

## fracking inquiry

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**From:** Geoff Hokin [REDACTED]  
**Sent:** Monday, 19 February 2018 3:36 PM  
**To:** fracking inquiry  
**Subject:** supplementary presentation to the Enquiry  
**Attachments:** IOG letter to NT Fracking Task Force 19\_02\_2018.pdf; Presenting the facts debunking the myths - II.pdf

The Hon. Justice Pepper  
Chair  
Scientific Inquiry into hydraulic Fracturing in the Northern Territory  
19<sup>th</sup> February 2018

Dear Justice Pepper,

Please find attached to this email a letter from our company executive chairman further to the information provided on the 16<sup>th</sup> of February with a supplementary presentation to address a number of questions provided to him by the panel on the 5<sup>th</sup> of February 2018.

Regards,

Geoff Hokin  
Principal Advisor Exploration & Operations



Level 7, 151 Macquarie St, Sydney, NSW 2000

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19<sup>th</sup> February 2018

The Hon. Justice Rachel Pepper  
Hydraulic Fracturing Taskforce  
GPO Box 4396  
Darwin, NT 0801, Australia

Via Email: [fracking.inquiry@nt.gov.au](mailto:fracking.inquiry@nt.gov.au)

**RE: Presentation to the Panel for the Scientific Inquiry into Hydraulic fracturing in the Northern Territory Monday 5<sup>th</sup> February 2018.**

Dear Justice Pepper,

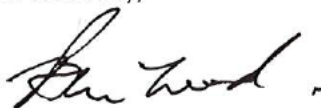
Further to my letter of the 16<sup>th</sup> February 2018, through the course of the sitting of the Scientific Inquiry in Darwin over the 5<sup>th</sup> and 6<sup>th</sup> of February, in addition to the questions raised regarding the hydrology of the McArthur Basin Central Trough, there were several off-line questions regarding, firstly the potential job generation of a globally significant shale gas resource, and secondly, the issues relating to comments on scientific research related to shale development.

To address the questions raised, based on my 10 plus years of experience in the Appalachian region in North East USA, I have attached a supplementary report (with some cross over to a similarly named report lodged to the Inquiry in May 2017) which provides: firstly, a headline summary of the extensive job creation that the Appalachia region (and the USA) has experienced over the past decade (since the commencement of full scale commercial exploitation of fracking in numerous shale basins); and secondly, examples of research based on the many aspects of fracking, that has either been widely accepted, or, retracted as being either false or misleading.

In relation to retracted anti-fracking research, for the example I used in my presentation on February 5<sup>th</sup>, I have provided references. In terms of examples of this research and the benefits of the development of shale, I have provided summaries and references to several major University research reports issued over the past 18 months. In addition, I have also provided examples of several other similar cases relating to poorly targeted or misleading 'scientific research' and litigation. Observations of the anti-fracking movement and their 'scientific research' is that it typically seems to be focused on 'proving' preconceived conclusions.

The information provided is not meant to be exhaustive but is supplied simply to demonstrate a series of observations from the USA. We will be pleased if the panel would accept this information as a supplementary submission to that recently made.

Yours faithfully,



Bruce Mcleod  
Executive Chairman & CEO  
Empire Energy Group

# Presenting the facts, debunking the myths - II

Imperial's support and vision to the safe development of the Northern Territory onshore shale gas industry

Presentation to the Northern Territory Hydraulic Fracking Taskforce  
February 2018

# Imperial operating in the McArthur Basin since 2010

- ✓ Imperial welcomes 'The Scientific Inquiry into Hydraulic Fracturing in the Northern Territory' which has demonstrated that the unconventional gas industry, managed responsibly, can bring very significant benefits to all stakeholders of our communities
- ✓ Further, Imperial wishes to acknowledge the attention to detail the Scientific Inquiry has shown in the Draft Final Report released in December 2017, and the thoroughness of the Panel shown at the final hearing in Darwin over the 5<sup>th</sup> and 6<sup>th</sup> of February 2018. This clearly demonstrates the commitment by the Panel on a wide range of issues
- ✓ Many of the Scientific Inquiry's recommendations in the Draft Final Report align with Imperial's approach to sustainable development of unconventional natural gas resources, including regional stakeholder engagement, environmental and cultural heritage protection

# McArthur Basin – Clean shale gas

Insights from other large scale shale development regions comparable to McArthur Basin.

Scientific facts from US show a safe proven way forward to safely develop onshore shale gas in the Northern Territory:

- ✓ Hydraulic fracturing (“fracking”) has existed since the 1940s. Over 1 million oil and gas wells have been fracked since then
- ✓ Globally there has not been a confirmed report of systemic ground water/aquifer contamination from shale fracking
- ✓ Fracking has been targeted by a small group of USA based anti-resource, lobbyists using false, deceptive and incomplete information
- ✓ Science, research and court cases consistently disprove the ‘myths’ around ‘fracking’

***Other than accidental surface spills, there are no proven cases that shale fracking has contaminated aquifers and/or groundwater***

***No other industrial process has that record?***

# Fracking Benefits Everyone

Anti fracking is a retreat from economic and environmental progress driven not by science, but fear-mongering

**Recent research declares fracking provides net benefits to local communities**

*“The discovery of hydraulic fracturing is widely considered the most important change in the energy sector since the commercialization of nuclear energy in the 1950’s. To date, almost all of the fracking activity has been confined to North America, yet even so it has upended many features of the global economy, global environment and international relations. There are substantial shale deposits both in North America and other parts of the world that have not been exploited to date so there is potential for further change.... to date local communities that have allowed fracking have benefited on average...”<sup>(1)</sup>*

*“This study makes it clear that on net there are benefits to local economies — which we believe is useful information for leaders in the USA and abroad who are deciding whether to allow fracking in their communities,” - MIT’s Chris Knittel, a co-author of the study...<sup>(1)</sup>*

# “Keep it in the Ground”/“Lock the Gate” ongoing campaigns to deceive the public

- ✓ Imperial's parent Company holds significant shale assets in New York State which have been adversely affected by the anti-fracking lobby. However, the anti-fracking lobby in Appalachia appears to be waning<sup>(1)</sup> as science overcomes scaremongering, and so local support declines. The anti-fracking lobby is now directing its resources to the obstruction of the natural gas pipeline industry
- ✓ A reason for evaporating support to the anti-fracking lobby is simple, science and results show that their '*catastrophic scenario*' has never eventuated. What is eventuating however, are new jobs, expanding agricultural and tourism sectors, increasing wealth, new industry and education infrastructure all flooding to regions (other than NY State), all blessed with shale resources
- ✓ This presentation is not meant to be exhaustive but does provide a number of observations from the US showing how this new, massive shale gas resource benefits both regional and nationwide economies. The presentation also provides a sample of typical misinformation spread by the anti-frack lobby. The author of this report has 10 plus years of experience observing the anti-frack movement and their misguided scientific research designed to support preconceived conclusions. The ingenuous and continuous supply of incorrect and/or misleading information to the public forum through either 'pay for play research' and/or false allegations demonstrates their unwillingness to accept the facts of the industry.



(1) Ohio Anti-Fracking Group Quietly Dismantles After “Disappointing” Study Results, Energy in Depth, January 6, 2017

# Development of Shale Gas – The Conclusion

The benefits of a responsibly managed shale development program

- ✓ Shale gas can be easy and effectively released from tight rock (shale)
- ✓ Scientific evidence proves that shale gas is environmentally clean and safe<sup>(1)</sup>
- ✓ Managed responsibly, shale development will bring many opportunities to the NT:
  - Economic independence for Traditional Owners
  - Improved regional infrastructure, health, education and training
  - New long term, regional industries and employment
- ✓ On a macro-level, the USA has clearly shown the positive effects the natural gas industry has in the reduction of CO<sub>2</sub> emissions and extensive job creation

**This presentation shows the significant social and economic benefits that responsible shale development could also bring to the NT**

Based on US data and information, the following is highlighted:

- The significant job creation in the USA driven by the natural gas industry
- The irresponsibility of the anti-frack movement which continually attempts to mislead the public by generating false and misleading 'research' and public statements.



# Business & Employment Opportunities

The Shale gas industry brings significant benefits to not just local regions blessed with the natural gas resource, but all communities associated with its development and utilization

# Fracking Benefits Everyone

A study by the Universities of Chicago, Princeton & MIT finds 'everyone benefits'

PAGE 8

***A new study by researchers at the University of Chicago, Princeton University, and the Massachusetts Institute of Technology (MIT) find the benefits of fracking outweigh the costs***

*The report titled "The Local Economic and Welfare Consequences of Hydraulic Fracturing<sup>(1)</sup>" - concludes communities affected by 'fracking' on average, benefit from the industry. The study, is the first USA nationwide study of its kind... Significant findings include:*

- ✓ *The study looked at nine different shale basins, "the most comprehensive assessment to date," according to the authors, and determined their conclusion using a "willingness-to-pay" metric.*
- ✓ *"Our estimates are based on the knowledge that communities currently have." "Based on what is currently known, the average community that has allowed fracking has enjoyed substantial net benefits." - lead researcher Michael Greenstone, University of Chicago.*
- ✓ *Benefits from fracking are significant at the macro level. "The application of fracking to develop oil and natural gas found in shale deposits has led to a sharp increase in US energy production and generated enormous benefits, including abruptly lower energy prices, a reduced trade deficit, stronger energy security and even lower carbon dioxide emissions in the power sector... Higher levels of domestic energy production have ... cut the trade deficit and increased energy security by reducing the amount of fuel purchased abroad"*
- ✓ *"Communities that have banned fracking would perhaps have seen less benefit" -Janet Currie, Princeton University, co-author<sup>(1)</sup>*

# NT beneficiaries to a controlled and responsible shale gas development program

## Traditional owners benefit:

- ✓ Royalties for on-ground expenditure
- ✓ Royalties on oil & gas sales
- ✓ Royalties on infrastructure
- ✓ Skills, jobs, contracting opportunities
- ✓ New business opportunities
- ✓ New infrastructure

## Regional population benefit:

- ✓ New jobs and industries to existing towns
- ✓ Replace industries that are in decline or closed (e.g. closure of Gove smelter)

## Pastoralists benefit:

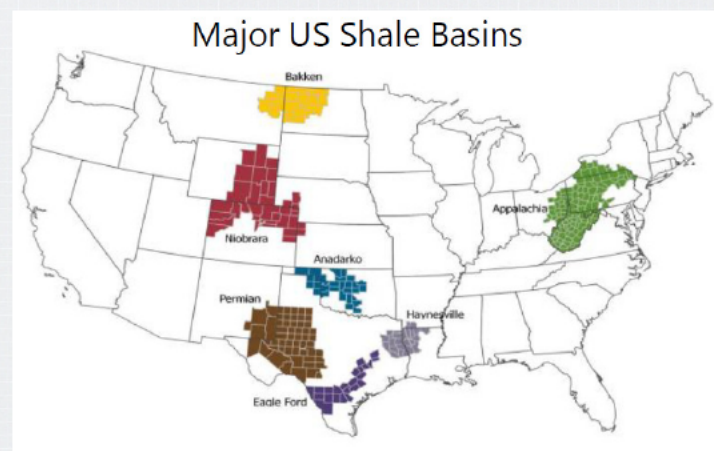
- ✓ New/improved roads and access
- ✓ Replace diesel generators with natural gas
- ✓ Jobs & contracting opportunities across tenements
- ✓ Improved education and medical facilities
- ✓ Employment opportunities for family members to stay in region
- ✓ Water quality monitoring bores handed over for water supply bores

## National benefits:

- ✓ Development of downstream industries and feedstock for industrial products
- ✓ Positive trade balance opportunities

# Does the Oil & Gas Industry provide value-add?

- ✓ In a study, conducted by PricewaterhouseCoopers (PwC) and commissioned by API<sup>(1)</sup>, the natural gas and oil industry supported 10.3 million US jobs in 2015
- ✓ According to the US Bureau of Labor Statistics, the average wage paid by the natural gas and oil industry, excluding retail station jobs, in 2016 was US\$101,181 which is nearly 90% more than the national average
- ✓ The study showed that the natural gas and oil industry not only supported 10.3 million US jobs, it added US\$1.3 trillion to the nation's economy in 2015
- ✓ The study found that jobs supported by the industry increased by 500,000 since 2011 and showed that all 50 states, whether producing or non-producing, continued to benefit from the industry
- ✓ Policies that promote the responsible development of the US's vast energy resources aren't solely economic, but also enhance US security and environmental stewardship
- ✓ Further, increased use of clean-burning natural gas for power generation and technology innovations have reduced US greenhouse gas emissions to near 30-year lows.



The Marcellus and Utica Shale supported 656,000 jobs and value added US\$90 billion to the State economies of Ohio (OH), Pennsylvania (PA) and West Virginia WV) in 2015

# So, more money, more jobs & less CO<sub>2</sub>

Shale gas WILL reduce CO<sub>2</sub> emissions by replacing coal as a energy source

The lifting of the temporary ban on fracking in the Northern Territory will transform the economy with little environmental impact

Indeed, lateral hydraulic fracturing of shale gas in the McArthur Basin has the potential to deliver (not in order of importance):

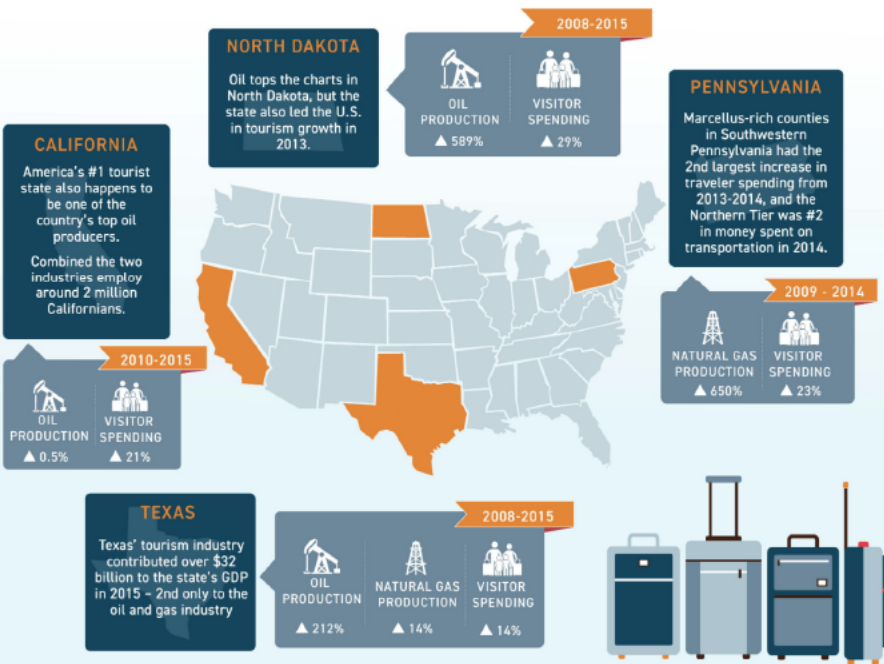
- ✓ Replacement of lapsed industries e.g. Gove smelter, with new or expanded \$billion industries such as LNG plant expansions, methanol and fertiliser plants etc.
- ✓ Increased development of infrastructure for regional communities & pastoralists
- ✓ Significant revenues in royalties to NT Government and Traditional Owners
- ✓ Through LNG exports, significantly reduce global greenhouse gases
- ✓ Infrastructure to progress the development of the tourism industry
- ✓ Substantial employment and opportunities for Territory
- ✓ Gas to the East Coast LNG and domestic markets
- ✓ Job creation on a large scale for decades to come
- ✓ Significant benefits to the Traditional Owners

# Debunking the Most Fact-Challenged Anti-Fracking Claims

## Tourism

*"Fracking jeopardizes tourism, manufacturing and agriculture"...*  
Abby Jones, PennFuture<sup>(1)</sup>

Tourism Industry Is Thriving in Top Oil & Gas Producing States

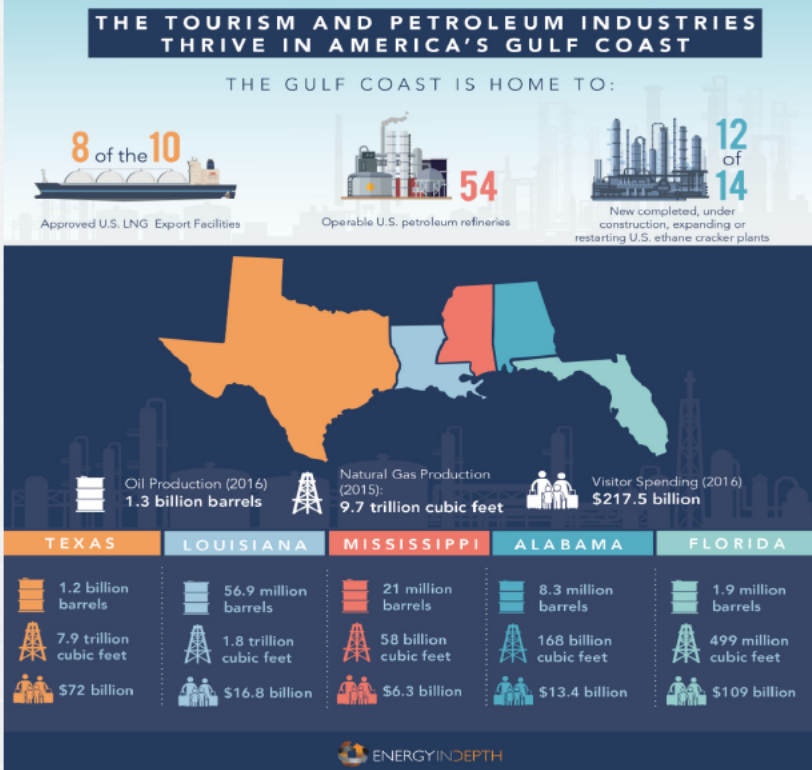


Tourism, manufacturing and agriculture are three important staples to Pennsylvania's culture and economy that have benefited from shale development



(1) DRBC Hearings, Waymart, PA January 2018

*"Fracking hurts health and the environment – (repeated claims by the anti-fracking lobby), but also the economy as well"....* Hilary Baum, NY Sustainable Business Council <sup>(2)</sup>



In America's Gulf Coast states, home to active oil and natural gas production, & most of the nation's refineries, ethane cracker facilities, and 12 of the 14 operational or proposed LNG plants, the tourism industry is booming

(2) DRBC Hearings, Philadelphia, PA January 2018

# Debunking the Most Fact-Challenged Anti-Fracking Claims

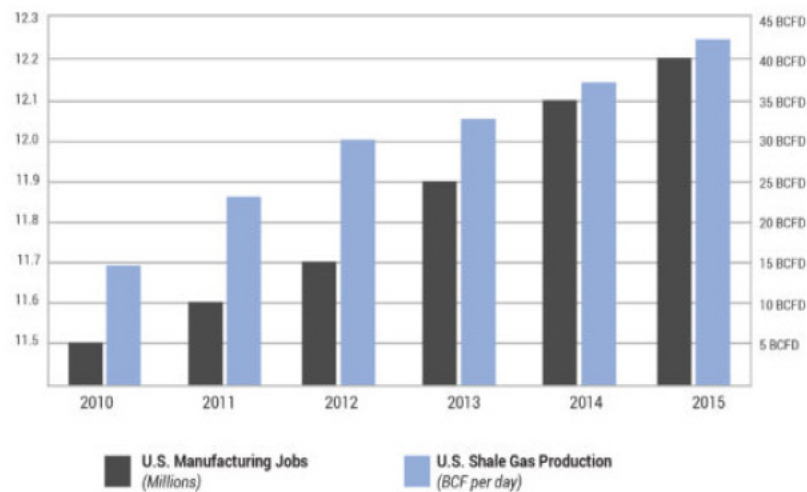
## Manufacturing

*"Fracking jeopardizes tourism, manufacturing and agriculture"...  
Abby Jones, PennFuture<sup>(1)</sup>*



energyindepth.org

### Shale Gas Production Fuels Manufacturing Jobs



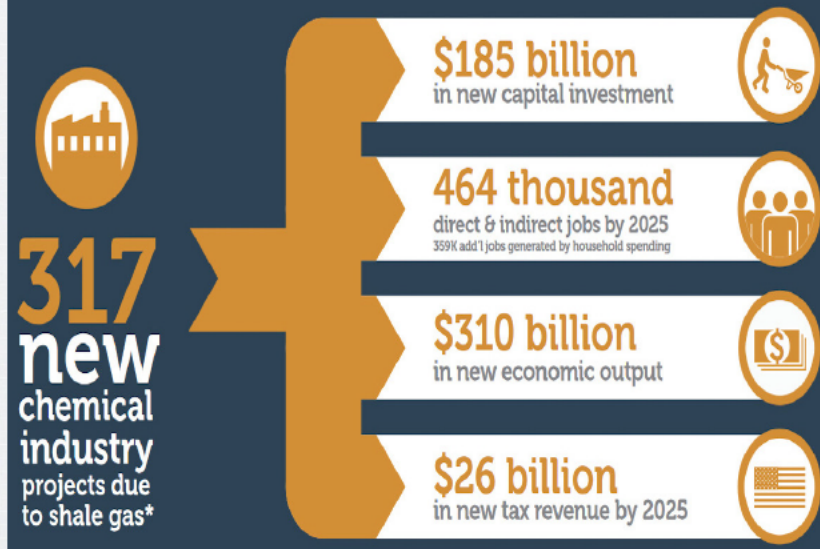
Manufacturing across the country has benefited from the increased supply and lower costs of natural gas since the shale revolution took off



(1) DRBC Hearings, Waymart, PA January 2018

*"Fracking hurts health and the environment – (repeated claims by the anti-fracking lobby), but also the economy as well".... Hilary Baum, NY Sustainable Business Council <sup>(2)</sup>*

### NEW MANUFACTURING PROJECTS ARE GROWING OUR ECONOMY & CREATING JOBS



The American Chemistry Council (ACC) finds that there have been over 300 new U.S. chemical industry projects alone as a result of shale gas that have had major economic impacts, as the infographic shows.

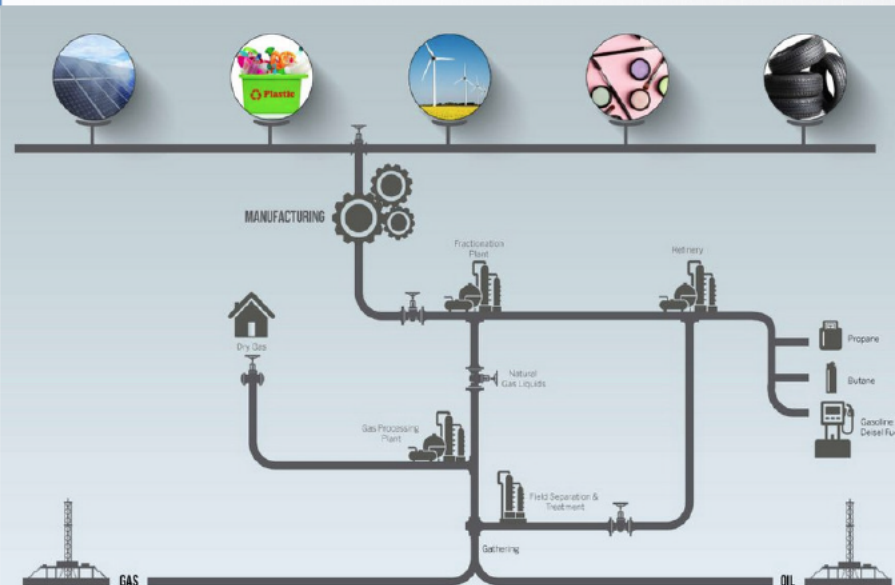
(2) DRBC Hearings, Philadelphia, PA January 2018

# Debunking the Most Fact-Challenged Anti-Fracking Claims

## Natural gas and ethane to the chemical industry

*"Fracking jeopardizes tourism, manufacturing and agriculture"...*  
Abby Jones, PennFuture<sup>(1)</sup>

*"Fracking hurts health and the environment – (repeated claims by the anti-fracking lobby), but also the economy as well".... Hilary Baum, NY Sustainable Business Council <sup>(2)</sup>*



### HOW SHALE SUPPORTS MANUFACTURING

Manufacturing across the country has benefited from the increased supply and lower costs of natural gas since the shale revolution took off

#### Potential Economic Impacts of An Appalachian Chemical Industry (Permanent, By 2025)

Capital Investment (\$2016)	Direct Output (\$2016)	Employment	Payroll (\$2016)	Federal, State, and Local Tax Revenue
\$32.4 billion in petrochemicals, resins and derivatives	\$23 billion in chemicals + plastic resins	25,664 direct jobs (chemical and plastics products manufacturing)	\$1.7 billion direct	\$1.7 billion in federal tax revenue annually
\$3.4 billion in plastic products	\$5.4 billion in plastics compounding + plastics products	43,042 indirect (supply chain) jobs	\$3.0 billion indirect (supply chain)	\$1.2 billion in state and local tax revenue annually
		32,112 "payroll-induced" jobs in local communities where workers spend their wages	\$1.5 billion payroll-induced	
<b>TOTAL:</b>	<b>TOTAL:</b>	<b>TOTAL:</b>	<b>TOTAL:</b>	<b>TOTAL:</b>
<b>\$35.8 billion</b>	<b>\$28.4 billion</b>	<b>100,818 jobs</b>	<b>\$6.2 billion</b>	<b>\$2.9 billion</b>

In a 2017 report<sup>(3)</sup> from the American Chemistry Council (ACC), the abundance of shale gas in PA, OH, WV & KY are poised to see a \$35.8bn boost in investment by 2025, and \$2.9bn added to federal, state and local tax coffers. This would support 25,700 new chemical and plastic manufacturing jobs, 43,000 supplier industry jobs and 32,000 "payroll-induced" jobs in communities where workers spend their wages.

(1) DRBC Hearings, Waymart, PA January 2018

(2) DRBC Hearings, Philadelphia, PA January 2018

(3) The Potential Economic Benefits of an Appalachian Petrochemical Industry, American Chemistry Council, May 2017

# Debunking the Most Fact-Challenged Anti-Fracking Claims

## Agriculture

*"Fracking jeopardizes tourism, manufacturing and agriculture"...  
Abby Jones, PennFuture<sup>(1)</sup>*

**Dave Williams, (February 27, 2017) host of PA Farm Country Radio(3):**

- ✓ "Everywhere one turns in the rural areas of PA from Washington Co in the southwest to Susquehanna Co in the northeast, the shale revolution is boosting agriculture. Whether it is providing new sources of farm capital, lowering fuel and fertilizer costs, providing off-farm employment or maintaining the critical infrastructure needed by the industry, shale gas is having a very positive impact on agriculture"
- ✓ "Recapitalizing farming enterprises is one of the major challenges facing PA's agricultural industry. Low commodity prices can starve a farm unless it has economic staying power or alternative sources of capital to sustain itself. Natural gas has provided such capital"
- ✓ "Put it all together and there's simply no doubt: the shale revolution has been a huge boost for Pennsylvania agriculture"

**All of these projects, from the well head to the end user, are boosting the economy and creating jobs throughout the US**



(1) DRBC Hearings, Waymart, PA January 2018

(2) DRBC Hearings, Philadelphia, PA January 2018

(3) Dave Williams, the host of PA Farm Country Radio, opinion piece, Lebanon Daily News in February 27, 2017

## Economy

*"Fracking hurts health and the environment – (repeated claims by the anti-fracking lobby), but also the economy as well".... Hilary Baum, NY Sustainable Business Council <sup>(2)</sup>*

- ✓ USA job creation from shale development, is estimated to be roughly 2.7 million(4)
- ✓ "communities within 100 miles of shale development experience more than \$500,000 in increased wages, royalties, and business income for every \$1 million invested in shale development(5)
- ✓ At the low range the cost to drill a Marcellus well is US\$5 million. There have been nearly 11,000 unconventional wells (as of January 31, 2018) drilled in PA. That's roughly \$27.5 billion in wages, royalties, and business income(6)
- ✓ The shale industry has paid \$1.2 billion in Impact Fees to PA communities(7)
- ✓ More than \$23 billion is being invested in new pipelines in Appalachia, and +\$10.5 billion invested in new gas-fired power plants in PA(8)

(4) America's Unconventional Energy Opportunity, A win-win plan for the Economy, the Environment, and a lower-carbon, cleaner-energy future, Harvard Business School & Boston Consulting Group, 2015 study

(5) Geographic Dispersion of Economic Shocks: Evidence from the Fracking Revolution, American Economic Review, Vol. 107, No. 4, April 2017

(6) EIA Trends in U.S. Oil and Natural Gas Upstream Costs, March 2016

(7) Pennsylvania Public Utility Commission, June 15, 2017

(8) FERC approved Appalachian Basin Pipelines & Natural Gas Power Plants Bring Major Investments, Jobs to Pennsylvania, Energy in Depth, October 24, 2017

# The Importance of Science

How the shale industry was side tracked by dishonesty  
and how scientific evidence is bringing the industry back to mainstream

# The process of junk research

## Sensationalist media debunked

- ✓ Sensationalist anti-fracking 'Research' gains headlines in media
- ✓ Often, these reports are proven to be incorrect and are withdrawn
- ✓ Retractions rarely make front page and are relegated to minor by-lines and are seldom seen in the public domain
- ✓ Court Judgements or findings adverse to the anti-fracking lobby are seldom reported by the media (The Dimock, PA, case being a prime example, refer to this presentation)
- ✓ This re-occurring process means much of the incorrect science is all that is recorded in the public domain

The following demonstrates this misinformation process, provides examples of misleading research and statements, and shows the facts that disprove the original misinformation, and in some cases shows the retractions and re-statements of much of the misleading 'paid for play research'

# Fact or Fiction? - Fears debunked

Over time anti fracking lobby claims have been shown to be false

"Based on experience and science, I recognized that fracking was one of our very best and safest extraction techniques. Fracking is good for the country's energy supply, our national security, our economy, and our environment."

"*Opposite of Woe: My Life in Beer and Politics*", (pg. 277), Colorado Governor J Hickenlooper (D)

In early May 2016 the Pennsylvania DEP quietly dropped a \$8.9mm fine against Range Resources "for contaminating the groundwater-fed wells of private water supplies, and a nearby stream." Range and the landowner where the well is drilled say methane was in groundwater supplies long before Range drilled the well. Range provided the DEP a complete isotopic analysis that proves what is in the well water did not come from the gas well.

Patriot-News, May 21, 2016

## New Dimock Study Does Not Link Water Issues to Fracking

ATSDR, May 2016

## CABOTWIN APPEAL IN DIMOCK WATER TRIAL.

March, 2017

New Yorkers pay an average of 50% more for electricity than residents in other states. Gov. Cuomo has turned upstate NY into one, big economic sacrifice zone—sentencing residents to a life of poverty and enslavement. Why? To appease the people who vote him into office every four years (mostly located in New York City)  
K Moreau, API, May 10, 2016

25 year Colorado research program - In looking at levels of dissolved methane in groundwater both before and after fracking began, the researchers found, "The rate [of ground water methane] did not change after the introduction of horizontal drilling combined with high-volume hydraulic fracturing in 2010."  
Proceedings of the National Academy of Sciences— June 7, 2016

Anti-fracking report found to be wrong by 27,500% (see later page)

July 8, 2016

As frack activists lose the drilling science argument.....  
"The political class, including regulators, profess to care about the plight of the working and middle class. Yet they continually block pipeline projects that would create thousands of jobs, enhance the national grid, and reduce energy costs for consumers".  
Killing America's Pipe Dreams, R Bradley, IER, 2016

Cabot pays out over US\$1.5 bn in royalties and bonuses in one PA County over last decade - 2017

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Activist groups have been working overtime in Colorado to mislead lawmakers, the media and everyday citizens into adopting their view that energy development in the state should be banned. Governor Hickenlooper is not buying into their talking points and has joined a growing chorus of business leaders, editorial boards and elected officials who are recognizing just how extreme the groups behind the initiatives have become. *Energy in Depth, April 2016*

# Cold, Hard Facts

In a recent video, a series of “community organizers” dryly read a list of horrors should Cabot Oil & Gas be allowed entry to drill in Ashland Co., OH, USA. They claim natural gas development would destroy the rural character of the area, contaminate water supplies, damage roads, discourage tourism and harm property values. Moreover, methane was touted as a carcinogen

**However, Chris Acker, (February 12, 2018) a landowner from rural Susquehanna Co, PA, USA, wrote a rebuttal that obliterates the misinformation being spread by the anti fracking lobby in Ashland Co.:**

- ✓ *“Cabot Oil & Gas has invested billions of dollars to develop this extraordinary natural gas resource in Susquehanna County, PA*
- ✓ *Astoundingly, production from my county alone could supply the entire needs of France*
- ✓ *Cabot has been here over a decade and I am intimately familiar with the effects of the industry*
- ✓ *‘It is disheartening, and frankly, tiresome to hear folks distort the truth about the industry’*
- ✓ *Susquehanna Co is still happily rural, our air and water are clean, our roads are better, tourism is flourishing and property values remain elevated*
- ✓ *For years Cabot held an annual picnic and the last one had a turnout of 9,000 appreciative neighbours along with two protesters*
- ✓ *Part of this appreciation is due to the \$1.5 billion Cabot has paid to local landowners in lease bonuses and royalties on production over the past 10 years for production that will continue for decades, as well as spending over \$45 million on roads(10)”*



(8) Lackawanna College – The School of Petroleum & Natural Gas, Well Said, April 15, 2014

(9) Bringing Natural Gas to People in Susquehanna County, Nexstar Broadcasting, Inc. 2018

(10) Cabot public announcements 2016/2017 (June 8, 2017)

## The Reality! Cabot & others in Susquehanna Co.. have:

- ✓ Created hundreds of new local jobs, lowering the unemployment rate to 4.7%(1)
- ✓ Stimulated growth of new and existing manufacturing and service businesses(2)
- ✓ Saved many family farms essential to rural character(3)
- ✓ Substantially increased local wages(4)
- ✓ Paid millions of dollars in impact fees to local government leading to lower property taxes(5)
- ✓ Spent \$45mm rebuilding 100's of miles of roads (6)
- ✓ Helped build a new state-of-art hospital and library(7)
- ✓ Endowed \$2.5mm to a new local technical college with graduates placed in good industry jobs(8)
- ✓ Extended new natural gas service to local communities, schools, government and businesses – largely displacing more expensive and dirtier fuel oil(9)
- ✓ Spurred construction of new senior housing from Shale impact funding fees
- ✓ Supported emergency services, multiple charities and natural disaster relief(10)
- ✓ Increased truck traffic is the main downside. However, the many benefits certainly outweigh this negative

(1) U.S. Bureau of Labor Statistics, Unemployment Rate in Susquehanna County, PA [PASUSQ5URN], retrieved from FRED, Federal Reserve Bank of St. Louis;

<https://fred.stlouisfed.org/series/PASUSQ5URN>, February 12, 2018

(2) Value-Added Growth In Susquehanna County, April 14, 2016

(3) April 14, 2016 Natural Gas: Saving Farms, Building Communities, Oil Man Feb 12, 2018

(4) Pennsylvania's Independent Fiscal Office (IFO) recently released projections for the 2017 Act 13 Impact Fee that will be disbursed in April 2018

(5) Pittsburgh Post-Gazette, February 1, 2018

(6) Cabot public announcements 2012/2017

(7) To Build a (Much Needed) Hospital, Energy in Depth, September 11, 2012

# Debunking the methane-in-air myth

A 2017 study that claimed shale gas development is a “*climate detriment*,” was retracted a short time after its release<sup>(1)</sup>



*Debunking false research with real research funded by the PA DOE and conducted in NE PA by Penn State, it was found...*

- ✓ *CH<sub>4</sub> leakage of wells and other infrastructure is roughly 0.4% of production*
- ✓ *A substantial source of the CH<sub>4</sub> found in the report contained little ethane C<sub>2</sub>H<sub>6</sub>, which lead to the focus that a significant portion of CH<sub>4</sub> is emitted either directly from underground and open cut coalmines, or from wells drilled through coalbed layers*
- ✓ *By law coal mines in PA must vent CH<sub>4</sub>*

Led by researchers from the Uni of Maryland and published in the American Geological Union's (AGU) Journal of Geophysical Research Atmospheres in March 2017, the peer-reviewed study claimed to find a well production methane leakage rate of 3.9% based on flight measurements in Aug and Sept 2015

“Finding” such a high leakage rate led the authors to reach a very bold (**and wrong**) conclusion when the report was released in March 2017, namely:

*“The production of energy from CH<sub>4</sub> extracted from our surveyed area with current technologies is a climate detriment”.....“At our measured leak rate of 3.9%±0.4% from production for the Marcellus Shale in SW Pennsylvania and NW Virginia, the use of natural gas rather than coal for combustion will result in a relatively greater climate impact over the next few decades.”*

Then, very quietly, with no media headlines the Uni of Maryland in Oct 2017 issued a Retraction Statement:

- ✗ *A re-analysis with corrected winds reduced the total estimated emissions by about a factor of 1.7x; and*
- ✗ *CH<sub>4</sub> leakage from coal mines had not been considered nor taken into account.*

# The Inconvenience of a Court Judgement

“Gasland’s” most high profile case against fracking, found fraudulent

x In 2009, with the backing of ‘Gasland’ anti-fracking lobby, 14 families in Dimock Township, PA reportedly experienced turbidity in their water from methane migration, supposedly from nearby shale drilling operations

x Following a State Court trial, the Jury ordered damages of \$4.24 million against the driller

- The State Dept. of Environmental Protection (DEP) investigated in 2010 and declared the driller responsible and imposed stiff and requirements, including a requirement to provide compensation to a number of families who complained fracking had interfered with their water aquifers.
- **Research later showed that the driller was not responsible. All families settled in 2012 after tests showed the wells contained elevated levels of methane but none of the chemicals associated with gas drilling or fracking.**
- In conjunction with fractivist supporters, two holdout families thought that they could sue the driller.
- In March 2016, the trial took place in Scranton, PA. The lawyer for the two families engaged in borderline unethical practices in the courtroom in her attempt to influence the jury. **“Expert” anti fracking lobbyist witnesses, Tony Ingraffea and Paul Rubin were shown to be inept in their testimony.**
- One of the two families admitted, **under oath, that their water had methane in it BEFORE drilling nearby had even begun.**
- The same family, later built a 22-room house on the property after they admitted there was ‘trouble’ with the water.
- The jury found the driller at fault for creating a nuisance, **NOT** for water well contamination and awarded \$4.24 million.
- On appeal by the driller, a Federal Court confirmed a miscarriage of justice against the driller and tossed out the \$4.24 million verdict, calling the evidence against the driller as *“sparse, sometimes contradictory, frequently rebutted by other scientific expert testimony, and relied in some measure upon tenuous inferences”*
- The Appeal Judge went further *“The jury’s award of more than \$4 million in damages for private nuisance bore no discernible relationship to the evidence, which was at best limited; and even were the court to find that the jury’s verdict of liability should stand, the court can perceive no way in which the jury’s damages award could withstand even passing scrutiny regardless of the applicable standard of review”*. (Judgment made public).

**In late March 2017, a Federal Court Judge ordered a new trial confirming that the evidence on which the jury awarded damages was flawed**

The judgement called evidence against the driller as *“sparse, sometimes contradictory, frequently rebutted by other scientific expert testimony, and relied in some measure upon tenuous inferences”*

# Debunking the methane-in-water myth

Scientists have again proven that fracking does not contaminate ground water supplies



*A study funded by the National Science Foundation<sup>(1)</sup> (no Big Green money or oil and gas money involved) has found that fracking operations in Colorado have not led to an increase in methane migration into groundwater supplies. The study, titled "Groundwater methane in relation to oil and gas development and shallow coal seams in the Denver-Julesburg Basin of Colorado" was published in the Proceedings of the National Academy of Sciences (PNAS) and is significant. The research examined methane levels going back 25 years, long before any horizontal fracking took place in the state*

The study, examined 25 years of public data maintained by the Colorado Oil and Gas Conservation Commission, and were used to determine sources and occurrence rates of methane and other gases in groundwater supplies

It was found that microbially generated methane, rather than high-volume hydraulic fracturing, is the primary source of dissolved methane in the region's groundwater supply

- ✓ The study is important, because there has been a huge increase in oil and natural gas fracking
- ✓ Because that drilling activity is happening in one of the state's most populous areas, it has become controversial, leading to efforts to ban the process, including via three proposed statewide ballot measures, all which failed

**The report shows that fracking has little to nothing to do with methane in groundwater supplies**



(1) Proceedings of the National Academy of Sciences (Jul 11, 2016) – Groundwater methane in relation to oil and gas development and shallow coal seams in the Denver-Julesburg Basin of Colorado

# Methane migration from well? – Settlement = \$0

Official settlement between Pennsylvania DEP & Range Resources



- The DEP said a Range well, drilled in 2011 in Lycoming Co, PA leaked methane since at least 2013 via an improperly cemented well casing, and the methane “contaminated the groundwater-fed wells of private water supplies, and a nearby stream”
- In 2015 the PA DEP issued Range Resources with a record \$8.9mm fine for methane migration on the Harman well in Lycoming County, PA
- Range claimed the DEP failed to identify any violations associated with the Harman well
- Range gave the DEP a complete isotopic analysis to prove what was in the well water did not come from the gas well

The anti-fracking lobby claim they are “dumbfounded”, again science prevails over deep seated divisiveness:

- ✓ *As a responsible operator, Range provided purification systems to five residents in Green Valley, explaining “it acts first and investigates later when a situation with water develops”*
- ✓ *Range and the landowner (Lewis Harman) where the well was drilled said methane was in groundwater supplies long before Range drilled the well*
- ✓ *Range appealed the determination and fine to the PA Environmental Hearing Board*
- ✓ *In May 2016, the DEP quietly dropped the fine and the case against Range*
- ✓ *On August 25, 2017, both Range and the DEP filed paperwork with the Environmental Hearing Board (a special court set up to hear appeals of DEP decisions) requesting the matter now officially be closed and “settled”(1)*

# Fracking wastewater - mostly brines, not frack fluids

Science continues to fill the knowledge gaps



Duke researchers used three statistical techniques to quantify the volume of wastewater generated from unconventional oil and gas wells in six US shale basins:

- *“Our analysis shows that these fluids only account for between 4 and 8% of wastewater being generated in the US unconventional oil and gas basins. Most of the fracking fluids injected into these wells do not return to the surface; they are retained in the shale deep underground”. – Avner Vengosh, Duke*
- *“To our knowledge, we are the first to report a broadly integrated use of these various geochemical techniques in studying groundwater contamination before and after the installation and fracking of shale gas wells.” – Avner Vengosh, Duke*

Naturally occurring brines, not man-made fracking fluids, account for most of the wastewater coming from hydraulically fractured unconventional oil and gas wells, a Duke study <sup>(1)</sup> finds:

- ✓ *“Much of the public fear about fracking has centered on the chemical-laden fracking fluids, which are injected into wells at the start of production, and the potential harm they could cause if they spill or are disposed of improperly into the environment” – Avner Vengosh, Duke*
- ✓ *Using multiple statistical techniques “helped us more accurately account for changes in each well’s wastewater volume and salinity over time, and provide a more complete overview of the differences from region to region,” - Andrew J. Kondash, Duke*
- ✓ **“This makes our findings much more useful, not just for scientists, but for industry and regulatory agencies as well,” - Andrew J. Kondash, Duke**

# Groundwater not affected by fracking

Fingerprinting of shale gas & chemicals leaves anti frackers in the 'lurch'



Outcome...

- Duke collaborated with researchers and the French Geological Survey to sample water from 112 drinking wells in NW West Virginia over 3 years
- The water wells were sampled before fracking began in the region to provide a baseline for later comparisons
- Samples were tested for an extensive list of contaminants, including salts, trace metals and hydrocarbons (methane, propane and ethane)
- The tests showed that methane and saline groundwater were present in both the pre-drilling and post-drilling well water samples, but they had a chemistry subtly, but distinctly different from the isotopic fingerprints of methane and salts contained in fracking fluids and shale gas



***“Fracking has not contaminated groundwater in NW West Virginia”***

Researchers from Duke, Penn State, Ohio State and Stanford published a study:

Only accidental spills of fracking wastewater may pose a threat to surface water in the region

- ✓ *“The integrated suite of tracers we used, which were developed at Duke in recent years, provides us with tools sensitive enough to accurately distinguish these subtle differences, which might be missed if you only used a handful of simple measurement techniques” –Jennifer Harkness, Duke*
- ✓ *“To our knowledge, we are the first to report a broadly integrated use of these various geochemical techniques in studying groundwater contamination before and after the installation and fracking of shale gas wells” – Avner Vengosh, Duke*

# Uni of Cincinnati Finds No Problems with Utica Shale Fracking



Uni of Cincinnati ("UC") latest study:...

UC gathered air samples near production sites in three of the top producing counties in Ohio (Guernsey, Noble and Belmont) to examine air quality near natural gas extraction

- Lead researcher Dr Erin Hayes told local elected officials during a presentation on the study that *"none of the air sample averages exceeded EPA levels of health concern"* after being evaluated for 63 volatile organic compounds (VOCs) and formaldehyde

This is the latest in a long list of studies based on actual air measurements finding emissions from oil and gas production sites are well below the threshold that indicates a threat to public health

UC has undertaken three fracking studies, but only one has been published. Notably, that study **had to be retracted because it exaggerated** what was ultimately determined to be a non-existent carcinogenic threat by 27,500% (see next slide). The two yet to be published studies found no harm was generated from fracking\*:

- ✓ *First study dealt with ambient air pollution (published in March 2015) had such major errors the authors retracted it in July 2016(1)*
- ✓ *Second study focused on the potential issues of fracking on nearby water wells in Ohio. That study was funded, in part, by the anti-fracking lobby. They didn't like the findings... **"there IS NO negative impact of fracking on groundwater"**, so the report has been hushed up and funders have refused to allow its publication(2)*
- ✓ *Third research project has now been completed, looking at air samples near fracking sites. This time looking for elevated levels of volatile organic compounds (VOCs) and formaldehyde. The findings are... **"none of the air sample averages exceeded EPA levels of health concern."** It now appears that this study will also be buried and not see the light of day(3)*

These last two studies have been ignored by the anti-fracking lobby, who claim that public health harm from fracking-related activities have typically been based on studies that fail to take air measurements and

\* "I'm really sad to say this but some of our funders, the groups that had given us funding in the past, were a little disappointed in our results .....they feel that fracking is scary and so they were hoping our data could point to a reason to ban it."  
- UC's Dr Amy Townsend-Small's presentation to local Ohio hydraulic fracturing opponents (4)



(1) "Impact of Natural Gas Extraction on PAH Levels in Ambient Air" and published in the peer reviewed journal Environmental Science & Technology, 2015, 49(8)

(2) University of Cincinnati, March 2016

(3) University of Cincinnati, August 30, 2017

(4) U.S. Chamber of Commerce (Feb 23, 2016) – Let's See the University of Cincinnati's Hydraulic Fracturing Research

# Alarmist research debunked

Anti-fracking report found to be wrong by 27,500%<sup>(1)(2)</sup>

In May 2015, a “study” from “scientists” at Oregon State and Uni of Cincinnati reportedly “found people living near fracking sites in Ohio were being exposed to ‘**deadly**’ air pollution”.

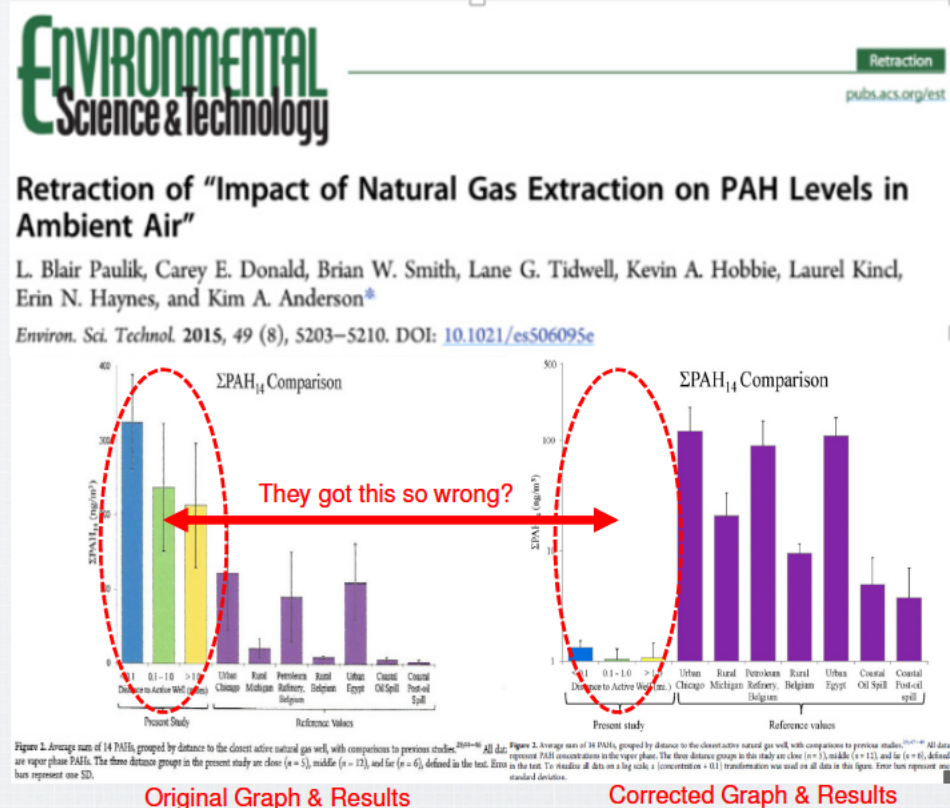
- The published paper was titled “*Impact of Natural Gas Extraction on PAH Levels in Ambient Air*” was ‘peer reviewed and issued in the Journal of Environmental Science & Technology
- One of the authors of the study implied elevated toxins in the air near fracking sites may lead to cancer
- Industry pointed out the significant problems with the research: a very small number of air samples, taken from “non-random” (i.e. cherry-picked) locations, with untrained homeowner “volunteers” collecting the samples and shipping them to Oregon for study

**After scrutiny the study was retracted ...**

- they used a wrong value for a gas constant;
- the Excel spreadsheet link/formulas were wrong! ***That meant the whole conclusion was disparately wrong***



***When the data was corrected, air quality risks near those fracking sites were ‘well below EPA levels’***



Combined with the many flaws of the study, the fact that the study participants were untrained in sample collection and recruited by a anti-fracking group, and, the degree to which the research team botched the original data borders on fraud, especially considering scientists would seemingly be capable of catching such egregious mathematical errors.

(1) “Impact of Natural Gas Extraction on PAH Levels in Ambient Air” and published in the peer reviewed journal Environmental Science & Technology, 2015, 49(8)  
 (2) Retraction July 8, 2016

# Another Court Judgement supports the industry

4 years and 3 appeals

**PA Appeal Court Says Range Resources Impoundment Did NOT Contaminate Water Well**



A junkyard plaintiff from SW PA who was 'used' by the anti fracking community as a poster child for their cause, had his case thrown out of Court after 4 years and 3 appeals

Mainstream scientists state that upward migration of fracking fluids through thousands of feet of impenetrable rock into water tables is physically impossible

- ✓ *"I have been working in hydraulic fracturing for 40 plus years and there is absolutely no evidence hydraulic fractures can flow from miles below the surface to the fresh water aquifers." — Dr. Stephen Holditch, Texas A&M University*
- ✓ *"Fracturing fluids have not contaminated any water supply and with that much distance to an aquifer, it is very unlikely they could." — Stanford geophysicist Mark Zoback*
- ✓ *"Data gathered from hydraulically stimulated wells in other states does not show evidence of hydraulically-induced fractures extending into overlying fresh water aquifers." — Uni of Michigan*

# Further False Research

## Govt Health Report destroys 'Fracking & Asthma' Study

Johns Hopkins Uni released further "science junk" in July 2016, concluding fracking causes asthma attacks.....

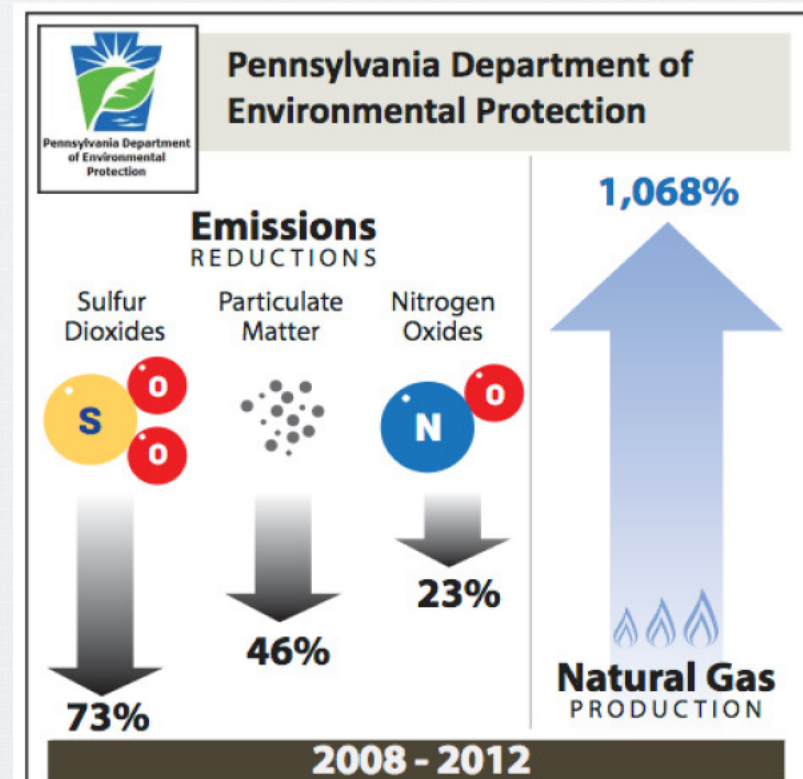
- The report didn't include PA county-by-county comparisons or between areas with and without shale development

Within days, the PA Department of Health ("PDH") produced data showing that heavily shale drilled counties within the study area have far lower age-adjusted rates of asthma hospitalizations!

- The icing on the cake is that in 2009 to 2013, the PDH data *actually shows a significant 24% reduction in patient asthma hospitalizations throughout the entire state*, which just so happens to be the same time the shale boom really took off
- **The anti fracking lobby researchers' conclusion that proximity to shale gas wells leads to asthma attacks was total destroyed by PDH data**



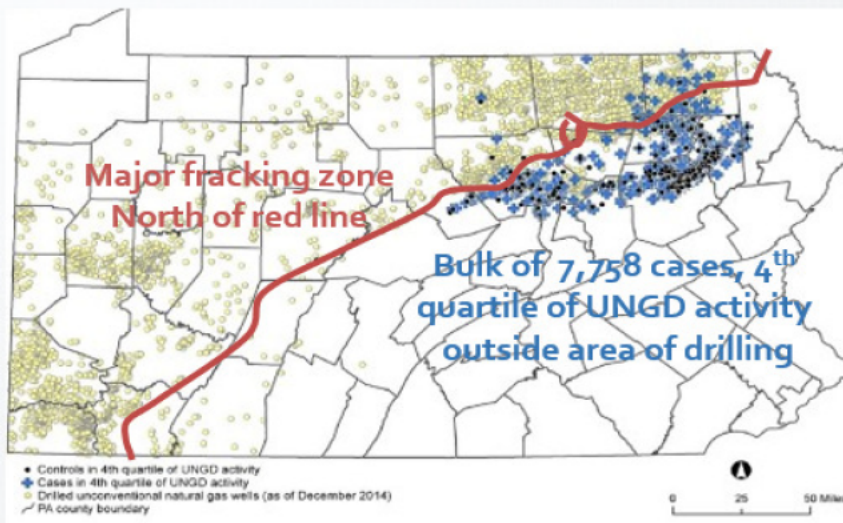
*Not coincidentally, sulphur dioxide, nitrogen oxide and fine particulate matter all started decreasing rapidly in Pennsylvania once fracking commenced*



# Dishonest research

Claims fracking leads to headaches, fatigue and sinus problems found illegitimate on inspection

Pennsylvanian counties sampled (blue crosses), but few were major drilling areas (yellow dots) with some counties having no drilling at all!



The fatal flaws for this 'research' .....

*"no consideration of baselines for smoking, poor nutrition, drug use, coal mining activities, coal power plant exposure, highway traffic (records closely follow a major interstate highway), pollen seasons and urban development"*



John Hopkins Uni claims fracking leads to headaches, fatigue and sinus problems(1)...

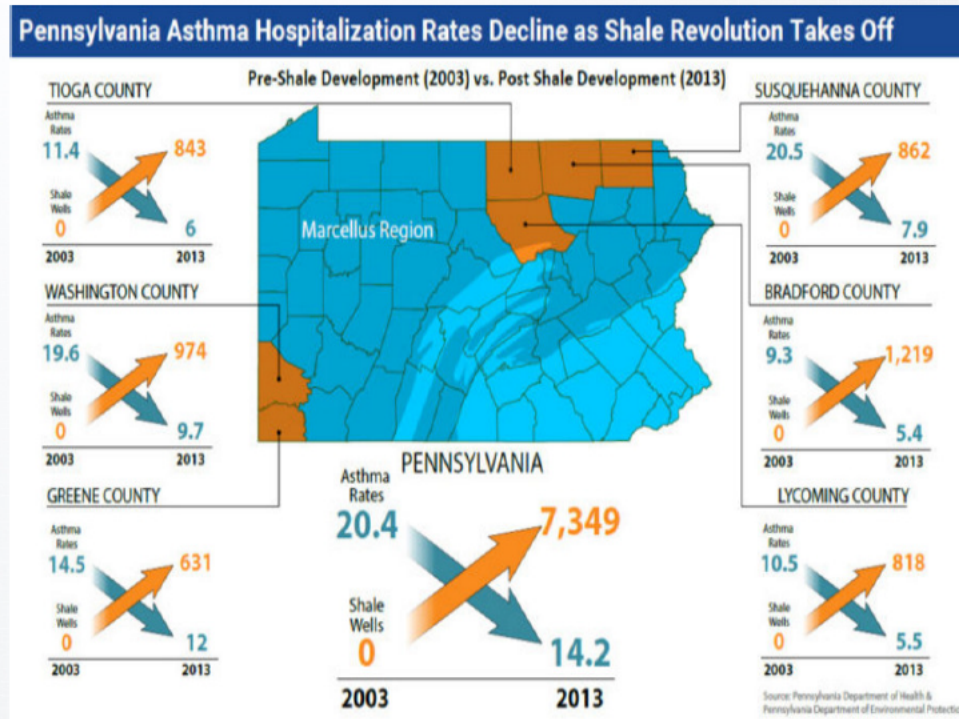
- But a researcher did say *"our data can rarely prove that an exposure caused a health outcome"*
- What the report stated amongst its many disclaimers *"our activity metric did not allow identification of specific exposures or exposure pathways"*
- But then the peer review claimed *"These are the kind of studies that should have been done five, six, seven years ago"*

Then media, in typical lazy fashion, reported *"FINDINGS OF THE STUDY"* to fit their prejudices. The researchers' conclusions were widely reported by the media as the 'truth'

A little scrutiny would have revealed the study deserved no legitimacy: almost all the subjects whose doctor records were used LIVE OUTSIDE of drilling areas. Media does not retract dishonesty and so the headline remains!

# Real Research – revealing the truth

The facts on hospitalisation proves shale gas drilling does not cause asthma



Is Marcellus development driving down those rates? – this is unknown, but what is known is that it is not negatively impacting asthma hospitalization rates

Johns Hopkins Uni research claims shale development increases asthma hospitalisation rates, but...

Why did researchers at Johns Hopkins Uni not compare rates on a County by County basis?

✗ Did they know their conclusions weren't sound?

Data from the PA Dep't of Health did show....

- ✓ Asthma hospitalization rates in PA have fallen across the state as shale development grows
- ✓ On closer view of this data the top producing natural gas counties (shown in map as brown), asthma hospitalizations rates have fallen.

# False Research is not just about health

“Penn State University wrong conclusion over cause of earthquakes”

## Penn State ‘Pre-Research’ announcement:

In May 2016 Penn State setup a seismic monitoring system throughout PA to track earthquakes

- ✗ Without **any** research they theorized fracking may be the cause for some of the earthquakes and said: ***“We have not done enough analysis of the data to make any conclusions yet, but there is a correlation spatially and temporally between the fracking and the earthquakes”*** – Andrew Nyblade
- ✗ In other words, they had not actually done the research, but announced there’s a connection between fracking and earthquakes
- ✗ When the concept was reported, the anti-fracking media ran with this pre-research announcement



When Penn State researchers actually did the research, they changed their tune.

- ✓ What they now say in a recently issued report is... *“The report found no correlation between the seismic events during that period and Marcellus Shale fracking or gas injection wells”*

**From what can be found, the actual study results have not been made public through the media**

# The USA EPA fails in its last anti-fracking case

John Fenton, who spread his false anti-fracking message throughout the Northern Territory, loses EPA's final anti-fracking case

*In Nov 2016, the last, solitary anti-fracking case being run by the US EPA, at the instigation of John Fenton's 'Pavillion Area Concerned Citizens' failed to prove a connection between fracking and water contamination in Pavillion, Wyoming*

## **X Pavillion – another debunked claim of so-called fracking-caused water contamination.**

- An EPA investigation started in 2010, at the request of citizens living outside Pavillion, who reported taste and odour in their well water.
- The geology where the drilling occurred around Pavillion is porous sandstone, not tightly-packed shale.
- Drilling in Pavillion was around 1,200 feet in depth, with the water table in that area at 800 feet. In shale gas drilling (in Appalachia), fracking occurs at least 5,000 feet down, and the average depth of the water table is at 150 feet from the surface.
- A December 2011 EPA draft report hinted at a link between drilling and water contamination turned Pavillion into a focus for the anti fracking debate, despite then EPA Administrator Lisa Jackson stating after the report's release, *"in no case has the EPA made a definitive determination that the fracking process has caused chemicals to enter groundwater"*.
- EPA officials expressed concern internally over the *"inflammatory and irresponsible"* media coverage of the report.
- EPA's data came from just two water monitoring wells in Pavillion, wells the EPA drilled. The quality of the drilling for the two wells was substandard. Ultimately the EPA handed them to the Wyoming's Department of Environmental Quality (DEQ) to complete the review.
- The DEQ<sup>(1)</sup> report concluded 'drilling activity did NOT contaminate well water. Contaminants found in wells *"were likely to be naturally occurring"*.
- Further, the monitoring wells the EPA drilled were done incorrectly, and the EPA itself accidentally introduced the very contaminants that it later detected and reported on.
- *"Evidence does not indicate that fracking fluids have risen to shallow depths utilized by water-supply wells,"* states the DEQ report's fact sheet.
- Further the DEQ<sup>(1)</sup> noted *"Also, based on an evaluation of fracking history, and methods used in the Pavillion Gas Field, it is unlikely that fracking caused any impacts to the water-supply wells"*.

# Anti-fracking lobbyists proving fears unfounded

After nearly 5,000 observations logged by anti frackers, no harm from fracking found to local streams

*Considering the number of wells drilled, shale gas drilling does not harm local streams...*



*ALLARM stands for Alliance for Aquatic Resource Monitoring. With the rapid growth of the Marcellus industry shale drilling in Pennsylvania and neighbouring states, “concerned citizens” wanted ways to collect data on water quality impacts from shale gas activities*

As a response to requests from communities, ALLARM developed a volunteer-friendly protocol in 2010 to assess small streams for the early detection and reporting of surface water contamination by shale gas extraction activities

- ✓ Volunteers (i.e. anti-frackers) monitor water quality throughout the year, including:
  - conductivity, barium, strontium, and total dissolved solids; and
  - physical parameters, including stream stage and visual observations prior to, during, and after shale gas well development
- ✓ Monitors also participate in a quality assurance, quality control program which includes in-person training, routine meter calibration, and sample testing via split-sample analysis two times a year
- ✓ Since they began monitoring local streams, nearly 5,000 observations have been logged. **No problems with shale drilling have been identified**

# Debunking more fracking myths

Science keeps showing there is no risk to public health

**Texas** - Uni of Texas, Arlington's Collaborative Laboratories for Environmental Analysis and Remediation<sup>(1)</sup> conducted a study on ambient emissions at hydraulic fracturing sites in the Eagle Ford Shale. This covered the measurement of volatile organic compounds (VOC) which can be carcinogenic and affect the central nervous system,

At frack sites in 13 different counties...

- ✓ They found toluene and xylene levels were 40x and 100x **below** Occupational Health & Safety (OHS) limits, respectively
- ✓ Xylene isomer concentrations did not exceed NIOSH air quality standards
- ✓ Importantly, emissions were not the result of the fracking process itself, but emanate from onsite activities. This would be similar to standing by a freeway or construction site etc

The conclusion suggest that air contamination events from fracking can be monitored and controlled



**Colorado** - the state's top medical officer Dr Larry Wolk<sup>(2)</sup> debunked claims about risks of fracking to public health.....

- ✓ Wolk, a practicing physician said he believes there is no causal relationship between oil & gas development and chronic diseases
- ✓ In Greeley and Weld Counties where a majority of Colorado's fracking is taking place, there is no registering of higher levels of negative health conditions

"Despite public fears that oil and gas development is causing asthma, birth defects and cancer, statistics from the health department show oil and gas has not affected the general health of Weld County, which produces 90% of the state's oil" - *Dr Larry Wolk*

"We've had at least 10,000 wells or more in Weld County for about 30 years or more and with that number of wells... if it was going to be a problem, it should have shown up long ago, but it hasn't" - *Dr Larry Wolk*

(1) Science of the Total Environment – August 2016

(2) The Greeley Tribune – Sept 2016

# UK study in-step with positive science

Authors of UK Fracking Study – *“Traffic impact of fracking is negligible”*

Although the authors of the study don't seem thrilled about the results, the report states that people in Britain should be, because it shows:

- ✓ Over a longer baseline (the entire operational lifetime of a pad) fracking would result in negligible relative increases compared to baseline traffic impacts
- ✓ In addition, there are the environmental benefits of natural gas compared to coal or diesel for the generation of electricity

**All this should make environmentally conscious people in the United Kingdom eager to positively consider the environmental benefits of fracking**

*“Investigating the traffic-related environmental impacts of hydraulic-fracturing (fracking) operations”<sup>(1)</sup>*

- ✓ Fracking could boost natural gas production in the United Kingdom. But fracking has been met with staunch opposition from environmental groups who oppose the potential impacts of drilling, production, and heavy truck traffic
- ✓ Anti fracking groups generally do not understand fracking nor do they base their claims on science or research
- ✓ Heavy vehicles are associated with producing high levels of noise, road damage, and air pollution in the form of small particulates, which form as a result of fuel combustion in all vehicles
- ✓ The authors of the paper developed a traffic impact model to produce an environmental assessment of both the short-term and long-term impacts of fracking at individual sites, as well as regional impact analysis

**The results were shown to be ‘net positive’**

# More positive research not making News

Why is science is not considered by anti frackers?

Funded by anti-fracking foundations - Testing water wells in Ohio to see if fracking was causing water contamination.<sup>(1)</sup>

**Conclusion** - *"The good news is that our study did not document that fracking was directly linked to water contamination."*

Uni of Cincinnati, Commenced 2012, Released Mar 2016

Study covering 16 USA states and interviewing over 200 local government officials along with gathering data and facts to identify the benefits to local governments from shale drilling<sup>(3)</sup>.

**Conclusion** - *"The recent surge in shale oil and natural gas development has been beneficial for most local governments in the United States.....on balance shale oil and gas drilling benefits local communities..."*

Duke, Commenced 2013, Released May 2016

**Conclusion** - *Neither shale gas nor fracking fluid travelled upward through 8,000 feet of rock in wells tested in PA.*

USA Energy Dept, Released July 2013

Sampling and analysis of 19,278 predrilling ground water wells in the Appalachian Basin (mainly Ohio).<sup>(2)</sup>

**Conclusion** - *"Based on the carbon and hydrogen stable isotope data along with the relatively consistent measurements within individual wells over the study period, we have found no evidence for natural gas contamination from shale oil and gas mining in any of the sampled groundwater wells of our study."*

Uni of Syracuse, Commenced 2009, Released Apr 2016

The potential impact of hydraulic fracturing activities on drinking water resources in the United States. (5 year, 950 sources and a US\$40 million research program).<sup>(4)</sup>

**Conclusion** - *"Hydraulic fracturing activities in the U.S. are carried out in a way that have not led to widespread, systemic impacts on drinking water resources."*

US EPA, Commenced 2010, Released June 2015



1) Hydraulic Fracturing Opponent Funds Study Finding It Doesn't Contaminate Water. – Energy in Depth, Ohio, Feb 15, 2016

2) Dissolved methane in Shallow groundwater of the Appalachian Basin: Results from the Chesapeake Energy predrilling geochemical database.

3) Most Local Government Budgets Gain from Oil, Gas Development. – Duke University May 18, 2016

4) USA EPA – Assessment of the Potential Impacts of Hydraulic Fracturing for oil and gas on drinking water resources. – Draft Report June 2015

# A safe way forward for NT gas

Many inquiries and studies have provided the evidence hydraulic stimulation 'fracking' of shale gas is safe

**There is no credible published research that finds hydraulic fracturing is not safe**

Significant numbers of studies, court cases and government reports have consistently found:

- ✓ Fracking does NOT cause systemic contamination of groundwater supplies
- ✓ Fracking does NOT produce large quantities of waste water brines
- ✓ Fracking does NOT increase methane in streams or water wells
- ✓ Fracking does NOT increase asthma rates in local populations
- ✓ Fracking does NOT have significant long term traffic impacts
- ✓ Fracking does NOT produce deadly air pollution
- ✓ Fracking does NOT cause earthquakes

# Imperial Oil & Gas

An Australian owned and operated company active in the NT and USA

Imperial Oil & Gas is a subsidiary of Empire Energy, listed on the Australian Stock Exchange in 1984. Initial entry into US oil and gas in 2006. A conventional oil and natural gas producer with operations in Appalachia (New York and Pennsylvania) and the Mid-Con (Kansas and Oklahoma)

In 2010 the Company secured approximately 14.6 million acres in the McArthur Basin, Northern Territory, which is considered highly prospective for large shale oil and gas conventional and unconventional resources. Work undertaken by the Company over the past 7 years demonstrates that the Central Trough of the McArthur Basin is a major Proterozoic depo-centre that forms one segment of a series of extensive prolific hydrocarbon basins extending through Oman, Siberia and southern China, and which contain resources of many billions of barrels of oil equivalent

For further information:

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