or destroying our precious natural resources including the water, air, and soil, just to name a few, that are vital for life - at least human life - on this planet. The short term economic profits + energy "needs" of those of us living today cannot come at the expense of the survival of sustainable life here in the future.

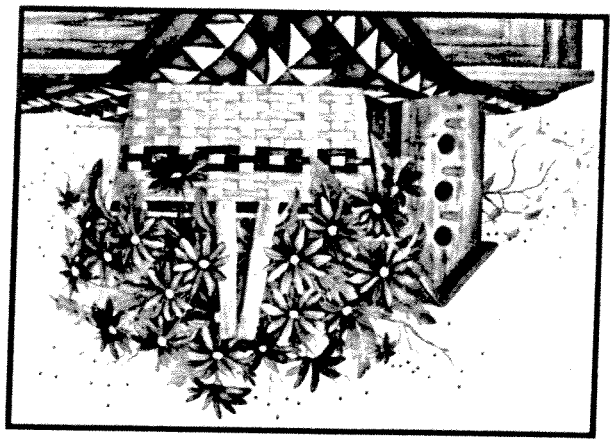
I am a university professor and one of just many, many normal citizens who have read + learned about what Fracking has done + is doing to communities elsewhere in the nation. We must proceed, if we proceed down this road, with all due caution. A hearing in Central IL is a must. → - Health & Ecology

12/2/13

Dear Mr. Mool and IDNR colleagues

I am writing first and foremost to request that a hearing on the new Fracking Rules in Illinois be scheduled in Central Illinois. I am very, very concerned about this physical transformation of our eco-systems that an increase of fracking in Illinois will bring. We the taxpayers and parents and grandparents of future taxpayers who hope to be parents + grand-parents of their own offspring must be informed and heard on what is, and what should + should not be, going on to [illegible] ↑

21678



Thanks for your time & attention to our concerns as I am sure they are ones that you too deep down share.

Warmly,

Lucille LT Eckrich

1214 E. Washington St.
Bloomington IL
61701

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Laurie Korsgaden Watercolors

Illustrated by Laurie Korsgaden © 2003.

9984424

new seasons
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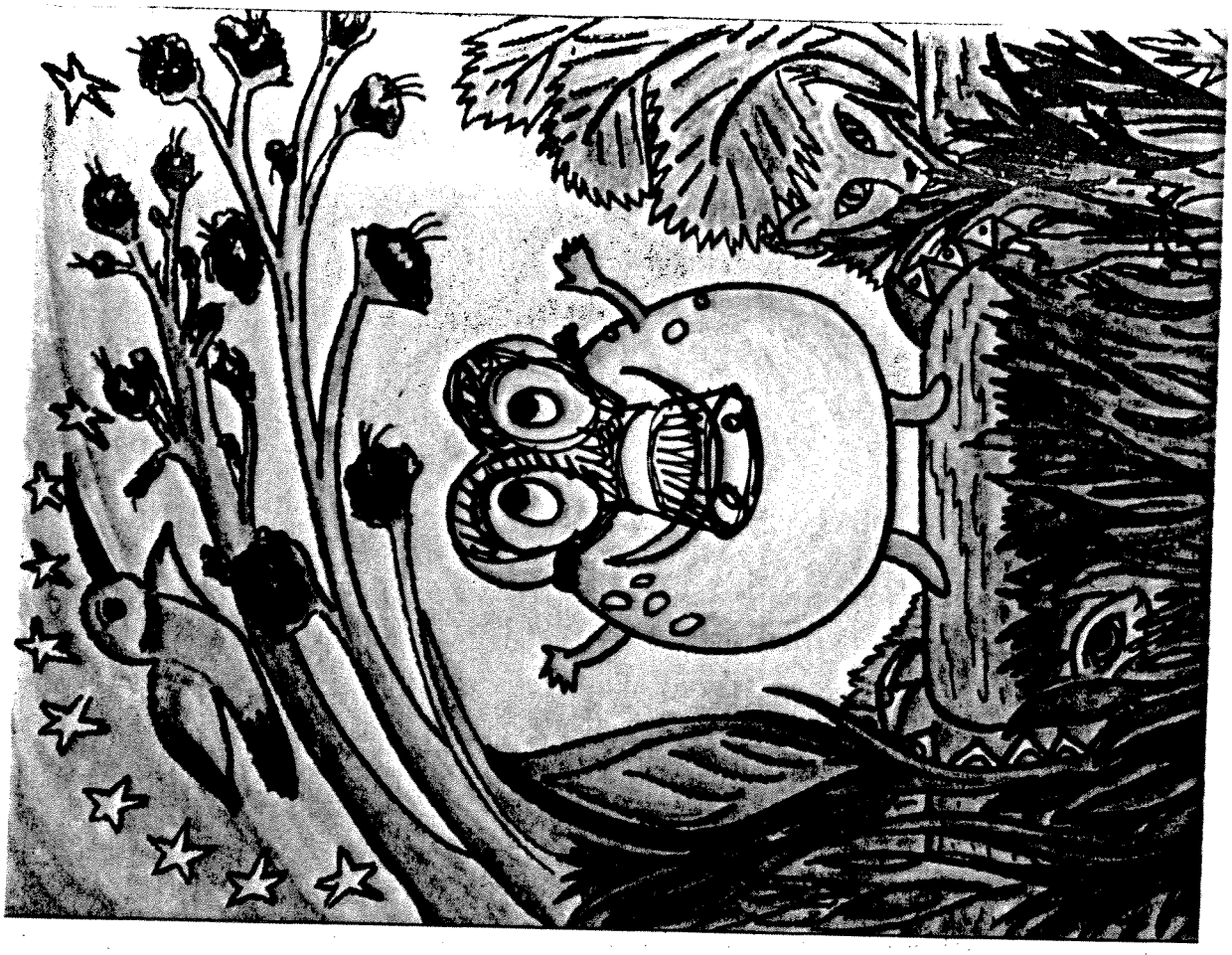
021679

A FROG IS A PART OF Aquatic Life - along with the invertes it eats (Larval stage in water) Your definition is Lacking!

IF PAUL SIMON LOVED FROGS, WHY CAN'T YOU?

Charlie Howe

021730



"Happy Frog" ©

A happy little spirit being marvels at the
wonders of the world

021781

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7 21762 29916 6

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OFFICE OF LEGAL COUNSEL

021782

Dear IANA

...to have a warm

and jolly holiday.

Please consider a moratorium on fracking! The rules don't protect us from earthquakes.

Sally Carter
Jackson County

© *Konrad Wothe/Minden Pictures*

NATIONAL WILDLIFE FEDERATION
11100 Wildlife Center Drive
Reston, VA 20190-5362
1-800-822-9919
www.nwf.org

Most people associate penguins with Antarctica, but only two out of the 17 species of penguins live there — the Emperor and the Adelie penguin. Unfortunately, climate change may be affecting these iconic species. Krill — the primary food source of many penguins — is on the decline due to lack of sea ice. You can help change the forecast for penguins and other wildlife by visiting NWF's Adoption Center.
Visit **www.nwf.org/adoption** and adopt your favorite animal today!

021753

Y086083

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'tis the season...

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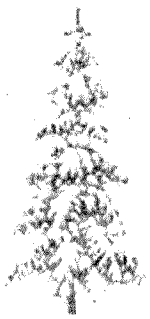
DEAR IDNR,

0217764



May all the joy and wonder of Christmas remain with you always.

And Remember
"Who would Jesus Frack?"

No One!
Love Dra

Original Art by Eva Melhuish
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11100 Wildlife Center Drive
Reston, VA 20190-5362
1-800-822-9919
www.nwf.org

To provide a refuge for birds and other small animals after the holidays, anchor your old holiday tree in a secluded spot in your yard. Wildlife will use it as a shelter from winter weather. For more tips on how to create a wildlife haven in your yard, visit **www.nwf.org/habitat** or call 1-800-822-9919.

021785

Y086667

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December 2013

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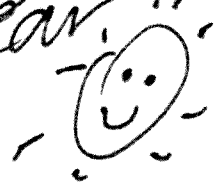
0217756

May the peace and joy of the season
remain with you
throughout the coming year.

The Rules & Regulations on Fracking cannot work in Illinois. Please keep our water SAFE. & Have a Merry Christmas.... & give us a Happy New Year.

Bonnie Nalley
Jackson County



Original Art by Bradley Jackson

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1-800-822-9919
www.nwf.org

Although it is often associated with the winter seasons, the cardinal's song can be heard year-round. This is unlike many other songbirds which generally only "sing" in the spring. Recently, warmer temperatures have caused the bird to extend its range northward — out of the U.S. and into southern Canada. Many other songbirds are also altering their migration patterns due to global warming. To find out more, visit **www.nwf.org/birdsandglobalwarming** or call 1-800-822-9919.

0217S7

Y086322

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...to have a warm
and happy holiday

❄ ❄ ❄

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Free us From
Fracking!
Let the Earth
have a chance
to live
Sincerely

021788

Lisa & Mike Husar
TeamHusar.com

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1-800-822-9919
www.nwf.org

Enjoying a walk with your dog is a great reason to spend more time outdoors. As they scout and sniff everything along the way, you'll find yourself noticing more about the natural world than you might have discovered on your own. For instance, if your dog sniffs the base of a tree, look for a squirrel or other animal in the branches above. Get more tips on how you can enjoy extra time outdoors by visiting **www.nwf.org/beoutthere**

021783

A3549

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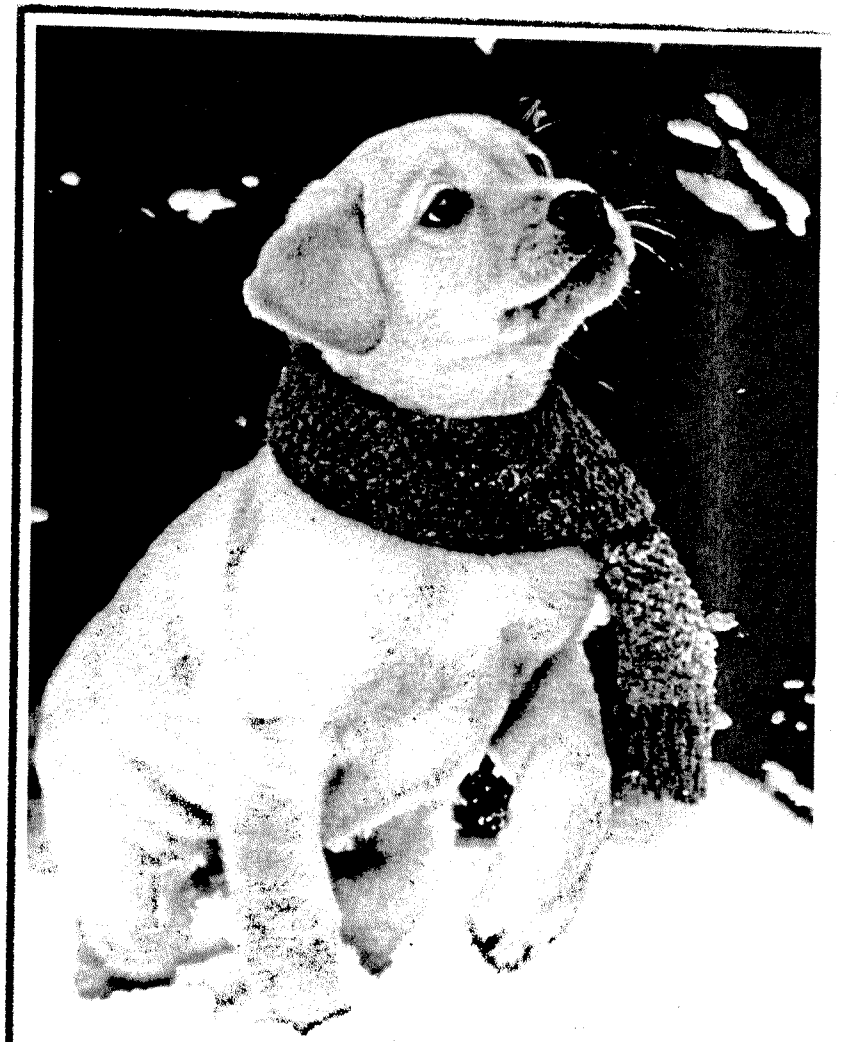

'tis the season...

Ban Fracking

This form of

permanent contaimination

can NOT Be

Tolerated @ ALL

Dennis R. Connolly

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021799

May the holiday season
be filled with joy
and special moments.

Original Art by Richard Macneil
Courtesy of Image Source

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1-800-822-9919
www.nwf.org

There are a number of ways you can care for wildlife in your area during the winter months. You can provide additional cover for birds and other small animals by starting a compost pile of needles, pinecones and wreaths. For more tips on how to make your yard wildlife-friendly, visit **www.nwf.org/habitat** or call 1-800-822-9919.

Y081988

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Holiday Greetings

Dear IDNR,

Please keep our land, air and water clean and pure

We love our IL environment

and May all your holiday wishes come true

Carolyn Ferdinand

0217492

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There are a number of ways you can care for wildlife in your area during the winter months. You can provide additional cover for birds and other small animals by starting a brush pile of branches and old wreaths. For more tips on how to make your yard wildlife-friendly, visit **www.nwf.org/gardenforwildlife** or call 1-800-822-9919.

021 143

A3550

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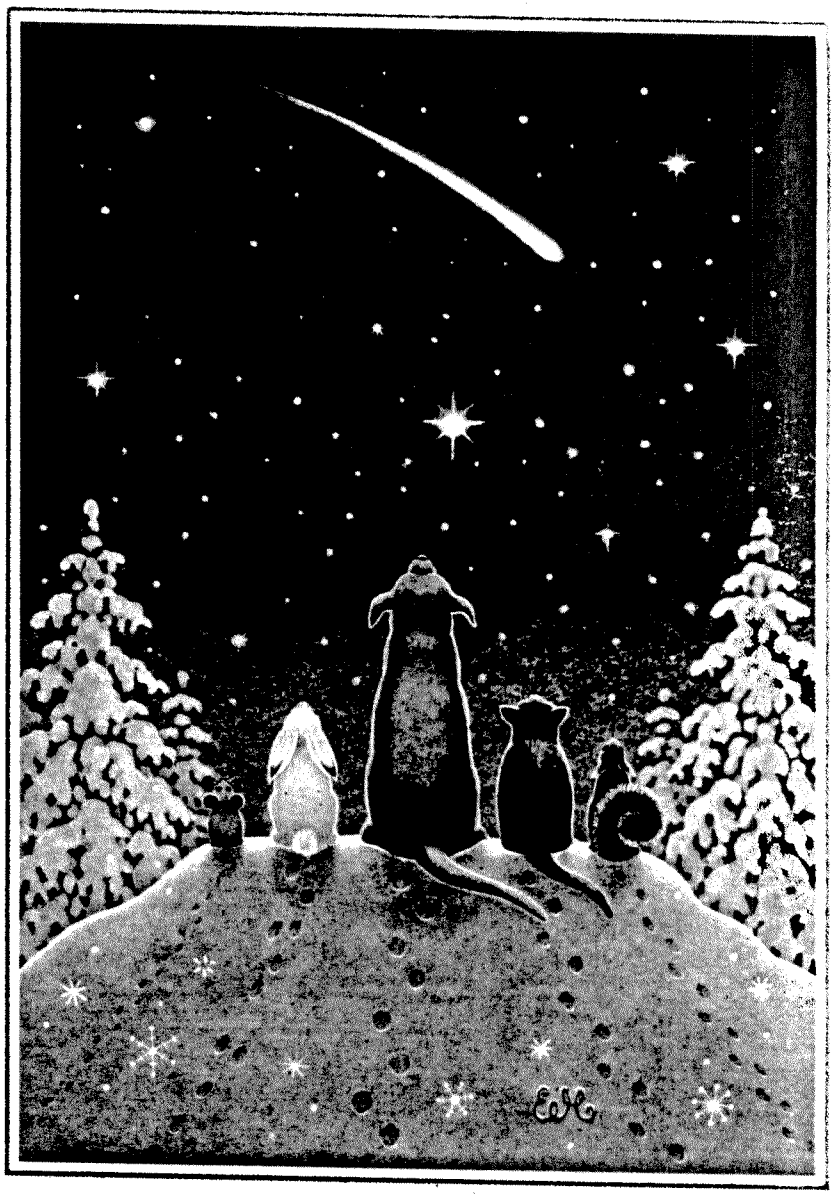

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MERRY CHRISTMAS,
IDNR!

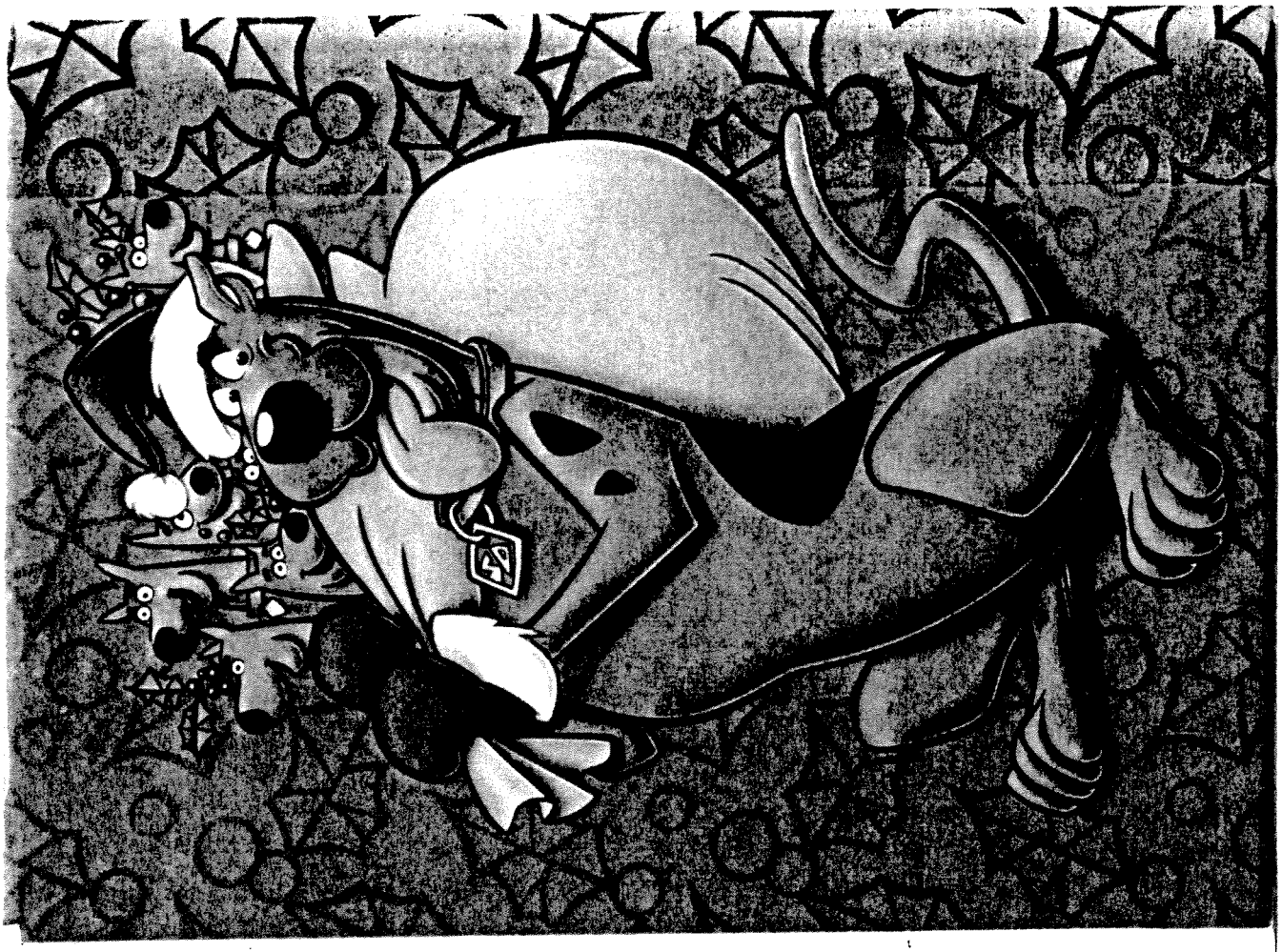
021794

THE FRACKING
REGULATIONS ARE
TOTALLY INADEQUATE
AND FRACKING IS IMMORAL.

IF YOU WANT A
HAPPY NEW YEAR,
MORITORIUM ON FRACKING
NOW!

NOT DESTRUCTION!
Karen Fiorino
Jackson, CO
IL

I WANT MY CHILD TO
LIVE IN A WORLD OF PROMISE.



021735

We don't want you to frack us!!

Please know that we are concerned on behalf of all of us who are negatively affected by the environmental issues caused by fracking.

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Dept. of Natural Resources
OFFICE OF LEGAL COUNSEL

May the gentle beauty of nature brighten your holidays

They will be brighter without fracking.

Thank you

- Jenn

Original Art by Bradley Jackson

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1-800-822-9919
www.nwf.org

Although it is often associated with the winter season, the cardinal's song can be heard year-round. This is unlike many other songbirds that generally only "sing" in the spring. Warmer temperatures have caused the cardinal to extend its range northward — out of the United States and into southern Canada. Many other songbirds are also altering their migration patterns due to climate change. To learn more, visit **www.nwf.org/birdsandclimate**

021497

A3538

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Wishing you
all the joys
of the season.

Dan Vrati

021793

SX209071/14
948VVMC624J

421799

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Wishing you
all the joys
of the season.

Our environment must be protected.

Julie Claussen

SX209071/14
948WMC624J

Dear IDNR

The fracking Rules + Regulations will Never be SAFE! Please Protect our Beautiful State and say No to Fracking!

Thankyou

Charles Murrell
189 Ripley Rd
Murphysboro, IL

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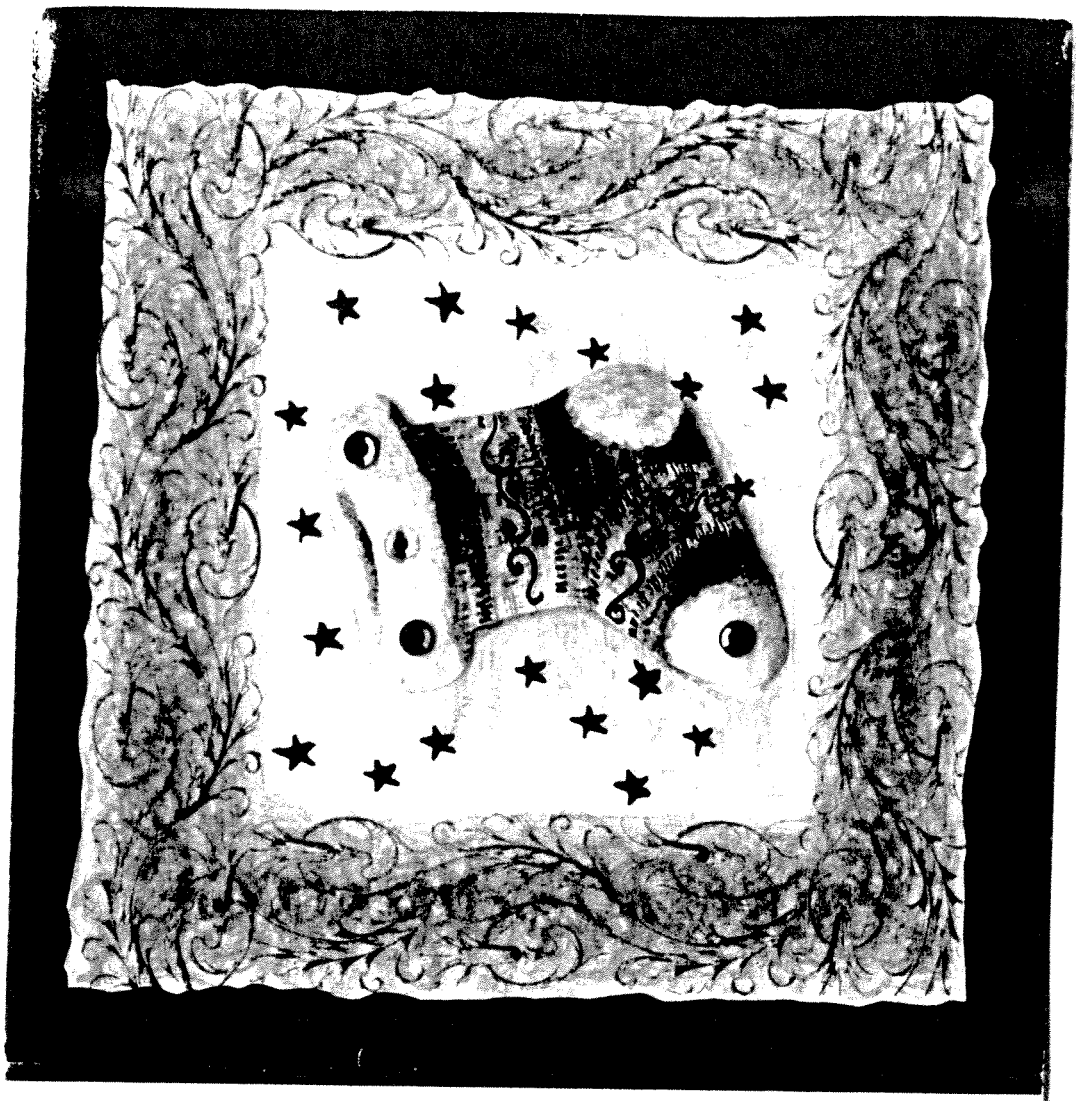
Wishing you
all the joys
of the season.

62803



SX209071/14
948WMC624J

021963

Hoping for a clean green earth w/o fracking in 2014 - It is contrary to earth regulations to do this violence & against the true spirit of Xmas peace

Blessings to you & your families & our mother earth

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Wishing you all the joys of the season.

Hugh Muldoon
700 W. Elm
E'dale, IL
62901

021304

SX209071/14
948WMC624J

921905

Please
No fracking in
Illinois. The gas comes now;
the bad consequences come
later.

Wishing you
all the joys
of the season.

David Roemer
Carbondale, Ill

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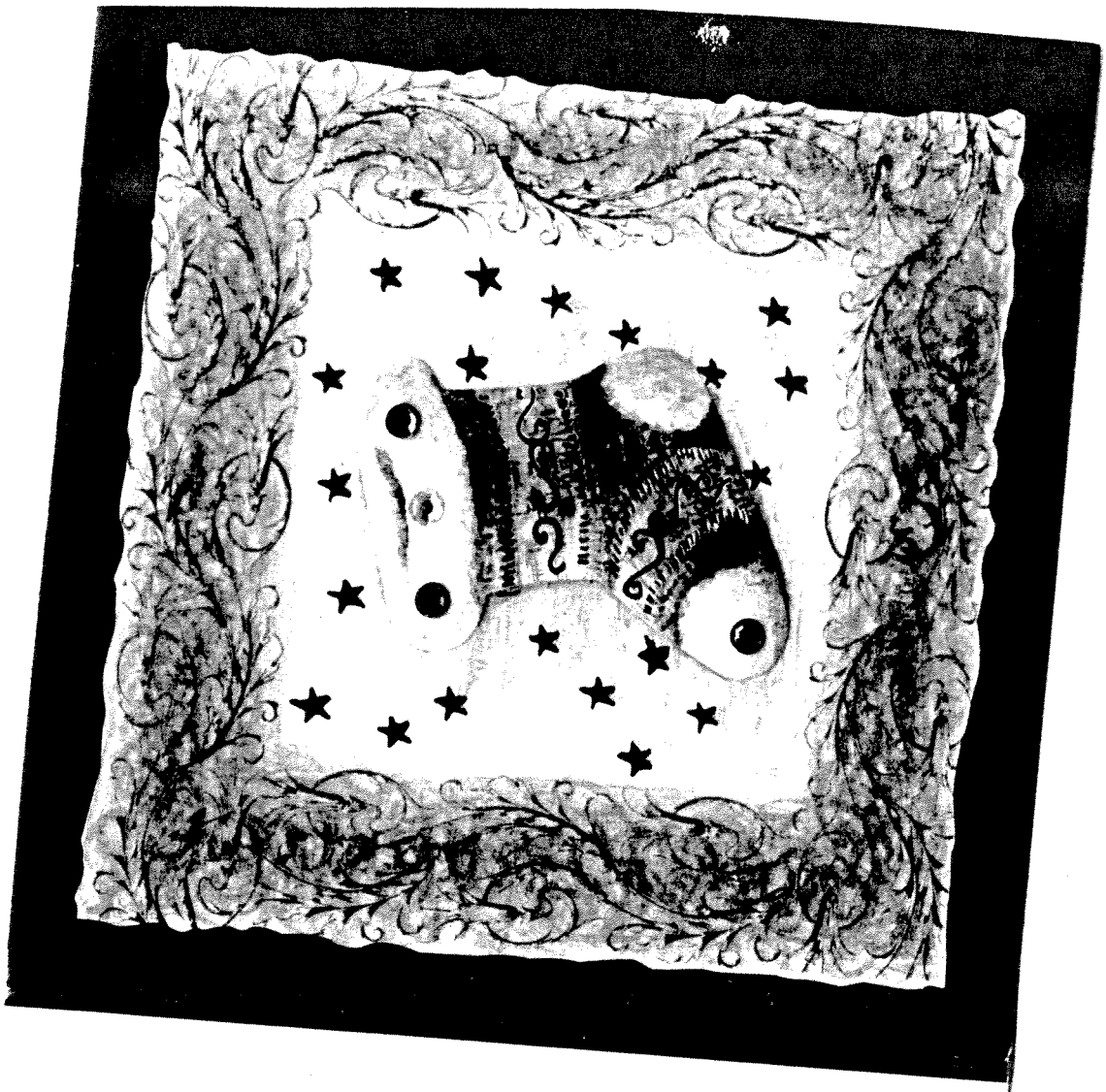
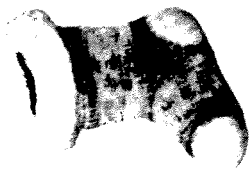


SX209071/14
948WMC624J



021907

JAN 3 2014
Dept. of Natural Resources
OFFICE OF [illegible] COUNSEL

Wishing you
all the joys
of the season.

Fracking
is a bad idea!
Randy Osborne

SX20907/1/14
948VVMC624J

JAN 3 2014
Dept. of Natural Resour
OFFICE OF LEGAL COUNS

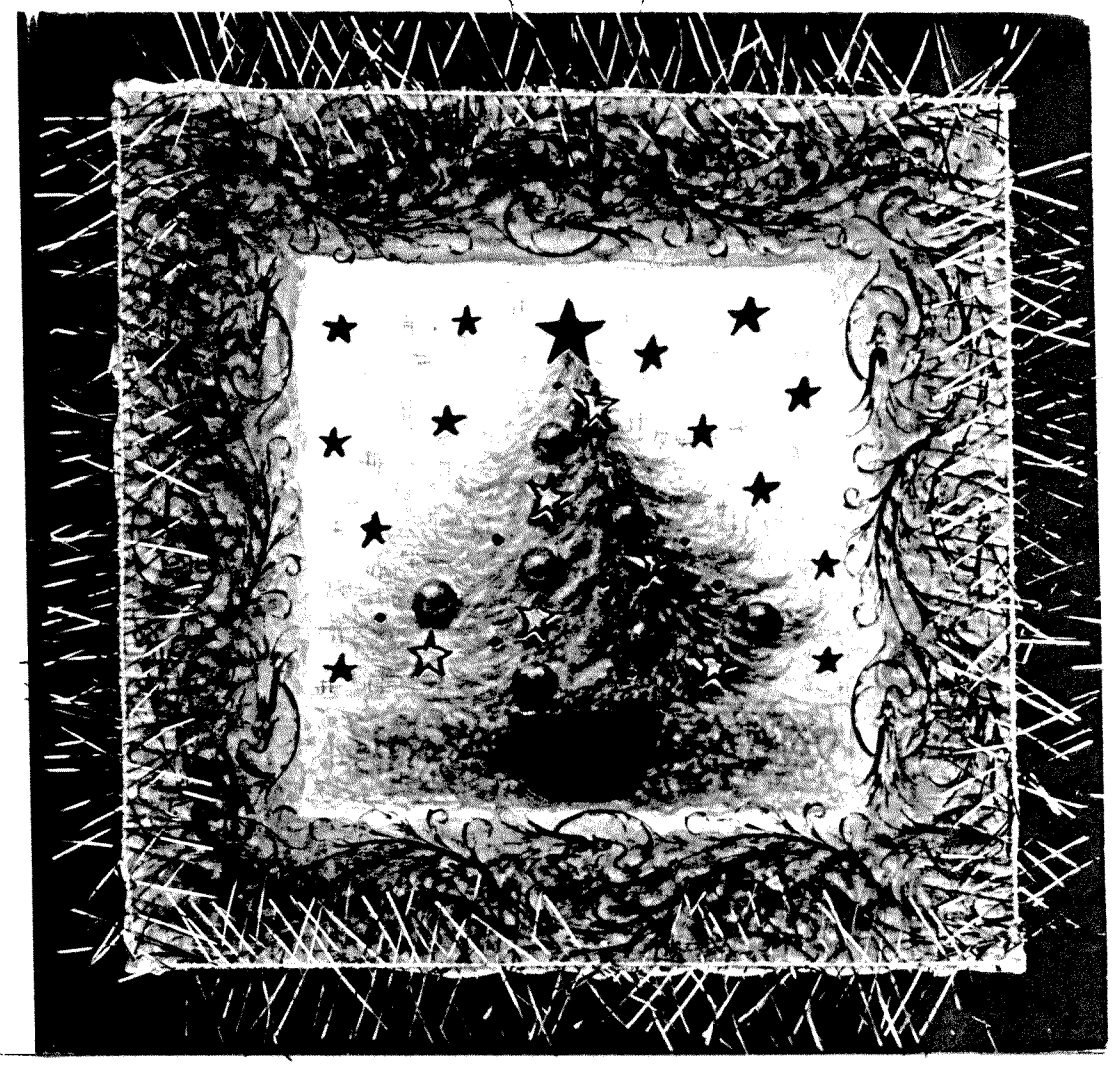
Merry Christmas
and a
Happy New Year

No fracking — NO WAY
NO How!

Paula Englan

Warning: CHOKING HAZARD - small parts.
Not for children under 3 years

SX209070/11
948WMC626J



021811

Dear IDNR,

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021912

May all your Christmas dreams come true.

Help make my dream come true:

BAN FRACKING

The regulations cannot be written strong enough to protect us & our environment.

M. J. Smerken, Ph.D.
Murphysboro, IL

Gem Store

The Macneil Studio © 2012
Designed in U.S.A.

4CMS0042-DGC

021813

15

Merry Christmas -

Please keep

Southern Illinois water

clean with No Fracking!

Thanks! Pat York

Wishing you
all the joys
of the season.

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021814

SX209071/14
948VVMC624j

021915

Stop Fracking
It destroys our
environment - Water
etc etc

earthquakes
Stimulated

Just Don't
Frack !

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621816

Have a wonderful Christmas
and a Happy New Year

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021917

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621813

Sending warmest Christmas greetings
from our family to yours

IT'LL GET A
LOT WARMER
IF FRACKING
HAPPENS.

BAN FRACKING NOW!
KAREN

WX3071187/2 Pinecone Design Ltd, Toronto, Ontario, Canada L4A 1C3 PC13-439-R dg

021819

Please
DON'T RUIN + Poison
Southern Illinois
with Fracking!

Jill Stevens
M'boro

62820

Sending warmest Christmas greetings
from our family to yours

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021821

PINE CONE DESIGN LIMITED

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Please leave our
beautiful Southern
Illinois environment

621822

Sending warmest Christmas greetings
from our family to yours

Glenn,

love, Kathy

021823

PINE CONE DESIGN LIMITED

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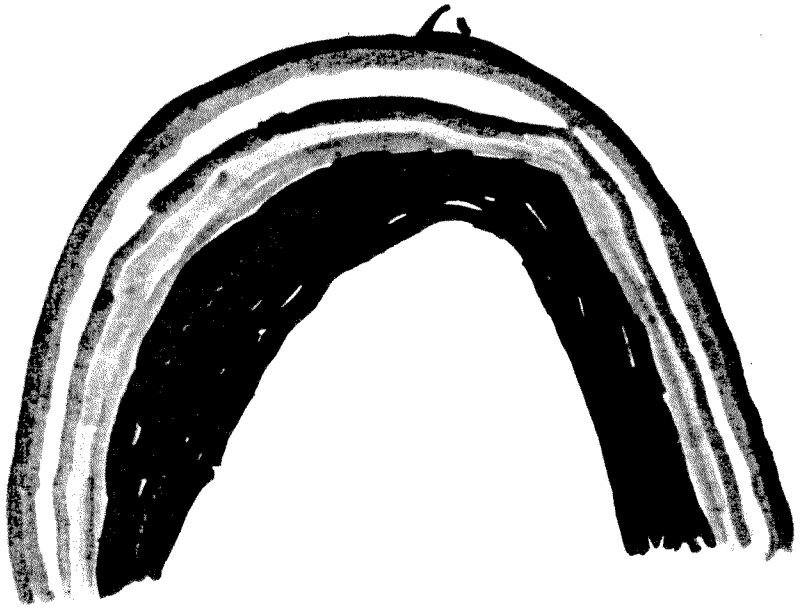

AT HR
SAMMY

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121824

Wishing you
all the joys
of the season.

Kids against Fracking,
let us see the rainbows
and drink from the
streams signed.

SX209071/14
948VMC624J

421925

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621826

Sending warmest Christmas greetings

from our family to yours

Merry X-mas!
Please Stop Fracking. It's Not worth it!!!
Sharon

WX3071872

Pinecone Design Ltd, Toronto, Ontario, Canada L4A 1C3

PC13-439-R dg

021827

Melanie & Ethan

There are many responses in the current legislation.

of the season.

all the joys

Wishing you

Dept. of Natural Resources
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621828

SX209071/14
948VVMC624J

021929

The profit of drilling the wells and poisoning clean water will not out last the destruction. That will last past our grandchildrens great granchildrens life time. Do you want that on your conscience?

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In the quiet moments of a winter's day,
may you reflect on the grace and beauty
of Christmas.

Merry Christmas
Happy New Year

and the grace and beauty of Southern Illinois

62183

LR-06
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The Image Bank
Bullaty-Lome

PAPER MAGIC GROUP CHRISTMAS™

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621931

621832

SX209071/14
948WMC624J

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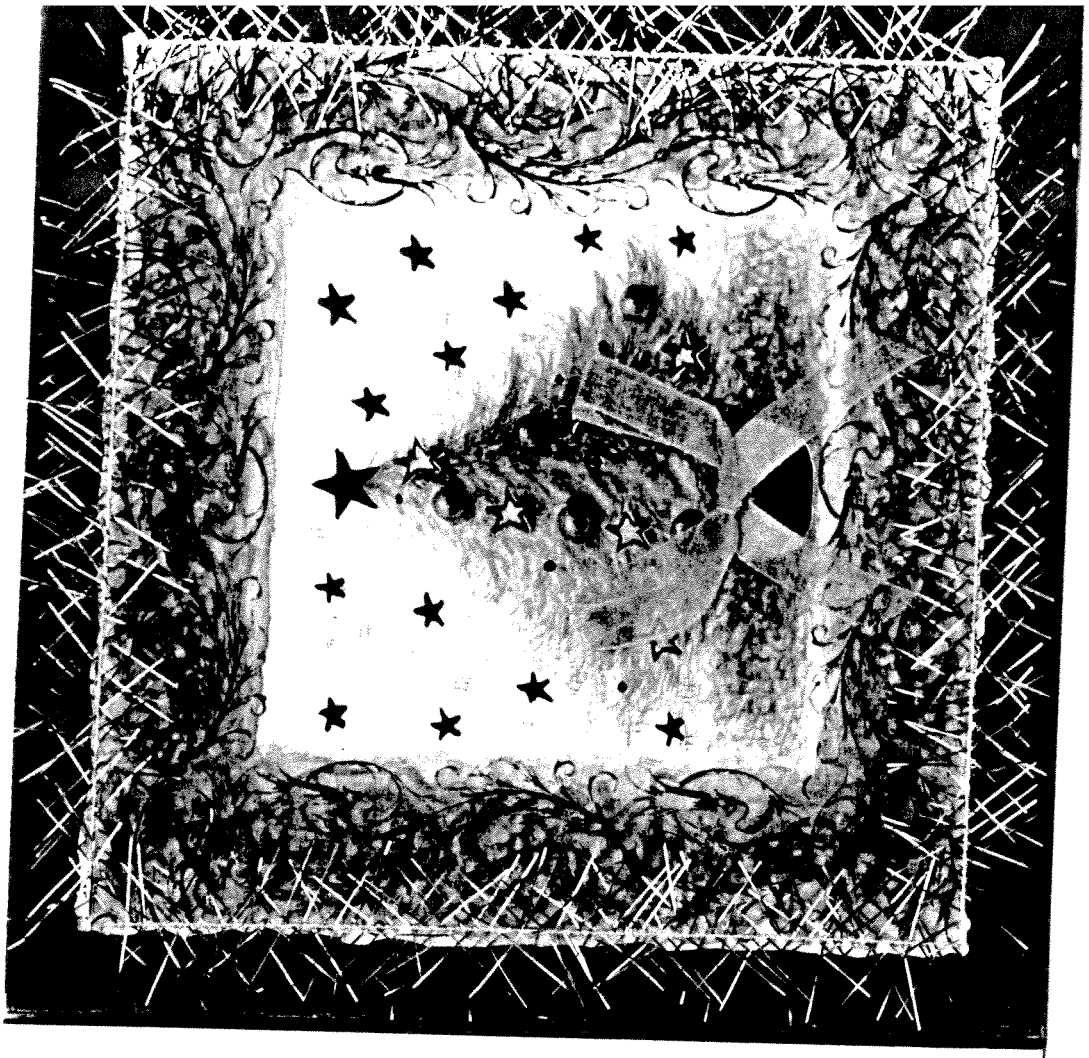
Merry Christmas
and a
Happy New Year

I'm from Texas and have seen what fracking has done to my home Town -

Lynn Wolff

021834



SX20907U11
948VVMC626J

021935

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621836

... thank you.

Dear IDNR + Gov. Quinn:

Please do not allow fracking to happen in Illinois. We want to keep our water & soil clean.

Thank You!

The Swain Family

Carbondale, Illinois

Lisa & Mike Husar/TeamHusar.com

NATIONAL WILDLIFE® FEDERATION

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Reston, VA 20190-5362
1-800-822-9919
www.nwf.org

021837

Did you know that the hair in a polar bear's fur is actually hollow? This keeps them warmer and makes them more buoyant when hunting in the freezing waters of the Arctic. Right now, polar bears need all the help they can get. Climate change is causing the ice they hunt from to melt earlier and earlier each year, so bears are desperately struggling to find enough food. And now scientists are predicting two thirds of the world's polar bears – including all of Alaska's – will disappear by 2050 unless we act right away! You can help change the forecast for polar bears by symbolically adopting one today! Just **visit www.nwf.org/adoption.**

33197CD5

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I urge you to reconsider a moratorium on horizontal fracturing because there is no way in our rural area to enforce the "rules." Fracking here would exacerbate earthquakes and destroy our water supply. Well.

21938

Wish you a
Merry Christmas
and a Happy New Year!

This is my wish for the new year.

Love and Light,
Dr. Candace A. Davis

GemStone

021939

0

Design by Jenny Snape
Courtesy of Advocate Art
Designed in U.S.A.

4CA0136A

Merry Christmas

I have one queston for the Oil Industry.
Why poisen your own water?
Its like puting poisen in your glass of water then drinking it. I heard that the oil indistry has to drill 1500 feet from a natrul area But now that they do horisontel drilling, dose that meen they can drill under a natrw area?
from: Iris age 10.

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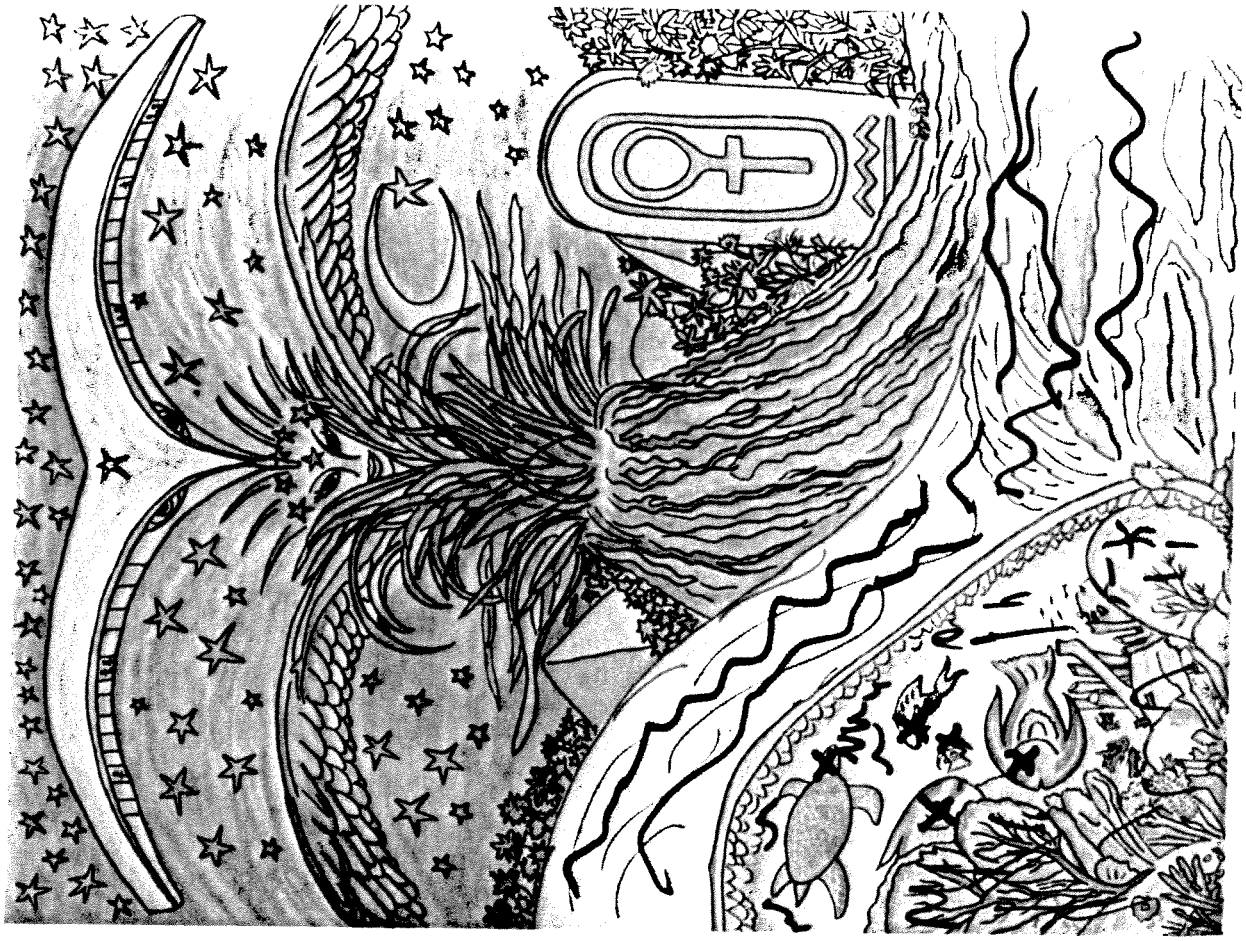

"Kali"©

Sometimes to create our reality we need to destroy what is no longer in our best interest. Here,as Kali, I destroy my world to create it again, watched over always by the creator, seen here in the corridor of the spaceship.

021941

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Card Design by MOED Firm

7 21762 29916 6

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Dept. of Natural Resources
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Dear
I.D.N.R. AND Gov. Quinn,

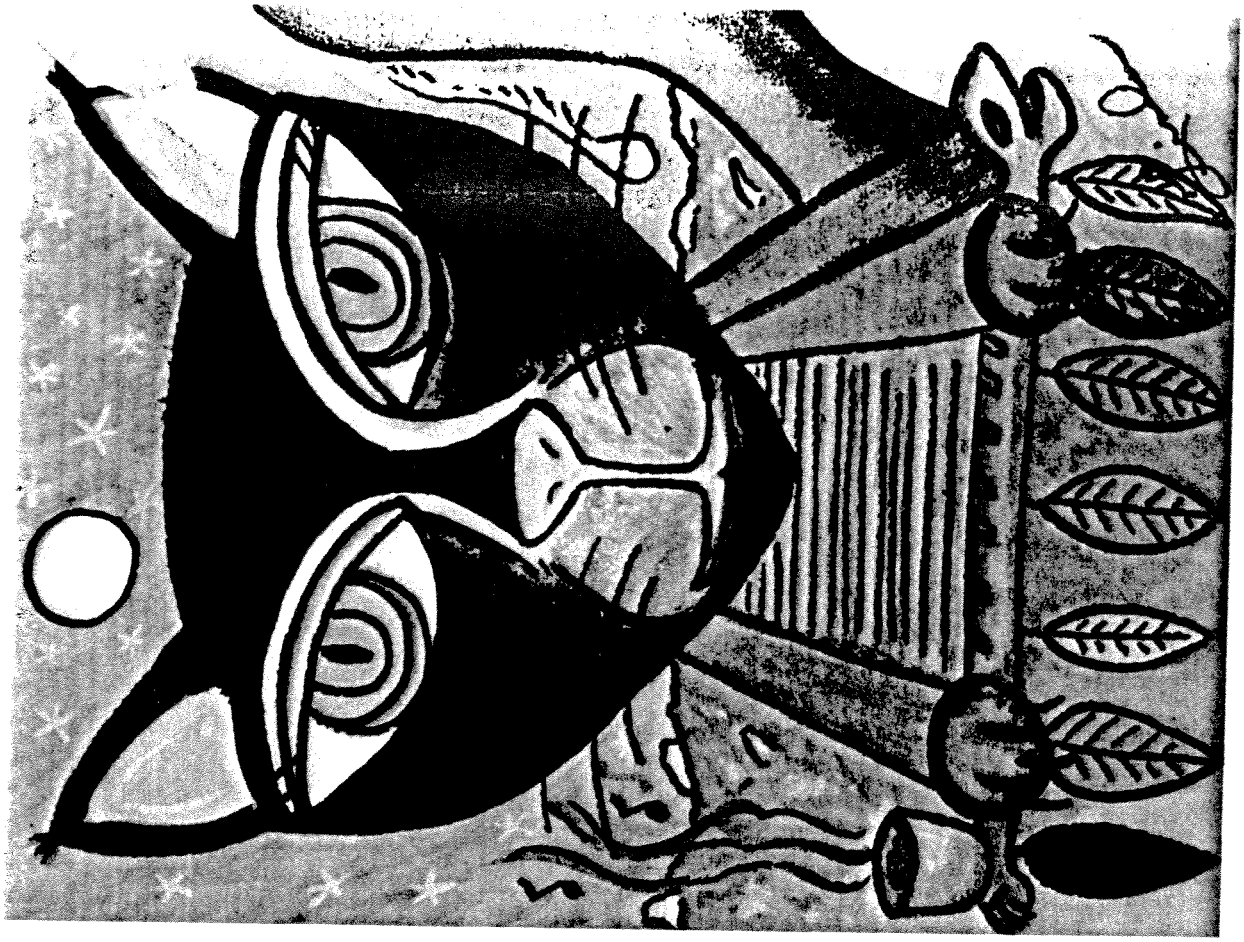
Fracking will never be safe. This has been proven in all other states where it has occurred.

Please do not let Illinois be destroyed. We meed a Moratorium - NOW!

Illinois meeds to keep it's water and ain clean. What few (over time) jobs will be temporary and the Loss of jobs dependant on tourism will be a devastating Loss

Sincerly
Corina Lang
105 HAWK Lane
Cobden, IL 62920

021842



"Jaguar Pyramid" ©

On a moonlight night on the Caribbean shore in Tulum, Mexico, a healing began. The mayan shaman began his healing and we shape-shifted into the jaguar. Powerful and whole the image of the jaguar pyramid was given to me at that precise moment. The spirituality of that night remains embedded in my soul, and when I look into the eyes of the jaguar, the strength of spirit stirs in me.

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621843

7 21762 29916 6

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021844

Fracking is illegal.

stopped

© Expressions Greetings

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www.nwf.org

Join the conversation about wildlife conservation! You can sign up to receive the latest wildlife news at **www.nwf.org/enewsletter**. Please also "like" us on Facebook at **facebook.com/nationalwildlife** and follow us on Google+ at **plus.google.com/+NationalWildlife**

021875

A3534

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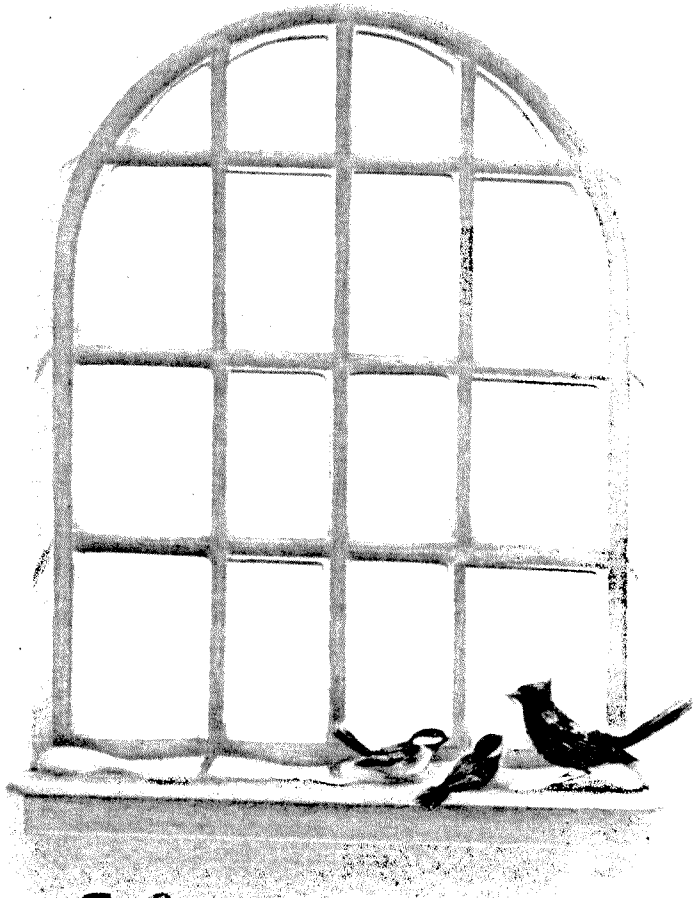

Merry Christmas

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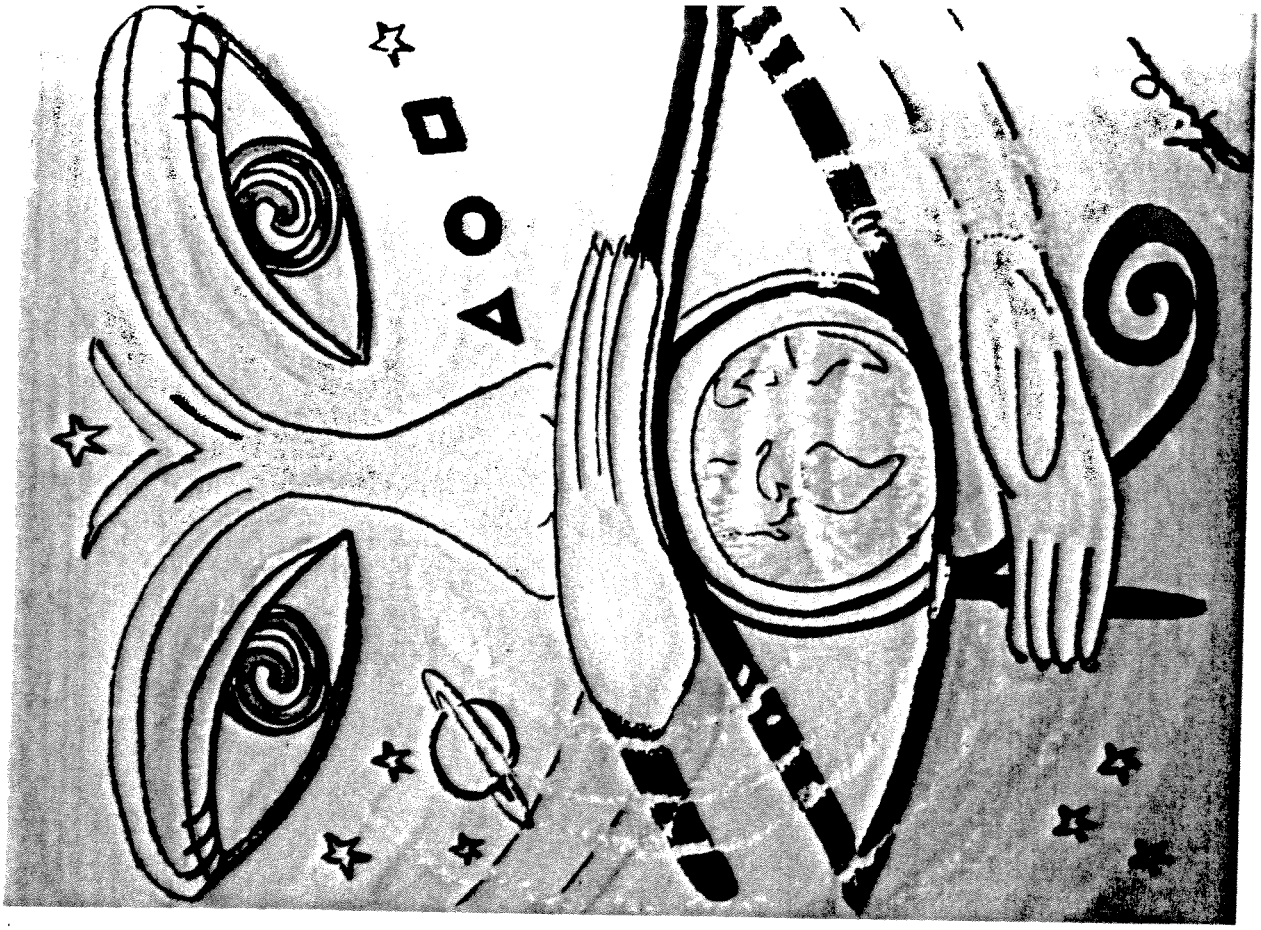
No matter how strict the regulations on fracking are they will never stop human error. In the case of drinking water/soil/& air we cannot afford catastrophic error!

021846



"Hold You in My Hands"©

Our beautiful world is always protected and
watched over by the creator.

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F21847

7 21762 29916 6

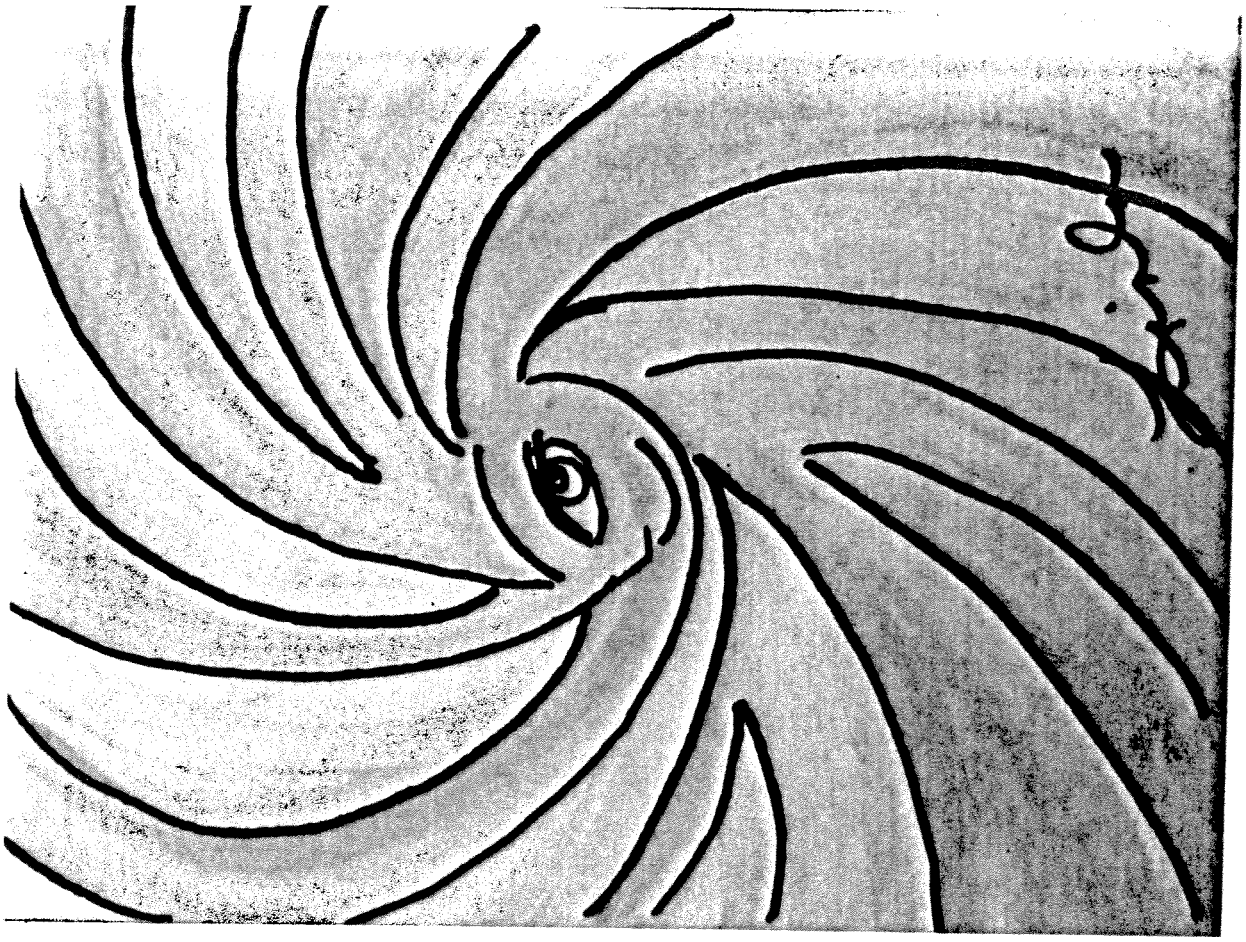
Dept. of Natural Resources
OFFICE OF LEGAL COUNSEL

All my wishes a seasonal greetings - thinking of the job you have ahead of you - an impossible job (if you ask me) of regulating something that should not even be happening. I wish for no earthquakes and for clean water.

Please help.!

A Southern FL citizen

021848



"Muse" ©

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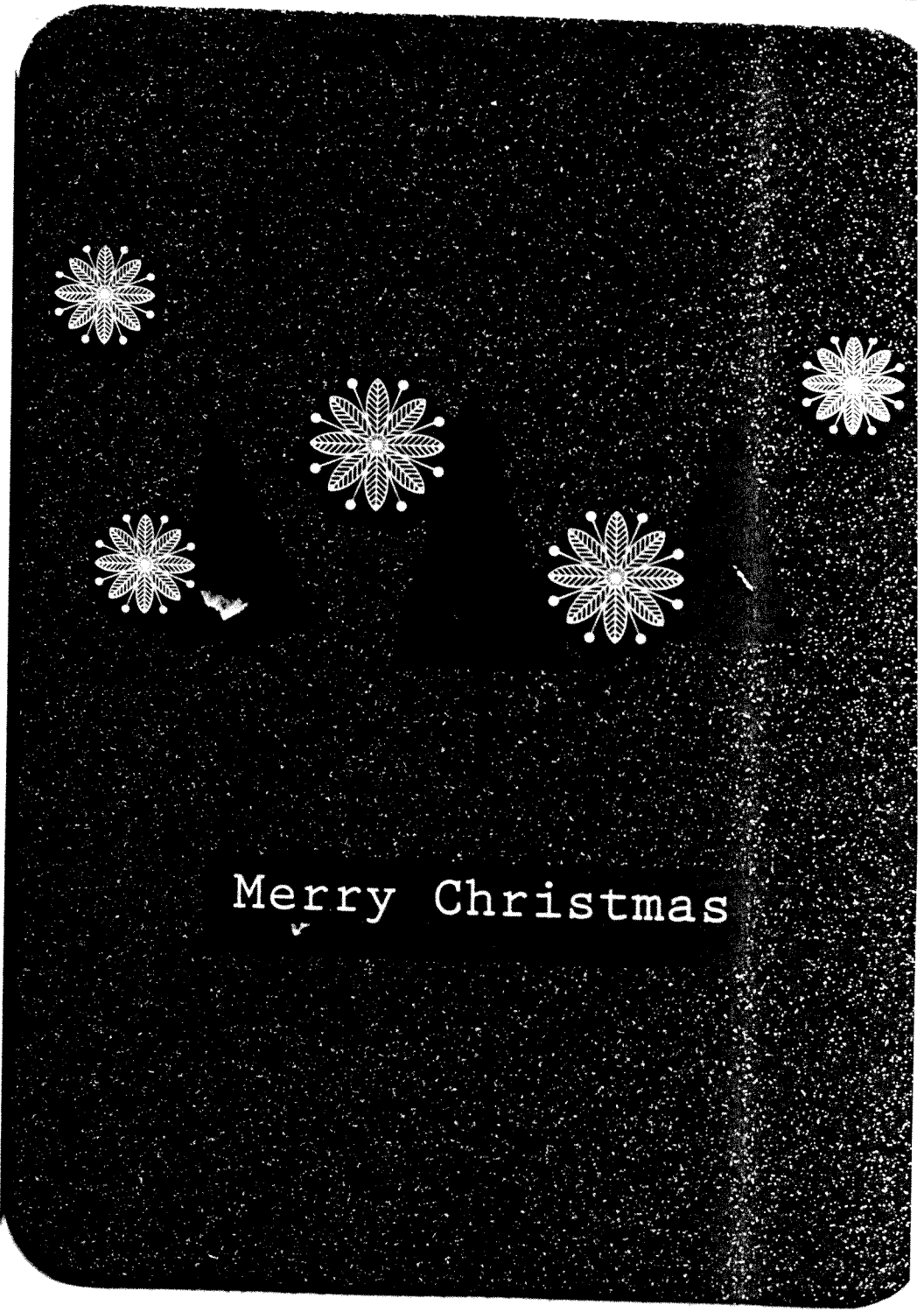
021850

I love the Shawnee forest I hope you keep it ~~...hope it's~~ wonderful in every way!



021851

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Pinecone Design Ltd, Toronto, Ontario, Canada L4A 1C3

PC 12-140 dg

IDNR:

Here's hoping 2014 brings new insights — fracking is NOT worth the cost.

Sarah Heyer C'dale

021852

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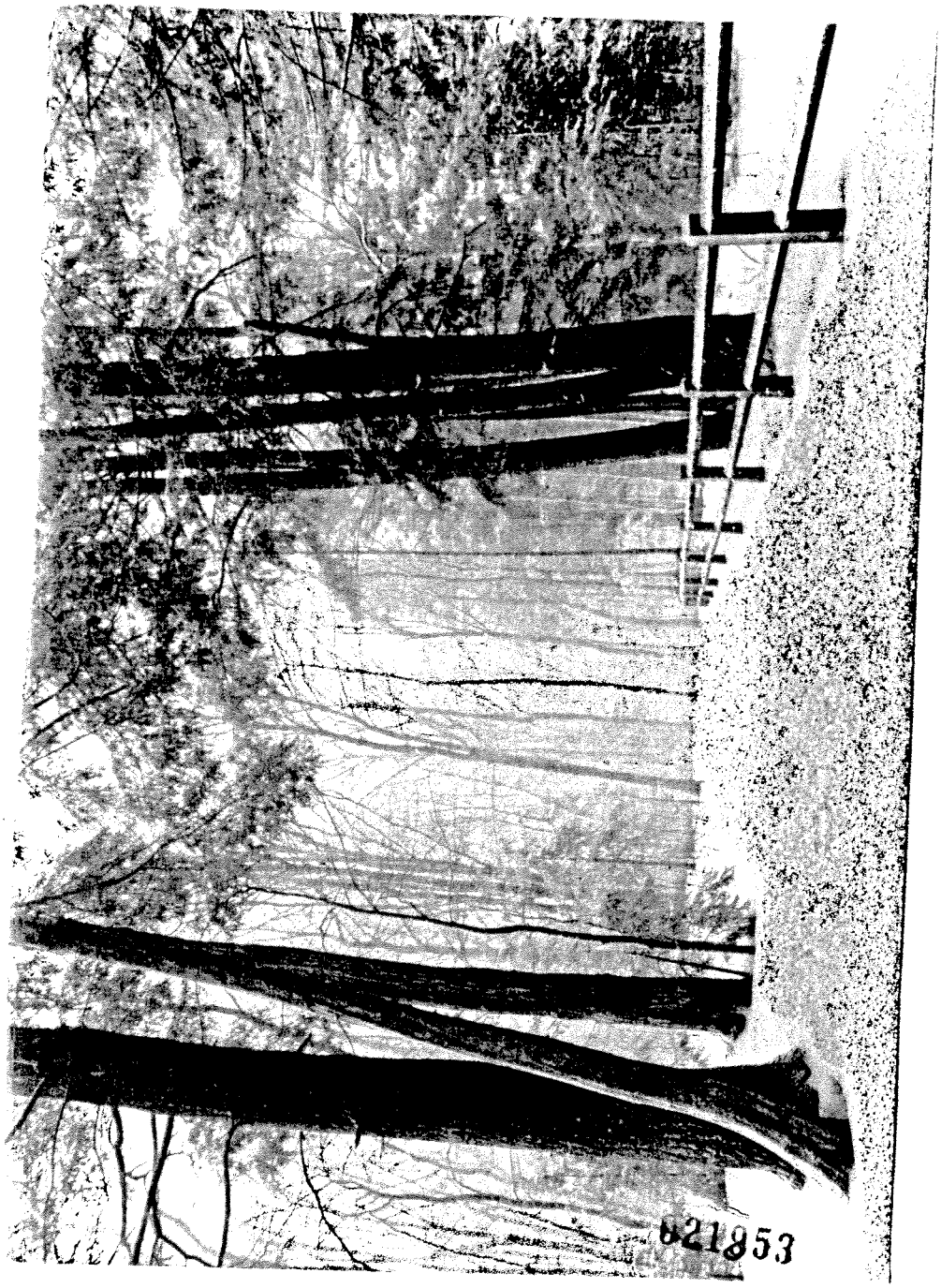
621853

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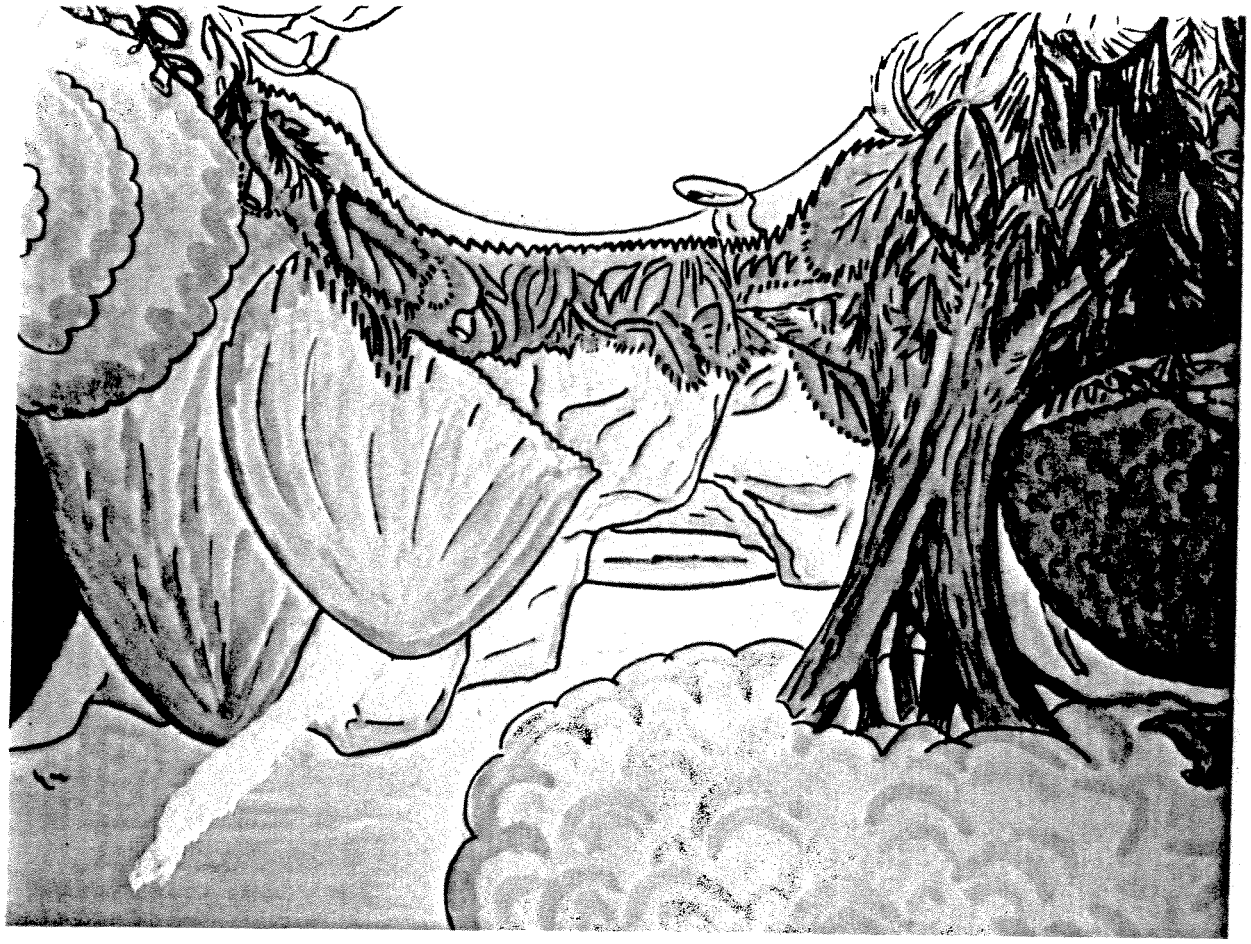
IDNR & JCAR:

[2185]

This greeting card reminds me of my wooded 60 acres in the hills of the Shawnee National Forest near a state park. It's tranquil with some of the State's best water near Lusk Creek, a home to wildlife, an excellent place for hiking and fishing. The EPA has already reported "dead streams" near our existing coal and oil industry in Southern Illinois. Your Rules are opening our water resources, our forests, our agricultural land to the hydraulic fracturing industry's toxic chemical, radioactive, and other waste that will destroy these resources. Southern Illinois should not be treated like a Third World Country, extracting our resources dry, poisoning our people and wildlife. Ban fracking; don't approve the Rules or even waste time rewriting them. You already have enough coal for Christmas from us. Sabrina Hardenbergh, Carbondale, IL



"Magical Other World" ©

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Dear IDNR,

Our natural resources are meant to be managed in the public interest. Any chance of polluting our ground water, soil, & air is not in the interest of the public. Please don't let them back in Illinois.

Sincerely,
The Kint Family
Makanda, IL

021856

"Griffon" ©

The mythological spiritual beast of fire,
transforms the spirit as it devours that
which no longer serves, purifying the spirit.

021857

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please Do not Frack Illinois.

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And let it begin with you and me.
Thank you for your friendship,
your business and
the opportunity to serve you.

021353

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021953

Design by DWMAC Graphics · H170

Dear IDNR,

Merry Christmas
and Happy New Year!

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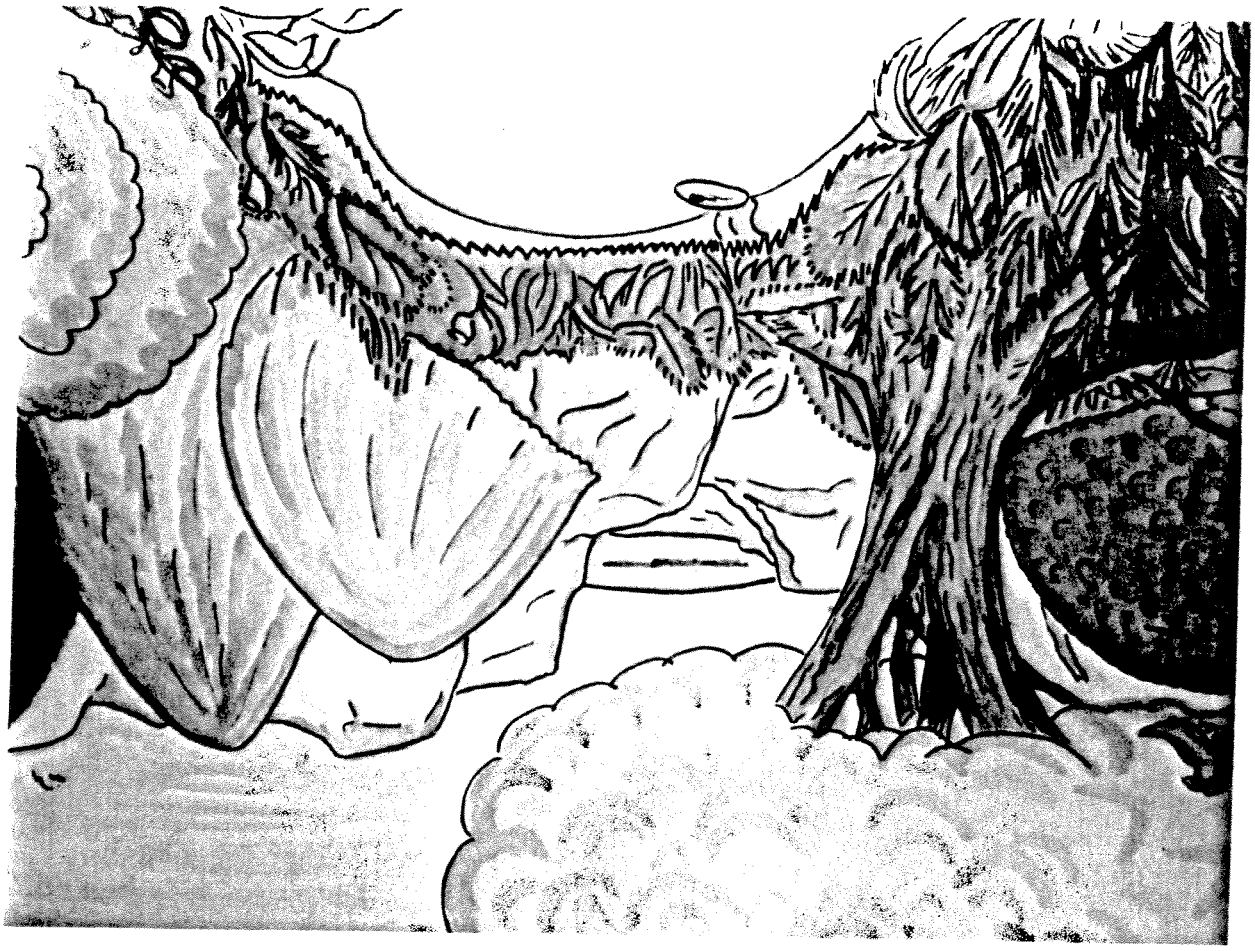
BAN FRACKING!
Keep our land
SAFE!

Love, a friend

021860



"Magical Other World" ©

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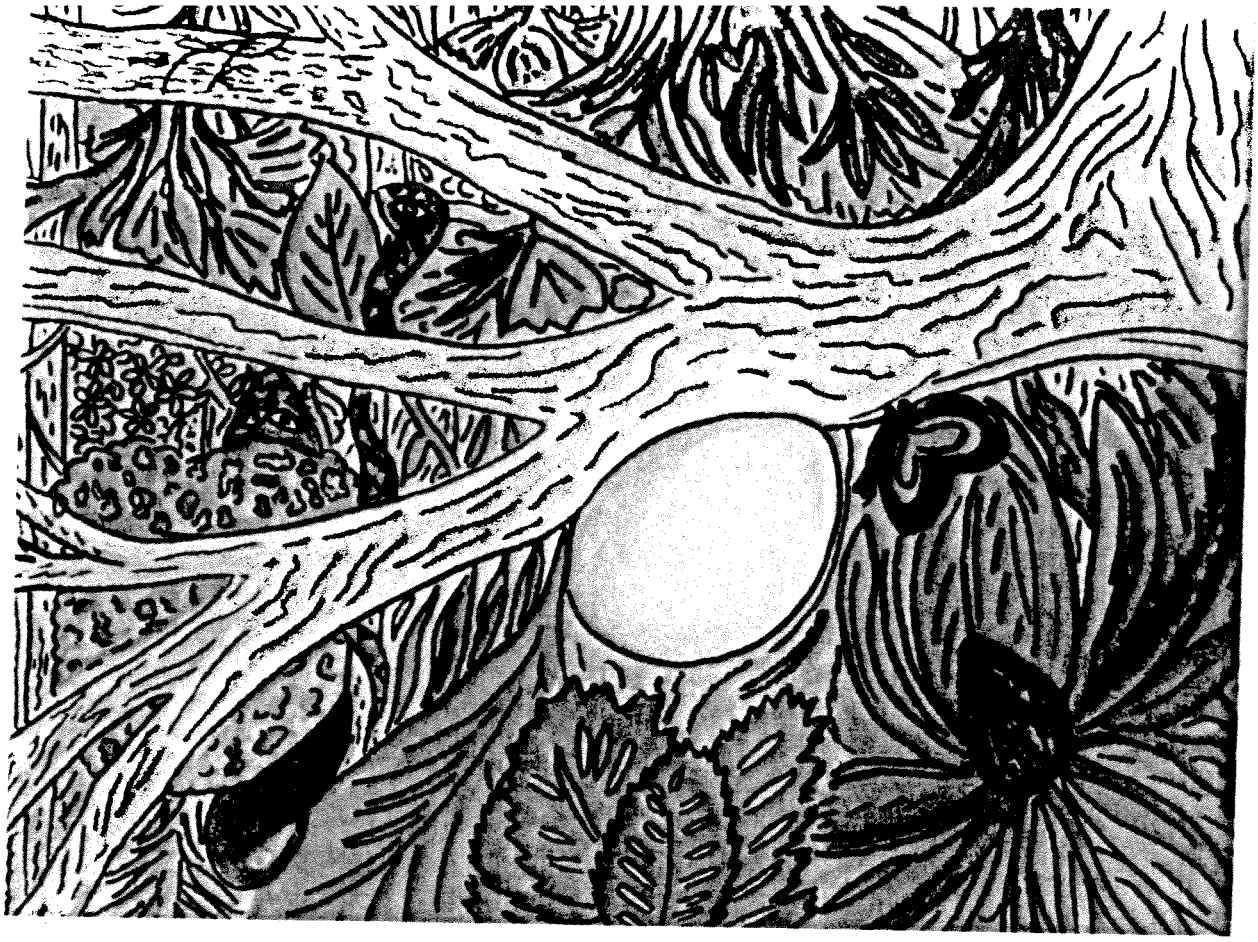
What the Frack are you doing to my water

Don't Frack!

please!

Christie Baer 510 N. Micheals
Carbondale IL.

621962



"The Big Blue Egg"©

Blue Orb/Egg sits on the tree branch,
transforming in the presence of the jungle
- mother of transformation of spirit.

021963

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Dear IDNR,

Do NOT FRACK southern Illinois. Please protect this precious area & the families that live here.

Wishing you a little holiday magic!

Sincerely,
Sandy Stevens
Carbondale, IL

62918

Polar bear rolling in the snow
© Daniel J. Cox/NaturalExposures.com

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worldwildlife.org

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021965

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Wishing you the warmth and wonder
of a joyful holiday season

Please keep Southern Illinois beautiful + give us a moratorium on fracking

Jill Adams
Makanda, IL

99121

Two Chickadees
© Stephanie Mirocha/Northern Promotions, Inc.

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worldwildlife.org

70

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The creature on the front is impossible - just like it's impossible to make fracking safe!

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Dear IDNR:

You've been given an impossible task - making fracking safe. There is no way to make it safe with any current technology. So please, grant no permits, and if you must make rules, make them much stricter! Listen to our comments and keep our water and land safe!

Happy Holidays,

Treesong

021868

"Griffon" ©

The mythological spiritual beast of fire,
transforms the spirit as it devours that
which no longer serves, purifying the spirit.

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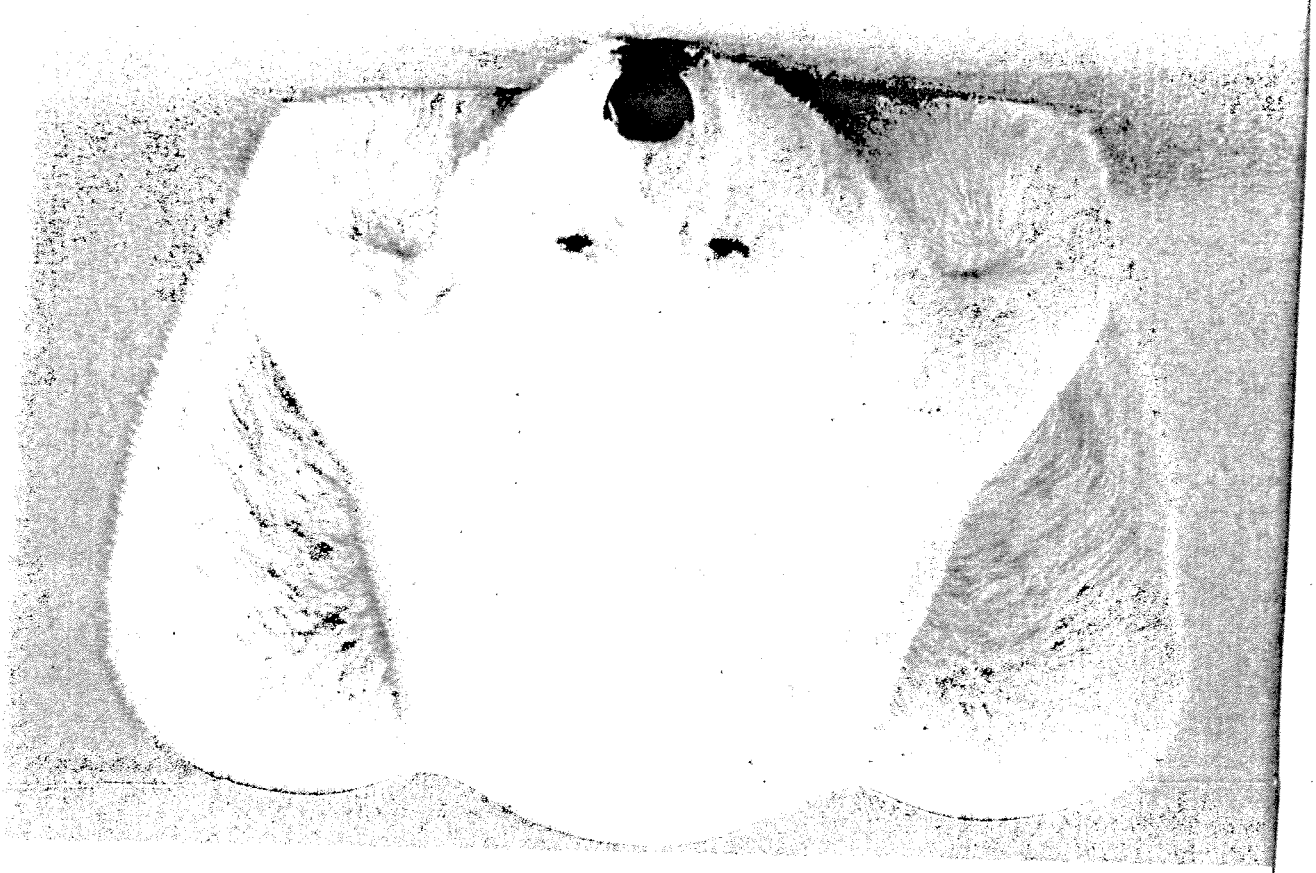
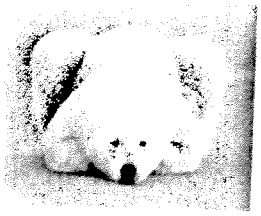
Dear IDNR

Please save our water!
Fracking is not safe. My father is
a chemical engineer and an international
water expert - and a lifelong conservative.
He is horrified by fracking! So am I.

Mary Sullivan

021870





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Bearing best wishes for a
Merry Christmas and a Happy New Year

Let's not take a 021872
chance w/ our water
supply. Stephen Smith
Organic Farmer

Lisa & Mike Husar
TeamHusar.com

NATIONAL WILDLIFE FEDERATION

11100 Wildlife Center Drive
Reston, VA 20190-5362
1-800-822-9919
www.nwf.org

021873

Until recently, polar bears have been one of nature's hardiest survivors. But as a result of the impacts of our changing climate, scientists predict that two-thirds of the world's polar bears, including all of Alaska's, could disappear within the next 40 years. Through NWF's Adoption Center, you can help protect at-risk wildlife by symbolically adopting a polar bear or other species of your choice. Visit **www.nwf.org/adoption** to find out more.

A3552

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May the gentle beauty of nature
brighten your holidays and be
unmarred by
fracking

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021874

Original Art by Bradley Jackson

NATIONAL WILDLIFE FEDERATION

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1-800-822-9919
www.nwf.org

Although it is often associated with the winter season, the cardinal's song can be heard year-round. This is unlike many other songbirds, which generally only "sing" in the spring. Recently, warmer temperatures have caused the cardinal to extend its range northward and into southern Canada. Many other songbirds are also altering their migration patterns due to global warming. To find out more, visit **www.nwf.org/birdsandglobalwarming** or call 1-800-822-9919.

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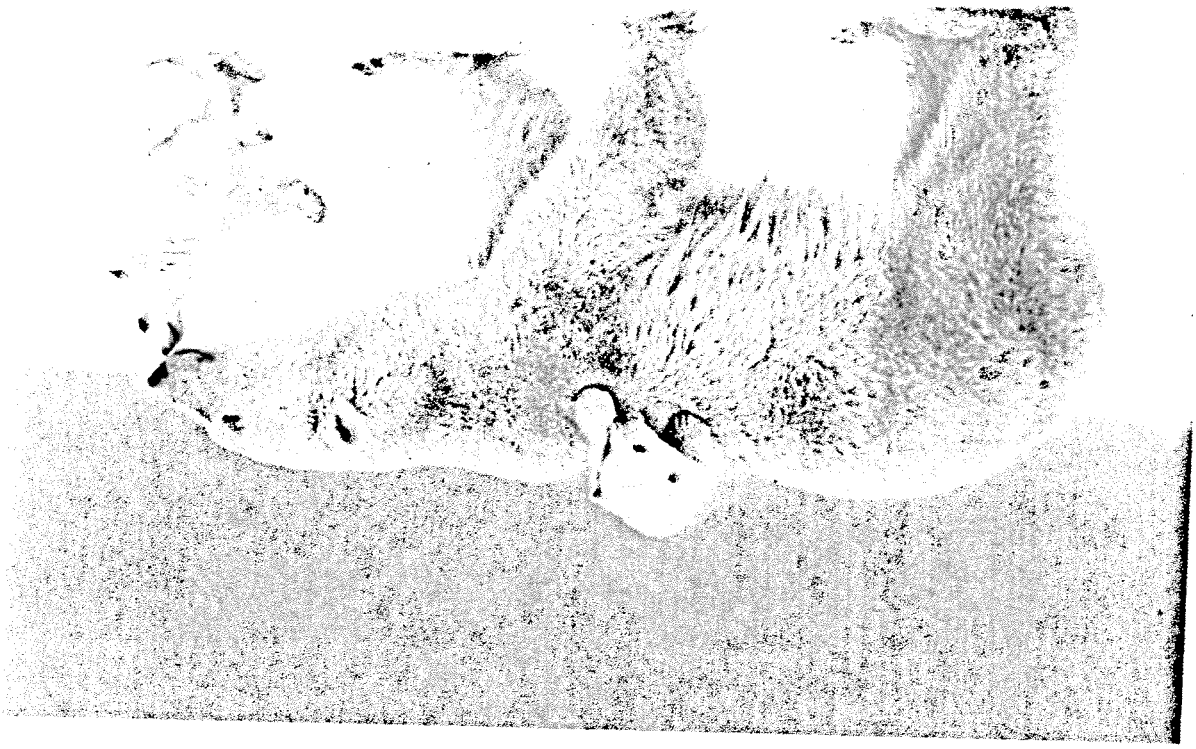
Please reconsider position on fracking. The only safe fracking is NO FRACKING

May all the peace and joy of this holiday season remain with you always.

Thank you,

Laurel Toussaint
10 Pinewood
Carbondale IL 62901

021876



Lisa & Mike Husar/TeamHusar.com

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Reston, VA 20190-5362
1-800-822-9919
www.nwf.org

Until recently, polar bears have been one of nature's hardiest survivors. But because of global warming, scientists predict two-thirds of their global population could disappear within the next fifty years. You can make a difference for wildlife in the fight against global warming. Visit **www.nwf.org/globalwarming** and make your voice heard today.

621977

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Please Keep our
water + health safe.
No Fracking!

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Merry Christmas
and a
Happy New Year

From
Citizens
Heidi, Doug,
Tao + Bacchus
Coons

SX2090701
948VVMC626J

021979

Don't let the frackers drain our streams dry!

If you are looking for oil, use a geiger counter! What?! You don't have rules on radioactivity?!

Barbara McKasson

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May all the joys
of the season be yours

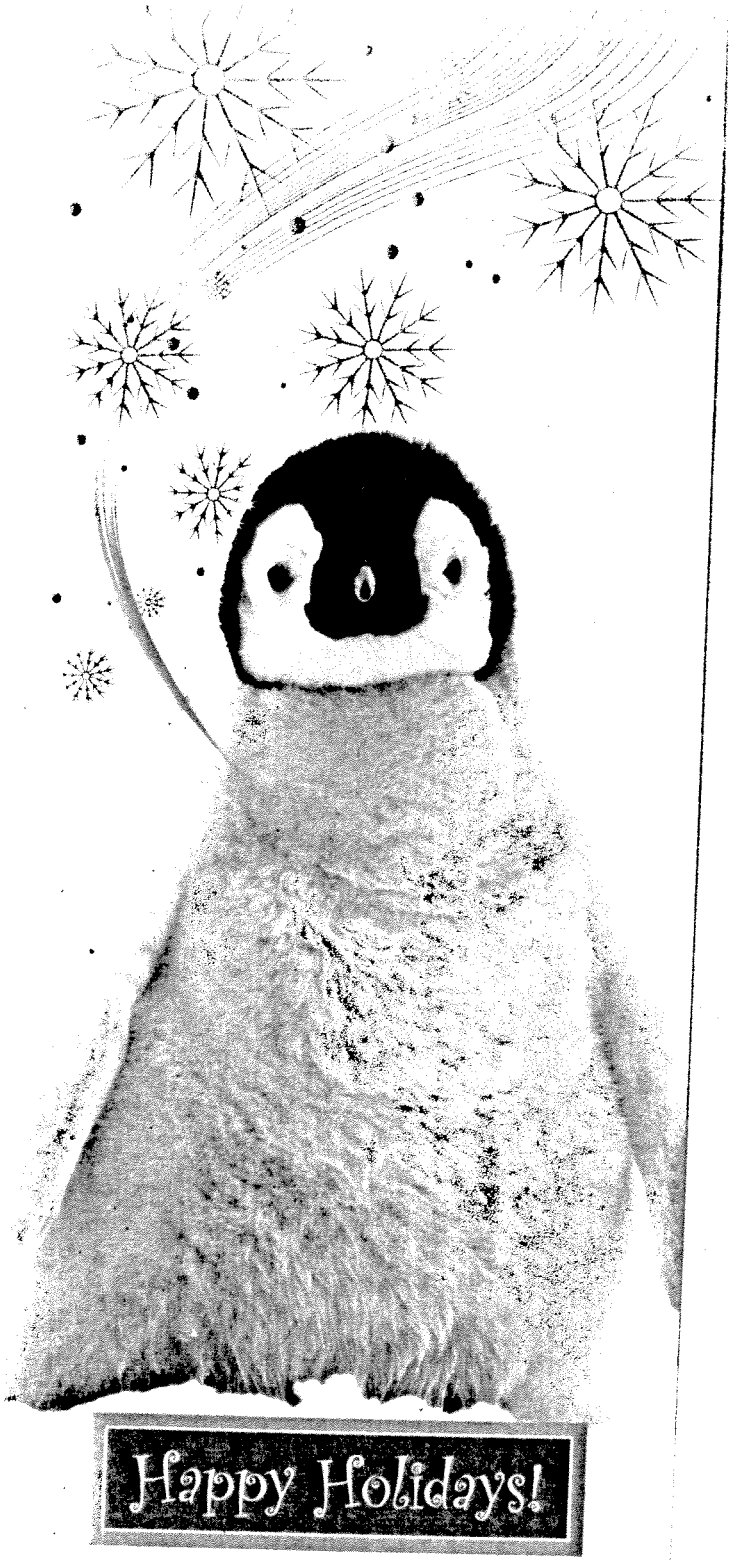
02185

Emperor penguin chick
© Biosphoto/SuperStock

worldwildlife.org

021981

WFE7513



Let it Snow –
pure, clean
snow...
not oil-laced
dirty
snow!
No Fracking
in
Southern...
IL

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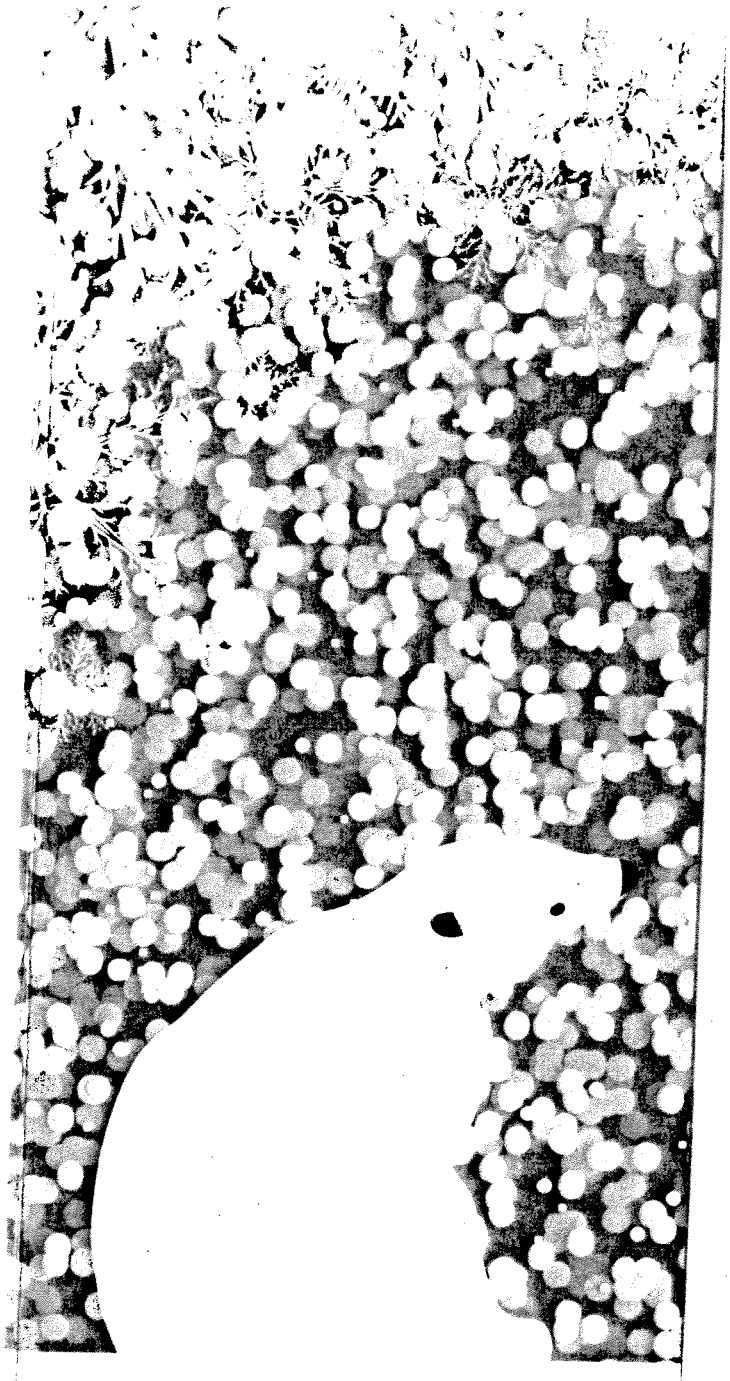
0218

Polar bear in snow
Snow background © Pilarts/Dreamstime.com

WWF worldwildlife.org



Let it snow!

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Wishing you
all the joys
of the season.

Our environment must be
Protected! So we can
have more joyous seasons!

Shari Sweeney

SX209071/14
948WVMC624J

021985

Concrete crumbles

steel rusts

IDNR regulations Radioactivity doesn't keep it from hurting people

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DURING THIS SEASON OF

peace

MAY YOUR HOME
BE FILLED WITH

joy

please do your jobs!

E Markel

021986

Red-crowned cranes
© DLILLC/Corbis

WWF

worldwildlife.org

WFE7511

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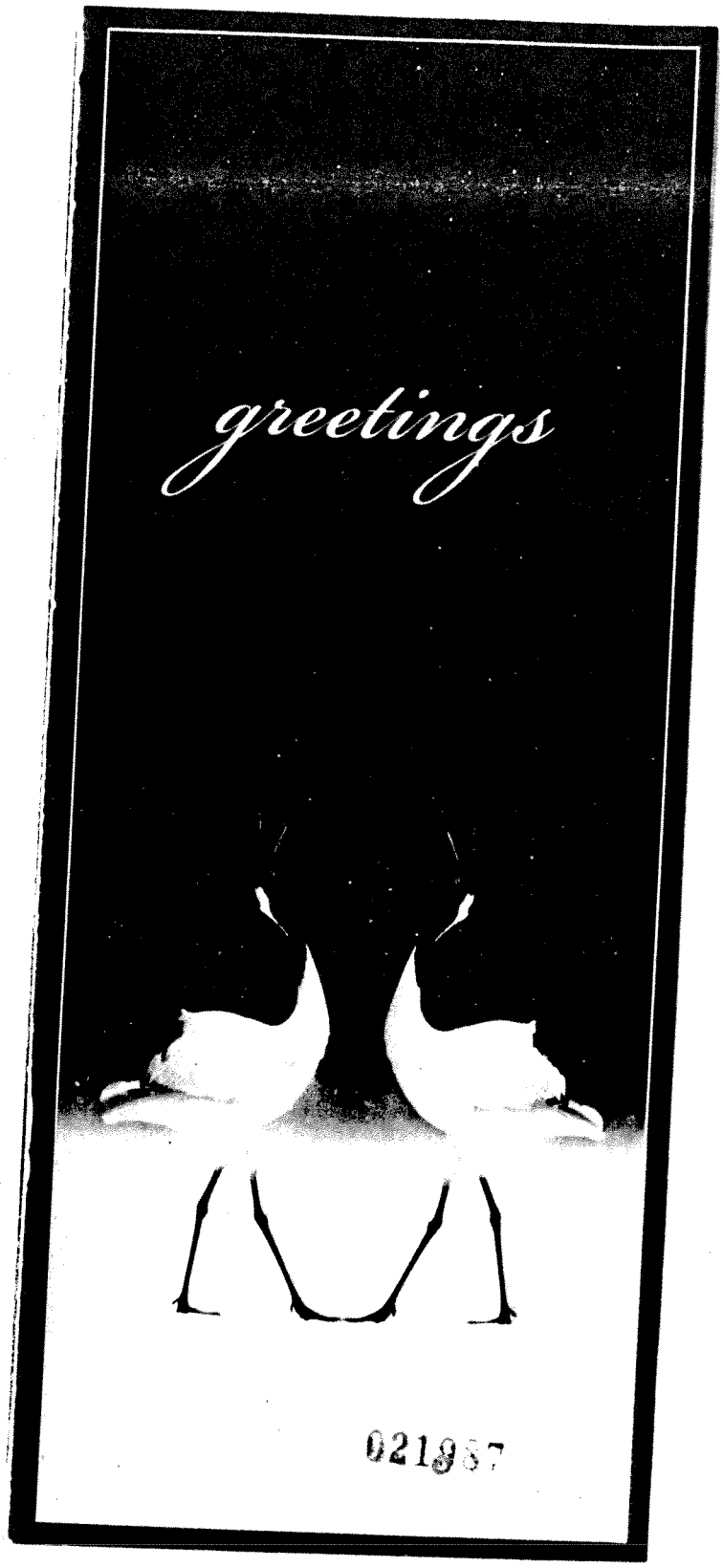

021987

Fracking Related Induced Seismicity,
Submitted by Frack Free Illinois,
www.facebook.com/FrackFreeIllinois
drlora2@yahoo.com
773-486-7660

To make your comment to the IDNR online:
Go to: http://www.dnr.illinois.gov/OilandGas/Pages/OnlineCommentSubmittalForm.aspx
Seismicity (240.796), In the "Section" dropdown box, click 240.796 Seismicity

COMMENT 1: The Rules contain language about earthquakes and, on a broader level, they also assume that fracking indeed causes earthquakes. The rules describe a whole series of fracking created earthquake levels of intensity.

Per recent correspondence with **Dr. Michael Hamburger, Professor of Geophysics at Indiana Univ.,** (a research seismologist studying earthquakes in the central United States. His research has included studies of the fundamental causes of earthquakes in the U.S. Midcontinent (Hamburger et al., 2002; Galgana and Hamburger, 2007; Hamburger, 2011), monitoring of low□ level seismicity in the area (Pavlis et al., 2001; Eagar et al., 2006), and detailed studies of individual earthquakes in the Wabash Valley region, including the 1987 Lawrence□ville, Illinois earthquake (Hamburger and Rupp, 1988; Taylor et al., 1989), the 2002 Caborn, Indiana earthquake (Hamburger et al., 2002) and the 2008 Mt. Carmel, Illinois earthquake (Hamburger et al. 2011). He has also studied artificially induced seismicity associated with reservoir impoundment (Simpson et al, 1981) and with oil and gas exploitation in southern Illinois (Eagar et al., 2006). He is currently involved in a major collaborative NSF□funded "EarthScope" research project, focusing on earth structure and earthquake generation in a broad region extending from southeastern Missouri to central Kentucky (Hamburger et al., 2012). The project, led by Indiana University, is being conducted in collaboration with Purdue University, the University of Illinois – Urbana□Champaign, and the Illinois, Indiana, and Kentucky state geological surveys, The project included operation of 70 temporary seismograph stations in southern Illinois and neighboring states, and analysis of that data is in progress. He has also worked on applied earthquake hazard studies and is a member of the U.S. Geological Survey's advisory committee on the National Seismic Hazard Mapping Program (Anderson et al., 2013), (for all questions to Dr. Hamburger please contact him at hamburg@indiana.edu);

"The evidence for triggered seismicity in response to injection of waste fluids is becoming incontrovertible (see review in Science by Ellsworth, 2013) and represents a growing concern for those involved in earthquake hazard estimation and mitigation. The areas of southern Illinois and neighboring states that are likely to be the focus for enhanced gas recovery are also sites of known seismic activity associated with the Wabash Valley and New Madrid seismic zones. The southern Illinois area carries the potential not only for the type of moderate□sized earthquakes (M 4 – 5.5) in the historic record, but potentially for New Madrid□size (M >7) earthquakes that are now clearly documented in the paleoseismic record (Obermeier et al., 1991; Munson et al., 1997)."

Why would the state allow any business activity that includes the real possibility of it creating earthquakes when done in an otherwise proper manner – especially in a geography known for major earthquakes?

COMMENT 2: The rules are silent regarding broader concerns regarding how fracking created earthquakes will affect existing earthquake prone communities. There is no mention of scientific review or study of the effect of fracking earthquakes within the Wabash Valley and New Madrid Seismic Zones. The Illinois Emergency Management Agency identifies southern IL with its most severe earthquake zone ratings of "Destructive "and "Ruinous".

021888

Has complete data been gathered on pre-existing faults in southern and southeast IL? Has this data been used in a hazard and risk analysis of the probability of induced earthquakes BEFORE fracking and well injection operations are initiated? As suggested on (p. 175) ("Steps Toward a "Best Practices Protocol") from the National Academy of Sciences report, ***Induced Seismicity Potential in Energy Technologies****(2013)*.

COMMENT 3: The IDNR is required by law to set up a "traffic light" control system to monitor seismicity and to require well operators to scale back or suspend injections when they raise a "concern for public health and safety." The Rules define various intensities of fracking caused earthquakes by a color code system. Enforcement doesn't begin until "yellow light alert", (a magnitude of at least 3.0 but less than 5.0). This color coding system does not appear to be used by the federal USGS, the federal agency responsible for monitoring earthquakes.

A Class II injection disposal well can be responsible for creating up to 4 earthquakes up to a level of 4.9 magnitude WITHOUT a mandatory shut-down order by the state. A 4.9 earthquake is a serious and newsworthy event – (USGS description: "Sensation like a heavy truck striking building. Standing motor cars rocked noticeably."). Mandatory shut-down of a site is based on a patchwork of multiple earthquakes at multiple times with varying intensity. For example, if an earthquake caused by fracking "causes significant damage" or a magnitude of 5.0 or greater the state will shut-down the frack site. A 5.0 earthquake is described by USGS as "felt by all, many frightened." The rules use a dangerous, high threshold of earthquake intensity for a mandatory shut-down. The fracking caused earthquake literally has to frighten people or break something before the state will step in.

Why would IDNR use a system not used nationally? Has the IDNR or the ILGS consulted the USGS on these rules and if not, why not?

COMMENT 4: **Per Dr. Michael Hamburger, Professor of Geophysics at Indiana Univ.,** (for all questions please contact Dr. Hamburger at hamburg@indiana.edu;

"The levels proposed for transition from "Green" to "Yellow" alert levels seem insufficient to capture the range of possible induced seismic events that might indicate the need to proceed with greater caution. Because the "Yellow" alert allows an injection well to continue operating, a conservative procedure might trigger additional data□gathering and monitoring activities at a relatively low threshold. With an appropriately dense monitoring network, the threshold magnitude for triggering a "Yellow Alert" could readily be reduced to magnitude 2.5 or even 2.0. The occurrence of a large number of low□magnitude earthquakes should also be used as a basis to trigger a Yellow Alert. Also, because induced seismic activity has routinely been identified at distances greater than the 3 miles (5 km) specified in the draft regulations, I would recommend increasing the maximum distance to at least 10 km (6.2 miles).

The announcement of a Yellow Alert, as currently proposed, does not require any additional monitoring activity. Ideally, the transition to this cautionary state would set in motion additional monitoring efforts, which in turn could be used to determine whether induced activity is occurring and its spatial and temporal relation to injection-well activity. I would recommend considering the additional requirement for one or more (ideally three) seismic monitoring stations in the vicinity of a well suspected of triggering induced seismic activity.

Similarly, the levels proposed for transition from "Yellow" to "Red" alert levels again seem insufficient to capture the range of possible induced seismic events that might indicate the need to at least temporarily suspend pumping activities. Because damaging earthquakes in the Midwest can occur at magnitudes well below 5.0, and because induced earthquakes

C21889

generally occur at shallow depths where they are capable of producing localized damage at nearby structures, I would recommend reducing the threshold magnitude to 4.0, or alternatively, to replacing the magnitude threshold with an instrumental intensity threshold of MM V. (potentially damaging), as estimated by the USGS ShakeMap protocol. Similarly, I would recommend increasing the distance from a possible triggered earthquake to neighboring injection wells from 6 miles (10 km) to 10 miles (15 km) and reducing the number of Yellow Alert earthquakes from five to three, to minimize the potential hazard from low□level induced seismicity swarms expanding to include moderate□and large□ magnitude events.

Finally, a Red Alert should presumably also trigger intensified monitoring activities, perhaps including enhanced surface array or borehole or monitoring of injection-related seismicity, and an increase in the number and sensitivity of seismic monitoring stations."

Since some expert seismologists have expressed doubt that the present draft rules for Class II wells are protective enough for Illinois residents, going forward will the IDNR and the ILGS consult with independent university based seismologists, such as Dr. Hamburger of Indiana Univ. and Dr. Van der Elst of the Lamont-Doherty Earth Observatory of Columbia Univ. to determine a more protective system for induced seismicity in Illinois? Is the IDNR going to seek any independent scientific consultation on whether severely large earthquakes (magnitude 7-9s) might be induced by the disposal of fracking waste water in highly active seismic zones such as the Wabash Valley and the New Madrid zones?

COMMENT 5: If a shut-down order is made, the fracking company gets a hearing, the purpose of which is to "mitigate induced seismicity events near the permitted well". To "mitigate" is to minimize, not eliminate earthquakes caused by fracking. As with the overall message of the earthquake rules, the intent appears to not eliminate earthquakes caused by fracking but actually permit them.

Will the ILGS or the IDNR consult any of the industry experts who were involved in the compilation of the Ground Water Protection Council's 2013 - White Paper on Induced Seismicity, which investigated a number of mechanisms for minimizing the frequency of induced seismicity; http://www.gwpc.org/sites/default/files/events/white%20paper%20-%20final_0.pdf **?**

COMMENT 6: On February 1, 2013, in a press release by the Illinois Emergency Management Agency, Governor Quinn urged every Illinois resident, school, and business to participate in an earthquake drill that was scheduled for a few days later. The press release described the situation in Southern Illinois as follows:

"Illinois sits atop two major fault zones, the New Madrid Seismic Zone and the Wabash Valley Seismic Zone. The most powerful series of earthquakes ever to hit the United States happened in 1811-12 near New Madrid, Missouri. In a 2008 study conducted by the University of Illinois Mid-America Earthquake Center, it was projected that if a similar quake struck the same region today, there would be 3,500 fatalities, 2.6 million people without electricity and $300 billion in direct economic losses. Bridges, docks, highways and water infrastructure would be in shambles." http://www3.illinois.gov/PressReleases/ShowPressRelease.cfm?SubjectID=2&RecNum=10901

Per the Introduction to USGS Fact Sheet 2009-3071 (http://pubs.usgs.gov/fs/2009/3071/): "There is broad agreement in the scientific community that a continuing concern exists for a major destructive earthquake in the New Madrid seismic zone. Many structures in Memphis, Tenn., St. Louis, Mo., and other communities in the central Mississippi River Valley region are vulnerable and at risk from severe ground shaking."

02183

Per the conclusion from the USGS Fact Sheet 2009-3071 (http://pubs.usgs.gov/fs/2009/3071/pdf/FS09-3071.pdf): ""The geologic record of repeated large earthquakes, the historical accounts of the 1811–12 large earthquakes, and the continuing earthquake activity in the area are compelling evidence that the New Madrid region has high earthquake hazard. The preponderance of evidence leads us to conclude that earthquakes can be expected in the future as frequently and as severely as in the past 4,500 years. Such high hazard requires prudent measures such as adequate building codes to protect public safety and ensure the social and economic resilience of the region to future earthquakes."

IDNR's proposed rules for seismicity include NO recognition of the risks of injuries, property damage, and ecological damage that would result from a major earthquake at or near injection/disposal wells or fracking wells. Burst pipes, cracked or broken casings, cracked storage tanks, up-heaved pit liners, broken well structures, and migrating toxic fluids would cause untold human suffering and ecological degradation that could never be compensated or repaired.

What is the justification for the IDNR to ignore the serious risks listed above for earthquakes that might be induced by disposal of frack waste water in Class II wells in Southern IL? Will the proposed rules governing the permitting and operations of Class II injection wells rely on NO studies, NO reports, and NO data; as per the 3rd page of the proposed rules?

COMMENT 7: The penalty for failing to attend an earthquake hearing or continuing to frack after causing a serious, reported earthquake is $50 for a first time violation. The rules define these violations as "Administrative penalties". This amount is a little less than the cost of a dinner and a movie. Even with 4 or more earthquake violations, the maximum fine is only $500, arguably an acceptable business expense. If the frack site continues to operate in violation of a state order regarding it creating earthquakes the minimum fine is $100.

We ask the IDNR to raise all of the penalties in these rules, for all the violations, to the maximum level so that there might be an actual deterrent on the industry for violating the rules.

COMMENT 8: Will fracking companies be held responsible for all monetary damages caused by earthquakes? Has a Compensation Fund or System been created to indemnify residents, homeowners, businesses with clients who suffer injuries or damaged property from an injection well induced earthquake? Will the Compensation Fund or System cover damage to public infrastructure?
Pursuant to these questions,
5.1: Does IDNR require insurance for each injection well for 100% indemnification of the costs of damages from an earthquake that the well has caused?
5.2: Has IDNR created a system for receiving, reviewing, and approving damage claims?
5.3: Will the system in 5.2 work quickly and efficiently and avoid placing onerous burdens of proof on claimants?

If the answer is no to these questions, why has the IDNR created a system that favors well operators and penalizes citizens with injuries or damaged property?

COMMENT 9: The Illinois Administrative Procedure Act requires that "during First Notice, the Department of Commerce and Economic Opportunity, (DCOE), review each proposed rule making to determine possible impact on small business." (Apparently, this has been extended to small municipalities as well). We know the potential damages from induced earthquakes to small business and municipalities are real. For example, the magnitude 5.7 injection well induced earthquake near Prague, OK "destroyed 14 homes, buckled a federal highway and left two people injured"..., and magnitude 3.4 geothermal-induced earthquakes in Basel, Switzerland "caused $8

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million in damage to surrounding properties" (Columbia University Earth Institute;http://www.earth.columbia.edu/articles/view/3072). Yet, the IDNR states in the Illinois Register that small businesses and municipalities will NOT be affected by the injection well rules.

Has IDNR staff consulted with DCOE before the First Notice, and if yes, please provide the public with dates, times, and individuals at the DCOE with whom they consulted? To protect small business and small municipalities in southern and southeastern IL should these rules be tied to the expert opinion that can be marshaled by the National Academy of Sciences? As evidenced by their report: ***Induced Seismicity Potential in Energy Technologies****(2013) and in particular:* **Chapter 6 ("Steps Toward a "Best Practices Protocol")**

COMMENT 10: Per Dr. Michael Hamburger, Professor of Geophysics at Indiana Univ., (for all questions to Dr. Hamburger please contact hamburg@indiana.edu);

"The proposed rules do not specify what type of magnitude determination is to be used for triggering a specific alert level. Because at least four different magnitude determinations are routinely used for estimating the size of midcontinent earthquakes (mb, Ms, Mw, mbLg, MD) and because discrepancies between these magnitude determinations commonly reach 0.5 magnitude units, it is important to specify what magnitude will be used for determination. For instance, the 2002 Caborn, Indiana earthquake was initially assigned an mbLg magnitude of 5.0; however the subsequent acquisition of long□period data allowed the determination of an Mw magnitude of 4.6. (In fact, the high□frequency mbLg magnitude might actually be more relevant for potential damage to nearby structures. The moment magnitude (Mw) determination is not made for all events, and may be available only weeks or months after the earthquake occurrence. The simplest option is to adopt the maximum magnitude available from any one of a number of reporting agencies."

Will the IDNR incorporate a best practices protocol for induced seismicity into the permitting process for injection wells?

COMMENT 11: Are there a sufficient number of seismometers located across the ~8,000 Class II injection wells in Illinois, including locations where new injection wells are being permitted, to accurately locate seismic events? Is the Illinois seismic monitoring system sufficiently well developed or spaced to precisely locate induced seismic events and assign the event to the injection well responsible for the event?

Per Dr. Michael Hamburger, Professor of Geophysics at Indiana Univ., (for all questions to Dr. Hamburger please contact: hamburg@indiana.edu);

"The Rules do not specify any arrangement for monitoring of natural and induced seismicity in the southern Illinois region. In general the monitoring of seismic activity in the region should reliably detect and locate earthquakes to at least a magnitude unit lower than the magnitude required to trigger a response (currently M 3.0) and to reliably discriminate small induced earthquakes from blasts or other artificial events. The regional networks operated by the U.S. Geological Survey (USGS), the Center for Earthquake Research and Information (CERI) and St. Louis University (SLU) are far sparser than those used to monitor activity in the New Madrid region, and the temporary observations associated with the EarthScope experiment have largely been discontinued. The proposed addition of several EarthScope stations to the regional monitoring networks will help ameliorate the situation. However, the reliable detection threshold will probably remain above M2.0, particularly during daytime hours. In order to reliably detect, locate, and discriminate induced seismic activity, the IDNR should enhance both the density and analysis capability of the current monitoring network, specifically focusing on low-magnitude events in southern Illinois."

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Will the IDNR and the ILGS institute the type of monitoring system Dr. Hamburger recommends, before horizontal fracking begins? Will data from Illinois seismometers be publicly available and accessible through the internet in real or near real time? Has a Seismic Monitory Advisory Committee (SMAC), consisting of a broad cross section of interested parties, not only the Oil and Gas Industry, IDNR, and well operators, but also a national lab, such as the *Argonne National Laboratory*, several independent, university-based seismologists, professional water associations, county and local government representatives, representatives of IEMA, and members of community groups in the high risk areas, been created to monitor and report on injection and seismic activities? And, will this Committee be granted, as part of its charter, a significant and meaningful advisory role with respect to the issues raised here, including, but not limited to, the permitting process, seismic monitoring, compensation, hazard and risk analysis of earthquakes in population centers, and the cut points on the traffic light system?

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Radioactivity Associated With Hydraulic Fracturing

Submitted by Frack Free Illinois,
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Public Act 098-0022, and the draft rules released by the IDNR are not adequate to protect Illinois residents in regards to the radioactivity of shale and the handling of fracking waste water and debris. The industry and geologists know that all shale is radioactive, it is only a matter of degree. A typical shale formation has 100 API units of radiation; the New Albany Shale has in some cases up to 200-400 API units above the normal shale background. It is by measuring the gamma ray signatures of rock that geologists know where they will find shale.

Naturally occurring radioactive material is NORM and when it is brought to the surface with fracking it becomes TENORM. The principal radionuclide of concern in NORM/TENORM is radium-226, a member of the uranium series, which is present in natural soils in concentrations of about 1 picocurie per gram (Ci/g). However, NORM/TENORM radioisotopes may be present in different layers of rock in varying concentrations, and most fracking waste contains radium-226 concentrations that are much higher than 1 pCi/g, and may be as high as tens of thousands of pCi/g. Frack waste water is radioactive, toxic brine when it returns to the surface, in some areas it has been found to contain up to 16,000 picoCuries per liter of radium-226. The discharge limit in effluent for Radium 226 is 60 pCi/L, and the EPA's drinking water standard is 5 pCi/L.

The current maximum contaminant level ((MCL) as set forth in 40 CFR 141.66(c)) for radium-226 and radium-228, combined is 5 picocuries per liter of water, and for solids 5 picocuries per gram. Please also keep in mind the half-life of Ra-226 is 1600 years. www.epa.gov/radiation/tenorm/oilandgas.html

When fracking brings up massive amounts of shale debris, flowback water and produced water it brings with it elements like uranium, radium-226, radium-228, bismuth-214, lead-214, actinium-228 and thallium-208 and many decay daughters such as radon gas. Fracking exposes our surface water, air, land and residents to these radioactive elements. This radioactivity does not go away when it hits the surface, and with radium's extensive decay chain the harmful radioactivity persists in our environment for many, many thousands of years.

How radioactive is this fracking debris and waste water from Illinois shale?
We can not tell how radioactive every well's waste is until we test all of the waste water and the drilling debris, but we know from the experts that our shale is more radioactive than most. Out east, the Marcellus and Utica shale formations have concentrations of radium-226 that are 30 times background and up to 3000 times the allowable levels of EPA exposure. The academics from across the country are telling us to assume all the fracking debris and fracking waste water will be radioactive.

The fracking wells do not become less radioactive as they continue into production, actually the reverse is true, the initial flowback water from the wells (first 7-10 days) will be less radioactive than the produced water, which gets pumped out of wells throughout the estimated 1-3 years of production from that well. But Public Act 098-0022, and now the inadequate IDNR draft rules, indicate that the only radioactive monitoring that is required is on the initial flowback water, not the more radioactive produced water - which gets more radioactive the longer the water sits in the shale, and they will not be mandated to test the fracking drilling debris, which can also be radioactive.

This is potentially a fatal flaw for frack field workers, truckers and residents living near enough that they might get exposed to this radioactivity. In 2005 The National Academies of Science released an over 700-page report on the risks from ionizing radiation. The BEIR VII or seventh Biological Effects of Ionizing Radiation report on "Health Risks from Exposure to Low Levels of Ionizing Radiation" reconfirmed the previous knowledge that there is no safe level of exposure to radiation—that even very low doses can cause cancer.
http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=11340

Frack field waste is LLRW, (Low Level Radioactive Waste), and should be disposed of per the "IL Low-Level Radioactive Waste Management Act" (420 ILCS 20). That designation would carry its own requirements by the federal and state agencies. The reality is that this waste is radioactive and toxic and it must be treated as such or there will be negative environmental and public health consequences.
http://pubs.usgs.gov/fs/fs-0142-99/fs-0142-99.pdf

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Per the US EPA,
"Because TENORM contaminated wastes in oil and gas production operations were not properly recognized in the past, disposal of these wastes may have resulted in environmental contamination in and around production and disposal facilities. Surface disposal of radioactive sludge/scale, and produced water (as practiced in the past) may lead to ground and surface water contamination." www.epa.gov/radiation/tenorm/oilandgas.html
Workers and residents in the area and in the community are at risk from this frack field waste radiation.
Again from the EPA;
Oil/Radiation Waste Disposal Workers – Disposal workers include those who work directly on top of uncovered waste sites. Potential risks assessed for these workers include exposures due to direct gamma radiation and radioactive dust inhalation. In addition, they may inhale radon gas which is released during drilling and produced by the decay of radium, raising their risk of lung cancer. Workers following safety guidance will reduce their total on-site radiation exposure.
Nearby Residents/Office Workers – Risks evaluated for members of the public working or residing within 100 meters of a disposal site are similar to those of disposal workers. They include: direct gamma radiation, inhalation of contaminated dust, inhalation of downwind radon, ingestion of contaminated well water, ingestion of food contaminated by well water, and ingestion of food contaminated by dust deposition.
Risks analyzed for the general population **within a 50 mile radius** of the disposal site include exposures from the downwind transport of re-suspended particulates and radon, and exposures arising from ingestion of river water contaminated via the groundwater pathway and surface runoff. Downwind exposures include inhalation of re-suspended particulates, ingestion of food contaminated by deposition of re-suspended particulates, and inhalation of radon gas. Individuals working inside an office building inadvertently constructed on an abandoned NORM waste pile also face the threat of radiation exposure. Potential risks assessed for the onsite individual include exposures from direct gamma radiation, dust inhalation, and indoor radon inhalation.
www.epa.gov/radiation/tenorm/oilandgas.html

In the Public Act 098-0022, there is a requirement to test the flowback water for radioactivity at least once, and the ground adjacent to the storage tanks and any hydraulic fracturing flowback reserve pit must also be measured for radioactivity. These requirements are admissions that radioactivity might be found in the drilling debris and the fracking waste, and by deduction also the produced water. In the Public Act there was no mention of testing the produced water from wells for radioactivity, but it was not disallowed either, it was merely not mentioned.

In the Public Act there is a broad mandate for the IDNR to enact rules that protect the public health and the environment:
Section 1-75 High volume horizontal hydraulic fracturing operations.
(a) General.
(2) All phases of high volume horizontal hydraulic fracturing operations shall be conducted in a manner that shall not pose a significant risk to public health, life, property, aquatic life, or wildlife.

Section 1-83 Order authority.
(d) The Department may issue conditions within any order to protect the public health or welfare or the environment.

The IDNR has not followed through with their expressed responsibilities in Public Act 098-0022 to protect the public health and environment, as it relates to radioactivity brought up by fracking. The IDNR has only allowed for the testing of the flowback water, and the adjacent ground, and has not regulated the testing of the produced water for radioactivity, this will certainly impact on the health of the public and the workers on and around the frack fields.

Section 245.850 Hydraulic Fracturing Fluid and Hydraulic Fracturing Flowback Storage, Disposal or Recycling, Transportation and Reporting Requirements
d) Testing of hydraulic fracturing flowback shall be completed as follows:
E) gross alpha and beta particles to determine the presence of any naturally occurring radioactive materials.

e) Before plugging and site restoration required by Section 245.1030, the ground adjacent to the storage tanks and any hydraulic fracturing flowback reserve pit must be measured for radioactivity (Section 1-75(c)(7) of the Act).

There is no mention in these rules what happens differently if the flowback water or the ground adjacent to the storage tanks and any hydraulic fracturing flowback reserve pit measures positively for radioactivity. No standards listed, no levels at which emergency procedures are begun, no reporting to IEMA, no mention of worker's protections, no changes in the disposal methods for the radioactive waste water, no limiting the use of Class II wells, (which are not designed for radioactive waste), no alterations in modes of transportation, there is nothing operational that changes following a finding of radioactivity from a frack well, including no mention of mandatory reporting to the landowner.

Section 245.850 Hydraulic Fracturing Fluid and Hydraulic Fracturing Flowback Storage, Disposal or Recycling, Transportation and Reporting Requirements
g) Except for recycling allowed by subsection (i), hydraulic fracturing flowback may only be disposed of by injection into a Class II injection disposal well that is below interface between fresh water and naturally occurring Class IV groundwater (Sections 1-75(c)(8) and 1-25(c) of the Act). The Class II injection disposal well must be equipped with an electronic flowmeter and approved by the *Department.*

--We request that the IDNR look at these rules again, surely there are standards in place for LLRW, including the "IL Low-Level Radioactive Waste Management Act", (420 ILCS 20), that would apply in a situation where the flow back water is found to contain radioactivity.

It stands to reason that if the flowback water from a well site tested positive for radioactive elements that the produced water from that same well site would also test positive for radioactivity, but there is nothing in the rules that calls for the testing of the produced water. This is a serious regulatory lapse that will likely cause damage to the public health and the environment.

Section 245.940 Produced Water Disposal or Recycling, Transportation and Reporting Requirements
The permittee shall dispose of or recycle produced water in accordance with the requirements of this Section:
a) Surface discharge of produced water onto the ground or into any surface water or water drainage way is prohibited (Sections 1-75(c)(9) and 1-25(c) of the Act).
b) Except for recycling allowed under subsection (d), produced water may only be disposed of by injection into a Class II injection well that is below interface between fresh water and naturally occurring Class IV groundwater (Sections 1-75(c)(8) and 1-25(c) of the Act). Unless used for enhanced oil recovery, the Class II injection well must be equipped with an electronic flowmeter and approved by the Department.
c) Produced water transfer operations from tanks to tanker trucks for transportation offsite must be supervised at the truck and at the tank if the tank is not visible to the truck operator from the truck. During transfer operations, all interconnecting piping must be supervised if not visible to transfer personnel at the truck and tank. (Section 1-75(c)(6) of the Act)
d) Produced water may be treated and recycled for use in hydraulic fracturing fluid for high volume horizontal hydraulic fracturing operations (Section 1-75(c)(8) of the Act).

There is another regulatory lapse in the lack of testing for radioactivity at the Medium Volume Horizontal Hydraulic Fracturing wells as described below, yet these wells will involve the same possibly radioactive shale layers as the High Volume wells, therefore the same risks of encountering radioactive waste water and debris exists, but nothing is mentioned in the rules.

Section 245.1200 Medium Volume Horizontal Hydraulic Fracturing Completion Reports
a) For any horizontal hydraulic fracturing operations where all combined stages of a stimulation treatment of a horizontal well are by the pressurized application of more than 80,000 gallons but less than 300,001 gallons of hydraulic fracturing fluid and proppant to initiate or propagate fractures in a geologic formation to enhance extraction or production of oil or gas, reporting under subsection (c) is required (Section 1-98(a) of the Act).

To protect workers, residents and our environment from serious radiation exposure from fracking. waste we ask that the IDNR modify these rules in consultation with IEMA to:

– Require monitoring of all the fracking debris, the flowback water and the produced water for all of the radioactive elements, throughout the full drilling and production phases of each well, from the cradle to the grave. The problem is that the lab tests for radioactive elements, in order to get accurate readings of levels, can take up to 21 days, but this kind of accurate testing of debris, flowback and produced water is absolutely essential.

– If positive for radioactivity these lab test results should stimulate a chain of requirements and additional regulations from the IDNR that would alter the containment, trucking, OSHA standards and waste handling requirements for each frack field well to comply with LLRW requirements. Including the requirements of notifying and protecting residents in the area from exposure to this radioactivity.

--To monitor the fields for significant radioactivity continuously, hand held or mounted radiation monitors should be provided on the frack fields by the industry, in waste areas and at the drill sites to warn the workers and residents if serious amounts of gamma radiation are being brought up. These monitors are not specific for exactly what radioactive elements are present but they could serve as a general alarm.

– Crucial OSHA radioactivity protections for the workers should be required when radiation alarms have shown that radioactivity is present; dosimeters, respirators, protective clothing, amongst other protections should be provided from the drilling companies to the workers.

– Radon being the 2nd leading cause of lung cancer is an important environmental radioactive toxin and radon monitors should be required on the frack fields. If radon is found to be released from the frack fields, in large quantities, then precautions for workers and residents should be initiated.

– Radon is inert and is not burned off by flaring, to release it into the air in large quantities is a very serious public health concern. The Fed. Gov. recognizes this and has notified the fracking industry that in 2015 they can no longer flare off gas from the frack wells, they must capture it. Wouldn't it be smarter if we start off with the best practices in IL?

– Enforcement of the requirements for working radiation and radon monitors, radioactivity testing and OSHA and community standards for dealing with radioactive waste and radon, including public notice should be strict, with heavy fines for any violations.

– Solid fracking debris that has tested high for radioactivity should be prohibited from being buried on any frack well site in simple lined pits, even if the landowner agrees. This is insufficient to protect land owners and future generations. The waste should be prohibited from being shipped to a typical landfill and mixed with non-radioactive material, this could lead to contamination of ground water, when water soluble radium leaches out of the landfill.

– Fracking waster water should not be processed at any municipal water treatment plant. The practice has ended in PA, where radioactivity was found being discharged from these plants into rivers and streams. Municipal water treatment plants are not able to remove radioactive elements.

– Class 2 injection wells are not a good long term storage option for fracking waste water that will stay radioactive for thousands of years. With age, and in our earthquake zones - with even small seismic events, the well casings degrade and the integrity of the wells fail. The IDNR has kept very poor records of these wells prior to 1990, many of the older ones are in very questionable condition. With the loss of integrity, a Class 2 well can not be counted on as a long term repository for significant radioactive waste. We recommend their use for fracking waste water be banned.
www.scientificamerican.com/article.cfm?id=are-fracking-wastewater-wells-poisoning-ground-beneath-our-feet

– Best practices in WVA are being utilized, and all fracking debris in WVA is being dealt with as LLRW and shipped to specific landfills which have separate LLRW containment facilities. All fracking waste should be assumed to be LLRW until proven otherwise. Mandate the use of LLRW containment facilities for all frack field debris and waste water.

Public Hearing on Proposed Rules For Hydrofracturing in IL
Re: Subpart G: Chemical Disclosure; Trade Secrets (245.700-245.730)
Submitted by Frack Free Illinois,
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www.facebook.com/FrackFreeIllinois

Fracking is a dangerous method of natural gas and oil extraction, which has been in the process of being rolled out by the IIDNR over this summer/fall, after a very insufficient regulatory bill passed the IL General Assembly in the spring, Public Act 098-0022 http://www.ilga.gov/legislation/publicacts/98/PDF/098-0022.pdf

We want to bring your attention to a problem that has been arising across America with fracking, and that is that the industry acts to keep the hundreds of chemicals that they are hosing down under people's land, possibly contaminating their water, releasing into their air, and trucking around their communities, a secret. We suspect that they want to keep them a secret because they want to limit their own liability. The most egregious aspect of this secrecy is that In many states across America the industry has persisted in keeping their exact chemical cocktails, which can differ per frack well, a secret from Physicians and Allied Health Professionals, endangering their patients.

Fracking is very dangerous and the jobs on the frack fields are 7 times more dangerous that any other jobs in America right now. In IL we anticipate blowouts, traffic accidents, chemical exposures of the frack field workers and possibly residents as well. We anticipate air pollution exposing residents to harmful VOCs, and chemical contamination of drinking water. And we suspect that there will be radioactive frack waste that exposes residents and workers to radioactivity.

The health effects of fracking have been poorly studied because the industry seems to work their connections in the Fed and State Governments to keep regulators from looking at these issues; *http://ecowatch.com/2013/fracking-pollution-sickens-residents-in-tx/*
Also many victims of fracking are being silenced by non-disclosure agreements when they win judgments against the oil and natural gas industry. But there have been smaller studies and scientific papers on the various health effects of the hundreds of chemicals used in the fracking process. There are many links in this letter to follow for information that will be useful to health practitioners around the frack fields, and to the IDNR.

At this one link, *http://endocrinedisruption.org/chemicals-in-natural-gas-operations/introduction* you will be able to find all of the articles and info listed below, published by TEDX, the Endocrine Disruption Exchange:
– *"What You Need To Know About Natural Gas Production"by Theo Colborn, Phd. of TEDX*
– *Drilling Chemicals*
– *Pit Chemicals*
– *A Health Effects Summary*
– *"Air Pollution and Natural Gas Operation", by scientists at TEDX, and published in Human and Ecological Risk Assessment, An International Journal in Nov, 2012,*
– *"Natural Gas Operations From a Public Health Perspective" by Theo Colborn, Phd and others: http://ourlongmont.org/wp-content/uploads/2012/10/Theo-*

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Colborn-Peer-Reviewed-Article-on-Public-Health-Perspective-on-Natural-Gas1.pdf

Studies such as the one done by the Univ. of Colorado, *"Human Health Risk Assessment of Air Emissions from Development of Unconventional Natural Gas Resources." March, 2012,* showed that people are getting sick approx. 1/2 mile from the wells and infrastructure, such as compressor stations, and depending on the wind direction even up to a mile away.
http://www.ucdenver.edu/about/newsroom/newsreleases/Pages/health-impacts-of-fracking-emissions.aspx
Below is a link to a major PA health study by the Southwest Pennsylvania Environmental Health Project, SWPA-EHP, *www.environmentalhealthproject.org,* not because they surveyed a lot of people, actually just a very few in 1 county in PA, but because they were able to exclude any other explanations for the health effects found, such as previous medical history, etc. The upshot is: water contamination causes some illnesses eventually, but air pollution around the drill rigs and compressor stations causes many symptoms immediately, especially if the patients live within a thousand feet from a compressor station. Benzene and other VOCs can accumulate in the air in homes close to this natural gas and oil infrastructure. *http://www.huffingtonpost.com/2013/08/25/pennsylvania-fracking-study_n_3813650.html?utm_hp_ref=green*

The link below is for a comprehensive page of health resources from, SWPA-EHP, their latest program is a series of CME Medical Training Workshops entitled *"Health Concerns in the Era of Gas Drilling: A Basic Toolkit for Healthcare Providers."*
http://www.environmentalhealthproject.org/resources/medical-resources/

We want to remind the IDNR that they have in the Hydraulic Fracturing Act, Public Act 098-0022, a broad mandate to protect the public health and the environment; **Section 1-83, Order authority.(d) The Department may issue conditions within any order to protect the public health or welfare or the environment.**

This summer we requested that the IDNR put the chemical disclosure of the fracking chemicals in the hands of the IDPH, which was expressly allowed in the Hydraulic Fracturing Act, (see below), but in the draft rules the IDNR has instead configured a situation where the ER Physicians and Nurses, when faced with an emergency situation, after hours or on weekends, will have to track down the fracking companies to get the full list of chemicals that their patient(s) may have be exposed to. This is unacceptable, the frack fields are operating 24/7, this is an undue hardship on Illinois Health Professionals, Emergency Personnel and their patients.

Public Act 098-0022, Section 1-77 Chemical disclosure; trade secret protection. (m) In the event of a release of hydraulic fracturing fluid, a hydraulic fracturing additive, or hydraulic fracturing flowback, and when necessary to protect public health or the environment, the Department may disclose information furnished under a claim of trade secret to the relevant county public health director or emergency manager, the relevant fire department chief, the Director of the Illinois Department of Public Health, the Director of the Illinois Department of Agriculture, and the Director of the Illinois Environmental Protection Agency upon request by that individual.

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From the draft rules, 245.720 Department Publication of Chemical Disclosures and Claims of Trade Secret

b) When an applicant, permittee, or person performing high volume horizontal hydraulic fracturing operations furnishes chemical disclosure information to the Department under Section 245.210, 245.700, 245.710 or 245.860 under a claim of trade secret, the applicant, permittee, or person performing high volume horizontal hydraulic fracturing operations shall submit redacted and un-redacted copies of the documents identifying the specific information on the master list of chemicals claimed to be protected as trade secret. The Department shall use the
redacted copies when posting the master list of chemicals on its website. (Section 1-77(f) of the Act)

d) Chemical disclosure information furnished under Section 245.210, 245.700,245.710 or 245.860 under a claim of trade secret shall be protected from disclosure as a trade secret if the Department determines that the statement of justification demonstrates that (Section 1-77(h) of the Act):

From the draft rules, Section 245.730 Trade Secret Disclosure to Health Professional

Information about high volume horizontal hydraulic fracturing treatment chemicals furnished under a claim of trade secret may be disclosed by the Department to a health professional for the limited purpose of determining what health care services are necessary for the treatment of an affected patient pursuant to the requirements of this Section.

a) A health professional shall complete and submit a request to obtain trade secret chemical information. In the request, the health professional shall:
1) state a need for the information and articulate why the information is needed;
b) In an emergency health care situation, a health professional shall:
1) call the Department during normal business hours and, as soon as circumstances permit without impeding the treatment of the affected patient, submit a completed request for information to the Department online or by fax. The Department shall respond to the health professional as quickly as possible by telephone, fax or other methods determined by the Department to be a secure means of disclosure; or

2) call the trade secret holder at any time (24 hours/7 days a week) and, as soon as circumstances permit without impeding the treatment of the affected patient, submit a completed request for information to the trade secret holder directly by fax or email. The trade secret holder shall respond to the health professional as quickly as possible, but in no case more than 2 hours, by telephone, fax or other methods determined by the trade secret holder to be a secure means of disclosure.

Regarding the sharing of information by Health Professionals:

d) The health professional may share information disclosed pursuant to this Section with other persons as may be professionally necessary, including, but not limited to, the affected patient, other health professionals involved in the treatment of the affected patient, the affected patient's family members if the affected patient is unconscious, unable to make medical decisions, or is a minor, the Centers for Disease Control and Prevention, and other government public health agencies.

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e) As soon as circumstances permit, the health professional who submitted the request for information shall inform the holder of the trade secret the names of all other health professionals to whom the information was disclosed.

f) As soon as circumstances permit without impeding the treatment of the affected patient, the holder of the trade secret may request a confidentiality agreement consistent with the requirements of this Section from all health professionals to whom the information is disclosed.

g) Any recipient of the information disclosed pursuant to this Section shall not use the information for purposes other than the health needs asserted in the request and shall otherwise maintain the information as confidential. Information so disclosed to a health professional shall in no way be construed as publicly available. (Section 1-77(l) of the Act)

Below are some excerpts from recent statements by environmental groups and community groups with some of their specific objections to these draft rules released from the IDNR:

From the Environmental Law and Policy Center in Chicago: Emergency Response & Disclosure – The law requires that trade-secret-protected information about chemicals be disclosed to health workers when necessary to treat a patient. IDNR's draft regulations give discretion over when to share this information and direct health workers to contact either "IDNR during normal business hours" or "trade secret holders." This is unacceptable given that emergencies can happen at any time of the day, and emergency personnel can't be expected to figure out which private fracking entity to contact if the Department is not available.

From Illinois People's Action in Peoria: IDNR identifies the definition of an "Affected Patient" as "a person receiving health care services from a health professional for an illness or injury diagnosed by the health professional to be caused by exposure to any chemicals used in high volume horizontal hydraulic fracturing operations that are subject to a claim of trade secret by a permittee or contractor."
PROBLEM: This definition is circular: in order to learn what chemical was used, a physician must first test for that chemical so s/he can prove s/he has a right to disclosure of the proprietary chemical. How can a doctor diagnose exposure to a secret chemical used in high volume fracking before s/he knows what the secret chemicals are to test for?

We request that the IDNR:
– transfer the responsibility of the full disclosure of all of the chemicals used in every frack well, including the trade secrets, to the Illinois Dept. of Public Health, IDPH. They have 24/7 - on call responsibilities already and they will be able to assist the Emergency Personnel and Health Professionals in a meaningful way. It is not the responsibility of the Illinois health care community to explain to a non-medical agency, such as the IDNR, or to the fracking corporations their needs for timely chemical disclosure, in the course of the medical care of their patients!

021901

– work with the IDPH to allow mandatory reporting of frack field related accidents, disease and death, so that statistics and health related information can be shared with other Illinois Health Professionals. This sharing of health related information, including complete information about any and all chemical exposures, must be facilitated in a timely and meaningful way, pro-actively, for our public health.

– cease asking for "confidentiality agreements ' with Illinois Health Professionals about such an important public health danger as the many and varied health effects that we will surely experience on and around the future frack fields of central and southern Illinois. The needs of our patients and the health professional community for timely and complete medical information about these many public health risks, including case reports pertaining to fracking related illnesses, accidents and deaths are preeminent. This fracking chemical disclosure information must comply with all previous and pertinent health professional standards, without onerous reporting requirements to the IDNR, or "confidentiality agreements".

Thank you for considering our requests and your attention to this very important issue,
Dr. Lora Chamberlain
Organizer for Frack Free Illinois
drlora2@yahoo.com
773-486-7660

021902

CAPOW! (Citizens Act to Protect Our Water)
presents a full-day conference

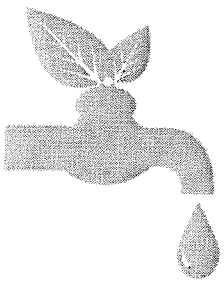
Water is Life!
Facing Our Water Crisis II

We are celebrating our Great Lakes. Now we must protect them!

PROGRAM (in formation)
Opportunity to Network — Identifying Next Steps

EXPERT PRESENTERS
Alliance for the Great Lakes
Center for Neighborhood Technology
Dr. Lora Chamberlain, Frack Free Illinois
Dr. Paul Connett, Fluoride Action Network
Food & Water Watch
David Kraft, Nuclear Energy Information Service (NEIS)
Debra Michaud, Tar Sands Free Midwest
Dr. Bill Rau, Illinois Peoples Action, on Fracking
Tom Shepherd, Southeast Environmental Task Force
Wisconsin Grassroots Network

CO-SPONSORS
(in formation)
Chicagoland Against Fracking
IVI-IPO
Southeast Environmental Task Force
Tar Sands Free Midwest
Center for Neighborhood Technology
Nuclear Energy Information Service (NEIS)



We are looking forward to a meeting, discussion and action with you!

For more information: www.protectourpublicwater.net or walterb306@cs.com

DATE
8:45 am – 4:00 pm
Saturday, December 7, 2013

LOCATION
Mertz Hall
1125 W. Loyola Ave.,
Loyola University Lake Shore Campus
(near intersection of Devon Avenue and Sheridan Road)

REGISTRATION
$10 adults, $5 students

To register for conference in advance, make check out to CMW with CAPOW! in memo line and mail check to: Chicago Media Watch, 1030 Asbury, Evanston, IL 60202

LUNCH
Advance reservations required. To reserve lunch at the cafeteria facing Mertz Hall, please RSVP by December 3rd to walterb306@cs.com

PARKING
$7 parking in campus garages: southwest corner of campus and near the Red Line stop off Sheridan Road

MAP
Map at http://www.becksbooks.com/textbook/loyola-university-chicago-lake-shore-campus-store-map

621983

Comments of the Illinois Attorney General's Office

Public Hearing on Proposed Regulations to Implement the Hydraulic Fracturing Regulatory Act

University of Illinois-Chicago (UIC)
November 26, 2013

Good evening. My name is James Gignac and I serve as Environmental and Energy Counsel to Illinois Attorney General Lisa Madigan.

Attorney General Madigan has long-standing and significant concerns about large-scale hydraulic fracturing in Illinois and its potential impacts on the people of our state. She worked alongside the Illinois Environmental Council, the Natural Resources Defense Council, the Environmental Law and Policy Center, Sierra Club, and other environmental advocates to pass the strongest bill possible. Attorney General Madigan fought to ensure that Illinois developed a rigorous set of requirements to govern high-volume fracking. These requirements were urgently needed because, prior to the Hydraulic Fracturing Act being passed, there were no regulations specific to the practice in Illinois.

Now, the Department of Natural Resources is developing regulations to implement the Act, a necessary and important step, and the subject of this evening's hearing.

The Attorney General believes that the Department has put forth many helpful clarifications and useful details in the proposed rulemaking. However, there are numerous areas in need of revisions to ensure that the proposed regulations properly reflect the language and intent of the Act.

Our office will discuss our concerns in detail in the form of written comments that will be submitted by January 3rd. For purposes of tonight's hearing, I would like to highlight just a portion of those concerns.

First, the Act contains an important tool for citizens, municipalities, and enforcement agencies to use in the event that water contamination occurs. Referred to as a rebuttable presumption, Section 1-85 of the Act places the burden on the fracking operator to establish that water pollution to nearby wells was not caused by its drilling activities. The proposed regulations, however, attempt to add limitations on the rebuttable presumption of water pollution that do not appear in the Act, such as the types of water quality data and testing parameters that may be used. The Department should not restrict the ability of citizens to obtain relief if their waters wells are contaminated.

Second, a key part of the Act prohibits the use of open pits to store fracking wastewater. In the event of unanticipated or unexpected flowback conditions, the Act does allow the use of properly constructed, lined reserve pits to capture flowback—but only on a temporary basis. Section 1-75(c) of the Act requires that any flowback captured in the pits must be removed from the site

within 7 days. The proposed regulations are inconsistent with the Act in that they would allow the 7-day time-period for removal to begin when the hydraulic fracturing operations are completed instead of 7 days from when flowback is captured in the pits. This must be corrected.

Third, the Act contains an important provision allowing disclosure of trade secret protected chemical information to health professionals for purposes of medical treatment. The proposed regulations must be changed so that, in the event of an emergency, medical personnel have one central point of contact, available 24 hours a day, seven days a week from which to obtain information for a patient exposed to a trade-secret protected chemical.

Fourth, we urge the Department to hold public hearings on permits in the county where the proposed well site would be located and to ensure that citizens who may be adversely affected have a full and fair opportunity to participate in the hearings. In addition, the proposed rules unnecessarily and unfairly place a burden of proof upon citizens to establish the validity of their concerns in the hearing process. That should be removed. The Act clearly states that it is ultimately up to the permit applicant to demonstrate to the Department's satisfaction that its proposed operations will comply with the law and will protect public health and safety.

We look forward to providing additional input on these and other topics where more work is needed—including, but not limited to, the currently low levels of administrative fines, the lack of a conversion factor for nitrogen foam, and the lack of retroactivity in the requirements—in our forthcoming written comments.

Thank you.

Richard J Stuckey
Testimony to IDNR
Hydraulic Fracturing Administration Rules Hearing
November 26, 2013

My name is Richard Stuckey, STUCKEY. I am a member of the Sierra Club, Climate Reality and several other Environmental organizations, but I am speaking today on behalf of my family and myself. I have lived in Chicago since 1976 and spent 12 years on the west coast before that. I am originally from the UK, but am now a US citizen

Thank you for this opportunity to testify on the Hydraulic Fracturing Rules. I am here to express my concerns about the potential impacts on environment, water and public health arising from fracking and on the shortcomings of the proposed rules to implement the intent of the Hydraulic Fracturing Regulatory Act.

As abundant evidence shows, Fracking is a potentially very dirty and dangerous business. The Illinois legislature passed the bill to regulate the practice in Illinois and in doing so they specified in the bill in unusual detail some of the safeguards which they wanted it to cover. The IDNR was charged with developing regulations to provide even more detail on how the bill was to be applied by industry. Those regulations were intended to support the full implementation of the bill, not just those parts that were easy to put into regulation or were easy for the industry to comply with.

Unfortunately, it seems as though IDNR has chosen to cover in its regulations only parts of the bill that it has chosen, and to ignore or misinterpret the bill for the convenience of the industry. As a result, the regulations do far less to regulate the business of Fracking than the bill requires, and in every case I am aware of, the deviations from the bill endanger the environment, restrict the frackers less than the writers of the bill intended, leave loopholes a mile wide that the industry will exploit to avoid living with the letter of the law, or will make it easier to evade the law, or to pay trivial penalties for non-compliance with the law.

Let me give you some examples.

The **law** requires information on chemicals used in fracking to be provided to health workers when necessary <u>in emergency situation</u>. But the **rules** make this

information available only during "business hours" and provide no information on trade secret holders are or how to contact them. Unfortunately, accidents do not respect "business hours" so this rule fails to meet the requirements of the law.

The **law** requires all wastewater to be stored above ground in sealed tanks. It allows use of open pits only for emergency containment and then only for a period of up to one week. However the **rules** in this area are very weak. They provide no guidance on how much tank storage must be provided and they allow waste water to sit in open pits until a week after operations on a well have been completed. That means that the water could sit in an open pit for years. These rules are inconsistent with the law.

As a last example, the **law** specifies over 100 chemicals that should be tested for before and after fracking, and if those chemicals are found in a well after (but not before) fracking the operator is presumed to have caused the pollution. Instead of implementing rules that are consistent with the law, the **draft regulations** specify only five "indicator chemicals" that are to be tested for. All chemicals have substitutes. If a polluter knows that IDNR will only be looking for five chemicals then they can easily avoid those chemicals and pollute with no risk of detection. This is a serious failure of the regulations to implement the intent of the law.

I could cite many other examples where the proposed Regulations fall far short of the intent of the law, and always to the benefit of the polluters.

I strongly encourage you to go back to the regulations and ensure that they fully implement the letter of the law contained in the bill and do not deviate from the bill in any manner that will endanger the environment, or public health or the safety of our water.

Thank you.

Richard J. Stuckey
1931 N. Fremont St
Chicago, IL 60614
rjstuckey@aol.com
312-543-5236

021937

My name is Hugh Fritz and I am a student at UIC. While reading through the Hydraulic Fracking Regulatory Act I thought of some information that I think would be beneficial if added. First, I noticed the act requires ~~stored~~ collected water to be stored at the fracking site for seven days before it is to be transported for propper disposal, but did not see any information on what propper disposal specifically meant. I think that knowing what happens to the water after it leaves the site is as important as what happens on the site. I think there could be more information on exactly where the water is meant to go, how long it will take to move it, how much storage space is available, and what if any treatment options are possible to make at least a portion of the water safe to be released to the public.

Another comment is that there are many provisions regarding environmental safety, but I think there should also be a section in the act relating to worker safety. I am sure there are many hazards associated with working at a fracking well and while the majority of worker safety falls with the individual company, I think there should be a section in the act enforcing policies to ensure safe working practices at fracking wells, such as required air quality tests to be done at wells where workers are active, required personal protective equipment for employers to provide their workers, or required training for all ~~companies to~~ workers to go through before beginning their employment.

021958

Illinois DNR Fracking Hearing Testimony by C. Jenny Walbridge, November 26, 2013

Greetings, Illinois Department of Natural Resources members. I'm Jenny Walbridge, and I've lived in the state pretty much all my life. Tonight I feel the burden of representing the many Illinoisians who know nothing about hydraulic fracturing, let alone that it is happening in our state, and who don't know about this hearing.

Frankly, I feel that fracking is a terrible idea!, the worst one that has come up since coal burning with its mercury pollution, which I know a thing or two about. Coal plants have closed in several places in Illinois--yay!--but now fracking is laying waste to our land and our people. The proposed rules for the law that recently passed, the one you are having a hearing on, do not protect human workers or citizens who live near the wells, nor do they protect tourism dollars or FUTURE USES OF OUR GREAT STATE!

What fracking--according to the proposed rules--does do is encourage the short-term making of money for a few, and the contribution to global warming that will swallow New Jersey and Florida if we keep it up. The Sierra Club, to which I belong, exists to celebrate and safeguard the environmental rights of all of us Americans, including Illinoisians. It asserts that the proposed rules offer only low penalties for non-compliance, encouraging the operators to see non-compliance penalties as an acceptable cost of business. This would not be acceptable to me, and I feel the rules encourage moral wrongdoing.

I also agree that: the proposed rules' emergency response information is unacceptably inadequate, putting lives at risk, and the rules can be interpreted to not apply to operations done with substitutes for water, such as foam or nitrogen, but they really should, as this is still fracking.
Plus: the rules exclude operations already in action--but these operations have effects on our land just like new ones will, obviously, so should be included under the law's jurisdiction, of course.
As living creatures, we need safety from poisons, but the rules, in their application to the proving of pollution offenses, only apply to certain chemicals--which do not include all of those from the list of over 100 included in the original law, according to the Sierra Club. This is terrible and should be changed!
And: the rules limit the amount and kind of review processes for modifications to permits; this opens the doors for fracking permit holders to avoid public participation in this process. I hate this, too!

Not only does fracking waste our water, it ruins our future--by causing earthquakes; by releasing methane; by ruining our land and tourism. It's not a good gamble, and I don't care if it provides some jobs--so do solar and wind power.

Really, I do not understand it...the frackers don't seem to care about the integrity of the land! How uninspired can they get? Where's the vision? Where's the tomorrow? I don't want our state to lose these! Additionally, we have a great resource in our people who know about alternative energy sources. We should use this knowledge and STOP FRACKING IMMEDIATELY--our beautiful state is worth it!

With fracking, we are talking about PERMANENT destruction. But our water is gold, not something to irradiate by fracking; not to waste for our future children! All over the country, there will soon be a need for more water--we cannot afford to squander it! Somebody--somebodies--have done something TOTALLY INSANE here, by allowing fracking in our great state. It's your job, as caretaker of our beautiful Illinois, to strengthen the law to the extent it was meant to be, so as to prevent as much damage as possible. Please do this--I really care, and so does every Illinoisian I tell about the horrors of fracking!

Thank you!

021939

TO THE IDNR!

First, I would like to respectfully request more hearings, especially in Chicago and Bloomington, after the holidays. People ~~need~~ have to be ~~able~~ able to participate and let their voice be heard. Online comments should also be extended, but they will not substitute for public hearings. We need to come together as people and connect as people. Physical presence is more work and effort, and it shows how much we care about this issue.

To start ~~my~~ comment, I will focus on Rule Subpart H Section 245.830 and Section 245.850, ~~Open air pits~~ which will allow open air pits of toxic, carcinogenic and even radioactive ~~Contaminated~~ water. The regulatory bill mandates closed/sealed tanks! Open air pits may leak, seep into groundwater, cause toxic rain and drinking water, affect our food supply via rain and ~~Seriously~~ etc, endanger human and animal health. The safety of 800,000 people depends on the rules and regulations about fracking and you should not choose profits over people.

The penalties are minimal and are not punishments. ~~Rather~~ They are minor inconveniences, which makes people minor inconveniences. People should not be treated this way. Penalties should be ~~significant~~ significant to multi-billion dollar corporations/companies. They should be so significant, that these companies will be considerate, careful and even ~~disn~~ discouraged to frack Illinois.

The IDNR needs NOT to allow fracking operations to regulate themselves! The IDNR needs to have strict, well planned and considerate rules that represent the people, not corporations or companies or profit. ~~We~~ We, the people, ~~deserve~~ deserve to be informed, listened to and treated fairly. Do not take advantage of us; do not compromise ~~our~~ our future and protect the environment. Do not contaminate our water! Please

HOLD STRONG FOR JUSTICE

IRON THE PEOPLE'S LOBBY

Fracking Background

This past June, Governor Quinn signed a bill to regulate fracking in IL. It was co-written by industry, Big Greens (NRDC, Sierra Club, the Environmental Law & Policy Center, and Faith in Place), government officials, and legislators. There were two failed moratorium bills in the lead-up to the regulatory bill.

Rules Process (for an explanation of the full process, click on "Illinois Rulemaking Process" on this page)

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- Second 45-day public comment period ("second notice")
- JCAR's decision -- no objection; no objection with recommendation; objection; or filing prohibition/suspension

Things to know:

IDNR = Illinois Department of Natural Resources, the state agency responsible for regulating fracking

JCAR = Joint Committee on Administrative Rules, a bicameral & bipartisan 12-member legislative body that must approve IDNR's proposed rules before they can go into effect

Moratorium = suspension of an activity for a given amount of time (i.e., a 2-year moratorium on fracking)

Rules

The following are weaknesses or omissions in the newly published rules of provisions that would have been allowed or encouraged by the regulatory bill.

(1) Wastewater Storage: the new rules allow toxic, radioactive, carcinogenic wastewater to be stored in open air pits rather than closed, sealed tanks.

(2) Automatic Permit Revocation for Violations: the new rules provide no penalty for violations of the American Petroleum Institute's standards.

(3) Disclosure of Administrative and Operating Violations: the new rules only require disclosure of "serious" previous violations before inviting companies to frack in Illinois, but the rules provide no definition of what a "serious" violation is.

(4) Fines on Administrative and Operating violations: the new rules only impose fines of $50 to at most $2,500 for a multi-billion-dollar industry.

(5) Health Professionals' Access to Chemicals: the new rules only allow doctors to know which of the 353 chemicals in secret proprietary blends may have been used in a hydraulic fracturing process that is affecting their patient after they have proven that the patient was affected by one of these chemicals, and only during IDNR business hours or via an unspecified "trade secret holder."

(6) Seismicity: the new rules allow up to four earthquakes of up to 4.9 magnitude, even near the New Madrid or Wabash fault lines in Southern Illinois before a company has to shut down an injection well.

(7) Produced Water Testing: the new rules do not have any ways to ensure that water produced from hydraulic fracturing is tested for radioactivity or meets the Illinois Low-Level Radioactive Waste Management act.

(8) Local Control: the new rules only allow local control of fracking permits for municipalities, but many of the fracking sites would be in rural areas where the appropriate local authority would be the county, not a municipality.

(9) Lack of Studies, Reports, or Underlying Data Used to Compose Rulemaking: the current rules are by IDNR's admission, not based on any research or data or studies available from other states where fracking has been done.

021911

name is Michelle Mejia & I'm a member
IIRON Student network & here with Fai
Illinois.

make my comment, I'd like to request
e IDNR extend the comment period
ter the holidays & provide more hearing
ly in Bloomington & Chicago. The only
o hearing is today & a day &
before Thanksgiving w/ only 11 days notice
ere is no hearing at Bloomington.

ic Permit Revocation for Violations
e original regulatory bill, (sec 1-70 in Lill)
that the construction & testing of fracking
neet standards ~~set~~ by the American
Institute (API), the rules create
ly no incentive for companies to meet these
is (Sec. 245.1100) - as of now it only
that IDNR "may" suspend or revoke
& or issue penalties - the event
standards are not met.
it following these standards, all fracking
would be in grave danger of blowouts
& explosions that endanger the lives of
nearby residents.
Solution to this is to suspend/revoke
its & /or issue permits automatically
er companies violate these standards
that IDNR "will" suspend/revoke

or issue penalties. This way
as will know to think twice
violating these provisions.

Hello,

my name is Kenzo Esquivel and I am a member of the IRON student network and am here with Fair Economy Illinois.

I would just like to start off with a request that the IDNR extend the comment period beyond the holiday season and also that you provide addition hearings around Chicago and Bloomington. It seems ridiculous that you would only have 1 hearing for all of Chicagoland's 2.7 million residents and to hold it a day and a half before Thanksgiving with only 11 days notice? This all seems quite unreasonable.

[redacted] For the last several years I have been extremely engaged in learning about the environment and taking action to preserve our natural surroundings. With the University of Chicago Climate Action Network and the IRON student network, I have become increasingly engaged with the topic of fracking and from my studies at the University, I have come to realize the great impact that these regulations could have on our future. Beyond IL, these regulations could serve as a model, however, with the myriad of issues that the regulations have, I no longer see these as the foward thinking rules that were promised back when Gov. Quinn passed the regulatory bill

The issues are numerous but I will focus on the issues in section 245.120 on local control which requires that fracking permits include documents certifying consent for fracking operations to occur from the municipal authorities affiliated w/ the particular city, village, or town where the well site is to be located.

Even though the intent of the legislation recognized that local govt have the ultimate decision making power, IDNR rules omit the consent of county authorities in the event that the local gov. unit falls and the county land. The vast majority of fracking in IL is going to occur outside of municipalities whereby the smallest govt unit is the local county. Both municipal and county governments in IL implement govt tax, hire law enforcement, and provide social services and infrastructure. Counties have always been able to issue permits on mineral and oil extraction in the past and should have the same powers as municipalities when it comes to deciding whether or not fracking is allowed in their jurisdiction.

In short the new rules only allow local control of Fracking Permits for municipalities, but many of the fracking sites would be in rural areas where the appropriate local authority would be the county, not the municipality

Heather Ruhnke > Stay @ home Mom
Crest Hill IL.

Why the Ruhnke Family of Crest Hill IL. Does not want hydraulic fracturing in our home state:
In the comfort of your home and community everyone uses water. I use it at home to bath my children, clean my dishes, and fill a pool on a warm summer day. As a Mother you worry so much about the safety of your children. Today from things that are hidden from you, GMO's in the food I give them, chemicals in the products I use, it is a new era of parenting. My concerns are that of any mother, wanting to give their children the best. This is why I am here today, with my children.

These are a few of my reasons, as I will not have time to state all of them:

1. 5 million gallons of fluid filled with 75 thousand chemicals is used in one insist of fracturing a well. This fluid is known to rise back up, leak into groundwater and these chemicals are know to cause all types of cancers. This is a reason to not allow Fracking at all in the US!

2. Illinois has 28 million acres of farmland, according to the IL. Dept of Agriculture website, the state of IL. Provides corn, soybean, hogs, cattle, diary products and wheat to many people. A tainted water supply because of Fracking, because of an accident could devastate these farms and leave millions without food. Are we really willing to take that chance to disrupt a already delicate balance? pg 280

3. According to Sandra Steingraber(pg.275 Raising Elijah) A single fracking operation requires the use of 2 to 8 million gallons of fresh water; removed from lakes, streams, or groundwater aquifers. This is a waste of a vital natural resource, are we willing to waste water to get natural gas, is that what it has come to?

I know that now when times are hard people look at this and say it could mean good paying jobs, it means no dependence on foreign oil in the US. Will the reasons be worth it when people have no safe drinking water, or when we have tainted farmlands, and food is scarce, or when we have so many more cases of cancer. It is time to step aside from this type of resource, it is time to speak up for our children and future generations ; & invest in Green energy and stop harming our planet, before it is too late.

021916

Lindsay Paulus
1806 Marion Ct.
Wheaton, IL
60187

To the Illinois Department of Natural Resources: please extend the comment period until after the holidays.

As a citizen of Illinois and a public school teacher of elementary students, I am opposed to fracking. Fracking will contaminate our groundwater with radioactive, carcinogenic, poisonous toxins. It will irreversibly harm the environment. This is something I can't imagine doing to the innocent children I teach, who have no say in the matter.

Corporate executives and politicians may be benefitting from fracking financially, but I can tell you first hand, my young students are in no way benefitting from fracking. No matter how much money fracking can earn for you, you can not buy a new environment or clean water for my students or your own grandchildren.

So section 1-53 (of the regulatory bill) requires that fracking operations "prevent pollutions," but there are almost no known ways to prevent the VOC emissions (Volatile Organic Compounds). We must stop fracking until solutions for preventing pollution are found so that section 1-53 actually does what it is saying & promising it will: protect the environment.

As a public school teacher in the state of Illinois I am required to implement a research-based, proven

do not claim to teach reading without any proof that my interventions work, do not claim that you will "prevent pollution" (regulatory bill 1-53) from fracking without a proven method of doing so.

Thank you.

Dear Illinois Dept. of Natural Resources,

I believe that hydraulic fracturing is a completely insane and irresponsible practice committed by people who do not understand the implications of what they are doing, and who have an utter disregard for the health of humans and the natural world. It is in violation of the Safe Drinking Water Act. The proposed IDNR legislation would allow fracking companies to leave uranium-containing wastewater in open pits through an ambiguous definition of what constitutes an emergency. Out of 2500 fracking products, more than 650 are known or possible carcinogens. Fracking contaminates aquifers with Hydrogen Sulfide, which is toxic to human as well as methane, which creates a serious risk of explosion. Illinois suffered from a significant drought in 2012, and yet fracking companies are mysteriously exempt from water use limitations, though the average fracking job uses between 2-4 million gallons of water. Drought will increasingly be an issue due to global warming, which fracking also contributes to via the release of methane. Fracking further pollutes the air with volatile organic contaminants & ozone. Do we need to wait for a Deepwater Horizon or Fukushima-level disaster for the risks of fracking to be taken seriously? I strongly urge the IDNR to extend the comment period and to revise fracking rules in favor of human health.

Sincerely,
Lee Dull

071912

071912

021920

HOLD STRONG FOR JUSTICE

IRON THE PEOPLE'S LOBBY

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021920

Julian Borjas
10950 Joda Drive Oak Lawn, IL.
RE: IDNR Hearing, "fracking" Rules

The rules proposed here today DO NOT go far enough to reduce the public's cost from fracking.

The ability for private companies to impose public costs unfairly taxes and jeopardizes the citizens of the State of Illinois, those gathered here, including members of the Illinois department of Resources and the employees of mining companies. **Pollution is a subsidy**, it levies a very real tax, paid by the public to help private businesses. And you don't need t be a scientist to understand that pumping a chemical slurry into the Earth will cause a reaction in the local environment.

But just in case you were a skeptic,

- Scientists in a harvard-led study found methane released from fracking is 20-30 times more heat trapping than carbon.

- Doctors from The National Institute of Occupational Safety and Health warned of an elevated risk of contracting the lung disease, from inhaling silica dust at fracking sites, an affliction costing $50 million medical care costs.

- Economists warn of practically incalculable costs from increased natural disasters, flooding and other mitigation costs.

Without proper regulation - including **monitoring any and all hydraulic fracturing fluid**- the costs of pollution will be passed onto tax-payers. The watering down of rules regarding fines is of great concern, for **these fines must at least cover the cost of damages and restoration to the public**.

If this industry is so then it innovative can cover its own costs and the public should be kept from damage by its elected officials, and **the public must be given a voice in these actions which directly affect us**.

Thank you.

021921

To:	**ILLINOIS DEPARTMENT OF NATURAL RESOURCES** **Hearings at the University of Illinois at Chicago**
From:	**Joyce Good, 4915 N. Avers Ave., Chicago IL 60625** **joycegood@SBCGlobal.net**
Date:	**November 26, 2013**
Subject:	**Rules of the Illinois Fracking Regulatory Act** **Permit Applications - Consent**

My reference is to Section 245.210 which states:

"...when an application is made to frack a well site located within the limits of any city, village or incorporated town, the application shall state the name of the city, village, or incorporated town and be accompanied with a certified copy of the official consent for the high volume horizontal hydraulic fracturing operations to occur from the municipal authorities where the well site is proposed to be located. No permit shall be issued unless consent is secured and filed with the permit application."

While consent is filed with the permit application, it should not be filed by any person or entity that is part of the oil and gas industry. Consent should stand starkly apart from any influence other than the popular will. Delivery of a request for consent should be through a neutral letter composed by the IDNR and posted on its website and delivered by certified mail. The gas and oil companies should not interact in person with any member of a government entity; to or by email; mail; phone; text or telegram. Consent should be uninfluenced by the oil and gas industry and wholly determined by the entity involved. Enforcement measures should be stated that keep consent the decision of the residents.

It appears that the intent of this section is to recognize that local units of government should have decision-making power regarding whether to allow fracking in their jurisdictions. In fact, it is presently known that at least five Illinois counties have voted for a one year moratorium on fracking. Their residents have opposed fracking. Because these counties have assembled, discussed, voted and expressed their opinions - they have demonstrated that this unit of government is interested, involved and able to make decisions. Moreover, the realities of the geography of fracking in Illinois demonstrate that fracking more often occurs in rural areas of counties rather than cities

or municipalities. Little, if any fracking, is anticipated within the cities of Carbondale, Marion, Decatur or other metropolitan areas affected by the majority of fracking land leases.

If prior notification and an intentional process of permitting is important for metropolitan communities, the proposed rules should include neighborhoods in counties and the families living there.

Moreover, to contact a municipality or township within a county that has already assembled and voted against fracking, would be to ignore or nullify the popular decision. This would stand in stark contradiction to the spirit of IDNR's own rule which requires popular consent.

There is no substantive difference between a municipal or county government in Illinois in its powers other than the issue of Illinois Constitutional Home Rule. Counties and municipalities of government tax, employ law enforcement, provide social services and infrastructure. The lack of county Home Rule has not preempted a county power to issue permits on mineral or oil extraction.
The present rules ignore precedent and provide no explanation why citizens residing in counties of Illinois should have less input regarding fracking permits.

Numerous county governments have long histories and traditions in the permitting process regarding mineral and drilling industries. As the current fracking law is largely silent on the issue of county control, IDNR rules should reflect Illinois history and encourage wider citizen decision-making, especially in counties.

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621923

Name LESLIE ROBERTS

Address
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OAK PARK, IL. 60304

Email lrdeed-harmon@yahoo.com

To the Illinois Department of Natural Resources,

As a citizen of the state of Illinois, I find the IDNR's proposed fracking regulations egregiously insufficient to protect Illinois' water and people.

My first comment refers to the "Chemical Disclosure Report" requirement outlined in Section 245.210(a)(8) of the Proposed Hydraulic Fracturing Regulatory Act administrative rules.

First and foremost, Section 245.210 states that every applicant for a permit under this Part "must submit" certain information, including a Chemical Disclosure Report identifying each chemical and proppant *anticipated* to be used in hydraulic fracturing fluid for each state of the high volume horizontal hydraulic fracturing operations.

However, Section 245.210(a)(8) allows an applicant to postpone submission of a Chemical Disclosure Report if it "documents to the Department's satisfaction why the information is not available at the time the application is submitted [...]" The criteria for documenting "to the Department's satisfaction" is subjective, vague, and ambiguous. The Department should revise the proposed rule to provide objective standards for the exercise of discretion by the Department under Section 245.210(a)(8).

see other side

Residents of towns throughout Pennsylvania (located on the Marcellus Shale on the Appalachian basin) and Texas (located on the Barnett Shale formation) had their groundwater drinking supply contaminated by fracking chemicals. These residents have been able to turn on their tap, put a match to it, and light their water on fire. Many residents have also had health impacts resulting from the contaminated water (and air), such as nose bleeds, and damage to the lungs, liver, kidneys, blood, and brain as well as immune and reproductive diseases.

It is unacceptable and inexcusable for the IDNR to have such vague and weak laws pertaining to the disclosure of chemical use in hydraulic fracturing. As a citizen of Illinois, I do not feel that these regulations protect me, my health, or my state's natural resources.

In addition, I believe that permittees should be required to obtain Department approval before adjusting or altering contents of fluid. This comment is in reference to Section 245.700 "Chemical Disclosures by Permittee" of the Proposed Hydraulic Fracturing Regulatory Act administrative rules. The regulations, as stated in this section, are completely insufficient to protect my health and our natural resources because they provide the industry extensive leeway in modifying fracking fluid before informing the IDNR. In addition, I believe that the IDNR should be setting standards for the chemical composition of fracking fluid that permittees should follow. These standards should be based on scientific research of what is proven safe. If such research does not yet exist, the state needs to fund this research before allowed fracking to take place in Illinois.

Given these complaints, I demand that the IDNR require permittees to fully disclose all contents of fracking fluid and their proportions far in advance of drilling. I also demand that this information be made completely public and easily accessible on the internet. No untested combinations of chemicals in fracking fluid should be permitted. This knowledge is my right as an Illinois citizen.

Thank you.

see otherside AND ATTACHED ... PAGES 021924

Sincerely,

scientific studies the IDNR rules were based on
SAID 'NONE'. START HERE:

see ON LINE PDF easily found in a search
UNITED STATES HOUSE OF REPRESENTATIVES
COMMITTEE OF ENERGY AND COMMERCE
MINORITY STAFF
APRIL 2011

CHEMICALS USED IN HYDRAULIC FRACTURING

PREPARED BY HENRY A. WAXMAN
EDWARD J. MARKEY
DIANA DEGETTE

IN A STUDY OF 14 fracking companies 2005-2009
650 TOXIC AND/or carcinogenic chemicals are used
given that the industry ran TV ADS SAYING fracking
is safe AND THEREFORE THEY can not be trusted
the state of Illinois needs to test for every
chemical see list report page 13-34.
for every well every day and forbid them all
not just diesel. IDNR DOES NOT HAVE THE
THE STATE OF IL CAPACITY OR WILL!

Leslie Roberts

021925

UNITED STATES HOUSE OF REPRESENTATIVES
COMMITTEE ON ENERGY AND COMMERCE
MINORITY STAFF
APRIL 2011

CHEMICALS USED IN HYDRAULIC FRACTURING

PREPARED BY COMMITTEE STAFF FOR:

Henry A. Waxman
Ranking Member
Committee on Energy and Commerce

Edward J. Markey
Ranking Member
Committee on Natural Resources

Diana DeGette
Ranking Member
Subcommittee on Oversight and Investigations

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I. EXECUTIVE SUMMARY

Hydraulic fracturing has helped to expand natural gas production in the United States, unlocking large natural gas supplies in shale and other unconventional formations across the country. As a result of hydraulic fracturing and advances in horizontal drilling technology, natural gas production in 2010 reached the highest level in decades. According to new estimates by the Energy Information Administration (EIA), the United States possesses natural gas resources sufficient to supply the United States for approximately 110 years.

As the use of hydraulic fracturing has grown, so have concerns about its environmental and public health impacts. One concern is that hydraulic fracturing fluids used to fracture rock formations contain numerous chemicals that could harm human health and the environment, especially if they enter drinking water supplies. The opposition of many oil and gas companies to public disclosure of the chemicals they use has compounded this concern.

Last Congress, the Committee on Energy and Commerce launched an investigation to examine the practice of hydraulic fracturing in the United States. As part of that inquiry, the Committee asked the 14 leading oil and gas service companies to disclose the types and volumes of the hydraulic fracturing products they used in their fluids between 2005 and 2009 and the chemical contents of those products. This report summarizes the information provided to the Committee.

Between 2005 and 2009, the 14 oil and gas service companies used more than 2,500 hydraulic fracturing products containing 750 chemicals and other components. Overall, these companies used 780 million gallons of hydraulic fracturing products – not including water added at the well site – between 2005 and 2009.

Some of the components used in the hydraulic fracturing products were common and generally harmless, such as salt and citric acid. Some were unexpected, such as instant coffee and walnut hulls. And some were extremely toxic, such as benzene and lead. Appendix A lists each of the 750 chemicals and other components used in hydraulic fracturing products between 2005 and 2009.

The most widely used chemical in hydraulic fracturing during this time period, as measured by the number of compounds containing the chemical, was methanol. Methanol, which was used in 342 hydraulic fracturing products, is a hazardous air pollutant and is on the candidate list for potential regulation under the Safe Drinking Water Act. Some of the other most widely used chemicals were isopropyl alcohol (used in 274 products), 2-butoxyethanol (used in 126 products), and ethylene glycol (used in 119 products).

Between 2005 and 2009, the oil and gas service companies used hydraulic fracturing products containing 29 chemicals that are (1) known or possible human carcinogens, (2) regulated under the Safe Drinking Water Act for their risks to human health, or (3) listed as hazardous air pollutants under the Clean Air Act. These 29 chemicals were components of more than 650 different products used in hydraulic fracturing.

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The BTEX compounds – benzene, toluene, xylene, and ethylbenzene – appeared in 60 of the hydraulic fracturing products used between 2005 and 2009. Each BTEX compound is a regulated contaminant under the Safe Drinking Water Act and a hazardous air pollutant under the Clean Air Act. Benzene also is a known human carcinogen. The hydraulic fracturing companies injected 11.4 million gallons of products containing at least one BTEX chemical over the five year period.

In many instances, the oil and gas service companies were unable to provide the Committee with a complete chemical makeup of the hydraulic fracturing fluids they used. Between 2005 and 2009, the companies used 94 million gallons of 279 products that contained at least one chemical or component that the manufacturers deemed proprietary or a trade secret. Committee staff requested that these companies disclose this proprietary information. Although some companies did provide information about these proprietary fluids, in most cases the companies stated that they did not have access to proprietary information about products they purchased "off the shelf" from chemical suppliers. In these cases, the companies are injecting fluids containing chemicals that they themselves cannot identify.

II. BACKGROUND

Hydraulic fracturing – a method by which oil and gas service companies provide access to domestic energy trapped in hard-to-reach geologic formations — has been the subject of both enthusiasm and increasing environmental and health concerns in recent years. Hydraulic fracturing, used in combination with horizontal drilling, has allowed industry to access natural gas reserves previously considered uneconomical, particularly in shale formations. As a result of the growing use of hydraulic fracturing, natural gas production in the United States reached 21,577 billion cubic feet in 2010, a level not achieved since a period of high natural gas production between 1970 and 1974.[1] Overall, the Energy Information Administration now projects that the United States possesses 2,552 trillion cubic feet of potential natural gas resources, enough to supply the United States for approximately 110 years. Natural gas from shale resources accounts for 827 trillion cubic feet of this total, which is more than double what the EIA estimated just a year ago.[2]

Hydraulic fracturing creates access to more natural gas supplies, but the process requires the use of large quantities of water and fracturing fluids, which are injected underground at high volumes and pressure. Oil and gas service companies design fracturing fluids to create fractures and transport sand or other granular substances to prop open the fractures. The composition of these fluids varies by formation, ranging from a simple mixture of water and sand to more complex mixtures with a multitude of chemical additives. The companies may use these

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[1] Energy Information Administration (EIA), *Natural Gas Monthly (Mar. 2011)*, Table 1, U.S. Natural Gas Monthly Supply and Disposition Balance (online at www.eia.gov/dnav/ng/hist/n9070us1A.htm) (accessed Mar. 30, 2011).

[2] EIA, *Annual Energy Outlook 2011 Early Release* (Dec. 16, 2010); EIA, *What is shale gas and why is it important?* (online at www.eia.doe.gov/energy_in_brief/about_shale_gas.cfm) (accessed Mar. 30, 2011).

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chemical additives to thicken or thin the fluids, improve the flow of the fluid, or kill bacteria that can reduce fracturing performance.[3]

Some of these chemicals, if not disposed of safely or allowed to leach into the drinking water supply, could damage the environment or pose a risk to human health. During hydraulic fracturing, fluids containing chemicals are injected deep underground, where their migration is not entirely predictable. Well failures, such as the use of insufficient well casing, could lead to their release at shallower depths, closer to drinking water supplies.[4] Although some fracturing fluids are removed from the well at the end of the fracturing process, a substantial amount remains underground.[5]

While most underground injections of chemicals are subject to the protections of the Safe Drinking Water Act (SDWA), Congress in 2005 modified the law to exclude "the underground injection of fluids or propping agents (other than diesel fuels) pursuant to hydraulic fracturing operations related to oil, gas, or geothermal production activities" from the Act's protections.[6] Unless oil and gas service companies use diesel in the hydraulic fracturing process, the permanent underground injection of chemicals used for hydraulic fracturing is not regulated by the Environmental Protection Agency (EPA).

Concerns also have been raised about the ultimate outcome of chemicals that are recovered and disposed of as wastewater. This wastewater is stored in tanks or pits at the well site, where spills are possible.[7] For final disposal, well operators must either recycle the fluids for use in future fracturing jobs, inject it into underground storage wells (which, unlike the fracturing process itself, are subject to the Safe Drinking Water Act), discharge it to nearby surface water, or transport it to wastewater treatment facilities.[8] A recent report in the *New York*

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[3] U.S. Environmental Protection Agency, *Evaluation of Impacts to Underground Sources of Drinking Water by Hydraulic Fracturing of Coalbed Methane Reservoirs* (June 2004) (EPA 816-R-04-003) at 4-1 and 4-2.

[4] For instance, Pennsylvania's Department of Environmental Protection has cited Cabot Oil & Gas Corporation for contamination of drinking water wells with seepage caused by weak casing or improper cementing of a natural gas well. *See Officials in Three States Pin Water Woes on Gas Drilling*, ProPublica (Apr. 26, 2009) (online at www.propublica.org/article/officials-in-three-states-pin-water-woes-on-gas-drilling-426) (accessed Mar. 24, 2011).

[5] John A. Veil, Argonne National Laboratory, *Water Management Technologies Used by Marcellus Shale Gas Producers*, prepared for the Department of Energy (July 2010), at 13 (hereinafter "*Water Management Technologies*").

[6] 42 U.S.C. § 300h(d). Many dubbed this provision the "Halliburton loophole" because of Halliburton's ties to then-Vice President Cheney and its role as one of the largest providers of hydraulic fracturing services. *See The Halliburton Loophole*, New York Times (Nov. 9. 2009).

[7] *See* EPA, *Draft Hydraulic Fracturing Study Plan* (Feb. 7, 2011), at 37; *Regulation Lax as Gas Wells' Tainted Water Hits Rivers*, New York Times (Feb. 26, 2011).

[8] *Water Management Technologies*, at 13.

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Times raised questions about the safety of surface water discharge and the ability of water treatment facilities to process wastewater from natural gas drilling operations.[9]

Any risk to the environment and human health posed by fracturing fluids depends in large part on their contents. Federal law, however, contains no public disclosure requirements for oil and gas producers or service companies involved in hydraulic fracturing, and state disclosure requirements vary greatly.[10] While the industry has recently announced that it soon will create a public database of fluid components, reporting to this database is strictly voluntary, disclosure will not include the chemical identity of products labeled as proprietary, and there is no way to determine if companies are accurately reporting information for all wells.[11]

The absence of a minimum national baseline for disclosure of fluids injected during the hydraulic fracturing process and the exemption of most hydraulic fracturing injections from regulation under the Safe Drinking Water Act has left an informational void concerning the contents, chemical concentrations, and volumes of fluids that go into the ground during fracturing operations and return to the surface in the form of wastewater. As a result, regulators and the public are unable effectively to assess any impact the use of these fluids may have on the environment or public health.

III. METHODOLOGY

On February 18, 2010, the Committee commenced an investigation into the practice of hydraulic fracturing and its potential impact on water quality across the United States. This investigation built on work begun by Ranking Member Henry A. Waxman in 2007 as Chairman of the Committee on Oversight and Government Reform. The Committee initially sent letters to eight oil and gas service companies engaged in hydraulic fracturing in the United States. In May 2010, the Committee sent letters to six additional oil and gas service companies to assess a

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[9] *Regulation Lax as Gas Wells' Tainted Water Hits Rivers*, New York Times (Feb. 26, 2011).

[10] Wyoming, for example, recently enacted relatively strong disclosure regulations, requiring disclosure on a well-by-well basis and "for each stage of the well stimulation program," "the chemical additives, compounds and concentrations or rates proposed to be mixed and injected." *See* WCWR 055-000-003 Sec. 45. Similar regulations became effective in Arkansas this year. *See* Arkansas Oil and Gas Commission Rule B-19. In Wyoming, much of this information is, after an initial period of review, available to the public. *See* WCWR 055-000-003 Sec. 21. Other states, however, do not insist on such robust disclosure. For instance, West Virginia has no disclosure requirements for hydraulic fracturing and expressly exempts fluids used during hydraulic fracturing from the disclosure requirements applicable to underground injection of fluids for purposes of waste storage. *See* W. Va. Code St. R. § 34-5-7.

[11] *See Ground Water Protection Council Calls for Disclosure of Chemicals Used in Shale Gas Exploration*, Ground Water Protection Council (Oct. 5, 2010) (online at www.wqpmag.com/Ground-Water-Protection-Council-Calls-for-Disclosure-of-Chemicals-in-Shale-Gas-Exploration-newsPiece21700) (accessed Mar. 24, 2011).

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broader range of industry practices.[12] The February and May letters requested information on the type and volume of chemicals present in the hydraulic fracturing products that each company used in their fluids between 2005 and 2009.

The 14 oil and gas service companies that received the letter voluntarily provided substantial information to the Committee. As requested, the companies reported the names and volumes of the products they used during the five-year period.[13] For each hydraulic fracturing product reported, the companies also provided a Material Safety Data Sheet (MSDS) detailing the product's chemical components. The Occupational Safety and Health Administration (OSHA) requires chemical manufacturers to create a MSDS for every product they sell as a means to communicate potential health and safety hazards to employees and employers. The MSDS must list all hazardous ingredients if they comprise at least 1% of the product; for carcinogens, the reporting threshold is 0.1%.[14]

Under OSHA regulations, manufacturers may withhold the identity of chemical components that constitute "trade secrets."[15] If the MSDS for a particular product used by a company subject to the Committee's investigation reported that the identity of any chemical component was a trade secret, the Committee asked the company that used that product to provide the proprietary information, if available.

IV. HYDRAULIC FRACTURING FLUIDS AND THEIR CONTENTS

Between 2005 and 2009, the 14 oil and gas service companies used more than 2,500 hydraulic fracturing products containing 750 chemicals and other components.[16] Overall, these companies used 780 million gallons of hydraulic fracturing products in their fluids between 2005 and 2009. This volume does not include water that the companies added to the fluids at the well site before injection. The products are comprised of a wide range of chemicals. Some are seemingly harmless like sodium chloride (salt), gelatin, and citric acid. Others could pose a severe risk to human health or the environment.

[12] The Committee sent letters to Basic Energy Services, BJ Services, Calfrac Well Services, Complete Production Services, Frac Tech Services, Halliburton, Key Energy Services, RPC, Sanjel Corporation, Schlumberger, Superior Well Services, Trican Well Service, Universal Well Services, and Weatherford.

[13] BJ Services, Halliburton, and Schlumberger already had provided the Oversight Committee with data for 2005 through 2007. For BJ Services, the 2005-2007 data is limited to natural gas wells. For Schlumberger, the 2005-2007 data is limited to coalbed methane wells.

[14] 29 CFR 1910.1200(g)(2)(i)(C)(1).

[15] 29 CFR 1910.1200.

[16] Each hydraulic fracturing "product" is a mixture of chemicals or other components designed to achieve a certain performance goal, such as increasing the viscosity of water. Some oil and gas service companies create their own products; most purchase these products from chemical vendors. The service companies then mix these products together at the well site to formulate the hydraulic fracturing fluids that they pump underground.

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Some of the components were surprising. One company told the Committee that it used instant coffee as one of the components in a fluid designed to inhibit acid corrosion. Two companies reported using walnut hulls as part of a breaker—a product used to degrade the fracturing fluid viscosity, which helps to enhance post-fracturing fluid recovery. Another company reported using carbohydrates as a breaker. One company used tallow soap—soap made from beef, sheep, or other animals—to reduce loss of fracturing fluid into the exposed rock.

Appendix A lists each of the 750 chemicals and other components used in the hydraulic fracturing products injected underground between 2005 and 2009.

A. Commonly Used Chemical Components

methanol

The most widely used chemical in hydraulic fracturing during this time period, as measured by the number of products containing the chemical, was methanol. Methanol is a hazardous air pollutant and a candidate for regulation under the Safe Drinking Water Act. It was a component in 342 hydraulic fracturing products. Some of the other most widely used chemicals include isopropyl alcohol, which was used in 274 products, and ethylene glycol, which was used in 119 products. Crystalline silica (silicon dioxide) appeared in 207 products, generally proppants used to hold open fractures. Table 1 has a list of the most commonly used compounds in hydraulic fracturing fluids.

Table 1. Chemical Components Appearing Most Often in Hydraulic Fracturing Products Used Between 2005 and 2009

Chemical Component	No. of Products Containing Chemical
Methanol (Methyl alcohol)	342
Isopropanol (Isopropyl alcohol, Propan-2-ol)	274
Crystalline silica - quartz (SiO2)	207
Ethylene glycol monobutyl ether (2-butoxyethanol)	126
Ethylene glycol (1,2-ethanediol)	119
Hydrotreated light petroleum distillates	89
Sodium hydroxide (Caustic soda)	80

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Hydraulic fracturing companies used 2-butoxyethanol (2-BE) as a foaming agent or surfactant in 126 products. According to EPA scientists, 2-BE is easily absorbed and rapidly distributed in humans following inhalation, ingestion, or dermal exposure. Studies have shown that exposure to 2-BE can cause hemolysis (destruction of red blood cells) and damage to the spleen, liver, and bone marrow.[17] The hydraulic fracturing companies injected 21.9 million gallons of products containing 2-BE between 2005 and 2009. They used the highest volume of products containing 2-BE in Texas, which accounted for more than half of the volume used. EPA recently found this chemical in drinking water wells tested in Pavillion, Wyoming.[18] Table 2 shows the use of 2-BE by state.

Table 2. States with the Highest Volume of Hydraulic Fracturing Fluids Containing 2-Butoxyethanol (2005-2009)

State	Fluid Volume (gallons)
Texas	12,031,734
Oklahoma	2,186,613
New Mexico	1,871,501
Colorado	1,147,614
Louisiana	890,068
Pennsylvania	747,416
West Virginia	464,231
Utah	382,874
Montana	362,497
Arkansas	348,959

[17] EPA, *Toxicological Review of Ethylene Glycol Monobutyl Ether* (Mar. 2010) at 4.

[18] EPA, *Fact Sheet: January 2010 Sampling Results and Site Update, Pavillion, Wyoming Groundwater Investigation* (Aug. 2010) (online at www.epa.gov/region8/superfund/wy/pavillion/PavillionWyomingFactSheet.pdf) (accessed Mar. 1, 2011).

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B. Toxic Chemicals

The oil and gas service companies used hydraulic fracturing products containing 29 chemicals that are (1) known or possible human carcinogens, (2) regulated under the Safe Drinking Water Act for their risks to human health, or (3) listed as hazardous air pollutants under the Clean Air Act. These 29 chemicals were components of 652 different products used in hydraulic fracturing. Table 3 lists these toxic chemicals and their frequency of use.

Table 3. Chemicals Components of Concern: Carcinogens, SDWA-Regulated Chemicals, and Hazardous Air Pollutants

Chemical Component	Chemical Category	No. of Products
Methanol (Methyl alcohol)	HAP	342
Ethylene glycol (1,2-ethanediol)	HAP	119
Diesel[19]	Carcinogen, SDWA, HAP	51
Naphthalene	Carcinogen, HAP	44
Xylene	SDWA, HAP	44
Hydrogen chloride (Hydrochloric acid)	HAP	42
Toluene	SDWA, HAP	29
Ethylbenzene	SDWA, HAP	28
Diethanolamine (2,2-iminodiethanol)	HAP	14
Formaldehyde	Carcinogen, HAP	12
Sulfuric acid	Carcinogen	9
Thiourea	Carcinogen	9
Benzyl chloride	Carcinogen, HAP	8
Cumene	HAP	6
Nitrilotriacetic acid	Carcinogen	6
Dimethyl formamide	HAP	5
Phenol	HAP	5
Benzene	Carcinogen, SDWA, HAP	3
Di (2-ethylhexyl) phthalate	Carcinogen, SDWA, HAP	3
Acrylamide	Carcinogen, SDWA, HAP	2
Hydrogen fluoride (Hydrofluoric acid)	HAP	2
Phthalic anhydride	HAP	2
Acetaldehyde	Carcinogen, HAP	1
Acetophenone	HAP	1
Copper	SDWA	1
Ethylene oxide	Carcinogen, HAP	1
Lead	Carcinogen, SDWA, HAP	1
Propylene oxide	Carcinogen, HAP	1
p-Xylene	HAP	1
Number of Products Containing a Component of Concern		**652**

[19] According to EPA, diesel contains benzene, toluene, ethylbenzene, and xylenes. *See* EPA, *Evaluation of Impacts to Underground Sources of Drinking Water by Hydraulic Fracturing of Coalbed Methane Reservoirs* (June 2004) (EPA 816-R-04-003) at 4-11.

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1. *Carcinogens*

Between 2005 and 2009, the hydraulic fracturing companies used 95 products containing 13 different carcinogens.[20] These included naphthalene (a possible human carcinogen), benzene (a known human carcinogen), and acrylamide (a probable human carcinogen). Overall, these companies injected 10.2 million gallons of fracturing products containing at least one carcinogen. The companies used the highest volume of fluids containing one or more carcinogens in Texas, Colorado, and Oklahoma. Table 4 shows the use of these chemicals by state.

Table 4. States with at Least 100,000 Gallons of Hydraulic Fracturing Fluids Containing a Carcinogen (2005-2009)

State	Fluid Volume (gallons)
Texas	3,877,273
Colorado	1,544,388
Oklahoma	1,098,746
Louisiana	777,945
Wyoming	759,898
North Dakota	557,519
New Mexico	511,186
Montana	394,873
Utah	382,338

2. *Safe Drinking Water Act Chemicals*

Under the Safe Drinking Water Act, EPA regulates 53 chemicals that may have an adverse effect on human health and are known to or likely to occur in public drinking water systems at levels of public health concern. Between 2005 and 2009, the hydraulic fracturing companies used 67 products containing at least one of eight SDWA-regulated chemicals. Overall, they injected 11.7 million gallons of fracturing products containing at least one chemical regulated under SDWA. Most of these chemicals were injected in Texas. Table 5 shows the use of these chemicals by state.

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[20] For purposes of this report, a chemical is considered a "carcinogen" if it is on one of two lists: (1) substances identified by the National Toxicology Program as "known to be human carcinogens" or as "reasonably anticipated to be human carcinogens"; and (2) substances identified by the International Agency for Research on Cancer, part of the World Health Organization, as "carcinogenic" or "probably carcinogenic" to humans. See U.S. Department of Health and Human Services, Public Health Service, National Toxicology Program, *Report on Carcinogens, Eleventh Edition* (Jan. 31, 2005) and World Health Organization, International Agency for Research on Cancer, *Agents Classified by the IARC Monographs* (online at http://monographs.iarc.fr/ENG/Classification/index.php) (accessed Feb. 28, 2011).

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The vast majority of these SDWA-regulated chemicals were the BTEX compounds – benzene, toluene, xylene, and ethylbenzene. The BTEX compounds appeared in 60 hydraulic fracturing products used between 2005 and 2009 and were used in 11.4 million gallons of hydraulic fracturing fluids. The Department of Health and Human Services, the International Agency for Research on Cancer, and EPA have determined that benzene is a human carcinogen.[21] Chronic exposure to toluene, ethylbenzene, or xylenes also can damage the central nervous system, liver, and kidneys.[22]

Table 5. States with at Least 100,000 Gallons of Hydraulic Fracturing Fluids Containing a SDWA-Regulated Chemical (2005-2009)

State	Fluid Volume (gallons)
Texas	9,474,631
New Mexico	1,157,721
Colorado	375,817
Oklahoma	202,562
Mississippi	108,809
North Dakota	100,479

In addition, the hydraulic fracturing companies injected more than 30 million gallons of diesel fuel or hydraulic fracturing fluids containing diesel fuel in wells in 19 states.[23] In a 2004 report, EPA stated that the "use of diesel fuel in fracturing fluids poses the greatest threat" to underground sources of drinking water.[24] Diesel fuel contains toxic constituents, including BTEX compounds.[25]

EPA also has created a Candidate Contaminant List (CCL), which is a list of contaminants that are currently not subject to national primary drinking water regulations but are known or anticipated to occur in public water systems and may require regulation under the Safe Drinking Water Act in the future.[26] Nine chemicals on that list—1-butanol, acetaldehyde, benzyl

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[21] U.S. Department of Health and Human Services, Agency for Toxic Substances and Disease Registry, *Public Health Statement for Benzene* (Aug. 2007).

[22] EPA, *Basic Information about Toluene in Drinking Water*, *Basic Information about Ethylbenzene in Drinking Water*, and *Basic Information about Xylenes in Drinking Water* (online at http://water.epa.gov/drink/contaminants/basicinformation/index.cfm) (accessed Oct. 14, 2010).

[23] Letter from Reps. Henry A. Waxman, Edward J. Markey, and Diana DeGette to the Honorable Lisa Jackson, Administrator, U.S. Environmental Protection Agency (Jan. 31, 2011).

[24] EPA, *Evaluation of Impacts to Underground Sources of Drinking Water by Hydraulic Fracturing of Coalbed Methane Reservoirs* (June 2004) (EPA 816-R-04-003) at 4-11.

[25] *Id.*

[26] EPA, *Contaminant Candidate List 3* (online at http://water.epa.gov/scitech/drinkingwater/dws/ccl/ccl3.cfm) (accessed Mar. 31, 2011).

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chloride, ethylene glycol, ethylene oxide, formaldehyde, methanol, n-methyl-2-pyrrolidone, and propylene oxide—were used in hydraulic fracturing products between 2005 and 2009.

3. Hazardous Air Pollutants

The Clean Air Act requires EPA to control the emission of 187 hazardous air pollutants, which are pollutants that cause or may cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental and ecological effects.[27] Between 2005 and 2009, the hydraulic fracturing companies used 595 products containing 24 different hazardous air pollutants.

Hydrogen fluoride is a hazardous air pollutant that is a highly corrosive and systemic poison that causes severe and sometimes delayed health effects due to deep tissue penetration. Absorption of substantial amounts of hydrogen fluoride by any route may be fatal.[28] One of the hydraulic fracturing companies used 67,222 gallons of two products containing hydrogen fluoride in 2008 and 2009.

Lead is a hazardous air pollutant that is a heavy metal that is particularly harmful to children's neurological development. It also can cause health problems in adults, including reproductive problems, high blood pressure, and nerve disorders.[29] One of the hydraulic fracturing companies used 780 gallons of a product containing lead in this five-year period.

Methanol is the hazardous air pollutant that appeared most often in hydraulic fracturing products. Other hazardous air pollutants used in hydraulic fracturing fluids included formaldehyde, hydrogen chloride, and ethylene glycol.

V. USE OF PROPRIETARY AND "TRADE SECRET" CHEMICALS

Many chemical components of hydraulic fracturing fluids used by the companies were listed on the MSDSs as "proprietary" or "trade secret." The hydraulic fracturing companies used 93.6 million gallons of 279 products containing at least one proprietary component between 2005 and 2009.[30]

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[27] Clean Air Act Section 112(b), 42 U.S.C. § 7412.

[28] HHS, Agency for Toxic Substances and Disease Registry, *Medical Management Guidelines for Hydrogen Fluoride* (online at www.atsdr.cdc.gov/mhmi/mmg11.pdf) (accessed Mar. 24, 2011).

[29] EPA, *Basic Information about Lead* (online at www.epa.gov/lead/pubs/leadinfo.htm) (accessed Mar. 30, 2011).

[30] This is likely a conservative estimate. We included only those products for which the MSDS says "proprietary" or "trade secret" instead of listing a component by name or providing the CAS number. If the MSDS listed a component's CAS as N.A. or left it blank, we did not count that as a trade secret claim, unless the company specified as such in follow-up correspondence.

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The Committee requested that these companies disclose this proprietary information. Although a few companies were able to provide additional information to the Committee about some of the fracturing products, in most cases the companies stated that they did not have access to proprietary information about products they purchased "off the shelf" from chemical suppliers. The proprietary information belongs to the suppliers, not the users of the chemicals.

Universal Well Services, for example, told the Committee that it "obtains hydraulic fracturing products from third-party manufacturers, and to the extent not publicly disclosed, product composition is proprietary to the respective vendor and not to the Company."[31] Complete Production Services noted that the company always uses fluids from third-party suppliers who provide an MSDS for each product. Complete confirmed that it is "not aware of any circumstances in which the vendors who provided the products have disclosed this proprietary information" to the company, further noting that "such information is highly proprietary for these vendors, and would not generally be disclosed to service providers" like Complete.[32] Key Energy Services similarly stated that it "generally does not have access to the trade secret information as a purchaser of the chemical(s)."[33] Trican also told the Committee that it has limited knowledge of "off the shelf" products purchased from a chemical distributor or manufacturer, noting that "Trican does not have any information in its possession about the components of such products beyond what the distributor of each product provided Trican in the MSDS sheet."[34]

In these cases, it appears that the companies are injecting fluids containing unknown chemicals about which they may have limited understanding of the potential risks posed to human health and the environment.

VI. CONCLUSION

Hydraulic fracturing has opened access to vast domestic reserves of natural gas that could provide an important stepping stone to a clean energy future. Yet questions about the safety of hydraulic fracturing persist, which are compounded by the secrecy surrounding the chemicals used in hydraulic fracturing fluids. This analysis is the most comprehensive national assessment to date of the types and volumes of chemical used in the hydraulic fracturing process. It shows that between 2005 and 2009, the 14 leading hydraulic fracturing companies in the United States used over 2,500 hydraulic fracturing products containing 750 compounds. More than 650 of these products contained chemicals that are known or possible human carcinogens, regulated under the Safe Drinking Water Act, or listed as hazardous air pollutants.

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[31] Letter from Reginald J. Brown to Henry A. Waxman, Chairman, Committee on Energy and Commerce, and Edward J. Markey, Chairman, Subcommittee on Energy and Environment (Apr. 16, 2010).

[32] Letter from Philip Perry to Henry A. Waxman, Chairman, Committee Energy and Commerce, and Edward J. Markey, Chairman, Subcommittee on Energy and Environment (Aug. 6, 2010).

[33] E-mail from Peter Spivack to Committee Staff (Aug. 5, 2010).

[34] E-mail from Lee Blalack to Committee Staff (July 29, 2010).

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Appendix A. Chemical Components of Hydraulic Fracturing Products, 2005-2009[35]

Chemical Component	Chemical Abstract Service Number	No. of Products Containing Chemical
1-(1-naphthylmethyl)quinolinium chloride	65322-65-8	1
1,2,3-propanetricarboxylic acid, 2-hydroxy-, trisodium salt, dihydrate	6132-04-3	1
1,2,3-trimethylbenzene	526-73-8	1
1,2,4-trimethylbenzene	95-63-6	21
1,2-benzisothiazol-3	2634-33-5	1
1,2-dibromo-2,4-dicyanobutane	35691-65-7	1
1,2-ethanediaminium, N, N'-bis[2-[bis(2-hydroxyethyl)methylammonio]ethyl]-N,N'-bis(2-hydroxyethyl)-N,N'-dimethyl-,tetrachloride	138879-94-4	2
1,3,5-trimethylbenzene	108-67-8	3
1,6-hexanediamine dihydrochloride	6055-52-3	1
1,8-diamino-3,6-dioxaoctane	929-59-9	1
1-hexanol	111-27-3	1
1-methoxy-2-propanol	107-98-2	3
2,2`-azobis (2-amidopropane) dihydrochloride	2997-92-4	1
2,2-dibromo-3-nitrilopropionamide	10222-01-2	27
2-acrylamido-2-methylpropanesulphonic acid sodium salt polymer	*	1
2-bromo-2-nitropropane-1,3-diol	52-51-7	4
2-butanone oxime	96-29-7	1
2-hydroxypropionic acid	79-33-4	2
2-mercaptoethanol (Thioglycol)	60-24-2	13
2-methyl-4-isothiazolin-3-one	2682-20-4	4
2-monobromo-3-nitrilopropionamide	1113-55-9	1
2-phosphonobutane-1,2,4-tricarboxylic acid	37971-36-1	2
2-phosphonobutane-1,2,4-tricarboxylic acid, potassium salt	93858-78-7	1
2-substituted aromatic amine salt	*	1
4,4'-diaminodiphenyl sulfone	80-08-0	3
5-chloro-2-methyl-4-isothiazolin-3-one	26172-55-4	5
Acetaldehyde	75-07-0	1
Acetic acid	64-19-7	56
Acetic anhydride	108-24-7	7
Acetone	67-64-1	3
Acetophenone	98-86-2	1
Acetylenic alcohol	*	1
Acetyltriethyl citrate	77-89-4	1
Acrylamide	79-06-1	2
Acrylamide copolymer	*	1
Acrylamide copolymer	38193-60-1	1

[35] To compile this list of chemicals, Committee staff reviewed each Material Safety Data Sheet provided to the Committee for hydraulic fracturing products used between 2005 and 2009. Committee staff transcribed the names and CAS numbers as written in the MSDSs; as such, any inaccuracies on this list reflect inaccuracies on the MSDSs themselves.

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Chemical Component	Chemical Abstract Service Number	No. of Products Containing Chemical
Acrylate copolymer	*	1
Acrylic acid, 2-hydroxyethyl ester	818-61-1	1
Acrylic acid/2-acrylamido-methylpropylsulfonic acid copolymer	37350-42-8	1
Acrylic copolymer	403730-32-5	1
Acrylic polymers	*	1
Acrylic polymers	26006-22-4	2
Acyclic hydrocarbon blend	*	1
Adipic acid	124-04-9	6
Alcohol alkoxylate	*	5
Alcohol ethoxylates	*	2
Alcohols	*	9
Alcohols, C11-15-secondary, ethoxylated	68131-40-8	1
Alcohols, C12-14-secondary	126950-60-5	4
Alcohols, C12-14-secondary, ethoxylated	84133-50-6	19
Alcohols, C12-15, ethoxylated	68131-39-5	2
Alcohols, C12-16, ethoxylated	103331-86-8	1
Alcohols, C12-16, ethoxylated	68551-12-2	3
Alcohols, C14-15, ethoxylated	68951-67-7	5
Alcohols, C9-11-iso-, C10-rich, ethoxylated	78330-20-8	4
Alcohols, C9-C22	*	1
Aldehyde	*	4
Aldol	107-89-1	1
Alfa-Alumina	*	5
Aliphatic acid	*	1
Aliphatic alcohol polyglycol ether	68015-67-8	1
Aliphatic amine derivative	120086-58-0	2
Alkaline bromide salts	*	2
Alkanes, C10-14	93924-07-3	2
Alkanes, C13-16-iso	68551-20-2	2
Alkanolamine	150-25-4	3
Alkanolamine chelate of zirconium alkoxide (Zirconium complex)	197980-53-3	4
Alkanolamine/aldehyde condensate	*	1
Alkenes	*	1
Alkenes, C>10 alpha-	64743-02-8	3
Alkenes, C>8	68411-00-7	2
Alkoxylated alcohols	*	1
Alkoxylated amines	*	6
Alkoxylated phenol formaldehyde resin	63428-92-2	1
Alkyaryl sulfonate	*	1
Alkyl (C12-16) dimethyl benzyl ammonium chloride	68424-85-1	7
Alkyl (C6-C12) alcohol, ethoxylated	68439-45-2	2
Alkyl (C9-11) alcohol, ethoxylated	68439-46-3	1
Alkyl alkoxylate	*	9
Alkyl amine	*	2

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Chemical Component	Chemical Abstract Service Number	No. of Products Containing Chemical
Alkyl amine blend in a metal salt solution	*	1
Alkyl aryl amine sulfonate	255043-08-04	1
Alkyl benzenesulfonic acid	68584-22-5	2
Alkyl esters	*	2
Alkyl hexanol	*	1
Alkyl ortho phosphate ester	*	1
Alkyl phosphate ester	*	3
Alkyl quaternary ammonium chlorides	*	4
Alkylaryl sulfonate	*	1
Alkylaryl sulphonic acid	27176-93-9	1
Alkylated quaternary chloride	*	5
Alkylbenzenesulfonic acid	*	1
Alkylethoammonium sulfates	*	1
Alkylphenol ethoxylates	*	1
Almandite and pyrope garnet	1302-62-1	1
Aluminium isopropoxide	555-31-7	1
Aluminum	7429-90-5	2
Aluminum chloride	*	3
Aluminum chloride	1327-41-9	2
Aluminum oxide (alpha-Alumina)	1344-28-1	24
Aluminum oxide silicate	12068-56-3	1
Aluminum silicate (mullite)	1302-76-7	38
Aluminum sulfate hydrate	10043-01-3	1
Amides, tallow, n-[3-(dimethylamino)propyl],n-oxides	68647-77-8	4
Amidoamine	*	1
Amine	*	7
Amine bisulfite	13427-63-9	1
Amine oxides	*	1
Amine phosphonate	*	3
Amine salt	*	2
Amines, C14-18; C16-18-unsaturated, alkyl, ethoxylated	68155-39-5	1
Amines, coco alkyl, acetate	61790-57-6	3
Amines, polyethylenepoly-, ethoxylated, phosphonomethylated	68966-36-9	1
Amines, tallow alkyl, ethoxylated	61791-26-2	2
Amino compounds	*	1
Amino methylene phosphonic acid salt	*	1
Amino trimethylene phosphonic acid	6419-19-8	2
Ammonia	7664-41-7	7
Ammonium acetate	631-61-8	4
Ammonium alcohol ether sulfate	68037-05-8	1
Ammonium bicarbonate	1066-33-7	1
Ammonium bifluoride (Ammonium hydrogen difluoride)	1341-49-7	10
Ammonium bisulfate	7783-20-2	3
Ammonium bisulfite	10192-30-0	15

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Chemical Component	Chemical Abstract Service Number	No. of Products Containing Chemical
Ammonium C6-C10 alcohol ethoxysulfate	68187-17-7	4
Ammonium C8-C10 alkyl ether sulfate	68891-29-2	4
Ammonium chloride	12125-02-9	29
Ammonium fluoride	12125-01-8	9
Ammonium hydroxide	1336-21-6	4
Ammonium nitrate	6484-52-2	2
Ammonium persulfate (Diammonium peroxidisulfate)	7727-54-0	37
Ammonium salt	*	1
Ammonium salt of ethoxylated alcohol sulfate	*	1
Amorphous silica	99439-28-8	1
Amphoteric alkyl amine	61789-39-7	1
Anionic copolymer	*	3
Anionic polyacrylamide	*	1
Anionic polyacrylamide	25085-02-3	6
Anionic polyacrylamide copolymer	*	3
Anionic polymer	*	2
Anionic polymer in solution	*	1
Anionic polymer, sodium salt	9003-04-7	1
Anionic water-soluble polymer	*	2
Antifoulant	*	1
Antimonate salt	*	1
Antimony pentoxide	1314-60-9	2
Antimony potassium oxide	29638-69-5	4
Antimony trichloride	10025-91-9	2
a-organic surfactants	61790-29-8	1
Aromatic alcohol glycol ether	*	2
Aromatic aldehyde	*	2
Aromatic ketones	224635-63-6	2
Aromatic polyglycol ether	*	1
Barium sulfate	7727-43-7	3
Bauxite	1318-16-7	16
Bentonite	1302-78-9	2
Benzene	71-43-2	3
Benzene, C10-16, alkyl derivatives	68648-87-3	1
Benzenecarboperoxoic acid, 1,1-dimethylethyl ester	614-45-9	1
Benzenemethanaminium	3844-45-9	1
Benzenesulfonic acid, C10-16-alkyl derivs., potassium salts	68584-27-0	1
Benzoic acid	65-85-0	11
Benzyl chloride	100-44-7	8
Biocide component	*	3
Bis(1-methylethyl)naphthalenesulfonic acid, cyclohexylamine salt	68425-61-6	1
Bishexamethylenetriamine penta methylene phosphonic acid	35657-77-3	1
Bisphenol A/Epichlorohydrin resin	25068-38-6	5
Bisphenol A/Novolac epoxy resin	28906-96-9	1

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Chemical Component	Chemical Abstract Service Number	No. of Products Containing Chemical
Borate	12280-03-4	2
Borate salts	*	5
Boric acid	10043-35-3	18
Boric acid, potassium salt	20786-60-1	1
Boric acid, sodium salt	1333-73-9	2
Boric oxide	1303-86-2	1
b-tricalcium phosphate	7758-87-4	1
Butanedioic acid	2373-38-8	4
Butanol	71-36-3	3
Butyl glycidyl ether	2426-08-6	5
Butyl lactate	138-22-7	4
C10-C16 ethoxylated alcohol	68002-97-1	4
C-11 to C-14 n-alkanes, mixed	*	1
C12-C14 alcohol, ethoxylated	68439-50-9	3
Calcium carbonate	471-34-1	1
Calcium carbonate (Limestone)	1317-65-3	9
Calcium chloride	10043-52-4	17
Calcium chloride, dihydrate	10035-04-8	1
Calcium fluoride	7789-75-5	2
Calcium hydroxide	1305-62-0	9
Calcium hypochlorite	7778-54-3	1
Calcium oxide	1305-78-8	6
Calcium peroxide	1305-79-9	5
Carbohydrates	*	3
Carbon dioxide	124-38-9	4
Carboxymethyl guar gum, sodium salt	39346-76-4	7
Carboxymethyl hydroxypropyl guar	68130-15-4	11
Cellophane	9005-81-6	2
Cellulase	9012-54-8	7
Cellulase enzyme	*	1
Cellulose	9004-34-6	1
Cellulose derivative	*	2
Chloromethylnaphthalene quinoline quaternary amine	15619-48-4	3
Chlorous ion solution	*	2
Choline chloride	67-48-1	3
Chromates	*	1
Chromium (iii) acetate	1066-30-4	1
Cinnamaldehyde (3-phenyl-2-propenal)	104-55-2	5
Citric acid (2-hydroxy-1,2,3 propanetricarboxylic acid)	77-92-9	29
Citrus terpenes	94266-47-4	11
Coal, granular	50815-10-6	1
Cobalt acetate	71-48-7	1
Cocaidopropyl betaine	61789-40-0	2
Cocamidopropylamine oxide	68155-09-9	1

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Chemical Component	Chemical Abstract Service Number	No. of Products Containing Chemical
Coco bis-(2-hydroxyethyl) amine oxide	61791-47-7	1
Cocoamidopropyl betaine	70851-07-9	1
Cocomidopropyl dimethylamine	68140-01-2	1
Coconut fatty acid diethanolamide	68603-42-9	1
Collagen (Gelatin)	9000-70-8	6
Complex alkylaryl polyo-ester	*	1
Complex aluminum salt	*	2
Complex organometallic salt	*	2
Complex substituted keto-amine	143106-84-7	1
Complex substituted keto-amine hydrochloride	*	1
Copolymer of acrylamide and sodium acrylate	25987-30-8	1
Copper	7440-50-8	1
Copper iodide	7681-65-4	1
Copper sulfate	7758-98-7	3
Corundum (Aluminum oxide)	1302-74-5	48
Crotonaldehyde	123-73-9	1
Crystalline silica - cristobalite	14464-46-1	44
Crystalline silica - quartz (SiO2)	14808-60-7	207
Crystalline silica, tridymite	15468-32-3	2
Cumene	98-82-8	6
Cupric chloride	7447-39-4	10
Cupric chloride dihydrate	10125-13-0	7
Cuprous chloride	7758-89-6	1
Cured acrylic resin	*	7
Cured resin	*	4
Cured silicone rubber-polydimethylsiloxane	63148-62-9	1
Cured urethane resin	*	3
Cyclic alkanes	*	1
Cyclohexane	110-82-7	1
Cyclohexanone	108-94-1	1
Decanol	112-30-1	2
Decyl-dimethyl amine oxide	2605-79-0	4
Dextrose monohydrate	50-99-7	1
D-Glucitol	50-70-4	1
Di (2-ethylhexyl) phthalate	117-81-7	3
Di (ethylene glycol) ethyl ether acetate	112-15-2	4
Diatomaceous earth	61790-53-2	3
Diatomaceous earth, calcined	91053-39-3	7
Dibromoacetonitrile	3252-43-5	1
Dibutylaminoethanol (2-dibutylaminoethanol)	102-81-8	4
Di-calcium silicate	10034-77-2	1
Dicarboxylic acid	*	1
Didecyl dimethyl ammonium chloride	7173-51-5	1
Diesel	*	1

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Chemical Component	Chemical Abstract Service Number	No. of Products Containing Chemical
Diesel	68334-30-5	3
Diesel	68476-30-2	4
Diesel	68476-34-6	43
Diethanolamine (2,2-iminodiethanol)	111-42-2	14
Diethylbenzene	25340-17-4	1
Diethylene glycol	111-46-6	8
Diethylene glycol monomethyl ether	111-77-3	4
Diethylene triaminepenta (methylene phosphonic acid)	15827-60-8	1
Diethylenetriamine	111-40-0	2
Diethylenetriamine, tall oil fatty acids reaction product	61790-69-0	1
Diisopropylnaphthalenesulfonic acid	28757-00-8	2
Dimethyl formamide	68-12-2	5
Dimethyl glutarate	1119-40-0	1
Dimethyl silicone	*	2
Dioctyl sodium sulfosuccinate	577-11-7	1
Dipropylene glycol	25265-71-8	1
Dipropylene glycol monomethyl ether (2-methoxymethylethoxy propanol)	34590-94-8	12
Di-secondary-butylphenol	53964-94-6	3
Disodium EDTA	139-33-3	1
Disodium ethylenediaminediacetate	38011-25-5	1
Disodium ethylenediaminetetraacetate dihydrate	6381-92-6	1
Disodium octaborate tetrahydrate	12008-41-2	1
Dispersing agent	*	1
d-Limonene	5989-27-5	11
Dodecyl alcohol ammonium sulfate	32612-48-9	2
Dodecylbenzene sulfonic acid	27176-87-0	14
Dodecylbenzene sulfonic acid salts	42615-29-2	2
Dodecylbenzene sulfonic acid salts	68648-81-7	7
Dodecylbenzene sulfonic acid salts	90218-35-2	1
Dodecylbenzenesulfonate isopropanolamine	42504-46-1	1
Dodecylbenzenesulfonic acid, monoethanolamine salt	26836-07-7	1
Dodecylbenzenesulphonic acid, morpholine salt	12068-08-5	1
EDTA/Copper chelate	*	2
EO-C7-9-iso-, C8-rich alcohols	78330-19-5	5
Epichlorohydrin	25085-99-8	5
Epoxy resin	*	5
Erucic amidopropyl dimethyl betaine	149879-98-1	3
Erythorbic acid	89-65-6	2
Essential oils	*	6
Ethanaminium, n,n,n-trimethyl-2-[(1-oxo-2-propenyl)oxy]-,chloride, polymer with 2-propenamide	69418-26-4	4
Ethanol (Ethyl alcohol)	64-17-5	36
Ethanol, 2-(hydroxymethylamino)-	34375-28-5	1
Ethanol, 2, 2'-(Octadecylamino) bis-	10213-78-2	1

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Chemical Component	Chemical Abstract Service Number	No. of Products Containing Chemical
Ethanoldiglycine disodium salt	135-37-5	1
Ether salt	25446-78-0	2
Ethoxylated 4-nonylphenol (Nonyl phenol ethoxylate)	26027-38-3	9
Ethoxylated alcohol	104780-82-7	1
Ethoxylated alcohol	78330-21-9	2
Ethoxylated alcohols	*	3
Ethoxylated alkyl amines	*	1
Ethoxylated amine	*	1
Ethoxylated amines	61791-44-4	1
Ethoxylated fatty acid ester	*	1
Ethoxylated nonionic surfactant	*	1
Ethoxylated nonyl phenol	*	8
Ethoxylated nonyl phenol	68412-54-4	10
Ethoxylated nonyl phenol	9016-45-9	38
Ethoxylated octyl phenol	68987-90-6	1
Ethoxylated octyl phenol	9002-93-1	1
Ethoxylated octyl phenol	9036-19-5	3
Ethoxylated oleyl amine	13127-82-7	2
Ethoxylated oleyl amine	26635-93-8	1
Ethoxylated sorbitol esters	*	1
Ethoxylated tridecyl alcohol phosphate	9046-01-9	2
Ethoxylated undecyl alcohol	127036-24-2	2
Ethyl acetate	141-78-6	4
Ethyl acetoacetate	141-97-9	1
Ethyl octynol (1-octyn-3-ol,4-ethyl-)	5877-42-9	5
Ethylbenzene	100-41-4	28
Ethylene glycol (1,2-ethanediol)	107-21-1	119
Ethylene glycol monobutyl ether (2-butoxyethanol)	111-76-2	126
Ethylene oxide	75-21-8	1
Ethylene oxide-nonylphenol polymer	*	1
Ethylenediaminetetraacetic acid	60-00-4	1
Ethylene-vinyl acetate copolymer	24937-78-8	1
Ethylhexanol (2-ethylhexanol)	104-76-7	18
Fatty acid ester	*	1
Fatty acid, tall oil, hexa esters with sorbitol, ethoxylated	61790-90-7	1
Fatty acids	*	1
Fatty alcohol alkoxylate	*	1
Fatty alkyl amine salt	*	1
Fatty amine carboxylates	*	1
Fatty quaternary ammonium chloride	61789-68-2	1
Ferric chloride	7705-08-0	3
Ferric sulfate	10028-22-5	7
Ferrous sulfate, heptahydrate	7782-63-0	4
Fluoroaliphatic polymeric esters	*	1

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Chemical Component	Chemical Abstract Service Number	No. of Products Containing Chemical
Formaldehyde	50-00-0	12
Formaldehyde polymer	*	2
Formaldehyde, polymer with 4-(1,1-dimethyl)phenol, methyloxirane and oxirane	30704-64-4	3
Formaldehyde, polymer with 4-nonylphenol and oxirane	30846-35-6	1
Formaldehyde, polymer with ammonia and phenol	35297-54-2	2
Formamide	75-12-7	5
Formic acid	64-18-6	24
Fumaric acid	110-17-8	8
Furfural	98-01-1	1
Furfuryl alcohol	98-00-0	3
Glass fiber	65997-17-3	3
Gluconic acid	526-95-4	1
Glutaraldehyde	111-30-8	20
Glycerol (1,2,3-Propanetriol, Glycerine)	56-81-5	16
Glycol ethers	*	9
Glycol ethers	9004-77-7	4
Glyoxal	107-22-2	3
Glyoxylic acid	298-12-4	1
Guar gum	9000-30-0	41
Guar gum derivative	*	12
Haloalkyl heteropolycycle salt	*	6
Heavy aromatic distillate	68132-00-3	1
Heavy aromatic petroleum naphtha	64742-94-5	45
Heavy catalytic reformed petroleum naphtha	64741-68-0	10
Hematite	*	5
Hemicellulase	9025-56-3	2
Hexahydro-1,3,5-tris(2-hydroxyethyl)-s-triazine (Triazine)	4719-04-4	4
Hexamethylenetetramine	100-97-0	37
Hexanediamine	124-09-4	1
Hexanes	*	1
Hexylene glycol	107-41-5	5
Hydrated aluminum silicate	1332-58-7	4
Hydrocarbon mixtures	8002-05-9	1
Hydrocarbons	*	3
Hydrodesulfurized kerosine (petroleum)	64742-81-0	3
Hydrodesulfurized light catalytic cracked distillate (petroleum)	68333-25-5	1
Hydrodesulfurized middle distillate (petroleum)	64742-80-9	1
Hydrogen chloride (Hydrochloric acid)	7647-01-0	42
Hydrogen fluoride (Hydrofluoric acid)	7664-39-3	2
Hydrogen peroxide	7722-84-1	4
Hydrogen sulfide	7783-06-4	1
Hydrotreated and hydrocracked base oil	*	2
Hydrotreated heavy naphthenic distillate	64742-52-5	3
Hydrotreated heavy paraffinic petroleum distillates	64742-54-7	1

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Chemical Component	Chemical Abstract Service Number	No. of Products Containing Chemical
Hydrotreated heavy petroleum naphtha	64742-48-9	7
Hydrotreated light petroleum distillates	64742-47-8	89
Hydrotreated middle petroleum distillates	64742-46-7	3
Hydroxyacetic acid (Glycolic acid)	79-14-1	6
Hydroxyethylcellulose	9004-62-0	1
Hydroxyethylethylenediaminetriacetic acid, trisodium salt	139-89-9	1
Hydroxylamine hydrochloride	5470-11-1	1
Hydroxypropyl guar gum	39421-75-5	2
Hydroxysultaine	*	1
Inner salt of alkyl amines	*	2
Inorganic borate	*	3
Inorganic particulate	*	1
Inorganic salt	*	1
Inorganic salt	533-96-0	1
Inorganic salt	7446-70-0	1
Instant coffee purchased off the shelf	*	1
Inulin, carboxymethyl ether, sodium salt	430439-54-6	1
Iron oxide	1332-37-2	2
Iron oxide (Ferric oxide)	1309-37-1	18
Iso amyl alcohol	123-51-3	1
Iso-alkanes/n-alkanes	*	10
Isobutanol (Isobutyl alcohol)	78-83-1	4
Isomeric aromatic ammonium salt	*	1
Isooctanol	26952-21-6	1
Isooctyl alcohol	68526-88-0	1
Isooctyl alcohol bottoms	68526-88-5	1
Isopropanol (Isopropyl alcohol, Propan-2-ol)	67-63-0	274
Isopropylamine	75-31-0	1
Isotridecanol, ethoxylated	9043-30-5	1
Kerosene	8008-20-6	13
Lactic acid	10326-41-7	1
Lactic acid	50-21-5	1
L-Dilactide	4511-42-6	1
Lead	7439-92-1	1
Light aromatic solvent naphtha	64742-95-6	11
Light catalytic cracked petroleum distillates	64741-59-9	1
Light naphtha distillate, hydrotreated	64742-53-6	1
Low toxicity base oils	*	1
Maghemite	*	2
Magnesium carbonate	546-93-0	1
Magnesium chloride	7786-30-3	4
Magnesium hydroxide	1309-42-8	4
Magnesium iron silicate	1317-71-1	3
Magnesium nitrate	10377-60-3	5

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Chemical Component	Chemical Abstract Service Number	No. of Products Containing Chemical
Magnesium oxide	1309-48-4	18
Magnesium peroxide	1335-26-8	2
Magnesium peroxide	14452-57-4	4
Magnesium phosphide	12057-74-8	1
Magnesium silicate	1343-88-0	3
Magnesium silicate hydrate (talc)	14807-96-6	2
Magnetite	*	3
Medium aliphatic solvent petroleum naphtha	64742-88-7	10
Metal salt	*	2
Metal salt solution	*	1
Methanol (Methyl alcohol)	67-56-1	342
Methyl isobutyl carbinol (Methyl amyl alcohol)	108-11-2	3
Methyl salicylate	119-36-8	6
Methyl vinyl ketone	78-94-4	2
Methylcyclohexane	108-87-2	1
Mica	12001-26-2	3
Microcrystalline silica	1317-95-9	1
Mineral	*	1
Mineral Filler	*	1
Mineral spirits (stoddard solvent)	8052-41-3	2
Mixed titanium ortho ester complexes	*	1
Modified alkane	*	1
Modified cycloaliphatic amine adduct	*	3
Modified lignosulfonate	*	1
Monoethanolamine (Ethanolamine)	141-43-5	17
Monoethanolamine borate	26038-87-9	1
Morpholine	110-91-8	2
Mullite	1302-93-8	55
n,n-dibutylthiourea	109-46-6	1
N,N-dimethyl-1-octadecanamine-HCl	*	1
N,N-dimethyloctadecylamine	124-28-7	3
N,N-dimethyloctadecylamine hydrochloride	1613-17-8	2
n,n'-Methylenebisacrylamide	110-26-9	1
n-alkyl dimethyl benzyl ammonium chloride	139-08-2	1
Naphthalene	91-20-3	44
Naphthalene derivatives	*	1
Naphthalenesulphonic acid, bis (1-methylethyl)-methyl derivatives	99811-86-6	1
Natural asphalt	12002-43-6	1
n-cocoamidopropyl-n,n-dimethyl-n-2-hydroxypropylsulfobetaine	68139-30-0	1
n-dodecyl-2-pyrrolidone	2687-96-9	1
N-heptane	142-82-5	1
Nickel sulfate hexahydrate	10101-97-0	2
Nitrilotriacetamide	4862-18-4	4
Nitrilotriacetic acid	139-13-9	6

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Chemical Component	Chemical Abstract Service Number	No. of Products Containing Chemical
Nitrilotriacetonitrile	7327-60-8	3
Nitrogen	7727-37-9	9
n-Methylpyrrolidone	872-50-4	1
Nonane, all isomers	*	1
Non-hazardous salt	*	1
Nonionic surfactant	*	1
Nonyl phenol ethoxylate	*	2
Nonyl phenol ethoxylate	9016-45-6	2
Nonyl phenol ethoxylate	9018-45-9	1
Nonylphenol	25154-52-3	1
Nonylphenol, ethoxylated and sulfated	9081-17-8	1
N-propyl zirconate	*	1
N-tallowalkyltrimethylenediamines	*	1
Nuisance particulates	*	2
Nylon fibers	25038-54-4	2
Octanol	111-87-5	2
Octyltrimethylammonium bromide	57-09-0	1
Olefinic sulfonate	*	1
Olefins	*	1
Organic acid salt	*	3
Organic acids	*	1
Organic phosphonate	*	1
Organic phosphonate salts	*	1
Organic phosphonic acid salts	*	6
Organic salt	*	1
Organic sulfur compound	*	2
Organic titanate	*	2
Organiophilic clay	*	2
Organo-metallic ammonium complex	*	1
Other inorganic compounds	*	1
Oxirane, methyl-, polymer with oxirane, mono-C10-16-alkyl ethers, phosphates	68649-29-6	1
Oxyalkylated alcohol	*	6
Oxyalkylated alcohols	228414-35-5	1
Oxyalkylated alkyl alcohol	*	1
Oxyalkylated alkylphenol	*	1
Oxyalkylated fatty acid	*	2
Oxyalkylated phenol	*	1
Oxyalkylated polyamine	*	1
Oxylated alcohol	*	1
Paraffin wax	8002-74-2	1
Paraffinic naphthenic solvent	*	1
Paraffinic solvent	*	5
Paraffins	*	1
Perlite	93763-70-3	1

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Chemical Component	Chemical Abstract Service Number	No. of Products Containing Chemical
Petroleum distillates	*	26
Petroleum distillates	64742-65-0	1
Petroleum distillates	64742-97-5	1
Petroleum distillates	68477-31-6	3
Petroleum gas oils	*	1
Petroleum gas oils	64741-43-1	1
Phenol	108-95-2	5
Phenol-formaldehyde resin	9003-35-4	32
Phosphate ester	*	6
Phosphate esters of alkyl phenyl ethoxylate	68412-53-3	1
Phosphine	*	1
Phosphonic acid	*	1
Phosphonic acid	129828-36-0	1
Phosphonic acid	13598-36-2	3
Phosphonic acid (dimethlamino(methylene))	29712-30-9	1
Phosphonic acid, [nitrilotris(methylene)]tris-, pentasodium salt	2235-43-0	1
Phosphoric acid	7664-38-2	7
Phosphoric acid ammonium salt	*	1
Phosphoric acid, mixed decyl, octyl and ethyl esters	68412-60-2	3
Phosphorous acid	10294-56-1	1
Phthalic anhydride	85-44-9	2
Pine oil	8002-09-3	5
Plasticizer	*	1
Poly(oxy-1,2-ethanediyl)	24938-91-8	1
Poly(oxy-1,2-ethanediyl), alpha-(4-nonylphenyl)-omega-hydroxy-, branched (Nonylphenol ethoxylate)	127087-87-0	3
Poly(oxy-1,2-ethanediyl), alpha-hydro-omega-hydroxy	65545-80-4	1
Poly(oxy-1,2-ethanediyl), alpha-sulfo-omega-(hexyloxy)-, ammonium salt	63428-86-4	3
Poly(oxy-1,2-ethanediyl),a-(nonylphenyl)-w-hydroxy-, phosphate	51811-79-1	1
Poly-(oxy-1,2-ethanediyl)-alpha-undecyl-omega-hydroxy	34398-01-1	6
Poly(sodium-p-styrenesulfonate)	25704-18-1	1
Poly(vinyl alcohol)	25213-24-5	2
Polyacrylamides	9003-05-8	2
Polyacrylamides	*	1
Polyacrylate	*	1
Polyamine	*	2
Polyanionic cellulose	*	2
Polyepichlorohydrin, trimethylamine quaternized	51838-31-4	1
Polyetheramine	9046-10-0	3
Polyether-modified trisiloxane	27306-78-1	1
Polyethylene glycol	25322-68-3	20
Polyethylene glycol ester with tall oil fatty acid	9005-02-1	1
Polyethylene polyammonium salt	68603-67-8	2
Polyethylene-polypropylene glycol	9003-11-6	5

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Chemical Component	Chemical Abstract Service Number	No. of Products Containing Chemical
Polylactide resin	*	3
Polyoxyalkylenes	*	1
Polyoxyethylene castor oil	61791-12-6	1
Polyphosphoric acid, esters with triethanolamine, sodium salts	68131-72-6	1
Polypropylene glycol	25322-69-4	1
Polysaccharide	*	20
Polyvinyl alcohol	*	1
Polyvinyl alcohol	9002-89-5	2
Polyvinyl alcohol/polyvinylacetate copolymer	*	1
Potassium acetate	127-08-2	1
Potassium carbonate	584-08-7	12
Potassium chloride	7447-40-7	29
Potassium formate	590-29-4	3
Potassium hydroxide	1310-58-3	25
Potassium iodide	7681-11-0	6
Potassium metaborate	13709-94-9	3
Potassium metaborate	16481-66-6	3
Potassium oxide	12136-45-7	1
Potassium pentaborate	*	1
Potassium persulfate	7727-21-1	9
Propanol (Propyl alcohol)	71-23-8	18
Propanol, [2(2-methoxy-methylethoxy) methylethoxyl]	20324-33-8	1
Propargyl alcohol (2-propyn-1-ol)	107-19-7	46
Propylene carbonate (1,3-dioxolan-2-one, methyl-)	108-32-7	2
Propylene glycol (1,2-propanediol)	57-55-6	18
Propylene oxide	75-56-9	1
Propylene pentamer	15220-87-8	1
p-Xylene	106-42-3	1
Pyridinium, 1-(phenylmethyl)-, ethyl methyl derivatives, chlorides	68909-18-2	9
Pyrogenic silica	112945-52-5	3
Quaternary amine compounds	*	3
Quaternary amine compounds	61789-18-2	1
Quaternary ammonium compounds	*	9
Quaternary ammonium compounds	19277-88-4	1
Quaternary ammonium compounds	68989-00-4	1
Quaternary ammonium compounds	8030-78-2	1
Quaternary ammonium compounds, dicoco alkyldimethyl, chlorides	61789-77-3	2
Quaternary ammonium salts	*	2
Quaternary compound	*	1
Quaternary salt	*	2
Quaternized alkyl nitrogenated compound	68391-11-7	2
Rafinnates (petroleum), sorption process	64741-85-1	2
Residues (petroleum), catalytic reformer fractionator	64741-67-9	10
Resin	8050-09-7	2

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Chemical Component	Chemical Abstract Service Number	No. of Products Containing Chemical
Rutile	1317-80-2	2
Salt of phosphate ester	*	3
Salt of phosphono-methylated diamine	*	1
Salts of oxyalkylated fatty amines	68551-33-7	1
Secondary alcohol	*	7
Silica (Silicon dioxide)	7631-86-9	47
Silica, amorphous	*	3
Silica, amorphous precipitated	67762-90-7	1
Silicon carboxylate	681-84-5	1
Silicon dioxide (Fused silica)	60676-86-0	7
Silicone emulsion	*	1
Sodium (C14-16) olefin sulfonate	68439-57-6	4
Sodium 2-ethylhexyl sulfate	126-92-1	1
Sodium acetate	127-09-3	6
Sodium acid pyrophosphate	7758-16-9	5
Sodium alkyl diphenyl oxide sulfonate	28519-02-0	1
Sodium aluminate	1302-42-7	1
Sodium aluminum phosphate	7785-88-8	1
Sodium bicarbonate (Sodium hydrogen carbonate)	144-55-8	10
Sodium bisulfite	7631-90-5	6
Sodium bromate	7789-38-0	10
Sodium bromide	7647-15-6	1
Sodium carbonate	497-19-8	14
Sodium chlorate	7775-09-9	1
Sodium chloride	7647-14-5	48
Sodium chlorite	7758-19-2	8
Sodium cocaminopropionate	68608-68-4	2
Sodium diacetate	126-96-5	2
Sodium erythorbate	6381-77-7	4
Sodium glycolate	2836-32-0	2
Sodium hydroxide (Caustic soda)	1310-73-2	80
Sodium hypochlorite	7681-52-9	14
Sodium lauryl-ether sulfate	68891-38-3	3
Sodium metabisulfite	7681-57-4	1
Sodium metaborate	7775-19-1	2
Sodium metaborate tetrahydrate	35585-58-1	6
Sodium metasilicate, anhydrous	6834-92-0	2
Sodium nitrite	7632-00-0	1
Sodium oxide (Na2O)	1313-59-3	1
Sodium perborate	1113-47-9	1
Sodium perborate	7632-04-4	1
Sodium perborate tetrahydrate	10486-00-7	4
Sodium persulfate	7775-27-1	6
Sodium phosphate	*	2

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Chemical Component	Chemical Abstract Service Number	No. of Products Containing Chemical
Sodium polyphosphate	68915-31-1	1
Sodium salicylate	54-21-7	1
Sodium silicate	1344-09-8	2
Sodium sulfate	7757-82-6	7
Sodium tetraborate	1330-43-4	7
Sodium tetraborate decahydrate	1303-96-4	10
Sodium thiosulfate	7772-98-7	10
Sodium thiosulfate pentahydrate	10102-17-7	3
Sodium trichloroacetate	650-51-1	1
Sodium tripolyphosphate	7758-29-4	2
Sodium xylene sulfonate	1300-72-7	3
Sodium zirconium lactate	174206-15-6	1
Solvent refined heavy naphthenic petroleum distillates	64741-96-4	1
Sorbitan monooleate	1338-43-8	1
Stabilized aqueous chlorine dioxide	10049-04-4	1
Stannous chloride	7772-99-8	1
Stannous chloride dihydrate	10025-69-1	6
Starch	9005-25-8	5
Steam cracked distillate, cyclodiene dimer, dicyclopentadiene polymer	68131-87-3	1
Steam-cracked petroleum distillates	64742-91-2	6
Straight run middle petroleum distillates	64741-44-2	5
Substituted alcohol	*	2
Substituted alkene	*	1
Substituted alkylamine	*	2
Sucrose	57-50-1	1
Sulfamic acid	5329-14-6	6
Sulfate	*	1
Sulfonate acids	*	1
Sulfonate surfactants	*	1
Sulfonic acid salts	*	1
Sulfonic acids, petroleum	61789-85-3	1
Sulfur compound	*	1
Sulfuric acid	7664-93-9	9
Sulfuric acid, monodecyl ester, sodium salt	142-87-0	2
Sulfuric acid, monooctyl ester, sodium salt	142-31-4	2
Surfactants	*	13
Sweetened middle distillate	64741-86-2	1
Synthetic organic polymer	9051-89-2	2
Tall oil (Fatty acids)	61790-12-3	4
Tall oil, compound with diethanolamine	68092-28-4	1
Tallow soap	*	2
Tar bases, quinoline derivatives, benzyl chloride-quaternized	72480-70-7	5
Tergitol	68439-51-0	1
Terpene hydrocarbon byproducts	68956-56-9	3

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Chemical Component	Chemical Abstract Service Number	No. of Products Containing Chemical
Terpenes	*	1
Terpenes and terpenoids, sweet orange-oil	68647-72-3	2
Terpineol	8000-41-7	1
Tert-butyl hydroperoxide	75-91-2	6
Tetra-calcium-alumino-ferrite	12068-35-8	1
Tetraethylene glycol	112-60-7	1
Tetraethylenepentamine	112-57-2	2
Tetrahydro-3,5-dimethyl-2H-1,3,5-thiadiazine-2-thione (Dazomet)	533-74-4	13
Tetrakis (hydroxymethyl) phosphonium sulfate	55566-30-8	12
Tetramethyl ammonium chloride	75-57-0	14
Tetrasodium 1-hydroxyethylidene-1,1-diphosphonic acid	3794-83-0	1
Tetrasodium ethylenediaminetetraacetate	64-02-8	10
Thiocyanate sodium	540-72-7	1
Thioglycolic acid	68-11-1	6
Thiourea	62-56-6	9
Thiourea polymer	68527-49-1	3
Titanium complex	*	1
Titanium oxide	13463-67-7	19
Titanium, isopropoxy (triethanolaminate)	74665-17-1	2
Toluene	108-88-3	29
Treated ammonium chloride (with anti-caking agent a or b)	12125-02-9	1
Tributyl tetradecyl phosphonium chloride	81741-28-8	5
Tri-calcium silicate	12168-85-3	1
Tridecyl alcohol	112-70-9	1
Triethanolamine (2,2,2-nitrilotriethanol)	102-71-6	21
Triethanolamine polyphosphate ester	68131-71-5	3
Triethanolamine titanate	36673-16-2	1
Triethanolamine zirconate	101033-44-7	6
Triethanolamine zirconium chelate	*	1
Triethyl citrate	77-93-0	1
Triethyl phosphate	78-40-0	1
Triethylene glycol	112-27-6	3
Triisopropanolamine	122-20-3	5
Trimethylammonium chloride	593-81-7	1
Trimethylbenzene	25551-13-7	5
Trimethyloctadecylammonium (1-octadecanaminium, N,N,N-trimethyl-, chloride)	112-03-8	6
Tris(hydroxymethyl)aminomethane	77-86-1	1
Trisodium ethylenediaminetetraacetate	150-38-9	1
Trisodium ethylenediaminetriacetate	19019-43-3	1
Trisodium nitrilotriacetate	18662-53-8	8
Trisodium nitrilotriacetate (Nitrilotriacetic acid, trisodium salt monohydrate)	5064-31-3	9
Trisodium ortho phosphate	7601-54-9	1
Trisodium phosphate dodecahydrate	10101-89-0	1
Ulexite	1319-33-1	1

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Chemical Component	Chemical Abstract Service Number	No. of Products Containing Chemical
Urea	57-13-6	3
Wall material	*	1
Walnut hulls	*	2
White mineral oil	8042-47-5	8
Xanthan gum	11138-66-2	6
Xylene	1330-20-7	44
Zinc chloride	7646-85-7	1
Zinc oxide	1314-13-2	2
Zirconium complex	*	10
Zirconium dichloride oxide	7699-43-6	1
Zirconium oxide sulfate	62010-10-0	2
Zirconium sodium hydroxy lactate complex (Sodium zirconium lactate)	113184-20-6	2

** Components marked with an asterisk appeared on at least one MSDS without an identifying CAS number. The MSDSs in these cases marked the CAS as proprietary, noted that the CAS was not available, or left the CAS field blank. Components marked with an asterisk may be duplicative of other components on this list, but Committee staff have no way of identifying such duplicates without the identifying CAS number.*

021957

HOLD STRONG FOR JUSTICE

IRON THE PEOPLE'S LOBBY

Fracking Background

This past June, Governor Quinn signed a bill to regulate fracking in IL. It was co-written by industry, Big Greens (NRDC, Sierra Club, the Environmental Law & Policy Center, and Faith in Place), government officials, and legislators. There were two failed moratorium bills in the lead-up to the regulatory bill.

Rules Process (for an explanation of the full process, click on "Illinois Rulemaking Process" on this page)

- IDNR releases first draft of the rules -- *this happened on Friday, November 15th*
- First 45-day public comment period ("first notice")
- IDNR reviews all comments and responds to each one in writing (they can address multiple comments with a single response), and then submits a revised draft of the rules to the Joint Committee on Administrative Rules (JCAR), which is made up of 12 state legislators from both the House & Senate
- Second 45-day public comment period ("second notice")
- JCAR's decision -- no objection; no objection with recommendation; objection; or filing prohibition/suspension

Things to know:

IDNR = Illinois Department of Natural Resources, the state agency responsible for regulating fracking

JCAR = Joint Committee on Administrative Rules, a bicameral & bipartisan 12-member legislative body that must approve IDNR's proposed rules before they can go into effect

Moratorium = suspension of an activity for a given amount of time (i.e., a 2-year moratorium on fracking)

Rules

The following are weaknesses or omissions in the newly published rules of provisions that would have been allowed or encouraged by the regulatory bill.

(1) Wastewater Storage: the new rules allow toxic, radioactive, carcinogenic wastewater to be stored in open air pits rather than closed, sealed tanks.

(2) Automatic Permit Revocation for Violations: the new rules provide no penalty for violations of the American Petroleum Institute's standards.

(3) Disclosure of Administrative and Operating Violations: the new rules only require disclosure of "serious" previous violations before inviting companies to frack in Illinois, but the rules provide no definition of what a "serious" violation is.

(4) Fines on Administrative and Operating violations: the new rules only impose fines of $50 to at most $2,500 for a multi-billion-dollar industry.

(5) Health Professionals' Access to Chemicals: the new rules only allow doctors to know which of the 353 chemicals in secret proprietary blends may have been used in a hydraulic fracturing process that is affecting their patient after they have proven that the patient was affected by one of these chemicals, and only during IDNR business hours or via an unspecified "trade secret holder."

(6) Seismicity: the new rules allow up to four earthquakes of up to 4.9 magnitude, even near the New Madrid or Wabash fault lines in Southern Illinois before a company has to shut down an injection well.

(7) Produced Water Testing: the new rules do not have any ways to ensure that water produced from hydraulic fracturing is tested for radioactivity or meets the Illinois Low-Level Radioactive Waste Management act.

(8) Local Control: the new rules only allow local control of fracking permits for municipalities, but many of the fracking sites would be in rural areas where the appropriate local authority would be the county, not a municipality.

(9) Lack of Studies, Reports, or Underlying Data Used to Compose Rulemaking: the current rules are by IDNR's admission, not based on any research or data or studies available from other states where fracking has been done.

621953

Hello, I am Janice Gintzler, of Crestwood, IL, the community of cancerous water, that public officials locally & @ the State are charged with protecting. Water should not be co-opted by private entities for their profit, as was done in Crestwood.

Water pollution is one of the major worries of Americans in public ~~corporations~~ involved in fracking regions. The fracking process, as I understand it uses high power water, mixed with proprietary chemical solutions are injected far into the earth where the shale is located. My fear is that the injection process will end up being below the water table, and thus become polluted with unknown chemicals, such that those in the area can light water coming from their taps on fire!

Therefore, I urge the IDNR to ensure that citizens whose water may become polluted, be able to learn what chemicals are in the water entering their homes, and to be notified with alacrity, or even before hydraulic fracturing begins. Because the state and government by law are required to notify residents of any changes in their water.

And, if any water pollution results, please ensure automatic permit revocation for such violation & also please ensure that the impacted communities receive fund remuneration from the corporate entities, to ensure that their situations can be remedied, possibly by the need to move to a safer area. Walk in their shoes, please.

PS concerns that there is no dept @ Hydraulic Fracking at IDNR & that capabilities of personnel at IDNR are inadequate to the ways of hydraulic fracturing.

Please lose the one-use plastic bottles & bags. They are oil based products, oil is used to bring them to market. Expensive to the Earth & to moni. Also, please bring your own container for left overs when you go out to eat.

726 S. Halsted - Rm 302 - Crain's Business Magazine has joined BICEP - Business Initiative for Climate and Environmental Policy -

The Climate Casino: Risk, Uncertainty & Economics for a warming world -

This is a fake regulatory bill. ~~Please, don't be an Illinois Department of Natural Resources that is cozy with the industry.~~ It is a subversion of both science and democracy. Fracking is the largest outlaw industry, exempt from effective regulations. Office of Mines and Minerals is notoriously cozy with industry.
This is a huge decision; a yes would serve as a starting gun for large scale fracking.
Hydraulic fracturing uses high powered fire hose water & toxic, cancer-causing chemicals meant for blowing up the shale down in wells that are quickly depleted but pollute for years afterwards. Fracking can't be safely regulated in a region prone to flooding and earthquakes. There's air, ground, water pollution, then well abandonment happens quickly. The rich get the profits and the taxpayers pay to clean up the mess and nurse the fatally sick, deal with disastrous consequences -
Inject poison, cancer causing chemicals. Why are they allowed to be secret?
In order to enrich the fossil fuel industry, and the richest 1% who own 39% of the wealth.
Why waste precious water on acts that further increase the risk of droughts & floods? Methane is 37 % worse than carbon dioxide for causing climate change because it breaks down more slowly. Southern Illinois would become a drought stricken dust bowl by the time our grandchildren are grandparents. They would have to witness their future wither away because of what we decide today.
Wisps of gas and puddles of oil are buried deep down inside Illinois rock. But like Pandora's box, in order to get the one useful resource we can't help but leave the rock leaking with radon and other poisonous gases.
Lithostatic pressure, props those cracks apart.
There's volatile, fire-hazardous propane, & radon.
Industrial scale strip mine for silica sand from Wisconsin and Minnesota hills & bluffs, would now be loaded into barges; those people are being subjected to noise pollution, causing learning disabilities. There's diesel exhaust. It's mountain-top removal. Silica particles in air causes silicosis, causes asbestos, lung cancer. Dust mask's for pregnant women, children.

levels that harm 40 lb men.

The Governor signed several bills to boost coal mining, including one to allow a surface mining operation in a state park, and another to ease the permitting process for strip mines. He leased 160 acres of a state park in southern Illinois for a strip mine.
~~Office of Mines and Minerals is notoriously cozy with industry.~~
~~Coal is America's deadliest power source. Many of those deaths are caused by air emissions that contribute to~~ respiratory problems and heart disease. The death toll also includes mining accidents, like the recent one at a Peabody mine in Saline County. Twenty people lost their lives in mine accidents last year. And despite preventative equipment, Black Lung still kills hundreds of miners and retired miners every year.
Quinn "A region's economic and environmental strength is based on the availability of clean water." That's exactly what worries people in fracking regions. Low-income rural areas face increased pollution impacts for many of the same reasons as do urban communities of color. Small towns often support any project that promises jobs, no matter how dangerous and deadly, because they see no better alternative.

021960

JUST TRANSITION - jobs in low-carbon, economy sustainable

principle of my religion is to affirm + promote Respect for the inter-dependent web of existance -

KAREN FORT

Illinois DNR Fracking Hearing Testimony by C. Jenny Walbridge, November 26, 2013

Greetings, Illinois Department of Natural Resources members. I'm Jenny Walbridge, and I've lived in the state pretty much all my life. Tonight I feel the burden of representing the many Illinoisians who know nothing about hydraulic fracturing, let alone that it is happening in our state, and who don't know about this hearing.

Frankly, I feel that fracking is a terrible idea!, the worst one that has come up since coal burning with its mercury pollution, which I know a thing or two about. Coal plants have closed in several places in Illinois--yay!--but now fracking is laying waste to our land and our people. The proposed rules for the law that recently passed, the one you are having a hearing on, do not protect human workers or citizens who live near the wells, nor do they protect tourism dollars or FUTURE USES OF OUR GREAT STATE!

What fracking--according to the proposed rules--does do is encourage the short-term making of money for a few, and the contribution to global warming that will swallow New Jersey and Florida if we keep it up. The Sierra Club, to which I belong, exists to celebrate and safeguard the environmental rights of all of us Americans, including Illinoisians. It asserts that the proposed rules offer only low penalties for non-compliance, encouraging the operators to see non-compliance penalties as an acceptable cost of business. This would not be acceptable to me, and I feel the rules encourage moral wrongdoing.

I also agree that: the proposed rules' emergency response information is unacceptably inadequate, putting lives at risk, and the rules can be interpreted to not apply to operations done with substitutes for water, such as foam or nitrogen, but they really should, as this is still fracking.
Plus: the rules exclude operations already in action--but these operations have effects on our land just like new ones will, obviously, so should be included under the law's jurisdiction, of course.
As living creatures, we need safety from poisons, but the rules, in their application to the proving of pollution offenses, only apply to certain chemicals--which do not include all of those from the list of over 100 included in the original law, according to the Sierra Club. This is terrible and should be changed!
And: the rules limit the amount and kind of review processes for modifications to permits; this opens the doors for fracking permit holders to avoid public participation in this process. I hate this, too!

Not only does fracking waste our water, it ruins our future--by causing earthquakes; by releasing methane; by ruining our land and tourism. It's not a good gamble, and I don't care if it provides some jobs--so do solar and wind power.

Really, I do not understand it...the frackers don't seem to care about the integrity of the land! How uninspired can they get? Where's the vision? Where's the tomorrow? I don't want our state to lose these! Additionally, we have a great resource in our people who know about alternative energy sources. We should use this knowledge and STOP FRACKING IMMEDIATELY--our beautiful state is worth it!

With fracking, we are talking about PERMANENT destruction. But our water is gold, not something to irradiate by fracking; not to waste for our future children! All over the country, there will soon be a need for more water--we cannot afford to squander it! Somebody--somebodies--have done something TOTALLY INSANE here, by allowing fracking in our great state. It's your job, as caretaker of our beautiful Illinois, to strengthen the law to the extent it was meant to be, so as to prevent as much damage as possible. Please do this--I really care, and so does every Illinoisian I tell about the horrors of fracking!

Thank you!

My name is Connie Schmidt. I am the chair person for the River Prairie Group of the Sierra Club which encompasses DuPage County. We have around 2500 members and I speak for them now. We have had two meetings on Fracking for our membership in the last year and both were attended by nearly 75 people so we want you to know that the citizens in the northern part of the state are concerned that the regulations on Fracking protect both the environment as well as the citizens of all parts of our state. In particular water contamination is of great concern.

Personally, my family is from the small towns of Benton and Makanda in the southern part of the state. My great uncles worked the coal mines for many years and several became sick and died of the black lung disease. Although the problems with Fracking are different the concept of the need for strong regulations to protect the workers and the citizens are the same.

When Illinois passed the law requiring Fracking regulations environmentalists cheered that we would be a leader in the nation to demonstrate safer practices to the Fracking industry. Among the many issues the following three are highlighted:

1. Open chemical disclosure is essential for both human and environmental health.

2. Vigilant protection of ground water from leaching tanks and open pits of stored tainted water are a must.

3. Existing wells must be subject to the same rigorous standards and not be allowed to continue unless proven that they are not endangering the citizens or the environment with polluting chemicals in the land air or water.

In closing I will state that the 2500 members of the Sierra club in DuPage County implore you NOT to water down the regulations and endanger the citizens or environment while empowering the corporations making a huge profit while leaving a irreparable mess it their wake.

Connie Schmidt
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Warrenville, IL 60555
Twnstr111@msn.com

021962

Hydraulic Fracking Adminstrative Riles Heraing-November 26th, 2013

As a resident of Homer Glen, Illinois, I currently do use Well water. I am also a member of the Homer Glen Environment Committee, and we have been following the Fracking issues in Illinois. While we do not feel that Fracking will come to Will county, there are real concerns about how Fracking will affect the Radium levels in our Wells.

I would like to point out that the city of Waukesha, Wisconsin, currently is having problems with Radium levels beyond the EPA limits. But only from their deep Wells. The water for these deep Wells originated West of the sub-continental divide. This water seeped underground below the impermeable shale layer and then into the deep aquifer.

While there currently is no mention of the Fracking process being responsible for this Radium, there is also nothing to say Fracking is not responsible. Or more to the point of why we are here today, will high volume hydraulic Fracking that is now being proposed eventually cause deep water Wells to become contaminated?

In researching the history of Fracking in Illinois, you will find that Fracking was probably done in some form or another 60 years ago. But in only very small numbers and then no environmental follow-up work was done. From what I can see, the oil & gas industry has been "Wildcatting" it up until now.

HB2615 and SB1715 did not have universal approval. Not at all! There were, and still are, a large number of people who oppose Fracking. Some because it just does not seem Right to pour 70,000 gallons of toxic chemicals into a deep Well and then pump hundreds of thousands of gallons of water under high pressure on top of that.

If nothing else, the waste water blown back from the Fracking process is highly toxic. Simply dumping that wastewater back into lakes, rivers or even holding ponds is extremely risky. As we have seen with Fly Ash retention ponds at coal fired power plants, they leak!

Then you have the toxic chemicals poured down the deep Well. We are being told that it is only enough that we know what these chemicals are. Not which ones should NOT be used, or in what amounts. It appears that no one is ever going to investigate what chemicals will have detrimental effects on the environment.

As far as I can see, there honestly is no way to tell in advance of applying pressure to the toxic mix, exactly how the Fracturing of the rock structure will occur. It does not seem to be an exact science yet. The possibility of the fracture that is created being bigger than expected is a real risk! What are the possibilities of the Fracking causing seismic activity?

The whole idea of Fracking is to "move" things around deep underground. To use high pressure with toxic chemicals to force a crack to happen and then inject a sand mix into the crack to keep the crack open. What are the assurances that Radium will not also follow the cracks? We know that there is a good chance the wastewater will have Radium, but where else will the Radium flow to?

Nowhere in the proposed rules do I see any further research being done with regards to any of these questions. There is vague talk about minimum testing, but nothing about follow-up work to make sure deep aquifers are protected. Or to determine how Fracking causes seismic activity.

There also seems to be no standard on how to regulate how wastewater will ultimately be treated. Holding all wastewater in a tank is a very good idea, but what happens next to that wastewater? There is no way that toxic brew should simply be dumped anywhere. It needs to be handled in the same fashion as any hazardous waste product.

Thank for allowing me to speak.

Randy Juras

14351 Oak Trail

Homer Glen, Illinois 60491-5966

021964

Testimony of the Rev. Dr. Terrence G. Gallagher: 140 S. River St. Unit #301, Aurora, IL. 60506

-prepared for presentation to the Illinois Department of Natural Resources at their "Hydraulic Fracturing Administrative Rules Hearing" held in Chicago, IL on November 26, 2013.

I wish to begin by expressing my appreciation for the opportunity to present my comments at this session. For the record, I am the Rev. Dr. Terrence Gallagher. I present these comments arising out of the responsibilities of my ministry as a public theologian and I speak from the knowledge, skills and experiences of 32 years in the Chemical industry as an engineer and manufacturing executive.

As a person of faith who is concerned about public health now and for generations to come, I strongly support the effective and stringent regulation of the fossil fuel extraction process known as hydraulic fracturing. The administrative rules to govern the fracturing extraction process as currently written fall well short of being an effective regulation which protects the environment for current and future citizens of the state of Illinois.

Prior to entering the ministry, I spent over 30 years in the chemical industry, originally as an engineer and ultimately as the Plant Manager of two chemical plants. I was in that role during some of the most active days of new pollution and safety requirements being implemented by the Federal EPA and State regulators. To be honest, there were times during those years that I bemoaned the burden of additional regulations similar to business voices that you might be hearing these days. But also to be honest, in retrospect, those regulations made us better as an industry. The results were better for our employees & neighbors certainly but also for our bottom lines as we were forced to grow in technological innovation as a result.

In the limited time that I have been allowed to speak to you, I would like to focus on the concept of allowing waste water and the associated chemical additives to sit in open pits at the well site. Frankly this is a startling aspect of the rules which harkens back to embracing the technological advances of the 19th century. Its' like going to Doctor and having him treat your infection by draining your blood to get the bad spirits out. Surely as a society we have advanced beyond the technological boundaries of just spilling toxic chemical mixtures into an open pit. In this day and age of MACT standards, you wouldn't allow a chemical manufacturing facility to do it so why would you grant such a variance to the world's most profitable industry? Open pits without adequate safeguards to protect the air, soil and water resources of this great state is a frankly an embarrassment to the engineering capabilities of the 21st century.

As a Plant Manager, I would never have permitted this type of a response to be utilized on any property that I was responsible for. It is both unethical as well as uneconomic in the risks that such antiquated techniques would expose our society to. Handling these waste streams effectively does not require new knowledge or unproven technology. After decades of developing the hydraulic fracturing process, there is an experience base and a knowledge basis sufficient to calculate and install adequate tankage with pollution control systems such that these hazardous waste streams do not enter our environment. If a particular drilling company insists that the limit of their technology is to spill the toxins into an open pit then you need to deny them an operating permit. Faced with this result, I think you will

find their technical capabilities suddenly expanding. In truth the only element lacking is not technology but a willingness to invest in the capabilities to do this process without harming the environment.

In our better moments as a society, we take actions to create agencies to enact rules and controls to protect the health of current and future citizens of this great state and guard the resources of this land. That's your responsibility, that's where you, the Illinois Department of Natural Resources have a critical role in the future well- being of our society. Lately you have been taking a lot of ill-conceived negative criticism for this role. Powerful voices of ignorance and of greed have been raised against you and I fear that you have become timid as a result. I am here today to encourage you to be **bold** in your efforts to protect us.

I have found it fascinating to observe that every major religion in the world has some form of the "Golden Rule". That is the rule which proclaims the life value of "do unto others as you would have them do unto you". There is something about this rule that just resonates with what it means to be human. I would suggest that it is high time we practiced this rule in light of what we do to our soil, water and air. For in a very real way what we do to others through our polluting these fragile resources, we have in fact done to ourselves. Christian teachings call on us to protect God's Earth and seek justice for our neighbors. This includes people we know and people across the State we may never meet as well as the neighbors who will comprise the generations yet to be born. Implementing effective and stringent regulation of the fossil fuel extraction process known as hydraulic fracturing is a very necessary response to the needs of those who live next to or downstream of these processes both now and into the future.

I would be remiss as a Public Theologian if I failed to point out that there is much more work to do in effectively regulating the pollution gases that come out of this process of hydraulic fracturing, Emissions of methane has been measured at extreme rates at well heads across this country depending on the driller and the technology utilized in the process. As you are aware Methane is a greenhouse gas which is many times more powerful as a global warming agent that CO2. Ultimately, we need to get to the point where we do not allow methane leakage at all.

Some day in the not too distant future, kids will ask why we would knowingly harm their future when we had the technology, the resources and the means to act differently. It will be difficult to look them in the eyes and respond that we simply lacked the willpower to change. To that end, I would encourage the IDNR to shed its current timidity and get serious about protecting our environment from the pollution of hydraulic fracturing process. Thank you for being willing to listen.

Rev. Dr. Terrence G. Gallagher

021966

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Rev. Dr. Terrence G. Gallagher

Testimony regarding the proposed
Hydraulic Fracturing Regulatory Act administrative rules
by Glenda Reed
Food & Water Watch Supporter

The Hydraulic Fracturing Regulatory Act was passed by the Illinois legislature, and signed into law, after closed-door negotiations between lawmakers, industry and several environmental groups. At the time, many of us warned that the oil and gas industry's well-paid lobbyists would succeed in watering down the resulting regulations, and that, even so, these regulations would be inadequately enforced.

Our underground sources of drinking water are simply too vital to our future to risk them for oil and natural gas. It only takes one case of contamination to ruin a community's water source.

The rules proposed by the IDNR ignore what we are learning from fracking disasters across the country and in doing so exacerbate the risks to the health of our water. Sections 245.210 (at (a)(6) and at (a)(7)), 245.815 (at (b)) and 245.1010 introduce an arbitrary and grossly inadequate measure to protect against so called "frack hits".

"Frack Hits" occur when new fractures from fracking intersect with aging and abandoned wells. According to these sections, permitted operators would only have to worry about frack hits on existing wells that are within 750 feet of the proposed well, measured as the minimum distance between any two points along two respective boreholes. Even then, they only need to consider those existing wells if they were drilled to within 400 feet of the rock formation targeted by the new well.

This is not only arbitrary but it is grossly inadequate. Just this past September, in New Mexico, fracking at one well blew fluids out of a neighboring wellhead located a half mile away. That's 2,640 feet away – 3 ½ times the distance required by IDNR's rules!.

New oil and gas wells with cement or casing failures, aging or abandoned wells with their own leaky casings, new fractures from fracking, and existing natural fractures and faults all combine to create a network of underground pathways through which contaminants can flow. Simply put, the oil and gas industry cannot reliably predict the length fractures are that they are creating, until they've created them and these new rules all but guarantee that new fractures from fracking will connect with existing pathways of contamination.

Of course there are many other problems that the proposed regulations only begin to address. We simply believe that these problems are best avoided altogether, with an outright ban.

021969

Hello, my name is Abby Dompke. I'm a member of the UIC organization Roots of Justice. I am also here today with Fair Economy Illinois.

Before I comment on the rules, I would like to request two things: first, that the IDNR extend the public comment period to 90 days, ending on Friday, February 7th; and second, that the Department hold more public hearings in Chicago and Bloomington in January, after the holiday season is over. The fact that this hearing is being held two days before Thanksgiving, and that I had just 11 days notice, contradicts IDNR's commitment to public participation throughout this rulemaking process. Fracking effects and is very important to many people in Illinois, and all of their voices deserve to be heard.

So first off, a key provision of the bill passed in June requires that fracking wastewater be stored in closed tanks. The only exception to this requirement is when companies underestimate the size of the tanks and produce more wastewater than can be contained in the tanks—in other words, in case of emergency. In those cases, companies would be allowed to store wastewater in dangerous open-air pits for theoretically up to 7 days.

The following are problems with these rules.The draft rules do not ensure that companies accurately calculate the appropriate tank size, creating a loophole for companies to chronically underestimate the size of these tanks. The Department could easily fix this by mandating a specific method by which companies must calculate the size of the tanks, in order to minimize the frequency of overflow and thus the use of open-air pits. Furthermore, the rules state that the 7-day time limit does not begin until

after all fracking operations are completed. This is contradictory to the intent of the legislation, and *invites* use of the open-air pits during fracking rather than deterring such use.

Storage of fracking wastewater in open-air pits is incredibly dangerous. The liquid waste permeates into the ground over time, potentially contaminating water sources. The fact that there is basically no rule for how long open air pits may be used in total increases the chance of this contamination. Additionally, fracking wastewater contains the toxic chemicals used in fracking fluid, and often also contains naturally occurring radioactive materials, including carcinogens and heavy metals. When exposed to the atmosphere, wastewater gives off fumes that are hazardous to human and animal health

Now, this next comment is in reference to Page 3, Paragraph 6 of the Proposed Hydraulic Fracturing Regulatory Act, which states: "Published studies or reports, and sources of underlying data, used to compose this rulemaking: None".

With this comment I strongly object to a set of rules that blatantly admits that its authors have chosen not to consult published studies, reports or sources of underlying data. This is absolutely unacceptable for something that has such a large effect on public health and the environment.

Before these rules are published this comment requests that the IDNR participate in regular monitoring of government reports, peer-reviewed studies, and media reports regarding hydraulic fracturing published by reputable sources about the effects of fracking that have taken place in other parts of the world. This is very

important for something that has such a large impact on the environment.

To leave these regulations as presently written, with the admission that the IDNR has consulted no reputable sources, and yet does not claim for itself the role of expert knowledge of the industry, creates the impression that the IDNR has chosen to operate with disregard to the wellbeing of the earth and the health of those that reside in it. By giving off this impression, public confidence in the regulations as currently written will falter greatly.

The issue of fracking is important to me first off because it is so detrimental to the environment and our health. Something this dangerous should have regulations set in place to protect us, the citizens, not the companies. In addition to this, I would like to believe that the purpose of our government is still to protect our people's health and give them a voice. Please show that this is your intent as government officials by extending the comment period and providing more hearings.

021972

The rules presented by the IDNR greatly favor the corporation over the civilian. Corporations exist for one purpose: profit. Big banks, fossil fuel companies, all sorts of companies have throughout history have broken laws, poisoned our environment, and endangered human lives for the sake of profit.

The only way to ensure corporations follow the law and protect us and our environment is to make it more expensive to break the law than it is to follow the law. The rules drafted by the IDNR contain minimal fines on corporations for very serious violations of human and environmental safety. Fines start at a token $50 per violation and only go up to $2500 violation (Sec. 245.200). In fact, the fines in the rules are technically lower than the daily fines specified in the original legislation. The top 5 producers of oil and gas made over 118 billion in profits last year. A $50 or $2500 fine will not slow these corporations down. This is akin to police stopping someone for speeding through a construction zone and hitting a worker and then writing them a ticket for 5 cents. The cost of polluting the groundwater of over 800,000 Illinoisans, the cost of illness and cancer caused by contaminated water and air, the cost of brain damage caused by toxic fumes – these should be reflected in the fines. The costs of violations of the rules need to be higher than the millions of dollars in profits that corporations stand to gain from fracking our water and land.

Nuclear Energy Information Service

Illinois' Nuclear Power Watchdog since 1981

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INITIAL COMMENTS ON RULES FOR Public Act 098-0022
PERTAINING TO FRACKING IN ILLINOIS
November 26, 2013
By
David A. Kraft, Director, NEIS

We thank you for the opportunity to present our initial comments on the proposed Illinois fracking rules. More detailed comments will be provided in writing prior to the January 3, 2014 comment deadline. For now, we wish to make these general points:

1.) GENERAL OBSERVATION: RADIATION HAZARD INADEQUATELY ADDRESSED:

The absence of explicit mention and the inadequacy of the regulations offered pertaining to radioactive substances in both the enabling legislation and in IDNR's rules displays shocking negligence on the part of the State Legislature and IDNR to protect the public health and safety and the environment. The words "radioactive" or "radioactivity" are mentioned only five times in brief passages in the 135 pages of rules promulgated by IDNR. Neither radon nor radium are mentioned by name in the entire document; even though both represent a substantial public health threat to workers and residents near fracking, storage and disposal sites.

2.) UNIQUE QUALITIES OF RADIOACTIVE MATERIALS AND RADIATION NOT ADEQUATELY REPRESENTED IN THE RULES PROPOSED:

- While general references are made regarding radioactive substances in the sections dealing with water quality, pollution, testing and spills and remediation, none of these adequately appreciate nor deal with the unique hazards produced by the radioactive substances released during the fracking process. In general radioactive substances are treated as simply one more check box like all the others to be dealt with. No specifics unique to the remediation of radioactive substances in soil or water are given; no treatment, handing or transportation methods or requirements are given. Radiation is simply a non-issue throughout these Rules.
- In the case of radon gas effects on local air quality either at the sites or local areas, it is not even mentioned in Sec. 245.845 on gas management during flowback, where only hydrocarbons are addressed; nor defined in any way in the Definitions section 245.110 of the Rules.
- In the specific case of the treatment and recycling of flowback water, no mention is made as to what standards for radiation content will apply, or what treatment methods would be used to enable radioactively contaminated flowback waste to be safely re-usable.

021974

- In the specific case of Spills and Remediation in Sec. 245.855, IDNR is content to let Illinois Oil and Gas Act and Administrative Rules apply, instead of more appropriate State regulations dealing with low-level radioactive waste (LLRW) disposal. As a result the rules may inadvertently call for a violation of State law prohibiting the disposal of LLWR in Class II disposal injection wells.
- In the specific case of the Operations Completion Report (OCR) in Sec. 845.860, while a detailed chemical disclosure report is mandated, this inventory applies only to the chemicals in the fracking fluids, not to others found in the flowback or produced water; nor in the solid waste materials. No detailed mention of how produced water would be disposed of or recycled is required. Radium would surely appear in these, and should be reported in detail as part of the OCR.

3.) A SIMPLE, OBVIOUS RECOMMENDATION:

It is clear that a significant radiological threat exists at every aspect of the fracking operation, both to the workers onsite, to the public living near wells, storage and disposal sites, in the present and in the future. The radiation contents of fracking need to be governed by existing rules and regulations for the storage, treatment, transportation and disposal of low-level radioactive wastes.

4.) FINAL OBSERVATION:

In January of 2013 we wrote extensive letters to numerous State legislators, warning of the radiologic hazards of fracking. Those warnings were neither responded to, nor addressed in the ensuing legislation. On November 25, 2013, an ABC Chicago Channel-7 News report described the knowing non-compliant and illegal operation of the ADCO Services radioactive waste broker firm in Tinley Park. The State IEMA was fully aware of over 70 violations at ADCO over a 20 year period, yet permitted ADCO to continue operations until bankruptcy forced the State to intervene.

This level of non-regulation will not be tolerated with fracking. ***"Betrayal is a solid rational basis for distrust,"*** according to journalist and author William Boardman. Given the thousands of frack sites under consideration for licensing, coupled with State financial woes and budget cuts to critical safety-related agencies, it seems highly irrational to accept the notion that State Agencies will have the person power to monitor this industry at a level protective of the public health and safety. The already demonstrated willingness of State Agencies to tolerate both non-compliant and illegal operations for decades in violation of the State Constitution, which guarantees all people in Illinois a clean and healthful environment, will not be tolerated. The lackadaisical treatment of the radiation hazard in IDNR's proposed fracking Rules is further evidence of this patterned unwillingness or inability to regulate. We urge IDNR to scrap these proposed rules and start over, perhaps with greater and more substantive active participation of the now distrustful Public whom they are so willing to subject to such environmental abuse.

Thank you for your consideration of these remarks.

021975

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We thank you for the opportunity to present our initial comments on the proposed Illinois fracking rules. More detailed comments will be provided in writing prior to the January 3, 2014 comment deadline. For now, we wish to make these general points:

1.) GENERAL OBSERVATION: RADIATION HAZARD INADEQUATELY ADDRESSED:

The absence of explicit mention and the inadequacy of the regulations offered pertaining to radioactive substances in both the enabling legislation and in IDNR's rules displays shocking negligence on the part of the State Legislature and IDNR to protect the public health and safety and the environment. The words "radioactive" or "radioactivity" are mentioned only five times in brief passages in the 135 pages of rules promulgated by IDNR. Neither radon nor radium are mentioned by name in the entire document; even though both represent a substantial public health threat to workers and residents near fracking, storage and disposal sites.

2.) UNIQUE QUALITIES OF RADIOACTIVE MATERIALS AND RADIATION NOT ADEQUATELY REPRESENTED IN THE RULES PROPOSED:

- While general references are made regarding radioactive substances in the sections dealing with water quality, pollution, testing and spills and remediation, none of these adequately appreciate nor deal with the unique hazards produced by the radioactive substances released during the fracking process. In general radioactive substances are treated as simply one more check box like all the others to be dealt with. No specifics unique to the remediation of radioactive substances in soil or water are given; no treatment, handing or transportation methods or requirements are given. Radiation is simply a non-issue throughout these Rules.
- In the case of radon gas effects on local air quality either at the sites or local areas, it is not even mentioned in Sec. 245.845 on gas management during flowback, where only hydrocarbons are addressed; nor defined in any way in the Definitions section 245.110 of the Rules.
- In the specific case of the treatment and recycling of flowback water, no mention is made as to what standards for radiation content will apply, or what treatment methods would be used to enable radioactively contaminated flowback waste to be safely re-usable.

021976

- In the specific case of Spills and Remediation in Sec. 245.855, IDNR is content to let Illinois Oil and Gas Act and Administrative Rules apply, instead of more appropriate State regulations dealing with low-level radioactive waste (LLRW) disposal. As a result the rules may inadvertently call for a violation of State law prohibiting the disposal of LLWR in Class II disposal injection wells.
- In the specific case of the Operations Completion Report (OCR) in Sec. 845.860, while a detailed chemical disclosure report is mandated, this inventory applies only to the chemicals in the fracking fluids, not to others found in the flowback or produced water; nor in the solid waste materials. No detailed mention of how produced water would be disposed of or recycled is required. Radium would surely appear in these, and should be reported in detail as part of the OCR.

3.) A SIMPLE, OBVIOUS RECOMMENDATION:

It is clear that a significant radiological threat exists at every aspect of the fracking operation, both to the workers onsite, to the public living near wells, storage and disposal sites, in the present and in the future. The radiation contents of fracking need to be governed by existing rules and regulations for the storage, treatment, transportation and disposal of low-level radioactive wastes.

4.) FINAL OBSERVATION:

In January of 2013 we wrote extensive letters to numerous State legislators, warning of the radiologic hazards of fracking. Those warnings were neither responded to, nor addressed in the ensuing legislation. On November 25, 2013, an ABC Chicago Channel-7 News report described the knowing non-compliant and illegal operation of the ADCO Services radioactive waste broker firm in Tinley Park. The State IEMA was fully aware of over 70 violations at ADCO over a 20 year period, yet permitted ADCO to continue operations until bankruptcy forced the State to intervene.

This level of non-regulation will not be tolerated with fracking. ***"Betrayal is a solid rational basis for distrust,"*** according to journalist and author William Boardman. Given the thousands of frack sites under consideration for licensing, coupled with State financial woes and budget cuts to critical safety-related agencies, it seems highly irrational to accept the notion that State Agencies will have the person power to monitor this industry at a level protective of the public health and safety. The already demonstrated willingness of State Agencies to tolerate both non-compliant and illegal operations for decades in violation of the State Constitution, which guarantees all people in Illinois a clean and healthful environment, will not be tolerated. The lackadaisical treatment of the radiation hazard in IDNR's proposed fracking Rules is further evidence of this patterned unwillingness or inability to regulate. We urge IDNR to scrap these proposed rules and start over, perhaps with greater and more substantive active participation of the now distrustful Public whom they are so willing to subject to such environmental abuse.

Thank you for your consideration of these remarks.

021977

Linda Forst, MD, MS, MPH
UIC School of Public Health
Testimony before Illinois Department of Natural Resources re: Draft Hydraulic Fracturing Regulations
November 26, 2013

My name is Linda Forst. I am the head of Environmental and Occupational Health Sciences at the School of Public Health here at the University of Illinois at Chicago. I am also a medical doctor trained in Internal and Occupational Medicine and in Public Health. I have spent my career providing health care to workers and the public related to hazardous exposures in the workplace and in the general environment; I also conduct research in this realm and I teach graduate students and physicians about environmental hazards and toxicology. I have the privilege of working with excellent scientists who study environmental and occupational hazards and their impacts on human health and the environment.

Today I am here to express my concern about Subpart G of the proposed regulations on hydraulic fracturing in Illinois. This pertains to emergency response and disclosure of the contents of the hydrofracturing fluid. I am concerned that the draft regulations strike an inappropriate balance between the protection of trade secrets and the protection of human health.

Those who drafted Subpart G are undoubtedly familiar with OSHA's Hazard Communication Standard: the current standard requires that companies have Material Safety Data Sheets on site and make them available to workers and their representatives. Workers are entitled to know what they are working with in order to make informed decisions. In the proposed IDNR regulations, health care providers who are treating workers and others will need to track down exposure information at IDNR during business hours or to locate the proprietor of the specific well site after hours. This is a tremendous barrier to treating workers and members of the public sickened by hazardous exposures. In an emergency, time spent tracking down this information can mean the difference between life and death.

I am also quite sure that the EPA's community right to know act, EPCRA, is familiar to those who drafted these regulations. It stresses the importance of community knowledge of local hazards and hazardous substances for purposes of emergency planning.

When the Governor Quinn signed the Hydraulic Fracturing Regulatory Act into law, it was touted as the most stringent and protective fracking law in the nation. These brass tacks regulations—again, emphasizing the protection of trade secrets--water it down. These are the changes to the proposed rules that I believe need to be made in order to protect the health of the public.

1. The new OSHA Hazard Communication standard will require moving to the Global Harmonization System before 2015. Illinois should require implementation of the new standard—companies should be required to produce the new Safety Data Sheets with their template sections and expanded information. If it is not required by the State now, there will be a new regulation required in a year.

2. Both statute and regulations acknowledge the need for health care workers to have immediate information about the chemicals involved in a health emergency, irrespective of claims of trade secrets. As written, the regulations place the burden on the treating physician to track down this information. Instead, the Illinois Poison Center could function effectively as a repository of this information. The IPC has a hotline that is available 24/7. IPC understands workplace and environmental hazards and how to communicate with health care providers in a way that is clinically relevant. Health care providers and citizens are already familiar with the Poison Center. Finally, the Poison Center is hooked into disaster management plans in the State. IDNR can leverage this high quality resource by adjusting the regulations to specify sharing of lists of chemicals with IPC and making IPC an agent of the State for this purpose. A confidentiality agreement can be put in place. The public and health care providers can be directed to call IPC in the event of an exposure or a health concern. Revenues generated from permitting and taxation should be directed to support IPC, a non-profit, for this additional work.
3. IDNR should work with the Illinois Department of Public Health to establish health surveillance for outcomes related to the exposure hazards of the hydraulic fracturing process. Acute health effects may be anticipated, given the types of chemical agents being used and the experiences of other states. Short-term, acute health effects that can be anticipated include, but are not restricted to, respiratory tract irritation and asthma, cardiovascular events, and mental health effects. Motor vehicle injuries from heavy traffic and sexually transmitted infections from single male contractors rolling into town are also serious problems that health departments confront. In the longer term, lung disease from elevated silica levels in hydrofracturing fluid, neurologic disorders, abnormal birth outcomes and cancers could arise. There are existing databases that can be used to track these health disorders over time. A real-time and longitudinal surveillance system should be put in place with, again, resources allocated from the revenues generated by the hydraulic fracturing business.
4. Finally, other research and tracking should be mandated. A Health Impact Assessment and ongoing case studies of counties or towns that are affected, perhaps compared to similar towns that are not, will shed light on the impact of hydraulic fracturing on community health. A survey of stakeholders—businesses, farmers, trade organizations, environmental organizations, state agencies, and private citizens—will help DNR and other state agencies respond to the needs of individuals and communities. IDNR should work with a consortium of state universities and sister agencies to conduct research and evaluate impacts. This is the best way tol assure the health and safety of the people of Illinois and it will serve to enlighten regulators in other states.

Thank you for allowing me to testify today. I look forward to these and other changes in the hydraulic fracturing regulations that better express the language and intent of the law.

UIC SCHOOL OF
UNIVERSITY OF ILLINOIS AT CHICAGO PUBLIC HEALTH

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Press Release - Mon, Nov. 25, 2013
Frack Free Illinois, Contact: Dr. Lora Chamberlain
773-486-7660, drlora2@yahoo.com

The 1st IDNR Public Hearing on the proposed rules for implementing "Fracking" will be **Tuesday, November 26, 2013, 6:30p-8:30p University of Illinois at Chicago (UIC), 750 S. Halsted Street, Student Center East, Rm 302, Chicago IL 60607**
Press conference in front of the Student Center East: 5:30 pm

Despite being praised in the press as the "strongest regulations in the nation" – now that the IDNR draft rules for fracking in Illinois have been published, even those environmental groups involved in crafting them do not believe they are protective enough of Illinois residents. The draft rules would not prevent widespread public health and environmental damage from fracking, because the rules ignore the up-to-date scientific information about the actual and predicted harms from fracking.

Of primary concern to Frack Free IL is that the regulations do nothing to monitor for dangerous radioactivity on the frack fields. The IDNR knows that all shale, which will be drilled in the fracking process, is radioactive. But in the rules there is almost no mention of monitoring for radioactivity in the fracking waste stream. The IDNR appears to have turned its back on their duty to protect the public's and worker's health.

The IDNR is aware that another significant risk from fracking is induced seismicity – which may cause significant earthquakes, by the disposal of millions of gallons of probably radioactive waste water in deep disposal wells. This is a known hazard to the fracking industry. The use of deep disposal wells in our two most active earthquake zones, the Wabash Valley and the New Madrid, should be held off limits, even per industry standards. But the IDNR seems to believe that southern and central IL could tolerate 4 Class 4.9 earthquakes before they would set a "Red Light Alert".

Illinois residents and lawmakers must stand up and demand that the IDNR return to the drawing board and work with independent, university-based, seismologists to develop rules that will actually protect Illinois residents and property from induced seismicity. We have too much to lose if the IDNR gets this wrong.

Our group is stunned at the flagrant disregard for the public health and environment evidenced in the draft rules. We call for an immediate moratorium on Hydraulic Fracturing in Illinois.

Our group is also dismayed that the IDNR openly admits, in their draft rules on page 3, that they did not refer to any published studies or reports, and sources of underlying data to inform their rule making. As a response we call for an immediate convening of an independent, university-based, hydraulic fracturing science research task force to evaluate the dangers of fracking and to inform the IDNR going forward. The IDNR must consult scientists who are not employed by the fracking industry, for a science-based regulatory framework.

We also call for the many state agencies who should be involved in the monitoring of various aspects of fracking in this state, such as IEMA, the IDPH, the IL Water Survey, the IL Geological Survey, the Dept. of Agriculture and others, to work together in an Inter-agency Hydraulic Fracturing Task Force, which would work in a public, transparent way to inform the re-writing of these rules by the IDNR.

Group member Dr. Lora Chamberlain stated, "The IDNR took months to develop these rules, they seemed to sit with the industry every day, but when did they confer with the independent scientists to discuss how to mitigate the many dangerous effects of fracking for the public? Apparently never. When is the IDNR going to take their mandate to protect Illinois residents and our environment seriously?"

Other groups who will be attending the public hearing include: Illinois Against Fracking, MoveOn.Org, IRON, Environmental Law and Policy Center, Natural Resources Defense Council, Sierra Club, and the League of Women Voters IL. Public testimony is encouraged.
For More Information On The Proposed Rules & the Public Hearing Schedule:
http://www.dnr.illinois.gov/OilandGas/Pages/Hydraulicfracturing.aspx

Fracking Related Induced Seismicity,
Submitted by Frack Free Illinois,
www.facebook.com/FrackFreeIllinois
drlora2@yahoo.com
773-486-7660

To make your comment to the IDNR online:
Go to: http://www.dnr.illinois.gov/OilandGas/Pages/OnlineCommentSubmittalForm.aspx
Seismicity (240.796), In the "Section" dropdown box, click 240.796 Seismicity

COMMENT 1: The Rules contain language about earthquakes and, on a broader level, they also assume that fracking indeed causes earthquakes. The rules describe a whole series of fracking created earthquake levels of intensity.

Per recent correspondence with **Dr. Michael Hamburger, Professor of Geophysics at Indiana Univ.,** (a research seismologist studying earthquakes in the central United States. His research has included studies of the fundamental causes of earthquakes in the U.S. Midcontinent (Hamburger et al., 2002; Galgana and Hamburger, 2007; Hamburger, 2011), monitoring of low□ level seismicity in the area (Pavlis et al., 2001; Eagar et al., 2006), and detailed studies of individual earthquakes in the Wabash Valley region, including the 1987 Lawrence□ville, Illinois earthquake (Hamburger and Rupp, 1988; Taylor et al., 1989), the 2002 Caborn, Indiana earthquake (Hamburger et al., 2002) and the 2008 Mt. Carmel, Illinois earthquake (Hamburger et al. 2011). He has also studied artificially induced seismicity associated with reservoir impoundment (Simpson et al, 1981) and with oil and gas exploitation in southern Illinois (Eagar et al., 2006). He is currently involved in a major collaborative NSF□funded "EarthScope" research project, focusing on earth structure and earthquake generation in a broad region extending from southeastern Missouri to central Kentucky (Hamburger et al., 2012). The project, led by Indiana University, is being conducted in collaboration with Purdue University, the University of Illinois – Urbana□Champaign, and the Illinois, Indiana, and Kentucky state geological surveys, The project included operation of 70 temporary seismograph stations in southern Illinois and neighboring states, and analysis of that data is in progress. He has also worked on applied earthquake hazard studies and is a member of the U.S. Geological Survey's advisory committee on the National Seismic Hazard Mapping Program (Anderson et al., 2013), (for all questions to Dr. Hamburger please contact him at hamburg@indiana.edu);

"The evidence for triggered seismicity in response to injection of waste fluids is becoming incontrovertible (see review in Science by Ellsworth, 2013) and represents a growing concern for those involved in earthquake hazard estimation and mitigation. The areas of southern Illinois and neighboring states that are likely to be the focus for enhanced gas recovery are also sites of known seismic activity associated with the Wabash Valley and New Madrid seismic zones. The southern Illinois area carries the potential not only for the type of moderate□sized earthquakes (M 4 – 5.5) in the historic record, but potentially for New Madrid□size (M >7) earthquakes that are now clearly documented in the paleoseismic record (Obermeier et al., 1991; Munson et al., 1997)."

Why would the state allow any business activity that includes the real possibility of it creating earthquakes when done in an otherwise proper manner – especially in a geography known for major earthquakes?

COMMENT 2: The rules are silent regarding broader concerns regarding how fracking created earthquakes will affect existing earthquake prone communities. There is no mention of scientific review or study of the effect of fracking earthquakes within the Wabash Valley and New Madrid Seismic Zones. The Illinois Emergency Management Agency identifies southern IL with its most severe earthquake zone ratings of "Destructive "and "Ruinous".

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Has complete data been gathered on pre-existing faults in southern and southeast IL? Has this data been used in a hazard and risk analysis of the probability of induced earthquakes BEFORE fracking and well injection operations are initiated? As suggested on (p. 175) ("Steps Toward a "Best Practices Protocol") from the National Academy of Sciences report, ***Induced Seismicity Potential in Energy Technologies****(2013)*.

COMMENT 3: The IDNR is required by law to set up a "traffic light" control system to monitor seismicity and to require well operators to scale back or suspend injections when they raise a "concern for public health and safety." The Rules define various intensities of fracking caused earthquakes by a color code system. Enforcement doesn't begin until "yellow light alert", (a magnitude of at least 3.0 but less than 5.0). This color coding system does not appear to be used by the federal USGS, the federal agency responsible for monitoring earthquakes.

A Class II injection disposal well can be responsible for creating up to 4 earthquakes up to a level of 4.9 magnitude WITHOUT a mandatory shut-down order by the state. A 4.9 earthquake is a serious and newsworthy event – (USGS description: "Sensation like a heavy truck striking building. Standing motor cars rocked noticeably."). Mandatory shut-down of a site is based on a patchwork of multiple earthquakes at multiple times with varying intensity. For example, if an earthquake caused by fracking "causes significant damage" or a magnitude of 5.0 or greater the state will shut-down the frack site. A 5.0 earthquake is described by USGS as "felt by all, many frightened." The rules use a dangerous, high threshold of earthquake intensity for a mandatory shut-down. The fracking caused earthquake literally has to frighten people or break something before the state will step in.

Why would IDNR use a system not used nationally? Has the IDNR or the ILGS consulted the USGS on these rules and if not, why not?

COMMENT 4: Per Dr. Michael Hamburger, Professor of Geophysics at Indiana Univ., (for all questions please contact Dr. Hamburger at hamburg@indiana.edu;

"The levels proposed for transition from "Green" to "Yellow" alert levels seem insufficient to capture the range of possible induced seismic events that might indicate the need to proceed with greater caution. Because the "Yellow" alert allows an injection well to continue operating, a conservative procedure might trigger additional data□gathering and monitoring activities at a relatively low threshold. With an appropriately dense monitoring network, the threshold magnitude for triggering a "Yellow Alert" could readily be reduced to magnitude 2.5 or even 2.0. The occurrence of a large number of low□magnitude earthquakes should also be used as a basis to trigger a Yellow Alert. Also, because induced seismic activity has routinely been identified at distances greater than the 3 miles (5 km) specified in the draft regulations, I would recommend increasing the maximum distance to at least 10 km (6.2 miles).

The announcement of a Yellow Alert, as currently proposed, does not require any additional monitoring activity. Ideally, the transition to this cautionary state would set in motion additional monitoring efforts, which in turn could be used to determine whether induced activity is occurring and its spatial and temporal relation to injection-well activity. I would recommend considering the additional requirement for one or more (ideally three) seismic monitoring stations in the vicinity of a well suspected of triggering induced seismic activity.

Similarly, the levels proposed for transition from "Yellow" to "Red" alert levels again seem insufficient to capture the range of possible induced seismic events that might indicate the need to at least temporarily suspend pumping activities. Because damaging earthquakes in the Midwest can occur at magnitudes well below 5.0, and because induced earthquakes

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generally occur at shallow depths where they are capable of producing localized damage at nearby structures, I would recommend reducing the threshold magnitude to 4.0, or alternatively, to replacing the magnitude threshold with an instrumental intensity threshold of MM V. (potentially damaging), as estimated by the USGS ShakeMap protocol. Similarly, I would recommend increasing the distance from a possible triggered earthquake to neighboring injection wells from 6 miles (10 km) to 10 miles (15 km) and reducing the number of Yellow Alert earthquakes from five to three, to minimize the potential hazard from low□level induced seismicity swarms expanding to include moderate□and large□ magnitude events.

Finally, a Red Alert should presumably also trigger intensified monitoring activities, perhaps including enhanced surface array or borehole or monitoring of injection-related seismicity, and an increase in the number and sensitivity of seismic monitoring stations."

Since some expert seismologists have expressed doubt that the present draft rules for Class II wells are protective enough for Illinois residents, going forward will the IDNR and the ILGS consult with independent university based seismologists, such as Dr. Hamburger of Indiana Univ. and Dr. Van der Elst of the Lamont-Doherty Earth Observatory of Columbia Univ. to determine a more protective system for induced seismicity in Illinois? Is the IDNR going to seek any independent scientific consultation on whether severely large earthquakes (magnitude 7-9s) might be induced by the disposal of fracking waste water in highly active seismic zones such as the Wabash Valley and the New Madrid zones?

COMMENT 5: If a shut-down order is made, the fracking company gets a hearing, the purpose of which is to "mitigate induced seismicity events near the permitted well". To "mitigate" is to minimize, not eliminate earthquakes caused by fracking. As with the overall message of the earthquake rules, the intent appears to not eliminate earthquakes caused by fracking but actually permit them.

Will the ILGS or the IDNR consult any of the industry experts who were involved in the compilation of the Ground Water Protection Council's 2013 - White Paper on Induced Seismicity, which investigated a number of mechanisms for minimizing the frequency of induced seismicity; http://www.gwpc.org/sites/default/files/events/white%20paper%20-%20final_0.pdf **?**

COMMENT 6: On February 1, 2013, in a press release by the Illinois Emergency Management Agency, Governor Quinn urged every Illinois resident, school, and business to participate in an earthquake drill that was scheduled for a few days later. The press release described the situation in Southern Illinois as follows:

"Illinois sits atop two major fault zones, the New Madrid Seismic Zone and the Wabash Valley Seismic Zone. The most powerful series of earthquakes ever to hit the United States happened in 1811-12 near New Madrid, Missouri. In a 2008 study conducted by the University of Illinois Mid-America Earthquake Center, it was projected that if a similar quake struck the same region today, there would be 3,500 fatalities, 2.6 million people without electricity and $300 billion in direct economic losses. Bridges, docks, highways and water infrastructure would be in shambles." http://www3.illinois.gov/PressReleases/ShowPressRelease.cfm?SubjectID=2&RecNum=10901

Per the Introduction to USGS Fact Sheet 2009-3071 (http://pubs.usgs.gov/fs/2009/3071/): "There is broad agreement in the scientific community that a continuing concern exists for a major destructive earthquake in the New Madrid seismic zone. Many structures in Memphis, Tenn., St. Louis, Mo., and other communities in the central Mississippi River Valley region are vulnerable and at risk from severe ground shaking."

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Per the conclusion from the USGS Fact Sheet 2009-3071 (http://pubs.usgs.gov/fs/2009/3071/pdf/FS09-3071.pdf): ""The geologic record of repeated large earthquakes, the historical accounts of the 1811–12 large earthquakes, and the continuing earthquake activity in the area are compelling evidence that the New Madrid region has high earthquake hazard. The preponderance of evidence leads us to conclude that earthquakes can be expected in the future as frequently and as severely as in the past 4,500 years. Such high hazard requires prudent measures such as adequate building codes to protect public safety and ensure the social and economic resilience of the region to future earthquakes."

IDNR's proposed rules for seismicity include NO recognition of the risks of injuries, property damage, and ecological damage that would result from a major earthquake at or near injection/disposal wells or fracking wells. Burst pipes, cracked or broken casings, cracked storage tanks, up-heaved pit liners, broken well structures, and migrating toxic fluids would cause untold human suffering and ecological degradation that could never be compensated or repaired.

What is the justification for the IDNR to ignore the serious risks listed above for earthquakes that might be induced by disposal of frack waste water in Class II wells in Southern IL? Will the proposed rules governing the permitting and operations of Class II injection wells rely on NO studies, NO reports, and NO data; as per the 3rd page of the proposed rules?

COMMENT 7: The penalty for failing to attend an earthquake hearing or continuing to frack after causing a serious, reported earthquake is $50 for a first time violation. The rules define these violations as "Administrative penalties". This amount is a little less than the cost of a dinner and a movie. Even with 4 or more earthquake violations, the maximum fine is only $500, arguably an acceptable business expense. If the frack site continues to operate in violation of a state order regarding it creating earthquakes the minimum fine is $100.

We ask the IDNR to raise all of the penalties in these rules, for all the violations, to the maximum level so that there might be an actual deterrent on the industry for violating the rules.

COMMENT 8: Will fracking companies be held responsible for all monetary damages caused by earthquakes? Has a Compensation Fund or System been created to indemnify residents, homeowners, businesses with clients who suffer injuries or damaged property from an injection well induced earthquake? Will the Compensation Fund or System cover damage to public infrastructure?
Pursuant to these questions,
5.1: Does IDNR require insurance for each injection well for 100% indemnification of the costs of damages from an earthquake that the well has caused?
5.2: Has IDNR created a system for receiving, reviewing, and approving damage claims?
5.3: Will the system in 5.2 work quickly and efficiently and avoid placing onerous burdens of proof on claimants?

If the answer is no to these questions, why has the IDNR created a system that favors well operators and penalizes citizens with injuries or damaged property?

COMMENT 9: The Illinois Administrative Procedure Act requires that "during First Notice, the Department of Commerce and Economic Opportunity, (DCOE), review each proposed rule making to determine possible impact on small business." (Apparently, this has been extended to small municipalities as well). We know the potential damages from induced earthquakes to small business and municipalities are real. For example, the magnitude 5.7 injection well induced earthquake near Prague, OK "destroyed 14 homes, buckled a federal highway and left two people injured"..., and magnitude 3.4 geothermal-induced earthquakes in Basel, Switzerland "caused $8

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million in damage to surrounding properties" (Columbia University Earth Institute;http://www.earth.columbia.edu/articles/view/3072). Yet, the IDNR states in the Illinois Register that small businesses and municipalities will NOT be affected by the injection well rules.

Has IDNR staff consulted with DCOE before the First Notice, and if yes, please provide the public with dates, times, and individuals at the DCOE with whom they consulted? To protect small business and small municipalities in southern and southeastern IL should these rules be tied to the expert opinion that can be marshaled by the National Academy of Sciences? As evidenced by their report: ***Induced Seismicity Potential in Energy Technologies****(2013) and in particular:* **Chapter 6 ("Steps Toward a "Best Practices Protocol")**

COMMENT 10: Per Dr. Michael Hamburger, Professor of Geophysics at Indiana Univ., (for all questions to Dr. Hamburger please contact hamburg@indiana.edu);

"The proposed rules do not specify what type of magnitude determination is to be used for triggering a specific alert level. Because at least four different magnitude determinations are routinely used for estimating the size of midcontinent earthquakes (mb, Ms, Mw, mbLg, MD) and because discrepancies between these magnitude determinations commonly reach 0.5 magnitude units, it is important to specify what magnitude will be used for determination. For instance, the 2002 Caborn, Indiana earthquake was initially assigned an mbLg magnitude of 5.0; however the subsequent acquisition of long□period data allowed the determination of an Mw magnitude of 4.6. (In fact, the high□frequency mbLg magnitude might actually be more relevant for potential damage to nearby structures. The moment magnitude (Mw) determination is not made for all events, and may be available only weeks or months after the earthquake occurrence. The simplest option is to adopt the maximum magnitude available from any one of a number of reporting agencies."

Will the IDNR incorporate a best practices protocol for induced seismicity into the permitting process for injection wells?

COMMENT 11: Are there a sufficient number of seismometers located across the ~8,000 Class II injection wells in Illinois, including locations where new injection wells are being permitted, to accurately locate seismic events? Is the Illinois seismic monitoring system sufficiently well developed or spaced to precisely locate induced seismic events and assign the event to the injection well responsible for the event?

Per Dr. Michael Hamburger, Professor of Geophysics at Indiana Univ., (for all questions to Dr. Hamburger please contact: hamburg@indiana.edu);

"The Rules do not specify any arrangement for monitoring of natural and induced seismicity in the southern Illinois region. In general the monitoring of seismic activity in the region should reliably detect and locate earthquakes to at least a magnitude unit lower than the magnitude required to trigger a response (currently M 3.0) and to reliably discriminate small induced earthquakes from blasts or other artificial events. The regional networks operated by the U.S. Geological Survey (USGS), the Center for Earthquake Research and Information (CERI) and St. Louis University (SLU) are far sparser than those used to monitor activity in the New Madrid region, and the temporary observations associated with the EarthScope experiment have largely been discontinued. The proposed addition of several EarthScope stations to the regional monitoring networks will help ameliorate the situation. However, the reliable detection threshold will probably remain above M2.0, particularly during daytime hours. In order to reliably detect, locate, and discriminate induced seismic activity, the IDNR should enhance both the density and analysis capability of the current monitoring network, specifically focusing on low-magnitude events in southern Illinois."

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Will the IDNR and the ILGS institute the type of monitoring system Dr. Hamburger recommends, before horizontal fracking begins? Will data from Illinois seismometers be publicly available and accessible through the internet in real or near real time? Has a Seismic Monitory Advisory Committee (SMAC), consisting of a broad cross section of interested parties, not only the Oil and Gas Industry, IDNR, and well operators, but also a national lab, such as the *Argonne National Laboratory*, several independent, university-based seismologists, professional water associations, county and local government representatives, representatives of IEMA, and members of community groups in the high risk areas, been created to monitor and report on injection and seismic activities? And, will this Committee be granted, as part of its charter, a significant and meaningful advisory role with respect to the issues raised here, including, but not limited to, the permitting process, seismic monitoring, compensation, hazard and risk analysis of earthquakes in population centers, and the cut points on the traffic light system?

021986

Radioactivity Associated With Hydraulic Fracturing

Submitted by Frack Free Illinois,
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drlora2@yahoo.com, 773-486-7660

Public Act 098-0022, and the draft rules released by the IDNR are not adequate to protect Illinois residents in regards to the radioactivity of shale and the handling of fracking waste water and debris. The industry and geologists know that all shale is radioactive, it is only a matter of degree. A typical shale formation has 100 API units of radiation; the New Albany Shale has in some cases up to 200-400 API units above the normal shale background. It is by measuring the gamma ray signatures of rock that geologists know where they will find shale.

Naturally occurring radioactive material is NORM and when it is brought to the surface with fracking it becomes TENORM. The principal radionuclide of concern in NORM/TENORM is radium-226, a member of the uranium series, which is present in natural soils in concentrations of about 1 picocurie per gram (Ci/g). However, NORM/TENORM radioisotopes may be present in different layers of rock in varying concentrations, and most fracking waste contains radium-226 concentrations that are much higher than 1 pCi/g, and may be as high as tens of thousands of pCi/g. Frack waste water is radioactive, toxic brine when it returns to the surface, in some areas it has been found to contain up to 16,000 picoCuries per liter of radium-226. The discharge limit in effluent for Radium 226 is 60 pCi/L, and the EPA's drinking water standard is 5 pCi/L.

The current maximum contaminant level ((MCL) as set forth in 40 CFR 141.66(c)) for radium-226 and radium-228, combined is 5 picocuries per liter of water, and for solids 5 picocuries per gram. Please also keep in mind the half-life of Ra-226 is 1600 years. www.epa.gov/radiation/tenorm/oilandgas.html

When fracking brings up massive amounts of shale debris, flowback water and produced water it brings with it elements like uranium, radium-226, radium-228, bismuth-214, lead-214, actinium-228 and thallium-208 and many decay daughters such as radon gas. Fracking exposes our surface water, air, land and residents to these radioactive elements. This radioactivity does not go away when it hits the surface, and with radium's extensive decay chain the harmful radioactivity persists in our environment for many, many thousands of years.

How radioactive is this fracking debris and waste water from Illinois shale?
We can not tell how radioactive every well's waste is until we test all of the waste water and the drilling debris, but we know from the experts that our shale is more radioactive than most. Out east, the Marcellus and Utica shale formations have concentrations of radium-226 that are 30 times background and up to 3000 times the allowable levels of EPA exposure. The academics from across the country are telling us to assume all the fracking debris and fracking waste water will be radioactive.

The fracking wells do not become less radioactive as they continue into production, actually the reverse is true, the initial flowback water from the wells (first 7-10 days) will be less radioactive than the produced water, which gets pumped out of wells throughout the estimated 1-3 years of production from that well. But Public Act 098-0022, and now the inadequate IDNR draft rules, indicate that the only radioactive monitoring that is required is on the initial flowback water, not the more radioactive produced water - which gets more radioactive the longer the water sits in the shale, and they will not be mandated to test the fracking drilling debris, which can also be radioactive.

This is potentially a fatal flaw for frack field workers, truckers and residents living near enough that they might get exposed to this radioactivity. In 2005 The National Academies of Science released an over 700-page report on the risks from ionizing radiation. The BEIR VII or seventh Biological Effects of Ionizing Radiation report on "Health Risks from Exposure to Low Levels of Ionizing Radiation" reconfirmed the previous knowledge that there is no safe level of exposure to radiation—that even very low doses can cause cancer.
http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=11340

Frack field waste is LLRW, (Low Level Radioactive Waste), and should be disposed of per the "IL Low-Level Radioactive Waste Management Act" (420 ILCS 20). That designation would carry its own requirements by the federal and state agencies. The reality is that this waste is radioactive and toxic and it must be treated as such or there will be negative environmental and public health consequences.
http://pubs.usgs.gov/fs/fs-0142-99/fs-0142-99.pdf

Per the US EPA,
"Because TENORM contaminated wastes in oil and gas production operations were not properly recognized in the past, disposal of these wastes may have resulted in environmental contamination in and around production and disposal facilities. Surface disposal of radioactive sludge/scale, and produced water (as practiced in the past) may lead to ground and surface water contamination." www.epa.gov/radiation/tenorm/oilandgas.html
Workers and residents in the area and in the community are at risk from this frack field waste radiation.
Again from the EPA;
Oil/Radiation Waste Disposal Workers – Disposal workers include those who work directly on top of uncovered waste sites. Potential risks assessed for these workers include exposures due to direct gamma radiation and radioactive dust inhalation. In addition, they may inhale radon gas which is released during drilling and produced by the decay of radium, raising their risk of lung cancer. Workers following safety guidance will reduce their total on-site radiation exposure.
Nearby Residents/Office Workers – Risks evaluated for members of the public working or residing within 100 meters of a disposal site are similar to those of disposal workers. They include: direct gamma radiation, inhalation of contaminated dust, inhalation of downwind radon, ingestion of contaminated well water, ingestion of food contaminated by well water, and ingestion of food contaminated by dust deposition.
Risks analyzed for the general population **within a 50 mile radius** of the disposal site include exposures from the downwind transport of re-suspended particulates and radon, and exposures arising from ingestion of river water contaminated via the groundwater pathway and surface runoff. Downwind exposures include inhalation of re-suspended particulates, ingestion of food contaminated by deposition of re-suspended particulates, and inhalation of radon gas. Individuals working inside an office building inadvertently constructed on an abandoned NORM waste pile also face the threat of radiation exposure. Potential risks assessed for the onsite individual include exposures from direct gamma radiation, dust inhalation, and indoor radon inhalation.
www.epa.gov/radiation/tenorm/oilandgas.html

In the Public Act 098-0022, there is a requirement to test the flowback water for radioactivity at least once, and the ground adjacent to the storage tanks and any hydraulic fracturing flowback reserve pit must also be measured for radioactivity. These requirements are admissions that radioactivity might be found in the drilling debris and the fracking waste, and by deduction also the produced water. In the Public Act there was no mention of testing the produced water from wells for radioactivity, but it was not disallowed either, it was merely not mentioned.

In the Public Act there is a broad mandate for the IDNR to enact rules that protect the public health and the environment:
Section 1-75 High volume horizontal hydraulic fracturing operations.
(a) General.
(2) All phases of high volume horizontal hydraulic fracturing operations shall be conducted in a manner that shall not pose a significant risk to public health, life, property, aquatic life, or wildlife.

Section 1-83 Order authority.
(d) The Department may issue conditions within any order to protect the public health or welfare or the environment.

The IDNR has not followed through with their expressed responsibilities in Public Act 098-0022 to protect the public health and environment, as it relates to radioactivity brought up by fracking. The IDNR has only allowed for the testing of the flowback water, and the adjacent ground, and has not regulated the testing of the produced water for radioactivity, this will certainly impact on the health of the public and the workers on and around the frack fields.

Section 245.850 Hydraulic Fracturing Fluid and Hydraulic Fracturing Flowback Storage, Disposal or Recycling, Transportation and Reporting Requirements
d) Testing of hydraulic fracturing flowback shall be completed as follows:
E) gross alpha and beta particles to determine the presence of any naturally occurring radioactive materials.

e) Before plugging and site restoration required by Section 245.1030, the ground adjacent to the storage tanks and any hydraulic fracturing flowback reserve pit must be measured for radioactivity (Section 1-75(c)(7) of the Act).

There is no mention in these rules what happens differently if the flowback water or the ground adjacent to the storage tanks and any hydraulic fracturing flowback reserve pit measures positively for radioactivity. No standards listed, no levels at which emergency procedures are begun, no reporting to IEMA, no mention of worker's protections, no changes in the disposal methods for the radioactive waste water, no limiting the use of Class II wells, (which are not designed for radioactive waste), no alterations in modes of transportation, there is nothing operational that changes following a finding of radioactivity from a frack well, including no mention of mandatory reporting to the landowner.

Section 245.850 Hydraulic Fracturing Fluid and Hydraulic Fracturing Flowback Storage, Disposal or Recycling, Transportation and Reporting Requirements
g) Except for recycling allowed by subsection (i), hydraulic fracturing flowback may only be disposed of by injection into a Class II injection disposal well that is below interface between fresh water and naturally occurring Class IV groundwater (Sections 1-75(c)(8) and 1-25(c) of the Act). The Class II injection disposal well must be equipped with an electronic flowmeter and approved by the *Department.*

--We request that the IDNR look at these rules again, surely there are standards in place for LLRW, including the "IL Low-Level Radioactive Waste Management Act", (420 ILCS 20), that would apply in a situation where the flow back water is found to contain radioactivity.

It stands to reason that if the flowback water from a well site tested positive for radioactive elements that the produced water from that same well site would also test positive for radioactivity, but there is nothing in the rules that calls for the testing of the produced water. This is a serious regulatory lapse that will likely cause damage to the public health and the environment.

Section 245.940 Produced Water Disposal or Recycling, Transportation and Reporting Requirements
The permittee shall dispose of or recycle produced water in accordance with the requirements of this Section:
a) Surface discharge of produced water onto the ground or into any surface water or water drainage way is prohibited (Sections 1-75(c)(9) and 1-25(c) of the Act).
b) Except for recycling allowed under subsection (d), produced water may only be disposed of by injection into a Class II injection well that is below interface between fresh water and naturally occurring Class IV groundwater (Sections 1-75(c)(8) and 1-25(c) of the Act). Unless used for enhanced oil recovery, the Class II injection well must be equipped with an electronic flowmeter and approved by the Department.
c) Produced water transfer operations from tanks to tanker trucks for transportation offsite must be supervised at the truck and at the tank if the tank is not visible to the truck operator from the truck. During transfer operations, all interconnecting piping must be supervised if not visible to transfer personnel at the truck and tank. (Section 1-75(c)(6) of the Act)
d) Produced water may be treated and recycled for use in hydraulic fracturing fluid for high volume horizontal hydraulic fracturing operations (Section 1-75(c)(8) of the Act).

There is another regulatory lapse in the lack of testing for radioactivity at the Medium Volume Horizontal Hydraulic Fracturing wells as described below, yet these wells will involve the same possibly radioactive shale layers as the High Volume wells, therefore the same risks of encountering radioactive waste water and debris exists, but nothing is mentioned in the rules.

Section 245.1200 Medium Volume Horizontal Hydraulic Fracturing Completion Reports
a) For any horizontal hydraulic fracturing operations where all combined stages of a stimulation treatment of a horizontal well are by the pressurized application of more than 80,000 gallons but less than 300,001 gallons of hydraulic fracturing fluid and proppant to initiate or propagate fractures in a geologic formation to enhance extraction or production of oil or gas, reporting under subsection (c) is required (Section 1-98(a) of the Act).

To protect workers, residents and our environment from serious radiation exposure from fracking. waste we ask that the IDNR modify these rules in consultation with IEMA to:

– Require monitoring of all the fracking debris, the flowback water and the produced water for all of the radioactive elements, throughout the full drilling and production phases of each well, from the cradle to the grave. The problem is that the lab tests for radioactive elements, in order to get accurate readings of levels, can take up to 21 days, but this kind of accurate testing of debris, flowback and produced water is absolutely essential.

– If positive for radioactivity these lab test results should stimulate a chain of requirements and additional regulations from the IDNR that would alter the containment, trucking, OSHA standards and waste handling requirements for each frack field well to comply with LLRW requirements. Including the requirements of notifying and protecting residents in the area from exposure to this radioactivity.

--To monitor the fields for significant radioactivity continuously, hand held or mounted radiation monitors should be provided on the frack fields by the industry, in waste areas and at the drill sites to warn the workers and residents if serious amounts of gamma radiation are being brought up. These monitors are not specific for exactly what radioactive elements are present but they could serve as a general alarm.

– Crucial OSHA radioactivity protections for the workers should be required when radiation alarms have shown that radioactivity is present; dosimeters, respirators, protective clothing, amongst other protections should be provided from the drilling companies to the workers.

– Radon being the 2nd leading cause of lung cancer is an important environmental radioactive toxin and radon monitors should be required on the frack fields. If radon is found to be released from the frack fields, in large quantities, then precautions for workers and residents should be initiated.

– Radon is inert and is not burned off by flaring, to release it into the air in large quantities is a very serious public health concern. The Fed. Gov. recognizes this and has notified the fracking industry that in 2015 they can no longer flare off gas from the frack wells, they must capture it. Wouldn't it be smarter if we start off with the best practices in IL?

– Enforcement of the requirements for working radiation and radon monitors, radioactivity testing and OSHA and community standards for dealing with radioactive waste and radon, including public notice should be strict, with heavy fines for any violations.

– Solid fracking debris that has tested high for radioactivity should be prohibited from being buried on any frack well site in simple lined pits, even if the landowner agrees. This is insufficient to protect land owners and future generations. The waste should be prohibited from being shipped to a typical landfill and mixed with non-radioactive material, this could lead to contamination of ground water, when water soluble radium leaches out of the landfill.

– Fracking waster water should not be processed at any municipal water treatment plant. The practice has ended in PA, where radioactivity was found being discharged from these plants into rivers and streams. Municipal water treatment plants are not able to remove radioactive elements.

– Class 2 injection wells are not a good long term storage option for fracking waste water that will stay radioactive for thousands of years. With age, and in our earthquake zones - with even small seismic events, the well casings degrade and the integrity of the wells fail. The IDNR has kept very poor records of these wells prior to 1990, many of the older ones are in very questionable condition. With the loss of integrity, a Class 2 well can not be counted on as a long term repository for significant radioactive waste. We recommend their use for fracking waste water be banned.
www.scientificamerican.com/article.cfm?id=are-fracking-wastewater-wells-poisoning-ground-beneath-our-feet

– Best practices in WVA are being utilized, and all fracking debris in WVA is being dealt with as LLRW and shipped to specific landfills which have separate LLRW containment facilities. All fracking waste should be assumed to be LLRW until proven otherwise. Mandate the use of LLRW containment facilities for all frack field debris and waste water.

Public Hearing on Proposed Rules For Hydrofracturing in IL
Re: Subpart G: Chemical Disclosure; Trade Secrets (245.700-245.730)
Submitted by Frack Free Illinois,
drlora2@yahoo.com, 773-486-7660
www.facebook.com/FrackFreeIllinois

Fracking is a dangerous method of natural gas and oil extraction, which has been in the process of being rolled out by the IIDNR over this summer/fall, after a very insufficient regulatory bill passed the IL General Assembly in the spring, Public Act 098-0022 http://www.ilga.gov/legislation/publicacts/98/PDF/098-0022.pdf

We want to bring your attention to a problem that has been arising across America with fracking, and that is that the industry acts to keep the hundreds of chemicals that they are hosing down under people's land, possibly contaminating their water, releasing into their air, and trucking around their communities, a secret. We suspect that they want to keep them a secret because they want to limit their own liability. The most egregious aspect of this secrecy is that In many states across America the industry has persisted in keeping their exact chemical cocktails, which can differ per frack well, a secret from Physicians and Allied Health Professionals, endangering their patients.

Fracking is very dangerous and the jobs on the frack fields are 7 times more dangerous that any other jobs in America right now. In IL we anticipate blowouts, traffic accidents, chemical exposures of the frack field workers and possibly residents as well. We anticipate air pollution exposing residents to harmful VOCs, and chemical contamination of drinking water. And we suspect that there will be radioactive frack waste that exposes residents and workers to radioactivity.

The health effects of fracking have been poorly studied because the industry seems to work their connections in the Fed and State Governments to keep regulators from looking at these issues; *http://ecowatch.com/2013/fracking-pollution-sickens-residents-in-tx/*
Also many victims of fracking are being silenced by non-disclosure agreements when they win judgments against the oil and natural gas industry. But there have been smaller studies and scientific papers on the various health effects of the hundreds of chemicals used in the fracking process. There are many links in this letter to follow for information that will be useful to health practitioners around the frack fields, and to the IDNR.

At this one link, *http://endocrinedisruption.org/chemicals-in-natural-gas-operations/introduction* you will be able to find all of the articles and info listed below, published by TEDX, the Endocrine Disruption Exchange:
– *"What You Need To Know About Natural Gas Production"by Theo Colborn, Phd. of TEDX*
– *Drilling Chemicals*
– *Pit Chemicals*
– *A Health Effects Summary*
– *"Air Pollution and Natural Gas Operation", by scientists at TEDX, and published in Human and Ecological Risk Assessment, An International Journal in Nov, 2012,*
– *"Natural Gas Operations From a Public Health Perspective" by Theo Colborn, Phd and others: http://ourlongmont.org/wp-content/uploads/2012/10/Theo-*

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Colborn-Peer-Reviewed-Article-on-Public-Health-Perspective-on-Natural-Gas1.pdf

Studies such as the one done by the Univ. of Colorado, *"Human Health Risk Assessment of Air Emissions from Development of Unconventional Natural Gas Resources." March, 2012,* showed that people are getting sick approx. 1/2 mile from the wells and infrastructure, such as compressor stations, and depending on the wind direction even up to a mile away.
http://www.ucdenver.edu/about/newsroom/newsreleases/Pages/health-impacts-of-fracking-emissions.aspx
Below is a link to a major PA health study by the Southwest Pennsylvania Environmental Health Project, SWPA-EHP, *www.environmentalhealthproject.org,* not because they surveyed a lot of people, actually just a very few in 1 county in PA, but because they were able to exclude any other explanations for the health effects found, such as previous medical history, etc. The upshot is: water contamination causes some illnesses eventually, but air pollution around the drill rigs and compressor stations causes many symptoms immediately, especially if the patients live within a thousand feet from a compressor station. Benzene and other VOCs can accumulate in the air in homes close to this natural gas and oil infrastructure. *http://www.huffingtonpost.com/2013/08/25/pennsylvania-fracking-study_n_3813650.html?utm_hp_ref=green*

The link below is for a comprehensive page of health resources from, SWPA-EHP, their latest program is a series of CME Medical Training Workshops entitled *"Health Concerns in the Era of Gas Drilling: A Basic Toolkit for Healthcare Providers."*
http://www.environmentalhealthproject.org/resources/medical-resources/

We want to remind the IDNR that they have in the Hydraulic Fracturing Act, Public Act 098-0022, a broad mandate to protect the public health and the environment; **Section 1-83, Order authority.(d) The Department may issue conditions within any order to protect the public health or welfare or the environment.**

This summer we requested that the IDNR put the chemical disclosure of the fracking chemicals in the hands of the IDPH, which was expressly allowed in the Hydraulic Fracturing Act, (see below), but in the draft rules the IDNR has instead configured a situation where the ER Physicians and Nurses, when faced with an emergency situation, after hours or on weekends, will have to track down the fracking companies to get the full list of chemicals that their patient(s) may have be exposed to. This is unacceptable, the frack fields are operating 24/7, this is an undue hardship on Illinois Health Professionals, Emergency Personnel and their patients.

Public Act 098-0022, Section 1-77 Chemical disclosure; trade secret protection. (m) In the event of a release of hydraulic fracturing fluid, a hydraulic fracturing additive, or hydraulic fracturing flowback, and when necessary to protect public health or the environment, the Department may disclose information furnished under a claim of trade secret to the relevant county public health director or emergency manager, the relevant fire department chief, the Director of the Illinois Department of Public Health, the Director of the Illinois Department of Agriculture, and the Director of the Illinois Environmental Protection Agency upon request by that individual.

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From the draft rules, 245.720 Department Publication of Chemical Disclosures and Claims of Trade Secret

b) When an applicant, permittee, or person performing high volume horizontal hydraulic fracturing operations furnishes chemical disclosure information to the Department under Section 245.210, 245.700, 245.710 or 245.860 under a claim of trade secret, the applicant, permittee, or person performing high volume horizontal hydraulic fracturing operations shall submit redacted and un-redacted copies of the documents identifying the specific information on the master list of chemicals claimed to be protected as trade secret. The Department shall use the
redacted copies when posting the master list of chemicals on its website. (Section 1-77(f) of the Act)

d) Chemical disclosure information furnished under Section 245.210, 245.700,245.710 or 245.860 under a claim of trade secret shall be protected from disclosure as a trade secret if the Department determines that the statement of justification demonstrates that (Section 1-77(h) of the Act):

From the draft rules, Section 245.730 Trade Secret Disclosure to Health Professional

Information about high volume horizontal hydraulic fracturing treatment chemicals furnished under a claim of trade secret may be disclosed by the Department to a health professional for the limited purpose of determining what health care services are necessary for the treatment of an affected patient pursuant to the requirements of this Section.

a) A health professional shall complete and submit a request to obtain trade secret chemical information. In the request, the health professional shall:
1) state a need for the information and articulate why the information is needed;
b) In an emergency health care situation, a health professional shall:
1) call the Department during normal business hours and, as soon as circumstances permit without impeding the treatment of the affected patient, submit a completed request for information to the Department online or by fax. The Department shall respond to the health professional as quickly as possible by telephone, fax or other methods determined by the Department to be a secure means of disclosure; or

2) call the trade secret holder at any time (24 hours/7 days a week) and, as soon as circumstances permit without impeding the treatment of the affected patient, submit a completed request for information to the trade secret holder directly by fax or email. The trade secret holder shall respond to the health professional as quickly as possible, but in no case more than 2 hours, by telephone, fax or other methods determined by the trade secret holder to be a secure means of disclosure.

Regarding the sharing of information by Health Professionals:

d) The health professional may share information disclosed pursuant to this Section with other persons as may be professionally necessary, including, but not limited to, the affected patient, other health professionals involved in the treatment of the affected patient, the affected patient's family members if the affected patient is unconscious, unable to make medical decisions, or is a minor, the Centers for Disease Control and Prevention, and other government public health agencies.

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e) As soon as circumstances permit, the health professional who submitted the request for information shall inform the holder of the trade secret the names of all other health professionals to whom the information was disclosed.

f) As soon as circumstances permit without impeding the treatment of the affected patient, the holder of the trade secret may request a confidentiality agreement consistent with the requirements of this Section from all health professionals to whom the information is disclosed.

g) Any recipient of the information disclosed pursuant to this Section shall not use the information for purposes other than the health needs asserted in the request and shall otherwise maintain the information as confidential. Information so disclosed to a health professional shall in no way be construed as publicly available. (Section 1-77(l) of the Act)

Below are some excerpts from recent statements by environmental groups and community groups with some of their specific objections to these draft rules released from the IDNR:

From the Environmental Law and Policy Center in Chicago: Emergency Response & Disclosure – The law requires that trade-secret-protected information about chemicals be disclosed to health workers when necessary to treat a patient. IDNR's draft regulations give discretion over when to share this information and direct health workers to contact either "IDNR during normal business hours" or "trade secret holders." This is unacceptable given that emergencies can happen at any time of the day, and emergency personnel can't be expected to figure out which private fracking entity to contact if the Department is not available.

From Illinois People's Action in Peoria: IDNR identifies the definition of an "Affected Patient" as "a person receiving health care services from a health professional for an illness or injury diagnosed by the health professional to be caused by exposure to any chemicals used in high volume horizontal hydraulic fracturing operations that are subject to a claim of trade secret by a permittee or contractor."
PROBLEM: This definition is circular: in order to learn what chemical was used, a physician must first test for that chemical so s/he can prove s/he has a right to disclosure of the proprietary chemical. How can a doctor diagnose exposure to a secret chemical used in high volume fracking before s/he knows what the secret chemicals are to test for?

We request that the IDNR:
– transfer the responsibility of the full disclosure of all of the chemicals used in every frack well, including the trade secrets, to the Illinois Dept. of Public Health, IDPH. They have 24/7 - on call responsibilities already and they will be able to assist the Emergency Personnel and Health Professionals in a meaningful way. It is not the responsibility of the Illinois health care community to explain to a non-medical agency, such as the IDNR, or to the fracking corporations their needs for timely chemical disclosure, in the course of the medical care of their patients!

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– work with the IDPH to allow mandatory reporting of frack field related accidents, disease and death, so that statistics and health related information can be shared with other Illinois Health Professionals. This sharing of health related information, including complete information about any and all chemical exposures, must be facilitated in a timely and meaningful way, pro-actively, for our public health.

– cease asking for "confidentiality agreements ' with Illinois Health Professionals about such an important public health danger as the many and varied health effects that we will surely experience on and around the future frack fields of central and southern Illinois. The needs of our patients and the health professional community for timely and complete medical information about these many public health risks, including case reports pertaining to fracking related illnesses, accidents and deaths are preeminent. This fracking chemical disclosure information must comply with all previous and pertinent health professional standards, without onerous reporting requirements to the IDNR, or "confidentiality agreements".

Thank you for considering our requests and your attention to this very important issue,
Dr. Lora Chamberlain
Organizer for Frack Free Illinois
drlora2@yahoo.com
773-486-7660

021995

Press Release - Mon, Nov. 25, 2013
Frack Free Illinois, Contact: Dr. Lora Chamberlain
773-486-7660, drlora2@yahoo.com

The 1st IDNR Public Hearing on the proposed rules for implementing "Fracking" will be **Tuesday, November 26, 2013, 6:30p-8:30p University of Illinois at Chicago (UIC), 750 S. Halsted Street, Student Center East, Rm 302, Chicago IL 60607**
Press conference in front of the Student Center East: 5:30 pm

Despite being praised in the press as the "strongest regulations in the nation" – now that the IDNR draft rules for fracking in Illinois have been published, even those environmental groups involved in crafting them do not believe they are protective enough of Illinois residents. The draft rules would not prevent widespread public health and environmental damage from fracking, because the rules ignore the up-to-date scientific information about the actual and predicted harms from fracking.

Of primary concern to Frack Free IL is that the regulations do nothing to monitor for dangerous radioactivity on the frack fields. The IDNR knows that all shale, which will be drilled in the fracking process, is radioactive. But in the rules there is almost no mention of monitoring for radioactivity in the fracking waste stream. The IDNR appears to have turned its back on their duty to protect the public's and worker's health.

The IDNR is aware that another significant risk from fracking is induced seismicity – which may cause significant earthquakes, by the disposal of millions of gallons of probably radioactive waste water in deep disposal wells. This is a known hazard to the fracking industry. The use of deep disposal wells in our two most active earthquake zones, the Wabash Valley and the New Madrid, should be held off limits, even per industry standards. But the IDNR seems to believe that southern and central IL could tolerate 4 Class 4.9 earthquakes before they would set a "Red Light Alert".

Illinois residents and lawmakers must stand up and demand that the IDNR return to the drawing board and work with independent, university-based, seismologists to develop rules that will actually protect Illinois residents and property from induced seismicity. We have too much to lose if the IDNR gets this wrong.

Our group is stunned at the flagrant disregard for the public health and environment evidenced in the draft rules. We call for an immediate moratorium on Hydraulic Fracturing in Illinois.

Our group is also dismayed that the IDNR openly admits, in their draft rules on page 3, that they did not refer to any published studies or reports, and sources of underlying data to inform their rule making. As a response we call for an immediate convening of an independent, university-based, hydraulic fracturing science research task force to evaluate the dangers of fracking and to inform the IDNR going forward. The IDNR must consult scientists who are not employed by the fracking industry, for a science-based regulatory framework.

We also call for the many state agencies who should be involved in the monitoring of various aspects of fracking in this state, such as IEMA, the IDPH, the IL Water Survey, the IL Geological Survey, the Dept. of Agriculture and others, to work together in an Inter-agency Hydraulic Fracturing Task Force, which would work in a public, transparent way to inform the re-writing of these rules by the IDNR.

Group member Dr. Lora Chamberlain stated, "The IDNR took months to develop these rules, they seemed to sit with the industry every day, but when did they confer with the independent scientists to discuss how to mitigate the many dangerous effects of fracking for the public? Apparently never. When is the IDNR going to take their mandate to protect Illinois residents and our environment seriously?"

Other groups who will be attending the public hearing include: Illinois Against Fracking, MoveOn.Org, IRON, Environmental Law and Policy Center, Natural Resources Defense Council, Sierra Club, and the League of Women Voters IL. Public testimony is encouraged.
For More Information On The Proposed Rules & the Public Hearing Schedule:
http://www.dnr.illinois.gov/OilandGas/Pages/Hydraulicfracturing.aspx

021996

Fracking Related Induced Seismicity,
Submitted by Frack Free Illinois,
www.facebook.com/FrackFreeIllinois
drlora2@yahoo.com
773-486-7660

To make your comment to the IDNR online:
Go to: http://www.dnr.illinois.gov/OilandGas/Pages/OnlineCommentSubmittalForm.aspx
Seismicity (240.796), In the "Section" dropdown box, click 240.796 Seismicity

COMMENT 1: The Rules contain language about earthquakes and, on a broader level, they also assume that fracking indeed causes earthquakes. The rules describe a whole series of fracking created earthquake levels of intensity.

Per recent correspondence with **Dr. Michael Hamburger, Professor of Geophysics at Indiana Univ.,** (a research seismologist studying earthquakes in the central United States. His research has included studies of the fundamental causes of earthquakes in the U.S. Midcontinent (Hamburger et al., 2002; Galgana and Hamburger, 2007; Hamburger, 2011), monitoring of low□ level seismicity in the area (Pavlis et al., 2001; Eagar et al., 2006), and detailed studies of individual earthquakes in the Wabash Valley region, including the 1987 Lawrence□ville, Illinois earthquake (Hamburger and Rupp, 1988; Taylor et al., 1989), the 2002 Caborn, Indiana earthquake (Hamburger et al., 2002) and the 2008 Mt. Carmel, Illinois earthquake (Hamburger et al. 2011). He has also studied artificially induced seismicity associated with reservoir impoundment (Simpson et al, 1981) and with oil and gas exploitation in southern Illinois (Eagar et al., 2006). He is currently involved in a major collaborative NSF□funded "EarthScope" research project, focusing on earth structure and earthquake generation in a broad region extending from southeastern Missouri to central Kentucky (Hamburger et al., 2012). The project, led by Indiana University, is being conducted in collaboration with Purdue University, the University of Illinois – Urbana□Champaign, and the Illinois, Indiana, and Kentucky state geological surveys, The project included operation of 70 temporary seismograph stations in southern Illinois and neighboring states, and analysis of that data is in progress. He has also worked on applied earthquake hazard studies and is a member of the U.S. Geological Survey's advisory committee on the National Seismic Hazard Mapping Program (Anderson et al., 2013), (for all questions to Dr. Hamburger please contact him at hamburg@indiana.edu);

"The evidence for triggered seismicity in response to injection of waste fluids is becoming incontrovertible (see review in Science by Ellsworth, 2013) and represents a growing concern for those involved in earthquake hazard estimation and mitigation. The areas of southern Illinois and neighboring states that are likely to be the focus for enhanced gas recovery are also sites of known seismic activity associated with the Wabash Valley and New Madrid seismic zones. The southern Illinois area carries the potential not only for the type of moderate□sized earthquakes (M 4 – 5.5) in the historic record, but potentially for New Madrid□size (M >7) earthquakes that are now clearly documented in the paleoseismic record (Obermeier et al., 1991; Munson et al., 1997)."

Why would the state allow any business activity that includes the real possibility of it creating earthquakes when done in an otherwise proper manner – especially in a geography known for major earthquakes?

COMMENT 2: The rules are silent regarding broader concerns regarding how fracking created earthquakes will affect existing earthquake prone communities. There is no mention of scientific review or study of the effect of fracking earthquakes within the Wabash Valley and New Madrid Seismic Zones. The Illinois Emergency Management Agency identifies southern IL with its most severe earthquake zone ratings of "Destructive "and "Ruinous".

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Has complete data been gathered on pre-existing faults in southern and southeast IL? Has this data been used in a hazard and risk analysis of the probability of induced earthquakes BEFORE fracking and well injection operations are initiated? As suggested on (p. 175) ("Steps Toward a "Best Practices Protocol") from the National Academy of Sciences report, ***Induced Seismicity Potential in Energy Technologies****(2013)*.

COMMENT 3: The IDNR is required by law to set up a "traffic light" control system to monitor seismicity and to require well operators to scale back or suspend injections when they raise a "concern for public health and safety." The Rules define various intensities of fracking caused earthquakes by a color code system. Enforcement doesn't begin until "yellow light alert", (a magnitude of at least 3.0 but less than 5.0). This color coding system does not appear to be used by the federal USGS, the federal agency responsible for monitoring earthquakes.

A Class II injection disposal well can be responsible for creating up to 4 earthquakes up to a level of 4.9 magnitude WITHOUT a mandatory shut-down order by the state. A 4.9 earthquake is a serious and newsworthy event – (USGS description: "Sensation like a heavy truck striking building. Standing motor cars rocked noticeably."). Mandatory shut-down of a site is based on a patchwork of multiple earthquakes at multiple times with varying intensity. For example, if an earthquake caused by fracking "causes significant damage" or a magnitude of 5.0 or greater the state will shut-down the frack site. A 5.0 earthquake is described by USGS as "felt by all, many frightened." The rules use a dangerous, high threshold of earthquake intensity for a mandatory shut-down. The fracking caused earthquake literally has to frighten people or break something before the state will step in.

Why would IDNR use a system not used nationally? Has the IDNR or the ILGS consulted the USGS on these rules and if not, why not?

COMMENT 4: **Per Dr. Michael Hamburger, Professor of Geophysics at Indiana Univ.,** (for all questions please contact Dr. Hamburger at hamburg@indiana.edu;

"The levels proposed for transition from "Green" to "Yellow" alert levels seem insufficient to capture the range of possible induced seismic events that might indicate the need to proceed with greater caution. Because the "Yellow" alert allows an injection well to continue operating, a conservative procedure might trigger additional data□gathering and monitoring activities at a relatively low threshold. With an appropriately dense monitoring network, the threshold magnitude for triggering a "Yellow Alert" could readily be reduced to magnitude 2.5 or even 2.0. The occurrence of a large number of low□magnitude earthquakes should also be used as a basis to trigger a Yellow Alert. Also, because induced seismic activity has routinely been identified at distances greater than the 3 miles (5 km) specified in the draft regulations, I would recommend increasing the maximum distance to at least 10 km (6.2 miles).

The announcement of a Yellow Alert, as currently proposed, does not require any additional monitoring activity. Ideally, the transition to this cautionary state would set in motion additional monitoring efforts, which in turn could be used to determine whether induced activity is occurring and its spatial and temporal relation to injection-well activity. I would recommend considering the additional requirement for one or more (ideally three) seismic monitoring stations in the vicinity of a well suspected of triggering induced seismic activity.

Similarly, the levels proposed for transition from "Yellow" to "Red" alert levels again seem insufficient to capture the range of possible induced seismic events that might indicate the need to at least temporarily suspend pumping activities. Because damaging earthquakes in the Midwest can occur at magnitudes well below 5.0, and because induced earthquakes

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generally occur at shallow depths where they are capable of producing localized damage at nearby structures, I would recommend reducing the threshold magnitude to 4.0, or alternatively, to replacing the magnitude threshold with an instrumental intensity threshold of MM V. (potentially damaging), as estimated by the USGS ShakeMap protocol. Similarly, I would recommend increasing the distance from a possible triggered earthquake to neighboring injection wells from 6 miles (10 km) to 10 miles (15 km) and reducing the number of Yellow Alert earthquakes from five to three, to minimize the potential hazard from low□level induced seismicity swarms expanding to include moderate□and large□ magnitude events.

Finally, a Red Alert should presumably also trigger intensified monitoring activities, perhaps including enhanced surface array or borehole or monitoring of injection-related seismicity, and an increase in the number and sensitivity of seismic monitoring stations."

Since some expert seismologists have expressed doubt that the present draft rules for Class II wells are protective enough for Illinois residents, going forward will the IDNR and the ILGS consult with independent university based seismologists, such as Dr. Hamburger of Indiana Univ. and Dr. Van der Elst of the Lamont-Doherty Earth Observatory of Columbia Univ. to determine a more protective system for induced seismicity in Illinois? Is the IDNR going to seek any independent scientific consultation on whether severely large earthquakes (magnitude 7-9s) might be induced by the disposal of fracking waste water in highly active seismic zones such as the Wabash Valley and the New Madrid zones?

COMMENT 5: If a shut-down order is made, the fracking company gets a hearing, the purpose of which is to "mitigate induced seismicity events near the permitted well". To "mitigate" is to minimize, not eliminate earthquakes caused by fracking. As with the overall message of the earthquake rules, the intent appears to not eliminate earthquakes caused by fracking but actually permit them.

Will the ILGS or the IDNR consult any of the industry experts who were involved in the compilation of the Ground Water Protection Council's 2013 - White Paper on Induced Seismicity, which investigated a number of mechanisms for minimizing the frequency of induced seismicity; http://www.gwpc.org/sites/default/files/events/white%20paper%20-%20final_0.pdf **?**

COMMENT 6: On February 1, 2013, in a press release by the Illinois Emergency Management Agency, Governor Quinn urged every Illinois resident, school, and business to participate in an earthquake drill that was scheduled for a few days later. The press release described the situation in Southern Illinois as follows:

"Illinois sits atop two major fault zones, the New Madrid Seismic Zone and the Wabash Valley Seismic Zone. The most powerful series of earthquakes ever to hit the United States happened in 1811-12 near New Madrid, Missouri. In a 2008 study conducted by the University of Illinois Mid-America Earthquake Center, it was projected that if a similar quake struck the same region today, there would be 3,500 fatalities, 2.6 million people without electricity and $300 billion in direct economic losses. Bridges, docks, highways and water infrastructure would be in shambles." http://www3.illinois.gov/PressReleases/ShowPressRelease.cfm?SubjectID=2&RecNum=10901

Per the Introduction to USGS Fact Sheet 2009-3071 (http://pubs.usgs.gov/fs/2009/3071/): "There is broad agreement in the scientific community that a continuing concern exists for a major destructive earthquake in the New Madrid seismic zone. Many structures in Memphis, Tenn., St. Louis, Mo., and other communities in the central Mississippi River Valley region are vulnerable and at risk from severe ground shaking."

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Per the conclusion from the USGS Fact Sheet 2009-3071 (http://pubs.usgs.gov/fs/2009/3071/pdf/FS09-3071.pdf): ""The geologic record of repeated large earthquakes, the historical accounts of the 1811–12 large earthquakes, and the continuing earthquake activity in the area are compelling evidence that the New Madrid region has high earthquake hazard. The preponderance of evidence leads us to conclude that earthquakes can be expected in the future as frequently and as severely as in the past 4,500 years. Such high hazard requires prudent measures such as adequate building codes to protect public safety and ensure the social and economic resilience of the region to future earthquakes."

IDNR's proposed rules for seismicity include NO recognition of the risks of injuries, property damage, and ecological damage that would result from a major earthquake at or near injection/disposal wells or fracking wells. Burst pipes, cracked or broken casings, cracked storage tanks, up-heaved pit liners, broken well structures, and migrating toxic fluids would cause untold human suffering and ecological degradation that could never be compensated or repaired.

What is the justification for the IDNR to ignore the serious risks listed above for earthquakes that might be induced by disposal of frack waste water in Class II wells in Southern IL? Will the proposed rules governing the permitting and operations of Class II injection wells rely on NO studies, NO reports, and NO data; as per the 3rd page of the proposed rules?

COMMENT 7: The penalty for failing to attend an earthquake hearing or continuing to frack after causing a serious, reported earthquake is $50 for a first time violation. The rules define these violations as "Administrative penalties". This amount is a little less than the cost of a dinner and a movie. Even with 4 or more earthquake violations, the maximum fine is only $500, arguably an acceptable business expense. If the frack site continues to operate in violation of a state order regarding it creating earthquakes the minimum fine is $100.

We ask the IDNR to raise all of the penalties in these rules, for all the violations, to the maximum level so that there might be an actual deterrent on the industry for violating the rules.

COMMENT 8: Will fracking companies be held responsible for all monetary damages caused by earthquakes? Has a Compensation Fund or System been created to indemnify residents, homeowners, businesses with clients who suffer injuries or damaged property from an injection well induced earthquake? Will the Compensation Fund or System cover damage to public infrastructure?
Pursuant to these questions,
5.1: Does IDNR require insurance for each injection well for 100% indemnification of the costs of damages from an earthquake that the well has caused?
5.2: Has IDNR created a system for receiving, reviewing, and approving damage claims?
5.3: Will the system in 5.2 work quickly and efficiently and avoid placing onerous burdens of proof on claimants?

If the answer is no to these questions, why has the IDNR created a system that favors well operators and penalizes citizens with injuries or damaged property?

COMMENT 9: The Illinois Administrative Procedure Act requires that "during First Notice, the Department of Commerce and Economic Opportunity, (DCOE), review each proposed rule making to determine possible impact on small business." (Apparently, this has been extended to small municipalities as well). We know the potential damages from induced earthquakes to small business and municipalities are real. For example, the magnitude 5.7 injection well induced earthquake near Prague, OK "destroyed 14 homes, buckled a federal highway and left two people injured"..., and magnitude 3.4 geothermal-induced earthquakes in Basel, Switzerland "caused $8

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million in damage to surrounding properties" (Columbia University Earth Institute;http://www.earth.columbia.edu/articles/view/3072). Yet, the IDNR states in the Illinois Register that small businesses and municipalities will NOT be affected by the injection well rules.

Has IDNR staff consulted with DCOE before the First Notice, and if yes, please provide the public with dates, times, and individuals at the DCOE with whom they consulted? To protect small business and small municipalities in southern and southeastern IL should these rules be tied to the expert opinion that can be marshaled by the National Academy of Sciences? As evidenced by their report: ***Induced Seismicity Potential in Energy Technologies****(2013) and in particular:* **Chapter 6 ("Steps Toward a "Best Practices Protocol")**

COMMENT 10: Per Dr. Michael Hamburger, Professor of Geophysics at Indiana Univ., (for all questions to Dr. Hamburger please contact hamburg@indiana.edu);

"The proposed rules do not specify what type of magnitude determination is to be used for triggering a specific alert level. Because at least four different magnitude determinations are routinely used for estimating the size of midcontinent earthquakes (mb, Ms, Mw, mbLg, MD) and because discrepancies between these magnitude determinations commonly reach 0.5 magnitude units, it is important to specify what magnitude will be used for determination. For instance, the 2002 Caborn, Indiana earthquake was initially assigned an mbLg magnitude of 5.0; however the subsequent acquisition of long□period data allowed the determination of an Mw magnitude of 4.6. (In fact, the high□frequency mbLg magnitude might actually be more relevant for potential damage to nearby structures. The moment magnitude (Mw) determination is not made for all events, and may be available only weeks or months after the earthquake occurrence. The simplest option is to adopt the maximum magnitude available from any one of a number of reporting agencies."

Will the IDNR incorporate a best practices protocol for induced seismicity into the permitting process for injection wells?

COMMENT 11: Are there a sufficient number of seismometers located across the ~8,000 Class II injection wells in Illinois, including locations where new injection wells are being permitted, to accurately locate seismic events? Is the Illinois seismic monitoring system sufficiently well developed or spaced to precisely locate induced seismic events and assign the event to the injection well responsible for the event?

Per Dr. Michael Hamburger, Professor of Geophysics at Indiana Univ., (for all questions to Dr. Hamburger please contact: hamburg@indiana.edu);

"The Rules do not specify any arrangement for monitoring of natural and induced seismicity in the southern Illinois region. In general the monitoring of seismic activity in the region should reliably detect and locate earthquakes to at least a magnitude unit lower than the magnitude required to trigger a response (currently M 3.0) and to reliably discriminate small induced earthquakes from blasts or other artificial events. The regional networks operated by the U.S. Geological Survey (USGS), the Center for Earthquake Research and Information (CERI) and St. Louis University (SLU) are far sparser than those used to monitor activity in the New Madrid region, and the temporary observations associated with the EarthScope experiment have largely been discontinued. The proposed addition of several EarthScope stations to the regional monitoring networks will help ameliorate the situation. However, the reliable detection threshold will probably remain above M2.0, particularly during daytime hours. In order to reliably detect, locate, and discriminate induced seismic activity, the IDNR should enhance both the density and analysis capability of the current monitoring network, specifically focusing on low-magnitude events in southern Illinois."

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Will the IDNR and the ILGS institute the type of monitoring system Dr. Hamburger recommends, before horizontal fracking begins? Will data from Illinois seismometers be publicly available and accessible through the internet in real or near real time? Has a Seismic Monitory Advisory Committee (SMAC), consisting of a broad cross section of interested parties, not only the Oil and Gas Industry, IDNR, and well operators, but also a national lab, such as the *Argonne National Laboratory*, several independent, university-based seismologists, professional water associations, county and local government representatives, representatives of IEMA, and members of community groups in the high risk areas, been created to monitor and report on injection and seismic activities? And, will this Committee be granted, as part of its charter, a significant and meaningful advisory role with respect to the issues raised here, including, but not limited to, the permitting process, seismic monitoring, compensation, hazard and risk analysis of earthquakes in population centers, and the cut points on the traffic light system?

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Radioactivity Associated With Hydraulic Fracturing

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Public Act 098-0022, and the draft rules released by the IDNR are not adequate to protect Illinois residents in regards to the radioactivity of shale and the handling of fracking waste water and debris. The industry and geologists know that all shale is radioactive, it is only a matter of degree. A typical shale formation has 100 API units of radiation; the New Albany Shale has in some cases up to 200-400 API units above the normal shale background. It is by measuring the gamma ray signatures of rock that geologists know where they will find shale.

Naturally occurring radioactive material is NORM and when it is brought to the surface with fracking it becomes TENORM. The principal radionuclide of concern in NORM/TENORM is radium-226, a member of the uranium series, which is present in natural soils in concentrations of about 1 picocurie per gram (Ci/g). However, NORM/TENORM radioisotopes may be present in different layers of rock in varying concentrations, and most fracking waste contains radium-226 concentrations that are much higher than 1 pCi/g, and may be as high as tens of thousands of pCi/g. Frack waste water is radioactive, toxic brine when it returns to the surface, in some areas it has been found to contain up to 16,000 picoCuries per liter of radium-226. The discharge limit in effluent for Radium 226 is 60 pCi/L, and the EPA's drinking water standard is 5 pCi/L.

The current maximum contaminant level ((MCL) as set forth in 40 CFR 141.66(c)) for radium-226 and radium-228, combined is 5 picocuries per liter of water, and for solids 5 picocuries per gram. Please also keep in mind the half-life of Ra-226 is 1600 years. www.epa.gov/radiation/tenorm/oilandgas.html

When fracking brings up massive amounts of shale debris, flowback water and produced water it brings with it elements like uranium, radium-226, radium-228, bismuth-214, lead-214, actinium-228 and thallium-208 and many decay daughters such as radon gas. Fracking exposes our surface water, air, land and residents to these radioactive elements. This radioactivity does not go away when it hits the surface, and with radium's extensive decay chain the harmful radioactivity persists in our environment for many, many thousands of years.

How radioactive is this fracking debris and waste water from Illinois shale?
We can not tell how radioactive every well's waste is until we test all of the waste water and the drilling debris, but we know from the experts that our shale is more radioactive than most. Out east, the Marcellus and Utica shale formations have concentrations of radium-226 that are 30 times background and up to 3000 times the allowable levels of EPA exposure. The academics from across the country are telling us to assume all the fracking debris and fracking waste water will be radioactive.

The fracking wells do not become less radioactive as they continue into production, actually the reverse is true, the initial flowback water from the wells (first 7-10 days) will be less radioactive than the produced water, which gets pumped out of wells throughout the estimated 1-3 years of production from that well. But Public Act 098-0022, and now the inadequate IDNR draft rules, indicate that the only radioactive monitoring that is required is on the initial flowback water, not the more radioactive produced water - which gets more radioactive the longer the water sits in the shale, and they will not be mandated to test the fracking drilling debris, which can also be radioactive.

This is potentially a fatal flaw for frack field workers, truckers and residents living near enough that they might get exposed to this radioactivity. In 2005 The National Academies of Science released an over 700-page report on the risks from ionizing radiation. The BEIR VII or seventh Biological Effects of Ionizing Radiation report on "Health Risks from Exposure to Low Levels of Ionizing Radiation" reconfirmed the previous knowledge that there is no safe level of exposure to radiation—that even very low doses can cause cancer.
http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=11340

Frack field waste is LLRW, (Low Level Radioactive Waste), and should be disposed of per the "IL Low-Level Radioactive Waste Management Act" (420 ILCS 20). That designation would carry its own requirements by the federal and state agencies. The reality is that this waste is radioactive and toxic and it must be treated as such or there will be negative environmental and public health consequences.
http://pubs.usgs.gov/fs/fs-0142-99/fs-0142-99.pdf

Per the US EPA,
"Because TENORM contaminated wastes in oil and gas production operations were not properly recognized in the past, disposal of these wastes may have resulted in environmental contamination in and around production and disposal facilities. Surface disposal of radioactive sludge/scale, and produced water (as practiced in the past) may lead to ground and surface water contamination." www.epa.gov/radiation/tenorm/oilandgas.html
Workers and residents in the area and in the community are at risk from this frack field waste radiation.
Again from the EPA;
Oil/Radiation Waste Disposal Workers – Disposal workers include those who work directly on top of uncovered waste sites. Potential risks assessed for these workers include exposures due to direct gamma radiation and radioactive dust inhalation. In addition, they may inhale radon gas which is released during drilling and produced by the decay of radium, raising their risk of lung cancer. Workers following safety guidance will reduce their total on-site radiation exposure.
Nearby Residents/Office Workers – Risks evaluated for members of the public working or residing within 100 meters of a disposal site are similar to those of disposal workers. They include: direct gamma radiation, inhalation of contaminated dust, inhalation of downwind radon, ingestion of contaminated well water, ingestion of food contaminated by well water, and ingestion of food contaminated by dust deposition.
Risks analyzed for the general population **within a 50 mile radius** of the disposal site include exposures from the downwind transport of re-suspended particulates and radon, and exposures arising from ingestion of river water contaminated via the groundwater pathway and surface runoff. Downwind exposures include inhalation of re-suspended particulates, ingestion of food contaminated by deposition of re-suspended particulates, and inhalation of radon gas. Individuals working inside an office building inadvertently constructed on an abandoned NORM waste pile also face the threat of radiation exposure. Potential risks assessed for the onsite individual include exposures from direct gamma radiation, dust inhalation, and indoor radon inhalation.
www.epa.gov/radiation/tenorm/oilandgas.html

In the Public Act 098-0022, there is a requirement to test the flowback water for radioactivity at least once, and the ground adjacent to the storage tanks and any hydraulic fracturing flowback reserve pit must also be measured for radioactivity. These requirements are admissions that radioactivity might be found in the drilling debris and the fracking waste, and by deduction also the produced water. In the Public Act there was no mention of testing the produced water from wells for radioactivity, but it was not disallowed either, it was merely not mentioned.

In the Public Act there is a broad mandate for the IDNR to enact rules that protect the public health and the environment:
Section 1-75 High volume horizontal hydraulic fracturing operations.
(a) General.
(2) All phases of high volume horizontal hydraulic fracturing operations shall be conducted in a manner that shall not pose a significant risk to public health, life, property, aquatic life, or wildlife.

Section 1-83 Order authority.
(d) The Department may issue conditions within any order to protect the public health or welfare or the environment.

The IDNR has not followed through with their expressed responsibilities in Public Act 098-0022 to protect the public health and environment, as it relates to radioactivity brought up by fracking. The IDNR has only allowed for the testing of the flowback water, and the adjacent ground, and has not regulated the testing of the produced water for radioactivity, this will certainly impact on the health of the public and the workers on and around the frack fields.

Section 245.850 Hydraulic Fracturing Fluid and Hydraulic Fracturing Flowback Storage, Disposal or Recycling, Transportation and Reporting Requirements
d) Testing of hydraulic fracturing flowback shall be completed as follows:
E) gross alpha and beta particles to determine the presence of any naturally occurring radioactive materials.

e) Before plugging and site restoration required by Section 245.1030, the ground adjacent to the storage tanks and any hydraulic fracturing flowback reserve pit must be measured for radioactivity (Section 1-75(c)(7) of the Act).

There is no mention in these rules what happens differently if the flowback water or the ground adjacent to the storage tanks and any hydraulic fracturing flowback reserve pit measures positively for radioactivity. No standards listed, no levels at which emergency procedures are begun, no reporting to IEMA, no mention of worker's protections, no changes in the disposal methods for the radioactive waste water, no limiting the use of Class II wells, (which are not designed for radioactive waste), no alterations in modes of transportation, there is nothing operational that changes following a finding of radioactivity from a frack well, including no mention of mandatory reporting to the landowner.

Section 245.850 Hydraulic Fracturing Fluid and Hydraulic Fracturing Flowback Storage, Disposal or Recycling, Transportation and Reporting Requirements
g) Except for recycling allowed by subsection (i), hydraulic fracturing flowback may only be disposed of by injection into a Class II injection disposal well that is below interface between fresh water and naturally occurring Class IV groundwater (Sections 1-75(c)(8) and 1-25(c) of the Act). The Class II injection disposal well must be equipped with an electronic flowmeter and approved by the *Department.*

--We request that the IDNR look at these rules again, surely there are standards in place for LLRW, including the "IL Low-Level Radioactive Waste Management Act", (420 ILCS 20), that would apply in a situation where the flow back water is found to contain radioactivity.

It stands to reason that if the flowback water from a well site tested positive for radioactive elements that the produced water from that same well site would also test positive for radioactivity, but there is nothing in the rules that calls for the testing of the produced water. This is a serious regulatory lapse that will likely cause damage to the public health and the environment.

Section 245.940 Produced Water Disposal or Recycling, Transportation and Reporting Requirements
The permittee shall dispose of or recycle produced water in accordance with the requirements of this Section:
a) Surface discharge of produced water onto the ground or into any surface water or water drainage way is prohibited (Sections 1-75(c)(9) and 1-25(c) of the Act).
b) Except for recycling allowed under subsection (d), produced water may only be disposed of by injection into a Class II injection well that is below interface between fresh water and naturally occurring Class IV groundwater (Sections 1-75(c)(8) and 1-25(c) of the Act). Unless used for enhanced oil recovery, the Class II injection well must be equipped with an electronic flowmeter and approved by the Department.
c) Produced water transfer operations from tanks to tanker trucks for transportation offsite must be supervised at the truck and at the tank if the tank is not visible to the truck operator from the truck. During transfer operations, all interconnecting piping must be supervised if not visible to transfer personnel at the truck and tank. (Section 1-75(c)(6) of the Act)
d) Produced water may be treated and recycled for use in hydraulic fracturing fluid for high volume horizontal hydraulic fracturing operations (Section 1-75(c)(8) of the Act).

There is another regulatory lapse in the lack of testing for radioactivity at the Medium Volume Horizontal Hydraulic Fracturing wells as described below, yet these wells will involve the same possibly radioactive shale layers as the High Volume wells, therefore the same risks of encountering radioactive waste water and debris exists, but nothing is mentioned in the rules.

Section 245.1200 Medium Volume Horizontal Hydraulic Fracturing Completion Reports
a) For any horizontal hydraulic fracturing operations where all combined stages of a stimulation treatment of a horizontal well are by the pressurized application of more than 80,000 gallons but less than 300,001 gallons of hydraulic fracturing fluid and proppant to initiate or propagate fractures in a geologic formation to enhance extraction or production of oil or gas, reporting under subsection (c) is required (Section 1-98(a) of the Act).

To protect workers, residents and our environment from serious radiation exposure from fracking. waste we ask that the IDNR modify these rules in consultation with IEMA to:

– Require monitoring of all the fracking debris, the flowback water and the produced water for all of the radioactive elements, throughout the full drilling and production phases of each well, from the cradle to the grave. The problem is that the lab tests for radioactive elements, in order to get accurate readings of levels, can take up to 21 days, but this kind of accurate testing of debris, flowback and produced water is absolutely essential.

– If positive for radioactivity these lab test results should stimulate a chain of requirements and additional regulations from the IDNR that would alter the containment, trucking, OSHA standards and waste handling requirements for each frack field well to comply with LLRW requirements. Including the requirements of notifying and protecting residents in the area from exposure to this radioactivity.

--To monitor the fields for significant radioactivity continuously, hand held or mounted radiation monitors should be provided on the frack fields by the industry, in waste areas and at the drill sites to warn the workers and residents if serious amounts of gamma radiation are being brought up. These monitors are not specific for exactly what radioactive elements are present but they could serve as a general alarm.

– Crucial OSHA radioactivity protections for the workers should be required when radiation alarms have shown that radioactivity is present; dosimeters, respirators, protective clothing, amongst other protections should be provided from the drilling companies to the workers.

– Radon being the 2nd leading cause of lung cancer is an important environmental radioactive toxin and radon monitors should be required on the frack fields. If radon is found to be released from the frack fields, in large quantities, then precautions for workers and residents should be initiated.

– Radon is inert and is not burned off by flaring, to release it into the air in large quantities is a very serious public health concern. The Fed. Gov. recognizes this and has notified the fracking industry that in 2015 they can no longer flare off gas from the frack wells, they must capture it. Wouldn't it be smarter if we start off with the best practices in IL?

– Enforcement of the requirements for working radiation and radon monitors, radioactivity testing and OSHA and community standards for dealing with radioactive waste and radon, including public notice should be strict, with heavy fines for any violations.

– Solid fracking debris that has tested high for radioactivity should be prohibited from being buried on any frack well site in simple lined pits, even if the landowner agrees. This is insufficient to protect land owners and future generations. The waste should be prohibited from being shipped to a typical landfill and mixed with non-radioactive material, this could lead to contamination of ground water, when water soluble radium leaches out of the landfill.

– Fracking waster water should not be processed at any municipal water treatment plant. The practice has ended in PA, where radioactivity was found being discharged from these plants into rivers and streams. Municipal water treatment plants are not able to remove radioactive elements.

– Class 2 injection wells are not a good long term storage option for fracking waste water that will stay radioactive for thousands of years. With age, and in our earthquake zones - with even small seismic events, the well casings degrade and the integrity of the wells fail. The IDNR has kept very poor records of these wells prior to 1990, many of the older ones are in very questionable condition. With the loss of integrity, a Class 2 well can not be counted on as a long term repository for significant radioactive waste. We recommend their use for fracking waste water be banned.
www.scientificamerican.com/article.cfm?id=are-fracking-wastewater-wells-poisoning-ground-beneath-our-feet

– Best practices in WVA are being utilized, and all fracking debris in WVA is being dealt with as LLRW and shipped to specific landfills which have separate LLRW containment facilities. All fracking waste should be assumed to be LLRW until proven otherwise. Mandate the use of LLRW containment facilities for all frack field debris and waste water.

Public Hearing on Proposed Rules For Hydrofracturing in IL
Re: Subpart G: Chemical Disclosure; Trade Secrets (245.700-245.730)
Submitted by Frack Free Illinois,
drlora2@yahoo.com, 773-486-7660
www.facebook.com/FrackFreeIllinois

Fracking is a dangerous method of natural gas and oil extraction, which has been in the process of being rolled out by the IIDNR over this summer/fall, after a very insufficient regulatory bill passed the IL General Assembly in the spring, Public Act 098-0022 http://www.ilga.gov/legislation/publicacts/98/PDF/098-0022.pdf

We want to bring your attention to a problem that has been arising across America with fracking, and that is that the industry acts to keep the hundreds of chemicals that they are hosing down under people's land, possibly contaminating their water, releasing into their air, and trucking around their communities, a secret. We suspect that they want to keep them a secret because they want to limit their own liability. The most egregious aspect of this secrecy is that In many states across America the industry has persisted in keeping their exact chemical cocktails, which can differ per frack well, a secret from Physicians and Allied Health Professionals, endangering their patients.

Fracking is very dangerous and the jobs on the frack fields are 7 times more dangerous that any other jobs in America right now. In IL we anticipate blowouts, traffic accidents, chemical exposures of the frack field workers and possibly residents as well. We anticipate air pollution exposing residents to harmful VOCs, and chemical contamination of drinking water. And we suspect that there will be radioactive frack waste that exposes residents and workers to radioactivity.

The health effects of fracking have been poorly studied because the industry seems to work their connections in the Fed and State Governments to keep regulators from looking at these issues; *http://ecowatch.com/2013/fracking-pollution-sickens-residents-in-tx/*
Also many victims of fracking are being silenced by non-disclosure agreements when they win judgments against the oil and natural gas industry. But there have been smaller studies and scientific papers on the various health effects of the hundreds of chemicals used in the fracking process. There are many links in this letter to follow for information that will be useful to health practitioners around the frack fields, and to the IDNR.

At this one link, *http://endocrinedisruption.org/chemicals-in-natural-gas-operations/introduction* you will be able to find all of the articles and info listed below, published by TEDX, the Endocrine Disruption Exchange:
– *"What You Need To Know About Natural Gas Production"by Theo Colborn, Phd. of TEDX*
– *Drilling Chemicals*
– *Pit Chemicals*
– *A Health Effects Summary*
– *"Air Pollution and Natural Gas Operation", by scientists at TEDX, and published in Human and Ecological Risk Assessment, An International Journal in Nov, 2012,*
– *"Natural Gas Operations From a Public Health Perspective" by Theo Colborn, Phd and others: http://ourlongmont.org/wp-content/uploads/2012/10/Theo-*

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Colborn-Peer-Reviewed-Article-on-Public-Health-Perspective-on-Natural-Gas1.pdf

Studies such as the one done by the Univ. of Colorado, *"Human Health Risk Assessment of Air Emissions from Development of Unconventional Natural Gas Resources." March, 2012,* showed that people are getting sick approx. 1/2 mile from the wells and infrastructure, such as compressor stations, and depending on the wind direction even up to a mile away.
http://www.ucdenver.edu/about/newsroom/newsreleases/Pages/health-impacts-of-fracking-emissions.aspx
Below is a link to a major PA health study by the Southwest Pennsylvania Environmental Health Project, SWPA-EHP, *www.environmentalhealthproject.org,* not because they surveyed a lot of people, actually just a very few in 1 county in PA, but because they were able to exclude any other explanations for the health effects found, such as previous medical history, etc. The upshot is: water contamination causes some illnesses eventually, but air pollution around the drill rigs and compressor stations causes many symptoms immediately, especially if the patients live within a thousand feet from a compressor station. Benzene and other VOCs can accumulate in the air in homes close to this natural gas and oil infrastructure. *http://www.huffingtonpost.com/2013/08/25/pennsylvania-fracking-study_n_3813650.html?utm_hp_ref=green*

The link below is for a comprehensive page of health resources from, SWPA-EHP, their latest program is a series of CME Medical Training Workshops entitled *"Health Concerns in the Era of Gas Drilling: A Basic Toolkit for Healthcare Providers."*
http://www.environmentalhealthproject.org/resources/medical-resources/

We want to remind the IDNR that they have in the Hydraulic Fracturing Act, Public Act 098-0022, a broad mandate to protect the public health and the environment; **Section 1-83, Order authority.(d) The Department may issue conditions within any order to protect the public health or welfare or the environment.**

This summer we requested that the IDNR put the chemical disclosure of the fracking chemicals in the hands of the IDPH, which was expressly allowed in the Hydraulic Fracturing Act, (see below), but in the draft rules the IDNR has instead configured a situation where the ER Physicians and Nurses, when faced with an emergency situation, after hours or on weekends, will have to track down the fracking companies to get the full list of chemicals that their patient(s) may have be exposed to. This is unacceptable, the frack fields are operating 24/7, this is an undue hardship on Illinois Health Professionals, Emergency Personnel and their patients.

Public Act 098-0022, Section 1-77 Chemical disclosure; trade secret protection. (m) In the event of a release of hydraulic fracturing fluid, a hydraulic fracturing additive, or hydraulic fracturing flowback, and when necessary to protect public health or the environment, the Department may disclose information furnished under a claim of trade secret to the relevant county public health director or emergency manager, the relevant fire department chief, the Director of the Illinois Department of Public Health, the Director of the Illinois Department of Agriculture, and the Director of the Illinois Environmental Protection Agency upon request by that individual.

022008

From the draft rules, 245.720 Department Publication of Chemical Disclosures and Claims of Trade Secret

b) When an applicant, permittee, or person performing high volume horizontal hydraulic fracturing operations furnishes chemical disclosure information to the Department under Section 245.210, 245.700, 245.710 or 245.860 under a claim of trade secret, the applicant, permittee, or person performing high volume horizontal hydraulic fracturing operations shall submit redacted and un-redacted copies of the documents identifying the specific information on the master list of chemicals claimed to be protected as trade secret. The Department shall use the
redacted copies when posting the master list of chemicals on its website. (Section 1-77(f) of the Act)

d) Chemical disclosure information furnished under Section 245.210, 245.700,245.710 or 245.860 under a claim of trade secret shall be protected from disclosure as a trade secret if the Department determines that the statement of justification demonstrates that (Section 1-77(h) of the Act):

From the draft rules, Section 245.730 Trade Secret Disclosure to Health Professional

Information about high volume horizontal hydraulic fracturing treatment chemicals furnished under a claim of trade secret may be disclosed by the Department to a health professional for the limited purpose of determining what health care services are necessary for the treatment of an affected patient pursuant to the requirements of this Section.

a) A health professional shall complete and submit a request to obtain trade secret chemical information. In the request, the health professional shall:
1) state a need for the information and articulate why the information is needed;
b) In an emergency health care situation, a health professional shall:
1) call the Department during normal business hours and, as soon as circumstances permit without impeding the treatment of the affected patient, submit a completed request for information to the Department online or by fax. The Department shall respond to the health professional as quickly as possible by telephone, fax or other methods determined by the Department to be a secure means of disclosure; or

2) call the trade secret holder at any time (24 hours/7 days a week) and, as soon as circumstances permit without impeding the treatment of the affected patient, submit a completed request for information to the trade secret holder directly by fax or email. The trade secret holder shall respond to the health professional as quickly as possible, but in no case more than 2 hours, by telephone, fax or other methods determined by the trade secret holder to be a secure means of disclosure.

Regarding the sharing of information by Health Professionals:

d) The health professional may share information disclosed pursuant to this Section with other persons as may be professionally necessary, including, but not limited to, the affected patient, other health professionals involved in the treatment of the affected patient, the affected patient's family members if the affected patient is unconscious, unable to make medical decisions, or is a minor, the Centers for Disease Control and Prevention, and other government public health agencies.

022009

e) As soon as circumstances permit, the health professional who submitted the request for information shall inform the holder of the trade secret the names of all other health professionals to whom the information was disclosed.

f) As soon as circumstances permit without impeding the treatment of the affected patient, the holder of the trade secret may request a confidentiality agreement consistent with the requirements of this Section from all health professionals to whom the information is disclosed.

g) Any recipient of the information disclosed pursuant to this Section shall not use the information for purposes other than the health needs asserted in the request and shall otherwise maintain the information as confidential. Information so disclosed to a health professional shall in no way be construed as publicly available. (Section 1-77(l) of the Act)

Below are some excerpts from recent statements by environmental groups and community groups with some of their specific objections to these draft rules released from the IDNR:

From the Environmental Law and Policy Center in Chicago: Emergency Response & Disclosure – The law requires that trade-secret-protected information about chemicals be disclosed to health workers when necessary to treat a patient. IDNR's draft regulations give discretion over when to share this information and direct health workers to contact either "IDNR during normal business hours" or "trade secret holders." This is unacceptable given that emergencies can happen at any time of the day, and emergency personnel can't be expected to figure out which private fracking entity to contact if the Department is not available.

From Illinois People's Action in Peoria: IDNR identifies the definition of an "Affected Patient" as "a person receiving health care services from a health professional for an illness or injury diagnosed by the health professional to be caused by exposure to any chemicals used in high volume horizontal hydraulic fracturing operations that are subject to a claim of trade secret by a permittee or contractor."
PROBLEM: This definition is circular: in order to learn what chemical was used, a physician must first test for that chemical so s/he can prove s/he has a right to disclosure of the proprietary chemical. How can a doctor diagnose exposure to a secret chemical used in high volume fracking before s/he knows what the secret chemicals are to test for?

We request that the IDNR:
– transfer the responsibility of the full disclosure of all of the chemicals used in every frack well, including the trade secrets, to the Illinois Dept. of Public Health, IDPH. They have 24/7 - on call responsibilities already and they will be able to assist the Emergency Personnel and Health Professionals in a meaningful way. It is not the responsibility of the Illinois health care community to explain to a non-medical agency, such as the IDNR, or to the fracking corporations their needs for timely chemical disclosure, in the course of the medical care of their patients!

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– work with the IDPH to allow mandatory reporting of frack field related accidents, disease and death, so that statistics and health related information can be shared with other Illinois Health Professionals. This sharing of health related information, including complete information about any and all chemical exposures, must be facilitated in a timely and meaningful way, pro-actively, for our public health.

– cease asking for "confidentiality agreements ' with Illinois Health Professionals about such an important public health danger as the many and varied health effects that we will surely experience on and around the future frack fields of central and southern Illinois. The needs of our patients and the health professional community for timely and complete medical information about these many public health risks, including case reports pertaining to fracking related illnesses, accidents and deaths are preeminent. This fracking chemical disclosure information must comply with all previous and pertinent health professional standards, without onerous reporting requirements to the IDNR, or "confidentiality agreements".

Thank you for considering our requests and your attention to this very important issue,
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773-486-7660

022011

A White Paper Summarizing a Special Session on Induced Seismicity

February 2013

January 23, 2013 | Sarasota, FL

INDUCED SEISMICITY

By Underground Injection

Ground Water Research & Education Foundation

Spotlight series

This special technology transfer session for seismologists, regulators, and other stakeholders entitled *"Assessing & Managing Risk of Induced Seismicity by Injection"* was a part of the GWREF Spotlight Series.

GROUNDWATER RESEARCH & EDUCATION FOUNDATION

The Ground Water Research & Education Foundation (GWREF) is a not-for-profit 501(c) 3 corporation dedicated to promoting research and education related to the protection of ground water.

Our mission is to promote and conduct research, education, and outreach, in the areas of development and application of technical systems, pollution prevention efforts related to ground water protection, underground injection technology, and watershed conservation and protection.

The foundation is comprised of a board made up of volunteers from government, institutes of higher education, and the public appointed through the Ground Water Protection Council.

GROUNDWATER PROTECTION COUNCIL

022012

White Paper Summarizing a Special Session on Induced Seismicity[1]

Chapter 1 - Introduction

The Ground Water Protection Council (GWPC), held its 2013 Underground Injection Control Conference in Sarasota, Florida on January 22-24, 2013. On January 23, the conference included a special session entitled "Assessing & Managing Risk of Induced Seismicity by Underground Injection". The session was presented by the Ground Water Research & Education Foundation (GWREF), a not-for-profit corporation dedicated to promoting research and education related to the protection of ground water. The Foundation is associated with the GWPC.

1.1 The Special Session

The topic of induced seismicity, or earthquakes caused by human activities, has been raised increasingly by the media over the past several years. To help disseminate factual information on the subject, the GWPC and GWREF decided to include a session on induced seismicity in the January underground injection control conference. The session included 12 presentations separated into three groups. Lori Wrotenbery of the Oklahoma Corporation Commission chaired the first group of presentations with a theme of "Studies: Researchers Presenting Findings and Research Strategies". This was followed by a second group of presentations, chaired by Ed Steele of Swift Worldwide Resources, with a theme of "Industry: State of the Art Technology Used to Limit Risk". Wrotenbery presided over a third group of presentations on the theme of "Regulatory".

1.2 The White Paper

This white paper summarizes the information that was discussed during the special session. It is not intended to be a complete and detailed report on the subject, but is generally limited to the information actually presented during the twelve presentations and any associated discussion during the question and answer periods. Note that a detailed technical report on induced seismicity was released by the National Research Council of the National Academy of Sciences (NAS) in 2012. That report contains much broader and in-depth coverage of induced seismicity and was written collaboratively by experts in the field.

[1] The white paper was prepared for GWPC by John Veil of Veil Environmental, LLC.

Since the NAS report was discussed by several speakers, some information relating to cases briefly mentioned by the speakers was expanded by pulling more detailed information from the Council's report. Other information was drawn from the NAS report to provide better documentation for topics discussed by individual speakers. Chapter 3 of this white paper describes the NAS report and its main points.

Some of the material is highly technical and esoteric. That information is very useful to specialists and practitioners. But in order to explain the importance of induced seismicity and the issues surrounding it to a wider audience, this white paper is written in a style and at a level for a broader non-technical audience.

Rather than summarizing each presentation in the order in which speakers actually made their presentations, the white paper pulls material from different presentations into a more thematic narrative that covers the key topics in a coordinated way.

Most of the speakers in the session agreed to let the GWPC post copies of their presentations on the GWPC website. Where those presentations are available, they are directly linked to references in this white paper. For those other presentations whose authors did not authorize the GWPC to post the slides, relevant information is summarized, and reference is made to their names – readers can contact those authors directly for additional information.

The white paper also includes Appendix A, which shows the agenda for the special session.

Chapter 2 –Seismicity

This chapter provides an overview of seismicity by drawing from different presentations.

2.1 What Is Seismicity?

Although several speakers offered their own definitions for induced seismicity, it makes sense to start with the description of seismicity used in the Summary section of the NAS report.

> *"Seismicity induced by human activity related to energy technologies is caused by change in pore pressure and/or change in stress taking place in the presence of (1) faults with specific properties and orientations, and (2) a critical state of stress in the rocks. In general, existing faults and fractures are stable (or are not sliding) under the natural horizontal and vertical stresses acting on subsurface rocks. However, the crustal stress in any given area is perpetually in a state in which any stress change, for example through a change in subsurface pore pressure due to injecting or extracting fluid from a well, may change the stress acting on a nearby fault. This change in stress may result in slip or movement along that fault creating a seismic event. Abrupt or nearly instantaneous slip along a fault releases energy in the form of energy waves ("seismic waves") that travel through the Earth and can be recorded and used to infer characteristics of energy release on the fault."*

That report further states: *"Earthquakes attributable to human activities are called 'induced seismic events' or 'induced earthquakes'."* This second quote includes two relevant points: a) "induced" means attributable to human activities, and b) the terms "seismic events" and "earthquakes" are comparable.

Jeff Bull, an oil and gas industry subject matter expert on induced seismicity, made a presentation on various aspects of induced seismicity. The presentation started with some basic introduction to seismicity – it is useful to include pieces of that introduction here.

Many earthquakes occur every day from natural causes. Most are far too small to be felt by humans at the surface. But seismic instruments can detect and document many of the small events. These frequent small earthquakes do not cause damage to man-made structures.

2.1.1 Magnitude and Intensity of Seismic Events

Seismic events occur with varying degrees of intensity; there are many more small events than larger ones. If an earthquake is strong enough, the energy released during the event may reach the earth surface and cause noticeable shaking. Damage to structures, if any, depends on the

amount of energy reaching the surface, the characteristics of the soil, and the structural design and physical condition of the local structures.

The scientific community has developed various scales to characterize the strength of individual earthquakes. The most familiar scale to the public for characterizing the magnitude of earthquakes is the Richter scale, developed in the 1930s. A related scale, developed in the 1970s, that also measures the magnitude of earthquakes is called the Moment Magnitude scale. It is commonly used now by the scientific community, and was used throughout the NAS report. Both scales assign numbers to events of different sizes. The numbers run on a logarithmic scale (i.e., a 4.0 earthquake is ten times larger than a 3.0 earthquake) and represent the amplitude (height) of the seismic waves measured on a seismograph. Bull notes that although the increase in wave amplitude is ten times higher, the amount of energy released may be about 30 times higher.

The Richter scale has no theoretical upper or lower limits. The magnitude of recorded natural events typically ranges from -3 (the lower limit of microseismic sensor sensitivity) to 9+ (the most severe earthquake ever recorded).

Another scale that measures the intensity of earthquakes is called the Modified Mercalli Index (MMI). The MMI uses the perceived effects of a seismic event on the people and structures at the surface to determine its intensity at any given location, but does not provide a single number for any earthquake. The MMI includes 12 levels of seismic event severity, ranging from imperceptible to devastating. The numeric values of the magnitude scales (Richter and Moment Magnitude) as well as the MMI increase with the strength of an event, but do not match up in an exact linear manner. For measuring the impact of an earthquake on people and structures, the MMI level is more useful in describing actual local effects and has been used by the U.S. Geological Survey (USGS) in the development of educational materials for the general public.

The MMI value depends upon many factors including:

- Depth of the seismic event,
- Distance from the seismic event epicenter,
- Geomechanical characteristics, and
- Terrain.

Population density can contribute to reported MMI values because of the likelihood of more reports of shaking and damage when a higher population area experiences an earthquake.

Figure 1 is taken from Bull's presentation – Bull notes on his slide that the table was created by Wikipedia using USGS information. The figure shows the relationship between the Richter

scale and the MMI, and describes the types of surface effects that represent events of different magnitude. It also gives an indication of how many earthquakes occur each year within the different MMI ranges.

Figure 1 – Comparison of Richter Magnitude Scale and MMI Values

Richter Magnitude	Description	MMI	Earthquake effect observations	World-wide occurrence
< 2.0	Micro		Micro earthquakes not felt by people and detected by sensitive instruments only.	Continual
2.0 – 2.9	Minor	1	Imperceptible: Not felt except by a very few people under exceptionally favorable circumstances.	>8,000 per day 1,300,000 per year (est.)
3.0 – 3.9	Minor	2	Scarcely felt: Felt by only a few people at rest in houses or on upper floors buildings.	
	Minor	3	Weak: Felt indoors; hanging objects may swing, vibration similar to passing of light trucks, duration may be estimated, may not be recognized as an earthquake.	130,000 per year (est.)
4.0 – 4.9	Light	4	Largely observed: Generally noticed indoors but not outside. Light sleepers may be awakened. Vibration may be likened to the passing of heavy traffic. Walls may creak; doors, windows, glassware and crockery rattle.	
	Light	5	Strong: Generally felt outside, and by almost everyone indoors. Most sleepers awakened. A few people alarmed. Small objects are shifted or overturned, and pictures knock against the wall. Some glassware and crockery may break, and loosely secured doors may swing open and shut.	13,000 per year (est.)
5.0 – 5.9	Moderate	6	Slightly damaging: Felt by all. People and animals alarmed. Many run outside. Walking steadily is difficult. Objects fall from shelves. Pictures fall from walls. Furniture may move on smooth floors. Glassware and crockery break. Slight non-structural damage to buildings may occur.	1,319 per year
	Moderate	7	Damaging: General alarm. Difficulty experienced in standing. Furniture and appliances shift. Substantial damage to fragile or unsecured objects. A few weak buildings damaged.	
6.0 – 6.9	Strong	8	Heavily damaging: Alarm may approach panic. A few buildings are damaged and some weak buildings are destroyed.	134 per year
7.0 – 7.9	Major	9	Destructive: Some buildings are damages and many weak buildings are destroyed.	15 per year
8.0 – 8.9	Great	10	Very destructive: Many buildings are damaged and most weak buildings are destroyed.	
		11	Devastating: Most buildings are damaged and many buildings are destroyed.	1 per year
9.0 – 9.9		12	Completely devastating: All buildings are damaged and most buildings are destroyed.	1 per 10 years (est.)
10.0+	Massive	>12	Never recorded, widespread devastation across very large areas.	Unknown

Source: Presentation by Jeff Bull

2.1.2 Location of Seismic Events

Two related terms describe the location at which an earthquake is triggered. The "epicenter" is the location at the surface above the slip event. The "hypocenter" is the event's actual location in the subsurface.

2.2 What Is Induced Seismicity?

Consistent with the NAS report text shown in section 2.1, induced seismicity was defined by several of the speakers as seismic events that are caused by human activities (as opposed to natural geological events). Induced seismic activity has been attributed to a range of human activities including:

- Impoundment of large reservoirs behind dams,
- Controlled explosions related to construction,
- Mine cavity collapse,

- Underground nuclear tests, and
- Energy technologies that involve injection or withdrawal of fluids from the subsurface.

In recent years, many claims have been made that injection related to various forms of energy production have led to increased rates of earthquakes that can be felt by the public. Therefore, the special session focused on the fourth of these categories. Examples of energy technologies include the following, which are discussed in more detail in the next chapter:

- Enhanced geothermal energy,
- Hydraulic fracturing,
- Long-term injection and production associated with enhanced oil recovery (EOR) programs,
- Injection wells used for long-term disposal of produced water and other fluids, and
- Carbon capture and sequestration (CCS) programs.

2.3 What Causes Induced Seismicity?

Many of the speakers emphasized the point that induced seismicity is not caused by the injected fluids lubricating faults. Rather, the induced seismicity is triggered by the increased pore pressure in the rock that effectively reduces the natural friction on a fault. Water is an incompressible fluid such that pressure applied at a wellhead is transmitted to the bottom of the well and out into the formation. This allows the pressure to move over extended distances where it can cause already susceptible faults to slip. The overall physics involved in these processes is very complex; more research is needed to develop a better understanding.

Austin Holland of the Oklahoma Geological Survey (OKGS) reported that most of the Earth's upper crust is near failure. The increased pore pressure from fluid injection effectively reduces friction on faults.

In cases where injection continues over long periods of time, the injected fluids will cause a cumulative rise in formation pressure. An increased formation pressure by itself does not necessarily induce earthquakes, but if faults that are already near failure or susceptible to slippage are located near to the site of increased pressure, an earthquake may be triggered. In order for induced seismicity to take place there needs to be a critically stressed fault near the human activity. Not all faults are equally susceptible – the location, orientation, and properties of the fault play an important role too.

If a particular project involves injecting and removing fluids from the same formation, as in the case of an enhanced oil recovery project, it is the net fluid balance that is important, not just the injected volume.

Robin McGuire of Lettis Consultants International presented factors that affect the potential to generate felt seismic events:

- Rate of injection or extraction,
- Volume and temperature of injected or extracted fluids,
- Pore pressure,
- Permeability of the relevant geologic layers,
- Faults, fault properties, fault location,
- Crustal stress conditions,
- Distance from the injection point, and
- Length of time over which injection and/or withdrawal takes place.

Chapter 3 - National Academy of Sciences Report

Injection of large volumes of fluids into underground formations can increase the potential for seismic events to occur under certain conditions. With the heightened level of U.S. oil and gas production, particularly with the rapid expansion of unconventional oil and gas resources that involve hydraulic fracturing and wastewater disposal through injection wells, Senator Jeff Bingaman of New Mexico, chair of the Senate Energy and Natural Resources Committee, wrote to Department of Energy Secretary Stephen Chu in 2010. Senator Bingaman requested the Secretary to engage the NAS's National Research Council to examine the scale, scope, and consequences of seismicity induced by energy technologies.

The NAS formed a Committee on Induced Seismicity Potential in Energy Technologies. Work began in 2011. A final report was released in June 2012[2].

This white paper does not include all the details of the NAS report. However, the presentation made by Robin McGuire of Lettis Consultants International (a member of the NAS committee that prepared the report) during the special session provides a summary of the report and its findings. Several others speakers made reference to the same report. Therefore, some of the key findings of that report are included here.

3.1 Focus of the NAS Report

According to McGuire's presentation, the NAS report:

- Summarized the current state-of-the-art knowledge on the possible scale, scope and consequences of seismicity induced during the injection of fluids related to energy production,
- Identified gaps in knowledge and the research needed to advance the understanding of induced seismicity, its causes, effects, and associated risks,
- Identified gaps and deficiencies in current hazard assessment methodologies for induced seismicity and research needed to close those gaps, and
- Identified and assessed options for interim steps toward best practices, pending resolution of key outstanding research questions.

[2] National Academy of Sciences, 2012, "Induced Seismicity Potential in Energy Technologies," prepared by an NAS Committee on Induced Seismicity Potential in Energy Technologies, published by the National Academies Press, Washington, DC, 300 pp. The report can be ordered in hard copy or downloaded in .pdf format at http://www.nap.edu/catalog.php?record_id=13355.

The report focused its attention on induced seismicity specifically associated with four energy technologies:

- Geothermal energy,
- Oil and gas production,
- Wastewater disposal in injection wells, and
- Carbon capture and storage (CCS).

Each of these is discussed in the following sections. The descriptions given below represent the level of detail provided in McGuire's presentation. The full NAS report contains far more detail and examples than are described here. Readers are encouraged to examine the report for additional information.

3.2 Geothermal Energy

Geothermal energy can be produced in at least three different ways. Some formations contain hot steam in the pores and fractures of the rock. These are called "vapor-dominated" systems. A well-known example of this type of production is the Geysers field located 75 miles north of San Francisco.

Others contain hot liquid water in the pores and fractures of the rock, and are referred to as "liquid–dominated" systems. Both of these systems require some water injection to maintain pressure and heated working fluids.

The third type of geothermal system is known as "enhanced geothermal systems (EGS)" or as "hot dry rock". In those formations, the hot formation does not contain abundant natural water or steam. To take advantage of the high temperature of the rock, extensive hydraulic fracturing must be done to promote water introduction into the rock and circulation of water within the rock formation. In addition, a water source must be injected into the rock as a heat-transfer fluid.

Geothermal systems employ both injection and withdrawal of water. Operators attempt to keep a balance between fluid volumes produced and the fluids replaced by injection to maintain reservoir pressure. Unlike the other forms of energy reviewed in the NAS report, geothermal energy has very high temperatures in the underground formation. The temperature difference between formation and injected water introduces an additional driving force for rock disturbance from thermal impacts.

3.2.1 Geothermal Influences on Induced Seismicity

The NAS report concludes that induced seismicity in geothermal systems appears related to both net fluid balance considerations and temperature changes produced in the subsurface. Different forms of geothermal resource development appear to have differing potential for producing felt seismic events:

- High-pressure hydraulic fracturing undertaken in some geothermal projects (EGS) has caused seismic events that are large enough to be felt.
- Temperature changes associated with geothermal development of hydrothermal resources has also induced felt seismicity (The Geysers).

3.3 Oil and Gas Production

Several aspects of the oil and gas production cycle involve injection and/or withdrawal of large volumes of fluids from underground formations. The NAS report focused on three of these. The first is oil and gas extraction. Typically this removes large volumes of fluids over decades. Operators attempt to balance the volume of fluids injected with the volume extracted as the fields mature. The relevant examples provided in the NAS report are all related to production from conventional oil and gas formations; most such cases are decades old.

The second aspect is enhanced recovery, in which fluids are injected to extract remaining oil and gas and maintain reservoir pressure. Often as fields grow more mature and the natural reservoir pressure diminishes, it is necessary to begin injection of fluids. The most common form is secondary recovery (injection of water for water flooding). When secondary recovery has reached its practical or economic limits, tertiary recovery (enhanced oil recovery using steam, CO_2, polymers, and other materials) may be employed. The key is maintaining pressure balance within the formation.

The third aspect is hydraulic fracturing. Although hydraulic fracturing has been performed on more than 1 million wells since the mid-1940s, the technique has become a household term in the past five years, as shale gas development has flourished in the United States. Hydraulic fracturing of horizontal shale gas wells often uses 5 million gallons of water injected under pressures high enough to fracture the shale rock.

3.3.1 Oil and Gas Extraction Influences on Induced Seismicity

Generally, oil and gas extraction from conventional wells has not caused significant seismic events. However, withdrawal of oil or gas from the subsurface can result in a net decrease in pore pressure in the reservoir over time, particularly if fluids are not reinjected to maintain or regain original pore pressure conditions.

There have been a limited number of earthquakes associated with oil and gas production. About half of these cases are from the United States. Two other well-documented cases were found in France and Uzbekistan.

3.3.2 Oil and Gas Enhanced Recovery Influences on Induced Seismicity

Intuitively, processes that withdraw fluids from a formation and reinject fluids back into the same formation are less likely to cause large increases in pore pressure. Enhanced recovery operations were found by the NAS committee to have minimal influence of induced seismicity. McGuire reported that relative to the large number of waterflood projects for secondary recovery, the small number of documented instances of felt induced seismicity suggests that those projects pose small risk for events that would be of concern to the public.

The committee did not identify any documented, felt induced seismic events associated with EOR (tertiary recovery). They concluded that the potential for induced seismicity is low.

3.3.3 Oil and Gas Hydraulic Fracturing Influences on Induced Seismicity

Although the rate of injection of fluids for hydraulic fracturing is quite high, the duration of a typical frac job is relatively short – typically just a few days, with any given frac stage subjected to elevated pressures for only a few hours.

McGuire reports that the committee concluded that the process of hydraulic fracturing a shale gas well does not pose a high risk for inducing felt seismic events. They estimated that about 35,000 wells had been hydraulically fractured for shale gas development to date in the United States. Among all those frac jobs, only a few cases of felt induced seismicity from hydraulic fracturing for shale gas had been documented worldwide (examples from Oklahoma, the Horn River basin in Canada, and the United Kingdom).

3.4 Produced Water Disposal Wells

The Underground Injection Control (UIC) program regulates injection wells. The U.S. Environmental Protection Agency (EPA) and states that have received authority to administer the UIC program have permitted more than 150,000 injection wells for managing produced water from oil and gas operations. Many of these wells are used for injecting fluids for secondary or tertiary recovery as described in section 3.3. But an estimated 30,000 wells are used for disposal of wastewater to formations that do not produce oil and gas.

3.4.1 Produced Water Disposal Well Influences on Induced Seismicity

Typically these disposal wells inject moderate volumes of fluids on a regular basis for many years. Given their ongoing injection and high cumulative volume, they may be thought to have some potential for inducing seismicity, if the local faults are susceptible. However, McGuire reports that the NAS committee found very few felt induced seismic events reported as either caused by or likely related to these wells.

A large percentage of disposal wells operate for years without creating any felt seismic events. But a small percentage of disposal wells do seem to be associated with clusters of earthquakes, typically small to moderate in strength. High injection volumes may increase pore pressure, and in proximity to existing faults could lead to an induced seismic event. Several examples of earthquake clusters linked to injection well activity are described in the next chapter.

Earthquakes associated with disposal wells are not necessarily limited in time and space to injection operations. The area of potential influence from injection wells may extend over several square miles, with earthquakes triggered more than 10 miles away. Induced seismicity may continue for months to years after injection ceases in some special cases, but the mechanisms that cause such effects are not well understood.

Evaluating the potential for induced seismicity in the location and design of injection wells is difficult because there are no cost-effective ways to locate faults and measure in situ stress. In a later chapter, several state regulators describe ways in which their agencies are trying to avoid locating new disposal wells in areas that are susceptible to induced seismicity.

3.5 CCS Operations

Over the past decade and a half, extensive research has been conducted on capturing CO_2 from large exhaust gas sources like power plants or gas processing plants. Once the CO_2 is captured,

it can be converted to a supercritical state and injected into an underground formation for permanent storage or sequestration. The volumes of CO_2 that would ultimately need to be sequestered to have a meaningful impact of atmospheric CO_2 levels will be extremely large. To the extent that full-scale CCS projects are implemented, they could represent very significant fluid injection programs.

3.5.1 CCS Influences on Induced Seismicity

According to McGuire's presentation, the only long-term (~14 years) commercial CO_2 sequestration project in the world is located at the Sleipner field offshore from Norway. That project injects CO_2 captured from an oil and gas production platform. The program is done at a small scale relative to the commercial projects proposed in the United States. Extensive seismic monitoring has not indicated any significant induced seismicity.

There is no experience with the proposed injection volumes of liquid CO_2 in large-scale sequestration projects (> 1 million metric tonnes per year). If the reservoirs behave in a similar manner to oil and gas fields, these large volumes have the potential to increase the pore pressure over large areas and may have the potential to cause significant seismic events.

One other consideration is that CO_2 has the potential to react with the host/adjacent rock and cause mineral precipitation or dissolution. The effects of these reactions on potential seismic events are not understood.

3.6 Comparative Impacts

McGuire's presentation included several charts taken from page 96 of the NAS report that show a side-by-side comparison of different energy activities and the amount of fluids injected on a daily and annual basis. That report is subject to copyright; therefore the figures are not reproduced here. The point of those charts is that some activities may have high daily injection volumes but have a short duration (e.g., hydraulic fracturing). When compared over an annual cycle, they have lower cumulative injection volumes than activities like CCS that have lower daily injection rates but continue throughout the entire year.

The charts also point out that some activities involve a relatively close balance of injection and withdrawal volumes (e.g., enhanced recovery) while CCS or disposal wells are presumed to incorporate injection only. Thus their cumulative impacts on pore pressure are likely to be more pronounced.

McGuire also showed a table that was adapted from Table S1 on page 6 of the NAS report. The table summarizes information for each of the energy activities regarding the number and strength of felt seismic events per year. The most prominent source of felt seismic events is vapor-dominated geothermal production at the Geysers, with an estimate 300-400 felt earthquakes per year since 2005. However, only one of those events had a magnitude greater than 4.0. The NAS report notes that the operators at the Geysers meet regularly with representatives of local communities, county government, federal and state regulatory agencies, the USGS, and national laboratory scientists in order to discuss the field operations and the recently observed seismicity.

Out of 30,000 water disposal wells surveyed, only 8 felt seismic events have been noted. However, 7 of those 8 events had a magnitude greater than 4.0.

3.7 Government Involvement and Coordination

McGuire noted that mechanisms are lacking for efficient coordination of government agency response to induced seismic events. He explained that responsibility for oversight of activities that can cause induced seismicity is dispersed among a number of federal and state agencies. Recently, potential induced seismic events in the United States have been addressed in a variety of manners involving local, state, and federal agencies, and research institutions. These agencies and research institutions may not have resources to address unexpected events; further, more events could stress this ad hoc system.

While EPA has overall regulatory responsibility for fluid injection under the Safe Drinking Water Act, and most states have delegated regulatory authority for the UIC program, neither the Code of Federal Regulations nor state regulations directly address induced seismicity. The USGS has the capability and expertise to address monitoring and research associated with induced seismic events. However, their mission does not focus on induced events. Significant new resources would be required if their mission is expanded to include comprehensive monitoring and research on induced seismicity.

Typically state agencies do not have the resources to undertake detailed seismic investigations. However, Tom Tomastik of the ODNR reported that his agency has undertaken its own seismic monitoring program. The agency hired two new geologists in 2012 to work in the UIC program (one of the new employees has a PhD in seismology).

Additionally, the ODNR began seismic monitoring for microseismic events around a few of the new Class II injection well sites. The ODNR purchased nine portable seismographs with the

capability of measuring movements in all three directional axes. Three of the new seismographs were deployed around a new disposal well. The ODNR is installing portable seismic units around some of the new Class II injection wells and will start monitoring prior to commencement of injection operations and will continue to monitor for a period of time after injection operations commence. They will continue to monitor for microseismic events up to approximately six months after initiation of injection operations. If no evidence of larger seismic events, the portable seismic stations will be moved to another new disposal well location.

This type of evaluation requires extensive resources and a great deal of time. Ohio's program is commendable, but may not be practical in other states. Chapter 6 discusses several approaches to evaluating risk on a case-by-case basis.

Chapter 4 – Examples of Induced Seismicity

Many of the presenters described examples of specific cases in which injection activities caused detectable earthquake activity. Some were mentioned quickly as examples, while others were described in greater detail. This chapter provides summaries of some of those cases. The examples are organized by the four energy sectors used in the previous chapter.

4.1 Induced Seismicity from Geothermal Energy Production

4.1.1 Basel, Switzerland

Robin McGuire made brief reference to a magnitude 3.4 earthquake associated with injection of water for an enhanced geothermal project in the center of Basel, Switzerland in 2006. He did not offer any details. The NAS report provides a more detailed description of the case. During the hydraulic fracturing process for the system, many small seismic events were detected with several higher than magnitude 3.0. This caused the developers to discontinue the stimulation efforts and ultimately to abandon the project.

4.1.2 The Geysers

Robin McGuire made a few references to the Geysers geothermal project in California. A summary table in his presentation reported that there had been 300-400 felt seismic events per year since 2005. Between 1 and 3 of these had magnitude greater than 4.0. The NAS report offers much more information on the frequency and magnitude of the events.

4.2 Induced Seismicity from Oil and Gas Extraction

None of the presenters described examples in which extraction of oil and gas directly contributed to seismic events through removal of fluid leading to reduction of pore pressure in underground formations. However, the NAS report did provide two examples. These are the Lacq gas field in southwestern France and the Gazli gas field in Uzbekistan. Since these were not discussed in the special session, they are not mentioned further here. But interested readers can find more information in the NAS report.

4.3 Induced Seismicity from Enhanced Recovery Operations in Oil and Gas Fields

4.3.1 Rangely, Colorado

Stuart Ellsworth of the Colorado Oil and Gas Conservation Commission (COGCC) provided some background on the Rangely field in northwestern Colorado. Oil production started many decades ago and was later augmented by water flooding operations beginning in 1957. Within a few years, the formation pore pressure rose to a level that triggered seismic events up to a magnitude 3.4. The area of injection was experiencing about 50 minor earthquakes per day.

The oil company operating the field agreed to let the USGS conduct an experiment to determine whether they could turn earthquakes off and on by injecting or withdrawing water from the formation. The researchers were successful in this experiment. When the injection ceased, the earthquakes dropped from more than 50 to fewer than 10 per day. When they began injection again, the daily number jumped back up to over 50. Over a two-year period, the USGS turned earthquake activity off, on, off, on, and off again.

Austin Holland of the OKGS included a figure from a 1976 scientific paper that shows how the number of earthquakes tracked the amount of water injected or withdrawn. The NAS report includes much more detail on the experiment.

4.3.2 Other Cases

A summary table in McGuire's presentation reported that there had been felt seismic events at 18 water flooding sites around the world. Three of these had magnitude greater than 4.0. The NAS report offers more information on the frequency and magnitude of the events.

4.4 Induced Seismicity from Hydraulic Fracturing of Oil and Gas Wells

Holland provided specific case examples from wells in Oklahoma for which he believed that hydraulic fracturing had possibly contributed to seismic events. He also mentioned other examples from the United Kingdom and Horn River basin in British Columbia, Canada.

The NAS report notes that the very low number of earthquakes relative to the large number of hydraulically fractured wells is likely due to the short duration of injection of fluids and the limited fluid volumes used in a small spatial area.

4.4.1 Oklahoma

Holland suggested that a small percentage of the hydraulically fractured wells in Oklahoma may have induced seismic events. He cited the fracturing in Eola Field in Garvin County as possibly contributing to about 100 earthquakes, with magnitudes as high as 2.9. He also suggested that fracturing activities in the Union City Field in Canadian County may have contributed to about 10 small earthquakes. However, these conclusions will require additional verification.

4.4.2 Blackpool, UK

Several of the presenters mentioned this case as a prominent example of earthquakes associated with hydraulic fracturing. However, none of the presenters provided details. The NAS report contains more detailed description. Cuadrilla Resources began drilling and completing some of the first shale gas wells in the UK in 2011. The hydraulic fracturing triggered earthquakes of 2.3 and 1.5 magnitude. The 2.3 earthquake was felt widely by residents, which created a great deal of media attention. Cuadrilla suspended drilling and fracturing while it undertook an extensive study.

4.5 Induced Seismicity from Produced Water Disposal Wells

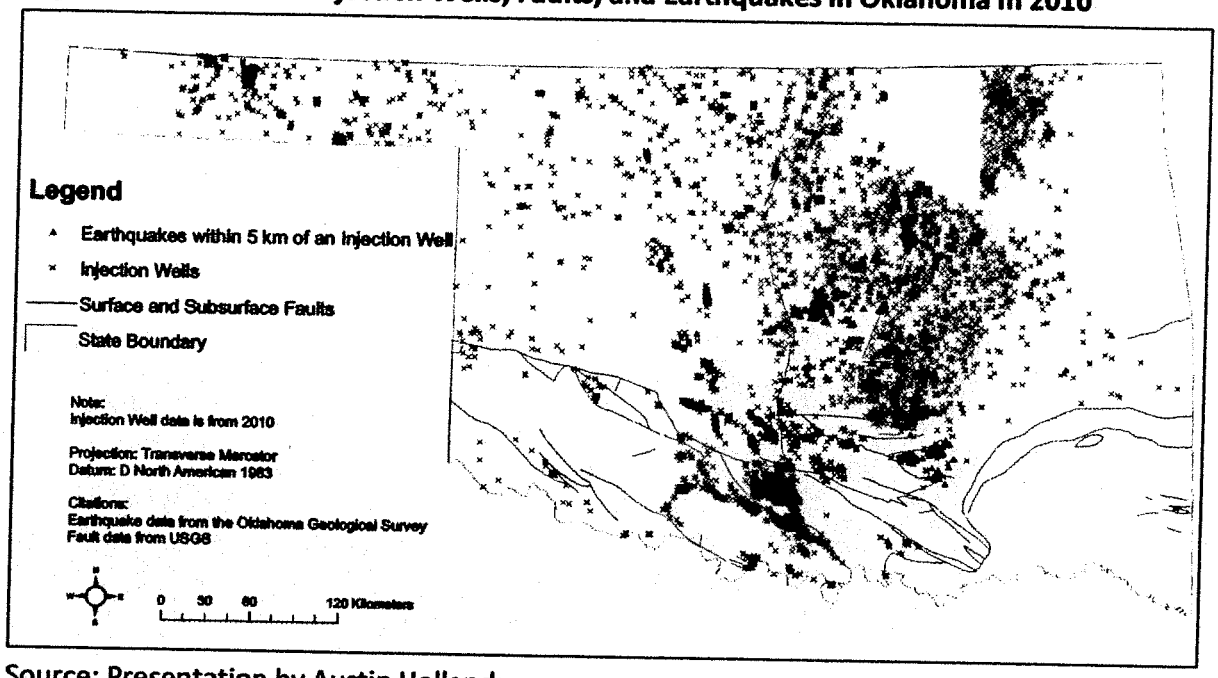
Compared to the other types of energy projects, disposal wells are more commonly linked to induced seismic events. This section describes examples relating to injection of oil and gas produced water. Two other examples of wells injecting other types of fluids are provided in section 4.6.

4.5.1 Oklahoma

Austin Holland reported on the relationship between earthquakes and injection wells in Oklahoma. Figure 2 plots the location of both of those categories on a map. Although some of the injection wells are located within 5 km of the earthquakes, there are many other injection wells throughout the state that clearly have not triggered earthquakes.

Holland described two cases in which injection of produced water into disposal wells was a potential cause for earthquakes. The first is an earthquake swarm of about 1,800 earthquakes located around Jones, OK, not far from Oklahoma City. The maximum magnitude of the events was 4.0 while the majority of them were of much smaller magnitude. Several large volume injection wells are located within 8-12 miles of the earthquake swarm. Prior to injection operations, the number of earthquakes in the area was small. Earthquake recurrence statistics

Figure 2 – Location of Injection Wells, Faults, and Earthquakes in Oklahoma in 2010



Source: Presentation by Austin Holland

in that area are not similar to those observed for the rest of Oklahoma. The data show a larger variation of active fault-plane orientations than expected. As a result, interpretation of the data is not as simple as anticipated. The Oklahoma Geological Survey continues to review the data and hopes to learn if the earthquake swarm was influenced by the disposal wells.

The second example described by Holland is a magnitude 5.7 earthquake near Prague, OK in November 2011. He noted that there are three UIC disposal wells within a mile of the earthquake location. Holland reported that other authors (in a manuscript currently under review for the journal Geology) propose the earthquakes were induced from injection from the 3 wells. Their hypothesis is based in part on the fact that the main shock occurred on a splay of the Wilzetta fault, which is consistent to be active in the regional stress-field. They also noted that the earthquakes have the characteristics typical of a natural aftershock sequence. Holland noted that as in the Jones swarm case, it is possible that these earthquakes were triggered by injection, but not certain. Where both natural and induced seismic events occur in the same area it can be very difficult to distinguish them from one another.

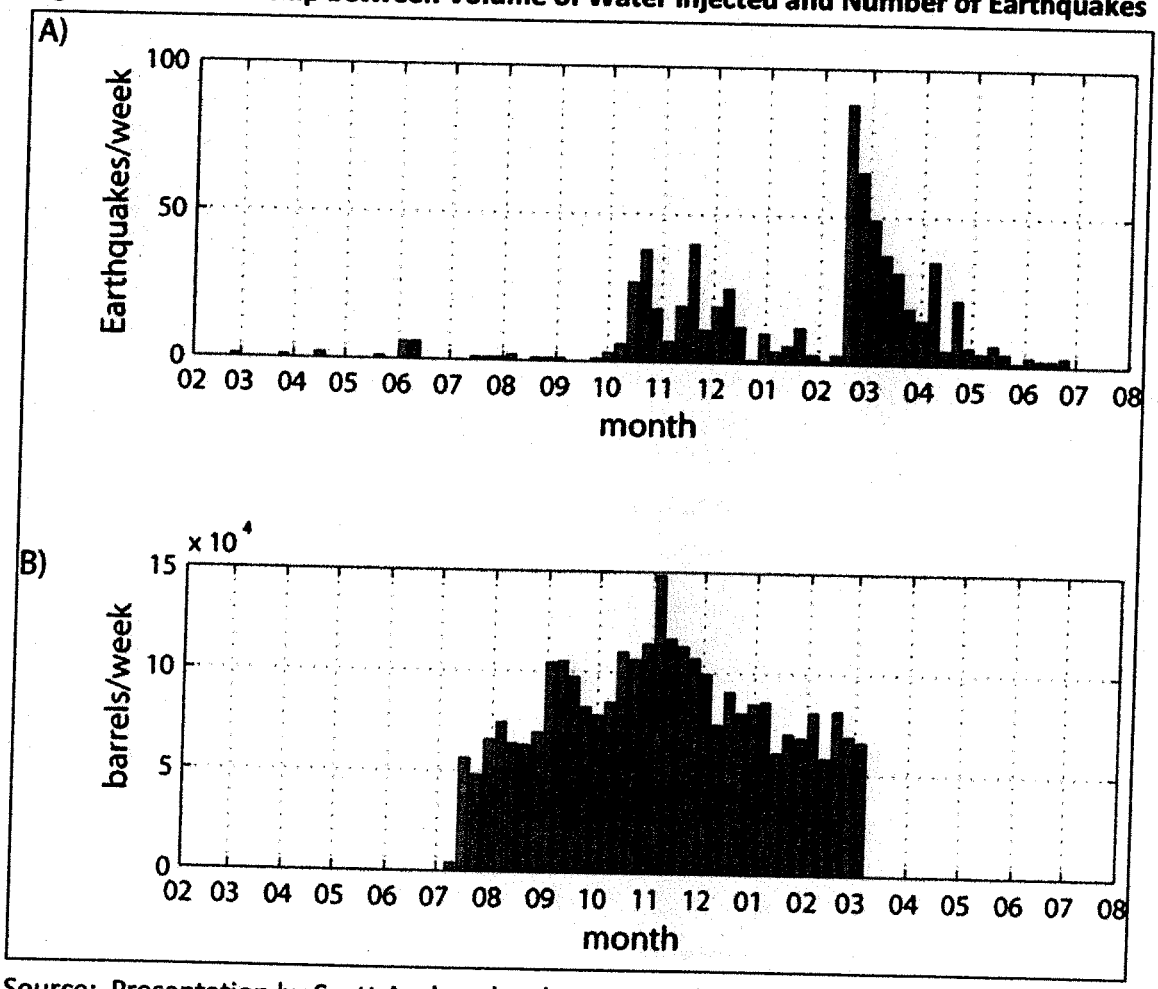
4.5.2 Arkansas

Scott Ausbrooks of the Arkansas Geological Survey reported on a cluster of earthquakes that occurred in the central portion of the state in the vicinity of several disposal wells. Following

injection of produced water and flowback water from shale gas production into several wells, a previously unknown fault, the Guy-Greenbrier fault, was illuminated by over 1,300 earthquakes with magnitudes up to 4.7 that occurred starting in September 2010. However, the vast majority of these events were relatively small in magnitude.

Figure 3, taken from Ausbrooks' presentation, shows the relationship between the number of earthquakes in that region and the volume of water injected. The data show a strong correlation between cumulative volume of water injected and the number of earthquakes, but as displayed in the bottom chart, there is a lag time of several months between the commencement of injection and the uptick in earthquakes. A similar relationship can be seen after injection is stopped – the earthquakes continue for another few months.

Figure 3 – Relationship between Volume of Water Injected and Number of Earthquakes



Source: Presentation by Scott Ausbrooks; the co-author is Stephen Horton of CERI.

Ausbrooks reported that the Guy-Greenbrier fault was already critically stressed prior to the start of injection. The earthquakes along the Guy-Greenbrier fault began after the start of injection at well #1 with intense seismic activity following the start of injection at well #5. The injection of fluids increased pore pressure in the Ozark aquifer. Because of the hydraulic connection between the Ozark aquifer and the Guy-Greenbrier fault, pore pressure could also have increased in the fault zone.

Ausbrooks concluded that given the spatial and temporal correlation between the disposal wells and activity on the fault, it would be an extraordinary coincidence if the earthquakes were not triggered by fluid injection. As discussed below in section 6.3, the AOGC placed a permanent moratorium on permitting any new or additional Class II disposal wells in a large area surrounding the Guy-Greenbrier and Enola seismically active areas.

4.5.3 Ohio

Tom Tomastik of the ODNR described the series of earthquakes that occurred near Youngstown, OH. The Northstar #1 injection well is located in an industrial district in Youngstown in the northeastern portion of the state. The lower portion of the well was originally drilled as a stratigraphic test well to 9,184 feet in April 2010. The DNR issued a permit to convert the wells to a Class II injection well in July 2010. Injection commenced on December 22, 2010.

The first two seismic events happened on March 17, 2011. Ten additional events followed through the end of 2011. Figure 4 shows the seismic events and their magnitudes.

Figure 4 – Seismic Events in Youngstown, OH

DATE	ORIG. TIME UTC	EPICENTER	MAGNITUDE	FELT
Mar. 17, 2011	10:42:20.22	41.11, -80.70	2.1	Not Felt
Mar. 17, 2011	10:53:09.51	41.11, -80.68	2.6	Felt (27 reports)
Aug. 22, 2011	08:00:31.50	41.12, -80.73	2.2	Not Felt
Aug. 25, 2011	19:44:20.99	41.10, -80.71	2.4	Not Felt
Sept. 02, 2011	21:03:26.20	41.12, -80.69	2.2	Felt (few)
Sept. 26, 2011	01:06:09.82	41.11, -80.69	2.6	Felt
Sept. 30, 2011	00:52:37.58	41.11, -80.69	2.7	Felt (300 reports)
Oct. 20, 2011	22:41:09.54	41.11, -80.68	2.3	Not Felt
Nov. 25, 2011	06:47:26.58	41.10, -80.69	2.2	Not Felt
Dec. 24, 2011	06:24:57.98	41.119, -80.694	2.7	Felt (90 reports)
Dec. 31, 2011	20:04:59.03	41.118, -80.693	4.0	Felt (more than 4,000)
Jan. 13, 2012	22:29:33.45	41.11, -80.69	2.1	Not Felt

Source: Presentation by Tom Tomastik

After the September seismic events, downhole testing was performed on the Northstar #1 injection well. In October, a tracer survey was conducted and indicated that injection fluids were entering 26 multiple injection zones from 8,215 to 8,940 feet. On December 30th, at the request of the Director of ODNR, the well operator shut down the Northstar #1 well. As described in some of the previous examples, often the seismic events continue after the injection has ceased. On the following day, the largest event to date occurred, with a magnitude of 4.0. In response, the Governor placed an indefinite moratorium on the other three drilled Northstar injection wells and one outstanding Northstar injection permit within a seven mile radius around the Northstar #1 injection well.

Tomastik reported that studies done by Lamont-Doherty Earth Observatory on the seismic data indicate there may be an unknown fault within the Precambrian rocks near the Northstar #1 injection well. Injection from the Northstar #1 well may have communicated with this potential fault and caused the seismic activity. Data continues to be collected and evaluated.

4.5.4 West Virginia

Tom Bass of the West Virginia Department of Environmental Protection (WVDEP) reported on multiple seismic events in central West Virginia during 2010 near a disposal well. West Virginia has 52 active non-commercial and 14 active commercial UIC disposal wells. These wells are important for the disposal of fluids associated with oil and natural gas development, particularly from the Marcellus Shale.

A commercial UIC well located in Braxton County, WV began experiencing small earthquakes in the range of magnitude 2.2 to 3.4 in April 2010. The same area had experienced one seismic event of 2.5 magnitude in 2000 prior to the injection well being drilled.

The well was originally drilled for production but was not economical. Therefore the operator elected to convert it to a disposal well. The well passed a mechanical integrity test making sure casing, tubing, and packer were tight prior to injection. All reports submitted by the operator prior to the earthquakes indicated that the well operated within permitted pressure limits. In response to the seismic activity, the Office of Oil and Gas placed a limit on the volume that could be injected within a 30 day period (15,000 bbl). No conclusive evidence was linked between the disposal well and the seismic activity.

4.5.5 Texas

McGuire briefly mentioned a series of earthquakes that occurred near the Dallas-Ft. Worth airport during 2008-2009. The proposed cause was injection of produced water from shale gas operations into a disposal well. He provided no details.

Adel Younan of ExxonMobil briefly mentioned another example in the same section of Texas. Although he provided no details, a speaker at a previous GWPC conference (Cliff Frohlich of the University of Texas) had described a series of earthquakes near Cleburne, Texas to the southwest of Fort Worth. Frohlich's investigation suggested that the earthquakes had been caused by a disposal well nearby.

4.6 Induced Seismicity from Other Types of Disposal Wells

Several presenters mentioned two well-known cases of disposal wells injecting fluids other than produced water that contributed to induced earthquakes. Both of these examples are found in Colorado.

4.6.1 Rocky Mountain Arsenal

Stuart Ellsworth of the COGCC provided some background on injection activities at the Rocky Mountain Arsenal near Denver. In the late 1950s, liquid waste was stored in ponds at the U.S. Army's Rocky Mountain Arsenal. The Army decided to inject the liquid into a 12,045-foot deep well drilled into deep, pre-Cambrian crystalline rock.

Injection began in March 1962. Less than a year after injection began, earthquakes began occurring in the vicinity. Thousands of small earthquakes were recorded near the Arsenal. In 1967, two earthquakes occurred with magnitude of 5.0. In 1968 injection stopped, and the Army began removing fluid from the Arsenal well at a very slow rate in an effort to reduce earthquake activity.

Ellsworth noted several features of this example that contributed to the observed earthquakes. These same factors also apply to the next example – Paradox Valley.

- Large injection volumes,
- High injection rate, and
- Low porosity and low permeability reservoir.

Holland included a figure from a 1968 scientific paper that shows the strong correlation between the volume of waste injected at the Rocky Mountain Arsenal and the earthquake frequency.

4.6.2 Paradox Valley

Hal Macartney of Pioneer Resources presented a detailed review of injection at Paradox Valley in southwestern Colorado. Although he gave the presentation, the listed authors of the presentation are Lisa Block and Chris Wood of the U.S. Department of Interior – Bureau of Reclamation. Macartney's presentation is not included on the GWPC website. Additional information relating to this project is taken from the presentation by Stuart Ellsworth and from the NAS report.

The Bureau of Reclamation operates the Colorado River Basin Salinity Control Project in the Paradox Valley to reduce the amount of salt entering the Dolores River and ultimately the Colorado River. They collect naturally occurring seepage of salt brine before it can contaminate the Dolores River. The intercepted salty water is disposed of by a combination of evaporation ponds and injection to a deep limestone formation at a depth of approximately 14,100 to 15,750 feet. The Bureau's scientists expected that this process might trigger earthquakes and thus deployed a network of local seismometers to monitor any activity.

During 6 years of pre-injection seismic measurement, the Bureau recorded only one earthquake. However, once injection began in July 1996, earthquakes were recorded almost immediately. Minor earthquakes continued through mid-1999, and two magnitude 3.5 events occurred in June and July of 1999. In response to the higher magnitude earthquakes, the Bureau of Reclamation initiated a program to cease injection for 20 days every six months. After experiencing a magnitude 4.3 earthquake in May 2000, they reduced injection to every other month. The result has been no more earthquakes over magnitude 4.0.

After monitoring injection into the Paradox Valley Unit injection well for almost 15 years, the Bureau of Reclamation has recorded over 4,600 induced seismic events. The largest seismic event occurred on May 27, 2000 and had a magnitude of 4.3. Macartney reports that about 1.92 billion gallons have been injected to date.

Macartney concluded that injection has induced earthquakes up to 16 km from the injection well, including on the far side of Paradox Valley. Decreasing the injection flow rate reduced the rate of induced seismicity and caused a region around the well to become aseismic. However,

it did not prevent the occurrence of felt earthquakes, nor did it stop the geographical expansion of the induced seismicity.

The largest induced earthquakes with magnitudes of 3.0 and above occur in a narrow band about 2 km from the well, on the side away from the salt valley. The occurrence of larger-magnitude earthquakes appears to correlate with high long-term average injection pressures. The response time of the seismicity to injection is increasing.

Chapter 5 – Evaluating the Risk of Induced Seismicity

There are numerous injection wells and production wells in the United States. Hydraulic fracturing is conducted on thousands of wells each year. If felt seismicity were induced equally by all of those activities, there would be thousands of reports of earthquakes in many states each week. Yet the relatively small number of felt earthquakes associated with energy production activities suggests that not all individual injection activities pose the same degree of risk. This chapter discusses some of the factors that relate to the risk and severity of induced seismicity and describes two separate risk evaluation systems developed by the oil and gas industry. It also describes risk models developed under DOE's research programs.

5.1 NAS Report Recommendations on Assessing Risks of Induced Seismicity

Robin McGuire summarized the finding made by the NAS committee regarding assessment of risks. The committee believes that methods do not exist currently to evaluate the hazards posed by individual projects. The types of information and data required to provide a robust hazard assessment include:

- Net pore pressures,
- In situ stresses,
- information on faults,
- Background seismicity, and
- Gross statistics of induced seismicity and fluid injection for the proposed site activity.

The committee recommended that a detailed methodology should be developed for quantitative, probabilistic hazard assessments of induced seismicity risk. The methodology would involve making assessments before operations begin in areas with a known history of felt seismicity, then following up with subsequent assessments in response to any observed induced seismicity.

This type of effort was recently begun in Ohio. Tom Tomastik reported on the ODNR's new seismic evaluation program. Some of the new Class II injection wells are being selected for pre-injection seismic monitoring based upon the geology and the proximity of the injection zone in relation to the Precambrian basement rocks, where most of the seismic activity occurs in Ohio. Monitoring would continue for six months after injection begins. If no significant induced seismicity is detected, the monitors will be moved to another location.

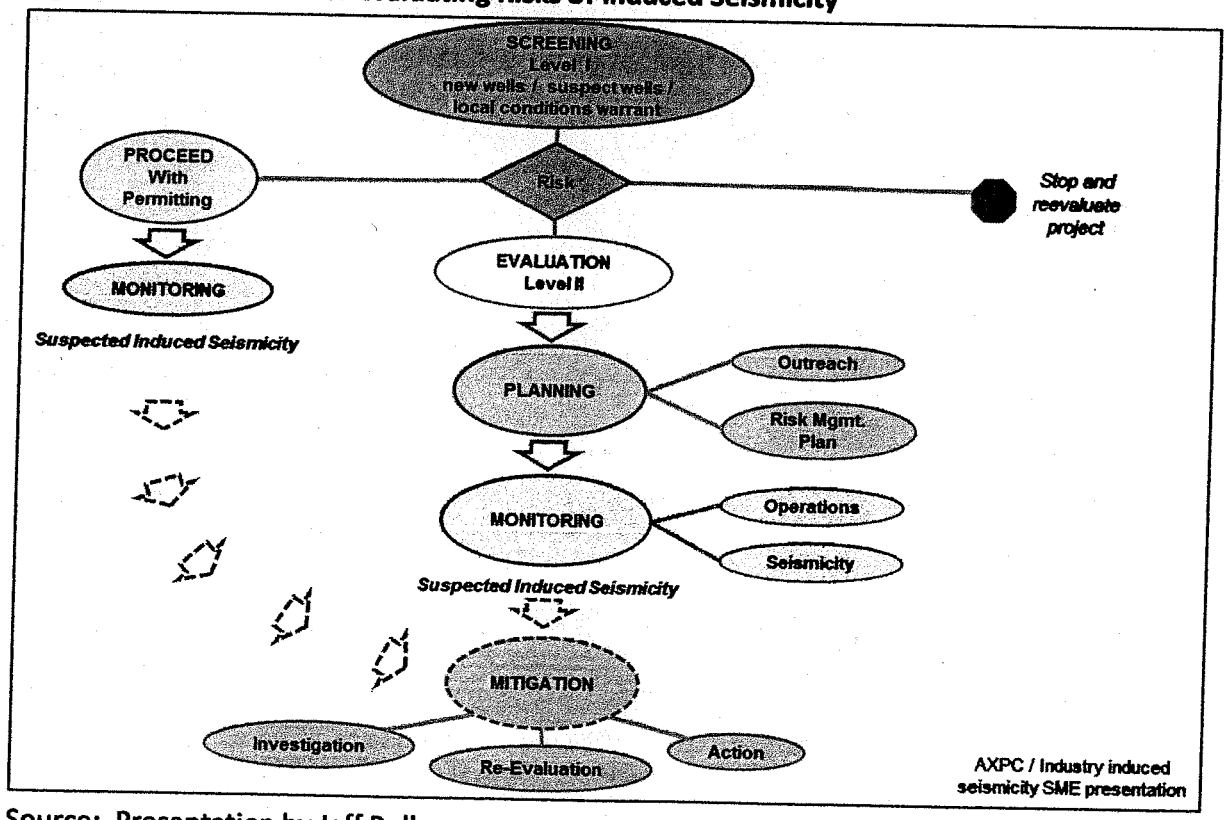
McGuire reported that the NAS committee further recommends that data related to fluid injection (e.g., well locations, injection depths, injection volumes and pressures, time frames)

should be collected by state and federal regulatory authorities in a common format and made accessible to the public (through a coordinating body such as the USGS). In addition, in areas of high-density of structures and population, regulatory agencies should consider requiring that data on fault identification for hazard and risk analysis be collected and analyzed before energy operations are initiated.

5.2 Risk Management Protocol Proposed by Industry Subject Matter Experts

Jeff Bull , an oil and gas industry subject matter expert on induced seismicity, shared a framework for screening, evaluation, planning, monitoring, and mitigation focused on wastewater injection wells. The framework was proposed by members of an industry working group representing companies from the American Exploration and Production Council and other industry participants. Bull noted that the framework is intended to be a "fit for purpose framework to manage the risk of induced seismicity and that it is scalable, allowing the operator to define the potential risk/impact at hand and then 'right size' any evaluation by selecting the appropriate tools to perform the evaluation". A flowchart of the framework is shown in Figure 5.

Figure 5 – Framework for Evaluating Risks of Induced Seismicity



Source: Presentation by Jeff Bull

Readers are referred to Bull's presentation for all the details. Some of the main points are summarized below. The first level of screening looks at new wells, any existing wells suspected of induced seismicity, and at other places where local conditions warrant. Depending on the evaluation, three possible outcomes can be reached:

- Proceed with permitting,
- Stop and reevaluate the project, or
- Proceed to additional evaluation.

If additional evaluation is the chosen outcome, the next step involves assessing the possibility of seismic events and ground motion occurring as a result of fluid disposal and estimating the impact on local population, property, or environment, including distress, damage, or loss. Some of the items that would be reviewed include:

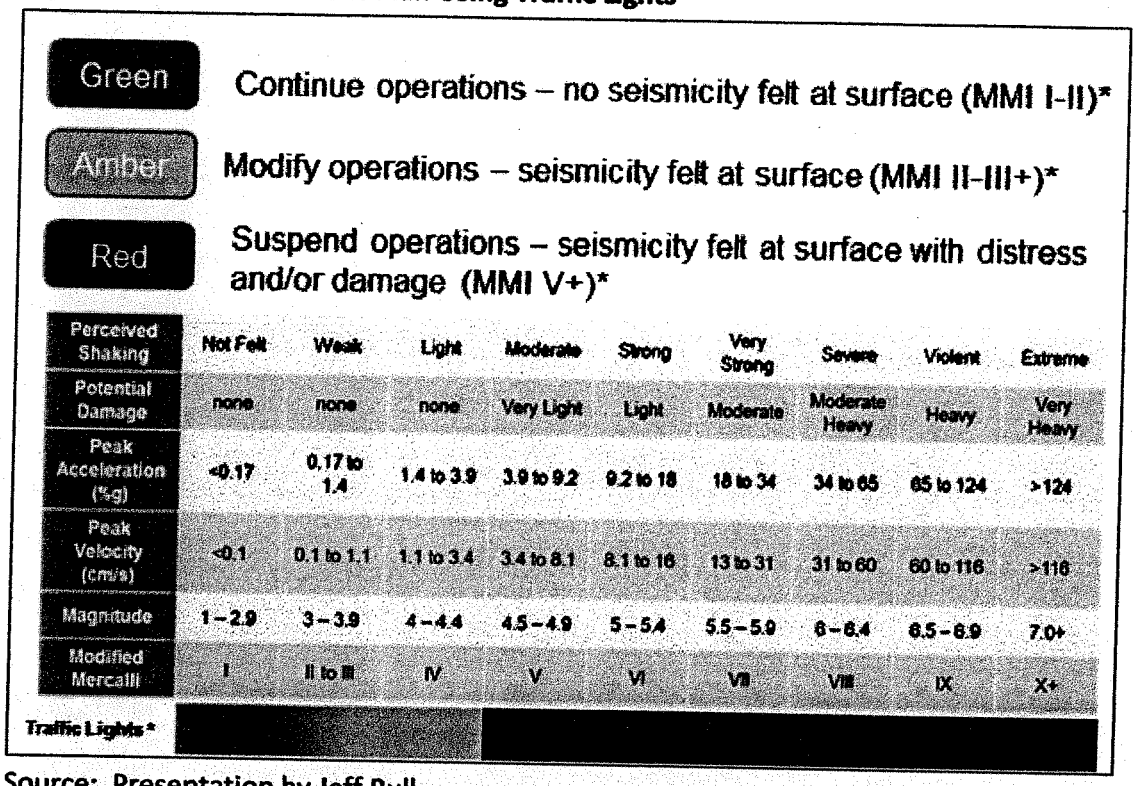
- Key geologic horizons and features,
- Regional stress assessment,
- Surface features,
- Ground conditions,
- Ground response,
- Local seismic events,
- Reservoir characterization,
- Reservoir properties, and
- Disposal conditions.

The next step involves planning and communication/outreach. Figure 6 shows the "traffic light" planning protocol for assessing risks.

Figure 6 is a hypothetical example that includes ratings of six factors (the blue rows). The actual threshold values of a traffic light system would be based on specific local conditions. Depending on the ratings given for each factor at a particular location, the project is assigned to a green, amber, or red category that helps to determine the next steps.

If a project receives a green rating, it could move ahead. At this point a variety of monitoring would be implemented. Some of the monitoring would measure the injected fluid itself while other monitoring would focus on the reservoir and any local or regional seismic activity that is observed. If the project receives an amber or red rating, risk mitigation would be considered and implemented as appropriate before continuing activities.

Figure 6 – Risk Assessment Plan Using Traffic Lights



Perceived Shaking	Not Felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme
Potential Damage	none	none	none	Very Light	Light	Moderate	Moderate Heavy	Heavy	Very Heavy
Peak Acceleration (%g)	<0.17	0.17 to 1.4	1.4 to 3.9	3.9 to 9.2	9.2 to 18	18 to 34	34 to 65	65 to 124	>124
Peak Velocity (cm/s)	<0.1	0.1 to 1.1	1.1 to 3.4	3.4 to 8.1	8.1 to 16	13 to 31	31 to 60	60 to 116	>116
Magnitude	1 – 2.9	3 – 3.9	4 – 4.4	4.5 – 4.9	5 – 5.4	5.5 – 5.9	6 – 6.4	6.5 – 6.9	7.0+
Modified Mercalli	I	II to III	IV	V	VI	VII	VIII	IX	X+
Traffic Lights*									

Source: Presentation by Jeff Bull

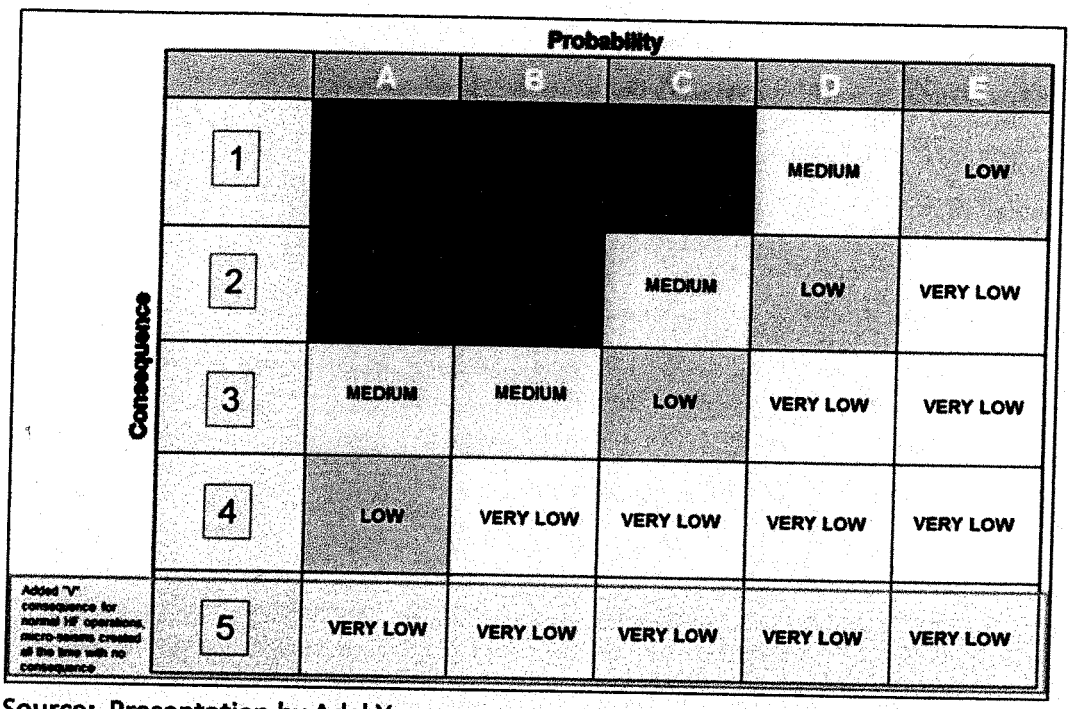
5.3 Risk Management Framework Proposed by ExxonMobil

Adel Younan of ExxonMobil described a possible risk management framework based on various technical considerations that were developed by a multi-disciplinary in-house team. This approach uses a "Risk Matrix" to assess risk level by a qualitative assessment of potential probabilities and consequences of an induced seismic event. After the risk level is identified, possible risk mitigation approaches can be evaluated (effectiveness/cost) and considered for implementation based on local conditions. The approach considers four levels of risk, with the following assigned categories:

- White – very low risk → continue operations
- Grey – very low risk → continue operation
- Yellow – medium risk → adjust operations; consider steps to mitigate risk
- Red – high risk →consider suspending operations; mitigate to reduce risk

The ExxonMobil protocol uses a matrix with probability on one axis and consequences on the other axis. Figure 7 shows the matrix. On the probability axis, A is highly likely, and E is very highly unlikely. On the consequence axis, 1 is MMI > VIII, and 5 is MMI of I to IV. The presentation includes details on the criteria that are used to rank the project.

Figure 7 – Risk Matrix Approach for Assessing Potential Induced Seismicity in Wastewater Disposal Wells and Hydraulically Fractured Wells

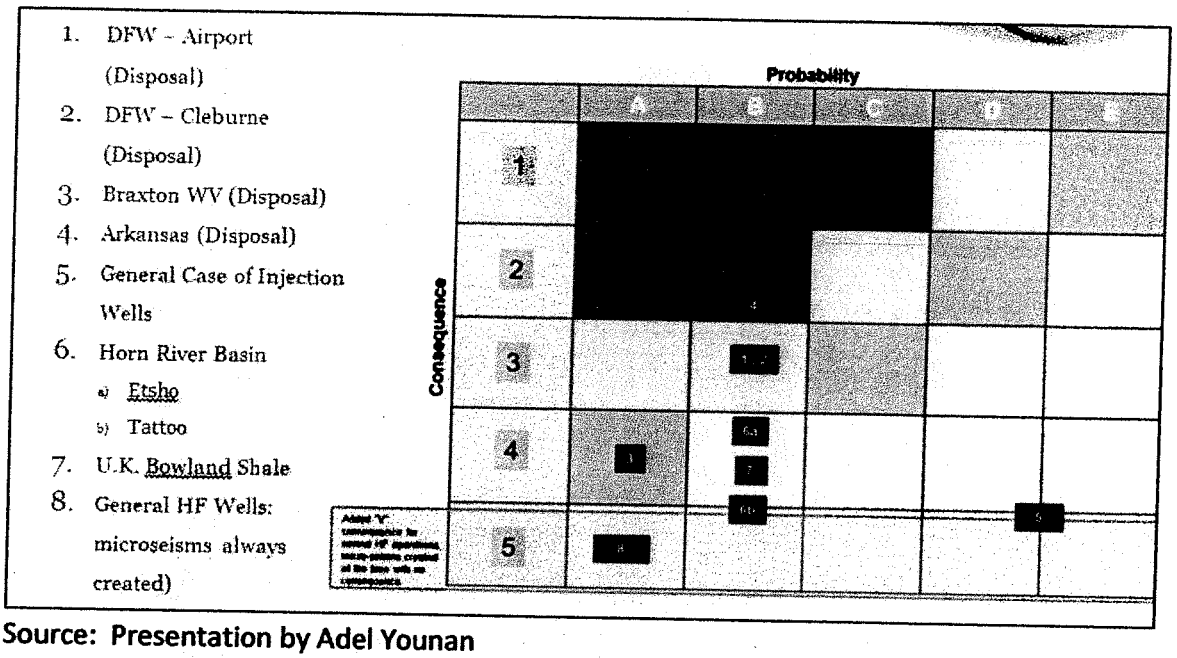


Source: Presentation by Adel Younan

To illustrate how the risk assessment methodology could be applied, Younan gave examples using four specific injection wells and two specific cases of hydraulic fracturing, as well as the general examples of normal injection well operations and hydraulic fracturing operations (where microseisms are routinely created as part of the stimulation process).

Figure 8 shows these examples plotted on the induced seismicity risk matrix. For example, two disposal wells in Texas that were linked to induced seismicity (Dallas/Fort Worth airport and Cleburn) were placed in box B3. The Braxton disposal well in West Virginia was placed in box A4. The Arkansas disposal wells were placed in box B2. Younan rated injection wells in general as falling at the intersection of rows 4 and 5 and columns D and E (i.e., very low consequence and probability of occurrence). He rated three specific hydraulic fracturing projects (two Canadian projects and the Blackpool site in the United Kingdom) in box B4. He indicated that hydraulic fracturing in general always creates microseisms but that the risk would fall into box A5 (i.e., high probability, but low consequence).

Figure 8 – Application of Risk Assessment to Example Wells



Source: Presentation by Adel Younan

Younan concluded that approaches to assess and manage seismicity risk should:

- Be encouraged,
- Be based on sound science,
- Take into account the local conditions, operational scope, geological setting, historical baseline seismicity levels, and
- Reflect reasonable and prudent consideration of engineering standards and codes related to seismicity structural health.

Seismicity monitoring and mitigation should be considered in local areas where induced seismicity is of significant risk. In such areas, appropriate monitoring and mitigation should include:

- A mechanism to alert the operator quickly to the occurrence of seismicity significantly above local historical baseline levels, and
- A procedure to modify and/or suspend operations if seismicity levels increase above threshold values for maintaining local structural health integrity and minimizing secondary damage.

Younan also emphasized that any specific methods and/or approaches selected for monitoring and mitigation should be fit for purpose and based on local conditions and the risk level, working collaboratively.

5.4 DOE Risk Models Relevant to Induced Seismicity

Grant Bromhal of DOE's National Energy Technology Laboratory reported on some of the DOE research efforts currently underway that deal with induced seismicity. DOE's National Risk Assessment Partnership (NRAP), with a team that includes 5 national labs (Lawrence Berkeley National Lab, Lawrence Livermore National Lab, Los Alamos National Lab, National Energy Technology Laboratory, and Pacific Northwest National Lab), is focused around quantifying risks associated with carbon storage in underground formations. One such area is the potential for induced seismic events resulting from large-scale CCS projects. Additionally, DOE and other federal agencies have research programs targeting induced seismicity around other energy-related areas such as geothermal resources, unconventional oil and gas recovery, and wastewater disposal.

NRAP has developed an Integrated Assessment Model with three components:

- RSQSim1—simulates tectonic earthquakes and slow slip events on faults, adapted to use time-dependent pore pressure changes,
- EMPSYN—calculates ground accelerations and velocities, and
- SIMRISK—calculates a frequency-magnitude distribution.

Bromhal reported that Generation 1 of the IAM for Probabilistic Seismic Hazards Assessment of single faults was released in July 2012. DOE expects that Generation 2 will be available in the spring of 2013. It will incorporate multiple faults and time periods, a calculation of the nuisance risk, and the ability to included parameter sensitivity. DOE plans a Generation 3 version of the IAM. It will incorporate higher frequencies in ground motion, full risk, and ties to fault leakage risk.

Regarding cooperation between federal agencies, Bromhal noted that DOE, USGS, and EPA have had a recent discussion on unconventional resource research. They included induced seismicity as an area for future collaboration. DOE and USGS have ongoing efforts in natural and induced seismic hazards analysis. The agencies proposed holding annual collaborative meetings between agencies and with other players to assess gaps/needs.

Chapter 6 – Regulatory Considerations

The final portion of the special session included remarks from EPA and several states describing the efforts that had been made to establish regulations relating to induced seismicity.

6.1 EPA

Keara Moore of EPA's Office of Ground Water and Drinking Water spoke in the special session but did not use any presentation slides. She stated that the subject of induced seismicity does concern EPA, particularly if the seismicity creates conditions that would harm any underground source of drinking water (USDW). At this time, EPA has no national rulemaking directly focused on induced seismicity under development. However, EPA's UIC National Technical Workgroup, with representatives from the regional EPA UIC program offices, is developing a report on the subject. The report would not carry the weight of regulations but could help to explain EPA's perspective on the subject. Moore reported that a draft of the workgroup's report is now being reviewed.

6.2 Ohio

Tom Tomastik of the ODNR made two presentations in the special session. His presentation on the Northstar #1 well and the seismic events associated with it was covered in Chapter 4. In this section, Tomastik's other presentation that reviewed Ohio's response to the Northstar #1 incident and the state's subsequent rulemaking is discussed.

The Northstar #1 well was closed in December 2011. The ODNR immediately made changes to its Class II saltwater injection well program. Three other Class II wells nearby were shut down. The ODNR put a hold on the issuance of any new permits.

The ODNR initiated drafting of new regulations to help prevent larger magnitude induced seismicity associated with Class II injection in late spring of 2012. By July of that year, the Governor issued Executive Order 2012-09K as an emergency amendment of UIC Rules 1501:9-3-06 and 1501:9-3-07 of the Ohio Administrative Code. This Executive Order allowed for the implementation of new draft UIC rules into the legislative process.

The new UIC Class II saltwater injection well rules proceeded through the legislative process, were passed and went into effect in October 2012. The ODNR started to issue new Class II saltwater injection well permits again in November 2012. The new permits incorporated the

requirements from the new regulations. The chief of the division issuing the permits could include various new monitoring on a case-by-case basis:

- Pressure fall-off testing,
- Geological investigation of potential faulting within the immediate vicinity of the proposed injection,
- Submittal of a seismic monitoring plan,
- Testing and recording of original bottomhole injection interval pressure,
- Minimum geophysical logging suite, such as gamma ray, compensated density-neutron, and resistivity logs,
- Radioactive tracer or spinner survey, and
- Any such other tests the chief deems necessary.

In addition the new permits would not allow drilling and completion of the wells into the Precambrian basement rock. No injection would be allowed until the results of the monitoring are evaluated. Upon review of the data, the chief can withhold injection authority, require plugging of the well, or allow injection to commence. The chief has the authority to implement a graduated maximum allowable injection pressure. All new Class II injection wells must continuously monitor the injection and annulus pressures to maintain mechanical integrity. They must include a shut-off device installed on the injection pump set to the maximum allowable injection pressure.

To supplement the new permitting requirements, the ODNR established a new state seismic monitoring program. This was described previously in section 3.7.

6.3 Colorado

Stuart Ellsworth of the COGCC described the ways in which Colorado evaluates injection projects in relation to their potential for induced seismicity. The COGCC's permit process considers:

- Injection volume,
- Pressure below the fracture gradient, and,
- Input from the Colorado Division of Water Resources and Colorado Geological Survey to reduce the potential for induced seismicity related to UIC Class II wells.

The COGCC permit writer calculates a maximum injection volume, based on thickness and porosity from geophysical logging data. By COGCC policy, the injection volume is restricted to a one-quarter mile radial volume and the height of the injection formation.

COGCC's policy is to keep injection pressures below the fracture gradient, which is defined uniquely for each injection well, minimizing the potential for seismic events related to fluid injection. Some injection wells do not need to inject under pressure because the formation will take water on a vacuum. Maximum surface injection pressure is calculated based on a default fracture pressure gradient of 0.6 psi per foot of depth or other data provided by the applicant.

Beginning in September 2011, the COGCC UIC permit review process was expanded to include a review for seismicity potential by the Colorado Geological Survey. If historical seismicity has been identified in the vicinity of a proposed Class II UIC well, COGCC requires an operator to define the seismicity potential and the proximity to faults through geologic and geophysical data prior to any permit approval.

6.3 Arkansas

Scott Ausbrooks of the Arkansas Geological Survey described the earthquake swarm around the Guy-Greenbrier fault beginning in 2010. He did not discuss the regulatory changes introduced by the Arkansas Oil and Gas Commission (AOGC) following those seismic events. But the NAS report did include some information on those regulations.

In January 2011, the AOGC placed a permanent moratorium on permitting any new or additional Class II disposal in a 1,150-square-mile area surrounding the Guy-Greenbrier and Enola seismically active areas. Operators with existing Class II wells were required to report daily injection pressures and volumes to the AOGC Director. In the surrounding Fayetteville Shale development area, the AOGC Director may propose additional requirements for any new disposal wells.

6.4 West Virginia

During his presentation, Tom Bass mentioned that the West Virginia Department of Environmental Protection had no plans to develop regulations specifically focused on induced seismicity. He did note that injection permits would be issued on a case-by-case basis.

Chapter 7 - Review of Major Issues and Findings

This chapter lists a few of the major issues and findings discussed during the special session.

1. Natural seismic events (earthquakes) occur regularly in many locations, but most of them are very small in magnitude and are not felt by humans at the surface, nor do they cause damage to surface structures. The Richter scale measures the size of the wave on a seismograph, whereas the Modified Mercalli Index measures the extent of impact occurring at the surface to people and structures.

2. Many of the seismic events are naturally occurring, but some can be caused by human activities. These are referred to as "induced seismicity".

3. The special session and this white paper focus on induced seismicity resulting from energy activities, including geothermal production, oil and gas extraction, enhanced recovery, and hydraulic fracturing, disposal wells used to inject produced water or other wastewaters, and carbon capture and storage projects. The information presented over several hours and summarized here served to enlighten a wider audience and provide some factual information concerning the risks associated with activities that can cause induced seismicity. The NAS report provides a greater body of historical information on this subject and is referenced frequently throughout the white paper.

4. In general, the hazards posed by geothermal operations are not significant because project operators both inject and withdraw water from the formations, thereby keeping the formation pore pressures from climbing dramatically, although constant minor tremors are often associated with such activities. In one noteworthy enhanced geothermal project located at Basel, Switzerland, a large water injection effort to open pathways in the hot rock caused felt earthquakes of sufficient concern to residents in that city that the project was subsequently cancelled.

5. Induced seismicity may occur occasionally in association with oil and gas extraction, but the number of documented cases is extremely small.

6. Induced seismicity rarely occurs during enhanced recovery operations. During such operations, fluids are injected into a formation while oil and gas are withdrawn from the same formation, thereby keeping formation pore pressures from rising dramatically.

7. Hydraulic fracturing involves injection of fluids at high rate for a short period of time. In nearly all cases, the potential for felt seismicity is very low, although a few cases have been observed where unique conditions were present. However, these have not led to any significant surface damage. The NAS report concluded that hydraulic fracturing does not pose a high risk for induced seismicity.

8. Tens of thousands of disposal wells are employed each day to inject produced water and other wastewaters into formations that are not hydrocarbon bearing. Most of these pose low risk of induced seismicity, but given the ongoing injection and cumulative formation pressure build up over time, there is some potential that disposal wells can contribute to induced seismicity. Most wells are completed in areas and geological formations that are not likely to lead to induced seismicity, but several well-documented examples are described in this white paper where seismic activity was linked to disposal wells (e.g., Ohio, Arkansas, Oklahoma, and Texas). These are typically due to some geological anomalies or faults in those locations.

9. The relatively new concept of large-scale injection of CO_2 into underground formations as part of carbon capture and storage projects could lead to induced seismicity. The ongoing, long-term injection of CO_2 could lead to increased formation pore pressure.

10. The oil and gas industry is aware of the potential for its activities to induce seismic events in certain circumstances. Two different frameworks for assessing the risk for individual injection projects were described during the special session.

11. Most state regulatory agencies do not have regulations that focus specifically on induced seismicity. The white paper describes some regulatory initiatives put into play in Colorado, Ohio, and Arkansas. EPA does not have regulations specifically focused on induced seismicity, but its UIC National Technical Workgroup is currently developing a position paper on the subject.

Appendix A – Agenda for Special Session

Assessing & Managing Risk of Induced Seismicity by Underground Injection: A Special session for seismologists, regulators, and other stakeholders

January 23, 2013

Moderator: Lori Wrotenbery, Oklahoma Corporation Commission
Part 1 - Studies: Researchers presenting findings and research strategies

- Abstract 22: Potential for Induced Seismicity within Oklahoma - **Austin Holland**, OK Geological Survey
- Abstract 23: Preliminary Report on the Northstar #1 Class II Injection Well and the Seismic Events in the Youngstown, Ohio Area – **Tom Tomastik**, Ohio DNR
- Abstract 7: Induced Seismicity Potential and Energy Technologies - **Robin McGuire**, Lettis Consultants International, Inc.
- Abstract 19: Disposal of Hydraulic Fracturing Flowback Fluid by Injection into Subsurface Aquifers Triggers Guy-Greenbrier Earthquake Swarm in Central Arkansas - **Scott Ausbrooks**, Arkansas Geological Survey
- Abstract 29: Research in the Area of Induced Seismicity – **Grant Bromhal**, USDOE-NETL

Moderator: Edward Steele, Swift Worldwide Resources
Part 2 - Industry: State of the art technology used to limit risk

- Abstract 35: Induced Seismicity and the Oil and Gas Industry Oil and Gas Industry – **Jeff Bull**, oil and gas industry subject matter expert on induced seismicity
- Lessons Learned at Paradox Valley - **Hal Macartney**, Pioneer Resources
- Abstract 27: Technical Elements to Consider in a Risk Management Framework for Induced Seismicity - **Adel Younan**, ExxonMobil Upstream Research Company

Moderator: Lori Wrotenbery, Oklahoma Corporation Commission
Part 3 - Regulatory

- Abstract 36: EPA Overview - **Keara Moore**, EPA Office of Ground Water & Drinking Water
- Abstract 24: Ohio's New Class II Regulations and Its Proactive Approach to Seismic Monitoring and Induced Seismicity – **Tom Tomastik**, Ohio DNR
- Abstract 28: **Tom Bass**, West Virginia DEP, Office of Oil & Gas
- Abstract 30: **Stuart Ellsworth**, Colorado Oil & Gas Conservation Commission

Induced Seismicity Session Wrap up discussion

This is Thanksgiving week, which may seem an inconvenient time for this Hearing on these important Rules, however for me it lends a broader perspective. To me Thanksgiving is rooted in Gratitude. Therein, Thanksgiving is humility before my blessings, so today I acknowledge my part in taking daily comfort from this socio-economic material culture which is reducing life as we, me included, squeeze the last drops of carbon from earth.

I believe that we as a culture are in a web of denial for the need to change, but in order to survive globally, we must change. As a Christian I believe God is with us. He lights the way, exposing paths mined with dangers, but He also shows us all we need to change: the knowledge of solar, wind and geothermal energies and sources which we can use to create a new Earth. When I was at the Bioneer Conference earlier this month in Chicago at Roosevelt University, I met many young people striving for a future: new soils, new communities, less materialism...all key focuses were on new and possible, and also on stepping back from the economic/corporate structures which promise a Climatic End. Today, at least from what I see in these Rules on Hydrofracturing, the people of Illinois are accelerating into destruction.

This System of green light red light, for dealing with the earthquakes is emblematic of this blind acceleration. The Rules say to green light through the constant low level quakes which the IDNR therein acknowledge, I presume, are in the Wabash and Madrid zones. Last August a group of us with Dr. Lora Chamberlain suggested to the IDNR that no oil and gas industrialization of this zone occur, as it does not in Germany and moreover, 17 countries. Should drilling and injection be allowed, how could the damage to the well bores be prevented in earthquakes and subsequent leakage? Inevitable, is a thought I had.

So we green light fracking and in the yellow light, which is far beyond, in Illlinois, the industry's own White Pages Summary of Induced Seismicity recommendation of restriction for earthquakes; we rule that fracking continue into the new national poster child for risk. Our Rules allow up to seismicity 5 before we say slow down, and then stop the industry for 3 to 6 miles around the epicenter of the quake. And then we monitor the flow of injection so we can control the earthquakes.

Hubris comes to mind.

The penalties are minimal. The rules have reduced them to $50.00 for a first infraction, and they dont get much higher. I think a human life could cost $2,000 if that is how one can interpret the vague language of that rule.

I do believe God is with us and we have had enough warning to listen. In 2Peter Ch 3, Peter warns the end will come in fire. But that does not mean, we can't choose a New Earth, a New Way that is beyond Fossil Fuels. Let us Re-resource this land and use the Wind and Sun and Heat of the Earth. Let us draw upon the youth whose lives depend on what we decide here today.

#

The Definition of High Volume at 80,000 gal per stage:
This does not define stage as to length or time of flow.
Will The High Volume flow be what is the actual type of Fracking, or will it be Medium Flow. If it is Medium Flow, will new Rules be written.

Comments of the Illinois Attorney General's Office

Public Hearing on Proposed Regulations to Implement the Hydraulic Fracturing Regulatory Act

University of Illinois-Chicago (UIC)
November 26, 2013

Good evening. My name is James Gignac and I serve as Environmental and Energy Counsel to Illinois Attorney General Lisa Madigan.

Attorney General Madigan has long-standing and significant concerns about large-scale hydraulic fracturing in Illinois and its potential impacts on the people of our state. She worked alongside the Illinois Environmental Council, the Natural Resources Defense Council, the Environmental Law and Policy Center, Sierra Club, and other environmental advocates to pass the strongest bill possible. Attorney General Madigan fought to ensure that Illinois developed a rigorous set of requirements to govern high-volume fracking. These requirements were urgently needed because, prior to the Hydraulic Fracturing Act being passed, there were no regulations specific to the practice in Illinois.

Now, the Department of Natural Resources is developing regulations to implement the Act, a necessary and important step, and the subject of this evening's hearing.

The Attorney General believes that the Department has put forth many helpful clarifications and useful details in the proposed rulemaking. However, there are numerous areas in need of revisions to ensure that the proposed regulations properly reflect the language and intent of the Act.

Our office will discuss our concerns in detail in the form of written comments that will be submitted by January 3rd. For purposes of tonight's hearing, I would like to highlight just a portion of those concerns.

First, the Act contains an important tool for citizens, municipalities, and enforcement agencies to use in the event that water contamination occurs. Referred to as a rebuttable presumption, Section 1-85 of the Act places the burden on the fracking operator to establish that water pollution to nearby wells was not caused by its drilling activities. The proposed regulations, however, attempt to add limitations on the rebuttable presumption of water pollution that do not appear in the Act, such as the types of water quality data and testing parameters that may be used. The Department should not restrict the ability of citizens to obtain relief if their waters wells are contaminated.

Second, a key part of the Act prohibits the use of open pits to store fracking wastewater. In the event of unanticipated or unexpected flowback conditions, the Act does allow the use of properly constructed, lined reserve pits to capture flowback—but only on a temporary basis. Section 1-75(c) of the Act requires that any flowback captured in the pits must be removed from the site

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within 7 days. The proposed regulations are inconsistent with the Act in that they would allow the 7-day time-period for removal to begin when the hydraulic fracturing operations are completed instead of 7 days from when flowback is captured in the pits. This must be corrected.

Third, the Act contains an important provision allowing disclosure of trade secret protected chemical information to health professionals for purposes of medical treatment. The proposed regulations must be changed so that, in the event of an emergency, medical personnel have one central point of contact, available 24 hours a day, seven days a week from which to obtain information for a patient exposed to a trade-secret protected chemical.

Fourth, we urge the Department to hold public hearings on permits in the county where the proposed well site would be located and to ensure that citizens who may be adversely affected have a full and fair opportunity to participate in the hearings. In addition, the proposed rules unnecessarily and unfairly place a burden of proof upon citizens to establish the validity of their concerns in the hearing process. That should be removed. The Act clearly states that it is ultimately up to the permit applicant to demonstrate to the Department's satisfaction that its proposed operations will comply with the law and will protect public health and safety.

We look forward to providing additional input on these and other topics where more work is needed—including, but not limited to, the currently low levels of administrative fines, the lack of a conversion factor for nitrogen foam, and the lack of retroactivity in the requirements—in our forthcoming written comments.

Thank you.

CAPOW! (Citizens Act to Protect Our Water)
presents a full-day conference

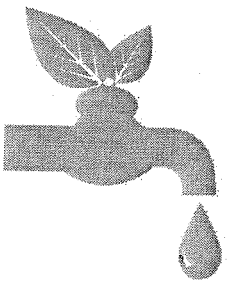
Water is Life!
Facing Our Water Crisis II

We are celebrating our Great Lakes. Now we must protect them!

PROGRAM (in formation)
Opportunity to Network — Identifying Next Steps

EXPERT PRESENTERS
Alliance for the Great Lakes
Center for Neighborhood Technology
Dr. Lora Chamberlain, Frack Free Illinois
Dr. Paul Connett, Fluoride Action Network
Food & Water Watch
David Kraft, Nuclear Energy Information Service (NEIS)
Debra Michaud, Tar Sands Free Midwest
Dr. Bill Rau, Illinois Peoples Action, on Fracking
Tom Shepherd, Southeast Environmental Task Force
Wisconsin Grassroots Network

CO-SPONSORS
(in formation)
Chicagoland Against Fracking
IVI-IPO
Southeast Environmental Task Force
Tar Sands Free Midwest
Center for Neighborhood Technology
Nuclear Energy Information Service (NEIS)



We are looking forward to a meeting, discussion and action with you!

For more information: www.protectourpublicwater.net or walterb306@cs.com

DATE
8:45 am – 4:00 pm
Saturday, December 7, 2013

LOCATION
Mertz Hall
1125 W. Loyola Ave.,
Loyola University Lake Shore Campus
(near intersection of Devon Avenue and Sheridan Road)

REGISTRATION
$10 adults, $5 students

To register for conference in advance, make check out to CMW with CAPOW! in memo line and mail check to: Chicago Media Watch, 1030 Asbury, Evanston, IL 60202

LUNCH
Advance reservations required. To reserve lunch at the cafeteria facing Mertz Hall, please RSVP by December 3rd to walterb306@cs.com

PARKING
$7 parking in campus garages: southwest corner of campus and near the Red Line stop off Sheridan Road

MAP
Map at http://www.becksbooks.com/textbook/loyola-university-chicago-lake-shore-campus-store-map

022055

Name William Jones Jr.

Address
2043 W. Fargo Chicago, IL 60645

Email Williamrjonesjr1@gmail.com

To the Illinois Department of Natural Resources,

As a citizen of the state of Illinois, I find the IDNR's proposed fracking regulations egregiously insufficient to protect Illinois' water and people.

According to IDNR's definitions, a "Well site" means surface areas, including the surface location of the well, occupied by all equipment or facilities necessary for, or incidental to, high volume horizontal hydraulic fracturing operations, construction, drilling, production, or plugging a well. While this definition might be appropriate for a well that drills straight down, as wells once did, it is not appropriate for horizontal hydraulic fracturing wells. Horizontal hydraulic fracturing operations involve an initial drilling site that then grows to include horizontal legs radiating out from the site. Leaks or ruptures, the well's proximity to water sources, and/or to real property are not adequately imagined by the well site definition that underpins so much of the IDNR's approach to these regulations.

The well site definition should be expanded to include the surface area above any and all horizontal or vertical legs of the well. The current narrow definition does not adequately protect the health, safety and well-being of Illinois citizens, nor will it adequately sequester water used for human or animal consumption from accidents that can occur anywhere the drilling occurs.

A useful way of thinking of a hydraulic fracturing well site would be to compare it to an iceberg, where the small amount of ice visible at the water's surface gives no hint of the size of the area occupied by the iceberg below the water line. The potential surface area that can be detrimentally affected by a hydraulic fracturing operation includes all land within 500, 750, or 1500 feet of a hydraulic fracturing leg (to use the IDNR's own measurements), regardless of the leg's horizontal or vertical relationship to the earth.

This definition is critical because setback requirements are based on IDNR's inadequate definition of a well-site when they should, at a minimum, be based on the distance from any part of the well, including all underground horizontal legs of the well. To adopt the current definition of well site is to apply an old understanding about what constitutes a well to an approach to drilling that has grown much more complex. The IDNR needs to reflect its understanding of the inherent and possible dangers of hydraulic fracturing by recognizing that the well site for such an operation has much greater breadth than the current definition envisions.

As a citizen of Illinois, I do not feel that the regulations that the IDNR has proposed are sufficient to protect me and my family or our state's natural resources. I demand that IDNR change its definition of a well site, and then create a comprehensive plan to protect groundwater and natural resources that will be impacted by fracking, regardless of their proximity to the drilling equipment.

In addition, on page three of the regulations that IDNR released, the regulations state:

"Published studies or reports, and sources of underlying data, used to compose this rulemaking: None"

The inability of the IDNR to produce scientific data to support its proposition indicates that IDNR is not basing its regulations off of scientific data. This is completely unacceptable. As a citizen of Illinois, I demand that the IDNR conduct an environmental impact study that uses all available studies and science to evaluate the impacts of fracking before it releases regulations.

Thank you.

Sincerely, William Jones Jr.

- 022056

Name William Jones

Address
7359 S Kenwood ave
Chicago IL 60619

Email wgrinchJ@sbcglobal.net

To the Illinois Department of Natural Resources,

As a citizen of the state of Illinois, I find the IDNR's proposed fracking regulations egregiously insufficient to protect Illinois' water and people.

My first comment refers to the "Chemical Disclosure Report" requirement outlined in Section 245.210(a)(8) of the Proposed Hydraulic Fracturing Regulatory Act administrative rules.

First and foremost, Section 245.210 states that every applicant for a permit under this Part "must submit" certain information, including a Chemical Disclosure Report identifying each chemical and proppant *anticipated* to be used in hydraulic fracturing fluid for each state of the high volume horizontal hydraulic fracturing operations.

However, Section 245.210(a)(8) allows an applicant to postpone submission of a Chemical Disclosure Report if it "documents to the Department's satisfaction why the information is not available at the time the application is submitted [...]" The criteria for documenting "to the Department's satisfaction" is subjective, vague, and ambiguous. The Department should revise the proposed rule to provide objective standards for the exercise of discretion by the Department under Section 245.210(a)(8).

Residents of towns throughout Pennsylvania (located on the Marcellus Shale on the Appalachian basin) and Texas (located on the Barnett Shale formation) had their groundwater drinking supply contaminated by fracking chemicals. These residents have been able to turn on their tap, put a match to it, and light their water on fire. Many residents have also had health impacts resulting from the contaminated water (and air), such as nose bleeds, and damage to the lungs, liver, kidneys, blood, and brain as well as immune and reproductive diseases.

It is unacceptable and inexcusable for the IDNR to have such vague and weak laws pertaining to the disclosure of chemical use in hydraulic fracturing. As a citizen of Illinois, I do not feel that these regulations protect me, my health, or my state's natural resources.

In addition, I believe that permittees should be required to obtain Department approval before adjusting or altering contents of fluid. This comment is in reference to Section 245.700 "Chemical Disclosures by Permittee" of the Proposed Hydraulic Fracturing Regulatory Act administrative rules. The regulations, as stated in this section, are completely insufficient to protect my health and our natural resources because they provide the industry extensive leeway in modifying fracking fluid before informing the IDNR. In addition, I believe that the IDNR should be setting standards for the chemical composition of fracking fluid that permittees should follow. These standards should be based on scientific research of what is proven safe. If such research does not yet exist, the state needs to fund this research before allowed fracking to take place in Illinois.

Given these complaints, I demand that the IDNR require permittees to fully disclose all contents of fracking fluid and their proportions far in advance of drilling. I also demand that this information be made completely public and easily accessible on the internet. No untested combinations of chemicals in fracking fluid should be permitted. This knowledge is my right as an Illinois citizen.

Thank you.

Sincerely,
William Jones

022057

Name Daniel P. Becker

Address 1800 Maplewood Lane
Glenview IL 60025

Email daniel.p.becker@comcast.net

To the Illinois Department of Natural Resources,

As a citizen of the state of Illinois, I find the IDNR's proposed fracking regulations egregiously insufficient to protect Illinois' water and people.

According to IDNR's definitions, a "Well site" means surface areas, including the surface location of the well, occupied by all equipment or facilities necessary for, or incidental to, high volume horizontal hydraulic fracturing operations, construction, drilling, production, or plugging a well. While this definition might be appropriate for a well that drills straight down, as wells once did, it is not appropriate for horizontal hydraulic fracturing wells. Horizontal hydraulic fracturing operations involve an initial drilling site that then grows to include horizontal legs radiating out from the site. Leaks or ruptures, the well's proximity to water sources, and/or to real property are not adequately imagined by the well site definition that underpins so much of the IDNR's approach to these regulations.

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A useful way of thinking of a hydraulic fracturing well site would be to compare it to an iceberg, where the small amount of ice visible at the water's surface gives no hint of the size of the area occupied by the iceberg below the water line. The potential surface area that can be detrimentally affected by a hydraulic fracturing operation includes all land within 500, 750, or 1500 feet of a hydraulic fracturing leg (to use the IDNR's own measurements), regardless of the leg's horizontal or vertical relationship to the earth.

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Thank you.

Sincerely,

Daniel P. Becker

022053

Name Alanah Fitch

Address
1524 Wilmette Ave
Wilmette IL 60091

Email afitch@luc.edu

To the Illinois Department of Natural Resources,

As a citizen of the state of Illinois, I find the IDNR's proposed fracking regulations egregiously insufficient to protect Illinois' water and people.

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Thank you.

Sincerely, Alanah Fitch 11/21/2013

022059

Name Romila Mascarenhas

Address
26 E Pearson
Chicago IL 60611

Email romilamascarenhas@gmail.com.

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Thank you.

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R Mascarenhas

022069

Name Katrina Bimaku

Address 6157 N Sheridan Road
Chicago, IL 606660

Email Kbimaku@luc.edu

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Katrina Bimaku

022061

Name Brithi Qualizza

Address 1311 W. Thorndale Ave.
Chicago IL 60660

Email brithiqualizza@gmail.com

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Sincerely, Brithi Qualizza

- 022062

Name Phillip Petersen

Address 5420 N. Kenmore Ave. # 303
Chicago IL. 60640

Email phil@opensourcetemple.com

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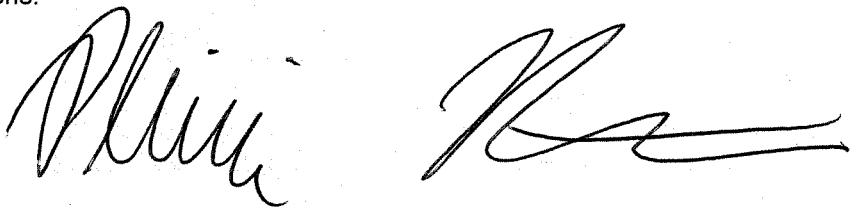

022063

Name Clare LaPlante

Address 1806 Greenwood St.
Evanston IL
60201

Email crlaplante@gmail.com

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Thank you.

Sincerely,

Clare LaPlante

022064

Name MARY TAYLOR STICHA

Address

550 Sheridan Square U.5E

~~Sheridan S~~ Evanston ILLINOIS 60202

Email Mary Sticha@Yahoo.com

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Sincerely, Mary Taylor Sticha

022065

Name MONA BUECHLER

Address
1420 W HOWARD ST
CHICAGO, IL 60626

Email HIITSMEPPI@YAHOO.COM

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022066

Name Andrew Delehy

Address 9807 S Seeley Chicago, IL 60643

Email delehy1@gmail.com

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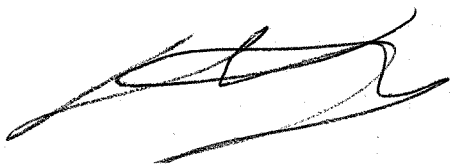

022067

Name Matt Buckley

Address
4752 N. Monticello Ave Apt. 2-A
Chicago IL 60625

Email matthbuckley4@gmail.com

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In addition, on page three of the regulations that IDNR released, the regulations state:

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The inability of the IDNR to produce scientific data to support its proposition indicates that IDNR is not basing its regulations off of scientific data. This is completely unacceptable. As a citizen of Illinois, I demand that the IDNR conduct an environmental impact study that uses all available studies and science to evaluate the impacts of fracking before it releases regulations.

Thank you.

Sincerely,

Name Aaron Shillcaitis

Address
13884 McCarthy rd.
Lemont, IL 60439

Email aapox3@yahoo.com

To the Illinois Department of Natural Resources,

As a citizen of the state of Illinois, I find the IDNR's proposed fracking regulations egregiously insufficient to protect Illinois' water and people.

According to IDNR's definitions, a "Well site" means surface areas, including the surface location of the well, occupied by all equipment or facilities necessary for, or incidental to, high volume horizontal hydraulic fracturing operations, construction, drilling, production, or plugging a well. While this definition might be appropriate for a well that drills straight down, as wells once did, it is not appropriate for horizontal hydraulic fracturing wells. Horizontal hydraulic fracturing operations involve an initial drilling site that then grows to include horizontal legs radiating out from the site. Leaks or ruptures, the well's proximity to water sources, and/or to real property are not adequately imagined by the well site definition that underpins so much of the IDNR's approach to these regulations.

The well site definition should be expanded to include the surface area above any and all horizontal or vertical legs of the well. The current narrow definition does not adequately protect the health, safety and well-being of Illinois citizens, nor will it adequately sequester water used for human or animal consumption from accidents that can occur anywhere the drilling occurs.

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Thank you.

Sincerely,

022069

Name Joshua Smith

Address 4826 S. Loomis
Chicago, IL 60609

Email ehardt916@gmail.com

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Thank you.

Sincerely,

022070

Name Jessica Bryant

Address
1226 W. Albion Ave #3
Chicago, IL 60626

Email jessicaf.bryant@yahoo.com

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Thank you.

Sincerely,

Jessica Bryant

022071

Name MIKE NORRIS

Address 2336 N. SPAULDING, CHICAGO, IL 60647

Email MNORRIS@GREENPEACE.ORG

To the Illinois Department of Natural Resources,

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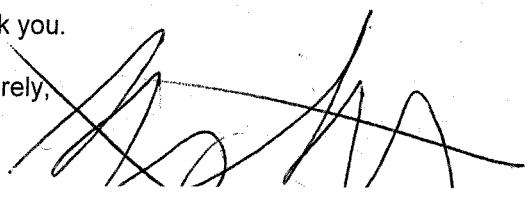

022072

Name Kathleen Anne Williamson

Address
9807 S. Seeley Ave
Chicago, IL 60643

Email travelpack84@gmail.com

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Thank you.

Sincerely,

Kathleen Anne Williamson

022073

Name Justine Ussia

Address
2338 N. Spaulding Ave. Apt. G
60647 Chicago, IL

Email justine.ussia@loop.colum.edu

To the Illinois Department of Natural Resources,

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Thank you.

Sincerely,

022074

Name Jeremy Sorkin

Address
2920 W Sherwin Ave
Chicago IL 60645

Email sorkin.j@gmail.com

To the Illinois Department of Natural Resources,

As a citizen of the state of Illinois, I find the IDNR's proposed fracking regulations egregiously insufficient to protect Illinois' water and people.

My first comment refers to the "Chemical Disclosure Report" requirement outlined in Section 245.210(a)(8) of the Proposed Hydraulic Fracturing Regulatory Act administrative rules.

First and foremost, Section 245.210 states that every applicant for a permit under this Part "must submit" certain information, including a Chemical Disclosure Report identifying each chemical and proppant *anticipated* to be used in hydraulic fracturing fluid for each state of the high volume horizontal hydraulic fracturing operations.

However, Section 245.210(a)(8) allows an applicant to postpone submission of a Chemical Disclosure Report if it "documents to the Department's satisfaction why the information is not available at the time the application is submitted [...]" The criteria for documenting "to the Department's satisfaction" is subjective, vague, and ambiguous. The Department should revise the proposed rule to provide objective standards for the exercise of discretion by the Department under Section 245.210(a)(8).

Residents of towns throughout Pennsylvania (located on the Marcellus Shale on the Appalachian basin) and Texas (located on the Barnett Shale formation) had their groundwater drinking supply contaminated by fracking chemicals. These residents have been able to turn on their tap, put a match to it, and light their water on fire. Many residents have also had health impacts resulting from the contaminated water (and air), such as nose bleeds, and damage to the lungs, liver, kidneys, blood, and brain as well as immune and reproductive diseases.

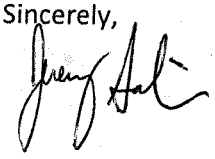
It is unacceptable and inexcusable for the IDNR to have such vague and weak laws pertaining to the disclosure of chemical use in hydraulic fracturing. As a citizen of Illinois, I do not feel that these regulations protect me, my health, or my state's natural resources.

In addition, I believe that permittees should be required to obtain Department approval before adjusting or altering contents of fluid. This comment is in reference to Section 245.700 "Chemical Disclosures by Permittee" of the Proposed Hydraulic Fracturing Regulatory Act administrative rules. The regulations, as stated in this section, are completely insufficient to protect my health and our natural resources because they provide the industry extensive leeway in modifying fracking fluid before informing the IDNR. In addition, I believe that the IDNR should be setting standards for the chemical composition of fracking fluid that permittees should follow. These standards should be based on scientific research of what is proven safe. If such research does not yet exist, the state needs to fund this research before allowed fracking to take place in Illinois.

Given these complaints, I demand that the IDNR require permittees to fully disclose all contents of fracking fluid and their proportions far in advance of drilling. I also demand that this information be made completely public and easily accessible on the internet. No untested combinations of chemicals in fracking fluid should be permitted. This knowledge is my right as an Illinois citizen.

Thank you.

Sincerely,



022075

Name Rafael Bratman

Address 1522 W. Farwell #3N
Chicago IL. 60626
~~Chicago~~

Email Rbratman@gmail.com

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Thank you.

Sincerely, Rafael Bratman

022076

Name CORDERO CLARK

Address
7539 S. WABASH
60619. Chicago IL

Email CORDCLARK@gmail.com

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Thank you.

Sincerely,

Cordero Clark

022077

Name Elizabeth Jones

Address
7359 S Kenwood Ave
Chgo, IL 60619

Email edolphins5@sbcglobal.net

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Thank you.

Sincerely,

Elizabeth G. Jones

022078

Name Joe Morganti

Address
609 Huntington Ln
Schaumburg, IL 60193

Email JMorganti29@yahoo.com

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It is unacceptable and inexcusable for the IDNR to have such vague and weak laws pertaining to the disclosure of chemical use in hydraulic fracturing. As a citizen of Illinois, I do not feel that these regulations protect me, my health, or my state's natural resources.

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Given these complaints, I demand that the IDNR require permittees to fully disclose all contents of fracking fluid and their proportions far in advance of drilling. I also demand that this information be made completely public and easily accessible on the internet. No untested combinations of chemicals in fracking fluid should be permitted. This knowledge is my right as an Illinois citizen.

Thank you.

Sincerely, Joseph C. Morganti

022079

Name Ivy Czekanski

Address
601 W. Deming Place #502
Chicago IL 60614

Email ivyloraxa@hotmail.com

To the Illinois Department of Natural Resources,

As a citizen of the state of Illinois, I find the IDNR's proposed fracking regulations egregiously insufficient to protect Illinois' water and people.

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Thank you.

Sincerely,

Ivy Czekanski

Ivy Czekanski

022080

Name Kaelen White

Address
5920 N. Paulina Chicago, IL 60660

Email Kaelenwhite33@yahoo.com

To the Illinois Department of Natural Resources,

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Thank you.

Sincerely,

Kaelen White

022081

Name Ella Gentz

Address 1421 W. Sherwin Ave Apt 3B
Chicago, IL 60626

Email elbagentz@gmail.com

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Thank you.

Sincerely, Ella Gentz

022082

Name Lyndi Ouellette

Address

Email

To the Illinois Department of Natural Resources,

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Thank you.

Sincerely,

Lyndi Ouellette

022083

Name Mark Macoun

Address 6166 N Sheridan Rd Apt 4B
Chicago IL 60660

Email mmacoun@yahoo.com

To the Illinois Department of Natural Resources,

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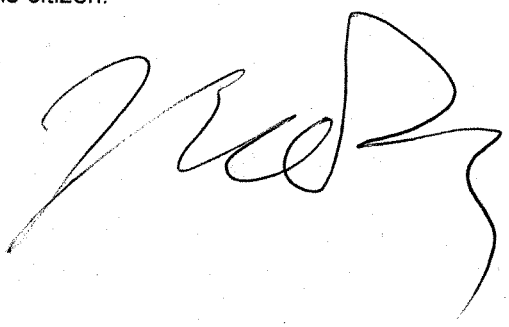

022084

Name Michael Dearborn

Address

Email

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Thank you.

Sincerely,

Michael Dearborn

022085

Name Chris Camarata

Address

Email

To the Illinois Department of Natural Resources,

As a citizen of the state of Illinois, I find the IDNR's proposed fracking regulations egregiously insufficient to protect Illinois' water and people.

According to IDNR's definitions, a "Well site" means surface areas, including the surface location of the well, occupied by all equipment or facilities necessary for, or incidental to, high volume horizontal hydraulic fracturing operations, construction, drilling, production, or plugging a well. While this definition might be appropriate for a well that drills straight down, as wells once did, it is not appropriate for horizontal hydraulic fracturing wells. Horizontal hydraulic fracturing operations involve an initial drilling site that then grows to include horizontal legs radiating out from the site. Leaks or ruptures, the well's proximity to water sources, and/or to real property are not adequately imagined by the well site definition that underpins so much of the IDNR's approach to these regulations.

The well site definition should be expanded to include the surface area above any and all horizontal or vertical legs of the well. The current narrow definition does not adequately protect the health, safety and well-being of Illinois citizens, nor will it adequately sequester water used for human or animal consumption from accidents that can occur anywhere the drilling occurs.

A useful way of thinking of a hydraulic fracturing well site would be to compare it to an iceberg, where the small amount of ice visible at the water's surface gives no hint of the size of the area occupied by the iceberg below the water line. The potential surface area that can be detrimentally affected by a hydraulic fracturing operation includes all land within 500, 750, or 1500 feet of a hydraulic fracturing leg (to use the IDNR's own measurements), regardless of the leg's horizontal or vertical relationship to the earth.

This definition is critical because setback requirements are based on IDNR's inadequate definition of a well-site when they should, at a minimum, be based on the distance from any part of the well, including all underground horizontal legs of the well. To adopt the current definition of well site is to apply an old understanding about what constitutes a well to an approach to drilling that has grown much more complex. The IDNR needs to reflect its understanding of the inherent and possible dangers of hydraulic fracturing by recognizing that the well site for such an operation has much greater breadth than the current definition envisions.

As a citizen of Illinois, I do not feel that the regulations that the IDNR has proposed are sufficient to protect me and my family or our state's natural resources. I demand that IDNR change its definition of a well site, and then create a comprehensive plan to protect groundwater and natural resources that will be impacted by fracking, regardless of their proximity to the drilling equipment.

In addition, on page three of the regulations that IDNR released, the regulations state:

"Published studies or reports, and sources of underlying data, used to compose this rulemaking: None"

The inability of the IDNR to produce scientific data to support its proposition indicates that IDNR is not basing its regulations off of scientific data. This is completely unacceptable. As a citizen of Illinois, I demand that the IDNR conduct an environmental impact study that uses all available studies and science to evaluate the impacts of fracking before it releases regulations.

Thank you.

Sincerely,

022086

Name Shawn Dalke

Address

Email

To the Illinois Department of Natural Resources,

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Thank you.

Sincerely,

Shawn Dalke

022087

Name Jonathan Hopwood

Address

Email

To the Illinois Department of Natural Resources,

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Thank you.

Sincerely,

022088

Name David Turner

Address

Email

To the Illinois Department of Natural Resources,

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Thank you.

Sincerely,

David Turner

022089

Rachel V. Tompkins, PhD
Clinical Psychologist
Licensed in Illinois and Missouri

118 So. Main St. — Edwardsville, IL 62025 — (618) 656-0696

Revised Testimony to IDNR
Rend Lake, Ina, IL
December 3, 2013

My name is Dr. Rachel Tompkins, I am speaking as a citizen and reflecting the views of the League of Women Voters, of which I am a member. My concerns are in relation to public health, and water and air pollution.

The Hydraulic Fracturing Regulatory Act, passed into law in June of 2013, foresaw many of the multiple serious problems, such as water and air pollution, which could result from fracking. It was written to protect the public from potential harm.

The recently published draft administrative rules have so many loopholes and such weak and inadequate provisions for enforcement that these rules weaken or circumvent the protections provided by the law.

Specific loopholes or weak aspects include:

Failure to include radioactive water and water tainted with the many chemicals included in the Clean Water Act in the list of those prohibited for discharge into fresh water

Weakening the presumption of liability for water pollution close to fracking operations

Allowing flowback wastewater to sit in open pits for much longer than the law allowed, rather than requiring adequate sealed storage to be part of planning, and limiting emergency use of open pits

Permitting alterations in plans for fracking wells without public input, with permission required only after alterations are made.

Allowing hydrocarbons produced to be emitted when capture is not considered cost-effective. Not providing for independent monitoring of these emissions. [lower emissions are the clearest benefit of natural gas as fuel]

Allowing private landowner, or industry representatives when they assert an inability to reach private landowners, to waive setback requirement (from streams, rivers and lakes) and water testing requirements at their discretion, when setback and water testing requirements are in the law to protect the water resources of a whole community, not one landowner.

No independent monitoring mentioned of water sampling either

Requiring medical personnel treating emergencies to contact the IDNR or "trade secret holder" "during business hours" with no promise of immediate response, to determine to which chemicals a patient may have been exposed. This places the "trade secret" concerns of industry far above the health of citizens.

Exempting from regulation existing wells and those which utilize foams or gasses as part of their base fluids.

Counting violations, once determined, for only two years. Limiting administrative fees, setting up a financial incentive to violate regulations

Does not mandate revocation of permits for failure to follow guidelines.

Sets the fees for such violations as giving false information on an application at $50, giving a green light to those who would falsify applications

Sets a fine of $200 for the operation of a non-permitted well, begging the question of why any company would choose to comply with a costly permitting process and the regulations.

Sets a fine of $200 if environmental damage is shown to be caused, and only $1000 if groundwater is fouled, when a polluted water table leads to a blighted community, as human life, agriculture, animal husbandry is profoundly affected, providing further backward incentive, so that it makes economic sense for a company to ignore all regulation.

These rules need to be tightened up so that they reflect the intention of the legislature when the Regulatory Act was passed. In addition, scientific studies have been published since then, documenting serious negative consequences of fracking to the environment, and economic negative consequences in Pennsylvania and Texas. These rules should reflect the most recent scientific data available.

Thank you

622091

Revised Testimony to IDNR
Rend Lake, Ina, IL
December 3, 2013

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Thank you

Robert G Mool
Department of Natural Resources
One Natural Resources Way
Springfield, IL 62702-1271

I was concerned about several sections of the newly written rules for Hydraulic Fracturing 'fracking' in Illinois.

Under section 254.630, "Prohibitions", radioactive water discharge into fresh water should be added to the discharge which is prohibited. In addition, any other chemicals (100 are included in the law passed by the legislature) currently or in future determined to be harmful to humans or to the health of bodies of water should be included. Also in the section regarding the presumption of liability for water pollution found within 1500 feet of fracking wells, a more extensive list of polluting chemicals introduced by fracking, should be included. The burden of proving that any measured pollution is not caused by fracking should remain with the well operator.

In regards to storage of fluids (wastewater) resulting from 'fracking', the use of open air pits should be much more restricted, with accurate calculation of required tank sizes expected and limited time during which open air pits can be used, one week only for emergency containment and not measured from the time the operation is complete, but from the time the wastewater is present above ground.

Under section 245.700 b), permission to any alteration of the contents of fluid used in the 'fracking' process should be required prior to the alteration, not after. Any alteration needs to be subject to transparency and public input.

Under 245.845, "Management of Gas and Produced Hydrocarbons During Flowback", the exception d) leaves a wide open gap for expense to outweigh the pubic good in terms of air pollution and ozone damage and its effects on global climate

Under 245.920, the existence of a flaring waver should clearly only be applicable to situations in which an alternate means of methane capture is in place.

Under 245.930, should there be an allowance for gas vented? Is there any independent means to monitor this other than self-report?

Under 245.1120 a) 3) A), why is a violation counted for only two years? A violation should stand, as it means a company is not using proper care and should raise a red flag for those monitoring this process.
Under b) 2) of that same section, administrative fees assessed should not be limited to $1000 per day when a violation has occurred. This allows violations to occur resulting in insignificant costs, when compliance with regulations may result in a greater cost, setting up an incentive to violate regulations.

622034

Under 245.1100, the rules should require mandatory revocation of the permit for failure to follow guidelines when building or developing a well or testing its integrity.

All regulations should apply to existing high-volume fracking wells as well as fracking which uses non-water fluids (such as foams or gasses) which wells should be regulated using a conversion calculation depending upon the chemical used.

Under 245.1120 "Director's Decision" c) No fees incurred when a determination of pollution or diminution is made pursuant to an investigation does not represent a good policy for guaranteeing compliance. Neither does administrative penalty fees set at not exceeding $1000 per day for each act of violation. The resulting costs from these violation may be very high for the affected communities The fee for the violation of a rule, such as giving false information on an application, set at $50, less than a parking ticket, definitely gives a green light to those who would falsify an application.
Under section 2), the operator of a non-permitted well facing a fine of $200 begs the question why any company would choose to comply with a costly and detailed permitting process.
Add to that backward incentive that the fine is $200 if environmental damage is caused and only $1000 if groundwater is fouled, and it makes economic sense for a company to ignore all regulation.

Sincerely,
Rachel V. Tompkins, Ph.D.
425 West Fourth St. Edwardsville, Il 62025

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Department of Natural Resources
One Natural Resources Way
Springfield, IL 62702-1271

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622056

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Rachel V. Tompkins, Ph.D.
425 West Fourth St. Edwardsville, Il 62025

Comment for Submission to IDNR Regarding Proposed Fracking Rules in Illinois

My comment pertains to monitoring water quality, specifically that water testing and monitoring should be required all along the length of any horizontal well bores. This is relevant to section 245.600 Water Quality Monitoring in the proposed rules.

Section 245.600(b)(1) of the proposed rules provides for the testing and monitoring of water sources within 1,500 feet of the well site. Among the many problems with the monitoring provisions, the proposed rules do not provide for testing along the horizontal leg of the well bore, which can extend for up to two miles from the well site. This is a reckless disregard of the known risk of the underground migration of toxic fluids from a horizontal well bore, especially when hydraulic fracturing involves the use of explosive charges and especially in areas known for the risk of higher-magnitude earthquakes.

Testing should be done even beyond 2 miles from the well site, for various reasons: Horizontally, fractures can extend up to half a mile from the well bore (1). Expert testimony in court cases shows that fluids have been found at least 3000 feet from the well bore (2), plus research shows that fluids can migrate up to 8-10 kilometers away from the injection site (3). ~5-6 miles

Once aquifer contamination happens, how far will it spread? What guarantee is there that an aquifer, once contaminated, will contain itself to a radius of 1500 feet from a well site? Certainly all residents affected by such an event need protection.

Baseline testing needs to cover ALL Illinois residents at risk from aquifer contamination from fracking.

Citations

(1) Horwitt, Dusty, Senior Counsel, Environmental Working Group. August 3, 2011. Cracks in the Façade: 25 Years ago, EPA Linked "Fracking" to Water Contamination.

(2) IN THE SUPREME COURT OF TEXAS, No. 05-0466, Coastal Oil & Gas Corp. and Coastal Oil & Gas USA, L.P., Petitioners, v. Garza Energy Trust et al., Respondents, On Petition for Review from the Court of Appeals for the Thirteenth District of Texas, Argued September 28, 2006.

(3) Ake, John, Kenneith Mahrer, Daniel O'Connell, Lisa Block. 2005. Deep Injection and the closely monitored induced seismicity at Paradox Valley, Colorado. Bulletin of the Seismological Society of America 95(2): 644-683.

Fracking regulation comments by Will Reynolds, December 3, 2013

I'm going to comment on several sections, including 310 on permit denial, section 1120 on penalties and 240 and 260 on public participation.

First, I'd like to say that I have some sympathy for DNR today because you've been charged with an impossible task. You've been asked to make fracking safe, as ~~Governor Quinn promised his inadequate~~ fracking law ~~would do~~, but we all know there's no evidence that fracking can be made reliably safe. You truly have an impossible task because the best practice is to not frack at all.

We also know that fracking causes more frequent earthquakes, as several studies have shown. An earthquake doesn't care what regulations you pass. We don't know what happens when you frack in major seismic zones like the Wabash and New Madrid fault lines. That means Illinois is being subjected to a massive science experiment with hundreds of thousands of area residents being used as human subjects.

Fines

Many citizens have expressed outrage at the puny fines proposed in these rules. But, there's even greater cause for alarm. The section on penalties ~~makes frequent use~~ of the word "may." The director of DNR or his designee **may** revoke permits and **may** impose fines. The words "shall" or "must" are conspicuously absent. This means companies with multiple violations may face little or no penalty at all.

That would not be unusual for this agency. Based on DNR's cozy relationship with industry, and history of waiving penalties, there's no assurance that meaningful fines will be collected. Even when a fine is recommended, companies will have another chance to have it reduced or waived for a long list of easy excuses. What you're telling the public is that a multi-billion dollar industry that loses $1,000 in change between the seat cushions may not be punished at all.

Public Process

Section 240 says notices of public hearings will be posted in newspapers near the hearing site. There's no requirement to post hearing notices online. I'd like to let the agency know that Nirvana's first album was release over 20 years ago and that means it's way past time to put everything on the internet.

Section 260 states the public comment period will only last 30 days, even though there's a 60 day window to approve a permit. After a public hearing, comments can only be given on evidence presented at the hearing. That means people who find out about a proposed well after news coverage of a hearing, or after the 30 day time limit, will have no opportunity to present comments on new issues. Those restrictions ~~needlessly~~ make participation more difficult for the average citizen who doesn't spend every day watching for permit filings.

In order for a public process to be meaningful, there must be a reasonable chance that the public can change the outcome of a decision. I don't see that in the rules. I see a hamster wheel that keeps people running in place, going through the motions while getting nowhere.

622033

Reasons for denying a permit

Section 310 lists only four reasons to deny a permit. It does not list pervious violations of Illinois regulation as a reason to deny a permit.

Some of us have seen how this game works before. When members of the public point out that a company applying for a mine permit has a long list of violations, we're told that old violations from other sites can't be considered during the permitting process. There's no accountability for past bad behavior when companies seek new permits.

If these regulations are going to be meaningful then DNR will have to put on your big boy pants, finally stand up to industry and start saying "no" to permits for bad actors.

The scenario we're facing is that, at DNR's discretion, a company may rack up hundreds of environmental violations, pay zero penalties, and still receive new permits to do even more damage. These rules should have been released on April 1st because they're a joke.

Tornado

My name is Luke Schroeder, I'm a Carbondale, IL resident and SIU student. I wanted to point something out that is lacking in the proposed rules. There are no regulations proposed by the IDNR that include safety measures for dealing with the aftermath of a tornado strike at a fracking site. In the last 10 years, 674 tornadoes have hit Illinois. To quote Illinois state climatologist Dr. Jim Angel, "Illinois has experienced some of the worst tornadoes in US history". Every single county has at some point been struck by tornadoes. What if a highly destructive tornado hit an area covered in fracking sites? What would happen if there were containers filled with frack fluid or produced water at the site? Or even contaminated water temporarily stored in an open pit? The safety of Illinois residents depends on a quick response for disaster relief in the event of a tornado, but there are no rules or regulations for dealing with harmful debris spread from fracking sites. Washington, IL was hit by an EF4 tornado on November 17th, and debris was found over 150 miles away from there. I have to ask, is there anything in the proposed rules that outlines how to deal with harmful fracking waste spread all over Illinois? Thank you.

Permit Bonds

My name is Luke Schroeder, I'm a Carbondale, IL resident and SIU student. I want to read a comment prepared by Illinois People's Action about permit bonds for fracking wells.

"Section 245.220 states, "The bond shall be in the amount of $50,000 per permit or a blanket bond of $500,000 for all permits." (Section 1-65(a) of the Act)
Plugging a well alone costs more than $50,000. In the study "Who Pays the Cost of Fracking?: Weak Bonding Rules for Oil and Gas Drilling Leave the Public At Risk", PennEnvironment Research & Policy Center reported documented instances in which fracking wells have cost $700,000 or more to plug. What is the motivation for the operator to not simply forfeit the bond when they shut down? Furthermore, drilling companies typically frack a string of wells and not just one. If they are cutting corners, using improper well-casings for example, or not sealing them correctly, the violation is likely to occur at each site. One $500,000 bond for perhaps as many as 100 -150 well sites is as unacceptable as a $50,000 for one well

site. Individual bonds should be required for every well and in the amount needed to cover the real costs of damages that have been proven to be the outcome of fracking-well accidents as well as the real costs of plugging the well."
Thank you.

Radioactivity Testing

My name is Luke Schroeder, I'm a Carbondale, IL resident and SIU student. I want to read a comment prepared by Illinois People's Action about radioactivity testing of flowback.

"Subsection (d)(1) of Section 245.850 provides for testing radioactivity only one time--during the early flowback stage--and only for "naturally occurring radioactive materials".

Problems with this section:

1. The proposed rules do not include any standards or protocols to follow if testing of flowback water shows unacceptable levels of radioactivity.
2. The proposed rules do not require the testing of "produced water", which is the water produced from a well in conjunction with oil or natural gas production. This is where radioactivity is most likely to show up. It should be noted that while these Rules have been purported to be the strongest in the nation, PA law requires the testing of produced water at two separate intervals.
3. The proposed rules do not require testing for added radioactive materials, like depleted uranium, which can be used in the perforation/fracturing operation.
4. The proposed rules do not test work areas for levels of radioactivity that would call for OSHA standards of occupational safety.

These deficiencies, cumulatively or singly, would pose a significant risk to the public health and safety, property, aquatic life, and wildlife, in violation of section 1-75(a)(2) of the Hydraulic Fracturing Regulatory Act."

Thank you.

DNR Public Hearing – INA, IL
12/3/13

Re: CONCERNS WITH ILLINOIS DNR DRAFT HYDRAULIC FRACTURING RULES

My name is Kyle Kingston and I come before you to comment on behalf of myself and all expressed opinions are strictly my own.

I am third generation, oil & gas industry, to work in the Illinois Basin and can attest to the industry's ability to provide jobs to the economy of Southern Illinois. Growing up and residing in White County, one of the counties where this play could actually be viable, I have seen firsthand how these struggling small towns and villages rely on this industry and the jobs it supplies.

I am a former state regulator to the oil & gas industry and can attest to the majority of the industry's desire to operate in an environmentally responsible fashion.

I have also had the fortune to personally work on sites not only in Illinois and Indiana, but also in Ohio, Pennsylvania, and Colorado and can attest that wells receiving the kind of stimulation we are discussing tonight do not belong to my Grandfather's oilfield. The companies that perform these types of completions often employ biologists, hydrologists, and other environmental engineers and scientists, along with an array of regulatory compliance personnel. They bring with them "Best Management Practices" and a general feeling of responsibility to be a good corporate citizen.

I first would like to address some of the concerns brought before you in the previously held hearing.

Several comments were directed at chemical disclosure and worker exposure. These concerns are already regulated by both OSHA's Hazcom Standard as well as SARA Title III, Tier II. Both workers and EMS are entitled to the material safety data sheets on location.

There were also multiple references to seismicity. To my knowledge the hydraulic stimulation of a formation has never been proven to cause an earthquake. There are however concerns that the injection of fluids may be attributed to small seismic events. To this point, the geology of the Illinois Basin is very conducive to injection, unlike some other Basins such as Eastern Ohio in the Appalachian Basin. In addition, Class II wells are already governed by the UIC program. A program in which USEPA has given primacy to the state due to their ability to regulate at a level as high if not higher than that in which the EPA themselves would regulate.

Finally, I would like to make a few brief comments directed at specific sections of the rule in which I feel should be improved.

First,

Section 245.270 (a) 1 (A) v: *"any other person that is or may be adversely affected who can directly demonstrate in writing with the request for public hearing that the person actually has a property interest in or uses resources of economic, recreational or environmental value that may be adversely affected by the granting of the permit at issue at the public hearing."* -

- The term "environmental value" is almost infinitely broad. A person that drives by a well pad on his way to work, with no property ownership anywhere near it, could file a request for a public hearing because his view of a tree 6,000 feet from the road might get blocked by a rig. I think along those same lines, the definition of "recreational" is equally broad. I would request that these terms be defined and streamlined.

622103

Second,

Section 245.270 (m) 3: *"The Hearing Officer shall issue and serve on all parties the hearing decision within 7 days after the close of evidence taking into consideration that the Department shall have no more than 60 days from the date it receives the permit application to approve or reject the permit application."*

- The Officer issues the decision within 7 days of the hearing, and only has to "take into consideration" that DNR has no more than 60 days to approve or deny the permit.I would request that a decision be rendered within 7 days after close of evidence, but within 50 days from the date DNR receives the permit application to avoid last minute approval/denial windows to allow time for implementation of any "conditions the Department may find necessary".

Third,

Section 245.310 (d): "an emergency condition exists under which conduct of the high volume horizontal hydraulic fracturing operations would pose a significant hazard to public health, aquatic life, wildlife, or the environment."

- This section pertains to conditions under which a permit can be denied. Most disturbing is this phrase: "pose a significant hazard to public health, aquatic life, wildlife, or the environment." I don't see how any anti-industry group won't bookmark that clause and reference it for every permit they challenge. They'll claim every potential impact to anyone is a "significant hazard to public health." These are the same groups, remember, who claim you cannot regulate hydraulic fracturing safely because of its inherent threat to public health.

Forth,

Section 245.410 (c): *"Permittees shall employ practices for control of fugitive dust related to their operations. These practices shall include, but are not limited to, the use of speed restrictions, regular road maintenance, and restriction of construction activity during high-wind days. Additional management practices such as road surfacing, wind breaks and barriers, or automation of wells to reduce truck traffic may also be required by the Department, in consultation with the Agency as the Department deems appropriate, if technologically feasible and economically reasonable to minimize fugitive dust emissions."*

- What constitutes a "high-wind" day? 30mph? 10mph? Gusts or sustained? What's the burden of proof from that allegation?

Fifth,

Section 245.600 (a) 7: *"if applicable, copies of any non-disclosure agreements made with landowners."*

- According to the language of this section, NDAs have to be provided to DNR. I don't see anything in here that statutorily prevents DNR from releasing contents of NDAs via right-to-know or similar FOIA type laws. In a later section on trade secrets for additive use, there is a clause that states "Information so disclosed to a health professional shall in no way be construed as publicly available."

Sixth,

Section 245.855 Spills & Remediation

- Section does not distinguish between spills on containment and off containment. Obviously a release which impacts soil is not the same as a release on containment which never reaches soil or water.

Seventh,

Section 245.1020: *"Restoration shall be commenced within 6 months of completion of the well and completed within 12 months. Restoration shall include, but is not limited to, repair of tile lines, repair of fences and barriers, mitigation of soil compaction and rutting, application of fertilizer or lime to restore the fertility of disturbed soil, and repair of soil conservation practices such as terraces and grassed waterways."*

- There is no leeway described (i.e. for inclement weather) that acknowledges the potential for delays or restrictions on restoration as defined in this section. At the very least there should be language that allows for companies to file a request for additional time, provided certain extenuating circumstances can be demonstrated.

Finally,

Section 245.1120 (c) 2 (B) ii: *"If the violation created a hazard to the safety of any person: add $2,000."*

- Is there a sunset provision to this, i.e. can someone claim harm five years later under this provision? What's the burden of proof?

I want to take this opportunity to thank DNR and everyone involved in this process for your time and consideration.

Thank You

R. Kyle Kingston
White County, IL Resident

IDNR Hearings on proposed rules for HVHF

From Barbara McKasson
2 Hillcrest Drive
Carbondale, IL 62901

I am a lifelong resident of Illinois and I do not want to see any part of the beautiful natural areas of Southern Illinois polluted by fracking waste. I do not want our wildlife nor farm animals to be poisoned by spills or leaks of fracking waste. I do not want our drinking water endangered by fracking waste operations.

DNR does not have a good record of protecting our land, air and water from conventional fracking waste. In the 1970s, the Illinois Environmental Protection Agency conducted thorough scientific studies of the environmental impact of "conventional" fracking. The EPA report, the "Illinois Oil Field Brine Disposal Assessment" found that thousands of acres of prime farm land had been made sterile from fracking waste disposal over the 30 previous years. (Three thousand acres in White County alone had been made unfit for farming by 1978.)

Now, DNR has damaged its credibility even more by writing rules that create loopholes in the new hydraulic fracturing law. How can we trust DNR to enforce a law that DNR itself has attempted to weaken?

At the very minimum, DNR must follow the law by fixing the proposed rules.

First, the existing High Volume Fracking wells should be regulated to the standards of the new rules.

Second, there should be an equivalency factor for nitrogen foam

and other fracking fluids that may be used in horizontal fracking. Otherwise, these directional fracking methods will be excluded from (regulation under) the new rules.

Third, the rules should require accurate calculations for tank size so that operators do not have to constantly use open pits for flowback and produced brines.

Fourth, presumption of the source of chemicals found in an incidence of water pollution within 1500 feet of a well should include the entire list of chemicals provided in the law.

Fifth, The law states that penalties will be issued to prevent non-compliance. The DNR proposed penalties for (administrative and operational) violations are too low to be a deterrent. These penalties should be greatly increased.

Sixth, health workers should be able to contact a "trade secret holder" immediately in an emergency situation at any time of day or night.

Seventh, the proposed rules have been worded to exclude many significant permit modifications from public notice and review. All significant permit modifications should be included, as required by the law.

These are just some examples of how the proposed rules do not measure up to the letter and intent of the law. This must be rectified.

Barbara M Kason

IDNR Hearings on proposed rules for HVHF

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2 Hillcrest Drive
Carbondale, IL 62901

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622133

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Fifth, The law states that penalties will be issued to prevent non-compliance. The DNR proposed penalties for (administrative and operational) violations are too low to be a deterrent. These penalties should be greatly increased.

Sixth, health workers should be able to contact a "trade secret holder" immediately in an emergency situation at any time of day or night.

Seventh, the proposed rules have been worded to exclude many significant permit modifications from public notice and review. All significant permit modifications should be included, as required by the law.

These are just some examples of how the proposed rules do not measure up to the letter and intent of the law. This must be rectified.

Barbara McKesson

Testimony of ELPC, Faith in Place, Illinois Environmental Council and NRDC

Illinois Hydraulic Fracturing Regulatory Act – Draft Implementing Regulations
Public Hearing, UIC Student Center East, Room 302 - November 26, 2013

My name is Tamika and I am speaking today on behalf of a coalition of non-profit environmental organizations including Faith in Place, Environmental Law and Policy Center, Natural Resources Defense Council, and the IL Environmental Council.

As our coalition has said from day one, we do not welcome fracking coming to Illinois. The draft administrative regulations published on Nov. 15, 2013 by the IL Dept. of Natural Resources to implement the Illinois Hydraulic Fracturing Regulatory Act do not reflect a willingness to take the time necessary to get appropriate protections in place before fracking commences. In fact, DNR's draft regulations run afoul of the law in several significant ways and thereby fail to sufficiently protect residents from the known environmental and public health risks of fracking.

Moreover, DNR has stifled the public's ability to meaningfully participate in the ongoing comment period by scheduling hearings over the holiday season for example Chicago's November 26th hearing was two days before one of the most traveled holidays, and limiting these hearings to two hours notwithstanding the enormous public interest and concern about fracking across the state is wholly inadequate. Further, DNR has imposed an overly complicated system for citizens to submit their comments, which – whether intended or not – gives the impression that DNR is deliberately inhibiting public participation.

Many of the problems we will outline today appear to be a result of a hasty deadline that DNR needlessly subjected itself to. In addition to our substantive concerns with the rule, we ask DNR to immediately slow the process down and publicly commit to protect the environment and public health by providing adequate, meaningful opportunity for public comment and hearing on these critical regulations.

Key substantive concerns we have include:

Emergency Response & Disclosure – The law requires that trade-secret-protected information about chemicals be disclosed to health workers when necessary to treat a patient, in both emergency and non-emergency situations. *In contrast, IDNR's draft regulations give discretion over when to share this information and direct health workers to contact either "IDNR during normal business hours" or "trade secret holders," which it provides no means to identify or locate. This is unacceptable. Emergencies can happen any time of day or night, and emergency personnel must not be left to guess which private fracking entity to contact if the Department is not available.*

- **Water Pollution** – The law requires all wastewater to be stored in closed tanks, allowing the use of lined open pits only for one week if unexpectedly huge volumes of wastewater come up the well. *In contrast, IDNR's draft regulations allow wastewater to sit in open pits potentially far longer than a week, and do not require accurate calculations of tank size – leaving room for frackers to underestimate tank capacity and therefore use open pits more frequently.*

- **Excludes Wells** – The law applies to all high-volume fracking wells, regardless of when they began operating or what process they use. *In contrast, IDNR's draft regulations would exempt existing wells and potentially exclude types of fracking that use gas.*

- **Liability** – The law presumes that any water pollution found within 1,500 feet of a fracking operation was caused by that fracking, unless the fracking company can prove otherwise. In other words, the burden of proof lies with the frackers, not with the communities impacted by the pollution. *In contrast, IDNR's draft regulations limit industry's burden of proof to a much smaller set of "indicator" chemicals, rather than the list of over 100 chemicals included in the law.*

- **Public Notice** – The law requires that any significant modifications to a permit undergo public review processes – notice, comment and public hearings. *In contrast, IDNR's draft regulations significantly narrow the types of modifications that require public processes, opening the door for fracking permit holders to avoid public scrutiny.*

The environmental coalition will be submitting extensive written comments on these and other concerns with DNR's draft regulations. We call on IDNR to act responsibly and promptly revise these regulations to ensure full compliance with the Illinois Hydraulic Fracturing Regulatory Act.

622-11

My name is Jonathon Hallberg, Executive Director for South Central Illinois Regional Planning & Development Commission, representing our organization, the Greater Wabash Regional Planning Commission, Southeastern Illinois Regional Planning & Development Commission, Southwest Illinois Metropolitan and Regional Planning Commission, and White County Road Commission.

Beyond basic language about bidding for road repairs in section 245.410, we find no place where the proposed administrative rules address upgrade, maintenance, or repair of roadways needed to accommodate activities under the Illinois Hydraulic Fracturing Act. These activities will affect traffic flow during and after hydraulic fracturing and drilling activities. Not planning for or undertaking them will have an even greater effect. Traffic management cannot occur without planning for these issues. A provision for the establishment of Road Upgrade and Maintenance Agreements, or RUMAs, within section 245.210 (15) of the proposed administrative rules would ensure these issues are addressed.

We also recommend striking the term, "preferably", in the initial paragraph to ensure that dialog occurs with the impacted highway authorities early in the permitting process.

The Illinois Hydraulic Fracturing Act (P.A. 098-0022) makes allowances in Section 1-55 (a) that "Each permit issued by the Department under this Act shall require the permittee to comply with all provisions of this Act and all other applicable local, State, and federal laws, rules, and regulations in effect at the time the permit is issued." The language we propose does not hamper the permitting process but rather supports the Act, even making allowances for delays. It ensures communities can exercise their rights under various Illinois statutes, including; 605 ILCS 5/5 et seq., 605 ILCS 5/6 et seq., 605 ILCS 5/9-113, and 625 ILCS 5/15-316.

The proposed alterations would read as follows (verbal statement below abridged):

245.210 – Permit Application Requirements

15) Traffic Management Plan
A traffic management plan that is developed by the applicant, ~~preferably~~ in coordination with the impacted highway authorities (county, township, road district system, and municipal street system) to *identify the anticipated, roads, streets and highways that will be used* (Section 1 – 35(b)(15) of the Act) to facilitate the well site construction, drilling operation, high volume horizontal hydraulic fracturing operations, production, and continued operations of the well site. The traffic management plan shall include the following:

A) a scaled map of the proposed routes the applicant intends to use to construct the well site, perform high volume horizontal hydraulic fracturing operations, production and continued operations, for at least a 10 mile radius around the well site, identifying all the different highway jurisdictions;

B) anticipated well site construction and drilling operations start and end dates, high volume hydraulic fracturing operations start and end dates, and other high traffic operations start and end dates;

C) an executed or proposed Road Upgrade and Maintenance Agreement (RUMA) established with affected county, township, road district system or municipal street system authorities, which includes; provisions for needed upgrades and supplemental maintenance of affected routes to accommodate operator transport activities; arrangements for undertaking such upgrades or supplemental maintenance; provisions for timely repair of damages by the operator; arrangements for coverage of costs, such as bonds or surety; and consequences for failure to repair in a timely manner;

a. In the event that a proposed RUMA is submitted, the applicant will outline the current status of negotiations, including whether a mediation/arbitration process is needed and what party will serve as a mediator/arbitrator;

~~C)~~D) contact information for the applicant's representative with knowledge of the traffic management plan; and

~~D)~~E) contact information for a representative of each impacted highway authority;

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~~D)~~E) contact information for a representative of each impacted highway authority;

622113

Concrete crumbles. Steel rusts. In the United States since the year 2000, sixteen bridges have collapsed. The Federal National Bridge Inventory reports 85,000 U.S. bridges are in bad shape and need to be replaced. What are bridges made of? Steel and concrete. What does fracking use to keep these deadly chemicals out of our drinking water? Steel and concrete. (Dramatic pause)

The fracking industry buries steel pipes thousands of feet underground, fills them with fracked water, effluents and sand, puts them under a tremendous amount of pressure, waits for 20% to 80% of the toxic and radioactive wastewater to come out, and seals the rest of the water inside the steel pipes with an inch of concrete. Then they tell you everything's going to be okay. You don't have to worry that fracked water is poisoned with more than 600 toxic and radioactive chemicals. The damage is done. Out of sight is outta mind, but the USGS says there's no way to keep all the water separate. It can't be done. The poison is going to end up in your water because all steel rusts.

The question is this. Why are we betting against a natural process everyone understands and expecting everything to work out to our advantage? All steel rusts. Doesn't that single fact unhinge all the fracking science?

When the industry talks to you about fracking, ask them who is going to check the steel pipes in a few generations when all the fracking money is gone and the pipes are still down there in the dark getting rustier and rustier and rustier.

Don't be fooled. They are going to hand this problem back to you and you're the one who will have to find the solution. Not them. They're in it for the money and if you'll sell your water cheap, they'll certainly take that to the bank.

Beth Martell
Makanda IL

6.22.14

REND LAKE COLLEGE
Illinois Hydraulic Fracturing Act
Rulemaking Meeting
12/3/13

- Greg Smothers -- Williamson County Engineer
  IACE Vice President

- Speak briefly about the present permit process as it pertains to the Traffic Management Plan that is required of all applicants.

- Current law does not adequately address the upgrade, maintenance, or repair of roadways that will be required to accommodate activities under the Illinois Hydraulic Fracturing Act.

- I want to also touch on Road Upgrade and Maintenance Agreements (RUMA) with all affected; Counties, Townships Road Districts, Unit Road Districts, and Municipalities.

- We strongly urge these rules to require Traffic Management Plans to be done in DIRECT coordination with all the affected/impacted highway authorities. It should not be something that is done when it is convenient, or when it is preferred, or at anyone's discretion. It should be done in every instance if we are going to properly protect our infrastructure.

SECTION 245.01
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- We also urge these rules to require that an executed RUMA with all impacted highway authorities must be part of any Traffic Management Plan to be included in an Applicant's Permit Application for IDNR's consideration.

- We ~~are supportive of any and all industry that will allow Illinois to thrive, grow and prosper~~ strive to provide & maintain a transportation system to support growth in our region. There is a great deal at risk with our road systems and infrastructure if we do not require these provisions. Rural Illinois government authorities do not have the tax bases or the where-with-all to maintain the roadway infrastructures placed under this type of distress.

Thank you!

622115

Michael Hicks
from Texico, IL

Hello. Tonight I'd like to comment on section 245.720 of the Hydraulic Fracturing Regulatory Act. Under this act fracturing companies will be required to provide a master list of chemicals used in their operations. But this section doesn't require them to disclose all of the chemicals publicly if they feel they are a "trade secret". A redacted version of this list will be given to the public, and we are supposed to trust that the people up top will be watching out for dangerous chemicals being used.

According to a report on hydraulic fracturing from the U.S. Energy and Commerce Committee (1) chemicals used include extremely toxic substances such as the cancer-causing benzene, lead and methanol. In fact, methanol, which is a hazardous air pollutant was the most used chemical from 2005 - 2009. Not all of the chemicals could be identified by gas service companies, suggesting the fracturing companies are "injecting fluids containing chemicals that they themselves cannot identify." Luckily, some of these "proprietary" chemicals were identified, and they included things such as instant coffee and walnut hulls all the way to chemicals linked to vision loss, birth defects, seizures, heart damage, brain damage and other health issues, according to the U.S Environmental Protection Agency. (2, 3)

There have been over 1,000 documented cases of water contamination next to areas of gas drilling (3), as well as cases of negative effects on health and illness from the chemicals involved in hydraulic fracturing. (4) Residents in DISH, Texas who live next to a gas production site reported illness among community members after complaining of strange odors from drilling sites. (5) Consulting groups were called in to investigate and found elevated levels of benzene and other toxic chemicals in the air, in some cases, 384 times the legal limit deemed as safe. (6) Another infamous case in Pennsylvania where locals were lighting their tap water on fire is also quite concerning. Fracturing companies have responded to the high levels of flammable methane found in water supplies with rhetorical tricks, claiming methane is a naturally occurring chemical; this is true, but the actual fracturing process itself involves drilling into the methane layer of the Earth, allowing this toxic gas to migrate into the water supply. (7) This water contamination, and contamination in other areas, has been repeatedly traced back to hydraulic fracturing or its surrounding process by The Pennsylvania Department of Environment Protection (8), studies by The Massachusetts Institute of Technology (9), studies by the Colorado School of Public Health (4), peer-reviewed studies by Duke University (7), as well as tests conducted by the EPA. (10)

Many sections of this act imply a concern of contamination, and while there are protections to hold companies liable for this, I'd like to ask: if there's even a small chance of contaminating the Earth, why is it something we are considering? Many choices in life involve risk, but environmental damage is permanent; we only get one Earth. The argument against all of this is an appeal to emotion - that we need this to create jobs. It's interesting to note that according to the New York Times, jobs in the oil and gas industry are seven times more likely to be fatal than the U.S. average. (11) To be specific, the EPA considers the radioactive material in fracturing flowback to be a hazard to workers, raising their risk of lung cancer. Workers are also exposed to alpha and gamma radiation, that can penetrate the skin and raise the risk of skin cancer. (12) Instead of asking workers to handle cancer-causing chemicals, I'd rather see jobs created to further our understanding and also lower feasibility of true energies of the future, such as geothermal, marine and solar. Most of these technologies are already in use around the world

today such as the Gemasolar Thermosolar Plant in Spain and Geothermal plants in California. Marine power has the potential of providing a substantial amount of renewable energy around the world (13), and developments are being made on this in multiple countries. (14, 15)

To conclude my comments, if fracturing companies are allowed the chance to contaminate our land, they should be required to disclose all chemicals involved with this process to the public, not just a redacted version as the act currently states. When it comes to public health and the environment, there should be total transparency, and the information I have provided tonight should be overwhelming proof that total transparency is desperately needed. Thank you.

1. "Chemicals Used In Hydraulic Fracturing" United States House of Representatives Committee on Energy And Commerce. <http://democrats.energycommerce.house.gov/sites/default/files/documents/Hydraulic-Fracturing-Chemicals-2011-4-18.pdf>.

2. Williams, David. "Drilling, fracking boom causes health concerns Health professionals urged to recognize symptoms of exposure" Colorado Public News. <http://www.cpt12.org/news/index.php/drilling-fracking-boom-causes-cancer-concerns/>.

3. Lustgarten, Abrahm. "Buried Secrets: Is Natural Gas Drilling Endangering U.S. Water Supplies?" ProPublica. <http://www.propublica.org/article/buried-secrets-is-natural-gas-drilling-endangering-us-water-supplies-1113>.

4. "Study shows air emissions near fracking sites may have serious health impacts" Colorado School of Public Health. <http://attheforefront.ucdenver.edu/?p=2546>.

5. Schmidt, Charles. "Blind Rush? Shale Gas Boom Proceeds Amid Human Health Questions" Environmental Health Perspectives. <http://ehp.niehs.nih.gov/119-a348/>.

6. Biello, David. "What the Frack? Natural Gas from Subterranean Shale Promises U.S. Energy Independence--With Environmental Costs" Scientific American. <http://www.scientificamerican.com/article.cfm?id=shale-gas-and-hydraulic-fracturing >.

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7. Lustgarten, Abrahm. " Scientific Study Links Flammable Drinking Water to Fracking" Propublica. <http://www.propublica.org/article/scientific-study-links-flammable-drinking-water-to-fracking>.

8. "Tap Water Torches: How Faulty Gas Drilling Can Lead To Methane Migration" StateImpact. NPR. <http://stateimpact.npr.org/pennsylvania/tag/methane-migration/>.

9. "The Future of Natural Gas" Massachusetts Institute of Technology. <http://mitei.mit.edu/system/files/NaturalGas_Report.pdf >.

10. Drajem, Mark. " High Methane in Pennsylvania Water Deemed Safe by EPA" Bloomberg. <http://www.bloomberg.com/news/2012-03-29/high-methane-in-pennsylvania-water-deemed-safe-by-epa.html>.

11. Urbina, Ian. "Deadliest Danger Isn't at the Rig but on the Road" The New York Times. <http://www.nytimes.com/2012/05/15/us/for-oil-workers-deadliest-danger-is-driving.html?pagewanted=all&_r=2&>.

12. McMahon, Jeff. "Strange Byproduct Of Fracking Boom: Radioactive Socks" Forbes. <http://www.forbes.com/sites/jeffmcmahon/2013/07/24/strange-byproduct-of-fracking-boom-radioactive-socks/>.

13. Carbon Trust, *Future Marine Energy. Results of the Marine Energy Challenge: Cost competitiveness and growth of wave and tidal stream energy*, January 2006

14. "Tidal power rides wave of popularity" TVNZ. <http://tvnz.co.nz/view/page/536641/1474541>.

15. "Wave energy project promises jobs boost" ABC News. <http://www.abc.net.au/news/2012-07-13/wave-energy-project-promises-jobs-boost/4128666>.

Public Hearing Comments on

Draft Hydraulic Fracturing Regulatory Act Administrative Rules

Submitted to

Illinois Department of Natural Resources

Submitted by

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December 3, 2013

022119

Public Hearing Comments on

Draft Hydraulic Fracturing Regulatory Act

Administrative Rules

Introduction

Good evening, I am Gerald Quindry, owner of Sigma Plus Engineering, LLC in Fairfeld, Illinois. I am a Civil and Environmental Engineer, and I am licensed to practice in Illinois. I hold a B.S. in Civil Engineering, and a Ph.D. in Environmental Engineering in Civil Engineering, both from the University of Illinois at Urbana-Champaign, and I have more than 35 years of experience in environmental consulting, including experience in the development of Federal water pollution regulations, regulatory compliance auditing, environmental site assessment and remediation, brownfield redevelopment, methane and organic vapor intrusion into buildings and mitigation of those hazards, oil spill prevention, control and countermeasures, and the design and operation of petroleum production, refining, storage, and distribution facilities.

My comments this evening relate specifically to Subpart F: "Water Quality" of the Draft Administrative Rules (the "Rules") promulgated by the Illinois Department of Natural Resources (IDNR) to implement provisions of the new Hydraulic Fracturing Regulatory Act (the "Act"). In addition to these comments, I will, in partnership with a professional statistician, submit written comments on the Rules before January 3, 2014. These additional written comments relate to the statistical treatment of chemical data called for in Section 245.610(e). My comments this evening will be related to the other problematic sections of the proposed Rules.

Provisions of the Rules

Subpart F of the Rules provides operational details for monitoring water quality near high volume hydraulic fracturing operations in Illinois. In brief, baseline water quality data is to be collected from water sources near any proposed well site prior to drilling. These data are then to be compared with data collected from the same sources after hydraulic fracturing operations are complete. The chemical tests to be performed include 27 specific analytes [Section 245.600(d)(1)(B)]. Data is to be submitted to IDNR on a strict time schedule and then made available to the public on an IDNR web site. Based on the comparison of results of baseline and follow-up monitoring, IDNR will make a determination of "whether any hydraulic fracturing additive or other oil or gas well contaminant has caused pollution or diminution..." [Section 245.600(e)]. If such a determination is made by IDNR, a Notice of Violation shall be issued [Section 245.610(a)] and enforcement actions undertaken under Section K of the rules.

622220

Subpart F of the Rules also includes many other provisions, for notification of IDNR of on-going activities, procedures to follow in obtaining landowner permission to sample, non-disclosure of data, etc. which are not germane to the discussion below, and they are ignored for purposes of this comment.

Issue 1: Timely Submission and Publication of Data

The Rules require [Section 245.600(b)(4)] that the results of baseline sampling be posted on the IDNR web site within 7 calendar days after receipt. The minimum data format is described in Section 245.600(b)(4).

Comment 1(a)

The data format in Section ~~254~~ 245.600(b)(4) is not appropriate for surface water samples. Surface waters do not have a well name, location and permit number. Not all surface waters have any name or a unique location identifier. For all data points, the inclusion of latitude/longitude pairs, in a consistent format, and using a consistent datum is recommended. An appropriate standard would be latitude/longitude using the NAD83 datum, in decimal degree format, with negative numbers used to denote south latitude and west longitude. (For example, the Illinois State Capitol building is located at Latitude 39.798434, Longitude -89.655077.)

Comment 1(b)

The required data format MUST include the sample date.

Comment 1(c)

Given the short time-frame for publication of water quality data by IDNR, it is likely that the method of choice for compliance with the Rules would be for IDNR to publish a non-indexed, non-searchable electronic image of laboratory report submissions (e.g., PDF images). IDNR should recognize that the publication of such scanned documents may be in compliance with the language of the Act, but will be of little use in accomplishing the goals of the Act. Electronic submission of formatted water quality data should be required. Electronic submissions are more efficient for all parties concerned, and are less prone to errors. They also can have the capability to provide for on-line searches by the public. The data used in the next section of my comments were retrieved from the US EPA STORET data warehouse (http://www.epa.gov/storet/). That system is available for adoption by the Department, and already has written instructions and a broad-based user community. Other systems are also available. In short, you don't have to re-invent anything, just specify and employ the tools already available to provide the data in a more accessible manner.

Issue 2: Conclusions Drawn from Water Quality Monitoring Approach

Section 245.600(e) states that "the Department **shall** ... make a determine whether any hydraulic fracturing additive or other oil or gas well contaminant has caused pollution or diminution for purposes of Sections 245.610 and 245.620." Section 245.610(e) describes how a determination of pollution or diminution **shall** be made in a water pollution investigation and incorporates language on statistical

significance not included in Section 245.600(e). Section 245.615(a) of the Rules states that, "Upon a determination of pollution or diminution by the Department, the Department **shall** issue a Notice of Violation and proceed with appropriate enforcement pursuant to Subpart K" (emphasis added). As will be demonstrated below, strict adherence to the Rules, when applied to surface waters, can result in instances when a Notice of Violation (NOV) must be issued, even when there has been no actual release of pollutant or diminution caused by oil drilling/fracking activity. Conversely, adherence to the Rules provides ample opportunity for actual environmental degradation, caused by drilling or fracking activities, to be missed by the monitoring program. The randomness of findings of pollution or diminution, and the technically unsupportable nature of NOV issuance would surely be solid grounds for judicial challenge of the entire enforcement process.

There are several flaws in the regulatory approach that has been taken in the Rules:

Comment 2(a)

There appears to be some circular flaws in the flow of the above sections. Section 245.600(e) provides instructions that are for the purposes employed in Section 245.610. But Section 245.610 appears to be the method for making the determination under Section 245.600(e). The Rules should be made more clear as to specifically how the baseline and follow-up sampling data will (or will not) result in a determination of pollution or diminution, and when a Notice of Violation **shall** be issued.

Comment 2(b)

"Statistically Significantly **Higher**" [Section 245.610(e)] is the term used in the Rules for comparison of data collected as baseline and follow-up sampling. But "higher" does not imply degradation for all of the 27 analytes of concern. For example, a release of acid-containing well completion fluids to a stream would cause a drop in alkalinity and pH, not an increase. In this case, "Statistically Significantly **Lower**" would be the appropriate evaluation. But the release of a caustic would cause a rise in alkalinity and pH. Thus, an excursion either above or below the norm could indicate pollution or diminution. Or perhaps not. Such excursions could have causes completely unrelated to oil and gas development activities. A farmer applying agricultural lime to a field will cause increases in alkalinity and pH. A determination of degradation or diminution needs to be more complicated than a simple comparison of numbers. The definition of degradation and diminution are different for each of the 27 analytes, and they should be individually stated in the Rules.

Comment 2(c)

"**Statistically Significantly** Higher" [Section 245.610(e)] provides no guidance on what statistical testing is to be used, and the level of significance required to make a determination of pollution or diminution. It is important that the procedure is known before initiating the monitoring and enforcement process. As I noted in my introductory material, I am preparing written comments on the statistical handling of the data, and will not comment further at this time.

Comment 2(d)

There are many sources of error in the sampling and chemical analysis of natural waters. In the protocol for baseline and follow-up sampling, some allowance for that variation is made by splitting collected samples into three sub-samples [Sections 245.600(d)(1)(A)] and analyzing them separately. This

procedure will provide some measure of laboratory-introduced variability, but it ignores others, such as the variability of water quality parameters with time. The charts of water quality data that are attached to this submission clearly demonstrate the problem.

Alkalinity is one of the baseline parameters employed in the regulations. Iron is another. The data were collected by the US Geological Survey at their monitoring station near Clay City, Illinois, from the Little Wabash River. That river is one of the larger streams in the region, and it drains a considerable fraction of the land where high volume hydraulic fracturing is likely to take place. Such historical data is not available for many of the smaller surface water bodies in the region, and smaller water bodies are likely to have even larger variations in water quality parameters. There is little in the way of an historical record to use to establish time variability of environmental parameters for these small water sources, but, since the Rules make no allowance for time-dependent variability, any variation will be fully attributed to the drilling and hydraulic fracturing activity that is to take place.

Given the historical data shown on the charts, what would a baseline sample, collected on any random day, likely show for alkalinity and for iron? How representative would it be? What would a follow-up sample have to look like to be "statistically significantly higher" (or lower) than the baseline collected, perhaps two-and-a-half years earlier? Without benefit of long-term monitoring data such as that shown in the charts, how would you know? Without such extensive data, unfortunately, the conclusion reached would rely more on timing and luck than whether or not a chemical release had occurred.

There is a better way to do this. Rather than comparing a baseline sample collected before drilling to a follow-up sample collected later at the same location, a comparison between "upstream" and "downstream" water quality parameters needs to be made. The baseline is the *difference* between upstream and downstream samples prior to oil or gas drilling and development, and the follow-up data measures the *difference* between these two locations after the well activity is complete. Given these data, time-dependent variations will be incorporated into both sets of data, and a better representation of environmental issues attributable to drilling and hydraulic fracturing activities can be made.

Comment 2(e)

It is unclear whether or not the determination by the Department made under Section 245.600(e) is to follow the same statistical test for significance that is called for in Section 245.610(e).

Comment 2(f)

The incorporation of a rebuttable presumption of liability into the Act and Rules creates unusual challenges for permit holders in establishing what would constitute a valid rebuttal of a finding of pollution or diminution. Given the demonstrated variability of the underlying data, it would be necessary to have much more baseline data to rebut a presumption. But having initiated drilling activities, the permit holder does not have the opportunity to collect any more baseline data. In addition, the list of chemical analytes that can result in a finding of pollution or diminution is far longer than the 27 baseline parameters. For many analytes, there may be no baseline data at all, and thus there can be no rebuttal. It should be possible, for example, for a permit holder to rebut a finding of pollution or diminution on the basis that the chemical found in excess after well drilling and

development was not used in drilling and fracking operations and is not a naturally occurring constituent of the strata being penetrated or subjected to hydraulic fracturing.

Issue 3: Sample Collection and Reporting Protocol

The Water Quality Monitoring Work Plan is described in Section 245.600(a). The required analytes for baseline and follow-up sampling are specified in Section 245.600(d)(1)(B).

Comment 3(a)

The Work Plan is a critical document in the regulatory process. As such, it should be submitted to the Department under signature and stamp of a Professional Engineer or Professional Geologist. This is consistent with the requirements of Title 35, Part 732 and Part 734 (Sections 732.108 and 734.130, respectively) for the investigation, reporting, and remediation of petroleum hydrocarbon releases from underground storage tanks. (A program with similar purpose to the Act and Rules.) For similar reasons, the sampling reports submitted to the Department described in Section 245.600(d)(1 thru 4) should be signed and stamped by the responsible Professional Engineer or Geologist.

Comment 3(b)

The collection protocol needs to specify whether or not the samples are to be filtered during sample collection. Water quality data (especially metals concentration) can be impacted by suspended particulate matter in the water. In surface water, the suspended solids content changes with recent precipitation and runoff. In groundwater, the suspended solids load is also highly sensitive to recent drawdown in the wells, as might happen in a private water supply well at a residence. If conclusions are to be drawn from the data collected by different parties and at different times, consistency in collection methods is required. The decision whether to employ filtering may be different for some parameters than it is for others, but the methodology should be consistent throughout the entire IDNR monitoring program under the Act.

Comment 3(c)

There are 27 analytes used as baseline indicators of possible pollution or diminution. There seems to be little logic in their selection, especially for surface and near-surface waters. Some of them are much more likely to be altered by conditions and events unrelated to drilling or fracking activities. Others are used (if at all) in such minute quantities to be undetectable when diluted into naturally occurring waters. I would be particularly interested in the justification used to include silver, mercury, alkalinity, and dissolved methane as indicators in surface waters.

Comment 3(d)

Dissolved gas concentrations in water are highly dependent on temperature and pressure. In a slow-moving stream or lake environment, methane is generated by methanogenic organisms in the bottom deposits and released to the water. Cooler water can contain a higher concentration of methane (and other gasses) than warm water, so an difference in methane concentrations would be seen if a summer

sample is compared to a winter sample, simply because of the change in water temperature. It would seem to be dangerous to draw any conclusions of drilling or fracking-caused pollution based simply on methane concentrations in a surface water, unless the concentration numbers are converted to a percent saturation value, adjusted for temperature. In a related issue, methane concentrations in confined aquifers can be higher than in shallow surface water simply because of the higher pressure. It is not an insignificant challenge to collect representative repeatable gas samples from water from pressurized zones.

Comment 3(e)

BTEX is called out in the list of analytes. It is unclear whether the use of the cumulative acronym for benzene, toluene, ethyl benzene, and total xylenes is intended to imply their use as a single indicator, or simple shorthand for the individual constituents. If use as a single indicator, it would perhaps be more useful to employ sampling and analysis for Total Petroleum Hydrocarbons (TPH) rather than singling out these four chemicals.

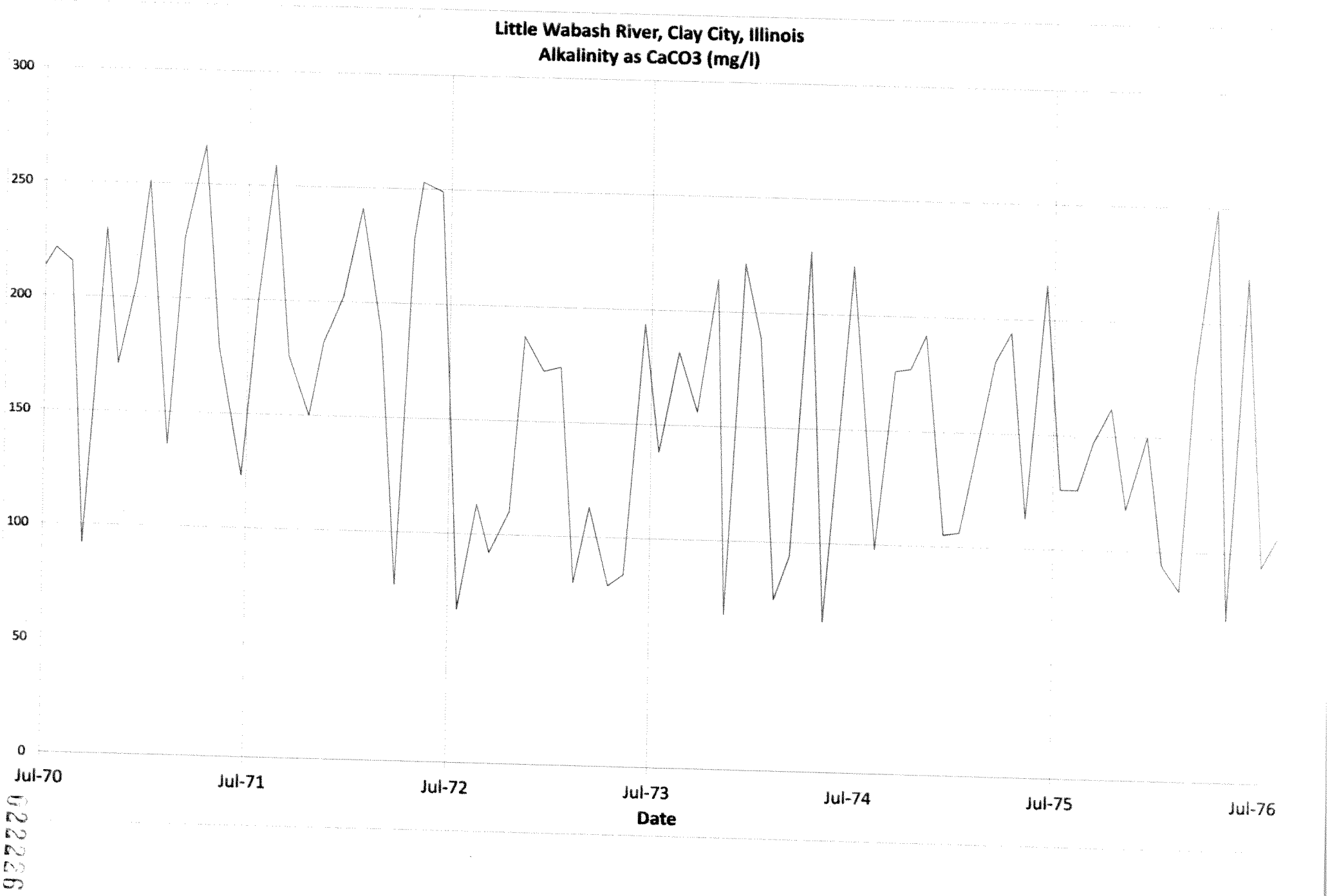
Comment 3(f)

Chemicals in common use in agriculture (or the likely impacts of those chemicals) should not be used as indicators of pollution or diminution caused by hydraulic fracturing, even if that indication is rebuttable. Specifically, agricultural lime will cause increases in alkalinity, which will then gradually decrease over time. Thus, alkalinity is a poor choice as an indicator in monitoring hydraulic fracturing operations.

Issue 4: Unclear Meaning / Editing

Comment 4

Section 245.600(a)(8)(C) references a non-existent subsection (a)(7)(D). The correct reference appears to be (a)(8)(D).


Little Wabash River, Clay City, Illinois
Alkalinity as CaCO3 (mg/l)
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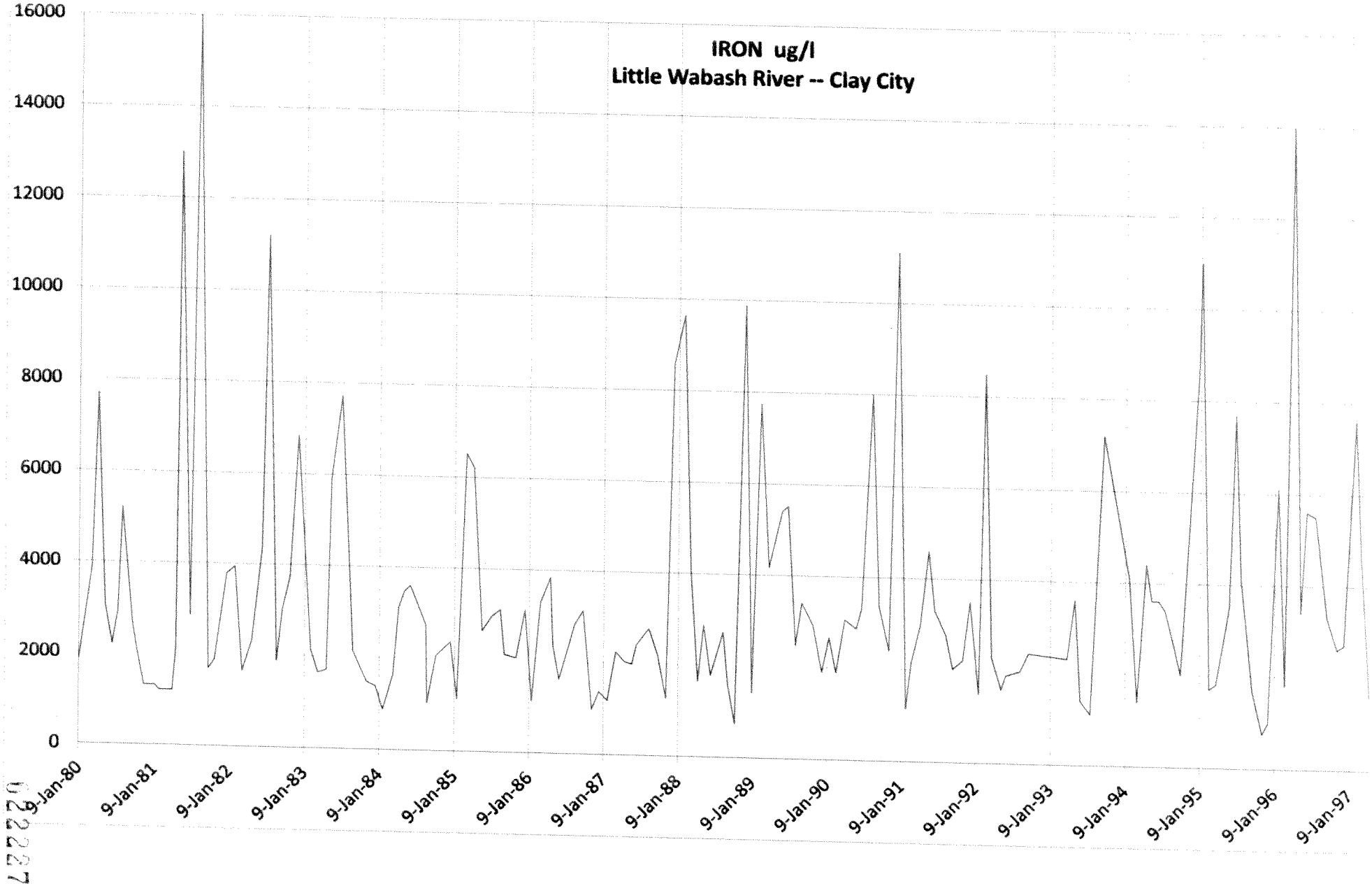
922220


IRON ug/l
Little Wabash River -- Clay City
16000
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9-Jan-97

As a resident of a rural area of Southern Illinois, at Lake of Egypt, in Goreville township I am distressed that disregard for local units of government in decision-making power regarding whether they should allow fracking to take place within their jurisdictions is not being taken into consideration in Subpart B: Registration and Permitting Procedures of the IDNR Proposed Administrative Rules. The realities of the geography of the proposed fracking areas in Illinois are that little if any fracking is anticipated within the town and cities of the region. Most of the fracking operations, according to leases already obtained, are slated to take place in very rural areas of the state.

So, my questions are:

- If prior notification and an intentional process of permitting is required for cities and towns, why are the Proposed Administrative Rules silent on any notification in regards to the neighborhoods and rural areas in these affected counties where often there are no cities nearby?

- Why should citizens residing in the rural counties of Illinois have less input on fracking permits than those living in town and cities?

- As these rules are currently written, doesn't this create a group of second class citizens with fewer rights in their ability to participate and ultimately determine the type and quality of energy extraction allowed in their neighborhoods?

- How is that legal under our state's Constitution? Aren't we all guaranteed the same rights to a healthy environment in this state?

- Don't all people of the state of Illinois have the right to know when harmful substances are being injected and stored in their soil, expelled into the air they breathe, and transported across their often poorly maintained rural roads?

I believe these are our rights and should be considered by IDNR. Thank you for listening to my concerns.

Dr. Sherry Sullivan
Goreville, IL

Sherry Sullivan, Ph.D.

022223

Comment for Submission to IDNR Regarding Proposed Fracking Rules in Illinois

I am a Jackson County resident and landowner. I rely on well water and am only 10 miles away from Johnson County which over half of has been leased for fracking. My comment pertains to the need for more rules to protect our most precious resource in Southern Illinois-our natural areas and the Shawnee National Forest.

The only ruling that I am aware of which would offer any protection to these natural areas is in Section 1-25: Setbacks and Prohibitions which states that a well site can not be within 750 ft. of a nature preserve or a site on the Register of Land and Water Reserves. Seven hundred and fifty feet seems very inadequate. There are twelve nature preserves just in Johnson County and many other designated natural areas in or nearby Johnson County such as Fern Clyffe State Park, Giant City State Park, Dixon Springs State Park, Crab Orchard National Refuge, Bell Smith Springs National Landmark, Millstone Bluff National Register Site, Burden Falls and Bay Creek Wilderness Areas, and Lusk Creek National Natural Landmark. Do we really want fracking allowed near all of these highly visited areas? Are oil and gas companies going to be allowed to drill underneath these areas since they can frack a mile or more horizontally? We need rules clearing stating that drilling in and underneath state parks, nature preserves, wilderness areas, etc. is prohibited. ~~In addition, we need clear rules saying that fracking in state parks is prohibited~~. We also need rules that will help protect tourism in Southern Illinois which is one of our areas largest sources of income. For example, tourists will not want to come to Southern Illinois if there are 200 foot high rigs right next to one of our beautiful vineyards or if when looking out from Garden of the Gods one can see hundreds, thousands of rigs on the horizon. We need some kind of ruling protecting our scenic views. The National Parks Conservation Association also lists the following issues that should be addressed when considering fracking near natural areas: the impact of new roads and other expanding infrastructure; water usage that could deplete key waterways; air, land and water pollution; and the disruption of sound -scapes and night skies.*

022229

In closing, if our state gets fracked like Colorado or North Dakota where their landscapes have been scarred with drill pads and rigs, we will have ruined our most precious resource here in Southern Illinois. It is critical that IDNR take these matters into account when revising the rules. or better yet declare to our IL Legislators that there aren't enough rules possible to ensure the safety and integrity of our environment, our livelihoods, and our homes here in S. Illinois.

Written by Lucia Amorelli, 1690 Sheppard Ln., Makanda, IL, 62958 (12/03/2013)

*2013 Publication of the National Parks Conservation Association

022230

Marilyn J. Smerker, Ph.D.
1936 Pine St
Murphysboro, IL 62966

Comment:

Subpart H: High Volume Horizontal Hydraulic
Fracturing Preparations and Operations (245.800-245.870)
Section 245.850 Hydraulic Fracturing
Fluid and Hydraulic Fracturing Flowback Storage, Disposal or Recycling,
Transportation and Reporting Requirements

Subsection (d)(1) of Section 245.850 provides for testing of fracking fluids only one time--during the early flowback stage--and only for "naturally occurring radioactive materials."

Problem: The proposed rules include no follow-up requirements or standards if testing shows radioactivity levels in flowback to be high. In otherwords, these proposed rules treat flowback the same whether it is highly radioactive or not! DNR knows that naturally occurring radioactivity material occurs in Illinois oil and gas operations. See 62 Ill. Admin. Code secs. 240.860(e)(3), 240.861(k)(1)(C).

Revisions Needed: The rules must specify how flowback AND produced water will be treated if they test positive for radioactivity. The rules should also require that the requirements of the Illinois Low Level Radioactivity Waste Management Act be followed.

I am a member of RAKE, Union of Concerned Scientists & SAFE

Dennis CONNOLLY

Hilton Garden Inn

~~I feel~~ I contend there is gross negligence on behalf of IDNR to not consider the real significant threat to our public ~~health~~ and our future generations, in regard to hydraulic fracking.

Consider the permanent chemical (trade secrets) contamination of our aquafirs by the fracking chemicals used, the release of radon and methane into drinking wells. ~~(carcinogenic)~~

As a member of the Union of Concerned Scientists I charge the IDNR with gross negligence in regard to the potent greenhouse gas methane release. I also charge the IDNR with criminal complicity by not outlawing this practice of hyperbolic bombing the seismic sensitive nature of our region being between two major fault zones

Your guidelines reveal complicity as far as earthquake allowances of up to 4.5 on the reicter scale. Where hydraulic fracturing has occurred a pattern of earthquakes follow. Most recently Texas, also quakes have happened in Arkansas & Ohio. The state of Illinois has not researched

2232

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(1) Wastewater Storage
Earthquake Zones

Radon Mitigation

Radioactivity

Flow back

Chemical ~~contamination~~ contamination

Regional ~~genocide~~ ecocide of SI for shortterm economic gain

① Wastewater Storage

② Seismicity

③ Water Quality Monitoring Subpart D

④ Risk of Large Scale Environmental Disasters

022233

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Why is IDNR not asking or considering these future scenario conditions?

Consider the drought of just 2 years ago and the millions of gallons of water needed to frack each well. This is reason enough to halt this practice. Now consider the chemical contaiminates used and I contend you haved failed to regulate or even think of the spill potential involved in a barge or truck accident.

Your fines are wholey inadequat and show a degree of criminal complicity.

Now please consider our political leaders and the oil & gas money involved, Has their decisions to allow this exploitation been disproportionally influenced?

Consider a moratorium there is no need for immediate

Dennis Connell, Fukashima 20234

Consider the EPA in regards to

rush into this! does not even monitor radiation

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I have lived in So. Illinois for over 30 years and have come to call it home. I love it here, mostly because of our natural resources—the forests, wet land, lakes and waterways—which are also what supports our tourism industry. My daughter was born and has grown up here. Protecting our environment is extremely important to us, and we try to be responsible stewards of the environment.

I have reviewed most of the proposed administrative rules, and I do not feel they serve the best interests of the land or the people of So. Illinois, but rather serve the oil and gas industry. I have yet to see the independent research on which these rules were based—research conducted by impartial entities rather than the oil industry or the government that protects this industry and subsidizes it with my tax money.

There is clear evidence that fracking operations contribute to earthquake activity, even in areas not prone to quakes. We in So. Illinois live atop the intersection of 2 fault zones which do have a significant history of earthquakes—including one so severe it cause the Mississippi River to flow backwards. The fines proposed for earthquake related issues are less than a slap on the hand to companies with annual profits in the millions and billions. They are akin to a penny fine for a DUI, a nickel for a DUI with injuries, and a dime for a DUI caused fatality. There is no deterrent here. Furthermore, the land cannot be returned to its original condition following earthquakes. Currently earthquake insurance for homeowners is exorbitant; if fracking operations start, it will likely be unavailable—and we certainly cannot count on the industry for compensation.

Let's turn to water issues. First, we will not be informed of what chemicals will be injected into and "stored" in our land--though we do know it contains heavy metals, such as lead and strontium, as well as other known carcinogens. We do have clear evidence that aquifers—streams, rivers, wells—will be contaminated. Like quake damage, this contamination cannot be undone. I have had a lifelong dream of retiring to a cabin in the woods, and I was finally able to purchase this in beautiful Union County. I have a stream on my land, and my water is well water, which will be at high risk of being poisoned by fracking operations. This will make my property not only uninhabitable—for me or the wildlife, but also unsalable—and there is no compensation for this.

I encourage the IDNR to institute at least a temporary moratorium on fracking in Illinois until adequate independent research on associated risks is completed. What damage is done in the rush to exploit the earth cannot be undone. The people of Illinois deserve—and demand—that this research be done to protect not only the public safety, but also the quality of life of all its inhabitants.

Mary Swanson

5728 Michael Lane

Carterville, IL 62918

carma62918@yahoo.com

December 3, 2013

022235

Sabrina Hardenbergh
SAFE, Sierra Club, Independent Health and Healthcare Researcher
1 Hardenbergh Road
Carbondale
Illinois
62902
sabrina@midwest.net
SUBPART G: CHEMICAL DISCLOSURE; TRADE SECRETS
245.730 Trade Secret Disclosure to Health Professional

First, the trade secret disclosure to health professionals is encumbered by IDNR and other business work schedules for information to flow in a timely manner, especially in the case of a poison control emergency. While the rule describes a procedure for information flow to occur, the first barrier is to catch IDNR during business hours; not good if the affected patient presents at the end of the weekly business cycle, and must wait until opening of the next business week. Then they must wait two hours further for the trade secret holder to report the toxic substance, before they must wait further for other medical diagnostics and treatment. 1) Will there be a 24/7 Crisis Hotline at IDNR for relaying this trade secret disclosure, 2) why isn't there a 24/7 Crisis Hotline at the trade secret holder's location, 3) will this be remedied before the Administrative Rules are approved, and 4) if not, what will IDNR/State of Illinois do to remedy this and when? Will all health professionals be able to obtain a list of the trade secret chemicals in their client catchment area prior to emergency presentation of an affected patient, as the Rule is unclear about this in the non-emergency sub-section?

Secondly, this disclosure of trade secrets to health professionals, an affected patient, and affected patient's family specifies that a confidentiality agreement will be signed, creating a gag order. Consequently, health professionals and public health professionals will be gagged as to their education role and Hippocratic Oath to "Do No Harm", the public will not be informed to take precautions against the specific toxic substances, and the recurrence of the same emergencies will replicate, creating further suffering in the local population, tax already limited time of health professionals and their office staff, as well as cause further injustices when it comes to appropriate worker's compensation, personal injury, and product liability cases for which the affected patient ought to be compensated for damages to life, livelihood, property, the family's consortium, and all manner of related damages. How will IDNR remedy this failure in disclosure to facilitate justice for the affected patient, family and community?

Why is this health related section not longer and much more detailed with respect to OSHA and clinical guideline related protocols, and what will be done to remedy this?

When we first heard fracking was coming to Southern Illinois, we went to the Murphysboro courthouse. Our protests upset the man they sent from the fracking industry. When our meeting was over, I heard him say under his breath that he'd recently lost a child and if he had the strength go through that he could go through anything. He was making his heart hard. He was trying to withstand the pain because he had a job to do and I'm sure if he didn't do it, someone else would.

Later he made a presentation at SIU, I watched how far he'd come. There were three industry representatives to take the heat. This time when everyone got upset, he smiled at the discomfort and stuffed his emotions to keep them under control. We looked at how he was handling things and we knew he was just following orders. He was not listening to us. He was a brick wall.

And that's something you're going to want to get a handle on if you're going to be a leader and not a follower. You can't afford to burnout, you can't afford to have your joy and enthusiasm disappear, you can't afford to feel as if nothing seems meaningful, you can't afford to feel alienated from other people.

Karma's a funny thing, but it doesn't work the way most people think it does. The idea of karma is you continually get the lessons that you need to open your heart. To the degree that you didn't understand in the past how to stop protecting your soft spot, how to stop armoring your heart, you're given this gift of life lessons to help you open further according to Pema Chodron. It's called the Wisdom of No Escape once you recognize we're all in this together you can find better solutions based on mutual wisdom.

Other industries simplify their complex interconnected problems by working backwards to solve problems. Other industries experiment with a bottom up management style to solve problems in the field. Why does the oil and gas industry get to dictate how things are going to go? I've got 10 reasons to tell you why they are going to have to change too.

Bob Mitchell
Makanda IL
622237

1. All steel rusts. All concrete cracks. Louis Allstadt former Executive VP of Mobil Oil confirms it. He says

Sooner or later the steel casing is going to rust out, and the cement is going to crumble. We may have better cements now, we may have slightly better techniques of packing the cement and mud into the well bore to close it up, but even if nothing comes up through the fissures in the rock layers above, where it was fracked, those well bores will deteriorate over time. And there is at least one study showing that 100 percent of plugs installed in abandoned wells fail within 100 years and many of them much sooner.

2. Earthquakes go hand it hand with fracking. Since we are between two active earthquake zones, you're going to want to take a look at Brent Ritzel's report. I handed out 50 copies tonight. You can also get it on the internet. I'll give you the link.

3. The USGS says we should treat water as if it is all coming from the same source because it does. We can't keep it separate. Fracking operations dump 10 trillion gallons of toxic liquids into Class II injection wells using broad expanses of the nation's geology as an invisible dumping ground.

4. The Bonds the fracking companies put up to do the work won't be high enough to clean up the environment; if anything goes wrong it'll be up the taxpayers to flip the bill.

5. Your infrastructure is going to be undermined. That goes for roads, utilities, health care and police.

6. Crime rates are going to sky-rocket ... especially crimes against women because of the kinds of people these jobs attract. They are drifters with high risk jobs, working hard and playing harder.

7. Fracking is a 24 hour round the clock operation. The noise is not going to end. The lights are never going to go off. The industrialization of your lives will be complete. I guess with fracking industrialization operations a mile apart, there

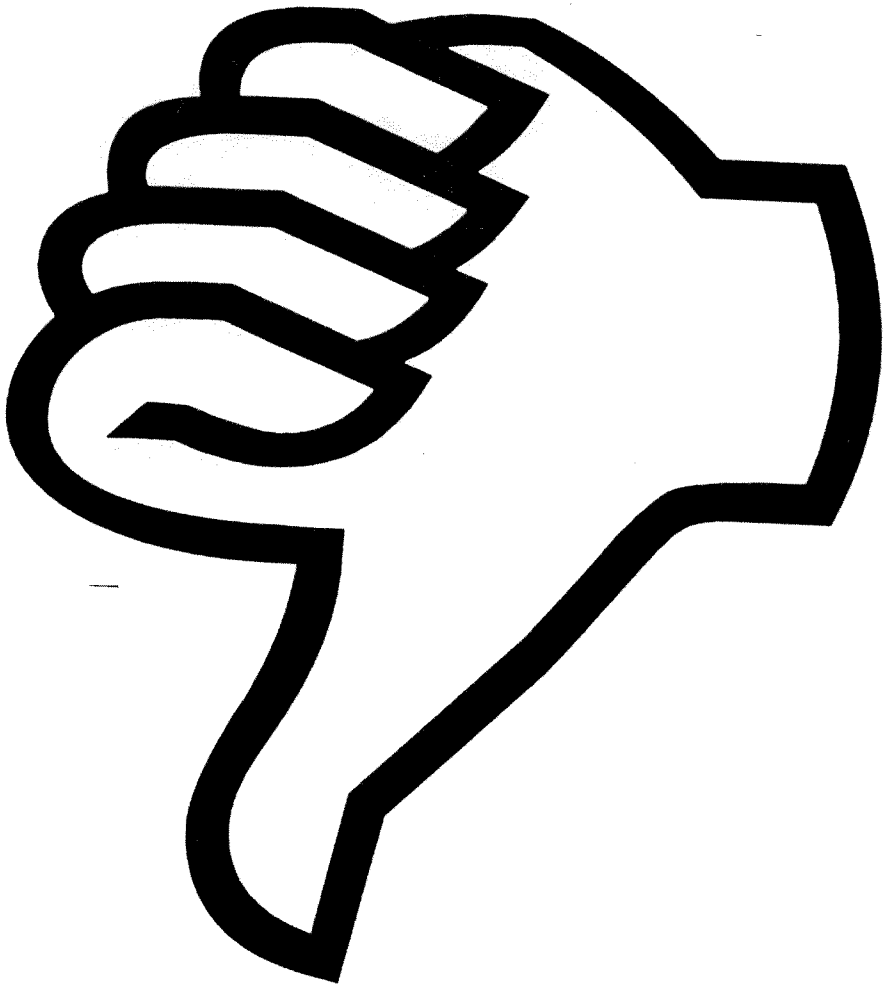
won't be much wilderness left even in rural areas. National parks aren't even safe.

8. When the fracking lottery comes to town, some people will make money selling their mineral rights. Some people will get poisoned. Doctors won't know what people are poisoned with because the industry doesn't want to divulge the ingredients of its fracking effluent. They're protected as trade secrets. Rest assured with hundreds of toxic ingredients, fracking effluent is even more toxic once you put those poisons together. Many ingredients have 10 serious health side effects on their own.

9. And you know we're going to run out of clean water, right? According to the United Nations, water use has grown at more than twice the rate of population increase in the last century. By 2025 and estimated 1.8 billion people will live in areas plagued by water scarcity with two thirds of the world's population living in water-stressed regions as a result of use, growth, and climate change.

10. The IDNR regulating radiation doesn't keep it from hurting anyone. If we want to find out what's beyond the Thunderdome, we're going to have to take care of the next generation. Not give our children harder problems to solve than the ones we have.

THUMBS DOWN!



Please include effective measures that test water to identify pollution & ensure that any remediation costs are borne by the actual polluter.

Derek Tennant

022241

tomas Grabalski

Add Regulation for operations to cease work during hours when the sun is not up. operations produce light & noise pollution, this pollution ~~can~~ will effect humans and wildlife sleep.

022242

I too do not want to develop cancer later in life. I too do not want children in IL to be born with Autism and other birth defects because of toxic air and water. I too do not want damaged and devalued property from earthquakes and unusable water. One thing a fellow activist brought up is Springfield sits on coal mines and with fracking all around us we may end up like Bayou Corne or something worse.

I think all citizens in IL would be here if they knew the truth and our media wasn't corrupted and sponsored by corporations, such as, the oil industry. The truth is only on independent media Free Speech and Link tv. Cable does not cover these stations only satellite tv and livestreams online. ..Global Warming is not a hoax!

Scientists have reported in July 2013-the Arctic ice sheet that keep the carbon stable lost 41,000 sqare miles EVEREY SINGLE DAY and kilometer wide columns of methane gas were bubbling up from the ocean floor. James Hansen from the NASA Goddard Institute was quoted in the NY Times as saying if this dirty oil is refined it will be "end game" for the planet. Dr. Michael Benton Professor of Paleontolgy of Bristol University and others have used the term for the carbon increase in our atmosphere as "the 6th mass extinction." And Peter Ward Professor of Geophysics at the University of Washington refers to global warming in the context of agriculture disruption as a "civilization tipping event" and when interviewed on the Thom Hartman Show he said "we have in the longer term mass extinction and in the shorter term human population extinction." It doesn't matter how safe the wells are or how safe the oil is transported! It is the refining of the oil that is going to kill us.

In 1893, Rudolf diesel invented an engine that ran on peanut oil. After he died mysteriously, his invention was discredited and the public was told his engine only ran on petroleum. In 1970, Tom Ogle of El Paso invented a vapor engine that got 100 miles per gallon. After he died mysteriously, his engine disappeared and his invention was discredited. It is obvious, years ago, we had the technology to have clean air and a healthy planet. These inventors were obviously whacked. Our government is being ran by the mob. If the fines IL imposes on the oil industry are less than the profits the oil industry makes. Il we still have toxic air and water. The Oil industry has a track record of eating the cost of fines. If the Devil knocks on your door you slam it in the devil's face you don't invite him in to negotiate. I obviously think we should have a moratorium on fracking.

Because of citizens United our politicians are dependent on corporations for their campaigning, therefore I government is ran by the mob and GREED is destroying our planet and our health...because of this, my gut feeling is nothing will come of this hearing and what I came here to say is ...Bill McKibben is right it is time to engage in a militant type of civil disobedience and put our bodies between the machines about ready to frack our state and the whores willing and ready to operate that machinery. If we do not take the attitude fire me, imprison me, kill me...we are already dead!

Testimony of JoAnn Ivy Conrad Frack Free Downstate Organizer

13 Red Oak Lane

Springfield , Illinois 62712

I testify before you as a guardian of mother earth. I am a daughter, a mother, a sister, a wife, and a teacher. I earned a BA from Illinois State University in the area of Legal Studies. I hold a Master's in Education from the University of Illinois. I have advocated for stronger fracking regulations. I have read the rules and the science. I was present when Fraktavist from around the country came to Illinois to beg politicians and the Sierra Club to wait for health studies. I would jokingly say we needed to wait for the legislators to actually read the science we were providing as well as the rules themselves. Sadly a vote was taken and the science and the rules were unread, undigested and rushed through. The legislators said they had no time to read either because the boat left the dock. And then they got on even though the ship is destined to sink!

The author and now famous environmentalist Aldo Leopold held "A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise." And instead of doing right the State of Illinois is doing wrong.

If the regulations are allowed by Governor Quinn, The Madigan's and the IDNR to be left loose and non-specific lives and land will be endangered.

Progressives know that short term jobs and long term suffering is wrong. Union workers know that Fracking jobs are highly dangerous. Communities have suffered, declined and been permanently abandoned ...left to turn to a ghost town. We are in a rush to take the quick way out along a road that will soon be torn apart, over a river that will soon be dead, and through the woods that will soon be gone. I refer now to the Chicago hearings. There when summarizing no mention of RADIATION was made. RADIATION is a major concern! IF you lived near Clinton as I do you would worry about RADIATION and EARTHQUAKES in a fault zone there are DANGERS.

Per the US EPA,
"Because TENORM contaminated wastes in oil and gas production operations were not properly recognized in the past, disposal of these wastes may have resulted in environmental contamination in and around production and disposal facilities. Surface disposal of radioactive sludge/scale, and produced water (as practiced in the past) may lead to ground and surface water contamination." www.epa.gov/radiation/tenorm/oilandgas.html
Workers and residents in the area and in the community are at risk from this frack field waste radiation.
Again from the EPA;

Oil/Radiation Waste Disposal Workers – Disposal workers include those who work directly on top of uncovered waste sites. Potential risks assessed for these workers include exposures due to direct gamma radiation and radioactive dust inhalation. In addition, they may inhale radon gas which is released during drilling and produced by the decay of radium, raising their risk of lung cancer. Workers following safety guidance will reduce their total on-site radiation exposure.

Nearby Residents/Office Workers – Risks evaluated for members of the public working or residing within 100 meters of a disposal site are similar to those of disposal workers. They include: direct gamma radiation, inhalation of contaminated dust, inhalation of downwind radon, ingestion of contaminated well water, ingestion of food contaminated by well water, and ingestion of food contaminated by dust deposition.

Risks analyzed for the general population **within a 50 mile radius** of the disposal site include exposures from the downwind transport of re-suspended particulates and radon, and exposures arising from ingestion of river water contaminated via the groundwater pathway and surface runoff. Downwind exposures include inhalation of re-suspended particulates, ingestion of food contaminated by deposition of re-suspended particulates, and inhalation of radon gas. Individuals working inside an office building inadvertently constructed on an abandoned NORM waste pile also face the threat of radiation exposure. Potential risks assessed for the onsite individual include exposures from direct gamma radiation, dust inhalation, and indoor radon inhalation.
www.epa.gov/radiation/tenorm/oilandgas.html

In the Public Act 098-0022, there is a requirement to test the flowback water for radioactivity at least once, and the ground adjacent to the storage tanks and any hydraulic fracturing flowback reserve pit must also be measured for radioactivity. These requirements are admissions that radioactivity might be found in the drilling debris and the fracking waste, and by deduction also the produced water. In the Public Act there was no mention of testing the produced water from wells for radioactivity, but it was not disallowed either, it was merely not mentioned.

In the Public Act there is a broad mandate for the IDNR to enact rules that protect the public health and the environment:

Section 1-75 High volume horizontal hydraulic fracturing operations.
(a) General.
(2) All phases of high volume horizontal hydraulic fracturing operations shall be conducted in a manner that shall not pose a significant risk to public health, life, property, aquatic life, or wildlife.

Section 1-83 Order authority.
(d) The Department may issue conditions within any order to protect the public health or welfare or the environment.

The IDNR has not followed through with their expressed responsibilities in Public Act 098-0022 to protect the public health and environment, as it relates to radioactivity brought up by fracking. The IDNR has only allowed for the testing of the flowback water, and the adjacent ground, and has not regulated the testing of the produced water for radioactivity, this will certainly impact on the health of the public and the workers on and around the frack fields.

Section 245.850 Hydraulic Fracturing Fluid and Hydraulic Fracturing Flowback Storage, Disposal or Recycling, Transportation and Reporting Requirements
d) Testing of hydraulic fracturing flowback shall be completed as follows:
E) gross alpha and beta particles to determine the presence of any naturally occurring radioactive materials.

e) Before plugging and site restoration required by Section 245.1030, the ground adjacent to the storage tanks and any hydraulic fracturing flowback reserve pit must be measured for radioactivity (Section 1-75(c)(7) of the Act).

There is no mention in these rules what happens differently if the flowback water or the ground adjacent to the storage tanks and any hydraulic fracturing flowback reserve pit measures positively for radioactivity. No standards listed, no levels at which emergency procedures are begun, no reporting to IEMA, no mention of worker's protections, no changes in the disposal methods for the radioactive waste water, no limiting the use of Class II wells, (which are not designed for radioactive waste), no alterations in modes of transportation, there is nothing operational that changes following a finding of radioactivity from a frack well, including no mention of mandatory reporting to the landowner.

Section 245.850 Hydraulic Fracturing Fluid and Hydraulic Fracturing Flowback Storage, Disposal or Recycling, Transportation and Reporting Requirements

g) Except for recycling allowed by subsection (i), hydraulic fracturing flowback may only be disposed of by injection into a Class II injection disposal well that is below interface between fresh water and naturally occurring Class IV groundwater (Sections 1-75(c)(8) and 1-25(c) of the Act). The Class II injection disposal well must be equipped with an electronic flowmeter and approved by the *Department.*

--We request that the IDNR look at these rules again, surely there are standards in place for LLRW, including the "IL Low-Level Radioactive Waste Management Act", (420 ILCS 20), that would apply in a situation where the flow back water is found to contain radioactivity.

It stands to reason that if the flowback water from a well site tested positive for radioactive elements that the produced water from that same well site would also test positive for radioactivity, but there is nothing in the rules that calls for the testing of the produced water. This is a serious regulatory lapse that will likely cause damage to the public health and the environment.

Section 245.940 Produced Water Disposal or Recycling, Transportation and Reporting Requirements

The permittee shall dispose of or recycle produced water in accordance with the requirements of this Section:
a) Surface discharge of produced water onto the ground or into any surface water or water drainage way is prohibited (Sections 1-75(c)(9) and 1-25(c) of the Act).
b) Except for recycling allowed under subsection (d), produced water may only be disposed of by injection into a Class II injection well that is below interface between fresh water and naturally occurring Class IV groundwater (Sections 1-75(c)(8) and 1-25(c) of the Act). Unless used for enhanced oil recovery, the Class II injection well must be equipped with an electronic flowmeter and approved by the Department.
c) Produced water transfer operations from tanks to tanker trucks for transportation offsite must be supervised at the truck and at the tank if the tank is not visible to the truck operator from the truck. During transfer operations, all interconnecting piping must be supervised if not visible to transfer personnel at the truck and tank. (Section 1-75(c)(6) of the Act)
d) Produced water may be treated and recycled for use in hydraulic fracturing fluid for high volume horizontal hydraulic fracturing operations (Section 1-75(c)(8) of the Act).

There is another regulatory lapse in the lack of testing for radioactivity at the Medium Volume Horizontal Hydraulic Fracturing wells as described below, yet these wells will involve the same possibly radioactive shale layers as the High Volume wells, therefore the same risks of encountering radioactive waste water and debris exists, but nothing is mentioned in the rules.

Section 245.1200 Medium Volume Horizontal Hydraulic Fracturing Completion Reports

a) For any horizontal hydraulic fracturing operations where all combined stages of a stimulation treatment of a horizontal well are by the pressurized application of more than 80,000 gallons but less than 300,001 gallons of hydraulic fracturing fluid and proppant to initiate or propagate fractures in a geologic formation to enhance extraction or production of oil or gas, reporting under subsection (c) is required (Section 1-98(a) of the Act).

To protect workers, residents and our environment from serious radiation exposure from fracking. waste we ask that the IDNR modify these rules in consultation with IEMA to:

– Require monitoring of all the fracking debris, the flowback water and the produced water for all of the radioactive elements, throughout the full drilling and production phases of each well, from the cradle to the grave. The problem is that the lab tests for radioactive elements, in order to get accurate readings of levels, can take up to 21 days, but this kind of accurate testing of debris, flowback and produced water is absolutely essential.

– If positive for radioactivity these lab test results should stimulate a chain of requirements and additional regulations from the IDNR that would alter the containment, trucking, OSHA standards and waste handling requirements for each frack field well to comply with LLRW requirements. Including the requirements of notifying and protecting residents in the area from exposure to this radioactivity.

--To monitor the fields for significant radioactivity continuously, hand held or mounted radiation monitors should be provided on the frack fields by the industry, in waste areas and at the drill sites to warn the workers and residents if serious amounts of gamma radiation are being brought up. These monitors are not specific for exactly what radioactive elements are present but they could serve as a general alarm.

– Crucial OSHA radioactivity protections for the workers should be required when radiation alarms have shown that radioactivity is present; dosimeters, respirators, protective clothing, amongst other protections should be provided from the drilling companies to the workers.

– Radon being the 2nd leading cause of lung cancer is an important environmental radioactive toxin and radon monitors should be required on the frack fields. If radon is found to be released from the frack fields, in large quantities, then precautions for workers and residents should be initiated.

– Radon is inert and is not burned off by flaring, to release it into the air in large quantities is a very serious public health concern. The Fed. Gov. recognizes this and has notified the fracking industry that in 2015 they can no longer flare off gas from the frack wells, they must capture it. Wouldn't it be smarter if we start off with the best practices in IL?

– Enforcement of the requirements for working radiation and radon monitors, radioactivity testing and OSHA and community standards for dealing with radioactive waste and radon, including public notice should be strict, with heavy fines for any violations.

– Solid fracking debris that has tested high for radioactivity should be prohibited from being buried on any frack well site in simple lined pits, even if the landowner agrees. This is insufficient to protect land owners and future generations. The waste should be prohibited from being shipped to a typical landfill and mixed with non-radioactive material, this could lead to contamination of ground water, when water soluble radium leaches out of the landfill.

– Fracking waster water should not be processed at any municipal water treatment plant. The practice has ended in PA, where radioactivity was found being discharged from these plants into rivers and streams. Municipal water treatment plants are not able to remove radioactive elements.

– Class 2 injection wells are not a good long term storage option for fracking waste water that will stay radioactive for thousands of years. With age, and in our earthquake zones - with even small seismic events, the well casings degrade and the integrity of the wells fail. The IDNR has kept very poor records of these wells prior to 1990, many of the older ones are in very questionable condition. With the loss of integrity, a Class 2 well can not be counted on as a long term repository for significant radioactive waste. We recommend their use for fracking waste water be banned.
www.scientificamerican.com/article.cfm?id=are-fracking-wastewater-wells-poisoning-ground-beneath-our-feet

– Best practices in WVA are being utilized, and all fracking debris in WVA is being dealt with as LLRW and shipped to specific landfills which have separate LLRW containment facilities. All fracking waste should be assumed to be LLRW until proven otherwise. Mandate the use of LLRW containment facilities for all frack field debris and waste water.

Radioactivity Associated With Hydraulic Fracturing

Submitted by Frack Free Illinois,
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Public Act 098-0022, and the draft rules released by the IDNR are not adequate to protect Illinois residents in regards to the radioactivity of shale and the handling of fracking waste water and debris. The industry and geologists know that all shale is radioactive, it is only a matter of degree. A typical shale formation has 100 API units of radiation; the New Albany Shale has in some cases up to 200-400 API units above the normal shale background. It is by measuring the gamma ray signatures of rock that geologists know where they will find shale.

Naturally occurring radioactive material is NORM and when it is brought to the surface with fracking it becomes TENORM. The principal radionuclide of concern in NORM/TENORM is radium-226, a member of the uranium series, which is present in natural soils in concentrations of about 1 picocurie per gram (Ci/g). However, NORM/TENORM radioisotopes may be present in different layers of rock in varying concentrations, and most fracking waste contains radium-226 concentrations that are much higher than 1 pCi/g, and may be as high as tens of thousands of pCi/g. Frack waste water is radioactive, toxic brine when it returns to the surface, in some areas it has been found to contain up to 16,000 picoCuries per liter of radium-226. The discharge limit in effluent for Radium 226 is 60 pCi/L, and the EPA's drinking water standard is 5 pCi/L.

The current maximum contaminant level ((MCL) as set forth in 40 CFR 141.66(c)) for radium-226 and radium-228, combined is 5 picocuries per liter of water, and for solids 5 picocuries per gram. Please also keep in mind the half-life of Ra-226 is 1600 years. www.epa.gov/radiation/tenorm/oilandgas.html

When fracking brings up massive amounts of shale debris, flowback water and produced water it brings with it elements like uranium, radium-226, radium-228, bismuth-214, lead-214, actinium-228 and thallium-208 and many decay daughters such as radon gas. Fracking exposes our surface water, air, land and residents to these radioactive elements. This radioactivity does not go away when it hits the surface, and with radium's extensive decay chain the harmful radioactivity persists in our environment for many, many thousands of years.

How radioactive is this fracking debris and waste water from Illinois shale?
We can not tell how radioactive every well's waste is until we test all of the waste water and the drilling debris, but we know from the experts that our shale is more radioactive than most. Out east, the Marcellus and Utica shale formations have concentrations of radium-226 that are 30 times background and up to 3000 times the allowable levels of EPA exposure. The academics from across the country are telling us to assume all the fracking debris and fracking waste water will be radioactive.

The fracking wells do not become less radioactive as they continue into production, actually the reverse is true, the initial flowback water from the wells (first 7-10 days) will be less radioactive than the produced water, which gets pumped out of wells throughout the estimated 1-3 years of production from that well. But Public Act 098-0022, and now the inadequate IDNR draft rules, indicate that the only radioactive monitoring that is required is on the initial flowback water, not the more radioactive produced water - which gets more radioactive the longer the water sits in the shale, and they will not be mandated to test the fracking drilling debris, which can also be radioactive.

This is potentially a fatal flaw for frack field workers, truckers and residents living near enough that they might get exposed to this radioactivity. In 2005 The National Academies of Science released an over 700-page report on the risks from ionizing radiation. The BEIR VII or seventh Biological Effects of Ionizing Radiation report on "Health Risks from Exposure to Low Levels of Ionizing Radiation" reconfirmed the previous knowledge that there is no safe level of exposure to radiation—that even very low doses can cause cancer.
http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=11340

Frack field waste is LLRW, (Low Level Radioactive Waste), and should be disposed of per the "IL Low-Level Radioactive Waste Management Act" (420 ILCS 20). That designation would carry its own requirements by the federal and state agencies. The reality is that this waste is radioactive and toxic and it must be treated as such or there will be negative environmental and public health consequences.
http://pubs.usgs.gov/fs/fs-0142-99/fs-0142-99.pdf

Dominic Giafaglione Carbondale IL, 62901

Abandoned Oil/Gas Wells Serving as Conduits to Contaminate Aquifers

In the proposed rules, Sections 245.210 (at (a)(6) and at (a)(7)), 245.815 (at (b)) and 245.1010 introduce an arbitrary and grossly inadequate measure to protect against so called frack hits, when new fractures from fracking intersect with aging and abandoned wells. According to these sections, to be permitted in Illinois under the proposed rules, operators would only have to worry about frack hits on existing wells that are within 750 feet of the proposed well (measured as the minimum distance between any two points along two respective boreholes). And even then, they only need to consider those existing wells if they were drilled to within 400 feet of the rock formation that the new well would target. This regulation is obviously inadequate. Just this past September, in New Mexico, fracking at one well blew fluids out of a neighboring wellhead located a half mile away. That's 2,640 feet away!

Also, independent research shows that, horizontally, fractures can extend at least 2500 feet from a well bore (1). In addition, expert testimony in court cases has provided evidence that frack fluids have been found 3000 feet from the well bore (2). Obviously, only requiring the plugging of old wells 750 feet from the well bore is grossly inadequate, especially since abandoned oil wells are an obvious and known source of aquifer contamination, here in Illinois. Indeed, the residents of Hardinville, Crawford County, Illinois, already know the cost of aquifer contamination from new fractures intersecting with old oil wells (3).

Finally, the vertical distance of 400 feet is not adequate, since connection with natural vertical faults and fractures is a possibility. It only takes one instance to cause long-term damage to an aquifer.

Revisions Needed: Require the plugging of abandoned oil or gas wells up to 4000 feet horizontally from any well bore, and regardless of how deep or shallow the old oil/gas well is reported to be. Further investigation needs to be done to provide a means of locating abandoned oil/gas wells which are not registered with the state of Illinois, owing to a decades-long history of oil drilling in many parts of Illinois.

Citations:

(1) Horwitt, Dusty, Senior Counsel, Environmental Working Group. August 3, 2011. Cracks in the Façade: 25 Years ago, EPA Linked "Fracking" to Water Contamination.

(2) IN THE SUPREME COURT OF TEXAS, No. 05-0466, Coastal Oil & Gas Corp. and Coastal Oil & Gas USA, L.P., Petitioners, v. Garza Energy Trust et al., Respondents, On Petition for Review from the Court of Appeals for the Thirteenth District of Texas, Argued September 28, 2006.

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(3) Kelley, Matt. "Oil Pollution a Bitter Harvest for Illinois Farmers." *Los Angeles Times*, January 22, 1997. http://articles.latimes.com/1997-01-22/business/fi-20986_1_oil-wells

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December 16, 2013

Robert G. Mool
Illinois Dept. of Natural Resources
One Natural Resources Way
Springfield, Illinois 62702-1271

Dear Mr. Mool:

The following are comments I intend to present at the public hearing called by the INDR on fracking rules for Illinois, to be held today, December 16, 2013, in Effingham, Illinois.

Thank you for the opportunity to speak. My name is Kay Ahaus, I live at 200 Rinderer Rd, near Trenton and Highland, Illinois, some 80+ miles from Effingham.

We live in rural Madison County within a half mile of an oil well that was drilled last summer. In August, the derrick went up overnight and came down within a few days. Yesterday I saw the landowner whose property this well is on and asked him what kind of activity was planned there. He said, "I didn't know the the oil company has been on my land. Next time they come out, call me." The landowner, by his own recall, "leased this parcel to an oil company from Ohio 1-2 years ago." But, the well was drilled by the oil company without his knowledge. By the way, this land sits in the middle of the flood plain and floods every spring we've lived near Trenton. There is no way this well can be safely fracked.

I've been concerned about how the oil and gas industry does business since my friends built their home in Edmond, Oklahoma. When they bought the land, they didn't know it was near an improperly capped oil well. Within a year they had to truck in their water to drink, bathe and eat. Seems the well leaked containments that rendered their water unpotable, and their land full of poisons. The wife developed breast cancer and the husband had severe heart and lung problems. There was no family history for their disease. Within a short time they had to move from their home they spent a lifetime of savings to build. So yes, I'm concerned that this industry is now in Illinois ready to risk our environment and our lives for their profits.

Fracking is a Faustian bargain. It has yet to prove that more energy will be produced from fracking than goes into the process, especially when social and environmental concerns are included in any equation. Will the public cost be worth the public benefit? I ask that the IDNR require each permit requester to prove it. If we are to risk water, air, land, wildlife and human endangerment, the end result had better be worth it to the public. Where are the public safeguards in these rules, to protect the public from **radioactive and chemical waste**? These must be stringent rules written by IDNR, approved by the public and monitored daily for infringements. There is no way radioactive materials can be controlled in open pits permitted by the proposed rules. All wastes must be in housed in air tight containers, and even then containers, when exposed to water in a flood plain leak.

022251

Here are my list of caveats to fracking and questions regarding the proposed IDNR rules:

IDNR should require **public hearings** be held in the county in which the companies request to drill. The hearings should be held at a time of year when the weather is not in climate, and at time when holidays and vacations do not impede public input. The public should have a fair opportunity to give time and effort to comments. **Everyone who comes to a hearing should be allowed to speak. Otherwise, it cannot be a public hearing.** Hearing by lottery is not a truly a public hearing. I ask that these hearings continue into February to allow for enough time and enough citizen input to fairly respond to these proposed rules.

1. To date, how many wells have the companies proposed to drill? How many are likely to be approved? How close will each well be to other wells? Where is all the shale located in Illinois? The rules should set limits to the number of wells in a given area as the more wells in an area, the more likely fracking will result in an earthquake. I spoke recently with a friend in Oklahoma where fracking has brought more earthquakes than prior to such drilling. She stated they seem to come in clusters, and there were three last week of 3-4.5 magnitude.

2. Where are these wells to be? Be specific. Show us maps and give us specific locations.

3. How many of these wells have already been drilled and capped? Where are they? Are they in Madison County? In my area? There has been no public notice in the papers or other public media in my area. In fact, the wells are being drilled without the knowledge of landowners on whose property the wells are drilled. Certainly, those landowners within a 2 mile radius have no idea of such drilling. Yet we all will be affected.

4. **The IDNR should inform all landowners within a 3 mile radius of a frack well that a permit is requested for their area. This should be done prior to beginning the 60 day permit process. A public hearing should be held in the county in which a well permit is requested. The 1500 foot area the proposed rules require is grossly inadequate to protect the public.**

5. **How will IDNR monitor the air, water, land, chemical output of theses wells? How often will these wells be monitored? By whom and who will pay this cost of monitoring? The oil companies should pay the State of Illinois to properly monitor fracking wells. The oil and gas industry is the richest industry in the United States. They are also the most subsidize energy industry in the United States. All monitoring costs should be on them, but the monitors should be state employees. The tax payers should not be on the hook for the costs of the oil companies doing business in Illinois. Air quality, land, water quality, effects on wild life and humans all should be monitored weekly.**

6. **In addition, the oil companies should have a well thought and well publicized plan to prevent contamination within a 3 mile radius of a well, and this must be in place at day one of the request for a permit to frack. We know that contamination will not stay within 1500 feet of the well. Once in the ground water or in the air, no telling how far radiation and chemical pollution may travel. A 3 mile radius from a well is a reasonable area to hold companies responsible for.**

7.An National Public Radio story on December 8 reported the oil and gas industry still uses the same techniques to clear spills as they used in Alaska with Exxon Valdez spill. They used those same inadequate clean up plans in the Gulf with the BP spill. Both areas are still seeing evidence of oil pollution years and decades after these incidents. So the IDNR must require rules that prevent contamination in first place, and very strict penalties if contamination does occur. What are the specific containment plans the IDNR will enforce if contamination occurs? Before fracking can begin, the public must see and analyze these plans.

8.The paltry penalty in the proposed rules is insufficient to deter negligence. The minimum fine for any infraction should be $5 million/per person, and go up from there to pay for damages to humankind, land, air and water, and wild life that may occur depending upon the severity of contamination and the number of humans affected and the amount landowners at risk. Even then, the money may not fairly compensate those injured by such potentially monumental consequences as leak of uranium or volatile organic compounds.

9.What are those chemicals and processes used in fracking? The companies claim this is privileged information. Really? I worked in a hospital for 35 years. We were required to have a MSDS (Manufacturers' Safety Data Sheet} for every single substance, even rubbing alcohol, within all departments in the hospital or clinic. These had to be easily accessible so that employees knew where and when to find the data sheets in case an employee or patient became contaminated. But, the chemicals that the oil companies use are far more dangerous than any used in medical facilities, yet we don't know what they are. We do know there are nearly 400 different ones, and that they have the potential when mixed to cause earthquakes, a lifetime of health hazards of air, water and land pollution. IDNR must require the equivalent of an MSDS for the oil industry before they frack, and let the public know where this information may be found on line and in the newspapers, radio and television. The public needs to know what risks the oil companies are willing to expose us to.

I suspect that if the general public knew what's in these trade secrets, no one would want a well drilled any where, much less near their homes or on their lands.

CONTMINATION BY RADIOACTIVITY IS A LIKELY POSSIBLITY WITH FRACKING IN ILLINOIS. With the large amounts of uranium that occur naturally in our geology, the high pressures used in frack are guaranteed to let loose uranium. The rules must be clear on monitoring and enforcement of uranium.

THE RULES MUST NOT ALLOW OPEN PITS FOR WASTE STORAGE. RADIOACTIVITY AND VOLATILE ORGANIC COMPOUNDS ARE SURE TO LEAK INTO THE WATER AND THE AIR. IDNR MUST INSIST ON CLOSED SYSTEM OF CONTAMINANT CONTAINMENT.

10. FRACKING MUST BE PROHIBITED IN THE FLOOD PLAINS AND ALONG THE NEW MADRID AND WABASH EARTHQUAKE FAULTS. THESE AREAS CAN NOT BE MADE SAFE FOR FRACKING.

Thank you for allowing me to speak. Kay Ahaus

Testimony at December 16, 2013 IDNR Hearing on Fracking

Kay Ahaus 200 Rinderer Rd, Trenton, Illinois 62293

Thank you for this opportunity to speak on fracking. Thank you for rescheduling last week's public hearing due to ice/snow storms.

Comments on this process:

Public hearings: IDNR should hold public hearings in the county in which a company requests to drill a well. These hearing should be held when the weather is not in climate and holiday/vacation times do not impede public input. I ask that these hearings be extended to March 31.

Everyone who signs up to speak at a public hearing should be allowed to do so. Otherwise, it is not a public forum. A hearing by lottery is not a true public hearing.

My knowledge of oil and gas companies:

1. **An Ohio oil company drilled a well on a neighbor's land this past summer without his knowledge. The well went up overnight and came down in a few days. Wells are being drilled without** Knowledge of the landowner
2. **Oklahoma has seen lots of fracking. There is an increase in earthquakes there since the inception of fracking. There were 3 last week with a magnitude between 3.4-4.**
3. **Friends built their dream home on a property in Edmond, Oklahoma, unknowlingly near poorly capped oil well. After living there for a brief period, they had to haul drinking, bathing, and cooking water daily. She developed breast cancer for which there was no family history, and he developed heart and lung disease. They moved because of the poisons in their water and on their land.**

Now to the IDNR rules:

1. **Fracking has not been proven to yield more energy than is required to drill and operate the well. The rules should require a feasibility study that shows each well will produce more energy than it uses. The public is put at health and financial risk for very questionable gain.**

2 Ahaus December 16, 2013

2. Where in the rules are the public safe guards to protect the public from radioactive wastes, chemical wastes, and volatile organic compounds? What are the safe limits for these pollutants, if there exists such a safe limit? These should be spelled out in the rules.
3. Fracking wastes cannot be stored safely in open pits. The rules must outlaw open pits.
4. The rules must include storage in sealed underground tanks.
5. Fracking creates all sorts of pollutants. If these are not stored on site then they will have to trucked, railroaded or sent by barge down our inland waterways, including the Mississippi River. Rules on transport from the site must be included and be specific. must
6. How many requests to drill wells have you received to date? How many of those are you likely to approve? How close together will these be? The more concentrated these wells, the more likelihood of earthquakes. The rules should limit the # of wells per 10 mile radius
7. Since these wells extend in a two mile radius, and we know air and ground pollution travels even greater distances, the rules should require that all landowners within a 3 mile radius be informed that a well request has come to the IDNR before the 60 permit process begins for a frack well. day
8. How often will these wells be monitored for air, water, land quality, and pollutants? The rules should require the oil companies to pay for the cost of such monitoring. Each well should have air, water, and land monitors running 24 hours each day; that data should be sent to the IDNR Office in Springfield to be monitored by the IDNR. No monitoring means no safety plan for the public.
9. The oil industry continues to use the same containment and cleanup plans they used in the Exxon Valdez disaster in the 1970's. They didn't work in the BP spill in the Gulf and they won't work with fracking process. The rules need to spell out in detail containment and cleanup plans. When IDNR has finished with such rules, public hearings need to be held in each county where these wells will be located. We need to see what the oil companies will do ~~if~~ when something goes wrong. a beneficia

10. The (for penalties) rules need to be much stiffer for penalties when spills, earthquakes, radiation and other contamination occur because of fracking. The minimum fine should be $5million per person/per event, and go up from there depending upon the severity of damages.

11. What's in those chemicals used in fracking? The hospital and medical clinics across the US have MSDS (Manufacturers' Safety Data Sheet) for every chemical used in their facilities, even down to such benign substances as vaseoline and rubbing alcohol. The wealthiest industry in the world can surely be required by IDNR to submit a data sheet on each of its nearly 400 chemicals. These data sheets should be posted on the IDNR website for all the public to see, and be produced at the site by the oil companies if a spill occurs. I suspect that if the public knew the chemicals involved in fracking, no one would want a frack drilled anywhere, much less within 2 miles of ~~the well.~~ them homes + well

12. There is much uranium underground in Illinois. Contamination with radioactivity from uranium is likely, especially if frack wells are drilled on earthquake faults and flood plains. IDNR rules should prohibit fracking on earthquake faults and flood plains.

Summary: All landowners within 3 miles of a well should be informed that the permit process is requested and a public hearing on such a well be held prior to the start of the permit process. No open pit storage facilities allowed. All fracking ~~limited~~ prohibited in flood plains and on earthquake faults in Illinois.

The oil/gas industry will pay for all monitoring, containment and cleanup

Kay Adams

12/16/13

022236

Testimony by
Food & Water Watch Supporter
Regarding Hydraulic Fracturing Regulatory Act administrative rules
Tuesday, December 3rd 2013

The Illinois DNR has given the fracking industry, too narrow a definition of who may be considered as "a person having an interest that is or may be adversely affected" by fracking and who will thus have the standing to request public hearings. This is essentially Illinois gave to the fracking industry permission to limit the public's ability to request hearings on proposed drilling and fracking sites.

According to Section 245.270, a person requesting a hearing must "directly demonstrate" that they have "a real property interest in or use resources of economic, recreational or environmental value that may be adversely affected." People living further than 1500 feet from a proposed fracking site are also allowed to request a public hearing, but the rules are unclear about when requested public hearings would be granted.

Just because the frack pad is not on my front lawn does not mean that it will not affect my home, my life, or my livelihood. If our neighbors lease their land, or if forced pooling means that I am forcibly included in a drilling site, we are limited by the IDNR's definition.

Though it may move quite slowly, groundwater moves, so any contamination of shallow groundwater from drilling or fracking operations would move with the slow flow of groundwater. Which direction will it flow? How far will it flow? Getting that answer would require careful scientific study, at significant expense.

Clearly, the state cannot expect individual landowners to undertake such studies before they request public hearings, yet they would have to in order to argue for a public hearing to just begin the process of ensuring that the water in their wells is protected.

And of course, Illinoisans can expect the oil and gas industry to badger the hearing officers tasked with deciding on whether or not individuals have standing to request public hearings.

022257

Clay County Highway Department

Michael R. Quandt, P.E.

Clay County Engineer

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To Whom It May Concern:

In regards to the "Hydraulic Fracturing Regulatory Act", Section 245.210, and on behalf of Clay County, Illinois, I submit the following request for incorporation into the act:

A "Road Repair and Maintenance Agreement" shall be executed between the Applicant and the impacted highway authorities (county, township, road district system, and municipal street system) of the transportation route whereby the Applicant shall be responsible for the cost and execution of interim repairs of the roadway and drainage system impacted by the Applicant. Additionally, within a time period approved by the highway authorities, following the conclusion of the development activity, the Applicant shall be responsible for the cost and execution of the permanent repair and restoration of the transportation route impacted by the Applicant, to be restored minimally to the condition of the transportation system prior to development activity.

Prior to the Development Activity, the Applicant shall post a bond, cash deposit or other surety in a form satisfactory to the proper Authority to cover the costs of Development Impact caused by the Development Activity on the Development Route by Applicant. Further when the bond, cash deposit, or other surety is established in a form satisfactory to the proper Authority it shall be accompanied by a proper form of assignment of the monetary instrument to the Authority, in form satisfactory to the proper Authority, which restricts the Applicant's ability to withdraw funds before the Authority releases them and allows the Authority to draw on the funds in the event of the Applicant's default.

If you have questions or comments regarding my comments regarding the Hydraulic Fracturing Regulatory Act, do not hesitate to call. Thank you.

Yours truly,

Michael R Quandt

Michael R. Quandt, P.E.
Clay County Engineer

MRQ/jn

022253

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December 5, 2013

RE: IDNR Administrative Rules for Illinois Hydraulic Fracturing Regulatory Act, or Public Act 098-0022

Thank you for the opportunity to provide comments on behalf of Prairie Rivers Network and our members in opposition to the current version of the proposed administrative rules to implement the Illinois Hydraulic Fracturing Regulatory Act, or Public Act 098-0022. Prairie Rivers Network is the state affiliate of National Wildlife Federation, a non-profit organization that strives to protect the rivers, streams, lakes and groundwater of Illinois and to promote the lasting health and beauty of watershed communities. Much of our work focuses on how environmental policies are implemented and enforced in Illinois in order to protect our environment and ultimately, our health.

IDNR's proposed rules are weaker than the regulations passed in June and are not protective of our clean and abundant water supplies. Prairie Rivers Network shares these comments as the basis for our opposition to the current draft of the rules:

1. Stronger protections are needed against water pollution. This includes full disclosure of all chemicals used, not just those that are considered to be "indicators". This is important for adjacent well water users who may need to identify and track contamination and it is also important for medical professionals and first responders who must be able to access chemical information on a 24-7 basis if an accident occurs.

2. No long term storage of fracking wastewater. Tanks should be appropriately sized to allow for sufficient storage for both flowback and produced water. Wastewater should be removed within 7 days of placement rather that 7 days after fracking operations are complete, as stated in the law.

3. Rules must include a requirement that ALL high volume hydraulic fracturing operations be subject to the law. For example, operations that

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engage in high-volume hydraulic fracturing and were established prior to the regulatory act, should not be exempt from following the law and implementing rules. These protections were made into law in order to protect our drinking water supply, our shared resources and our health and no exemptions are merited.

4. Ensure public participation in the permitting process for both new and renewed operations. Every significant revision to the proposed operation's permitted plan must require a public input process. Too often, we see members of the public unable to participate because the permittee has gamed the system through amendments of previous applications.

5. Increase penalties for non-compliance so they serve as a deterrent, not just a cost of doing business.

We understand that no amount of regulation can ever make fracking fail-safe, but the stronger Illinois' regulations are, the better protected our communities, water supply, air quality, and health will be.

Thank you for your consideration of our comments. Prairie Rivers Network hereby urges denial of the current version of the high-volume hydraulic fracturing administrative rules.

THE LARGE AREA OF LIGHTS IN THE UPPER LEFT-HAND CORNER OF THIS PICTURE IS NOT A CITY - IT IS THE BAKKEN OIL FIELDS OF NORTH DAKOTA.

PUBLIC COMMENT - VITO MASIRANGELO

I believe hydraulic fracturing of shale to release entrapped hydrocarbons can be successful and environmentally sound if done properly. In many states problems have arisen because proper procedures were not followed, either by errors in the permitting process or in the operating process.

On pages 127-128 there is an outline of the penalties for permit and operating administrative violations. Permit administrative violations penalties range from $50 - $500 for four or more previous violations of the SAME rule. For operating administrative violations penalties range from $100 - $2,500 for five or more previous violations of the SAME rule. Additional penalties are incurred in addition depending upon the severity of the environmental impact.

I see a problem with the language on page 127 leading to the penalties. It states: "The Department may assess a penalty for an administrative violation as follows:"

I underlined the work may. This means that there is a real possibility that no penalties will be assessed.

An administrative violation regarding what is being pumped into the ground and possibly affecting groundwater can be violated numerous times and a penalty may be assessed.

On page 97 there is a Trade Secret Disclosure section relating to health professionals only. Does this mean that the person who has been poisoned does not have the right to know what chemicals were ingested?

In Section 240.796 I feel there is a problem operating wells within 6 miles of the epicenter of a magnitude 5 earthquake. A magnitude 5 earthquake is a serious geological event. Whether there is a green, yellow, or red alert it should be up to the Department to shut down a particular well as needed and not just notify the operator and leave it to the operator's discretion to continue operation. Many wells may be drilled into the New Albany Shale near or within the Wabash Valley Fault Zone. These wells could potentially contaminate not only the groundwater in the fault zone but also the nearby river systems. I oppose the siting of wells within all known fault zones in Illinois that have been mapped by the Illinois State Geological Survey.

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How much money are you receiving from oil & gas lobbists ?

Its your moral job to enforce the rules so strictly that no gas company will want to frack!

There is no such thing as safe fracking

Joyce Kaye
Bloomington IL
61704
022263
309 826-7554

Dying in a Fracking Wasted Land

D
Frack wells drill, are you listenin'
A
toxic waste pits are spillin'
A7 Em7 A A7
a horrible sight, we're cryin' tonight
Bm7 A D
dying in a fracking wasted land

D
these regulations are a big turd
A
don't protect us, its absurd
A7 Em7 A A7
we're singing our song, no we won't go along
Bm7 A D
dying in a fracking wasted land

Bridge:
F# B F#
In the forest they have built a frack well
F# B F#
they pretend that it is safe and sound
A D A
don't ya worry, you'll get used to that smell
A7 E A
and the poisons spreading all around

D
the situation is dire
A
industry's full of liars
A7 Em7 A A7
its time that we break the plans that they made
Bm7 A D
dying in a fracking wasted land

Bridge 2 (same as first)

(same chord progression as other choruses)

There'll be jobs if you're willing
to take part in the killin'
steal our water away, cuz a few men get paid
Dying in a fracking wasted land

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We Wish You a Frack-Free Christmas
(Tune: "We Wish You A Merry Christmas")

We wish you a frack-free Christmas
We wish you a frack-free Christmas
We wish you a frack-free Christmas
And a healthy New Year!

Good tidings to you and all of your kin
Good tidings..Stop Fracking!
Have a healthy New Year.

Oh bring forth a ban on drilling
Oh bring forth a ban on drilling
Oh bring forth a ban on drilling
Our earth is too dear!

We won't go until you stop this
We won't go until you stop this
We won't go until you promise
Clean water and air!

IPA is Coming to Town
(Tune: Santa Claus is Coming to Town)

You better watch out,
You better not try
Fracking our farmland,
We're telling you why
IPA is coming to town

We're making a list
Checking it twice
And if you're naughty,
We won't be nice
IPA is coming to town

Don't take oil and gas money
You know that they're all crooks
And if you do, then you'll look bad,
In our children's history books

Chorus

"The Twelve Days of Fracking"
(Tune: "The Twelve Days of Christmas")

On the 12th day of Christmas, Senate brought to me
A half-baked safety guarantee.

(Continue until 12th day...)

12 Flaming Faucets
11 Lying Lobbyists
10,000 miles of Pipeline
9 Rowdy Man Camps
80,000 Truck Trips
7 Major Blowouts
600 Lousy Leases
596 Toxic Chemicals!

4 Public Hearings
3 minutes to speak
2,000 pages
And a Half-Baked Safety Guarantee.

"Fracking Wonderland"
Sung to: "Winter Wonderland"

Fire bells ring, are you listening
In the lane, oil is glistening
A terrible sight,
the gas drills at night.
Walking in a fracked up wonderland.

Gone away is the bluebird,
they're all dead ain't no new birds
the pipes that they laid,
sent the wildlife away,
living in a fracked up wonderland.

In the meadow we can build a snowman,
Til Haliburton comes and knocks it down
they'll say: Are you leasing?
We'll say: No man,
there ain't no frickin frackin in this town!

Later on, we'll expire,
when our sink erupts in fire
To fight unafraid,
The plans that they've made,
living in a fracked up wonderland.

In the meadow we can build a snowman,
Til Haliburton comes and knocks it down
they'll say: Are you leasing?
We'll say: No man,
there ain't no frickin frackin in this town!

When they come and start to drilling,
it's not just us that they're killing
We'll frolic and play, when we run them away,
living in a fracked up wonderland.
living in a fracked up wonderland.
living in a fracked up wonderlaaaaaaand

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Santa Claus is Coming to Town

You better watch out,
You better not try
Passing bad rules
We're telling you why
Santa Claus is coming to town

We're making a list
He's checking it twice
And if you're naughty,
We won't be nice
Santa Claus is coming to town

Don't take oil and gas money
You know that they're all crooks
And if you do, then you'll look bad,
In our children's history books

Chorus

Santa Claus is Coming to Town

You better watch out,
You better not try
Passing bad rules
We're telling you why
Santa Claus is coming to town

We're making a list
He's checking it twice
And if you're naughty,
We won't be nice
Santa Claus is coming to town

Don't take oil and gas money
You know that they're all crooks
And if you do, then you'll look bad,
In our children's history books

Chorus

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And if you do, then you'll look bad,
In our children's history books

Chorus

Santa Claus is Coming to Town

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We're telling you why
Santa Claus is coming to town

We're making a list
He's checking it twice
And if you're naughty,
We won't be nice
Santa Claus is coming to town

Don't take oil and gas money
You know that they're all crooks
And if you do, then you'll look bad,
In our children's history books

Chorus

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SUBPART B: REGISTRATION AND PERMITTING PROCEDURES
245.210 Permit Application Requirements
a)
12) Well Site Safety Plan
A well site safety plan to:

A) address proper safety measures to be employed during high volume horizontal hydraulic fracturing operations for the protection of persons on the well site (Section 1-35(b)(12) of the Act) that complies with federal and State law;

B) address proper safety measures to be employed during high volume horizontal hydraulic fracturing operations for the protection of the general public (Section 1-35(b)(12) of the Act) that complies with federal and State law;

C) identify the presence of any hazardous materials used or stored at the well site;

D) provide contact information for all appropriate emergency responders; and

E) provide contact information of the applicant to be used by emergency responders.

Note that Public Act 098-0022, Section 1-35(b)(12) is as follows:

(12) a well site safety plan to address proper safety measures to be employed during high volume horizontal hydraulic fracturing operations for the protection of persons on the site as well as the general public. Within 15 calendar days after submitting the permit application to the Department, the applicant must provide a copy of the plan to the county or counties in which hydraulic fracturing operations will occur. Within 5 calendar days of its receipt, the Department shall provide a copy of the well site safety plan to the Office of the State Fire Marshal;

Both Public Act 098-0022, Section 1-35(b)(12), and IDNR Administrative Rule SUBPART B: REGISTRATION AND PERMITTING PROCEDURES, 245.210 Permit Application Requirements are vague as to employee

safety and conduct policy and enforcement by the hydraulic fracturing permittee and its sub-contractors. While these sections perhaps leave room for future regulations to enter into consideration, they must more specifically reference existing employment laws, dictated by OSHA, Illinois Worker's Compensation Commission (IWCC), Illinois Department of Human Rights, Illinois Wage and Hour, and so forth, especially as many of the hydraulic fracturing related companies are from out-of-state and may be less familiar with Illinois law. Additionally, IWCC requires employers pay insurance into workers' compensation, and this ought to be specified in this and other insurance sections of this Administrative Rule, since some employers dodge this making others pick up the costs. As for the OSHA rules, and other state and federal regulations such as the Toxic Substance Disclosure to Employees Act, as part of the employee training, workers should be made aware of the various chemicals and radioactive items that they may encounter during their work, and be made aware of the OSHA and other state and federal regulations for proper handling of such items. This will also require rewriting SUBPART G: CHEMICAL DISCLOSURE; TRADE SECRETS, so as to allow disclosure to all employees, as stated above per Toxic Substance Disclosure to Employees Act, and other similar regulations. Periodic retraining should occur at least once a year, whenever state and federal regulations dictate, plus whenever an adverse incident has occurred at the worksite and anywhere within the employer's organization (even if not at the particular worksite). Workers must not work overtime, as this may become a hazard to judgment while using hazardous chemicals, substances and equipment. The employer must provide employee health insurance, so as to not burden the federal or state government with healthcare costs which are highly likely in this hazardous industry. Please demonstrate that IDNR has had input and review by several employment and health law attorneys during the revision of these Rules. Please specify that the applicants for a permit present their employee conduct policy that demonstrates their training of employees in this policy regarding knowledge of risks, proper risk mitigation, self-conduct including alcohol and drug use, adverse event reporting, conduct monitoring protocol and reporting plan, and workers' compensation insurance, with specific reference to OSHA, IWCC, IDHR, and Illinois Department of Labor regulations, and any and all others that fall under federal, state and local employment, health property and environmental law.

OSHA:
https://www.osha.gov/SLTC/etools/oilandgas/index.html
https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=NEWS_RELEASES&p_id=22227

IWCC:
http://www.iwcc.il.gov/
http://www.iwcc.il.gov/insurance.htm
http://www.ilga.gov/legislation/ilcs/ilcs3.asp?ActID=2431&ChapAct=820%A0ILCS%A0310/&ChapterID=68&ChapterName=EMPLOYMENT&ActName=Workers%27%2BOccupational%2BDiseases%2BAct%2E
http://www.iwcc.il.gov/annualreport12.pdf

Illinois Dept. of Labor:
https://www.illinois.gov/IDOL/Pages/default.aspx
Employee: Safety: https://www.illinois.gov/idol/Laws-Rules/safety/Pages/default.aspx
Toxic Substance Disclosure to Employees Act https://www.illinois.gov/idol/Laws-Rules/safety/Pages/Toxic-Substance-Disclosure-to-Employees-Act.aspx

IDHR:
http://www2.illinois.gov/DHR/Pages/default.aspx