

2013 HOUSE ENERGY AND NATURAL RESOURCES

HB 1348

2013 HOUSE STANDING COMMITTEE MINUTES

House Energy and Natural Resources

Pioneer Room, State Capital

HB 1348
January 31, 2013
18107

Conference Committee

Minutes

Relating to setbacks for oil and gas wells.

Minutes:

10 testimony

Rep. Porter: We will call the hearing on HB 1348.

Rep. Froseth: Oil and gas has been good for N.D. and the future. This bill does one thing it changes the setback which current law says it has to be at least 500 feet from an occupied dwelling. This bill would change that to 1325 feet which is a ¼ mile. I received lot of emails on this bill; one that indicated problems that people encounter that living that close to an oil site was spelled out in this letter from Rosella Person. (See testimony1)

Rep. Keiser: Would there be a time when the person of an occupied place might approve a closer location and would this preclude that?

Rep. Froseth: I think it can be done in negotiations with the oil company.

Rep. Droval: We need to have a good business environment for people to make money whether they are in the oil business or agriculture etc. We must also protect our citizens and our land for future generations. We need to do a better job protecting our citizens. We shouldn't have to force the oil companies to move the rig further away. I do think 500 feet is too close. If a flare gets out of control 500 is not much time to get out of there.

Derrick Braaton: I am an attorney with Baumstark Braaton Law Partners; I am here as a lobbyist for Northwest Land Owners Association. Our office requested the oil and gas division to get copies of all the studies and science that were referred to in that hearing and that were reportedly support of the 500 foot setback. We read them and don't believe that they support the idea of 500 setbacks as the maximum even if there is any magic to the 500 foot setback. Included with my testimony is a letter from John Coefield (See testimony 2) the bottom line is that there is no demonstration that would support the notion that a 500 setback will protect the public.

Myron Hanson: President of the Northwest Landowners; Mr Baaton addressed a lot of the issues that I wanted to talk about so I won't address those. We heard previous testimony last week on SB 2206 that the industry feels that these considerations are adequately addressed by the current statute. (See testimony 3)

Dan Wogsland: Executives Director of the N.D. Grain Growers Association and we are in support of HB1348. During our deliberations at the N.D. Grain Growers Associations Annual meeting in December,2012,NDGGA membership adopted the following resolution.(See testimony 4)

Kristie Schlosser Carlson: I represent the 40,000 members of the N.D. Farmers Union and the Policy and Action developed democratically by our grassroots memberships.(see testimony 5)

Brenda Jorgenson: I am from White Earth Valley here is my story of what happened on Sunday 4/10/11. (See testimony 6)

Clark Stevens: I live in Glenburn N.D. and I am in favor of this bill. This is my personal story.

Ron Ness: President of the N.D. Petroleum Council. The N.D. Petroleum Council represents more than 400 companies in all aspects of the oil and gas industry, including oil and gas production, refining, pipeline, transportation, mineral leasing, consulting legal works, and oilfield service activities in N.D.(See testimony 8) I think the 500 feet has worked.

Rep. Silbernagel: Is the current setback by statute?

Ron Ness: I think 500 feet from the well head.

Rep. Keiser: Can you go into how waste work correlative rights are?

Ron Ness: Waste is not utilizing the best process or the best knowledge in order to develop the resource. Anybody that comes in with a permit; the engineers at the Dept. of Mineral Resources are looking at a possible way to ensure that the return to the parties and to everyone interested are using the best technology and getting the most out of that resource and that is now they permit those wells.

Rep. Keiser: Correlative rights; is that the same?

Ron Ness: Correlative rights are the right of that mineral owner to develop their assets.

Rep. Hunsakor: I haven't heard you give strong arguments for that when you compare that with the testimony we already heard. What is the reason for that when we heard the testimony against the 500 feet?

Ron Ness: I think the question is what is the right distance for any of these things?

Rep. Hunsakor: You haven't answered my question. What is the reason as far as the oil industry argument why it should stay at 500 feet?

Ron Ness: The 3 issues are 1 the waste and correlative rights and trying to ensure that mineral owner has a chance. 2 we are talking about the impact to wildlife and habitat in N.D.

Rep. Hunsakor: You did mention and 2 are here today that allotted to how serious this is.

Ron Ness: I can't speak to that. I did hear the 2 today there are other people across the state that don't like there's either.

Rep. Kelsh: Why aren't some of the wells not being flared?

Ron Ness: I don't know.

Rep. Kelsh: There was also the question of "who do we call"?

Ron Ness: I think the Dept. of Health, the Dept. of Mineral Resources are some good sources.

Kent Beers: I work for Oasis Petroleum; I hear today representing the N.D. Petroleum Council. Some of you may have heard of Oasis we have been active in the Baaken since 2008 we drilled over 300 wells. (See testimony 9). If you are the individual in the home you do not want to stand at the window and look at the well site or put up with some of the smells that the people talked about but the unintended consequences of this is sufficient. The amount of service that will be disrupted and economically the cost and the operators to do things differently are equally important; there would be lots of loses in reserves.

Rep. Keiser: Do you have any idea how often the homeowner has requested that the well be moved more than the 500 feet?

Kent Beers: It has been asked and well bent over backwards to try and accommodate them.

Lynn Helms: Director of the Dept. of Mineral Resources; my testimony is very short did want to address some of the questions that was raised about the science that we talked about. (See testimony 10).

Rep. Anderson: How many of us in here today would like to live 500 feet from oil flare?

Rep. Porter: We will close the hearing on HB 1348.

2013 HOUSE STANDING COMMITTEE MINUTES

House Energy and Natural Resources

Pioneer Room, State Capital

HB 1348
February 8, 2013
18594

Conference Committee

Imireth

Relating to setbacks for oil and gas wells

Minutes:

1 Attachment

Rep. Porter: We have HB 1348 in front of us.

Rep. Nathe: HB 1348 comes to you with no amendments. We could not find any common ground. This bill deals with setbacks for oil and gas wells. I move this forward with no amendments.

Rep. Hunskor: I have amendments that I would present at this time. After our committee meeting I read this and as I see it this bill is as amended would be no different than current law. We are talking about 500 feet from an occupied dwelling. Current law says that an occupied dwelling can be no less than 500 feet from a well bore. This bill as amended says the same thing. The complaint that we had from the people did not have to do with the well bore it had to do with the flares. (Attachment 1) I move the amendment.

Rep. Porter: We have a motion from Rep. Hunskor and a second from Rep. Anderson for the proposed amendment that everyone has.

Rep. Nathe: A lot of this has been done already. I suggest that we leave this as it already is. I would resist this amendment.

Rep. Hunskor: Rep. Nathe what you say is true but about the case where the well bore is 800 feet? They also let those flares be at 600 feet or 500 feet, that is not what those people asked for. It makes no sense to disrupt folks in an occupied dwelling when the flare could just as well be on the other side of the well bore.

Rep. Nathe: I don't disagree with you but we received this amendment from one group of people and have another land owner group that says this is not a problem.

Rep. Mock: If the well bore is located at 550 and administrative rules require that the flare is 150 away from the well bore. Could that flare be located 400 or be any closer to the dwelling than the well?

Lynn Helms: The current administrative rule says that the well bore or any facilities association with the well bore have to be at least 500 feet from the occupied dwelling. If the flare was 500 feet away that would mean the well bore has to be 650 feet away. The absolute closest the production of that well can be is the 500 feet.

Rep. Anderson: Is there a problem when the well is 500 feet moving the flare 500 feet away?

Lynn Helms: They would have to.

Rep. Anderson: In the cases where you are able to do that I would recommend doing that.

Lynn Helms: I agree and under 19.3 the companies have to follow and get an approval of where they get locate the flare pit.

Rep. Mock: In the Hunskor amendment it has in cases where extenuating circumstances exists the way I read this is that the further setback within that quarter mile would not apply if the owner otherwise consents, or if the commission determines that its reasonably necessary for it. Wouldn't that issue already be addressed?

Lynn Helms: One problem with this amendment is it gives two reasons to overrule that landowner which is preventing waste and prevent relative rights.

Rep. Mock: Is this where we have to visit with Rep. Hunskor and some of the landowners. Couldn't we add in there "or to prevent population"?

Lynn Helms: I would agree and we do that through rule 18 because it is form in which we do all the back and forth in conversations.

Rep. Hunskor: Based on the testimony we heard and Rep. Mocks comments is it possible that this bill doesn't have appropriations in it that we can work further on this and work on it on Thursday?

Rep. Porter: My problem with that is all that you would back to us with is what is currently in the administrative code other than what is presented here.

Rep. Hunskor: If that is true if Mr. Helms can accommodate what Rep. Mock was talking about through administrative rules, then no this if fine. As I understand the amendment that is before us there isn't any problem from Mr. Helms with the way it is written since he can already do what was talked about in the administrative code.

Rep. Porter: Not that is incorrect, what you are doing is on the last line of the amendment is reducing the number of reasons that are currently used in the administrative code to site the facilities to just those two things "to prevent waster and to protect correlative rights".

They have many other reasons that they use that they use in that siting process this would make it more restrictive than the current code.

Rep. Nathe: The rule gives Mr. Helms a lot more flexibility in the amendment. I think that is the main reason why the senate killed Bill SB 2206.

Rep. Silbernagel: I think when this bill was put in from of us, the amendments were not clear as to the 500 foot setback and through this process I think it brought clarity to the landowners and to the committee as to what is currently there.

Rep. Damschen: The amendments would make it stricter than if it was rewritten to follow the code we would basically have the existing law?

Rep. Porter: That depend on how the amendment would read. We will do a voice vote on adopting the proposed amendment as presented by Rep. Hunskor. Motion is denied.

Rep. Mock: In visiting with some of the experts in the audience the Hunskor amendment if it fits ok I would ask Mr. Braaton repeat recommendation that he just made.

Rep. Porter: Before I am willing to open it up for the two group to do more testimony which is not part of where we are at; if we want to lie this to the side until next week to do work with that subcommittee I would do that. We will reassign this HB 1348 to Rep. Nathe, Rep. Silbernagel and Rep. Hunskor for next week.

2013 HOUSE STANDING COMMITTEE MINUTES

House Energy and Natural Resources

Pioneer Room, State Capital

HB 1348

February 14, 2013

18983

Conference Committee

Emmett

To provide for an retroactive application

Minutes:

Rep. Porter: We will open HB 1348.

Rep. Nathe: The subcommittee met this afternoon both parties got together and came up with this amendment. They both agree with this amendment you have the amendments on one page and on the other page you have the engrossed bill with the amendments on there.

On page 1 line 18 on the amendment where it says" on wells permitted on new pads built after August 1, 2013 including, upon request from landowners of any such occupied dwelling the location of all flares, tanks or theaters utilized in connection with the permitted well at a greater distance from the occupied dwelling than the oil and gas well bore as can reasonably be accommodated within the proposed pad location or"

What that means is the bill will move it from the 500 feet to 1000 feet so the industry gave up 1000 feet and the landowners came to 1000 feet.

Rep. Porter: We have a motion from Rep. Nathe and a second from Rep. Hunskor Motions carries We have a motion form Rep. Nathe and a second from Rep Hunskor for a do pass as amended to HB 1348. Motion Carried

Yes 11 NO 0 Absent 2 Carrier Rep. Nathe

February 14, 2013

2/15/13
JMC

PROPOSED AMENDMENTS TO HOUSE BILL NO. 1348

Page 1, after line 6, insert:

"1."

Page 1, line 12, after the second period insert:

"2."

Page 1, line 15, remove the overstrike over "five"

Page 1, line 15, remove "one thousand three"

Page 1, line 15, remove "twenty"

Page 1, line 15, remove the overstrike over "~~152.4~~"

Page 1, line 15, remove "402.34"

Page 1, line 17, remove "one thousand three"

Page 1, line 17, overstrike "hundred"

Page 1, line 17, remove "twenty" and insert immediately thereafter "one thousand"

Page 1, line 17, replace "402.34" with "300.48"

Page 1, line 18, overstrike "as" and insert immediately thereafter ":

- a. For wells permitted on new pads built after July 31, 2013, the conditions imposed under this subdivision may include, upon request of the landowner of the occupied dwelling, requiring that the location of all flares, tanks, and treaters utilized in connection with the permitted well be located at a greater distance from the occupied dwelling than the oil and gas well bore if the location can be accommodated reasonably within the proposed pad location; or

- b. As"

Page 1, line 19, after the second "the" insert "occupied"

Renumber accordingly

Date: 2-8-2013
Roll Call Vote #: 1

2013 HOUSE STANDING COMMITTEE
ROLL CALL VOTES
BILL/RESOLUTION NO. HB 1348

House Natural Resources Committee

Check here for Conference Committee

Legislative Council Amendment Number _____

Action Taken: Do Pass Do Not Pass Amended Adopt Amendment
 Rerefer to Appropriations Reconsider

Motion Made By Rep Hunskor Seconded By Rep Anderson

Representatives	Yes	No	Representatives	Yes	No
Chairman Todd Porter			Rep. Bob Hunskor		
Vice Chairman Chuck Damschen			Rep. Scot Kelsh		
Rep. Jim Schmidt			Rep. Corey Mock		
Rep. Glen Froseth					
Rep. Curt Hofstad					
Rep. Dick Anderson					
Rep. Peter Silbernagel					
Rep. Mike Nathe					
Rep. Roger Brabandt					
Rep. George Keiser					

Total (Yes) _____ No _____

Absent _____

Floor Assignment _____

If the vote is on an amendment, briefly indicate intent:

voice vote to ~~make~~ adopt the amendment proposed as presented by Rep. Hunskor. motion failed

Date: 2-14-13
Roll Call Vote #: 1

2013 HOUSE STANDING COMMITTEE
ROLL CALL VOTES
BILL/RESOLUTION NO. 1348

House Natural Resources Committee

Check here for Conference Committee

Legislative Council Amendment Number _____

Action Taken Do pass as amended to adopt the amendment

Motion Made By Rep Nathe Seconded By Rep Hunsakor

Representatives	Yes	No	Representatives	Yes	No
Chairman Todd Porter			Rep. Bob Hunsakor		
Vice Chairman Chuck Damschen			Rep. Scot Kelsh		
Rep. Jim Schmidt			Rep. Corey Mock		
Rep. Glen Froseth					
Rep. Curt Hofstad					
Rep. Dick Anderson					
Rep. Peter Silbernagel					
Rep. Mike Nathe					
Rep. Roger Brabandt					
Rep. George Keiser					

Total (Yes) _____ No _____

Absent _____

Floor Assignment _____

If the vote is on an amendment, briefly indicate intent:

So adopt the amendment proposed by Rep Nathe included. Voice Carried

Date: 2-14-13
Roll Call Vote #: 2

2013 HOUSE STANDING COMMITTEE
ROLL CALL VOTES
BILL/RESOLUTION NO. 348

House Natural Resources Committee

Check here for Conference Committee

Legislative Council Amendment Number Do pass as Amended

Action Taken _____

Motion Made By Rep. Nathe Seconded By Rep. Hunskor

Representatives	Yes	No	Representatives	Yes	No
Chairman Todd Porter	✓		Rep. Bob Hunskor	✓	
Vice Chairman Chuck Damschen	✓		Rep. Scot Kelsh	✓	
Rep. Jim Schmidt	✓		Rep. Corey Mock	✓	
Rep. Glen Froseth	✓				
Rep. Curt Hofstad	✓				
Rep. Dick Anderson	✓				
Rep. Peter Silbernagel	✓				
Rep. Mike Nathe	✓				
Rep. Roger Brabandt	✓				
Rep. George Keiser		✓			

Total (Yes) 11 No 0

Absent 2

Floor Assignment Rep Nathe

If the vote is on an amendment, briefly indicate intent:

REPORT OF STANDING COMMITTEE

HB 1348: Energy and Natural Resources Committee (Rep. Porter, Chairman) recommends **AMENDMENTS AS FOLLOWS** and when so amended, recommends **DO PASS** (11 YEAS, 0 NAYS, 2 ABSENT AND NOT VOTING). HB 1348 was placed on the Sixth order on the calendar.

Page 1, after line 6, insert:

"1."

Page 1, line 12, after the second period insert:

"2."

Page 1, line 15, remove the overstrike over "five"

Page 1, line 15, remove "one thousand three"

Page 1, line 15, remove "twenty"

Page 1, line 15, remove the overstrike over "~~452.4~~"

Page 1, line 15, remove "402.34"

Page 1, line 17, remove "one thousand three"

Page 1, line 17, overstrike "hundred"

Page 1, line 17, remove "twenty" and insert immediately thereafter "one thousand"

Page 1, line 17, replace "402.34" with "300.48"

Page 1, line 18, overstrike "as" and insert immediately thereafter ":

- a. For wells permitted on new pads built after July 31, 2013, the conditions imposed under this subdivision may include, upon request of the landowner of the occupied dwelling, requiring that the location of all flares, tanks, and treaters utilized in connection with the permitted well be located at a greater distance from the occupied dwelling than the oil and gas well bore if the location can be accommodated reasonably within the proposed pad location; or

- b. As"

Page 1, line 19, after the second "the" insert "occupied"

Renumber accordingly

2013 SENATE NATURAL RESOURCES

HB 1348

2013 SENATE STANDING COMMITTEE MINUTES

Senate Natural Resources Committee Fort Lincoln Room, State Capitol

HB 1348
March 28, 2013
Job Number 20655

Conference Committee

Veronica Spurling

Explanation or reason for introduction of bill/resolution:

Relating to setbacks for oil and gas wells

Minutes:

attachments

Chairman Lyson opened the hearing for HB 1348.

Myron Hanson, representing the Northwest Landowners, stood in support of HB 1348. See attachment #1. He introduced amendments. See attachment #2. (Ends at 06:35) He also left a copy of the prime sponsor's testimony. See attachment #3.

Frank Leppell presented a petition with 415 signatures in support of HB 1348. See attachment A. He also presented written testimony. See attachment #4. (Ends 18:55)

Mr. Leppell also read a testimony from his wife who could not attend the hearing. See attachment #5. (Ends at 22:34)

Marie Hoff, a member of Dakota Resource Council, presented a written testimony on behalf of Shelly Ventsch, a resident of New Town. See attachment #6. They would like to amend the bill to make the setback at least 1000 feet from a residence. (Ends at 25:30)

Sean Arithson, a staff member of the Dakota Resource Council, presented written testimony on behalf of Brenda Jorgenson a Dakota Resource Council member who could not attend the hearing. See attachment #7. She requested an amendment to increase the setback to 1000 feet from a residence. (Ends at 29:35)

Kristen Mesker, a farm wife from Powers Lake, ND presented written testimony. See attachment #8. (Ends at 32:18)

Wally Owen, a resident of Medora, spoke in favor of HB 1348. He mentioned he had been on the ambulance crew since 1983 and he had to get off because "he can't take it any more...people who are burned, crushed, soaked in oil... which is happening constantly". He feels 500 feet is too dangerous. See attachment #9. (Ends at 35:50)

Daryl Dukart, Dunn County Landowners organization, stood in support of HB 1348. It is a quality of life issue.

Senator Murphy asked if he would support the 1000 ft. setback.

Mr. Dukart answered the question. (36:36 to 37:48)

Cedar Gillett, a resident of New Town, stood in support of the bill as well as an amendment to increase the setback to 1000 feet. It is a safety issue. (Ends at 39:40)

Sharon Anderson, a rancher from Powers Lake, presented written testimony in favor of HB 1348. See attachment #10. Attachment #11 is a group of studies that back up the risks of health problems from living near an oil well. (Ends at 44:17)

Donna Bliss, a member of Dakota Resource Council, spoke in favor of the bill and commented that there are some mineral rights owners that object to these things.

Ron Ness, ND Petroleum Council, stood in support of engrossed HB 1348 as amended. They also support the amendments offered by Mr. Hanson from the Northwest Landowners and Representative Froseth.

Linda Weiss, a landowner from western ND, spoke in support of the bill and the 1000 foot amendment.

Ruth Malm, a Dakota Resource Council member from Belfield, spoke in support of the bill. Her concerns were the long-term health effects and the safety issues due to traffic on Highway 85.

Opposition: None

Neutral: None

Chairman Lyson closed the hearing for HB 1348.

2013 SENATE STANDING COMMITTEE MINUTES

Senate Natural Resources Committee Fort Lincoln Room, State Capitol

HB 1348
April 4, 2013
Job Number 20884

Conference Committee

Veronica Spaulding

Explanation or reason for introduction of bill/resolution:

Relating to setbacks for oil and gas wells

Minutes:

No attachments

Chairman Lyson opened the discussion for HB 1348.

Chairman Lyson asked Ron Ness to step to the microphone.

Ron Ness, ND Petroleum Council, said with the setback increased to 1000 feet it seemed that everyone was happy with it. (02:00 to 02:48)

Senator Triplett asked if the ND Petroleum Council is comfortable with page 1 line 14 through the end of the bill and also with page 1 line 7 through line 13.

Mr. Ness said it has no impact on the bill.

Senator Unruh: Do Pass

Senator Murphy: Second

Senator Burckhard: Is this amended as per Myron Hanson's request? It involves page one line 22 and 23. From the testimony heard, there was agreement on Mr. Hanson's amendment.

Senator Unruh: Withdrew the Do Pass Motion

Senator Burckhard: Motion to adopt the Myron Hanson amendment.

Senator Triplett: Second

Motion carried by voice vote.

Senator Unruh: Do Pass as Amended

Senator Murphy: Second

Roll Call Vote: 7, 0, 0

Carrier: Senator Murphy

13.0359.02002
Title.03000

Adopted by the Natural Resources Committee

April 4, 2013

4/4/13
TO

PROPOSED AMENDMENTS TO ENGROSSED HOUSE BILL NO. 1348

Page 1, line 22, replace "landowner" with "owner"

Page 1, after line 22 insert "permanently"

Renumber accordingly

Date: 4-4-13
Roll Call Vote #: 2

2013 SENATE STANDING COMMITTEE
ROLL CALL VOTES
BILL/RESOLUTION NO. engr. 1348

Senate Natural Resources Committee

Check here for Conference Committee

Legislative Council Amendment Number _____

Action Taken: Do Pass Do Not Pass Amended ^{as} Adopt Amendment
 Rerefer to Appropriations Reconsider

Motion Made By Unruh Seconded By Murphy

Senators	Yes	No	Senators	Yes	No
Senator Lyson	✓		Senator Triplett	✓	
Senator Burckhard	✓		Senator Murphy	✓	
Senator Hogue	✓				
Senator Laffen	✓				
Senator Unruh	✓				

Total (Yes) 7 No 0

Absent 0

Floor Assignment T. Murphy

If the vote is on an amendment, briefly indicate intent:

REPORT OF STANDING COMMITTEE

HB 1348, as engrossed: Natural Resources Committee (Sen. Lyson, Chairman) recommends **AMENDMENTS AS FOLLOWS** and when so amended, recommends **DO PASS** (7 YEAS, 0 NAYS, 0 ABSENT AND NOT VOTING). Engrossed HB 1348 was placed on the Sixth order on the calendar.

Page 1, line 22, replace "landowner" with "owner"

Page 1, after line 22 insert "permanently"

Renumber accordingly

2013 TESTIMONY

HB 1348

From Rep Frosetta:

1

Mr. Chairman, Mr. Vice Chairman and Legislative members of the North Dakota Energy and Natural Resources, House Standing Committee,

Thursday, January 31, 2013 you will receive testimony on House Bill NO. 1348

I am unable to stand before you to testify in favor of this bill. I would however like to send this e-mail in my stead.

I live in the White Earth Valley of Mountrail County in North Dakota. We are right in the thick of oil Country.

The nearest wells are approximately three fourths to one mile away from my home.

The well to the East of my home on Section 15-Township 156-Range 94- in Myrtle Township is the well I will use for this letter.

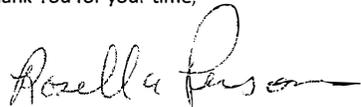
The current set back policy for oil wells is not nearly enough. You have to factor in the topography of the area also. I live in a Valley that lies below this well. During the 2012 year I called at least 5 times about the heavy odor being emitted from this well site during flaring. I will say Hess investigated and even upgraded their equipment. They gave me three numbers to call in the event this happened again and they even gave out their control room number. This makes me believe this was a serious error be hit human or just a fluke.

Not only were the smells horrible, the windows in my home in the fall we coated with some type of oil film that window washing fluids would not take off. I had to use old fashioned hot water with vinegar going over them twice to clean them. Think about this if the windows held this type of film what was and is in my lungs and everyone else's in the area.

I shudder to think of having children close to an oil rig that is flaring, not to mention the other fumes emitted from the rig site. House Bill NO. 1348 is an important one. After what I have experienced, I think a 1320 foot set back from occupied dwellings or places of business is a reasonable request.

If you would care to speak with me my telephone number is 701-755-3353.

Thank You for your time,



Rosella Person

2

**Testimony in Support of
HOUSE BILL NO. 1348
House Energy and Natural Resources Committee – January 31, 2013**

Chairman Porter, House Energy and Natural Resources Committee members, my name is Derrick Braaten. I am an attorney with Baumstark Braaten Law Partners in Bismarck, and I appear today as a lobbyist on behalf of the Northwest Landowners Association to support House Bill 1348.

As many of you know the Northwest Landowners Association is a network of farmers and ranchers whose purpose is to inform, support, and promote the property rights of landowners in North Dakota. The Association has approximately 350 members across the state.

The Senate Natural Resources Committee recently held a hearing on Senate Bill 2206 which also relates to increased setbacks from homes for oil and gas wells. It is my understanding that at that hearing a question was asked of Lynn Helms, director of the North Dakota Oil and Gas Division, regarding any studies related to setbacks, and Mr. Helms had indicated that certain studies were conducted. We requested and received the studies Mr. Helms was referring to in that testimony. We do not believe these studies indicate in any way that a greater setback from homes for oil and gas wells in North Dakota is needed. One is titled “A Municipal Officials Guide to Diesel Idling Reduction in New York State,” and contains information on setbacks for truck stops at which diesel semis are idling. Another study is titled “Structure Response and Damage Produced by round Vibration From Surface Mine Blasting.” Although explosions from oil wells are a concern, this study does not address the various reasons North Dakota landowners are asking for increased setbacks, and was originally introduced as part of a bill in 2005 related to setbacks for seismic blasting. The third study is an Oil and Gas Impact Report conducted in

La Plata County, Colorado. This study does have some relevant information on setbacks of 300 feet, but the primary discussion with respect to the 300 foot setback relates to an oil or gas well's impact on the visual landscape. While this is certainly a concern of landowners, there are many reasons justifying an increased setback, and the study does not contain any comprehensive analysis of why a 300 foot setback was used, other than stating that at 300 feet, most people would agree that an oil or gas well is the most prominent feature of the landscape. The longer study from which this report is culled contains some telling statements. The study's authors note that "Increased development of CBM in La Plata County may cause environmental changes at the Fruitland Outcrop, increasing the risk of methane seeps or fires and associated risks to public health and safety. Direct impacts associated with the anticipated development of CBM in the study area include an increased risk of methane seepage, releases of toxic gases and odors and fires or explosion." Additionally, the La Plata study was done in a study area that contained 285 existing wells, with 318 additional wells projected. It is unreasonable to extrapolate from this small, focused study and argue that it supports a rule for all of North Dakota's landowners living in the midst of the largest oil boom in recent history. In summary, we do not believe that these studies contain information that justified the current 500 foot setback over the large setback distance being proposed here.

With my written testimony, I have provided a letter from John Coefield, a retired scientist who formerly worked for the Montana Department of Environmental Quality. Mr. Coefield agrees that the studies provided do not offer support for the proposition that the current setback should not be increased.

There is some information on setbacks from the North Dakota Department of Health that we believe is instructive. Attached to my written testimony is an excerpt from a model zoning

ordinance for animal feeding operations, developed in part by the North Dakota Department of Health. For livestock operations with 300-1000 head of livestock, the setback distance is half of a mile. The setback for the largest operations is one and a half miles. Also attached to my testimony is a table containing actual setbacks for animal feeding operations in several counties in oil country, which range from a half mile to two miles. Landowners have many serious concerns related to siting of oil wells that are as significant and sometimes more significant than the concerns related to siting animal feeding operations. Farmers and ranchers have prospered in North Dakota and have been able to do so with these significant setbacks in place. And this bill does not even provide setbacks as stringent as those by which the farmers and ranchers of North Dakota must comply.

Finally, it is also my understanding that in the prior hearing on the senate bill related to increased setbacks, there was also discussion of the setbacks in other states. Based on my reading of the minutes, it appears that someone made the comment that most states are at 500 feet. It is important to recognize that some states, such as Texas, allow setback decisions to be made by local governments. I have attached a table which lists several cities in Texas, and the setbacks they have for oil and gas wells from homes (Table Source: <http://www.leaguecity.com/DocumentCenter/Home/View/4390>). As you will see, many of them have setbacks of 1,000 feet, and some as far as 2,000 feet. I checked the GIS map server from the Texas Railroad Commission, and verified that these cities do have oil and gas development as well. Texas is well-known for its prolific oil and gas development, and several cities in Texas have setbacks of 1,000 to 2,000 feet.

Finally, I want to note something we all know. Northwestern North Dakota is not a compacted urban area. It is largely farm and ranch land, and there are plenty of wide open

spaces where oil and gas development occurs. It is not at all unreasonable for the landowners of North Dakota to ask that these oil and gas wells be set back from their homes so that they are not in danger, and so that they do not have to live with the constant smells and noise from an oil and gas well, particularly when we already have more stringent setbacks in place for animal feeding operations in the state. Most importantly, however, there should be no cause for concern that oil will be left in the ground as a result of a larger setback. If an oil and gas well needs to be located somewhere for topographical or geological reasons, this bill retains the language which allows the Industrial Commission to determine that the well location is reasonably necessary to prevent waste or to protect correlative rights. The Commission indicated at a recent hearing related to development in the Killdeer Mountains that leaving oil in the ground is waste. Therefore, if the setback would actually ever result in the inability to drill a well, the developer can apply to the Industrial Commission and request a waiver as anticipated by the law that is already in place.

In conclusion, I urge a **DO PASS** recommendation for **House Bill 1348**, and I would be happy to answer any questions at this time.

2

From: John Coefield

January 30, 2013

1165 Erickson Road

Helena, MT 59602

To: Derrick Braaten

BAUMSTARK BRAATEN LAW PARTNERS

109 North 4th Street, Suite 100

Bismarck, ND 58501;

Derrick,

As you requested, I have reviewed: Draft language for ND HB 1348; Page 4 of the record of testimony on SB 2006 from January 24, 2013 where Lynn Helms discusses the increase in the setback distance from 350 feet to 500 feet that resulted from the 2005 session; the September 2006 Municipal Official's Guide to Diesel Idling Reduction in New York State; the La Plata County Oil and Gas Impact report appended to the 2007 session HB 1299 staff report; and the 1987 Vibration and Blasting Study report.

I have also drawn on more than 30 years of experience working with the State of Montana Air Quality Program. At the time of my retirement I was the State Air Quality Meteorologist and had reviewed dozens of Oil and Gas Projects for compliance with Ambient Air Quality Standards and Increments. I have attended several Oil and Gas Workshops and have toured many Oil and Gas projects. I am very familiar with the kinds of impacts expected from these kinds of facilities and have been involved in attempting to resolve complaints from the public when they are adversely impacted by Oil and Gas emissions.

The bottom line is that there has been no demonstration that would support the notion that a 500 foot set-back will always protect the public. The basic problem is the uncertainty in the quantity and character of the emissions from these facilities. The first issue, quantity, is the nature of this kind of essentially fugitive emission of a flammable gas. The emissions are generally not confined in a stack with a testable emission rate and there are really no emission monitors available that would provide a record of what is emitted over time. These sources do not usually have enforceable emission limits even for criteria pollutants. The second issue is the question of just what pollutants are being emitted. Generally speaking the two main pollutants from these sources are characterized as either Volatile Organic Compounds (VOCs) or Hydrogen Sulfide but both of these categories are generally a mix of gases. VOCs are usually expressed as Methane (CH₄) but other products like Butane are usually present as well. Some of these other VOCs are extremely toxic and or carcinogenic. Hydrogen Sulfide (H₂S) is the result of the natural presence of Sulfur in the rock formation where the gas and Oil originate and the

amount of sulfur present varies widely from production zone to production zone as the geology changes. H₂S is extremely toxic and is usually combusted to Sulfur Dioxide (SO₂) to protect workers, wildlife and nearby residents. Of course SO₂ is a criteria pollutant with known health effects of its own.

These uncertainties make a generic impact analysis that could be applied in all cases impractical. The only sure way to confidently assess the health impacts of a facility would be through some sort of field study measuring the concentration and chemistry of emissions downwind and then back calculating to an emission rate. This could then be used in a dispersion analysis to predict worst case impacts at known distances. This is not a practical solution and I am strongly in favor of substituting set-back distances for this kind of project.

North Dakota has made a good start with the 500 foot set-back but empirical evidence of un-acceptable impacts at that distance makes it clear that this distance is not always going to work. In my opinion, absent a demonstration that 500 feet will work, the set-back should be increased. I think ¼ mile is a good place to start but if residents continue to be driven from their homes at that distance, it would need to be increased again.

I hope this helps,



John A Coefield

Meteorologist

2

A
MODEL ZONING ORDINANCE
FOR
ANIMAL FEEDING OPERATIONS

Developed by a
ZONING WORK GROUP
for Animal Feeding Operations

Final
March 2000

Facilitated by the



NORTH DAKOTA DEPARTMENT OF HEALTH
Environmental Health Section
P.O. Box 5520
Bismarck, North Dakota 58506-5520

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PREAMBLE

Public concern about odors produced by animal feeding operations and agricultural concern for rights to practice farming and ranching emerged within North Dakota during 1998. As remedies for these concerns, the 1999 North Dakota Legislative Assembly approved amendments to law that (1) limited the powers of local governments to prohibit or prevent the use of land or buildings for farming or ranching but allowed local governments to regulate the nature and scope of concentrated feeding operations, and (2) established a state standard for odors. The 1999 legislation was Senate Bills 2355 and 2365.

Subsequent to signing this legislation, Governor Edward T. Schafer issued Executive Order 1999-03, which reads in part:

The Department of Health shall . . . take steps reasonably necessary to protect the environment of the state of North Dakota, according to its responsibilities under law; and,

The Department shall establish a working group with interested political subdivisions, or their associations to develop model zoning regulations for the subdivisions to implement as they deem appropriate; . . .

The Department of Health arranged for and facilitated meetings of the work group and a committee of the work group. The work group was comprised of representatives of two livestock producer associations, three boards of county commissioners, two township officers associations, two city officers and the Department of Health. At times, several other people participated in meetings or assisted the work group, including county planners and land-use administrators.

This document is the product of the work group. It represents the consensus recommendation of the work group for zoning of concentrated feeding operations, sometimes referred to as feedlots or animal feeding operations. Its purpose is to:

- ☞ Provide a reference, or model, for zoning and ordinances pertaining to concentrated feeding operations for use by the local governments across North Dakota.
- ☞ Remind local governments of their roles in protecting public safety and health and in planning the uses, conservation and protection of natural resources, including land for farming and ranching.
- ☞ Foster uniform zoning ordinances for concentrated feeding operations among counties and townships. Since regional differences in population density, climate, and soil and water resources occur across the state, local governments can revise the model as appropriate.
- ☞ Avoid duplication among state environmental protection rules and local government zoning ordinances.

Setback Distances for <i>Animal Feeding Operations</i>		
Number of Animal Units	Hog Operations	Other Animal Operations
fewer than 300	none	none
300 - 1000	0.50 mi (0.805 km)	0.50 mi (0.805 km)
1001 or more	0.75 mi (1.207 km)	0.50 mi (0.805 km)
2001 or more	1.00 mi (1.609 km)	0.75 mi (1.207 km)
5001 or more	1.50 mi (2.414 km)	1.00 mi (1.609 km)

The *operator* of a new *animal feeding operation* shall locate the site of that operation from existing residences, businesses, churches, schools, public parks and areas of property that are zoned residential so as to exceed the corresponding listed setback from these places.

If notified in writing by an *operator* of a planned future expansion of an *animal feeding operation*, the local unit of government may implement the corresponding odor setback for a temporary time period not to exceed two years, after which time the setback will remain in effect only if the expansion was completed.

A local unit of government may, upon recommendation of the zoning commission or land use administrator, increase or decrease a setback distance for a new *animal feeding operation* after consideration of the proposed operation's plans, if it determines that a greater or lesser setback distance is necessary or acceptable, respectively, based upon site conditions or demonstrable safety, health, environmental or public welfare concerns.

3. CONDITIONAL USES

3.1 PERMIT PROCEDURES

3.1.A. Applicability.

The *operator* of a new *livestock* facility or an *existing livestock* facility, which meets the definition of an *animal feeding operation* and which is a conditional (or special) use of land as listed below, shall apply for and obtain a conditional (or special) use permit.

1. A new *animal feeding operation* that would be capable of handling, or that expands to handle, more than 1,000 animal units is a conditional (or special) use of land.
2. An *existing animal feeding operation* that expands to handle more than 1,000 animal units is a conditional (or special) use of land.

Setback Distances from Established Residences for Animal Feeding Operations

County	Number of Animal Units	Hog Operations	Other Animal Operations
Dunn	100-299	1 mile	.5 miles
	300-999	2 miles	1 mile
	1000 or more	2 miles	2 miles
Mountrail	5-50	0.50 mi	Not Applicable
	51-299	2.00 mi	0.50 mi
	300 – 1000	2.00 mi	0.50 mi
	1001 or more	2.00 mi	0.50 mi
	2001 or more	2.00 mi	0.75 mi
	5001 or more	2.00 mi	1.00 mi
Renville	300 – 1000	.5 miles (0.805 km)	.5 miles (0.805 km)
	1001 or more (300-700 more for swine)	.75 miles (1.207 km)	.5 miles (0.805 km)
	2001 or more (1401 or more for swine)	1.00 mi (1.609 km)	0.75 mi (1.207 km)
	5001 or more (3501 or more for swine)	1.50 mi (2.414 km)	1.00 mi (1.609 km)
Williams	Less than 300	None	None
	300 – 1000	.5 miles (0.805 km)	.5 miles (0.805 km)
	1,001 or more	.75 miles (1.207 km)	.5 miles (0.805 km)
	2001 or more	1 mile (1.609 km)	.75 miles (1.207 km)

Information taken from <http://www.ndhealth.gov/WQ/AnimalFeedingOperations/CountyZoning>

1000-Foot Drilling Setbacks from Protected Uses of Cities Within Texas

	Population	Square Miles	Density (# of residents per square mile)	Public Park	Private Park	Residence	Commercial Building	Religious Institution	Hospital Building	School	School Boundary	Day Care	Day Care Boundary	Public Building	Other Off-site Structure	Water Well	Public Library	Property Line
Aledo	2,716	1.9	1,429	1,000	N/A	1,000	1,000	1,000	1,000	1,000	N/A	1,000	N/A	1,000	1,000	200	1,000	N/A
Bedford	46,979	10	4,698	600	N/A	600	600	600	600	1,000	N/A	600	N/A	600	N/A	500	600	N/A
Converse	18,198	6.3	2,889	N/A	N/A	1,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Coppell	38,659	14.94	2,588	1,000	N/A	1,000	1,000	1,000	1,000	1,000	N/A	1,000	N/A	1,000	1,000	N/A	1,000	N/A
Corinth	19,935	41	2,523	1,000	N/A	1,000	N/A	1,000	1,000	1,000	N/A	N/A	N/A	N/A	N/A	200	N/A	200
Denison	22,682	22.9	990	N/A	N/A	1,000	1,000	N/A	1,000	1,000	N/A	N/A	N/A	1,000	N/A	N/A	1,000	N/A
Denton	113,383	62.3	1,820	1,000	N/A	1,000	N/A	1,000	1,000	1,000	N/A	N/A	N/A	N/A	500	1,000	1,000	N/A
Dickinson	18,680	9.8	1,906	N/A	N/A	500	500	N/A	1,000	1,000	N/A	N/A	N/A	1,000	N/A	1,000	1,000	500
Flower Mound	64,669	43.4	1,490	1,000	N/A	1,000	500	1,000	1,000	1,000	N/A	N/A	N/A	1,000	500	1,000	1,000	500
Grapevine	46,334	35.9	1,291	1,000	N/A	1,000	N/A	1,000	1,000	1,000	N/A	N/A	N/A	1,000	100	1,000	1,000	500
Kingsville	26,213	13.9	1,886	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
La Marque	14,509	14.8	1,015	N/A	N/A	2,000	N/A	2,000	2,000	N/A	2,000	N/A	N/A	2,000	2,000	N/A	2,000	N/A
Lumberton	11,943	9.4	1,271	N/A	N/A	1,000	1,000	1,000	1,000	1,000	N/A	1,000	N/A	1,000	N/A	N/A	1,000	N/A
Marvel	5,179	23.3	222	N/A	N/A	2,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
McKinney	131,117	62.9	2,085	1,000	N/A	1,000	500	1,000	1,000	1,000	N/A	500	N/A	1,000	N/A	1,000	1,000	500
Morgan's Point	4,170	1.8	2,317	N/A	N/A	1,000	1,000	N/A	N/A	N/A	1,000	N/A	N/A	1,000	N/A	1,000	1,000	N/A
Nederland	17,547	5.7	3,078	N/A	N/A	1,000	1,000	N/A	N/A	1,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Port Neches	13,040	9.2	1,417	N/A	N/A	1,000	1,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roanoke	5,962	6	994	1,000	N/A	1,000	500	1,000	1,000	1,000	N/A	500	N/A	1,000	500	1,000	1,000	N/A
Rockport	8,766	14.5	605	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Seabrook	11,952	21.5	556	N/A	N/A	1,500	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Southlake	26,575	21.9	1,213	N/A	N/A	1,000	1,000	1,000	1,000	N/A	1,000	1,000	N/A	1,000	1,000	N/A	1,000	N/A
Victoria	62,592	33.1	1,891	N/A	N/A	600	600	1,500	1,500	1,500	N/A	N/A	N/A	1,500	N/A	N/A	1,500	N/A
Weatherford	25,250	22.7	1,112	1,000	N/A	1,000	N/A	N/A	1,000	N/A	1,000	N/A	N/A	N/A	N/A	1,000	N/A	N/A
Westlake	992	6.7	148	1,000	N/A	1,000	1,000	1,000	1,000	N/A	1,000	1,000	N/A	1,000	N/A	N/A	1,000	N/A

Notes:

1. This data is primarily composed of research from the Municode database and may not incorporate every city that has a 1,000-foot drilling setback.
2. Some cities allow reduction in 1,000-foot setback with or without City Council approval if property owners within the buffer give consent.
3. These cities measure setbacks from the well bore or the drill site, which may encompass more than one well bore.
4. The ordinances for the cities of Aledo, Bedford, Corinth and Denton only pertain to the drilling of gas wells.

Mr. Chairman, members of the Committee

Myron Hanson, President of Northwest Landowners

The Northwest Landowners supports the increased setback requirement for an oil and gas production facility adjacent to an occupied home from the current 500 feet to 1320 feet.

We feel that a setback of 1320 feet more adequately addresses the health, safety and quality of life issues faced by the farmers and ranchers that have to live in the middle of this activity.

We heard previous testimony last week on SB 2206 that the industry feels that these considerations are adequately addressed by the current statute.

This is not 1951 and they are not drilling the Iverson number one. This is not even 2007 when I believe this issue was last considered, before the explosion in the level of activity.

This is an evolving situation with evolving technologies that would seem to allow for a greater degree in the flexibility of operations.

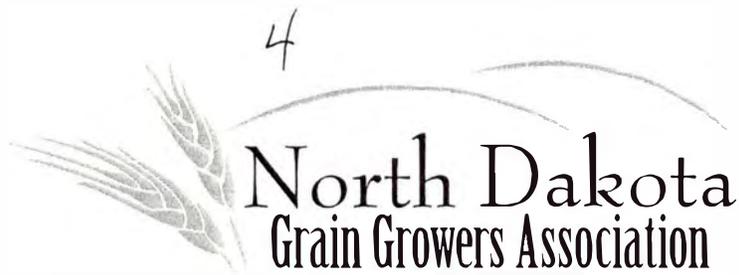
Additionally we would like to ask the question of why the North Dakota Dept. of Health recommends a setback of one half mile for a 300 cow feeder operation but the 500 feet is deemed sufficient for a serious industrial process. A requirement that is five times greater than the setback for oil and gas.

H2S gas, spills, blowouts, and fire represent a serious threat to people living and working on our states farms and ranches.

Because of the waiver provisions that are retained in the bill, that allow for the industry to move inside the setback requirement, we feel that this would allow for the resolution of potential conflicts with topographical concerns or the

closeness of neighboring homestead, or to prevent waste, we feel that this represent a better margin of safety for North Dakota farmers and ranchers.

We urge a do pass recommendation for HB 1348.



Your voice for wheat and barley. www.ndgga.com

North Dakota Grain Growers Association
Testimony on HB 1348
House Energy and Natural Resources Committee
January 31, 2013

Chairman Porter, members of the House Energy and Natural Resources Committee, for the record my name is Dan Wogsland, Executive Director of the North Dakota Grain Growers Association. The North Dakota Grain Growers Association is in support of HB 1348.

During our deliberations at the North Dakota Grain Growers Association's Annual Meeting in December, 2012, NDGGA membership adopted the following resolution:

"In order to protect one of North Dakota's most precious resources, its productive farm and ranch land, NDGGA hereby resolves that it supports that the setback for all drilling and production operations be increased from 500 feet to 1320 feet to protect the value of occupied farm and ranch homes."

Increasing the setback distances for drilling and production operations from occupied dwellings is the right thing for North Dakota. This isn't just an issue of economics; it is an issue of public safety. Additionally it is an issue of a show of respect by the drilling and production industry for the North Dakota farmers and ranchers who have lived on the land for generations and who will continue to live on the land long after the oil boom.

NDGGA fully supports HB 1348; its setback distances for drilling and production operations are a common sense approach to landowner/industry relations. With today's drilling and production technology, coupled with the abundance of area in North Dakota in which to operate, there is no need to "crowd" occupied residences.

Mr. Chairman, members of the House Energy and Natural Resources Committee, some will say this legislation will create a hardship for the drilling and production industry; I would submit the current setback law creates a hardship for rural North Dakota. Therefore, Mr. Chairman, members of the House Energy and Natural Resources Committee, the North Dakota Grain Growers Association supports HB 1348 and would urge the Committee and the House to concur.

NDGGA provides a voice for wheat and barley producers on domestic policy issues – such as crop insurance, disaster assistance and the Farm Bill – while serving as a source for agronomic and crop marketing education for its members.

House Energy and Natural Resources
North Dakota Farmers Union
Written Testimony on House Bills 1333, 1348, 1349, 1352, 1355, 1407
January 31, 2013

Mr. Chairman and Members of the Committee, my name is Kristi Schlosser Carlson, and I represent the 40,000 members of the North Dakota Farmers Union and the Policy and Action developed democratically by our grassroots membership. In that policy, we establish our foundational belief that family farmers and ranchers are stewards of the land. We strive for a balance among protecting the due process of landowners; producing food, fiber, and fuel; valuing natural resources; and meeting energy needs.

We recognize that balance is a difficult one to strike. Many of the bills the committee hears today appear to attempt to plug holes in current processes and an attempt to find that balance. Generally, we support many of these efforts, and encourage a comprehensive response that strives for consistency across regulatory agencies. For example, HB 1333 appears to begin a conversation about unclear jurisdiction, and we encourage ongoing discussion on those issues. We will also continue to educate our members about those processes and engaging companies in ways to address concerns.

Our policy speaks specifically to assuring landowners the same standards in energy development leases and easements that are extended to state lands, such as those in HB 1349. It also directly addresses certain process protections that should be included in these contracts, such as those in HB 1407, part 1. And it specifically enumerates that 1,320 feet is the appropriate distance between homes and wells, supporting HB 1348. We do not believe that enumerating protections and standards in statute or rule interferes with the negotiation process in a “willing seller – willing buyer” relationship. In fact, the process protections in part 1 of HB 1407 are similar to those in N.D.C.C. 17-04-06 regarding wind energy and property rights. Similarly, HB 1355 regarding the definition of “commencement of drilling operations” clarifies statute and prevents unwarranted litigation. It would be difficult to imagine that a landowner would believe that, among the more commonly negotiated terms (location, compensation, construction, etc.), he/she should have to define this term. Therefore, such a definition would be a reasonable statutory protection, and not one that would jeopardize meaningful negotiation of a contract. Additionally, in HB 1348, the negotiation process remains in place – a homeowner can waive that requirement or the commission can grant an exception.

In the spirit of balancing landowner protections and that opportunity to negotiate terms, the committee might consider adding language found in other statutes, such as “unless otherwise agreed by the parties,” in HB 1349’s specified details of certain reclamation processes, like the type of grass seeded or the depth of the topsoil. The committee can do this, but still protect the landowners by requiring that broader standards be met.

Finally, NDFU supports using the North Dakota mediation service in these processes; it’s been an accepted and welcome process by all parties.

RE: House Bill 1348 January 31, 2012

4
testimony by Brenda Jorgensen

On our way to church on Sunday, 4/10/11, we saw a man on top of the frac' tanks at the location ½ mile west of our house, holding a yellow hose, pumping from a chemical crate on a flat-bed truck into the frac' tanks.

While out for an evening walk on April 10, 2011, Richard and I encountered strong chemical smells from the location ½ mile west of our house. We learned later that our granddaughter (6) couldn't stop coughing, after checking out the spring run-off with us on the 4-wheeler earlier that afternoon.

So the next day, April 11, 2011, I was very careful to check the wind before I went for a walk. When I returned home my eyes were burning and stinging and my voice was very distorted and scratchy for over two hours! That evening our son-in-law came over to our house and was in the yard rubbing his eyes, complaining and wondering what that was from. There was no obvious smell that day, but there were obvious reactions.

We now live next to a location that is unconfirmed to be 800' from our house. That means the wellhead is 800' away, which allows all the frac' tanks to be much closer to our house, and all the chemical trucks loading the frac' tanks are that much closer to our house. Because of those reactions, I just mentioned above, we are very leery to be outside. We loved the outdoors. We used to cross-country ski and snowshoe in the winter. Walking is not even something I can enjoy. I always check the wind, but the North Dakota wind switches, and then we've been caught up in some foul fumes. This year the winds have been predominantly from the South/Southwest, which is the direction of the location closest to my house.

The flare on the first well drilled within 800' from our house has gone out several times – 6 times that we know of. Two of those times it was very disrupting and scary:

On Saturday, Aug 25, 2012, the house was full of gas when we returned from a funeral of a dear friend. The flare was out before we left mid morning and was still out four hours later. Who do we call? What do we do? I got the horses moved out of the pasture right after making several calls. We are not given any emergency numbers.

On May 23, 2012, I wrote, "The flare was out during the night. I was up since 3:00 a.m. because of strong propane smells in the house. Todd Peterson in the State Health Department, Air Quality, was called. He will talk to Petro Hunt LLC about location #20975. That flare's been out three times and Richard has called PHLLC about that each time. I've had a sore throat for a week now."

On Feb 4, 2012, the whole Valley was full of sulfur smell when we drove home in the dark fog. When that was reported, I was asked if I knew where that was coming from?

On Feb 4, 2012, there was a terrible smell like someone was giving a permanent in my house, like ammonia, coming from the outside into my house! They were preparing to frac'.

On Oct 31, 2012 the past two days the air outside the patio door is foul and has a strong diesel smell.

The vibration from drilling is felt in your body, right in your soul. It feels like you're at a concert with the bass way too loud. Sometimes my ears wanted to be held tight. It's very unnerving. On Jan 7, 2012, Our grandson (5) and granddaughter (now 7) told us they had been waking up in the night and not being able to sleep. Our grandson said, "I can hear it and feel it. It feels like a truck in my bed – shaking my bed. On

The rumbling of the frac' trucks is heard and felt all day, all night, on all levels of the house. That affects all the neighbors along the way though too.

The school bus driver brought our granddaughter to our house after school, and on her way out, she reported a semi and tanker pulled off the location at the end of our driveway and nearly ran her over.

I asked to be notified of chemical activity so as to protect our health and that of our neighbors and herds. I asked for air monitoring equipment again and again. I've asked for disclosure of the chemicals used. This is just too close.

There's more – always is,

Brenda Jorgenson - Box J Ranch

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Good morning Mr. Chairman and members of the committee, my name is Clarke Stevens, I live at 2241 78th St NW in Glenburn ND and I am in favor of this bill. As I mentioned before I live in Glenburn. I live on a farm about three miles from town. I'm married to my wife of twelve years Lora and have three children. Blaine 10, Valerie 7, and Ava 4. We have lived on our farm for around six years. I have lived and farmed around Oil wells, Oil Treater Plants, Salt Water Disposal Units and Oil Tank Batteries all my life. If you have been around it you know the distinct smell of the Sulfur gas that is a waste product in the extraction and production of oil. I currently live 200 yards from an oil tank storage site. To say the smell that comes from this site is overwhelming would be an understatement. Although the smell is not constant, it does occur on a daily basis. The smell of the gas can be so strong at times that it radiates throughout our house. It doesn't matter if it's spring, summer, fall, or winter. The gas is always in the air. The company that operates the sites near my home have installed 3 flares that **"WHEN"** and I do stress **when** working do provide some relief from the pungent smell. The problem has progressed to the point that some days in the summer my kids can't even stand to be outside playing. The smell bothers my daughter Valerie to the point of nausea and has made her vomit on occasion. It's not fun trying to weed your garden on a nice summer day only to be startled by the sound of your seven year old daughter vomiting because of the smell. The smell of the gas burns all of our noses, causes our eyes to water, and gives my wife, son, and myself headaches. Waking up in the morning with a headache and the smell of sulfur radiating throughout your home is not, a pleasant start to the day. All of this, because we decided to open the windows and let the cool summer night air in after a hot August day, I think we all love the sweet smell of harvested crops on the fall night air. Well, just replace that with the smell of ten week old rotten eggs and you have the smell my family is living with. The latest instance worth mentioning occurred just last Sunday. My family and I headed out the door for church. Our garage is about 20 feet from our front door. That short walk was all the time it took for all of us to start experiencing the beginning side effects of the gas. Only time will tell if my family develops any long term side effects from the daily gas smell we are dealing with.

With all that said. My farmstead was here long before the oil industry was. Although there might not be anything that can be done in my situation, I can only hope going forward that you as elected officials will take the proper measures to insure that another family like mine will not have to deal with the same problems. One thing that no doubt would help is increasing setback requirements for oil well sites. Mr. Chairmen I'm asking you and the other members of this committee to strongly consider instituting stronger restrictions set back requirements. Don't let the North Dakota life so many of us love be affected by a problem that could be solved by simply not allowing oil well sites to be built so close to people's homes, farmsteads, and cities, etc. Mr. Chairmen I thank you and also all the members of this committee for giving me the time to address you this morning.

Clarke Stevens

Glenburn, ND

Cell 701-833-3472





120 N. 3rd Street • Suite 200 • P.O. Box 1395 • Bismarck, ND 58502-1395
Phone: 701-223-6380 • Fax: 701-222-0006 • Email: ndpc@ndoil.org

Testimony of Ron Ness
House Bill 1348
House Natural Resources Committee
January 31, 2013

Chairman Porter and members of the House Natural Resources Committee, my name is Ron Ness, president of the North Dakota Petroleum Council. The North Dakota Petroleum Council represents more than 400 companies in all aspects of the oil and gas industry, including oil and gas production, refining, pipeline, transportation, mineral leasing, consulting, legal work, and oilfield service activities in North Dakota. I appear before you today in opposition of House Bill 1348.

North Dakota, through administrative rule, increased the setback provision from 250 feet to 500 feet in 2006. The 500 foot setback rule has worked allowing enough distance to ensure safety for homeowners but also allow developers and landowners to locate wells in places where the minerals can be extracted and impacts to the land reduced. To my knowledge safety has not been an issue with oil wells in relation to occupied dwellings, and I'm not aware of any incidents of fire impacting anyone located near a well in the 62 years of oil activity in North Dakota.

This bill will likely result in more controversy since it not only would make the distance required from occupied dwellings the most restrictive in the nation, but it would also discourage what we are all working so hard to accomplish in the Bakken: Responsibly developing our natural resources while working to reduce the footprint of industry to limit the impacts on farming, ranching and wildlife.

With nearly 5,000 Bakken wells drilled since 2006, there have been very few instances where the operator and home owners haven't been able to workout an agreement. Increasing the setback to 1,320 feet will make the process even more challenging for the parties to agree. farmers, ranchers and tenants will lose more control as mineral developers who have a right of access will place the wells where they are needed with limited options to make adjustments.

If passed this bill will:

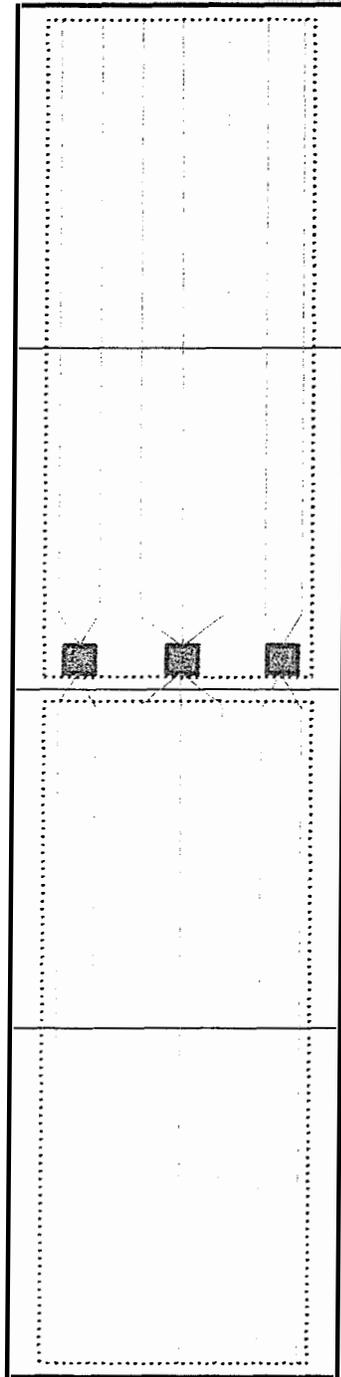
- 1.) Discourage reduced footprint operations with multi-well pads and corridor development.
- 2.) Increase impacts on farming and ranching by forcing the wells into the fields rather than drilling the wells by the road which would mean fewer roads and pipelines across the fields impacting the land.
- 3.) Increased impacts on wildlife by requiring the mineral developer to spread operations across the landscape instead of working the edges, which is a huge benefit of extended-reach horizontal drilling.
- 4.) Increase the waste of mineral resources by limiting access to certain areas of a spacing unit and essentially taking some oil and gas formations requiring vertical drilling off the table where you are trying to locate trapped oil and gas in anticlines with the use of 3 or 4D seismic technology.
- 5.) Add more trucks, dust, and traffic as pipelines will be more challenging to develop. This will result in more roads and truck loads across the fields, spreading dust even further into the cropland.

The consequences of increased setbacks include inefficient land use, drilling of additional wells, more truck traffic, fragmented wildlife habitat, and loss of farmland. Increased setbacks also harm the royalty owner. Expanded setbacks increase development costs and decrease access certainty, putting millions of dollars of royalty interests at risk and potentially denying the mineral owner (who might be the farmer or rancher who doesn't live in the house) the right to develop their property.

Current setback rules acknowledge and accommodate these stakeholders and adequately address the perceived health and safety risks while allowing the surface owner, mineral owner, oil operator and regulators the ability to determine the best location of the well in order to maximize the resource and protect private property rights. For some people there is no amount of distance setback that would appease them.

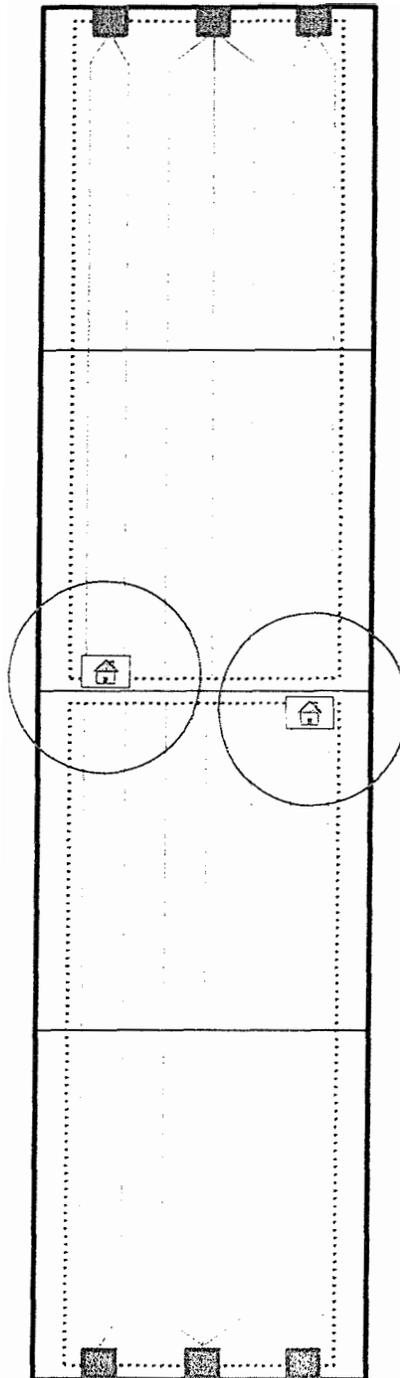
We strongly urge a Do-Not Pass on HB 1348. I would be happy to answer any questions.

Ideal Scenario



13 Acres Total Surface Disturbance
0.5% Total Disturbance

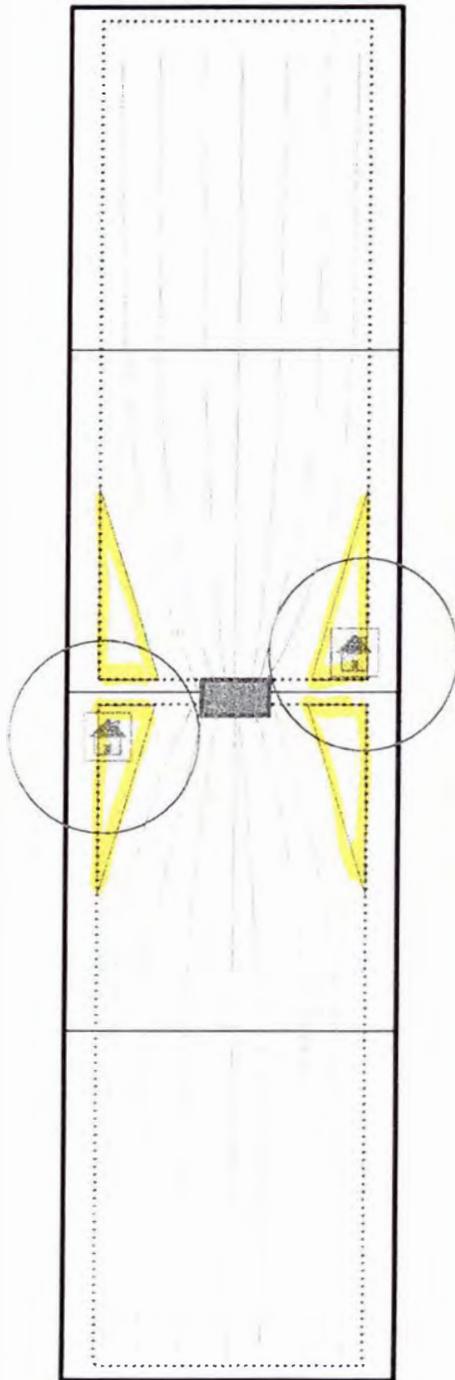
Increase Surface Disturbance



21 Additional Acres additional Disturbance
0.9% Total Pad Disturbance
6 Miles of extra Pipelines
Up to 6 miles of extra Road

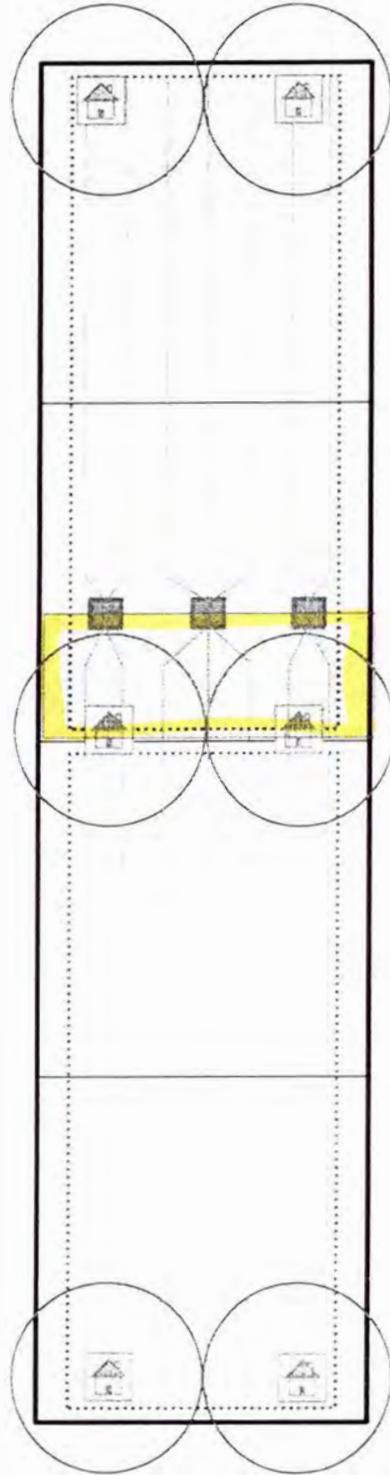
9

Undrained Acreage Due to Directional Constraints



80 Acres of Lost drainage area (shaded blue)
3 Acres Less Pad Disturbance
0.4% Total Pad Disturbance
No extra Road or Pipe

Undrained Acreage



160 Acres of Lost Drainage (shaded blue)
1.5 Miles Extra Piping
1.5 Miles Extra Road ~ 6 Acres increased disturbance



MERCEDES 5502 41-7T

MARLEE 5502 41-7B

RES. HOUSE

RES. HOUSE

RES. HOUSE

RES. HOME

ODÍN-JORGENSEN 5502 44-8H

VUKI 5502 42-7H

CONTRERAS 5502 42-7H

STOWERS 5502 43-8H

RES. HOME

RES. HOME

RES. HOUSE

LYNN BHL

RES. HOME

RES. HOME

MARLEE BHL

CONTRERAS BHL

RES. HOUSE

STOWERS BHL

RES. HOUSE

RES. HOUSE

RES. HOUSE

RES.

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Google earth

10



House Bill 1348
House Energy and Natural Resources
January 31, 2013

Testimony of Lynn D. Helms, Director

This bill takes us back to discussions in the 2005 session and 2007 legislative sessions.

In 2005 testimony, I presented the results of the US Bureau of Mines investigation into setback distances for blasting and the legislature concluded that 500 feet is the appropriate setback for shot hole seismic.

In 2007, I provided for this committee the results of the Colorado Oil and Gas Association study in LaPlata County Colorado and the New York State – EPA study of appropriate setbacks for Diesel Idling Reduction. That legislature concluded that increasing the setbacks to 500 feet was appropriate.

In 2010, the North Dakota Industrial Commission signed an order establishing rational east-west development corridors based on 1280 acre stand up spacing and 500 foot setbacks from occupied dwellings. This bill will have the unintended consequence of pushing that development back toward a more random pattern based on windows of available land outside the 1,320 foot radius circles.

10

Mr. Chairman and members of House Energy and Natural Resources, while Bakken and Three forks development and the proponents of this bill have presented new ideas and arguments today, the science hasn't changed. Therefore, the North Dakota Industrial Commission urges a do not pass for House Bill 1349.

PROPOSED AMENDMENTS TO HOUSE BILL NO. 1348

Page 1, line 15, remove the overstrike over “~~five~~”

Page 1, line 15, remove the overstrike over “~~152.4~~”

Page 1, line 15, remove “one thousand three”

Page 1, line 15, remove “twenty”

Page 1, line 15, remove “402.34”

Page 1, line 19, after “dwelling.” insert “If the commission issues a drilling permit for a location within one thousand feet of an occupied dwelling, the applicant shall locate all tanks, treaters and flares utilized in connection with the permitted well a greater distance from the occupied dwelling than the oil and gas well bore, unless the owner otherwise consents or the commission determines that it is reasonably necessary for the tanks, treaters and flares to be otherwise located to prevent waste or protect correlative rights.”

Final

1

PROPOSED AMENDMENTS TO HOUSE BILL NO. 1348

from Rep Nathe

Page 1, line 15, remove the overstrike over "five"

Page 1, line 15, remove "one thousand three"

Page 1, line 15, remove "twenty"

Page 1, line 15, remove the overstrike over "152.4"

Page 1, line 15, remove "402.34"

Page 1, line 17, remove "three"

Page 1, line 17, overstrike "hundred"

Page 1, line 17, remove "twenty"

Page 1, line 17, replace "402.34" with "304.8"

Page 1, line 18, after "permit" insert: "on wells permitted on new pads built after August 1, 2013 including, upon request from the landowner of any such occupied dwelling, the location of all flares utilized in connection with the permitted well at a greater distance from the occupied dwelling than the oil and gas well bore as can reasonably be accommodated within the proposed pad location or"

Renumber accordingly

thanks on treaters

#1

Mr. Chairman, members of the committee:

For the record, Myron Hanson, representing the Northwest Landowners.

We stand in support of HB 1348.

Earlier in this session two bills were introduced, one here in the Senate and one in the House to change the distance between the well bore and an occupied home. It was felt that the current five hundred foot requirement was too close given the changing dynamics of the wells in the Bakken.

We were unable to make our cases for changing the setback . When it became apparent that changing the well bore wasn't possible, the question became, how do we provide some measure of relief to the farmers and ranchers living next to one these Bakken wells?

Moving the equipment downstream from the well bore was what came out of these discussions.

There is a T.V. commercial airing that says people from Grassy Butte to Grand Forks benefit from this activity. We don't disagree, but the burden of securing this benefit is carried by a small number of third and fourth generation farmers and ranchers living and working in the midst of this activity.

The Northwest Landowners sees HB 1348 as a means of providing some relief to those people and urges a do pass recommendation.

#2

PROPOSED AMENDMENT TO FIRST ENGROSSMENT HB 1348

March 25, 2013

Page 1, line 22 remove the word "~~landowner~~" and replace with "owner"

Page 1, line 23 before the word "occupied" insert the word "permanently"

Renumber accordingly.

#3

Froseth, Glen A.

To:
Subject:

Froseth, Glen A.
Re: HB 1348

HB 1348

Senator Lyson and members of the Senate Energy and Natural Resources committee, for the record I am Glen Froseth, Representative from District 4.

HB1348 deals with the setback spacing of an oil well located near an occupied dwelling.

As amended, HB1348, owners of permanently occupied dwellings must be notified if a well permit applicant proposes drilling within 1320 feet of the dwelling. *(Section 1, lines 11, 12, 13)*

A new oil or gas well must be sited 500 feet or more from the dwelling in order to be permitted. According to the engrossed version of HB1348, if the new well will be located within 1000 feet of the dwelling, the location of all flares, tanks and treaters used in connection with the well must be situated at a greater distance from the dwelling than the well bore itself, if that location can be reasonably accommodated. The owner of the dwelling must make this request. (In simpler terms, if the well is located closer than 1,000 feet, all auxiliary equipment such as flares, treaters, etc., must be located on the far side of the well, and not between the well and the dwelling.) *(Lines 21-24 Page 1 and lines 19-2 Page 2)*.

Mr. Chairman and committee, I respectfully ask for a Do Pass on HB1348. Thank you.

Setback Petition.

Chairman Lyson and the North Dakota Senate Natural Resource Committee,

We believe that, in the rush to get oil out of the ground as fast as possible, state officials are not protecting the lives and livelihoods of people who live and work in western North Dakota. The current oil well pad set back from a dwelling of 500 feet is not enough to protect residents from flares, grass fires, explosions, toxic smells and the safety and health hazards from increased traffic. For the safety and well being the citizens in western North Dakota, we ask the Senate Natural Resources Committee to please amend HB 1348 to increase the set back from 500 feet from a dwelling to 1,000 feet from a dwelling.

Petition Numbers:

Online: 252

Written: 163

TOTAL: 415

PETITION – Increase set back in HB 1348 to 1,000 Feet
 TO: Chairman Lyson and the North Dakota Senate Natural Resource
 Committee

We believe that, in the rush to get oil out of the ground as fast as possible, state officials are not protecting the lives and livelihoods of people who live and work in western North Dakota. The current oil well pad set back from a dwelling of 500 feet is not enough to protect residents from flares, grass fires, explosions, toxic smells and the safety and health hazards from increased traffic. For the safety and well being the citizens in western North Dakota, we ask the Senate Natural Resources Committee to please amend HB 1348 to increase the set back from 500 feet from a dwelling to 1,000 feet from a dwelling.

NAME	ADDRESS	PHONE #	E-MAIL
1. Kass Kirby	10542 Highway 14006 East	701-421-8856	
2. Dennis Nelson	315 Main St. Box 915 New Town ND		
3. Jacob Brown	303 SW 107th #250 New Town N.D.	701-629-5256	
4. Heath Westby	6860 34th St NE Parshall, ND	(701) 898-7007	
5. 	P.O. Box 244 Stanley, ND	58784	
6. Karen Wieringer	PC Box 130 New Town ND 58763	701-627-4699	
7. Barb Detrenie	7710 39th At NW Parshall ND	58770 898-0201	
8. Dean Hamutalo	433 8th Ave SE Stanley, ND	58784	
9. Jacqui Dupler	40916 81st Ave NW New Town ND	58763 701-627-4351	701-628-1121
10. Dany Bradback	PO Box 742 Stanley, ND	58784 (701) 628-4474	

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 TO: Chairman Lyson and the North Dakota Senate Natural Resource
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NAME	ADDRESS	PHONE #	E-MAIL
1. <u>Herna Pedersen</u>	<u>203 ave N Dodge</u>	<u>846-7472</u>	
2. <u>Amanda Lorenz</u>	<u>Dodge ND 10601 81 Ave SW</u>	<u>846-1789</u>	
3. <u>Madella Brinkman</u>	<u>Dodge 203 1st St E</u>	<u>846-7267</u>	
4. <u>Susan Taxel</u>	<u>7761 County Rd 12 Dodge</u>	<u>983-4519</u>	
5. <u>Jenny Deane</u>	<u>7541 Cty. Rd. 2 Dodge, N.D.</u>	<u>983-4682</u>	
6. <u>Thomas W</u>	<u>200 3rd Ave NW Bo/Ne Valley</u>	<u>983 9253</u>	
7. <u>Christ Brinkman</u>	<u>303 1st St E Dodge</u>	<u>846-7267</u>	
8. <u>Becky Pugliese</u>	<u>301 Central Ave</u>		
9. <u>Charlotte Neurohr</u>	<u>7845 Hwy 4200 Dodge ND</u>	<u>701 246 7295</u>	
10. <u>Karen Dutterkefer</u>	<u>205-3rd Ave. S. Dodge, N.D.</u>	<u>846-7283</u>	

PETITION – Increase set back in HB 1348 to 1,000 Feet
 TO: Chairman Lyson and the North Dakota Senate Natural Resource
 Committee

We believe that, in the rush to get oil out of the ground as fast as possible, state officials are not protecting the lives and livelihoods of people who live and work in western North Dakota. The current oil well pad set back from a dwelling of 500 feet is not enough to protect residents from flares, grass fires, explosions, toxic smells and the safety and health hazards from increased traffic. For the safety and well being the citizens in western North Dakota, we ask the Senate Natural Resources Committee to please amend HB 1348 to increase the set back from 500 feet from a dwelling to 1,000 feet from a dwelling.

Date	NAME	ADDRESS	PHONE #	E-MAIL
1. 3-16-13	Carol Moldenhauer	7846 16th SW, Dodge, ND	701-846-5169	cmoldenhauer@hotmail.com
2. 3-16-13	Elyde L. Moldenhauer	7846 16th SW, Dodge, ND	701-846-5169	
3. 3-16-13	Kenneth Richman		948-2290	
4. 3/16/13	Liz Richman	6750 County 26 Zap, ND	948-2290	
5. 3/17-13	Leidolf Brauman	305 West Main Golden Valley, ND	58541	
6. 3/17-13	Darlene J. Bauman	305 West Main - Golden Valley, ND	58541	
7. 3-17-13	Cheryl Mattelhardt	6350 Cty Rd 26 Zap, ND	58580	
8. 3-17-13	Cheryl Mattelhardt	6350 Cty Rd 26 Zap, ND	58580	
9. 3-17-13	Cindy Eubank	1003 Co Rd 7 Golden Valley, ND	58541	
10. 3-17-13	Dejon Brauman	369 County Rd 2 Golden Valley, ND	58541	
11. 3-17-13	Loren Bauman	371 County 2 Golden Valley, ND	58541	

PETITION – Increase set back in HB 1348 to 1,000 Feet

TO: Chairman Lyson and the North Dakota Senate Natural Resource Committee

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<u>NAME</u>	<u>ADDRESS</u>	<u>PHONE #</u>	<u>E-MAIL</u>
1. Rita Lorenz	1051 8th Ave SW Dodge	701-846-7266	
2. Fred LORENZ	1051 8th Ave SW Dodge	701 846-7266	
3. Mick Seak	8159 Hwy Dodge	701-846-7500	
4. Kelly Allmendinger	619 79th Ave SW Dodge	701-846-7406	
5. Loreta Entze	1585 County 7 Golden Valley	701 983-4418	
6. Jan Cooper	210 Second Ave, Golden Valley	701-983-4572	
7. Barbara Streifel	303 Kemper Dodge, ND.	701-846-7379	
8. Leonard J Streifel	303 Kemper Dodge ND	701-846-7379	
9. Jimmie Seak	8159 Hwy 200 Dodge, ND	701-846-7500	
10. Paul Seak	203 Madison Ave Dodge, ND	846-7500	

PETITION – Increase set back in HB 1348 to 1,000 Feet
 TO: Chairman Lyson and the North Dakota Senate Natural Resource
 Committee

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NAME	ADDRESS	PHONE #	E-MAIL
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- | | | | |
|-------------------------------|--|-----------------|--|
| 1. <i>Maure D. Hoff</i> | <i>Bismarck
911 N. Mandan St</i> | <i>224-1096</i> | |
| 2. <i>Valerie Lindahl</i> | <i>Bismarck
905 Arthur Dr.</i> | <i>202-2248</i> | |
| 3. <i>Katie Dinneen-Wirtz</i> | <i>222 Texas Ave
Bismarck, ND 58501</i> | <i>226-6176</i> | |
| 4. <i>Ari Dinneen</i> | <i>1817 N Bell St
Bismarck, ND 58501</i> | <i>527-6380</i> | |
| 5. <i>A. Dinneen</i> | <i>58503
2515 Powder Ridge Cr</i> | <i>407-3161</i> | |
| 6. <i>Beth Dinneen</i> | <i>2515 Powder Ridge Ct
Bismarck, ND 58503</i> | <i>527-0093</i> | |

fayme stringer henry	Grand FORks	North Dakota
Sandra Dukart Dukart	Manning	North Dakota
Glenna Meiers	New Town	North Dakota
Travis Bean	Bismarck	North Dakota
Karen Smith	Kenmare	North Dakota
Sarah Trandahl	Center	North Dakota
Scott Liedle	White Earth	North Dakota
Colton Bruhn	Fargo	North Dakota

Colette Nybakken	Minot	North Dakota
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Donald Nelson	Keene	North Dakota
Don Morrison	Bismarck	North Dakota
Greg Steckler	Dunn Center	North Dakota
Charlene Bjornson	Durbin	North Dakota
Carla Renner	Zap	North Dakota
Iorraine dopson	Bismarck	North Dakota
Colleen Stebbins	Bowman	North Dakota
Trana Rogne	kindred	North Dakota
Leo Walker	Maddock	North Dakota
Nancy Evans	Dodge	North Dakota
Rick Olek	Fargo	North Dakota
Paulette Trego	Bismarck	North Dakota
Phil Kambeitz	Bismarck	North Dakota
Cathy Schwinden	Fargo	North Dakota
Verle Reinicke	Bismarck	North Dakota
Joan Johnson	Fargo	North Dakota
Konrad Norstog	Watford City	North Dakota
Sara Goodman	Langdon	North Dakota
cheryl planert	Beacg	North Dakota
Ashley Ueckert	Sentinel Butte	North Dakota
Marie Hoff	Bismarck	North Dakota
Cathy Breiner	Mandan	North Dakota
Tammy Nelson-Mathews	Cogswell	North Dakota
Peggy Stewart	Ferndale	Washington
Colleen Reinke	Bismarck	North Dakota
George Bauer	Gwinner	North Dakota
Roger Haglund	Moorhead	Minnesota
Rick Hovda	Parshall	North Dakota
Linda Weiss	Belfield	North Dakota
sharleen birkimer	Louisville	Kentucky
Larry Heilmann	Fargo	North Dakota
Diane Harker	Belfield	North Dakota

[REDACTED]

Carol Davis	Belcourt	North Dakota
Marty Young bear	New Town	North Dakota
Frances Black Tail Deer	New Town	North Dakota
Brandy Phelan	Martin	North Dakota
Mary Sand	Killdeer	North Dakota
Heidi Jacobs	Bismarck	North Dakota
Renaev Evensvold	Powers Lake	North Dakota
Marissa Hunts Along	Mandaree	North Dakota
theodora bird bear	mandaree	North Dakota
Tama Smith	Beach	North Dakota
Lois Sundquist	Wilton	North Dakota

[REDACTED]

Alex DeCoteau	Rolla	North Dakota
Larry Novak	Alexander	North Dakota
Renaev Evensvold	Powers Lake	North Dakota
Lylis Wells	Welch	Minnesota
vance gillette	new town	North Dakota
Dorothy Reil	Alexander	North Dakota
Nicole Jorgenson		

[REDACTED]

Sharon Luntsford	Alexander	North Dakota
Betty Van Berkom	Powers Lake	North Dakota
Dianne Sattler	Thompson	North Dakota
John Carlson	Hamilton	Montana
Ron Saeger	Fargo	North Dakota
Aleta Hendricks	Dickinson	North Dakota
Dean Anderson	Watford City	North Dakota

[REDACTED]

Steven Nelson	Watford City	North Dakota
Penelope Soiseth	Williston	North Dakota
Jason Signalness	Watford City	North Dakota
Cindy Klein	Dickinson	North Dakota
jaylyn saunders saunders	watford city	North Dakota
Bryan Anderson	Minot	North Dakota
Kristen Mesker	Powers Lake	North Dakota
Nancy Saeger	Fargo	North Dakota
Bonnie Hofmann	Medina	North Dakota
Christopher Bean	Williston	North Dakota
Nichole Egeberg-Bernsdorf	Minot	North Dakota
stacy arnegard	arnegard	North Dakota

Bette Stieglitz	Fargo	North Dakota
Charles Barber	Mandan	North Dakota
Melvin Wisdahl	Williston,	North Dakota
Barbara Schwartz	Richardton	North Dakota
Audrey Cleary	Bismarck	North Dakota
Jay Mosbrucker	West Fargo	North Dakota
Dennis Kost	Washburn	North Dakota

Brenda Jorgenson	Tioga	North Dakota
James Kambeitz	Bismarck	North Dakota
Mary Engel	Bismarck	North Dakota
Helen M. Rudie	Fargo	North Dakota
Harriet Bracken	Leeds	North Dakota
Daryl Bragg	Manvel	North Dakota
Sara Simmers	Mandan	North Dakota
Joan Breiner	Flasher	North Dakota
Scott Davis	White Earth	North Dakota
Kim Christianson	Bismarck	North Dakota
Thomas Disselhorst	Bismarck	North Dakota
Eric Clausen	Minot	North Dakota

Jeffrey Kinkade	Minot	North Dakota
corrine redmond	tioga	North Dakota
Ken Trana	Carson	North Dakota
Roberta Ramberg	White Earth	North Dakota
corinne lee	bismarck	North Dakota
Mary Beth Simmer	Fargo	North Dakota
Amy Kulackoski	Bismarck	North Dakota
Sharon Anderson	Powers Lake	North Dakota
Laurel Lawrence	tioga	North Dakota
Lynn Hill	Jamestown	North Dakota
Dorothy Ventsch	New Town	North Dakota
Marilyn Levine	New Town	North Dakota
Cheryl Lacey	New Town	North Dakota
David Rydell	Grand Forks	North Dakota
Delores Salin	New Hope	Minnesota
Carol S Nelson	Valley City	North Dakota
Warren Ventsch 3725 117 Ave. SE	58072-9539	North Dakota
Gail Reieron	Fargo	North Dakota

Karen Erickstad	Bismarck	North Dakota
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Doug Feiring	Powers Lake	North Dakota
Jill Bergstedt	Enderlin	North Dakota
John Mehlhoff	Fargo	North Dakota
Brett Feiring	Powers Lake	North Dakota
Kasandra Feiring	Powers Lake	North Dakota
[REDACTED]	[REDACTED]	[REDACTED]
Gregory Gunderson	White Earth	North Dakota
Kenneth Mogen	NewTown	North Dakota
Erica Turnquist	Alexander	North Dakota
Daniel Leppell	Garrison	North Dakota
Marcia Wilber	New Town	North Dakota
Louis Kuster	Stanley	North Dakota
Cheryl Lee	New Town	North Dakota
Robert Banderet	Cogswell	North Dakota
Curtis Stofferahn	Grand Forks	North Dakota
Richard Johnson	Brampton	North Dakota
Curt Larson	Forman	North Dakota
Edward Morrison	Arvada	Colorado
Kristine Askerooth	Cayuga	North Dakota
Arden Barglof	Forman	North Dakota
[REDACTED]	[REDACTED]	[REDACTED]
Howard Oppegard	Valley City	North Dakota
Eva Hepper	Keene	North Dakota
Jeff Hepper	Keene	North Dakota
Debbie Larsen	Watford City	North Dakota
Janet Merrill	Minneapolis	Minnesota
Tanya Weiss	Bismarck	North Dakota
Carol Jensen	Lisbon	North Dakota
Laurie Banderet	Cogswell	North Dakota
Benjamin Merrill	Saint Paul	Minnesota
Laura Stramer	Minneapolis	Minnesota
Amber LaDue-Kling	Grassy Butte	North Dakota
Laura Huseby	Tioga	North Dakota
Sharon Krieger	Tioga	North Dakota
Don M Maston	Watford City	North Dakota
Ellen Becker	Minneapolis	Minnesota
Stacy Bendl	Avon	Ohio
Jan Swenson	Bismarck	North Dakota
Cris Fulton	Bowman	North Dakota
Buel Sonderland	Fargo	North Dakota
Scott Fry	Bismarck	North Dakota
THOMAS DAHLE	BISMARCK	North Dakota
Janel Mendoza	Morris	Minnesota

Tom Moberg	Fargo	North Dakota
Dick Monson	Valley City	North Dakota
darlene medlar	Dickinson	North Dakota
Rebekah Olson	Bismarck	North Dakota
Rob Sand	Killdeer	North Dakota
Gary Larson	Fargo	North Dakota
Patty Veitch Paschke	Honeyford	North Dakota
Carol Jean Larsen	Bismarck	North Dakota
Marc Landblom	Dickinson	North Dakota
Carter Heiser	Dickinson	North Dakota



Audrey Staples	New Town	North Dakota
aruna seth	Bismarck	North Dakota
Tammy Hathaway	Bismarck	North Dakota
Justin Kilmer	Grand Forks	North Dakota
Crysta Parkinson	Williston	North Dakota
Mitch Melberg	Williston	North Dakota



Robert Scheeler	Minot	North Dakota
Mariah Ralston	Bismarck	North Dakota
daryl belik	Tioga	North Dakota
Stephanie Clooten	Bismarck	North Dakota



Natasha Kasprowicz	Grand Forks	North Dakota
Renae Mosbrucker	Mandan	North Dakota
Angela McGinness	Mandan	North Dakota
James Steinberger	Fargo	North Dakota
Tyler Demars	Bismarck	North Dakota
Natasha Holwegner	MINOT	North Dakota
Shane Jorgenson	Bismarck	North Dakota
Rebecca Papenfuss	West Fargo	North Dakota
Wayne Pruse	Bismarck	North Dakota
Natasha Heid	Bismarck	North Dakota
Sherry Heilmann	Minot	North Dakota
Kris Molde	Grafton	North Dakota
Ken Hegge	Williston	North Dakota
Delilah Yellow Bird	Roseglen	North Dakota
Beth Binkowski	Linton	North Dakota
Gia Cummisk	Dickinson	North Dakota
Colleen Reese	New Town	North Dakota

Andy Huseby	Tioga	North Dakota
Lisa Rainbow	Devils Lake	North Dakota
Tammie Nadeau	Grand Forks	North Dakota
Shawn Wallace	Rochester	North Dakota
Janice Schlenvogt	belcourt	North Dakota
Deborah Painte	Bismarck	North Dakota
Jacob Hofmann	Medina	North Dakota
Lindsay Ostlie	carrington	North Dakota
Julie Hofmann	Medina	North Dakota
[REDACTED]		
Lawrence Ulsaker	Medora	North Dakota
[REDACTED]		
Ashly Benson	Bismarck	North Dakota
Stephanie Vagts	Tioga	North Dakota
[REDACTED]		
Anessa Pfeifer-johnson	Bismarck	North Dakota
Kathryn Aitchison	Bismarck	North Dakota
Katie Patrie	Bismarck	North Dakota
Cynthia Miller	Mendota Heights	Minnesota
Kat Wacker	Bismarck	North Dakota
Jessica Horst	Bismarck	North Dakota
Elizabeth Anderson	mENOKEN	North Dakota

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NAME **ADDRESS** **PHONE #** **E-MAIL**

Lynn E. Moe 10541 40th St NW Keene ND 675-2339

Maurice Moe 10541 40th St NW Keene ND 58847 701-675-2339

[Signature] 2858 10th Av NW Keene ND 58847 701-675-2039

Carolyn Nelson 113-7th St SE Watford City ND 58854

Adam Hansen 3751 10th Ave NW Keene ND 675-2434

Randall Spang 3351 Keene ND 390-4640

Randall Spang 3357 Keene ND

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<u>NAME</u>	<u>ADDRESS</u>	<u>PHONE #</u>	<u>E-MAIL</u>
Marilyn Rolfsrud	3601-113 th Ave NW.		Keene, N.D.
Harold Rolfsrud			Keene ND
Trevor Krumborg	10594 35 th St. NW Keene ND 58847		Ke
Charlene Olson	11201 35 th St NW		Keene ND
Janie Wisness	4153 110 th Avenue		Keene ND
Dwight A. Chapin	114 th St		Keene, N.D.
Tim Jorgensen	11351 Hwy 23		Watford City ND 58854
Nanda Leppell	11385 40 th St NW		Chaelsan ND

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NAME **ADRESS** **PHONE #** **E-MAIL**

Chris Kubal *120 Main St Keene, ND 58007* *701-675-2171* *chris.kubal@net.net*

Frank Leppell *11385, 40th St NW* *Charlson ND*

John Anderson *3641 Hwy 23* *Keene ND 58847*

John Anderson *3641 Hwy 23* *Keene ND 58847*

John Anderson *12621 25th NW* *Ward ND 58857*

John Anderson *3793 106th Av NW* *New Town ND 58763*

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NAME	ADDRESS	PHONE #	E-MAIL
Karlan Rolla	11431 41 st SW Newtown, ND 58763	675 2424	
Paul Wisness	3862 Highway 73 Keene, ND NEW TOWN, ND	675 2232	
Roga Brown	10111 42 nd SW	675-2453	
Burton Brown	101 2 nd St Keene, ND	675-2389	
Nancy Rolbrud	223 Main St Keene, ND	675-2225	
Don A. Schulz	2988 Hwy 73 W.L. 58854	675-2107	Schori1701@yahoo.com
Michael	2988 Hwy 73 W.L. 58854 Keene, ND	675-2107	
Paul Wisness	4153 110 th Ave NW Keene, ND	58847	
James Leppell	3587 103 rd Ave NW Keene, ND	58847	
Cheryl Feiring	9325 35 th St NW Keene, ND	58763	

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<u>NAME</u>	<u>ADDRESS</u>	<u>PHONE #</u>	<u>E-MAIL</u>
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Erika Boes	Po Box 1423, Watford City	231-766-1241	
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Seth Middlercamp	IB " "	231-215-3089	
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Heath Cocholtz	11	231-215-4910	
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Brian Vollmer	2611 114th Ave NW Watford City	701-842-4186	
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Elley Chandler III	Po Box 1423 Watford City	231 769-9595	
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Ed Hamilton	Keene	701-609-0012	
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NAME	ADDRESS	PHONE #	E-MAIL
Robert Zimpel	Keene, ND	218-838-0360	
Bradley Edley			
Curtis Peterson	Keene ND	612-390-1262	
Chris Johnson		218-344-1689	
Glen DeMenge	Keene ND	218-426-4009	
Jeff Becker		218-429-1613	
Chad Demenge	Keene ND	218-820-8783	
Christ Demenge	Keene ND	218-821-5608	
Jerry Demenge	Keene ND	218-820-8129	Call Anytime
Leroy Rind	Keene	701.675-2385	

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<u>NAME</u>	<u>ADRESS</u>	<u>PHONE #</u>	<u>E-MAIL</u>
James Beppell	3582 103 Ave NW Keene ND	58847	
			teamtwweed@yahoo.com
Michelle Tweed	60th Ave NW #41 Carrison, ND	58540	701-333-8574
Laura Schep	409 2 nd Ave NE	(701)-989-4339	
Mike Leingang	400 E Ave F Bismarck, ND	58501	701-214-4664
Dwight B. Bly	503 Buffalo St	ND 58831	
Dean Piaty	1501 7 th St SW	Minot, ND	701-720-9365
Frank Piaty	9952 37 th NW	New Town, N.D.	
Mike Lacey	4111 85th Ave NW	New Town N.D.	
Amanda Richardson	5515 Prairiewood Dr	Bismarck ND	58504 527-352

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NAME	ADDRESS	PHONE #	E-MAIL
Dean Toster	208 5TH AVE E Newtown N.DAK	627-4850	
Anthony Jamison	23450 rd 4 1/2 N Chinle Valley AZ	928-830-0295	
Steve Arnold	Box 40 New Town ND	421-1440 701-421-	
[Signature]	304 Main St Apt 2 New Town, ND	701-421-8703	
Brandon Laquer	304 main St Apt 5 new town ND	701-312-016	
Core Castle	Box 1550 New Town N.D		
William [Signature]	9380 73rd LN NW New Town, ND	701 421 1541	
Chris Poble	3813 89th Ave NW New Town ND		
Jeff Rood	9111 51st ST NW Ross ND	629200	
James Reese	3875 87th Ave NW New Town		

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NAME	ADDRESS	PHONE #	E-MAIL
Dan Shroyer	P.O. 267 ^{Watford City}	701-842-6428	-
Miriam Bensch	Box 101 ^{New Town}	701-627-4061	NT
Royann Whitehat	^{New Town} Box 475	701-421-0125	-
Brandon Grady	9952 37 th St NW	701-421-6479	-
Buster Bell	688 Bakersfield Dr.	701-421-2037	-
Florine Bell	688 Bakersfield Dr. ^{N.T.}	421-8373	-
Brandy Jo Canyon	^{Box 805} New Town	(701)627-3558	-
Charlie Conklin	^{Box 356} New Town	701-421-7029	-
Shandra Suda	P.O. #584, New Town, N Dakota 58743		
NT member	7480 N 35th St NW, 58770		

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<u>NAME</u>	<u>ADDRESS</u>	<u>PHONE #</u>	<u>E-MAIL</u>
Kyle Hartel	12048 HWY 23 Watford City	701-842-4849	Kylesthartel@gmail.com
Chaunci Mell	3564 Hwy 180e W Wat. City	842-2781	chaunci1@gmail.com
Lloyd Alveshere	10412 21st St NW	Reene, ND 675-2523	latt@ruggedwest.com
Nikki Darrington	13710 24th St. NW	Arnegard, ND 58035	nikalena-02@hotmail.com
Cindy Geiger	2112 125th Ave NW	Watford City, ND 58854	
Colleen Alber	520 6th ST SE	STANLEY, ND 58784	(701) 400-2163 keeniealber@gmail.com 701-240-6975
Joe Eversold	7904 68th St NW	Stanley, ND 58784	
Tracy Mesker	Tracy Mesker 514 S Otter Ave	Parkers Prairie MN 56361	320-760-6348 701-400-3278
Carl KITTLESON	1311 N 26th	Bismarck ND 58501	
Renee Reinhardt	1575 55th Ave SW	Hezen, ND 58545	701-873-5201

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NAME **ADDRESS** **PHONE #** **E-MAIL**

John Reese 433 Eagle Dr 701-627-4835 N/A

all Svanora 8960 57th S. NW 629 1874

Tom Walters 8325 N37th St 701-314-1044 N/A

John Sundeen 205 6th Ave East New Town 701-627-3867

Douglas Rensch 3967 87th Ave NW. New Town 58763

Joe Schiller 1555 113th Ave NW Killdeer, ⁵⁸⁶⁴⁰ 863-7036

Dan Huff 423 HWY 1804 New Town 58763

Uz Benore 8923 41st St NW New Town 58763

Randi Giffey 1412 Van Hook New Town 58763

Mike Satter ^{PO} Box 1566 New Town 58763

#4

18

In support of HB 1348 only if it can be amended: Lines ~~16 and 17~~ 500ft to 1,000ft, and the way this part of the bill is worded, it looks to me like the N Dak Industrial Commission can put the footage down to anything they feel like even if the dwelling owner don't agree and line #21 needs to be amended from July 31 to May 1st, this way we will not have a surge of new well pads built to beat the dead line.

I testified in support of the SB 2206 bill. At the hearing, the ND Petroleum Council made the argument that if you get setbacks to 1000 feet or more, it will cost the surface owner the most! The reality is this would be the most effective way to make the oil companies use the new technology and build multi-well pads instead of single well pads. Refer to map 1

Ron Ness of the Petroleum Council stated that 500 foot setbacks affect 18 acres of farmland and 1000 foot setbacks affect 72 acres. This is something that I apparently don't understand. I know a single well pad uses 6 acres and a multi-pad with 3 wells uses the same acreage. Then, we get 6 to 8 well pads that use approximately 12 acres. Do the math: 8 single well pads use 48 acres versus 12 acres for multi-well pads. Refer to map 2

What the people in the counties of the Bakken oil fields don't realize is the facts of what is intended with this new technology of horizontal drilling to produce the Bakken wells and to cover all the mineral interests (look at map # 3). These wells are being drilled so the horizontal bore of each well is approximately 660 feet apart for a length of 1 to 2 miles, so this way they need to drill seven or eight across the end of a 640 acre section 2 miles long for their 1280 spacing. With this new technology they can and have built multi-pad well sites with 6 to 12 wells and still get the well bores approximately 660 feet apart.

I know this can be done. I have helped build multi-well pad sites. Some of these sites were built on private land to drill into federal or US Forest Service controlled lands because of the new road less rules for these lands, plus the regulations for federal lands are very strict compared to state regulations. This also needs to be fixed.

At the SB 2206 hearing Ron Ness testified that (there is a perception that the distance from a well to a building is determined only by the oil and gas company. That is simply false). Okay if that statement is true than who is placing their wells next to your house? Is it the ND Petroleum Council or the ND Industrial Commission?

On safety issues, flares are starting fires off the sites. Testimony at the hearing bragged that in 62 years of oil production we have not burnt down a resident's house. That might be the case, but being on a rural fire department I have helped put out fires that if left unchecked would have burnt a house or an entire ranch down. Thanks to area residents and first responders, the fires got put out. We have just been lucky!

Testimony was also given that oil companies can shut-in a well via phone or computer. The whole story is "shut in" means the valves at the well head are shutoff. There are some flowing wells that this can be

done on, but this is expensive to set up and most Bakken wells don't flow very long. The wells with pumping units rely on two different valves at the well head. One is called a radigan which seals around the polish rod. The second valve is called a blinds valve. If the polish rod breaks and falls into the well you can shut this valve. The point is these valves have to be shut manually and you tend to get really wet with oil and water when you do this. All these types of valves rely on rubber seals and this is not foolproof. Closed valves tend to leak and sometimes don't hold at all. Ask Dave Drovdal about the blowout that oil soaked his neighbor's house. Truth be known the N Dak Industrial Commission does very little to protect dwelling owner's. I don't think they ever look at the devastation and the acreage that is being completely destroyed (when they permit these wells) or if it is in someone's feed lot or calving area, if you aren't part of the oil business they don't care.

Salt Water

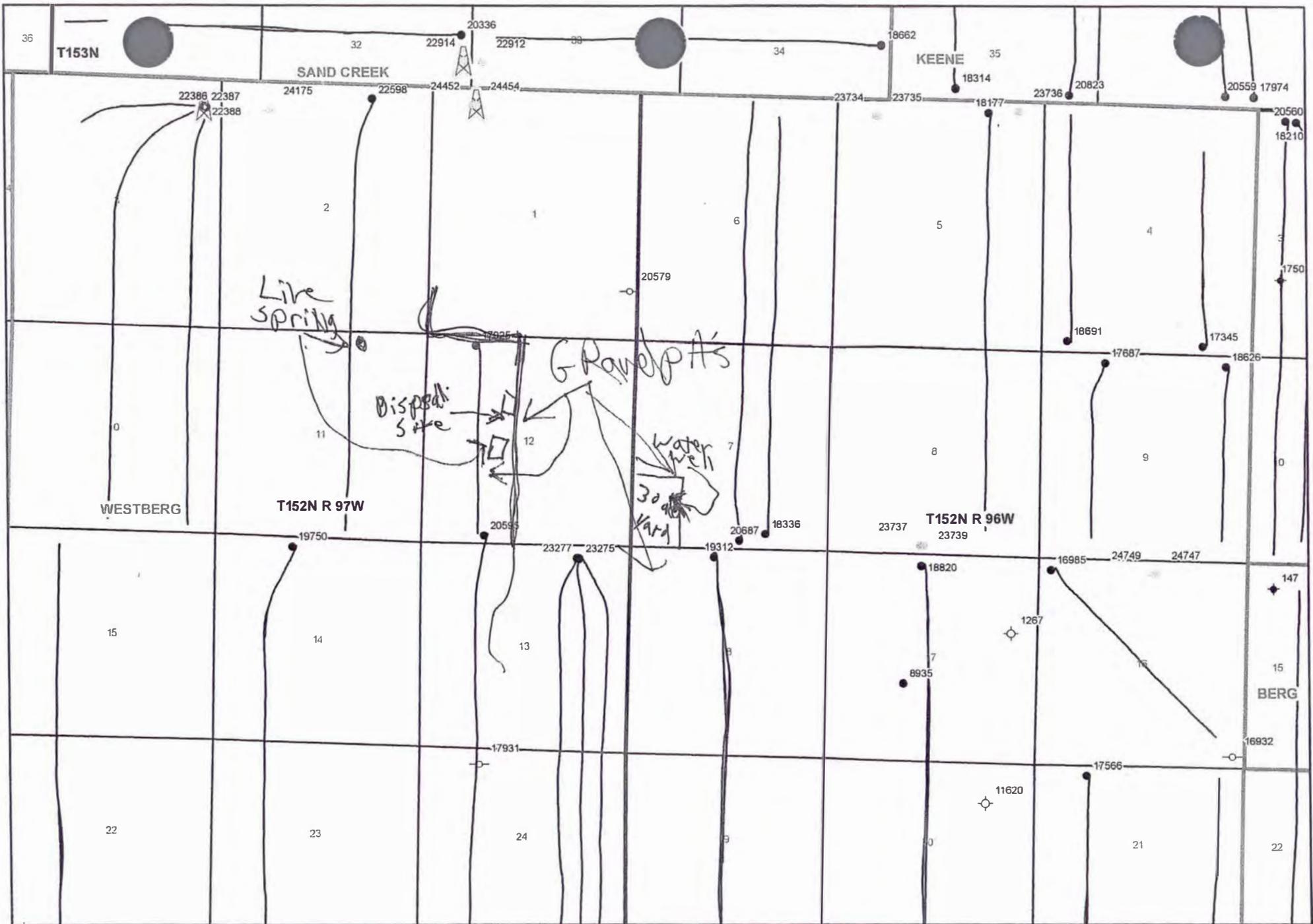
A good example is a homestead I lived on for 10 years. They want to put a SW disposal well on this place. We wrote a letter to the N Dak Industrial Commission this is ½ mile from my place to the N West (Refer to map 4). The site is 500ft from the house I used to live in, the water wells on this place is 6ft deep and 30ft deep, the area is full of gravel veins, so there is a live spring 150ft from the house. My problem is if there is a spill here it will be in the ground water, and my water well is not that deep so it could get into my water source. It has been approved by ND industrial commission.

Food for thought. This type of drilling covers all of the mineral interest and they can drill from 1 mile away and turn 90 degrees and drill another 1 to 2 miles and multi-well pads can save countless amounts of acres, then why are oil companies being allowed to destroy western North Dakota with single well pads and making the largest foot print in North Dakota history. I will answer any questions.

Thank you

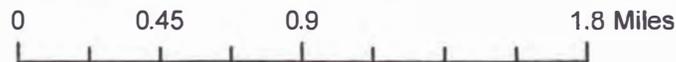
Frank Leppell

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Handwritten signature/initials



Prepared by N.D.I.C.
Oil and Gas Division

3/25/2013
10:49:43 AM



Wanda Leppell

#5

In support of bill HB1348 1/4 mile setback.

I am a rancher and farmer that lives in the middle of the oil boom. Yes I do believe we need the oil development, but somehow we need to coexist. The oil and gas wells should have to be a quarter of a mile or more from an occupied dwelling. The reasons are.

1. My neighbors who are land owners with some or all the mineral rights have a lease with the oil companies. Two have a lease with 1,000 feet from dwelling and two others have 1,500 feet from a dwelling. The oil companies have no problems with these setbacks in their leases. Now we can't get a setback for more than 500 feet because we don't own the land or minerals on land 400 feet from our house. So why should the mineral right owners have all the power to set the setback footage and home owners have no rights and just have to put up with it, while we watch our property values go in the trash.
2. So far a house has not been burned down is what I've been told, but it's not because the oil companies have never had a fire. My husband has been out on many fire calls he was the fire chief for 20 years and still continues to go out on calls and help when he can. They had fires get very close to a house many times, but between the locals and the fire department they got it shut down. It is hard to compare this boom to the ones in the past. If the wells go in that there predicting we will have many more wells than the past.
3. Why should wells be allowed so close to a house. Most ranchers have their carrels and calving areas right by their home. Some of the wells they put in are by or in the middle of their calving facilities. Why do they have the right to affect the way we make our income? What! We have to change occupations or sell out and move and start over somewhere else. Just remember where you get your food from. Do you want to rely on other countries for that?
4. We raise kids to be independent out here. It really doesn't take a kid long to get 500 feet from the house so now we have to worry about them getting killed or hurt on the oil well site

I'm really starting to wonder if farming and ranching will be obsolete in western ND. A lot of people I know have sold out and left here already. It's hard to tell because of all the new people coming in.

I wish you all could come and spend some time (like a month) to really see what it is like to live here and to understand both sides a little better. Instead of reading about it or being told about it is not the same as living with it (but you would get to go home) that would be the difference. My house is open and you're sure welcome to stay.

Thank You

Wanda Leppell

March 28, 2013

HB 1348

Mr. Chairman, Members of the Committee:

I am Shelly Ventsch from New Town. A well blowout happens because "something went wrong." A blowout shoots oil, gases, and produced water high up into the air, spraying a mist which is easily carried by even a slight breeze, onto everything. These can last for days. Two recent blowouts reached 1/4 mile (1320 ft.) and a half mile (2640 ft.) and yet 500 ft. is considered a safe distance from residences. Proper cleanup requires washing or removing vegetation and removal of all the contaminated soil. Imagine the people and their homes, pets, plants, and wildlife in the path of the contents of an unexpected blowout. The workers doing the cleanup all seem to be wearing protective clothing/gear. Most residents wouldn't have hazmat suits, goggles, and respirators on hand, should a blowout occur. With more wells being put on existing pads and western North Dakota being a sparsely-populated area, a setback of 1000 feet would not affect every new well. Considering the number of wells being planned, in comparison to the number of residents in those locations, I believe it would affect only a small percentage of new wells. To help the people living around oil activity, I would like to see this bill amended to increase the setback to 1000 ft. from a residence. Thank you.

Chairman Lyson, Committee members,

I am Sean Arithson, a staff member of the Dakota Resource Council, here today to speak for one of our members, Brenda Jorgenson, who is not able to be here today.

Brenda writes,

Chairman Lyson and Committee members,

My name is Brenda Jorgenson. We moved to the Box J Ranch in the beautiful White Earth River Valley in 1979 to continue the farm/ranch Richard's grandfather started.

Most people can go home and feel safe. I want to tell you what it's like living next to an oil well. I am just one of many farmers and ranchers who are dealing with this. It's my sincere hope we can do better. I am urging you to amend and pass HB 1348 to move the current pad setback from 500 feet from a dwelling, to no less than 1000 feet from a dwelling.

With all of the oil activity in the area the past few years, we could always count on our own home as a safe haven from noise, traffic and toxic smells. Now, the same reasons I have mentioned to you are now starting to surround us in the White Earth Valley.

Since September 2010, we have had to deal with the negative effects with having an oil pad next to our home.

While out for an evening walk on April 10, 2011, Richard and I encountered strong chemical smells from the location ½ mile west of our house. We learned later that our granddaughter (6) couldn't stop coughing, after checking out the spring run-off with us on the 4-wheeler earlier that afternoon.

So the next day, April 11, 2011, I was very careful to check the wind before I went for a walk. When I returned home my eyes were burning and stinging and my voice was very distorted and scratchy for over two hours! That evening our son-in-law came over to our house and was in the yard rubbing his eyes, complaining and wondering what that was from. There was no obvious smell that day, but there were obvious reactions.

On May 23, 2012, the flare was out during the night. I was up since 3:00 a.m. because of strong propane smells in the house. Todd Peterson in the State Health Department, Air Quality, was called. He will talk to Petro Hunt LLC about location #20975. That flare's been out three times and my husband Richard has called PHLLC about that each time. I had a sore throat for a week now.

On Saturday, Aug 25, 2012, the house was full of gas when we returned from a funeral of a dear friend. The flare was out before we left mid-morning and was still out four hours later. Who do we call? What do we do? I got the horses moved out of the pasture right after making several calls. We are not given any emergency numbers.

These are just a few of the troubles we have encountered with having an oil well near our home. We have had many more instances that have affected the way we live on our farm and ranch.

I ask you to please, amend this bill to have a setback of 1000 feet and give it a do pass to help make life for farmers and ranchers a little bit better.

#8

Kristen Nesker
SB 1348 Hearing
Senate Natural Resources Committee
March 28, 2013

The backbone of North Dakota has always been the farming and ranching industry. I grew up on a ranch in northwest North Dakota. Now my husband and I own a ranch. My husband has to work multiple jobs to support the ranch and our growing family. We are just like so many others in our area.

We established good grazing techniques with the help of NRCS and friends to help benefit our land. Now most of our land we graze has oil wells on it. We have dealt with spills and other problems. I fear for the well-being of our family's health as well as the health of our livestock. We bought our ranch with the intention of our kids and their kids having the option to continue ranching.

With the increase of oil wells and activity around our area, I fear for our future. With this activity there is an increase in problems such as oil spills, salt water spills, H₂S, water contamination, health hazards, and increase dust from truck traffic. Having all of this just 500ft from your home is too close.

When I look into our future with the possibility of this happening, I see trucking in water for us and for our cattle because ours is contaminated, having land we can't graze due to salt water spills or fracking chemicals, sick cattle we can't sell, and health problems with our children. I think of the money we will be offered from companies to compensate for these problems. It won't be enough. There will be no future here for our kids; we will be pushed out of this state.

Let's start protecting our future by pushing back oil sites to 1000ft from our homes.

#9

You are faced with deciding whether you will protect the citizens, private property and a way of life or enhance profits for the oil companies with your decision on setbacks for oil wells from homes. HB 1348 will reasonably increase setbacks from the current unreasonable 500 feet.

For the oil industry to be truly successful in North Dakota BALANCE is required. It is simply FAIRNESS, the oil companies have the technology today to increase the setbacks at little cost compared to their profits. Their costs are mainly one of inconvenience. For the property owner the cost are significant safety and health risks, significant property depreciation and total disruption in their way of life.

Empathies with the people having an oil well within 500 feet of their home, the traffic, noise, smell, fumes and view. You are not restricting drilling but require the oil companies to be reasonable at an insignificant cost.

Support of increasing setbacks for oil drilling would help balance the impact of the oil intrusions. It would be fair and balanced and protect North Dakota's way of life, its citizen's health and safety and private property rights. No one can reasonably feel that this is not the right thing to do.

Thank You

Wally Owen

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Medora, North Dakota 58645

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Mr. Chairmen and members of the committee. I am Sharon Anderson and my husband and I ranch near Powers Lake. I am here supporting a setback of 1320 ft. mainly because I fear for the health risks associated with those living in close proximity to an oil well.

I've researched studies conducted by both government and private agencies and would like to briefly share a few of their findings.

- The Colorado School of Public Health states that there has been a growing body of scientific studies linking emissions from oil and gas operations to air pollution issues and fracking and flowback risks. Studies have shown levels of volatile organic chemicals within a half of a mile of the drill site. Elevated levels of hazardous chemicals are present when a well is hydrofractured. Studies have shown that the many petroleum hydrocarbons present at a well site can cause an increased risk of lung problems, birth defects, blood disorders as well as the potential risk of developing cancer and other acute non-cancer health effects.
- An EPA article determined that a number of sites in the Midwest contain concentrations of naturally occurring radioactive waste, another byproduct of our oil and gas development that I wonder if oil companies are left to self-regulate.
- This winter the federal agency NOAA (The National Oceanic and Atmospheric Administration) are measuring wintertime OZONE, they are finding huge amounts of methane and other chemicals coming out of the natural-gas fields. This winter phenomenon appears to be created when heavy snow cover, acts as a reflector enhancing the sunlight and heat in the atmosphere, this helps to form an inversion that holds the emissions in a confined area, this can exacerbate asthma and other respiratory diseases.
- At least one thousand truck trips are required to frack a single well. These trucks along with other equipment create soot, volatile organic compounds, and ozone. Exposure to this kind of air pollution has demonstrated links to asthma. Cancers and preterm birth.

Standards for most contaminants are established based on the health impacts on adults, so current standards may not suffice to protect children. Children's bodies take in proportionately greater amounts of toxins than adults. Their rapid development places them at greater risk to toxins. A resting infant takes in twice as much air per pound of body weight than an adult. Children may also be more susceptible to some toxins because their livers and kidneys are not fully mature and cannot detoxify substances as readily as an adult.

1320 ← as per 45:00 on audio tape

Please consider a setback of ~~1350~~ 1320 ft. The State of Maryland requires 1,000 ft. setbacks without exception and several towns in the heart of North Texas require setbacks of 1,500 ft.

The study I mentioned from the School of Health stated that residents living less than 1/2 mile from a well were at the greatest risk for health effects. We are asking for half that distance for the setback, ~~1350~~ ¹³²⁰ ft. this is not an unreasonable request. Every child has the right to a healthy environment, it's our social responsibility.

Please don't make our children the canaries in our environmental oil mine.

#11

Erie Rising

Elevating the way we live

Human Health Risk Assessment of Air Emissions from Development of Unconventional Natural Gas Resources

Posted on [March 19, 2012](#) by [erierising](#)

by:

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Abstract Background: Technological advances (e.g. directional drilling, hydraulic fracturing), have led to increases in unconventional natural gas development (NGD), raising questions about health impacts.

Objectives: We estimated health risks for exposures to air emissions from a NGD project in Garfield County, Colorado with the objective of supporting risk prevention recommendations in a health impact assessment (HIA).

Methods: We used EPA guidance to estimate chronic and subchronic non-cancer hazard indices and cancer risks from exposure to hydrocarbons for two populations: (1) residents living > 1/2 mile from wells and (2) residents living ≤ 1/2 mile from wells.

Results: Residents living ≤ 1/2 mile from wells are at greater risk for health effects from NGD than are residents living > 1/2 mile from wells. Subchronic exposures to air pollutants during well completion activities present the greatest potential for health effects. The subchronic non-cancer hazard index (HI) of 5 for residents ≤ 1/2 mile from wells was driven primarily by exposure to trimethylbenzenes, xylenes, and aliphatic hydrocarbons. Chronic HIs were 1 and 0.4 for residents ≤ 1/2 mile from wells and > 1/2 mile from wells, respectively. Cumulative cancer risks were 10 in a million and 6 in a million for residents living ≤ 1/2 mile and > 1/2 mile from wells, respectively, with benzene as the major contributor to the risk.

Conclusions: Risk assessment can be used in HIAs to direct health risk prevention strategies. Risk management approaches should focus on reducing exposures to emissions during well completions. These preliminary results indicate that health effects resulting from air emissions during unconventional NGD warrant further study. Prospective studies should focus on health effects associated with air pollution.

Key Words: natural gas development; risk assessment; air pollution; hydrocarbon emissions

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The authors declare they have no competing financial interests.

Abbreviations.

1.0 Introduction

The United States (US) holds large reserves of unconventional natural gas resources in coalbeds, shale, and tight sands. Technological advances, such as directional drilling and hydraulic fracturing, have led to a rapid increase in the development of these resources. For example, shale gas production had an average annual growth rate of 48 percent over the 2006 to 2010 period and is projected to grow almost fourfold from 2009 to 2035 (US EIA 2011). The number of unconventional natural gas wells in the US rose from 18,485 in 2004 to 25,145 in 2007 and is expected to continue increasing through at least 2020 (Vidas and Hugman 2008). With this expansion, it is becoming increasingly common for unconventional natural gas development (NGD) to occur near where people live, work, and play. People living near these development sites are raising public health concerns, as rapid NGD exposes more people to various potential stressors (COGCC 2009a).

The process of unconventional NGD is typically divided into two phases: well development and production (EPA 2010a, US DOE 2009). Well development involves pad preparation, well drilling, and well completion. The well completion process has three primary stages: 1) completion transitions (concrete well plugs are installed in wells to separate fracturing stages and then drilled out to release gas for production); 2) hydraulic fracturing (“fracking”: the high pressure injection of water, chemicals, and proppants into the drilled well to release the natural gas); and 3) flowback, the return of fracking and geologic fluids, liquid hydrocarbons (“condensate”) and natural gas to the surface (EPA 2010a, US DOE 2009). Once development is complete, the “salable” gas is collected, processed, and distributed. While methane is the primary constituent of natural gas, it contains many other chemicals, including alkanes, benzene, and other aromatic hydrocarbons (TERC 2009).

As shown by ambient air studies in Colorado, Texas, and Wyoming, the NGD process results in direct and fugitive air emissions of a complex mixture of pollutants from the natural gas resource itself as well as diesel engines, tanks containing produced water, and on site materials used in production, such as drilling muds and fracking fluids (CDPHE 2009; Frazier 2009; Walther 2011; Zielinska et al. 2011). The specific contribution of each of these potential NGD sources has yet to be ascertained and pollutants such as petroleum hydrocarbons are likely to be emitted from several of these NGD sources. This complex mixture of chemicals and resultant secondary air pollutants, such as ozone, can be transported to nearby residences and population centers (Walther 2011, GCPH 2010).

Multiple studies on inhalation exposure to petroleum hydrocarbons in occupational settings as well as residences near refineries, oil spills and petrol stations indicate an increased risk of eye irritation and headaches, asthma symptoms, acute childhood leukemia, acute myelogenous leukemia, and multiple myeloma (Glass et al. 2003; Kirkeleit et al. 2008; Brosselin et al. 2009; Kim et al. 2009; White et al. 2009). Many of the petroleum hydrocarbons observed in these studies are present in and around NGD sites (TERC 2009). Some, such as benzene, ethylbenzene, toluene, and xylene (BTEX) have robust exposure and toxicity knowledge bases, while toxicity information for others, such as heptane, octane, and diethylbenzene, is more limited. Assessments in Colorado have concluded that ambient benzene levels demonstrate an increased potential risk of developing cancer as well as chronic and acute non-cancer health effects in areas of Garfield County Colorado where NGD is the only major industry other than agriculture (CDPHE 2007; Coons and Walker 2008; CDPHE 2010). Health effects associated with benzene include acute and chronic nonlymphocytic leukemia, acute myeloid leukemia,

chronic lymphocytic leukemia, anemia, and other blood disorders and immunological effects. (ATSDR 2007, IRIS 2010). In addition, maternal exposure to ambient levels of benzene recently has been associated with an increase in birth prevalence of neural tube defects (Lupo 2010). Health effects of xylene exposure include eye, nose, and throat irritation, difficulty in breathing, impaired lung function, and nervous system impairment (ATSDR 2007b). In addition, inhalation of xylenes, benzene, and alkanes can adversely affect the nervous system (Carpenter et al. 1978; Nilsen et al. 1988; Galvin et al. 1999; ATSDR 2007a; ATSDR 2007b).

Previous assessments are limited in that they were not able to distinguish between risks from ambient air pollution and specific NGD stages, such as well completions or risks between residents living near wells and residents living further from wells. We were able to isolate risks to residents living near wells during the flowback stage of well completions by using air quality data collected at the perimeter of the wells while flowback was occurring.

Battlement Mesa (population ~ 5,000) located in rural Garfield County, Colorado is one community experiencing the rapid expansion of NGD in an unconventional tight sand resource. A NGD operator has proposed developing 200 gas wells on 9 well pads located as close as 500 feet from residences. Colorado Oil and Gas Commission (COGCC) rules allow natural gas wells to be placed as close as 150 feet from residences (COGCC 2009b). Because of community concerns, as described elsewhere, we conducted a health impact assessment (HIA) to assess how the project may impact public health (Witter et al. 2011), working with a range of stakeholders to identify the potential public health risks and benefits.

In this article, we illustrate how a risk assessment was used to support elements of the HIA process and inform risk prevention recommendations by estimating chronic and subchronic non-cancer hazard indices (HIs) and lifetime excess cancer risks due to NGD air emissions.

2.0 Methods

We used standard United States Environmental Protection Agency (EPA) methodology to estimate non-cancer HIs and excess lifetime cancer risks for exposures to hydrocarbons (US EPA 1989, US EPA 2004) using residential exposure scenarios developed for the NGD project. We used air toxics data collected in Garfield County from January 2008 to November 2010 as part of a special study of short term exposures as well as on-going ambient air monitoring program data to estimate subchronic and chronic exposures and health risks (Frazier 2009, GCPH 2009, GCPH 2010, GCPH 2011, Antero 2010).

2.1 Sample collection and analysis:

All samples were collected and analyzed according to published EPA methods. Analyses were conducted by EPA certified laboratories. The Garfield County Department of Public Health (GCPH) and Olsson Associates, Inc. (Olsson) collected ambient air samples into evacuated SUMMA® passivated stainless-steel canisters over 24-hour intervals. The GCPH collected the samples from a fixed monitoring station and along the perimeters of four well pads and shipped samples to Eastern Research Group for analysis of 78 hydrocarbons using EPA's compendium method TO-12, Method for the Determination of Non-Methane Organic Compounds in Ambient Air Using Cryogenic Preconcentration and Direct Flame Ionization Detection (US EPA 1999). Olsson collected samples along the perimeter of one well pad and shipped samples to Atmospheric Analysis and Consulting, Inc. for analysis of 56 hydrocarbons (a subset of the 78 hydrocarbons determined by Eastern Research Group) using method TO-12. Per method TO-12, a fixed volume of sample was cryogenically concentrated and then desorbed

onto a gas chromatography column equipped with a flame ionization detector. Chemicals were identified by retention time and reported in a concentration of parts per billion carbon (ppbC). The ppbC values were converted to micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) at 01.325 kilo Pascals and 298.15 Kelvin.

Two different sets of samples were collected from rural (population < 50,000) areas in western Garfield County over varying time periods. The main economy, aside from the NGD industry, of western Garfield County is agricultural. There is no other major industry.

2.1.1 NGD Area Samples

The GCPH collected ambient air samples every six days between January 2008 and November 2010 (163 samples) from a fixed monitoring station located in the midst of rural home sites and ranches and NGD, during both the well development and production. The site is located on top of a small hill and 4 miles upwind of other potential emission sources, such as a major highway (Interstate-70) and the town of Silt, CO (GCPH 2009, GCPH 2010, GCPH 2011).

2.1.2 Well Completion Samples

The GCPH collected 16 ambient air samples at each cardinal direction along 4 well pad perimeters (130 to 500 feet from the well pad center) in rural Garfield County during well completion activities. The samples were collected on the perimeter of 4 well pads being developed by 4 different natural gas operators in summer 2008 (Frazier 2009). The GCPH worked closely with the NGD operators to ensure these air samples were collected during the period while at least one well was on uncontrolled (emissions not controlled) flowback into collection tanks vented directly to the air. The number of wells on each pad and other activities occurring on the pad were not documented. Samples were collected over 24 to 27-hour intervals, and samples included emissions from both uncontrolled flowback and diesel engines (i.e., from trucks and generators supporting completion activities). In addition, the GCPH collected a background sample 0.33 to 1 mile from each well pad (Frazier 2009). The highest hydrocarbon levels corresponded to samples collected directly downwind of the tanks (Frazier 2009, Antero 2010). The lowest hydrocarbon levels corresponded either to background samples or samples collected upwind of the flowback tanks (Frazier 2009, Antero 2010).

Antero Resources Inc., a natural gas operator, contracted Olsson to collect eight 24-hour integrated ambient air samples at each cardinal direction at 350 and 500 feet from the well pad center during well completion activities conducted on one of their well pads in summer 2010 (Antero 2010). Of the 12 wells on this pad, 8 were producing salable natural gas; 1 had been drilled but not completed; 2 were being hydraulically fractured during daytime hours, with ensuing uncontrolled flowback during nighttime hours; and 1 was on uncontrolled flowback during nighttime hours.

All five well pads are located in areas with active gas production, approximately one mile from Interstate-70.

2.2 Data assessment

We evaluated outliers and compared distributions of chemical concentrations from NGD area and well completion samples using Q-Q plots and the Mann-Whitney U test, respectively, in EPA's ProUCL version 4.00.05 software (US EPA 2010b). The Mann-Whitney U test was used because the measurement data were not normally distributed. Distributions were considered as significantly different at an alpha of 0.05. Per EPA guidance, we

assigned the exposure concentration as either the 95 percent upper confidence limit (UCL) of the mean concentration for compounds found in 10 or more samples or the maximum detected concentration for compounds found in more than 1 but fewer than 10 samples. This latter category included three compounds: 1,3-butadiene, 2,2,4-trimethylpentane, and styrene in the well completion samples. EPA's ProUCL software was used to select appropriate methods based on sample distributions and detection frequency for computing 95 percent UCLs of the mean concentration (US EPA 2010b).

2.3 Exposure assessment

Risks were estimated for two populations: (1) residents > 1/2 mile from wells; and (2) residents ≤ 1/2 mile from wells. We defined residents ≤ 1/2 mile from wells as living near wells, based on residents reporting odor complaints attributed to gas wells in the summer of 2010 (COGCC 2011).

Exposure scenarios were developed for chronic non-cancer HIs and cancer risks. For both populations, we assumed a 30-year project duration based on an estimated 5-year well development period for all well pads, followed by 20 to 30 years of production. We assumed a resident lives, works, and otherwise remains within the town 24 hours/day, 350 days/year and that lifetime of a resident is 70 years, based on standard EPA reasonable maximum exposure (RME) defaults (US EPA 1989).

2.3.1 Residents > 1/2 mile from well pads

As illustrated in Figure 1, data from the NGD area samples were used to estimate chronic and subchronic risks for residents > 1/2 mile from well development and production throughout the project. The exposure concentrations for this population were the 95 percent UCL on the mean concentration and median concentration from the 163 NGD samples.

2.3.2 Residents ≤ 1/2 mile from well pads

To evaluate subchronic non-cancer HIs from well completion emissions, we estimated that a resident lives ≤ 1/2 mile from two well pads resulting a 20-month exposure duration based on 2 weeks per well for completion and 20 wells per pad, assuming some overlap between activities. The subchronic exposure concentrations for this population were the 95 percent UCL on the mean concentration and the median concentration from the 24 well completion samples. To evaluate chronic risks to residents ≤ 1/2 mile from wells throughout the NGD project, we calculated a time-weighted exposure concentration (C_{s+c}) to account for exposure to emissions from well completions for 20-months followed by 340 months of exposure to emissions from the NGD area using the following formula:

$$C_{s+c} = (C_c \times ED_c/ED) + (C_s \times ED_s/ED)$$

where:

C_c = Chronic exposure point concentration ($\mu\text{g}/\text{m}^3$) based on the 95 percent UCL of the mean concentration or median concentration from the 163 NGD area samples

ED_c = Chronic exposure duration

C_s = Subchronic exposure point concentration ($\mu\text{g}/\text{m}^3$) based on the 95 percent UCL of the mean concentration or median concentration from the 24 well completion samples

ED_s = Subchronic exposure duration

ED = Total exposure duration

2.4 Toxicity assessment and risk characterization

For non-carcinogens, we expressed inhalation toxicity measurements as a reference concentration (RfC in units of $\mu\text{g}/\text{m}^3$ air). We used chronic RfCs to evaluate long-term exposures of 30 years and subchronic RfCs to evaluate subchronic exposures of 20-months. If a subchronic RfC was not available, we used the chronic RfC. We obtained RfCs from (in order of preference) EPA's Integrated Risk Information System (IRIS) (U. S. EPA 2011), California Environmental Protection Agency (CalEPA) (CalEPA 2003), EPA's Provisional Peer-Reviewed Toxicity Values (ORNL 2009), and Health Effects Assessment Summary Tables (U.S. EPA 1997). We used surrogate RfCs according to EPA guidance for C_5 to C_{10} aliphatic and C_6 to C_{10} aromatic hydrocarbons which did not have a chemical-specific toxicity value (U.S. EPA 2009a). We derived semi-quantitative hazards, in terms of the hazard quotient (HQ), defined as the ratio between an estimated exposure concentration and RfC. We summed HQs for individual compounds to estimate the total cumulative HI. We then separated HQs specific to neurological, respiratory, hematological, and developmental effects and calculated a cumulative HI for each of these specific effects.

For carcinogens, we expressed inhalation toxicity measurements as inhalation unit risk (IUR) in units of risk per $\mu\text{g}/\text{m}^3$. We used IURs from EPA's IRIS (US EPA 2011) when available or the CalEPA (CalEPA 2003). The lifetime cancer risk for each compound was derived by multiplying estimated exposure concentration by the IUR. We summed cancer risks for individual compounds to estimate the cumulative cancer risk. Risks are expressed as excess cancers per 1 million population based on exposure over 30 years.

Toxicity values (i.e., RfCs or IURs) or a surrogate toxicity value were available for 45 out of 78 hydrocarbons measured. We performed a quantitative risk assessment for these hydrocarbons. The remaining 33 hydrocarbons were considered qualitatively in the risk assessment.

3.0 Results

3.1 Data assessment

Evaluation of potential outliers revealed no sampling, analytical, or other anomalies were associated with the outliers. In addition, removal of potential outliers from the NGD area samples did not change the final HIs and cancer risks. Potential outliers in the well completion samples were associated with samples collected downwind from flowback tanks and are representative of emissions during flowback. Therefore, no data was removed from either data set.

Descriptive statistics for concentrations of the hydrocarbons used in the quantitative risk assessment are presented in Table 1. A list of the hydrocarbons detected in the samples that were considered qualitatively in the risk assessment because toxicity values were not available is presented in Table 2. Descriptive statistics for all

hydrocarbons are available in Supplemental Table 1. Two thirds more hydrocarbons were detected at a frequency of 100 percent in the well completion samples (38 hydrocarbons) than in the NGD area samples (23 hydrocarbons). Generally, the highest alkane and aromatic hydrocarbon median concentrations were observed in the well completion samples, while the highest median concentrations of several alkenes were observed in the NGD area samples. Median concentrations of benzene, ethylbenzene, toluene, and m-xylene/p-xylene were 2.7, 4.5, 4.3, and 9 times higher in the well completion samples than in the NGD area samples, respectively. Wilcoxon-Mann-Whitney test results indicate that concentrations of hydrocarbons from well completion samples were significantly higher than concentrations from NGD area samples ($p < 0.05$) with the exception of 1,2,3-trimethylbenzene, n-pentane, 1,3-butadiene, isopropylbenzene, n-propylbenzene, propylene, and styrene (Supplemental Table 2).

3.2 Non-cancer hazard indices

Table 3 presents chronic and subchronic RfCs used in calculating non-cancer HIs, as well critical effects and other effects. Chronic non-cancer HQ and HI estimates based on ambient air concentrations are presented in Table 4. The total chronic HIs based on the 95% UCL of the mean concentration were 0.4 for residents $> \frac{1}{2}$ mile from wells and 1 for residents $\leq \frac{1}{2}$ mile from wells. Most of the chronic non-cancer hazard is attributed to neurological effects with neurological HIs of 0.3 for residents $> \frac{1}{2}$ mile from wells and 0.9 for residents $\leq \frac{1}{2}$ mile from wells.

Total subchronic non-cancer HQs and HI estimates are presented in Table 5. The total subchronic HIs based on the 95% UCL of the mean concentration were 0.2 for residents $> \frac{1}{2}$ mile from wells and 5 for residents $\leq \frac{1}{2}$ mile from wells. The subchronic non-cancer hazard for residents $> \frac{1}{2}$ mile from wells is attributed mostly to respiratory effects (HI = 0.2), while the subchronic hazard for residents $\leq \frac{1}{2}$ mile from wells is attributed to neurological (HI = 4), respiratory (HI = 2), hematologic (HI = 3), and developmental (HI = 1) effects.

For residents $> \frac{1}{2}$ mile from wells, aliphatic hydrocarbons (51 percent), trimethylbenzenes (22 percent), and benzene (14 percent) are primary contributors to the chronic non-cancer HI. For residents $\leq \frac{1}{2}$ mile from wells, trimethylbenzenes (45 percent), aliphatic hydrocarbons (32 percent), and xylenes (17 percent) are primary contributors to the chronic non-cancer HI, and trimethylbenzenes (46 percent), aliphatic hydrocarbons (21 percent) and xylenes (15 percent) also are primary contributors to the subchronic HI.

3.3 Cancer Risks

Cancer risk estimates calculated based on measured ambient air concentrations are presented in Table 6. The cumulative cancer risks based on the 95% UCL of the mean concentration were 6 in a million for residents $> \frac{1}{2}$ mile from wells and 10 in a million for residents $\leq \frac{1}{2}$ mile from wells. Benzene (84 percent) and 1,3-butadiene (9 percent) were the primary contributors to cumulative cancer risk for residents $> \frac{1}{2}$ mile from wells. Benzene (67 percent) and ethylbenzene (27 percent) were the primary contributors to cumulative cancer risk for residents $\leq \frac{1}{2}$ mile from wells.

4.0 Discussion

Our results show that the non-cancer HI from air emissions due to natural gas development is greater for residents living closer to wells. Our greatest HI corresponds to the relatively short-term (i.e., subchronic), but high emission, well completion period. This HI is driven principally by exposure to trimethylbenzenes, aliphatic hydrocarbons, and xylenes, all of which have neurological and/or respiratory effects. We also calculated higher

cancer risks for residents living nearer to wells as compared to residents residing further from wells. Benzene is the major contributor to lifetime excess cancer risk for both scenarios. It also is notable that these increased risk metrics are seen in an air shed that has elevated ambient levels of several measured air toxics, such as benzene (CDPHE 2009, GCPH 2010).

4.1 Representation of Exposures from NGD

It is likely that NGD is the major source of the hydrocarbons observed in the NGD area samples used in this risk assessment. The NGD area monitoring site is located in the midst of multi-acre rural home sites and ranches. Natural gas is the only industry in the area other than agriculture. Furthermore, the site is at least 4 miles upwind from any other major emission source, including Interstate 70 and the town of Silt, Colorado. Interestingly, levels of benzene, m,p-xylene, and 1,3,5-trimethylbenzene measured at this rural monitoring site in 2009 were higher than levels measured at 27 out of 37 EPA air toxics monitoring sites where SNMOCs were measured, including urban sites such as Elizabeth, NJ, Dearborn, MI, and Tulsa, OK (GCPH 2010, US EPA 2009b). In addition, the 2007 Garfield County emission inventory attributes the bulk of benzene, xylene, toluene, and ethylbenzene emissions in the county to NGD, with NGD point and non-point sources contributing five times more benzene than any other emission source, including on-road vehicles, wildfires, and wood burning. The emission inventory also indicates that NGD sources (e.g. condensate tanks, drill rigs, venting during completions, fugitive emissions from wells and pipes, and compressor engines) contributed ten times more VOC emissions than any source, other than biogenic sources (e.g. plants, animals, marshes, and the earth) (CDPHE 2009).

Emissions from flowback operations, which may include emissions from various sources on the pads such as wells and diesel engines, are likely the major source of the hydrocarbons observed in the well completion samples. These samples were collected very near (130 to 500 feet from the center) well pads during uncontrolled flowback into tanks venting directly to the air. As for the NGD area samples, no sources other than those associated with NGD were in the vicinity of the sampling locations.

Subchronic health effects, such as headaches and throat and eye irritation reported by residents during well completion activities occurring in Garfield County, are consistent with known health effects of many of the hydrocarbons evaluated in this analysis (COGCC 2011; Witter et al. 2011). Inhalation of trimethylbenzenes and xylenes can irritate the respiratory system and mucous membranes with effects ranging from eye, nose, and throat irritation to difficulty in breathing and impaired lung function (ATSDR 2007a; ATSDR 2007b; US EPA 1994). Inhalation of trimethylbenzenes, xylenes, benzene, and alkanes can adversely affect the nervous system with effects ranging from dizziness, headaches, fatigue at lower exposures to numbness in the limbs, incoordination, tremors, temporary limb paralysis, and unconsciousness at higher exposures (Carpenter et al. 1978; Nilsen et al. 1988; US EPA 1994; Galvin et al. 1999; ATSDR 2007a; ATSDR 2007b).

4.2 Risk Assessment as a Tool for Health Impact Assessment

HIA is a policy tool used internationally that is being increasingly used in the United States to assess multiple complex hazards and exposures in communities. Comparison of risks between residents based on proximity to wells illustrates how the risk assessment process can be used to support the HIA process. An important component of the HIA process is to identify where and when public health is most likely to be impacted and to recommend mitigations to reduce or eliminate the potential impact (Collins and Koplan 2009). This risk assessment indicates that public health most likely would be impacted by well completion activities, particularly for residents living nearest the wells. Based on this information, suggested risk prevention strategies in the HIA

are directed at minimizing exposures for those living closest to the well pads, especially during well completion activities when emissions are the highest. The HIA includes recommendations to (1) control and monitor emissions during completion transitions and flowback; (2) capture and reduce emissions through use of low or no emission flowback tanks; and (3) establish and maintain communications regarding well pad activities with the community (Witter et al 2011).

4.3 Comparisons to Other Risk Estimates

This risk assessment is one of the first studies in the peer-reviewed literature to provide a scientific perspective to the potential health risks associated with development of unconventional natural gas resources. Our results for chronic non-cancer HIs and cancer risks for residents > than 1/2 mile from wells are similar to those reported for NGD areas in the relatively few previous risk assessments in the non-peer reviewed literature that have addressed this issue (CDPHE 2010, Coons and Walker 2008, CDPHE 2007, Walther 2011). Our risk assessment differs from these previous risk assessments in that it is the first to separately examine residential populations nearer versus further from wells and to report health impact of emissions resulting from well completions. It also adds information on exposure to air emissions from development of these resources. These data show that it is important to include air pollution in the national dialogue on unconventional NGD that, to date, has largely focused on water exposures to hydraulic fracturing chemicals.

4.4 Limitations

As with all risk assessments, scientific limitations may lead to an over- or underestimation of the actual risks. Factors that may lead to overestimation of risk include use of: 1) 95 percent UCL on the mean exposure concentrations; 2) maximum detected values for 1,3-butadiene, 2,2,4-trimethylpentane, and styrene because of a low number of detectable measurements; 3) default RME exposure assumptions, such as an exposure time of 24 hours per day and exposure frequency of 350 days per year; and 4) upper bound cancer risk and non-cancer toxicity values for some of our major risk drivers. The benzene IUR, for example, is based on the high end of a range of maximum likelihood values and includes uncertainty factors to account for limitations in the epidemiological studies for the dose-response and exposure data (US EPA 2011a). Similarly, the xylene chronic RfC is adjusted by a factor of 300 to account for uncertainties in extrapolating from animal studies, variability of sensitivity in humans, and extrapolating from subchronic studies (US EPA 2011a). Our use of chronic RfCs values when subchronic RfCs were not available may also have overestimated 1,3-butadiene, n-propylbenzene, and propylene subchronic HQs. None of these three chemicals, however, were primary contributors to the subchronic HI, so their overall effect on the HI is relatively small.

Several factors may have lead to an underestimation of risk in our study results. We were not able to completely characterize exposures because several criteria or hazardous air pollutants directly associated with the NGD process via emissions from wells or equipment used to develop wells, including formaldehyde, acetaldehyde, crotonaldehyde, naphthalene, particulate matter, and polycyclic aromatic hydrocarbons, were not measured. No toxicity values appropriate for quantitative risk assessment were available for assessing the risk to several alkenes and low molecular weight alkanes (particularly < C₅ aliphatic hydrocarbons). While at low concentrations the toxicity of alkanes and alkenes is generally considered to be minimal (Sandmeyer, 1981), the maximum concentrations of several low molecular weight alkanes measured in the well completion samples exceeded the 200 – 1000 µg/m³ range of the RfCs for the three alkanes with toxicity values: n-hexane, n-pentane, and n-nonane

(US EPA 2011a, ORNL 2009). We did not consider health effects from acute (i.e., less than one hour) exposures to peak hydrocarbon emissions because there were not appropriate measurements. Previous risk assessments have estimated an acute HQ of 6 from benzene in grab samples collected when residents noticed odors they attributed to NGD (CDPHE 2007). We did not include ozone or other potentially relevant exposure pathways such as ingestion of water and inhalation of dust in this risk assessment because of a lack of available data. Elevated concentrations of ozone precursors (specifically, VOCs and nitrogen oxides) have been observed in Garfield County's NGD area and the 8-hr average ozone concentration has periodically approached the 75 ppb National Ambient Air Quality Standard (NAAQS) (CDPHE 2009, GCPH 2010).

This risk assessment also was limited by the spatial and temporal scope of available monitoring data. For the estimated chronic exposure, we used 3 years of monitoring data to estimate exposures over a 30 year exposure period and a relatively small database of 24 samples collected at varying distances up to 500 feet from a well head (which also were used to estimate shorter-term non-cancer hazard index). Our estimated 20-month subchronic exposure was limited to samples collected in the summer, which may have not have captured temporal variation in well completion emissions. Our 1/2 mile cut point for defining the two different exposed populations in our exposure scenarios was based on complaint reports from residents living within 1/2 mile of existing NGD, which were the only data available. The actual distance at which residents may experience greater exposures from air emissions may be less than or greater than a 1/2 mile, depending on dispersion and local topography and meteorology. This lack of spatially and temporally appropriate data increases the uncertainty associated with the results.

Lastly, this risk assessment was limited in that appropriate data were not available for apportionment to specific sources within NGD (e.g diesel emissions, the natural gas resource itself, emissions from tanks, etc.). This increases the uncertainty in the potential effectiveness of risk mitigation options.

These limitations and uncertainties in our risk assessment highlight the preliminary nature of our results. However, there is more certainty in the comparison of the risks between the populations and in the comparison of subchronic to chronic exposures because the limitations and uncertainties similarly affected the risk estimates.

4.5 Next Steps

Further studies are warranted, in order to reduce the uncertainties in the health effects of exposures to NGD air emissions, to better direct efforts to prevent exposures, and thus address the limitations of this risk assessment. Next steps should include the modeling of short- and longer-term exposures as well as collection of area, residential, and personal exposure data, particularly for peak short-term emissions. Furthermore, studies should examine the toxicity of hydrocarbons, such as alkanes, including health effects of mixtures of HAPs and other air pollutants associated with NGD. Emissions from specific emission sources should be characterized and include development of dispersion profiles of HAPs. This emissions data, when coupled with information on local meteorological conditions and topography, can help provide guidance on minimum distances needed to protect occupant health in nearby homes, schools, and businesses. Studies that incorporate all relevant pathways and exposure scenarios, including occupational exposures, are needed to better understand the impacts of NGD of unconventional resources, such as tight sands and shale, on public health. Prospective medical monitoring and surveillance for potential air pollution-related health effects is needed for populations living in areas near the development of unconventional natural gas resources.

5.0 Conclusions

Risk assessment can be used as a tool in HIAs to identify where and when public health is most likely to be impacted and to inform risk prevention strategies directed towards efficient reduction of negative health impacts. These preliminary results indicate that health effects resulting from air emissions during development of unconventional natural gas resources are most likely to occur in residents living nearest to the well pads and warrant further study. Risk prevention efforts should be directed towards reducing air emission exposures for persons living and working near wells during well completions.

6.0 Acknowledgements

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Figure 1: Relationship between completion samples and natural gas development area samples and residents living $\leq 1/2$ mile and $> 1/2$ mile from wells.

• Time weighted average based on 20-month contribution from well completion samples and 340- month contribution from natural gas development samples.

• BTEX, benzene, toluene, ethylbenzene, and xylenes; COGCC, Colorado Oil and Gas Conservation Commission; HAP, hazardous air pollutant; HI, hazard index; HIA, health impact assessment; HQ, hazard quotient; NATA, National Air Toxics Assessment; NGD, natural gas development

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Why Children are at Higher Risk

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When it comes to harmful environmental exposures, children cannot be considered "little adults." Their bodies take in proportionately greater amounts of environmental toxins than adults, their rapid development makes them more vulnerable to environmental interference, and their normal behavior patterns place them at greater risk to some toxins.

Children can be exposed to environmental toxins even before birth if the mother is exposed during pregnancy to toxins that can cross the placenta, such as carbon monoxide or lead. Children's organs, including the brain, lungs, and reproductive systems, begin developing during the fetal stage and continue to develop through adolescence. Organ growth occurs in spurts, and it is during key growth periods that organ systems are most vulnerable to permanent damage. The Environmental Protection Agency recently acknowledged the enhanced risk to children from environmental exposures when it released draft supplemental guidelines for assessing cancer risk from early-life exposure to carcinogens.

Children are exposed to greater amounts of environmental toxins

Pound for pound, children breathe more air, consume more food, and drink more water than adults, due to their substantial growth and high metabolism. For example, a resting infant takes in twice as much air per pound of body weight as an adult. Subject to the same airborne toxin, an infant therefore would inhale proportionally twice as much as an adult.

Children also drink proportionally more water than adults. Pound for pound, infants and children drink more than 2½ times as much water as adults. A formula-fed infant consumes about one seventh of its body weight in water each day—the equivalent of a 154-pound man drinking nearly 6½ gallons of water per day. Standards for most waterborne contaminants are established based on the health impacts on adults, so current standards may not suffice to protect children.

Children also may be exposed to greater amounts of toxins in the environment due to the fact that they spend significant amounts of time on the floor and ground. As a result, they are more likely to come into contact with toxins found in dust, carpets, and soil, such as lead. Some airborne contaminants, such as radon, mercury, and some pesticide vapors concentrate in greater quantities at ground level, so small children would be exposed to higher concentrations of these toxins than adults in the same room.

Young children (ages six months to about two years) have a natural urge to place objects in their mouths. This normal hand-to-mouth activity can cause them to ingest toxins in their environment to which adults would not necessarily be exposed. For example, in homes with high dust lead levels, children may ingest lead when they put their hands or toys in their mouths. Children also may be exposed to arsenic and creosote, two toxic chemicals used to pressure-treat wood, if they play on playground equipment, decks, or porches treated with these chemicals.

Small children also more readily absorb nutrients (and toxins) they ingest. For example, children require more calcium than adults because their bones are growing, and they can absorb more calcium from the same food sources. Although this enhanced ability is a plus when it comes to nutrients, it also can increase a child's exposure to toxins such as lead. A toddler will absorb about 50 percent of ingested lead, whereas an adult will absorb about 15 percent.

Children's developing bodies are more susceptible to harm

During the first months and years of life, children's organs are developing rapidly, making them more prone to functional damage. For example, the nervous system continues to develop throughout childhood and therefore is especially vulnerable to environmental factors. At the same time, the nervous system is not well equipped to repair any structural damage caused by environmental toxins.



If a child is exposed to neurotoxins such as lead or mercury, the resulting loss of intelligence or behavioral problems can be irreversible.

Especially during the first year of life, a child's ability to metabolize, detoxify, and excrete toxins differs from that of an adult. In some cases, this works to a child's advantage, as when they are unable to break down a relatively harmless substance into harmful byproducts. However, children also may be more susceptible to some toxins because their liver and kidneys are not fully mature and cannot detoxify and excrete harmful substances as readily as adults.

Children have more time to develop latent diseases

Many environmentally related diseases take decades before symptoms develop. Because children have more years to live, they have more time to develop latent diseases. For example, mesothelioma, which is caused by exposure to asbestos, takes years to develop. Early exposure to neurotoxins may lead to Parkinson's disease later in life, and pesticide exposures may result in cancer years later. Because of the long latency period of these diseases, exposures in childhood are more likely to result in disease than exposures in adulthood.

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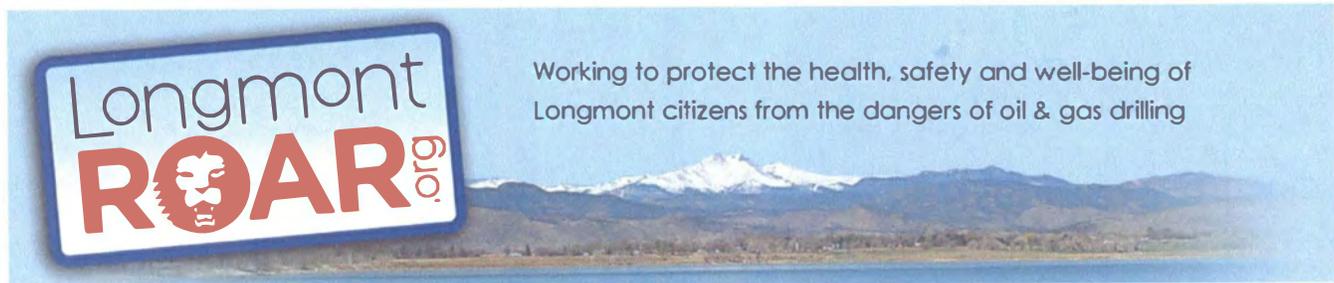
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General, Health and Environmental Concerns

An Overview

["Taking the Handle Off the Fracking Pump: Human Rights and the Role of Public Health Inquiry in an Age of Extreme Fossil Fuel Extraction"](#) (Sandra Steingraber, PhD) Please click on this link for a comprehensive, well-written and compelling overview of the effects of oil & gas exploration.

Summary: Horizontal hydrofracking is a form of fossil fuel extraction that turns the earth inside out. It buries a surface resource that is vital to life (fresh water) and brings to the surface subterranean substances—hydrocarbons, radioactivity, heavy metals, brine—that were once locked away in deep geological strata and which now require permanent containment. Before it is sent down the borehole, the fresh water used to fracture bedrock is mixed with inherently toxic materials. These include known and suspected carcinogens, neurological toxicants, and chemicals linked to pregnancy loss. At least one thousand truck trips are required to frack a single well. These trucks—along with earth-moving equipment, compressors, and condensers—release or create soot, volatile organic compounds, and ozone. Exposures to this kind of air pollution has demonstrable links to asthma, stroke, heart attack, cancers, and preterm birth. As the shale gas boom sweeps eastward into densely populated areas already struggling with air pollution and whose rivers provide drinking water for millions, public health inquiry is desperately needed to explicate the cumulative health impacts of fracking and to quantify their economic costs. This talk explored the human rights dimensions of fracking and the role of public health research within that context. Of particular interest were the ethical questions of conducting such research in communities whose residents may be serving, in effect, as involuntary subjects in an ongoing, uncontrolled experiment. How does our moral obligation to prevent harm square with attempts to monitor the evidence for harm? What is relationship between mitigation and prevention? When does research serve to sanction and legitimize polluting activities and when does it challenge them?
(SOURCE: [Physicians Scientists and Engineers for Healthy Energy Conference Lectures](#))

Further Study is Needed before We Forge Ahead

[Health Effects of Fracking for Natural Gas Need Study, Says CDC Scientist](#), Bloomberg, Jan 4, 2012

The CDC (center for disease control & prevention) said "We do not have enough information to say with certainty whether shale gas drilling poses a threat to public health," said Christopher Portier, director of the CDC's National Center for Environmental Health and Agency for Toxic Substances and Disease Registry.

Fracking and Cancer

Report from [Steingraber On Cancer Risk in Texas's Fracking Zone](#):

"I feel that I am on firm ground—and so is Josh Fox—in saying that the breast cancer incidence in particular areas of Texas look different than the rest of the state and that these areas happen to be where fracking goes on intensely. Given that drilling and fracking operations involve releases of known and suspected breast carcinogens—and benzene is one—it is reasonable, and morally right, to ask if fracking might be involved with the creation of these patterns. Until the answers are in, benefit of the doubt goes to breasts, not to the chemicals that cause cancer in breasts. And the burden of proof belongs on the shoulders of the gas industry to demonstrate safety, not on the backs of women, who would have to suffer and die in order to demonstrate without a doubt that fracking causes breast cancer. When public health is at stake, the trigger for action is indication of harm, not proof of harm. Stop fracking. Do the research. Investigate these patterns."

COGCC Ignores Public Health

Head of COGCC says current setback rules ignore public health. [Thom Kerr](#) defines safety as hazard, but excludes Health and toxicology.

Why Longmont? Why Now?

Click [here](#) to hear Rodney Herring, president of TOP Operating Company, answer the question. It is entirely about making the most money possible before there are more stringent regulations.

What You Need to Know About Natural Gas Exploration

If you want a crash course on the dangers of natural gas exploration, watch this 47 minute [video](#) from The Endocrine Disruption Exchange.

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Unconventional Natural Gas Development and Infant Health: Evidence from Pennsylvania

"The immediate outcomes of interest are infant health at birth measures (low birth weight, premature birth, small for gestational age and 5 minute APGAR scores). This study examines singleton births to mothers residing close to an unconventional natural gas well from 2003-2010 in Pennsylvania. The difference in differences approach compares birth outcomes before and after a gas well was completed for mothers who live 2.5 km (approx. 1.5 miles) from gas development. The results suggest that exposure to NGD before birth increases the overall prevalence of low birth weight by 25 percent, increases overall prevalence of small for gestational age by 17 percent and reduces 5 minute APGAR scores, while little impact on premature birth is detected."

[Download full report here.](#)

Impacts of Gas Drilling on Human and Animal Health

NEW SOLUTIONS, Vol. 22(1) 51-77, 2012, Scientific Solutions, MICHELLE BAMBERGER & ROBERT E. OSWALD

To describe how exposures may occur, and to report health effects, the authors of this study conducted interviews with animal owners in six states (Colorado, Louisiana, New York, Ohio, Pennsylvania, Texas) affected by gas drilling.

Communities living near hydrocarbon gas drilling operations have become de facto laboratories for the study of environmental toxicology. The close proximity of these operations to small communities has created a variety of potential hazards to humans, companion animals, livestock and wildlife. These hazards have become amplified over the last 20 years, due in part to the large-scale development of shale gas drilling (horizontal drilling with high-volume hydraulic fracturing), encouraged by the support of increased drilling and exploration by U.S. government agencies [1]. Yet this large-scale industrialization of populated areas is moving forward without benefit of carefully controlled studies of its impact on public health. As part of an effort to obtain public health data, we believe that particular attention must be paid to companion animals, livestock, and wildlife, as they may serve as sentinels for human exposures, with shorter lifetimes and more opportunity for data collection from necropsies.

[Click here to download the entire study](#)

One Colorado Town Takes the Time to Study the Impacts Before Drilling

[The Battlement Mesa Health Impact Assessment \(HIA\)](#)

This document, commissioned by the Garfield County Board of County Commissioners, provides objective information and evidence-based recommendations to increase the potential health benefits of natural gas drilling in the Battlement Mesa PUD, while minimizing potential health risks. [\(Read how this document came about through a citizen action group such as ours\)](#)

The summary of Findings and Regulations from this document makes some great key points:

***What we know:** Air pollution is a known hazard to the public health. There is sufficient information available to indicate that even with current practices and technologies the natural gas industry produces large amounts of air pollutants. In addition, Antero's recent well development activities on the Watson Ranch pad resulted in short term health impacts. Antero has proposed additional mitigation measures for the project in Battlement Mesa but these mitigations are as yet untested. Further mitigation measures may be needed to reduce the likelihood of health effects. As it stands, the Antero project has the potential to pollute the air and negatively impact the public health in Battlement Mesa. Many information gaps exist.*

***What we do not know:** Currently, there is not enough information to determine whether or not current federal, state, and COGCC regulations and rules are sufficient to protect public health from air pollution resulting from natural gas development and production in high population density areas such as the Battlement Mesa PUD.*

***What we know:** Water pollution is hazardous to the public health. Garfield County Oil and Gas studies, EPA studies, and other studies demonstrate that natural gas development and production can release contaminants to domestic water supplies and compromise water quality. Individual circumstances can influence the potential contamination of water. In Garfield County, accidents and malfunctions have been the most common cause of water contamination from natural gas development and production. However, the Mamm Creek Hydrological Study indicates some impacts to groundwater, such as increased levels of chloride and methane, from routine natural gas operations. If a domestic water resource is contaminated, remediation is time and cost intensive and may not restore the water resource to a quality for domestic use.*

***What we do not know:** The hydrogeology in Battlement Mesa has not been characterized and the relationship between groundwater, domestic water supplies, and the Colorado River is not well understood.*

The extent of the impact of routine natural gas development and production on water quality is not known. Systematic monitoring is needed to verify that ground water is not compromised by routine natural gas development and production operations. Systematic monitoring can also provide early warning if water becomes contaminated.

RESOURCES:

["Evaluating Potential Health Impacts of Natural Gas Development in a Residential Community using Health Impact Assessment"](#) VIDEO This presentation focused on the methodology and findings of this work, as well as discussing the strengths and limitations of the HIA and the consequences of political intrusions.

The Balance Sheet — Blogs — The Denver Post

MARCH 22, 2012, 10:56 AM

A whiff of a potential problem in Colorado with fracking and drilling

By **MARK JAFFE** |  5 Comments

[The Denver Post](#),

In the spring of 2010, odors coming from an Antero Resources drilling rig not far from homes in Battlement Mesa, in western [Colorado](#), drove residents to shut their windows and at least one to bury her head in a pillow.

The Colorado [Oil](#) and Gas Commission issued a notice of alleged violation and Antero took steps to address the problem.

Even as the odors vanished many residents in the Garfield County development wonder whether there was more to the fumes than just a bad smell.

A University of [Colorado-Denver School of Public Health study released this week](#) tried to offer at least a partial answer based on air samples taken in Battlement Mesas and concluded that there appear to be elevated levels of some potentially hazardous chemicals when a well is hydrofractured.

When it comes to the impacts oil and gas drilling near developed areas [Battlement Mesa may be a test case](#). Antero had proposed drilling 200 wells of nine pads in Battlement Mesa and two other companies are drilling within a half of mile of the 5,000-resident development.

That sparked a push for a health assessment by residents of Battlement Mesa and while the Garfield County commissioners eventually voted to kill the project, much of its data lives on, such as the air samples used in the School of Public Health study.

There has been [a growing body of scientific studies linking emissions from oil and gas operations to air pollution](#) issues, but the current study focuses on one point — well completions, which involve [fracking](#) and flowback.

In the fracking process a mixture of water, sand and trace chemicals are pumped into a well under pressure to fracture the rocks and release more oil and gas.

The fracking fluid, water from the rock strata and hydrocarbons then start flowing back out of the well. It is this process that chemical fumes can escape.

Using air samples collected from 2008 through 2010, the study analyzed emissions and tried to calculate the potential health risk.

There are a lot of aspects of the study that have been questioned by industry – the calculated cancer risk, the exposure – and the lead author Lisa McKenzie also stresses that more study is needed.

One element, however, that can be pulled from the study is that levels of volatile organic chemicals associated with fracking and flowback were high within a half of a mile of the drill site.

The federal Environmental Protection Agency has developed a Hazard Index – it isn't a legal standard just a tool – in which "1" is the level at which no health effects would be expected.

The levels at half-mile from the well pads in Battlement Mesa were at "5," according to the study.

The chemicals contributing to that elevated rate were to trimethylbenzenes, xylenes, and aliphatic hydrocarbons, the study said. The chemicals have been linked to neurological and respiratory problems.

Whether people are exposed to the chemicals for a long enough period to create health problems is an unresolved issue – but it raises a question that needs an answer.

And what of Battlement Mesas?

"Those initial odor complaints were in a section called Watson Ranch that was close to the Antero well," said Bob Arrington, a member of Battlement Concerned Citizens. "Now we've had complaints in Tamarisk Village which is about a half-mile from an Encana well."

The Encana well is on a rise above the development and as part of its drilling permit, the company is using sound walls to dampen noise, and low-noise, low-visibility flares with air emissions controls.

The fumes from the rig tend to gather in a gully and flow down hill, Arrington said. Once the Encana community representative was notified, she got on the phone to the drill site. "They fired up a combustor and took care of it," Arrington said. "What we've seen is that operators have a lot of discretion in how they handle their rigs."

ARTICLE PRINTED FROM THE BALANCE SHEET

<http://blogs.denverpost.com/thebalancesheet/2012/03/22/whiff-potential-problem-fracking-drilling/3346/>

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NORM (Naturally Occurring Radioactive Material)

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Introduction

By definition, naturally occurring radioactive material (NORM) is not subject to regulatory control under the Atomic Energy Act of 1954, or the Low Level Radioactive Waste Policy Act. Because of these regulatory exclusions, NORM is subject primarily only to individual state radiation control regulations. In North Dakota, NORM is under the regulatory control of the Radiation Control Program of the North Dakota Department of Health - Division of Air Quality.

Wastes containing NORM are generally not regulated by federal agencies. One exception is the transportation of NORM contaminated wastes. These shipments are subject to U.S. Department of Transportation (DOT) regulations. In addition, NORM handling and management activities may be subject to regulations promulgated by the Occupational Safety & Health Administration (OSHA) as well as those maintained by the North Dakota Health Department.

Naturally Occurring Radioactive Material (NORM)

Naturally occurring radioactive materials (NORM) generally contain radionuclides found in nature, such as radium, thorium, uranium, etc. Once this NORM becomes concentrated through human activity, such as mineral extraction or oil production, it can become a radioactive contamination hazard or a radioactive waste.

There are two types of NORM material: Discrete and Diffuse.

The first, **discrete** NORM, has a relatively high radioactivity concentration in a very small volume, such as a radium source used in medical procedures or level gauges. Because of its relatively high concentration of radioactivity, this type of NORM poses a direct radiation exposure hazard.

The second type, **diffuse** NORM, has a much lower concentration of radioactivity, but is spread out over a large volume of material, such as contaminated soil. Diffuse NORM poses a different type of problem because of its high volume and low concentration of radioactive material. The following are six sources of diffuse NORM:

1. Metal Mining & Processing Waste
2. Coal Ash
3. Phosphate Waste
4. Uranium Mining Overburden
5. Oil and Gas Production Wastes
6. Water Treatment Residues

Diffuse NORM may pose a health hazard because of its many uses. For example, though most metal-mining waste is stored near where it is generated, small amounts have been used as construction backfill and road building materials. It is also used in concrete and wallboard.

Coal ash is primarily used as an additive in concrete and as backfill.

Phosphate waste (slag) from the processing of elemental phosphorous has been used in construction and in paving.

Uranium mining waste is the soil and rock that is removed during surface or underground uranium mining. This waste is sometimes used to backfill mined-out areas and to construct roads around the mining site.

Oil and gas production may produce radioactive pipe scale (a residue left in pipes from producing oil wells) and sludge that leave sites and equipment contaminated. In the past, some contaminated piping and other scrap metal have been used inadvertently by schools and other organizations for playground equipment, welding material, fencing, etc. because this contaminated metal was recycled before it was found to be contaminated.

Radiation-contaminated water treatment residue accumulates when radioactive material is filtered out of drinking water during the purifying process. This waste may be disposed of in landfills or lagoons. It may also be used in agriculture as a soil conditioner.

There is increasing evidence that improper use or disposal of such naturally-occurring radioactive materials can result in significant contamination of the environment and elevated radiation exposure. This can adversely affect the health of those occupationally exposed, as well as the general public.

Disposal Issues

There are currently no federal regulations covering disposal of NORM. The State of North Dakota, as an Agreement State, does regulate all aspects of NORM (and other non-byproduct radioactive material). Currently there are no regulations specific to the control of NORM. NORM is covered by the same regulations that apply to other radioactive material in the state.

Material or equipment found to contain less than 5 picocuries of total radium per gram of material through accredited lab analysis is not considered NORM, by definition, and may be disposed of, or released for unrestricted use.

Material or equipment found to be contaminated to levels above 5 picocuries per gram are considered NORM and must be handled, stored, transported and disposed of in accordance with the [North Dakota Radiological Health Rules](#).

For More Information

The safe handling, storage, transport and disposal of NORM is a very important issue. NORM or other radioactive waste disposal standards have changed substantially with improved technology and evolving environmental protection considerations. Regulatory programs and standards continue to change, so if you would like more information on the handling, storage, transport or disposal of NORM, contact:

Dave Stradinger, Environmental Scientist
Radiation Control Program
918 East Divide Avenue, 2nd Floor
Bismarck, ND 58501-1947
Phone: 701-328-5188
email: dstradinger@nd.gov

Or visit:

- The Conference of Radiation Control Program Directors Suggested State Regulations for Control of Radiation: [PART N](#) -- "REGULATION AND LICENSING OF TECHNOLOGICALLY ENHANCED NATURALLY OCCURRING RADIOACTIVE MATERIALS (TENORM)"
- The [NORM Technology Connection](#) website

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The Radiation Control Program pages are maintained by James Lawson, RT
jlawson@nd.gov

on-site testing to address this? Is there

Like Wyoming, Utah finds high wintertime ozone pollution near oil, gas wells

By Mark Jaffe *The Denver Post* *The Denver Post*
Posted:

DenverPost.com

High levels of winter ozone air pollution have been recorded in a Utah oil and gas field — after the phenomenon was seen in Wyoming — raising concerns that such pollution could become more widespread.

A team of scientists is combing the Uintah Basin to determine the link between the area's 10,000 oil and gas wells and ozone levels, which in 2011 were higher in eastern Utah than in New York City.

"What we are seeing in the Uintah Basin and (Wyoming's) upper Green River (Basin) has implications for the entire West," said Brock LeBaron, the Utah Department of Environmental Quality's manager of the Uintah study.

Ozone pollution — which can impair breathing — has been an urban and summertime problem, but in the West, it has emerged as a rural winter issue.

As drilling picks up, particularly in areas such as Colorado where shale oil has been discovered, the concern is that the problem could grow.

The Piceance Basin in northwest Colorado, for example, is an area that could be susceptible to the snowy conditions that created winter ozone in the Utah and Wyoming incidents, researchers say.

A recent study of the Denver-Julesburg Basin in northeastern Colorado by the National Oceanic and Atmospheric Administration found elevated levels of methane coming from well sites. NOAA scientists say initial results from another study show high concentrations of butane, ethane and propane in Erie, east of Boulder, where hundreds of natural-gas wells are operating.

"We are finding a huge amount of methane and other chemicals coming out of the natural-gas fields," said Russell Schnell, a NOAA scientist in Boulder.

"It still has to be confirmed," Schnell said. "But we may have to take a closer look at all oil fields."

Industry groups say they are also concerned about the ozone issue.

"There is a lot we don't understand about wintertime ozone; we need this research," said Kathleen Sgamma, vice president for government affairs at the trade group Western Energy Alliance.

The industry is participating in the Utah study. "We've gotten great cooperation," said Gabrielle Petron, a NOAA researcher driving around the basin in a truck equipped with a mobile lab.

In Wyoming, researchers found the winter phenomenon appears to be created when a heavy snow cover, which acts as a reflector enhancing the sunlight and heat in the atmosphere, helps to form an inversion that holds the emissions in a confined area.

NOAA's Schnell said that it is also suspected that the snow acts "as a huge sponge" that absorbs chemicals as the temperature drops at night and releases them as the day warms.

Ozone, a corrosive gas that can exacerbate asthma and other respiratory diseases, is created when volatile organic compounds, such as gasoline fumes, and nitrogen oxides, such as power plant emissions, mix with heat and sunlight.

While ground-level ozone is a health threat, naturally created stratospheric ozone is vital to protecting terrestrial life from the Sun's deadly ultraviolet radiation.

In the winter of 2005, ozone levels reach 120 parts per billion for an hour in rural Pinedale, Wyo. The town of 1,400 is surrounded by 2,900 gas wells in the Jonah and Pinedale Anticline fields.

After the incident, ozone was detected by state air equality agencies around the West.

In 2010 and 2011, ozone levels in the Uintah Basin soared. The peak value in 2011 was 139 parts per billion, according to Utah officials.

That was 85 percent higher than the federal health standard, 75 ppb, and above the 99 ppb peak for 2011 in the New York metropolitan area, according to New York Department of Environmental Conservation data.

The Federal Agency NOAA (The National Oceanic + Atmospheric Administration)

This winter, NOAA and University of Colorado at Boulder researchers have fanned out across the Uintah Basin. They are erecting sampling towers, measuring emissions using aircraft and going from site to site in Petron's mobile laboratory.

"They are tracking upwind, downwind," said Schnell. "It will be the best-studied basin in the world."

In Vernal, Utah, population 9,000, the biggest town in the basin, the oil fields and truck traffic are the prime sources of emissions, Petron said. The 500-megawatt Bonanza Power coal-fire plant at the edge of the basin must also be assessed, he said.

Researchers haven't been able to measure ozone and atmospheric chemistry because there is currently no snow, and a second field study will have to be done.

"The goal is to be able to figure out what you need to control," said Carl Daly, air program director for the Environmental Protection Agency's Denver office.

"Wyoming has reduced emissions, but they still had a bad year in 2011," Daly said.

The Wyoming Department of Environmental Quality and the industry launched initiatives to cut emissions.

The agency estimates that emissions have been cut by more than 20 percent.

The industry also has made more than \$100 million in investments to curb emissions and set up a system to cut activity on days when ozone is likely to form.

"We are using natural-gas-fired rigs instead of diesel, we are cutting fugitive emissions, and we installed incinerator-grade combustors at well sites," said Douglas Hock, a spokesman for Encana Corp.

Encana has proposed drilling another 3,500 wells in the area.

Even with the reductions and investments in March 2011, there was a 124 ppb ozone reading.

"They don't understand what is going on yet," said Elaine Crumpley, 64, a Pinedale resident and spokeswoman for Citizens United for Responsible Energy Development.

"They studied the problem for five years here and still don't have answers," Crumpley said. "I hope they learn something in Utah."

Mark Jaffe: 303-954-1912 or mjaffe@denverpost.com

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Like Wyoming, Utah finds high wintertime ozone pollution near oil, gas wells

By **Mark Jaffe**
The Denver Post

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 38 COMMENTS

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Industry groups **Today's Promotion** issue.

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Pollution linked to drilling

High levels of ozone were found in Wyoming's Green River Basin and Utah's Uintah Basin, raising concerns about air quality in Colorado oil fields including the Piceance Basin. Methane and propane were found in high levels close to the Denver-Julesburg Basin in Colorado.



Click on image to enlarge (The Denver Post)

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RadTown USA

You are here: [EPA Home](#) » [RadTown USA](#) » Radioactive Wastes from Oil and Gas Drilling

<http://www.epa.gov/radtown/drilling-waste.html>
Last updated on Tuesday, August 14, 2012

Radioactive Wastes from Oil and Gas Drilling

This page describes the radioactive waste created during the oil and gas drilling process.

On this page:

- [Overview](#)
- [Who is protecting you](#)
- [What can you do to protect yourself](#)
- [Resources](#)

Overview

The oil and gas industry provides three-fifths of the energy for the United States. When most of us drive a car, turn on a light bulb, or cook on a stove, a large portion of the energy we use comes from the fossils of plants and animals. While fossil fuels are chemical sources of energy, the processes used to extract them from the earth often generate radioactive waste.

Even though we use them on a daily basis, most people know little about the processes that take oil and gas from the ground to produce energy. These processes may leave behind waste containing concentrations of naturally-occurring radioactive material (NORM) from the surrounding soils and rocks. Once exposed or concentrated by human activity, this naturally-occurring material becomes Technologically-Enhanced NORM or TENORM. Radioactive materials are not necessarily present in the soils at every well or drilling site. However in some areas of the country, such as the upper Midwest or Gulf Coast states, the soils are more like to contain radioactive material.

Radioactive wastes from oil and gas drilling take the form of produced water, drilling mud, sludge, slimes, or evaporation ponds and pits. It can also concentrate in the mineral scales that form in pipes (pipe scale), storage tanks, or other extraction equipment. Radionuclides in these wastes are primarily [radium-226](#), [radium-228](#), and [radon gas](#). The radon is released to the atmosphere, while the produced water and mud containing radium are placed in ponds or pits for evaporation, re-use, or recovery.

The people most likely to be exposed to this source of radiation are workers at the site. They may inhale radon gas which is released during drilling and produced by the [decay](#) of radium, raising their risk of lung cancer. In addition, they are exposed to alpha and gamma radiation released during the decay of radium-226 and the low-energy gamma radiation and beta particles released by the decay of radium-228. (Gamma radiation can also penetrate the skin and raise the risk of cancer.) Workers following safety guidance will reduce their total on-site radiation exposure.

RadTown USA Topics

Transportation:

- Radioactive Materials Transported by Cargo Ship
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Radioactive Wastes from Oil and Gas Drilling (PDF)
(2pp, 130Kb)
[about pdf format]

Most states and federal land management agencies currently have regulations which control the handling and disposal of radionuclides which may be present in production sites. However, the general public may be exposed to TENORM from oil and gas drilling when sites that were active prior to the mid-1970s, when regulations went into effect, are released for public use. It is likely that a number of these sites contain radioactive wastes. The public may also be exposed when contaminated equipment is reused in construction projects.

Who is protecting you

U.S. Environmental Protection Agency (EPA)

EPA is responsible for setting federal radiation standards for exposure to NORM and TENORM.

EPA develops standards for the oil and gas extraction and production industry under the Clean Air Act, Clean Water Act, Safe Drinking Water Act, Resource Conservation and Recovery Act and the Comprehensive Environmental Response, Compensation, and Liability Act.

The States

Each state has one or more programs that address both NORM and TENORM. Some states have established or set limits to control to TENORM. These limits apply to the oil and gas drilling industry. Most states also control public exposure to radiation through programs implementing the federal Clean Air Act, Clean Water Act and other environmental laws authorized by the EPA.

U.S. Department of Labor (DOL), Occupational Safety and Health Administration (OSHA)

DOL's Occupational Health and Safety Administration (OSHA) establishes health and safety regulations for the oil and gas extraction, production, and servicing industry. OSHA also issues hazardous information bulletins to inform staff and the public of significant occupational safety and health issues including radiation hazard recognition, evaluation, and control in the workplace.

U.S. Department of Energy (DOE)

DOE provides grants for research on the use and disposal of radioactive materials related to the development of energy sources.

What you can do to protect yourself

Government organizations continue to address potential threats from oil and gas drilling and production for the public health and safety but you can take actions as well for your own health and safety.

Workers in the industry have the potential for overexposure to radioactive material and must stay up-to-date on federal, state, and industry health and safety guidelines. Following these procedures will reduce total on-site exposure. Workers also need to take precautions to avoid

bringing radioactive material residue on their clothes and shoes home to their families and neighborhoods.

- Change out of potentially contaminated clothes and shoes before returning to the family car and to your home or office.
- Do not re-use or bring home discarded equipment or material such as pipes, devices, bricks, rocks, or water.

Members of the public should contact their local state geological survey or bureau of health to determine if there is a likelihood of NORM and TENORM occurrence associated with oil and gas production in their state, or area where they live. Until then:

- Limit exposures and disturbance of the production site and any abandoned equipment.
- Do not handle, dispose or re-use abandoned equipment used at drilling sites.

Resources

Technologically-Enhanced, Naturally-Occurring Radioactive Material

June 22, 2012. U.S. Environmental Protection Agency

On this website, you can read about the products, processes and industries that may generate TENORM. You can also learn about the laws and guidelines that apply to radioactive oil and gas drilling wastes and other TENORM.

NORM (Naturally Occurring Radioactive Material) [EXIT Disclaimer](#)

June 22, 2012. North Dakota Department of Health

This Web page describes NORM and presents North Dakota state requirements.

Oil and Gas Well Drilling and Servicing eTool-Radiation Hazard

June 22, 2012. U.S. Department of Labor

Well logging presents a radiation hazard. You can read about it on this website.

Health Hazard Information Bulletin: Potential Health Hazards Associated with Handling Pipe used in Oil and Gas Production

June 22, 2012. U.S. Department of Labor

This document discussed potential health hazards associated with materials used in oil and gas production.

Safety Report Series No. 34: Radiation Protection and the Management of Radioactive Waste in the Oil and Gas Industry [about pdf format]

International Atomic Energy Agency

In this document, you can learn about radiation sources in the oil and gas industry worldwide and important safety steps.