



Shale gas y la técnica del fracking

03 Impactos ambientales

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Paco Ramos



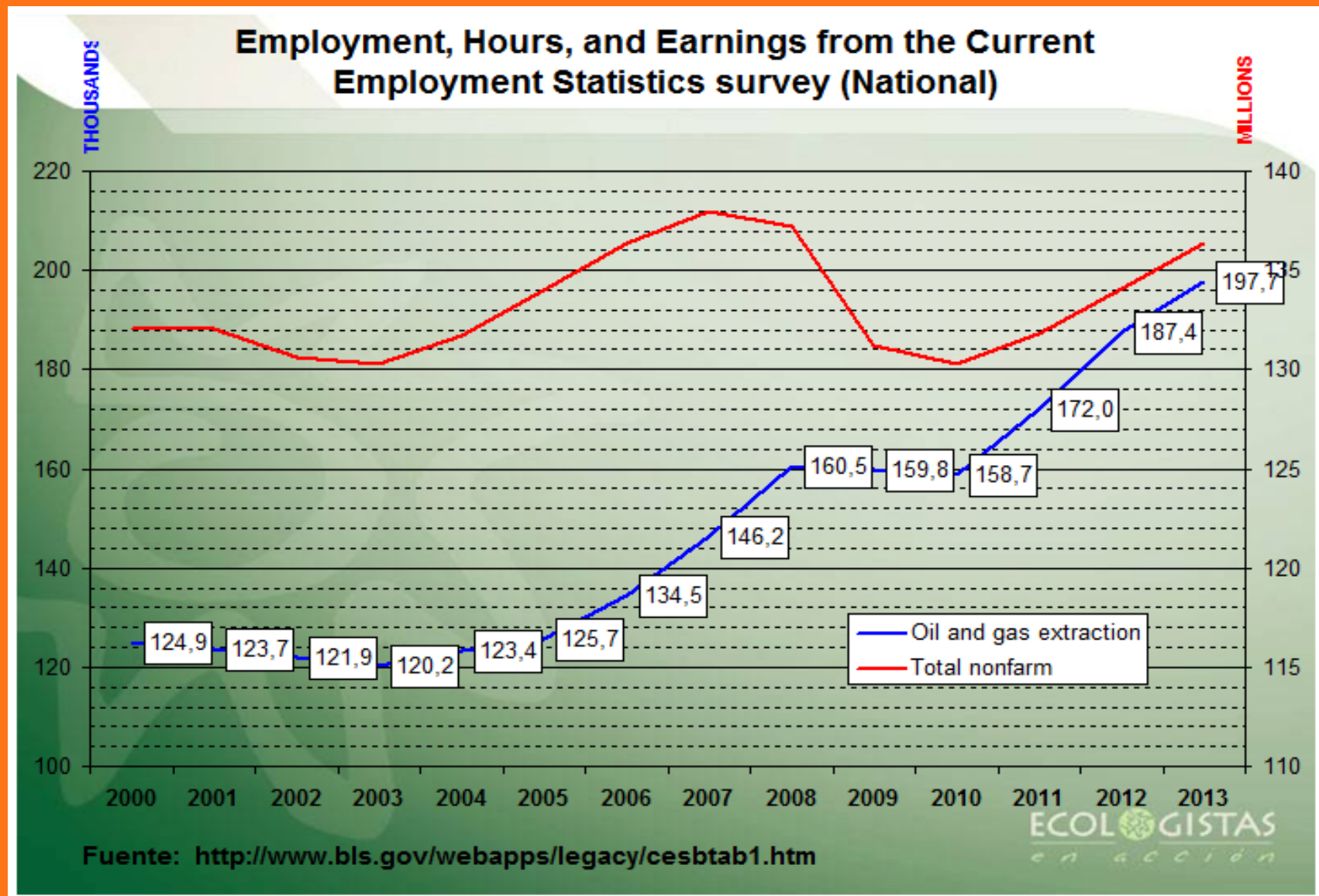


Shale gas y la técnica del fracking

03. Impactos ambientales

→ Desarrollo de la extracción de gases no convencionales

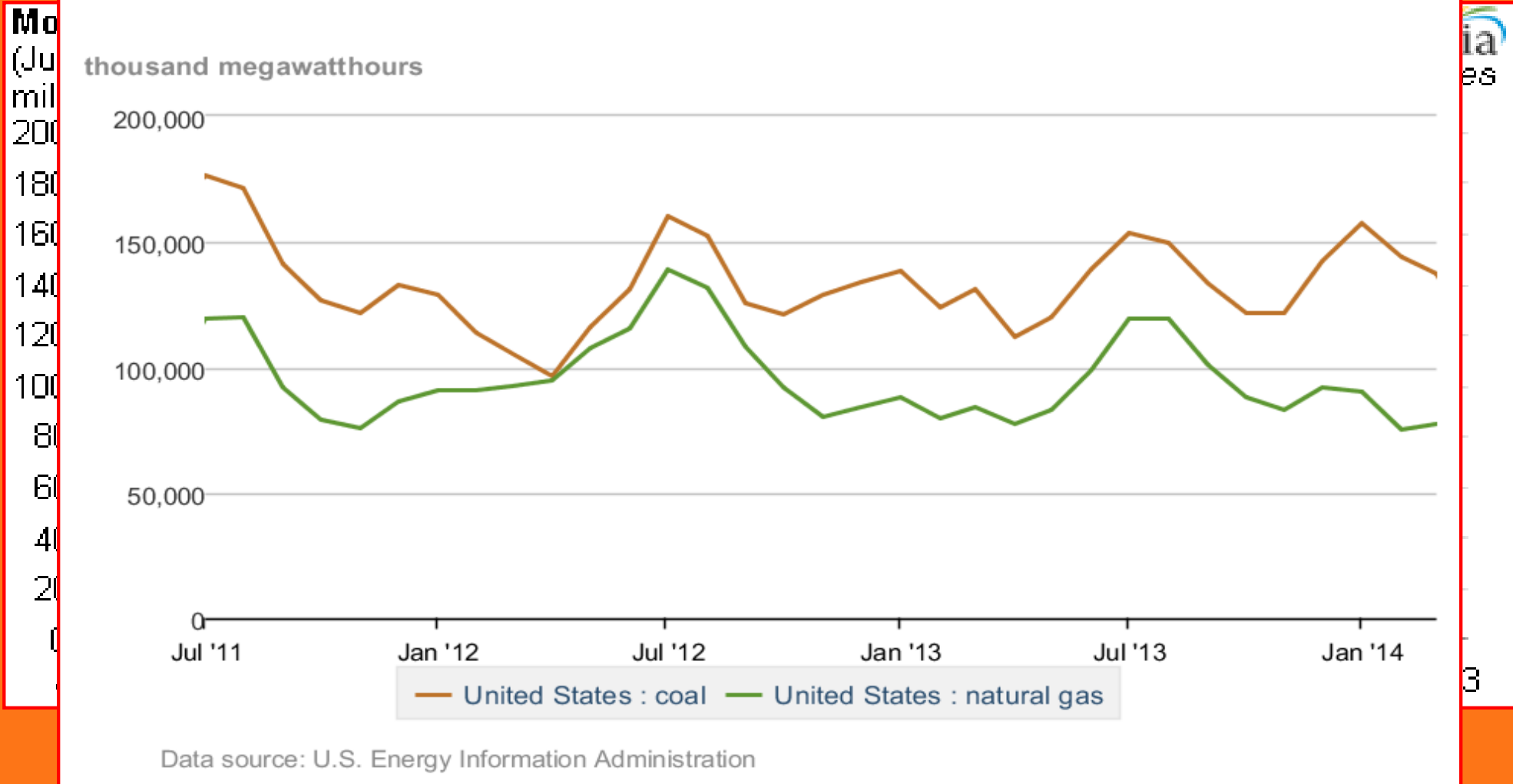
Desarrollo de la extracción de gases no convencionales



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Desarrollo de la extracción de gases no convencionales

Net generation for all sectors, monthly





Shale gas y la técnica del fracking

03. Impactos ambientales

→ Debate Social

Debate Social

Negocios.com

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ENRIQUE HERNÁNDEZ BENTO

Industria: 'El debate social sobre el fracking lo tenemos perdido'

El subsecretario de Industria, Energía y Turismo ha participado esta mañana en una conferencia organizada por Intereconomía.



Manifestación anti fracking | EFE

Enrique Hernández Bento, subsecretario de Industria, Energía y Turismo, ha reconocido esta

Por ello, indicó que “es fundamental llegar a un consenso político entre los principales partidos políticos”. Hernández Bento incluyó entre estas fuerzas políticas al **Partido Popular** de algunas comunidades autónomas, como **Cantabria** o **La Rioja**, que propugnan que se cambie la **Ley de Hidrocarburos** para prohibir el fracking.

de inversión en España’, organizada por el **Área de Conferencias y Formación de Intereconomía**.

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EN TIEMPO REAL



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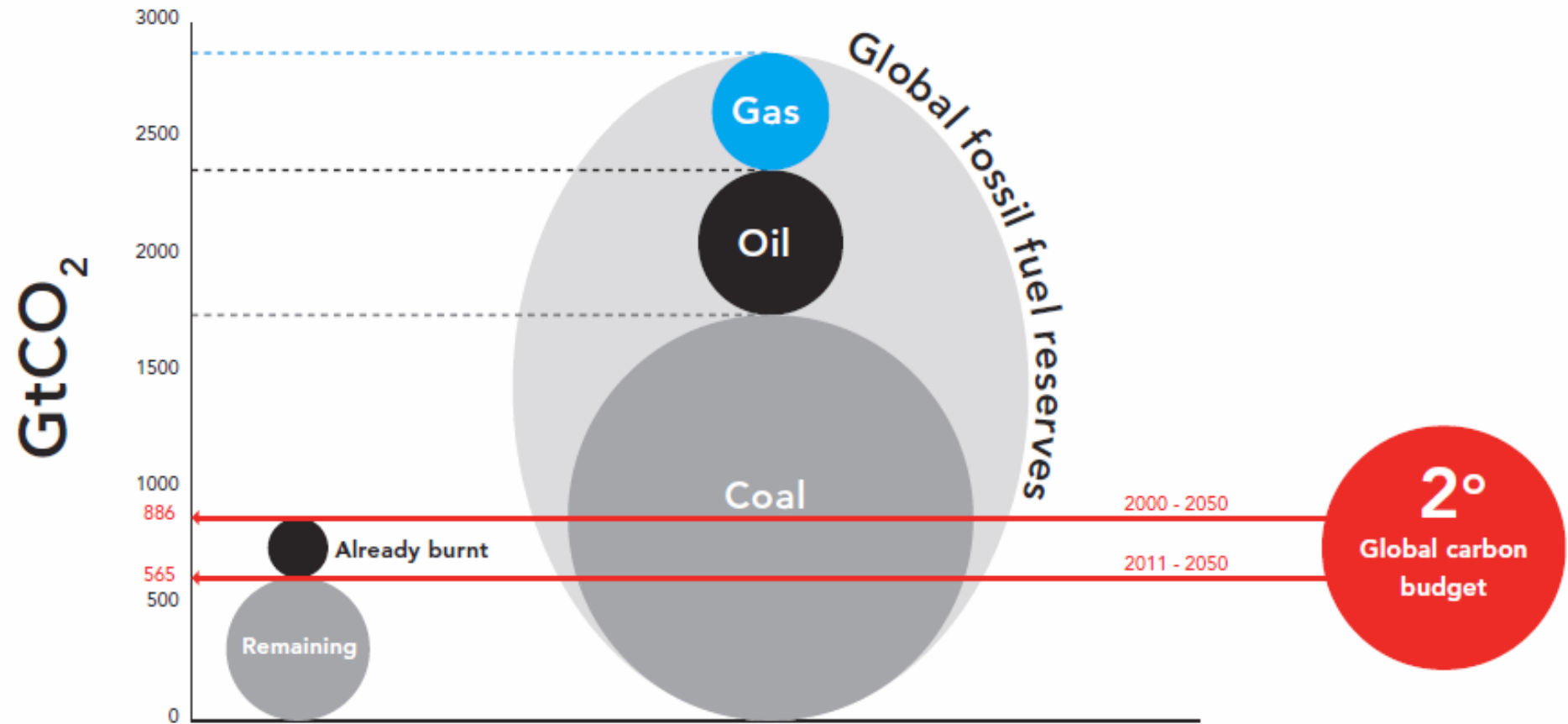


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Debate Social

Comparison of the global 2°C carbon budget with fossil fuel reserves CO₂ emissions potential

Fig.1



Debate Social

VIERNES, 02 MAYO, 2014



Plataforma española sobre la exploración y desarrollo del shale gas

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Detalle del Curso de verano

CURSO: TD.4.1
EL NUEVO PANORAMA DEL PETRÓLEO: LOS HIDROCARBUROS NO CONVENCIONALES

DATOS GENERALES

- Laredo
- Torrelavega
- Suances
- Santander
- Colindres
- Ramales de la Victoria
- Camargo
- Noja
- Aguilar
- Riba

Fundación **REPSOL** | energía social

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DIVERSIDAD E INTEGRACIÓN CIUDADANÍA RESPONSABLE ENERGÍA EDUCACIÓN E INNOVACIÓN DESARROLLO SOCIAL BECAS CULTURA


Inicio / Agenda / Seminario sobre hidrocarburos no convencionales

Agenda


Seminario sobre hidrocarburos no convencionales




ESCUELA TÉCNICA SUPERIOR DE INGENIEROS DE MINAS
C/ Independencia, 13. (Oviedo)




Miércoles, Abril 9, 2014 - Viernes, Abril 11, 2014




Mañana y tarde



NOTICIAS



10.11.2014
El Aula Móvil en A Coruña



PROYECTOS

Fundación Repsol colabora en el Seminario sobre hidrocarburos no convencionales que organiza la Escuela Técnica Superior de Ingenieros de Minas de la Universidad de Oviedo.

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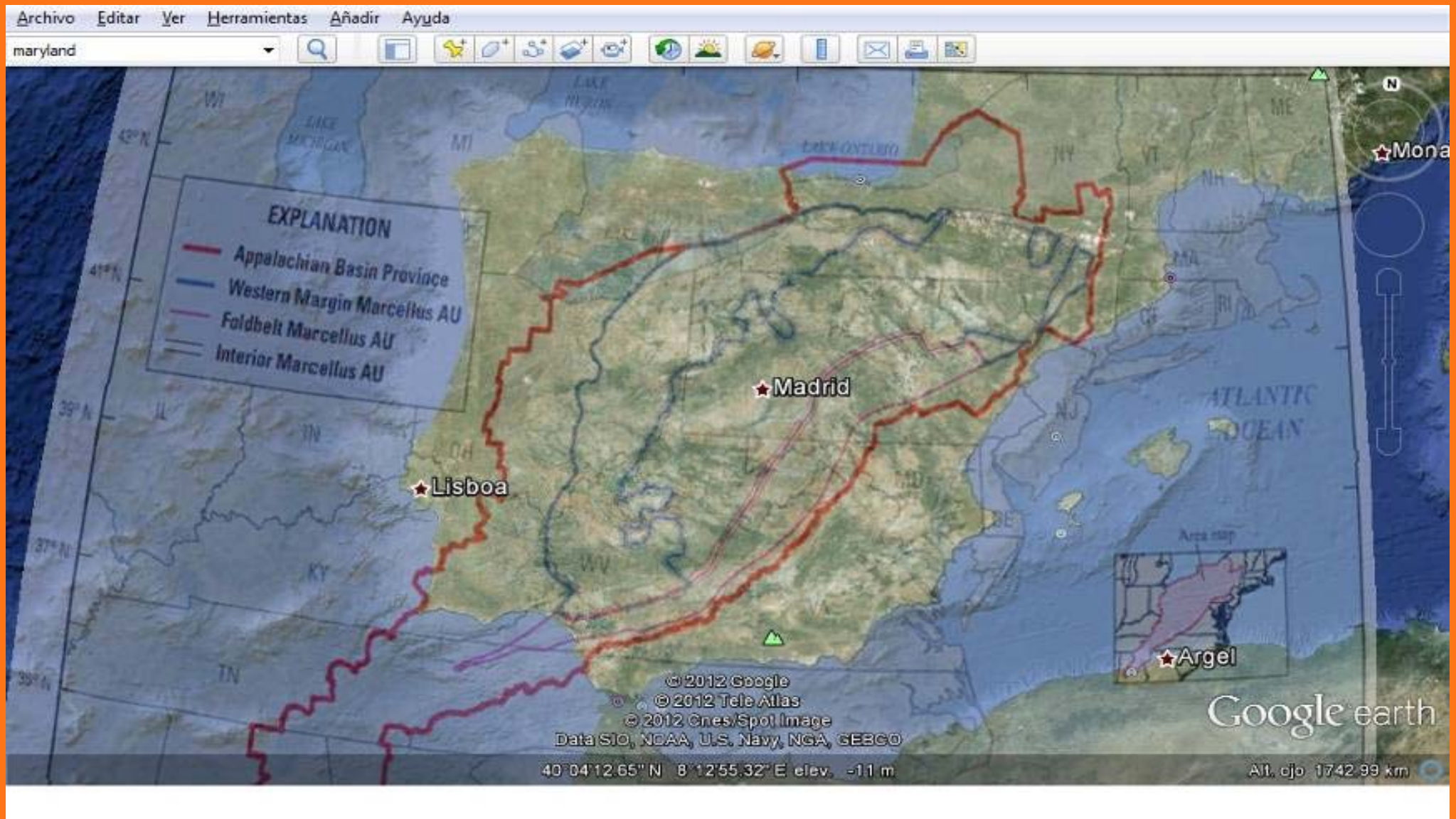


Shale gas y la técnica del fracking

03. Impactos ambientales

→ Pero esto no son los EE.UU.

Pero esto no son los EE.UU.



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Pero esto no son los EE.UU.

Lunes, 17 de junio 2013

LA VANGUARDIA.com | Medio ambiente

Ediciones Quiero | Tem


Portada Internacional Política Economía Sucesos Opinión Deportes Vida Tecnología Cu

ES Magazine Món Barcelona Ciencia Sanidad Salud Qué estudiar Medio ambiente Eficienci

"El 'fracking' será caro en Europa"

Francis O'Sullivan, experto en energía del MIT: "El problema es qué hacer con el agua salina que sale de las capas profundas"

Medio ambiente | 16/06/2013 - 07:25h | Última actualización: 16/06/2013 - 07:25h



El IREC invitó a O'Sullivan Kim Manresa

ANTONIO CERRILLO
Barcelona

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El gas de esquisto o gas pizarra (*shale gas*) ha abarato el precio de la energía en EE. UU. Pero Francis O'Sullivan, director del Programa de Sostenibilidad Energética del Massachusetts Institute of Technology (MIT), dice que este gas, extraído con fractura hidráulica de la roca (*fracking*), no es la panacea para la UE. Lo dijo el jueves en una conferencia en Barcelona organizada por el Institut de Recerca en Energia de Catalunya (IREC) y la Fundació b_TEC.

his pricing advantage
oped drilling-services
1,600 gas drilling rigs
fewer than 100 such
According to Wood
er (hp) of hydraulic-
Europe, compared

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8 May 2013 Last updated at 22:19 GMT 377 Share

North American firms quit shale gas fracking in Poland

Eni Pulls Out of Polish Shales

Two North American energy companies have ended their shale gas fracking in Poland.

Talisman Energy of Canada and company Marathon said they have decided to quit what is seen as potentially one of the last sources of shale gas in Europe.

Marathon said its decision was "unsuccessful attempts to find shale gas in Poland."

Poland had hoped the shale gas would be a key part of the country's ambitions to reduce its dependence on Russia.

The departure of the two companies is a blow to the country's ambitions.

"Poland's shale gas exists only if the right conditions happen," said Grzegorz Pytel, a senior advisor at the think tank.

Talisman said it was selling its shale gas assets to Leon Energy.

REUTERS EDITION: U.S. SIGN

HOME BUSINESS MARKETS WORLD POLITICS TECH OPINION BREAKINGVIEWS

UPDATE 1-France's Total calls time on Polish shale license

Mon Apr 14, 2014 7:55am EDT



Italy's Eni is likely to abandon its shale gas projects in Poland due to unprofitable shale gas exploration licenses. The daily newspaper *Puls Biznesu* reported that the oil giant's three concession fade out.

According to a statement sent by the Polish environment ministry to Reuters, Eni's shale gas exploration licenses have expired and the company does not intend to renew them.

Eni has a third license that will expire in June 2018.

Recently, the Polish government's attempt at mandating co-operation in state controlled enterprises has crumbled. Reports indicate that a deal between Eni and the Polish government will lapse.

In December, Piotr Wozniak, Poland's Deputy Environment Minister and has been removed. Environment Minister Maciej Grabowski dismissed Wozniak from both positions with Sławomir Brodziński. Wozniak was responsible for drafting regulations for the development of the shale gas industry and for licensing. The reshuffle indicates the difficulties within the Polish government to foster shale gas development, which would decrease Warsaw's reliance on imports from Russia.

NATURAL GAS EUROPE

3LEGS' PULL-OUT ANOTHER BLOW FOR POLISH SHALE EFFORTS?

Horizontal shale wells in Poland remain a question mark, as San Leon Energy and 3Legs Resources release their updates on Wednesday, reporting blows for the entire industry.

3Legs Resources announced it is in the best interest of its shareholder to exercise a one-time option to cease participation in activity on its three western Baltic Basin concessions.

'The Company has concluded that it would be in the best interests of its shareholders to exercise this option, thereby capping its financial liability in relation to the three concessions; it has now exercised this option,' 3Legs Resources wrote on its website on Wednesday.

San Leon confirmed its commitment to its Gdansk W concession, but betrayed some frustration.

'While it is disappointing that commerciality has still to be proven in a Polish horizontal shale well, the Company notes that the hydrocarbon liquid:gas ratio in the Lublewo LEP-1ST1H well appears to be in excess of 10 times that in the Lewino-1G2 well. Since finishing testing Lewino-1G2 in January 2014, San Leon has believed that its liquid:gas ratio was at a desirable level, providing liquid sales potential whilst minimising any adverse effects on gas production,' reads the note released by the Ireland-based company on Wednesday.

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Shale gas y la técnica del fracking

03. Impactos ambientales

- La Fractura hidráulica y sus posibles impactos sobre el medio ambiente y la salud humana

Fuentes de Información

Tyndall
for Climate

Shale
enviro

A report of
University

John Bro
Kevin An
Ruth Wor
Paul Gibb
Maria Sh
Tyndall M

Anthony
independ

Steven G
Fiona Nik
Sustalnat

Report co

SEPA
United States
Environmental Protection
Agency

DR

Investi
Contar
Pavilli

Office of Research and Development
National Risk Management Research Laboratory, Ada, Oklahoma 74802

RECOMENDACIONES AMBIENTALES EN RELACIÓN CON LAS MEDIDAS PREVENTIVAS Y CORCTORAS A CONSIDERAR EN PROYECTOS RELACIONADOS CON LA EXPLORACIÓN Y EXPLOTACIÓN DE HIDROCARBUROS MEDIANTE TÉCNICAS DE FRACTURA HIDRÁULICA



ENERO 2014

DIRECCIÓN GENERAL DE POLÍTICAS INTERIORES

TEMÁTICO A
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11 December 2012 | www.osa.gov/itd/tdr

Confidential Impacts of
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PORT

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siones de la
s y petróleo
en el medio
ud humana

ENVI

2011

United States Environmental Protection Agency
Office of Research and Development

CONF

Exenciones Ambientales

Moratorias en la aplicación de :



**HIS COMPANY INVENTED
FRACKING**

El "vacío legal de Halliburton" fue creado por el Congreso en 2005, a "instancias" del entonces, vicepresidente, Dick Cheney.

**HE GETS FRACKING EXEMPT FROM THE CLEAN AIR
ACT, CLEAN WATER ACT, AND SAFE DRINKING
WATER ACT, THEN TELLS YOU IT'S SAFE.**

The Safe D

de Agua

The Natio

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Emergenc

Ley de

Planific

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Comprehen

Liability

Act.- Ley Completa de Responsabilidad, Compensación y Respuesta al Medio ambiente

Exenciones Ambientales



Stephen L. Johnson

2005 – 2009



Lisa P. Jackson

2009 – 2013



Gina McCarthy

2013 –

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Baja Productividad

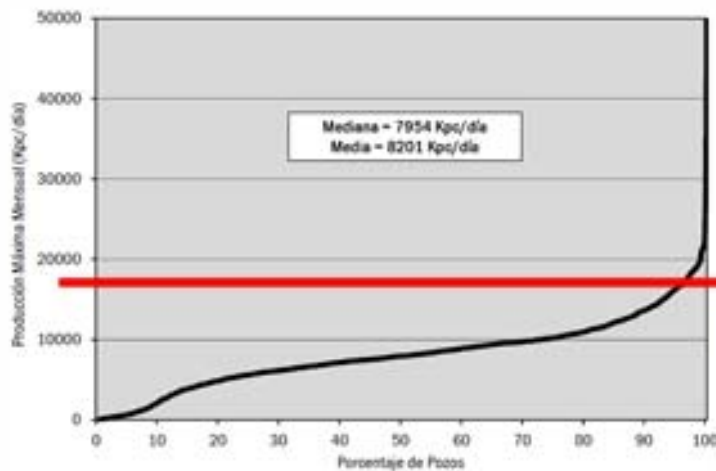


Figura 44. Distribución de la calidad de los pozos en el campo Haynesville definida por la tasa de producción mensual más alta en toda la vida del pozo.²⁰⁷

El eje X indica el porcentaje acumulado de pozos ordenados de menor a mayor calidad. La tasa de producción mensual más alta se alcanza típicamente durante el primer o segundo mes después de que el pozo haya sido completado.

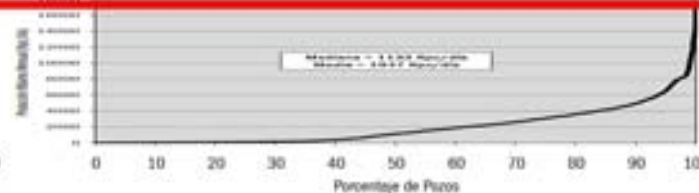


Figura 55. Distribución de la calidad de los pozos en el campo Marcellus definida de acuerdo con la tasa de producción mensual más alta de toda la vida útil de los pozos.²⁰⁷

El eje X indica el porcentaje acumulado de pozos ordenados de menor a mayor calidad. La tasa productiva mensual más alta se alcanza típicamente durante el primer o segundo mes después de que el pozo haya sido completado.

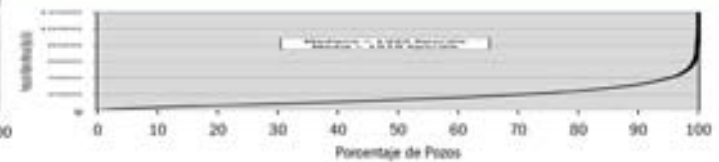


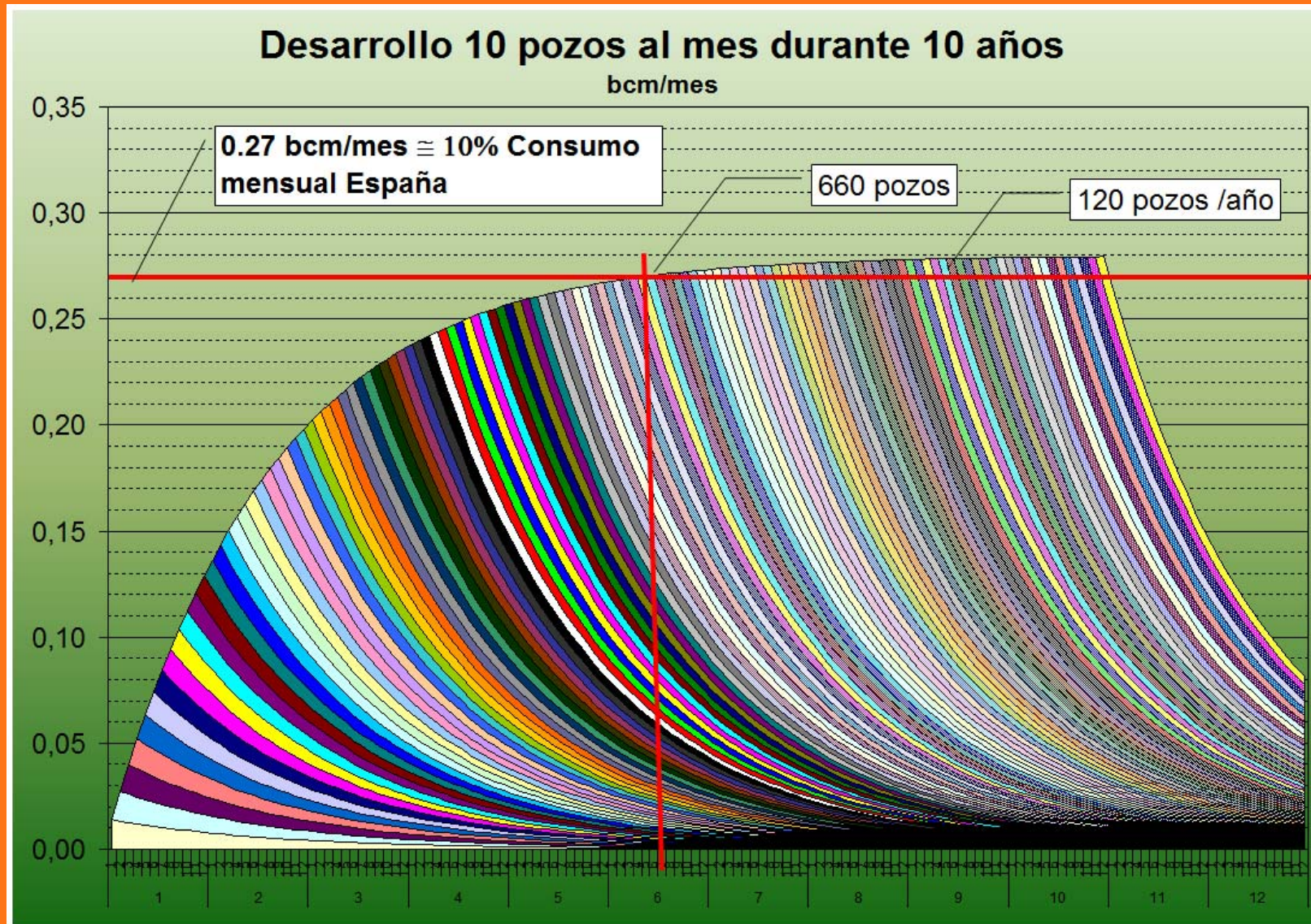
Figura 49. Distribución de la calidad de los pozos en el campo Barnett definida por la tasa de producción mensual más alta en toda la vida de los pozos.²⁰⁷

El eje X indica el porcentaje acumulado de pozos ordenados de menor a mayor calidad. La tasa productiva mensual más alta se alcanza típicamente durante el primer o segundo mes productivo después de que el pozo haya sido completado.

c) Extracción o almacenamiento subterráneo de petróleo y gas natural con fines comerciales cuando:

- 1.º La cantidad de producción sea superior a 500 toneladas por día en el caso del petróleo y de 500.000 metros cúbicos por día en el caso del gas o bien,
- 2.º Se realicen en medio marino.

Baja Productividad



Riesgos Acumulados



Apoyo a la identificación de los riesgos potenciales para el medio ambiente y la salud humana derivados de las actividades con hidrocarburos que impliquen la fracturación hidráulica en Europa

Support to the identification of potential risks for the environment and human health arising from hydrocarbons operations involving hydraulic fracturing in Europe

Report for European Commission
DG Environment

AEA/IED57281
Issue Number 17
Date 10/08/2012



CONAMA2014

AEA Support to the identification of potential risks for the environment and human health arising from hydrocarbons operations involving hydraulic fracturing in Europe

Table ES1: Summary of preliminary risk assessment

Environmental aspect	Project phase						Overall rating across all phases
	Site identification and preparation	Well design drilling, casing, cementing	Fracturing	Well completion	Production	Well abandonment and post-abandonment	
Individual site							
Groundwater contamination	Not applicable	Low	Moderate-High	High	Moderate-High	Not classifiable	High
Surface water contamination	Low	Moderate	Moderate-High	High	Low	Not applicable	High
Water resources	Not applicable	Not applicable	Moderate	Not applicable	Moderate	Not applicable	Moderate
Release to air	Low	Moderate	Moderate	Moderate	Moderate	Low	Moderate
Land take	Moderate	Not applicable	Not applicable	Not applicable	Moderate	Not classifiable	Moderate
Risk to biodiversity	Not classifiable	Low	Low	Low	Moderate	Not classifiable	Moderate
Noise impacts	Low	Moderate	Moderate	Not classifiable	Low	Not applicable	Moderate - High
Visual impact	Low	Low	Low	Not applicable	Low	Low-moderate	Low - Moderate
Seismicity	Not applicable	Not applicable	Low	Low	Not applicable	Not applicable	Low
Traffic	Low	Low	Moderate	Low	Low	Not applicable	Moderate
Cumulative							
Groundwater contamination	Not applicable	Low	Moderate-High	High	High	Not classifiable	High
Surface water contamination	Moderate	Moderate	Moderate-High	High	Moderate	Not applicable	High
Water resources	Not applicable	Not applicable	High	Not applicable	High	Not applicable	High
Release to air	Low	High	High	High	High	Low	High
Land take	Very high	Not applicable	Not applicable	Not applicable	High	Not classifiable	High
Risk to biodiversity	Not classifiable	Low	Moderate	Moderate	High	Not classifiable	High
Noise impacts	Low	High	Moderate	Not classifiable	Low	Not applicable	High
Visual impact	Moderate	Moderate	Moderate	Not applicable	Low	Low-moderate	Moderate
Seismicity	Not applicable	Not applicable	Low	Low	Not applicable	Not applicable	Low
Traffic	High	High	High	Moderate	Low	Not applicable	High

Not applicable: Impact not relevant to this stage of development

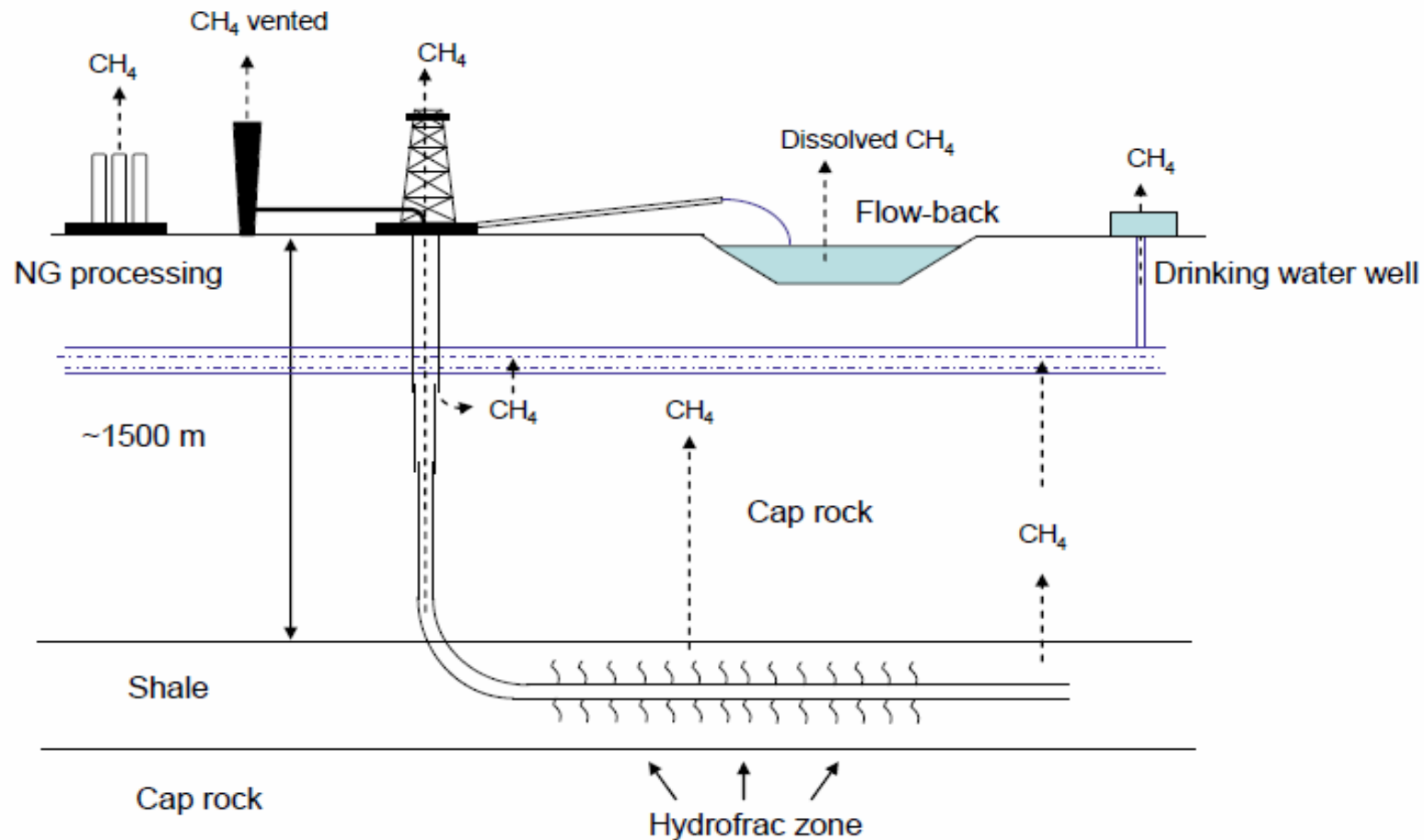
Not classifiable: Insufficient information available for the significance of this impact to be assessed

La Fractura hidráulica y sus posibles impactos sobre el medio ambiente y la salud humana

- Balance de Gases de Efecto Invernadero
- Impactos sobre el paisaje.
- Las emisiones contaminantes y la contaminación del suelo.
- Aguas superficiales y subterráneas.
 - Productos químicos y radiactividad
 - Movimientos sísmicos.

Balance de gases de efecto invernadero

Figure 4: CH₄ emissions from shale gas exploration, extraction and processing



Source: own source based on [SUMI 2008] The shale gas exploration and development (initial drilling and completion), which includes the flow-back procedure, contributes to a large extent to the overall methane emissions. Table 5 shows the methane emissions from the flow-back procedure at four unconventional wells.

Balance de gases de efecto invernadero

The image shows a screenshot of a Nature journal article page. The article title is "What it takes to avoid climate danger". A large, tilted text box is overlaid on the page, containing the following text: "Su influencia en las emisiones de gases de efecto invernadero de Europa seguirá siendo **pequeña, incluso insignificante, con efectos negativos** si hay otros proyectos más prometedores que se abandonan debido a los incentivos y señales equivocados". The background shows the article's content, including a graph titled "Natural Gas Leakage" and the EDF logo.

What it takes to avoid climate danger

A. Gasoline car **B. H...**

Natural Gas Leakage

7.0
6.0
5.0
4.0
3.0

0 20 40 60 80 100

achieved

Fleet Conversion
Service-Life
Pulse

EDF
ENVIRONMENTAL DEFENSE FUND
Finding the ways that work

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Oceanic and Atmospheric Administration (NOAA) and the University of Colorado in Boulder, first sparked concern in February 2012 with a study¹ suggesting that up to 4% of the methane produced at a field near Denver was escaping into the atmosphere. If methane — a potent greenhouse gas — is leaking from fields across the country at similar rates, it could be offsetting much of the climate benefit of the ongoing shift from coal- to gas-fired plants for electricity generation.

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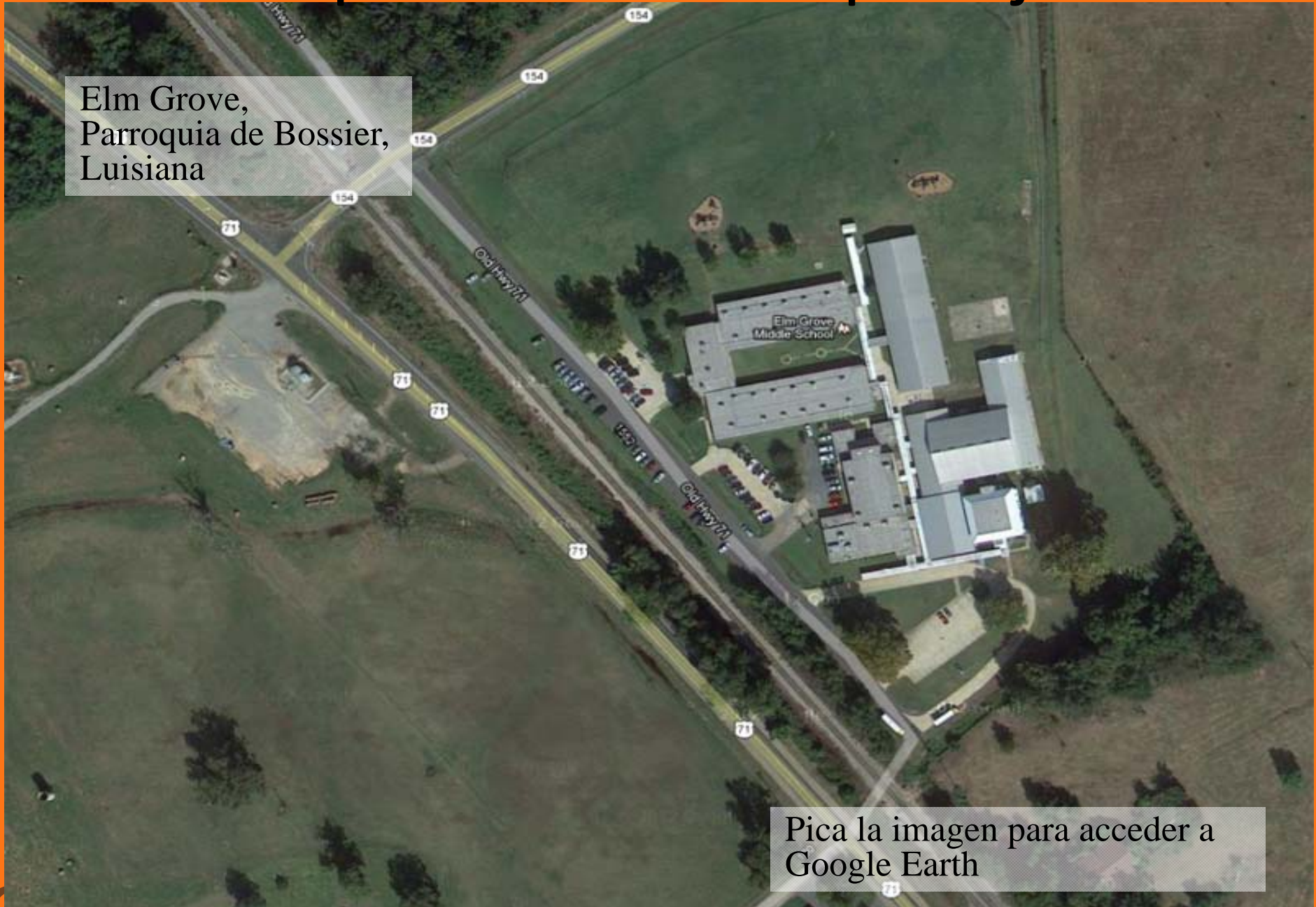
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الطبيعة العربية
High impact science

Impactos sobre el paisaje

Elm Grove,
Parroquia de Bossier,
Luisiana



Pica la imagen para acceder a
Google Earth

Impactos sobre el paisaje

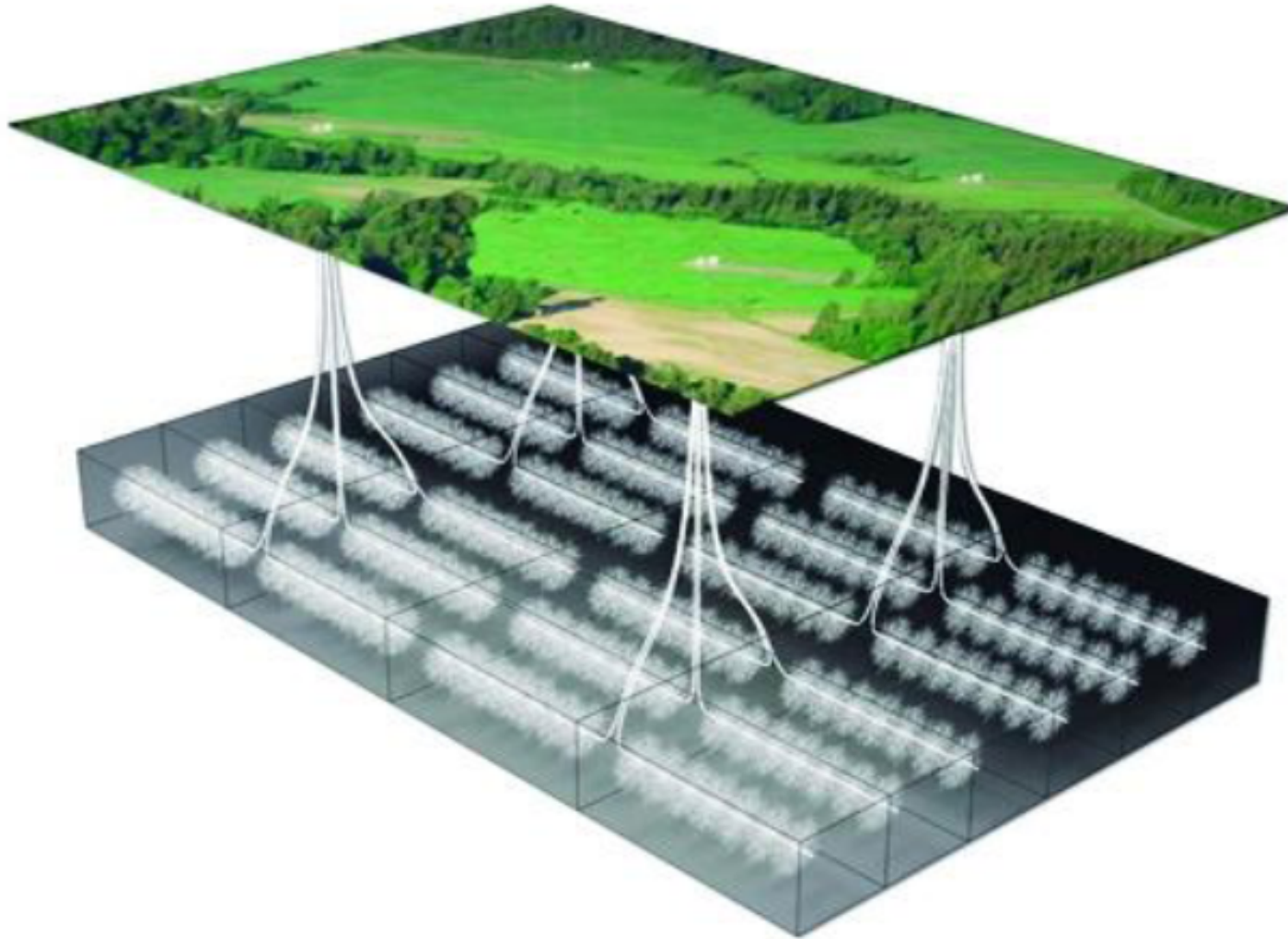


Impactos sobre el paisaje



Impactos sobre el paisaje

Figure 2.3: Illustration of the arrangement of arrays of multi-well pads over target formations¹⁴



Impactos sobre el paisaje

Cuadrados

10.000 acres

40 km²

4.000 Ha

15 MPozos

Rectángulos

700 acres

2,8 km²

283 Ha

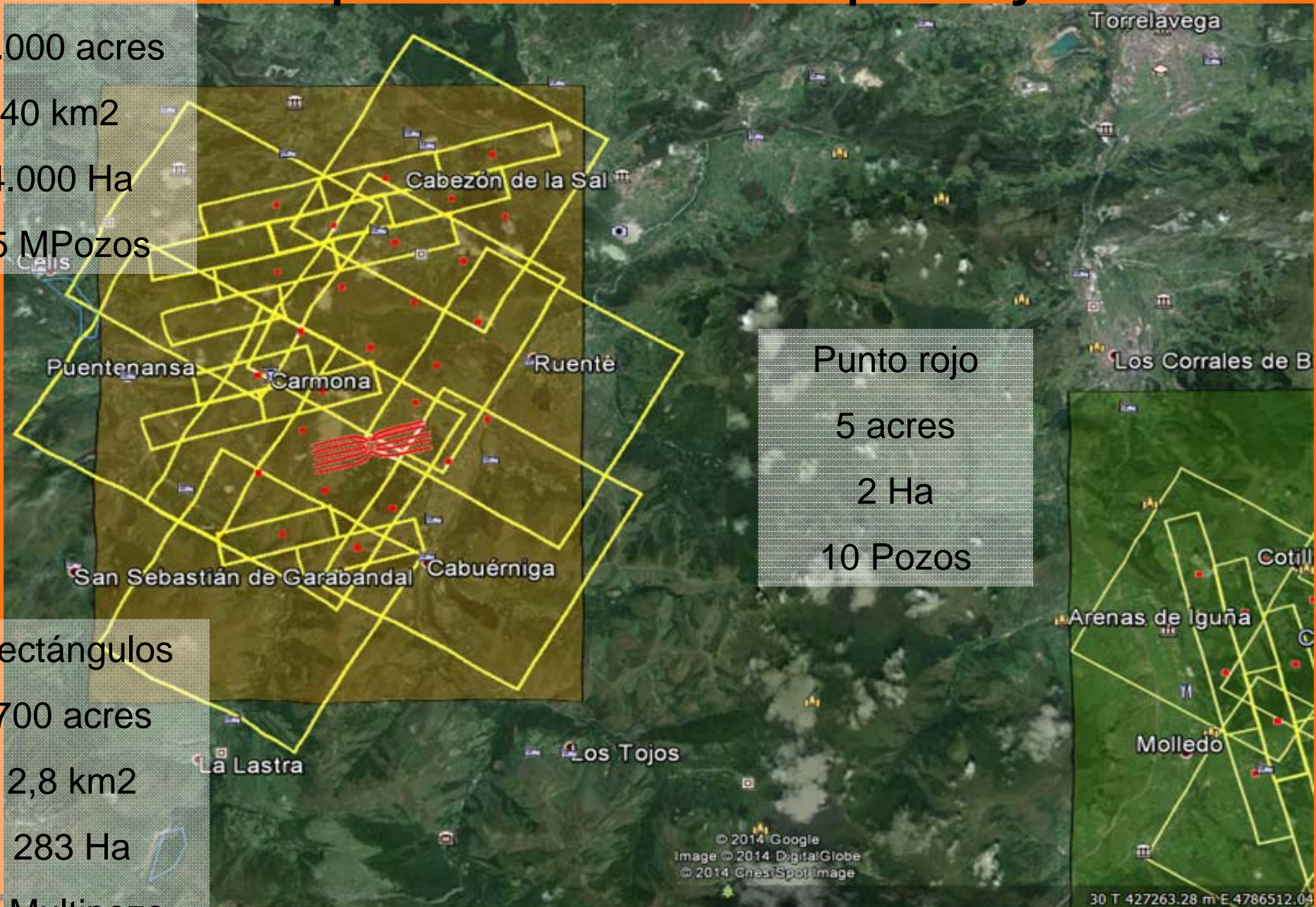
1 Multipozo

Punto rojo

5 acres

2 Ha

10 Pozos



Las emisiones contaminantes y la contaminación del suelo

- 1. Well head and frac tree with 'Goat Head'
- 2. Flow line (for flowback & testing)
- 3. Sand separator for flowback
- 4. Flowback tanks
- 5. Line heaters
- 6. Flare stack
- 7. Pump trucks
- 8. Sand hogs
- 9. Sand trucks
- 10. Acid trucks

- 11. Frac additive trucks
- 12. Blender
- 13. Frac control and monitoring center
- 14. Fresh water impoundment
- 15. Fresh water supply pipeline
- 16. Extra tanks
- 17. Line heaters
- 18. Separator-meter skid
- 19. Production manifold



Pozo

Tanques de fluido fracking

bombeo

Mezclador

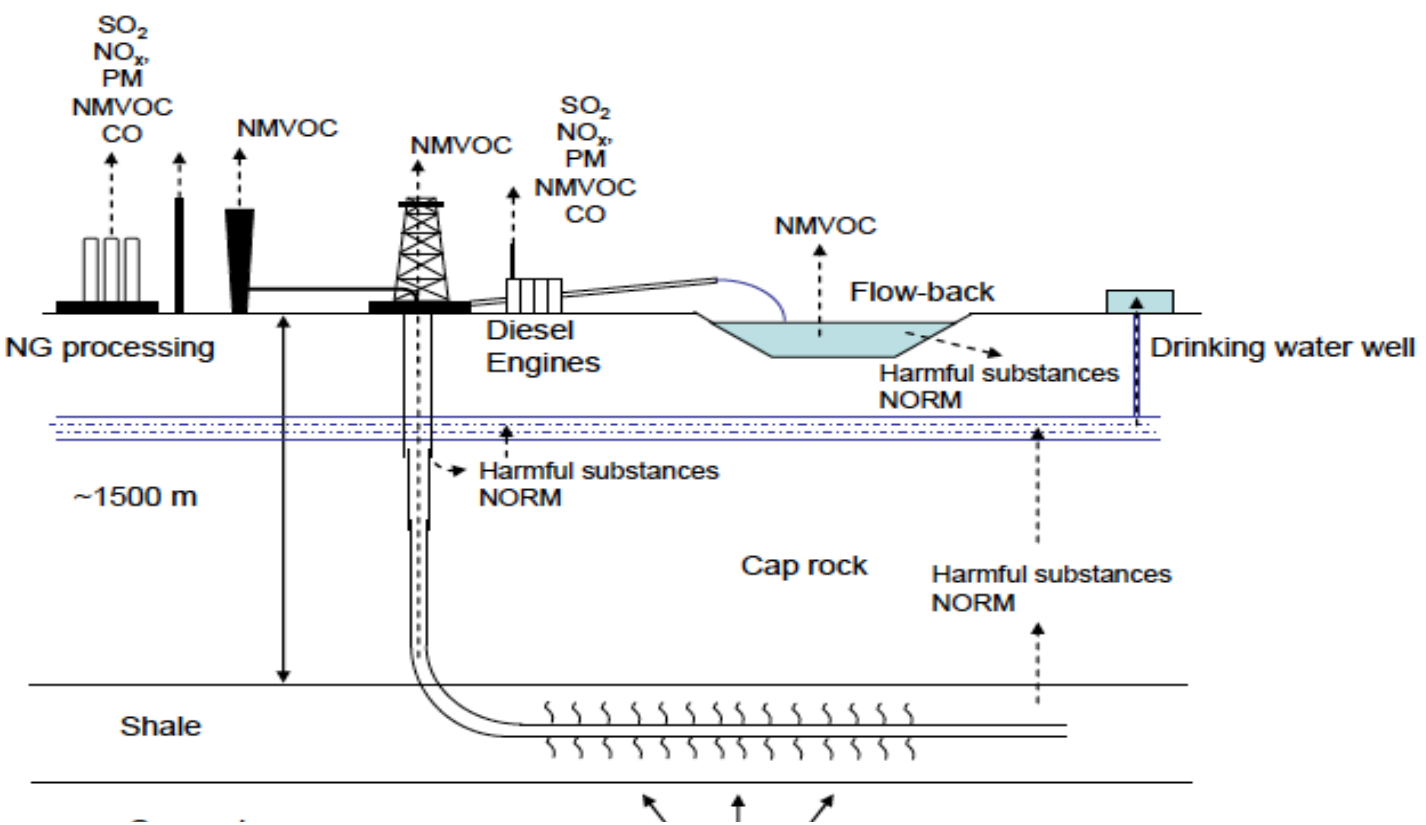
Reservas de agua

Camiones con arena

Camiones con ácido

Las emisiones contaminantes y la contaminación del suelo

Figure 1: Potential flows of air pollutant emissions, harmful substances into water and soil, and naturally occurring radioactive materials (NORM)



EUROPEAN PARLIAMENT IP/A/ENVI/ST/2011-07 June 2011
DIRECTORATE GENERAL FOR INTERNAL POLICIES. POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY
Impacts of shale gas and shale oil extraction on the environment and on human health

Riesgos Salud Emisiones Aire



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Riesgos Salud Emisiones Aire



Contents lists available at SciVerse ScienceDirect

Science of the Total Environment

journal homepage: www.elsevier.com/locate/scitotenv



Human health risk assessment of air emissions from development of unconventional natural gas resources☆☆☆

Lisa M. McKenzie*, Roxana Z. Witter, Lee S. Newman, John L. Adgate

Colorado School of Public Health, University of Colorado, Anschutz Medical Campus, Aurora, Colorado, USA

Los residentes a menos de 1/2 milla de un pozo están expuestos a mayores riesgos para su salud que los que viven a más de 1/2 milla.

El riesgo acumulado de cáncer fue de 10 por millón en los primeros y de 6 en los segundos, el benceno es quien más contribuye al riesgo

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

NGD warrant further study. Prospective studies should focus on health effects associated with air pollution.

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CONTINUED

Riesgos Salud Emisiones Aire

David Brown*, Beth Weinberger, Celia Lewis and Heather Bonaparte

Understanding exposure from natural gas drilling puts current air standards to the test

Abstract: Case study descriptions of acute onset of respiratory, neurologic, dermal, vascular, abdominal, and gastrointestinal sequelae near natural gas facilities contrast with a subset of emissions research, which suggests that there is limited risk posed by unconventional natural gas development (UNGD). An inspection of the pathophysiological effects of acute toxic actions reveals that

model based on local weather conditions to warn of periodic high exposures; and 3) comprehensive detection of chemical mixtures using canisters or other devices that capture the major components of the mixtures.

Keywords: acute toxic actions; toxic materials; unconventional natural gas development (UNGD).

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the body. The objective of this paper is to illustrate that current methods of collecting emissions data, as well as the analyses of these data, are not sufficient for accurately assessing risks to individuals or protecting the health of those near UNGD sites. Focusing on air pollution impacts, we examined data from public sources and from the published literature. We compared the methods commonly

those near UNGD sites. Focusing on air pollution impacts, we examined data from public sources and from the published literature. We compared the methods commonly used to evaluate health safety near UNGD sites with the

Recent and projected growth in the oil and gas production sector has underscored the need for EPA to gain a better understanding of emissions and potential risks from this industry sector. Harmful pollutants emitted from this industry include air toxics such as benzene, toluene, ethylbenzene, and xylene; criteria

sylvania

ET@aol.com
southwest
PA, USA

Aguas superficiales y subterráneas.

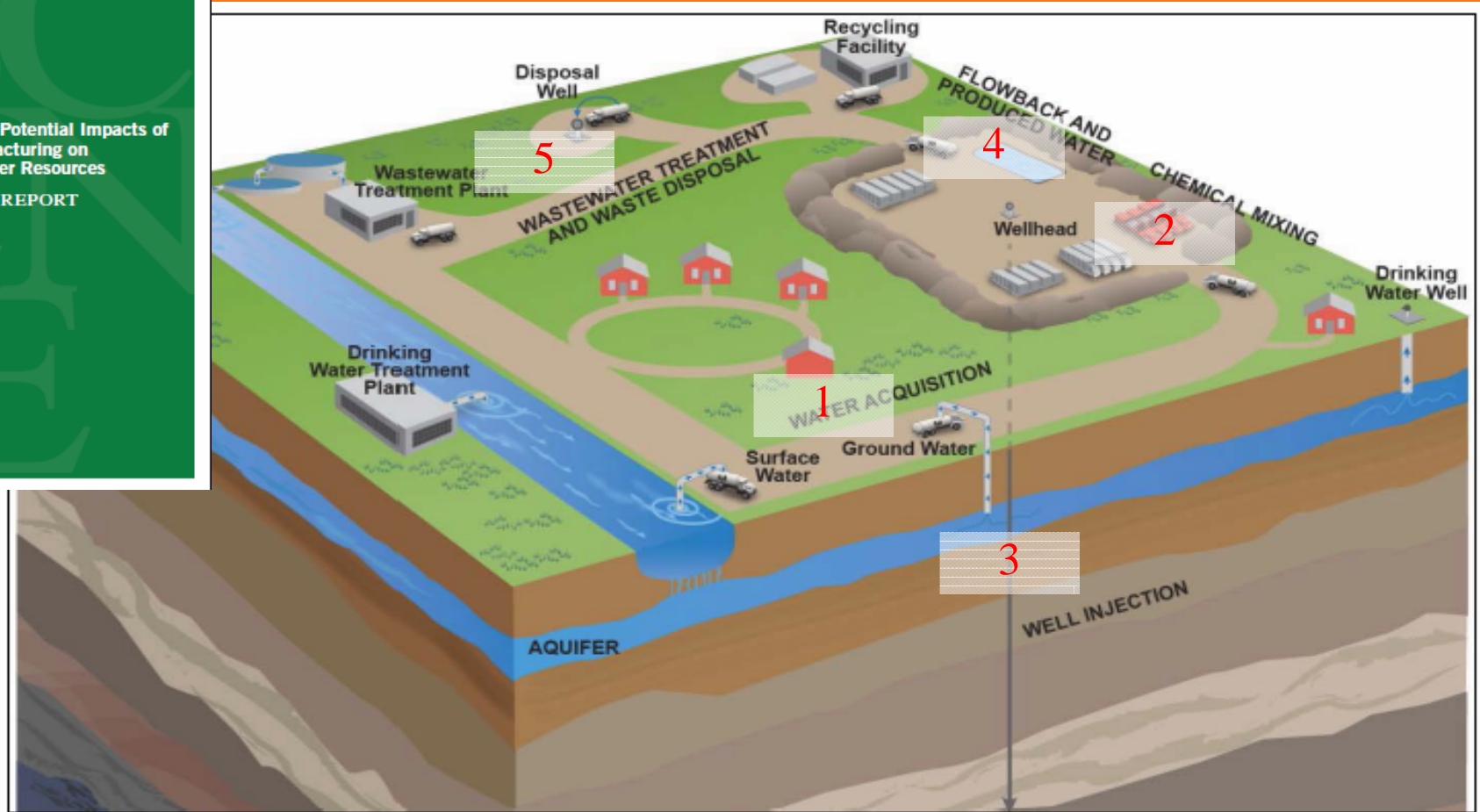


Figure 1. Illustration of the five stages of the hydraulic fracturing water cycle. The cycle includes the acquisition of water needed for the hydraulic fracturing fluid, onsite mixing of chemicals with the water to create the hydraulic fracturing fluid, injection of the fluid under high pressures to fracture the oil- or gas-containing formation, recovery of flowback and produced water (hydraulic fracturing wastewater) after the injection is complete, and treatment and/or disposal of the wastewater.

Consumo de agua

Table 2: Water demand of various wells for shale gas production (m³)

Site/Region	Total (per well)	Only Fracturing	Source
Barnett Shale	17000		Chesapeake Energy 2011
Barnett Shale	14000		Chesapeake Energy 2011
Barnett Shale	no data	4500 -13250	Duncan 2010
Barnett Shale	22500		Burnett 2009
Horn River Basin (Canada)	40000		PTAC 2011
Marcellus Shale	15000		Arthur et al. 2010
Marcellus Shale	1500 – 45000	1135 – 34000	NYCDEP 2009
Utica shale, Québec	13000	12000	Questerre Energy 2010

Contaminación del agua

La contaminación del agua puede ser producirse por:

- Vertidos de lodo de perforación, del flujo de retorno, residuos o tanques de almacenamiento. Provocan la contaminación del agua y la salinización.
- Las fugas o accidentes de las actividades de la superficie, como pérdidas de líquidos en tuberías de agua o estanques, por la manipulación no profesional o equipos viejos.
- Fugas de falta de cementación de los pozos.
- Fugas a través de estructuras geológicas, ya sea a través de grietas naturales o artificiales

Contaminación del agua

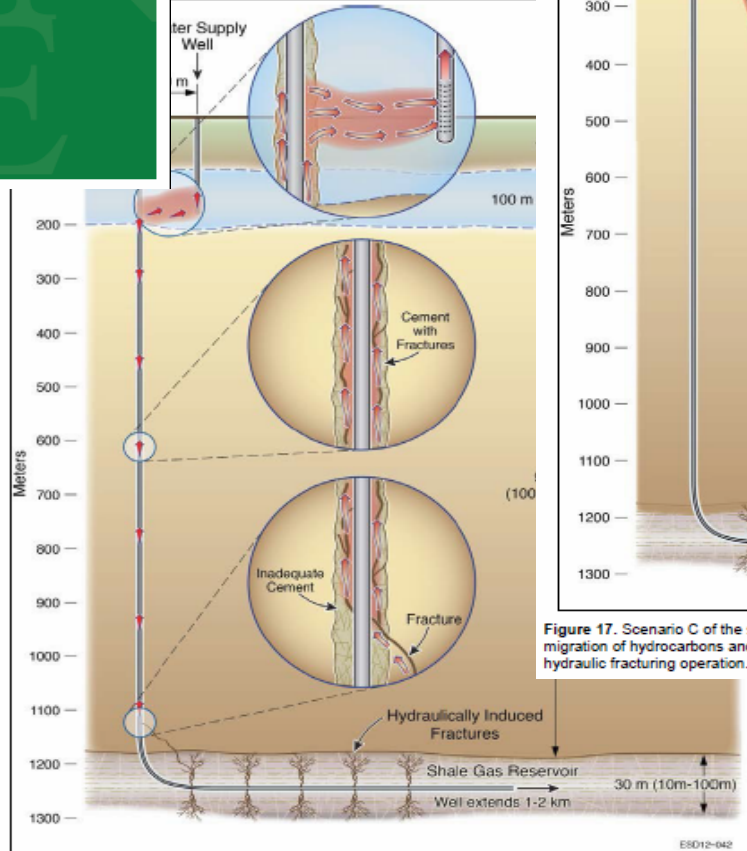


Figure 14. Scenario A of the subsurface migration modeling project. This scenario simulates a hypothetical migration pathway that occurs when a defective or insufficiently constructed well is damaged during excessive pressure from hydraulic fracturing operations. A migration pathway is established through which fluids could travel through the cement or area near the wellbore into overlying ground water aquifers.

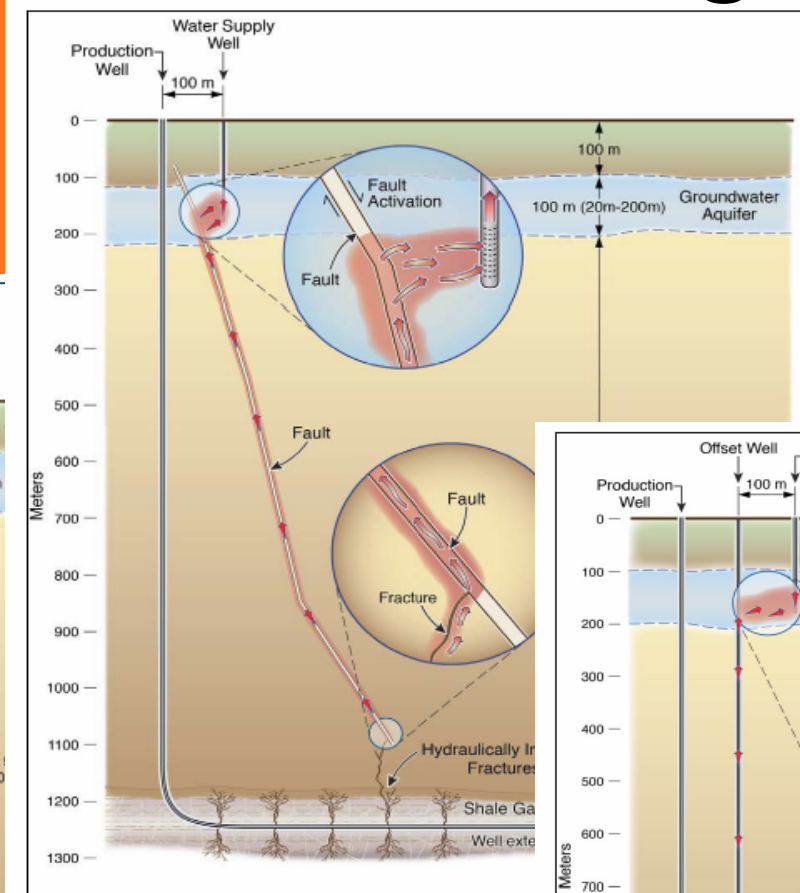


Figure 17. Scenario C of the subsurface migration modeling project. This hypothetical scenario simulates migration of hydrocarbons and other contaminants through sealed/dormant faults and fractures created during hydraulic fracturing operation.

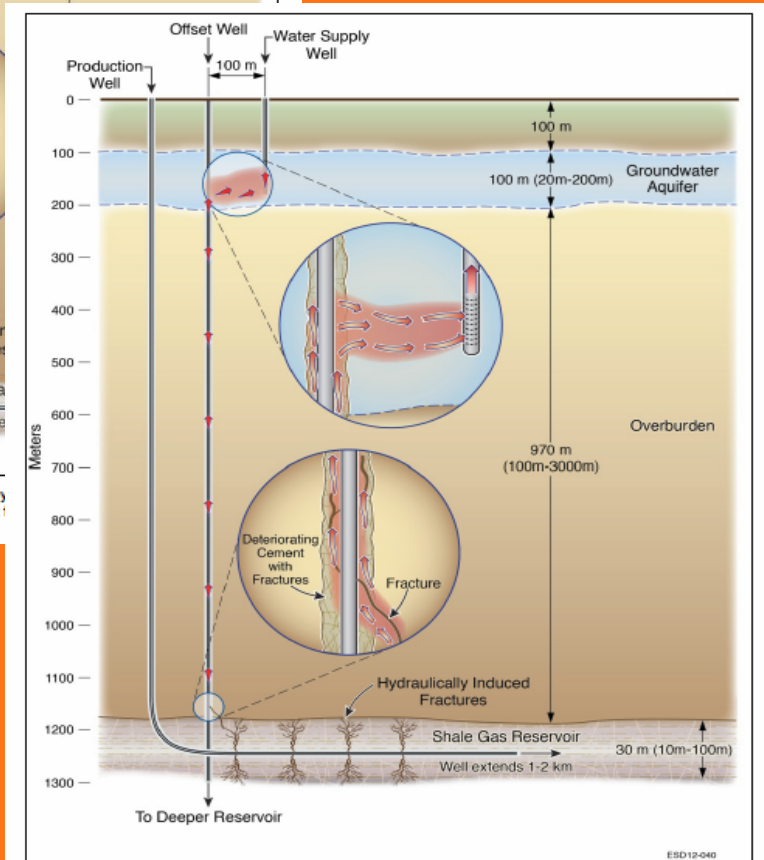
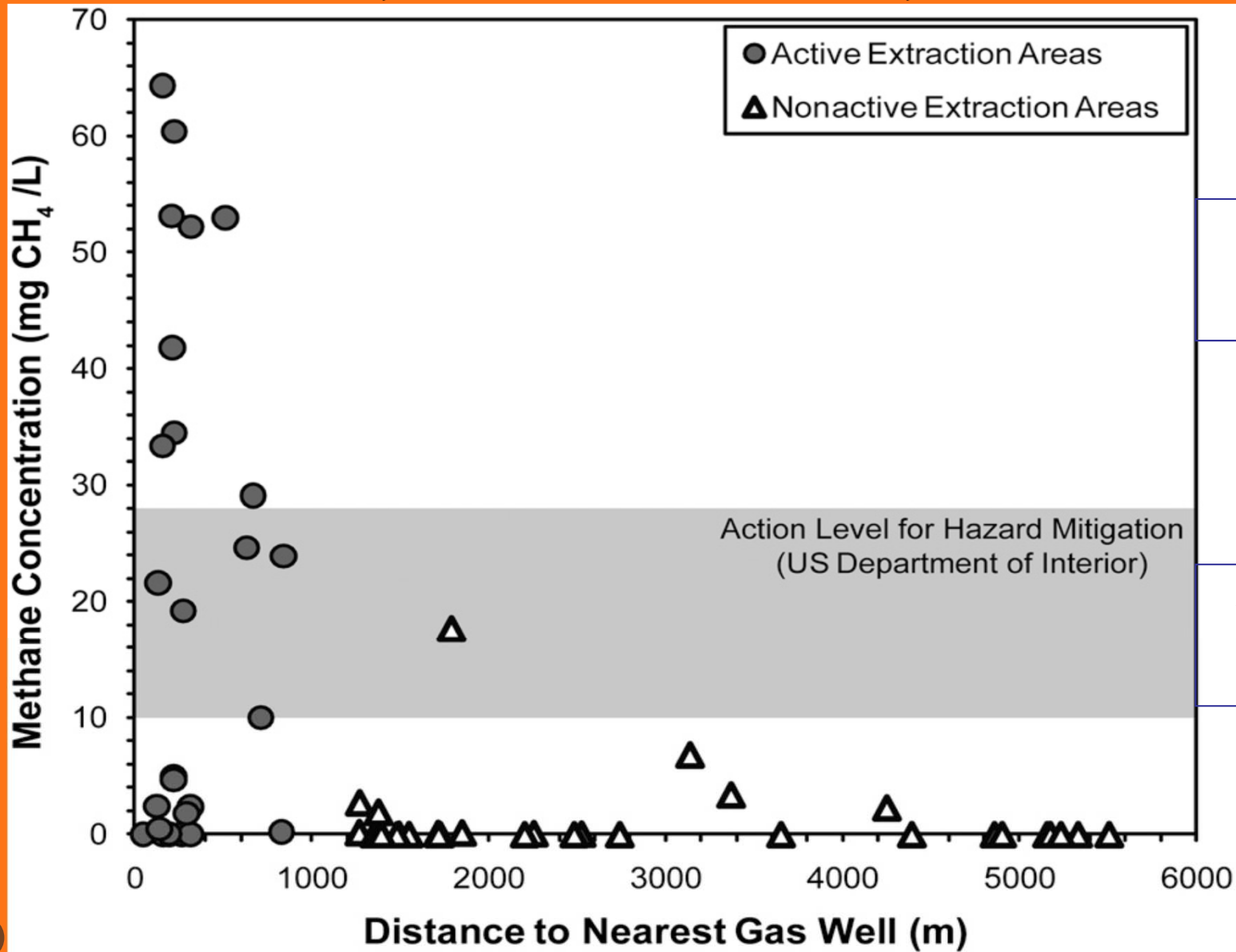


Figure 18. Scenario D1 of the subsurface migration modeling project. This hypothetical scenario simulates movement of hydrocarbons and other contaminants into offset wells in conventional oil/gas reservoirs with deteriorating cement due to fracturing of the overburden. The offset wells may intersect and communicate with aquifers, and inadequate or failing completions/cement can create pathways for contaminants to reach ground water aquifers.

Contaminación por metano

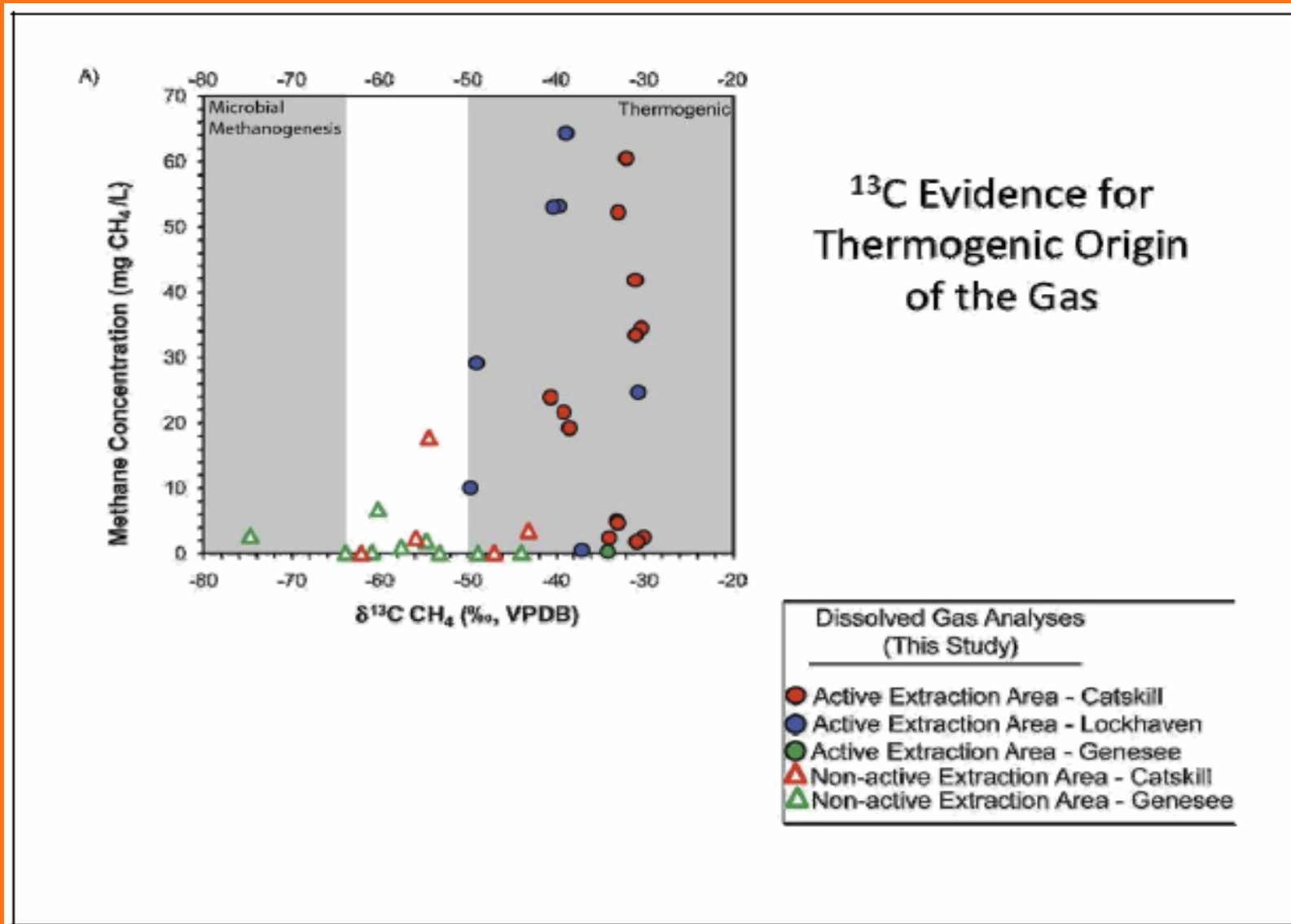
PNAS, Abril 2011. Universidad Duke, Durham



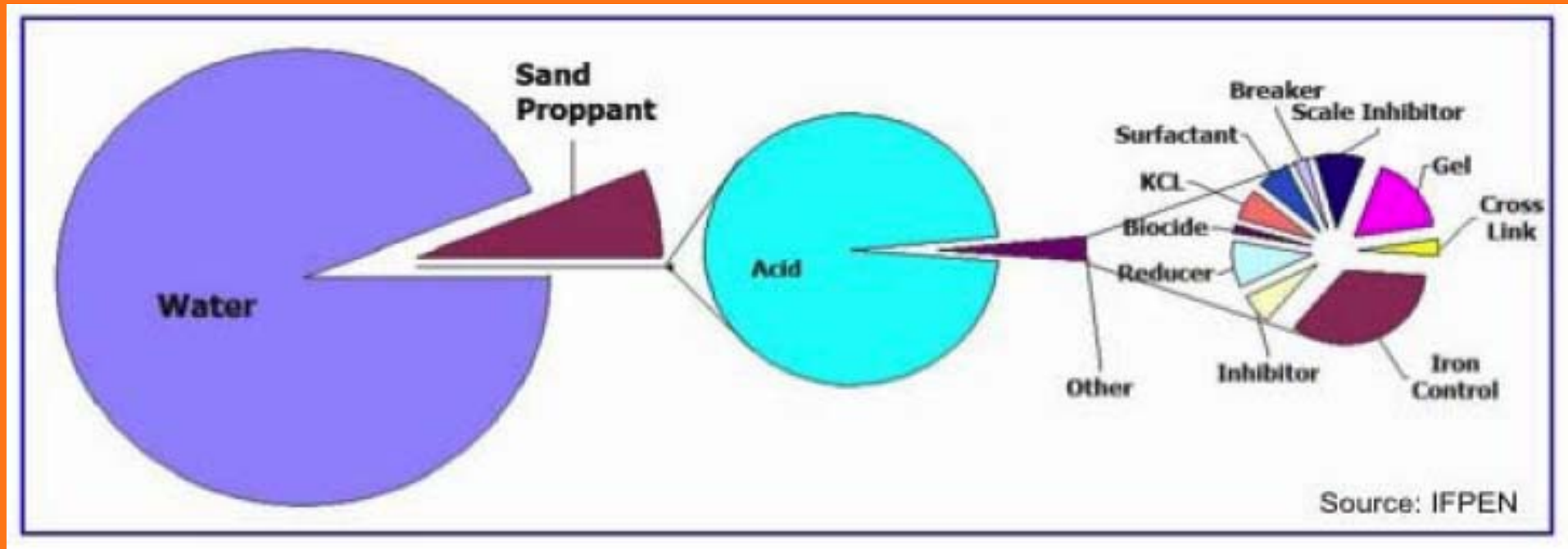
Áreas Activas:
uno o más pozos
en 1 Km

Áreas No Activas:
no hay pozos
en 1 Km

Contaminación por metano



Productos químicos



Productos químicos

- La tecnología para recuperar el gas natural por fractura hidráulica utiliza diversos tipos y cantidades no reveladas de productos químicos tóxicos. El TEDX (The Endocrine Disruption Exchange, Inc.) ha recopilado una lista de 944 productos, que contienen 632 sustancias químicas, utilizados durante las operaciones de gas natural.
- Se llevó a cabo una búsqueda bibliográfica para determinar los efectos potenciales sobre la salud de las 353 sustancias identificadas por el Chemical Abstracts Service (CAS).
 - Más del 75% de los productos químicos pueden afectar a la piel, ojos y otros órganos de los sentidos, así como a los sistemas respiratorio y gastrointestinal.
 - Aproximadamente entre el 40-50% podría afectar el cerebro ya al resto del sistema nervioso, al sistema inmunológico y cardiovascular y a los riñones.
 - El 37% podría afectar al sistema endocrino
 - El 25% podría causar cáncer y mutaciones.

Productos Químicos

*Study of the Potential Impacts of Hydraulic Fracturing
on Drinking Water Resources: Progress Report*

December 2012

Table 11. Chemicals identified by the US House of Representatives Committee on Energy and Commerce as known or suspected carcinogens, regulated under the Safe Drinking Water Act (SDWA) or classified as hazardous air pollutants (HAP) under the Clean Air Act. The number of products containing each chemical is also listed. These chemicals were reported by 14 hydraulic fracturing service companies to be in a total of 652 different products used between 2005 and 2009. Reproduced from USHR (2011).

Chemicals	Category	No. of Products
Methanol	HAP	342
Ethylene glycol	HAP	119
Naphthalene	Carcinogen, HAP	44
Xylene	SDWA, HAP	44
Hydrochloric acid	HAP	42
Toluene	SDWA, HAP	29
Ethylbenzene	SDWA, HAP	28
Diethanolamine	HAP	14
Formaldehyde	Carcinogen, HAP	12
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
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

Productos Químicos

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PREVIOUS ARTICLE Volume 155 Issue 3 | March 2014 NEXT ARTICLE

Estrogen and Androgen Receptor Activities of Hydraulic Fracturing Chemicals and Surface and Ground Water in a Drilling-Dense Region

Christopher D. Kassotis, Donald E. Tillitt, J. Wade Davis, Annette M. Hormann, and Susan C. Nagel

DOI: <http://dx.doi.org/10.1210/en.2013-1697>
Received: July 24, 2013
Accepted: December 02, 2013
Published Online: December 16, 2013

ABSTRACT FULL TEXT FIGS REFS PDF SUPPL DATA

Abstract

The rapid rise in natural gas extraction using hydraulic fracturing increases the potential for contamination of surface and ground water from chemicals used throughout the process. Hundreds of products containing more than 750 chemicals and components are potentially used throughout the extraction process, including more than 100 known or suspected endocrine-disrupting chemicals. We hypothesized that a selected subset of chemicals used in natural gas drilling operations and also surface and ground water samples collected in a drilling-dense region of Garfield County, Colorado, would exhibit estrogen and androgen receptor activities. Water samples were collected, solid-phase extracted, and measured for estrogen and androgen receptor activities using reporter gene assays in human cell lines. Of the 39 unique water samples, 89%, 41%, 12%, and 46% exhibited estrogenic, antiestrogenic, androgenic, and antiandrogenic activities, respectively. Testing of a subset of natural gas drilling chemicals revealed novel antiestrogenic, novel antiandrogenic, and limited estrogenic activities. The Colorado River, the drainage basin for this region, exhibited moderate levels of estrogenic, antiestrogenic, and antiandrogenic activities, suggesting that higher localized activity at sites with known natural gas-related spills surrounding the river might be contributing to the multiple receptor activities observed in this water source. The majority of water samples collected from sites in a drilling-dense region of Colorado exhibited more estrogenic, antiestrogenic, or antiandrogenic activities than reference sites with limited nearby drilling operations. Our data suggest that natural gas drilling operations may result in elevated endocrine-disrupting chemical activity in surface and ground water.

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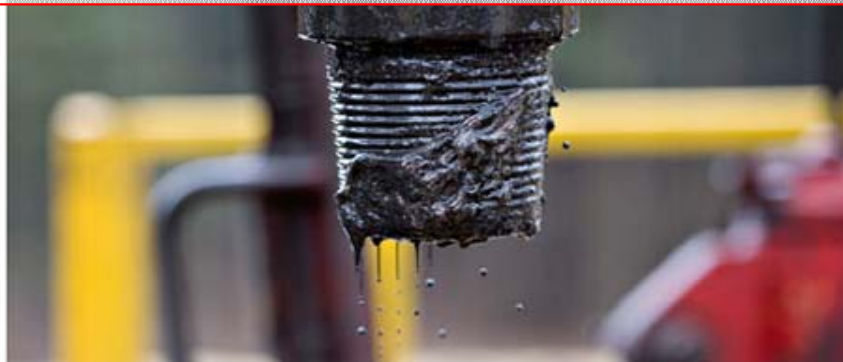
CONAMI

Children given lifelong ban on talking about fracking

Two Pennsylvanian children will live their lives under a gag order imposed under a \$750,000 settlement

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Los niños tendrán prohibido de hablar de Fracking toda su vida
 Dos niños de Pensilvania vivirán sus vidas bajo una orden de silencio impuesta en virtud de un acuerdo de 750,000 \$



A drill pipe at a shale gas operation in Pennsylvania. Photograph: Bloomberg via Getty Images

Two young children in Pennsylvania were banned from talking about fracking for the rest of their lives under a gag order imposed under a settlement reached by their parents with a leading oil and gas company.

The sweeping gag order was imposed under a \$750,000 settlement between the Hollowich family and Range Resources Corp, a leading oil and gas driller. It provoked outrage on Monday among environmental campaigners and free speech advocates.

Sobre la posible contaminación de acuíferos con los

acción del
an realizado
solo se ha
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nyección de
as". Sin
ntaminación
cto entre el

Solo se ha documentado un caso de contaminación directa de aguas subterráneas por fracking

aplica en el
n frecuencia desconocidas o ya se han visto
berfa del carbón". Además, los requisitos de
es, en las que los afectados y las empresas
n el rápido ritmo de desarrollo y los escasos
vestigadores, impedimentos importantes
cto a los impactos medioambientales.

ing como culpable es la contaminación de
ipio este gas no se disuelve en el agua y no
acumulación puede producir explosiones. En
buido a los conductos defectuosos de una
o de agua privado. Este tipo de fallos podría
como en el caso de la contaminación, es
cturación son las únicas culpables.

era del petróleo hace ya siglo y medio y su
Allí se han perforado más de 350.000 pozos

Article history

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Energy - Fossil fuels
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A Texan tragedy: am
oil, no water
Fracking boom suck
away precious water
from beneath the
ground, leaving cattle
dead, farms bone-dr
and people thirsty

Fracking: a botch on
landscape



Texas family plagued with ailments gets \$3M in 1st-of-its-kind fracking judgment

By Jason Morris, CNN
 April 26, 2014 -- Updated 1241 GMT (2041 HKT)



Fracking in the U.S.

<< < 1 2 3 4 5 6 7 8 9 10 11 12 13

STORY HIGHLIGHTS

- Parr family suffered from nosebleeds, rashes, vision problems, "vomiting white foam"
- A Dallas jury this week ordered Aruba Petroleum to pay the Parris \$3 million in damages
- Aruba says it didn't cause health problems or property damage; company may appeal
- Asked about drawn-out appeals process, Lisa Parr quotes Tom Petty: "I won't back down"

Dallas (CNN) — When the Parr family started having serious health problems late in 2008, they had no idea it was associated with what they call "a multitude" of drilling operations that popped up near their 40-acre ranch in Decatur, 60 miles northwest of Dallas.

At first, Lisa Parr dismissed her migraine headaches, nausea and dizziness as the flu, but when her symptoms persistently got worse, she knew something more serious was involved.

"By 2009, I was having a multitude of problems," Lisa Parr told CNN. "My central nervous system was messed up. I couldn't hear, and my vision was messed up. My entire body would shake inside. I was vomiting white foam in the mornings."

- La Familia Parr sufría de hemorragias nasales, erupciones, problemas de visión, "vomitos espuma blanca"
- Un jurado Dallas ordenó esta semana a Aruba petróleo para pagar a los Parr 3 millones de \$ por daños
- Aruba dice que no causó problemas de salud o daños a la propiedad; la empresa puede apelar
- Preguntados sobre el dilatado proceso de apelaciones, Lisa Parr, citando a Tom Petty: "I won't back down" "No retrocederé"

February 24, 2014

Edition: U.S. ▾



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The Huffington Post | by James Gerken

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Shale gas y la técnica del fracking

03. Impactos ambientales

→ Pero aun hay más...

Radiactividad

- Los materiales radiactivos naturales (denominados N.O.R.M.) forman parte de cualquier formación geológica, aunque en un porcentaje muy reducido del orden de ppm o ppmm. La mayoría de los yacimientos de esquisto negro de los Estados Unidos tienen un contenido de uranio entre el 0,0016 % y el 0,002 %. [Swanson 1960].
- Estos materiales radiactivos naturales, como el uranio, torio y radio unidos a la roca, son transportados a la superficie con el fluido de reflujos durante el proceso de fracturación hidráulica
- Durante las actividades de procesamiento del gas, los N.O.R.M. pueden aparecer en forma **de gas radón en la corriente de gas natural**

Movimientos Sísmicos

PREESE HALL

- Estamos de acuerdo con la conclusión de que la sismicidad observada fue inducida por las actividades de fractura hidráulica en Preese Hall. Sin embargo, no estamos convencidos, dada la baja probabilidad prevista, de que existan otros terremotos en futuras actividades. **Creemos que no es posible afirmar categóricamente que no se registren más terremotos durante un tratamiento similar en un pozo cercano.** Los análisis no lograron identificar la falla causante, y el conocimiento detallado de las fallas en la cuenca es bajo. **En el estado actual de conocimientos es muy posible que haya fallas en situación de esfuerzo crítico en otras partes de la cuenca.**

 University

Dr Brian J. BAPTIE

 British
Geological Survey
NATIONAL ENVIRONMENT RESEARCH INSTITUTE

Movimientos Sísmicos

El informe analiza el potencial de las tecnologías energéticas - incluyendo la obtención de gas de esquisto, la captura y almacenamiento de carbono, la producción de energía geotérmica, y el gas y petróleo convencionales - para causar terremotos.

Induced Seismicity Potential in Energy Technologies

El factor más directamente relacionada con los terremotos inducidos es el saldo total entre el líquido introducido o retirado bajo el suelo. **Dado que los nuevos desarrollos de petróleo y el gas, la captura y almacenamiento de carbono y la producción de energía geotérmica implican saldos netos de inyección o de extracción de líquidos, todos tienen por lo menos el potencial de inducir terremotos que podrían ser percibidos por la gente.** Sin embargo, las tecnologías diseñadas para mantener un equilibrio entre la cantidad de fluido que se inyecta y se extrae, como la geotérmica o el petróleo y gas convencionales, parecen producir menos eventos sísmicos inducidos que las tecnologías que no mantienen el equilibrio de líquidos.

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Los científicos prevén más terremotos si sigue el proyecto Castor

El Instituto Geológico y Minero elabora un informe que podría entregar a Industria la próxima semana

Natural | 01/11/2013 - 17:16h | Última actualización: 01/11/2013 - 17:26h



Plataforma del proyecto Castor frente al Delta del Ebro Lluís Gené - AFP



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