Is hydraulic fracturing safe and sustainable?

Presented on May 3, 2011
in New York City at the United Nations 19th Commission on Sustainable Development

by Jessica Ernst
from Rosebud, Alberta Canada

How can it be?

If it poisons water and divides communities, and captures our energy regulators and elected officials?

'Fracking' starts to bring on legal challenges

Web Page Business Section Canada's Globe and Mail

Headline, Front Page Print Edition Business Section:

'Fracking' lawsuit spurs legal worries in oil patch.

May 3, 2011 by Jeff Gray and Nathan Vanderklippe, Toronto and Calgary.

EnCana spokesman Alan Boras:

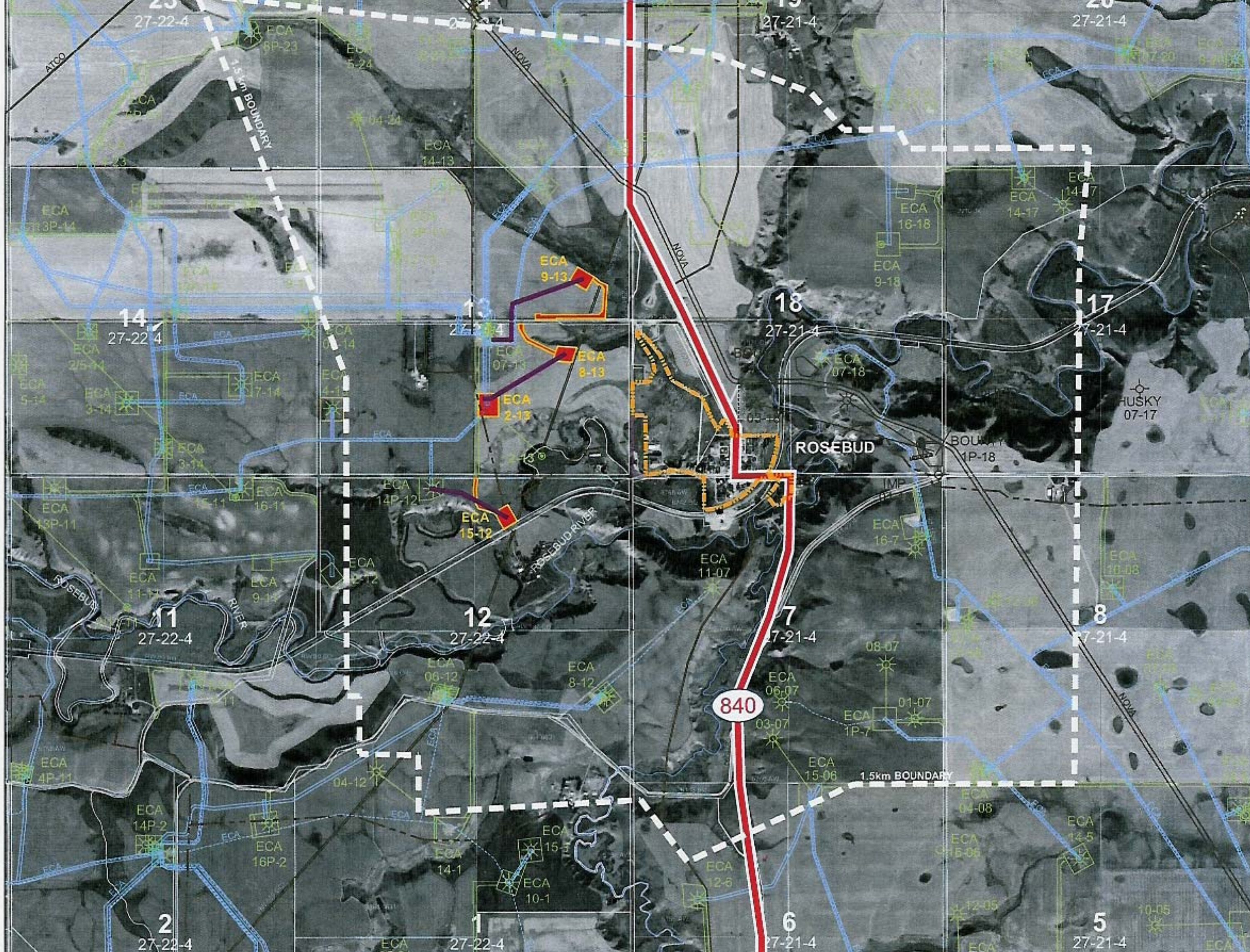
"numerous precautions put in place that ensure that we do not interact or contaminate groundwater."

But, are promises and precautions followed?


Rosebud is about 100 km north east of Calgary
CANADA
UNITED STATES
ROCKY MOUNTAINS
CASCADES
SIERRA NEVADA
APPALACHIAN MOUNTAINS
North Pacific Ocean
Gulf of Alaska
Hudson Bay
Davis Strait
Labrador Sea
Arctic Circle
Anchorage
Fairbanks
Inuvik
Dawson
Whitehorse
Valdez
Kodiak
Juneau
Watson Lake
Great Bear Lake
Great Slave Lake
Yellowknife
Hay River
Cambridge Bay
Repulse Bay
Kangiqcliniq (Rankin Inlet)
Ivujivik
Iqaluit (Frobisher Bay)
Paamiut (Frederikshåb)
Happy Valley Goose Bay
Schefferville
Churchill
Lake Athabasca
Chisasibi (Fort George)
Prince Rupert
Prince George
Edmonton
Saskatoon
Calgary
Regina
Winnipeg
Moosonee
Victoria
Vancouver
Seattle
Portland
Sacramento
San Francisco
Salt Lake City
Great Salt Lake
Las Vegas
Death Valley
(lowest point in North America, -86 m)
Los Angeles
San Diego
Tijuana
Mexicali
Phoenix
Albuquerque
El Paso
Denver
Kansas City
Oklahoma City
Dallas
Minneapolis
Milwaukee
Chicago
St. Louis
Memphis
Atlanta
Jacksonville
Charleston
Indianapolis
Columbus
Cleveland
Pittsburgh
Detroit
Windsor
Toronto
Hamilton
Ottawa
Montréal
Québec
Thunder Bay
Lake Superior
Lake Huron
Lake Michigan
Lake Erie
Lake Ontario
Lake Winnipeg
Boston
New York
Philadelphia
Baltimore
Washington, D.C.
Norfolk
Charlottetown
Saint John
Gulf of St. Lawrence
Mackenzie River
Yukon River
Peace River
Slave River
Saskatchewan River
Columbia River
Snake River
Missouri River
Mississippi River
Ohio River
Arkansas River
Colorado River

My property at Rosebud, Alberta, Canada.

Standing on my land beside the old Rosebud River



EnCana.

LEGEND

SERVICE WELLS :	
OIL WELLS :	
GAS WELLS :	
GAS INJECTION WELLS :	
SUSPENDED GAS WELLS :	
ABANDONED GAS WELLS :	
SUSPENDED OIL WELLS :	
ABANDONED OIL WELLS :	
SURFACE HOLE LOCATION :	
LOCATION :	
SUSPENDED :	
ABANDONED :	

ECA WELLSITES
EXISTING SURVEYED (LICENSED)
EXISTING SURVEYED (NOT-LICENSED)

ECA PIPELINE (EGIS)
FOREIGN PIPELINES (EGIS)
GAS CO-OP LINE

MOSAIC PLAN
SHOWING
WELLSITES & PIPELINES
WITHIN
TWP. 27 - RGE.'s 21 & 22 - W.4M.
ALBERTA
SCALE 1: 15 000

4	ADD [illegible]	MAY [illegible]	[illegible]
3	ADD 1.5 km RADIUS	JUNE [illegible]	[illegible]
2	UPDATED	APRIL [illegible]	[illegible]
1	GENERAL REVISION	OCTOBER [illegible]	[illegible]
No.	DESCRIPTION	DATE	BY
	REVISION		

I lived at my place since 1998
Shallow hydraulic fracturing and coalbed methane came

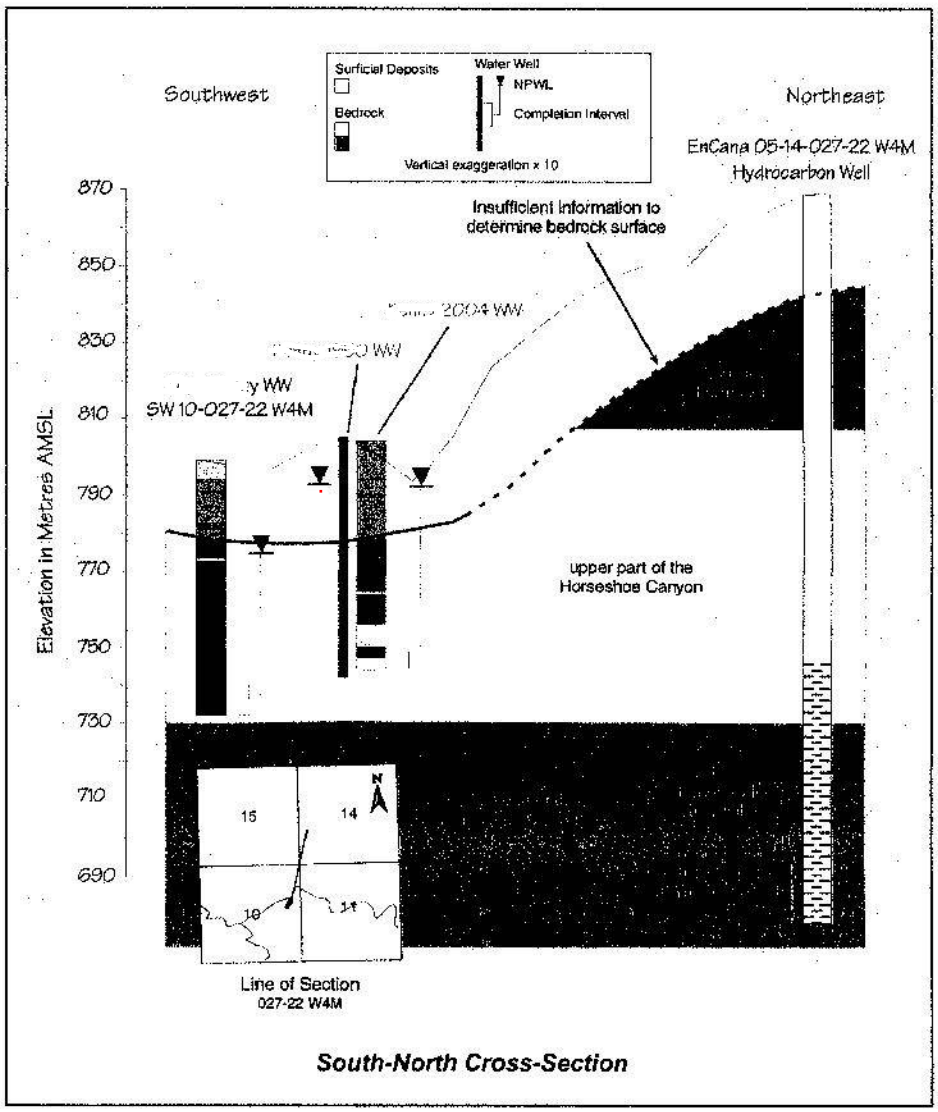
My water dramatically changed
Whistling taps and blowing gas
Dogs repulsed by the water
Caustic burns to skin after bathing, irritated eyes.
No longer able to get suds out of soaps and shampoo.

Like new sinks and toilets

6. INTERPRETATION

6.1. Aquifers

The SK 1950 WW and the SK 2004 WW are completed in the same hydraulic unit within the upper part of the Horseshoe Canyon Formation. The elevations of the water levels in both water wells are similar; there is no significant difference in the chemical quality of the groundwater from the two water wells and pumping from the SK 1950 WW causes measured drawdown in the water level in the SK 2004 WW. The vertical relationship between the elevation of the completion depths and the non-pumping water levels in the SK 1950 WW and the SK 2004 WW is shown in the adjacent cross-section.



South-North Cross-Section

Also shown on the cross-section is the EnCana 05-14 Gas Well and the perforation interval of the gas well when stimulated on 02 Mar 04. The cross-section shows the top of the perforated interval at an elevation of 747.45 metres AMSL, which coincides closely with the top of the completion interval of the SK 2004 WW.

The stimulation of the EnCana 05-14 Gas Well used nitrogen gas and the estimated pressure outside the perforations is nine megaPascals. Based on an aquifer model, the pressure change measured at the SK 1950 and SK 2004 water wells as a result of the stimulation would be in the order of 0.2 kiloPascals. As a result of flowing the 05-14 Gas Well for 76 days after stimulation, very little if any nitrogen gas would be expected to remain in the coal zone in the 125.5- to 126.5-metres below KB interval.

6.2. 2004 Water Well

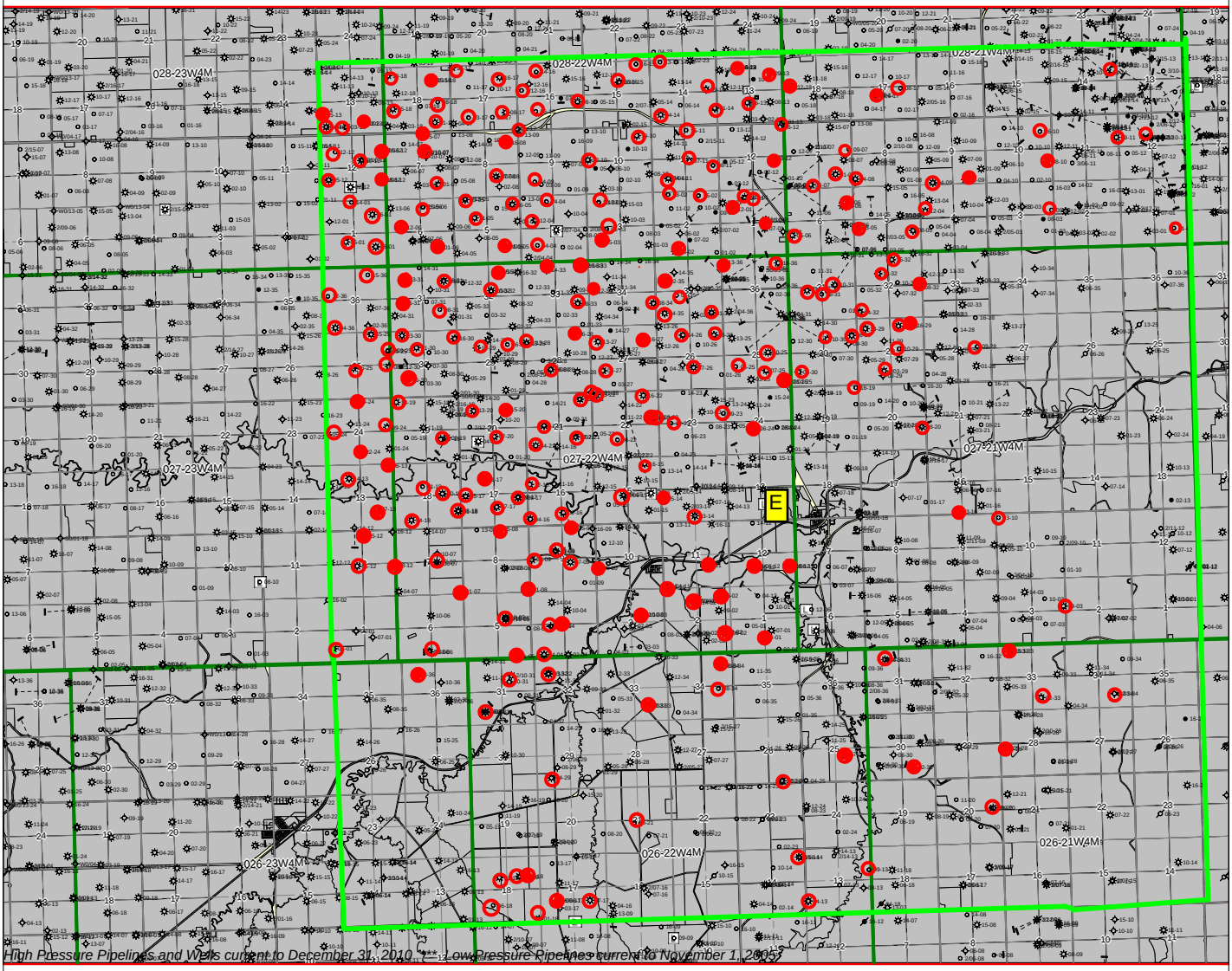
The interpretation of the turbidity data indicates that there are two sources of sediment in the groundwater from the SK 2004 WW. The first source is the groundwater running down the outside of the liner; the second source is the sandstone layers below the coal zone. When the water well is not being pumped, there is a gradual flow of groundwater down the annulus.

Why lie about hydraulic fracturing?

- At the time that EnCana was doing shallow hydraulic fracturing in my community and our water wells began to go bad, the company promised us they had not yet done any shallow fracs near us, and if they did, they would never frac into or near our aquifers.
- But, EnCana had already repeatedly fractured our aquifers, and many shallow gas wells nearby.

Shallow Gas Wells Drilled and Frac'd Near Rosebud, Alberta

Circles: EnCana Wells Perforated and or Hydraulically Fractured Above the Base of Groundwater Protection before April 2006
Solid dots: EnCana Wells Perforated and or Hydraulically Fractured Above 200m before April 2006



High Pressure Pipelines and Wells current to December 31, 2010 ~ Low Pressure Pipelines current to November 1, 2005

E = approximate location of Ernst property

~ 1 mile

N

Wellheads
- Abandoned Wellhead
- Suspended Gas Wellhead
- Suspended Oil Wellhead
- Flowing Gas Wellhead
- Location Wellhead
- Flowing Oil Wellhead
- Miscellaneous Wellhead
- Water Wellhead
- Well Downhole Location
- [L] Newly Licenced Well
- [S] Newly Spudded Well

High Pressure Pipelines
- Gas Pipeline
- Oil Pipeline
- Water Pipeline
- LVP/HVP Pipeline
- Foreign Pipeline (Only when a company is specified.)

Low Pressure Pipelines
- Gas Co-op Pipeline

My property is near the centre of the lime green square on the energy well map above. Zooming in on the map shows the legal land description details for all the energy wells around Rosebud.

Between 2001 and 2006, EnCana perforated and fractured coal seams and other formations located above the Base of Groundwater Protection at over 190 wells within approximately a 6 mile radius of my well. About 60 of these were above 200 m underground, 10 were above 175 m underground and one was even repeatedly fractured directly into the aquifer that supplies my well and others in the community.

Gas leaking from an energy well was proven to migrate more than 6 miles.

Industry advised the Alberta energy regulator that:

Shallow fracturing harmed oilfield wells

and

“there may not always be a complete understanding of fracture propagation at shallow depths”

(from Alberta EUB Directive 027)

EUB = Energy Utilities Board, now ERCB, Energy Resources Conservation Board

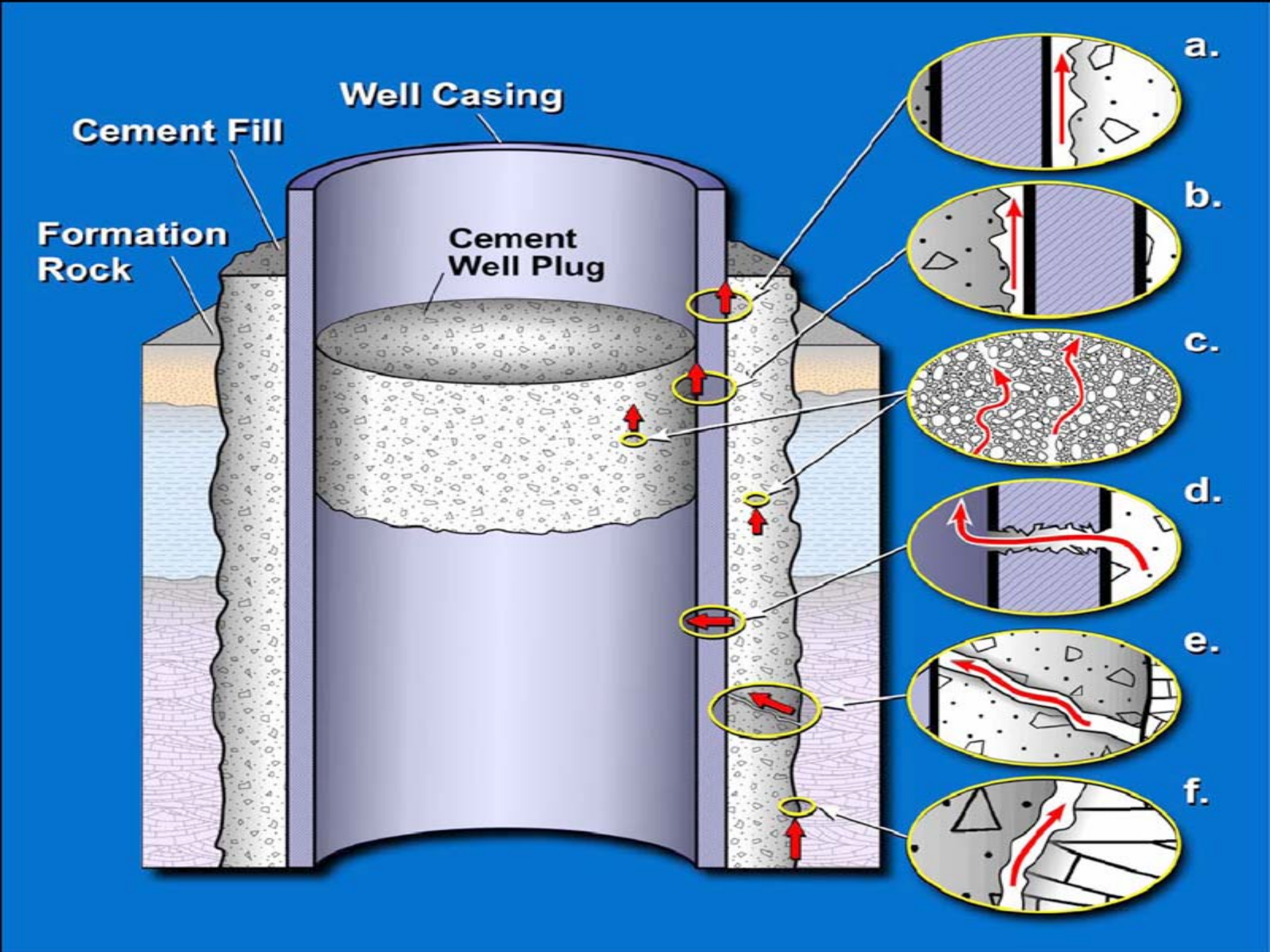
Natural methane in water wells

Industry experts advise that natural methane in water is usually at low levels and does not dramatically change.

Industry study in the ’90’s in Alberta and Saskatchewan found dissolved levels of methane in water wells to be low:

“The concentrations were generally low: all but three were < 0.05 mg/l….The two highest concentrations measured were slightly above 1 mg/l.”

EUB CBM Water Chemistry study (2006) on methane in water wells in coal found methane was not detected in 10/12 water wells


Well Casing
Cement Fill
Formation Rock
Cement Well Plug
a.
b.
c.
d.
e.
f.

EUB Alberta Energy and Utilities Board

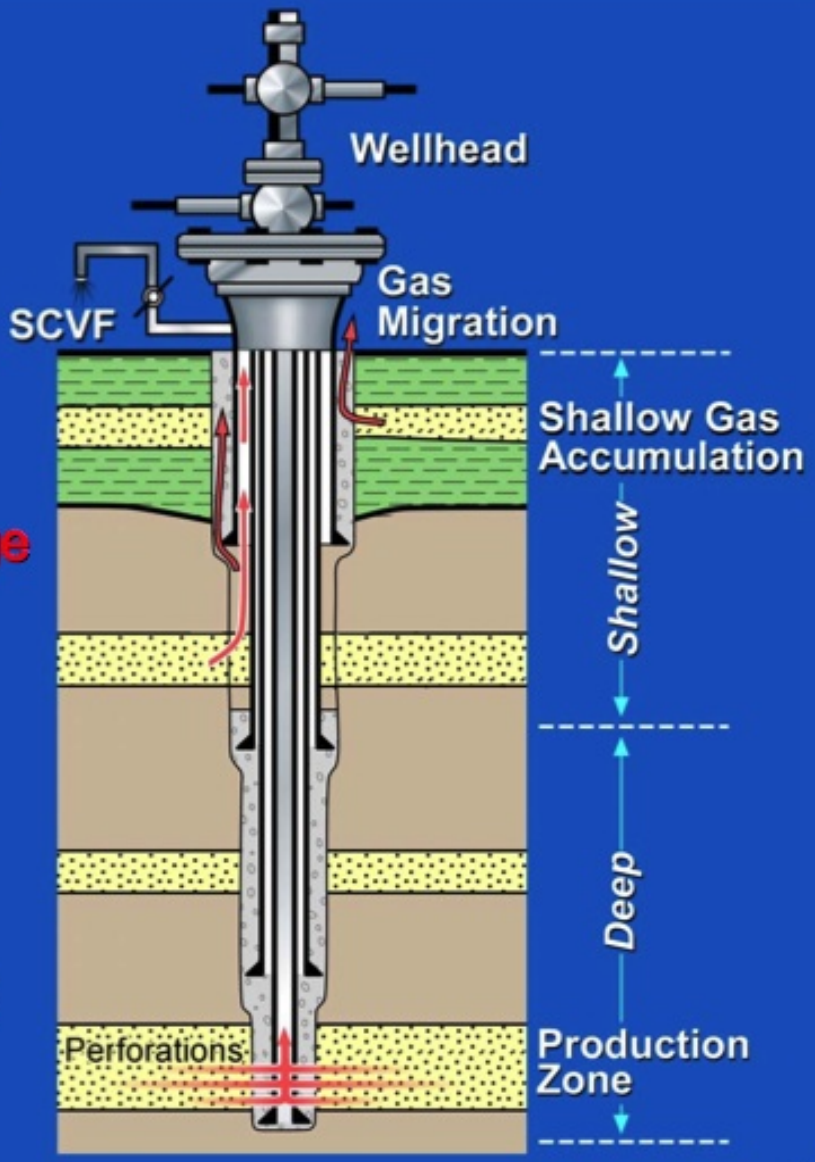
Leakage Potential along a Well

Shallower, upper part

Higher potential for leakage

Deep, lower part completed in producing zones

Less potential for leakage



AGS

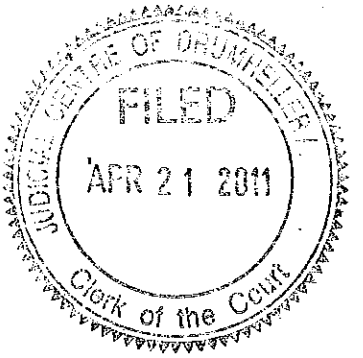
Regulators misinform the public – why deny the problem?

Landowner &/or nature blamed instead of comprehensive investigating; data used to blame nature withheld.

EnCana still has not disclosed the chemicals they injected into and near our drinking water.

Court File No. 0702-00120

IN THE COURT OF QUEEN'S BENCH OF ALBERTA
CENTRE
JUDICIAL ~~DISTRICT~~ OF DRUMHELLER~~HANNA~~



BETWEEN:

JESSICA ERNST

Plaintiff

and

ENCANA CORPORATION,
ENERGY RESOURCES CONSERVATION BOARD and
HER MAJESTY THE QUEEN IN RIGHT OF ALBERTA

Defendants

AMENDED STATEMENT OF CLAIM

Amended on: April 21, 2011

Murray Klippenstein
Klippensteins Barristers & Solicitors
160 John Street, Suite 300
Toronto, ON M5V 2E5
Tel.: (416) 598-0288
Fax: (416) 598-9520

Solicitors for the Plaintiff &
Address for Service

NOTICE TO DEFENDANT(S)

You are being sued. You are a Defendant.

Go to the end of this document to see what you can do and when you must do it.

My Statement of Claim
and more information is available at
www.ernstversusencana.ca

The claim represents assertions that have not yet been proven in court. All defendants will have the opportunity to respond in these proceedings.

Is explosive water natural?

In over 2300 water well records located in the 50 km2 surrounding my home completed prior to the arrival of CBM operations in or around 2001, only four noted the presence of a gas that could possibly be methane in the water.

Historic record on my well:

This record was included in an appendix of the Alberta Research Council (name changed to Alberta Innovates Technologies Futures) report on my water, but instead of using this record, the Council used unsubstantiated anecdotal stories of methane in water wells elsewhere and dismissed the dangerous methane contamination in my water as natural.

Gas Present: No

Methane dissolved (excludes any gaseous methane) in my community's groundwater:

22 - 66 mg/l

Industry admits there is risk of explosion at 1 mg/l

if the methane leaving the water accumulates in a confined space

In my community, EnCana broke several laws, regulations and requirements that were intended to protect our drinking water supplies, and were to be administered and enforced by the Government of Alberta, through our regulators –

Alberta Environment and the Energy Resources Conservation Board (ERCB).

Toxic chemicals found by the regulator in Rosebud Hamlet water:

Petroleum distillates,
bromodichloromethane,
phenanthrene,
toluene,
methyl ethyl ketone,
xylene,
benzene,
butylbenzyl phthalate,
di-ethyl phthalate,
di-n-butyl phthalate,
bis(2-ethyhexyl) phthalate and
benzothiazole.

Hexavalent chromium was found by the regulator in a monitoring well in the Hamlet

Toxic Chemicals found by the regulator in my water

- 0.21 mg/L of F-2 petroleum hydrocarbons (“F-2 Hydrocarbons”). F-2 Hydrocarbons are higher-order hydrocarbons that are primary components of various fuels including gasoline, kerosene, diesel fuel and jet fuel;

- 2.0 µg/L of 2-Propanol 2-Methyl. 2-Propanol 2-Methyl is a product of degrading methyl *tert*-butyl (MTBE), and may indicate MTBE contamination. Both 2-Propanol 2-Methyl and MTBE are hazardous;

- 3.6 µg/L of Bis (2-ethylhexyl) phthalate (BEHP). BEHP can cause cancer as well as damage to the liver after prolonged exposure.

- Chromium increased in my water by factor of 45 after EnCana fractured the aquifer that supplies my well.

Despite knowledge that EnCana had breached regulator legal requirements when drilling near Rosebud, and despite numerous reports of suspected water contamination, our regulators failed to follow the investigation and enforcement processes they had established and publicized.

Instead, regulators responded to my legitimate complaints and concerns in a hostile and confrontational manner that was characterized by bad faith.

When regulators finally conducted an investigation, it was completed negligently and in bad faith.

Instead of regulating EnCana, the ERCB attempted to threaten, intimidate and punish me for comments that I had made about the regulator publicly and privately.

These actions taken by the ERCB infringed on my right to free speech as guaranteed by the Canadian *Charter of Rights and Freedoms*.

In my community, the regulators consistently failed to enforce regulations specifically designed to protect the safety of our groundwater.

Their failure to act, despite frequent promises to protect the public, has served as a governmental cover-up of environmental contamination caused by the oil and gas industry.

This is a global issue!

Preliminary study identified over 688 shales in 142 basins worldwide.

Data presented by Schlumberger Oilfield Services at the HIS CERA Week conference in Houston, Texas, February 2009.

The old Rosebud River on my land

Thank you

1-403-677-2074
ernstj@telusplanet.net

Notes and References:

Slide 1: More information on the United Nations 19th Commission on Sustainable Development available at http://www.un.org/esa/dsd/csd/csd_csd19.shtml

Slide 3: EnCana quote from http://www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/fracking-starts-to-bring-on-legal-challenges/article2007417/

Slide 7: Map sent to me by EnCana in 2010. EnCana received licence on April 7, 2011 from the Alberta Energy Resources Conservation Board (ERCB) to drill and fracture more gas wells near **and under** my already adversely affected land. Most of my valid concerns submitted to the regulator about EnCana having fractured the aquifer that supplies my well, the very dangerous levels of methane in my water, and the company planning to drill and fracture under my land and the old Rosebud River that meanders my land remain unaddressed or deflected, most significantly my request for EnCana's chemicals to be used and submission to Congress investigating EnCana's fracturing activities and all allegations of water contamination http://www.albertasurfacerights.com/upload/files/2010%2007%2019%20Congress%20Investigating%20EnCana.pdf

The ERCB wrote me in their letter post marked April 7, 2011: **"the Board has determined that you do not appear to have rights that may be directly and adversely affected by approval of the Applications."**

Slide 9: from Hydrogeological Consultants Ltd. January, 2005. *EnCana Corporation. Redland Area. NE10-027-22-W4M. Sean Kenny Site Investigation.* File No.: 04:510.

Slide 10: Shallow gas wells mapped by Jessica Ernst from publicly available energy well data to April 1, 2006 and Base of Groundwater Protection data at the ERCB https://www3.eub.gov.ab.ca/Eub/COM/BGP/UI/BGP-Main.aspx AccuMap http://www.ihs.com/products/oil-gas-information/analysis-software/accumap/index.aspx and Abacusdatagraphics http://www.abacusdatagraphics.com/. Many more gas wells have since been drilled and fractured in the map area, including above the Base of Groundwater Protection. Instead of using isotopic fingerprinting data from EnCana gas wells around Rosebud that indicate match of gases in Rosebud water to gases from EnCana's gas wells, the Alberta Research Council used data (that they refuse to disclose) on unidentified gas wells over 100 miles away to dismiss the water contamination.

Slide 13: from the original 2006 Alberta Energy and Utilities Board (EUB) Directive 027 that was removed off the regulator website, entitled: *Shallow Fracturing Operations—Interim Controls, Restricted Operations, and Technical Review.* The EUB/Board approved this directive on January 31, 2006. <*original signed by*> M. N. McCrank, Q.C., P.Eng. Chairman

Notes and References Continued:

Slide 14:

- Canadian Association of Petroleum Producers. 1995. *Migration of Methane into Groundwater from Leaking Production Wells Near Lloydminster; March 1995.* CAPP Pub. #1995-0001.
- Canadian Association of Petroleum Producers. 1996. *Migration of Methane into Groundwater from Leaking Production Wells Near Lloydminster; Report for Phase 2 (1995).* CAPP Pub. #1996-0003.
- Schmitz, Ron, P. Carlson, M. D. Watson, and B. P. Erno. 1993. *Husky Oil's Gas Migration Research Effort – an Update.*
- EUB/AGS Special Report 081: Water Chemistry of Coalbed Methane Reservoirs. 2006. T.G. Lemay and K.O. Konhauser

Slide 15: Diagram originally from: *Quantitative estimation of CO2 leakage from geological storage: Analytical models, numerical models, and data needs*. 2003. M. A. Celia, S. Bachu, J. M. Nordbotten, S. E. Gasda, and H. K. Dahle.

Slide 16: Bachu, S. and T. Watson. 2007. *Factors Affecting or Indicating Potential Wellbore Leakage.* Presentation to the 3rd IEA-GHG Wellbore Workshop, March 12-13, 2007.
http://www.co2captureandstorage.info/docs/WBI3Presentations/SBachuTWatson.pdf

Slide 18: Cover of Amended Statement of Claim filed in the court, complete claim available at
http://www.ernstversusencana.ca/wp-content/uploads/2010/10/Statement-of-Claim.pdf

Slides 20, 21, 23-28: from the Amended Statement of Claim filed in the court, complete claim available at
http://www.ernstversusencana.ca/wp-content/uploads/2010/10/Statement-of-Claim.pdf

Slide 33: More information on UNANIMA International available at www.unanima-international.org/eng/

Photos in Slides 6, 17, and 29 by Colin Smith; photos in Slides 5 and 30 by Jessica Ernst

GASLAND: Is Mining Sustainable?

Tuesday, May 3 2011
6:15-7:45
NLB Conference Room 2

Shale rock is a geologic feature located in many parts of our world: Asia, Africa, North America, Europe and Australia. Currently extraction of natural gas from this formation using the controversial technique of hydraulic fracturing (fracking) is becoming more and more widespread. This event will discuss the use of the technique and its consequences for safe and clean water.

Following a partial screening of the award-winning film **GASLAND** (Josh Fox, director), there will be an interactive panel discussion featuring two activists whose lives have been affected by this method of extraction. They will discuss their experiences and present recommendations for the future.

Moderator: Catherine Ferguson, *UNANIMA International*

Panelists:

Jessica Ernst, *Biologist, Activist, and Former Environmental Consultant for EnCana (Alberta, Canada)*

Don Barber, *Farmer, Community Leader, and Supervisor of Caroline, New York*

Co-Sponsoring organizations: Congregation of Notre Dame de Montréal, Marianists International, UNANIMA International