



Issue 73
 JANUARY
 FEBRUARY
 2013

O
U
R
W
A
T
E
R
O
U
R
F
U
T
U
R
E

Croton Watershed Clean Water Coalition, Inc.



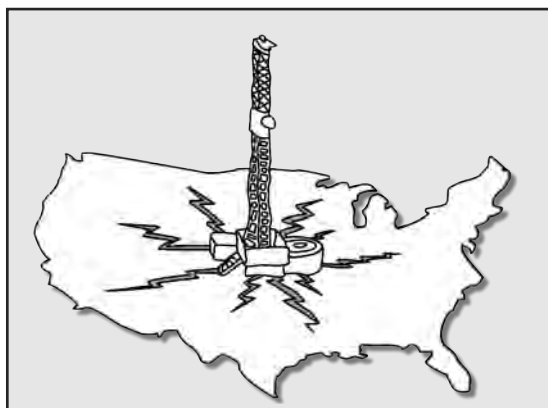
Proposed Regulations for High Volume Hydraulic Fracturing

*James Bryan Bacon, ESQ., P.C.
 Attorney at Law*

Dear Sir or Madam,

Please accept the following comments on behalf of the Croton Watershed Clean Water Coalition and a number of residents living in the southern tier of New York State relating to the New York State Department of Environmental Conservation (DEC) proposed regulations for High Volume Hydraulic Fracturing (HVHF).

DEC must include additional definitions in proposed 6 NYCRR §550.3 to update the New York's Environmental Conservation Law (ECL) definitions dating from enactment of the state's 1963 oil and gas legislation.¹ Updated definitions are required due to advancements in oil and gas extraction



IN THIS ISSUE:

Proposed Regulations for High Volume Hydraulic Fracturing	1
James Bacon Testimony	5
Update On The Spectra Pipeline	5
Introduction	7

technology and significant advances in the understanding of New York's geology and substrata where natural gas is trapped in impermeable rock formations.



Publications by the oil and gas industry² and professionals regularly refer to a wide array of natural gas derivatives, extraction processes and geologic formations, none of which are reflected by the definitions in the ECL or DEC's proposed regulations.

As explained by the industry:

Technology and geological knowledge advances now allow acquisition of unconventional natural gas deposits. Several techniques allow unconventional gas to be extracted, including fracturing, acidizing and pressurizing using water or steam.³

As a result, we request DEC to add the following definitions to 6 NYCRR §550.3 in order that the regulations reflect a current understanding of natural gas and its source formations in New York and to ultimately clarify DEC's position on the law of capture and the purposes of compulsory integration.

Conventional Gas: migratory natural gas deposits tapped by vertical drilling and no artificial stimuli or pressurization. Conventional gas deposits in migratory pools have been the most practical sources to mine. Once drilled, the gas is extracted quite readily, usually by natural pressurization.

Readers are invited to send comments, articles, feedback by email to fumir@aol.com or by conventional mail to:
 CWCWC, P O Box 484
 Bedford, NY 10506

Unconventional Gas: natural gas deposits obtained from impermeable source rock through hydrofracturing, acidization, flooding or other pressurizing means. The term also covers tight gas, shale gas and deep gas.

Tight gas: natural gas that is stuck in a very tight formation underground, trapped in unusually impermeable, hard rock, or in a sandstone or limestone formation that is unusually impermeable and non-porous, i.e. the Lower Silurian age Medina Group and Theresa Sandstone (Galway Formation).

Shale gas: Natural gas trapped in the source rock from the Devonian Age, i.e. Genesee, Marcellus; Silurian Age, i.e. Sodus and Ordovician Age, i.e. Utica.

Deep gas: gas produced from sources at significant physical depths of 7,500 to 10,000 feet. Such formations are Middle to Late Ordovician to Cambrian in age and include the Trenton, Black River, Theresa and Potsdam. In the Finger Lakes area and Southern Tier it would include the Middle and Lower Ordovician age.

Source rock: Rock formations containing tight gas and/or shale gas including the Deep Trenton-Black River “hydrothermal dolomite,” Marcellus Shale, Lower Silurian Clinton Group shales, Lower Silurian age Medina Group sandstones, Ordovician-age Utica Shale and Theresa Sandstone (Galway Formation).

Support for additional definitions is found in DEC’s publications as well. As DEC’s website⁴ explains “New York has untapped ‘deep’ exploration potential. Of more than 33,000 wells currently in the New York well database, fewer than 600 wells were drilled deeper than 5,000 feet. Only 655 wells in New York’s current database were drilled to the Trenton Formation or deeper. (This total may not include recent Trenton-Black River wells, which are confidential.) Fewer than 110 wells have penetrated the entire sedimentary section.”

Deep natural gas deposits will only become more sought after as time increases the value of the resource and technology advances to make extraction more and more economical. DEC’s definitions should be brought up to date to reflect current field conditions and the resources which will be extracted as a result of the promulgation of DEC’s new regulations and completion of DEC’s environmental review of HVHF.

I also include herewith my comments submitted to the New York State Assembly Committee on Environmental Conservation on January 10, 2013 which also calls for clarifying the oil and gas definitions. Specifically, we object to DEC’s use of undefined and loosely defined terms to expand the purposes of compulsory integration and the law of capture to allow a driller in a spacing unit to mine all non-

migratory gas beneath a spacing unit. DEC’s response to comment 4232⁵ in its Assessment of Public Comment on the draft regulations, indicates DEC will interpret the law of capture to include non-migratory gas.

However, the HVHF of any owner’s property without their consent is trespass and an unlawful taking.

HVHF coupled with Compulsory Integration is a Trespass

The *Second Restatement of Torts*—a treatise issued by the American Law Institute (ALI) that summarizes the general principles of current tort law provides that an actor is subject to liability for trespass for any intentional entrance onto or into land—regardless of whether actual harm results—and makes no exception for subsurface trespass.

New York recognizes subsurface trespass. “The essence of trespass to real property is injury to the right of possession, and such trespass may occur under the surface of the ground.” *Bloomington, Inc. v. New York City Transit Authority*, 13 NY3d 61, (2009). (See also *O’Connell v. Graves*, 70 AD3d 1451, [4th Dep’t 2010], where subterranean encroachment of septic system considered trespass; *Smith v. City of Brooklyn*, 18 AD 340, 345-46, [2nd Dep’t 1897], “An adjoining owner has no right to tunnel into another’s land for water or minerals, or take away soil lying under the surface;” *Hathorn v. Dr. Strong’s Saratoga Springs Sanitarium*, 55 Misc. 445 [Saratoga Cty, Sup. Ct. 1907], “The rights of an owner in property below the surface should be regarded as inviolable as those in property upon the surface” and *Forbell v. The City of New York*, 164 N.Y. 522 [1900], “No doubt trespass may be committed by the projection of force beyond the boundary of the lot where the projecting instrument is operated.”)⁶

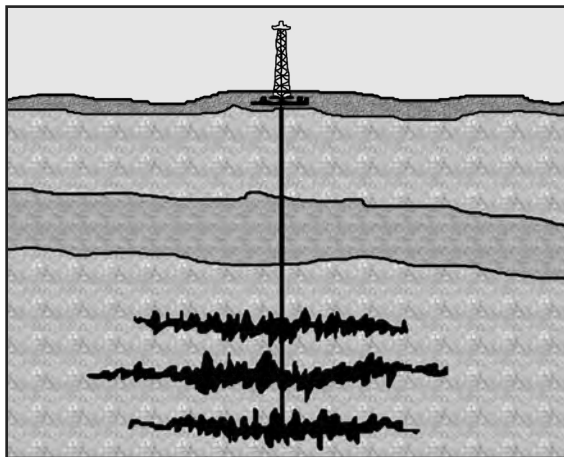
There is no doubt that HVHF constitutes a trespass where the well-bore or fractures invade a neighboring subsurface property. Even in the Texas matter of *Coastal Oil & Gas Corp. v. Garza Energy Trust*, 268 S.W.3d 1, 9 (Tex. 2008), where the majority side-stepped the issue, the dissenting judge stated “[the] party effectively enters another’s lease without consent, drains minerals by means of an artificially created channel or device, and then ‘captures’ the minerals on the trespasser’s lease.”

Current law (ECL §23) allows the subsurface migratory gas to be extracted from beneath other properties integrated into a spacing unit. However, the ECL does not explicitly extend that right to non-migratory gas from source rock. That extension should not be allowed for the following reasons.

First, in New York, the law of capture and the doctrine of correlative rights have historically only applied to migratory subsurface minerals. The gas trapped in the Marcellus shale is different:

[H]ydrocarbons exist in rock or more specifically the pore space within the rock.... Porosity is defined as the fraction of the void space... Many shales have high porosity values reaching 20% to 30%. The problem with shale (and coal) is the lack of... permeability. Take for example a Styrofoam cup. Styrofoam is very porous (which gives it excellent insulating properties) yet it has no permeability because your drink does not leak out of it. Permeability is a measure of a porous material (i.e. rock) to transmit fluid. Without permeability you can't get oil or gas in or out of the rock... With the development of hydraulic fracturing, permeability can be produced in a rock that has very little naturally occurring permeability. It's this man-made increase in deliverability of hydrocarbons to the wellbore that makes an economic or an uneconomic well...

you must have both porosity and permeability to have a producible reservoir. Porosity is static. Permeability can be enhanced.⁷



Therefore, by allowing HVHF to obtain the Marcellus shale gas beneath an unconsenting neighbor, the ECL would for the first time be used to force a trespass upon the neighbor's subsurface property.

Second, the 1963 oil and gas legislation (Title 9 of the ECL) was written prior to the development of HVHF and was based upon 1963 technology; i.e. vertical drilling into oil and/or gas fields and pools. Because oil or gas will flow toward the point of lowest pressure, the 1963 unitization law was authorized as necessary to efficiently drain oil pools and gas domes which underlay more than one property. The 2005 amendments to the ECL did not change the definitions of pool, fields or reservoir to include tight shale formations. Those definitions are:

"Field" means the general area underlaid by one or more pools.

"Pool" shall mean an underground reservoir containing a common accumulation of oil and gas or both. Thus each zone of a structure which is completely separated from any other zone in the same structure is a pool. 6 NYCRR 550.3

"Reservoir" means any underground reservoir, natural or artificial cavern or geologic dome,

sand or stratigraphic trap, whether or not previously occupied by or containing oil or gas.

Therefore, the fact that the gas is trapped in the source rock removes it from the definition of field, pool or reservoir. As above, DEC's definitions need to be expanded to distinguish between conventional migratory gas and unconventional non-migratory gas.

HVHF coupled with Compulsory Integration is a Taking

Both the federal and state constitutions prohibit the taking of private property without just compensation. As recognized in *United States v. Causby*, 328 U.S. 256, 265 (1946) "[A]n owner is entitled to the absolute and undisturbed possession of every part of his premises, including the space above, as much as a mine beneath." The physical occupation of property is the clearest example of a taking. "[W]here real estate is actually invaded by

superinduced additions of water, earth, sand, or other material, or by having any artificial structure placed on it, so as to effectually destroy or impair its usefulness, it is a taking, within the meaning of the Constitution." *Pumpelly v. Green Bay Co.*, 13 Wall. (80 U.S.) 166 (1872). Further:

"A physical occupation of private property by the government which is adjudged to be of a permanent nature is a taking, and that is true without regard to whether the action achieves an important public benefit or has only minimal economic impact on the owner. *Loretto v. Teleprompter Manhattan CATV Corp.*, 102 S.Ct. 3164 (1982)

According to Gregory May, vice president of residential mortgage lending at Tompkins Trust Company, HVHF's subterranean injection of hazardous materials will devalue and encumber the title of property.

There are "key areas that responsible and informed lenders have concluded create an inability for mortgage lenders to provide the required 'representations and warrants' to secondary market investors like Fannie Mae, Freddie Mac and FHA when a standard gas lease exists."⁸

HVHF leasing would conflict with the terms of a residential mortgage document, conflict with set back provisions, title insurance and the lenders' ability to confirm compliance with secondary market guidelines. Consequently, HVHF would render title by most accounts, unmarketable.

If one cannot sell their property or mortgage it, it is worthless. While the correlative rights doctrine may compensate an owner for the gas beneath his property it does not compensate him for the total loss of his property.

In conclusion, the ECL's oil and gas policy calls for the full protection of "the rights of all persons including landowners and the general public." HVHF does just the opposite. HVHF and CI strip away the individual's private property rights and by forced trespass taints the property with hazardous chemicals and negates the marketability and lender financing of the property.

In sum, in order to avoid the unconstitutional taking of private property without just compensation, DEC must promulgate a definition for conventional gas as migratory, define unconventional gas as non-migratory and limit the establishment of spacing units to be used for the drilling and extraction of migratory gas only. Again, the purposes of compulsory integration should not be used to upend NY's law of trespass and allow HVHF to take from a homeowner his most significant investment.

Finally, we reiterate our objection to subsurface drilling beneath any state lands and urge DEC to draft 6 NYCRR §52.3 to include prohibitions on subsurface disturbances of state lands.

As made clear by our prior comments:

HVHF is inconsistent with the state's policies of forest and wildlife stewardship as set forth in Article XIV §3 of the State Constitution. DEC's proposed ban on surface drilling on State lands must be extended to ban subsurface drilling activities which are inconsistent with Article XIV §3, the Environmental Conservation Law and public policy.⁹

DEC has prevented industrialization by prohibiting commercial mining, wind turbines, cellular phone towers, power lines and All-Terrain Vehicles (ATVs) from most areas, *i.e.*:

The placement of new communications towers (for purposes other than DEC administrative use), wind turbines or other utilities should be avoided and for ecological purposes would be more appropriately placed on private lands which have already been fragmented... [and]

State Forests are not an appropriate setting for industrial - scale wind farms that would require permanent clearing of land¹⁰... [and]

Current Department policy is to decline any commercial mining application(s) pertaining to State Forest lands, as the impacts from these activities are not compatible with the purposes for which Reforestation Areas were purchased.¹¹

In closing, we again state that drilling horizontally beneath State lands is inconsistent with DEC policy and the

purposes for which State lands were acquired as HVHF would deposit hazardous frac fluids on State lands. The potential for HVHF fluids and wastes to migrate and contaminate surface resources may be caused by human or mechanical error, seismic activity, the passage of time, *i.e.* deteriorating concrete casings, methane migration or abandoned wells and opened fissures acting as conduits to the surface. Because the risk exists, subsurface drilling should be banned for all State-owned lands and waters, including all waterways. Similarly, any HVHF infrastructure, such as piping, utility connections or roads that cross or invade State lands, would be ¹² contrary to the NYS Constitution and ECL.

- 1 Environmental Conservation Law (ECL) §23-0101.
- 2 http://www.naturalgas.org/overview/unconvent_ng_resource.asp.
- 3 <http://www.oilandgasevaluationreport.com/2010/10/articles/technology/tight-gas-sandstone-is-it-truly-unconventional/>.
- 4 Capturing the Benefits from New York's Natural Oil and Gas Resource Endowment: http://www.dec.ny.gov/docs/materials_minerals_pdf/nyserda5.pdf.
- 5 Assessment of Public Comments 6 NYCRR Parts 52, 190, 550-556, 560, and 750 (PDF) (1MB) - Comments received from September 28, 2011 through January 11, 2012; available at http://www.dec.ny.gov/docs/administration_pdf/asspubcom.pdf.
- 6 For an in-depth analysis please see: OWNING THE CENTER OF THE EARTH: HYDRAULIC FRACTURING AND SUBSURFACE TRESPASS IN THE MARCELLUS SHALE REGION: The Cornell Journal of Law and Public Policy [Vol. 21:457 Dec. 2011] Available at: <http://www.lawschool.cornell.edu/research/JLPP/upload/Lamarre-final.pdf>.
- 7 "The 2 P's of Economic Reservoirs: Porosity and Permeability" Greg McFarland
<http://www.oilandgasevaluationreport.com/articles/oil-field-basics-1/>
- 8 Greg May rebuttal to pro-drilling editorial appearing in the New York State Bar Association Journal January 2012 (which countered E.Radow's NYS Bar Assoc. article from Nov. 2011). See <http://nysbar.com/blogs/barjournal/>.
- 9 CWCWC comments submitted by James Bacon, Esq., dated December 29, 2011.
- 10 Pg 167-168 SPSFM.
- 11 SPSFM at 240.
- 12 See Attachment A; Sustained Casing Pressure and Gas Migration; Brufatto, et al. Schlumberger, OilField Review, Autumn, 2003: http://www.sourcewatch.org/index.php?title=File:Ingraffea_Slides_7-25-11-2_Page_16.png.

James Bacon Testimony Before Assembly Standing Committee on Environmental Conservation

Good afternoon, my name is James Bacon. I'm the attorney representing the Croton Watershed Clean Water Coalition and certain residents in the southern tier. We are deeply concerned with DEC's response to comment 4232¹ in its Assessment of Public Comment on the draft regulations for High Volume Hydraulic Fracturing or HVHF. Response 4232 indicates DEC will interpret the law of capture to include non-migratory gas thereby condoning subsurface trespass and the taking of private property. As background, New York follows the law of capture which is that a migratory substance, such as oil or gas, is not owned until a landowner drills and gains possession of it. The state's oil and gas regulations assume that all gas is migratory. Therefore, DEC requires spacing units dedicating land to one driller so that multiple wells will not de-pressurize underground pools and cause waste. This process is also known as unitization.

Any landowner refusing to be unitized will be forced into a spacing unit by compulsory integration to prevent pool de-pressurization from additional drilling. Draining the migratory gas from beneath properties in the spacing unit is not trespass because the well bore never invades other properties and the draining process causes no harm. While DEC defines all natural gas as migratory, the oil and gas industry distinguishes between *conventional* and *unconventional* gas based upon geology and the mining technique. The industry defines HVHF as an unconventional technique that extracts unconventional gas. A deep vertical well is drilled and then the well bore is directed horizontally into a thin layer of source rock such as the Marcellus, Utica or Trenton-Black river shale. Boring is followed by high-pressure fracturing of the shale's minute pores to extract the gas.

To protect homeowners' rights, DEC must update its regulations to define *conventional* gas as migratory gas extracted from pools without artificial stimuli and define *unconventional* gas as non-migratory gas trapped in impermeable sediment and extracted by unconventional means such as hydrofracturing, acidization or pressurization. Significantly, DEC's 4232 response indicates it will not distinguish between conventional and unconventional gas and thus will expand the law of capture to grant a driller ownership of all non-migratory gas beneath all properties in a

spacing unit. Therefore, for the first time in New York, compulsory integration would render homeowners powerless to protect their property from well bores invading their land, opening fissures beneath it, injecting hazardous materials into it and taking their non-migratory minerals.

That type of property invasion is permitted in some western states such as North Dakota because that state's oil and gas policy subordinates individual rights to the industry and its courts hold that compulsory integration is a proper exercise of the state's police power that supersedes the law of trespass.² By contrast, our state's oil and gas policy protects individual rights. It states that the production of oil and gas must be regulated in a manner whereby, "the rights of all persons including landowners and the general public may be fully protected."³ However, if DEC's policy in response 4232 is not revised, individual rights will suffer permanent harm. Not only will compulsory integration subject landowners to subsurface trespass, the disposal of hazardous frac fluids beneath their lands will prevent those homeowners from obtaining mortgages or re-financing and will taint the marketability of their title.

The industrial use of a homeowner's property for HVHF would also violate the typical homeowners' "residential use only" mortgage restriction. DEC can prevent that permanent damage to the homeowner by defining conventional gas as migratory, defining unconventional gas as non-migratory and by limiting the establishment of spacing units for the drilling and extraction of migratory gas only – which better reflects the legislative purpose for unitization and its historical application in New York. If DEC refuses, we request the Legislature to adopt definitions for conventional and unconventional gas and limit unitization in order to prevent DEC from skewering the state's oil and gas policy and trampling individual rights. Compulsory integration should not be expanded to upend NY's law of trespass and take from a homeowner his most significant investment. Thank you

Update On The Spectra Pipeline

By Clare Donahue, Sane Energy Project

The Spectra pipeline is the first significant new gas transmission pipeline to enter New York City in 40 years. It's a large diameter pipe (30" for its Manhattan run, 42" elsewhere) and high pressure (350 psi, or roughly the force of a fire hose). A pipeline of similar size and pressure exploded in suburban San Bruno, California, in 2010, taking with it a

large swath of homes and leaving 8 dead, 51 injured, and a crater 4 stories deep.

The Spectra pipe is the first of many similar projects that will transport Marcellus and other shale gas into New York markets, and is a danger on many levels: The obvious one

being the risk of explosion to residents nearby, but also other risks, including the delivery of higher radon levels into the city apartments via cooking gas; and increasing the demand to frack in Pennsylvania and other shale-rich areas.

Two years ago this month, the small contingent of people who eventually became Sane Energy Project, walked the freezing and windblown streets of the West Village, asking storeowners and residents to sign on as “interveners” against the Spectra pipeline. Utterly inexperienced in any pipeline review process, we had learned what “intervening” meant only days before. (It requires registering with FERC, the Federal Energy Regulatory Commission, as a stakeholder, so that later on, one will have standing to bring legal action.) The average number of interveners in a typical pipeline project until then had numbered in the dozens. With only one week until the deadline, miraculously, nearly 500 people signed on to intervene. By the time of the October 2011 FERC hearings, there were nearly 5,000 public comments filed in opposition. Only 22 filed in favor—and all but one had a direct financial interest in the project.

Fast forward to the present: Several interveners have indeed brought legal action.

Sane Energy Project leads a coalition of environmental and community groups in a lawsuit against the Hudson River Park Trust (HRPT), Spectra Energy, and Con Edison. **The HRPT is a state agency that granted an easement to Spectra that allows them to build the pipeline across a treasured public park—the Hudson River Greenway—a stretch of bike paths, floral plantings, grass beaches and public amenities running along the river and West Side Highway. The suit alleges that HRPT granted permission for incompatible park uses, violated the public trust, and failed to comply with state environmental laws.**

The Sierra Club, Food and Water Watch, No Gas Pipeline, and the City of Jersey City have also filed motions indicating their intention to bring a federal action against FERC for allowing the project. In their suit, they will show that FERC failed to take the required “hard look” at the issue of radon in shale gas, as well as several other issues, including the violation of citizen’s constitutional rights.

Despite massive community opposition and these two legal actions, the FERC system is set up to benefit industry mandates over citizen desires, and construction was allowed to begin on the Spectra pipeline this past summer. Pipe was laid under the Hudson River shortly after Hurricane Sandy passed through town, and construction continues on the New Jersey side of the river. A needed connection into the underground vault on the Manhattan side must wait for the Whitney Museum to make progress on construction of their

newest branch. (Yes, that’s right: This massive, high-pressure pipeline will run adjacent to the basement of a museum storing irreplaceable art.) From the underground vault, Con Edison will build a connecting pipe, of the same size and pressure, north through the neighborhood of Chelsea—home to significant art galleries, hotels, boutiques, and residences. If the builders get their way, gas will start flowing in November of this year.

Where does that leave us now? A motion by HRPT/Spectra/Con Ed to dismiss the state-level lawsuit brought by Sane Energy Project was heard before a judge on December 18th. We now await the Justice’s decision,

which may come within the next 2 months.

The federal lawsuit against FERC will gear up meantime. Both cases are groundbreaking, potentially precedent setting, and will be anxiously watched by both sides. To be sure, the risks are high, and the industry, with the backing of the Bloomberg administration and utilities, has brought out the big guns against the enviro’s legal team.

Reacting to Spectra and understanding how the review process works required a quick learning curve.

We may have been wet behind the ears when we first heard about it, but the education we’ve received has provided useful experience. **The anti-fracking movement now fully understands the implications of pipelines and how they enable fracking, export, and climate change. With multiple other pipelines in the works (the Constitution, Rockaway, Commonwealth, and others), as a movement we are now much better prepared and activated.** CARP, the Coalition Against the Rockaway Pipeline, was up and running in record time, building on the experience of Spectra activists. A recent hearing for the Constitution pipeline drew an audience of more than 800, and local landowner resistance has been fierce.

Public participation is needed on all fronts. Anyone who opposes the development of shale gas is a stakeholder in the fight against Spectra and other pipelines. When the time comes to sign on as interveners for the Constitution and Rockaway pipes, be at the ready—we’ll want many times the number of interveners as joined the Spectra fight.

Keep up with news of the Spectra pipeline at www.SaneEnergyProject.org

Keep up with news of the Constitution pipeline at www.StopthePipeline.org.

Keep up with news of the Rockaway pipeline at www.CARP.org.

Clare Donohue is a founding member of Sane Energy Project.



Introduction

By Ruonan Zhang; Research Assistant

Born in Shandong Province, China, I enjoyed my childhood from 5 years old with my grandparents in the countryside of Dinggong Village where I caught chafers (a kind of insect which feed on petals and leaves) and fed them with petals and watered peach and cherry branches with buds to observe their blossoming. Then I went back to the city of Zibo where my parents lived. However, the city is famous for its petroleum and chemical industry, is seriously polluted. The river in the city emitted a foul odor and I developed a severe allergy to the bad air conditions. This contrast in environmental conditions shook my young mind, which buried the seed to devote myself to environmental protection.

I decided to widen my horizons and seek for deeper insight into environmental field, so went abroad alone and furthered my study in the US. After graduating from Cornell University, I longed to use my knowledge and skills to solve practical environmental problems. To start my career as an environmental engineer, I wanted to connect with more concrete problems. Since I have experience working as intern for Habitat for Humanity, I thought that an NGO might be a good place to start. So I searched the non-profit organizations in New York through the web. Finally Croton Watershed Clean Water Coalition (CWCWC) caught my attention. Protecting the watershed is meaningful work to which I thought that I could apply my knowledge and abilities. Then I got in contact with this organization and quickly got a friendly response.

The Croton Watershed Clean Water Coalition Inc. (CWCWC) gives me a good start. Now I have had the honor to work as a research intern with this organization. CWCWC is a wonderful place for me to accumulate more experiences, which will be useful and valuable for me in my environmental career choice. The board members are so nice that they give much encouragement and generous help. I feel quite proud and energized to work for such an organization.

At the present time, my main responsibilities include doing research in how the hydrofracking industrial process will impact the quality of water resources in Westchester and Putnam Counties, NY. The research is developed in several aspects, e.g.:

- I. The treatment methods in waste water treatment plants of both counties stated above, and whether they can handle the fracking waste water.
So far I have found that, in both counties, the waste water treatment plants use the widely-accepted method of biological treatment. And this method is usually used to treat city type sewage. Though the equipments of treatment may vary, they share the common



principle.: Microorganisms will make use of some kinds of chemicals as their nutrition for growth and reproduction, and thus chemicals can be removed in this process. However, industrial waste water, including fracking waste water, their contents are more complicated than city type sewage, and may contain chemicals which are poisonous to the microorganisms rather than nutrients to them. This means that that the fracking waste water, might not be treated directly by the local waste water treatment plant, unless the chemicals toxic to microorganisms contained in fracking waste water are removed ahead of time.

- II. The potential danger of radioactivity brought by fracking waste and how they can be treated properly.
My findings point out that there is potential hazard brought by the fracking waste, but debates and research over it are still ongoing. Brine which contains radioactive chemicals is usually reused by the fracking company to save cost. And generally, the fracking company will transport their waste to the appointed wastewater treatment plant and ask the third party to treat it. There many methods for treating radioactive waste, but they share some dangers: most commonly, radioactive wastes are collected, concentrated and finally deeply buried.
- III. Other chemical and biological hazards of fracking waste.
This research is still ongoing.

These experiences have improved my research skills and for the first time, I feel that I can do real help to relieve actual environmental issues. I've gained more confidence in my future career development through this. This internship is helpful to me for seeking a career as a professional environmental engineer, and let me enjoy the friendly environment working with all the nice members of CWCWC.



Our Water, Our Future
Croton Watershed Clean
Water Coalition, Inc.
9 Old Corner Road
Bedford, N.Y. 10506

NONPROFIT ORG
U.S. POSTAGE
PAID
WHITE PLAINS, NY
PERMIT NO. 395



JANUARY FEBRUARY 2013

Email: crotonwshed@aol.com Phone: 914-234-6470 Fax: 914-234-6139 www.newyorkwater.org

Croton Watershed Clean Water Coalition Membership Application

Name: _____

Address: _____

City: _____ State: _____ Zip: _____

Email: _____

- | | |
|---|--|
| <input type="checkbox"/> Group/Coalition Membership \$50/year | <input type="checkbox"/> Students/Seniors \$10/year |
| <input type="checkbox"/> Family Membership \$25/year | <input type="checkbox"/> Other \$_____ |
| <input type="checkbox"/> Individual Membership \$20/year | <input type="checkbox"/> Additional Contribution \$_____ |
| <input type="checkbox"/> Renewal | <input type="checkbox"/> New Membership |

CWCWC, Inc. is a tax exempt, charitable organization under section 501 (c)(3) of the Internal Revenue Code. Your membership contribution is fully tax deductible.
Make checks payable to Croton Watershed Clean Water Coalition, Inc. and mail along with your membership form to:

Treasurer, CWCWC, Inc., PO Box 484, Bedford NY 10506