February 27, 2015

COMMENT RESPONSE CONCERNING THE PROPOSED WYOMING AIR QUALITY STANDARDS AND REGULATIONS, CHAPTER 8, SECTION 6, NONATTAINMENT AREA REGULATIONS

The Air Quality Division is taking this opportunity to respond to all comments officially submitted prior to the close of the Air Quality Advisory Board meeting on December 10, 2014.

INTRODUCTION

On December 10, 2014 the Air Quality Advisory Board (Board) met in Pinedale, Wyoming. The Air Quality Division (Division) requested the Board's consideration on proposed changes to Wyoming Air Quality Standards and Regulations (WAQSR), Chapter 8, Nonattainment Area Regulations. Chapter 8, Section 6, Upper Green River Basin existing source regulations, was proposed to establish requirements for existing oil and gas production facilities, and compressor stations, located in the Upper Green River Basin (UGRB) ozone nonattainment area (NAA). As indicated in the October 31, 2014 Public Notice, the public was given 30 days (October 31, 2014 – December 1, 2014) to comment on the proposed WAQSR, Nonattainment Area Regulations. Additionally, verbal and/or signed comments presented to the Division at the December 10, 2014 Board meeting were also included as part of the official public record.

The Division appreciates all the input received from interested parties and stakeholders regarding the proposed regulation. The support, additional information and individual concerns provided within the comments were taken into consideration by the Division and are addressed in this document.

The Division has embarked upon this rulemaking to reduce ozone precursor emissions in the UGRB using strategies well known for resulting in the reduction of pollutants for improved air quality. Holding operators of existing facilities to the same standards as operators of new and modified facilities not only levels the playing field among companies but also helps Wyoming stay at the forefront of sensible oil and gas air regulations.

OVERVIEW OF COMMENTS RECEIVED

During the public comment period, including the Board meeting, the Division received twelve (12) individual comment letters. Comments were received from concerned citizens, industrial proponents, a governmental agency, and environmental advocacy groups.

PROCESS FOR TRACKING PUBLIC COMMENTS

Official comments on the existing source regulation were divided into groups by commenter type; citizens, industrial proponents, governmental agencies, and environmental advocacy groups. The Division analyzed each letter and verbal comment to identify potentially substantive comments. Within each commenter group the letters and verbal comments containing substantive comments requiring a response from the Division were given a unique identifying number (e.g. citizen letter 1 is coded C-1, industrial proponent letter 1 is coded P-1, governmental agency verbal comment is codes V-GA-1, Air Quality Advisory Board verbal comment is V-AB-1, and environmental group 2 verbal comment number 2 is V-EG-2).

CONTENT ANALYSIS ANNOTATION

The Content Analysis process was used to identify substantial comments that may require a response from the Division. Substantial comments are identified electronically on the original correspondence or written transcript from the Board meeting, along with their unique identifier by highlighting individual comments. The letter/written transcript identifier and comment number are annotated in the left or right hand margins of the correspondence. Official comment letters, annotated by the Division, are located in Attachment A of this document.

All official comments received are included under specific headings such as: General Comments or Sections of the proposed regulation. Where possible, comments consisting of similar content have been grouped together by topic with the Division's overarching response following.

OFFICIAL COMMENT LOG

Unique Identifying Number	Date Received	Organization or Individual
C-1	11/21/14	Written Comment - Meredith Taylor
C-2	11/24/14	Written Comment - Dave Hohl
C-3	11/28/14	Written Comment - John Otis Carney, Jr.
C-4	11/28/14	Written Comment - Todd J. Herreid
C-5	11/28/14	Written Comment - Jim Roscoe

Unique Identifying Number	Date Received	Organization or Individual
C-6	11/28/14	Written Comment - Jennifer Wilson
NGO -1	11/26/14	Written Comment - American Lung Association
EG-1	12/1/14	Written Comment - Joint Letter - Environmental Defense Fund, Wyoming Outdoor Council, and CURED
End of Public Notice Comment Period (12/1/14)		
Comments submitted at the Air Quality Advisory Board Meeting (12/10/14)		
V-AB-1	12/10/14	Verbal Comment – Diana Hulme
V-AB-2	12/10/14	Verbal Comment – Klaus Hanson
V-P-1	12/10/14	Verbal Comment – Petroleum Association of Wyoming
P-1	12/10/14	Written Comment – Petroleum Association of Wyoming
V-P-2	12/10/14	Verbal Comment – Jonah Energy, LLC
P-2	12/10/14	Written Comment – Jonah Energy, LLC
V-EG-1	12/10/14	Verbal Comment – Environmental Defense Fund
EG-2	12/10/14	Written Comment – Environmental Defense Fund
V-NGO–1	12/10/14	Verbal Comment – American Lung Association
V-C-1	12/10/14	Verbal Comment – Dave Hohl
C-7	12/10/14	Written Comment – Dave Hohl
V-C-2	12/10/14	Verbal Comment – Jim Roscoe
V-C-3	12/10/14	Verbal Comment – John Anderson
V-P-3	12/10/14	Verbal Comment - Anadarko
V-GA-1	12/10/14	Verbal Comment – Sweetwater County Board of County Commissioners
V-P-4	12/10/14	Verbal Comment – QEP Resources
P-4	12/10/14	Written Comment – Joint Letter - Ultra Resource, Inc. and QEP Resources
V-P-5	12/10/14	Verbal Comment – Williams Field Services
P-5	12/10/14	Written Comment – Williams Field Services
V-EG-2	12/10/14	Verbal Comment - CURED
V-C-5	12/10/14	Verbal Comment – Carmel Kail
V-EG-3	12/10/14	Verbal Comment – Wyoming Outdoor Council

COMMENTS AND RESPONSE

GENERAL COMMENTS AND SUPPORT:

Comment Number(s): C-1-1, C-3-1, C-4-1, C-5-1, C-6-1, EG-1-1, P-2-1, EG-2-1, V-P-1-S, V-P-2-1, V-EG-1-1, V-C-2-1, V-C-3-1, V-P-3-S, V-P-4-S, V-P-5-S, V-EG-2-S , V-EG-3-S

Response:
Proposed rulemaking for the UGRB ozone nonattainment area was first officially announced in June 2014. Since then, the Division has worked diligently with all interested parties to inform and strengthen the proposed regulation. The final iteration of the proposed regulation represents the hard work and collaboration that went into developing a regulation that will protect air quality and foster economic development.

The Division appreciates the overwhelming amount of support the proposed regulation received during the October 31 to December 1, 2014 public comment period, in addition to comments submitted for the record at the December 10, 2014 AQAB meeting. Of eighteen (18) distinct commenters, fourteen (14) provided comment in support of the regulation moving forward in the regulatory process, as proposed on December 10, 2014. Even those previously in strong opposition to the proposed regulation (July 14, 2014) have provided supportive comments, and spoke appreciatively of the additional stakeholder meetings that were held prior to the December AQAB meeting. The Division appreciates the positive comments from interested parties acknowledging the additional outreach and improvements made to the December 10, 2014 proposed regulation.

The Division also recognizes concerns about extending the requirements to include as many emission sources as possible, and has elected to keep the scope of this proposed regulation primarily focused on the same emission sources as those in the State's Chapter 6, Section 2 Oil and Gas Permitting Guidance (September 2013). The proposed regulation will be implemented as a "Permit by Rule," and has been developed to work in conjunction with oil and gas production facility requirements for new and modified sources located in the same nonattainment area. A Permit by Rule is a cost effective, regulatory mechanism that allows states the authority to regulate and enforce requirements on non-complex sources of emissions. As part of the comment review process, the Division revised the title to reflect that the proposed regulation is a "Permit by Rule." The Division determined that the revision provides additional clarity for owners and operators of affected facilities, and is therefore appropriate.

Comment Number (s): V-EG-2-1, C-4-1

RESPONSE:
It is the Division's intent to move the proposed regulation forward through the formal rulemaking process in a timely and effective manner. The proposed regulation is established to help bring the UGRB back into federally designated attainment status for the 2008 Ozone National Ambient Air Quality

Standard (NAAQS). Achieving attainment status would result in improved air quality conditions for citizens who reside in the UGRB.

Comment Number (s): V-C-3-1, V-EG-2-2, V-EG-3-2

RESPONSE:
In formulating the proposed regulation, the Division thoroughly considered input from the Citizen's Advisory Task Force, as well as members of the general public, environmentalist organizations and industry proponents. In order to better position the UGRB towards achieving attainment status and maintain equity amongst operators, the proposed regulation consists of enforceable requirements for existing sources that are no more stringent than the requirements for new and modified sources as permitted under the Chapter 6, Section 2, Oil and Gas Guidance (September 2013).

Comment Number (s): C-3-1, V-GA-1-1

RESPONSE:
The intent of the proposed regulation is to protect the state's air quality, while fostering economic development. In order to better position the UGRB towards achieving federally designated attainment status and maintain equity amongst operators, the proposed regulation consists of enforceable requirements for existing sources that are no more stringent than the requirements for new and modified sources as permitted under the Chapter 6, Section 2, Oil and Gas Guidance (September 2013).

Comment Number (s): C-3-2

RESPONSE:
The Division appreciates the recognition that the proposed UGRB existing source regulation is a "good start" to addressing air pollution in the state of Wyoming. Although the Division is actively engaged in the review of EPA's proposed ozone standard and aware of potential impacts a lower ozone standard may have on the state of Wyoming, the proposed 2015 Ozone NAAQS falls outside the scope of this particular rulemaking.

Comment Number(s): P-4-1

RESPONSE:
As proposed, facilities with an existing permit that includes requirements prepared under the Chapter 6, Section 2, Oil and Gas Guidance (September 2013) may satisfy the requirements of the proposed regulation. The Division has determined that exempting facilities or sources that were permitted under pre-September 2013 guidance does not meet the purpose and intent of the proposed regulation. The Division finds that utilizing a threshold of 4 tons per year (tpy) for existing sources is a technically feasible and economically reasonable way to "level the playing field" between older and new sources. Therefore, the Division is not revising these provisions of the proposed regulation.

Comment Number(s): V-AB-2-1

RESPONSE:
Any PAD and single-well oil and gas production facility or source, or compressor station, is determined to be subject to the proposed Permit by Rule in Subsection (a), Applicability. In State regulation, it is inherent that the owner(s) and/or operator(s) of any affected facility would be responsible for satisfying the requirements of the regulation. The Division has determined that adding the term "by operators" to the suggested Subsections throughout the proposed regulation does not provide additional clarity and will not be incorporated into the proposed regulation.

Comment Number(s): V-P-1-1 through V-P-1-24 **

RESPONSE:
The verbal comments provided by the Petroleum Association of Wyoming (PAW) paraphrase the written comments submitted at the Air Quality Advisory Board meeting. The Division has determined that the written comments provide a more thorough and reasonably clear explanation of PAW's concerns regarding the proposed regulation, and will respond to the written comments only.

***The Division considers its response to PAW's written comments as the most concise and effective way to adequately address PAW's verbal comments; for any questions pertaining to PAW's written or verbal comments, please see the Unique Identifier Number of P-1 in this document.*

PROPOSED REGULATION - APPLICABILITY - SECTION 6 (a):

Comment Number(s): C-2-3, EG-1-4

RESPONSE:
The Division will proceed with the January 1, 2017 compliance date and all of the emission control/reduction measures as proposed. The statutory rulemaking process for a noncontroversial rule can take anywhere from 9-12 months; this regulation has proven to be controversial, and therefore the Division determined that the January 1, 2017 compliance timeframe is a logical and reasonable revision to the proposed regulation.

Comment Number(s): C-2-1, NGO-1-1, EG-1-2, EG-2-2, V-EG-1-2, V-NGO-1-1, V-C-1-1, V-C-5-1, C-7-1

RESPONSE:
The intent and purpose of this proposed Permit by Rule is to control emissions from existing oil and gas sources, and compressor stations, in the UGRB ozone NAA. The regulation was developed as part of the Division's UGRB Ozone Strategy, which incorporates specific recommendations from the Citizens' Ozone Task Force focused on UGRB ozone issues. Therefore, the proposed regulation cannot reasonably be expected to be an effective statewide regulation. Alternative regulatory options for the entire State may be investigated at a future date.

Equipment at a compressor station, including pneumatic controllers, pneumatic pumps, dehydration units and tanks, is already required to go through the State permitting process prior to construction of the facility. The implementation of control equipment, and control technology, at compressor stations is specified by the Chapter 6, Section 2 permit requirements; these compressor station controls are not allowed to be removed.

The Division cannot prescribe the type of control used to meet the 98% manufacturer-design control efficiency for facilities or sources in the UGRB.

Comment Number(s): P-1-2, V-P-3-1

RESPONSE:
The Division has taken this comment into consideration and has made the appropriate revisions to further clarify the intent and purpose of the proposed regulation. The Division has determined that industry would be required to go through the State permitting process to utilize an alternative emission control technology and/or equipment. Proponents would have to make a demonstration through the State permitting process to validate the use of a new technology or equipment.

Comment Number(s): EG-1-5, P-4-5

RESPONSE:
In response to comments requesting clarification of compressor station applicability, the Division has determined that changing the definition of compressor station does not add any value or clarity to the proposed regulation. Compressor stations located at any PAD and/or single-well facility or source are subject to requirements of this proposed regulation based on the Chapter 6, Section 2 permit requirements. Applicability for midstream compressor stations is determined by Subsection (g) of the proposed regulation. It is the Division's intention to maintain consistency with the Environmental Protection Agency's (EPA) definition of compressor station in order to ensure State Implementation Plan (SIP) approvability upon submission to EPA.

PROPOSED REGULATION -DEFINITIONS – SECTION 6 (b):

Comment Number(s): P-1-3

RESPONSE:
The Division has considered the comment requesting that the term "pressurized" be removed from the definition of extended hydrocarbon analysis, and has determined to maintain the definition as written. A pressurized sample input value is necessary in order for the model to run appropriately.

Comment Number(s): V-AB-1-1, P-3-6

RESPONSE:
The Division has made the appropriate revision to the definition of "extended hydrocarbon analysis" to further clarify the intent and purpose of the proposed regulation.

PROPOSED REGULATION - FLASHING EMISSIONS – SECTION 6 (c):

Comment Number(s): P-1-1, P-1-4, P-1-7, P-1-11, P-1-14

RESPONSE:
As stated in the Division's October 31, 2014 Response to Comment, the compliance date has been extended by 1 year to allow ample time for industry to satisfy requirements of the rule. The 1-year compliance timeframe is appropriate for a Permit by Rule, developed to streamline the reduction of VOC emissions from existing sources in the UGRB. The Division does not consider providing a further extension in the rule as appropriate.

Comment Number(s): P-1-5, P-4-2, P-1-24, V-P-3-2, V-P-4-2

RESPONSE:
As stated in the Division's October 31, 2014 Response to Comment, the proposed regulation is designed to require that emergency, open top, and/or blowdown tanks will not be used as active storage tanks. In order to guarantee these storage tanks are used on a temporary basis, the Division has included the requirement that emergency, open top, and/or blowdown tanks be emptied within seven (7) days. The Division has included the requirement to empty the tanks within 7 days in permit conditions pertaining to these sources, and is including it in this regulation to maintain consistency with previously issued Chapter 6, Section 2 permit requirements. It is not the Division's intent, however, to include blowdown tanks in the calculation for emissions due to the nature of this emission source. Additionally, the Division recognizes the practical limitations of emptying a tank based on its design (i.e. drain on the side of the tank). Therefore, if blowdown tanks are utilized in accordance with the requirements of the proposed regulation, it is not necessary to include blowdown tank emissions in the tank emission calculation. It is important to control flashing emissions from storage tanks to help protect public health in an Ozone Nonattainment Area, and therefore this requirement will not be removed from the proposed regulation.

Comment Number(s): P-1-6

RESPONSE:
Use of the term representative in Paragraph (ii)(C)(I) does not add any value or clarity to the proposed Permit by Rule. The Division will rely on the definition of composite extended hydrocarbon analysis.

PROPOSED REGULATION - DEHYDRATION UNITS– SECTION 6 (d):

Comment Number(s): P-1-8

RESPONSE:
The Division appreciates the informational comment regarding the use of inconsistent language between Subsection (d)(ii)(B) and (d)(ii)(C)(III)(1.) within the proposed regulation. The Division determined that it was inappropriate to include the parameters of the emission control equipment as an input for the model to determine emissions from dehydration units. The intent of the proposed regulation is to calculate uncontrolled VOC emissions from dehydration units. Therefore, the Division determined that the removal of the language better satisfies the intent and purpose of the proposed regulation.

Comment Number(s): P-1-9

RESPONSE:
Thank you for the comment and recommended language revision for Subsection (d)(ii)(C)(I). The Division acknowledges that some of the suggested textual changes further clarify the purpose and intent of the proposed regulation, while others do not. The Division has revised the language as appropriate.

Comment Number(s): P-1-10

RESPONSE:
The proposed rule, as written, conveys the same intent as the recommended formatting change. The proposed rule's current format abides by the State of Wyoming's Rules on Rules formatting requirements. Therefore, the Division will not incorporate the recommended changes.

Comment Number(s): P-5-1, P-5-2, V-P-5-1, V-P-5-2

RESPONSE:
The Chapter 6, Section 2, Oil and Gas Guidance (September 2013) for the UGRB was leveraged as a template to formulate a regulatory option that will address emissions from existing oil and gas production sources or facilities and compressor stations in the UGRB Ozone NAA. The proposed regulation is not a codified replica of the Guidance, and this intent was conveyed to stakeholders early on in the rulemaking process (Statement of Basis). Subsection (a), Applicability, determines whether or not a PAD, single well oil and gas production facility or source, or compressor station is subject to the proposed regulation. Provision (a)(ii), states that an affected facility or source is subject to the requirements of this regulation unless a Chapter 6, Section 2 permit has been issued that meets or

exceeds the requirements of the proposed regulation, not the Guidance. The determination of affected source applicability will rely on a proponent-initiated permit comparison between the requirements of the proposed regulation and existing permit conditions. An affected owner or operator would determine equipment applicability using the same operating conditions as approved in their federally enforceable Chapter 6, Section 2 permit.

PROPOSED REGULATION - EXISTING PNEUMATIC CONTROLLERS– SECTION 6 (f):

Comment Number(s): P-1-12

RESPONSE:
The use of the term "no-bleed" was already addressed in previous comments on the proposed regulation and the language was revised. "No-bleed" is not used in the proposed regulation.

Comment Number(s): P-1-13, V-P-3-3

RESPONSE:
The intent and purpose of the proposed regulation is that emissions from pneumatic controllers be controlled by utilizing low or zero-bleed rate controllers. The regulation does not limit operators from using intermittent or continuous bleed controllers as long as the bleed rate is below the 6 standard cubic feet per hour (scfh) threshold. The decision to retain the language proposed by the Division is to ensure that controllers used in the ozone nonattainment area are not emitting more than 6 scfh.

PROPOSED REGULATION - FUGITIVES – SECTION 6 (g):

Comment Number(s): V-P-3-5

RESPONSE:
The Division's intent is that the control system inspection is included in an LDAR protocol, which is consistent with Chapter 6, Section 2 permitting actions for new and modified sources. In the case where an operator is not required to implement an LDAR protocol, the operator would be subject to provision (h)(i)(C), the requirements for inspection of the "control systems."

Comment Number(s): EG-1-5, V-AB-1-2, V-P-3-6

RESPONSE:
Due to requests for clarity concerning Subsection (g)(i)(C), the Division revised the language to clarify the requirements of the LDAR quarterly inspections. The Division's intent is to mirror what is required for

LDAR in Chapter 6, Section 2 permits. In the current Chapter 6, Section 2 permitting process, an AVO inspection alone does not satisfy the requirements necessary for the approval of an LDAR protocol.

Comment Number(s): C-2-2, NGO-1-2, EG-1-3, C-7-2, V-NGO-1-2, V-C-1-2, V-EG-3-1

RESPONSE:
This proposed regulation is designed to be no more stringent than requirements for new and modified sources as permitted under the Chapter 6, Section 2, Oil and Gas Guidance (September 2013). The Division considers a threshold of 4 tpy for existing sources as technically feasible and economically reasonable, while not undermining the permitting process.

Comment Number(s): P-1-14, P-4-3, V-P-4-1

RESPONSE:
The Division has taken this comment into consideration and has made the appropriate revisions to further clarify the intent and purpose of the proposed regulation by changing the representative component count from 100 “similar facilities” to 100 “wells" from the same geographical area. The Division has determined that a representative component count from 100 wells is a justifiable, statistically significant sample size for the UGRB.

Comment Number(s): P-1-15, P-4-4

RESPONSE:
The Division has determined that it is not appropriate to include specific language regarding the inclusion of Emission Inventory Study information in lieu of the requirements under Subsection (g)(ii)(A). To date, the study has not produced results that can be utilized to comply with the proposed regulation. Additionally, not all operators subject to this regulation are participating in the Emission Inventory Study. Inclusion of the Emission Inventory Study information may be better utilized in future rulemaking.

PROPOSED REGULATION – MONITORING, RECORDKEEPING AND REPORTING – SECTION 6 (h):

Comment Number(s): P-1-16

RESPONSE:
The intent of Subsection (h)(i)(C) is that quarterly site evaluations are specific to control systems; the Division has included the term “control” to the regulation text to clarify the intent.

Comment Number(s): P-1-18, P-1-21

RESPONSE:
The Division has taken this comment into consideration and has not made the proposed revision. The suggested change does not meet the intent and purpose of the existing source rule. The intent of Subsections (h)(ii) and (h)(iii) is that recordkeeping and reporting requirements apply to each PAD and single well facility or source, or compressor station, already determined under Subsection (a) to be an affected source. The proposed regulation as written requires that operators determine through a permit comparison which recordkeeping and reporting requirements are applicable for affected sources.

Comment Number(s): P-1-17

RESPONSE:
The Division has taken this comment into consideration and has determined that removal of the language in Subsection (h)(i)(C)(II) is inappropriate. Based on the reasoning for the response to P-1-16, retaining the language in Subsection (h)(i)(C)(II) provides clarity for operators implementing an LDAR protocol and avoids placing duplicative monitoring requirements on those operators.

Comment Number(s): P-1-19, V-P-3-4

RESPONSE:
The Division would like to clarify that the proposed regulation language does not require that operators record a reason for the absence of a "pilot flame," specifically. The Division notes that the recordkeeping requirements in Subsection (h)(ii)(B)(II) regarding control device parameter monitoring operations are in WAQSR, Chapter 6, Section 2 permits. Furthermore, these requirements are no more stringent than recordkeeping requirements for new and modified sources permitted under the Chapter 6, Section 2, Oil and Gas Guidance (September 2013). Maintaining records of parameter downtime, alone, does not provide Division staff with sufficient information to determine compliance with the regulation. The Division concludes that there is an environmental benefit to understanding why a control device monitoring parameter may be absent, and therefore will not revise the language as suggested.

Comment Number(s): P-1-20, P-1-24

RESPONSE:
As previously addressed in the Division's October 31, 2014, Comment Response document, the Division does not consider the recordkeeping requirement in (h)(ii)(D) duplicative. Records generated under Subsection (c)(i)(C)(I), in accordance with WAQSR Chapter 1, Section 5, will satisfy the recordkeeping requirements for emergency tanks in Subsection (h)(ii)(D). Therefore, the recordkeeping requirement in Subsection (h)(ii)(D) will not be removed.

The Division's intent for Subsection (c)(i)(C) is that emergency, open top, and/or blowdown tanks are not to be used as active storage tanks – but may be used for temporary storage. To ensure that these tanks are not utilized as active storage tanks, the proposed regulation requires that the aforementioned tanks are emptied within 7 days. The Division has included the requirement to empty the tanks within 7 days in permit conditions and, consequentially, is also including it in this regulation to maintain consistency with previously issued Chapter 6, Section 2 permit requirements. These requirements are not more stringent than monitoring, recordkeeping and reporting requirements for new and modified wells permitted under the Chapter 6, Section 2, Oil and Gas Guidance (September 2013). Therefore, the Division concludes that if emergency, open-top, and/or blowdown tanks are utilized in accordance with the requirements of the proposed regulation, records satisfying Subsection (h)(ii)(D) are already being generated, and thusly, the recordkeeping requirement is not overly burdensome or duplicative.

Comment Number(s): P-1-22

RESPONSE:
The Division appreciates PAW's comment regarding the request for pneumatic controller(s) bleed rate as being inappropriate. The comment brought to light a typographical error that has been corrected by the Division. The Division's intent is to request the "type" of pneumatic controller(s) installed.

Comment Number(s): P-1-23

RESPONSE:
As addressed in the Division's October 31, 2014 Comment Response document, this comment was taken under consideration and the language was previously revised for clarity. Therefore, the Division has determined that the language in Subsection (h)(iii)(A)(B)(C) and (D) will not be revised a second time.

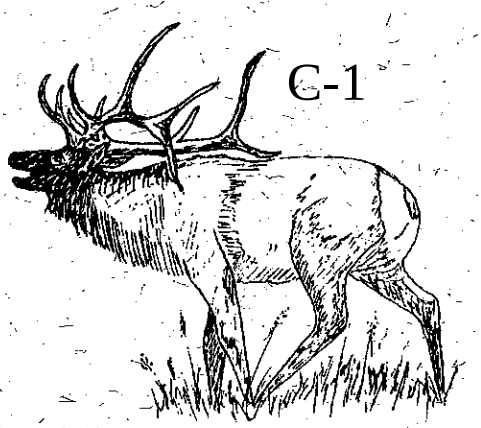
Comment Number(s): V-AB-1-3

RESPONSE:
The Division's intent is a one-time demonstration for control removal. If emissions increase after the one-time demonstration, an owner or operator would be subject to the most current Guidance.

ATTACHMENT A

- C-1 Meredith Taylor
- C-2 Dave Hohl
- C-3 John Otis Carney, Jr.
- C-4 Todd J. Herreid
- C-5 Jim Roscoe
- C-6 Jennifer Wilson
- NGO -1 American Lung Association
- EG-1 Environmental Defense Fund, Wyoming Outdoor Council, and CURED
- P-1 Petroleum Association of Wyoming
- P-2 Jonah Energy, LLC
- EG-2 Environmental Defense Fund
- C-7 Dave Hohl
- P-4 Ultra Resource, Inc. and QEP Resources
- P-5 Williams Field Services Company, LLC.
- V All Verbal Comments

C-1



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Mr. Steven A. Dietrich, Administrator, DEQ/AQD
Herschler Building 2-E 122 W. 25th Street
Cheyenne, Wyoming 82002

November 15, 2014

Dear Administrator Dietrich:

As a business person who makes a living outfitting people in Wyoming's great outdoors I support the proposed Upper Green River Basin source regulations for the ozone nonattainment.

I am the owner of Taylor Outfitting. I have long been concerned about the impacts air pollution can have on our citizens, environment, and wildlife of Wyoming. There is overwhelming scientific evidence linking ozone pollution with adverse health impacts. Taylor Outfitters offers guided wildlife tours and natural history trips. People who are active outdoors are susceptible to air pollution impacts. It also impacts children, older adults, and those with asthma and emphysema limiting the number of people who can enjoy everything our state has to offer.

C-1-1

Wyoming has the most scenic views in the nation, but air pollution threatens this when from oil and gas pollution mixes with other gases to create smog and reduce visibility. Our guests want to enjoy and photograph Wyoming's landscapes that we love, so ozone impacts our business.

Air pollution and ozone affects vegetation, ecosystems, and human health. Ozone exposure increases animal and plant susceptibility to disease and insect damage.[1] The effect of ground-level ozone on trees is believed to add up over many years and affect entire forest ecosystems. Ozone can also kill or damage leaves, decreasing the natural beauty of the area.[2]

DEQ must address air pollution in the Upper Green River Basin with rules as strong as possible and effective as soon as possible. Please adopt the proposed Upper Green River Basin existing source regulations in Section 6 of the Wyoming Air Quality Standards and Regulations, Chapter 8, Nonattainment Area Regulations. Improving air quality is not only fundamental to protecting the health of Wyoming citizens and the environment it is critical to our business. Thank you for your consideration.

Sincerely,

Meredith Taylor

Meredith Taylor, Owner
Taylor Outfitters
6360 US Highway 26
Dubois, WY 82513

[1] Accessed via http://www.epa.gov/groundlevelozone/ecosystem.html. November 6, 2014.
[2] Accessed via http://www.epa.gov/rgytgrnj/air/quality/o3health.htm. November 6, 2014.

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November 20, 2014

Steven A. Dietrich, Director
DEQ/AQD
Herschler Building 2-E, 122 W 25th Street
Cheyenne, WY 82002

Dear Mr. Dietrich:

I would like to submit the following comments on the revised existing source rules for the Upper Green River Basin (UGRB) to be submitted to the Air Quality Advisory Board on December 10 2014.

I applaud the Air Quality Division's extensive efforts to take public comments and to consider them in this current revision of the proposed rules. These revisions are contributing to increasing the effectiveness of reducing emissions and providing healthier air for those living in the UGRB.

C-2-1

There are a few areas where additional improvements can be made. The rules have been revised to include leak detection and repair (LDAR) on Compressors. This leaves many other sources of emissions related to compressor stations including engines,pneumatic pumps and controllers, dehydration units, and other devices without the benefit of the improvements required of them at well sites. I would like to see the rule require controls on emissions for the entire compressor station rather than only a specific elements of the facility.

C-2-2

The 4 ton per year (tpy) threshold for LDAR, flashing emissions, dehydration units, etc. leaves 97% of the facilities, and 87% to 95% of the emission from those facilities unregulated as their emissions are below 4 tpy. While the emissions from any given facility is small, the large number of these facilities result in a large cumulative volume of emissions in the basin that are not controlled. In essence with a 4 tpy threshold the rule accomplishes only a marginal reduction in emissions at best whether applied to older facilities, or new or modified facilities.

Conversely a rigorous LDAR program has the potential to provide many benefits in addition to the principal concern of healthy air. Leaks are essentially a wasted resource. Companies do not get to sell it, and state and county governments do not receive severance or royalty funds from it. Companies do not have to pay for the publicly owned resource they waste. Once in the pipe efforts should focus on keeping it there so we all benefit from the resource.

Various companies in the UGRB place varying levels of emphasis on their LDAR programs. Those with the most rigorous programs have a routine inspection and repair program regardless of leak volumes, and feel it is cost effective. If a volume figure is required for some regulatory purpose it should be low - 1/2 to one tpy at most. The rule should focus on detectable leaks so they can be fixed rather than volumes below or over a prescribed threshold so they can be excepted.

C-2-3

Lastly is the newly proposed implement date of January 1, 2017, a year later than originally proposed. In 2012 the Upper Green River Valley Ozone Task Force submitted two recommendations dealing with controls on existing facilities. Industry has been aware for over two years that rules for their facilities were coming. January 1, 2016 provides a reasonable time for companies to accommodate the specific rules. Some companies are currently conducting LDAR at a level compliant with the proposed regulations including my recommendations.

Thank you for the opportunity to participate in the formulation of these rules.

Sincerely,

Dave Hohl

Dave Hohl

cc: Matt Mead, Governor
cc: Wyoming Air Quality Advisory Board
cc: Casper Star-Tribune
cc: WyoFile
cc: Pinedale Roundup

John Otis Carney, Jr.
5655 N. Fish Creek Road
Wilson, Wyoming 83014

November 20, 2014

Mr. Steven A. Dietrich
Administrator, DEQ/AQD
Herschler Building 2-E
122 W. 25th Street
Cheyenne, Wyoming 82002

Re: Support the proposed changes to the Wyoming Air Quality Standards and Regulations, Chapter 8, Nonattainment Area Regulations, Section 6.

Dear Administrator Dietrich:

I am writing to express my support for the proposed changes to the Upper Green River Basin existing source regulations for the ozone nonattainment area. The Wyoming Department of Environmental Quality Air Quality Division should ensure the rules are as strong as possible and cover as many emission sources as possible.

I moved to Wyoming in 1992. I was drawn to Wyoming for the same reasons many of us have relocated here, but in my case included a family ranch in Sublette County that my father purchased in 1963. For business reasons I chose to live in Teton County to start my architectural practice where I saw the beginnings of a period of growth that I thought would allow me to build my practice. I have served as a Teton County Commissioner and have been a member of the Teton County Planning Commission. Through these roles I came to fully understand the importance of air quality not only for the health and well-being of our citizens and the environment but also to protect our local economies. C-3-1

A nonattainment designation can hinder economic growth. Counties that are in "non-attainment" for ozone are restricted in their ability to attract new businesses. Businesses whose operations could contribute to the air pollution will have a harder time receiving air quality permits so long as the county is in nonattainment. The regulatory changes will help clean up the air in the region, paving the way for new investment and growth. Wyoming has long talked about diversifying our economy. Being in nonattainment will severely limit these chances.

The Environmental Protection Agency is currently in the midst of conducting its regularly scheduled review of the ozone standard. EPA intends to propose a new ozone NAAQS in December 2014 and finalize the standard in late 2015. It is anticipated that once again a standard will be proposed within the range of 0.060-0.070 ppm, consistent with the recommendations of the Clean Air Scientific Advisory Committee.

If the EPA adopts standards that are in the range of 0.060-0.070 ppm, ten Wyoming counties could exceed federal air quality standards for ozone pollution. These counties include Laramie, Campbell, Converse, Natrona, Fremont, Sweetwater, Uinta, Carbon, Sublette, and Teton counties. We must act on air pollution in the state. C-3-2

Wyoming needs to lead on this issue. The proposed changes to the Upper Green River Basin existing source regulations for the ozone nonattainment area are a good start and will show our determination to address air pollution in our state. I ask that you adopt the proposed Upper Green River Basin existing source regulations and cover as many sources as possible in Section 6 of the Wyoming Air Quality Standards and Regulations, Chapter 8, Nonattainment Area Regulations.

Sincerely,

John O. Carney, Jr.

Cc: Jim Roscoe
File

Todd J. Herreid
530 Sundance Drive
Green River, WY 82936
(307) 875-3221

November 18, 2014

Mr. Steven A. Dietrich
Administrator, DEQ/AQD
Herschler Building 2-E
122 W. 25th Street
Cheyenne, Wyoming 82002

Dear Administrator Dietrich:

As the former Executive Director of the Castle Rock Hospital District in Green River, I have long been concerned about the health impacts of air pollution on the citizens of Wyoming.I was encouraged to see the Wyoming Department of Environmental Quality Air Quality Division propose existing source regulations for the Upper Green River Basin ozone nonattainment area.Any adopted rules should cover as many emissions sources as possible and be implemented as soon as possible in order to ensure the safety of Wyoming residents.

Air pollution can have devastating health consequences. Infants, children, and older adultsare especially susceptible to air pollution. Ozone decreases lung function, makes lungs more susceptible to infection, aggravates asthma, emphysema, and chronic bronchitis, damages cells that line the lungs, and causes permanent lung damage. Infants and children are also at risk for developmental reasons, including prenatal health impacts.[1] Adults who are active outdoors are also at risk from elevated levels of air pollution. This is of considerable concern given the fact that many Wyomingites are avid sportsmen and women.

Methane contributes to the concentration of ground-level ozone. Lowering emissions of air pollutants from natural gas and oil operations will minimize health impacts. At a time when people are concerned about the costs of health care, improving air quality can decrease avoidable hospital admissions and emergency room visits.The Wyoming Department of Health reported a rise in clinic visits in Sublette County due to increased ozone levels.[2]This alone should prove the importance of DEQ's proposed rules. As the EPA looks to impose stricter ozone standards,Wyoming should look to be a leader and adopt regulations that protect the health of our citizens today. Wyoming should not wait for EPA to protect the health of those who call Wyoming home.

C-4-1

Public health should be a top priority of the Department of Environmental Quality.I ask you to adopt the proposed Upper Green River Basin existing source regulations in Section 6 of the Wyoming Air Quality Standards and Regulations, Chapter 8, Nonattainment Area Regulations. Given the fact that improving air quality is fundamental to protecting the health of Wyoming citizens, DEQ should also look at expanding these standards to cover the entire state.

Air pollution is a critical public health issue. It is imperative that we protect the quality of life we have come to enjoy in Wyoming. Thank you for your consideration on this important matter.

Sincerely,

Todd J Herreid, MBA
Former Executive Director, Castle Rock Hospital District

[1] Salam MT, Millstein J, Li Y-F, Lurmann FW, Margolis HG, Gilliland FD. Birth outcomes and prenatal exposure to ozone, carbon monoxide, and particulate matter: results from the children's health study. Environ Health Perspec 2005; 113: 1638-1644.
[2]Forslund, Thomas. 2013. Associations of Short-Term Exposure to Ozone and Respiratory Outpatient Clinic Visits-Sublette County, 2008-2011. Wyoming Department of Health.

November 23, 2014

Mr. Steven A. Dietrich
Administrator, DEQ/AQD
Herschler Building 2-E
122 W. 25th Street
Cheyenne, Wyoming 82002

Support for the adoption of Wyoming Air Quality Standards and Regulations, Chapter 8, Nonattainment Area Regulations, Section 6.

Dear Administrator Dietrich:

I represented the upper Green for 4 years in the Wyoming Legislature from 2008 until 2012. I was on the minerals committee when you first spoke to us. I saw firsthand the importance of natural gas to the states revenues. I think we actually saw $13 gas, & watched it go below $3. I also saw the chaotic development of the Jonah & Anticline field development and the drastic degradation of the air quality in my district. Pushing for more use of natural gas while in the Legislature, as transportation fuel & heating fuel I found that state wide and even nationally there was very good support for the uses of natural gas, but objections to the way it was developed. Public opinion was very negative about the air quality and possible water contamination. No one wanted to live next to a developing field, which I do.

There has been very good improvement in the field development, reduced truck traffic, new fuel gathering systems, less venting but there is still an abundance of fugitive emissions. Better monitoring techniques are available but not being used.

I feel strongly that if air quality is improved around one of the larger gas fields in the country and the upper Green is restored it will in the long run benefit the natural gas industry, Wyoming revenues and promote better acceptance of natural gas as a clean inexpensive fuel for the country.

– C-5-1 –

I am writing to express my support for the changes proposed by DEQ to the Upper Green River Basin existing source regulations for the ozone nonattainment area. Rules need to be adopted that produce the best possible outcomes for the citizens of the Upper Green River Basin.

I have lived in Wyoming for over 43 years. I am a Wyoming businessman and an avid outdoorsman. In 1992, drawn by the clean air, solitude, and scenic beauty of the area, I bought a ranch in Sublette County. Unfortunately I have watched air quality deteriorate over the last decade. That fact that the EPA has designated the Upper Green River Basin in nonattainment for ozone is troublesome for numerous reasons.

First, increased ozone levels hurt public health. Ozone is particularly harmful to the elderly, children, and those suffering from asthma and other chronic lung diseases. It is also harmful to active adults who spend considerable time outdoors. In Sublette County that likely represents the majority of people who work, 'play' and live here.

Second, a county found to be in nonattainment will be severely limited in its efforts to attract new industry and employers. Businesses which require air quality permits may not be able to obtain them so long as the area is in nonattainment. Regulations must be adopted and enforced that

acknowledge this reality; they are needed if we are going to look for new opportunities that will diversify our economy and move the region forward.

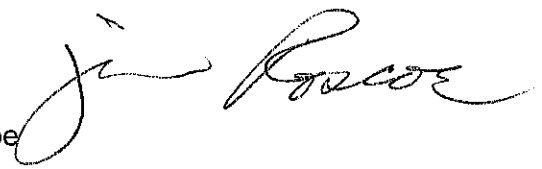
Third, addressing the pollution from leaks that lead to harmful ozone formation also keeps more natural gas (primarily methane) in pipelines for companies to sell. Methane leaks cost the state considerable revenue. According to EPA data reported by the oil and gas companies themselves, about 140,000 metric tons of methane was emitted from Oil and Gas Production activities in Wyoming in 2013, an amount that is estimated to be worth approximately $25-$30 million dollars. The proposed changes to the regulations could ensure that Wyoming's resources are not wasted but instead are being used to best serve our citizens.

Lastly, addressing air quality will protect the very reason most of us call Wyoming home. The clean air, clear mountain views, and unpolluted environment make Wyoming a unique and special place to live. Addressing air pollution in the UGRB nonattainment area is long overdue.

Improving local air quality is too important of an issue to delay any further. Public health, local economic opportunity, and the very nature of Wyoming are at risk. I ask the department to adopt rules which will protect people, our economy and our way of life. The proposed Upper Green River Basin existing source regulations in Section 6 of the Wyoming Air Quality Standards and Regulations, Chapter 8, Nonattainment Area Regulations are a step in the right direction. I urge the DEQ to ensure the rules cover as many emission sources as possible.

The two Governors I served under both said they believe that we in Wyoming should develop our natural resources responsibly and on our own terms. I think this is a perfect time to do just that. Clean up the air in the upper Green river valley with our own rules which would help to keep the EPA off our back.

Sincerely,



Jim Roscoe

November 21, 2014

Mr. Steven A. Dietrich
Administrator, DEQ/AQD
Herschler Building 2-E
122 W. 25th Street
Cheyenne, Wyoming 82002

Dear Administrator Dietrich:

I am writing to express my support for the changes to the Upper Green River Basin existing source regulations for the ozone nonattainment area. I strongly feel that air quality is an important issue and I want to ensure that the life we enjoy in Wyoming is protected. Rules need to be adopted that produce the best possible outcomes for the citizens of the Upper Green River Basin and our environment.

I am the Vice President of the Circle Nine Ranch in Boulder, WY. Our ranch has been in the family for nearly 50 years. I raised my two daughters in the community. In Wyoming we value our scenic beauty, clean air, and clear mountain vistas. Unfortunately, in the time I have lived here, I have seen a significant deterioration of the air quality. We used to be able to see the mountains in sharp relief against the crystal blue sky. That is no longer the case. We are losing the very thing that makes Wyoming a great place to live. C-6-1

Along with the loss of visibility my family has experienced health problems due to declining air quality. My mother struggled with breathing problems for the last several years of her life. One of my sisters cannot visit for more than a few days before she is forced to leave due to the air quality. As an active and avid outdoors woman I also worry about air quality and the health impacts of pollution. I spend a considerable amount of time in the mountains. My husband and I are dedicated to our health. People who are active outdoors are susceptible to ozone pollution. Most Wyoming residents live and work outdoors. I want to make sure my family is being protected when we spend time experiencing everything Wyoming has to offer. Additionally there is evidence that the pollution that is encapsulated in the rain is having a large impact on the microbial life in the soil in the mountains, which in turn effects the health of the wildlife that bring so many tourism dollars into Wyoming.

We can protect the scenic beauty of Wyoming and public health at the same time by adopting the proposed Upper Green River Basin existing source regulations in Section 6 of the Wyoming Air Quality Standards and Regulations, Chapter 8, Nonattainment Area Regulations. Please work to protect the environment we all depend on and adopt these rules and make sure they are providing the best protection for our state as possible.

Sincerely,

Jennifer Wilson
62 Ridge Road
Lander, WY 82520

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NOV 26 2014

AIR QUALITY DIVISION

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November 25, 2014

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AIR QUALITY DIVISION

Mr. Steven A. Dietrich
Administrator, DEQ/AQD
Herschler Building 2-E
122 W. 25th Street
Cheyenne, Wyoming 82002

Via fax: 307-777-5616 and U.S. Mail

Dear Administrator Dietrich:

As the country's preeminent organization committed to saving lives by improving lung health and preventing lung disease, we strongly urge the Wyoming of Department of Environmental Quality Air Quality Division to adopt changes to Wyoming Air Quality Standards and Regulations (WAQSR), Chapter 8, Nonattainment Area Regulations. This process represents an important opportunity to protect public health in the Upper Green River Basin (UGRB). Adopting the proposed regulations establishing requirements for existing oil and gas production facilities and compressor stations located in the UGRB ozone nonattainment area, with the suggested modifications identified below, will better protect the health of people living in that area. For these reasons we believe the proposed rule should be approved at the Air Quality Advisory Board meeting on December 10 in Pinedale.

Health studies show that exposure to high levels of ozone pollution (commonly referred to as "smog") leads to lung problems; causes respiratory harm, such as worsened asthma and worsened chronic obstructive pulmonary disease, including emphysema and chronic bronchitis; causes increased susceptibility to infections and other respiratory ailments; is a leading cause of hospital visits, especially among children; and is linked to cardiovascular harm (e.g., heart attacks, strokes, heart disease, and congestive failure), central nervous system harm, reproductive and developmental harm, and even premature deaths.

The American Lung Association has long advocated measures to protect Americans from breathing dangerous levels of ozone pollution. All available strategies, including regulation, should be employed as necessary to protect the public health against acute and chronic adverse

health effects. The American Lung Association is especially concerned about the effects of air pollution on the health of vulnerable populations, including people with lung diseases such as asthma, lung cancer, and chronic obstructive pulmonary disease (COPD), the elderly, and children. Currently nearly 132 million people across the U.S. live in counties where monitors show unhealthy levels of ozone or particulate pollution. Unfortunately one of the counties is Sublette County, Wyoming, in the heart of the Upper Green River Basin ozone nonattainment area.

The unhealthy ozone levels in Sublette County have, for the past several years, led to failing grades in the American Lung Association's annual "State of the Air" reports. At times, ozone levels in Sublette County have exceeded those in Los Angeles, California. A recent study by the Wyoming Department of Health documented an increase in clinic visits for adverse respiratory-related effects on particularly smoggy days in Sublette County.[1] Reducing ozone pollution is an important public health issue and we are glad to see the Wyoming DEQ make a serious attempt to better protect local citizens in its proposed rules.

Ozone pollution is created by an interaction between two different kinds of air pollutants, oxides of nitrogen and volatile organic compounds. Oil and gas development is a significant source of both of these air contaminants. In fact, oil and gas development is the largest emission source for these pollutants in the Upper Green River Basin's Sublette, Lincoln, and Sweetwater counties.

The Department's proposal to reduce harmful emissions from local oil and gas facilities and to restore healthy, clean air to the residents of Sublette, Sweetwater, and Lincoln counties is strong in several aspects. We support the DEQ's proposed requirements at well sites to replace both continuous and intermittent high-bleed pneumatic controllers with low or no-bleed ones. We support the proposed requirement for 98% control of flash emissions from storage tanks, separation vessels, and glycol dehydrators, as well as the elimination or 98% reduction of pneumatic pump emissions. We also strongly support the proposed quarterly instrument-based leak inspections at well sites and compressor stations included in the most recent draft rules.

NGO-1-1

However, the department could realize even more pollution reductions (and thus greater public health benefits) by further utilizing proven, highly cost effective technologies and practices that in many instances save operators money. To ensure the AQD fulfills its mandate to eliminate pollution and enhance the air quality in the basin, as well as protect the public health, we recommend the following further improvements:

- **Extending *all* pollution reduction requirements the state has proposed for wells sites to compressor stations.** By addressing pneumatic controllers, pumps, and dehydration

1

[1] State of Wyoming, Dept. of Health, Associations of Short-term Exposure to Ozone and Respiratory Outpatient Clinic Visits-Sublette County, WY, 2008-2011 (March 1, 2013)

NGO-1-2

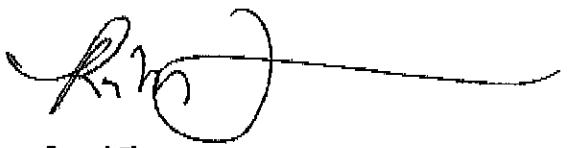
units at the compressor stations, the Department could realize even more cost-effective pollution reductions.

- **Extending the requirements for quarterly, instrument-based leak inspections to more sources of emissions**. If the proposal were adopted as currently drafted, many of the wells in the Upper Green River Basin would fall below the four ton-per-year emissions threshold the state has proposed for quarterly inspections. The state's rules would therefore only apply strong, regular leak inspections to a small percentage of the sources in the basin. A lower, more inclusive, threshold will capture more sources and reduce more pollution, since regular leak inspections, together with timely and effective repairs, are one of the best ways to reduce harmful ozone pollution in our air.

Reducing emissions of air pollutants from natural gas and oil operations is crucial to minimizing health impacts to Wyoming citizens. We urge you to adopt the proposal with the improvements noted above.

Thank you for your efforts on this critical public health issue.

Sincerely,



Ronni Flannery
American Lung Association of the Mountain Pacific
936 S. 2nd Street, West
Missoula, MT 59801
(406) 215-5700

EDF ENVIRONMENTAL DEFENSE FUND
Finding the ways that work

Wyoming Outdoor Council

December 1, 2014

Mr. Steven A. Dietrich
Administrator, DEQ/AQD
Herschler Building 2-E
122 W. 25th Street
Cheyenne, Wyoming, 82002

VIA Regular Mail and Facsimile

Re: Comments on October 2014 Proposed Revisions to Department of Environmental Quality, Air Quality Division, Chapter Eight, Section Six Requirements for Existing Oil and Gas Production Facilities or Sources in the Upper Green River Basin.

Dear Mr. Dietrich:

Thank you for accepting these comments submitted by Environmental Defense Fund ("EDF"), Citizens United for Responsible Energy Development ("CURED"), and the Wyoming Outdoor Council ("WOC"). EDF is a national membership organization with over one million members residing throughout the United States who are deeply concerned about the pollution emitted from oil and natural gas sources. WOC is the state's oldest independent conservation organization and has worked for more than four decades to protect Wyoming's environment and quality of life for future generations. CURED is a Pinedale based advocacy group and member of the state's ozone task force.

We greatly appreciate the Air Quality Division's ("AQD") continued efforts to put in place rigorous clean air measures to protect the health and way of life of citizens living in the Upper Green River Basin ("UGRB"). We believe the proposal rests on a very strong foundation of commonsense, cost effective and proven pollution control measures and commend the Agency for the recent improvements and clarifications contained in the October draft. In particular, we strongly support the extension of the quarterly instrument-based leak detection and repair ("LDAR") measure to compressor stations. For these reasons we believe this proposed rule should be approved at the Air Quality Advisory Board meeting on December 10 in Pinedale.

However, as detailed in our comments below, we believe room remains to improve the protectiveness and workability of the proposal. Data and studies from the UGRB and other basins clearly demonstrate that elevated levels of volatile organic compounds ("VOCs") emitted from oil and gas activities contribute to harmful ozone pollution.[1] Reducing these pollutants is necessary to restore healthy air to the citizens of Pinedale and surrounding communities. Indeed, in light of the Environmental Protection Agency's ("EPA") recent announcement that it will propose lowering the National Ambient Air Quality Standard for ozone to between 60 to 70 parts per billion, realizing all available cost effective reductions is necessary and prudent.

The points we submit for your consideration are:

1) We support the quarterly instrumented inspection requirement for fugitive emissions at compressor stations;
2) However, we request that control requirements apply to pneumatic pumps, pneumatic controllers, storage tanks, and glycol dehydrators located at compressor stations as well as to well sites;
3) We also request the AQD lower the control threshold for fugitive emissions, to two (2) rather than four (4) tons per year ("tpy") of VOCs in order to realize additional cost effective pollution reductions;
4) We do not object to the delayed compliance date provided the Department of Environmental Quality ("DEQ") retains the quarterly instrument-based LDAR requirement for compressor stations; and
5) We request that AQD make the following clarifications in the proposed regulatory language or in the final Statement of Basis Document:
   a. that the proposal applies to all natural gas compressor stations located in the UGRB, regardless of what segment of the natural gas supply chain they belong to; and
   b. that an operator must use an instrument-based method to conduct all four of the quarterly leak detection inspections at well sites and compressor stations; audio, visual, olfactory (AVO) methods standing alone at any of the four quarterly leak detection inspections are not sufficient to meet the terms of the rule.

I. Leak Detection and Repair to Address Leaking Equipment at Compressor Stations

We support the provision requiring quarterly instrument-based inspections of fugitive emissions at compressor stations. As we demonstrated in our comments on the initial

[1] Field, R. A. et al. (2014) "Air quality concerns of unconventional oil and natural gas production." Environmental Science: Processes & Impacts, Vol. 15, 954-969, doi: 10.1039/C4EM00081A. Available at: http://pubs.rsc.org/en/content/articlelanding/2014/em/c4em00081a#!divAbstract; Edwards, P. M., et al., (2013) "Ozone photochemistry in an oil and natural gas extraction region during winter: simulations of a snow-free season in the Uintah Basin, Utah." Atmos. Chem. Phys., 13, 8955, doi:10.5194/acp-13-8955-2013. Available at www.atmos-chem-phys.net/13/8955/2013/; Edwards et al., (2014) "High winter ozone pollution from carbonyl photolysis in an oil and gas basin." Nature, 1, doi:10.1038/nature13767.

proposal, quarterly inspections are highly cost effective, required in multiple other jurisdictions, and are a critical component of an effective overall emissions reduction program.[2]

Based on the most recent DEQ inventories, leaking components are one of the largest sources of emissions at compressor stations. In 2011 and 2012 they accounted for approximately 25% of VOC emissions at compressor stations.[3] At the national level, fugitive emissions from reciprocating compressors are projected to be the largest source of onshore oil and natural gas methane emissions in 2018.[4] Other types of leaks from compressors, such as centrifugal compressor seal and reciprocating rod packing, are also among the largest sources of emissions from onshore activities.[5] Requiring quarterly inspections at compressor stations has the potential to reduce these emissions by 60%.[6] A 60% reduction from the fugitive emissions reported to DEQ for calendar year 2012 would remove 241 tons of VOCs from the atmosphere.

As we noted in our initial comments, the actual emissions addressed and reductions realized from expanding LDAR to compressor stations may be much larger given that the estimation methods operators use when reporting emissions likely underestimate actual emissions. When reporting emissions for inventory purposes operators use emission factors that represent the average leak rates for various types of components (e.g., flanges, connectors, pumps, valves). These emission factors, by nature, do not account for atypical leak rates that can be caused by inadequate maintenance or operation or improper design.

A number of studies support our view that actual emissions may be significantly greater than estimated emissions. For example, the University of Texas ("U.T.") production study, a national study using direct measurement, rather than estimation methods, found that measured fugitive emissions were 38% higher than estimated emissions reported to EPA.[7] "Top-down" studies that analyze the concentration of methane and other constituents of natural gas in the air in and near oil and gas producing regions have also found significantly higher emissions than inventory estimates. Studies done in 2012 in Utah's Uintah Basin and Colorado's Denver-Julesberg Basin found leak rates significantly higher than what one would expect based on EPA's Greenhouse Gas ("GHG") Inventory Rule. Specifically, scientists determined that 6-12% of the average hourly natural gas production was leaking in Utah[8] while 4.1 ± 1.5% of the gas produced in Colorado was leaking.[9] Reports submitted

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[2] EDF/WOC/CURED July 11 Comments to Mr. Steven A. Dietrich, p. 6, incorporated herein.
[3] *Id.* at 6 (citing 2011 inventory data); DEQ-AQD-Emission Inventory-Composite-Annual-2012-UGRB-Public-Emissions-Inventory.xlxs.
[4] ICF, Economic Analysis of Methane Emission Reduction Opportunities in the U.S. Onshore Oil and Natural Gas Industries, Fig. 3-4 (March 2014) ("March ICF report").
[5] *Id.*
[6] EDF/WOC July 11 Comments (citing ICF for the proposition that quarterly instrumented inspections have the potential to reduce equipment leaks by 60%).
[7] Allen, D.T., et al, (2013) "Measurements of methane emissions at natural gas production sites in the United States," Proc. Natl. Acad. Sci. 2013, 110 (44), 17768-17773; DOI: 10.1073/pnas.1304880110.
[8] Karion, A., et al. (2013) "Methane emissions estimate from airborne measurements over a western United States natural gas field." Geophysical Research Letters, Vol. 40, 4393-4397, doi: 1-.1002/grl.50811. Available at: http://onlinelibrary.wiley.com/doi/10.1002/grl.50811/full.

to EPA indicate that a little less than 1% of the gas produced in the country is lost due to leaks.[10] Some of the disparity between national and regional leak rates can be explained by the differences in the local regulatory frameworks. Utah, for example, requires little in the way of controls and therefore one would expect to find more gas lost due to venting, flaring and equipment leaks than in states with more robust pollution controls required. Nevertheless, the results of these "top-down" studies indicates that the Wyoming UGRB emission inventory may underrepresent actual emissions from existing sources in the Basin, and the U.T. Production Study suggests this may be particularly true for fugitives. Given this data, efforts to control fugitive emissions at compressor stations, as is proposed, are warranted.

A recent study performed by EPA in the Pinedale area suggests one possible explanation for the discrepancy between emission inventory estimates and measured emissions. The study utilized a mobile monitoring method to quantify short-term methane emission rates at 210 oil and gas production sites in the Pinedale Basin, as well as Denver-Julesburg (CO) and Barnett (TX) basins. Mobile monitoring allows for measurement of maintenance-related emissions as well as elevated short-term emissions such as tank flashing.[11] The study used a multivariate linear regression to assess the relationship of emissions to well age, gas production, and hydrocarbon liquids production. According to the authors:

> methane emissions were positively correlated with gas production, but only approximately 10% of the variation in emission rates was explained by variation in production levels. The weak correlation of emission rates with production rates indicate that *maintenance related stochastic variables and design of production and control equipment are factors determining emissions.*[12] (emphasis added).

Perhaps even more important for this proposal, the authors also noted that older wells may be more prone to these random emission events. Per the authors:

> Maintenance issues (e.g., fugitive leaks, open or leaking thief hatches, failed pressure relief devise, malfunctioning separator dump valves) could be more prevalent at smaller older production sites than at higher producing sites that are potentially better maintained and may have fundamentally different engineering designs (e.g., use of buffer tanks to suppress tank emissions).[13]

These studies demonstrate the need for frequent instrumented inspections at oil and gas facilities such as compressor stations and well sites, in particular at older, existing facilities.

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[9] Petron, G., et al., (2014) "A new look at methane and non-methane hydrocarbon emissions from oil and natural gas operations in the Colorado Denver-Julesburg Basin," J. Geophys. Res. Atmospheres, 119, 6863. Available online at: http://onlinelibrary.wiley.com/doi/10.1002/2013JD021272/abstract.

[10] Calculated based on national emissions reported to EPA 2012 Greenhouse Gas Inventory.

[11] H.L. Brantley, et al, "Assessment of Methane Emissions from Oil and Gas Production Pads Using Mobile Measurements," at 3, Exh. 1.

[12] *Id.* at 1-2.

[13] *Id.* at 18.

As we have previously noted, frequent inspections of facilities is one of the most cost effective ways to identify unintentional and unpredictable leaks. ICF estimates that the net cost of quarterly inspections at compressor stations is only $912 at compressors in the gathering and boosting segment.[14] For those compressor stations located in the processing and transmission segments, the gas savings exceed the costs making the implementation of quarterly LDAR a net money maker for companies. Per ICF, quarterly inspections at these facilities have a negative cost of $1,438 and $6,399.[15]

EG-1-1

In addition, as the Department has recognized, a number of companies in the UGRB already inspect their compressor stations quarterly.[16] Holding other operators to the same standards as these leading companies not only levels the playing field among companies but also helps Wyoming retain its position as a leader in clean air practices for the oil and gas industry. So again, we support the proposed regulations for fugitive emissions sources, in particular the new requirement that LDAR be required at compressor stations.

II. Common Sense Measures to Reduce Venting at Compressor Stations

EG-1-2

As we noted in our initial comments, equipment leaks are not the only source of pollution at compressor stations. Based on the 2012 inventory, pneumatic controllers and pumps, dehydrators and tanks contributed an additional 242 tons of VOCs in the UGRB. As noted above, actual emissions are likely higher.

The Division has proposed sensible, cost effective requirements to reduce emissions from these sources when located at a well site. It is equally feasible to control these sources when located at a compressor station. Indeed, recent rules adopted by the Colorado Air Quality Control Commission make no distinction between controls required at well sites and those required at compressor stations.[17] Colorado requires the identical control requirements for existing high-bleed pneumatic controllers, storage tanks, glycol dehydrators and fugitive emissions located at compressor stations as those at well sites.[18] Importantly, the Colorado rule applies not only to the state's ozone nonattainment area, but to operations throughout the state. A recent ICF report that evaluated some of the most

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[14] March ICF report at 3-12. This assumes net costs of $6,017 annually coupled with net gas savings of $5,105, assuming gas at $4 per Mcf.

[15] *Id.*

[16] WY AQD Comment Response Concerning the Proposed Wyoming Air Quality Standards and Regulations, Chapter 8, Section 6, Nonattainment Area Regulations (Oct. 31, 2014).

[17] *See* 5 C.C.R. 1001-9, CO Reg. 7, §§ XVII-XVIII (Feb. 24, 2014).

[18] *Id.* at §§ XVII.C. (tank controls for tanks located at natural gas compressor stations and well production facilities); XVII.D.3. (glycol dehydrator control requirements for dehydrators located at natural gas compressor stations and oil and gas exploration and production operations); XVIII (pneumatic retrofit requirements for controllers located at natural gas compressor stations and well production facilities); *see also* XVII.F. (LDAR requirements for natural gas compressor stations and well production facilities. The specifications of the LDAR requirements are the same, although the tiers dictating the inspection frequencies vary between well sites and compressor stations.)

cost effective technologies and practices for reducing emissions from onshore oil and gas activities similarly made no distinction between controls available for equipment located at well sites versus other facilities including compressor stations.[19]

Reducing emissions from pneumatic controllers, pumps, tanks, and glycol dehydrators located at compressor stations can be attained cost effectively. Retrofitting high-bleed controllers with low-bleed ones is one of the most cost effective air pollution reduction steps an operator can take as it pays for itself in less than a year and half[20] and results in net gas savings of $3.08 and $0.58 per Mcf of natural gas produced, depending on whether the controller is a continuous or intermittent bleed controller, respectively.[21] As we noted in our July comments, replacing a natural gas driven pneumatic pump with an electric one also yields significant gas savings of $0.22/Mcf for chemical injection pumps and $4.57 per Mcf for Kimray pumps.[22]

While we feel that flaring is wasteful and should be limited to the greatest extent possible, the practice can be effective in some limited cases as a pollution control method. According to the Colorado Air Pollution Control Division, installing a flare on a storage tank is a highly cost effective way to reduce pollution. Installing a flare on a condensate tank yields an average cost effectiveness of $716 per ton of VOC reduced while using the same control technology to control emissions from crude oil or produced water tanks is cost effective at $427 and $715 tons per VOC reduced, respectively.[23] Colorado also analyzed the cost effectiveness of requiring existing glycol dehydrators with at least six tons of uncontrolled actual VOCs to control these emissions by 95% using a flare. The Colorado APCD found this strategy also to be highly cost effective at $632 per ton of VOC reduced.[24]

We urge the DEQ to extend the proposed requirements for pneumatic devices and pumps, glycol dehydrators and tanks located at well sites to compressor stations as well in order to realize these additional cost effective and feasible emission reductions.

III. Realizing Additional Air Contaminant Reductions by Addressing A Greater Percentage of Covered Sources

The AQD proposal leaves significant (and inexpensive) emissions reductions on the table by limiting the control requirement for fugitives to facilities with 4 tpy of VOC emissions, or greater, from these sources. The Statement of Basis indicates that only 3% of facilities with fugitive emissions will be affected by the proposal at the 4 tpy level. The Statement of Basis does not differentiate between controlled versus uncontrolled sources. Therefore, it may

[19] See March 2014 ICF report.
[20] Colorado Air Pollution Control Division, Final Cost-Benefit Analysis for Proposed Revisions to AQCC Regulations No. 3 and 7, 9-10 (Feb. 7, 2014).
[21] March ICF report at 3-16.
[22] EDF/WOC July comments at 8.
[23] Colorado Air Pollution Control Division, Final Cost-Benefit Analysis for Proposed Revisions to AQCC Regulations No. 3 and 7, 9-10 (Feb. 7, 2014).
[24] *Id.* at 34.

EG-1-3

underestimate the number of facilities potentially affected by the proposal's 4 tpy threshold since controlled emissions are significantly lower than uncontrolled emissions and therefore are likely to fall below the 4 tpy threshold.

To obtain an alternative perspective on the likely impact of the proposal, we obtained copies of AQD well site permit analyses for all well sites in Sublette County from 2007 to 2014. The permit analyses contain information on the potential uncontrolled fugitive emissions.[25] Our analysis of the information contained in these permits also demonstrates the proposal will apply to only a small percentage of facilities and emissions in the basin, underscoring the need to lower the applicability threshold for the LDAR requirement.

We reviewed each of these 500 permit analyses, noting the fugitive emissions above and below 4 tpy and summing the total emissions estimated for each facility.[26] Based on our review of the permit analyses, a 4 tpy of VOCs threshold for fugitive emissions will only affect 16-17% of facilities and 54% of emissions.[27] In contrast, lowering the threshold to 2 tpy of fugitive VOCs will capture 36%-40% of facilities and 85% of fugitive emissions. Note, these are conservative estimates in that a number of facilities, and therefore emissions, are already implementing at least quarterly inspections as part of voluntary directed and inspection maintenance programs or are required to conduct quarterly inspections pursuant to guidance issued by DEQ in 2013. Thus, the actual impact of the proposal is likely smaller, meaning a smaller percentage of facilities will likely have to implement an LDAR program (because some already are), and thus a smaller percentage of uncontrolled emissions will be affected.

As we have previously noted, requiring frequent inspections of facilities coupled with expeditious repair times is a critical component of an effective pollution reduction program and lowering the control threshold for the LDAR requirement to 2 tpy of VOCs is highly cost effective at $647 per ton of VOC reduced.[28] We strongly urge DEQ to lower the applicability

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[25] We limited the data set to well sites in Sublette County rather than the entire UGRB NAA since the Division maintains records at the county rather than partial county level. Therefore, obtaining permit analysis for sites in those parts of Lincoln and Sublette County that are part of the NAA was overly burdensome.

[26] We recognize there are certain limitations and uncertainties in the data. One, the permits may not represent facilities or emissions outside Sublette County. Two, some of the facilities have been modified since the time the original analysis was done and thus emissions may have changed. We did not attempt to identify modifications. Three, the analysis does not take into account any subsequent LDAR implemented due to voluntary programs or mandatory permit requirements. However, even with these limitations, we believe the permit analysis presents a credible way to estimate the impact of the proposal on existing facilities and emissions.

[27] See EDF analysis, attached hereto as Exhibit 2. The range in the potentially affected facilities, and emissions, turns on whether or not one counts permits that did not contain an actual numeric estimate for fugitive emissions. Some permit analysis simply noted that the fugitive emissions would be "insignificant." The lower range of potentially affected facilities and emissions includes the permits with "insignificant" emissions and assumes such emissions are less than 4 tons per year. The higher range excludes those permits.

[28] See EDF/WOC July Comments at 5. Indeed, even a 1 Tpy threshold is well within the bounds of traditional regulatory cost effectiveness metrics. Using the same approach we took to estimate the cost effectiveness of a 2 Tpy threshold, we estimate the cost effectiveness of requiring quarterly LDAR inspections at well sites with 1 tpy of fugitive VOCs to be $2,263 per ton of VOC reduced, assuming $75 in recovered gas.

threshold for LDAR to 2 tpy of VOCs in order to realize additional cost effective pollution reductions.

IV. Delayed Implementation is Acceptable Only if DEQ Retains the Improvements Contained in the October Draft

EG-1-4

The current October proposal extends the compliance deadline for affected sources to January 1, 2017, in response to industry comments. This is one year later than the initial proposal provided for. As we stated at the July hearing on the June proposal, immediate reductions in air contaminant emissions are necessary to restore healthy air to the citizens of Pinedale and surrounding communities and we urge the AQD to require such reductions as expeditiously as possible. Nevertheless, we acknowledge the Division's attempts to respond to differing stakeholder concerns and recognize that the October proposal includes elements requested by both industry (extended compliance date) and environmental organizations (LDAR for compressor stations). In recognition of the Division's attempts at equity, and in an effort to get a final rule in place as quickly as possible, we are willing to accept the January 1, 2017 compliance deadline ***provided*** it is coupled with the improvements the Department has proposed herein, specifically, the quarterly instrumented LDAR program for compressor stations. The additional pollution reductions that will accrue due to this requirement will go a long way towards cleaning up the air in the UGRB, and therefore provide somewhat of a counterweight to the protracted implementation schedule. Without this important requirement, however, we strongly object to any delays beyond the initially proposed January 1, 2016 compliance deadline.

V. Clarifications

We appreciate the clarifications to the rule that the AQD made in the October draft and the Response to Comments document. In particular, we are pleased that the Response to Comments document explained that produced water tanks are subject to the proposed 98% control requirement and that intermittent bleed devices are subject to the retrofit requirement. We are also pleased the AQD has made the availability of replacing a natural gas powered pump with an electric one an explicit compliance option in the proposal. These clarifications add to the workability and enforceability of the rule.

EG-1-5

Compliance and enforcement could further be enhanced by clarifying two remaining provisions. The first is the definition of a compressor station. It is our understanding that the AQD's intent is to require quarterly LDAR at all compressor stations located in the UGRB. This would include those located in the natural gas storage and transmissions segments, as well as those located in the production and processing segments. We do not believe that the current definition makes this clear. The current definition is taken from EPA's New Source Performance Standards for the oil and natural gas sector.[29] Importantly, while EPA requires controls for compressors in the production and processing segments, it declined to extend these requirements to compressors in the storage and transmission

[29] 40 C.F.R. § 60.5430.

segments when it finalized the NSPS rule in 2012. EPA has since signaled the possibility of extending these controls to the "downstream" compressors located in the storage and transmission segments.[30] We maintain that such controls, including LDAR, should be equally applicable to such compressors and support AQD's intent to include such compressors in the proposed LDAR requirement. We request AQD make this intent clear in the Statement of Basis or in the rule language. Possible regulatory language could be the addition of the following text in bold to the current definition:

> "Compressor station" means any permanent combination of one or more compressors that move natural gas at increased pressure from fields, in transmission pipelines, or into storage, **located in the production, processing, transmission or storage segment of the natural gas supply chain."**

The second clarification we request is to the LDAR provision for fugitives. The current language states that all LDAR protocols must include a monitoring schedule "no less frequent than quarterly" consisting of "Method 21, an optical gas imaging instrument, other instrument-based technologies, audio-visual-olfactory (AVO) inspections, or some combination thereof", but that "an LDAR Protocol consisting of only AVO inspections will not satisfy the requirements of this Subsection."[31] Our understanding of this provision is that it requires operators use an instrument-based technology for each and every one of the four inspections each year. This is what is required for new and modified sources in the UGRB. AVO could be used in addition to the four instrument-based inspections. We request the AQD confirm that all four of the quarterly inspections must be done with instrument-based technologies. One option would be to revise the proposed regulatory text to state explicitly that operators must use instrument-based technologies to perform all four of the quarterly inspections. Another option would be to clarify this intent in the final Statement of Basis.

Thank you for accepting these comments. We look forward to working with the AQD and the Air Quality Advisory Board to finalize the proposal expeditiously in order to implement the necessary pollution reduction measures required to restore healthy air to the residents of the Upper Green River Basin.

Respectfully submitted,

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[30] U.S. EPA Office of Air Quality Planning and Standards White Papers: *Oil and Natural Gas Sector Compressors*; (Apr. 2014), http://www.epa.gov/airquality/oilandgas/whitepapers.html; Climate Action Plan Strategy to Reduce Methane Emissions (Mar. 2014), http://www.whitehouse.gov/sites/default/files/strategy_to_reduce_methane_emissions_2014-03-28_final.pdf.

[31] Proposed revisions to WY DEQ AQD REGS Ch. 8, Sec. 6(g)(i)(A)-(D) (Oct. 24, 2014).

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Exhibit 1

Assessment of Methane Emissions from Oil and Gas Production Pads using Mobile Measurements

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KEYWORDS. Methane, Oil and Gas, Fugitive Emissions, Mobile Measurements

ABSTRACT. A mobile methane emissions inspection approach, EPA draft Other Test Method (OTM) 33A, was developed, validated, and used to quantify short-term methane emission rates from 210 oil and gas production pads in Texas, Colorado, and Wyoming from 2010 to 2013. Emission rates were log-normally distributed with geometric means of 0.33, 0.14, and 0.59 g/s in the Barnett, Denver-Julesburg, and Pinedale basins, respectively. Although the OTM 33A method focused on sites with emission rates above 0.01 g/s and allowed for measurement of elevated short-term emissions (i.e., condensate tank flashing) and maintenance-related emissions; overall distributions were similar to those observed in recent onsite direct measurement studies. Considering data across all basins, a multivariate linear regression was used to assess the relationship of methane emissions to well age, gas production, and hydrocarbon liquids production. Methane emissions were positively correlated with gas production, but only approximately 10 % of the variation in emission rates was explained by variation in production

levels. The weak correlation of emission rates with production rates indicate that maintenance-related stochastic variables and design of production and control equipment are factors determining emissions.

Introduction

Environmentally responsible development of oil and gas assets requires an understanding of atmospheric emissions of methane (CH_4) and other organic pollutants as well as their potential impact on local and regional air quality and greenhouse gas budgets. Emissions are associated with many different processes in upstream (well development and production) and midstream (transportation and storage) oil and gas activities[1, 2]. Although differing in profile, emissions occur in all phases of well construction, drilling, and completion, and continue as part of the ongoing production processes. Emissions from upstream oil and gas production pads can be difficult to measure and model due to temporal variability and the large number of potential sources[3, 4]. Production pad emission profiles depend on a variety of factors including the geological formation, equipment design and maintenance state, and on operational procedures. For example, fugitive and vented emissions from atmospheric-pressure condensate storage tanks are a significant potential source of emissions and can be challenging to measure and control[5, 6]. Production pad emissions can also change over time as wells age and production levels and pressures change. Improving our understanding of emissions from production sites requires a combination of approaches, including estimating emissions using engineering calculations for inventories[2, 7, 8], direct measurements for refinement of emission and activity factors[9], and inspection techniques to inform departures from nominal operations and support compliance activities[10].

Direct (onsite) measurements can provide information on component-level emissions, but are resource intensive, requiring site access and special safety considerations. Furthermore, the high site-to-site variability decreases the probability of obtaining a representative sample from a small number of sites. To complement direct measurement approaches, a number of research groups are investigating the use of mobile inspection techniques to locate and assess emissions from off-site observing locations[3, 11, 12, 13]. These emerging approaches vary with respect to execution requirements and emission estimation techniques; however, their mobile nature facilitates identification of unknown emission sources (e.g., pipeline leaks) and anomalous operating conditions (e.g., malfunctions). Unlike direct measurements, mobile approaches typically cannot isolate specific emission points and are generally less precise than direct measurements but are comparatively easier to implement, simultaneously measure emissions from an entire production pad, and enable measurements to be made at a greater number of locations.

This paper describes the mobile inspection approach, EPA draft Other Test Method (OTM) 33A[16], and its use to generate CH_4 emission rate data from oil and gas production sites in the Denver-Julesburg (DJ) Basin, the Barnett Shale, Pinedale, and Eagle Ford from 2010-2013. In addition to the analysis of repeated measurements at 9 sites, the emission estimates from the OTM 33A field studies were compared with recent on-site studies led by the Eastern Research Group (ERG)[14] and Allen et al.[15]. The ERG study[14], conducted for the City of Fort Worth, TX, used both direct measurement and source estimation methods to characterize CH_4 and organic compound emissions at 388 production sites containing wells, produced water storage tanks, separators, and compressors. Component-level source identification in the ERG study[14] was accomplished by infrared camera observations and direct source measurements were conducted using Hi Flow samplers (Bacharach Inc., New Kensington, PA), toxic vapor analyzers, and

evacuated canisters. The measurements were used by the City of Fort Worth to evaluate the adequacy of setback provisions for production pads and compressor stations. The results of the ERG study[14] indicated that compressors, leaking tank thief hatches, and pneumatic valve controllers are the most frequently encountered and significant emissions sources of CH_4. Using similar on-site source measurement techniques, Allen et al.[15] measured CH_4 emissions from 150 production sites in four regions of the United States to evaluate engineering estimates of methane emissions from natural gas production that are used in national inventories. Their results indicated that emissions from pneumatics and equipment leaks were higher than estimated in the EPA greenhouse gas (GHG) emissions inventory[15].

Methods

OTM 33A[16] is a mobile inspection approach used to locate sources and determine real-time emission rates with screening-level accuracy (± 60 %), without the need for site access or location-specific modeling. The technique is applicable to select oil and gas sources such as roadway proximate well pads located in relatively open areas. In addition to downwind vehicle access and favorable plume transport conditions required for all mobile assessment methods, the emission characterization portion of OTM 33A relies on relatively consistent meteorological conditions, obstruction-free line of sight observation, and a knowledge of the distance to the source[16].

The OTM 33A equipment configuration used either a G1301-fc cavity ring-down spectrometer (Picarro, Inc., Santa Clara, CA, USA) or a GG-24-r off-axis integrated cavity output spectrometer (Los Gatos Research Inc., Mountain View, CA USA) as CH_4 concentration measurement instruments (CMIs). The mobile measurement platforms were sports utility vehicles containing the CMI, computer control system, and lead-acid batteries to allow operation

with the engine turned off. The vehicles were fitted with rotatable front-mounted masts with a height of 2.7 m that allowed the CMI probe and meteorological instruments to be located away from the body of the vehicle. Primary wind field data were acquired using model 81000V Ultrasonic Anemometers (R.M. Young, Inc., Traverse City, MI, USA). A collocated compact auto-north weather station (model AIO 102780, Climatronics Corp., Bohemia, NY, USA) provided secondary wind data along with temperature, atmospheric pressure, and relative humidity measures. Location was recorded using a Hemisphere Crescent R100 Series GPS system (Hemisphere GPS, Calgary, AB Canada). Collocated with the CMI probe, a user-triggered solenoid allowed acquisition of nominal 30 second evacuated canister grab samples. A LabView™ (National Instruments, Inc., Austin TX, USA) computer program time-aligned the data stream while allowing user control of the system.

For a typical production pad assessment, emissions were located through downwind, drive-by inspection, keying on sharply elevated CH_4 spikes indicative of proximate source plumes. Maximizing real-time CH_4 concentrations measured by the CMI, the vehicle was positioned in the plume at a safe and appropriate downwind observing location with the probe facing the source, and the engine was turned off. Distance from the measurement vehicle to the emission source ranged from 10 m to 200 m with an average distance of 57 m. Data were acquired for a 15- to 20-minute time period with the vehicle remaining stationary. In some cases, evacuated canister samples (triggered at high CH_4 concentration levels) were acquired to provide speciated data on co-emitted compounds. Auxiliary data from infrared cameras (FLIR Systems, Inc., Boston MA, USA), when available, helped identify the source location, facilitating measurements of the distance from the mobile platform to the source using a laser range finder.

Distances were later confirmed through Google Earth™ images coupled with wind-concentration rose data. The vehicle was positioned to minimize line-of-sight wind flow obstructions.

Emission rate estimates were calculated using a point source Gaussian (PSG) approach with a custom MATLAB™ (MathWorks, Natick, MA, USA) analysis program[16]. This approach relies on variations in wind direction to move the plume around the observation location in three dimensions; further assumptions include a point source and Gaussian plume dispersion. The analysis software time-aligned the measurements to correct for sampling line delay, rotated the 3-D sonic anemometer data to polar coordinates centered on the predominant wind direction, and binned the CH_4 concentrations by wind direction data in ten degree increments. The results were fitted with a Gaussian function to determine the average peak CH_4 concentration in the plume. Background concentrations were determined during time periods with no plume-probe overlap. The program calculated the representative atmospheric stability indicator (ASI) from an average of the turbulence intensity (TI), measured by the 3D-sonic anemometer and the standard deviation in 2-D wind direction ($\sigma\theta$), acquired by the compact meteorological station. By defining a seven unit ASI scale with steps of equal increments (TI = 0.025, $\sigma\theta$ = 4.0°), an ASI value for each measurement was assigned which ranged from 1 (TI > 0.205, $\sigma\theta$ > 27.5°) to 7 (TI < 0.08, $\sigma\theta$ < 7.5°), roughly corresponding to the Pasquill stability classes A through D[17]. For the PSG emission estimate, the values of horizontal (σy) and vertical (σz) dispersion are determined from an interpolated version of point source dispersion tables using the measured source distance and the ASI. The PSG emission estimate (q) is a simple 2-D Gaussian integration (no reflection term) multiplied by mean wind speed (u) and the peak concentration (c) determined by the Gaussian fit: $(q = 2\pi \cdot \sigma y \cdot \sigma z \cdot u \cdot c)$[16].

131 A set of 107 controlled CH_4 release experiments were conducted to investigate data quality
132 indicators and the expected accuracy range for the PSG approach in relatively obstruction-free,
133 open areas as encountered in this study. The experiments used single point releases from slightly
134 dispersed, mass flow-controlled cylinders of 99.9% CH_4 cylinders, performed at a variety of site
135 locations, observation distances, and under a range of atmospheric conditions[16]. Release rates
136 ranged from 0.19 g/s to 1.2 g/s with the majority of values at approximately 0.6 g/s. Based on
137 these experiments, a primary set of three data quality indicators was identified: (1) fitted peak
138 CH_4 concentration centered within +/- 30 degrees of the source direction; (2) an average in-
139 plume concentration greater than 0.1 ppm; and (3) a Gaussian fit with an $R^2 > 0.80$. The plume
140 centering indicator helps ensure the identity of the upwind source and can protect against off-axis
141 interfering sources and poor plume advection conditions. The concentration limit helps protect
142 against insufficient plume transport and the R^2 indicator helps identify interfering sources and
143 obstructed wind flow conditions (non-Gaussian transport).

144 The percent error ([estimated emission rate-release rate]/[release rate]) of the controlled release
145 experiments that met the data quality criteria ranged from -60% to 52% with 72% of the
146 measurements within +/- 30%. Without application of the data quality indicators, the set of
147 release experiments produced accuracy values ranging from -87% to 184% of actual. The 184%
148 overestimate was believed to be due to pooling and release under partially stagnant conditions
149 and a trial wind variance indicator was developed for this case (not observed in field trials).
150 Factors affecting accuracy can include insufficient plume advection and non-representative
151 concentration profiles caused by near-field obstructions or poor plume-to-probe overlap.
152 Potential data quality indicators such as wind speed and plume concentration statistics are being
153 investigated as part of OTM 33A method development[16]. For the current analysis, only

154 measurements that met the three primary criteria were included (representing 77% of the
155 controlled release measurements and 71% of the field measurements).

156 OTM 33A was used in eight two-week field campaigns in four oil and gas production basins:
157 Colorado DJ Basin, July 2010 and 2011; Texas Barnett shale, Sept. 2010 and 2011; Texas Eagle
158 Ford Shale, Sept. 2011; and Wyoming Pinedale, which includes the Pinedale Anticline and Jonah
159 fields, June 2011, July 2012, and June 2013. Datasets for each individual basin were combined
160 as the methods of data collection were similar, although there were some software and hardware
161 improvements in later studies. All measurements were collected in the daytime on days with no
162 significant precipitation.

163 Oil and gas production information for the counties sampled was obtained from DI Desktop
164 (Drillinginfo, Austin, TX, USA). Included in the dataset were well type, operator, first
165 production date, spatial coordinates of the well, and annual and monthly hydrocarbon liquids,
166 gas, and water production levels. OTM 33A measurements were spatially matched with
167 production data using aerial imagery (Google Earth[18] and ArcGIS[19] base maps). When
168 coordinates did not align with aerial imagery, additional datasets provided by the State of TX[20]
169 and State of CO[21] were used to cross-reference location information. Monthly production values
170 were available for 81 % of the measurements. When monthly production was not available,
171 annual values were converted to monthly estimates. The matched dataset was analyzed using R[22]
172 and ArcGIS 10[19].

173 Both emissions estimates and production values were log-normally distributed and for this
174 reason, figures are shown on a log scale. The mean and standard error of the log-transformed
175 data were calculated using a non-parametric bootstrap[23, 24] and then transformed back into the
176 original scale. To compare OTM 33A emissions estimates with the direct measurement studies

177 conducted by ERG[14] and Allen et al.[15], direct measurements were converted from CH_4 scfm into
178 g/s using a molar volume of 40.87 m^3 mol^{-1} and summed by site. Measurements from the ERG
179 study[14] were matched with the corresponding monthly production values from DI Desktop
180 (Drillinginfo, Austin, TX. USA) based on the recorded Entity ID. Production values for the sites
181 measured by Allen et al.[15] were reported by the well operators to the study team.

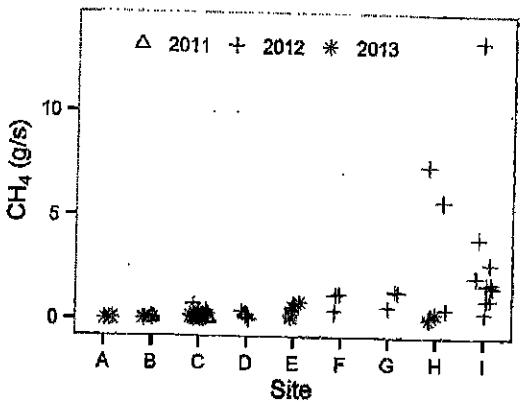
182 **Results and Discussion**

183 **Description of sites with repeat measurements**

184 The OTM 33A mobile inspection approach was used to identify and assess CH_4 emissions
185 from roadway proximate well pads with an average in-plume concentration > 0.1 ppm. No
186 attempt was made to measure or statistically account for well pads with apparently low (and thus
187 difficult to measure) emissions. In many cases, infrared camera videos (examples in
188 Supplemental B) acquired from off-site observing locations, simultaneously with the CH_4
189 measurements, helped to identify specific emission sources. Storage tank-related emissions were
190 frequently observed. The emission rate data and video examples presented here may not be
191 representative of the full population of sources emitting currently over the selected minimum
192 measurement rate due to engineering advancements, changes in work practices, and the
193 implementation of new state regulations.

194 To improve understanding of both technique and source variability, repeat measurements
195 (three or more) were made at 9 sites in the Pinedale Basin, with the number of measurements per
196 site ranging from 3 to 21 (Table S1). The consistent winds and lack of obstructions in the
197 Pinedale Basin create favorable conditions for OTM 33A. Measurements were made in different
198 years at four of these sites (Figure 1), and the time between measurements ranged from < 1 day
199 to 732 days (Table S1). Geometric means and 95 % confidence intervals were calculated using a

200 non-parametric bootstrap. For sites A-G, the 95 % confidence interval for the mean was less than
201 1 g/s while at sites H and I, large variations in emissions were observed, resulting in confidence
202 intervals ≥ 2 g/s (Table S1).



203

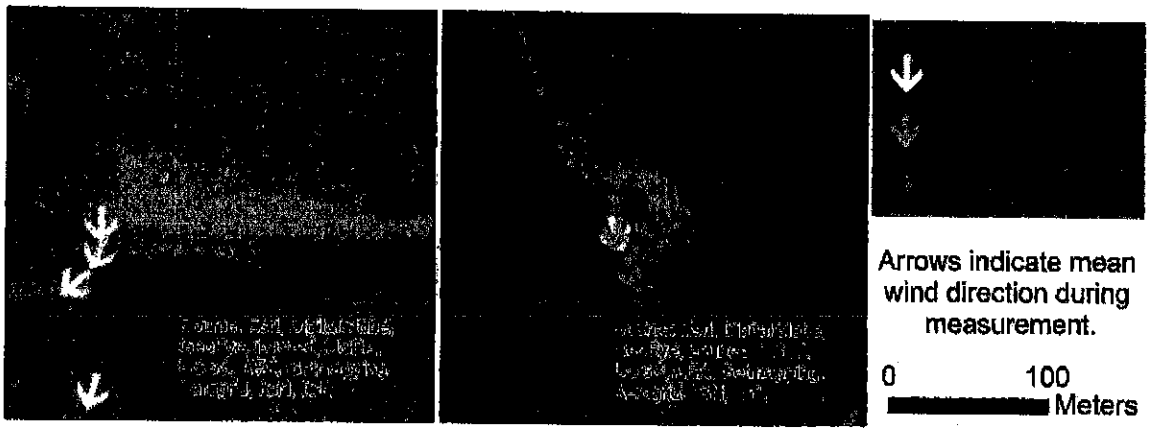
204 **Figure 1.** CH_4 emission rates (g/s) measured at repeated sites by year.

205

206 The results indicate that while low emissions (< 2 g/s) frequently persist over time, the larger
207 emissions observed using OTM 33A are likely episodic in nature. One source of persistent low-
208 level emissions observed with the infrared camera is believed to be a vented produced water tank
209 at Site C (Video S1). Previous studies have shown that flashing from a condensate tank after a
210 separator dump can result in episodic large emissions[6]. CH_4 emissions greater than 2 g/s were
211 observed at 13 % of the 210 unique sites measured. The variability of emission rates at sites H
212 and I indicates that these larger emissions may be episodic events that cannot be used to infer
213 annual emission rates without a greater understanding of their frequency and duration (Figure 1).
214 Site I was measured on four separate days in 2012. On each of the days, the emissions
215 appeared to originate from the same tank. Infrared videos indicate that all of the emissions > 3.0
216 g/s occurred during the time period that a thief hatch on a condensate tank was open (Video S4,

217 Video S5, and Video S6). On the last day the site was measured, the thief hatch was closed and
218 the measured emissions seemed to originate from a pressure relief device and were < 3.0 g/s
219 (Video S7).

220 Another potential cause of variation in emissions levels is the variability in plume capture.
221 Depending on meteorological conditions, the plume measured can include all of the sources on
222 the pad or only some of the sources (Figure 2). Measurements were made at Site H on three days
223 in 2012 and one day in 2013 (four and two independent emission measurements, respectively).
224 The higher emissions observed were only present on one of the days in 2012 and originated from
225 the tank on the north side of the pad (Video S2) while the smaller emissions seemed to originate
226 from the southern edge of the pad (Video S3).



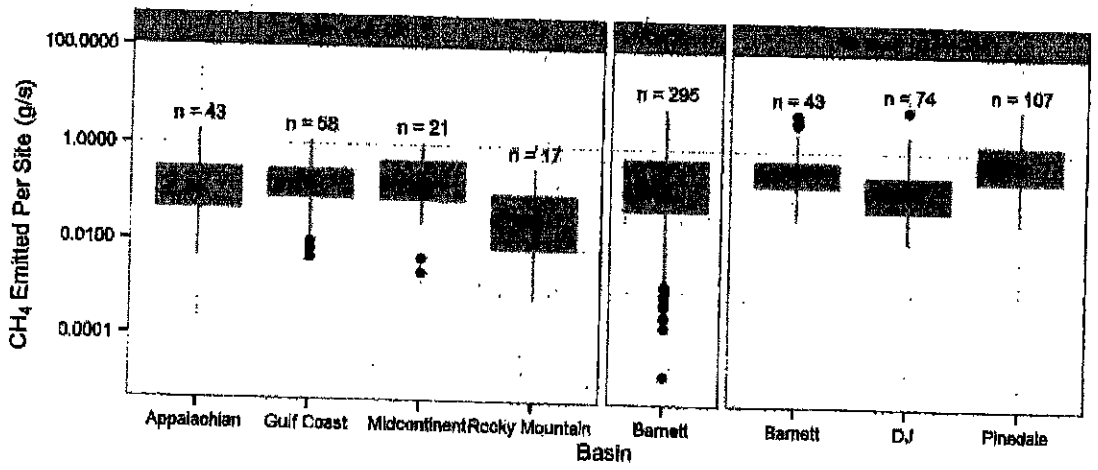
227

228 **Figure 2.** Map of repeated measurements at sites H and I. Arrow direction indicates mean wind
229 direction and the arrow location indicates the location of the mobile platform during the
230 measurement.

231 **Comparisons with direct measurement studies**

232 A total of 318 OTM 33A measurements were collected that met the data quality criteria. Of
233 these measurements, 31 were excluded from the analysis because the measured emissions either

234 did not originate from nominal well pad operations (e.g., evidence of active pad maintenance,
235 pipeline leaks, gas processing plants, etc.) or no current production data were available, resulting
236 in a total of 210 unique sites. The sites were classified into gas or oil production pads based on
237 the TX Railroad Commission definition of a gas well[25] (> 100 Mscf of gas per barrel of
238 hydrocarbon liquids). Gas production pads constituted 93 %, 2 %, 75 %, and 84 % of the sites
239 measured in the Barnett, DJ, Eagle Ford, and Pinedale basins, respectively. Methane emissions
240 were averaged by site and month, resulting in a total of 228 combinations of emission and
241 production values. Due to the small sample size in the Eagle Ford (n = 4), these measurements
242 were excluded from the basin comparison (Figure 3). CH_4 emissions by basin were compared
243 using a Kruskal-Wallis one-way analysis of variance test and pairwise Wilcoxson rank-sum tests
244 and were found to be significantly different ($p < 0.05$).



245

246 **Figure 3.** Comparison of measured CH_4 emissions per production pad (g/s) from Allen et al.[15],
247 ERG[14], and OTM 33A by basin. Whiskers extend to the largest measurement that is within 1.5
248 times the interquartile range (IQR). Means and 95 % confidence intervals are shown in black and
249 were calculated using a non-parametric bootstrap.

250 CH_4 emissions estimates from the direct measurement studies conducted by ERG[14] and Allen
251 et al.[15] were compared to the OTM 33A measurements (Figure 3). The studies encompass a range
252 of production pads that vary with respect to oil and gas composition, production levels, amount
253 and type of production equipment, age, and emission control measures, resulting in a broad
254 distribution of emissions. The mean of the CH_4 emissions measured using OTM 33A in the
255 Barnett Shale (0.33 g/s) is more than twice the mean of the emissions measured by ERG[14] (0.14
256 g/s). Nevertheless, the interquartile range of the OTM 33A emission estimates for the Barnett
257 falls within the interquartile range of the ERG emissions estimates despite the differences in the
258 measurement methods.

259 In the ERG study[14], emissions from storage tank breathing and standing losses, glycol
260 dehydrator re-boiler vents, wastewater and/or condensate loading, flaring, and non-routine
261 emissions from malfunctions or maintenance were not measured or calculated. Similarly, the
262 measurements by Allen et al.[15] were limited primarily to equipment leaks, pneumatic controllers,
263 and chemical injection pumps. Tank leaks were measured at some sites but rarely could all of the
264 emission points be accessed. In contrast, OTM 33A measurements generally represent an
265 integrated plume including all potential sources on a production pad. Supporting infrared camera
266 footage from the OTM 33A studies indicated that emissions often originate from storage tanks
267 which have previously been shown to comprise a significant source[6, 5] (Supplemental B). OTM
268 33A is also more likely to capture malfunction-related CH_4 releases than direct measurement
269 methods because of its mobile and off-site measurement capabilities.

270 Furthermore, the remote nature of the OTM 33A method and its application in these studies to
271 only sites with downwind average in-plume concentrations greater than 0.1 ppm result in an
272 effective lower sampling limit of approximately 0.010 g/s, compared with < 0.001 g/s limits for

the on-site measurement techniques (Figure 4a). As a result, the OTM 33A measurements represent the upper end of the distribution in this comparison (Figure 4b).

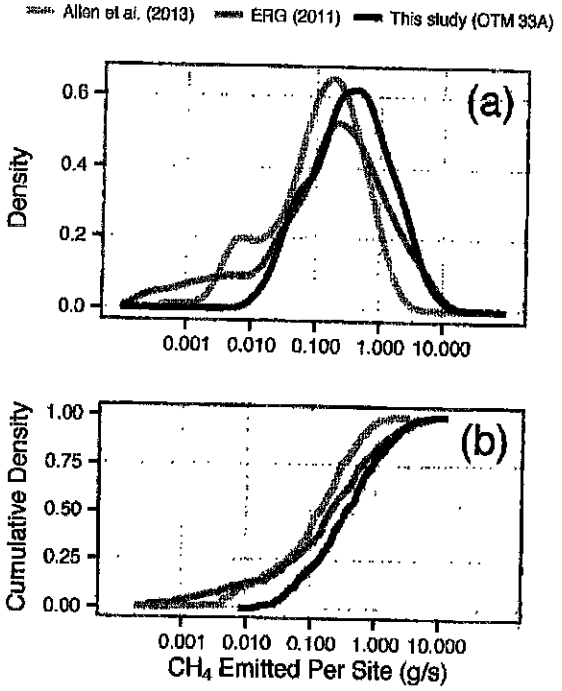
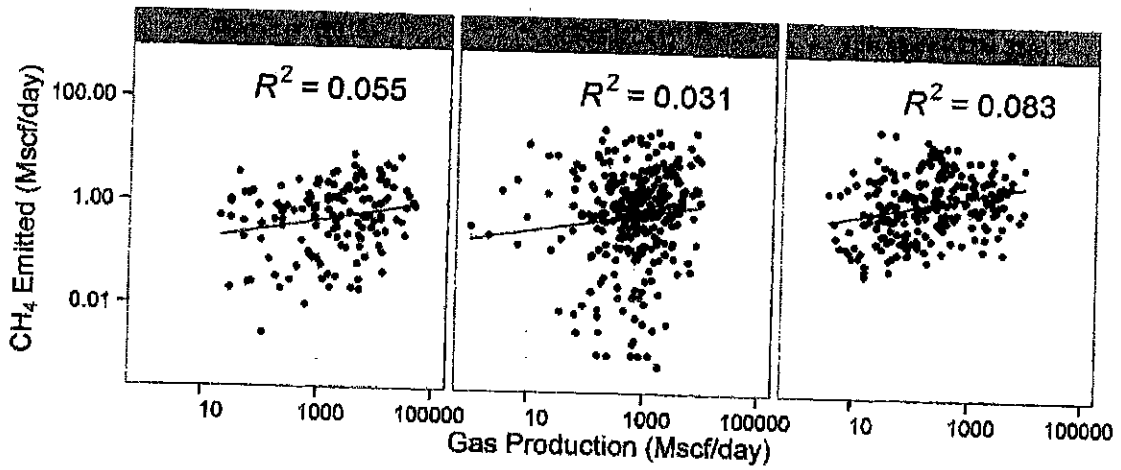


Figure 4. Density (a) and cumulative density (b) of measurements of CH_4 emission rates (g/s) from this study (OTM 33A), Allen et al. [15], and ERG [14].

Comparison of measurements with production values.

CH_4 emissions from the direct measurement studies and OTM 33A were compared to monthly gas production using a linear regression on the log transformed data (Figure 5). Sites with gas production < 1 Mscf/day or CH_4 emissions < 0.0005 g/s were excluded from the analysis (five sites in the ERG study). Gas production values explained more of the variation in the OTM 33A measurements than the measurements from the on-site studies, although variation in gas production still accounted for only 8.3 % of the total variation in emissions ($R^2 = 0.083$).



285

286 **Figure 5.** CH_4 emissions (Mscf/day) versus reported monthly gas production (Mscf/day). Blue
287 lines represent the linear regression lines.

288 The OTM 33A CH_4 emission estimates were also compared with hydrocarbon liquids and
289 water production and the (arithmetic) mean age of active permitted wells on the site using
290 Pearson correlation coefficients (Table 1) and a multivariate linear regression.

291 Approximately 23 % and 15 % of the pads measured using OTM 33A reported no hydrocarbon
292 liquids or water production, respectively. To use these pads in the log-transformed model, pads
293 with no reported oil or water production were assigned 0.01 bbl/day. Several values were tested
294 and the choice of this value did not significantly affect the results. When considering the
295 correlation between production and emissions individually, CH_4 emissions were most strongly
296 correlated with gas production (R = 0.29). CH_4 emissions were also positively correlated with
297 water production, negatively correlated with mean age, and not correlated with hydrocarbon
298 liquids production (Table 1).

299

300

301 Table 1. Pearson correlation coefficients (R) of emissions and production.

	CH4 Emissions (Mscf/day)	Gas Production (Mscf/day)	Hydrocarbon Liquids Production (bbl/day)	Water Production (bbl/day)
CH4 Emissions (Mscf/day)	1.00			
Gas Production (Mscf/day)	0.29	1.00		
Hydrocarbon Liquids Production (bbl/day)	-0.01	0.44	1.00	
Water Production (bbl/day)	0.22	0.77	0.40	1.00
Mean Age (years)	-0.20	-0.59	-0.34	-0.57

302

303 A multivariate linear regression was conducted to determine the effect of gas and hydrocarbon
304 liquids production and age of the well on CH_4 emissions simultaneously. Water production was
305 not included in the model because it was so highly correlated with gas production ($R > 0.7$) that
306 the effects could not be separated. The following model was used:

307 (1) $$\log(CH_4) = \beta_1 * \log(Gas) + \beta_2 * \log(Oil) + \beta_3 * Age$$

308 where CH_4 represents measured emissions in g/s, Gas is total reported production in Mscf/day,
309 Oil is total reported hydrocarbon liquids production in bbl/day, and Age is the mean age of the
310 permitted wells in years. Age was not significantly correlated with CH_4 emissions, while gas
311 production was significantly positively correlated, and oil production was significantly
312 negatively correlated (Table S2). The negative correlation with oil production is consistent
313 across the basins (Figure S1). This negative correlation with oil production is likely due to the
314 lower fraction of CH_4 in wet gas compared to dry gas. Furthermore, emissions from condensate

315 tanks, which are more prevalent in wet gas areas, typically contain a lower fraction of CH_4 and
316 higher fraction of heavier hydrocarbons such as VOCs when compared with produced gas[5]. The
317 inclusion of hydrocarbon liquids and age in the model did not explain much more of the variation
318 in emissions resulting in an adjusted R^2 of only 0.096, in contrast to an R^2 of 0.083 when only
319 gas production was included.

320 Other important sources of variation not accounted for in this analysis include emissions
321 controls and equipment present on the production pads. Further uncertainty is introduced by the
322 production data: daily or hourly production levels may not be consistent with monthly
323 production.

324 Although the OTM 33A CH_4 emissions data include episodic features (e.g., flash emissions), it
325 is instructive to compare emission rates as a percent of production with the measurements by
326 Allen et al.[15] and ERG[14]. While the CH_4 emissions estimates per site in g/s were similar across
327 the three studies, the OTM 33A estimates of CH_4 as a percent of total production are
328 substantially higher than the studies by ERG[14] and Allen et al.[15] (Figure S2). For the sites
329 measured using OTM 33A, approximately 0.72 %, 1.36 %, and 0.58 % of production was
330 emitted on average in the Barnett, DJ, and Pinedale basins, respectively, compared with 0.11 %
331 of production measured by ERG[14] in the Barnett shale and 0.01 % and 0.09 % measured by Allen
332 et al.[15] in the Appalachian and Rocky Mountain basins, respectively (Figure S2). As evidenced
333 in the statistical analysis, differences in production rate explain only a small fraction of the
334 variation in emissions.

335 Mean gas production at the OTM 33A sites was significantly lower than mean gas production
336 at the sites measured in the direct measurement studies (Figure S4). Gas production at the OTM
337 33A sites ranged from 3.7 (Mscf/day) to 9,021 (Mscf/day) with 37 % of the sites producing <

100 Mscf/day. In contrast, Allen et al.[15] reported a gas production range of 20 to 47,690 (Mscf/day) with only 10 % of the sites producing < 100 Mscf/day and with approximately 20 % of the measured sites producing > 10,000 Mscf/day. The gas production values of the ERG [14] sites ranged from 0.06 to 9,085 Mscf/day in the Barnett with 10 % of the sites producing < 100 Mscf/day (Figure S4). The OTM 33A results indicate that sites with very low gas and oil production can emit a much greater fraction of the gas produced than sites with higher production levels. Maintenance issues (e.g., fugitive leaks, open or leaking thief hatches, failed pressure relief devices, malfunctioning separator dump valves) could be more prevalent at smaller older production sites than at higher producing sites that are potentially better maintained and may have fundamentally different engineering designs (e.g., use of buffer tanks to suppress flash emissions). Furthermore, many of the fugitive processes can emit at levels that are not linearly associated with production rates.

In summary, the OTM 33A mobile inspection method was successfully applied to quantify CH_4 emissions at 210 oil and gas well pads with an accuracy of ± 60 % determined by tracer release tests. Well pad emissions were log-normally distributed and differed significantly by basin with geometric means ranging from 0.14 g/s in the Denver-Julesburg to 0.59 g/s in the Pinedale basin. Repeat measurements at 9 sites indicated consistent low emission rates at seven sites and highly variable emissions at two sites. The production rates accounted for approximately 10 % of the variation in emission rates in a multivariate linear regression. While emission rates in g/s were comparable with published on-site direct measurement studies, emissions as a percentage of production were higher by a factor of 7 or more, indicating that sites with lower production levels can emit a much greater percentage of production. Infrared camera videos indicate that emission rates may be strongly affected by stochastic variables. In particular,

equipment malfunctions or operator error may cause emission rates to increase substantially compared to nominal operating conditions. Accurately estimating site emissions on a regional scale likely will require determining the average magnitude and frequency of these stochastic events.

Supporting Information. Supplemental figures, tables, and IR videos are supplied as supporting information. This material is available free of charge via the Internet at http://pubs.acs.org.

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383 The views expressed in this article are those of the authors and do not necessarily represent the
384 views or policies of the U.S. Environmental Protection Agency.

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Exhibit 2

Wyoming Permit Review

Operator [1]	Total # Wells	Total # Permits	Fugitives (VOCs) [2]													
			# Permits Above 4 tpy	% Permits above 4 tpy (INCLUDING FNL permits)	% Permits above 4 tpy (EXCLUDING FNL permits)	# Permits Below 4 tpy	# Permits Above 2 tpy	% Permits above 2 tpy (INCLUDING FNL permits)	% Permits above 2 tpy (EXCLUDING FNL permits)	# Permits Below 2 tpy	# Permits Above 1 tpy	% Permits above 1 tpy (INCLUDING FNL permits)	% Permits above 1 tpy (EXCLUDING FNL permits)	# Permits Below 1 tpy	Fugitives not Listed (FNL)	Fugitives listed as Insignificant [3]
Ultra Resources, Inc.	1,752	187	5	3%	3%	182	24	13%	13%	163	66	35%	35%	121	0	0
EnCana Oil & Gas (USA) Inc.	1,609	122	28	23%	24%	87	87	71%	76%	28	107	88%	93%	8	***7***	0
QEP Energy Company	889	71	18	25%	25%	53	33	46%	46%	38	34	48%	48%	37	0	37
Shell Western Exploration & Production Inc. (SWEPI)	388	35	9	26%	26%	26	12	34%	34%	23	12	34%	34%	23	0	23
BP America Production Company	100	40	8	20%	80%	2	9	23%	90%	1	10	25%	100%	0	***30***	0
Questar Exploration and Production Company	45	9	4	44%	80%	1	5	56%	100%	0	5	56%	100%	0	***4***	0
Shell Rocky Mountain Production, L.L.C.	44	6	4	67%	67%	2	6	100%	100%	0	6	100%	100%	0	0	0
Yates Petroleum Corporation	19	6	0	0%	0%	6	1	17%	17%	5	1	17%	17%	5	0	0
EOG Resources, Inc.	15	2	0	0%	0%	2	0	0%	0%	2	1	50%	50%	1	0	1
Newfield Production Company	6	4	1	25%	25%	3	1	25%	25%	3	1	25%	25%	3	0	3
Wexpro Company	6	2	2	100%	100%	0	2	100%	100%	0	2	100%	100%	0	0	0
Anschutz Pinedale Corporation	4	3	0	0%	0%	3	0	0%	0%	3	0	0%	0%	3	1	2
Nextraction Energy Corporation	1	1	0	0%	0%	1	0	0%	0%	1	0	0%	0%	1	0	1
Mountain Gas Resources LLC	1	1	0	0%	0%	1	0	0%	0%	1	0	0%	0%	1	1	0
Devon Energy Production Company, L.P.	1	1	0	0%	0%	1	0	0%	0%	1	0	0%	0%	1	0	0
Pinedale Energy, LLC	1	1	0	0%	0%	1	0	0%	0%	1	0	0%	0%	1	1	0
Denbury Onshore, LLC	2	2	0	0%	0%	2	0	0%	0%	2	0	0%	0%	2	0	0
Chevron USA	1	1	0	0%	0%	1	0	0%	0%	1	1	100%	100%	0	0	0
TOTAL	***4,884***	***494***	***79***	***16%***	***17%***	***374***	***180***	***36%***	***40%***	***273***	***246***	***50%***	***54%***	***207***	44	67

[1] Anschutz, Mountain Gas Resources, and Painedale Energy each had one permit without fugitives listed. These were assumed to be "Insig" (insignificant) based on other emissions at the facility.

[2] The percentages for each threshold that exclude permits without fugitives do not account for the permits in the "Fugitives not Listed" column. This has the largest impact on % breakdowns for EnCana, BP, and Questar.

[3] The permits in the "Fugitives listed as Insignificant" column are accounted for in all percentages. These are assumed to have less than 1 tpy (<0.049 tpy) fugitives.

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December 1, 2014

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DEC 10 2014

AIR QUALITY DIVISION

Steven A. Dietrich
Air Quality Administrator
Herschler Building 2-E
122 W. 25th Street
Cheyenne, WY 82002

Re: Comments on Proposed Rule Change to Wyoming Air Quality Standards and Regulations, Chapter 8, Nonattainment Area Regulations

Dear Mr. Dietrich:

The Petroleum Association of Wyoming (PAW) appreciates this opportunity to provide additional comments to the Wyoming Department of Environmental Quality (WDEQ) Air Quality Division (AQD) concerning the proposed revisions to the proposed rule change to Wyoming Air Quality Standards and Regulations, Chapter 8, Nonattainment Area Regulations.

PAW is Wyoming's largest oil and gas trade association. PAW members produce over 90% of the natural gas and 80% of the crude oil in the state and have a vested interest in the policies, rules and regulations administered by the WDEQ.

We continue to support WDEQ in your efforts to bring the area back into attainment. PAW is pleased to see most of the changes the AQD has presented and greatly appreciates the additional meetings and time the AQD has put into working on the renewed proposal, however we believe the rule, as proposed, still requires some clarity.

P-1-1

We thank the AQD for extending the phase-in period and agree with the intent of the rule. Companies will make all efforts to meet the extended deadlines but due to the difference in management of companies, we continue to have companies that cannot proceed in ordering necessary parts or hiring of subcontractors until the rule is implemented and final. It is for these reasons we are asking for the ability to request extentions during the first year of the program for extenuating circumstances.

We offer several additional suggestions to clarify the requirements in order to help industry comply with the rule. We also offer suggestions intended to improve the rule better for both industry and AQD. Through working together to understand the needs of each side, PAW believes our comments and suggestions are timely and appropriate.

Our further detailed comments are attached for your review.

Thank you,

John Robitaille
Vice President

Section 6. **[Reserved.] Requirements for existing oil and gas production facilities or sources in the Upper Green River Basin.**

New Proposed Rule	PAW Comments	Recommended Rule Language Change
(a) Applicability. (i) These regulations apply to all PAD and single well oil and gas production facilities or sources, and all compressor stations located in the Upper Green River Basin (UGRB) ozone nonattainment area that exist as of January 1, 2014. The UGRB ozone nonattainment area is that area which was adopted by reference from 40 CFR part 81.351, revised and published as of July 1, 2013, not including any later amendments. Copies of the Code of Federal Regulations (CFR) are available for public inspection and can be purchased from the Department of Environmental Quality, Air Quality Division, Cheyenne Office. Contact information for the Cheyenne Office is available at: http://deq.state.wy.us. Copies of the CFR can also be purchased from Government Institutes, 15200 NBN Way, Building B, Blue Ridge Summit, PA 17214, or online at: http://www.gpo.gov/fdsys/browse/collectionCfr.action?collectionCode=CFR.		RECEIVED DEC 10 2014 AIR QUALITY DIVISION
(ii) PAD and single well oil and gas production facilities or sources, shall comply with all applicable requirements of these regulations unless a Wyoming Air Quality Standards and Regulations (WAQSR) Chapter 6, Section 2 permit has been issued that meets or exceeds the control requirements of these regulations; and		

Section 6. **[Reserved.] Requirements for existing oil and gas production facilities or sources in the Upper Green River Basin.**

New Proposed Rule	PAW Comments	Recommended Rule Language Change
(iii) A compressor station, as defined in Subsection (b), shall comply with the requirements of Subsection (g) of these regulations unless a Wyoming Air Quality Standards and Regulations (WAQSR) Chapter 6, Section 2 permit has been issued that meets or exceeds the Subsection (g) requirements; and		
(iv) In spite of the requirements of Chapter 6, Section 2(a)(i) and (iii) of the WAQSR, a preconstruction permit under Chapter 6, Section 2 is not required for any control device (flare/enclosed combustion unit) or equipment identified in these regulations unless a facility or source is required to obtain a permit under Chapter 6, Section 4 or Section 13. (v) Upon Division approval, an alternative emission control device and/or equipment may be used in lieu of, or in combination with, a combustion device that will achieve the 98% manufacturer-designed volatile organic compounds (VOC) control efficiency required by these regulations.	PAW appreciates proposed paragraph (v) that allows for innovative approaches for controls that might be less than 98% but will be economical and technically feasible for continued control, after emissions drop below 4 tpy. However, for clarity, we suggest a text modification to avoid any confusion that the alternative control does not have to meet a 98% control efficiency but that has the potential to achieve greater emission reductions over the life of the well.	(v) Upon Division approval, an alternative emission control device and/or equipment may be used in lieu of, or in combination with, a combustion device ~~that will achieve the 98% manufacturer-designed volatile organic compounds (VOC) control efficiency required by these regulations.~~
"Composite extended hydrocarbon analysis" are averaged extended hydrocarbon compositions based on samples from at least five wells producing from the same formation and under similar conditions (± 25 psig).		
"Compressor station" means any permanent combination of one or more compressors that move natural gas at increased pressure from fields, in transmission pipelines, or into storage.		

P-1-2

Section 6. **[Reserved.] Requirements for existing oil and gas production facilities or sources in the Upper Green River Basin.**

New Proposed Rule	PAW Comments	Recommended Rule Language Change
"Dehydration unit" means a system that uses glycol to absorb water from produced gas before it is introduced into gas sales or collection lines.		
"Extended hydrocarbon analysis" means a gas chromatograph analysis performed on pressurized hydrocarbon liquid (oil/condensate) and gas samples, and shall include both speciated hydrocarbons from methane (C1) through decane (C10), including the following Hazardous Air Pollutants (HAP) - benzene, toluene, ethyl-benzene, xylenes (BTEX), n-hexane, and 2-2-4-trimethylpentane.	WDEQ improved the definition from the original proposal by removing how and where a sample should be collected. However, the word "pressurized" also needs to be removed since an extended analysis is not dependent on this type of sample. For example, an extended analysis can also be performed on a crude oil sample from an atmospheric tank.	***"Extended hydrocarbon analysis"*** means a gas chromatograph analysis performed on ~~pressurized~~ hydrocarbon liquid (oil/condensate) and gas samples, and shall include both speciated hydrocarbons from methane (C1) through decane (C10), including the following Hazardous Air Pollutants (HAP) - benzene, toluene, ethyl-benzene, xylenes (BTEX), n-hexane, and 2-2-4-trimethylpentane
"Facility components" consist of flanges, connectors (other than flanges), open-ended lines, pumps, valves and "other" components listed in Table 2-4 from EPA-453/R-95-017 at the site grouped by stream (gas, light oil, heavy oil, water/oil). Table 2-4 from EPA-453/R-95-017 is available online at: http://deq.state.wy.us/aqd/ or http://www.epa.gov/ttnchie1/efdocs/equiplks.pdf.		
"Flashing emissions" means VOC emissions, including HAP components, that occur when gases are released from produced liquids (oil, condensate, produced water, or a mixture thereof) that are exposed to temperature increases or pressure drops as they are transferred from pressurized vessels to lower pressure separation vessels or to atmospheric storage tanks. **No fugitive definition**		
"Optical gas imaging instrument" means an instrument that makes visible, emissions that may otherwise be invisible to the naked eye.		

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Section 6. **[Reserved.] Requirements for existing oil and gas production facilities or sources in the Upper Green River Basin.**

New Proposed Rule	PAW Comments	Recommended Rule Language Change
"PAD facility" means a location where more than one well and/or associated production equipment are located, where some or all production equipment is shared by more than one well or where well streams from more than one well are routed through individual production trains at the same location.		
"Separation vessels" means all gun barrels, production and test separators, production and test treaters, water knockouts, gas boots, flash separators, and drip pots.		
"Single well facility" means a facility where production equipment is associated with only one well.		
"Storage tanks" means any tanks that contain oil, condensate, produced water, or some mixture thereof.		
(c) Flashing Emissions at Existing PAD and Single Well Facilities or Sources as of January 1, 2014. (i) VOC emissions from all existing storage tanks and all existing separation vessels are subject to these regulations. (A) For total uncontrolled VOC emissions from flashing that are greater than or equal to 4 tons per year (tpy), flashing emissions from all produced oil, condensate, water tanks, and separation vessels shall be controlled to at least 98% manufacturer-designed VOC destruction efficiency by January 1, 2017. (B) Storage tanks that are on site for use during emergency or upset conditions are not subject to the control requirements in this Subsection. (C) Emergency, open-top, and/or blowdown tanks shall not be used as active storage tanks but may be used for temporary storage. (I) Emergency tanks shall be utilized for	In response to prior comments, PAW appreciates WDEQ extending the compliance date by another year. However, given that the final rule will not be promulgated until sometime after January 1, 2015, rule text needs to be amended to allow for a compliance date exception if an operator has a justifiable reason to need more time. Many operators may not begin formal planning and budgeting to purchase and construct equipment and controls until there is the certainty of a final rule. Examples of potentially justifiable reasons for an exception include: Vendor delays in delivery of equipment, construction delays from adverse weather, availability of crews, equipment breakdowns, delay in BLM permitting, etc. Tanks referenced in (c)(i)(B) are also used for equipment maintenance, venting, and well blowdowns not just emergencies and upsets. PAW recommends the language edits in the next column to allow for their temporary use.	(c) Flashing Emissions at Existing PAD and Single Well Facilities or Sources as of January 1, 2014. (i) VOC emissions from all existing storage tanks and all existing separation vessels are subject to these regulations. (A) For total uncontrolled VOC emissions from flashing that are greater than or equal to 4 tons per year (tpy), flashing emissions from all produced oil, condensate, water tanks, and separation vessels shall be controlled to at least 98% manufacturer-designed VOC destruction efficiency by January 1, 2017 1.) An operator may request an extension by submitting a written request to the AQD no later than November 1, 2016. An extension will be granted or denied within 30 days following submittal of the request. (B) Storage tanks that are on site only for temporary use during maintenance, blowdowns,

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• TRYING TO PLAN FOR UNFORESEEN PROBLEMS W/ COMPLIANCE

Section 6. **[Reserved.] Requirements for existing oil and gas production facilities or sources in the Upper Green River Basin.**

New Proposed Rule	PAW Comments	Recommended Rule Language Change
unavoidable equipment malfunctions as defined in Chapter 1, Section 5 of the WAQSR. (II) If emergency, open-top, and/or blowdown tanks are utilized, they must be emptied within seven (7) calendar days. (D) Control Removal. The removal of flashing emissions control devices will be allowed pursuant to the requirements in Subparagraph (h)(iii)(E), after one (1) year from the date of installation if uncontrolled VOC flashing emissions have declined to less than, and will remain below 4 tpy.	In paragraph (c)(i)(C)(II) PAW believes the requirement for blowdown tanks should be removed. This blanket requirement does not consider the quantity of liquids produced, nor associated emissions from the tank itself or from nonessential trucking. Mandating a prescriptive emptying requirement does not make sense because there are no flashing emissions and only minimal evaporative emissions that will not be eliminated by emptying the tanks within 7 days. Even after emptying a tank with a truck, a liquid heel will remain in the bottom of the tank. Furthermore, tank usage events will not necessarily result in enough liquid volume going to the tank to make emptying feasible. Often blowdowns produce less than a barrel of liquid per event, which may be less than what required in order to be drawn from the outlet of the tank. If it is WDEQ's intent to ensure the use of these tanks is only temporary, as stated in the response to comments in the original proposal, a solution is to amend paragraph (B) using PAW's recommended language in the next column to give the control exemption only to tanks used temporarily.	emergency or upset conditions are not subject to the 98% control requirements. (C) ~~(II) If emergency, open-top and/or blowdown tanks are utilized, they must be emptied within seven (7) calendar days.~~ • BLOWDOWNS MAY BE LESS THAN 1 BARREL IN QUANTITY
(ii) Calculation for Flashing Emissions. (A) Determine the average daily condensate/oil production for the previous twelve (12) calendar months in barrels per day (bpd). (B) Use any generally accepted model in accordance with 40 CFR 60, Subpart OOOO or direct measurement of tank emissions to determine uncontrolled VOC emissions. (C) Model input shall consist of: (I) A site-specific analysis of liquids, or composite extended hydrocarbon analysis of liquids, taken from the pressurized, upstream	PAW recommends the word "representative" be inserted in (ii)(C)(I) for clarity that it can be used for other sites operating within the same parameter limitations of the composite analysis definition.	(C) Model input shall consist of: (I) A site-specific analysis of liquids, or representative composite extended hydrocarbon analysis of liquids, taken from the pressurized, upstream separation equipment under normal operating conditions; (II) … (III) … • CLARIFICATION

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Section 6. **[Reserved.] Requirements for existing oil and gas production facilities or sources in the Upper Green River Basin.**

New Proposed Rule	PAW Comments	Recommended Rule Language Change
separation equipment under normal operating conditions; (II) Average daily condensate/oil production rate as determined in Subparagraph (c)(ii)(A) of these regulations; (III) Site-specific or composite extended hydrocarbon analyses will be no older than three (3) years from date of flashing emissions calculation including; (1.) The average, actual equipment operational parameters, including separator temperature and pressure; and (2.) American Petroleum Institute (API) gravity and Reid vapor pressure (RVP) of sales oil.		
(d) Dehydration Units at Existing PAD and Single Well Facilities or Sources as of January 1, 2014. (i) VOC emissions released from all existing dehydration units are subject to these regulations. (A)[*Deleted PAD Facilities and Single Well Facilities*] For total uncontrolled VOC emissions from all dehydration units that are greater than or equal to 4 tpy, VOC emissions from all dehydration units shall be controlled to at least 98% manufacturer-designed VOC destruction efficiency and equipped with reboiler still vent condensers by January 1, 2017. (B) Control Removal. The removal of combustion units used to achieve the 98% manufacturer-designed VOC destruction efficiency will be allowed pursuant to the requirements in Subparagraph (h)(iii)(E), after one (1) year from the date of installation if total uncontrolled VOC emissions from all dehydration units are less than, and will remain below 4 tpy,	In response to prior comments, PAW appreciates WDEQ extending the compliance date by another year. However, given that the final rule will not be promulgated until sometime after January 1, 2015, rule text needs to be amended to allow for a compliance date exception if an operator has a justifiable reason to need more time. Many operators may not begin formal planning and budgeting to purchase and construct equipment and controls until there is the certainty of a final rule. Examples of potentially justifiable reasons for an exception include: Vendor delays in delivery of equipment, construction delays from adverse weather, availability of crews, equipment breakdowns, delay in BLM permitting, etc.	(d) Dehydration Units at Existing PAD and Single Well Facilities or Sources as of January 1, 2014. (i)(A)For total uncontrolled VOC emissions from all dehydration units that are greater than or equal to 4 tpy, VOC emissions from all dehydration units shall be controlled to at least 98% manufacturer-designed VOC destruction efficiency and equipped with reboiler still vent condensers by January 1, 2017 1.) An operator may request an extension by submitting a written request to the AQD no later than November 1, 2016. An extension will be granted or denied within 30 days following submittal of the request. · PLAN FOR PROBLEMS

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Section 6. **[Reserved.] Requirements for existing oil and gas production facilities or sources in the Upper Green River Basin.**

New Proposed Rule	PAW Comments	Recommended Rule Language Change
and all dehydration units are equipped with reboiler still vent condensers.		
(ii) Calculation for Dehydration Units. (A) Determine the average daily gas production rate for the previous twelve (12) calendar months in million cubic feet per day (MMCFD). (B) Use the model GRI-GLYCalc, Version 4.0 or higher, and the annualized average daily production rate to determine annualized uncontrolled VOC emissions from the dehydration unit process vents. Process vents include reboiler still vents, glycol flash separators, and still vent condensers. (C) Model input shall consist of: (I) A site-specific wet gas analysis or composite extended hydrocarbon analysis of wet gas taken from the pressurized, upstream separation equipment under normal operating conditions; (II) Average daily gas production rate as determined in Subparagraph (d)(ii)(A) of these regulations; and (III) Site-specific or composite extended hydrocarbon analyses shall be no older than	Paragraph (ii)(B) contradicts paragraph (C)(III)(1) in that it mandates determination of uncontrolled VOC emissions while (C)(III)(1) correctly stipulates input of operating parameters of emission control equipment. Permitting guidance is for emissions control determination ahead of initial construction, whereas emissions control for existing sources should be determined based on all currently operating equipment. Justification on permitting guidance alone is not appropriate in this case. If an existing dehydrator is currently configured with a condenser and has less than 4 tpy of VOC emissions, a combustor may potentially be required only because the existing condenser cannot be accounted for in the applicability determination. Before a combustor is even installed, it will already be known ahead of time that it can be removed in 12 months. This results in high cost with little benefit. A pressurized wet gas sample for dehy emission calculations can be taken anywhere between the separator and the inlet to the glycol contactor, it does not have to come exclusively from the separator. We have provided a recommended rule text	(ii) Calculation for Dehydration Units. (A)… (B) Use the model GRI-GLYCalc, Version 4.0 or higher, and the annualized average daily production rate to determine annualized ~~uncontrolled~~ VOC emissions from the existing dehydration unit process vents. Process vents include reboiler still vents, glycol flash separators, and still vent condensers. (C) Model input shall consist of: (I) A site-specific ~~wet gas analysis~~ or representative composite extended hydrocarbon analysis of wet gas ~~taken from the~~ using a pressurized sample collected upstream of the contact tower ~~separation equipment~~ under normal operating conditions 1 Site-specific or composite extended hydrocarbon analyses shall be no older than three (3) years from date of the dehydration unit

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CLARIFICATION PURPOSES

Section 6. **[Reserved.] Requirements for existing oil and gas production facilities or sources in the Upper Green River Basin.**

New Proposed Rule	PAW Comments	Recommended Rule Language Change
three (3) years from date of the dehydration unit calculation including; (1.) The average, actual equipment operational parameters, including wet gas temperature and pressure, dry gas water content, glycol flash separator temperature and pressure, stripping gas source and rate, and average operating parameters of emission control equipment; and (2.) The maximum lean glycol circulation rate in gallons per minute (gpm) for the glycol circulation pump in use.	change in (C)(I) PAW believes (d)(ii)(C) needs reformatting. The current (III) should be renumbered as (I)(1.) to properly denote that the required site specific or composite extended analyses have to be no older than 3 years from the applicability determination. The current (III)(1.) should be renumbered as (III) and the current (III)(2.) should be renumbered as (IV).	calculation including:. (II) Average daily gas production rate as determined in Subsection (d)(ii)(A) of these regulations; and ~~(III) Samples shall be no older than three (3) years from date of applicability determination or control removal.~~ (III)~~(1.)~~ The average, actual equipment operational parameters, including wet gas temperature and pressure, dry gas water content, glycol flash separator temperature and pressure, stripping gas source and rate and average operating parameters of emission control equipment; and (IV)~~(2.)~~The maximum lean glycol circulation rate in gallons per minute (gpm) for the glycol circulation pump in use. REFORMAT
(e) Existing Pneumatic Pumps at PAD and Single Well Facilities or Sources as of January 1, 2014. VOC emissions associated with the discharge streams of all natural gas-operated pneumatic pumps shall be controlled to at least 98% manufacturer-designed VOC destruction efficiency, or the pump discharge streams shall be routed into a sales line, collection line, fuel supply line, other closed loop system, or replaced with solar, electric, or air driven pumps by January 1, 2017.	In response to prior comments, PAW appreciates WDEQ extending the compliance date by another year. However, given that the final rule will not be promulgated until sometime after January 1, 2015, rule text needs to be amended to allow for a compliance date exception if an operator has a justifiable reason to need more time. Many operators may not begin formal planning and budgeting to purchase and construct equipment and controls until there is the certainty of a final rule. Examples of potentially justifiable reasons for an exception include: Vendor delays in delivery of equipment, construction delays from adverse weather, availability of	(e)…by January 1, 2017 1.) An operator may request an extension by submitting a written request to the AQD no later than November 1, 2016. An extension will be granted or denied within 30 days following submittal of the request.

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Section 6. **[Reserved.] Requirements for existing oil and gas production facilities or sources in the Upper Green River Basin.**

New Proposed Rule	PAW Comments	Recommended Rule Language Change
	crews, equipment breakdowns, delay in BLM permitting, etc.	
(f) Existing Pneumatic Controllers at PAD and Single Well Facilities or Sources as of January 1, 2014. Natural gas-operated pneumatic controllers shall be low (less than 6 standard cubic feet per hour (scfh)) or no bleed or the controller discharge streams shall be routed into a sales line, collection line, fuel supply line, or other closed loop system by January 1, 2017.	To be consistent with NSPS, Subpart OOOO use of the terms continuous bleed or intermittent vent is recommended. "No-bleed" is a marketing term, not a technical term. However, for simplicity and reduced compliance burden PAW recommends limiting applicability to continuous bleed controllers only, since there is no such thing as an inherently designed low bleed controller. Regulating operation of a continuous bleed controller to ensure it uses operating parameters (i.e. instrument gas pressure) for a low bleed emission rate makes sense, while an intermittent vent (i.e. "no-bleed") controller is inherently designed to have a zero bleed rate. As allowed in Subpart OOOO, an exemption is needed for continued use of high bleed controllers, if operationally necessary. Relying exclusively on permitting guidance is inappropriate here as new sites can be designed to conform to applicable requirements, however there could be existing site configurations that would incur additional cost if other equipment changes are needed in addition to simply converting a high bleed controller for a low bleed. An exemption should be needed very rarely if at all, but a provision is prudent nonetheless.	(f) Existing Pneumatic Controllers at PAD and Single Well Facilities or Sources as of January 1, 2014. Continuous bleed natural gas-operated pneumatic controllers shall be low bleed (less than 6 standard cubic feet per hour (scfh)) ~~or no bleed~~ or the controller discharge streams shall be routed into a sales line, collection line, fuel supply line, or other closed loop system by January 1, 2017. (i) An operator may request an exemption or extension because of operational infeasibility by submitting a written request no later than November 1, 2015. An exemption will be granted or denied within 30 days following submittal of the request.

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Section 6. **[Reserved.] Requirements for existing oil and gas production facilities or sources in the Upper Green River Basin.**

New Proposed Rule	PAW Comments	Recommended Rule Language Change
(g) Fugitive Emissions. (i) For PAD and single well facilities or sources, and compressor stations in existence prior to January 1, 2014, with fugitive emissions greater than or equal to 4 tpy of VOCs, including HAP components, operators shall develop and implement a Leak Detection and Repair (LDAR) Protocol by January 1, 2017. (A) The LDAR Protocol inspection monitoring schedule shall be no less frequent than quarterly; and (B) Shall include a leak repair schedule; and (C) Shall consist of 40 CFR part 60, Appendix A, Method 21, an optical gas imaging instrument, other instrument-based technologies, audio-visual-olfactory (AVO) inspections, or some combination thereof. (D) An LDAR Protocol consisting of only AVO inspections will not satisfy the requirements of this Subsection.		
(ii) Calculation for Fugitive Emissions. (A) Fugitive emissions shall be estimated using Table 2-4 from EPA-453/R-95-017, Protocol for Equipment Leak Emission Estimates, and the owner(s) or operator(s) facility component count. (I) PAD and single well facility or source component counts shall be determined by actual field count, or a representative component count from the same geographical area, taken from no less than one hundred (100) similar facilities. (II) Compressor station component counts shall be determined by actual field count. (III) Emission factors in the Protocol for Equipment Leak Emission Estimates are not intended to be used to represent emissions from	Getting actual field counts of fugitive components for 100 hundred locations as specified in (ii)(A)(I) to get a representative sampling will be a time consuming and unnecessary effort, with no justifiable basis, especially for locations that are nearly identical and where fugitive emissions are not expected to be anywhere near the 4 TPY threshold. Geographical area has no definition and does not always affect design requirements. Similarity of site size and equipment installed should be the governing factor. Representative counts of fugitive components from a handful (5) of sites with similar installations should be satisfactory; particularly where fugitive emissions will be far less than 4 tpy and minor differences in fugitive counts will not be a determining factor in the applicability determination.	(ii) Calculation for Fugitive Emissions. (A) Fugitive emissions shall be estimated using Table 2-4 from EPA-453/R-95-017, Protocol for Equipment Leak Emission Estimates, and the owner(s) or operator(s) facility component count or an alternate Division approved method. (I) PAD and single well facility or source component counts shall be determined by actual field count, or a representative component count ~~from the same geographical area,~~ taken from no less than ~~one hundred (100)~~ five (5) similar facilities. (II) Compressor station component counts shall be determined by actual field count. (III) Emission factors in the Protocol for

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· 100 FACILITIES IS TOO MANY

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New Proposed Rule	PAW Comments	Recommended Rule Language Change
components that are improperly designed or equipment not maintained properly. (B) Site-specific speciated hydrocarbon emission rates can be estimated by multiplying the total hydrocarbon emission rate, estimated in Subparagraph (g)(ii)(A) above, by measured VOC and HAP weight fractions.	Additionally, operators who are participating in the Emissions Inventory Study taking place during the summer of 2014, or have actual emission rate data regarding fugitive emission at their locations should be allowed to use that data towards the fugitive emissions applicability in lieu of the requirements of C8,S6(g)(ii)(A). While the Response to Comments document appears to indicate this can be taken into account, it isn't clear and rule text is needed for clarity to confirm this option is satisfactory.	Equipment Leak Emission Estimates are not intended to be used to represent emissions from components that are improperly designed or equipment not maintained properly. (B) Site-specific speciated hydrocarbon emission rates can be estimated by multiplying the total hydrocarbon emission rate, estimated in Subparagraph (g)(ii)(A) above, by measured VOC and HAP weight fractions <u>of the specific fluids leaking from a component.</u> *CLARIFICATION
(h) Monitoring, Recordkeeping, and Reporting. (i) Monitoring. The owner(s) or operator(s) of each PAD and single well facility or source, or compressor station shall comply with all applicable monitoring requirements as specified by this Subsection. (A) Operation of a combustion device used to control emissions shall be continually monitored using any device(s) that sense and record a parameter(s) that indicates whether the combustion device is functioning to achieve the 98% manufacturer-designed VOC destruction efficiency requirements as specified by these regulations. (I) The combustion device shall be designed, constructed, operated, and maintained to be smokeless, to satisfy the requirements of Chapter 3, Section 6(b)(i) of the WAQSR. (II) Visible emissions shall not exceed a total of five (5) minutes during any two (2) consecutive hours as determined by 40 CFR part 60, Appendix A, Method 22. (B) [*Deleted original (B)*]All emission control devices	In paragraph (i)(C) The wording of this requirement is unclear. Does this mean that all facilities regardless of the use of a control device must conduct Quarterly site evaluations of their equipment? It is assumed (or requested) that this requirement is just for equipment, "involved with, eliminating, reducing, containing or collecting vapors and routing them to an emission controls system or device." In DEQ's "Response to Comments" it appears that the intent of this rule is only for controlled equipment. PAW does not think an explanation in the Response to Comments document is sufficient and recommends this be clarified in rule text as suggested in the next column for paragraph (i). (h)(i)(C)(II) PAW requests removal of this provision as the LDAR program is for components and quarterly site evaluations are specific to control systems.	(h) Monitoring, Recordkeeping and Reporting. (i)) Monitoring. The owner(s) or operator(s) of each PAD and single well facility or source, or compressor station <u>with a control device required by this rule</u> shall comply with all applicable monitoring requirements as specified by this Subsection. *CLARIFICATION ~~(C)(II) Owners or operators required to implement an LDAR Protocol have satisfied the requirements of paragraph (C) above.~~ IF CHANGE IS MADE, DO NOT NEED THIS LANGUAGE

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Section 6. **[Reserved.] Requirements for existing oil and gas production facilities or sources in the Upper Green River Basin.**

New Proposed Rule	PAW Comments	Recommended Rule Language Change
and equipment used to reduce VOC emissions at any PAD and single well facility or source shall be operated and maintained pursuant to manufacturer specifications or equivalent, and consistent with good engineering and maintenance practices. (C) *[Originally (E)]* Owner(s) or operator(s) shall conduct a quarterly site evaluation of equipment, systems, and devices that include, but are not limited to, combustion units, reboiler overheads condensers, storage tanks, drip tanks, vent lines, connectors, fittings, valves, relief valves, hatches, and any other appurtenance employed to, or involved with, eliminating, reducing, containing or collecting vapors and routing them to an emission control system or device. (I) At least one (1) of the quarterly evaluations per calendar year shall consist of 40 CFR part 60, Appendix A, Method 21, an optical gas imaging instrument, or other instrument-based technologies. (II) Owner(s) or operator(s) required to implement an LDAR Protocol have satisfied the requirements of paragraph (C) above.		
(ii) Recordkeeping. The owner(s) or operator(s) of each PAD and single well facility or source, or compressor station shall comply with all applicable recordkeeping requirements as specified by this Paragraph. Records shall be maintained for a period of five (5) years and made available to the Division upon request. (A) All emission control devices and equipment are adequately designed and sized to achieve the control efficiency required by these regulations and to accommodate fluctuations in emissions.	For clarity, PAW recommends the rule text change in the next column to clearly indicate that this section applies to sites with control devices required by this rule.	(ii) Recordkeeping. The owner(s) or operator(s) of each PAD and single well facility or source, or compressor station <u>with a control device or LDAR program required by this rule</u> shall comply with all applicable recordkeeping requirements as specified by this Paragraph. Records shall be maintained for a period of five (5) years and made available to the Division upon request. (A) All emission control devices and equipment are adequately designed and sized to achieve the control

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New Proposed Rule	PAW Comments	Recommended Rule Language Change
(B) [*previously (A)*]Owner(s) or operator(s) shall maintain the following records for each combustion device: (I) Manufacturer-designed VOC destruction efficiency. (II) [*previously (I)*] Records of the parameter monitoring during active site operation under Subparagraph (h)(i)(A) including; (1.) A description of the reason(s) for the absence of the monitored parameter; (2.) The steps taken to return the combustion device back to the 98% manufacturer-designed VOC destruction efficiency; and (3.) Date and duration of periods when the combustion device and/or the associated containment and collection equipment is not functioning to achieve the 98% manufacturer-designed VOC destruction efficiency. (III) Date and duration of visible emissions from the combustion device. (C) Owner(s) or operator(s) shall record and maintain records for fugitive emissions pursuant to Subsection (g) of these regulations. These records shall include the dates and results of all LDAR inspections performed pursuant to a PAD and single well facility or source, or compressor station's LDAR protocol, including the date(s) and type of corrective action taken as a result of the required inspections. (D) Records of the date, duration, and reason for emergency and/or blowdown tank usage shall be maintained pursuant to Subparagraph (c)(i)(C) of these	PAW requests the elimination of the requirement for recording a reason for absence of a pilot flame. Most pilots are remotely monitored by telemetry systems that automatically record downtime, but not cause of downtime. This requirement adds a significant amount of additional paper work with no additional environmental benefit. Instead, a description of the parameter being monitored would seem more appropriate and would give context to (2) and (3). (ii)(B)(II)(2)This does not add any emission reduction benefits nor does it demonstrate compliance with the control requirements. This record-keeping would be burdensome with no environmental benefit. PAW requests the removal of Paragraph (ii)(D) for recordkeeping related to emergency and/or blowdown tank usage. Chapter 1, section 5 will cover requirements for emergency tanks. In the Response to Comments document, WDEQ acknowledges this point, but did not change the rule. Since there is recognition of an existing rule that covers this, a duplicative requirement is unnecessary as Chapter 1, section 5 stands on its own. While deletion is preferred, at most the rule should merely reference the requirements in Chapter 1, Section 5. Records are kept of blowdowns through blowdown/venting permits. Based on the record-keeping the Division has received from these permits, the Division has acknowledged that emissions from blowdown and venting are not a significant source of emissions and thus additional record keeping is overly burdensome. There seems to be no justification for having requirements more stringent than what is required for new sources. PAW suggests DEQ delete this	efficiency required by these regulations and to accommodate fluctuations in emissions. (B) [*previously (A)*]Owner(s) or operator(s) shall maintain the following records for each combustion device: (I) Manufacturer-designed VOC destruction efficiency. (II) [*previously (I)*] Records of the parameter monitoring during active site operation under Subparagraph (h)(i)(A) including; (1.) A description of the parameter that is being monitored. ~~reason(s) for any period where the absence of the monitored parameter;~~ (2.) Record date, time, and duration when monitoring indicates the combustion device is down or malfunctioning, ~~the steps taken to return the combustion device back to the 98% manufacturer-designed VOC destruction efficiency~~; and (3.) … (III) Date and duration of visible emissions from the combustion device. (C) … ~~(D) Records of the date, duration, and reason for emergency and/or blowdown tank usage shall be maintained pursuant to Subparagraph (c)(i)(C) of these regulations.~~

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New Proposed Rule	PAW Comments	Recommended Rule Language Change
regulations.	provision and further justifies deleting (ii)(D).	
(iii) Reporting. The owner(s) or operator(s) of each PAD and single well facility or source, or compressor station shall comply with all applicable reporting requirements as specified by this Subsection. (A) The owner(s) or operator(s) shall provide the name and location of the PAD and single well facility or source, or compressor station anticipated to require the installation of a combustion device, replacement of equipment, or implementation of an LDAR Protocol, if applicable, by January 1, 2016. (B) Installation Notification of Control Device(s) and Associated Equipment (including pneumatic pumps). Owner(s) or operator(s) of each PAD and single well facility or source subject to the requirements of these regulations shall submit a report to the Division thirty (30) days after the end of each calendar quarter, beginning January 1, 2016, containing the following, if applicable: (I) The number of pollution control devices or equipment installed; (II) Pollution control installation date, type of control, and equipment controlled; (III) Name and location of the PAD and/or single well facility or source where controls are installed. (C) Installation Notification of Pneumatic Controller(s). Owner(s) or operator(s) of each PAD and single well facility or source subject to the requirements of these regulations shall submit a report to the Division thirty (30) days after the end of each calendar quarter, beginning January 1, 2016, containing the following, if	For clarity, PAW recommends the rule text insertion in paragraph (iii).	(iii) Reporting. The owner(s) or operator(s) of each PAD and single well facility or source, or compressor station subject to any emission reduction requirements of this rule shall comply with all applicable reporting requirements as specified by this Subsection. (A) The owner(s) or operator(s) shall provide the name and location of the PAD and single well facility or source, or compressor station anticipated to require the installation of a combustion device, replacement of equipment, or implementation of an LDAR Protocol, if applicable, by January 1, 2016. (B) Installation Notification of Control Device(s) and Associated Equipment (including pneumatic pumps). Owner(s) or operator(s) of each PAD and single well facility or source subject to the requirements of these regulations shall submit a report to the Division thirty (30) days after the end of each calendar quarter, beginning January 1, 2016, containing the following, if applicable: (I) The number of pollution control devices or equipment installed during the quarter; (II) Pollution control installation date, type of control, and equipment controlled; (III) Name and location of the PAD and/or single well facility or source where controls are installed. (C) Installation Notification of Continuous Bleed Pneumatic Controller(s). Owner(s) or operator(s) of each PAD and single well facility or source subject to the requirements of these regulations shall submit a report to the Division thirty (30) days after the end of

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Section 6. **[Reserved.] Requirements for existing oil and gas production facilities or sources in the Upper Green River Basin.**

New Proposed Rule	PAW Comments	Recommended Rule Language Change
applicable: (I) The number and bleed rate of pneumatic controllers installed and date of installation; and (II) Name and location of the PAD and/or single well facility or source where pneumatic controllers are installed. (D) The final, quarterly notification of installation required under Subsections (B) and (C) above, shall be submitted no later than January 31, 2017, if applicable. (E) Removal Notification of Control Device(s). The owner(s) or operator(s) of each PAD and single well facility or source subject to the requirements of these regulations shall submit a demonstration to the Division for approval prior to removal of any pollution control device. This demonstration shall contain at a minimum: (I) The average daily condensate/oil or gas production rate for the previous twelve (12) calendar months; (II) Emissions as determined by utilizing paragraph (I) above, and the calculation for flashing emissions in Paragraph (c)(ii), and/or the calculation for dehydration units in Paragraph (d)(ii) of these regulations; (III) Any additional supporting data used to calculate emissions, including but not limited to, a site specific or composite extended hydrocarbon analysis no older than three (3) years from the proposed removal date; and (IV) Name and location of the PAD and/or single well facility or source where controls are proposed for removal. (F) Any PAD and single well facility or source, or compressor station subject to requirements of	Asking for a bleed rate in (C)(I) is inappropriate as it is not possible to provide. A low bleed controller is defined as <6 scfh, and there is no continuous bleed controller inherently designed to be operated at a specific bleed rate. Instrument gas pressure, an external factor, and pilot orifice diameter of the controller must be compatible to achieve a low bleed rate. An intermittent vent controller (i.e. no bleed) has an inherently designed bleed rate of zero. While PAW believes that the rule is simplified by only regulating continuous bleed controllers as shown in our comments for paragraph (f), if WDEQ disagrees, then it would be appropriate to ask for the controller type (i.e. continuous low bleed or intermittent vent (no bleed)) instead of asking for a bleed rate. It isn't clear whether or not quarterly reports are expected even if no equipment is installed during any given quarter. To avoid unnecessary reporting, PAW recommends a rule text change in paragraph (D) that clearly specifies that no quarterly report is required for sites where no equipment installations under (B) and (C) occurred during the reporting period.	each calendar quarter, beginning January 1, 2016, containing the following, if applicable: (I) The number ~~and bleed rate~~ of continuous low bleed pneumatic controllers installed during the quarter and date of installation; and (II) Name and location of the PAD and/or single well facility or source where continuous low bleed pneumatic controllers are installed. (D) Quarterly notifications are not required for any quarter in which no installations referenced in Subsections (B) and (C) occurred. The final, quarterly notification of installation required under Subsections (B) and (C) above, shall be submitted no later than January 31, 2017, if applicable. (E) Removal Notification of Control Device(s). The owner(s) or operator(s) of each PAD and single well facility or source subject to the requirements of these regulations shall submit a demonstration to the Division for approval prior to removal of any pollution control device. This demonstration shall contain at a minimum: (I) The average daily condensate/oil or gas production rate for the previous twelve (12) calendar months; (II) Emissions as determined by utilizing paragraph (I) above, and the calculation for flashing emissions in Paragraph (c)(ii), and/or the calculation for dehydration units in Paragraph (d)(ii) of these regulations; (III) Any additional supporting data used to calculate emissions, including but not limited to, a site specific or composite extended

P-1-22

P-1-23

Section 6. **[Reserved.] Requirements for existing oil and gas production facilities or sources in the Upper Green River Basin.**

New Proposed Rule	PAW Comments	Recommended Rule Language Change
Subsection (g) of these regulations shall submit, for Division review and approval, the LDAR Protocol prior to implementation of the protocol. (G) All report and notification submissions shall be certified as being true, accurate, and complete by a responsible official to the best of their knowledge. A responsible official is an individual who is responsible for the information provided in the reports and notifications, and who accepts responsibility for the reports and notifications. (H) The owner(s) or operator(s) shall submit notifications or reports as required in this Subsection to the Division electronically through https://airimpact.wyo.gov or by hard copy to the Cheyenne Office and Lander Field Office. Contact information for the Cheyenne and Lander offices is located at: http://deq.state.wy.us/.		hydrocarbon analysis no older than three (3) years from the proposed removal date; and (IV) Name and location of the PAD and/or single well facility or source where controls are proposed for removal. (F) Any PAD and single well facility or source, or compressor station subject to requirements of Subsection (g) of these regulations shall submit, for Division review and approval, the LDAR Protocol prior to implementation of the protocol. (G) All report and notification submissions shall be certified as being true, accurate, and complete by a responsible official to the best of their knowledge. A responsible official is an individual who is responsible for the information provided in the reports and notifications, and who accepts responsibility for the reports and notifications. (H) The owner(s) or operator(s) shall submit notifications or reports as required in this Subsection to the Division electronically through https://airimpact.wyo.gov or by hard copy to the Cheyenne Office and Lander Field Office. Contact information for the Cheyenne and Lander offices is located at: http://deq.state.wy.us/.
(i) Compliance. Compliance with Chapter 8, Section 6 of the WAQSR, does not relieve any owner(s) or operator(s) of a PAD and single well facility or source, or compressor station from the responsibility to comply with any other applicable requirements set forth in any federal or State law, rule or regulation, or in any permit.		

Section 6. **[Reserved.] Requirements for existing oil and gas production facilities or sources in the Upper Green River Basin.**

New Proposed Rule	PAW Comments	Recommended Rule Language Change
• Are blowdown tanks included in the emission limits? A strict reading of the definition of "storage tanks" makes us believe they are. However, in the September 2013 guidance does not include blowdown tank emissions under control requirements other than best management practices (BMPs), and the blowdown permits currently issued require the same. PAW believes blowdown tanks should be excluded from tank emission calculations. In addition, PAW requests that all other recordkeeping and control requirements relating to blowdown tanks be removed from the rule. Chapter 1, Section 5 covers emergency tank requirements. The requirements of the proposed rule provide insignificant environmental benefit and duplicate requirements of the venting / blowdown permits. The Division has acknowledged that emissions from blowdown and venting are not a significant source of emissions and thus, additional recordkeeping is overly burdensome. The additional record-keeping required by this rule would result in existing wells having more stringent record-keeping and reporting requirements than new wells.		

P-1-24

Received date 12/10/14

P-2

JONAH ENERGY LLC

December 10, 2014

Attn: Steven A. Dietrich, Administrator
Department of Environmental Quality
Air Quality Division
Herschler Building, 2-E
122 West 25th Street
Cheyenne, WY 82002

RE: Comments on Proposed Regulation
WAQSR, Chapter 8, Nonattainment Area Regulations
Section 6, Upper Green River Basin Existing Source Regulations

Dear Mr. Dietrich:

Jonah Energy LLC (Jonah Energy) appreciates the opportunity to provide the following comments for consideration to the Wyoming Department of Environmental Quality (WDEQ) Air Quality Division (AQD) on the Wyoming Air Quality Standards and Regulations (WAQSR) proposed Chapter 8, Section 6 Upper Green River Basin Existing Source Regulations. Jonah Energy currently operates in the Jonah Field in Sublette County, Wyoming. As an oil and gas company with significant operations in the Upper Green River Basin, and with several employees that live and work in the area that will be impacted by the proposed regulations, Jonah Energy appreciates that a shared responsibility is necessary in order to improve the air quality in the Upper Green River Basin.

P-2-1

Jonah Energy has reviewed the latest version of the proposed Chapter 8, Section 6 Upper Green River Basin Existing Source Regulation and we support the rule as proposed. We are supportive of a timely implementation of the proposed rule to further aid in continued emission reductions in the Upper Green River Basin. Jonah Energy is currently in compliance with the proposed Chapter 8, Section 6 regulation emission control requirements, Leak Detection and Repair (LDAR) requirements and recordkeeping requirements. The proposed regulation is timely, necessary and important for all stakeholders involved as part of returning the Upper Green River Basin to attainment with federal air quality standards for ozone.

While the majority of our production facilities and associated production equipment are controlled to meet WDEQ's presumptive BACT permitting requirements through the Oil and Gas Production Facilities Chapter 6, Section 2 (C6 S2) Permitting Guidance for new and modified facilities, there are some locations which are not subject to the latest C6 S2 Permitting Guidance for which we use our discretion and apply voluntary measures in order to minimize emissions from those production facilities.

Each month, Jonah Energy conducts infrared camera surveys using a FLIR® camera at each of our production facility locations. Since the implementation of Jonah Energy's Enhanced Direct Inspection & Maintenance (EDI&M) Program in 2010, we have conducted over 16,000 inspections and have repaired thousands of leaks that were identified by the FLIR camera. Based upon a market value of

natural gas of $4/MMBtu, the estimated gas savings from the repair of leaks identified exceeded the labor and material cost of repairing the identified leaks. Additionally, an estimate of hundreds of tons of volatile organic compound (VOC) emissions have been eliminated from being emitted to the atmosphere.

The result of Jonah Energy's EDI&M Program has significantly reduced VOC and hazardous air pollutant (HAP) emissions to the Upper Green River Basin airshed, has reduced the amount of sales gas lost due to leaks going undetected resulting in significant sales gas savings, and has reduced the number and severity of enforcement actions from the WDEQ due to fugitive leaks.

Jonah Energy appreciates WDEQ's consideration of our comments and would welcome working with the Agency on items mentioned herein or raised during the public comment process. Should you have any questions, please feel free to contact me directly.

Respectfully,

Paul Ulrich
Director, Government Affairs & Regulatory

JONAH ENERGY LLC

Jonah EDI&M Program Summary

Author:	**Glenn Whicker**
DATE:	**Nov 17, 2014**

1. Program Description

The Enhanced DI&M program was launched on July 15, 2010. The program is a leak detection and repair program designed to reduce fugitive emissions from equipment components at Jonah Energy Central Delivery Points and stand-alone wellhead facility locations in the Jonah Field. The inspection schedule for this program requires that each facility location be inspected using a Forward looking Infrared Gas Detection Camera (FLIR) once per month. All remote wellhead locations will be inspected once every twelve months. All leaks discovered during inspections are repaired on a schedule described in the Program Plan. Important measurement and tracking aspects of the program are documented and stored in a database.

2. Program Objectives

- Significantly reduce VOC and Greenhouse Gas emissions to the Sublette County airshed.
- Make this program enforceable by the WDEQ instead of being subjected to fines for NOVs from leaking equipment.
- Bank VOC emission offset credits to use for future production.
- Reduce the amount of sales gas lost from leaks.

3. Program Status

- The EDI&M program has been running smoothly for five years and is successfully meeting the monthly inspection schedule and all requirements of the Program Plan.
- Significant reductions in VOC emissions have been made. We have exceeded the 75% emission reduction goal from the estimated permitted VOC fugitive emissions.
- Significant sales gas savings have been made.

4. Program Inspection and Repair Results Summary:

12 Month Total	2010	2011	2012	2013	2014 YTD
# of Inspections	3303	3473	4187	3847	2294
Leaks identified	2959	2159	2086	1947	930
Repair Time (hr)	704.9	401.8	357.4	246.5	114

JONAH ENERGY LLC

Major initiatives carried out in the Jonah Field to help reduce ozone precursor emissions and associated Sublette County ground level ozone concentrations include the following:

1. Conversion of Drill Rig Engines from Diesel to Natural Gas Fuel

2. Implemented Best Management Practices (BMP) including:
   a. *Installed advanced combustors that thermally oxidize vapor from condensate and produced water tanks, and from the wellhead dehydrator still vents and flash tanks. This BMP has resulted in a higher level of operational reliability and increased combustion efficiency to a minimum of 98%.*
   b. *Increased set points on pressure-relief devices to a higher pressure, thereby reducing the frequency of pressure-driven venting.*
   c. *Installed knockout tanks upstream of combustors to prevent liquid carryover from entering the burner assembly. This resulted in an increase in combustor reliability and minimized smoking.*
   d. *Increased emission control system piping diameter to prevent backpressure on tanks, thereby enhancing vapor flow to combustors.*
   e. *Replaced pressure relief valves with higher performance Anderson-Greenwood valves on most locations. This resulted in lower leak rates and decreased fugitive emissions.*
   f. *Replaced high-bleed pneumatic devices with low-bleed pneumatic devices that reduce gas loss and associated VOC emissions.*
   g. *Installed plunger lift systems and surfactants that unload liquids from wells without the need for blowing down the wells and venting gas to atmosphere. This action reduced VOC emissions from well blowdown operations.*
   h. *Recovering pneumatic pump vent gas to be used as fuel gas.*

3. Jonah Energy has consolidated many single well production facilities into multiple well Central Distribution Point (CDP) facilities. This resulted in a further long-term reduction in VOC emissions.
   a. *Tank vapors previously emitted to atmosphere at uncontrolled single well sites are controlled at consolidated CDP sites using combustors, thereby reducing VOC emissions to atmosphere.*
   b. *Motive gas, used to drive pneumatic pumps at single well sites previously emitted to atmosphere, is controlled at consolidated CDP sites using combustors, thereby reducing VOC emissions to atmosphere.*
   c. *Consolidation of single well sites into CDPs eliminates redundant equipment, thereby reducing fugitive emissions.*
   d. *Recovered hydrocarbon vapor streams are used to fuel reboiler and separator heaters, thereby reducing fuel consumption and associated combustion emissions to atmosphere.*

e. *Truck and other motor vehicle miles and associated vehicle exhaust emissions are reduced because of a reduction in the total number of facilities.*

4. Jonah Energy worked with WDEQ to develop a flareless completion permit; this approach significantly reduces VOC emissions. In this process, the well is completed using a flowback skid that captures gas that was typically vented to the atmosphere in a conventional completion process.

5. Jonah Energy has centralized well completion operations, thereby reducing the need to mobilize completion equipment to multiple well sites resulting in reduced associated engine emissions.

6. Jonah Energy has worked with compression partners to decrease field gathering system pressure from approximately 600 pounds per square inch (psi) to approximately 230 psi. This has resulted in a decrease in condensate tank flash emissions.

7. Jonah Energy is evaluating the installation of vapor recovery units to capture flash vapors from condensate tanks.

8. Jonah Energy has implemented a voluntary Enhanced Directed Inspection and Maintenance (EDI&M) program to augment current permit requirements which has further reduced fugitive emissions from leaking equipment by more than 75%. Jonah Energy conducts a field-wide camera inspection of CDPs, equipment, and well heads to identify and repair leaks.

9. Jonah Energy has enclosed the water tanks in the Jonah Field and routed tank emissions to the emissions control systems at each production location. Jonah Energy executed this retrofit action voluntarily.

rcvd 12/10/14

EG-2

WY UGRB Existing Source Comments

Jon Goldstein

Thank you for the opportunity to comment on this important issue.

My name is Jon Goldstein and I am Senior Energy Policy Manager with Environmental Defense Fund.

As stated in our joint written comments with the Wyoming Outdoor Council and Citizens United for Responsible Energy Development, we greatly appreciate the Air Quality Division's continued efforts to ~~put in place rigorous clean air measures~~ protect + improve AQ in the Upper Green River Basin.

We believe the division's proposal ~~rests on a very strong foundation of~~ represents commonsense, cost effective and proven pollution control measures and commend the Agency for the recent improvements and clarifications contained in the October draft. We

In particular, we strongly support the extension of the quarterly instrument-based leak detection and repair measure to compressor stations.

EG-2-1

Many aspects of the proposal before you today ~~continue to demonstrate~~ bolster Wyoming's tradition of national leadership on clean air measures for oil and gas activities.

The division's proposal to require the replacement of both continuous and intermittent high-bleed pneumatic controllers with low or no-bleed ones, 98% control of flash emissions from storage tanks and separation vessels and glycol dehydrators, the elimination or 98% reduction of pneumatic pump emissions, and quarterly instrumented leak inspections at higher emitting well sites and compressor stations, are all praiseworthy.

EG-2-2

For these reasons we ~~strongly support~~ urge the Air Quality Advisory Board to approve these rules today and keep this process moving toward a full hearing at the Environmental Quality Council.

While we believe much work remains to improve the protectiveness and workability of the proposal, including extending all pollution control measures to compressor stations and capturing more pollution sources by employing a lower fugitive emissions threshold, these issues can easily be addressed as the proposal moves forward to the EQC and we see no reason for further delay. we believe

Studies from the UGRB and other basins clearly demonstrate that elevated levels of volatile organic compounds emitted from oil and gas activities contribute to harmful ozone pollution and reducing these pollutants is necessary to restore healthy air to the citizens of Pinedale and surrounding communities.

Ozone is a serious public health issue. These measures will help clean up the air and better protect the health of local residents. As the epa considers more stringent O3 stds, the more the state can do to address this problem now, the better off the state will be.

Thank you for the opportunity to comment today and I'd be happy to take any questions.

rcv'd 12/10/14

C-7

AQAC Comments

I would like to thank you for your efforts in this rule making process to reduce ozone-producing emissions and other air pollutants that accompany them resulting from gas production in the Upper Green River Valley. I also appreciate the opportunity to participate in this process as a citizen.

The proposed rule to control emissions from existing sources makes great progress, and over the past three months the DEQ has made improvements making it even more effective. At this point the most important action is to move the rule along toward approval and implementation.

In order to take full advantage of this current opportunity there are still a couple of further improvements that could be included:

1. The rules have been improved to include leak detection and repair (LDAR) on compressors. This leaves many other sources of emissions related to compressor stations without the benefit of the improvements required of them at well sites. These include engines,pneumatic pumps and controllers, dehydration units, and other devices. I would like to see the rule require controls on emissions for the compressor station as a whole rather than only a specific element of the facility. C-7-1
2. The 4 ton per year (tpy) threshold for LDAR, flashing emissions, dehydration units, etc. leaves 97% of the facilities, and 87% to 95% of the emission from those facilities unregulated as their emissions are below 4 tpy. While the emissions from any given facility is small, the large number of these facilities results in a large cumulative volume of emissions in the basin. The 4 tpy threshold accomplishes only a marginal reduction. I would like to see this threshold at a level that reduces emissions and leaks from these facilities by 75% to 90%. Though not being considered here, this comment applies to new and modified sources as well, where the 4tpy standard is equally ineffective. C-7-2

These improvements would contribute to the goal of establishing a level playing field where rules for existing facilities, and new and modified sources are the same.

Conventional opinion views regulations as harmful to industry. I feel differently. Strong rules and low emissions benefit everyone. Rules resulting in low emissions place both industry and the DEQ in a position to accommodate increases in production in existing fields, activity moving closer to Pinedale, periodic winter weather conducive to ozone production, potentially 3 new mega-fields coming on line, and a probable reduced ozone standard. In this manner the DEQ and industry will maintain good air quality in the Pinedale area in a proactive manner. This better protects the security of industry and the health of local residents in the long term allowing industrial activity to continue and increases.

Again, and most importantly, this rule needs to move forward. I would like to see that occur with the additional improvements I have mentioned.

Dave Hohl

Dave Hohl

December 10, 2014

December 10, 2014

TRANSMITTED IN PERSON

Steven A. Dietrich
Administrator, DEQ/AQD
Herschler Building 2-E
122 W. 25th Street
Cheyenne, WY 82002

Re: UQ Comments on Wyoming Air Quality Standards and Regulations for Nonattainment Area Regulations - Chapter 8, Section 6, Requirements for existing oil and gas production facilities or sources in the Upper Green River Basin, as revised

Dear Mr. Dietrich:

Thank you for the second opportunity to comment on the proposed revisions to the Wyoming Air Quality Standards and Regulations (WAQSR) Chapter 8, Section 6. As described by our specific comments below, Ultra and QEP (UQ) have reviewed the proposed revisions and generally appreciate the revisions that were made based on comments provided by Industry during the first public comment period. Generally UQ supports this rulemaking and has only a small number of remaining concerns.

UQ truly appreciates the Wyoming Department of Environmental Quality's Air Quality Division's ("the Division") efforts to work with Industry and other stakeholders to address concerns with the Existing Source Rule as proposed. UQ would also like to thank the Division for extending the timelines set forth in the proposed rule and also for the clarification provided on how this rule impacts the Chapter 6 Section 2(C)(ii), Interim Permitting Policy for sources in Sublette County. UQ also appreciates the Division's clarification of the Pneumatic pump and controller sections, the composite hydrocarbon analysis section, the monitoring sections and the clarification of language throughout the rule. Although UQ still feels that the requirement for quarterly inspections is cumbersome and costly with little environmental benefit, we have no further comment at this time.

Based on the revised rulemaking, UQ generally has three (3) outstanding concerns and two (2) editorial comments. Our outstanding concerns include;

1) facilities modified since the March 2010 guidance should be exempt from this rule,
2) the 7-day requirement to empty blowdown tanks for operators with a liquids gathering system and
3) the requirement to complete component counts from one hundred (100) representative facilities.

Our two editorial concerns are also outlined below and involve the language in Sections 6(a) and (b).

Outstanding concerns:

P-4-1

1.) From our previous comments, we would like to restate that UQ has implemented a number of measures to comply with JPAD-specific control requirements as outlined in the WDEQ's "Oil and Gas Production Facilities Chapter 6, Section 2 Permitting Guidance". In many cases, emissions control measures have been implemented at existing pads where new wells were added. UQ does not believe that additional modification of those pads to bring them into compliance with the new rule is an effective use of resources. Therefore, UQ suggests that JPAD facilities with an existing permit that includes

presumptive BACT requirements prepared according to the March 2010 or subsequent revision of the Permitting Guidance be exempt from the rule.

2.) Chapter 8, Section 6(c) Flashing Emissions at an Existing Facility or Source as of January 1, 2014 section (i) (C) states the following:

"(C) Emergency, open-top and/or blowdown tanks shall not be used as active storage tanks but may be used for temporary storage.

(II) If emergency, open-top and/or blowdown tanks are utilized, they must be emptied within seven (7) calendar days."

Comment: As stated in UQ's previous comments, there are several streams other than blowdowns routed to the blowdown tanks, such as dehy blowcases and fuel gas scrubbers, and the tanks are used as storage tanks for these minor, low-emission streams. The volume routed to these tanks during well blowdowns is quite small. It is unnecessary to require tanks to be emptied after 7 days, as most emissions are from flash and will have already occurred by that time.

As reported to the Division in January of 2011and enclosed with this letter, QEP Energy Company conducted emissions testing for QEP's test tank at the Stewart Point 5-20 Pad to provide quantitative analytical data for emissions seen through an infrared camera for test tanks used a the Pinedale Anticline. The results indicated that average VOC emissions were 0.0088 tons per year (17.6 pounds per year [*emphasis added*]) and HAP emissions were 0.0008 tpy from the tank. Based on this study, QEP has demonstrated that test tanks are insignificant emissions sources; therefore, it is unclear why these tanks would need to be emptied every 7 days. In addition to other environmental degradation and safety issues caused from increases in truck traffic, the emissions from perpetually emptying these tanks would lead to much higher emissions than the emissions currently coming from the tanks.

P-4-2

Furthermore, given the number of sources which discharge to these tanks, it would be impossible to show compliance with this requirement, without having trucks constantly traveling to each and every pad to drain inches of water from these tanks every 7 days. This previous emission study clearly illustrates that the increase in emissions from this truck traffic does not justify the environmental benefit from emptying these tanks as frequently as 7 days. Therefore, UQ would request that the division exempt sites which drain to a liquid gathering system from this requirement, or impose a more realistic volume based limit for emptying the tanks. To minimize truck traffic and set an enforceable limit, UQ suggests a volume limit for emptying the tanks of 100 barrels.

3.) Chapter 8, Section 6(g)((ii) Applicability Determination for Fugitive Emissions states the following:

(A) Fugitive emissions shall be estimated using Table 2-4 from EPA-453/R-95-017, Protocol for Equipment Leak Emission Estimates, and the total facility component count.

(I) Pad and single well facility or source component counts shall be determined by actual field count, or a repetitive component count from the same geographical area, taken from no less than one hundred (100) similar facilities.

(B) Site-specific speciated hydrocarbon emission rates can be estimated by multiplying the total hydrocarbon emission rate estimated in Subsection (ii)(A) above by measured VOC and HAP weight fractions.

Comment: UQ appreciates the Division's willingness to work with Industry representatives to allow for a representative component count for leak estimates; however, UQ believes that attaining component counts from "100 similar facilities" is ambiguous and unrealistic due to the following reasons:

1) Project Scope: The majority of UQ's wells are on multi-well pads; however, component counts by well are considered to be consistent across the production train for individual wells and well types. If we assume a typical well pad on the Pinedale anticline has 20 wells on it, and based on the language quoted above, UQ would need to provide component counts for 100 pads and subsequently 2,000 wells.
2) Project Cost: UQ previously estimated that it would cost approximately $1,400[1] per well. So if 100 "similar facilities" were used to determine component counts, each operator would need counts for 2,000 wells and spend approximately $2.8 million dollars to obtain a "representative field count." In addition, how will the representative facilities be defined and determined? UQ hopes that this example provides the Division with sufficient data to understand the level of effort required for "100 representative facilities".

P-4-3

UQ respectfully requests that the division accept one of the suggestions below, or set a lower, more reasonable number of "similar facilities". Providing a better definition of "similar facilities" to determine actual component counts which will garner the results and level of detail the Division originally intended for Subsection (g)(ii). If wells with liquids gathering systems cannot be exempt, to meet the intent of the rule in a manageable and reasonable manner, UQ would suggest replacing "similar facilities" with a requirement to conduct component counts on 100 wells (minimum) at 5 pads with similar well pad facilities and associated equipment.

UQ would also like to re-state its previous comment on subsection (g) requesting the Division consider current published and accepted component count methods listed in Part 98, Subpart W – Petroleum and Natural Gas Systems, specifically to 40.CFR §98.233(r) and Table W-1B. This method has already undergone the research, scrutiny, and public comment as required to be published in the Federal Register, and UQ believes this alternative method to determine component counts is appropriate for this application.

P-4-4

Finally, UQ is currently participating in the Emissions Inventory Study which will generate actual emissions rate data regarding fugitive emissions at UQ sites. We request that we be able to use this site specific, accurate data in lieu of the requirements of the above referenced section. The Division indicated in their response to comments that they would "consider this option"; however, UQ feels it would be preferable to include that language in this rule making so that additional rulemakings will not be needed in the future.

[1] Assumes 1 man crew @$70/hour. two 10-hour days per well.

Editorial Concerns:

1.) Section 6 (a) Applicability (iii) states the following:

"A compressor station, as defined in Subsection (b), shall comply with the requirements of Subsection (g) of these regulations unless a Wyoming Air Quality Standards and Regulations (WAQSR) Chapter 6, Section 2 permit has been issued that meets or exceeds the Subsection (g) requirements; and"

P-4-5

Comment: This definition appears to be taken from NSPS OOOO and does not take into account compressors (centrifugal or reciprocating) that are located at a well site. Although the well pad and these compressor stations have the same monitoring requirements under the intent of this rule, UQ feels it is very important to clarify this definition during this rulemaking by differentiating between compressor stations at midstream operations and those located at well sites. This suggestion will not have an impact on the intent of this rule, but will clarify the language for those tasked with implementing this rule in the unforeseen future.

2.) *Section 6 (b) Definitions*

a. ***"Extended hydrocarbon analysis"*** *means a gas chromatograph analysis performed on pressurized hydrocarbon liquid (oil/condensate) and gas samples, and shall include both speciated hydrocarbons from methane (C1) through decane (C10), including the following Hazardous Air Pollutants (HAP) - benzene, toluene, ethyl-benzene, xylenes (BTEX), n-hexane, and 2-2-4-trimethylpentane.:*

P-4-6

Comment: UQ feels the clarifier "both", as used in this definition, "...and shall include *both* speciated hydrocarbons..." is somewhat confusing and unnecessary. In addition, the reading of the definition suggests that *only* methane (C1) through Decane (C10) should be reported in an analysis, which UQ does not believe to be the Division's intent.

To add clarity to this definition, UQ suggests the following revision:

"Extended hydrocarbon analysis" means a gas chromatograph analysis performed on pressurized hydrocarbon liquid (oil/condensate) and gas samples. The analysis shall include, but is not limited to, the following speciated hydrocarbons: methane (C1) through decane (C10), and the following Hazardous Air Pollutants (HAP) - benzene, toluene, ethyl-benzene, xylenes (BTEX), n-hexane, and 2-2-4-trimethylpentane.

As stated above, UQ truly appreciates the Division's efforts to work with Industry and other stakeholders to address concerns during the rulemaking process and thanks you for allowing us to provide additional comment.

Sincerely,

Brad Johnson
Senior VP
Operations
Ultra Resource, Inc.
304 Inverness Way South
Suite 295
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Joe Redman
General Manager
Greater Green River Basin
QEP Resources
1050 17th Street
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DEC 10 2014

AIR QUALITY DIVISION

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Green River, WY 82935
307/872-2880
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December 9, 2014

Steven Dietrich, Administrator
Wyoming Department of Environmental Quality
Air Quality Division
122 West 25th Street
Cheyenne, WY 82002

Subject: Comments on Proposed Rule Change to Wyoming Air Quality Standards and Regulations, Chapter 8, Nonattainment Area Regulations

Dear Mr. Dietrich:

Williams Field Services Company, LLC, (WFS) appreciates this opportunity to provide comments on the proposed revisions to the proposed rule change to Wyoming Air Quality Standards and Regulations, Chapter 8, Nonattainment Area Regulations.

WFS contributed to and supports the comments submitted by the Petroleum Association of Wyoming. WFS would like to add some additional comments regarding the proposed revisions to the proposed rule affecting dehydration units.

1. As written, the proposed regulation does not appear to allow existing dehydration units, which are operating under existing permits that require limited operating hours, to take into account those limited operating hours when determining applicability to the rule. If an existing dehydration unit has federally enforceable permit conditions that limit the potential to emit, those federally enforceable conditions need to be taken into account when determining applicability to the existing source rule. If not, it is unclear if the intent of the existing source rule would be to supersede existing permits such that any prior operating hours limitation would no longer be in force. P-5-1

2. The WDEQ's Response To Comment document dated October 31, 2014, states on Page 10, for the Response to Comment Number(s) P-1-6, P-2-18, that, "... the Division has determined that it is not appropriate to utilize flash tanks and condensers in determining applicability in the proposed regulation for existing sources." P-5-2

   As with the previous comment regarding limited operating hours, if a dehydration unit is operating with a flash tank and/or condenser and this scenario is recognized in an existing permit, the use of the flash tank and/or condenser should be recognized in the

applicability determination for the existing source rule. This appears to be correctly included in the proposed rule in (d)(ii)(C)(III)(1.), which stipulates that the model shall consist of, "… average operating parameters of emissions control equipment." It is important to note that without this provision, the existing source rule becomes more stringent than the requirements for new sources, as the September 2013 Oil and Gas Guidance Document, (page 9 definition of "potential") allows use of the worst case operating parameters of the flash tank and condenser when determining control removal.

If you have any questions, or need any further clarification regarding these comments, please feel free to contact me.

Sincerely,

Cortnie Morrell

Cortnie Morrell
Environmental Specialist

comment? Do you want questions, comments on anything in the proposed rule?

MS. CEDERLE: Sure.

BOARD MEMBER HULME: I do have one. This is Diana Hulme. On page 8-86, at the bottom of the definitions, you said the extended hydrocarbon analysis. This is likely just a grammatical nitpick. The third line where it says, "Include both speciated hydrocarbons from methane through decane, including the following Hazardous Air Pollutants" that are listed, I would move to strike the word "both" out of there because there aren't really two things listed. So that it would just say, "And shall include both speciated hydrocarbons from methane through decane, including the following Hazardous Air Pollutants."

V-AB-1-1

MS. CEDERLE: Noted.

CHAIRMAN BROWN: Go ahead.

BOARD MEMBER HULME: I actually have two more comments, questions, clarification. On page 8-90, Section (g) under the Fugitive Emissions, and then subpart (i) and (C), capital (C), Jeni, when you -- or Jeni and Amber, when you gave the presentation, I think I heard you say that each quarter of the year would require instrument measurement at a minimum, but could also include the AVO technique as well; is that correct? Did I hear that correctly?

V-AB-1-2

MS. POTTS: Yes.

BOARD MEMBER HULME: So for sure, instrumentation that has been listed is required, but they could add VOC to that?

The way -- when I first read this language, to me, reading (C) and (D), (C) mentions that it "Shall consist of optical gas imaging instrument, other instrument-based technologies, audiovisual-olfactory inspections, or some combination," and then (D) says, "An LDAR Protocol consisting of only AVO inspections will not satisfy the requirements."

When I read that, I took that to mean that three of the four quarters could be AVO. So what I'm wondering -- I'm not sure everyone has this issue, but I'm just wondering, for potential clarification of that language in (C), whether (C) could say that "An optimal gas imaging instrument or other instrument-based technology and audiovisual-olfactory inspections," and leave off "some combination thereof." To me, it was just unclear that until you said that this morning in the explanation, it was unclear to me that instrument-based readings were required and then AVO could be supplemental to that. I'll just throw that out for consideration.

MS. CEDERLE: We've actually received comment in regards to clarifying that language as well.

V-AB-1-3

BOARD MEMBER HULME: And then my last comment of clarification, again, on page 8-93, this would be capital letter (E), towards the bottom of that page, on "Removal Notification of Control Devices." Just a clarification question. Is that notification of -- or demonstration of the ability to remove control, is that a one-time demonstration that has to be done or is that required -- is that demonstration required any further down the road past one time?

MS. CEDERLE: Our intent is a one-time demonstration. We have to remember that these are existing sources and that it's very unlikely that the production level would spike back up.

BOARD MEMBER HULME: I just wanted a clarification. Thank you.

CHAIRMAN BROWN: Any other comments from the Board?

Okay. Before we get going with public comments -- excuse me.

BOARD MEMBER HANSON: One comment.

CHAIRMAN BROWN: Okay. Sorry.

BOARD MEMBER HANSON: That's on page 8-88. I discussed it with them already on the calculation of flashing emissions and Jeni, in her presentation, added the word "by operators," and I wondered whether that would

V-AB-2-1

clarify it. It's sort of a minor matter. It's probably understood that it should be by the operators, but I thought it would be clarified if we added just the words under this -- the (ii), "Calculation for Flashing Emissions by operators," and then it would refer to (A) and (B), determine the average and use in any generally accepted model, et cetera.

MS. CEDERLE: Klaus, I have that noted right now, but I also wanted to clarify with you that since we have a calculation for dehydration emissions on the next page, 8-89, is that something you would suggest to have that language incorporated there as well?

BOARD MEMBER HANSON: It would be good, yes.

MS. CEDERLE: Okay.

BOARD MEMBER HANSON: And I think it's minor. It is just to add the word "by operators."

CHAIRMAN BROWN: Any other comments from the Board or questions?

For the public comments, we're requesting if you haven't signed in, please sign in to the sign-in sheet at the back of the room, and if you wish to make a comment, please check the comment box so we can make sure that we have all the records taken care of properly at the end of the meeting.

And then for the public comment, would you please come up to the podium and state your name, and we'll have the microphone available there. And please make your comments directed to the Board and then we can do some questions -- answer some questions if there's some technical questions that we can address.

I had a request. Mr. John Robitaille would like to make a statement.

MR. ROBITAILLE: All right. Thank you very much. John Robitaille with the Petroleum Association of Wyoming. I'm going to try to limit my comments strictly to Section 6. I appreciate the efforts of the Division going forward with this. It's been a long process.

V-P-1-S

We really appreciate the effort and the support for the intent of the rule. I can tell you I don't think we really have anything substantive. We're making some clarifying edits and some suggestions in our comments.

So if you would turn to page 2 of our large document here, you'll notice our first comment would be under (v), asking for some clarification by striking the -- striking the 98 percent manufacturer-designed control efficiency.

V-P-1-1

And really what we're trying to do is just avoid some confusion, because there are alternative controls over the life of the well life that extend farther than that.

And so we're just -- we're trying not to limit that, just trying to clarify and avoid a little bit of confusion in that one provision.

If you turn the page to page 3, we go to the definition of extended hydrocarbon analysis. We're asking that the word "pressurized" be removed simply because we do not think that it is really -- that type of analysis, it's not really dependent to be pressurized. An example is we can take those types of analysis from an atmospheric tank. So just have that removed to clarify that just a touch for us. V-P-1-2

Go to page 4. Under flashing emissions -- and you'll see this throughout the document. We've asked for this provision throughout the document.

What we're suggesting -- while we greatly appreciate the move to 2017, there are instances where we may get into a situation where things are out of our control. It may be a vending problem. It may be a permitting with a different agency problem. If that should happen, then the operator would then be in noncompliance due to no fault of their own. V-P-1-3

So what we're asking for is by November 1, 2016, if we foresee these problems, we could come in and ask for an extension on that date.

Of course, it would have to be for good cause.

You know, it couldn't just be, well, I just didn't get to it. You know, just if we foresee these problems, if we're having permitting problems, if we've talked to the vendor, we can't get that particular piece that we need, what have you, come in prior to the date November 1, 2016 and see if we could get an extension granted.

In addition, on that, under (c)(i)(B), you'll see that we're asking for some inclusion of some language, suggesting that these tanks be temporary and in use for maintenance and blowdowns as they are not only used for blowdowns or emergencies or upsets. There are other reasons that they could be used, and so we'd like to clarify that just a little bit as well.

V-P-1-4

On the next page, on 5, you'll see that we are asking to remove the requirement to empty the tanks within seven calendar days. The reason being -- several reasons. One being when we do a blowdown, typically, we could produce less than one barrel, which would be below the level at which it would be sucked off. So it wouldn't do any good.

V-P-1-5

We can also -- even if it is full and we drain it, there's still going to be some in the bottom. And in addition to that, if you accept the provision we put in just a minute ago where it says "temporary," then, of course, it wouldn't be -- it wouldn't be perceived as

something that would be a permanent addition to the operation.

Moving on to calculation for flashing emissions under (C) there, we'd just like the word "representative" inserted so that it would read "representative composite" just for clarification, again, just to make it easier on our guys to be able to follow the regulation.

Go over to page 6 now, and we are in the dehys, and again, you see that extension language. The same reasons as before, just in case we run into problems, which, you know, never happens, but just in case.

We roll over to page 7 now. Again, we're into calculations for dehys. Under (B), we would request removal of the word "uncontrolled" and insert the word "existing" under (B). Simply just easier for us to follow, easier to understand what we're looking for here.

When we get down to (C), we have some things. We would prefer the removal of "wet gas analysis" and include "representative composite" again. Again, just for clarification. And then we would like to have the language say "sample collected upstream of the contact tower." That's mostly because it's my understanding you can take these samples anywhere in the streams. So if we're above the contact tower, that's pretty much where you would get the representative sample. That's just, again, some

V-P-1-6
V-P-1-7
V-P-1-8
V-P-1-9

easier -- easier for us to understand and follow the rule.

And then we would include that any site-specific or composite hydrocarbon analysis would be no older than three years from the date of the dehy unit and we're getting into all these various calculations. V-P-1-10

We're asking that you strike 3 under that because we put it up above. The same thing. And then we renumber 3 and 4 instead of 1 and 2 because it would seem to flow easier with us. I don't know if you agree with that or not.

We get back into pneumatic pumps. Again, you see the extension language for just in case, in case we run into a situation. V-P-1-11

We turn to page 9, Existing Pneumatic Controllers. We are asking that you include continuous bleed, and then anytime you say low or no bleed, we're asking for low bleed only, because no bleed is a marketing term and not really a technical term. So if we want to stay technical with our regulations, that's the correct terms that we would be using. And again, with pneumatic controllers, there's the extension language one more time just in case. V-P-1-12

Turning to page 10, Fugitive Emissions, under (ii), we have all of these various abilities to get -- to calculate fugitive emissions. We're asking for the V-P-1-13

addition of if there is such a thing, an approved alternate division method.

And then under (ii)(I), the current regulation is asking for 100 similar facilities. We think that 100 is excessive, and so we're requesting five. I think that you can get what you need with less than 100, certainly, and we think five is sufficient. V-P-1-14

Turn to page 11. We are still under Fugitives, I believe, under (B). When we get into this, we think that we can use the emission inventory study data and think that even if it was written in the response to comments that that was the intent, it's really not clear enough for us, so we'd prefer that we include that. V-P-1-15

And then for additional clarity, at the bottom of (B) where we talk about measured VOC and HAP weight fractions, we'd like to include "of the specific fluids leaking from a component" just so that we are -- we're clear on what we're looking for. V-P-1-16

Into monitoring, again, for clarification, we would like that to read under (i), "Well facility or source, or compressor station with a control device required by this rule," just so we're clear about what we are monitoring, recordkeeping and reporting. And then if that was included, then (C)(II) would no longer be necessary under the -- under that portion of the rule, as V-P-1-17

it would be redundant. So that could be removed.

We go to page 12. Again, for clarification, under (ii), Recordkeeping, we would suggest the inclusion after or compressor station with a control device or LDAR program required by this rule just so that we can be certain about, again, what exactly it is we're looking for and what we're intending.

V-P-1-18

Keeping under Recordkeeping under (B)(II)(1), again, for clarification, this would be a description of the parameter that is being monitored. And then under (II), we would include the -- record the date, time, duration, wind monitoring in the case combustion device is down or malfunction.

V-P-1-19

Now, the reason for that, most of these pilot flames are monitored automatically by telemetry, and so some of them don't even have pilot flames. I mean, they have like a flicker or something.

So to say that we need to know exactly when it went down or how it went down or why it went down, so and so forth, we think if we covered it this way, then, would get you what you need, but it also kind of covers that gamut of what may or may not be going on out in the field.

V-P-1-20

And again, by including that provision under (ii), that would eliminate the need for (B). It would just become redundant.

V-P-1-21 V-P-1-22 V-P-1-23 V-P-1-24

On page 14 under Reporting, again, we want to clarify what it is we're looking for. So we would say, "Single well facility or source, or compressor station subject to any emission reduction requirements of this rule," again, just to be clear.

Under (A)(I), at the end of the sentence, we would include "during the quarter." And again, we have the "Continuous Bleed Pneumatic Controller" under (C) just to clarify what we're talking about.

Page 15, (C)(I), again, we remove the bleed rate and include continuous low bleed. So it would be "Continuous low bleed pneumatic controllers installed during the quarter."

Again, in (II), it would be "Continuous low bleed." And then in (D), we would include the provision, "Quarterly notifications are not required for any quarter in which no installations referenced in Subsections (B) and (C) occurred." So that if you don't do anything, if you don't have any, why would you report "I did nothing." That's essentially where we are.

And I believe that is the end of our requested edits. I can try to answer questions, if you have any.

CHAIRMAN BROWN: Any questions from the Board for Mr. Robitaille?

BOARD MEMBER BONER: I have one question.

going to read those to you, but I will let you know what is, in fact, attached to the letter.

So it is a letter dated December 10, 2014 to attention: Steve M. Dietrich, Administrator of the Department of Environmental Quality Air Quality Division. And it is regarding comments on proposed regulation WAQSR, Chapter 8, Nonattainment Area Regulations, Section 6 Upper Green River Basin Existing Source Regulations.

"Dear Mr. Dietrich: Jonah Energy LLC," further referred to as Jonah Energy, "appreciates the opportunity to provide the following comments for consideration to the Wyoming Department of Environmental Quality Air Quality Division on the Wyoming Air Quality Standards and Regulations proposed Chapter 8, Section 6 Upper Green River Basin Existing Source Regulations. Jonah Energy currently operates in the Jonah Field in Sublette County, Wyoming. As an oil and gas company with significant operations in the Upper Green River Basin, and with several employees that live and work in the area that will be impacted by the proposed regulations, Jonah Energy appreciates that a shared responsibility is necessary in order to improve the air quality in the Upper Green River Basin.

"Jonah Energy has reviewed the latest version of the proposed Chapter 8, Section 6 Upper Green River Basin Existing Source Regulation and we support the rule as

V-P-2-1

proposed. We are supportive of a timely implementation of the proposed rule to further aid in continued emission reductions in the Upper Green River Basin. Jonah Energy is currently in compliance with the proposed Chapter 8 Section 6 regulation emission control requirements, Leak Detection and Repair requirements and recordkeeping requirements. The proposed regulation is timely, necessary and important for all stakeholders involved as part of returning the Upper Green River Basin to attainment with federal air quality standards for ozone.

"While the majority of our production facilities and associated production equipment are controlled to meet Wyoming DEQ's presumptive BACT permitting requirements through the Oil and Gas Production Facilities Chapter 6, Section 2 Permitting Guidance for new and modified facilities, there are some locations which are not subject to the latest Chapter 6, Section 2 Permitting Guidance for which we use our discretion and apply voluntary measures in order to minimize emissions from those production facilities.

"Each month, Jonah Energy conducts infrared camera surveys using a FLIR," F-L-I-R, "camera at each of our production facility locations. Since the implementation of Jonah Energy's Enhanced Direct Inspection and Maintenance Program in 2010, we have conducted over

16,000 inspections and have repaired thousands of leaks that were identified by the FLIR camera. Based upon a market value of natural gas of $4 per million Btu, the estimated gas savings from the repair of leaks identified exceeded the labor and material cost of repairing the identified leaks. Additionally, an estimate of hundreds of tons of volatile organic compound emissions have been eliminated from being emitted to the atmosphere.

"The result of Jonah Energy use EDI&M Program has significantly reduced volatile organic compound and hazardous air pollutant emissions to the Upper Green River Basin airshed, has reduced the amount of sales gas lost due to leaks going undetected resulting in significant sales gas savings, and has reduced the number and severity of enforcement actions from the Wyoming Department of Environmental Quality due to fugitive leaks.

"Jonah Energy appreciates the Wyoming Department of Environmental Quality's consideration of our comments and would welcome working with the Agency on items mentioned herein or raised during the public comment process. Should you have any questions, please free to contact me directly. Respectfully," signed by Paul Ulrich, Director of Government Affairs and Regulatory.

And attached to the letter are two additional pages. One is a summary of the Jonah EDI&M Program, and

the other is a list of major initiatives carried out in the Jonah Field to help reduce ozone precursor emissions and associated Sublette County ground level ozone concentrations.

CHAIRMAN BROWN: Thank you.

Any comments from the Board? Questions from the Board?

Will we get a copy of that?

MS. CEDERLE: I will provide a copy of that as well to the court reporter.

CHAIRMAN BROWN: Okay. Let's -- we'll just go down the lists that are kind of here. So next on the list will be Jon Goldstein, EDF.

MR. GOLDSTEIN: Thank you, Mr. Chair. My name is Jon Goldstein, and I'm senior energy policy manager with Environmental Defense Fund.

And as stated in our joint written comments with the Wyoming Outdoor Council and Citizens United for Responsible Energy Development, we greatly appreciate the Air Quality Division's continued efforts to protect and improve air quality in the Upper Green River Basin.

We believe the Division's proposal represents common sense, cost-effective and proven pollution control measures, and we commend the Agency for the recent improvements and clarifications contained in the October

V-EG-1-1

draft. In particular, we strongly support the extension of the quarterly instrument-based leak detection and repair measure to compressor stations.

Many aspects of the proposal before you today bolster Wyoming's tradition of national leadership on clean air measures for oil and gas activities.

The Division's proposal to require the replacement of both continuous and intermittent high-bleed controllers with low or no-bleed ones, 98 percent control of flash emissions from storage tanks and separation vessels and glycol dehydrators, the elimination or 98 percent reduction of pneumatic pump emissions and quarterly instrumented leak inspections at higher emitting well sites and compressor stations are all praiseworthy.

For these reasons, we urge the Air Quality Advisory Board to approve these rules today and keep the process moving toward a full hearing at the Environmental Quality Council.

While we believe work remains to be done to improve the protectiveness and workability of the proposal, including extending all pollution control measures to compressor stations and capturing more pollution sources by employing a lower fugitive emissions threshold, we believe these emissions can easily be addressed as the proposal moves forward to the EQC, and we see no reason for further

V-EG-1-2

delay.

Studies from the Upper Green River Basin and other basins clearly demonstrate that elevated levels of volatile organic compounds emitted from oil and gas activities contribute to harmful ozone pollution and reducing these pollutants is necessary to restore healthy air to the citizens of Pinedale and surrounding communities.

Ozone is a serious public health issue, as Darla mentioned earlier today, and the EPA is considering more stringent ozone standards, so we believe that the more the state can do now to address this issue, the better off the state will be in both solving the current problem as well as getting ahead of the problem that may be coming. These measures will help clean up the air and better protect the health of local residents.

Thank you for the opportunity to comment today, and I'd be happy to answer any questions.

CHAIRMAN BROWN: Thank you. Any comments, questions from the Board?

Let's see. Next on the list is Mr. Dave Hohl.

MR. HOHL: My name is Dave Hohl. I'm an approximately 36 years resident of Pinedale and presenting this as a local citizen. I have two presentations to make. The American Lung Association had submitted comments to the

DEQ, but due to fog in Missoula could not make it. So I'm going to read their presentation and then also some comments of my own.

So I'll start with the American Lung Association. "Dear Administrator Dietrich: As the country's preeminent organization committed to saving lives by improving lung health and preventing lung disease, we strongly urge the Wyoming Department of Environmental Quality Air Quality Division to adopt changes to Wyoming Air Quality Standards and Regulations, Chapter 8, Nonattainment Area of Regulations. This process represents an important opportunity to protect public health in the Upper Green River Basin. Adopting the proposed regulations establishing requirements for existing oil and gas production facilities and compressor stations located in the Upper Green River Basin ozone nonattainment area, with the suggested modifications identified below, will better protect the health of people living in that area. For these reasons we believe the proposed rule should be approved at the Air Quality Advisory Board meeting on December 10th in Pinedale.

"Health studies show that exposure to high levels of ozone pollution (commonly referred to as 'smog') leads to lung problems; causes respiratory harm, such as worsened asthma and worsened chronic obstructive pulmonary disease,

including emphysema and chronic bronchitis; causes increased susceptibility to infections and other respiratory ailments; is a leading cause of hospital visits, especially among children; and is linked to cardiovascular harm (e.g., heart attacks, strokes, heart disease, and congestive failure), central nervous system harm, reproductive and developmental harm, and even premature deaths.

"The American Lung Association has long advocated measures to protect Americans from breathing dangerous levels of ozone pollution. All available strategies, including regulation, should be employed as necessary to protect the public health against acute and chronic adverse health effects. The American Lung Association is especially concerned about the effects of air pollution on the health of vulnerable populations, including people with lung diseases such as asthma, lung cancer, and chronic obstructive pulmonary disease, the elderly, and children. Currently nearly 132 million people across the U.S. live in counties where monitors show unhealthy levels of ozone or particulate pollution. Unfortunately, one of those counties is Sublette County, Wyoming, in the heart of the Upper Green River Basin ozone nonattainment area.

"The unhealthy ozone levels in Sublette County have, for the past several years, led to failing grades in

the American Lung Association's annual 'State of the Air' reports. At times, ozone levels in Sublette County have exceeded those in Los Angeles, California. A recent study by the Wyoming Department of Health documented an increase in clinic visits for adverse respiratory-related effects on particularly smoggy days in Sublette County. Reducing ozone pollution is an important health issue -- public health issue and we are glad to see the Wyoming DEQ make a serious attempt at better -- to better protect local citizens in its proposed rules.

"Ozone pollution is created by interaction between the two different kinds of air pollutants, oxides of nitrogen and volatile organic compounds. Oil and gas development is a significant source of both of these contaminants. In fact, oil and gas development is the largest emission source for these pollutants in the Upper Green River Basin's Sublette, Lincoln, and Sweetwater counties.

"The Department's proposal to reduce harmful emissions from local oil and gas facilities and to restore healthy, clean air to the residents of Sublette, Sweetwater, and Lincoln counties is strong in several aspects. We support the DEQ's proposed requirements at well sites to replace both continuous and intermittent high-bleed pneumatic controllers with low or no-bleed ones

or zero bleed. We support the proposed requirements for 98 percent control of flash emissions from storage tanks, separation vessels, and glycol dehydrators, as well as the elimination or 98 percent reduction of pneumatic pump emissions. We also strongly support the proposed quarterly instrument-based leak inspections at well sites and compressor stations included in the most recent draft rules.

"However, the Department could realize even more pollution reductions (and thus greater public health benefits) by further utilizing proven, highly cost-effective technologies and practices that in many instances save operators money. To ensure the AQD fulfills its mandate to eliminate pollution and enhance the air quality in the basin, as well as protect the public health, we recommend the following further improvements:

"Extending all air pollution reduction requirements the state has proposed for well sites to compressor stations. By addressing pneumatic controllers, pumps, and dehydration units at the compressor stations, the Department could realize even more cost-effective pollution reductions.

"Second, extending the requirements for quarterly, instrument-based lead inspections to more sources of emissions. If the proposal were adopted as

V-NGO-1-1

V-NGO-1-2

currently drafted, many of the wells in the Upper Green River Basin would fall below the four-ton-per-year emissions threshold the state has proposed for quarterly inspections. The state's rules would therefore only apply strong, regular leak inspections to a small percentage of the sources in the basin. A lower, more inclusive threshold will capture more sources and reduce more pollution, since regular leak inspections, together with timely and effective repairs, are one of the best ways to reduce harmful ozone pollution in our air.

"Reducing emissions of air pollutants from natural gas and oil operations is crucial to minimizing health impacts to Wyoming citizens. We urge you to adopt the proposal with the improvements noted above.

"Thank you for your efforts on this critical public health issue. Sincerely, Ronni Flannery, American Lung Association of the Mountain Pacific."

And I've written my own personal comments. I find I can do a more credible job than just ad-libbing.

I would like to thank the Air Quality Advisory Council for your efforts in the rulemaking process to reduce ozone-producing emissions and other air pollutants that accompany them resulting from gas production in the Upper Green River Valley. I also appreciate the opportunity to participate in this process as a citizen.

The proposed rule to control emissions from existing sources makes great progress, and over the past three months, DEQ has made improvements making it even more effective. At this point the most important action is to move the rule along towards approval and implementation.

In order to take full advantage of this current opportunity, there are still a couple of further improvements that could be included:

1. The rules have been improved to include leak detection and repair on compressors. This leaves many other sources of emissions related to compressor stations without the benefit of the improvements required of and at well sites. These include engines, pneumatic pumps and controllers, dehydration units and other devices. I would like to see the rule require controls on emissions for the compressor station as a whole rather than only a specific element of the facility. V-C-1-1

Number 2. The four ton per year threshold for LDAR -- leak detection and repair -- flashing emissions, dehy units, et cetera, leaves 90 percent of the facilities and 87 to 95 percent of the emissions from those facilities unregulated, as their emissions are below four tons per year. While the emissions from any given facility is small, the large number of these facilities results in a large cumulative volume of emissions in the basin. The V-C-1-2

four ton per year threshold accomplishes only a marginal reduction. I would like to see this threshold at a level that reduces emissions and leaks from these facilities by 75 to 90 percent. Though not being considered here, this comment applies to new and modified sources as well, where the four tons per year standard is equally ineffective.

These improvements contribute to the goal of establishing a level playing field where rules for existing facilities and new and modified sources as well are the same.

Conventional opinion views regulations as harmful to industry. I feel differently. Strong rules and low emissions benefits everyone. Rules resulting in low emissions place both industry and the DEQ in a position to accommodate the increases in production in existing fields, activity moving closer to Pinedale, periodic winter weather conducive to ozone production, potentially three new mega fields coming on line within the nonattainment area and a probable reduction reduced ozone standard. In this manner, the DEQ and industry will maintain good air quality in the Pinedale area in a proactive manner. This better protects the security of industry and the health of local residents in the long term, allowing industrial activity to continue and increase.

Again, and most importantly, this rule needs to

move forward. I would like to see that occur with the additional improvements I've mentioned. Thank you.

CHAIRMAN BROWN: Thank you, Mr. Hohl.

Any comments, questions?

Thank you.

Let's see. Next on this list -- I can't read your writing, but this looks like John Roscoe, Jim Roscoe?

MR. ROSCOE: Thank you, Mr. Chairman. I'm Jim Roscoe. I'm a property owner in Boulder. I'd just like to encourage the Board to accept this rule. I think it's a step in the right direction. I believe we have farther to go.

V-C-2-1

I agree with both governors that I served under in the legislature saying that we want to develop our natural resources in a responsible way and on our own terms, and I believe that if we can do this, the decisions we can make in Wyoming is far preferable than the decisions being made in Washington. And if we can get ourselves out of this nonattainment mess that we created, it would also set a great example for the industry to move forward and be accepted.

Let's see. How do I want to say this? I think -- I was a strong proponent of natural gas. Worldwide and nationally, it's a fantastic fuel and that we need to improve on the development of the resource. Thank you very

much.

CHAIRMAN BROWN: Thank you, Mr. Roscoe.

Any comments?

Thank you.

Let's see. Next on the list is Mr. John Anderson.

MR. ANDERSON: Thank you for the opportunity to talk to you, provide my perspective. This is probably going to be fairly short.

My background on this is as a citizen of Pinedale, and I served on the Air Force Advisory Task Force, and that's the primary role I want to speak from here. We worked very hard at that and bringing those proposals forward, and this is one step among many that we recommended, and I would really like to see you move this forward. I think there are many other areas that need to be addressed also, but this isn't the proper forum for that. But I would support you passing this along to the next step in the process. Thank you.

V-C-3-1

CHAIRMAN BROWN: Thank you.

Next on the list is Chad Schlichtemeier.

MR. SCHLICHTEMEIER: Chad Schlichtemeier, Rockies air manager with Anadarko Petroleum Corporation.

CHAIRMAN BROWN: Excuse me, Chad.

MR. SCHLICHTEMEIER: And if I'm pausing

here, it's not because I fell asleep, it's because I'm having troubles reading my handwriting here. So bear with me.

I first want to say Anadarko supports and would like to commend the Division on all the work that they've done to date. You know, we do a lot of work in Utah and deal with Region 8 on a frequent basis and Wyoming's program is always held to be the gold standard when it comes to taking proactive approaches to addressing areas of concern. And so I think it's -- while this rule -- and we support, you know, the Board going forward with this rule, we still think there's some areas where we can make this a more effective rule.

V-P-3-S

So that would be the caveat. Move forward with the rule with no further delays, but have the Division work with all parties to make sure we can get this to be an effective rule when it gets to the end result here.

Just a couple things that I'd like to go over.

On the innovative part, the previous commenter talked about, you know, all the small sources is cumulative to really make a difference here, and that's why one of the things we're pushing for in this rule is to have the ability to think outside the box.

V-P-3-1

Your conditional combustors, when you start getting down to small sources, you have to have makeup gas

in order to have them operate properly.

So if you have to start weighing in the amount of gas that's being burned just to make the combustor operate properly is not going to make sense as we move down in these smaller sources.

So removing the requirement, yeah, you could do innovative approaches, but it has to meet 98 percent, kind of takes away some of the flexibility and why we want to have innovative technologies.

We think that there's -- by thinking outside the box, there may be some technologies out there which may not meet 98 percent, but you can run them for a longer period of time and not taking them off at four tons. So having that flexibility may, in the long run, actually lead to less emissions. And it also helps, moving forward, when we start looking to the Division's Phase 2 and things like that on innovative control technologies to be able to address these smaller sources in an economic manner.

Another thing on blowdowns. You know, we've had a lot of discussions on whether those tanks, you know, should be addressed in this rulemaking here. You know, I think it's something that, you know, I think is sensible, has been used a lot here on coming up with a rule that makes sense and control requirements.

You know, the rule focuses on flash emissions.

V-P-3-2

If you use a tank for blowdowns and stuff like that, once the liquid is sitting in there, it's already been stabilized, there's no flashing occurring. So the only emissions you're getting there is working and breathing emissions. So you go out there, there could be a small amount. As the rule is written today, any amount of liquid in the bottom of the tank, you need to take a truck out there.

Typically, where you load out is above the bottom of the tanks. So you go out there, no matter how much you unload it, there's still going to be a residual amount of condensate or crude in the bottom of those tanks. So realistically, short of taking off the top and going to some type of suction in there, you're never going to get all that material removed from the tank.

So I guess when it comes to, I hear -- I read in the response to comments that this rule is going to be no more stringent than what's currently being required. That condition, my understanding, is not in every permit going forward. There were some selected permits that condition was negotiated with.

So I think that should be considered in going forward in saying this is a one size fits all that we should have for all blowdown tanks or emergency tanks the requirement to have to load those out.

V-P-3-3

Pneumatic controllers. This is a -- seems like there's been a lot of noise made about this, but this is important. And I know working in Colorado a lot, there's a lot of discussion there on intermittent controllers, how should they be addressed through emissions controls.

And one thing that -- you know, if you look at an intermittent controller, an intermittent controller just vents when the controller is actuated, such as you have on a separator that's doing a level control. When that liquid gets up to a certain level, it actuates to allow liquid to flow out of it. There's venting emissions during that certain period of time. When the level goes down and the controller shuts off, there's no emissions during that period.

In general, intermittent controllers have less emissions than low bleed, six standard cubic feet per hour. That's why we think it's imperative that this rule is clear that the source we're after here is the high-bleed, continuous controllers, and that's why we've basically asked for the word "continuous" and also asked for the language to be less than the six standard cubic feet per hour that's defined under OOOO.

So I think if we talk about low bleed, no bleed, those are all marketing terms, zero bleed. What we're after is making sure the controller you have in is less

than the standard -- six standard cubic feet per hour that's currently required. That does not then limit industry from continuing to use the intermittent controllers, which is good for the environment.

On the monitoring part, there's a requirement in there that talk about, you know, we need to continually record on the pilot light to ensure the control device maintains 98 percent control efficiency.

The pilot light has no bearing on a 98 percent control efficiency. The pilot light is being monitored to ensure the gas coming from the source is being combusted, and that's basically the intent of why you're monitoring the pilot light is to ensure your combustor is working.

It doesn't tell you whether it's 90 percent, 98 percent or a hundred percent. It just tells you that when the gas is going to the combustor, the combustor is working.

So we've asked for language to be changed there so there's not saying that monitoring the pilot light correlates to 98 percent control efficiency, because there is no correlation. Basically we're after to ensure the emissions from the source are being combusted.

LDAR. It's important that we understand what LDAR covers. You know, during the presentation, if I heard it correctly, that LDAR was said to be all-inclusive of

V-P-3-4

your control equipment plus your components.

LDAR covers components such as valves, flanges, connecters and things like that. You go out with your FLIR camera, your Method 21, or whatever, and you determine whether those -- you see a leak, and if there's a leak, then you fix it.

On a tank such as a tee hatch and NARO valve, those are not components. They do not fall under the LDAR program. That's why there's two separate programs set up in a rule that says you have one that addresses sites that are controlled, that you go there and make sure your control equipment and the equipment getting there is all being monitored, and then there's the LDAR program that basically addresses component counts.

That's why there needs to be two separate paths here, one for the control equipment, the tanks and stuff covered under their quarterly inspection, and then there needs to be the LDAR program. So I think that needs to be re-looked at to make sure we clearly understand what the LDAR program encompasses.

V-P-3-5

And also, I'd like to talk about Miss Hulme's comment that she had earlier on the quarterly inspections. That was -- when I heard the presentation today, I guess that's the first it's been, I guess, presented in such a manner that the AVO basically is in conjunction with some

V-P-3-6

type of either FLIR or Method 21.

I think if you go back and read the response to comments that the quarterly inspections is referenced to what we follow to what's in the Oil & Gas Guidance.

I think if we look at what's in the Oil & Gas Guidance, as Miss Hulme pointed out, it's basically three of the four quarters should be AVO with one of the quarters being then either through a third camera or Method 21.

I guess getting back to the no more stringent than what's being done in current permits, I think we need to take a look at that and make sure requiring some type of Method 21 or flare requirement every quarter is consistent with what we're doing in current permits.

Once again, I guess I just want to thank the Division and the Board for taking the time. And I do think the Division has a lot of great things in this rule, and it's a proactive rule going forward. And I think it's important to take the time here. As it was conveyed at the beginning of their presentation, this rule is probably going to set precedence for other areas, given the potential lowering of the ozone standard. Depends on where it goes, we're probably going to have other areas of the state that are going to be brought in.

So I think it's important that we take the time now to get in the weeds and really get this thing worked

out to where we need to be so at the end that this can be the standard that we look at going forward in other areas as it fits. Thank you very much.

CHAIRMAN BROWN: Thank you.

Any questions for Mr. Schlichtemeier? Spelled just like it sounds.

MR. SCHLICHTEMEIER: Yeah.

CHAIRMAN BROWN: Any questions or comments? Thank you.

Let's see. Next on the list is Mark Kot.

MR. KOT: My name is Mark Kot. I'm the Sweetwater County public lands planner, and I'm here on behalf of the Sweetwater County Board of County Commissioners. I'd like to thank the Board for the opportunity to speak today and certainly appreciate the hard work that the DEQ has put into this important rule.

Sweetwater County is a portion -- has a portion of the ozone attainment area in its county, and 43 percent of the county's tax base derives from oil and gas, so this is a very important rule for the economy of Sweetwater County.

With that in mind, the county encourages the Air Quality Advisory Board to make a recommendation that is balanced. We believe that the rule should improve air quality in public health while at the same time recognizing

V-GA-1-1

the ability of the oil and gas industry to implement and to absorb the costs of this rule.

The county believes that if this balance is not maintained and is upset and becomes too stringent and inflexible, the oil and gas industry may experience some economic setbacks. If this happens, it would negatively impact the tax and employment base of Sweetwater County and other counties in southwest Wyoming who are home to many oil and gas industries and employees who work on a daily basis in the Upper Green River Basin.

Keeping this potential impact in mind, again, Sweetwater County strongly encourages the Air Quality Board to keep balance in mind and to strive to have a rule that protects air quality and public health while at the same time maintaining the viability of the oil and gas industry which provides the tax and employment base and the high quality of life that is enjoyed by many individuals and families in southwest Wyoming. Thank you for your time.

CHAIRMAN BROWN: Thank you, Mark.

Any questions, comments?

Thank you.

Next on the list, Christy Woodward.

MS. WOODWARD: Hi. My name is Christy Woodward, and I'm a senior environmental engineer for QEP Energy.

V-P-4-S

V-P-4-1

We also wanted to thank the Division for all the work that they've done on this rule and definitely support the rulemaking. I'm here on behalf of QU, which is a QEP and Ultra organization that works together on the Anticline for development.

We just had two outstanding concerns with the existing rule, and I have provided comments as such. And the first major concern that we have is with the hundred similar facility component counts. This is under Chapter 8, Section 6(c), emergency -- or excuse me, I'm ahead of myself. 6(g)(ii), pad and single-well facility or source component counts shall be determined by actual field count, or a representative count from the same geographical area, taken from no less than 100 facilities.

We also believe along with PAW and some of the organizations represented here that that is an excessive number. We do have similar facilities on each pad, and we kind of put those together in a cookie-cutter fashion. And we also believe that five similar facilities is a more appropriate number.

The second concern that we have is related to the blowdown tanks. We do have small amounts of liquids that occasionally go to those.

As some of you may be aware, we have a liquids gathering system on the Anticline and have very small

amounts of liquids that go to those tanks, and so we feel that having to empty those tanks every seven days would actually potentially increase emissions on the Anticline due to excessive truck traffic and would request that if the Division wants to set a limit on those that they set a limit of a hundred gallons for the tanks or exempt facilities that have liquid-gathering facilities. V-P-4-2

So again, I do appreciate the Division's efforts to work with us and just wanted to reiterate those two points. V-P-4-S

We have provided statistics in our comments as well as studies as to the emissions that come from those tanks that will hopefully support our points. Thank you.

CHAIRMAN BROWN: Thank you.

Any questions, comments?

Next on the list, Cortnie Morrell.

MS. MORRELL: Hello. My name is Cortnie Morrell. I'm with Williams Field Services. I just, along with everyone else, want to thank the Division for the hard work they've put in. I appreciate the man-hours and the work and especially appreciate the additional stakeholder meetings that were held earlier this year in efforts to understand and clarify comments. I think that's always how we work together best and that's how we get to our best products. V-P-5-S

So we have prepared a brief comment letter, and I'm going to speak to those two comments. I might deviate from the text a little bit as written, however.

Williams, obviously, contributed and supports the comments that were submitted and read today by John Robitaille with Petroleum Association of Wyoming, and we have two additional items that we just want to highlight, and those are specific to how the rule affects dehydration units.

Particularly when it comes to the applicability analysis and the calculations used in that, Williams does operate dehydration units in the Upper Green River Basin that are currently permitted with limited operating hours, and they've been permitted that way for several years. It's not clear in the rule if the use of those limited operating hours would be allowed in determining the applicability with a four ton per year threshold, and Williams asserts that it needs to be accounted for since they're operating under a federally enforceable permit condition.

V-P-5-1

And as stated also in Chapter 8 later on, this rule does not supersede any other permits, so language or anything from the Division that could clarify that that is acceptable would be appreciated.

The other comment, also in relation to

dehydration units and the applicability determination, is in relation to the use of condensers. Previous versions of the Oil & Gas Permitting Guidance have had scenarios such that an operator could choose to install a flashing condenser in lieu of a combustion device, or conversely, the rule allows for removal of combustion devices as long as a condenser remains installed on the unit.

In terms of existing sources, I think not allowing an existing dehy using a condenser to take into account it's a condenser would be a mistake.

I also believe that because -- provisions in the rule that allow for the removal of control equipment refer back to the calculation method used in the applicability, again, which, based on the Division's comments, does not allow the specific condenser. That would make it a little more stringent than what applies to new sources.

V-P-5-2

In the current Oil & Gas Permitting Guidance, on page 9, there's a definition of what potential is, and in the rule when it talks about making your determination to remove a control device, it refers to this calculation of potential emissions, and in that definition, it specifically says that it allows the use of worst case operating parameters of the flash tank condenser when determining control removal.

I think that really the point for this is that

when we're dealing with the existing equipment, it is a different animal than a brand-new piece of equipment, and we do need to be mindful of existing conditions, especially when they exist in current permits, and take those into account when we're determining applicability. Thank you.

CHAIRMAN BROWN: Thank you.

Any questions, comments?

Thank you, Cortnie.

Let's see. Next on the list is Mary Lynn Worl.

MS. WORL: Thank you. My name is Mary Lynn Worl. I'm a citizen here in Sublette County, and I'm also the vice chair of Citizens United for Responsible Energy Development.

So thank you for this opportunity to address the advisory board on behalf of CURED, and some of these comments may be my own personal comments.

My comments are going to be centered around health, the reason that we really need to move forward with these regulations.

Last night at the open house, I was at the CURED booth, and three people in the course of conversation indicated to me that they had a chronic cough, chronic sore throat, and that would be simply stupid of me to stand here and say to you, well, that's because of the chemicals in our air, our air pollution. But this is a real common

V-EG-2-1

thread that we hear here in Sublette County talking to each other and individuals coming to our group CURED, talking about many of the signs and symptoms that Dave read in the letter from Ronni Flannery from the American Lung Association.

But when we stop and think about epidemiology studies, possible epidemiology studies, or health risk studies that would be done here in Sublette County, statistics simply are not on our side because of our low population. If we had, you know, rather than 10,000 and some people, if we had 50, 60, a hundred thousand people, then we could probably generate some statistical power, some statistical significance with what's happening with our health here in Sublette County.

However, science certainly is on our side. The science is very strong regarding the health impacts, not only of ozone in terms of acute impacts and chronic impacts, but also with the NOX and VOX, the toxicity of these chemicals.

And when we stop and think back to all of us here that live here in Sublette County and work here, recreate here, we're not immune to the toxicity of the chemicals in our air. Right now, we just do not have the scientific data to prove that we are being impacted. But in my heart and my -- I have a background in physiology -- I am certain

that we have many people, not only babies developing asthma, COPD with some of our older people and other impacts that we probably will never know that are occurring.

So on behalf of CURED, I encourage the Board to pass on the regulations. There's a lot of time that has been spent, there's a lot of time that has been available for comment and for changes, but I think any further delays is just more delays with the impacts that we're feeling with our health.

V-EG-2-S

I also encourage DEQ to go back and review all of the recommendations that were made by the ozone advisory board, not only those that got a hundred percent thumbs up, but some of those that didn't get a hundred percent thumbs up, and by doing so help to move our air along to a more healthy situation.

V-EG-2-2

And last of all, I would encourage all citizens within Sublette County and surrounding areas to become involved, to become informed and speak your mind. So thank you.

CHAIRMAN BROWN: Thank you, ma'am.

MS. WORL: Thank you.

CHAIRMAN BROWN: Any comment?

Let's see. We have two commenters left, and I think we can get through those fairly quickly. The next

commenter, Susan Kramer.

MS. KAIL: I think she left.

CHAIRMAN BROWN: Okay. Then we'll go to Carmel Kail.

MS. KAIL: I will be fast. My name is Carmel Kail, and I want to echo most of what has been said. I don't have a whole lot to add.

I do feel that more can be done on lots of fronts, probably not within this rule, perhaps relating to the four tpy threshold on all kinds of things, and perhaps starting with the presumptive BACT since there's been a lot of reference to the consistency with permits for new sources nonetheless, although more can be done and should be done.

V-C-5-1

Rulemaking to control emissions from existing sources was recommended by the governors of the Green River Basin Citizens Advisory Board something over two years ago. This has taken a lot longer since the two years from that broad-based group than I ever expected to get to this stage. I'm glad we're here. Let's get her done.

CHAIRMAN BROWN: Thank you.

Any comments?

We do have one last speaker, Mr. Bruce Pendery.

MR. PENDERY: Thank you. Thank you for this opportunity to provide comments to you on the proposed

nonattainment area Upper Green River Basin existing source rule regulations.

My name is Bruce Pendery. I'm the chief legal counsel for the Wyoming Outdoor Council.

WOC appreciates the proposed rules and urges the Air Quality Advisory Board to register its approval of the proposal so that these needed and important air pollution controls can move on to the Environmental Quality Council for formal adoption. The health and welfare of people living in the Upper Green River Basin demands that these regulations be endorsed at this time.

V-EG-3-S

We note that the current proposal has been improved since the initial proposal was released last June. We are especially appreciative of the addition of a new provision that leak detection and repair requirements will be extended to compressor stations. For these reasons, we again urge the Air Quality Advisory Board to endorse these rules.

While as the comments we submitted on the proposal make clear, we would still like to see additional improvements in the rules, we believe that these additional improvements can be made by the Environmental Quality Council when it holds its hearing and need not be made here at this time. Attempting to make these changes here now will only lead to additional delay in the adoption of these

rules and the people of the Upper Green River Basin deserve the protection of these -- that these rules will offer to them now, not at some uncertain time in the future. There has been too much delay already. So please move this regulatory proposal on to the Environmental Quality Council.

When the proposal gets to the Environmental Quality Council, we will have ample time to ask for, and hopefully get, the additional improvements we seek. As our comments indicate, this would include making the new leak detection and repair requirements applicable to compressors also to include other emissions from compressor stations, not just leaks. We will also seek to have the threshold for the LDAR reduced from four tons per year of emissions to say two tons per year. But again, the Environmental Quality Council is the appropriate place for us to seek these changes, not this hearing. Others will have the same opportunities before the Environmental Quality Council. V-EG-3-1

These proposed existing sources rules represent an important step forward. Over two years ago, the Upper Green River Basin Air Quality Citizens Advisory Task Force, on which I served, put together ten recommendations for how ozone levels in the Pinedale area could be reduced and nearly two years ago, the Department of Environmental Quality agreed to pursue those recommendations. V-EG-3-2

The first two recommendations, which were the most important of the ten recommendations, and they were recommendations to reduce emissions from existing oil and gas stationary sources in the ozone nonattainment area, particularly in areas where the DEQ PBACT requirements were not applicable.

These proposed existing source rules represent fulfillment of that promise to the citizens of the Upper Green River Basin and for that reason, the Air Quality Advisory Board should give its endorsement to them at this time. Thank you.

CHAIRMAN BROWN: Thank you.

Any questions, comments?

This is a great time to take another break. We can break for an hour for lunch, or have a quick break, but it's kind of been a long morning already. Why don't we at least take a one-hour break and reconvene here at one o'clock.

(Meeting proceedings recessed 11:59 a.m. to 1:07 p.m.)

CHAIRMAN BROWN: Let's go ahead and reconvene for the afternoon session. So we've gone through all the public comment and presentation by the DEQ. Now it's time for questions from the Board or clarifications from the DEQ, or do you have any comments from the