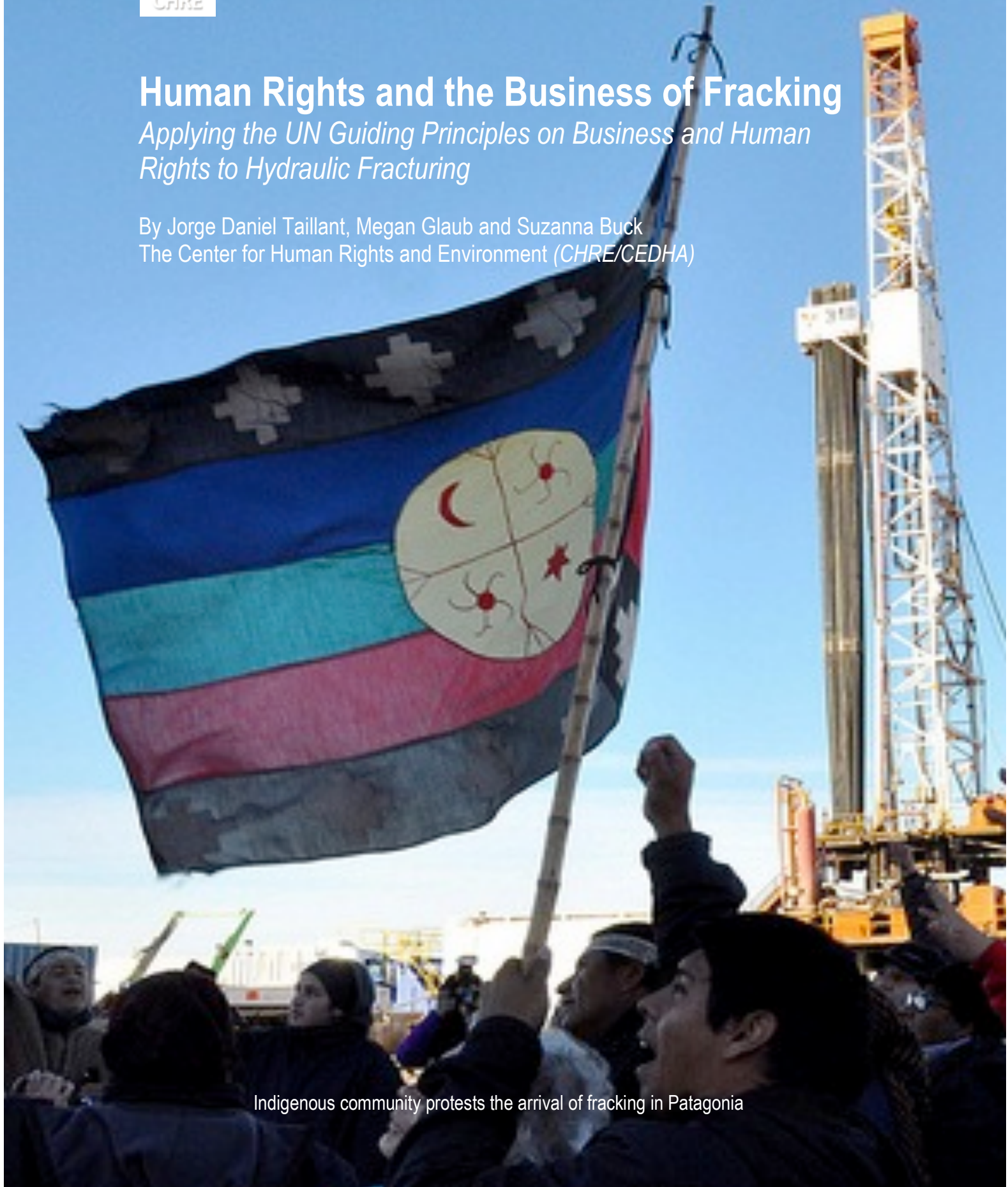




Human Rights and the Business of Fracking

Applying the UN Guiding Principles on Business and Human Rights to Hydraulic Fracturing

By Jorge Daniel Taillant, Megan Glaub and Suzanna Buck
The Center for Human Rights and Environment (CHRE/CEDHA)



Indigenous community protests the arrival of fracking in Patagonia

Human Rights and the Business of Fracking

Applying the UN Guiding Principles on Business and Human Rights to Hydraulic Fracturing

© The Center for Human Rights and Environment (CHRE/CEDHA)
August 2015

DRAFT 2: September 29, 2015

This is a consultation draft and document in evolution. Comments, suggestions, critiques are welcome. Please send your comments to the authors at: jdtailant@gmail.com



For more information:
<http://fracking.cedha.net>
jdtailant@gmail.com

The Center for Human Rights and Environment (CHRE/CEDHA) is a not-for-profit organization working to create a more harmonious relationship between the environment and people, promoting human rights protection and more sustainable environmental policy.

Foreword

Miguel Unamuno contemplated “*it is weak because he has not doubted sufficiently and has wanted to reach conclusions*”.

Our society is on a vertiginous race to maximize the exploitation of natural resources to feed our thirst for material wealth. We are extracting natural resources at unabated rates, without considering many of the permanent and irreversible social and environmental consequences of our actions. One of these contentious races is the desire by many to meet our energy consumption needs through the exploration of new ways to continue extracting and consuming fossil fuels. The principal industrial process proposed for this expansion is a controversial method called hydraulic fracturing, now known to most simply as *fracking*, a process by which we inject large volumes of water and chemicals into the ground to force fossil fuels out of the geology.

Fracking brings with it many environmental concerns, including huge increases in water usage, as well as the generation of voluminous quantities of contaminated effluent. Fracking has been proven to cause severe air, land and water contamination and is today one of the driving forces of climate change.

Unfortunately, the regulatory institutions that we have created to check our growth and ascertain environmental sustainability are politically weak. Time and again industrial interests have won out against sustainability, and invariably bend to or are superseded by stronger political interests. It is important to realize that the choices we make today, about energy, about growth models, and about material consumption, will bring unavoidable consequences to present and future generations. We are deciding today what our world will look like tomorrow. We are deciding today what the health of our climate will be for our children and for our grand children. At current rates, our climate emergency is *en route* to become a veritable climate catastrophe.

The strategic decisions that we must make as societies regarding the use of our natural resources and regarding the exploitation of our subsoil and of our geology necessarily must be accompanied by a broad and inclusive societal discussion, evaluating the pros and cons of our broad development choices. Transparent and participatory debate will allow us to take collective decisions and adopt long term policies and strategies that will help defend our planet, our living environment and our universal human rights.

This publication, published by the Center for Human Rights and Environment (CHRE), prepared after extensive research, with valuable contributions from outside experts and targeting a general public that is not necessarily expert in energy issues, but is eager to learn more about the fracking debate, explains in laymen’s terms, *what fracking is, how it works, and what are the risks* of hydraulic fracturing to the environment and to our very basic human condition. It is a tool to understand how fracking affects our daily lives and how it can have dire consequences on our right to health, our right to water, our right to property, our right to development and progress, and most importantly our right to a healthy environment, and to the very basic and universal *right to life*.

It is the hope of the Center for Human Rights and Environment, that this publication will help shed light on future discussions over fracking, so that as a global society we can be more responsible, so that we can transcend ideological positions, and reach the social consensus that we need to forge a more sustainable way forward on this very vulnerable planetary environment that we call home.

Romina Picolotti

Founder of the Center for Human Rights and Environment (CHRE)
Argentina’s Secretary of Environment (2006-2008)

Acknowledgments

The following report was made possible by the generous grant contributions of The Centre for Research on Multinational Corporations (SOMO), the Unitarian Universalist Service Committee (UUSC) and Patagonia Inc.

We must also thank the many people that participated in the research that led up to this publication including an interdisciplinary team that has participated at various stages of the CHRE's research and advocacy on hydraulic fracturing-related issues. Particular thanks are due to Megan Glaub and Suzanna Buck, who as volunteers to the Center for Human Rights and Environment in 2015, conducted background research, co-authored and provided editing and revisions to this publication. Joseph Wilde-Ramsing of The Centre for Research on Multinational Corporations (SOMO), contributed directly to our work providing key input, reviewing various versions and providing key recommendation to content and overall direction. Candace Headen, Anna Roeloffs, Callie Carnemark, and Fernanda Baissi carried out research on hydraulic fracturing for the CHRE in 2012, which led to CHRE's first publication focused on fracking, [Fracking Argentina](#), which informed and inspired much of the material in this document. Maria Eugenia D'Angelo and Mariana Vals of ECOJURE contributed to our own understanding of the legal dimensions of hydraulic fracturing activities.

Drew Nelson of the Environmental Defense Fund of the United States, provided key input to our early research and technical background documents that were very useful to the development of this publication. Jonathan Banks at the Clean Air Task Force provided guidance on numerous technical issues on environmental risks considered in this report. Jonathan also helped get the CHRE to several fracking sites, where we were able to gain first-hand knowledge of the activity. Jennifer Cassel provided key legislative references regarding the evolution of hydraulic fracturing regulations in the United States. Marcelo Santiago of Americas Petrobras also provided important technical opinions regarding hydraulic fracturing operations during CHRE's ongoing research. Additionally we must recognize numerous individuals from the oil and gas sector that have preferred to remain anonymous but that have contributed valuable information and insight to this publication.

We would like to thank Norberto Majlis and Roberto Ochandio for providing critical commentaries to early editions of this publication.

Finally, we thank all of the civil society organizations that have contributed their input and viewpoints to the content of this manual.

Jorge Daniel Taillant, Megan Glaub and Suzanna Buck

Table of Contents

FOREWORD	3
ACKNOWLEDGMENTS	4
I. INTRODUCTION	6
II. THE USES OF THIS PUBLICATION	11
III. FRACKING: WHAT IS IT AND WHY IS IT RISKY?	12
IV. THE HUMAN RIGHTS DIMENSIONS OF FRACKING	46
V. THE UN GUIDING PRINCIPLES ON BUSINESS AND HUMAN RIGHTS	60
VI. THE UN GUIDING PRINCIPLES THROUGH THE LENS OF HYDRAULIC FRACTURING	64
STATE DUTY CHECKLIST	79
CORPORATE RESPONSIBILITY CHECKLIST	86
REMEDY AND GRIEVANCE MECHANISM CHECKLIST	95
VII. THE OECD GUIDELINES FOR MULTINATIONAL ENTERPRISES AND HYDRAULIC FRACTURING	96
VIII. CONCLUSIONS	102
IX. FURTHER READING	104
ANNEX: FRACKING BY PHASES, ISSUES, HUMAN RIGHTS AND THE UN GUIDING PRINCIPLES REQUIREMENTS	107

I. Introduction

The day this publication entered into its first draft phase, the state of Texas, home to some of the world's most extensive hydraulic fracturing operations (or more simply *fracking*), announced a *ban on the ban* of fracking. This ironic double-negative is juxtaposed to increasingly frequent actions taken by other jurisdictions around the world, to prevent the extraction of natural gas and oil by fracking. Such is the case of cities such as Denton Texas; of states or provinces such as Florida, Vermont, New York, Maryland and Hawaii, and of Quebec, Canada; and even of *entire countries* such as France and Germany.

Fracking is already a fully evolved industrial activity in the United States. According to official data, over 25,000 new fracking wells were drilled and hydraulically fractured each year between 2011 and 2014.¹ In other countries, fracking operations are nascent, some only in exploratory phases. In Argentina for example, the industry already has several hundred exploratory or operational wells. In yet other countries, such as Mexico, fracking fever in the energy sector is encouraging public officials to push the oil and gas frontier further, but in most of these incipient markets, only a handful of wells have actually been explored or hydraulically fractured. The intention of the industry however, is to expand the oil and gas horizon by expanding hydraulic fracturing operations around the world. The oil and gas sector argues that fracking will not only boost the economy, but will help promote energy self-sufficiency, and even that it will help curb global warming, based on the idea that natural gas (a typical target of fracking operations) burns cleaner than other fossil fuels.

Meanwhile, in each of these new potential emerging markets, concerns over the social and environmental risks posed by hydraulic fracturing, including those from official public sector environmental agencies, resonate strongly across society. The concerns expressed by many opponents of fracking are grounded on tangible and legitimate past and emerging evidence.

According to the US EPA, in the United States 9.4 million people and 6,800 community water sources are within one mile of a fracked well. The EPA goes on to state that "residents and drinking water

resources in areas experiencing hydraulic fracturing activities are most likely to be affected by any potential impacts, should they occur".²

Whatever side of the argument one is on, whether embracing fracking for the alleged benefits of energy self-sufficiency or rejecting it for its implied risks and impacts to the environment and human health, it is difficult to deny that the oil and gas sector is *and has been*, for the better part of its existence, a *dirty industry*. The industrial extraction of oil dates back to the late 19th Century, when the fossil fuel industry liberally extracted and transported oil and gas with little regard for social or environmental safety. The sector has left a dirty legacy of environmental and social impacts with concerns today further fueled by the sector's manifest impacts on our global climate emergency.

Despite the very *recent* arrival of intense fracking activity, the extraction procedure utilized by hydraulic fracturing has already been around long enough to leave a considerable environmental footprint. The most notorious documented fracking impacts are due to burst underground well pipe casings contaminating water aquifers, fugitive methane leaks from pressurized gas not only causing climate change, but creating nauseous clouds that make local communities sick, and the seepage of industrial effluents affecting surface water resources and other sensitive ecosystem resources. Other impacts are related to the arrival of the type of activity associated with heavy industry (noise, traffic, etc.), which are especially intense during certain phases of hydraulic fracturing operations.

More recently, evidence that fracking causes tremors or earthquakes has also surfaced among academic circles, debunking claims by the oil and gas sector that fracking is harmless to the geological stability of bedrock. It is because of these well documented cases of severe environmental impacts, coupled with the high energy dependence of modern society, that fracking has come to be one of the most controversial industrial practices of our time.

¹ EPA. June 2005. P. ES5

² EPA. June 2005. P. ES6

This manual *or guideline* is written in an age of a rapidly growing call for public officials' and corporate actors' accountability. It is an age when climate change and environmental health are gaining a firm hold as two of our highest social priorities. This age is marked both by the growing free-flow of readily accessible information as well as by the active engagement of common citizens with the development related issues that most affect them.

Fracking is the *first* large industrial activity born in this "Facebook" era, an era in which we are driven to share, to seek the reactions of and to influence our peers, and in which we strive to make our opinions go "viral", so that others will copy and *share* our thoughts, our quotes, our pictures and our videos, and our aspirations, generating a world of like-minded individuals loosely connected through an intangible cyber space, receiving information, ads, pictures, inspiration and rejection of societal issues on a real time basis.

And *fracking*, as one of the most controversial industrial activities of our time, has not been left off of this evolving social media platform. In fact, the sort of visceral reactions caused by fracking (in favor of or against) play perfectly into the dynamics of social media. Reactions to fracking have been viral in nature, spurred on by images such as those projected in the movie *Gasland*, showing a homeowner's tap water igniting due to the contamination of a local aquifer by a near-by gas well. People around the world are mobilizing to oppose this industry on the grounds of its danger to individual and collective well-being.

And this brings us to the other dimension of the discussion we propose in this publication: namely, *how we define this individual and collective well-being*, which has been one of the most challenging and important focuses of our global society over the past several centuries, a focus that has centered on the emergence and evolving collective understanding of universal human rights. The respect and realization of human rights are the underpinning essence of the fabric of our global society.

Since the advent of the *Universal Declaration on Human Rights* in 1948 and the subsequent covenants, treaties and other binding State-sponsored declarations that followed, global society has defined minimum benchmarks to gauge our individual and collective well-being, establishing civil, political, social, economic and cultural rights which we must protect and to which we must aspire as a society in order to guarantee individual and collective well-being. We

have also set up agencies and institutions around the world to take forward the promotion and protection of human rights and to make sure that all individuals and communities are realizing their human rights. Compliance with, and the implementation of human rights *is* tangibly growing around the world as is our social call for compliance to be more tangible and effective.

Universal human rights guide our collective aspiration to a basic individual and collective human condition, utilizing the full realization of our human rights as an aspirational benchmark to define our expectation of meeting a threshold of individual and collective entitlements concerning personal integrity, health, safety, living and natural environment and way of life. The success of human rights compliance as a global collective baseline for defining our desired human condition derives from the fact that human rights are easily embraced across and beyond countries, through political systems and beyond regions and cultures.

The right to physical integrity, the right of civil liberty, the right to a fair trial, the right of participation, the right to health and the right to life, for example, are some of the essential universal legal underpinnings derived from the *Universal Declaration of Human Rights* born in the mid 20th Century. They are today the basic civil and political tenets of modern society.

As more and more human rights are recognized and protected by States around the world, and as technology aides in disseminating information about societies whose citizens actively respect and protect these rights, and as these same technological advancements more quickly and effectively reveal the violation of human rights that are still occurring, more individuals and communities who are denied human rights are beginning to demand them. This helps create an evolving cycle of recognition of basic civil and political rights leading to rapid realization of newer cultural, social, and new generation rights such as *the right to a healthy environment* which today is finally understood as a right without which we cannot fully realize other fundamental rights like *the right to health* or even *the right to life*.

This new generation of rights, along with accompanying administrative and procedural rights necessary to engage on other substantive rights, are oriented toward achieving individual well-being, economic progress, and cultural dynamism, and to ensuring a safe environmental habitat, and they are seeing rapid societal assimilation over the last few decades.

By the same token, societies around the world today expect more from their State, and more from each other (individually and institutionally) in the way of guarantees to affirm human rights. Societies are looking beyond their respective governments to guarantee and respect human rights. We are looking at each other, and at our public and private institutions to actively ensure that all of us work to create a more harmonious, fair, and sustainable world. In this sense, while in the past people have looked to States as the primary responsible party for protecting human rights, society is now looking beyond State actors to ensure compliance of human rights by other actors in society.

The question on many people's minds during this evolution, particularly over the past twenty or so years, is how all of us, and our organizations, have a responsibility to ensure the implementation and realization of human rights. In other words, do we as individuals and institutions also have binding obligations to uphold, protect, promote and ensure human rights realization through our individual and collective actions? In short, the answer to this question is a resounding, yes.

As countries and societies modernize, individuals have increasing control over their own development and evolution. Individual voices are increasingly more able to influence collective conduct, and demand that actions are carried out in a way that is respectful of our collective will. It is not a coincidence that this growing individual freedom is driven by the expansion of communications technology that harnesses individual freedom and thought, and puts these to work to the benefit of society. In many ways this allows our universally agreed-upon framework for human advancement, *human rights*, to rapidly become the framework for our collective discussion and agreement of how together and through all of our institutions we can achieve global sustainable development.

It is in this context, that our long-established inter-governmental agencies like the United Nations, our global economic organizations like the World Bank, and our regional agencies like the Organization of American States or the European Union, and many nations have slowly but surely realized the importance of placing human rights at the forefront and center of development discussions and strategic policy setting, for collective progress and development.

It is with this in mind that we come to the topic of this publication, which is essentially to understand a growing global conflict about the political and

corporate choices made in order to meet the energy needs of today and of the future, and how these choices affect or will affect individual and collective well-being, or more specifically, how they will affect the realization of human rights of individuals and communities in the present and in the future.

And here we come to the *fracking debate*, which is one of the most profound development debates of our time, posing fundamental questions about climate and sustainability, about models of energy development, questions about human health and evolution, and our very identity as a human race, geared, or *not so geared*, toward a sustainable way of life in what we have only recently begun to understand is a very limited and vulnerable natural environment we are destroying.

In order to bring this *fracking debate* to a human rights realm, we need a facilitating language to guide the discussion. Without such a common language, each person and interest group would come to the table to talk about human rights and fracking utilizing their own concepts and wording, with a different starting point determined by different priorities, view points, laws and regulations, and with a different understanding of how society should order its thinking and priorities in this debate.

In the end, without a common language for a human rights and fracking debate, we would continue to have concerned citizens pushing for bans of *fracking* activity, and industrial lobbyists and industry representatives pushing for *bans of bans*, a scenario which can only lead to further conflict.

A human rights approach to address fracking needs specific analytical tools to move forward in a cohesive and broadly acceptable manner.

Many human rights advocates have already expressed concerns over the arrival of hydraulic fracturing and in fact some experts and some countries or other jurisdictions *have* already taken initial steps to think of the fracking dilemma through a human rights lens.

In 2011, the EHRA (Environment and Human Rights Advisory) published a primer report for the State of New York, entitled *A Human Rights Assessment of Hydraulic Fracturing for Natural Gas*, which laid out a basic set of issues for considering human rights impacts of fracking activity at the NY State level.³ It also drew attention to the responsibilities of the State for assuring human rights compliance as fracking was considered in the State. Another more recent publication published in October of 2014 examined human rights implications of fracking in the United Kingdom also laying out the principal social and environmental concerns of the activity and the UK's responsibilities to ensure human rights protection.⁴ About the same time as this publication went public in draft form, academic articles also began to appear calling for a human rights approach and "human rights impact assessments" to analyzing hydraulic fracturing activities.⁵

We feel it is time to bring fracking more generically into the global human rights arena and lay out an even more ample and ambitious arena to have this *human rights and fracking* discussion.

We propose a language that is broad in scope, inclusive in terms of existing human rights, and one in which we have achieved a common understanding of how corporate activity (in this case of the oil and gas industry), may affect human rights, and where responsibility lies in terms of guaranteeing human rights for people and communities that could be affected by fracking if the activity is allowed to move forward.

In order to seek clarity over the relevance of human rights implications of corporate activity, the United Nations developed a specialized mandate which led to the establishment of basic global General Principles and a set of guidelines to implement those Principles in an effort to address many of the questions and nuances of how human rights are *or can be* affected by corporate activity.

³ see:

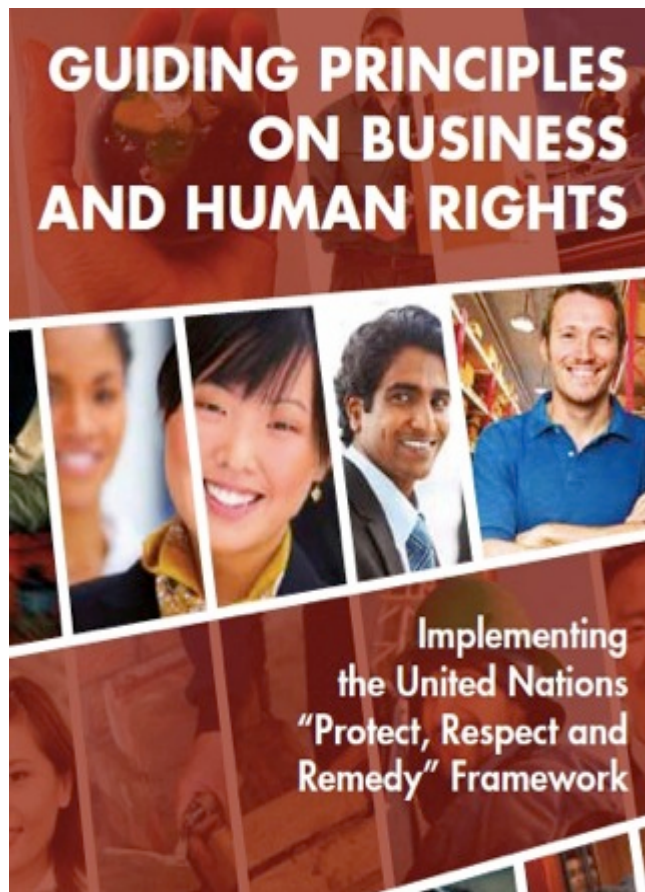
https://www.earthworksaction.org/files/publications/EHRA_Human-rights-fracking-FINAL.pdf

⁴ see:

<http://www.sas.ac.uk/sites/default/files/files/UK%20HRIA%20w%20appdx-hi%20res.pdf>

also: <http://www.tribunalonfracking.org/wp-content/uploads/2014/12/UK-HRIA-wo-appdx-hi-res.pdf>

⁵ see: <http://extremeenergy.org/2015/02/09/extreme-energy-fracking-and-human-rights-a-new-field-for-human-rights-impact-assessments/>



These principles are called the [UN Guiding Principles on Business and Human Rights](#),⁶ inspired by its predecessor, the *Protect, Respect and Remedy Framework* devised by the UN to address State, Corporate and Access to Justice due diligence and obligations of the business community in the human rights realm.

Our objective in this publication is to filter the fracking debate through these *Guiding Principles*, and in so doing gain insight on how to understand fracking through an ordered and logical (and widely accepted) *business and human rights* lens. In this publication we do not advocate for or against *fracking* although the authors of this publication discourage fracking, as we believe the risks of considerable environmental and communal harm, added to the rising climate risks of continued dependency on fossil fuels calls for a

⁶ see:

http://www.ohchr.org/Documents/Publications/GuidingPrinciplesBusinessHR_EN.pdf

progressive reduction of fossil fuel production. To this end, expanding fracking activity only pushes our dependency on fossil fuels further into the future, and this, we believe is justification enough to oppose the expansion of hydraulic fracturing activity around the world.

Our ultimate objective is to gain perspective and objectivity in the discussion. It is to place this growing social conflict around fracking activity in a more grounded understanding of our social priorities, legal obligations, and in a common universal framework to help sort our discussion *vis a vis* the social and environmental risks and impacts of fracking, and ultimately to address those risks and impacts, either through the responsibilities and obligations of State actors to ban hydraulic fracturing as a non-viable approach to generating energy, or to ensure the

highest level of protection possible in all cases where the activity is permitted to move forward; or through the due diligence responsibilities and obligations of non-State actors that are carrying out the activity—*the companies*.

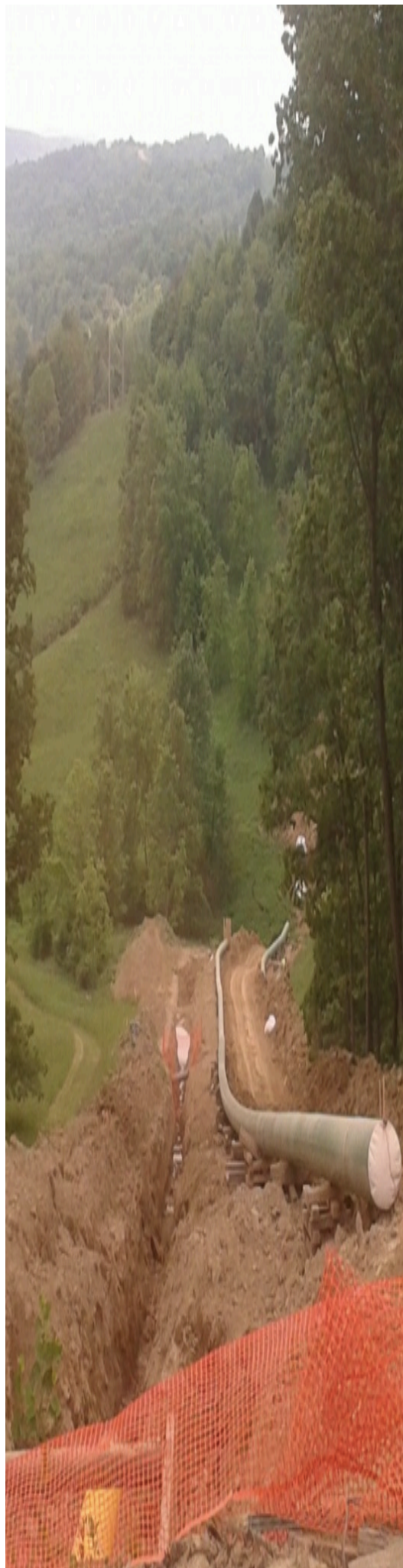
Either way, moving the debate and the sector in these directions will surely reduce the impacts of fracking to the environment and to people and communities.

jdt, mg, sb

GENERAL PRINCIPLES

These Guiding Principles are grounded in recognition of:

- (a) States' existing obligations to respect, protect and fulfill human rights and fundamental freedoms;
- (b) The role of business enterprises as specialized organs of society performing specialized functions, required to comply with all applicable laws and to respect human rights;
- (c) The need for rights and obligations to be matched to appropriate and effective remedies when breached.



II. The Uses of this Publication

This publication will help:

- Better understand the human rights dimensions of fracking;
- Consider impacts of fracking in a rights-based logic framework;
- Identify and document human rights risks and impacts related to fracking;
- Advocacy organizations to identify and address fracking impacts;
- Oil and gas companies understand their human rights risks and impacts;
- Oil and gas companies devise policies/systems to address human rights;
- Inform the formulation of public policy and regulations for fracking activity;
- Public officials conduct human rights audits at oil and gas companies.

We envision three likely (or potential) users of this publication:

a) Individuals, communities and civil society organizations

People, communities and organizations concerned with the potential or actual risks and impacts of *fracking* activity could use this publication to consider the State duties and obligations to protect human rights at risk from fracking, as well as corporate responsibilities to address these risks. This can help identify concrete demands to authorities and to companies to request bans or regulations of fracking activity. It can also help individuals, communities and organizations set advocacy goals more clearly in binding language and demands. It can help inform and structure complaints and claims where a State or a company has not complied with human rights obligations and due diligence requirements. Advocates can use this publication to develop strong legal grounds to take legal or other action against the State or the company in question to stop fracking, to change the activity, or to seek reparations and remediation for past impacts.

b) Corporations

This publication will be useful to oil and gas (and associated) companies to map out human rights issues which are material to their operations, as well as to consider their sphere of influence in their contractual relations (either with the State or with subcontractors and suppliers) in order to address the growing concerns expressed by individuals, communities and many civil society organization and other environmental and human rights policy groups related to fracking operations. It can be a guide for companies to develop in-house corporate policies, management systems and grievance mechanisms to address human rights concerns of *fracking* activity.

c) Public Officials

This publication will be useful to public officials governing the oil and gas sector. For public officials willing to explore governance alternatives to monitor, regulate, and bring the oil and gas sector into human rights compliance, this publication offers useful guidance to achieve this objective. It can also help legislative representatives develop stricter laws to lower impacts of the oil and gas sector. It can also be used to consider bans on fracking or to limit fracking activity where impacts may be especially significant.

In sum, we hope that his manual will be useful to a multiplicity of actors engaged in the fracking debate.

III. Fracking: What is it and why is it risky?

What is Fracking?

Hydraulic fracturing (*fracking*), is an industrial technique that uses hydraulic pressure through the injection of water and chemicals into the geology to extract oil and gas from the pores of laminated layers of rock called *shale*.

While in *conventional* oil and gas extraction fossil fuel is tapped by drilling vertically downwards and installing a single pipe to reach a central saturated and continuous deposit of fossil fuel, in *fracking*, since the reserve is thinly spread out in micro pores of rock laminates, *unconventional* methods are used, typically, drilling vertically down to the level of the reserve *and then horizontally*, sometimes for several miles, through the geological formation. Explosives and hydraulic pressure are then used along the well hole to perforate the pipe (explosions) and break open the pores of rock (pressure), releasing trapped fossil fuels.



Figure 1: Fracking drilling station near Pittsburgh Pennsylvania. Photo JDTaillant

Once “conventional” oil and gas reserves that are easily tapped are exhausted, oil or gas may remain in the mother rock (the lower part of the geology that decomposed over millions of years to generate the oil or gas), but it may also remain trapped in microscopic pores that will not release the fossil fuel through *conventional* drilling techniques. A pipe sent straight down to the mother rock and then suctioned won’t be able to tap these reserves.

This situation is analogous to drinking water with a straw from a cup filled with water and ice. The traditional oil or gas reserve is the full cup with water and ice. You can drink most of the liquid with a single straw placed inside the cup. But, the straw fails to suck up the remaining water at the base of the cup, nor can it suck up the water contained in the ice. Now imagine that you could do something to tap all of the water resting on the inside surface of the cup, or on the surface of the melting ice cubes, or even inside of the ice. If you could use some *unconventional* form of suction to get that extra water up through the straw, you could consume quite a bit more water. Fracking is precisely this, an *unconventional* way of getting more oil and gas out of wells, when the *conventional* “straws” have already sucked up all they can.

In the following image taken from the US Environmental Protection Agency June 2015 report on the impacts of hydraulic fracturing to water resources we can compare *conventional oil and gas operations drilling* (the vertical well to the far right), and the typical *non-conventional fracking well* which begins vertically and then turns horizontally (middle of the image).

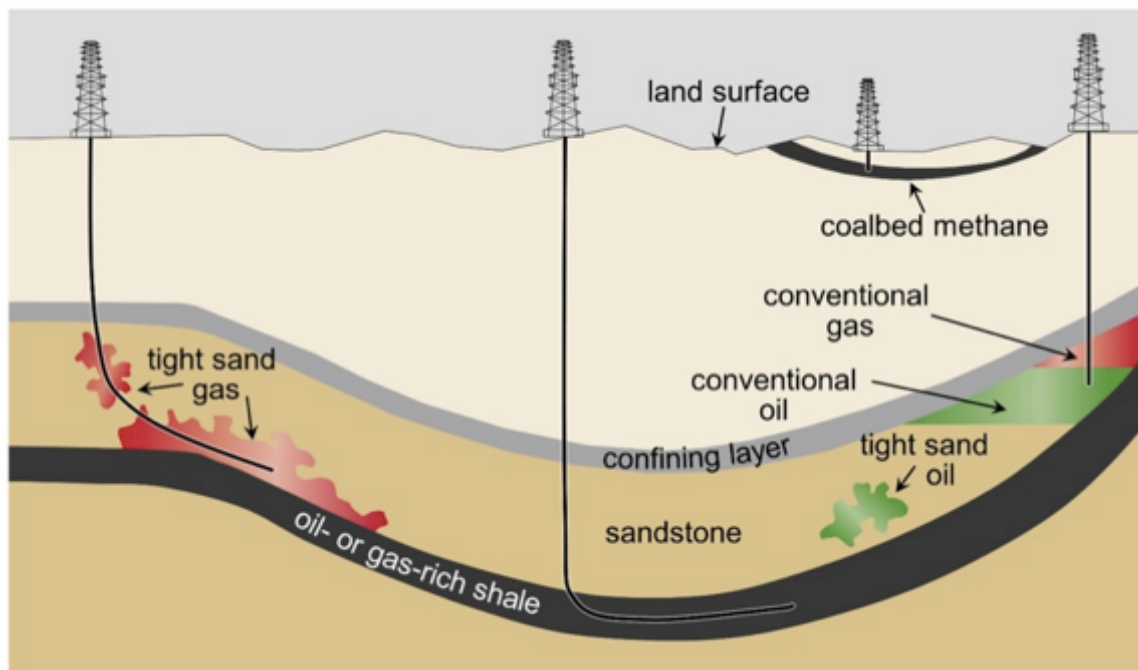
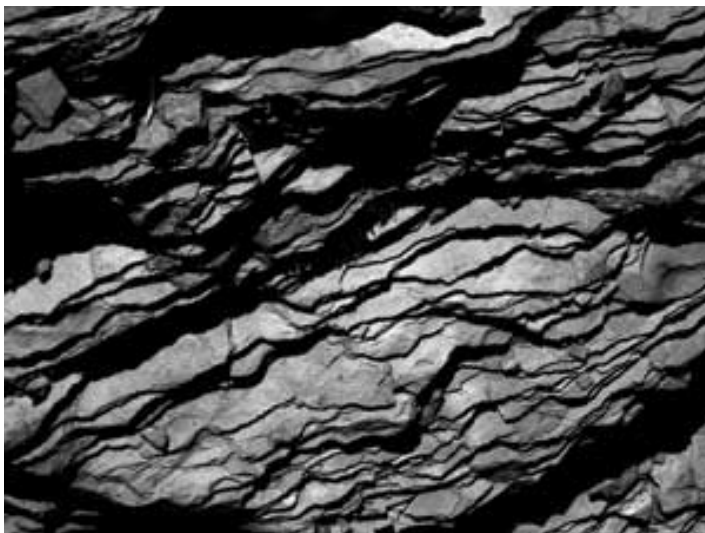


Figure 2: Types of Oil and Drilling (Conventional vs. Non-Conventional Fracking). Source EPA

The way that oil companies extract these *unconventional* oil and gas reserves is by drilling *next* to the oil formation down to the level of the mother rock where the oil and gas is trapped in the micro pores of the shale. The drill then moves horizontally through the bedrock where this reserve is located, oftentimes for many miles. The well pipe is then perforated every few yards with mini-explosions to access the geology.



A mixture of water, chemicals, and proppant, known as 'fracking fluid,' is injected into the pipes of the fracking well and massive hydraulic pressure is added, producing further micro fractures in the bedrock of the mother rock's shale. Very small particle silica sand or other solid proppants are added to the mix and seep into the fissures holding them open, allowing the oil and gas contained in the shale rock to flow back into the well pipe and finally escape through the piping up to the surface.

Figure 3: Shale Rock containing hydrocarbons.
Source: Power Engineering

Rudimentary forms of hydraulic fracturing have been used for the past fifty years, as this was a way to squeeze out a little extra oil and gas from exhausted conventional wells, but only within the past two decades, with the use of chemicals and voluminous quantities of water, the extraction of oil and gas through fracking procedures has become more economically viable.⁷

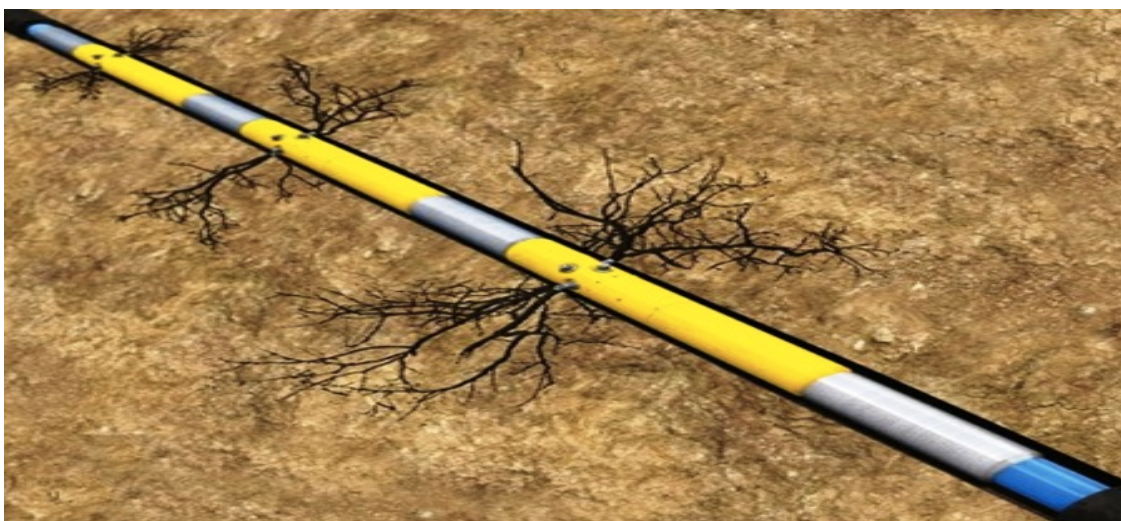


Figure 4: Explosives are used to perforate the casing and hydraulic pressure generates micro fissures in the geology which branch out into the shale rock. Source: Baker Hughes

⁷ see: <http://thetyee.ca/News/2013/01/07/Shale-Gas-Realities/>

Most of the world's fracking activity taking place today occurs in the United States, centered in States such as Texas, Oklahoma and Pennsylvania. A total of 22 States in the United States permit hydraulic fracturing.⁸ The discovery of significant unconventional shale oil and shale gas deposits around the world including within China, Argentina, Australia, Mexico and the UK, as well as several other countries, has pushed the viability of oil and gas extraction further into the future, at a time when the planet was gearing up for a progressive energy sector shift towards more sustainable forms of energy, such as wind and solar.⁹

Because of the large infrastructure, machinery and specialized expertise involved in hydraulic fracturing the large financial investments in the sector are a significant hurdle impeding the rapid expansion of hydraulic fracturing beyond the United States. This expansion is often contingent on achieving not only the necessary know-how and financial underpinning, but also the political and social conditions necessary to permit the activity. Another key element in the equation for fracking to be viable has to do with ensuring the *economic viability* of the operations. As oil prices rose drastically over the last decade, so did the viability of the industry to frack reserves, as well as the interest of oil and gas companies to take fracking beyond US borders, but as oil prices fell recently, that enthusiasm has slowed somewhat. Fracking non-conventional reserves remains a lot more expensive than tapping conventional oil and gas deposits and for this reason, the numbers need to add up for investors of fracking to make economic sense.

⁸ see: <http://insideclimatenews.org/news/20150120/map-fracking-boom-state-state>

⁹ see: <http://www.eia.gov/analysis/studies/worldshalegas/>

What are the main social and environmental concerns related to fracking?

Since the controversial documentary 'Gasland' showed combustible tap water in a home near a gas well, environmentalists and local communities around the world have begun targeted advocacy actions to stop fracking from coming to their neighborhoods, kicking off one of the most controversial development debates of our time.

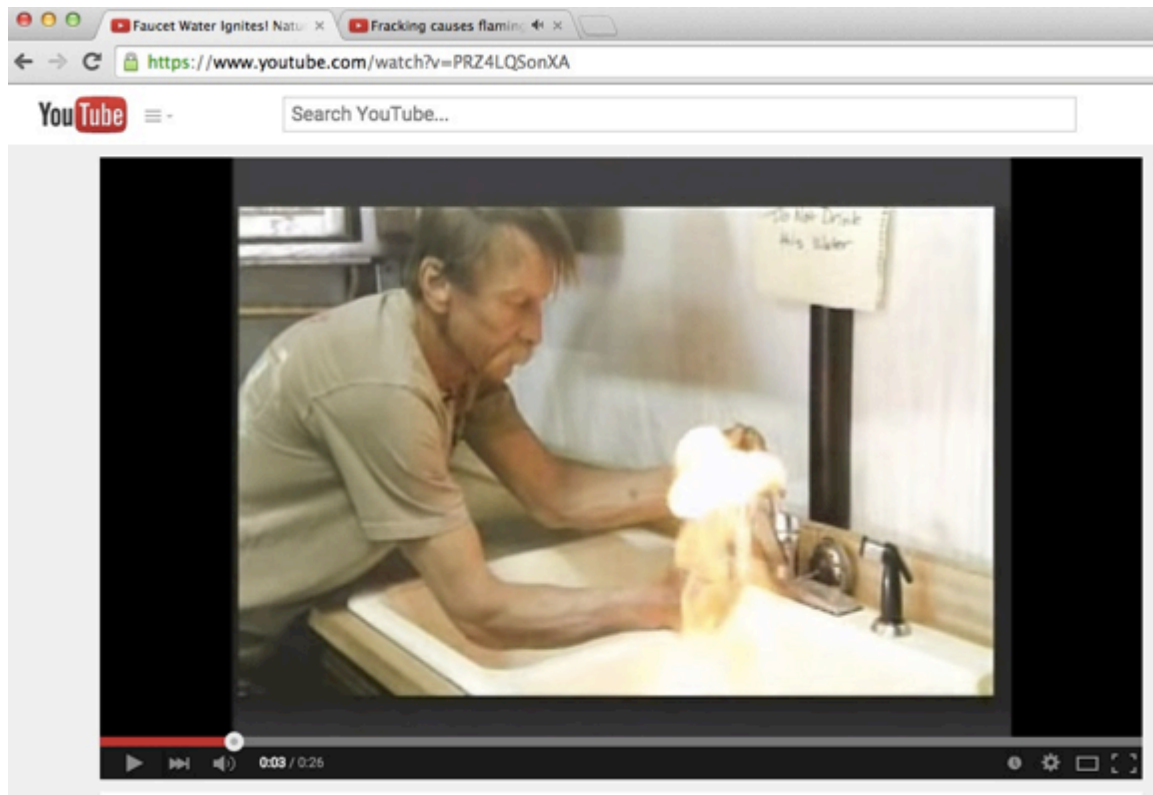


Figure 5: The documentary film Gasland's depiction of ignitable residential faucet water spawned the global anti-fracking movement

The rapidly evolving global social movement against fracking has focused concerns over fracking on the following grounds:

- Water use and contamination
- Industrial effluents
- Atmospheric contamination
- Land use
- Earthquakes caused by fracking

These are all valid topics to address as we consider the social and environmental risks and impacts of fracking, however, as we will discuss below, there are still many more issues of concern related to the activity which merit further discussion.

Objectively speaking, and despite what oil and gas sector representatives say about oil and gas extraction and commercial production through fracking, the oil and gas industry leaves a high environmental footprint. The social and environmental costs of using fossil fuels to meet our energy needs are high. Yet, the levels of environmental contamination *per se* have not thwarted other industries that society tolerates, such as

leather, paper, nuclear energy, plastics, etc. For each of these industries there are accompanying drawbacks and costs from a social and environmental perspective, in some cases more than in others. The real question is how much we want to tolerate each of these industries and their impacts, and to what degree will we tolerate them considering the benefits that they offer us?

Whenever fossil fuels are extracted from the ground, there are inevitable short and long-term environmental impacts to consider. From oil spills and methane leaks, to water contamination and deforestation, to high traffic and noise pollution, and ultimately to climate change, oil and gas production is not a clean activity. The history of environmental damage related to fossil fuel extraction is well documented.

The basic risks of fracking carry over from the historical risks that we already know of in the oil and gas sectors, but fracking also adds new risks. One of the greatest impacts that is very particular to fracking stems from the large volumes of water needed to fracture the geology, and the large volumes of water that are contaminated in the process. Other considerations include the vulnerability to the stability of the geology as well as the heightened impact on the climate.

As we examine the human rights dimensions of fracking we will consider a number of risks, impacts, and contentious issues related to fracking activities that should be weighed before allowing any hydraulic fracturing operation to go forward. Some of these include:

- Water volume usage
- Surface water contamination
- Sub-surface water contamination
- Generation of large volumes of industrial effluents
- Land use choices and exclusions
- Atmospheric contamination
- Climate change impacts
- Geological security (earthquakes)
- Long term environmental security
- Deforestation
- Transportation security
- Noise pollution
- Long term clean up
- Indigenous entitlements, culture and lifestyles
- Worker health and safety
- Access to information about social and environmental risks
- Participation in decision-making about development models
- Sector proceeds / taxation proceeds usage
- Long term energy generation choices

Fracking and Water Contamination

The risks to and the impacts of hydraulic fracturing to water resources drive the most heated dimension of the fracking debate. Fracking requires a very large volume of water to press the oil and gas out of the ground, a notable difference from previous conventional methods used in fossil fuel extraction, which also required water (for drilling) but not in such great volumes.

In conventional oil and gas operations, a well is drilled until reaching an oil reserve and then the fossil fuel is suctioned out. Except for its use as a lubricant for drilling, water is not a central input to the conventional oil

and gas extraction process. In fracking, however, large volumes of water are pumped into the ground along with added chemicals commonly referred to as “fracking fluids,” and then the mixture, containing oil and/or gas, is pumped back out along with the water and chemicals. The amount of fracking fluids recovered per operation varies greatly, anywhere between ten and ninety percent (which is a very large spread), with the rest remaining in the ground.^{10,11} This need for water immediately brings up the issue of *where to get the water*, and *what to do with it once it's contaminated*.

There are two types of industrially contaminated water generated from fracking operations: *flowback water* (extracted the first 30 days or so from the time the well is put under pressure) and then what the industry ironically refers to as “*produced water*”, which flows out of the well over the entire life of the well (which may be for many years).¹² Of course, oil and gas companies that carry out hydraulic fracturing do not *produce* water, but rather, they *contaminate water* and produce instead an *industrial effluent*. This effluent is a very toxic industrial effluent containing a variety of toxic chemicals, fuels, sand *and water*. Production water is deemed to be “dirtier” than flowback water as it manifests higher Total Dissolved Solids (TDS) and Total Suspended Solids (TSS), that is, it has higher amounts of toxic debris in the water in solid or liquid form.



Figure 6: Tanks receive flowback water from a fracking well and separate water, gas, sand and oil.
Photo: JDTaillant

¹⁰http://www.gwpc.org/sites/default/files/state_oil_and_gas_regulations_designed_to_protect_water_resources_0.pdf

¹¹http://www.umweltbundesamt.de/sites/default/files/medien/378/publikationen/texte_53_2014_umweltauswirkungen_von_fracking_28.07.2014_0.pdf

¹² see: <http://www.wellservicingmagazine.com/featured-articles/2013/01/cool-clear-water-treating-flowback-and-production-water-is-serious/>

This effluent must be removed onto the surface in order to separate the marketable fossil fuels from the contaminated liquid and other remains. This flowback waste liquid contains large amounts of brine (salts), toxic metals, organic hydrocarbons, and naturally occurring radioactive materials (NORM). As indicated by the Natural Resources Defense Council (NRDC):

“These pollutants can be dangerous if they are released into the environment or if people are exposed to them. They can be toxic to humans and aquatic life, radioactive, or corrosive. They can damage ecosystem health by depleting oxygen or causing algal blooms, or they can interact with disinfectants at drinking water plants to form cancer-causing chemicals.” (Hammer and VanBriesen, 2012, p.1)

The big question and challenge for oil and gas companies is to figure out what to do with all of the left over contaminated water once the fossil fuels are extracted and sent to market. The easy way out for the industry has been simply to pump the effluent back into the ground into deep wells and leave it there, *forever*. Evidently, this is not a very environmentally friendly solution. To complicate matters further, recent studies are showing that pumping massive amounts of industrial effluent into deep wells can, *and has* caused earthquakes. Other approaches to ground injection have varied considerably. In some cases water is separated from toxic elements and recycled, on the one hand recuperating a portion of the water, but on the other, leaving a heavier and more concentrated industrial effluent to treat. Recycling may be used for reducing concentrations of the effluent to meet subsequent disposal standards, to reuse parts of the effluent for industrial use (including fracking again) or to extract and process effluent to an acceptable level of contamination to be sent into an industrial channel, sewer or other facility for later treatment.

Other times, industrial effluents are treated at already existing municipal facilities (which usually do not have the capacity to treat fracking effluents which are generally more contaminated than the effluents they usually receive), or are handled by specialized brine-treatment facilities, or portions of liquids may be dumped into local waterways, placed into stationary impoundments, ponds or pits, or left in permanent storage tanks, *indefinitely*.¹³ Many millions of gallons of industrial effluent must be treated and disposed of per well. That amounts to quite a large volume of contaminated water generated by fracking operations. According to official estimates, in the United States alone, 2.4 billion gallons (9.1 billion liters) of wastewater are generated per day from active oil and gas well operations.¹⁴

Fracking contaminates water throughout each stage of operations, but is most intensely utilized during *early* stages of preparing wells. About 2.8 million gallons of water (about 11 million liters) are used per well, and considering that a single fracking platform might have up to 11 or 12 wells, some 30 million gallons of water (120 million liters) are necessary for some fracking sites, a volume that is in direct competition with other uses for this water (personal, community, agricultural, industrial, etc.). Treating industrial effluents from fracking is not easy (nor is it cheap), and in many cases, the facilities that receiving the effluent are not prepared to treat them. A recent study by Warner *et.al* analyzing downstream water quality from a bromide facility (a facility that treats fracking effluents) found worrying levels of radioactive radium concentrations at 200 times normal levels in stream sediment. Chloride and bromide concentrations were on average 4.5 to 12 times normal levels. The treatment plant was found to contribute about 90% of downstream chloride content.¹⁵ Heavier metals extracted from fracking effluents must be treated with great care, including the sludge left over once all of the recyclable water is extracted. Generally, contamination levels of this sludge are too high to send the sludge to municipal waste dumpsites and hence it must be treated as hazardous waste, adding another complication (and cost) to handling fracking effluents.

Evidently, water management is a key concern in fracking operations. Whether the issue is availability of water, cost of disposal, cost of treatment, cost of recycling or obtaining new water supplies, access to water determines much of the economic bottom line of hydraulic fracturing operations. At the same time, the resource also determines the level of contamination that the activity will generate.

¹³ see: http://www2.datashed.org/sites/default/files/supporting_info.pdf p. S2.

¹⁴ see: EPA. June 2015. P. ES19

¹⁵ see: <http://energyblog.nationalgeographic.com/2013/10/04/fracking-water-its-just-so-hard-to-clean/>



Figure 7: A single well pad may have up to 11 or 12 different wells drilled; in this picture the red Christmas tree-like valves close off each well drilled. Ten are visible in the image. Photo: JDTaillant, at a Pennsylvania-Marcellus Shale gas well.

Another concern related to water safety compromised by fracking activity is potential risks to aquifers. In most cases, shale gas and oil reserves are beneath water aquifers. This means that to get to the fossil fuel reserve, companies must drill through the aquifer, install steel tubes (casings) that will remain in the aquifer through the life of the project and beyond, essentially *forever*. Then hydraulic pressure opens up fissures in the geology beneath the aquifer, releasing contaminated liquids into the geology. The oil, gas, fracking liquids, soiled water etc., are then suctioned through the steel piping up through the geology and through the aquifer on to the surface. Risks and impacts to the aquifer can derive from two sources: 1. Faulty piping and cementing of piping that allows contaminated fluids to seep directly into the aquifer and 2. Fissures that might extend dangerously close to the aquifer, potentially contaminating it directly.

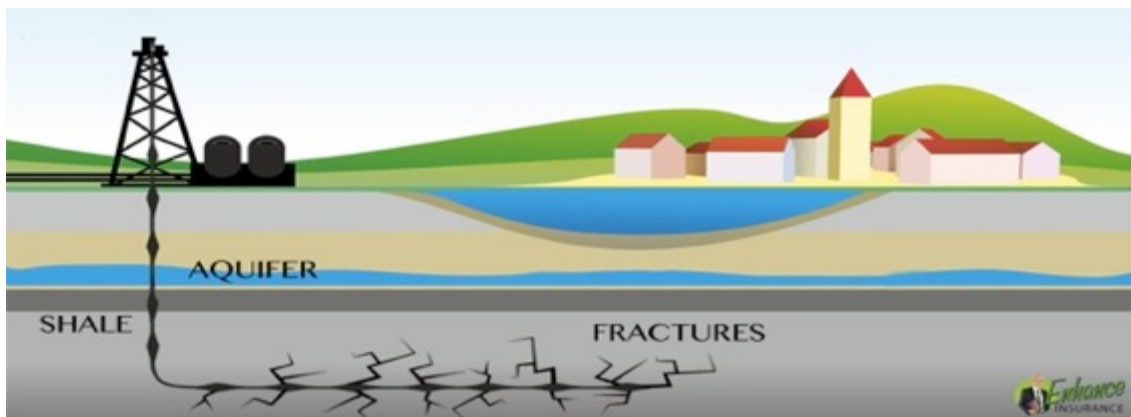


Figure 8: Depiction of a fracking well dug close to a water aquifer shows risks of fissures close to the water resource. Source: <http://www.enhancedinsurance.com/news/unseen-fracking-insurance-risks/>

The 2008 documentary *Gasland*, showing tap water igniting, presumably because oil or gas well casings had ruptured and permitted fossil fuels to seep into the local aquifers, spawned a heated debate about the risks of fracking wells close to community aquifers. The industry argues that technology has improved since early wells were drilled and that proper cementing of casings avoids any risk to water resources. Evidence of contamination and multiple legal cases brought by homeowners, however, are not on the side of the industry.

Studies have suggested that fracking wells have a tendency to fail. Fracking pipes composed of thirty-foot sections jointed together may reach for many miles. The United States Environmental Protection Agency (EPA) has recognized in its recent assessment of fracking impacts on water resources that

“impacts to drinking water resources from subsurface liquid and gas may occur if casing or cement are inadequately designed or constructed, or fail. [and that] There are several examples of these occurrences in hydraulically fractured wells that have or may have resulted in impacts to drinking water resources.” (EPA. June 2015, P. ES14).



Figure 9: Fracking well pipes stacked at fracking site ready for assembly and submersion into the ground.

A single completed fracking pipe can be more than five miles long (eight kilometers). A five-mile pipe (which is neither short nor long for the industry) would have up to 800 union junctures, each a potential spot for corrosion, breakages or leaks.

Additionally, it has been shown that there is a much higher fail rate at unconventional well drillings compared to conventional ones, which exacerbates the risks of the leakage. If there are flaws in the design or construction of well casings, or if over time the steel used in the casing and the pipe unions rust or break due to corrosion, or due to an earthquake, for example, they can release oil and gas as well as other hazardous chemicals (fracking fluids) into the ground, into aquifers and into the atmosphere. There is a high

tendency for this particular type of well to fail; an average of 6.2% of fracking wells in Pennsylvania, for example, were found to be leaking in an independent study. The fail rate may be higher in countries with less environmental oversight or where best practices are not employed in casing design.¹⁶

Another study carried out the University of Waterloo and a firm called Geofirma, in a work focusing on the experiences of the oil and gas sector in Canada concludes:

“Wellbore leakage, the seepage of natural gas through cement channels, ... is a problem reported across Canada. Wellbore leakage is a threat to the environment and public safety because of potential groundwater quality deterioration, contributions to greenhouse gas emissions and explosion risks if methane gas accumulates in inadequately ventilated areas. Leakage rates remain poorly quantified and remedial workovers are often challenging. ... Several key processes were identified that lead to the potential development of a leakage problem, working to either prevent the initial creation of an adequate cement seal or compromising the integrity of the cement sheath over time. The pathways produced by these processes include microannuli, channels and fractures due to poor mud removal, invasion by fluids during setting, stresses imposed by operations, cement shrinkage and casing corrosion. Intermediate-depth formations, i.e., non-commercial gas zones, are often found to be the source of the buoyant fugitive gases that migrate up these pathways.” (Dusseault et.al. p. i)



Figure 10A: Cemented concentric steel pipe used in fracking wells. This is an *ideal* design, since in practice the pipes (due to irregular positioning in the geology) may not be located in a concentric manner thereby thinning cement and reducing safety



Figure 10B: In reality, the concentricity of pipe cemented casing, particularly once the wellbore begins to migrate horizontally—sending the internal casings to the bottom due to gravity, is more likely to be like in this image, where there is more manifest *eccentricity*, than concentricity. That is, the internal piping pushes downward, leaving a dangerously thin layer of cement separating the pipes. In this image we also see the contamination of cement by drilling mud, causing weaknesses in the cement integrity which can also lead to contamination. Source: Desseault et.al.

¹⁶ <http://www.pnas.org/content/early/2014/06/25/1323422111>

In addition to eccentricity in cement casing are the potential to generate pores in the cementing process through which toxic gases or chemicals can seep to the groundwater, due to the pressurization irregularities in the cementing process. In the next image (provided by Dusseault et.al., 2014 quoting a study by Watson 2004), we see channels and gas pockets as a result of gas invasion during cementing set.



Figure 11: Channels and gas pockets caused by faulty cementing are a possible channel for contamination. Source: Watson 2004, quoted in Dusseault 2014.

It should also be noted that over time, the integrity of wells may fail. We cannot be certain that over many years, decades or even centuries, there might not be a compromise to the integrity of an abandoned well, causing seepage to migrate into sensitive environmental resources.

As stated by Dusseault et.al,

“... even an adequately completed wellbore with a good initial seal may be compromised over time. Wellbores need to be designed to be able to withstand mechanical and thermal loading. Regardless of how well the cement sheath is placed, if the wellbore is not both durable and adaptive to changing conditions, the wellbore may not be able to withstand large changes in stress (Ravi et.al. 2002; Bellabarba et.al. 2008). The use of enhanced recovery methods (steam injection, hydraulic fracturing, etc.) elevated the mechanical and thermal loading on wellbores, and significantly increases the probability of leakage problem development during the operational lifetime of the wellbore, before final abandonment. ... The slow deterioration of a wellbore, both the cement and the steel, also presents an issue for long-term wellbore integrity. (>100 years)” (Dusseault et.al p. 40)

Another point of concern placing water resources at risk are the large open contaminated water deposits which are kept and/or treated at the surface. These ponds represent a serious risk to flora and fauna, as well as to human health, should their content mix with fresh water resources.

The industry’s produced effluent is the liquid that flows from the well after the initial and more intense flowback has completed in the first weeks of operations. This effluent, which the industry calls *produced water*, is highly contaminated. The US EPA identified 134 chemicals in “produced water”, and noted:

"Produced water varies in quality from fresh to highly saline, and can contain high levels of major anions and cations, metals, organics, and naturally occurring radionuclides. Produced water from shale and tight gas formations typically contains high levels of total dissolved solids (TDS) and ionic constituents (e.g. bromide, calcium, chlorine, iron, potassium, manganese, magnesium, and sodium.) Produced water also may contain metals (e.g., barium, cadmium, chromium, lead, and mercury), and organic compounds such as benzene." (EPA, June 2015, p. E17)

This industrial effluent, once removed from the well, is processed to remove marketable fossil fuels and remaining water is typically sent into a hole dug out in the ground lined with a plastic cover to avoid contact of the dangerous contaminated water with the natural environment. It generally sits in the open separated by a fence, but is still accessible to birds, insects and other wildlife and to the air circulating above it. As recognized by the EPA (June 2015, P. ES17), "impacts on drinking water resources have the potential to occur if produced water is spilled and enters surface water or ground water."



Figure 12: Industrial effluent pond holds contaminated water on the surface near a fracking well.

Risks and impacts from ponds of industrial effluent can come from breakages to the plastic lining resulting in seepages into the ground and potentially into the ground water, problems with the structure of the pond which may result in undesirable flows of effluent into nearby soil or local streams, unanticipated flooding in the area which may cause effluents to mix with drainage water and enter local streams, storm drainages, sewers or directly into the community, contamination from gusts of wind which pick up contaminants from the surface of the pond circulating them into the local air, contamination of fauna which may drink water from the industrial effluent pond.

The US EPA has studied the occurrence of spillages from the industrial effluents produced by fracking and concluded:

“Surface spills of produced water from hydraulically fractures wells have occurred. ... the frequency of on-site spills from hydraulic fracturing activities ... estimated for two states at fracturing sites in Colorado and Pennsylvania, including spills of produced water, ranged from approximately 0.4 to 12.2 spills per 100 wells. Away from the well, produced water spills from pipelines and truck transport also have the potential to impact drinking water resources.” (EPA, June 2015. P. E17)

The EPA also looked at spills in 11 other states, and concluded that the average volume of spills of industrial effluents were 990 gallons (3,750 liters) and that the causes were reported as human error, equipment failure, container integrity failure, and miscellaneous and unknown causes. (EPA, June 2015. P. E17) Eight percent of the spills recorded, states the EPA, contaminated surface water or ground water. (EPA, June 2015. P.E19)

In sum, if the EPA is correct, and if these wells are representative of the sector, about 10% of wells will at some point spill part of their industrial effluent. We should also recall that these contaminated sites, unless fully cleaned, remain contaminated indefinitely (forever) or until someone cleans them up.

The EPA also notes that “chemical properties [chemicals in hydraulic fracturing] that affect the likelihood of an organic chemical in produced water reaching and impacting drinking water resources include: mobility, solubility, and volatility.” (EPA, June 2015, P. E18) That is, the chemical properties present in this effluent water may be such that the toxicity of the deposit may not be statically located but rather move undesirably to contaminate other unprotected and uncontaminated locations.

Finally we should note that hydraulic fracturing is a relatively new technique and as such we do not have long-term information about the integrity of well casings or abandoned fracking wells over time to know and understand how these sites will survive over the years.

The EPA also mentions this fact, not only recognizing:

“fracturing older wells may also increase the potential for impacts to drinking water resources via movement of gases and liquids from the inside of the production well or along the outside of the production well to the ground water resources, ... [but also that] aging ... of the well can contribute to casing degradation, which can be accelerated by exposure to corrosive chemicals, such as hydrogen sulfide, carbonic acid, and brines.” (EPA, June 2015. P. ES15)

This is because geology is complex, never uniform, and highly irregular. Put the geology under stress with high-pressure fracking fluid from beneath the ground and seepage is likely to occur in the least imaginable places, sometimes far away from a wellhead’s point of entry. In the State of Colorado, for example,

“inadequate cement placement in a production well allowed methane and benzene to migrate along the production well and through natural faults and fractures to drinking water resources [illustrating] how construction issues, sustained casing pressure, and the presence of natural faults and fractures can work together to create pathways for [fracking] fluids to migrate toward drinking water resources.” (EPA June 2015, p. ES15)

The fact that a gas or oil company cannot trace a methane leak from its piping or an effluent leak in the vicinity to its installations, doesn’t mean that the leak isn’t coming from their fracking operations and the extensive web of drilling they’ve conducted under the ground. It can also be due to an unforeseen invasion of one company’s well, into another company’s previously drilled (and possibly abandoned) well. Because a single well pad that might have 10 or 12 different wells drilled in all directions, the expansive extent of drilling

may reach a very large geographic area extending out in a circular fashion, several miles from the well pad site. The potential or capacity of a company or a State authority to identify all of the potential leakage points in this vast area is low, yet the risk that such leakage occurs is extremely high.

Although methane leaks from shale formations due to drilling and high pressure have been shown to be likely occurrences, because of the difficulty of proving a direct relationship without the necessary evidence, the EPA is cautious to firmly establish a direct relationship. Nonetheless, the EPA does recognize that, for example, in northeastern Pennsylvania, many drinking water wells within its study area were found to have elevated methane concentrations following the introduction of hydraulic fracturing. Also in some cases, states the EPA, “potentially explosive quantities of methane were vented into a number of drinking water wells.” (EPA. June 2015. P. 6-17)

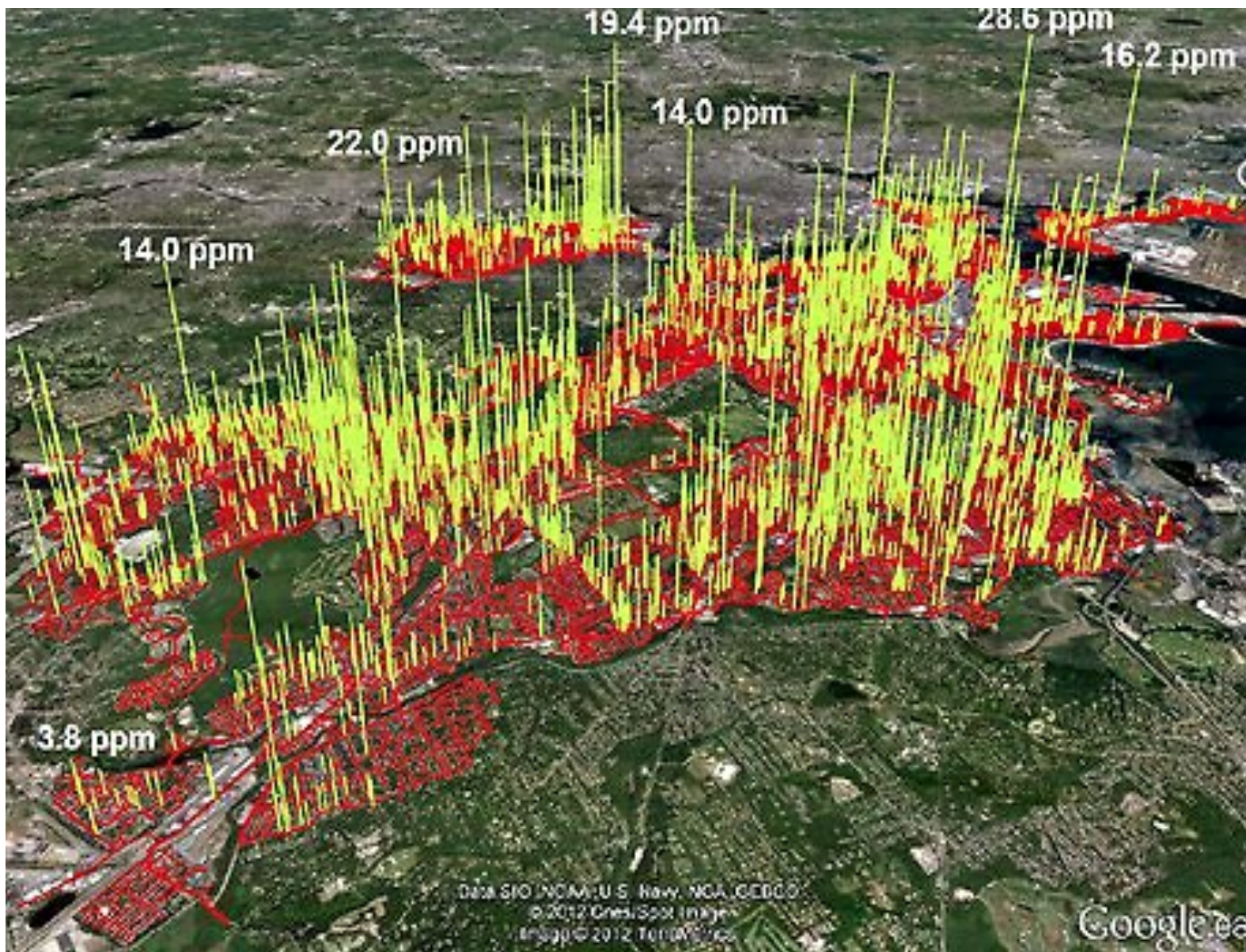


Figure 13: Methane emissions from oil and gas operations are consistently underreported and offset climate benefits of gas over coal.

Fracking and Atmospheric Contamination

“Fugitive emissions, i.e. uncontrolled leakages of natural gas from oil and gas wells in a commonplace problem in oil and gas producing areas.” (Dusseault 2014, P.9) Air pollution from fracking is a serious threat to human health and to environmental sustainability. It’s also accelerating climate change.

Air pollution from hydraulic fracturing derives from *every* stage of production, not only the actual *fracturing* of wells, but also from associated activities, including drilling, handling of chemicals, pressurization of the geology, extraction, transportation, compression, power generation for the pressurization process (generally accomplished with large diesel engines) and deposition of effluents. Impacts may be suffered by local communities living in proximity to fracking operations or by workers that are oftentimes the first exposed. Impacts can also exist at a broader climatological level as emissions leave a fracking zone, and are transported around the region, or even around the world.

As reported by the Natural Resources Defense Council (NRDC) in a recent report on air pollution from fracking activity, a study commissioned by the West Virginia Department of Environmental Protection found

that at many sites, a 625-foot distance from oil and gas activity, *beyond the safe distances set by many States*, still resulted in benzene concentrations above levels the Center for Disease Control and Prevention (CDC) considers the minimum risk level for avoiding health effects.

In Colorado State, reports the NRDC, drilled sites examined revealed many hydrocarbon pollutants including trimethylbenzenes, aliphatic hydrocarbons and xylenes, associated with adverse respiratory and neurological effects. Concentrations of benzene, toluene, ethylbenzene and xylene increases with proximity to the well site while in some tight gas fields studied in Utah State, researchers estimated that the total annual mass flux of volatile organic compounds (VOCs) was equivalent to the emissions from 100 million cars. The same study concluded that benzene levels measured exceeded health standards set by the California Environmental Protection Agency to protect against harm to developing fetuses, immune system and blood. (Srebotnjak, P.4)

Communities where fracking takes place have systematically suffered from gusts of pollution-laced winds that swoop into homes, businesses, schools and even hospitals, creating nauseous clouds of invisible air containing volatile organic compounds, such as benzene, xylene, toluene, ethylbenzene, formaldehyde, methane, and even highly explosive toxic gases such as hydrogen sulfide, all of which can make people sick, dizzy, cause faint spells or even cause death. Shale gas can also include large quantities of hydrogen sulfide, which if released into the air, can be deadly, as occurred in some Chinese basins.¹⁷ This pollutant is toxic and can degrade equipment, causing accidents like the 2003 Sichuan well blow out, which killed 243 and injured some 9,000 others through hydrogen sulfide inhalation.¹⁸

It is common to hear from oil and gas companies that they are not responsible for the air contamination found near their wells because a direct relationship between the contamination and their wells cannot be ascertained. We should again be wary of this defense since the complexity of the geology and the difficulty of tracing contamination should not be used to rule out responsibility.



Figure 14: Drill Rig in front of homes in the town of Frederick in Weld County, Colorado. Source: NRDC

¹⁷ <http://www.nortonrosefulbright.com/files/norton-rose-fulbright-shale-gas-handbook-108992.pdf>

¹⁸ This accident was at a conventional well: <http://www.unep.fr/scp/xsp/disaster/casestudies/china/gaoqiao.htm>

The above NRDC report also points to recent research showing growing air pollution deriving from hydraulic fracturing activity, including increasing levels of smog and toxic air contaminants. Exposure to air contamination from the types of pollution found in fracking activity can lead to eye, nose, and throat irritation, respiratory illnesses, central nervous system damage, birth defects, cancer or premature death. (Srebotnjak, p. 2)

As pointed out by NRDC, proximity to fracking activity increases the risk of acquiring air-borne diseases, including birth defects and cancer. Hydraulic fracturing activity is also known to cause damage to the ozone which in turn can cause respiratory and neurological problems for people living in the vicinity of operations, producing symptoms such as shortness of breath, nosebleeds, headaches, dizziness, and chest tightness. Diesel emissions, adds the NRDC, are also a serious problem related to power generation and transport in fracking. Soot from diesel engines can lodge in the lungs causing asthma attacks, cardiopulmonary disease (including heart attacks and strokes), respiratory disease, adverse birth outcomes, and premature death (from pneumonia, heart attack, stroke and lung cancer).

Furthermore, methane, which is a green house gas dozens of times more potent than CO₂, leaks not only from the drilled wells, but can also leak from the many thousands of joints in the piping utilized in wells, and in processing equipment. And despite the arguments of the oil and gas industry that fracking shale gas is much more climate-friendly than other energy sources (because natural gas burns cleaner than other types of fossil fuels), in fact, conservative estimates of methane leakages in the oil and gas sector suggest that climate benefits of cleaner gas burning are offset and even exceeded by the negative impacts of methane leaks.

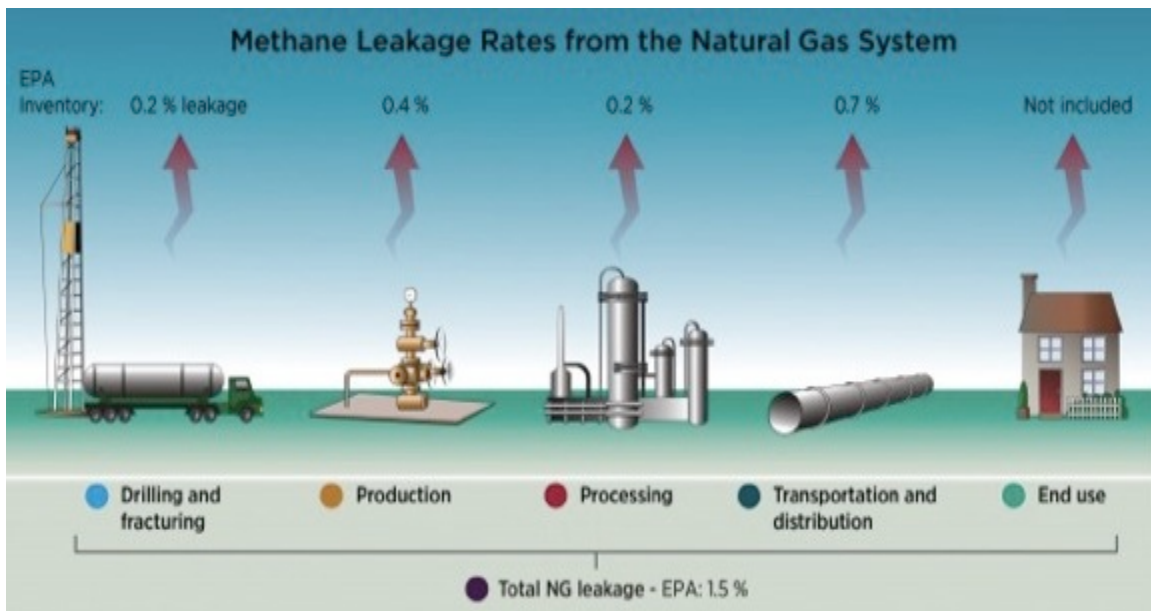


Figure 15: EPA recognizes at least 1.5% methane leaks from gas production, although new studies suggest that methane leakage may be up to 5 times higher.

Independent analysis in the U.S. has shown that contrary to official estimates suggesting relatively low methane leakages (1.5%) from Natural Gas Systems, fracking sites may be leaking much higher values of their extracted fuels. A recent study carried out in Uintah County in Utah State reported an 8% methane leakage rate emitted into the atmosphere by a fracking gas field. This measure was conducted over a period of one month with equipment on 12 four-hour flyovers. Eight percent represents up to 38 times the inventory based estimates from this region and five times the EPA calculated nationwide average.¹⁹ We should note

¹⁹ see: ftp://ftp.cmdl.noaa.gov/hats/papers/montzka/2012_pubs/in%20review_Karion%20et%20al%202012.pdf

that despite the likelihood that EPA estimates fall short of real methane leaks, the oil and gas sector argues that the EPA *overestimates* leakages, suggesting that methane leaks are about half of the EPA number.

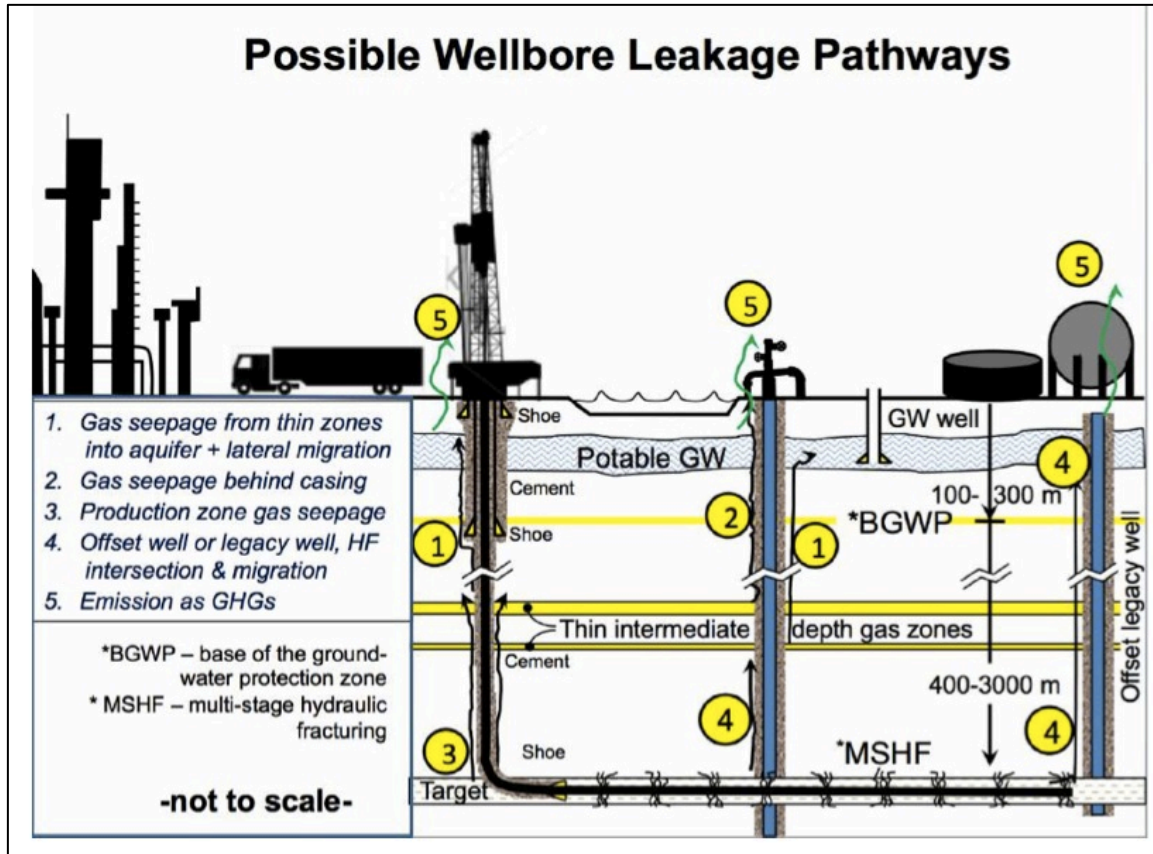


Figure 16: Sources of Fugitive Emissions typical of fracking operations. Source: Dusseault et.al. 2014, P. 15.

As Dusseault et.al 2014 state:

Potential leakage pathways attributed to shale gas and other unconventional gas development [include] ... storage tanks and facilities, transportation accidents, drilling and surface casing issues, leakage from offset and legacy wellbores, and leakage from the immediate vicinity of a wellbore. (Dusseault et.al p. 14)

Dusseault goes on to site studies that link wellbore leakage pathways to groundwater contamination (paraphrased):

Wellbore leakage may also lead to the deterioration of the quality of potable groundwater. Water quality deterioration because of microbially catalyzed hydrocarbon oxidation has been described [as in the case of a well blowout in Ohio USA] in which the natural oxidants (e.g., O_2 , NO_3 , SO_4 in the aquifer were replaced by iron and manganese, which had dissolved from the reduction of the oxides within the aquifer. Furthermore, the total dissolved solids (TDS) increased in concentration and sulfate reduction of the methane produced hydrogen sulfide. [another study] in the San Juan basin in New Mexico and Colorado [USA] indicated a strong association between methane and hydrogen sulfide. ... we can expect that natural-gas contamination of freshwater aquifers will result in the oxidized methane being replaced by H_2S and the net effect of the oxidation-reduction reactions will be a groundwater elevated in terms of TDS, thus causing a pronounced deterioration in the quality of the groundwater. (Dusseault et.al pp. 15-16)

The authors of this report also stress that the “leakage of gas to the atmosphere from the point of extraction to the point of consumption also reduces its climate (and economic) benefits. As an example, if more than

3.2% of natural gas leaks to the atmosphere on its way from the point of extraction to a gas-fired powerplant, the electricity produced will have a larger GHG footprint than that from a coal-fired plant.” (Karion et.al 2013, p. 3)

Air contamination from fracking comes in several forms, and is not only related to methane. Other solvents such as benzene present in the industrial effluent as a by-product of fracking can also make its way into the air at a fracking site, including for example hydrogen sulfide, as reported above in the example from China.



Figure 17: Thousands of joints in fracking pipe unions are potential points of methane leaks. Photo: JDTaillant

Fracking also generates other types of air pollution such as that related to exposure to breathable crystalline silica sand, which is used as a proppant in the hydraulic fracturing procedure. This sand is inserted into the fracking water and liquids during the fracturing phase and seeps into the crevasses created by the pressurized fracturing of the geology. When the sand fills the pores, and the pressure is eventually released, the sand allows the micro rock fissures to remain open while the fuel is released up through the well. When moved around and handled on the surface, before and during fracturing, these miniscule sand particles are propelled into the local air. They are carcinogens that can damage lung tissue and cause lung cancer, and lead to other problems, including susceptibility to tuberculosis and kidney disease.²⁰ The inhalation of silica can also cause silicosis, an irreversible lung disease. Studies at fracking sites have shown that in some cases, workers are exposed to more than 10 times the threshold for occupational hazard, a level that is dangerous even if workers utilize designated air-filtering masks. (Srebotnjak, p. 4)

²⁰ see: http://documents.foodandwaterwatch.org/doc/fracking_hazards_worker_safety.pdf#_ga=1.154376826.375350365.1431460896

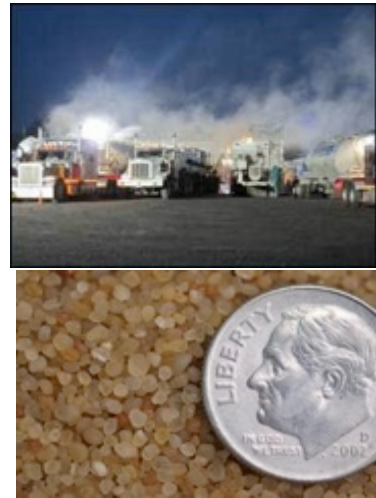


Figure 18: Fine fracking silica sand particles are a threat to workers. Source: <http://media.npr.org>

Effects on Land and Land Use

Fracking impacts to land, both in terms of direct natural resource impacts and to land stability are multifold, but also to be considered are issues of conflicting land use priorities and impacts to topography.

Figure 19: Fracking lands. Photo: Peter Aengst via SkyTruth/EcoFligh



Impacts of fracking on land range from surface changes, such as deforestation for well pads and road access (which occurs much more frequently than has been presumed), to the stability of the land, which could be affected by the high pressure injected into the geological formation (which has shown already in numerous studies to cause instabilities that can lead to tremors and/or earthquakes).²¹

²¹ see: http://www.controlrisks.com/~media/Public%20Site/Files/Oversized%20Assets/shale_gas_whitepaper.pdf



Figure 20: (previous page): deforestation due to the insertion of pipelines can be significant; this picture is a pipeline carrying fossil fuels from fracking activity in the Marcellus Shale in Pennsylvania. Photo: JDTaillant

Take the following image from oil/gas operations in Patagonia, South America. One is immediately struck by the extensive invasion of the oil and gas industry, in an indiscriminate pattern of roads and well pads carried out in an erratic, unplanned format. It should be noted that well pad clearance is significantly larger for hydraulic fracturing operations than for conventional oil drilling. This image is quite typical of the effects on terrain of the oil and gas industry the world over. One fracking well pad measures approximately 2.5 acres (that's 2.5 acres cleared simply to set up a fracking station).



Figure 21: Aerial images of Patagonia show extensive oil/gas activity impacts on land use. Source: Google Earth

A quick and conservative analysis of this image (which could be almost any image related to oil and gas operations around the world) reveals that the complimentary access roads that link the platforms require an additional 2.5 acres simply for transportation from pad to pad. That's a total of 5 acres of land cleared per pad to set up operations at well pads and for connecting roads. The oil and gas sector in Argentina has already explored or extracted fossil fuels at 25,000 wells. Assuming similar rates at each pad, that's more than 60,000 acres of Patagonian terrain repurposed just for well pads and assuming an equal distribution of deforested access roads that puts total land clearing upwards of 120,000 acres. In the image, more than 250 acres of land were cleared to introduce oil and gas well pads and related access roads.

In the case where well pads are carved out into the terrain in off-road conditions, we should also consider the significant amount of dust lifted into the air during clearing operations, during road introduction and use, and particularly during the intense early phases of fracking, where upwards of a thousand trucks must come in and out of the fracking area for each pad. In the following image we see how oil and gas co-exists

alongside residential areas. This is the locality of Denver City, Texas, completely surrounded and overrun by oil and gas drilling, a scene typical not only for fracking ventures, but the oil and gas sector as a whole.



Figure 22: Intense land fragmentation from oil/gas extraction surrounding a residential area in Texas, USA. Source: Google Earth

This *fragmentation of the land* has a devastating affect on wildlife, which must struggle with newly introduced roads crisscrossing and dissecting their natural habitat. Those lands are mostly abandoned by the sector today, never restored or replanted by oil and gas companies.

Another land-use dimension of fracking is the proximity of fracking operations to existing commercial activity, such as farming, and the risks this proximity implies for agricultural product safety and quality.

One of the argued benefits of fracking, touted by the oil and gas sector, is that a single well pad can be used to tap the fossil fuels beneath a very extensive area of land, and since only a single well is needed for what may amount to tens of miles of horizontal drilling, the invasive nature of the industry is limited. While it is true that fewer pads are necessary for hydraulic fracturing than in conventional drilling, it is also true that the invasion of the drilling *underneath* the land nevertheless exists, and subterranean risks are not necessarily preferable to surface impacts. Fracking not only places natural resources at risks from spills and unforeseeable seepage in a large geographical area surrounding the single pad, but the fracking process also competes for water resources over a much more extended geographical area, otherwise allotted to previously existing industries, farms or households. Furthermore, the environment of the area (such as this one) may drastically change with the arrival of heavy industry, particularly in the set up and early fracking/extraction phase of the activity.



Figure 23: Fracking competing with local agriculture in Pennsylvania. Source: <http://home.comcast.net/~lhartg/2011.html>

Increased Traffic Congestion and Contamination due to Industrial Transport

Large-scale industrial traffic is a major component of fracking activities. Before extraction even begins, heavy machinery must be brought in to construct an access road and build the drill pad and prepare the terrain for operations. Water and fracking fluids and proppants must be brought to the well pad area and then transported away once they are used. The oil or gas that is extracted is also generally trucked away for processing. A study in Texas determined that an average of 592 one-way trips are required to build and maintain a single well²², while a New York study estimated 895 to 1,350 truckloads per well.²³

In many instances, the roads in the area are not designed to withstand this level of truck traffic and as a consequence suffer extensive damage. This damage translates to elevated road maintenance costs for the local government and use of public money to repair infrastructure.²⁴ Areas with fracking have also seen a sharp rise in traffic fatalities, according a study by the Associated Press.²⁵ Oil and gas truckers are not regulated as highly as other truckers, often working longer hours without breaks. Drivers are oftentimes paid per load, incentivizing them to speed.

Trucking adds an additional element of air pollution from fracking activities from their exhaust, and spreads it over a larger area. Diesel soot is a human carcinogen and is linked to the development of asthma.²⁶ Additionally, fracking operations generally take place round the clock, and as a consequence, so does related trucking, making noise pollution a serious health issue for nearby communities.

²² see: http://www.marcellus-shale.us/road_damage.htm

²³ see: <http://www.dec.ny.gov/energy/58440.html>

²⁴ see: <http://www.environmentamerica.org/reports/ame/costs-fracking> and <http://www.nofrackingway.us/2013/10/16/fracking-roads/>

²⁵ see: <http://bigstory.ap.org/article/ap-impact-deadly-side-effect-fracking-boom-0>

²⁶ see: <http://www.cleanairtrust.org/trucks.dirtytruth.html>



Figure 24: Trucks line up to access fracking operations; Source: Environment America (photo: Brandi Lukas)

Truck Traffic Volumes

The Division of Mineral Resources within the New York State Department's Environmental Conservation Department has appraised the volume of truck traffic associated with building a pad for shale gas operations, and also for each well drilled from the pad (consider that transport to market is not included):

Purpose	Truck Trips			
	Per Well		Per Pad	
Drill pad and road construction equipment			10	45
Drilling rig			30	30
Drilling fluid and materials	25	50	150	300
Drilling equipment (casings, drill pipe etc.)	25	50	150	300
Completion rig			15	15
Completion fluid and materials	10	20	60	120
Completion equipment (pipe, wellhead)	5	5	30	30
Hydraulic fracture equipment (pump, trucks, tanks)			150	200
Hydraulic fracture water	400	600	2,400	3,600
Hydraulic fracture sand	20	25	120	150
Flowback water removal	200	300	1,200	1,800

Figure 25: Trucking Volumes flows by well and pad.

Source: <http://www.shinesustainability.com/reports/CPFI-Shale-Gas-Guidance-Note-April-2013.pdf>

Earthquakes and Tremors caused by Fracking Activity

Only a few years ago environmentalists warned that fracking caused earthquakes. The industry aggressively responded by suggesting such arguments were unfounded and extremist. Today, reputed scientific research is definitively expounding evidence to the contrary, confirming the relationship between fracking and earthquakes and/or tremors.

Large clusters of earthquakes have already been recorded in the previously earthquake *inactive* state of Oklahoma,²⁷ and costly and deadly earthquakes have been linked to fracking in China, Spain, the Philippines and other earthquake-prone areas.²⁸

²⁷ Katie M. Keranen, Heather M. Savage, Geoffrey A. Abers et al, "Potentially induced earthquakes in Oklahoma, USA: Links between wastewater injection and the 2011 Mw 5.7 earthquake sequence", March 2013 (<http://dx.doi.org/10.1130/G34045.1>)

²⁸ <http://link.springer.com/article/10.1007%2Fs11589-014-0062-3>

Reports from Texas, where much of the United State's fracking activity is centered show a correlation between the arrival of fracking and the number of earthquakes registered. Since 2008, for example, the northern region of Texas has experienced a swarm of earthquakes, more than 130 temblors in all.²⁹

In the case of Oklahoma, in early 2015, the State government embraced a scientific consensus that the increase in the number of earthquakes affecting the State are due to oil and gas operations placing large volumes (billions of gallons) of industrial effluent from their operations into the ground.³⁰ The State has also published a website correlating earthquakes to waste water wells.³¹



Figure 26: More and more evidence is available linking fracking to earthquakes and tremors.

²⁹ see: <http://www.cnn.com/2015/05/09/us/texas-earthquakes-fracking-studies/>

³⁰ see: http://www.nytimes.com/2015/04/22/us/oklahoma-acknowledges-wastewater-from-oil-and-gas-wells-as-major-cause-of-earthquakes.html?hp&action=click&pgtype=Homepage&module=second-column-region®ion=top-news&WT.nav=top-news&_r=0

³¹ see: <http://earthquakes.ok.gov>

Industrial Effluents (a.k.a—produced water) / Fracking Fluids and Human Health

The chemicals used by oil and gas companies to carry out fracking operations are commonly referred to as “fracking fluids”. There are over 1,000 known ingredients utilized by various oil and gas companies in fracking fluids although generally they are listed as a dozen or so chemicals. These fluids include acids, alcohols, aromatic hydrocarbons, bases, hydrocarbon mixtures, polysaccharides, and surfactants.³²

The following chart, provided by [Frac Focus](#), suggests a typical breakdown by percentage of what is contained in fracking fluid.³³

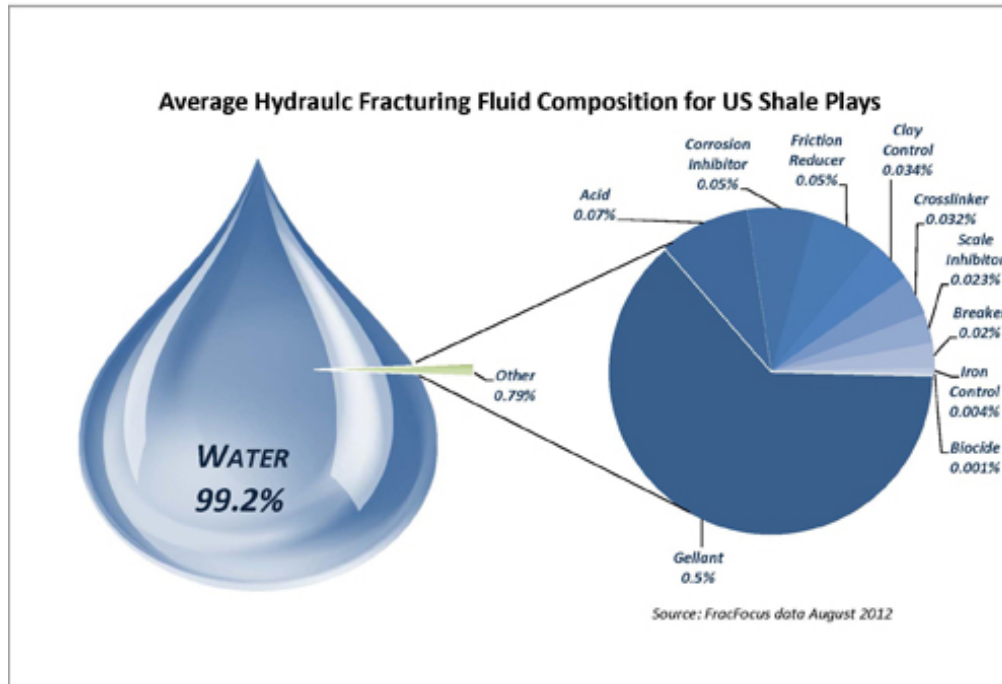


Figure 27: Fracking fluids by percentage composition. Source: Frac Focus

At first glance we notice that nearly all fracking fluid (99.2%) is presumably water and that only 0.8% are chemical components. The problem is however, that the various chemicals contained in that 0.8 percent and the quantities used is the subject of extremely heated controversy and concern.

The chemicals used in any given well will vary, depending on the type of soil/geology, water being used, and fossil fuel being extracted. Some of the basic properties of the chemicals used are geared to achieve certain desired results, such as reducing friction and lubricating the extraction areas to ease out the targeted fossil fuel. Other chemicals include biocides to avoid natural decay, and oxygen reducers to avoid the rusting of metal in the piping as well as acids to reduce potential drilling mud damage. Fine sand is also used to wedge open fractures in the geology allowing the fossil fuel to make its way back up to the surface when placed under pressure.

The following table (Colburn 2011) illustrates some of the more common chemical fluids used (and the reason for their use) in the hydraulic fracturing process.

³² source: EPA. June 2015. P. ES11.

³³ see: <http://fracfocus.org/water-protection/drilling-usage>

Functional Categories of Hydraulic Fracturing Chemicals

(from Colburn 2011)

Acids	To achieve greater injection ability or penetration and later to dissolve minerals and clays to reduce clogging, allowing gas to flow to the surface.
Biocides	To prevent bacteria that can produce acids that erode pipes and fittings and break down gellants that ensure that fluid viscosity and proppant transport are maintained. Biocides can produce hydrogen sulfide (H ₂ S) a very toxic gas that smells like rotten eggs.
Breakers	To allow the breakdown of gellants used to carry the proppant, added near the end of the fracking sequence to enhance flowback.
Clay Stabilizers	To create a fluid barrier to prevent mobilization of clays, which can plug fractures.
Corrosion Inhibitors	To reduce the potential for rusting in pipes and casings.
Crosslinkers	To thicken fluids often with metallic salts in order to increase viscosity and proppant transport.
Defoamers	To reduce foaming after it is no longer needed in order to lower surface tension and allow trapped gas to escape.
Foamers	To increase carrying-capacity while transporting proppants and decreasing the overall volume of fluid needed.
Friction Reducers	To make water slick and minimize the friction created under high pressure and to increase the rate and efficiency of moving the fracking fluid.
Gellants	To increase viscosity and suspend sand during proppant transport
Proppants	To hold fissures open, allowing gas to flow out of the cracked formation, usually composed of sand and occasionally glass beads.
Scale Control	To prevent build up of mineral scale that can block fluid and gas passage through the pipes
Surfactants	To decrease liquid surface tension and improve fluid passage through pipes in either direction.

Figure 28: Fracking fluids and their function. Source: Colburn et.al. 2011.

Public attention, particularly from advocates against fracking, has been extremely concerned with the human health risks of the chemicals found in fracking fluids, largely because of the many documented cases of communities suffering health impacts near fracking operations, but also because the industry has been very secretive over the chemical content in their fracking fluids.

In the United States, the oil and gas sector has stoutly fought against revealing the exact composition of fracking fluids, arguing that the special mix of chemicals utilized in fracking fluids is a trade secret. The problem of course, from a human rights perspective, is the lack of information available to communities about the potential hazards and presence of toxic chemicals in residential environments or where they might compromise community drinking water.

The oil and gas sector often suggests that fracking fluids already amply exist in the public realm (including in ice cream, cheeses and drinks—as argued by Argentina’s State-owned oil and gas company YPF) and that as such there is nothing to fear over their composition or presence in the local environment. They argue that fracking fluids do not contaminate the environment, or that their use is extremely minimal in the fracking process, emphasizing that the amount of fracking fluid utilized per well is under 1% of the total volume of fluids utilized, and that the rest is simply water and as such, there is nothing dangerous about these fluids.



Figures 29A and 29B: Fracking fluids and container stored at fracking well pad.
see: <http://www.marcellus-shale.us/fracking.htm>

While it is true that most fracking fluids *do* already exist in industry and that by percentage they may represent only a few percentage points of the mix, their mere presence in any volume (as opposed to their relative volume in percentages) is what really needs to be considered. As suggested by the United States Department of Energy, in a report published in 2009:

“Most industrial processes use chemicals and almost any chemical can be hazardous in large enough quantities or if not handled properly. Even chemicals that go into our food or drinking water can be hazardous. ... the potential exists for unplanned releases [caused by fracking] that could have serious effects on human health and the environment. By the same token, hydraulic fracturing uses a number of chemical additives that could be hazardous ... many of these additives are common chemicals which people regularly encounter in everyday life.” (USDOE, 2009)

The fact that fracking fluids may only be 1% by volume in the process of hydraulic fracturing, does not preclude that even small amounts of these elements may not be detrimental, even deadly to human health or to the environment. As Colborn *et.al.* argue,

"Industry representatives have said there is little cause for concern because of the low concentrations of chemicals used in their operations. Nonetheless, pathways that could deliver chemicals in toxic concentrations at less than one part-per-million are not well studied and many of the chemicals on the list should not be ingested at any concentration. Numerous systems, most notably the endocrine system, are extremely sensitive to very low levels of chemicals, in parts-per-billion or less. The damage may not be evident at the time of exposure but can have unpredictable delayed, life-long effects on individuals and/or

their offspring. ... Health impairments could remain hidden for decades and span generations.” (Colburn 2011, p.1049).

The following table in L.M. McKenzie 2012 lists chronic and subchronic reference concentrations, critical effects and major effects for hydrocarbons in quantitative risk assessments:

Chronic and subchronic reference concentrations, critical effects, and major effects for hydrocarbons in quantitative risk assessment.

Hydrocarbon	Chronic		Subchronic		Critical effect/ target organ	Other effects
	RfC (µg/m ³)	Source	RfC (µg/m ³)	Source		
1,2,3-Trimethylbenzene	5.00E+00	PPTRV	5.00E+01	PPTRV	Neurological	Respiratory, hematological
1,3,5-Trimethylbenzene	6.00E+00	PPTRV	1.00E+01	PPTRV	Neurological	Hematological
Isopropylbenzene	4.00E+02	IRIS	9.00E+01	HEAST	Renal	Neurological, respiratory
n-Hexane	7.00E+02	IRIS	2.00E+03	PPTRV	Neurological	-
n-Nonane	2.00E+02	PPTRV	2.00E+03	PPTRV	Neurological	Respiratory
n-Pentane	1.00E+03	PPTRV	1.00E+04	PPTRV	Neurological	-
Styrene	1.00E+03	IRIS	3.00E+03	HEAST	Neurological	-
Toluene	5.00E+03	IRIS	5.00E+03	PPTRV	Neurological	Developmental, respiratory
Xylenes, total	1.00E+02	IRIS	4.00E+02	PPTRV	Neurological	Developmental, respiratory
n-propylbenzene	1.00E+03	PPTRV	1.00E+03	Chronic RfC PPTRV	Developmental	Neurological
1,2,4-Trimethylbenzene	7.00E+00	PPTRV	7.00E+01	PPTRV	Decrease in blood clotting time	Neurological, respiratory
1,3-Butadiene	2.00E+00	IRIS	2.00E+00	Chronic RfC IRIS	Reproductive	Neurological, respiratory
Propylene	3.00E+03	CalEPA	1.00E+03	Chronic RfC CalEPA	Respiratory	-
Benzene	3.00E+01	ATSDR	8.00E+01	PPTRV	Decreased lymphocyte count	Neurological, developmental, reproductive
Ethylbenzene	1.00E+03	ATSDR	9.00E+03	PPTRV	Auditory	Neurological, respiratory, renal
Cyclohexane	6.00E+03	IRIS	1.80E+04	PPTRV	Developmental	Neurological
Methylcyclohexane	3.00E+03	HEAST	3.00E+03	HEAST	Renal	-
Aliphatic hydrocarbons C ₉ -C ₈ ^a	6E+02	PPTRV	2.7E+04	PPTRV	Neurological	-
Aliphatic hydrocarbons C ₉ -C ₁₈	1E+02	PPTRV	1E+02	PPTRV	Respiratory	-
Aromatic hydrocarbons C ₉ -C ₁₈ ^b	1E+02	PPTRV	1E+03	PPTRV	Decreased maternal body weight	Respiratory

Abbreviations: 95%UCL, 95% upper confidence limit; CalEPA, California Environmental Protection Agency; HEAST, EPA Health Effects Assessment Summary Tables 1997; HQ, hazard quotient; IRIS, Integrated Risk Information System; Max, maximum; PPTRV, EPA Provisional Peer-Reviewed Toxicity Value; RfC, reference concentration; µg/m³, micrograms per cubic meter. Data from CalEPA 2011; IRIS (US EPA, 2011); ORNL 2011.

^a Based on PPTRV for commercial hexane.
^b Based on PPTRV for high flash naphtha.

Figure 30: Fracking fluids and associated human health impacts. Source: McKenzie 2012.

McKenzie et.al. conclude in their research that “residents living ≤ ½ mile from wells are at greater risk for health effects from natural gas developments than are residents living > ½ mile from wells. Subchronic exposures to air pollutants during well completion activities present the greatest potential for health effects. (McKenzie et.al. p.1)

Finally, Colbron notes that the chemicals utilized in the entire extraction process, including the ‘pre-fracking’ phases of drilling, can impact human health, and not only in the actual fracturing portion of the process. Colbron finds that people have suffered serious health symptoms such as:

“respiratory distress, nausea, and vomiting. From the first day the drill bit is inserted into the ground until the well is completed, toxic materials are introduced into the borehole and returned to the surface ... [and] it has been commonplace to hold these liquids in open evaporation pits until the wells are shut down, which could be up to 25 years.” Colbron 2011. P. 1053.

According to a recent EPA study identifying over 1,000 chemical ingredients among fracking fluids it reviewed, the most common substances found (in 65% of wells) were hydrochloric acid, methanol and hydro-treated light petroleum distillates. Skin exposure to hydrochloric acid can cause irritation and chemical burns. Low exposure to hydrochloric acid fumes can irritate the eyes, nose, throat and mouth; high concentrations can lead to shortness of breath and asphyxia. Ingesting moderate concentrations of methanol can lead to headaches to blurred vision, and high concentrations can lead to blindness, possibly death. If inhaled at certain concentrations, hydro-treated light petroleum distillates can trigger a host of health problems, such as dizziness, headaches and nausea.³⁴

³⁴ see: <http://insideclimatenews.org/news/31032015/fracking-companies-keep-10-chemicals-secret-epa-says>

The EPA also examined the toxicological properties of hydraulic fracturing chemical additives and found that of the 1,000+ chemicals on record, the potential 'mobility' of these chemicals through the environment and the potential for long-term persistence as contaminants were high and that most tend to remain in water.³⁵

Considering the accumulative nature of the chemicals used in fracking fluids seepage of fracking fluids into aquifers would result in permanent damage to the water table, a key natural resource for communities and other activities coexisting with fracking. Such contamination can cause obvious health implications for those consuming water polluted by fracking.

Hydrocarbon components such as benzene and toluene and methane that are released during fracking activities can mix with exhaust from equipment creating ground-level ozone. Intake of this ozone can burn lung tissue and cause severe asthma among other chronic health problems.³⁶

Few advocacy campaigns focus on the health of workers in the oil and gas sector, although workers at fracking sites may be some of the most directly affected from fracking operations, bearing the brunt of exposure to hazardous chemicals and other components such as sands utilized in fracking.

Transparency and Access to Information about Fracking Fluids and other Contaminants

The mere presence of industrial fracking fluids anywhere near community drinking water is a problem in and of itself. Injecting these fluids into the Earth at extremely high pressure introduces a high element of risk to the equation. For this reason, if fracking is to be allowed, knowledge of the existence of this presence and the use of chemicals in operations (and what might go wrong with this use) is fundamental to guarantee human and environmental safety.

An initiative called [Frac Focus](#) (the same organization that published the graphical information shown in the previous section), run by the Ground Water Protection Council and the Interstate Oil and Gas Compact Commission in the United States, has established a chemical disclosure registry system for fracking fluids, and can be used by residents to obtain information about fracking fluids utilized near their homes. The site has registered nearly 100,000 fracking wells in the United States. Such a system is not available in other countries.

In a step up from US regulations, state (provincial) law in Neuquén, Argentina (decree 1483)³⁷ mandates chemical content transparency by fracking companies. The decree lays out the conditions under which the company is obligated to list chemicals used, provide life-cycle monitoring of the chemical and ensure that each chemical is authorized by the State's environmental code.

Abandoned Wells and Risks due to New Fracking Activity

The nature of horizontal drilling poses another problem in areas that have been previously drilled for conventional oil and gas extraction where wells may be abandoned, unmonitored, or clandestine. Existing abandoned subterranean pathways can serve as leakage pathways for CO₂, methane, brine and other fluids. (Kang, 2014, p.2)

In Pennsylvania, for instance, it is estimated that there are some 200,000 abandoned wells, the whereabouts of which are simply unknown. In the United States as a whole, it is estimated that there are

³⁵ EPA. June 2009. P. ES12

³⁶ http://www.biologicaldiversity.org/campaigns/fracking/pdfs/Colborn_2011_Natural_Gas_from_a_public_health_perspective.pdf

³⁷ see: http://fracking.cedha.net/wp-content/uploads/2013/09/D1483-12_uso-agua-yac.-no-conv..pdf

more than one million abandoned wells.³⁸ Any country where oil and gas operations have existed in the past runs the risk of new hydraulic fracturing operations potentially invading hidden, older, or abandoned wells.

Considering that conventional drilling is vertical in nature, many fracking wells may be drilled at a previously tapped deposit, thus creating a new subterranean excavation *crossing* the vertical lines of previous perforations. If abandoned wells are not monitored and properly sealed, or if their location is unknown, new fracking wells may invade these forgotten wells and when pressurized, cause fracking fluids, contaminated water, and oil and gas to seep up through old wells, into the geology, into water ways and onto the surface. This risk is heightened if the old well was not properly sealed. There are even reported cases of methane leakages from abandoned wells suddenly entering directly into homes resulting in deadly explosions.

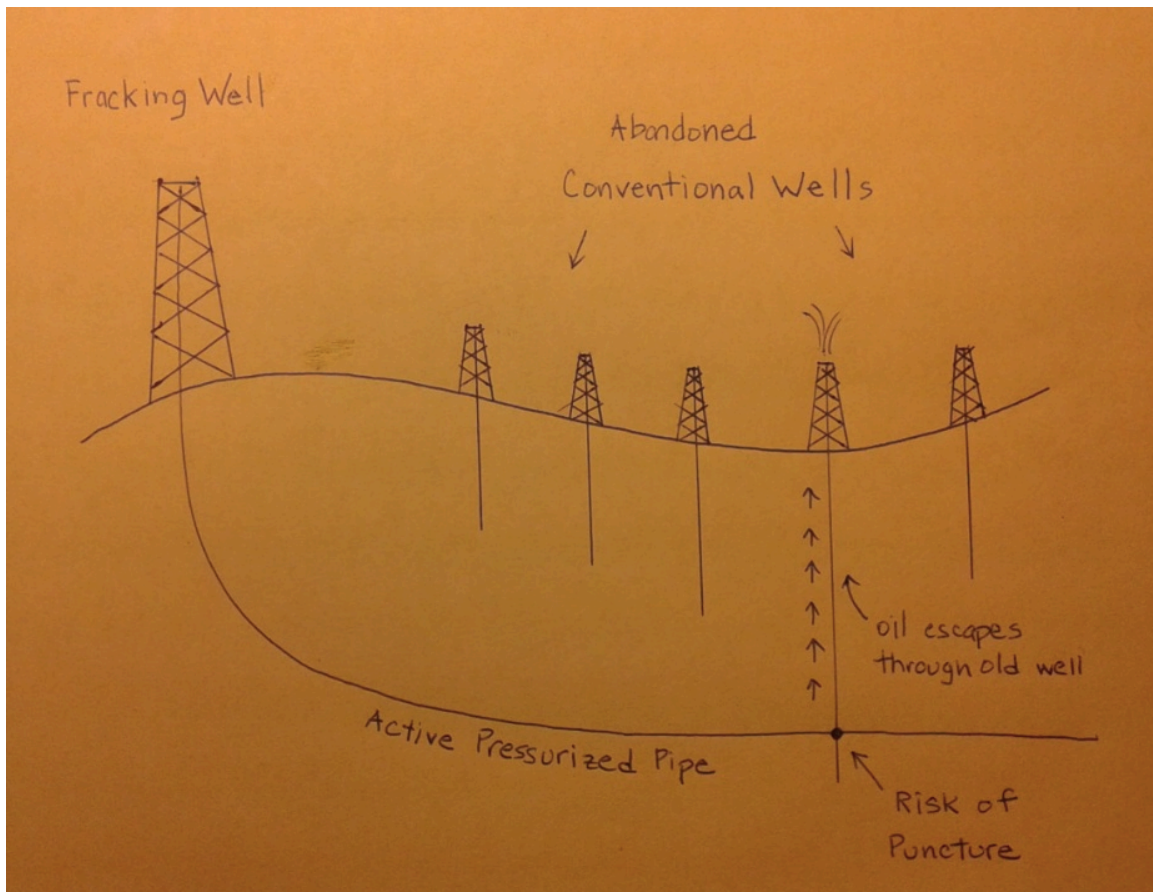


Figure 31: Abandoned conventional wells pose risk to new high-pressure fracking wells that can invade old well geology and cause seepage of fracking fluids up to the surface through old wells.

³⁸ see: <http://www.theguardian.com/environment/2014/sep/18/pennsylvania-abandoned-fracking-wells-methane-leaks-hidden>

IV. The Human Rights Dimensions of Fracking

This section now turns the discussion to the *human rights* implications and dimensions of the risks and impacts caused by hydraulic fracturing activities.

As we have seen, there are a number of issues related to environmental quality, health, land use choices, protection of endangered or vulnerable areas, development models, access to information, participation in decision-making, public consultation, social license, vulnerable communities/groups, and many more which immediately become relevant when hydraulic fracturing arrives (or even before it arrives) to a given community. Many of these issues are directly relevant to human health and safety or to other aspects of human existence such as culture, identity, to the human relationship to the environment, and more generally to quality of life. We propose to take this discussion directly into a rights-based dimension, and specifically to the discussion of hydraulic fracturing considered from a human rights perspective.

As we analyze fracking from a human rights perspective, we immediately see that the human rights triggered in nearly any discussion on fracking operations cover the full spectrum of civil and political rights, to economic, social and cultural rights, to procedural rights, and finally on to new generation rights, such as the right to a healthy environment.

What is important to consider when shifting our thinking of a “human rights approach” toward an issue such as an industrial activity, is *the basic logic of human rights* as a lens for analysis as well as the way that human rights are expected to be implemented *and* to identifying who are the responsible individuals or institutions that must guarantee the realization of human rights that are affected. The objective of this consideration is not merely to link a given problem or impact to an affected human right, but rather to understand that when a human right is violated or affected by a given activity, there are responsibility and accountability chains that can easily be identified.

We will see that the *UN Guiding Principles on Business and Human Rights* offer a very useful lens through which to consider various actor *responsibilities and* associated *due diligence* to comply with and to protect human rights. Additionally, those due diligence responsibilities in turn imply State legal obligation to ensure the follow-through of responsible parties, placing fracking activity and related due diligence in the realm of *binding* legal obligation to ensure the protection of people, communities and the environment is upheld.

Furthermore, a focus on due diligence (the steps that actors *must* be taking in order to avoid undesired social and environmental impacts and subsequently human rights violations) is also necessary in order to understand how rights might be violated, ways that we can avoid those violations, cease ongoing violations, and attempt to remedy those that have already occurred.

When we shift our thinking to a human rights based approach, we must realize that a few considerations must be made, such as:

1. Each individual (and sometimes an entire community) holds, and is entitled to, certain inalienable human rights at a global, regional or national level;
2. Those rights must not be violated by anyone (person, group of persons, or institution);
3. That there are non-state parties that can violate those rights;
4. That there are state agencies entrusted with a responsibility to promote and protect those rights;
5. Both state and non-state actors have due diligence obligations which are associated to their responsibilities to upholding and protecting human rights;
6. That there should be redress mechanisms available to individuals and communities to bring complaints when those rights get violated;

7. That justice must be served by those mechanisms (if they exist).

Maintaining the integrity of each and all of these considerations, processes and chains of responsibility, taken as a whole, is just as important to a human rights based discussion of a given situation as addressing any one of these issues separately. This is a particular aspect of human rights analysis that differs from other types of analysis looking at responsibility. Responsibility for any given human rights violation might be the results of actions or omissions by several actors, and not only by the actor who actually committed the action that directly caused the violation. In human rights analysis, avoiding human rights violations and taking steps to ensure that avoidance, is just as important as not committing the violating act.

More recent evolution in human rights thinking (and here we are beginning to get into the discussion about the UN Guiding Principles on Business and Human Rights) has taken this step a bit further, and more procedural issues now accompany our rights-based thinking. This is that *States must not only ensure that rights violators are held accountable*, which is the way human rights have been addressed for the past several decades (usually after the fact of the violation), but even more importantly, that the State must take day to day proactive measures to ensure that non-state actors are aware of their risks in violating human rights, and so that they also take daily measure to avoid human rights violations.

This shift in human rights implementation extending responsibility from State to non-State actors is a fundamental change in the way of thinking that is promoted by the UN Guiding Principles on Business and Human Rights (UNGPs).

Another dimension that we will engage on in this publication is the fact that the resolution of human rights violations is at least partially taking a step away from legal adjudication in court systems. It has been the practice that human rights violations (generally perpetrated by a State) have been resolved in international legal courts, and that we would generally take *States* to court because we believe that *they* were the ones that actually violated human rights due to the understanding that the *duty to protect* human rights is attributed to the State. The typical example which has had extensive cases brought before international human rights tribunals is the civil and political rights violations perpetrated by public officials of dictatorial governments. In these cases, if a person was illegally detained, tortured, or killed by an agent of the state (such as a military officer), then the victim or victim's family would bring a case to an international human rights tribunal against the State for the violation of human rights of the victim.

In this new era we are looking at a proposal for resolving human rights violations (which move beyond State actor violations), grounded on two evolving ideas. *First*, that third parties (non-State actors) also have responsibilities to uphold, protect and not violate human rights. *Second*, that review and adjudication regarding compliance may occur outside the realm of a national or international court or legal system.

Over the past two decades, we have been expanding the human rights adjudication system beyond the more traditional tribunals and forums, to include non-judicial forums, from in-company and external conflict resolution mechanisms, to intergovernmental agency inspection panels (such as the World Bank Inspection Panel or the IFC's Compliance Advisory Ombudsman). A wider range of institutions are now incorporating human rights based approaches into their daily operations and as a measurement of their performance and success of programs. The forums have the capacity and opportunity to address and resolve human rights problems from start to finish before they ever approach a court system or human rights tribunal.

While legally-minded advocates might hold fast to the idea that human rights *must* be adjudicated in binding judicial arenas (such as a national or international court) the ground is shifting on this view, as the evaluation of human rights impacts is slowly beginning to be addressed in non-judicial forums. Today more than just courts are examining how a company, State or other non-State actor adheres to human rights (or not).

In this regard, the *UN Guiding Principles on Business and Human Rights (UNGPs)* are marking an important step forward to understand the criteria and conditions for this due diligence compliance framework. One of the things the UNGPs tell us is that companies must ensure that they have proactively identified human rights risks within their operations, and that they introduce, for example, *policies* to establish their commitments to uphold human rights, *management systems* to monitor their human rights impacts, and *grievance mechanisms* offering potential victims recourse action (such as non-judicial grievance mechanisms). They must also public report on their human rights impacts, policies and systems. These measures are a first stepping stone in guaranteeing human rights, since many times, compliance with human rights due diligence will avoid human rights violations from the onset. Furthermore, failure to comply with such due diligence could be considered as a violation of human rights, particularly if we can identify specific human rights violations that result from that failure, and particularly where the company has *knowledge* that its operations may be causing an undesirable impact on people and communities or to the natural environment upon which they depend.

In the legal field, this new due diligence requirement imposed on third parties implies that States are obliged to ensure that companies are actually complying with this human rights due diligence. The UNGPs are in effect setting the bar for what companies *should* be doing (and maybe *not* doing) and what those expectations subsequently imply for State *obligations*.

As we have seen from our discussion prior to this section, *fracking* is an activity that has a potentially large impact on the environment, on human health, on land use issues, on economic dynamics of a given region, and on the general quality of life for individuals and communities.

Fracking may also involve specific sets of actors, vulnerable groups, or specific businesses (maybe small businesses, or larger industrial sectors) that compete for economic development resources and that may be impacted by the arrival of large-scale oil and gas operations. It may occur in countries and under governments that are not very democratic or that do not allow for true channels of participation or representation (which itself is a violation of human rights). It may also occur in areas with indigenous populations, where such groups have authoritative or consultative rights to resources or land.

What are Human Rights?

This may seem like a very basic question, one that we already should know the answer to, but it may nonetheless present significant challenges before we can begin to look at fracking from a human rights perspective. We first need to define the scope of rights that fracking could impact. Once we've defined our scope of discussion, we can then begin to identify which of those rights are at peril due to fracking activity.

There is a wide body of legitimate human rights legislation that has been adopted at both international and regional levels. The most universally accepted of these (in terms of their relationship to business) are:

- the International Bill of Human Rights, consisting of
 - the Universal Declaration of Human Rights³⁹
 - the International Covenant on Civil and Political Rights⁴⁰
 - the International Covenant on Economic, Social and Cultural Rights⁴¹
- the eight ILO core conventions⁴² as set out in the Declaration on Fundamental Principles and Rights at Work

³⁹ see: <http://www.un.org/en/documents/udhr/>

⁴⁰ see: <http://www.ohchr.org/en/professionalinterest/pages/ccpr.aspx>

⁴¹ see: <http://www.ohchr.org/EN/ProfessionalInterest/Pages/CESCR.aspx>

⁴² see: <http://www.ilo.org/global/standards/introduction-to-international-labour-standards/conventions-and-recommendations/lang--en/index.htm>

As we will see, the *UN Guiding Principles on Business and Human Rights* refer specifically to these human rights instruments (when the UNGPs turn to corporate responsibility). However we must stress that the reduction of the discussion to these legal documents does not exclude consideration of other international human rights law. The UNGPs in fact *do not* narrow the discussion of State human rights obligations relative to corporate behavior. They *do* speak, however, of a bare “minimum” list for business actors (UNGP, Principle 12).

The message that should be taken away from this publication is that the realm of human rights applicable to fracking activity is broad, and much wider than the basic human rights found in the Universal Declaration of Human Rights or in the treaties and declaration mentioned by the UN Guiding Principles as relevant to corporate actors.

Some of the rights listed in these declarations/treaties/conventions are for example:

- the right to life
- the right to health
- the right to effective remedy
- the right to take part in government
- the right to work
- the right to self-determination
- the right to take conduct in public affairs
- the right to safe and healthy working conditions
- the right to an adequate standard of living
- the right to fully and freely utilize natural wealth and resources
- the right to property
- the rights of the family
- the rights of women
- the rights of the child

Guiding Principle 12

The responsibility of business enterprises to respect human rights refers to internationally recognized human rights—understood, at a minimum, as those expressed in the International Bill of Human Rights and the principles concerning fundamental rights set out in the International Labour Organization’s Declaration on Fundamental Principles and Rights at Work.

In addition to the general treaties and declarations listed above, States may sign *regional* treaties binding the State to additional human rights law, such as the European Convention on Human Rights and Fundamental Freedoms, or the Inter-American Convention on Human Rights. Or the State may have its own internal human rights doctrine, such as the United Kingdom’s Human Rights Act. These too are valid “human rights” legal instruments that may apply to a given situation involving hydraulic fracturing activity and

State obligation as well as corporate responsibility, and should be considered in the analysis. We note also that the narrowing of the discussion to the above mentioned treaties *does not refer to State obligations*, and refers merely to a *bare minimum responsibility of non-State actors* and does not preclude that corporate responsibility *may also apply in regards to other international human rights law*.

Human Rights Affected by Fracking Activity

While we could envisage a situation where nearly *any human right* could be potentially violated by fracking activities or related operations, some human rights issues are more evidently attributable to hydraulic fracturing than others.

A human rights analysis of fracking operations could begin by listing various human rights and then identifying the fracking activities that could affect those rights, which could produce a very lengthy and laborious string of hypothetical circumstances. Conversely, we can order our thoughts by listing the typical hydraulic fracturing activities, and then proceed to identify human rights risks or known impacts that we see in real life examples of the practice, or that could reasonably exist as a consequence of hydraulic fracturing.

As we said earlier, we can envisage nearly any human right that could be affected by fracking ... such as the right to education, which may seemingly *not* be related to fracking, but which *could be* affected if workers at a fracking facility work inflexible hours and cannot take their children to school, or if students at a nearby schoolhouse cannot study due systematic atmospheric contamination occurring derived from fracking operations. Nevertheless, in this document, we will focus only on the more common and documented cases of human rights affected by hydraulic fracturing dividing up the activity into its standard phases and then examining the most visible human rights risks and impacts observed.

To this end, we've produced a comprehensive annex table which can be used as an analytical reference tool for human rights impacts assessment of hydraulic fracturing, relating the various phases of hydraulic fracturing activity with associated human rights risks, and the corresponding obligations of States, responsibilities of companies and the possible remedy channels available to address human rights violations caused by fracking. This table is found at the end of this publication.

Some consequences of fracking activity that have the potential risk of violating human rights might be:

- The contamination of a community's water supply (affecting for example the *right to health, right to life*, or newer evolving rights such as the *right to a healthy environment* or the *right to water*, etc.)
- The effects on the livelihood of local agricultural producers after the arrival of a fracking operation (affecting the *right to a livelihood, right to work, right to development*)
- A drop in property values in a given area as a result of impacts caused by fracking operations, (affecting the *right to property*)
- Contamination of the air around a fracking operation (affecting the *right to health, right to life, right to a healthy environment*)
- Risks to the health of workers at fracking sites (affecting the *right to health*)
- If companies or the State do not reveal information about toxic fracking fluids used in fracking activity (affecting the *right of access to information*)

- Failure to consult an indigenous community about the arrival and development strategy affected by fracking activity on autonomous indigenous lands, or displaced communities as a result of fracking operations (affecting *cultural rights or indigenous rights*)⁴³

The Right to Health (a corollary to the right to Life)



Perhaps the right that most drives the fracking debate is *the human right to health*.

Many communities that oppose fracking fear that fracking will make them sick. This fear is legitimately grounded in extensive and easily accessible information (as described in Section III) showing that past fracking activity has degraded the earth, water and the air in surrounding localities.

Figure 32: Water contamination by hydraulic fracturing could affect the right to health, the right to a healthy environment, and many other rights
source: www.ceh.org

Fracking activity has undeniably made people sick and as such, *the right to health* has been *and is* directly affected by fracking. To the extent that further fracking activity might render more people sick in the future, the discussion around *the right to health* as relates to fracking is merited. Following this discussion, the connection between the *right to health* and the *right to life* cannot be clearer. If you get very sick, you or your children (born or unborn) die, due to pollution from fracking, or if a serious illness is a result of or connected to fracking, consideration of the very basic and universal human right to life is also essential.

The numerous health-related issues caused by fracking operations described in Section III of this publication all affect the human right to health and are grounds upon which to consider that human rights violations have occurred.

The Right of Access to Information

We have also seen how social and environmental advocacy has identified systemic violations by State and corporate actors of rights of access to information. In developing countries, such as Argentina, violations of the right to information have surfaced recently regarding fracking investment contracts between the State and multinational companies.

⁴³ see: <http://www.ilo.org/indigenous/Conventions/no169/lang-en/index.htm>

As we noted previously, one of the defining debates that has taken place regarding access to information in the United States involves the very basic concern over the chemical contents of fracking fluids and how they may present a risk to the health of individuals and communities, or the flora and fauna of the impact area of fracking operations. In the United States, the oil and gas industry has succeeded in protecting the secrecy of the contents of their fracking fluids—many of which are highly toxic to human health. They have done so by arguing that the contents and specific mixtures of the fluids are highly valuable trade secrets, which if shared with the public, would place the disclosing company at a competitive disadvantage.

It should also be noted that the oil and gas sector has been hesitant to provide information or recognize the general impacts and risks caused by fracking, preferring instead to hold up the lack of definitive information about the causal relationship between fracking and witnessed health problems of individuals living near fracking operations. This is a systemic problem that is characteristic to the sector, and in many countries, getting information about oil and gas operations, and their impacts, can be very difficult. This debate is also a human rights issue.

The *right of access to information* has recently drawn much attention, as individuals and communities that feel they are vulnerable to impacts from fracking have begun to claim information access rights. Many countries have laws on the books that establish the right of the public's access to information. This right and discussion about the realization of this right in activities related to fracking will come up often. Accessing information about fracking is also a human rights-related issue.

Right of Participation

Like the right to information, *the right of participation* becomes highly contentious when addressing large industrial investment decision-making, largely because of the long-term implications and political underpinnings of large-scale investment decisions. In most cases, the entitlement of people and communities to participate in the conduction of public affairs (established in international law such as in the UDHR or the Covenants, or in more recent international multi-lateral declarations like the Rio Declaration), are generally given as either a *direct right*, or as an *indirect right* granted through political representation. Communities, particularly indigenous communities, are keen to realize the right of participation through direct and binding participation, that is, the community actually gets to decide if an activity will be allowed to proceed in their area. ILO Convention 169 grants certain participatory and consultative rights to indigenous communities, rights that have been the focus of heated debate between communities and public officials regarding fracking operations in Patagonia, for example.

In other cases participatory rights are presumed indirectly through the political system. That is, if you live in a democracy, public officials of the Executive might be entrusted with the final word on fracking decisions. In these cases (most of the cases) the decision about whether or not you get fracked lies in the hands of public officials, which through elections indirectly exercise your participatory right in decision-making. Obviously, this can become problematic in countries with weak democratic institutions, where representation is often a mere formality that occurs once every four or five years, and as a result the exercise and fulfillment of this right becomes intangible.

Building on evolving regional treaties and regional human rights instruments, such as the Aarhus Convention, the European Court of Human Rights has said, for example, that the State has “a duty to guarantee the right of members of the public to participate in the decision-making process concerning environmental issues.”⁴⁴

⁴⁴ A Human Rights Assessment of Hydraulic Fracturing, and other Unconventional Gas Development in the United Kingdom, page 19, Oct. 30, 2014.

Citizens affected by fracking operations should know that they always have a right to communicate their concerns to political leaders and to have the assurance that their input is being considered during the decision-making process; both before and after a fracking operation has begun in their community.

Such procedural rights not only allow communities the legitimate opportunity to place certain aspects of fracking activity under community scrutiny and subject to social license (such as deciding that fracking will occur only in certain areas or under certain conditions) but also the equally legitimate option for a specific community to exercise its right *not* to allow hydraulic fracturing.

New York is an example of such decision-making. The State has elected to become frack-free⁴⁵ as a result of local grassroots campaigns against new fracking operations. Once small cities and municipalities began banning fracking, the State issued a moratorium on the activity until a more comprehensive assessment is made about the dangers and risks associated with fracking compared to the potential benefits.

Many regions and municipalities have instituted “bans” on fracking measures. The specifics of these bans will vary depending on the wording of each declaration, and can range from ‘moratoriums,’ or temporary provisions against fracking until more research is done on risks. Others have instituted complete and permanent restrictions. Still others have limited the scope of fracking activities, thus making their “bans” more regulatory in nature. Below are some examples of jurisdictions that have passed laws against fracking, but the list is by no means exhaustive ^{46 47}:

- U.S State-wide Bans:
 - Connecticut
 - Maryland
 - Hawaii
 - New Jersey
 - New York (Moratorium)
 - North Carolina
 - Ohio
 - Washington, DC
 - Vermont
- U.S. City/County-wide Bans:
 - 22 counties in California
 - Boulder, Colorado
 - 7 counties in Illinois
 - Terre Haute, Indiana
 - Chesterfield, Massachusetts
 - 21 major cities and counties in Michigan
 - Goodhue County, Minnesota
 - Las Vegas, New Mexico
 - Mora County, New Mexico
 - San Miguel County, New Mexico
 - Denton, Texas

⁴⁵ Tackling Fracking Using a Human Rights Lens, page 2, International Human Rights Funder’s Group.
https://www.ihrfg.org/sites/default/files/In_Focus_Fracking_14March2013_FINAL.pdf

⁴⁶ see:

<http://keptapwatersafe.org/global-bans-on-fracking/>
<http://www.foodandwaterwatch.org/water/fracking/anti-fracking-map/local-action-documents/#pennsylvania>
<http://keptapwatersafe.org/global-bans-on-fracking/>
<http://www.foodandwaterwatch.org/water/fracking/activist-tools/>
<http://www.foodandwaterwatch.org/water/fracking/how-new-york-banned-fracking/>

- Bartonville, Texas
- DISH, Texas
- Flower Mound, Texas
- Delaware River Basin
- 18 major counties in Pennsylvania, including Pittsburgh
- 10 major counties in Virginia
- Lewisburg, West Virginia
- Pennsboro, West Virginia
- 5 counties in Wisconsin
- Bridger-Treton National Forest, Wyoming
- Other country fracking bans:
 - Canada
 - Couillard
 - New Brunswick
 - Nova Scotia
 - Eastern Band of Cherokee Indians
 - Germany
 - Haudenosaunee Environmental Task Force
 - Spain
 - Turtle Mountain Band of Chippewa
 - United Kingdom
 - Scotland
 - Wales

Right to remedy

The right to remedy stems back to the *Universal Bill of Human Rights*, and is a fundamental backbone to human rights approach to development and to the consideration of business conduct in the realm of human rights. When something goes wrong (and things *can* go very wrong with fracking operations), individuals and communities must be assured they can bring their complaints through either judicial or non-judicial mechanisms and find remediation and reparation to the wrongs that have been caused.

As is clear from *United Nation's Guiding Principles on Business and Human Rights*, every individual is entitled to the right to an appropriate remedy of any human rights violation that has occurred. Not only do States have a duty to provide transparent and accessible methods for remedy, but corporations also have a responsibility to assess and repair any harms caused. The right to remedy includes judicial, legislative, and non-governmental means.

In the realm of fracking activity, remedy is becoming a key issue with communities taking complaints to national courts. In the United States, many judicial verdicts have provided victims of human rights violations caused by fracking activity with effective remedies for harm done.

On a more negative note, we also see jurisdictional conflicts both in the United States and abroad (for example in Argentina), where one judicial forum trumps the decision of another. The “ban of bans” in Texas, is another example. Although the municipal courts sided with those wishing to place a moratorium on fracking, the local decisions were overturned when a decision was made by the more influential *State Courts*.

We have not yet seen activity at some of the international or regional human rights tribunals regarding fracking operations, or at some of the non-judicial forums, such as the country level *National Contact Points* which resolve cases of alleged human rights due diligence violations as established by the OECD

Guidelines for Multinational Enterprises.⁴⁸ Nonetheless, the momentum for international consideration of fracking impacts is building and cases are likely to arrive at these tribunals. At about the same time as the publication of this guideline, several advocacy organizations announced that the *Permanent People's Tribunal (PPT)* will hold a session on hydraulic fracturing and other un-conventional fossil fuel extraction processes.⁴⁹ Clearly, hydraulic fracturing is arriving to the radar screen of a number of agencies, tribunals, and other forums concerned with the impacts of industrial activity on human rights, and we can expect this to evolve further.

GENERAL PRINCIPLE 25

As part of their duty to protect against business-related human rights abuse, States must take appropriate steps to ensure, through judicial, administrative, legislative or other appropriate means, that when such abuses occur within their territory and/or jurisdictions those affected have access to effective remedy.

Indigenous Rights

Conflicts between tribal communities and oil and gas operations are long-standing. Fracking is no different. One place where this has been especially candescent is in Argentina, where Mapuche communities in the Patagonia region of Neuquén and Chubut provinces have been very outspoken against the advancement of fracking operations in the *Vaca Muerta* shale formation. This is one of the world's largest non-conventional shale and oil reserves and also one of the few regions outside of the United States where fracking is advancing at full speed.

The human rights concerns in relation to indigenous rights are multifold, and include many if not all of the rights issues involving other communities. However, in the case of indigenous populations, there are additional and *specific* indigenous rights that come to the discussion.

Recent evolution of international law as well as for example, inter-governmental development agency policy (such as World Bank social and environmental safeguards, or the IFC's Performance Standards) include specific policy requirements in relation to indigenous communities, mandating for example, specific indigenous community consultation and often *consent* before investment projects can move forward in indigenous territories.

⁴⁸ see: <http://www.oecd.org/daf/inv/mne/48004323.pdf>

⁴⁹ see: http://www.theecologist.org/News/news_analysis/2960192/permanent_peoples_tribunal_puts_fracking_on_trial.html

also see: <http://www.tribunalonfracking.org>

Additionally, specialized international laws targeting indigenous rights, such as ILO Convention 169⁵⁰, already ratified by 20 nations (including Argentina, Colombia, Mexico—where fracking exploration is underway) entitle indigenous peoples with specially defined rights, such as a right to public consultation and participatory engagement for decisions related to development models and opportunities.

Article 6 of ILO Convention 169

1. In applying the provisions of this Convention, governments shall:

(a) consult the peoples concerned, through appropriate procedures and in particular through their representative institutions, whenever consideration is being given to legislative or administrative measures which may affect them directly;

(b) establish means by which these peoples can freely participate, to at least the same extent as other sectors of the population, at all levels of decision-making in elective institutions and administrative and other bodies responsible for policies and programmes which concern them;

(c) establish means for the full development of these peoples' own institutions and initiatives, and in appropriate cases provide the resources necessary for this purpose.

2. The consultations carried out in application of this Convention shall be undertaken, in good faith and in a form appropriate to the circumstances, with the objective of achieving agreement or consent to the proposed measures.

Right to a healthy environment

An over-arching right generally focused on the general health and quality of the environment, and more recently appearing in international law, *the right to a healthy environment* has recently evolved as a new generation right now appearing in many constitutions, establishing a newer legal understanding of the essential and integral function of our environment to our well being and to the general well-being of the planet. Without a healthy environment, other human rights like the right to health become immediately intangible. The intensity and expansion of hydraulic fracturing has immediate effects on the general well-being of the environment for the many reasons described in the preceding sections, and thus affects *the right to a healthy environment*.

Right to water

Eighty five percent of the world's population lives in the driest part of the planet, while over 750 million people lack access to clean drinking water.⁵¹ As has been described above, hydraulic fracturing activities are very water intensive, and could potentially add to the already existing problem of water availability for

⁵⁰ http://www.ilo.org/wcmsp5/groups/public/---ed_norm/---normes/documents/publication/wcms_100897.pdf

⁵¹ see: <http://water.org/water-crisis/water-facts/water/>

many communities. The obvious risks posed by water contamination caused by fracking activity is a key human rights dimension that encompasses *the right to water* discussion. All individuals have a right to demand access to clean, drinkable water as a fundamental aspect of the right to life. The lack of clean water has secondary affects on communities as well. Water shortages or contamination could also force individuals to relocate, leading to greater displaced populations (another violation of rights). The UN Special Rapporteur on Toxic Waste has mentioned the human rights risks associated to water involved by fracking activity. He states in his Report to the Human Rights Council:

"The excess water from oil or gas production (produced water) [from hydraulic fracturing] and drilling fluids constitute hazardous wastes and are sometimes re-injected into the reservoir. In some countries where the practice is not banned, produced water is disposed of in waste ponds, which may not be lined with impermeable barriers, or even dumped directly into streams or oceans." (A/HRC/21/48)⁵²

Labor Rights in Hydraulic Fracturing

Much of the collateral hype related to the arrival of hydraulic fracturing activity is job creation. Fracking operations bring new, highly technical jobs to areas that may already have oil and gas operations underway, or create a new industry where little or no extraction activity has taken place. The safety, health, and quality of the working environment, embodied as human rights in multinational, as well as regional and national *labor rights standards* are a critical in the arrival of fracking operations.

Hydraulic fracturing activity has some specific risks associated to the safety of the work environment for labor. The sort of extractive activity involved in hydraulic fracturing is physically demanding, and is oftentimes conducted in very risky working environments, with risks to human health, to physical integrity and even poses a serious risk of death.

Worker-related health risks range from exposure to toxic chemicals utilized for drilling and hydraulic fracturing and extraction due to handling of chemicals, or to the breathing of toxic fumes or fine dust particles that may circulate at the work site or near machinery and vehicles that transport chemicals and products. This exposure may derive from direct handling of chemicals, or handling of contaminated materials like earth and water.

Extraction phases, particularly *the fracturing phase*, include highly intense operations during short time periods of time. The round-the-clock nature of operations presents another set of worker challenges. Excessive working hours can create a health and safety hazard for workers that have not sufficiently rested or had adequate amount of hours and/or days off.

Other impacts may derive from the failure of companies to introduce safety procedures or from the lack of worker training and understanding of safety standards. They may also come from the pressure placed on workers to complete tasks in the short time allotted during intense stages of operations, causing them to circumvent lengthier safety procedures.

In some markets we may find gender discrimination or other forms of worker inequality either in terms of hiring or pay scales. In many cases, local communities cannot supply the industry with the highly trained technical jobs needed to carry out hydraulic fracturing activities. This means that workers must be relocated from their normal place of residence and work to new regions where they are essentially internal immigrants, adding to an existing local population. These migrant workers may suffer discrimination related

⁵² see: <http://www.accountabilitycounsel.org/wp-content/uploads/2012/05/UN-Special-Rapporteur.pdf> or <http://daccess-dds-ny.un.org/doc/UNDOC/GEN/G12/149/26/PDF/G1214926.pdf?OpenElement>

to immigrant labor, and may not be adequately protected under existing labor laws for residents. In some of these cases, the human rights issues presented are not necessarily *specifically* related to fracking, but they are nonetheless human rights issues that must be considered.

Worker rights, which are and should be understood also as *human rights*, are established in many international, regional and national laws.

The International Labor Organization (ILO) promotes labor rights through its eight fundamental conventions⁵³, along with key governing conventions to create its Decent Work Agenda, aimed at protecting the labor rights of all workers. States have legal obligations under the conventions they have ratified to ensure they comply with the standards established by the ILO in order to prevent and remedy any labor rights violations. An additional protocol, the Declaration on Fundamental Principles and Rights at Work⁵⁴ covers four of these fundamental conventions, and creates responsibilities for States to respect worker rights even if they have not ratified the conventions themselves.

Worker rights are also covered within the International Bill of Rights, in both the International Covenant for Civil and Political Rights (ICCPR)⁵⁵ and the International Covenant on Economic, Social and Cultural Rights (ICESCR)⁵⁶. Many regional groups of States have also signed on to optional protocols, or additional agreements expanding upon the basic provisions among these treaties. The Protocol of San Salvador⁵⁷, for example, sets out specific standards for satisfactory work conditions and has been signed by much of the Americas. The International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families⁵⁸ is another UN treaty that has been adopted regionally.

Worker rights are also promoted by independent organizations such as the Global Reporting Initiative⁵⁹, which encourages governments and also *businesses* to report on due diligence related to creating and maintaining safe and human rights compliant work environments. Global reporting standards such as those of GRI add an accountability dimension to human rights due diligence, and some countries are even legally mandating companies to produce sustainability reports that report on such due diligence, another angle to consider legal accountability of corporations for human rights compliance.

Voluntary initiatives such as the UN Global Compact⁶⁰, encourage States to pledge a commitment to sustainable decent work. Some of the specific key labor rights that could be affected by hydraulic fracturing activities are:

- Right to not be subject to forced or compulsory labor (ICCPR Article 8, ILO Convention No. 105)
- Right to freedom of movement (ICCPR Article 12)
- Right to freedom of association (including the right to strike and right to organize) (ICCPR Article 22, ILO Convention No. 87, ICESCR Article 8)
- Right to safe and healthy working conditions (ICESCR Article 7, Protocol of San Salvador Article 7)
- Right to health generally (ICESCR)
- Right to equal opportunity of employment (ICESCR Article 7)
- Right to fair wages and equal remuneration (ICESCR Article 7)
- Right to rest and leisure days (ICESCR Article 7)
- Rights of migrant workers (UN CMW—specifically extends all human rights to migrant workers)
- Right against child labor

⁵³ see: <http://www.ilo.org/global/standards/introduction-to-international-labour-standards/conventions-and-recommendations/lang-en/index.htm>

⁵⁴ see: <http://www.ilo.org/declaration/thedeclaration/lang-en/index.htm>

⁵⁵ see: <http://www.ohchr.org/EN/ProfessionalInterest/Pages/CCPR.aspx>

⁵⁶ see: <http://www.ohchr.org/EN/ProfessionalInterest/Pages/ICESCR.aspx>

⁵⁷ see: <http://www.oas.org/juridico/english/treaties/a-52.html>

⁵⁸ see: <http://www.ohchr.org/EN/ProfessionalInterest/Pages/CMW.aspx>

⁵⁹ see: <https://www.globalreporting.org/Pages/default.aspx>

⁶⁰ see: <https://www.unglobalcompact.org/what-is-gc/mission/principles>

Human Rights and Climate Change

Increasing trends of climate destruction have brought forth a very engaged debate on the effects of climate change on the realization of human rights. Like the right to a healthy environment, without which we cannot realize other rights like the right to health, we cannot envisage a world where human rights are fully realized if we do not have an accompanying healthy climate. This includes clean air to breathe, but also a healthy climate where we can cultivate crops effectively and live free of natural climate-related disasters.

We have only recently come to collective recognition that the combustion of fossil fuels are the primary cause for the world's collapsing climate, and if we continue to expand the burning of fossil fuels we will inevitably and irreversibly destroy the delicate balance of the Earth's climate. Some suggest we have already reached that tipping point.

Fracking, although lauded by the oil and gas industry as a new and 'cleaner' energy source, in fact is not better for the health of the climate, as it has been shown that significant methane leaks by fracking operations into the atmosphere outweigh any benefit of fracking for natural gas. Promoting fracking is in fact, promoting more fossil fuel production and consumption, which is anathema to the objective we must all embrace to revert climate change, namely to project a world with less fossil fuel consumption and more consumption of renewable clean energy.

When States invest ever-more resources into unconventional gas or oil production, they are limiting the investment they can make in other more sustainable sources of renewable energy, and violating the human right to provide and secure a livable climate. Businesses too have an obligation and responsibility to engage on efforts to revert dependency on fossil fuels. Hydraulic fracking activities, particularly if we are expanding our global dependency on fossil fuels and not evolving our energy mix towards a more renewable energy dominant paradigm (with measurable overall quantitative reductions in the amount of fossil fuels burned) will place human rights at great risk.

Human Rights and Atmosphere / Air

Linked together with the right to a healthy environment and to the human rights and climate change discussion is the right to clean, breathable air. As mentioned above, one of the major environmental and human rights risks associated with fracking activities is the release of excess methane gas and other toxic gases into the air and atmosphere. The typical leaks of methane and other noxious gases into the air in the diverse phases of fracking operations, are affecting human rights of workers and local communities near operations, and are also affecting climate conditions.

Toxic gas emissions make people sick, nauseous or can even cause birth defects or death, affecting the right to health, the rights of women and children, and the right to life. Lack of clean air in one location has compound and lasting affects on the air in other areas as well, and might even lead to displaced populations (as with a lack of water). Impacts also include air contamination from fine particle silica used at fracking sites. This air is breathed by workers affecting their right to health.

Like water, the air and atmosphere transcend borders and jurisdictions, so the problem has far-reaching implications.

V. The UN Guiding Principles on Business and Human Rights



The UN Guiding Principles on Business and Human Rights⁶¹ were adopted in 2011, after an extensive multi-actor consultation on the human rights impacts caused by corporate behavior.

While the global debate on the relationship between corporate activity and human rights has only flourished in the last few decades, the relevance of human rights to business actors stems back to the very conception of legally binding international human rights, even though the subsequent years after the birth of universal human rights focused primarily on State obligations to protect and promote human rights law. In fact, the idea that non-State actors are central to human rights protection and observance are imbedded in the very preamble of the Universal Declaration of Human Rights (UDHR) which clearly stated that:

Every individual and every organ of society, ... shall strive by teaching and education to promote respect for these rights and freedoms and by progressive measures, national and international, to secure their universal and effective recognition and observance, both among the peoples of Member States themselves and among the peoples of territories under their jurisdiction.⁶² (emphasis added)

And so, despite the *State-focused* interpretation and application of human rights over the past 50 or 60 years, business (as one of the organs of society) is also very clearly at the heart of human rights law. And as State obligations and responsibilities have been codified and as human rights tribunals have become accustomed to cases demanding State accountability to protect human rights, as a society we have slowly begun to move beyond mere *State* accountability for human rights violations, protection and promotion, and moved slowly into the realm of non-State actor accountability, that is, “the other” organs of society mentioned in the UDHR preamble.

Despite initial push-back from both companies but also from States who are often unwilling to give up jurisdiction over industrial activity occurring in their territory, and as societies have grown to feel comfortable with insisting on, and fulfilling this accountability, we are beginning to move beyond State actor responsibility, delving deeper into this unexplored realm of non-State actor accountability for human rights compliance, protection and promotion.

An earlier effort through a previous UN initiative which produced a declaration called the *UN Norms on the Responsibility of Transnational Corporations and other Business Enterprises with Regards to Human Rights* (or the UN Norms)⁶³, adopted in 2003 by the Sub Commission on Human Rights, anticipated the debate, but these UN Norms were issued at a time when the discussion arena was still not ready to delve into non-State

⁶¹ see: http://www.ohchr.org/Documents/Publications/GuidingPrinciplesBusinessHR_EN.pdf

⁶² see: http://www.ohchr.org/EN/UDHR/Documents/UDHR_Translations/eng.pdf

⁶³ see: <http://www1.umn.edu/humanrts/business/norms-Aug2003.html>

actor responsibility for human rights compliance. Many States and corporations strongly opposed the idea that human rights should be attributed to non-State actors. The UN Norms, hence, suffered a stillborn death, finding their way into a stalemated UN bureaucracy, which simply buried the UN Norms into oblivion.

But the debate on human rights and business was red-hot at the time, and would ultimately move forward under a new UN mandate tasked with picking up where the UN Norms had left off and finding a pathway to reach some degree of global consensus on how *the other organs of society* should approach human rights. That mandate would produce the UN Framework and later the Guiding Principles on Business and Human Rights, resetting the discussion along many of the lines originally introduced by the UN Norms but under a newfound consensus and agreement that some workable format to address human rights accountability of corporate behavior was necessary at the international level and that it should be the highest human rights authority, the newly created UN Human Rights Council, that should guide that discussion.

The underlying problem with corporate perpetration of, or complicity in, human rights violations stems from the void oftentimes left by government in its duty to protect individuals and communities from human rights violations, and from the fact that often governments are unable *or unwilling* to hold corporations (or for that matter, any other actors besides States) accountable for human rights violations.

The UN Guiding Principles for Business and Human Rights (the UNGPs) distilled this discussion into three basic pillars, on which most actors, including Government, Business and Civil Society could generally agree; namely that duties, obligations, responsibilities and entitlements could be divided into three basic realms:

1. The State Duty to Protect Human Rights
2. The Corporate Responsibility to Respect Human Rights
3. The Right to Remedy of Victims

Considered in the realm of fracking activities we can interpret these pillars to conclude very simply that:

- States are legally bound to protect individuals and communities from human rights violations caused by, or potentially caused by hydraulic fracturing.
- Oil and gas companies are responsible for taking measures to avoid and must abstain from causing human rights violations in their hydraulic fracturing operations. The expectation is that corporations *must* adhere to such commitments.
- When things go wrong in hydraulic fracturing activities, victims must have remedy, either through judicial recourse or through some non-judicial mechanism which they can freely choose, but which must guarantee the protection of their rights, the hearing of their problems and the remedial resolution of their conflict.

The UNGPs are essentially a list of 31 Principles with related interpretive commentary that allow us to dig deeper into the implications and the implementation of these three basic pillars.

The underlying idea of the UNGPs is to provide guidance to States, business, civil society *and to victims*, as to where the responsibilities, obligations and entitlements lie for all parties relative to the potential impacts of corporate behavior in relationship to human rights.

The 31 principles are divided into three sections, mirroring and corresponding to the three pillars:

- 1) Principles 1-10 referring to State Duties to Protect Human Rights
- 2) Principles 11-24 referring to the Corporate Responsibility to Respect Human Rights
- 3) Principles 25-31 on Access to Remedy in case of Violations of Human Rights

In short, these Principles (Ps) are (in summary form):

1) State Duties

P1- States must protect individuals and communities from human rights violations, including by third parties. They must take steps to prevent, investigate, punish, and redress human rights violations caused by companies, and have effective policies, legislation, regulations and adjudication in place.

P2 -- States should set out expectations for companies on human rights due diligence

P3 -- Enforce laws, enable respect, provide guidance and encourage application

P4 -- Ensure that state companies respect human rights

P5 -- Ensure that human rights are respected in sub-contracting

P6 – Ensure that companies in commercial transactions respect human rights

P7 – Ensure no violations occur in conflict zones

P8 – Ensure policy coherence between agencies

P9 – Ensure policy coherence in State to State treaties

P10 – Ensure human rights protection in multi-lateral arenas

2) Corporate Responsibilities

P11 – Respect human rights in all operations

P12 – Respect the International Bill of Human Rights and ILO Conventions (at the very least)

P13 – Protect human rights in their own activities and in that of partner relations

P14 – Protect human rights through all sizes of operations

P15 – To have policies and processes in place to protect human rights

P16 – To have high level, visible and accessible policies and procedures respecting human rights

P17 – To have human rights due diligence procedures

P18 – Identify and address human rights issues and conduct consultation

P19 – Integrate human rights findings into procedure

P20 – Build indicators to track effectiveness of responses to issues related to human rights

P21 – Communicate findings externally

P22 – Provide and collaborate in remediation actions

P23 – Comply with the law and address compliance

P24 – Prevent and mitigate the most severe human rights issues

3) Remedies

P25 – States must ensure remedial channels

P26 – States must ensure judicial mechanisms of redress

P27 – States must provide effective non-judicial grievance mechanisms

P28 – States must facilitate access to non-judicial grievance mechanisms

P29 – Companies must create operational grievance mechanisms

P30 – Industry and other multi-stakeholder initiatives should ensure that effective grievance mechanisms are in place

P31 – Grievance mechanisms should be Legitimate, Accessible, Predictable, Equitable, Transparent, Rights Compatible, a Source of Learning and based on engagement and dialogue

We will now turn to specific social and environmental concerns related to fracking activities that relate to these principles. We recall that what we are essentially concerned with in each case is to what extent States have taken necessary measures to ensure that fracking activity is regulated and controlled in such a way so that it does not result in human rights violations; that companies have taken due diligence steps to ensure that their operations are not violating human rights, and where human rights have been violated or are at risk, that the proper access to justice and remedy mechanisms are in place to revert, repair and avoid the violations.

VI. The UN Guiding Principles Through the Lens of Hydraulic Fracturing

We now turn our discussion to the main content and purpose of this publication: how the *UN Guiding Principles on Business and Human Rights*⁶⁴ are relevant and useful to address human rights concerns associated with fracking operations.

This section should be useful to:

- Communities attempting to frame their concerns over fracking operations using a human rights based approach, to bring visibility to the extremely significant, sometimes life-or-death concerns implied by the arrival of fracking activities to their environments;
- Civil society organizations wishing to bring a legal complaint, or a complaint to a legal tribunal or to a company's internal grievance mechanisms, or for example, an OECD Guidelines Specific Instance complaint against a company (public or private) approving, conducting or attempting to conduct fracking activity;
- Oil and gas companies wishing to identify human rights materiality to their fracking operations;
- Public officials that wish to develop a keener understanding of potential social and environmental impacts of fracking activity and the State's own responsibilities to anticipate and avoid these impacts.

It should be clear to the reader by now that fracking operations *have* clear implications for the realization of human rights. There are innumerable human rights risks that stem from fracking activities at each of the stages of production (permitting, prospecting, drilling, fracking, separation, compression, transport and marketing), and these could lead to human rights violations. Another thing to consider is that there are a considerable number of different actors involved in the different phases of the activity and each has different obligations and responsibilities to ensure that they do not cause human rights violations or that third parties working as their subcontractors or in their jurisdictions, are not responsible for human rights violations.

These actors might include the State, the principal company that holds extraction rights, and the various subcontractors (drillers, transporters, chemical suppliers, miners, waste handlers, etc.) used by the company that must be considered. Relevant actors may also include those actors that would adjudicate or help resolve conflicts.

The added value of and the opportunity created by the UN Guiding Principles for Business and Human Rights is that it lays out how each of these actors relates to a given conflict or potential human rights violation situation. The UNGPs aid us in sorting out the various obligations, responsibilities, and due diligence requirements that each of these actors must comply with, or otherwise be in violation of internationally binding human rights treaties.

While the UNGPs themselves may not be binding legal norms, the establishment of UN-sanctioned substantive guidance with very detailed recommendations of how a State and company can and should avoid human rights impacts, helps us understand the causal linkages between existing human rights obligations and State and corporate due diligence requirements and could also inform and be provided as legal interpretive guidance to human rights tribunals or a National Contact Point reviewing OECD Guidelines

⁶⁴ see: http://www.ohchr.org/Documents/Publications/GuidingPrinciplesBusinessHR_EN.pdf

compliance, which might be handling cases brought to such forums where human rights violations have occurred.

The very detailed guidance on due diligence by States and companies on how to prevent human rights violations caused by corporate activity, is one of the most important contributions of the UNGPs. This guidance material and its interpretive content offers grounds upon which defendants of victims of human rights violations caused by fracking can build their human rights advocacy and defense, it offers States guidance on clarifying what their regulatory and legal framework should look like and how they should be controlling oil and gas companies, it offers companies direction on how to devise appropriate policies and management systems to ensure they are not violating human rights, and lastly it offers victims themselves important clarity about what States and non-State actors should have done and should be doing to avoid human rights violations. This evidence and guidance is fundamental in analyzing and claiming redress for human rights violations that might be caused by hydraulic fracturing.

Violations are not only about *directly* causing harm but may also be associated with failures of the State to assume its *duty to protect* victims, which may include (but is not limited to) the State's failure to properly introduce regulatory and policy dimensions, monitor company activity, or by providing accessible information, participation in decision-making to stakeholders, or unduly allowing for third parties to carry out activities that lead to human rights violations or risks. It is important to understand that the protection of human rights in the corporate dimension *must be preemptive* and ongoing (and include monitoring), and it falls upon the State to ensure that State agencies take all necessary steps to ensure that human rights protection is firmly in place *before* any fracking activity ever takes place as well as during all subsequent phases of operations that are allowed to move forward.

UN Guiding Principle 3 goes specifically to this point (supplemented by UNGP Principle 8, pointing to the need of agency policy coherence across government). We find in most countries, great deficiencies in this regard. Few States have actually taken proactive steps to create and introduce a robust human rights due diligence framework for corporate activity. Fracking activity in countries like Argentina, and now in Mexico, for the most part do not consider specific human rights due diligence in any shape or form when it comes to the oil and gas sector.

GENERAL STATE REGULATORY AND POLICY FUNCTIONS

Guiding Principle 3

In meeting their duty to protect, States should:

- (a) Enforce laws that are aimed at, or have the effect of, requiring business enterprises to respect human rights, and periodically to assess the adequacy of such laws and address any gaps;
- (b) Ensure that other laws and policies governing the creation and ongoing operation of business enterprises, such as corporate law, do not constrain but enable business respect for human rights;
- (c) Provide effective guidance to business enterprises on how to respect human rights throughout their operations;
- (d) Encourage, and where appropriate require, business enterprises to communicate how they address their human rights impacts.

Violations may also likely imply that *non-state* actors (such as an oil and gas company or a sub contractor) have violated human rights in their day-to-day operations by failing to introduce proper policies or management systems to measure, monitor human rights compliance, and avoid human rights violations, or that a company has engaged in activity that led to a violation (UNGP, Principles 15 and 16). It may also have to do with the activity of a contractor (such as a drilling contractor or a company conducting the actual fracturing procedure) which has not been monitored by the hiring company for human rights due diligence, or which does not have a direct relationship with the State (UNGP, Principle 18) so that the State duly considers the actions of the subcontractor and how they may be affecting human rights.

It may also be because victims of the impacts of fracking operations do not have adequate redress mechanisms (complaint forums or grievance mechanisms) to bring human rights violations to (judicial or non-judicial) bodies that will hear out and adjudicate *or resolve* their complaint. It is also important to understand that the UNGPs take the redress mechanisms *outside* the boundary of the State, placing this requirement not only in the realm of the corporation but also to other non-state actors or sets of actors (such as a *national human rights institution* or other independent complaint mechanisms designed to receive complaints). The UNGPs offer a new way of applying international human rights law. If victims of human rights violations do not have adequate access to remedy, the obligations and responsibilities, according to the UNGPs, for providing that remedy falls on *both* State and business to resolve (UNGP, *State*: 25-28, and *Business*: 29, respectively).

Additionally the UNGPs take the redress question *beyond* the adjudication of the court. Recognizing that court systems are not always the most effective or most agile forum for addressing complaints related to human rights issues, the UNGPs provide guidance for redress *beyond* court mechanisms, laying out the responsibilities of companies to provide victims with channels of redress as human rights issues surface. These new trends involving human rights redress, expanding mechanisms beyond legal forums and implicating companies in the responsibility for providing remedy, offer victims of human rights violations argumentative evidence that a State or a company has not met its obligations and responsibilities for preventing and addressing human rights violations. If they are not meeting this obligation, they are not duly protecting human rights.

The first step in grasping the intricacies of the relationship between rights holders, responsible actors, rights, and rights violators in the case of hydraulic fracturing activity, is to fully understand the actors and their roles, know the issues at play, understand the rights and risks at stake, and effectively think through, and map out, the logical relationship between these actors, rights and risks.

We have spoken about the generic logical framework for considering human rights in which we have an inter-relationship between “the right”, the “right holder”, the “responsible party” and/or the “violation” and the “redress mechanism”.

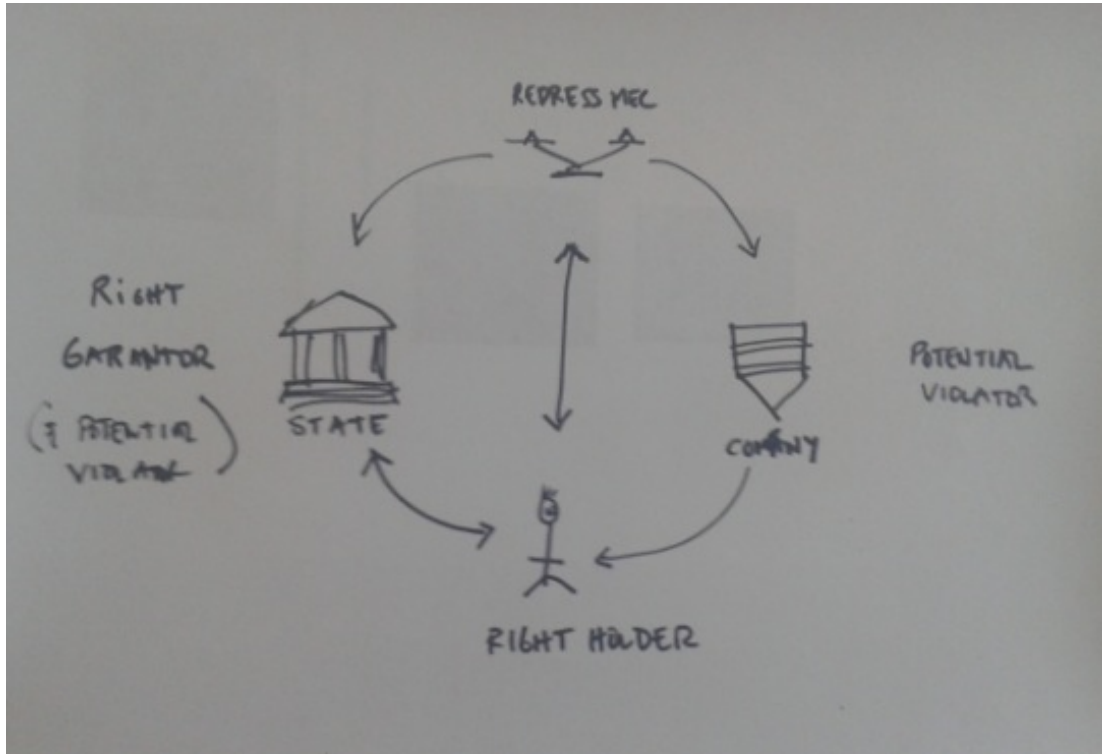


Figure 32: Relationship between Right Holder, Right Guarantor and Right Violator

We should understand that the UNGPs themselves are not geared so much to identify *which* human rights a corporation might violate, but rather, *who* is held accountable for potential human rights violations (whatever the rights at stake may be) and what measures they should have taken (but might not be taking) to ensure that human rights are not violated by corporate activity.

In this regard, the “Commentary” provided for in the UNGPs after each Principle is just as important and significant to the discussion as are the Principles themselves, as they shed interpretative light on *how* the Principles should be implemented in relation to *and by* each actor. The commentaries provide us guidance on precisely where we need to search for and assign obligations and responsibilities to the State and to non-State actors involved, in this case, in fracking activity. They also help identify how well a State or a corporation has carried out its due diligence to avoid human rights violations. This success or failure is key to determining causal relationships that can be used as important evidence in an adjudication forum seeking remedy.

For example, if fracking activity has been conducted under secrecy, with a lack of transparency surrounding the risks and potential impacts, and an indigenous community is claiming violation of human rights due to the activity (as explained in the Commentary to Principle 3):

“The State should advise on appropriate methods, including human rights due diligence, and to consider effectively issues of gender, vulnerability and/or marginalization, recognizing the specific challenges that may be faced by indigenous peoples, ... A requirement to communicate can be particularly appropriate where the nature of business operations or operating contexts pose a significant risk to human rights.” (UNGPs, Commentary to Principle 3).

As we analyze hydraulic fracturing activities through the lens of the UNGPs we propose the consideration four basic questions that we should address:

1. What Human Rights are at stake in the given fracking activity or concern?
2. What actions has the State taken (or omitted) in order to ensure that human rights have not been violated (including establishing a policy/regulatory framework)?

Or: how has a State action resulted in a direct or indirect human rights violation, either by the State itself, or by a third party (such as a company)?
3. What due diligence must the company carry out in order to avoid the violation of human rights?

Or: what action has the company taken (or omitted) that has resulted in a human rights risk or violation?
4. Do victims have an effective channel through which to bring a complaint and gain redress?

If we can map out and answer these four basic questions in any given situation, activity or concern, where we believe human rights risks or violations may be at play, we can use the UNGPs to identify risk and violations of fracking activity to human rights, sort out responsibility and accountability, and hopefully also identify potential remedies.

As we have indicated previously, the UNGPs have been recently adopted, thus there are few actual experiences with which to apply the Principles to an analysis of human rights and business activity. Hopefully, as more and more groups are encouraged to utilize the UNGPs to analyze and advocate for the compliance of human rights by corporations, this will change.

We now turn to each of these four basic questions.

1) What Human Rights are at stake in the given fracking activity or concern?

The first step in any human rights-based analysis of a given risk or conflict situation which places individuals or communities at risk or which impacts them, is to consider which human rights and human rights laws apply and to which actors.

The UNGPs address human rights obligations broadly, firmly asserting that State actors have the duty to protect all human rights to which they are signatories, and that they must ensure that third parties do not violate these rights, and that corporations also have responsibilities to protect human rights. When referring to corporate responsibility, the UNGPs mention the following internationally recognized treaties as the “minimum” treaties for which business is responsible:

- the International Bill of Human Rights, consisting of
 - the Universal Declaration of Human Rights⁶⁵
 - the International Covenant on Civil and Political Rights⁶⁶
 - the International Covenant on Economic, Social and Cultural Rights⁶⁷
- the eight (8) ILO core conventions⁶⁸ as set out in the Declaration on Fundamental Principles and Rights at Work

The word *minimum* is important in this context, setting a minimal threshold for corporate compliance, but not precluding that the UNGPs could not be utilized for a more extensive set of laws, treaties, declarations, etc. In fact, *any human right* that is established by international law and to which the State of jurisdiction of a fracking operation subscribes, is legitimate grounds upon which to employ the UNGPs analysis to determine human rights compliance. Principle 23 of the UNGPs clearly states that “all applicable laws” apply to business conduct.

For this reason, it is important to have a full grasp of all of the potential risks and impacts caused by the various stages of hydraulic fracturing activity, as well as a strong understanding of applicable human rights laws.

We have already seen that conflicts over fracking activity will likely involve:

- zoning issues (relative to the land and land use)
- water rights issues (relative to quantity, quality, risks, to water resources)
- air quality issues (relative to local air quality and atmospheric impacts)
- geological vulnerability (relative to ground tremors and earthquakes)
- noise pollution issues (relative to industrial noise in local environments)
- worker health issues (relative to worker risks due to the activity)
- community health issues (relative to the various environmental impacts of fracking)
- commercial conflicts (with preexisting conflicts with commercial activity such as small farming)
- indigenous rights issues (relative to rights over land use)
- climate rights issues (relative to the un-sustainability of fossil fuel extraction)
- consultative issues (relative to social license and possible binding consultations)
- access to information issues (relative to acquiring information about operations)
- participation issues (relative to participation in decision making about social license, FPIC, etc.)

⁶⁵ see: <http://www.un.org/en/documents/udhr/>

⁶⁶ see: <http://www.ohchr.org/en/professionalinterest/pages/ccpr.aspx>

⁶⁷ see: <http://www.ohchr.org/EN/ProfessionalInterest/Pages/CESCR.aspx>

⁶⁸ see: <http://www.ilo.org/global/standards/introduction-to-international-labour-standards/conventions-and-recommendations/lang--en/index.htm>

Each of these will have a corresponding set of applicable human rights law, enshrined in international or regional human rights instruments. The following table summarizes issues with relevant/applicable related human rights law.

Issues	Examples of Applicable Human Rights Law
Strategic policy decision/planning and problems of Public or Stakeholder Engagement	Right to Participation, Right to Consultation, Right to Information
Conflicts over exploration and drilling permits issued	Right to Participation, Right to Consultation, Right to Information
Concerns over water volume and consumption time utilized or conflicts over water permits granted	Right to Water, Participation, Right to Development, Right to Work,
Impacts or risks of water contamination	Right to Water, Right to Health, Right to a Healthy Environment, Right to Life, Right to Property
Local or general air and atmosphere contamination	Right to Health, Right to a Healthy Environment, Right to Property, Right to Climate,
Earthquake or tremor events	Right to a Healthy Environment, Right to Property
Excessive noise pollution	Right to Health, Right to a Healthy Environment, Right to Property
Worker health and safety problems such as from inhaling silica, or exposure to chemicals	Right to Health, Right to Physical Integrity, Right to Life, Right to a Healthy Environment
Increased traffic congestion, road accidents, or other traffic related incidents	Right to Health, Right to a Healthy Environment, Right to Property, Right to Life
Local community health problems appear with fracking activity	Right to Health, Right to development, Right to Property, Right to Culture
Indigenous Peoples Conflicts	Indigenous Rights, Right to Health, Right to a Healthy Environment, Right to Information, Right to Participation, Right of Access Information
Climate impacts from methane leaks or diesel emissions from energy generation or transport.	Right to Life, Right to Climate, Right Participate, Right of Information, Right to Health, Right to Property
Improper or no consultation over strategic decisions, well permitting, etc.	Right to Consultation, Right to Information, Freedom of Expression
Improper or no access to information about permits, risks, and impacts	Right to Information
No participation granted to stakeholders, vulnerable groups, Indigenous peoples, and other interest groups	Right to Participate, Freedom of Expression, Indigenous Rights,

Figure 32: Fracking Issues and Examples of Applicable Human Rights Law

Understanding and identifying this linkage between *issues* and *applicable law*, as well as the treaty binding State Duty, is key to constructing a human rights-based analysis of the problems presented by fracking as well as identifying the State and business actor due diligence necessary to avoid the impact or repair the damage. The analysis will not only need to focus on the applicable rights in the case, but will also need a thorough understanding the various phases of the hydraulic fracturing process, the technical intricacies of the hydraulic fracturing procedure, knowing its potential impacts, and knowing who are the actors involved. This comprehensive information is key to be able to identify what the State and the company did *or did not do* to ensure that applicable human rights were not violated.

Example*

*In order to promote fracking activities and offer a multinational company a favorable investment environment, a national government proposed to sign an investment contract with an international gas company offering the company broad investment benefits in exchange for carrying out hydraulic fracturing activity. The Executive Power has ample majority in the national and provincial legislative bodies, and has decided not to show Congressional representatives the contract that they are proposing and yet the federal government is insisting that it be approved without a reading. Stakeholders, including indigenous communities, have expressed strong concern and opposition to the decision. Stakeholders, including indigenous leaders, have been systematically excluded from the decision to promote hydraulic fracturing, despite earlier promises from the national government's oil and gas company, that they would be consulted.** When concerned individuals, communities, civil society groups and indigenous leaders peacefully marched to the Legislature on the day of the vote, to express their disagreement with the government's secretive dealings with the fracking company, the non-violent crowd was brutally repressed and beaten by police. The vote on the contract with the company was held during the protest and was approved (despite that the Congressional representatives never had access to the contract).*

What Human Rights issues were affected and relevant to this example?

The principle issues that are evidently at play are the lack of participation and consultation with local stakeholder groups coupled with the secretive contractual dealings between the State and the company. There is also a direct abuse by the federal government of the country's democratic process including the fundamental role of the Congress as representative of the population. There is also a manifest failure to consult indigenous communities in the process—in the real life example, the country is a signatory to ILO Convention 169. Further, and of great concern is that peaceful protesters were not allowed to assemble and were brutally repressed. We could likely identify other rights affected, however below is a good list to begin our analysis.

What is the applicable Human Rights Law violated in the example?

ISSUE

*Lack of Information
Lack of Participation
Lack of Consultation
Lack of Consultation w/Indigenous Peoples
No peaceful assembly permitted
No expression of opinion allowed
Physical integrity not protected*

Examples of Applicable Human Rights Law

*Right to Information (UDHR Art.19, RD Principle 10)
Right to Participate (UDHR Art. 21, RD Principle 10)
Right to Receive Consultation (ILO 169)
Rights of Indigenous Peoples (UNDRIP, ILO 169)
Rights of Assembly (UDHR Art.20)
Freedom of Opinion (UDHR Art.19)
Right to Physical Integrity (UDHR Art.3)*

The UNGPs are useful to understand where the State (and the company) went wrong with its actions including:

<i>Secretive dealings with the company</i>	<i>UNGP Principles 5 and 9 (State should meet HR compliance in contracting and investment treaties)</i>
<i>Poor policy coherence executive/legislative</i>	<i>UNGP Principle 8 (all public agencies/levels should share information)</i>
<i>Poor policy coherence federal/provincial</i>	<i>UNGP Principle 8 (all public agencies/levels should share information)</i>
<i>Inadequate domestic policy to meet HR obligations</i>	<i>UNGP Principle 9 (State should meet HR compliance in contracting and investment treaties)</i>
<i>Company engagement in HR faulty actions</i>	<i>UNGP Principle 13 (must meet HR compliance even if violations are not theirs)</i>
<i>Company should gauge HR in its relations</i>	<i>UNGP Principle 18 (must engage stakeholders in relations)</i>

* These examples are based on real-life cases, although some elements may have been modified to provide more specific issue analytical dynamics.

** see: <http://www.lavaca.org/notas/neuquen-represion-a-los-que-se-manifiestan-contra-el-fracking-en-vaca-muerta/>

RD = Rio Declaration, see: <http://www.unep.org/Documents/Multilingual/Default.asp?documentid=78&articleid=1163>

UDHR = Universal Declaration on Human Rights, see: <http://www.un.org/en/documents/udhr/>

UNDRIP = UN Declaration on the Rights of Indigenous Peoples; see: http://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf

2) What actions has the State taken (or what has the State omitted) in order to ensure that human rights have not been violated (including establishing a policy/regulatory framework)? Or how has a State action resulted in a human rights violation?

States generally bear the first and *foremost* responsibility for ensuring that human rights violations do not occur. That's simply the nature of how international human rights have evolved. And while the original drafters of the UDHR understood that non-State actors should also be held accountable, governments didn't think through at the time just *how* accountability would play out for the "other organs" of society. That's precisely the question the UNGPs are answering today.

What is certain, however, is that States are clear on their obligation to work to avoid the violation of human rights. This analysis is critically important in any examination of fracking-related activities, that is, to identify *what* precisely the State may have done *or omitted to do* which led to a human rights violation by a non-State actor. Focusing on State responsibility as opposed to a company's responsibility is one way to work through the analysis of and subsequent action responding to a human rights violation in a business context. This has some benefits but also some drawbacks. On the one hand, court systems will be most easily swayed to recognize State accountability, than they will be willing to recognize non-State actor obligations, but on the other, it takes the focus away from the practices of the principal actor that is causing the violation, *the company*.

With regard to the UNGPs approach to State duty, the UNGPs describe State obligations as "a standard of conduct", (see UNGPs, Principle 1), that is, there are a series of actions that the State should be engaged on to ensure that corporations do not end up violating human rights. In this regard, the UNGPs can help victims of human rights violations caused by fracking activities by identifying where the State has come up short on its obligations to ensure human rights protection *vis a vis* fracking activity.

Considering that outside of the United States, fracking activity is mostly incipient, or focused on

exploration, much of the present discussion around human rights and fracking will be centered on the early preparatory phases of fracking, such as permit issuance, land use decisions, investment agreements, prospecting, exploratory drilling, etc.. Cases will likely involve contentious situations regarding proper public access to information, public consultation, or public participation in national development or energy strategy decision-making (allow for fracking to happen or not). They may also include cases centering on competing land use issues, on future climate impacts, or future risks to water resources and on water usage relative to volumes and competing industries, etc.

As fracking outside of the United States moves from the issuance of exploration permits to the actual exploration, and eventually to the hydraulic fracturing and extraction phases, we will begin to see more cases where the actual health, natural resources risks and impacts of fracking related to extraction become tangible, and advocacy cases regarding fracking impacts on human rights will likely turn toward impacts beyond procedural consultative and participatory rights issues to direct human and environmental impacts.

Once actual fracking activity gets underway, health and natural resource impacts will need adjudication. Cases will likely address issues such as fresh water contamination, air and atmosphere contamination, health impacts to workers and nearby communities, industrial effluent/waste water mismanagement, traffic and noise pollution, property and land use impacts to local commerce and competing agriculture, risks and impacts to local aquifers, geological vulnerability and impacts to property and land value, etc. Airborne silica may also be an issue to workers at hydraulic fracturing sites.

The State is obligated to ensure that the proper regulations are in place to guide corporate activity (UNGP, Principle 3) in hydraulic fracturing in each of these dimensions of the activity. The

State must ensure that the company carrying out the activity has the operative policies and management system in place to address these issues (UNGP, Principle 3), and then the State must oversee, monitor and evaluate corporate performance in compliance with this due diligence. (UNGP, Principle 5)

What we already see when we examine incipient fracking activity currently underway around the world, particularly in developing countries, is that States are extremely eager to promote fracking activity as a vehicle for long-term revenue generation or to achieve energy independence *but less enthused* about addressing public concerns over associated impacts and allowing for public participation in official decision-making. We also do not see States going out of their way to set up and implement industrial due diligence for the sector. Fracking is evolving in closed political systems with little consultation, minimal or no public participation, and very poor transparency. It's also happening at a time when societies are extremely sensitive to pollution generated by heavy industry, and when the permeability of information and opinions via social networking and modern communication stands in contrast to the opacity of high level decision making.

This is a formula for conflict and as such we are likely to see more and more human rights violations occur related to fracking activity right from the onset of planning of operations. We are also likely to see more conflict arising from closed-door policies of governments and companies, confronting intentionally excluded stakeholder groups that are demanding more transparency and participation.

To complicate matters further, the places with most social conflict (oftentimes violent social conflict) around such large industrial investments, are nations with weak democracies or with very strong top-down vertical and very discretionary political representation, where individuals and public interest groups have very little sway over public official decision-making. In such cases the potential for explosive confrontation is high, as communities have little or no opportunity of influencing Executive Power decisions (or

Legislative decisions) over the many decisions that pave the way for fracking operations to move forward.

Argentina is a prime example of where *fracking* has advanced through *closed-door* and *top-down* governance with a nascent but quickly growing pushback from social and environmental interest groups and communities leading opposition movements against fracking.

Policy coherence is another important concern outlined in the UNGPs under which States should ensure that all state-based institutions that shape business practices are aware of and observe their human rights obligations (UNGP, Principle 8). When a State regulates fracking operations, it should ensure that each of its various regulatory bodies are consistent in their procedures and requirements, for example, promoting harmonization and equality between fracking promotion and environmental controls. Environmental concerns are especially dependent on consistency. Any regulatory methods, especially ones to reduce potential social or environmental impacts (that could lead to human rights violations) could be rendered ineffective if one agency is using a different standard than others or if one of the State's regulatory agencies should be engaged in controlling the sector but is not (Health, Industry, Environment, Water, etc.).

In Neuquén, Argentina, for example, communities (particularly indigenous communities) are especially concerned that the French company Total, is carrying out exploratory fracking activities in a protected natural reserve called *Auca Mahuida*, the province's largest protected natural reserve. The State has signed agreements with the company and has granted Total exploration and extraction permits to operate in the reserve. The provincial government has also agreed to this arrangement. The decision is in contradiction to other State agency public policy *protecting* the area as a wildlife and natural resource preserve and as such, Auca Mahuida should have been established as a NO-GO zone for fracking. This shows a clear vertical inconsistency between oil and gas policy and environmental policy. This

inconsistency is effectively promoting tension and conflict in the sector and has already led to protests and to impacts of stakeholder human rights.

ENSURING POLICY COHERENCE GUIDING PRINCIPLE 8

States should ensure that governmental departments, agencies and other State-based institutions that shape business practices are aware of and observe the State's human rights obligations when fulfilling their respective mandates, including by providing them with relevant information, training and support.

UNGP Principle 8 points to common imbalances between agencies of the State promoting vs. controlling industry.

We tend to think of States as monolithic, representing a single viewpoint and position, but experience has shown that even within governments there can be very conflicting priorities and significant relative political power inequality between ministries that promote industry and ministries that control industry for environmental or social impact. While one agency of the State may be working to promote and protect human rights or indigenous rights, another may be ignoring stakeholder concerns over possible impacts of the sector, or failing to consult with indigenous populations about decisions that will affect their lands. Energy is key political agenda, historically, political decisions and actions taken by the State to promote energy development, have been more politically important than policies and actions to protect environmental resources. In such a

political mindset it is logical hence, that ministries (and more specifically ministers) that govern the energy sector, for example, will have stronger political clout and leverage than ministries (and ministers) that protect the environment. The consequence in practice for the discussion that we are addressing is that when push comes to shove between an energy minister and an environment minister, government will likely fall short on regulations and control.

In still other cases, this internal conflict may be resolved in the worst possible way: completely eliminating the inter-ministerial conflicts by setting up formal environmental controls over a given ministry *inside* of the same ministry. This is the case in San Juan Argentina, where any political tension that might have existed between mining issues and environmental impact was eliminated by formally taking mining out of the provincial Environment Ministry's jurisdiction. Instead, a parallel Environmental Unit was set up *within* the Mining Ministry to handle all environmental impact issues directly by the same public officials that are promoting the industry.

This unexpected but very real inconsistency of government policy existing in many developing countries and even in some industrialized countries, is addressed by the UNGPs attention to *coherence* between public policy and agencies is discussed. (UNGP: Principle 8).

When we run fracking conflict situations through the UNGP filter, a first step should be to consider the diverse and multi-faceted nature of the State, identifying the role the various levels and agencies of the State play in either *fostering* or *avoiding* conflicts, in promoting or containing industry, in protecting or undermining human rights, in fostering transparent and inclusive decision-making processes vs. closing discussions and limiting public access which as a consequence, leads to human rights violations.

In the earlier example of the secretive vote in the Neuquén Legislature of Argentina of a fracking investment agreement with Chevron, we can see that the State acted unlawfully, not only because police officers of the State brutally beat peaceful protestors, but also because neither the

government (nor the State owned enterprise engaging in the investment joint-venture) took preventive measures to comply with basic human rights due diligence, which might have included organizing a public forum where stakeholders could voice their concerns over an eventual deal with Chevron or organizing appropriate consultative sessions with indigenous groups, as the State is mandated to do as a signatory of ILO Convention 169.

THE STATE-BUSINESS NEXUS GUIDING PRINCIPLE 4

States should take additional steps to protect against human rights abuses by business enterprises that are owned or controlled by the State, or that receive substantial support and services from State agencies such as export credit agencies and official investment insurance or guarantee agencies, including, where appropriate, by requiring human rights due diligence.

UNGP Principle 4 focuses on the responsibility of State-owned companies

Instead, both the Provincial and National governments refused to fulfill participatory rights of indigenous groups and even refused to hold consultative meetings regarding fracking investments or to discuss the investment contract proposed with Chevron.

Also at fault in this example was the State-owned enterprise, YPF, participating in the joint venture. Indigenous community leaders approached YPF requesting engagement and participation and claiming their rights under ILO Convention 169, but the company refused to grant any opportunity

for consultation and participation in decision making regarding their territories.

Further, the State *could have* but did not share the investment contract it intended to sign with Chevron with the general public, nor did it provide any input to the Provincial Legislative representatives about the contract, leading again to very clear violations of human rights.

The UNGP's *first* pillar is by far the most important of the three pillars, since it hones in on the State *legal obligation* to ensure that human rights violations do not occur in the first place. We say it is the most important pillar, not because the other two are not important, but rather because legal systems around the world are already versed in human rights obligations related to State duty, and it is in the first pillar of the human rights and business debate where complaints regarding corporate violations of human rights and State obligations are likely to get most traction in adjudication processes.

While all actors of society should respect human rights, the idea that States have subscribed responsibilities (and more specifically *obligations*) that they must comply with, is a basic and accepted tenant of international law. The UNGPs refer specifically to a set of actions *the State* must implement, and on which a State must proactively engage with to guarantee that activities involving corporate actors do not violate human rights. Many if not all of these apply seamlessly to the oil and gas sector, and more specifically to fracking activities.

Another dimension of State action has to do with State enterprises, or enterprises that receive considerable amounts of public funds for their commercial activity. Here States also should take steps to protect against human rights abuses by businesses that receive substantial support and services from State agencies or that are controlled by the State (UNGP, Principle 4). One of the areas of focus of the evolution of the UNGPs is precisely this *State-business nexus* existing between large public companies and the

State. Clearly, enterprises that are fully owned by the State or that have partial investment (particularly majority investment), are more closely controlled by government decisions.

Even financial investment in a company, such as through an Export Credit Agency, may give the State certain governing or oversight powers, which could and should be employed to ensure that companies receiving public funding, are not involved in human rights violations. That a State effectively and responsibly exercise this oversight is important to the human rights compliance of corporate activity. If the State is investing funds into a general investment fund that subsequently invests in oil and gas operations, the State should also insist that no company that is violating human rights through fracking operations, receive investments.

Recent cases brought to international conflict resolution forums involving state-owned companies violating for example, the OECD Guidelines for Multinational Enterprises (The OECD Guidelines), have greatly informed the evolution and drafting of the UNGPs and have served as model cases to develop many of the due diligence content of the UNGPs. Clearly, State-owned companies have a higher degree of responsibility and obligations when it comes to human rights violations caused by their activity simply because they are an official representative of the State or because the State can have considerable influence over their due diligence and corporate practice.

Fracking involves oil and gas companies, and in many developing nations oil and gas is a business of the State (Russia—*Gazprom*, China—*CNPC*, Argentina—*YPF*, Mexico—*PEMEX*, Brazil—*PETROBRAS*, are some

examples where State-owned oil and gas companies are considering or already moving forward with fracking operations). In these countries, States have a higher degree of responsibility as much of the activity of these companies in fracking operations, is conducted by the State or greatly influenced by or directly run by the State.

Even in industrialized countries, and where States may not be behind fracking operations, States often closely engage in determining energy sector evolution, direction and sector standards, either by setting up regulatory frameworks that determine where State financing will be invested, or what types of energy will be promoted through incentives, etc. States generally help set up a framework for how the sector functions in day to day activity, or will formulate standards that define how the sector relates to society, handles risks, or addresses social and environmental impacts, all of which will strongly determine how the sector, and specifically fracking activities, might impact human rights.

Fracking operations in England, for example, are closely intertwined with politics, government spending, and policies. Thus, the State should require heightened scrutiny of fracking operations to ensure that no human rights violations occur and that all human rights situations or risks are properly vetted through effective channels of public participation and access to information. UNGPs 5 and 6 stipulate that even when a State does not directly control or influence an industry, it should nevertheless require adequate oversight of business they contract with and conduct commercial transactions.

GUIDING PRINCIPLES 5 & 6

5. States should exercise adequate oversight in order to meet their international human rights obligations when they contract with, or legislate for, business enterprises to provide services that may impact upon the enjoyment of human rights.

6. States should promote respect for human rights by business enterprises with which they conduct commercial transactions.

Principles 5 and 6 of the UNGPs clearly delineates State responsibility to conduct adequate oversight of contractor companies.

Fracking activity is unlike many other industries in that *numerous* companies are sub-contracted to carry out core activities in different phases of operations. So while a large company like Exxon, Chevron, Shell, Total, Pemex, or YPF, may be the company visible to the public that holds a hydraulic fracturing permit and ownership rights over the fossil fuels extracted, a slew of smaller companies may actually be the ones carrying out the various industrial phases of the extractive process. The publically visible company may have little or no participation in the day to day fracking activities, such as drilling the well, hydraulically fracturing the well, separating, compressing and transporting the fossil fuels, etc..

These phases of operations need to be carefully analyzed, contracts between the mother company and the subcontractor must be understood and analyzed, and responsibilities appropriately assigned, and each phase of production, as well as the overall process, should meet international human rights obligations and

responsibilities. Fracking is a high-risk activity with potentially significant (and also potentially very different) environmental impacts at each stage of production from prospecting to drilling to, pressurization to extraction, to separation and compressing, and finally to marketing.

Timing is also key in the process of hydraulic fracturing and the State must also be sensitive to the temporal evolution of the activity, identifying the various risks and actors involved at each stage and during particularly intense activity moments of each stage. The time span during which a well is “fracked” is generally reduced to a specific short-term period, during which many of the potential human rights risks can be heightened, and vulnerability increased. The State needs to be more alert during these times, especially with monitoring or auditing actions. When industrial effluents (produced water) are extracted and treated is also a high-risk moment of fracking, during which significant water and atmospheric contamination may occur. If we know when certain human rights violations might occur, it is important that we are in better control of our monitoring during those times.

Strict government oversight of effluent management will be especially important to societies with little experience with fracking and as such, environmental control agencies will need to learn new skills to make these controls and audits effective. It is clear from our analysis of disposal methods that it has been common that companies and States turn to their established local treatment facilities for treating sewer and other industrial effluents, but at the same time, those installations do not have capacity or technology to treat the specific contamination coming from fracking operations.

State agencies must be familiar with the best practices available for each stage of fracking activity, and the State should encourage *or mandate*, companies to follow these best practices. (UNGP, Principle 3 Commentary)

In conflict-affected areas the potential for human rights abuses is heightened; thus States have a greater duty to ensure enterprises operating in those contexts are not involved in human rights

abuses (UNGP, Principle 7). This can be accomplished with early engagement with enterprises to identify, prevent, and mitigate human rights-related risks, providing adequate assistance to businesses, denying access to public support and services if an operation engages in gross human rights violations, and ensuring that current policies, legislation, regulations and enforcement measures effectively address the risks of human rights abuses. In regions such as Patagonia, where the oil sector has a long and violent history of confrontation with Indigenous communities, special consideration should be taken from the onset to address these trends and ensure peaceful engagement by the State with indigenous communities.

States also should use the UNGPs to promote shared understanding and advance international cooperation in the management of business and human rights challenges (UNGP, Principle 8).

A stakeholder can sit with the UNGPs alongside an identified set of human rights issues or perceived human rights conflicts in a given situation involving fracking operations, and quickly identify how the State has acted (or omitted actions) with respect to policy, legislation, monitoring, stakeholder engagement, access to information, and conflict resolution. This sort of analysis permits the identification of tangible instances where the State may or may not have fulfilled its legally binding obligations under international law.

A proactive State, as called for by the UNGPs, is one that is aware of, takes a series of anticipatory measures towards human rights violations, and which introduces policies, laws, regulations, and other measures to ensure that the combination of its actions are working to advance the realization of human rights.

STATE DUTY CHECKLIST

this checklist is not exhaustive and should be considered in conjunction with column 3 of the Annex Table:
Fracking by Phases, Issues, Human Rights and the UN Guiding Principles Requirements

Some questions that might help guide the analysis concerning State Duty to protect human rights in fracking activity might include (derived from UNGP Principle 3):

✓	Does the State have a rational and sustainable energy policy that includes reducing dependency on fossil fuels and lowering short term CO ₂ emissions and other climate pollutants?
✓	Has the State developed an effective Climate Strategy and is it addressing emissions by sector, including recognizing the emissions from the oil and gas sector, and specifically the risks of emissions from methane and other climate pollutants in hydraulic fracturing?
✓	Has the State conducted a proper stakeholder and vulnerable group identification?
✓	Has the State conducted proper stakeholder consultation to identify human rights vulnerability?
✓	Has the State mandated transparency and access to information as well as participation channels throughout the evolution (or consideration) of fracking activity?
✓	Has the State engaged interested indigenous communities and does it guarantee their input in its consultative processes and definition of development plans? And does the State guarantee indigenous communities the right to consent before fracking operations are allowed to take place in or near indigenous territories?
✓	Has the State ratified ILO Convention 169 and is it complying with the indigenous consultative and participatory rights established in the Convention?
✓	Has the State established NO-GO scenarios for fracking and conditions in the event that assessments show human rights violations, or that the impacts of fracking outweigh benefits?
✓	Has the State established NO-GO areas due to protection, environmental vulnerability, etc.?
✓	Has the State published all contracts with multinational companies investing in fracking operations and allowed for public discussion about investments before signing contracts and commitments to advance with hydraulic fracturing?
✓	Does the State streamline Human Rights policy and social and environmental protection across ministries, agencies, industrial sectors and geographical regions?
✓	Do State environmental authorities have effective <i>and independent</i> control over fracking operations?
✓	Has the State conducted its own human rights impact assessment of proposed fracking activity or more generally for its energy sector, and for example, engaged its national human rights agency or consulted with human rights focused civil society organizations in this process?
✓	Has the State obliged oil and gas companies to conduct human rights impact assessments of their proposed fracking activity for all phases of production, including establishing NO-GO scenarios?
✓	Has the State published information regarding land-use and permitting issuance or projected permitting, in order for stakeholders to raise concerns regarding land use issues?
✓	Has the State mandated air quality monitoring at specific points and on a regular and systematic basis, reporting and mandating best practices employed in all aspects and phase of hydraulic fracturing activity?
✓	Does the State mandate high efficiency vehicles and motors, utilizing to the extent possible, renewable energy and does it mandate the use of best practices to lower emissions from vehicular and motorized machinery?
✓	Has the State consulted with its own agencies related to natural resource protection, human rights protection, labor, and other agencies of the state that would have an interested stake in the evolution of fracking operations?
✓	Has the State consulted with non-State actors agencies/organizations etc. related to natural resource protection, human rights protection, labor, and other agencies with related focuses that would have an interested stake in the evolution of fracking operations?
✓	Has the State carried out a baseline assessment of the natural and social resources that might potentially be affected by proposed hydraulic fracturing activity? And does it mandate companies to regularly monitor and publically report on key indicators related to this baseline?

✓	Does the State subscribe to the Right to Water and commit to upholding the Right to Water in its development strategy?
✓	Does the State consider the Right to Water, including issues related to water quality, volumes and intensity of water employed, and freshwater resource safety in its assessment of hydraulic fracturing operations plans?
✓	Has the State adequately addressed user water access rights and how they may be affected by fracking activity?
✓	Does the State ban the use of aquifer water or other vulnerable water resources for fracking operations?
✓	Does the State mandate companies to recycle as much waste effluent as possible?
✓	Does the State ban or provide other safety guidance on waste effluent disposition by reinjection into deep wells (where reinjection is allowed) and does the State mandate best practice for pretreatment and other reinjection procedures?
✓	Has the State established and mandated the use of best practice stipulations for all aspects and phases of hydraulic fracturing? For example in exploration, land intervention, drilling, noise generation, casings, controlling methane and other gaseous leaks, treating waste water, compression, transport, transit, etc.?
✓	Does the State establish health and safety requirements specific for hydraulic fracturing? Including for example, exposure to gases and other toxic elements, or the use of protective equipment for potentially breathing silica sand or other proppants?
✓	Has the State evaluated and stipulated measures to ensure the long-term sustainability and safety of any stored, buried or otherwise contained industrial effluents from hydraulic fracturing activity?
✓	Has the State banned open-air ponds/pits/impoundments?
✓	Has the State instated strict rules, regulations and limits, as well as reporting requirements for noise pollution as well as for traffic congestion and pollution?
✓	Has the State adequately considered and stipulated measures to avoid deforestation, fragmentation of lands and mandated reclamation, restitution and reforestation of lands used for hydraulic fracturing activities?
✓	Has the State adequately assessed geological stability and risks and possible human rights consequences of introducing wells and pressurizing the geology or injecting effluent in the geology?
✓	Has the State established long-term protective measures to ensure the upkeep, maintenance of, and ensure financing for activities (by the company and not by public funds) related to this monitoring and maintenance once hydraulic fracturing operations have ceased?
✓	Has the State considered, evaluated and provided for an equitable use of tax revenues of hydraulic fracturing operations to ensure long-term equitable and sustainable development of affected communities that benefit from the revenues anticipated from the activity? Has the state developed long-term social indicators and does it monitor them to ensure that this reinvestment is actually benefiting local communities?
✓	Has the State obliged companies to make transparent the use of chemicals and publish their related risks?
✓	Does the State publish information about the health and environmental risks and diseases, symptoms and other health-related concerns, related to hydraulic fracturing, by chemical used and with useful information to inform, treat, respond to and seek assistance for potential impacts?
✓	Has the State set up monitoring and reporting obligations on human rights impacts risks? For example, are fracking companies obliged to produce sustainability information regarding fracking operations?
✓	Does the State regularly and systematically monitor companies, audit them, and seek information from them about the social and environmental impacts, human rights compliance and other social or environmental information significant to guarantee human rights compliance of hydraulic fracturing operations?
✓	Has the State ensured that there are practical conflict resolution mechanisms in place to hear out and address victim complaints?

3) What due diligence has the company carried out in order to avoid the violation of human rights? Or what action has the company taken (or omitted) that has resulted in a human rights violation?

To answer this question, we will consider three issues:

1. What is the binding nature of international law on corporations?
2. Which human rights apply to corporations?
3. What due diligence is required by corporations to comply with human rights in fracking activities?

The Binding Nature of International Law for Corporations

The discussions that evolved during the 2000s and 2010s on what eventually became the UN Guiding Principles on Business and Human Rights focused extensively on whether a company (a non-State actor) *does or does not have* binding legal obligations to comply with human rights.

This debate gets straight to the question of whether or not human rights (or the UNGPs) are legally binding for corporations. Any environmental or human rights activist reading this manual will have this question on her mind as she attempts to devise an advocacy strategy to protect human rights affected by fracking activity. Management and employees (as well as the lawyers) of a company carrying out fracking activity will also have this question on their minds if they are considering establishing a human rights policy and management systems for fracking operations. They will want to know what they *have* to do according to the law, and what they *might* do if they are inclined to do so. State officials may also have this question in mind as they devise their own human rights policy, monitoring systems, audits, and promotional activities in relationship to business practices and human rights.

The General Assembly of the United Nations stated clearly its position on the requirement that business protect human rights in 1948 when it proclaimed the UN Declaration on Human Rights

“as a common standard of achievement for all peoples and all nations, to the end that **every individual and every organ of society**, keeping

this Declaration constantly in mind, shall strive by teaching and education to promote respect for these rights and freedoms and by progressive measures, national and international, to secure their universal and effective recognition and observance, **both among the peoples of Member States themselves and among the peoples of territories under their jurisdiction.**”⁶⁹ [emphasis added]

The political arenas under which these issues are discussed in modern times, however, have not been so clear. In order to achieve the necessary degree of consensus, the team that was tasked to come up with an operable framework to address corporate accountability in the area of human rights (the UNGPs), proposed language that allows for member-state discussion by centering on the “State’s **duty**” to protect human rights and the “corporate **responsibility**” to do so. The end result: softer language and in turn implied (or so some believe) *softer* legal accountability for corporations.

The short answer to the dilemma is that it is left to the tribunals and courts to take a stand on the interpretation of the legal implications of this “responsibility” for corporations to exercise human rights due diligence and more specifically whether the corporation itself is an actor that can be held accountable for the violations of international law. The UNGPs’ focus on corporate responsibilities will surely create more concrete legal expectations and in time, these may be adjudicated as legal obligations.

⁶⁹ see: http://www.ohchr.org/EN/UDHR/Documents/UDHR_Translations/eng.pdf

GUIDING PRINCIPLE 12

The responsibility of business enterprises to respect human rights refers to internationally recognized human rights—understood, at a minimum, as those expressed in the International Bill of Human Rights and the principles concerning fundamental rights set out in the International Labour Organization’s Declaration on Fundamental Principles and Rights at Work.

Principle 12 establishes the bare minimum threshold for human rights accountability of corporations.

Guiding Principle 15

In order to meet their responsibility to respect human rights, business enterprises should have in place policies and processes appropriate to their size and circumstances, including:

- (a) A policy commitment to meet their responsibility to respect human rights;
- (b) A human rights due diligence process to identify, prevent, mitigate and account for how they address their impacts on human rights;
- (c) Processes to enable the remediation of any adverse human rights impacts they cause or to which they contribute.

Principle 15 establishes the requirement that businesses establish policies and processes to address human rights.

Guiding Principle 23

In all contexts, business enterprises should:

- (a) Comply with all applicable laws and respect internationally recognized human rights, wherever they operate;
- (b) Seek ways to honour the principles of internationally recognized human rights when faced with conflicting requirements;
- (c) Treat the risk of causing or contributing to gross human rights abuses as a legal compliance issue wherever they operate.

Principle 23 of the UNGPs establishes a broad foundation of human rights laws applicable to business conduct

Which Human Rights Apply to Corporations?

The simple answer is: the same human rights as apply to States.

The UNGPs take a broad approach to the applicability of human rights to business. Although, as a gesture to the still remaining strongholds with doubts over this broad interpretation, the UNGPs mention a *minimum threshold* for corporate accountability, which is: the International Bill of Human Rights and the ILO’s Declaration on Fundamental Principles and Rights at Work (UNGP, Principle 12).

In other words, the UNGPs (which should be understood as the view of the United Nations, the highest authority on the interpretation of human rights laws, says, that *at the very least* and beyond any doubt whatsoever, companies have a responsibility to abide by the International Bill of Rights (that’s the foundational international human rights treaties) and the ILO’s Declaration on the Fundamental Principles and Rights at Work.

However, in the commentary to Principle 12 the UNGPs reveal the full breadth of the intention of the United Nations, moving corporate responsibility over human rights compliance, *beyond* the mentioned minimum threshold, and into a more universal understanding of the applicability of human rights to corporations, stating that,

“Because enterprises can have an impact on virtually the entire spectrum of internationally recognized human rights, their responsibility to respect applies to all such rights. ... enterprises should respect the human rights of individuals belonging to specific groups or populations that require particular attention ... [and that] United Nations instruments have been elaborated further on the rights of indigenous peoples; women; national or ethnic, religious and linguistic minorities; children; persons with disabilities; and migrant workers and their families.” (UNGP, Principle 12, Commentary)

After the *threshold minimum* mention in the Principle, the Commentary is unequivocally set in

a more robust dimension, placing human rights accountability of corporations fully within the realm of *all* international human rights law.

Further into the Principles, Principle 23 is unequivocal, and provides the vehicle for a more expansive interpretation of human rights accountability for corporations well beyond the International Bill of Human Rights and ILO Conventions, by stating that business must respect “all applicable law” and respect [without a qualifier] internationally recognized human rights”.

Clearly Principle 23 was a formal step in broadening the minimum threshold in Principle 12 to the full spectrum of Human Rights. If a given human rights treaty is adhered to and signed by a State, that means that the treaty is applicable law in that State. Some State constitutions in fact make reference to the applicability and primacy of international human rights at and above constitutional stature. By this concept, and by the interpretation of the United Nations spelled out in Principle 23, that treaty would also be applicable law to corporations operating in the State.

Guiding Principle 17

In order to identify, prevent, mitigate and account for how they address their adverse human rights impacts, business enterprises should carry out human rights due diligence. The process should include assessing actual and potential human rights impacts, integrating and acting upon the findings, tracking responses, and communicating how impacts are addressed. Human rights due diligence:

- (a) Should cover adverse human rights impacts that the business enterprise may cause or contribute to through its own activities, or which may be directly linked to its operations, products or services by its business relationships;
- (b) Will vary in complexity with the size of the business enterprise, the risk of severe human rights impacts, and the nature and context of its operations;
- (c) Should be ongoing, recognizing that the human rights risks may change over time as the business enterprise's operations and operating context evolve.

If the circumstances are such that the corporation is operating in Latin America, for example, then we should measure human rights compliance as also applicable to all regional human rights treaties, conventions, resolutions, such as the Inter-American Convention on Human Rights, and the Protocol of San Salvador on Economic Social and Cultural Rights. In Europe we would consider the European Convention on Human Rights and Fundamental Freedoms, and so forth.

According to UNGP Principle 23, *all* corporations, irrespective of size, structure, ownership, or sector are responsible for complying with *all* human rights. By the same token, States have the duty to ensure this compliance.

For the defender of a community advocating for the human rights protection of individuals or communities affected by fracking operations, this means that there are an ample array of international and regional law instruments upon which to frame human rights protection. For companies wishing to address human rights in their operations, such as develop policy, create management systems, or provide remedy, their human rights due diligence should ensure coverage of *all* human rights applicable to a national and regional scope of rights. For a State official building a regulatory, policy and legal framework for hydraulic fracturing activity, considerations must also be made for all applicable human rights law that could be affected by gas and oil companies.

Because Fracking operations are so complex and touch on a variety of different potential concerns such as human health, natural resource protection, access to safe water, climate change impacts, access to information, participation, etc., the legal and due diligence responsibilities of a an oil and gas company are extensive and multi-faceted. A company must assess its potential human rights impacts thoroughly, and subsequently ensure that its policies and management systems, as well as its engagement, communication and redress mechanisms are integrated across its operations (similar to the consistency required within different State agencies).

UNGPs 11 through 24 are focused on the Corporate Responsibility to Respect Human Rights and lay out a series of considerations, policies, practices and management systems that a corporation should introduce to avoid human rights violations. The language of the UNGPs utilizes “due diligence” to indicate what the corporation should do, that is, *its practical and tangible actions* that will help identify material human rights and avoid human rights violations, and how the corporation should act, once a violation or potential violation is identified. (see UNGP, Principle 17). Businesses are also expected to have policies and management mechanisms in place [Principles 15 and 16] to streamline and engage on human rights in their operations. Companies are also expected not to violate human rights [Principles 11, 13]. They must identify human rights risks, and track human rights impacts [Principle 17, 20].

Principle 15 implies a significant list of due diligence requirements for a fracking company. It should have a clear human rights policy in place. A company engaged in hydraulic fracturing should have conducted a human rights due diligence process which would include for example, “a human rights impact assessment” (as listed in UNGP, Principle 17), which would in turn have included a consultation process with potentially affected stakeholders. In many of the emerging fracking operations around the world, this simple step has not occurred. This would imply both failed due diligence by oil and gas companies, and by the States that are legally accountable for ensuring this due diligence is met.

Principle 15 and 17 establish that businesses must report human rights issues (as through the yearly publication of a Sustainability Report, for example, with a scoping exercise to identify materiality of human rights issues to their operations, or establishing quantifiable measurements, policy description, etc.), they must identify and report violations, they must mitigate problems, and report on how they have addressed problems. They must also provide remediation processes to stakeholders and victims. [Principles 15, 17]. They must also provide in-house grievance mechanisms to

remediate impacts [Principle 15] and subscribe and respect local, national and international law to protect human rights.

Fracking operations, as we have seen, imply a number of phases each generally carried out by a different sub-contractor. That means that no single company conducts operations from start to finish. In fact a number of companies, each with different policies, practices, management systems, and business ethics, will be involved in the operations of a single well. And while the UNGPs are clear about corporate accountability for operations, they are also clear about requirement that corporations also tend to the impact of their suppliers and various business relations such as sub-contractors. [Principles 13, 17, 19]. This is particularly relevant to the oil and gas sector and to fracking activities in particular precisely because of the nature of utilizing a multiplicity of sub-contractors to carry out fracking operations.

Guiding Principle 13

The responsibility to respect human rights requires that business enterprises:

- (a) Avoid causing or contributing to adverse human rights impacts through their own activities, and address such impacts when they occur;
- (b) Seek to prevent or mitigate adverse human rights impacts that are directly linked to their operations, products or services by their business relationships, even if they have not contributed to those impacts.

Companies should seek to prevent or mitigate impacts that are directly linked to their operations, products or services. In high-risk situations, business’s due diligence requires robust engagement—this means earlier and heightened engagements with stakeholders to better understand risk factors.

Because fracking is such a high-risk activity, businesses that engage in fracking should be expected to uphold higher standards of human rights protections. When businesses communicate clearly with stakeholders, they are not only addressing the specific rights concern

that was originally raised, but also promoting transparency and access to information [Principles 16, 17].

Companies should express their commitment to meet their human rights responsibility through a statement of policy that is approved at the most senior level, and informed by experts. [Principle 16] This ensures that any policy measures will adequately prevent potential human rights violations. It is especially important for companies working in sensitive ecological areas,

or in conflict areas, to consult with external experts who can provide information on local practices, laws, and customs, and that companies effectively respect the health and safety needs of stakeholders. [Principle 18]

These policies should be publicly available and communicated internally and externally to all personnel, business partners, and relevant parties [Principle 21]. This again promotes both transparency, and stakeholder participation.

CORPORATE RESPONSIBILITY CHECKLIST

this checklist is not exhaustive and should be considered in conjunction with column 4 of the Annex Table:
Fracking by Phases, Issues, Human Rights and the UN Guiding Principles Requirements

Some questions that might help guide the analysis up specific responsibility and due diligence by oil and gas companies (derived by considering UNGPs 11-24) could include:

A) Policy	
✓	Does the company have a human rights policy in place and it is known to management, staff, sub-contractors and to the public?
✓	Does the company reference the human rights legislation applicable to its operations, including the UNGPs? At the international, regional and national levels?
✓	Does the company have management mechanisms in place to streamline human rights into all operations and does it report on human rights policy compliance?
✓	Does the company have a policy on and operate with transparency and access to information as well as participation channels throughout the evolution prior to and at each stage of hydraulic fracturing operations? Does this include transparency of investment agreements and contracts with the State or State agencies or companies and any payments made to such agencies or companies?
✓	Does the company condition investments to social license attainment or consent from affected indigenous communities?
✓	Has the company established NO-GO policies or conditions related to potential human rights impacts revealed in assessment phases, including prior to deciding to invest in the territory?
✓	Does the company commit to protect the "Right to Water" and refrain from activities that could put vulnerable or key fresh water resources at heightened risk?
✓	Does the company provide training to workers and other associates on human rights and social/environmental policies and procedures?
✓	Does the company have a comprehensive Climate Change Policy committing to immediate and long-term reduction of CO ₂ emissions and reduction of other climate pollutants such as black carbon, methane, HFCs, and other Short Life Climate Pollutants?

B) Human Rights Assessment	
✓	Has the company carried out an extensive identification of all human populations and groups living in the company's area of influence including all areas immediately above all planned drilling and other outlying areas that could be affected by operations?
✓	Has the company conducted human rights assessments of its operations including identifying material issues and all human rights (international, regional, national, local) applicable to operations?
✓	Has the company carried out effective stakeholder consultation to identify human rights vulnerability of its operations by stakeholder group identified and other potentially affected individuals or communities?
✓	Has the company identified the presence of specific vulnerable groups needing special treatment, attention and engagement in project design?
✓	Has the company identified culturally sensitive sites at or near planned operations and areas of influence?
✓	Has the company engaged/contacted national human rights organizations or agencies, civil society human rights organizations, or other relevant actors in the human rights field to consult, gather information about, or to inform its own human rights assessment activity in the country and area of operations?
✓	Does the company review its human rights impact assessment and its impact materiality periodically as operations evolve?

C) Environmental Impact Assessment	
✓	Has the company carried out and published baseline data on environmental resources, freshwater reserves, and other especially vulnerable natural resources (including flora/fauna), natural preserves, protected sites? etc. in the vicinity of its planned operations?
✓	Has the company identified environmental risks and particularly sensitive environmental vulnerabilities that could result in undesired human rights impacts as a consequence of its operations?
✓	Does the company periodically review its environmental assessment and its environmental baseline relative to evolving measurements to determine its overall environmental impacts of their operations?
✓	Does the company update its environmental impacts and its materiality to human rights due diligence periodically as operations may evolve?

D) Stakeholder Consultation and Engagement	
✓	Has the company conducted meaningful and effective consultation and community engagement on potential environmental <i>and</i> human rights impacts <i>before</i> deciding to invest (or expand investments) in a given market?
✓	Has the company identified the presence of indigenous populations living at or near the project site, at distances where they or their lands could be affected by operations?
✓	Has the company committed to guaranteeing the rights established for Indigenous Populations in ILO Convention 169, for Indigenous Populations living at or near the project site, at distances where their lands could be affected by operations?

F) Specific to Permitting	
✓	Does the company avoid requesting <i>or receiving</i> permits to explore for or extract resources in areas established as protected natural reserves, indigenous lands (where it has not received consent from the community), or that are otherwise deemed vulnerable for reasons related to the environment or to the vulnerability of special groups?
✓	Does the company avoid aggressive land acquisition tactics, onerous rental agreements, or leasing/purchasing agreements that would knowingly and unfairly crowd out or displace preexisting local farmers, commercial activity or other vulnerable interest groups, affecting their right to development, property, agriculture, cultural rights, etc.?
✓	Does the company conduct specific human rights impact assessment based on potential human rights impacts related to competition for land use, water access rights, etc.?

G) Specific to Exploration and Drilling	
✓	Does the company adequately establish an area of influence that includes all superficial lands above and adjacent to all drilling areas (including the full extent of horizontal drilling)?
✓	Does the company carry out and evaluate potential human rights impacts to all stakeholders in their area of influence that could be affected by operations?
✓	Does the company consider its potential impacts to human rights from its land clearing, deforestation or introduction of roads related to exploration and drilling?
✓	Does the company develop and then implement a remediation plan and reforestation plan once it has completed its exploration and will no longer use lands, as well as such plans for post-project completion?

H) Specific to the Fracturing Phase	
✓	Does the company publicly inform the dates and times during which it will be fracturing wells?
✓	Does the company monitor for well pressure leaks, methane leaks, fracking fluid leaks during fracturing operations?

✓	Does the company monitor outlying areas for possible abandoned well leaks during pressurization of operating wells?
✓	Does the company address the impacts of intense industrial traffic and or movement or operation of heavy equipment and the potential impacts it may have on local communities during fracking operations?
✓	Does the company commit to not fracturing wells at unsafe distances to existing aquifers?

Other General Considerations

I) Well Location Related and Project Design	
✓	Has the company appropriately considered project design including well pad and other infrastructure relative to <i>location</i> in relation to distances and implied risks of environmental, health, property, and other negative social and economic impacts, including specific human rights impacts to the community, farmers, local commerce, schools, hospitals, parks, etc.?

J) Toxicity and other Environmental Risk and Impacts	
<i>Information</i>	
✓	Does the company provide contact information where community members and or workers can inform themselves about health concerns or symptoms possibly related to fracking activity?
✓	Does the company publish real time information about the state of its wells, fracturing times, chemicals utilized and contamination monitoring points?
✓	Does the company provide the public with all of the information it provides authorities on environmental and social impacts of industrial processes?
<i>Chemicals</i>	
✓	Does the company publish the chemicals and volumes of each chemical utilized in its fracking fluids and in all other stages of its operations?
✓	Does the company label chemicals on site and provide training for management and possible accidents they could cause, and the necessary protective equipment/gear to handle chemicals?
✓	Does the company publish information on the possible side effects and temporary or permanent possible health impacts of exposure to the chemicals it employs and recommended first aid actions in the event a person or community is exposed to the chemicals?
<i>Wells</i>	
✓	Does the company publish updated and/or real-time information regarding all of its past, present and future wells (explored, drilled, fracked, in production, closed)? Including information on: <ul style="list-style-type: none"> ○ Location, drilling depth, fracking depth, aquifer depth, direction of drilling, length of fractures from well, total length of each well and direction of each, pressurization of well, activities carried out at well, production of well, location of aquifer relative to the well and the distance of fractures to aquifers, water employed per well, water recuperated per well, remaining contaminated water in well after completion, distance to persons/communities of the well,
✓	Does the company provide locational information, including GPS coordinate for easy public identification of wells?
✓	Does the company employ the highest available technology for cementing casing?
✓	Does the company monitor well pressure for potential leaks throughout operations and phases?
✓	Does the company take into account the possible presence of unknown or abandoned wells, and appropriately check pressure losses during fracturing procedures that may be due to having punctured abandoned unknown wells?
✓	Does the company report on and ensure a safe distance of surface casing below the water table?
<i>Water</i>	
✓	Does the company uphold and commit to protect <i>the right to water</i> ?

✓	Does the company periodically inform water volume use on a per well basis?
✓	Does the company consult preexisting water users and assess their needs and the competition and its impacts that will result from the intense consumption of water used by fracking operations including but not limited to households, farmers, commerce, pre-existing industries and other water users?
✓	Does the company consider regional water consumption patterns, timing, volume consumed, etc. before developing water management policies and particularly when it intensifies water usages, for example, during fracturing?
✓	Does the operator consider using recycled/reclaimed water, or other water besides freshwater reserves?
✓	Does the operator rule out the usage of water from aquifers where surface water is present and accessible?
✓	Does the company commit to not discharging flowback water or industrial effluent into existing waterways without proper treatment?
✓	Does the company commit to recycling water from its own operations to the greatest extent possible?
✓	Does the company take measures to avoid spillage/seepage of effluents into local water streams, including placement of ponds at appropriate distances from vulnerable water sources, and take measures to avoid effluent storm water runoff or extreme events causing overflow/contamination?
✓	Does the company minimize flowback or industrial effluent water contamination to natural resources, minimizing flowback water left in the ground, and avoiding reinjection of flowback water to underground wells?
✓	Does the company establish measurement points for water contamination, and regularly take measurements and report those measurements to government and/or to the public?
✓	Does the company identify, avoid impacting and monitor especially vulnerable freshwater sources, particularly important to community, local farming or other pre-existing water supply?
✓	Does the company take into account possible extreme flooding events that could cause mixing of freshwater resources with contaminated surface water stored onsite (such as water and/or chemicals held in ponds/pits/impoundments or other containers)?
<i>Air</i>	
✓	Does the company utilize the best technology, establish protocols, and employ best practices to reduce methane and other gaseous leakages, particularly in machinery, pipe joints, etc. in all phases of operations?
✓	Does the company employ best practices to reduce air contamination from exposed effluents in ponds, from site related sand/silica use, and provide workers and communities with equipment, information and other needed resources to ensure healthy air quality?
✓	Does the company establish measurement points for air contamination, and regularly take measurements and report those measurements to government and/or to the public?
✓	Does the company measure dust generation at fracking site (well pad) or along roads and take appropriate measures to reduce social and environmental impacts related to dust suspension?
✓	Does the company report any emergency natural gas releases into the atmosphere?
<i>Climate Change</i>	
✓	Does the company introduce technological improvements and best practices to all of its industrial processes including exploration, extraction, production, transportation etc., to reduce CO ₂ emissions and other GHGs (climate pollutants) including such as black carbon, methane, HFCs, and other Short Life Climate Pollutants?
✓	Does the company employ, where possible, renewable energy for its operations, or reutilize energy generated in the hydraulic fracturing process such as unutilized methane?
✓	Does the company publish an estimated methane loss of total operations? By equipment?
✓	Does the company adopt transportation and energy generation motors with contamination-reducing filters, systems, and fuels?
✓	Does the company control machinery/equipment/material quality to ensure there is no deterioration of pipes, connectors, and other machinery material that could cause leaks and spillage into the environment and replace parts, machinery, and materials where necessary?
✓	Does the company avoid flaring excess gas and report any forced flaring incidences?
<i>Biodiversity</i>	
✓	Does the company avoid conducting activities in natural reserves or other sensitive or protected natural resources?

✓	Does the company remediate natural resource depredation or deforestation due to the introduction of well pads, roads or pipelines?
✓	Does the company establish measurement points for land contamination, and regularly take measurements and report those measurements to government and/or to the public?
<i>Health</i>	
✓	Does the company publish health risks associated to each chemical and procedure in the fracking and other stages of the procedure (such as respiratory, gastrointestinal, neurological, and dermatological diseases or affectations)?
✓	Does the company publish information on health symptoms, first aid, and emergency treatment related to possible chemical impacts?
✓	Does the company offer a hotline to address concerns or questions regarding health risks and symptoms that might occur in the community?
<i>Radioactivity</i>	
✓	Does the company conduct and publish radioactivity assessments of the geology and drilling results?
✓	Does the company ensure proper gear is utilized in the handling of radioactive material, machinery, etc.?
✓	Does the company adequately clean drilling and extraction equipment that has been contaminated by radioactive minerals?
<i>Seismic Activity</i>	
✓	Does the company carry out detailed seismic studies and determine risks from its operations on geological vulnerability as well as measure seismic activity during its operations?
<i>Noise</i>	
✓	Does the company employ best practice and utilizes methods and materials for attaining maximum noise reduction for workers and community caused by drilling, fracturing, compression, including devices and construction?
✓	Does the company control its own or contractor employees to confirm that they are utilizing noise reduction devices while on site?
<i>Traffic</i>	
✓	Does the company assess impacts of traffic congestion and plan for reducing traffic impacts to a minimum?
✓	Does the company plan vehicular transit in a way to minimize local impacts due to noise, emissions, and congestion particularly at the most sensitive moments to such impact (for example, nighttime, holidays, school hours, or other times when human or environmental impacts might be heightened)?
✓	Does the company train and audit subcontractors on traffic policy?

K) Best Available Technology and Best Practices	
✓	Does the company commit to utilizing best available technology and employing best practice to reduce water, air, land, and other contamination and particularly to reducing risks of human rights impacts in all phases of operations?

L) Monitoring and Reporting	
✓	Has the company set up monitoring and reporting procedures on human rights impacts and risks?
✓	Does the company produce a Sustainability Report and report on sustainability indicators on a regular basis?
✓	Does the company report fines, lawsuits, other sanctions, and other grievances filed against the company and their responses to these grievances?

M) Labor Rights	
✓	Does the company follow best practice labor standards?
✓	Does the company ensure workers are not employed for excessive hours?
✓	Does the company ensure workers utilize proper safety gear/equipment/clothing in their day-to-day operations including gloves, air filters, and other protective clothing, etc.?
✓	Does the company ensure workers are not exposed to toxic fumes, gases, liquids, sand/silica?
✓	Does the company ensure equal opportunities of employment with equitable pay scales for men and women?
✓	Does the company avoid employing workers under excessive working conditions?
✓	Does the company favor local employment and assess the impacts of migrant workers to the hydraulic fracturing sites?

N) Supply Chain	
✓	Does the company communicate human rights policy (as well as environmental and other social policies) to suppliers and contractors, and vet them before signing contracts?
✓	Does the company provide training to suppliers and sub contractors about its human rights and environmental policy?
✓	Does the analysis of the various corporate actors (mother company, subcontractors, suppliers) show human rights policy and uniformity across the supply chain and subcontractor chain?
✓	Does the company employ appropriate devices and best practice to reduce and to monitor methane leakages across operations?
✓	Does the company require subcontractors to report on human rights compliance?

O) Environmental Insurance and Funds	
✓	Has the company contracted an appropriate environmental insurance to safeguard future costs of accidents, cleanups or other remedial actions?
✓	Has the company established an Environmental Fund for costing future cleanup, reparations, remediation activities?

P) Well Completion / Closure	
✓	Does the company take measures to guarantee the long-term safety and integrity of closed/plugged wells?
✓	Does the company commit to periodically monitoring closed well conditions/safety?
✓	Does the company provide for long-term environmental and social protection, <i>including the establishment of financing mechanisms</i> for maintaining monitoring and maintenance of contaminated sites and abandoned wells so that the public must not assume long-term costs of such monitoring and maintenance?
✓	Does the company commit to remediating contaminated lands, reforesting utilized lands, including well pads and internal roads introduced for fracking operations?

4) Do victims have effective channels through which to bring a complaint and gain redress?

The UNGPs' third pillar focuses the business and human rights debate on *remedies* for victims of human rights violations that are caused by corporate practices. The objective of this pillar is to ensure that either through legal or non-legal means, victims or potential victims of human rights violations or risks caused by hydraulic fracturing are effectively addressed, remediated, repaired and ultimately avoided.

Principles 25-31 are focused on Access to Remedy (be it judicial or non—judicial in nature). Principles 25-28 focus on the State's duty to ensure effective remedy, while Principle 29 and 30 project this responsibility on business and other multi-stakeholder non-State actors.

Both States and companies must provide remedies to victims of human rights violations when things go wrong [Principles 22, 25, 27, 30]. This is one of the basic pillars of the UNGPs and of human rights generally. The idea underlying this third pillar of the UN Framework for Business and Human Rights is that accountability is really only effective when victims of human rights abuses have somewhere to take their complaints where they will be heard, earnestly addressed *and hopefully*, resolved. Effective remedial solutions come both in the form of a legal tribunal decisions dictated and governed by national or international law and agencies, or alternative non-legal mechanisms such as a State-devised non-judicial forums (UNGP, Principle 27), or a company's in-house grievance mechanism (UNGP, Principle 29), which should treat the complaint according to the rules established by the company, which presumably should be in line with accepted human rights law.

We generally think of human rights being adjudicated in *legally-binding* human rights tribunals such as the European Human Rights Court, or the Inter-American Commission and Court on Human Rights, or in a national court of justice. Nonetheless, the recent evolution of alternative settings for resolving individual and community conflicts in non-judicial settings is providing other forums for dispute resolution

where human rights issues can be addressed and sometimes resolved.

Development agencies such as the World Bank, IMF, and regional development banks have developed “panels” or “ombudsman” forums linked to the institution's social and environmental policy, to evaluate agency compliance with their social and environmental safeguards, and victims of social and environmental abuses (which might be caused by their financing) and offer victims a place to bring and resolve their complaints. Except in very limited examples, these agencies do not specifically frame their discussions in human rights language (some do not even mention the term human rights). These sustainability policy-related issues and the topics addressed through policies can oftentimes mirror many human rights concerns (such as health, gender equity, discrimination, indigenous and cultural rights, public consultation, transparency, property, environmental quality, etc.).

Consider for example the topic heading of the World Bank's private sector financing agency, the International Finance Corporations (IFC)'s, eight Social and Environmental Performance Standards.

PS1: Social and Environmental Assessment and Management Systems

PS2: Labor and Working Conditions

PS3: Pollution Prevention and Abatement

PS4: Community Health, Safety and Security

PS5: Land Acquisition and Involuntary Resettlement

PS6: Biodiversity Conservation and Sustainable Natural Resource Management

PS7: Indigenous Peoples

PS8: Cultural Heritage

We can see how nearly all of these Performance Standards of the IFC have corresponding human rights relevance. This does not mean that human rights are necessarily best treated through the IFC's accountability mechanisms (in fact, most of the international development agencies have

been weak in the implementation of social and even environmental policy) but to the extent that they do offer a tangible forum at which to address some of the typical concerns faced by stakeholder communities, they could be seen as a viable channel for seeking attention by and redress from multilateral development agency financing that may apply to hydraulic fracturing projects.

Another possibly more directly appropriate and relevant forum for addressing human rights impacts of corporate activity (particularly multinational corporation activity), is a forum developed by States under the OECD system, called *National Contact Points* (NCPs). These are offices created to resolve disputes deriving from multinational company practices in alleged violations to the OECD's Guidelines for Multinational Enterprises, which also include various references to human rights and related corporate dimensions. Here again, however, the NCP/OECD Guidelines system has been historically extremely weak and mostly ineffective in guaranteeing human rights compliance, particularly because of the inherent weakness of the "voluntary" nature of corporate engagement in the system. Furthermore, the OECD Guidelines system suffers from two very significant weaknesses: 1. the complicity of some States in actually promoting controversial investments through their export credit agencies, and 2. the passing off of cases from mother countries in the industrialized world to developing countries which may be much less able to effectively adjudicate the issue (whether because of economic conflicts of interest, or less legitimate judicial forums).

Other conflict resolution forums related to sectors (such as the extractive sector) have also begun to surface offering individuals and communities a State-sponsored mechanism to bring complaints related to impacts caused by mining operations and like the previously mentioned multilateral or national forums treating multinational company practices and complaints, they have also been relatively unsuccessful in guaranteeing human rights accountability.

The UNGPs recognizes the evolving nature of voluntary and extra-judicial initiatives focused on conflict resolution, promoting not only these but also binding judicial forums to resolve conflicts. In the end, the important thing to take away in the implementation of the UNGPs is that States must ensure that appropriate and effective forums exist to which victims can bring complaints. If non-judicial and volunteer forums are not successful in resolving disputes, then we are likely to see that advocacy groups and individual and/or community victims will prefer more traditional binding judicial mechanisms to resolve implementation disputes regarding the UNGPs

Whomever the responsible party for providing remedy, the State must take appropriate steps to ensure, be it through judicial, administrative, legislative, or other appropriate means, that when abuses occur within their jurisdictions, affected individuals have access to *effective* remedy [Principle 25]. Not doing so would be considered a violation of the States Duty to Protect human rights and could be actionable in national courts or in international human rights tribunals.

Remedy mechanisms can only be deemed effective when the people they serve know about them, trust them, and use them successfully in the defense of their rights. Thus, all these systems should comply with standards for transparency, access to information, and participation.

ACCESS TO REMEDY GUIDING PRINCIPLES 25 & 30

25. As part of their duty to protect against business-related human rights abuse, States must take appropriate steps to ensure, through judicial, administrative, legislative or other appropriate means, that when such abuses occur within their territory and/or jurisdiction those affected have access to effective remedy.

30. Industry, multi-stakeholder and other collaborative initiatives that are based on respect for human rights-related standards should ensure that effective grievance mechanisms are available.

We have also seen in countries with emerging fracking operations the great imbalances that exist in the relative power between communities and affected stakeholders, and government and oil and gas companies.

Cases in the United States, where intense fracking activity already has nearly a decade of history, human rights cases (generally involving rights such as health, clean air, healthy environment, property, etc.) have been considered in local courts. In the rest of the world, fracking is relatively new, and as such there are few examples to reference of individuals or communities seeking remedial action due to fracking impacts. In countries such as Argentina, for example, there are only a few emerging cases that have focused on local individuals, communities or indigenous groups attempting to obtain stays on drilling a specific well, based on the risks to the natural environment or human health.

The authors do not know of any cases at the time of publication brought to international tribunals in fracking related activities. It is perhaps too early to draw conclusions on the trends that might emerge from these cases, be they heard in judicial or non-judicial forums. There are too few to see whether they will focus more on administrative or procedural issues (such as the right of access to information, participation, etc.) or whether they will focus (as in the case of the United States) on the human and environmental impacts faced by communities near fracking operations.

What we *have* seen as a commonality in legal proceedings, as mentioned previously, is the existence of imbalances between local judicial systems and federal or provincial judiciaries. Local jurisdictions may have obtained a local court ruling in favor of victims of environmental impacts or risks caused by fracking activity, only to have a provincial or federal court reverse the

ruling. This is equally as likely to occur in industrialized as well as developing countries, like the cases in Texas, (with the ban on bans on fracking) or in Chubut province of Argentina (the reversal of court decisions halting a fracking operation).

Another of the problems faced in fracking-related conflicts is the inability of local groups to have their complaints heard either by the company or by the federal or provincial authority. We have seen this occur in developing countries eager to promote investments in fracking, but not to hear out community preferences to promote other economic activities.

Another typical problem faced in developing countries is the difficulty, sometimes impossibility of engagement with oil and gas companies on the issue of impacts from fracking. The CHRE (CEDHA) has requested of Chevron, Total, and YPF, for example, to visit fracking sites in Argentina to learn more about the process, phases of operations, potential impacts, risks and best practice, etc., only to receive elusive answers, stalling, or no answer at all to our inquiries. Such engagement with CSOs is essential if future conflict cases are to be handled in constructive and trusting environments. This is unfortunately not currently occurring.

Recalling the UNGPs text in the commentary to the third pillar, "effective remedy has both procedural and substantive aspects" and have to do with an individual or group's sense of entitlement and general notions of fairness. (UNGP, Principle 25) Without engagement, without transparency, without space for dialogue or debate, as is currently occurring in the advancement of fracking operations in many parts of the world, coupled with the outright confrontational nature of conflict surrounding fracking activity, it is difficult to envision a future where effective remedy is tangibly achieved by complainants.

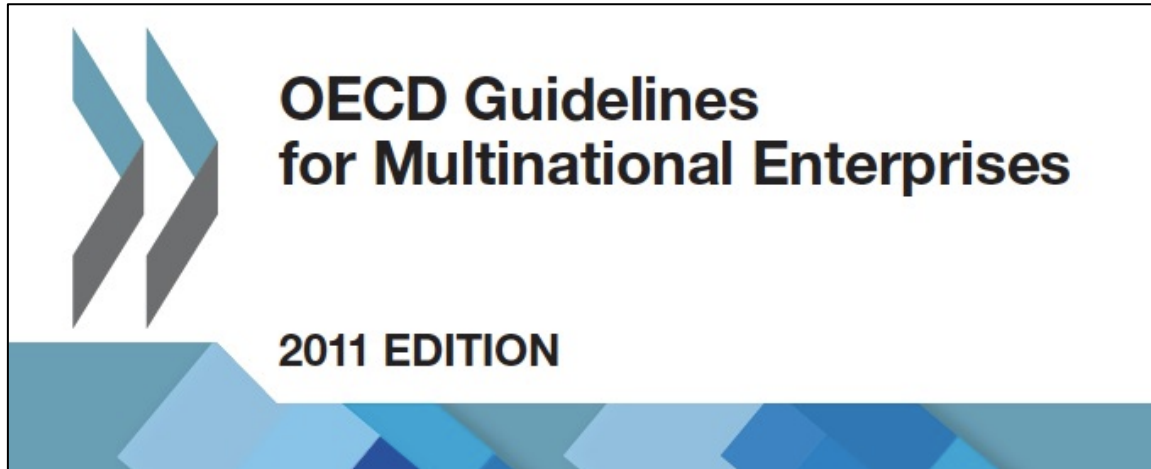
REMEDY AND GRIEVANCE MECHANISM CHECKLIST

this checklist is not exhaustive and should be considered in conjunction with column 5 of the Annex Table:
Fracking by Phases, Issues, Human Rights and the UN Guiding Principles Requirements

Some questions that might help guide the analysis of compliance with remedy obligations (established by the UNGPs 25-31) could include:

✓	Has the company established internal <i>and external</i> grievance mechanisms to address complaints from workers, contractors, individuals, communities, human rights or environmental or other interest groups, indigenous communities and/or other actors?
✓	Does the company publish information about its' grievance mechanism, rules, procedures, etc. and whether or not it has been effective in resolving complaints?
✓	Do stakeholders have discretionary rights, entitlements or opportunities to contest any decisions by the company or by the State regarding permitting, location of activity, that may be deemed to impact human rights?
✓	Can all self-proclaimed stakeholders access company and/or State grievance mechanisms to address their claims and disputes?
✓	Do the grievance mechanisms offered by the company or the State mention, or are they framed in, human rights language and policy?
✓	Does the company and/or State provide a hotline service for concerned individuals and groups to present information or complaints regarding potential human rights violations, environmental impacts or other problems brought about by fracking activity?
✓	Does the company and/or State ensure the reception of anonymous denunciations about fracking operations and ensure adequate follow-up and treatment of such complaints?
✓	Does the company publish information about legal complaints (number, reason, status, resolution)?
✓	Has the company constituted and communicated an effective Whistle Blower Policy that allows for anonymous denunciations of human rights, environmental and other social impacts?
✓	Are local, provincial or national courts, or other conflict resolution mechanisms devised by the State effective in resolving grievances brought to the mechanisms regarding fracking operations?
✓	Does the State promote and facilitate public awareness and understanding of the mechanisms that exist to seek redress from human rights violations that may occur in the sector?
✓	Are there excessive financial or administrative barriers to accessing remediation for fracking related activities?
✓	Do national human rights institutions recognize the risks posed by hydraulic fracturing and are they engaged in the discussion, and the treatment of cases of alleged abuse?
✓	Does the country witness systematic conflicting jurisdictional complications regarding fracking cases? For example, a federal court or a provincial court systematically overturning local court decisions regarding bans, or rulings on reparations/contamination?

VII. The OECD Guidelines for Multinational Enterprises and Hydraulic Fracturing



Originally adopted in 1976, and updated numerous times (the last of which occurred in 2011), the OECD Guidelines for Multinational Enterprises (henceforth, *the OECD Guidelines*) are recommendations addressed by governments to multinational enterprises operating in or from adhering countries. They provide principles and standards for responsible business conduct in a global context consistent with applicable laws and internationally recognized standards.⁷⁰

The OECD Guidelines include chapters on:

- I. Concepts and Principles
- II. General Policies
- III. Disclosure
- IV. Human Rights
- V. Employment and Industrial Relations
- VI. Environment
- VII. Bribery, Extortion
- VIII. Consumer Interests
- IX. Science and Technology
- X. Competition
- XI. Taxation

The OECD Guidelines were created as an effort by governments to address social and environmental impacts witnessed at a global scale, and which were particularly troublesome as many large companies from industrialized countries were perpetrating such impacts through their international operations.

While the standards and principles promoted by the OECD Guidelines are non-binding for companies, the promotion of the guidelines *are* binding for States that are signatories to the OECD. Furthermore, a conflict resolution forum was created under the OECD establishing National Contact Points in signatory countries,

⁷⁰ see: <http://www.oecd.org/daff/inv/mne/48004323.pdf>

to which victims could bring complaints (called Specific Instances) and request that States engage alleged corporate violators with a view to resolve disputes.

The discussion proposed in this publication linking hydraulic fracturing to human rights risks and impacts is particularly relevant to the OECD Guidelines, since many of the issues that are raised in the UNGPs are also treated in the OECD Guidelines. The OECD Guidelines refer for example to the importance that public and private companies adopt *good practices*, respect of local and international law, and that States that are signatories of the OECD will promote their use and respect, including establishing conflict resolution mechanisms (National Contact Points). All of these General Principles are in line with the same approach taken by the UNGPs. Furthermore, the various chapters contained in the OECD Guidelines provide further relevant topics that could be brought to the same discussion we are having over the applicability of the UNGPs to Hydraulic Fracturing.

For example, Chapter II (General Principles) of the OECD Guidelines calls for enterprises to:

- Contribute to economic, environmental and social progress
- Respect internationally recognized human rights affected by their activity
- Uphold good governance principles and develop/apply good corporate governance practices
- Develop and apply self regulatory practices and management systems
- Carry out risk-based due diligence
- Promote the OECD Guidelines amongst business partners
- Engage with relevant stakeholders

The Chapter on Disclosure (Chapter III), like the UNGPs underscores the importance of timely and accessible transparency of information and provides guidance to companies about how the company should address disclosure.

Chapter IV on Human Rights is particularly relevant to the fracking discussion as it brings forward, State commitment to promoting human rights compliance by multinational companies. Like the UNGPs, the OECD Guidelines also stress the importance the companies adhere to the international human rights to which the State where they are operating adhere, and specifically under this Chapter, the OECD Guidelines state that enterprises should:

1. Respect human rights (avoid infringing human rights) and should address adverse impacts
2. Avoid causing or contributing to human rights impacts
3. Seek to prevent *and mitigate* human rights impacts they cause (including through partners)
4. Have a policy commitment to respect human rights
5. Carry out human rights due diligence
6. Provide for process of remediation of human rights impacts

We see immediately that all of the issues on which the Human Rights chapter stipulates are also present in the UNGPs. In fact, in the 2011 revisions of the OECD Guidelines, there is a direct and specific reference to the United Nation's Framework for Business and Human Rights "Protect, Respect, Remedy" and set out that the OECD Guidelines are in line with this framework. We should note that the Guiding Principles were still in draft form when the last revision of the OECD Guidelines took place but nonetheless, there was already a strong commitment by signatory States to uphold this evolving business and human rights framework. We can say that in this regard, the OECD Guidelines and the UNGPs are mutually reinforcing documents that lay out expectations and commitments from States and for enterprises.

Like the UNGPs, the OECD Guidelines also link human rights compliance at a minimum to those rights established reference the International Bill of Rights (consisting of the Universal Declaration on Human Rights and the International Covenant on Civil and Political Rights and the International Covenant on Economic, Social and Cultural Rights). (see OECD Guidelines Chapter IV. Commentary 39)

Furthermore, the OECD Guidelines also stress that

“Enterprises can have an impact on virtually the entire spectrum of internationally recognized human rights. In practice, some human rights may be at greater risk than others in particular industries or contexts, and therefore will be the focus of heightened attention. ... enterprises should respect the human rights of individuals belonging to specific groups or populations that require particular attention, ... [including] indigenous peoples, ... women, children ... and migrant workers” (see OECD Guidelines Chapter IV. Commentary 40)

The OECD Guidelines call for companies to “identify, prevent, and mitigate” human rights impacts and “account” for how these impacts have been addressed. (OECD Guidelines Chapter IV. Commentary 41). The company should also leverage its power to avoid human rights impacts. (OECD Guidelines Chapter IV. Commentary 42), that they should have appropriate human rights policies (OECD Guidelines Chapter IV. Commentary 44), and have due diligence procedures in place to address human rights (OECD Guidelines Chapter IV. Commentary 45) and finally that companies ensure that where human rights impacts have occurred that the company work to remediate the impacts (OECD Guidelines Chapter IV. Commentary 46).

The Environmental Chapter (OECD Guidelines Chapter VI) is clearly another pillar of the OECD Guidelines that is critically relevant to hydraulic fracturing operations. We can at each paragraph of the OECD Guidelines on environmental issues, identify relevance to hydraulic fracturing dimensions already discussed in this publication. It takes into account the Rio Declaration on Environment and Development, the Aarhus Convention on Access to Information, Public Participation in Decision-making, and Access to Justice in Environmental Matters and reflects standards contained in such instruments as the ISO Standard on Environmental Management Systems. (OECD Guidelines Chapter VI, Commentary 60)

The Guidelines presume that companies and management systems should give “appropriate attention to environmental issues”, and provide an “internal framework necessary to control an enterprise’s environmental impacts and to integrate environmental considerations into business operations.” (OECD Guidelines Chapter VI, Commentary 61)

“Enterprises should, within the framework of laws, regulations and administrative practices in the countries in which they operate, and in consideration of relevant international agreements, principles, objectives and standards, take due account of the need to protect the environment, public health and safety, and generally to conduct their activities in a manner contributing to the wider goal of sustainable development. In particular, enterprises should:

1. Establish and maintain a system of environmental management appropriate to the enterprise, including:
 - a. Collection and evaluation of adequate and timely information regarding the environmental health, and safety of their activities;
 - b. Establishment of measurable objectives and ... targets for improved environmental performance and resource utilization ...
 - c. Regular monitoring and verification of progress toward environmental, health, and safety objectives or targets.

[This paragraph is particularly important to ensure that oil and gas companies are studying environmental impacts, and identifying the possible health implications to communities and workers of those impacts; further, oil and gas companies should monitor pollution at all stages of operations]

2. Taking into account concerns about cost, business confidentiality, and the protection of intellectual property rights:
 - a. Provide the public and workers with adequate, measurable and verifiable ... and timely information on the potential environmental, health and safety impacts of the activities of the enterprise, which could include reporting on progress in improving environmental performance; and
 - b. Engage in adequate and timely communication and consultation with the communities directly affected by the environmental, health and safety policies of the enterprise and by their implementation.

[This paragraph points to the need of corporations to provide real term information on environmental and health impacts; this is critically important for moments of actual fracturing, or ongoing extraction of natural gas; sub paragraph (b) points to the need that companies conduct real and informed consultation. We have seen how cases of hydraulic fracturing have skirted public consultation, particularly indigenous peoples, directly affected by operations.]

3. Assess, and address in decision-making, the foreseeable environmental, health, and safety-related impacts associated with the processes, goods and services of the enterprise over their full life cycle with a view to avoiding or, when unavoidable, mitigating them. Where these proposed activities may have significant environmental health or safety impacts, and where they are subject to a decision of a competent authority, prepare an appropriate environmental impact assessment.

[We point here to our previous discussions on the long term implications of pollution, for example, remnant contaminated water deposited indefinitely in deep wells, or the long-term integrity of closed wells.]

4. Consistent with the scientific and technical understanding of the risks, where there are threats of serious damage to the environment, taking also into account human health and safety, not use the lack of full scientific certainty as a reason for postponing cost-effective measures to prevent or minimize such damage.

[As fracking present very serious risks and damage to the environment, and because oil and gas companies have repeatedly denied risks and impacts—such as the relationship between fracturing or deep well discharge of large volumes of contaminated water—when in fact over time these risks and impacts have been confirmed with evolving scientific studies, this is a particularly relevant paragraph to the fracking debate]

5. Maintain contingency plans for preventing, mitigating, and controlling serious environmental and health damage from their operations, including accidents and emergencies; and mechanisms for immediate reporting to the competent authorities.

[Fracking accidents are common, as are emergencies, and we have seen numerous cases where accidents from operations have caused both environmental and human health impacts; for this reason, this paragraph is also very pertinent to the analysis of the OECD Guidelines through a fracking lens.]

6. Continually seek to improve corporate environmental performance, at the level of the enterprise and, where appropriate, of its supply chain, by encouraging such activities as:
 - a. Adoption of technologies and operating procedures in all parts of the enterprise that reflect standards concerning environmental performance in the best performing part of the enterprise;
 - b. Development and provision of products or services that have no undue environmental impacts; are safe in their intended use; reduce greenhouse gas emissions; are efficient in their consumption of energy and natural resources; can be reused, recycled, or disposed of safely;
 - c. Promoting higher levels of awareness among customers of the environmental implications of using the products and services of the enterprise, including, by providing accurate information on their products (for example, on greenhouse gas emissions, biodiversity, resource efficiency, or other environmental issues); and
 - d. Exploring and assessing ways of improving the environmental performance of the enterprise over the longer term, for instance by developing strategies for emission reduction, efficient resource utilization and recycling, substitution or reduction of use of toxic substances, or strategies on biodiversity.

[Fracking involved numerous supply chain actors, subcontractors, etc. and as such, this paragraph is very of the OECD Guidelines is relevant to fracking operations as are for example, the application and use of best practices and best available technologies.]

The Environmental Chapter of the OECD Guidelines tells us that oil and gas companies should ensure “sound environmental management” which should be interpreted in a broad sense, embodying activities that are aimed at controlling both direct and indirect environmental impacts of activities over the long term, involving pollution control and resource management elements”. (OECD Guidelines Chapter VI, Commentary 63). Providing accurate information about activities and relationships to subcontractors and the associated environmental impacts of these relationships are also important tenets of the OECD Guidelines which must be respected by corporations and promoted by States (OECD Guidelines Chapter VI, Commentary 65). These apply directly to the types of activities that are typical of hydraulic fracturing operations.

The OECD Guidelines call for transparency and information regarding contaminants in products as well as *ex ante* assessment on potential impacts of products even if they are not required by law. (OECD Guidelines Chapter VI, Commentary 67).

In terms of preventive measures, best practice or best available technology, which are particularly important to consider in fracking operations for activities such as wellbore casings, drilling operations, use of chemicals, well closure, methane emission monitoring and avoidance of fugitive emissions, the OECD Guidelines call for companies to lead the field in the use of preventive measure. (OECD Guidelines Chapter VI, Commentary 71 and 72)

What is likely to be of great interest to the victims of human rights risks and abuses due to hydraulic fracturing, is the conflict resolution mechanism offered by the OECD Guidelines for addressing violations of the principles and standards contained in the guidelines by corporations, namely, the National Contact Point *Specific Instance* procedure.

National Contact Points (the conflict resolution mechanisms offered by the OECD Guidelines) are tasked with:

“ [furthering] the effectiveness of the Guidelines. NCPs will operate in accordance with core criteria of visibility, accessibility, transparency and accountability to further the objective of functional equivalence.” (OECD Guidelines version 2011, Procedural Guidance. P.71.) National Contact points:

The *National Contact Points*, under the OECD Guidelines receive complaints, called *Specific Instances*, where victims allege OECD Guidelines violations by multinational enterprises. Subsequently, the NCP reviews the complaint and decides on admissibility where issues presented merit further attention. That is, if there appears to be material relevance of the alleged violations to issues, principles and/or standards that should be respected by corporations and promoted by States. The NCP will act as a neutral bystander, and attempt to facilitate engagement, discussion and mediation between the parties (victims and company) to seek a friendly settlement. At the end of the process the NCP issues a non-enforceable statement to the parties, where it may point out OECD Guideline violations and/or recommendations to resolve the dispute.

Because the OECD Guidelines address and offer remedial channels for possible environmental and human rights risks and impacts that might be caused by hydraulic fracturing they are a relevant forum to consider addressing human rights and/or environmental impacts of hydraulic fracturing.

It should be noted that since its' founding in 1976, the experience for real conflict resolution and effective remedies of the NCP process has been weak, negligible or useless. This has to do with several reasons, some of which might be the following:

1. Corporations are not willing to engage in the friendly mediation process;
2. Corporations may walk away from the mediation process at any time with no penalty;
3. Governments may not have any real intention of bringing companies to the forum to engage;
4. NCP Statements are not enforceable, nor do they have any binding character on the parties;
5. Reaction and procedural times are sometimes long and the process loses relevance as the company continues to carry out activity;

Nonetheless, the NCP process does have some beneficial relevance, particularly in terms of bringing alleged violations to the attention of public officials, to the media, to the public realm and to the accused company. While NCP cases may not have a strong history of resolution they have helped bring public scrutiny to the poor practices of corporate violators of the OECD Guidelines, exerting different degrees of pressure according to the specific case involved.

We can say at this state of evolution of the international corporate accountability framework to hold corporate violators accountable for human rights abuses is that the world's understanding of the implications of corporate behavior on the realization of human rights is evolving, and initiatives such as the UNGPs, the OECD Guidelines for Multinational Enterprises and other similar standards initiatives, are shaping the expectations of legal and non-legal actors towards ensuring corporate accountability of human rights.

We have yet to see a Specific Instance filed to an NCP involving a hydraulic fracturing case, although the high level of conflict generated by hydraulic fracturing activity is likely to result in a Specific Instance at some future moment. It stands to be seen how effective this mechanism will be to resolve human rights disputes related to fracking activity.

VIII. Conclusions

The same week we completed the first public draft of this publication, organizations on two continents concerned with human rights compliance and realization, announced that the Permanent People's Tribunal (PPT) will hold a session on hydraulic fracturing and other un-conventional fossil fuel extraction processes.

Societies around the world are firmly behind the conviction that development and energy production should not occur at the expense of the very basic fabric of our global social order. Energy production or energy self-sufficiency should not come at the expense of human health, of physical integrity, or be built upon the unnecessary destruction of our most sensitive natural resources, nor should it trample the rights of local or indigenous communities, or violate our very basic right to life.

It is very clear that the exploration, extraction and production of hydrocarbon fossil fuels places individual and collective human rights at enormous risk. Experience over the last few decades also clearly shows that continuing our dependency on fossil fuel generation comes at great social and environmental costs. One of these costs is the destruction of the balance of our very vulnerable climate. We cannot live as a human race without a healthy climate.

And yet, at the same time that we are expanding our global concern over human rights violations that continue to occur in the name of development and for the sake of energy production and self-sufficiency, and while we are striving evermore to guarantee the effective and full realization of all human rights around the world, the oil and gas sector is firmly set on expanding and deepening global dependency on fossil fuels.

We are convinced that another world is possible, one that less dependent on fossil fuels, and we are also convinced that this world will not be achieved without the firm commitments by our global leaders, by States, by industry, and by people and communities around the planet that we must work collectively to change the way that we live. We must strive to change our consumption patterns, we must buy smaller and more energy efficient vehicles, eliminate unnecessary consumption, install more efficient energy in our homes, and reduce our unrecyclable waste.

We must send clear signals to our leaders and demand from them that they help lead the way to the more sustainable future that we desire. We must call on them to mandate a progressive *reduction* (and not an expansion) of our global dependency on oil and gas and that they push for a progressive replacement of our energy matrix focusing on one that promotes real and tangible growth of renewable energy relative to fossil fuels.

This means *unequivocally* that in the long term, *we must say no to oil and gas*, and that is also means that unequivocally we must oppose the expansion of oil and gas dependency through hydraulic fracturing or through any other means devised to extract and produce more fossil fuels. *Fracking* is not a solution to our climate emergency, as some actors in the oil and gas sector have suggested. The arguments that burning natural gas is cleaner than coal, only hold at a very superficial level, as in fact, before we ever burn gas as a fuel, the production of natural gas has other significant climate impacts that make natural gas even worse for the climate than some of the most contaminating fossil fuel choices.

States must plan today for a tomorrow that is less dependent on fossil fuels. They must plan for a tomorrow that in real terms should have *less fossil fuel consumption and not more*, and where there is *more renewable energy produced and not less*.

As we indicated in the introduction of this publication, this manual is written in an age of a rapidly growing call for human rights accountability of public agency and corporate behavior. Society is calling for a stop to human rights violations perpetrated by irresponsible and illegal corporate behavior that is in many cases knowingly tolerated or even encouraged by States.

Hydraulic fracturing has quickly become one of the most controversial industrial activities of our time, generating suspicion and fear. Communities that have lived with hydraulic fracturing can attest to real impacts affecting their health and environment.

This publication enumerates many of the human rights concerns brought about by hydraulic fracturing, and proposes a framework to consider State and Corporate Responsibilities and Obligations enumerated by the highest global authority on human rights. Our proposition is to utilize the UN Guiding Principles on Business and Human Rights to help identify and sort out the risks and responsibilities that we as a society have to uphold universally accepted human rights. As we have seen in the preceding pages, rights such as the right to health, the right to property, the right to access information and to participate in public affairs, the right to life and the right to a healthy environment, among many others, are affected by hydraulic fracturing in many tangible ways.

This publication is an initial effort to sort out the human rights issues and dimensions of this debate. It offers a window into a complex scenario, considering the social and environmental impacts of a controversial industrial activity that divides societies. Our objective is to filter the debate through a lens that can bring real concerns and impacts to light so that we can consider the consequences of this activity in context of our very pressing social, economic and environmental priorities.

We hope that the work we offer in these pages will bring clarity to the debate and in the end, help protect human rights around the world.

jdt, mg, sb

IX. Further Reading

S. Bachu and T. Watson. Factors Affecting or Indicating Potential Wellbore Leakage. Presentation: EUB Alberta Energy and Utilities Board. 2007
<http://www.albertasurfacerights.com/upload/files/SBachuTWatson%20%20Potential%20Wellbore%20Leakage.pdf>

CIEL. Climate Change and Human Rights: A Primer.
http://www.ciel.org/Publications/CC_HRE_23May11.pdf

The Climate Principles. Shale Gas Exploration and Production: Key Issues and Responsible Business Practices. Guidance Note for Financiers. 2013
<http://www.shinesustainability.com/reports/CPFI-Shale-Gas-Guidance-Note-April-2013.pdf>

T. Colburn, C. Kwiatkowski, K. Schultz & M. Bachran. Natural Gas Operations from a Public Health Perspective. In Human and Ecological Risk Assessment, 17:1039-1056. 2011
http://www.biologicaldiversity.org/campaigns/fracking/pdfs/Colborn_2011_Natural_Gas_from_a_public_health_perspective.pdf

M. Dusseault et.al. Towards a Road Map for Mitigating the Rates and Occurrences of Long-Term Wellbore Leakage. University of Waterloo & Geofirma Engineering Ltd. May 2014
http://catskillcitizens.org/learnmore/Wellbore_Leakage_Study%20compressed.pdf

T. Dutzik, et.al. Who Pays for the Cost of Fracking? Environment America. 2013.
http://www.environmentamerica.org/sites/environment/files/reports/Who%20Pays%20the%20Cost%20of%20Fracking_vUS%20screen_0.pdf

Equitable Origin. EO100tm. Standard Technical Addendum. EO100.1: Shale Oil and Gas Operations. (Public Draft 2015)
http://www.equitableorigin.org//media/eoweb-media/files_db/EO100_Standard_Shale_Oil_and_Gas_DRAFT_v2.pdf

EHRA. Environment and Human Rights Advisory. A Human Rights Assessment of Hydraulic Fracturing for Natural Gas. 2011.

US Environmental Protection Agency (EPA). Assessment of the Potential Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources. June 2015
http://wp.cedha.net/wp-content/uploads/2015/06/HF_ERD_JUN2015.pdf

A. Gear, E. Grant, T. Kerns, K. Morrow and D. Short. *A Human Rights Assessment of Hydraulic Fracturing and other Unconventional Gas Development in the United Kingdom*. October 2014
<http://www.sas.ac.uk/sites/default/files/files/UK%20HRIA%20w%20appdx-hi%20res.pdf>

R. Hammer and J. VanBriesen. In Fracking's Wake: New Rules are Needed to Protect our Health and Environment from Contaminated Wastewater. May 2012.
<http://www.nrdc.org/energy/files/fracking-wastewater-fullreport.pdf>

L. Hansen. Transport, Storage, and Disposal of Fracking Waste. OLR Research Report.
<http://www.cga.ct.gov/2014/rpt/2014-R-0016.htm>

A. Ingraffea. Fluid Migration Mechanisms Due to Faulty Well Design and/or Construction: An Overview and Recent Experiences in the Pennsylvania Marcellus Play. PSE. 2012.
http://www.psehealthyenergy.org/data/PSE_Cement_Failure_Causes_and_Rate_Analysis_Jan_2013_Ingraffea1.pdf

- Interfaith Center on Corporate Responsibility and Investor Environmental Health Network. Extracting the Facts: An Investor Guide to Disclosing Risks from Hydraulic Fracturing Operations. 2012.
<http://www.iehn.org/documents/frackguidance.pdf>
- International Council on Human Rights Policy. Climate Change and Human Rights: A Rough Guide. 2008
http://www.ohchr.org/Documents/Issues/ClimateChange/Submissions/136_report.pdf
- R. Jackson. The Integrity of Oil and Gas Wells. In Proceedings of the National Academy of Sciences of the United States of America. PNAS Vol. 111 no.30. 2014.
www.pnas.org/cgi/doi/10.1073/pnas.1410786111
- M. Kang. CO₂, Methane, and Brine Leakage Through Subsurface Pathways: Exploring Modeling, Measurement, and Policy Options. Princeton University. 2014
http://dataspace.princeton.edu/jspui/bitstream/88435/dsp019s1616326/1/Kang_princeton_0181D_10969.pdf
- A. Karion, et.al. Methane emissions estimates from airborne measurements over a western United States natural gas field. In Geophysical Research Letters, an AGU Journal. 2013.
[ftp://ftp.cmdl.noaa.gov/hats/papers/montzka/2012_pubs/in%20review_Karion%20et%20al%202012.pdf](http://ftp.cmdl.noaa.gov/hats/papers/montzka/2012_pubs/in%20review_Karion%20et%20al%202012.pdf)
- G. Llewellyn et.al. Evaluating a groundwater supply contamination incident attributes to Marcellus Shale gas development. In Proceedings of the National Academy of Sciences of the United States of America. May 2015.
<http://www.pnas.org/content/112/20/6325>
- LM. McKenzie, R. Witter, L. Newman, J. Adgate. Human health risk assessment of air emissions from development of unconventional natural gas resources. In Science of the Total Environment. 2012.
- Mercy International Association. A Guide To Rights-Based Advocacy: International Human Rights Law and Fracking.
http://www.mercyworld.org/_uploads/_ckbl/files/2015/Final%20Fracking%20Guide%202015.pdf
- E. Ridlington, J. Rumpler. Fracking by the Numbers: Key Impacts of Dirty Drilling at the State and National Level. Environment America. 2013
http://www.environmentamerica.org/sites/environment/files/reports/EA_FrackingNumbers_scrn.pdf
- Shift & Mazars. UN Guiding Principles: Reporting Framework with Implementation Guidance. 2015
http://www.ungpreporting.org/wp-content/uploads/2015/02/UNGuidingPrinciplesReportingFramework_withimplementationguidance_Feb2015.pdf
- D. Short et.al. Extreme energy, “fracking” and human rights: a new field for human rights impact assessments? The Journal of Human Rights. 2015
<http://dx.doi.org/10.1080/13642987.2015.1019219>
- T. Srebotnjak and M. Rotkin. Fracking Fumes: Air Pollution from Hydraulic Fracturing Threatens Public Health and Communities. Natural Resources Defense Council. 2014
<http://www.nrdc.org/health/files/fracking-air-pollution-IB.pdf>
- JD. Taillant, A. Roeloffs, C. Headen. Fracking Argentina: Informe Técnico y Legal sobre la Fracturación Hidráulica en Argentina. Center for Human Rights and Environment. 2013.
<http://wp.cedha.net/wp-content/uploads/2013/10/Fracking-Report-CEDHA-final-24-oct-2013-SPANISH.pdf>
- UNANIMA. Hydraulic fracturing for natural gas: A new threat to human rights. 2011. <http://daccess-dds-ny.un.org/doc/UNDOC/GEN/G11/160/72/PDF/G1116072.pdf?OpenElement>
- UNEP. Can we safely squeeze the rocks? UNEP Global Environmental Alert Service (GEAS). November 2012
http://www.unep.org/pdf/UNEP-GEAS_NOV_2012.pdf
- US Department of Energy (DOE). Modern Shale Gas Development in the United States: A Primer. 2009

R. Vidic. et. al. Impact of Shale Gas Development on Regional Water Quality.

<http://www.marcellus.psu.edu/news/PDFs/scienceArticleMay2013.pdf>

or: <http://dx.doi.org/10.1126/science.1235009>

N. Warner et.al. Impacts of Shale Gas Wastewater Disposal on Water Quality in Western Pennsylvania. In American Chemical Society.

http://www2.datashed.org/sites/default/files/supporting_info.pdf

T. Watson. Surface casing vent flow repair: a process. Paper presented at the Petroleum Society's 5th Canadian International Petroleum Conference. Calgary, Alberta. 2004.

ANNEX: Fracking by Phases, Issues, Human Rights and the UN Guiding Principles Requirements

Link to the Annex:

<http://wp.cedha.net/wp-content/uploads/2015/11/Fracking-and-UNGPs-Draft-2-September-29-2015.2.pdf>