§35- 8 -18.3. Spill Pollution Prevention and Control Measures.

This section is permissive on the use of "linings, feltings, paddings, and support boardings of adequate quality." The use of these prevention and control measures should be required ("shall use" rather than "may utilize"). And all the plans should be submitted to the State, not just in the event of prior problems.

Thank you for the opportunity to provide comments on the rule.

Angie Rosser
Executive Director
West Virginia Rivers Coalition