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California, Here They Come:

Now Is the Time to Ban Fracking

food&waterwatch

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From the Sacramento Valley to Los Angeles County, the oil and gas industry has been fracking in California without clear regulatory oversight for many years. Now, the next generation of drilling and fracking – involving much more fluid and chemicals injected at much higher pressure, and creating much more waste, pollution and risk – has arrived on the West Coast. Californians will regret it if the drilling and fracking industry succeeds in extracting as much oil and gas as possible, as quickly as possible, from the Monterey Shale and other "tight" rock formations that lie beneath the state.

Fracking has long been used in California to stimulate oil production, often to rework aging or damaged wells.[1] The new generation of drilling and fracking, however, marks a radical departure. Indeed, when Zodiac Exploration Inc. announced in February 2012 that it had drilled a horizontal well more than 14,000 feet below Kings County, and that it had then "stimulated" the well in 10 stages to produce oil, the company's president stated, "This type of deep high pressure and high temperature operation is new to California."[2]

Across the United States, this new generation of drilling and fracking technology has unleashed a rush to extract "unconventional" oil and gas resources, particularly shale gas and tight oil.[3] Now, new intensive drilling, fracking and "acidizing" methods are expected to drive future oil extraction from the sprawling Monterey Shale in California.[4]

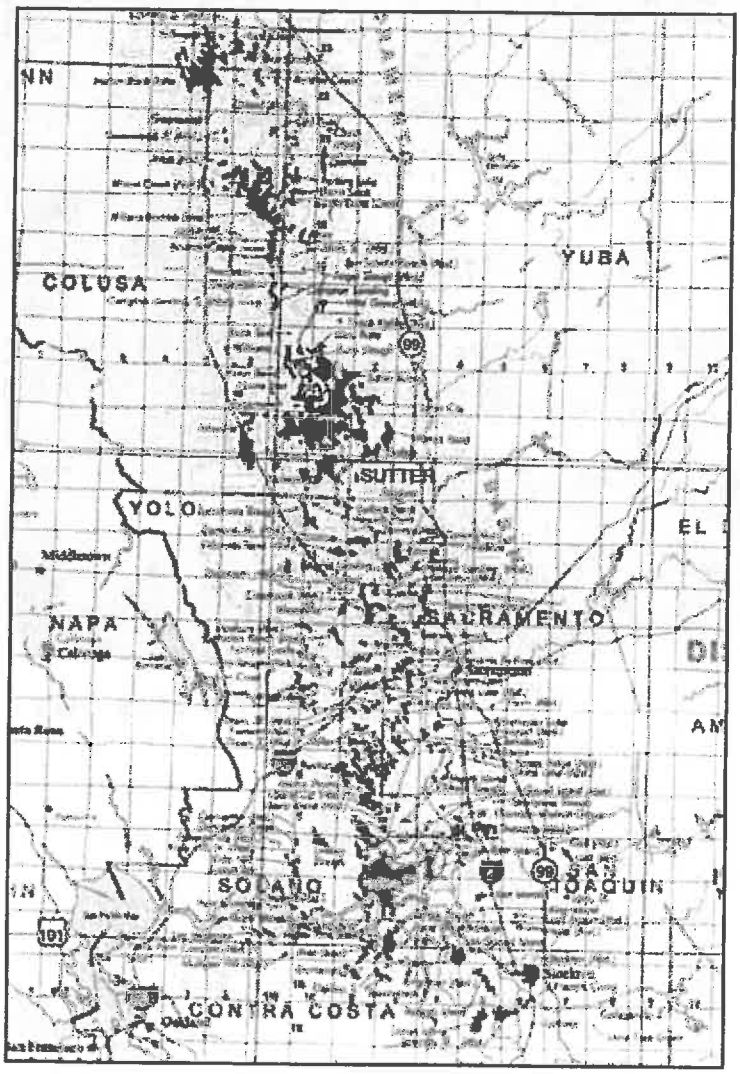
If this happens, it would be a boon for the oil and gas industry, but Californians will pay a steep price:

- Deeper and longer drilling and higher-volume, more-intense fracking will mean much more toxic waste and subsequent disposal problems;
- Increasing demand for fresh water, leaking toxic waste pits, well-cementing failures and injection of chemicals underground all pose serious short- and long-term water risks;
- Drilling and fracking hundreds of new wells in a region each year can result in serious air pollution problems, among other public health and safety problems;
- Increased unconventional drilling and fracking for oil and gas will only intensify the already alarming threats of global climate change.

California does not need to go down this road. The state should avoid enrolling its citizens in this large, uncontrolled public health experiment. An immediate ban on fracking in California would set a sustainable course for the state, one demonstrating that the goals of economic and environmental prosperity can both be met.

California is already getting worked over

Fracking is short for fracturing. Fluid – typically a mix of water, sand and chemicals – is pumped underground at a high enough pressure to fracture the rock that surrounds a part



of a well. The fractures, propped open by the injected sand, provide a clearer pathway for any oil or gas to flow. Highly corrosive acids are also used to rework aging or damaged oil wells – once pumped underground, the acids eat away at surrounding rock, creating channels for oil or gas to flow.[5] Such use of acids is called "acidizing," or "acid fracking" when done at pressures high enough to fracture the rock surrounding a well.[6]

Most of California's natural gas fields lie beneath the watershed of the Sacramento River, while the San Joaquin, Santa Maria, Ventura and Los Angeles Basins contain most of the state's oil fields.[7] California law governing the regulation of oil and gas operations declares, as the policy of the state, that any permit to remove oil and gas grants the permission "to do what a prudent operator using reasonable diligence would do...including, but not limited to, the injection of air, gas, water, or other fluids [including acids] into the productive strata, the application of pressure heat or other means for the reduction of viscosity of the hydrocarbons, the supplying of additional motive force, or the creating of enlarged or new channels for the underground movement of hydrocarbons into production wells, when these methods or processes employed have been approved by the [State Oil and Gas] supervisor..."[8]

Clearly, given that the industry has been conducting well "workovers" for decades in California, conventional fracking and acidizing treatments are among the methods approved by the State Oil and Gas Supervisor. Yet this has gone on with next-to-no scrutiny from California regulators:

- The state maintains no information about what wells have been fracked, when they were fracked or what chemicals were used during fracking, in part because no regulations require the reporting and disclosure of such information.[9]
- The only specific reference to "rework" operations in California law has to do with mandated filing of records on any reworking of a well, but the filing of "true and reproducible copies of all electrical, physical, or chemical logs, tests, or surveys" is only required if such logs are made.[10]
- In 2002, the California Environmental Protection Agency conducted an analysis of oil exploration and production wastes to determine if these wastes were being handled properly, but the analysis did not include data on workover wastes from fracking or acidizing.[11]

In 2011 in California, there were 2,294 new wells drilled, 2,343 wells completed for production and 3,376 notices filed for the reworking of existing wells.[12] Occidental Petroleum Corporation alone drilled about 675 new wells and conducted about 500 workovers.[13] Yet because the state

Sacramento Basin gas fields (red) and Ventura and Los Angeles Basin oil fields (green). Courtesy of the California Department of Conservation/ Division of Oil, Gas, and Geothermal Resources.

does not keep track, the portion of well completions and the portion of well workovers that involved fracking or acidizing aren't publicly known.

FracFocus.org – an online registry where companies can voluntarily disclose information on specific fracking operations – shows that at least 91 wells were fracked in California from January 2011 to April 2012, including two in Los Angeles County.[14]

More drilling and fracking means more waste, not less

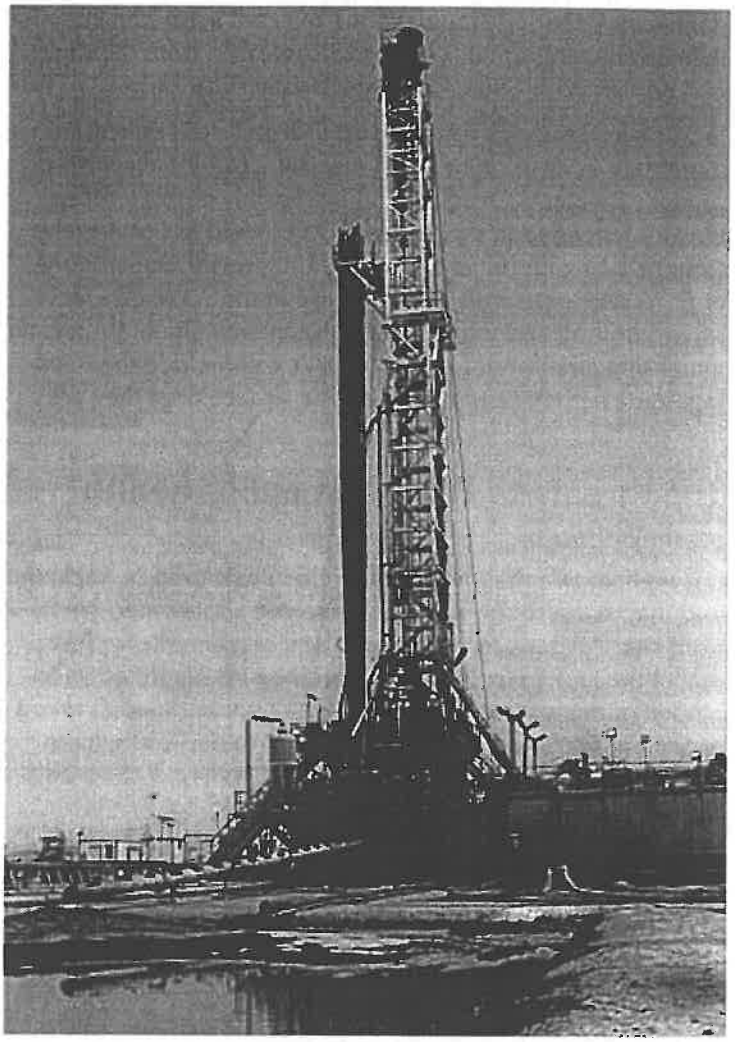
In granting the oil and gas industry the freedom "to do what a prudent operator using reasonable diligence would do," California law clearly states the policy goal: "to further the elimination of waste by increasing the recovery of underground hydrocarbons."[15] This is ironic – the notion that leaving oil and gas in the ground is wasteful – given the massive volume of waste that results from oil and gas extraction operations.

In its 2002 study, California's Environmental Protection Agency reported that in 1995, the estimated total volume of California drilling waste, both solid and liquid, was over 1.8 million barrels, enough to cover more than 235 acres one-foot deep.[16] Assuming the same amount of waste for every foot drilled from the beginning of 1995 through 2009, Food & Water Watch estimates that the oil and gas industry generated 5,659 acre-feet of drilling waste over 15 years in California.[17]

But this 15-year timeframe hardly overlaps with the current technological era, in which it is possible to frack a two-mile long horizontal section of a well in 30 or more stages, all up to two miles or more below ground.[18] If such intensive drilling and fracking become widespread in California, more lagoons of toxic waste can be expected to color and contaminate the state's Central Valley. Increasing amounts of such waste would pose particular problems if generated and disposed of in and around Los Angeles, which sits above large pockets of the Monterrey Shale.

Drill cuttings, about the size of coarse grains of sand, are coated with used drilling fluids that can contain harmful contaminants such as benzene, cadmium, arsenic, mercury and radium-226.[19] Dumping drill cuttings in landfills could expose workers to harmful levels of some of these environmental toxins.[20] Radium-226 contamination would persist for more than 1,000 years after the landfill closed, ruining the productivity of the land for many generations.[21]

Dumping loads of drilling cuttings in landfills could lead to operational problems as well. The landfill linings could be degraded, resulting in leaks of radioactive material and other harmful contaminants.[22] Also, layers of drilling cutting wastes could plug up the flow of landfill fluids, causing spills out the sides of the landfill.[23]



The estimated 5,659 acre-feet of this drilling waste from 1995 to 2009 in California is dwarfed by the volume of wastewater brought to the surface along with any oil or gas.[24]

For decades, California's oil and gas industry has injected water and steam underground to more easily pump heavy, viscous oil out of reserves.[25] In 2009, the industry injected underground a total of about 1.4 billion barrels, or about 180,000 acre-feet of water or steam into onshore oil and gas wells.[26] It is not clear whether this estimate, which is the total volume used in "waterflood," "steamflood" and "cyclic steam" injections, includes water that is injected as part of fracking fluid.[27]

Produced water is any water produced from a well, along with oil or gas.[28] This wastewater is a varying mix of any water injected underground and any naturally occurring "formation" water that has long been trapped deep underground.[29] Produced water potentially contains extreme levels of naturally occurring but harmful contaminants, including arsenic, lead, hexavalent chromium, barium, strontium, benzene, polycyclic aromatic hydrocarbons, toluene, xylene, corrosive salts and naturally occurring radioactive material, such as ra-

dium-226.[30] During acidizing, the injected acids can actually increase the amount of toxic metals released from the rock and brought to the surface in wastewater.[31]

In 2011 in California, onshore oil and gas wells generated more than 2.5 trillion barrels, or about 326,000 acre-feet of produced water.[32] Over 126 million barrels of this wastewater was generated at the Inglewood Oil Field of Los Angeles County.[33] As with the amount of drilling waste, the amount of produced water will only increase in the wake of widespread drilling and fracking of the Monterey Shale. Worse, an increasing amount of this wastewater will include the fracking fluid chemicals that return to the surface after they are injected.[34]

The threats to California public health

Water pollution

It is well known that many of the chemicals used in fracking, and that return to the surface in fracking wastewater, are far from safe. Naphthalene, benzene and acrylamide are just a few of the known or suspected carcinogens identified as included in many fracking fluids.[35] Other environmental toxins present in many fracking fluids, such as toluene, ethylbenzene and xylenes, can result in nervous system, kidney and/or liver problems.[36]

Since conventional treatment facilities are not equipped to treat radioactive material and other contaminants known to be in some fracking wastewater, such contaminants can simply flow through conventional treatment facilities and get discharged into public rivers and streams.[37]

Disposal of drilling and fracking waste in evaporation pits also creates serious problems when these pits leak. A jury in Kern County in 2009 found that 96 million barrels of wastewater from drilling operations had leached from holding ponds onto a farmer's property, resulting in contamination of the aquifer beneath his land.[38] An investigation by ProPublica in 2008 identified more than 1,000 cases of water contamination near drilling sites, according to local and state government documents from just Colorado, New Mexico, Alabama, Ohio and Pennsylvania,[39] most of which involved surface leaks and spills.

But groundwater is also at risk of contamination from below, not just from the surface. Once fracking fluid is injected underground, much of it stays underground indefinitely, where it mixes with and displaces any naturally contaminated formation water.

Recent mathematical modeling demonstrates that the risk of groundwater contamination from this process continues for years and merits serious concern.[40] There is a network of different pathways through which contaminants – including fracking fluid chemicals, any salts, metals and radioactive material dissolved in formation water, and methane and other gases – could flow into and contaminate groundwater. The different pathways include a well being developed that has a failed well casing, any nearby older and abandoned wells with failed well casings, new fractures created during fracking, and existing natural fractures and faults.[41]

Despite industry claims to the contrary, such contamination has occurred. A 1987 U.S. Environmental Protection Agency report found that gel used in fracking fluid had contaminated a water well in West Virginia, and that scientific assessment of other cases of potential contamination was hindered by court settlements that sealed the information.[42] A more recent study published in the *Proceedings of the National Academy of Sciences* found that average methane concentrations in shallow drinking water wells in active gas areas were 17 times higher than those in non-active areas, possibly due to leaky well casings.[43] Finally, in December 2011, the U.S. EPA released a draft report on contaminated groundwater near drilling and fracking operations in Pavillion, Wyoming, concluding that "the data indicates likely impact to ground water that can be explained by hydraulic fracturing."[44]

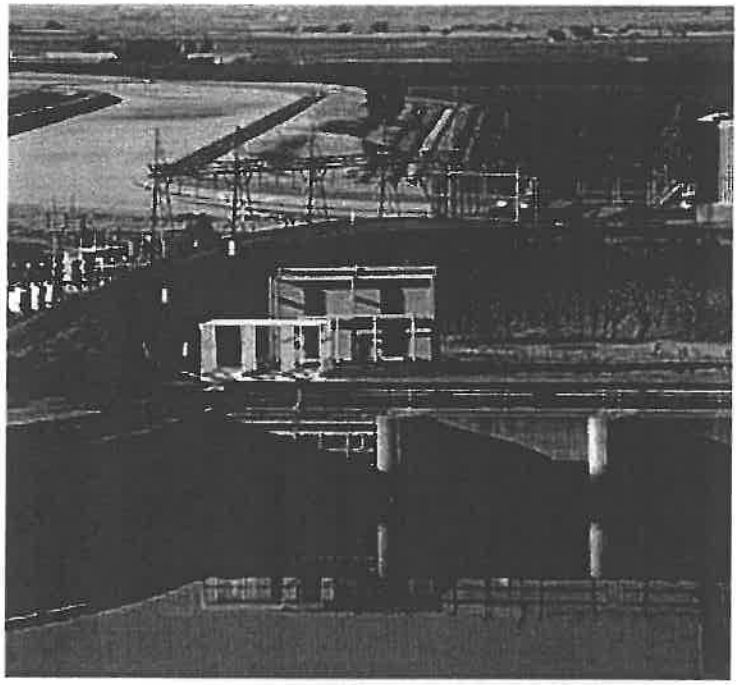
Air Pollution

Drilling and fracking are also resulting in serious local and regional air pollution problems across the country, as well as contributing to global climate change. Fracking creates a "multiphase" flow of fluid, characterized as a high-pressure mixture of sand, liquids and gases.[45] After fracking, when some of this multiphase fluid returns to the surface, a lot of the gases in it are vented directly into the air while the liquids pour into holding pits or tanks.[46]

Some air pollutants implicated in cancer and other serious health problems are labeled hazardous air pollutants and are regulated under the Clean Air Act, and at least 24 of these hazardous air pollutants, including hydrogen fluoride, lead and methanol, are known to have been in hundreds of products used in fracking.[47]

Volatile organic compounds, including benzene and toluene, which are also harmful to human health, can likewise be discharged during fracking.[48] These compounds mix with emissions from heavy-duty truck traffic, large generators and compressors at well sites to form ground-level ozone, which can further combine with particulate matter to form smog.[49] Exposure to smog has been linked to various cancers, cardiovascular disease, diabetes, and premature deaths in adults and to asthma, premature birth, and cognitive deficits in children.[50]

While it is difficult to draw direct causal links between air pollution from drilling and fracking operations, on one hand, and individual cases of illness on the other, the evidence for concern is growing.[51] This difficulty stems in part from the fact that data collection is hampered by the lack disclosure of fracking fluid chemicals used.[52] However, a recent study found that people living within half a mile of fracking operations face significantly higher cancer risk, and higher risk of



developing other health problems because of air pollution, compared to people who live farther away.[53]

But the air pollution concerns are not just local. Ozone from gas drilling operations has also created a regional air pollution problem in Wyoming, where ground-level ozone levels on several days in 2011 were higher than the highest recorded level in Los Angeles in all of 2010.[54] It would be unfortunate if increased drilling and fracking in the Los Angeles Basin – not decreased emissions in Wyoming – ensured that this didn't happen more often.

Finally, on a global scale, drilling and fracking result in significant greenhouse gas emissions,[55] which of course threaten the climate on which we depend.[56]

Earthquakes

Disposing of fracking wastewater by injecting it deep below ground has caused numerous small earthquakes across the United States, so it is not unreasonable to expect the same in California.[57] It is unknown whether increased fracking in California and underground disposal of the resulting wastewater would increase the chance of a larger, more destructive earthquake in the state.

On the other hand, regardless of its cause, a large earthquake could compromise the integrity of wells that either are already producing or are still being drilled and fracked. For the hundreds of thousands of Californians living near the Inglewood Oil Field in Los Angeles County and along active fault lines, such unknowns justify genuine precaution.

California can do better

In late 2011, Governor Jerry Brown fired two top regulators, following industry complaints that their office's review of permits for new wells was taking too long.[58] The firings came despite a horrific accident, months before, in which an oil worker was boiled alive when a sinkhole, created by injected steam, formed near an oil well.[59]

The result has been streamlined permitting that bodes well for an industry seeking to develop and adapt new extraction methods to tap the Monterey Shale and other "tight" rock formations in the state.[60] Given the water needed for drilling and fracking in the San Joaquin, Santa Maria, Los Angeles and Ventura Basins, Governor Brown's decades-long push to build a Peripheral Canal around the Sacramento-San Joaquin River Delta to send more water to southern parts of the state also bodes well for the industry.[61] In Kern County, for example, much of the water used by the oil and gas industry arrives via the Central Valley and State Water Projects, and the plan for a Peripheral Canal would bolster this supply.[62]

Furthermore, water from the Peripheral Canal being sold to the oil industry to drill and frack would add insult to the public injury of how the state relinquished control of the state-funded Kern Water Bank to largely private interests.[63] While these interests are well positioned to make large profits off of the oil industry's growing demand for water, Californians would be left paying the costs to build the infrastructure to deliver it, as well as left with the legacy of drilling and fracking pollution.

Take Action

Californians should not be forced to join the large, uncontrolled public health experiment that is unconventional oil and gas development.[64] State legislation to require disclosure of fracking chemicals will only provide the public with a heads-up on the chemicals that could be contaminating their groundwater a decade or two from now. Likewise, requiring advance notice to families when oil or gas wells nearby will be fracked will do nothing to address the potential harms.

The solution is to ban fracking now. The negative impacts of maximum extraction would be far-reaching for our water, air, land and climate. These impacts would far outweigh the the shortsighted, exaggerated and sometimes just plain false promises made about the economic and energy security benefits of widespread drilling and fracking.[65]

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Food & Water Watch works to ensure the food, water and fish we consume is safe, accessible and sustainable. So we can all enjoy and trust in what we eat and drink, we help people take charge of where their food comes from, keep clean, affordable, public tap water flowing freely to our homes, protect the environmental quality of oceans, force government to do its job protecting citizens, and educate about the importance of keeping shared resources under public control.

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Stop Fracking with California

TAKE ACTION

The Department of Conservation (DOC) has issued industry-friendly draft regulations that will allow fracking to continue in California with minimal protections for air, water and communities. Without any independent review of fracking in California, the state is giving the green light to this risky process. The proposed regulations fall short in so many areas that we lack the confidence that the state will develop adequate regulations to protect public health and the environment. Therefore Clean Water Action calls on the Governor to take the following action:

- Impose a **moratorium on fracking until there has been an independent investigation**. We need to be sure that fracking can be done safely here, or else it should not happen at all.
- Ensure that adequate **public input is provided on proposed regulations and drilling projects**
- Ensure **protections for water**, including groundwater monitoring and wastewater disposal oversight, by giving the regulatory mandate to the state's water quality agency – the State Water Resources Control Board.
- Provide better **protections for air and climate by including the Air Resources Board as a regulator of fracking and require air permits for each operation.**
- Require reporting and disclosure of **well-casing failures** to the public and to the state's water quality agency.
- Require **public disclosure** of chemicals used in fracking, with no exemptions for "trade secrets."
- Require that drillers provide adequate advance **notification of drilling activities to landowners and water providers.**
- Address other **dangerous extraction techniques** that may also harm our environment.

Until these and numerous other concerns are addressed, fracking should not happen in California, Until an independent review has determined that fracking can cause no harm, there should be a moratorium.

• *TAKE ACTION TODAY!*

- Send Governor Brown an email telling him to enact a moratorium on fracking in California
- Go online: **www.bit.ly/stopfrackingca**
- Scan the **QR code with your smart phone**
- Or send a **handwritten letter** to:
  - Governor Jerry
  - c/o State Capitol, Suite 1173
  - Sacramento, CA

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CLEAN WATER ACTION

CALIFORNIA

Hydraulic Fracturing: Hydraulic fracturing (fracking) is a method of extracting natural gas and oil trapped inside shale or other rock formations. Vast amounts of water are mixed with sand and chemicals and injected into the earth at high pressure to fracture the rock around the well and release oil or gas. California is the fourth largest oil producing state and hundreds of wells are fracked annually in at least six counties: Kern, Los Angeles, Monterey, Sacramento, Santa Barbara, Ventura. With the discovery of 15 billion barrels of oil in the Monterey Shale, the oil industry is planning significant increases in extraction operations using fracking and other enhanced oil recovery techniques in California.

Dangers of Fracking: Fracking, and related activities, pose numerous threats to the environment, health and communities. There are examples from states around the country that have documented:

- Surface and groundwater pollution
- High volume water use
- Air pollution and greenhouse gas emissions
- Induced seismic activity
- Wastewater disposal issues
- Toxic chemical use
- Destruction and contamination of farmland

Regulatory Failure: Despite these concerns, there has been little review of the technique and analysis of whether or not fracking should occur in California, and what safeguards are necessary. In addition, fracking is exempted from federal laws that protect drinking water and regulate hazardous wastes, and is largely unregulated in California. As a result, the location of fracking operations, the chemicals used, the impacts on drinking water, and the disposal of toxic wastewater is not reported to the public and is often unknown by the state agencies who are charged with overseeing the industry and protecting Californians.

Moratorium: California should implement a moratorium on all hydraulic fracturing operations that shall not be lifted until the following actions have been taken:

- An independent commission of experts thoroughly examines all the threats of fracking in California, including potential impacts on water and air quality, water use, greenhouse gas emissions, seismic concerns, chemical use, health impacts, and impacts on the economy such as the agricultural industry
- The State assesses other types of oil and gas drilling that are receiving permits, such as shallow diatomite extraction, acid washing, and steam flooding
- The State determines that fracking can occur in California without putting our environment, health and communities at risk.

Take Action! Email Governor Brown to stop fracking in California. See other side or visit:

- **www.bit.ly/stopfrackingca**

For more information on Clean Water Action's hydraulic fracturing work in California, contact
Andrew Grinberg:
agrinberg@cleanwater.org or 415.369.9172

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Facts on Fracking - How is it Different

rickbee20101 · 48 videos

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Uploaded on Apr 18, 2011

Friends of the Jordan is hosting a series of educational videos on the subject of fracking. This process, used to extract natural gas from shale, is being promoted in Northern Michigan. This segment explains how it is different from conventional natural gas wells. The speaker is Dr. Anthony Ingraffea from Cornell University.

Category Nonprofits & Activism

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11RoAR11 4 months ago

No, the problem is your Gov much like Large Corp will do anything to remain in power. Natural gas will not solve your economic problems, as much as printing money will not solve your economic problems. contrary to what your leaders will have you believe. Wake UP

Reply · in reply to SuperMarc1203(Show the comment)

SuperMarc1203 10 months ago

The problem is that our government won't support the natural gas industry. Natty gas is going to save our economy and you would be wise to go long on natural gas ETFs

Reply ·

aleklaser1 1 year ago

I love You!

Reply · in reply to Robert Napoli(Show the comment)

Robert Napoli 1 year ago

311 the World woke up and decided NO NUKES NO FLUKES We ask for the END OF THE NUCLEAR NIGHTMARE ON EARTH. We DEMAND THE END OF TOXIC POWER SYSTEMS ON EARTH. Let us BAN HYDRO FRACKING IN AMERICA as this POISONS MILLIONS OF GALLONS OF WATER Let us DEMAND THE END OF THE MILITARY INDUSTRIAL CORPORATE COMPLEX NOW. Let us DEMAND THE END OF ENDLESS WARS ON HUMANKIND Let us DEVELOP IN UNITY the Energy of SOLAR, MAGNETIC, WIND TURBINE,GEOTHERMAL&HYDRO KINETIC 4 ALL POWER

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The following are cold Remedies pulled by the FDA from the shelves because of their amine ingredient:

(Medical diseases influenced by amines were and are hemorrhagic stroke or bleeding in the brain, with women at risk more than men, and diabetics, and, cancer chemotherapy patients.)

PPA-AFFECTED DRUGS

Some of the products that contain phenylpropanolamine (PPA):

AcuTrim Diet Gum Appetite Suppressant Plus Dietary Supplements
AcuTrim Maximum Strength Appetite Control
Alka-Seltzer Plus Children's Cold Medicine Effervescent
Alka-Seltzer Plus Cold Medicine (Cherry or orange flavor)
Alka-Seltzer Plus Cold Medicine Original
Alka-Seltzer Plus Cold & Cough Medicine Effervescent
Alka-Seltzer Plus Cold & Flu Medicine Effervescent
Alka-Seltzer Plus Cold & Sinus Effervescent
Alka-Seltzer Plus Night-Time Cold Medicine Effervescent
BC Allergy Sinus Cold Powder
BC Sinus Cold Powder
Comtrex Deep Chest Cold & Congestion Relief
Comtrex Flu Therapy & Fever Relief Day & Night
Contac 12 Hour Cold Capsules
Contac 12 Hour Cold Caplets
Coricidin 'D' Cold, Flu & Sinus
Dexatrim Caffeine Free
Dexatrim Extended Duration
Dexatrim Gelcaps
Dexatrim Vitamin C/Caffeine Free
Dimetapp Cold & Allergy Chewable Tablets
Dimetapp Cold & Cough Liqui-Gels
Dimetapp DM Cold & Cough Elixir
Dimetapp Elixir
Dimetapp 4-Hour Liqui-Gels
Dimetapp 4-Hour Tablets
Dimetapp 12-Hour Extentabs Tablets
Naldecon DX Pediatric Drops
Permathene Mega-16
Robitussin CF
Tavist-D 12 Hour Relief of Sinus & Nasal Congestion
Thinz-Span Capsules Appetite Suppressant
Triaminic DM Cough Relief
Triaminic Expectorant Chest & Head Congestion
Triaminic Syrup Cold & Allergy
Triaminic Triaminicol Cold & Cough
Walgreens brand:
Wal-hist-D Cold and Allergy Symptoms
Wal-tap 12-Hour Relief of Cold and Allergy Symptoms
Wal-tap Elixir Grape
Wal-tussin

SOURCE: Consumer Healthcare Products Association, Examiner survey. Compiled by Examiner staff and wire services

EXAMINER GRAPHICS

Dr. Winn Parker Ph.D. (MT)
P.O. Box 864
Millbrae, California 94030

e-mail: KWATI@SBCGLOBAL.net

COPY AND PASS ON

MATERIAL SAFETY DATA SHEET

SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MATHESON TRI-GAS, INC.
959 ROUTE 46 EAST
PARSIPPANY, NEW JERSEY 07054-0624

EMERGENCY CONTACT:
CHEMTREC 1-800-424-9300
INFORMATION CONTACT:
973-257-1100

SUBSTANCE: CHLORINE

TRADE NAMES/SYNONYMS:
MTG MSDS 22; CHLORINE MOLECULAR; DIATOMIC CHLORINE; DICHLORINE; MOLECULAR CHLORINE; UN 1017; Cl2; MAT04600; RTECS FO2100000

CHEMICAL FAMILY: halogens, gas

CREATION DATE: Jan 24 1989
REVISION DATE: Dec 16 2002

SECTION 2 COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: CHLORINE
CAS NUMBER: 7782-50-5
PERCENTAGE: 100.0

SECTION 3 HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=4 FIRE=0 REACTIVITY=0

EMERGENCY OVERVIEW:
COLOR: yellow or green
PHYSICAL FORM: gas
ODOR: distinct odor, irritating odor
MAJOR HEALTH HAZARDS: harmful if inhaled, respiratory tract burns, skin burns, eye burns
PHYSICAL HAZARDS: Containers may rupture or explode if exposed to heat. May ignite combustibles.

POTENTIAL HEALTH EFFECTS:
INHALATION:
SHORT TERM EXPOSURE: burns, chest pain, difficulty breathing, headache, dizziness, hyperactivity, emotional disturbances, bluish skin color, lung damage, death
LONG TERM EXPOSURE: burns, skin disorders, lack of sense of smell, lung damage
SKIN CONTACT:
SHORT TERM EXPOSURE: burns
LONG TERM EXPOSURE: burns
EYE CONTACT: