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Subject: [FWD: [DenverClimateStudygroup] Fracking articles in AAAS/Science Mag - PNAS and Industry (CRED) [3 Attachments]]

From: pebelanger@glassdesignresources.com

Date: Tue, Jul 15, 2014 2:26 pm

To:

Cc:

Bcc:

Attach: clip0001.jpg

clip0004.jpg

fracking overview Science-2014-Stokstad-1468-71 -highlighted opt.pdf

fracking opening article Science-2014-Malakoff-1464-7.pdf

hunting for a climate fugitive Science-2014-Kintisch-1472-3.pdf

All,

I just sent the following to the Denver Climate study group for discussion and subsequent replies; it's a closed group but you are welcome to join. Please see the following for more information; or contact me for later synopsis:

- <https://groups.yahoo.com/neo/groups/DenverClimateStudygroup/info>
- and <http://www.denverclimatestudygroup.com/>

I've generally argued that fracking can be done safely but feeling the main issue was mainly old well bores. That's addressed in the attached article and below, but what's coming to light in my mind is leakage issue behind casing that is still being evaluated but as you'll see of great concern.

To the email below I intended to add the following but forgot:

We know that CO2 emissions are lower in the U.S. as a result of the displacement of coal by Natural gas (NG) (methane) in generating electricity. Additionally, there are clean-air/health benefits in using NG vs. coal (fewer particulates, mercury, etc.). One needs to consider this in picking one's poison. And yes renewables are clean, but they are not going to be replaced overnight.

read on, and see attachments:

——— Original Message ———

Subject: [DenverClimateStudygroup] Fracking articles in AAAS/Science Mag - PNAS and Industry (CRED) [3 Attachments]

From: "pebelanger@glassdesignresources.com [DenverClimateStudygroup]" <DenverClimateStudygroup@yahoogroups.com>

Date: Tue, July 15, 2014 11:10 am

To: "denverclimatestudygroup denverclimatestudygroup" <DenverClimateStudygroup@yahoogroups.com>

[Attachment(s) from pebelanger@glassdesignresources.com included below]

All,

Back a couple years ago the list discussed methane leakage (Cornell studies: Cathles vs. Howarth, etc.). Now it's come up again enveloped in the fracking issue and the fight in Colorado as well for local setback control vs. state control.

Fracking:

FIRST:**CRED - Colorado for responsible energy development:**

An **Industry** perspective: <http://www.cred.org/> advertised in local papers, etc - and 1 of the associated YouTube links: <http://www.cred.org/>

SECOND:

Otherwise something that just came out in **AAAS/Science Magazine** based on PNAS studies:

In particular the **FIRST ATTACHMENT: Fracking overview Science-2014-Stokstad-1468-71 -highlighted opt.pdf**
The other two in there as fyi

from the June 27th issue, 2014



<http://www.sciencemag.org/content/344/6191/local/cover-enclosure.gif>

1ST ATTACHMENT LISTS ADDRESSES:

- no real concern for fracking itself not reaching water table
- some concern for old wells as conduit to ground water
- No concern that casing itself will fail
- REAL concern about cement behind pipe failing
- **Estimated 45% failure expected in NE Pennsylvania** - even it 1/2(that would be a real concern. See map / link below ~ 4000-5000' wells.
- Companies playing around with additives to address the situation cited.
- studies ongoing by 6x failure of fracked wells vs. conventional wells.

What I know Colorado it doing about it:

- Monitoring water wells within 1/2 mile before during and after
- requiring all new fracked well permits of known (all?) wellbores withing 1500' of proposed path

Questions:

- Are CBLs done before or after fracking?
- Would the vibrations from staged fracking travel up-line/up-pipe and start fracturing the cement behind pipe to explain greater casing (behind pipe) failure rate vs. conventional wells? Other hypotheses?
- Why greater failure rate in fracked wells vs. conventional?
- Any statistics of behind pipe failure rates in other areas/other formations (vs. 45% estimated failure in NE PA?).
- What are other states doing?
- Anyone have info on improved cementing?
- other questions/discussion

PNAS link - with abstract:

and this article link is from the Proceeding of the NAS: <http://www.pnas.org/content/early/2014/04/10/1316546111>
 I DO NOT have a subscription - can anyone get and share?

Toward a better understanding and quantification of methane emissions from shale gas development

[Dana R. Caulton^{a,1}](#),
[Paul B. Shepson^{a,b}](#),
[Renee L. Santoro^c](#),
[Jed P. Sparks^d](#),
[Robert W. Howarth^d](#),
[Anthony R. Ingraffea^{c,e}](#),
[Maria O. L. Cambaliza^a](#),
[Colm Sweeney^{f,g}](#),
[Anna Karion^{f,g}](#),
[Kenneth J. Davis^h](#),
[Brian H. Stirmⁱ](#),
[Stephen A. Montzka^f](#), and
[Ben R. Miller^{f,g}](#)
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Edited* by Barbara J. Finlayson-Pitts, University of California, Irvine, Irvine, CA, and approved March 12, 2014 (received for review September 4, 2013)

Abstract². Authors & Info³. S4. Metrics⁵. 6. Significance

We identified a significant regional flux of methane over a large area of shale gas wells in southwestern Pennsylvania in the Marcellus formation and further identified several pads with high methane emissions. These shale gas pads were identified as in the drilling process, a preproduction stage not previously associated with high methane emissions. This work emphasizes the need for top-down identification and component level and event driven measurements of methane leaks to properly inventory the combined methane emissions of natural gas extraction and combustion to better define the impacts of our nation's increasing reliance on natural gas to meet our energy needs.

Abstract

The identification and quantification of methane emissions from natural gas production has become increasingly important owing to the increase in the natural gas component of the energy sector. An instrumented aircraft platform was used to identify large sources of methane and quantify emission rates in southwestern PA in June 2012. A large regional flux, 2.0–14 g CH₄ s⁻¹ km⁻², was quantified for a ~2,800-km² area, which did not differ statistically from a bottom-up inventory, 2.3–4.6 g CH₄ s⁻¹ km⁻². Large emissions averaging 34 g CH₄/s per well were observed from seven well pads determined to be in the drilling phase, 2 to 3 orders of magnitude greater than US Environmental Protection Agency estimates for this operational phase. The emissions from these well pads, representing ~1% of the total number of wells, account for 4–30% of the observed regional flux. More work is needed to determine all of the sources of methane emissions from natural gas production, to ascertain why these emissions occur and to evaluate their climate and atmospheric chemistry impacts.

- [unconventional gas](#)
- [greenhouse gas](#)
- [hydraulic fracturing](#)

Footnotes

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Author contributions: P.B.S., J.P.S., R.W.H., M.O.L.C., and B.H.S. designed research; D.R.C., P.B.S., and R.L.S. performed research; D.R.C., P.B.S., R.L.S., J.P.S., R.W.H., A.R.I., K.J.D., S.A.M., and B.R.M. analyzed data; D.R.C., P.B.S., R.L.S., J.P.S., R.W.H., A.R.I., C.S., A.K., S.A.M., and B.R.M. wrote the paper; and B.H.S. designed and installed aircraft setup.

The authors declare no conflict of interest.

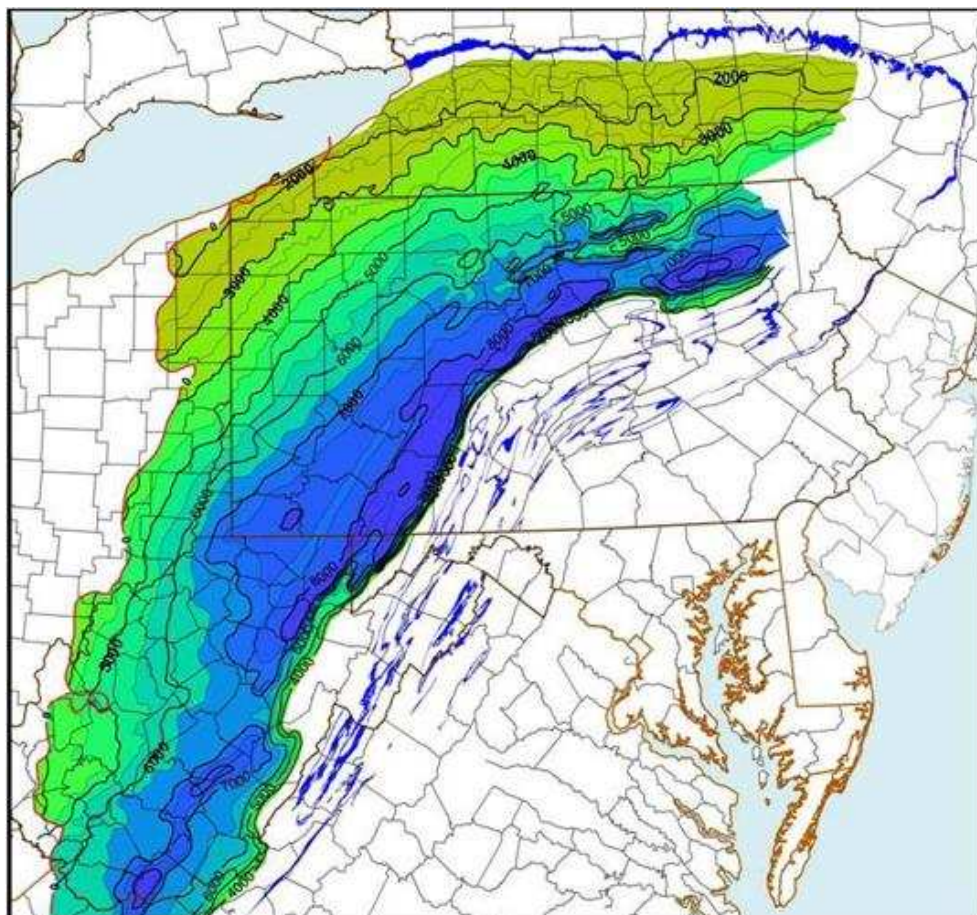
*This Direct Submission article had a prearranged editor.

This article contains supporting information online at www.pnas.org/lookup/suppl/doi:10.1073/pnas.1316546111/-DCSupplemental.

AAPG DATAPAGES:

Other link:
depth to Marcellus link from AAPG datapages:

<http://www.searchanddiscovery.com/documents/2009/10206wrightstone/images/fig05.htm>



Paul

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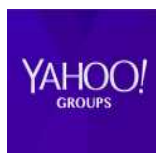
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3 of 3 File(s)

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Yahoo Groups

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