

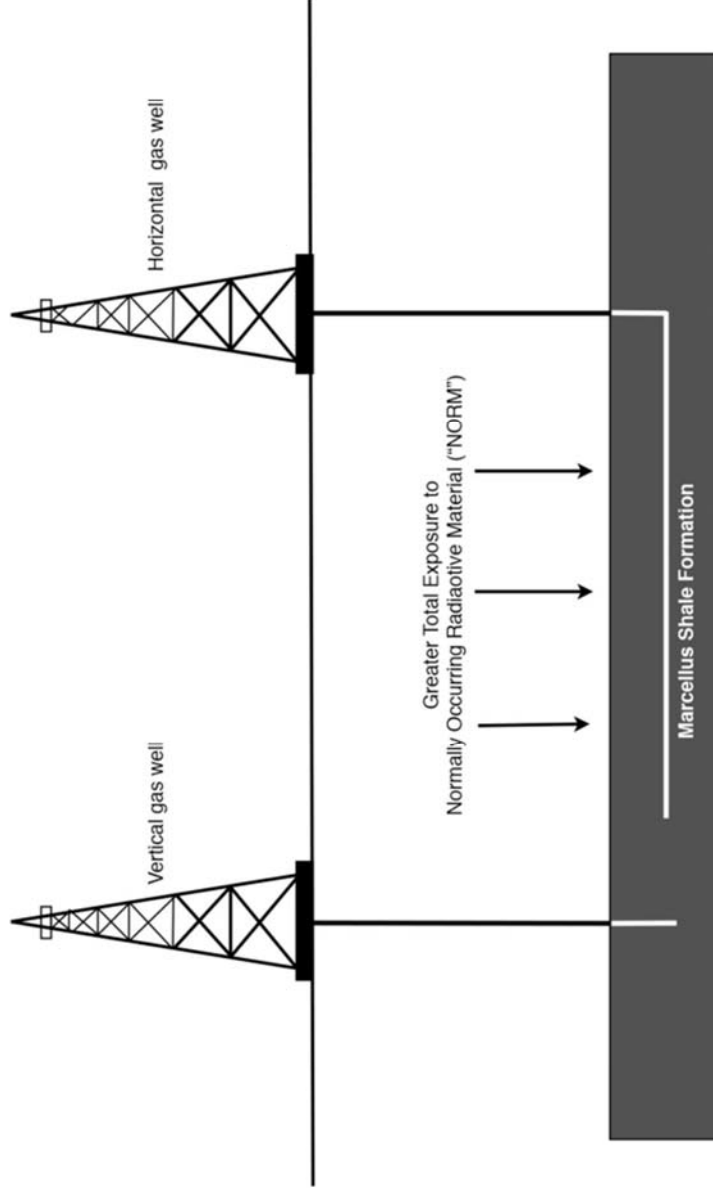


Figure 1: Comparison of Exposure to NORM in Marcellus Shale for Vertical Wells and Horizontal Wells

National Council on Radiation Protection
 E. Ivan White, Senior Staff Scientist
 Consideration of Radiation of Hazardous Waste
 Produced from Horizontal Hydrofracking

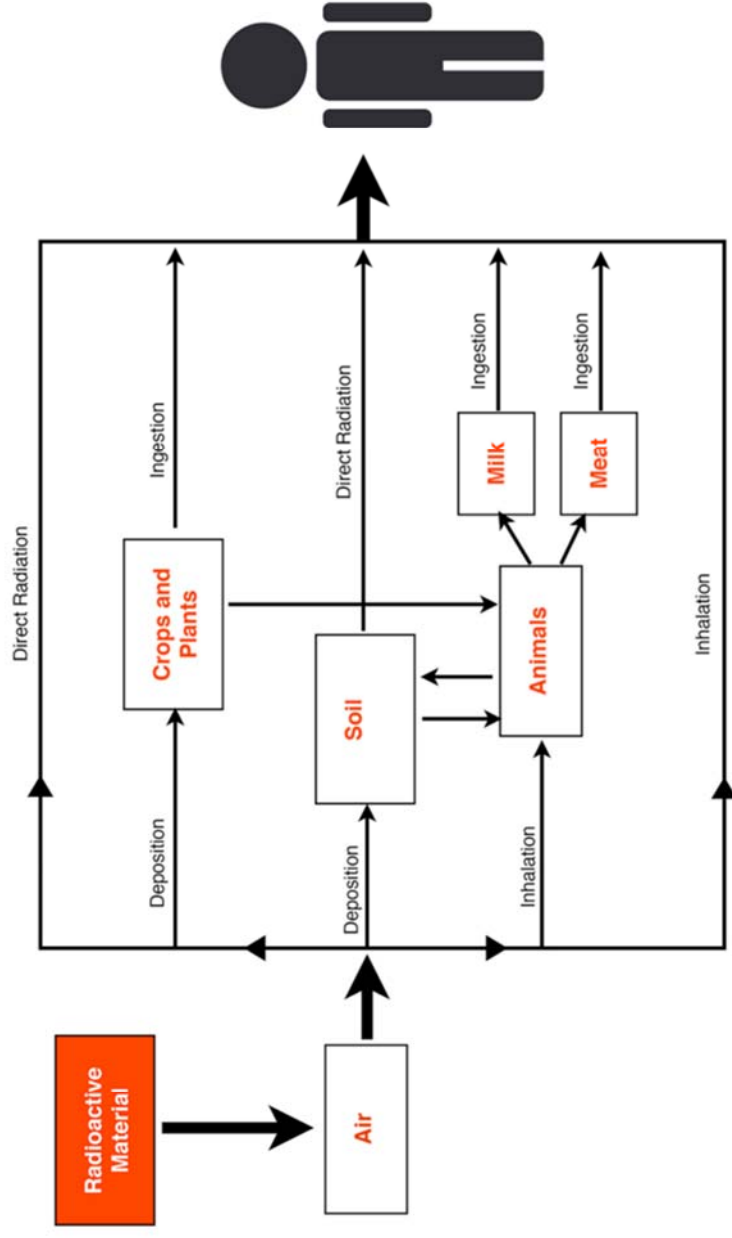


Figure 2: Pathways for Radiation Migration Through Air



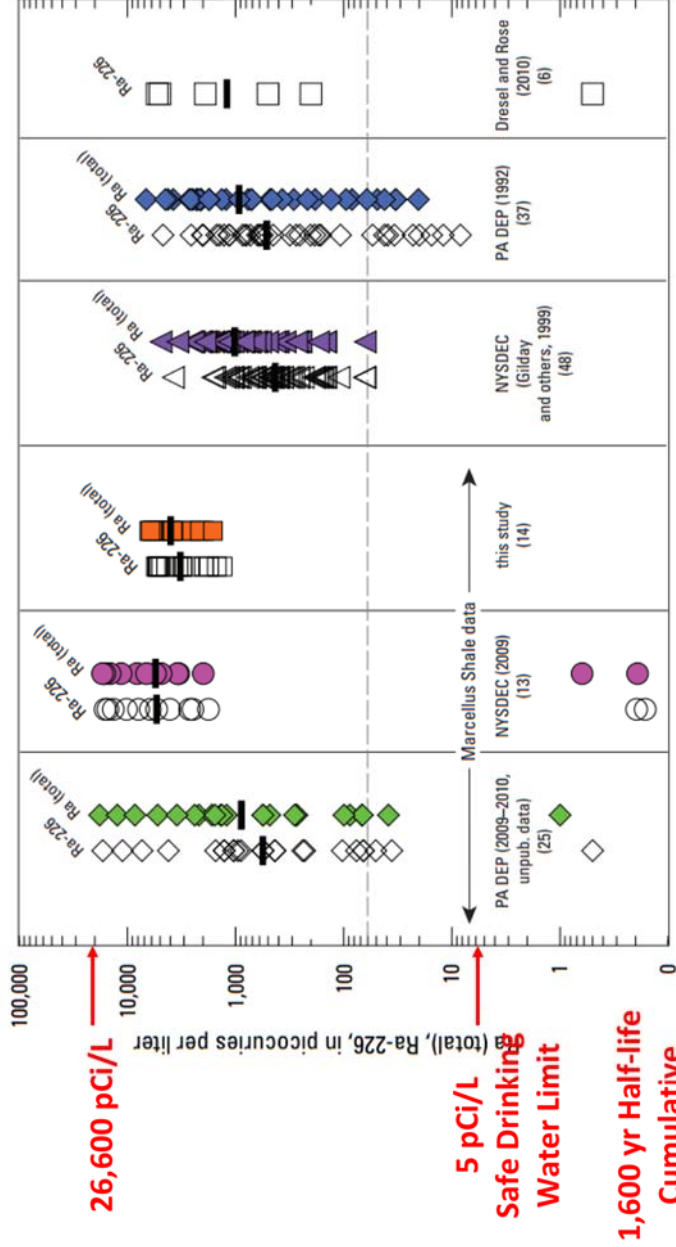


Figure 4. Measured activities for total radium (Ra-226 + Ra-228) and Ra-226 for each of the data sources used in the study. The three datasets for produced water from Marcellus Shale wells are shown on the left; the remaining three datasets are for non-Marcellus Shale wells. The number of points in each dataset is shown in parentheses, and the median values are plotted as heavy black lines. For reference, the dashed line shows the industrial effluent discharge limit (60 pCi/L) for Ra-226 (U.S. Nuclear Regulatory Commission, <http://www.nrc.gov/reading-rm/doc-collections/cfr/part020/appb/Radium-226.html>).

HEALTH EFFECTS OF CHEMICALS USED IN FRACKING

INFOGRAPHIC BY PHYSICIANS FOR SOCIAL RESPONSIBILITY- LOS ANGELES | WWW.PSR-LA.ORG
 BASED ON "NATURAL GAS OPERATIONS FROM A PUBLIC HEALTH PERSPECTIVE" | WWW.ENDOCRINEDISRUPTION.ORG
 COLBORN, THEO, ET AL. "NATURAL GAS OPERATIONS FROM A PUBLIC HEALTH PERSPECTIVE." HUMAN AND ECOLOGICAL RISK
 ASSESSMENT: AN INTERNATIONAL JOURNAL 17.5 (2011): 1039-1056.



BY THE NUMBERS

- 980** NUMBER OF FRACKING CHEMICAL "PRODUCTS" WE KNOW ABOUT
- 649** NUMBER OF CHEMICALS IN THE 980 FRACKING "PRODUCTS"
- 90%** "PRODUCTS" CONTAINING CHEMICALS THAT HAVE ADVERSE HEALTH EFFECTS
- 43%** "PRODUCTS" THAT WE KNOW LESS THAN 1% OF THE CHEMICALS IN THEM

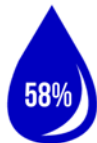


WHAT'S A
"PRODUCT"?



A PRODUCT MAY CONTAIN MORE THAN ONE CHEMICAL.
 A CHEMICAL MAY BE IN MORE THAN ONE PRODUCT.

FOR THE 56% OF
FRACKING
CHEMICALS WE
CAN IDENTIFY



58%

SOLUBLE
IN WATER



36%

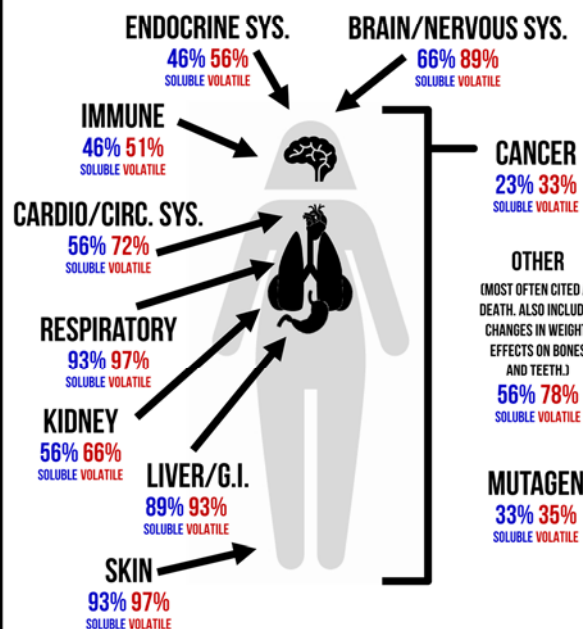
VOLATILE

SMALLER PERCENTAGE,
BUT BIGGER IMPACT. THESE
CHEMICALS CAN BE
INHALED, SWALLOWED,
AND/OR ABSORBED
THROUGH THE SKIN

ALL IMAGES FROM
THE NOUN PROJECT —
 FRACKING: TOM ANANTWERP,
 STOMACH: SERGIO DELGADO
 GARCIA, HEART: CATHERINE
 PLEASE, LUNGS: JORIS HOOGEN-
 DOORN, WATER DROP: CHRIS
 DOBBINS, CLOUD: JAMES FEN-
 TON, QUESTION CLOUD: ANAS
 RAMADAN, WOMAN: LUIS PRADO

BODY SYSTEMS AFFECTED BY FRACKING CHEMICALS*

SHOWN WITH % OF CHEMICALS AFFECTING EACH BODY SYSTEM
 (SOLUBLE CHEMICALS IN BLUE AND VOLATILE CHEMICALS IN RED)



CHEMICALS
WITH A "CAS"
NUMBER

WHAT'S A "CAS"
NUMBER?



A "CAS" NUMBER IS A UNIQUE NUMBER ASSIGNED TO EVERY
 CHEMICAL DESCRIBED IN OPEN SCIENTIFIC LITERATURE.

Waste Type	Barrels	Tons
Basic Sediment	13,385	
Drill Cuttings		596,068
Drilling Fluid Waste	568,103	
Flowback Fracturing Sand		44,913
Fracing Fluid Waste	3,963,864	
General O&G Waste		6,210
Produced Fluid	16,374,609	
Servicing Fluid	1,815	
Grand Total	20,921,776	647,192

Waste generated by unconventional wells in Pennsylvania from January to June 2015 by type.
<http://www.fractracker.org/2015/09/pa-waste-8-states/>

Waste Disposal Method	Solid Waste (Tons)	Liquid Waste (Bbbls)
Cent Waste Trt Fac NPDES Discharge	22,639	1,362,225
Centralized Treatment Plant For Recycle	0	83,618
Injection Disposal Well	322	1,798,364
Landfill	599,600	31,419
Residual Waste Proc Fac (General Permit)	6,657	3,662,234
Residual Waste Processing Facility	1,018	22,343
Residual Waste Transfer Facility	16,363	32,063
Reuse Other Than Road Spreading	0	13,863,624
Road Spreading	0	147
Storage Pending Disposal Or Reuse	592	65,739
Grand Total	647,192	20,921,776

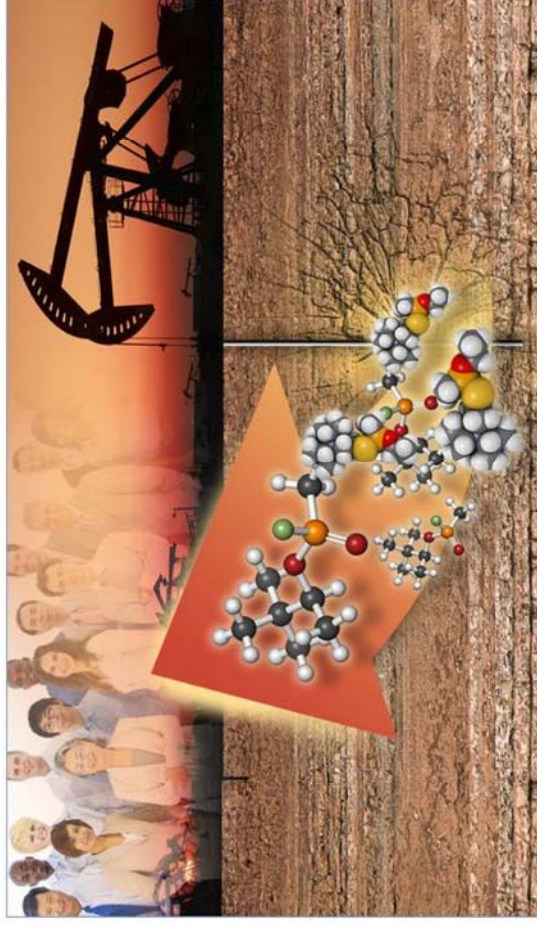
Waste generated by unconventional wells in Pennsylvania from January to June 2015 by type.
<http://www.fracktracker.org/2015/09/pa-waste-8-states/>

Barrels	Gallons
20,921,776 x 42 = 878,714,592	Total Liquid Waste Reported
7,058,152 x 42 = 296,442,384	Tracked to a Specific Treatment or Disposal Facility
13,863,624 x 42 = 582,272,208	Untracked – Marked as reuse, whereabouts unknown

Toxins found in fracking fluids and wastewater, study shows

By Michael Greenwood

January 6, 2016



(Illustration by Pat Lynch / Yale University)

In an analysis of more than 1,000 chemicals in fluids used in and created by hydraulic fracturing (fracking), Yale School of Public Health researchers found that many of the substances have been linked to reproductive and developmental health problems, and the majority had undetermined toxicity due to insufficient information.

Contact

Michael Greenwood
michael.greenwood@yale.edu
203-737-5151



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Blue note: The relationship between

NEWS RELEASE

JULY 15, 2015

Hydraulic Fracturing Linked to Increases in Hospitalization Rates in the Marcellus Shale Region, According to Penn Study

PA residents in counties with high well density more likely to be admitted for suite of ailments

PHILADELPHIA - Hospitalizations for heart conditions, neurological illness, and other conditions were higher among people who live near unconventional gas and oil drilling (hydraulic fracturing), according to new research from the University of Pennsylvania and Columbia University [published this week in PLOS ONE](#). Over the past ten years in the United States, hydraulic fracturing has experienced a meteoric increase. Due to substantial increases in well drilling, potential for air and water pollution posing a health threat has been a concern for nearby residents.

Related Links

Perelman School of Medicine at the
University of Pennsylvania
University of Pennsylvania Health
System

To address this issue, researchers from two Environmental Health Science Core Centers (EHSCC) of the National Institute of Environmental Health Sciences -- the [Center of Excellence in Environmental Toxicology](#) (CEET) at Penn's [Perelman School of Medicine](#) and the Center for Environmental Health in Northern Manhattan at the Mailman School of Public Health, Columbia University, examined the link between drilling well density and healthcare use by zip code from 2007 to 2011 in three northeastern Pennsylvania counties.

Using databases that contained over 198,000 hospitalizations (which includes multiple hospitalizations for the same person), the team examined the top 25 specific medical categories for hospitalizations, as defined

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O: 215-349-5658
C: 215-439-0544

Other Contacts

Department of Communications
(Media Relations):

P: 215-662-2580
F: 215-349-8312

For Patients and the General Public:
1-800-789-7386

PennMedicine.org
Contact Penn Medicine

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MEMORANDUM FROM THE LAW OFFICES OF
HALLORAN & SAGE LLP
225 Asylum Street
Hartford Connecticut 06103

TO:	John Elsesser, Town Manager
FROM:	Duncan J. Forsyth Richard P. Roberts Kelly C. McKeon
DATE:	September 17, 2015
RE:	Review of Proposed Town Ordinance

I. BACKGROUND

It is our understanding that the Town has received a petition requesting a Town meeting to vote on a proposed ordinance that prohibits (1) any natural gas waste or oil waste on any road or real property located within the Town, whether or not such waste has received beneficial use determination or other approval for use by the Department of Energy and Environmental Protection ("DEEP"); (2) the introduction of natural gas waste or oil waste into any wastewater treatment facility or solid waste management facility within or operated by the Town; and (3) the storage, disposal, sale, acquisition, handling treatment and/or processing of waste or natural gas or oil extraction within the Town (the "Proposed Ordinance").¹ The Proposed Ordinance also requires that any bids and contracts related to the purchase or acquisition of materials or the retention of services to be used to construct or maintain any road or real property within the Town include a provision stating that no materials containing natural gas or oil waste were used.

In accordance with § 9.5 of the Town Charter, the Proposed Ordinance must be examined by the town attorney, who is authorized to correct any illegalities and unconstitutional provisions that may exist. Based on the foregoing, we offer the following legal opinion on the Proposed Ordinance.

II. CONNECTICUT STATUTE REGULATING FRACKING WASTE

¹ The Proposed Ordinance attempts to regulate both "natural gas waste" and "oil waste" by consistently differentiating between the two terms. "Natural gas waste" is defined as, among other things, waste that is generated as a result of natural gas extraction activities. See Proposed Ordinance, § 5.4. "Oil waste" is defined as, among other things, waste that is generated as a result of oil extraction activities. See Proposed Ordinance, § 5.5.

In Public Act 14-200 (2014), codified at Conn. Gen. Stat. § 22a-472, the Connecticut Legislature established a moratorium on certain fracking activities. The statute provides that “[n]o person may accept, receive, collect, store, treat, transfer or dispose of waste from hydraulic fracturing, including, but not limited to, the discharge of wastewaters into or from a pollution abatement facility, until [DEEP] adopts regulations” that (1) subject fracking wastes from energy production to the state’s hazardous waste management regulations; (2) ensure any radioactive components of fracking waste do not pollute the air, land, or waters or otherwise threaten human health or the environment; and (3) require disclosure of the composition of the waste. *See* C.G.S. § 22a-472(b). The DEEP must submit these regulations to the legislative review committee sometime between June 30, 2017 and July 1, 2018. *Id.* After the regulations are adopted, the statute requires any person collecting or transporting fracking waste for receipt, acceptance or transfer in Connecticut to obtain a DEEP permit prior to any such collection or transportation in this State. *Id.* at § 22a-472(c). The statute also provides that no person may “sell, offer, barter, manufacture, distribute or use any product for anti-icing, de-icing, pre-wetting or dust suppression” that is derived from or contains fracking waste until DEEP adopts regulations. *Id.* at § 22a-472(d).

The moratorium in § 22a-472 only extends to waste from hydraulic fracturing of natural gas, not oil. The statute defines “hydraulic fracturing” as “the process of pumping a fluid into or under the surface of the ground in order to create fractures in rock for exploration, development, production or recovery of gas.” *See* C.G.S. § 22a-472(a)(4) (emphasis added). *See* C.G.S. § 22a-472(a)(3). The legislative history confirms that the Act is only concerned with placing a moratorium on the fracking of gas and not oil. *See* Sen. Meyer, 5/5/14 (“We were concerned here that if we were not careful with our language, we were going to be prohibiting fracturing that’s used for other good purposes, and so the focus, the clear and sole focus of this bill is on the fracturing hydraulic, means water under pressure with chemicals that focuses on hydraulic fracturing of natural gas, not on the fracturing of other substances.”); (“there is hydraulic fracturing in some instances with respect to minerals and with respect to crude oil. This bill does not attempt to regulate or have a moratorium on those kinds of activities”). Our research found no Connecticut statute that places a similar moratorium on accepting, receiving, collecting, storing, treating, transferring or disposing of waste from hydraulic fracturing for oil. We did find C.G.S. § 22a-473, which prohibits any person from engaging in exploratory drilling for oil or gas until the DEEP promulgates regulations as required under § 22a-472. However, nothing in §22a-473 or any other statute suggests that the Connecticut legislature has prohibited persons from accepting, receiving, collecting, storing, treating, transferring or disposing of waste from hydraulic fracturing for oil.

III. PREEMPTION

The doctrine of preemption is based upon the premise that a legislature may reserve to itself exclusive jurisdiction over an entire subject area thereby preventing local action in that area. “A local ordinance is preempted by a state statute whenever the legislature has demonstrated an intent to occupy the entire field of regulation on the matter...or...whenever the local ordinance irreconcilably conflicts with the statute....Whether an ordinance conflicts with a statute or statutes can only be determined by reviewing the policy and purposes behind the

statute and measuring the degree to which the ordinance frustrates the achievement of the state's objectives." *Bauer v. Waste Mgmt. of Connecticut, Inc.*, 234 Conn. 221, 232 (1995) (citations omitted). "That a matter is of concurrent state and local concern is no impediment to the exercise of authority by a municipality through local regulation, so long as there is no conflict with the state legislation." *Town of Rocky Hill v. SecureCare Realty, LLC*, 315 Conn. 265, 295 (2015).

"A test frequently used to determine whether a conflict exists is whether the ordinance permits or licenses that which the statute forbids, or prohibits that which the statute authorizes; if so, there is a conflict. If, however, both the statute and the ordinance are prohibitory and the only difference is that the ordinance goes further in its prohibition than the statute, but not counter to the prohibition in the statute, and the ordinance does not attempt to authorize that which the legislature has forbidden, or forbid that which the legislature has expressly authorizes, there is no conflict." *Aaron v. Conserv. Comm'n*, 183 Conn. 532, 544 (1981). "[M]erely because a local ordinance, enacted pursuant to the municipality's police power, provides higher standards than a statute on the same subject does not render it necessarily inconsistent with the state law." *Greater New Haven Property Owners Ass'n v. City of New Haven*, 288 Conn. 181, 191 (2008).

IV. ANALYSIS

a. The Town's ban on the transportation of natural gas waste from extraction activities in § 1.1 of the Proposed Ordinance is preempted by § 22a-472.

Section 1.1 of the Proposed Ordinance bans natural gas waste from extraction activities on "any road ... within the town for any purpose." (emphasis added). The language on "any road" should be stricken from the Proposed Ordinance because it is preempted by C.G.S. § 22a-472.

As previously noted, a test frequently used to determine whether a conflict exists is whether the ordinance prohibits that which the statute authorizes; if so, there is a conflict. *Aaron v. Conserv. Comm'n*, 183 Conn. 532, 544 (1981). In making this determination, courts frequently review the legislative history of the statute for guidance. *See, e.g., Bell Atlantic Mobile, Inc. v. Dep't of Public Utility Control*, 253 Conn. 453, 479 (2000); *Modzelewski's Towing and Recovery, Inc. v. State Dep't of Motor Vehicles*, WL 4494312, *5 (Schuman, J., 7/29/14) (citing *Huntington Branch, NCAA v. Town of Huntington*, 844 F.2d 926, 934 (2d Cir. 1988)).

A review of the legislative history of C.G.S. § 22a-472 suggests that the legislature deliberately decided not to prohibit the transportation of fracking waste through the State of Connecticut. *See, e.g., Rep. Albis, 5/7/14* ("the transport of [fracking] materials would not be prohibited under this act...the department currently has regulations to deal with those types of spills, so they would be able to address that instance should it occur"); *Sen. Meyer, 5/5/14* ("we had to look at the question whether or not Pennsylvania might be shipping fracturing waste from Pennsylvania to Massachusetts through the State of New York, through the State of Connecticut, and we do not prohibit that interstate transportation because the legal advice we were given was

that could interfere with the interstate commerce”); Sen. Meyer, 5/5/14 (“there was an early version this winter of this bill that I think did have a reference to prohibition of export or import....We struck that on our lawyers’ recommendations.”); Sen. Meyer, 5/5/14 (“Our counsel...advised us that it would be a violation of the Commerce Clause if we prohibited the transportation of fracking waste through the State of Connecticut, and therefore, an earlier version of this bill was amended to take away any reference to transporting, exporting or importing to avoid that interstate.”); Sen. Meyer, 5/5/14 (“[O]ur LCO pointed out to us that we would be violating the Interstate Commerce Clause if we actually prohibited the transportation of fracking waste across the State of Connecticut. And so in the bill you’ll see there’s nothing that refers to transportation or exporting or importing. We’re not going to be able to interfere with fracking waste that’s going say, from Pennsylvania to New Hampshire.”). This legislative history demonstrates that the legislature consciously deliberated on whether or not to include a ban on the transportation of fracking waste through Connecticut via roads, and decided that such a ban was unwise given the potential for constitutional violations of the Commerce Clause.

Moreover, the legislature defined “transfer” in C.G.S. § 22a-472(a)(8) as “to move from one vehicle to another or to move from one mode of transportation to another.” During debate on the Senate floor, Senator Meyer explained the very “limited” scope of this definition. He stated that “transfer” as used in § 22a-472(b) would not incorporate the kind of transportation which would invade the Commerce Clause; rather, it is limited only to processes whereby a person may be exposed to the waste via a change in transportation vehicle (for example, from a train to a different train or from a train to a truck). By intentionally limiting the ban on fracking waste only to its “transfer” and not to its “transportation,” the legislature has impliedly authorized the transportation of fracking wastes through Connecticut.

Lastly, while § 22a-472’s moratorium is limited to hydraulic fracturing waste for natural gas, and does not include waste from hydraulic fracturing for oil, we believe that the Town should nevertheless strike the language on “any road” from § 1.1 of the Proposed Ordinance because of potential constitutional violations with the Interstate Commerce Clause.

b. The Town’s ban on the introduction of natural gas waste from extraction activities on real property (portion of § 1.1), wastewater treatment facilities (§ 1.2), and solid waste management facilities (§ 1.3) within the Town are not preempted by § 22a-472.

In determining whether a municipality has the authority to enact an ordinance, the state Supreme Court has held that courts are not to look for statutory prohibition against such an enactment. Instead, they must look for statutory authority for it. *Simons v. Canty*, 195 Conn. 524, 530 (1985). While the Town does not have the specific authority to regulate fracking wastes, the general statutory grant of police powers is likely sufficient to authorize the Town to undertake the proposed regulations in (1) the portion of § 1.1 of the Proposed Ordinance that prohibits any fracking wastes on any real property located within the Town; (2) § 1.2 of the Proposed Ordinance that prohibits the introduction of fracking waste into any wastewater treatment facility within or operated by the Town; and (3) § 1.3 of the Proposed Ordinance that prohibits the introduction of fracking waste into any solid waste management facility within or

operated by the Town. Unlike the conflict between § 22a-472 and the portion of § 1.1 of the Proposed Ordinance that attempts to regulate the transportation of waste from natural gas fracking, we could find no similar conflict with the foregoing provisions of the Proposed Ordinance. We are of the opinion that the general statutory grant of police powers is sufficient to authorize the enactment of these subsections.

Connecticut courts have upheld the validity of local ordinances based on the general statutory grant of police powers found in C.G.S. § 7-148. For example, in *Modern Cigarette, Inc. v. Orange*, 256 Conn. 105 (2001), the issue was whether a local ordinance banning all cigarette vending machines within the town was preempted by a state statute that regulated the location of cigarette vending machines, restricting their location from any area which was “frequented primarily by minors.” The trial court declared the ordinance invalid and enjoined the town from enforcing it, but the state Supreme Court reversed, determining that the state statute does not prohibit the town, acting within its powers to protect the health, safety and welfare of its citizens. The court held that “when a statute authorizes a municipality to regulate a certain activity, a prohibition of that activity will be valid if it is rationally related to the protection of the community’s public health, safety and general welfare.” *Id.* at 127. The court further noted:

Every intendment is to be made in favor of the validity of [an] ordinance and it is the duty of the court to sustain the ordinance unless its invalidity is established beyond a reasonable doubt.... [T]he court presumes validity and sustains the legislation unless it clearly violates constitutional principles.... If there is a reasonable ground for upholding it, courts assume that the legislative body intended to place it upon that ground and was not motivated by some improper purpose.... This is especially true where the apparent intent of the enactment is to serve some phase of the *public welfare*.

Id. at 118 (emphasis added).

In *Modern Cigarette*, because the legislature’s concern in enacting the state statute was to prevent tobacco products from being used by minors (i.e., for the public welfare), the court held that the local ordinance, which simply went further and was more comprehensive than the statute, was rationally related to that purpose. *Id.* at 131. Finally, the court noted that if the legislature had wanted to preempt the town from enacting such an ordinance, it could have done so expressly. *Id.* at 132.

The legislative history of § 22a-472 repeatedly demonstrates that the legislature’s motivation for placing a moratorium on the collection, storage, treatment, transfer or disposal of waste from fracking natural gas was because of the “high scientific evidence...that fracking waste is highly toxic,” and therefore should be regulated. *See* Sen. Meyer, 5/5/14; *see also* Sen. Meyer, 5/5/14 (“[w]hat we’re concerned about is this toxic fracking waste coming in here from another state”); (the state “shouldn’t have to have the responsibility for dealing with the toxic material”). We are of the opinion that the portion of § 1.1 banning waste from fracking natural gas on real property within the Town, § 1.2 and § 1.3 simply go further and are more

comprehensive than § 22a-472, and are rationally related to the purpose of protecting the citizens of this State and the environment from the dangerous toxicity of these substances. Moreover, if the legislature had wanted to preempt the Town from enacting such provisions, it could have done so expressly, or implied as such in the legislative history.

c. Section two of the Proposed Ordinance is not preempted by § 22a-472.

Sections 2.1, 2.2 and 2.3 of the Proposed Ordinance provide that all bids and contracts related to the purchase, acquisition of materials, or retention of services to be used to construct or maintain any road or real property within the Town must include a provision stating that no materials containing waste from fracking natural gas will be used. Nothing in § 22a-472 conflicts with these sections of the Proposed Ordinance. In fact, § 22a-472(d) prohibits the use of waste from fracking natural gas in de-icing and dust suppression products, which are used on roads and real estate. The legislative history demonstrates that the purpose for including subsection (d) in § 22a-472 was that other states were beginning to face water contamination issues where toxic fracking wastes were being used in de-icing and dust suppression materials. In other words, the purpose was again to protect the public welfare. Section 2 of the Proposed Ordinance does not conflict with the state statute; instead, it is rationally related to that purpose of protecting the public welfare.

d. The Town's ban on oil waste from extraction activities on any real property located within the Town (portion of § 1.1), the introduction of oil waste into any wastewater treatment facilities (§ 1.2) or solid waste management facilities (§ 1.3), and the affirmation requirements in § 2 of the Proposed Ordinance are legally valid.

As previously noted, our research found no Connecticut statute that places a similar moratorium on accepting, receiving, collecting, storing, treating, transferring or disposing of waste from hydraulic fracturing for oil. Therefore, the issue is not one of preemption; rather, the question is whether the Connecticut General Statutes governing the scope of municipal powers, or the Town Charter, grants the Town the power to enact such restrictions. We believe that the Town does have such authority. Below is a list of several statutes that we believe provide the Town with the authority to enact restrictions regarding the storage, disposal, treatment and/or handling of extracted waste oil within the Town:

C.G.S. § 7-148(c)(4)(H): Grants municipalities the power to “[p]rovide for or regulate the collection and disposal of . . . waste material.”

C.G.S. § 7-148(c)(7)(E): Grants municipalities the power to “[d]efine, prohibit and abate within the municipality all nuisances and causes thereof, and all things detrimental to the health, morals, safety, convenience and welfare of its inhabitants and cause the abatement of any nuisance....”

C.G.S. § 7-148(c)(7)(H)(xi): Grants municipalities the power to “[p]rovide for the health of the inhabitants of the municipality and do all things necessary or desirable to secure and promote the public health.”

C.G.S. § 7-148(c)(8): Grants municipalities the power to “[p]rovide for the protection and improvement of the environment....”

V. CONCLUSION

Our conclusion is fourfold:

(1) The language on “any road” in § 1.1 of the Proposed Ordinance should be stricken because it is preempted by C.G.S. § 22a-472.

(2) The portion of § 1.1 regulating waste from fracking natural gas on real property within the Town, § 1.2 and § 1.3 of the Proposed Ordinance are not preempted by C.G.S. § 22a-472, and simply go further and are more comprehensive than the state statute.

(3) Section 2 of the Proposed Ordinance is not preempted by C.G.S. § 22a-472.

(4) The Town has the authority to enact restrictions regarding the storage, disposal, treatment and/or handling of extracted waste oil within the Town.

As noted above, §22a-472 requires DEEP to submit proposed regulations by July 1, 2018. Should regulations eventually be promulgated, we strongly urge that any ordinance passed by the Town on these matters be reviewed to determine whether it is still compatible with the state regulatory scheme.

Please note:

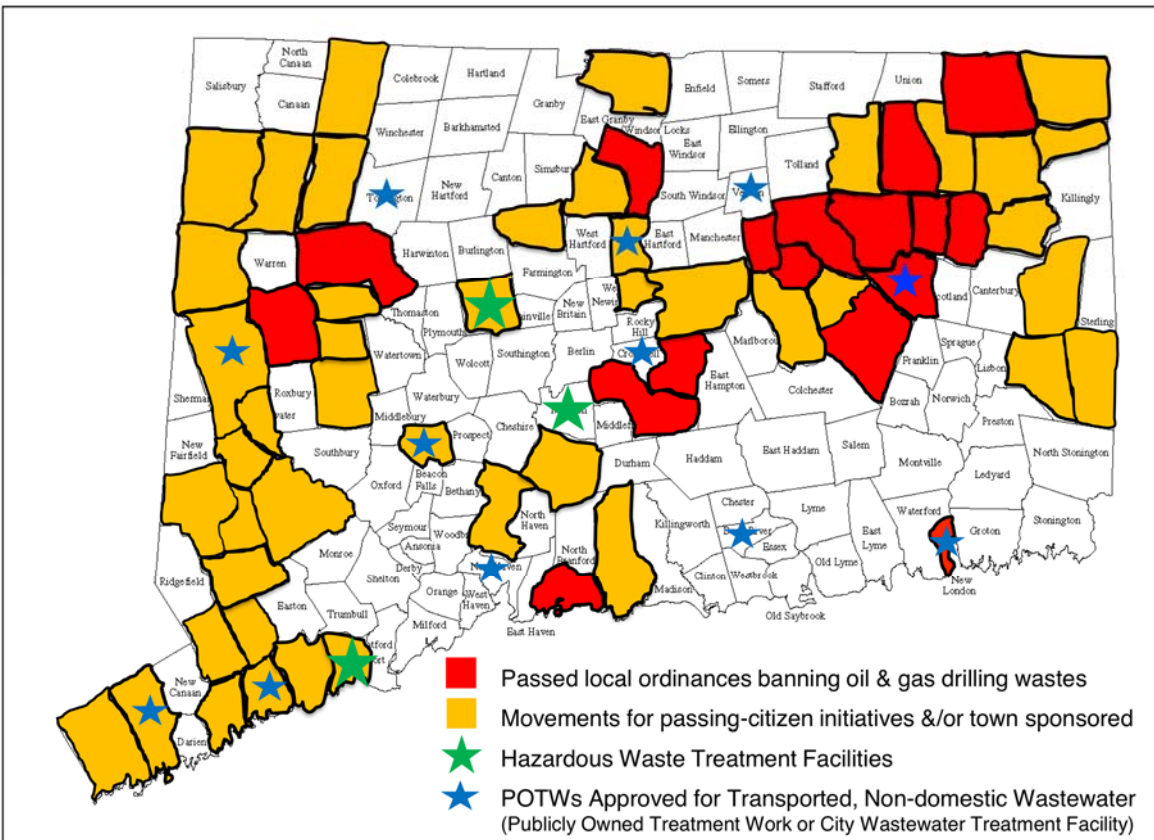
Halloran & Sage provided excellent research and documentation for the Town of Coventry.

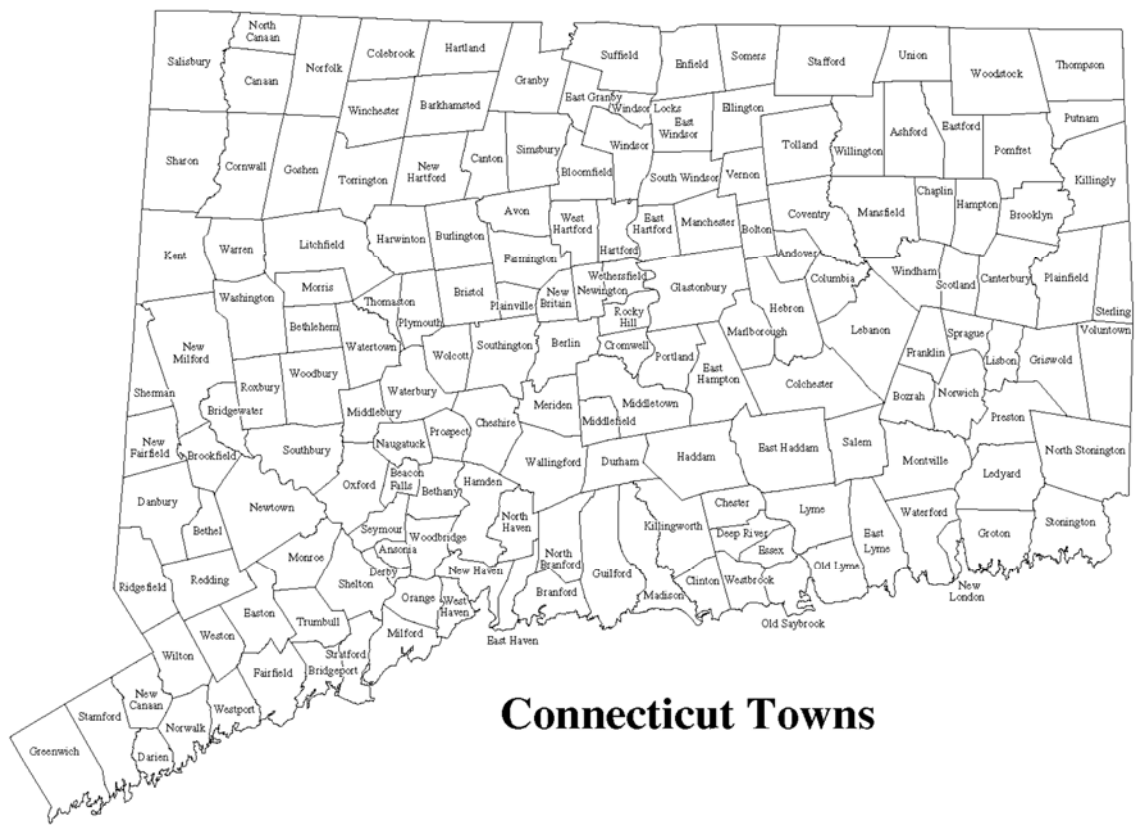
However, please disregard section IV (a) as this analysis is incorrect. The use of the term “any road” does not ban transportation, and there is no mention of transportation in the Prohibitions section.

Coventry decided to add a Transportation section in their ordinance and this section has been repeated by some of the 16 of 17 CT towns that have passed the Riverkeeper model language. This added clause is not necessary, but provides some town leaders “peace of mind”.

Signed,

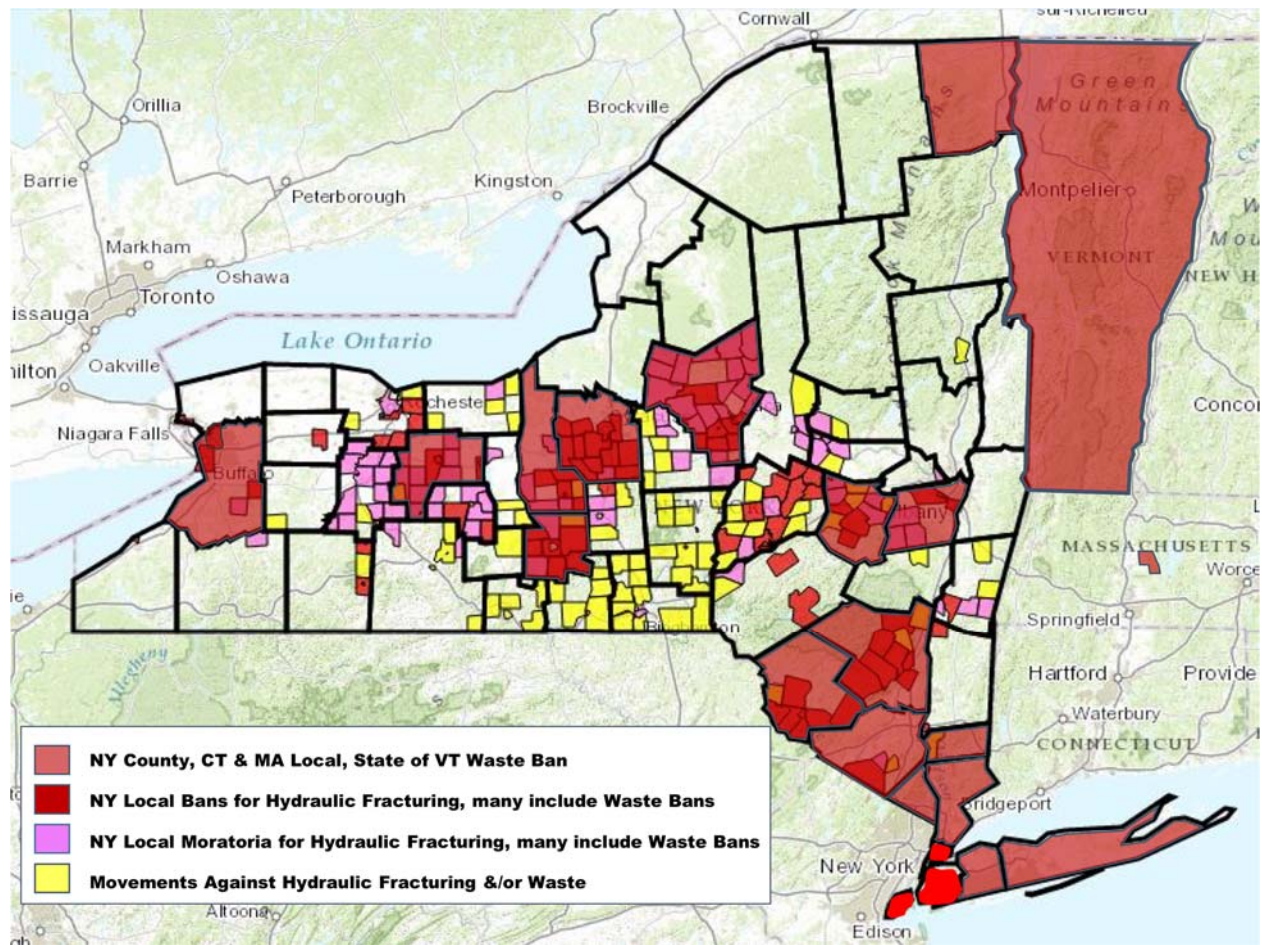
Jennifer Siskind
Local Coordinator
Food & Water Watch





Connecticut Towns

Connecticut Department of Economic and Community Development 1996



Questions and Clarification of Language in Oil & Gas Drilling Waste Ban Ordinance

1. Does this ordinance ban waste oil drained from automobiles or small engines?

NO. The definitions in this ordinance clearly state it prohibits wastes coming out of wells where oil & gas is being drilled and extracted, or any by-products made from that waste. It does not prohibit any refined petroleum products, or any waste that comes from those products, such as used motor oil or waste oil.

“Waste oil” (or used motor oil derived from engine use) is not the same as “oil waste” as defined in this ordinance. Hundreds of towns in neighboring New York and the entire state of Vermont have had similar oil & gas drilling waste bans for several years, and the collection and disposal of “waste oil” from engine use or any other refined petroleum product waste has not been impacted.

2. Does this ordinance ban tar or asphalt used for roadways?

NO. Tar and asphalt for roadways use products from refined petroleum and wastes from the refinement process, not waste that comes from drilling oil & natural gas wells.

A few states are allowing solid wastes from oil & gas drilling wastes to be mixed with an asphalt capping material used to cap brownfields, when remediating toxic, contaminated properties. This ordinance would ban this type of asphalt capping product, due to risks of leaching of chemicals or radioactive materials present in drilling wastes.

3. Does this ordinance ban fracking my drinking water well, if it goes dry?

NO. Though the word “fracking” is similar, this ordinance only applies to fracking or hydraulic fracturing of oil and gas wells, not drinking water wells.

4. Does this ordinance prevent drilling test wells for potential leaking underground oil or gasoline tanks?

NO. This ordinance does not address any type of drilling. It only applies to wastes coming out of wells that are being drilled for natural gas and oil exploration.

5. Does this ordinance ban wastes from being cleaned out of gas pipelines?

NO. This ordinance only deals with wastes coming out of wells where oil and natural gas are being drilled and extracted and where large volumes of gas are stored underground or as LPG. This ordinance does not ban wastes coming out of pipelines where natural gas is transported. (Some towns may have PIGging stations for a gas transmission line. A PIG is a Pipeline Inspection Gadget. PIGs are periodically sent through the pipeline, to check for damage or deterioration, or for cleaning off hazardous and radioactive scale and residue that builds up overtime inside the walls of gas transmission pipes. This cleaning off of materials that builds up inside pipelines is not prohibited by this oil & gas drilling waste ban language, and can continue if an ordinance passes.)



**Memo of Support
Connecticut General Assembly Environmental Committee
Public Hearing March 13, 2017**

**HB 6329 AN ACT CONCERNING HYDRAULIC FRACTURING WASTE IN CONNECTICUT
To permanently prohibit the storage, disposal, handling and use of hydraulic fracturing
waste in Connecticut.**

Grassroots Environmental Education commends the introduction of HB 6329 and strongly supports this critically important legislation that will protect the health and safety of Connecticut residents and the state's natural resources. We urge inclusion of the following important changes to strengthen the bill:

1) Definition of fracking waste should also include all relevant forms of oil and gas extraction, production and storage waste including liquid or solid waste or its constituents generated as a result of natural gas and oil extraction activities which may consist of water, brine, chemicals, naturally occurring radioactive materials, heavy metals or other contaminants; leachate from solid wastes associated with natural gas and oil extraction activities; any waste that is generated as a result of or in association with the underground storage of natural gas and liquefied petroleum gas well storage operations; any products or byproducts resulting from the treatment, processing or modification of any of the above wastes. 2) Provision to be included in bids and contracts related to the construction or maintenance of all publicly owned roads or real property within the state regarding purchase or acquisition of materials or retention of services. 3) Inclusion of penalties for each violation of law e.g. fine of \$25,000 per violation for the sale, application and/or acceptance of natural gas waste or oil waste (Bans enacted in New York counties and New York City include such penalties)

Grassroots Environmental Education is a science-based, environmental health nonprofit, providing public education on environmental health issues and practical solutions for local and state governments, health care providers, school systems, environmental and health organizations nationwide. Grassroots works directly with a network of leading medical and scientific experts in the field of environmental health to bridge the gap between emerging science and public understanding through evidence-based tools and educational programs.

Highly contaminated radioactive fracking waste byproducts and their constituents continue to pose an urgent public health threat due thousands of oil and gas wells and other production, storage and processing operations in neighboring states. Proliferation of radioactive waste byproducts and their constituents could result in irreversible damage and place significant financial and health burdens on taxpayers. Due to the huge volume of fracking waste produced, industry is increasingly interested in repurposing waste byproducts by grinding and blending them with other materials for roads and construction. Other companies are processing or dewatering the waste and using the salts for icemelt. Significant gaps and serious concerns remain regarding the safety of processing fracking waste resulting in end products that could be even more hazardous containing excessively high levels of

radioactive materials and other contaminants.¹

In recognition of this urgent public health threat, to date, public officials are taking precautionary steps to protect the health and safety of residents and their water supplies. To date, ten Connecticut towns have already enacted fracking waste bans and more than a dozen other towns are actively engaged in the process. In New York fifteen counties have enacted fracking waste bans including Westchester, Nassau, Suffolk, Rockland, Putnam, Ulster, Orange, Albany, Schoharie, Oneida, Tompkins, Cayuga, Clinton, Onondaga and Erie Counties. In August 2016, New York City enacted a comprehensive fracking waste ban that now protects the health and safety of its eight and a half million residents and its natural resources. The State of Connecticut must follow their lead without further delay.

Hydraulic fracturing, also known as "hydrofracking", is a technology used for oil and gas extraction from shale formations which involves the injection of millions of gallons of fresh water mixed with hundreds of chemicals and sand forced under high pressure into the well bores to crack open the shale. Ten to forty percent of this highly toxic mixture is returned to the surface with the oil or gas and additional contaminants including volatile organic compounds (VOCs) such as benzene, a carcinogen linked with blood disorders, heavy metals (e.g., arsenic, lead, chromium, mercury), brine 8 times saltier than seawater, and radioactive elements including Radon and Radium which are known carcinogens.

The extraction process produces two types of wastewater. Flowback water is the chemically treated fracking fluid that returns to the surface shortly after a fracking operation. Produced water, also known as formation water or fracking brine, is the fluid that comes out of the target drilling formation along with the oil or gas. The process also produces tons of semi-solid waste in the form of drilling muds, sludge and cuttings.

Produced water or fracking brine has high levels of chlorides and bromides and contains toxic heavy metals. Produced water and semi-solids (drill cuttings, sludge and drilling muds) can contain high levels of Radium-226 and Radium-228. Radium-226 has a half-life of 1600 years and is linked to anemia, cataracts, bone, liver and breast cancers and death.² It also emits gamma radiation that can travel fairly long distances through air, raising risks for cancer in communities. Radon, a decay product of Radium is considered the leading cause of lung cancer in non-smokers with no safe level of exposure.³ There are approximately 21,000 deaths per year attributed to Radon.⁴ Radioactive materials including Radium and its decay product, Radon, are known to be significantly higher in the Marcellus Shale.⁵

Radon is an odorless, tasteless and colorless gas formed by the radioactive decay of Radium, Uranium and Thorium and has a half-life of 3.8 days. Polonium and Lead, the decay products of Radon, have a half-life of 138 days and 22.3 years respectively and are solids known to attach to dust particles. Lead is a neurotoxin with no safe threshold level of exposure and is linked with cognitive deficits and attention deficit/hyperactivity disorder in children and low birth weight. It is linked to elevated blood pressure in adults and is an important risk factor for renal failure.⁶ U.S. EPA classifies Lead as a probable human carcinogen while Polonium is considered a radioactive carcinogen. Radon absorbed by the lungs decays further into Polonium and Lead damaging lung tissue. Lead and Polonium can also damage DNA and RNA.⁷ The exposure pathway of all three of these radioactive materials is through inhalation and possible ingestion.

¹ Earthworks, "Wasting Away: Four States' Failure to Manage Gas and Oil Field Waste from the Marcellus and Utica Shale", April 2015, <http://www.atsdr.cdc.gov/toxprofiles/>

² <http://www.epa.gov/toxprofiles/>

³ Ibid.

⁴ E. Rowan, M. Engle, 2011, Radium content of oil and gas field produced waters in the northern Appalachian Basin, U.S. Geological Survey Report 2011-1135

⁵ Textbook of Children's Environmental Health, Edited by P. Landrigan, R. Etzel, Oxford University Press, 2014

⁶ Ibid.

Data from the Pennsylvania Department of Environmental Protection (DEP) reveals that from 2010-2014, other states have accepted hundreds of thousands of tons of fracking waste byproducts, including wastewater and drill cuttings, from fracking operations in Pennsylvania into landfills.⁸ Leachate from those landfills is accepted at wastewater treatment plants ill equipped to process hazardous chemicals and radioactive materials in oil and gas drilling waste byproducts.

State and federal laws exclude oil and gas waste byproducts from the definition of hazardous waste even though it exceeds criteria for hazardous classification. These exemptions eliminate hazardous waste tracking requirements for handling, storage, treatment and disposal.⁹

In his report, **Consideration of Radiation in Hazardous Waste Produced from Horizontal Hydrofracking**,¹⁰ Ivan White, a staff scientist for the congressionally commissioned National Council on Radiation Protection charged with the protection of military and civilian populations, expressed concern regarding the cavalier attitude toward human exposure to radioactive material and stated that radioactivity should never be released into the environment in an uncontrolled manner because of the potential for exposure from the many potential pathways that exist.¹¹ Radioactive materials can migrate through air exposing crops and plants, soil, animals, livestock, food supplies and humans. Radioactive contaminants can also migrate through soil and surface or groundwater exposing sand and sediment, aquatic animals and plants, fish, irrigation water, vegetation, animals, livestock, food supplies and humans. He further stated that the type of radioactive material found in the Marcellus Shale formation and brought to the surface by hydrofracking is the type that has a long half-life and could easily bio-accumulate over time delivering a dangerous radiation dose to potentially millions of people long after the drilling is over.¹²

According to a U.S. Geological Survey study, levels of total Radium tested in the wastewater from eleven active New York vertical gas wells averaged over 8,400 pCi/L exceeding the EPA's maximum contaminant level for drinking water (5 pCi/L for combined Radium-226 and Radium-228) by more than 1,000 times.¹³

In a 2011 review of federal, state and company records, the New York Times reported that in a sampling of wells studied in Pennsylvania and West Virginia, reported levels of Radium or other radioactive elements exceeded EPA's maximum contaminant level for drinking water by 100 times to more than 1,000 times.¹⁴

The TENORM report released by the Pennsylvania Department of Environmental Protection (PA DEP) indicates significant radioactivity levels in waste associated with gas development and production exceeding EPA's maximum contaminant levels by more than several thousand times. Radium-226 levels in flowback samples were measured between 551 pCi/L and 25,500 pCi/L while Radium-228 levels were measured between 248 pCi/L and 1,740 pCi/L. Radium-226 levels in produced water or brine samples were measured between 40 pCi/L and 26,600 pCi/L while Radium-228 concentrations were measured between 26 pCi/L and 1,900 pCi/L.¹⁵

Naturally occurring radioactive materials (NORM) are distributed through geologic formations and exist undisturbed in nature whether at the earth's surface or below the surface. However, when NORM are disturbed and transported by human activity to human environments they are considered

⁸ http://www.depweb.state.pa.us/portal/server.pt/community/dep_home/5968

⁹ http://www.earthworksaction.org/files/publications/FS_LoopHolesForPollutersNEW.pdf

¹⁰ <http://www.grassrootsinfo.org/pdf/whitereport.pdf>

¹¹ Ibid.

¹² Ibid.

¹³ E. Rowan, M. Engle, Radium content of oil and gas field produced waters in the northern Appalachian Basin, U.S. Geological Survey Report 2011-1135

¹⁴ <http://www.nytimes.com/interactive/2011/02/27/us/natural-gas-documents-1-intro.html?ref=us>

¹⁵ http://www.depweb.state.pa.us/portal/server.pt/community/dep_home/5968

that could interfere with the interstate commerce”); Sen. Meyer, 5/5/14 (“there was an early version this winter of this bill that I think did have a reference to prohibition of export or import....We struck that on our lawyers’ recommendations.”); Sen. Meyer, 5/5/14 (“Our counsel...advised us that it would be a violation of the Commerce Clause if we prohibited the transportation of fracking waste through the State of Connecticut, and therefore, an earlier version of this bill was amended to take away any reference to transporting, exporting or importing to avoid that interstate.”); Sen. Meyer, 5/5/14 (“[O]ur LCO pointed out to us that we would be violating the Interstate Commerce Clause if we actually prohibited the transportation of fracking waste across the State of Connecticut. And so in the bill you’ll see there’s nothing that refers to transportation or exporting or importing. We’re not going to be able to interfere with fracking waste that’s going say, from Pennsylvania to New Hampshire.”). This legislative history demonstrates that the legislature consciously deliberated on whether or not to include a ban on the transportation of fracking waste through Connecticut via roads, and decided that such a ban was unwise given the potential for constitutional violations of the Commerce Clause.

Moreover, the legislature defined “transfer” in C.G.S. § 22a-472(a)(8) as “to move from one vehicle to another or to move from one mode of transportation to another.” During debate on the Senate floor, Senator Meyer explained the very “limited” scope of this definition. He stated that “transfer” as used in § 22a-472(b) would not incorporate the kind of transportation which would invade the Commerce Clause; rather, it is limited only to processes whereby a person may be exposed to the waste via a change in transportation vehicle (for example, from a train to a different train or from a train to a truck). By intentionally limiting the ban on fracking waste only to its “transfer” and not to its “transportation,” the legislature has impliedly authorized the transportation of fracking wastes through Connecticut.

Lastly, while § 22a-472’s moratorium is limited to hydraulic fracturing waste for natural gas, and does not include waste from hydraulic fracturing for oil, we believe that the Town should nevertheless strike the language on “any road” from § 1.1 of the Proposed Ordinance because of potential constitutional violations with the Interstate Commerce Clause.

b. The Town’s ban on the introduction of natural gas waste from extraction activities on real property (portion of § 1.1), wastewater treatment facilities (§ 1.2), and solid waste management facilities (§ 1.3) within the Town are not preempted by § 22a-472.

In determining whether a municipality has the authority to enact an ordinance, the state Supreme Court has held that courts are not to look for statutory prohibition against such an enactment. Instead, they must look for statutory authority for it. *Simons v. Canty*, 195 Conn. 524, 530 (1985). While the Town does not have the specific authority to regulate fracking wastes, the general statutory grant of police powers is likely sufficient to authorize the Town to undertake the proposed regulations in (1) the portion of § 1.1 of the Proposed Ordinance that prohibits any fracking wastes on any real property located within the Town; (2) § 1.2 of the Proposed Ordinance that prohibits the introduction of fracking waste into any wastewater treatment facility within or operated by the Town; and (3) § 1.3 of the Proposed Ordinance that prohibits the introduction of fracking waste into any solid waste management facility within or

the Radium.²⁴ The authors' findings indicated that the EPA method is ineffective for analyzing oil and gas drilling waste byproducts. Their subsequent study calls attention to the use of radium alone to predict radioactivity concentrations can greatly underestimate total radioactivity levels and that uranium and thorium decay series require scrutiny as well.²⁵

The Pennsylvania Department of Environmental Protection (DEP) data noted a marked increase in radiation alarms at Pennsylvania landfills between 2009-2012 triggered by waste trucks from hydrofracking wells with over 1,000 of those radiation alarms coming from oil and gas drilling waste byproducts.²⁶

Bill Hughes, chair of the Wetzel County Solid Waste Authority in West Virginia, reported that tests on water leaching from the Meadowfill landfill shows varying levels of radioactivity averaging 250 pCi/L in 2013 and at times spiking as high as 2,000 pCi/L, many times higher than the clean drinking water standard while another local landfill in Wetzel taking large amounts of hydrofracking waste also demonstrated significant levels of radioactivity.²⁷ Hughes acknowledged that radioactivity occurs in the drill cuttings and brine from the Marcellus gas wells.

Landfill disposal of radioactive waste from oil and gas extraction, production and storage operations could contaminate them for thousands of years. All landfill membranes fail eventually and leaching or flooding could result in contamination of nearby ponds, streams, or groundwater. Leachate from landfills is a frequent cause of groundwater contamination and its disposal cannot be safely handled by wastewater treatment facilities or via applications on farmland or other real property.

Fifty-nine scientists attested to the fact that wastewater treatment facilities are not designed to treat chemicals, contaminants and highly radioactive materials produced from hydrofracking operations.²⁸ High bromide levels in oil and gas waste byproducts are highly corrosive to equipment and can react during water treatment to form brominated trihalomethanes linked to bladder and colon cancers and are associated with birth defects. Once added to drinking water supplies, trihalomethanes are difficult to eliminate.²⁹

According to another study conducted at Duke University, authors examined water quality and radioactivity of discharged effluents, surface waters, and stream sediments associated with a treatment facility site in western Pennsylvania.³⁰ Downstream from the treatment facility, concentrations of chloride and bromide were above background levels and Radium-226 levels in stream sediments at the point of discharge were 200 times greater than upstream and background sediments and above radioactive waste disposal threshold regulations posing potential public health and environmental risks of Radium bioaccumulation in areas of shale gas waste byproduct disposal.³¹

Agricultural areas are especially vulnerable to the immediate threat posed by radioactive oil and gas waste byproducts and their constituents. Mounting evidence reveals livestock illness and death from acute toxicity poisoning from harmful exposures to oil and gas drilling waste byproducts. Reproductive problems in cows and higher rates of stillborn and deformed calves have also been reported.³²

Presence of highly radioactive materials and other contaminants on farmland and in food products can

²⁴ Ibid.

²⁵ <http://ehp.niehs.nih.gov/wp-content/uploads/advpub/2015/4/ehp.1408855.acco.pdf>

²⁶ <http://triblive.com/business/headlines/3945499-74/gas-radiation-radioactivity#axzz3X9aXRbFF>

²⁷ <http://www.publicnewsservice.org/2014-04-21/environment/marcellus-waste-radioactivity-in-water-leaching-from-landfills/a38864-1>

²⁸ <http://www.psehealthyenergy.org/site/view/1035>

²⁹ <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1566350/>

³⁰ <http://pubs.acs.org/doi/abs/10.1021/es402165b>

³¹ Ibid.

³² http://www.psehealthyenergy.org/data/Bamberger_Oswald_NS22_in_press.pdf

cause irreparable damage and serious financial impacts. Protection of the quality and safety of food production is imperative for the health and safety of residents and to ensure consumer confidence in food production.

Vehicles transporting radioactive fracking waste byproducts increase the risk of human and animal exposure and contamination of water, air, soil and farmland when accidents, leaks, and spills occur. Due to lack of proper hazardous classification and tracking requirements, trucks hauling the waste have no special hazardous waste warning signs or emergency instructions placing first responders and residents at risk.

Truck accidents, spills, leaks and road spreading applications can expose drivers, passengers, pedestrians, animals and livestock to radioactive materials while contaminating nearby surface waters, residential areas, school properties and cropland. Radioactive particles may become airborne as trucks and passenger vehicles travel along roads and can be tracked on tires into driveways and garages and ultimately tracked in on shoes into homes. Rain and snowmelt carrying radioactive materials can run off road surfaces where it can migrate onto nearby property, farms and into streams, ponds and irrigation systems, leach into soil or seep into groundwater. These numerous pathways of exposure pose increased risk for human and livestock inhalation and ingestion of highly radioactive materials, and carcinogenic and endocrine disrupting chemicals.

Potential exposure to toxic chemicals and radioactive contaminants comes at a tremendous toll to human health and the economy. An updated and expanded analysis of the costs of environmentally mediated diseases in children nationwide by Dr. Leo Trasande, Associate Professor in the Department of Pediatric Environmental Medicine and Population Health at NYU Medical Center, found that the costs of childhood cancer, asthma, and neurological disorders had escalated from \$54.9 billion in the 2002 analysis to \$76.6 billion in 2008. Dr. Trasande states that the analysis re-emphasizes for policy makers the implications of failing to prevent toxic chemical exposures not only for the health of children but also for the health of the economy.³³

Emphasis must be placed on primary prevention, eliminating hazards BEFORE children and adults are exposed. Disease and dysfunction triggered by toxins can be prevented and it is imperative that strong measures be taken to prevent harmful exposures to hazardous materials in oil and gas waste from extraction, production and storage operations. The potential for irreversible damage is far too great a socio-economic burden for any region to withstand. The mere perception of contamination could have far-reaching consequences.

Grassroots Environmental Education strongly urges the swift passage of HB6329 with full inclusion of the aforementioned edits to protect public health and safety and resources.

Grassroots is available to answer any questions you may have and provide further documentation.

Respectfully submitted by,

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³³ <http://content.healthaffairs.org/content/30/5/863.abstract>



Greenwich Conservation Advocates <greenwichconservationadvocates@gmail.com>

Fracking Waste Water - Town of Greenwich Shellfish Commission

Roger Bowgen <roger@c2trans.com>

Fri, May 19, 2017 at 8:03 AM

To: GreenwichConservationAdvocates@gmail.com

Cc: Michael Long <Michael.Long@greenwichct.org>, Sue Baker <shb1730@yahoo.com>

Dear Marija and Jay

I would refer to the discussion on Fracking Waste Water at this month's Town of Greenwich Shellfish Commission meeting.

After due consideration the Commission would not be in favour of the Town receiving Fracking Waste Water or using it in any form on land or highways.

The Commission, in conjunction with the Bureau of Aquaculture, spend many hours, every month, sampling and checking the water quality in Greenwich waters. This operation assists in monitoring the health of the shellfish beds and ensuring that the shellfish themselves are not being compromised by contaminants entering Long Island Sound.

Any use of fracking water in Greenwich would result in "run off" that would eventually find it's way into the Sound. This would be damaging not only to the Sound itself, but also to the shellfish and the thriving, local shellfishing industry in Greenwich waters.

Very truly yours

Roger Bowgen
Chairman
Town of Greenwich Shellfish Commission

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Attachments:

Petition Signatures from Greenwich voters in support of the ordinance