

**NY STATE ASSEMBLY HEARING ON THE POTENTIAL PUBLIC HEALTH IMPACTS OF
HYDRAULIC FRACTURING
MAY 26TH, 2011**

OUTLINE

POTENTIAL STRESSORS ON HUMAN HEALTH THAT HAVE BEEN IDENTIFIED IN AREAS WHERE GAS DRILLING OCCURS

- Air
- Water
- Waste management
- Noise
- Traffic
- Psychological stressors
- Health infrastructure
- Socioeconomic issues
- Accidents
- Radioactivity
- Psychological stressors

**OIL AND GAS INDUSTRY EXEMPTIONS FROM FEDERAL STATUTES
PHYSICIANS' CONCERNS
HEALTH IMPACT ASSESSMENT**

Sincere thanks to the organizers of these hearings, Assemblymembers Robert Sweeney and Richard Gottfried, Chairs of the EnCon and Health Committees, respectively. And special thanks to Speaker Sheldon Silver's office.

This is the first time that the health impacts of gas drilling exploration and development techniques, including hydraulic fracturing, are being addressed in a public hearing. It is critical that health issues are included in the natural gas debate. Humans may be the short-term beneficiaries of natural gas; however, the development and production of natural gas cannot imperil the health and safety of people. The Assembly's concern regarding the human health impacts is sincerely appreciated. The DEC with its SGEIS process must do a better job of including these issues.

POTENTIAL STRESSORS ON HUMAN HEALTH THAT HAVE BEEN IDENTIFIED IN AREAS WHERE GAS DRILLING OCCURS

- Air Pollution

Where it has been studied in Colorado the greatest health impact of gas drilling is air pollution, according to the Colorado School of Public Health.

<http://www.garfield-county.com/public-health/documents/1%20%20%20Complete%20HIA%20without%20Appendix%20D.pdf>

The diesel and natural gas emissions from trucks, compressors, pumps, processing plants and other equipment contains a complex of benzenes, toluene, and xylene as well as other volatile organic compounds. Drilling activity and traffic create high levels of dust, and methane from venting and flaring contributes to the air pollution. These hazardous air pollutants may combine

with nitrogen oxides to form ground level ozone. However, because of the exemption from the Clean Air Act, the sum total of drilling development and production are not measured and therefore we have insufficient air quality determinants. Ozone can damage forage and food crops, decreasing yields in agricultural products <http://www.ars.usda.gov/Main/docs.htm?docid=12462>
<http://web.mit.edu/news/office/2007/ozone-1026.html>

Dr Armendariz of Texas has found that total air pollution in the Dallas Fort Worth area was more than double all the auto and truck exhaust. Dallas-Fort Worth also happens to have had a recent increase in incidence of asthma—to 25%—compared to half that in other Texas cities. Is the air pollution from gas drilling contributing to this statistic?

Children are especially vulnerable because their lungs continue to grow and enlarge until about age 18. Plus they breathe faster and are closer to the ground. As they mature in the presence of ozone, alveolar production is reduced, and the result of chronic ozone exposure can be brittle lungs like those of an elderly adult.

Air pollution has also been shown to be associated with neurodevelopmental disorders, lower IQ in babies born to mothers with HAP exposure during pregnancy and learning disorders.

Air pollution from the movement of 1000 trucks needed per well (or 2000 truck trips) and gaseous toxins generated from the well site will adversely affect the health of people, particularly those with respiratory conditions—asthma and emphysema, for example. For one well pad it would be 8000 trucks traveling to and fro (that's 16,000 trips). A 10 square mile area can support 10 well pads—that's 80,000 trucks (and 160,000 trips) to develop that 10 square mile area. The pollution from that many trucks and that concentration of wells will surely cause serious respiratory issues.

Once a well is drilled, it is not unusual for it to require re-fracturing anywhere from a year to 10 years from the initial fracture in order to extend its production life. So the machinery will be brought in again, millions of gallons of water will be used again, the toxic chemicals will be needed again, all the noise and pollution will occur again in order to extend the life of the well.

Additional references on air pollution:

<http://www.youtube.com/user/balckbart0930#p/u/2/sEoN-3A-zQ4> example from Dimock, PA
http://www.edf.org/documents/9235_Barnett_Shale_Report.pdf and
http://www.damascuscitizens.org/HEALTH-EPA_Comments_Eric_London_MD.pdf and
[http://www.eeb.cornell.edu/howarth/GHG%20update%20for%20web%20--%20Jan%202011%20\(2\).pdf](http://www.eeb.cornell.edu/howarth/GHG%20update%20for%20web%20--%20Jan%202011%20(2).pdf) and
<http://www.propublica.org/documents/item/epa-greenhouse-gas-emissions-reporting-from-the-petroleum-and-natural-gas-i> and
<http://s3.documentcloud.org/documents/29077/new-epa-data-subpart-w-tsdf.pdf> and
<http://www.earthworksaction.org/pubs/Lana's%20paper%20for%20web.pdf> and
<http://www.star-telegram.com/2010/10/03/2516374/formaldehyde-from-gas-compressor.html>
and
<http://www.pnas.org/content/108/20/8172> and
<http://michigantoday.umich.edu/2011/05/story.php?id=7993&tr=y&aid=8325907>

- **Water Contamination**

A person can live about a month without food, but only about a week without water.

Osborn et al recently wrote that horizontal hydrofracking drilling technologies are dramatically increasing natural-gas extraction. In aquifers overlying the Marcellus and Utica shale formations of northeastern Pennsylvania and upstate New York, they documented systematic evidence for methane contamination of drinking water associated with shale gas extraction. In active gas-extraction areas (one or more gas wells within 1 km), average and maximum methane concentrations in drinking-water wells increased with proximity to the nearest gas well. <http://www.biology.duke.edu/jackson/pnas2011.html>

Additionally, chemicals have contaminated groundwater, water wells and aquifers (see references below).

The NYC Watershed and the Delaware River Basin Watershed together provide water for over 15 million people—about 5% of the US population. However, this area is densely populated. So while we have a seemingly endless supply of water, there are many people dependent on this supply.

In the Southern Tier and south-central NY, people rely on private water wells, and sole- and primary source aquifers. Contamination of any of the water sources in these watersheds would be devastating. Governor Cuomo stated that “watersheds are sacrosanct”. Since there is still much unknown about the technology and effects of hydraulic fracturing, we cannot say it is safe, and therefore the process should be banned until it can someday be proven safe.

In 1992 the GEIS in Chapter 8 described this potential exposure pathway:

“Contamination of water supplies used for livestock, irrigation and other agricultural purposes is also a concern to farmers. Over the years, oil and gas operations have been suspected in several water pollution incidents.

However, the source of these water pollution problems is often difficult to determine, especially without accurate information on the original quality of the water supply. In addition, it is difficult to prove the exact cause of livestock illness or mortality without extensive testing (Lacey, 1983, personal communication, t 4 3).

Farmers are also concerned about the location of drilling pits in or near pastures (NYS Dept. of Agriculture and Markets, 1982a). Drilling pits containing brine can be a nuisance because stock may be attracted to the salt. Fencing is rare because of the temporary nature..”

Additional references on water contamination:

http://www.edf.org/documents/9235_Barnett_Shale_Report.pdf and

[http://www.nytimes.com/2011/02/01/business/energy-environment/01gas.html?](http://www.nytimes.com/2011/02/01/business/energy-environment/01gas.html?src=me&ref=business)

[src=me&ref=business](http://www.earthworksaction.org/NM_GW_Contamination.cfm) and http://www.earthworksaction.org/NM_GW_Contamination.cfm

and <http://www.vanityfair.com/business/features/2010/06/fracking-in-pennsylvania-201006>

and <http://www.fractracker.org/2010/09/water-well-contamination-studies.html> and

http://switchboard.nrdc.org/blogs/amall/incidents_where_hydraulic_frac.html

- **Concern about Chemicals**

What do we know about the chemicals?

Not much because the gas industry calls the formulations “proprietary”.

In fact, a doctor cannot obtain the chemical blend in the case of an emergency, as happened in the case of a nurse in Colorado who treated a worker with a chemical spill on his clothing. He was not significantly harmed, she almost died from multiple organ failure and during the time she was in the intensive care unit, her doctor could not obtain the name of the offending chemical.

The chemicals we do know are suspected carcinogens, mutagens, endocrine disruptors, neurotoxins and hazardous air pollutants when aerosolized. The chemicals are insufficiently documented.

Some chemicals are used throughout the lifecycle of the well.

One of these is 2- butoxyethanol, a solvent used in industrial cleaning solutions that, at doses as low as 0.02 parts per million affects the endocrine system and which causes adrenal, kidney and liver tumors, blood dyscrasias and other human health problems. It was used in the Exxon Valdez spill with resultant detrimental health effects and in the Gulf oil disaster as Corexit.

These dangerous chemicals should not be used.

Additional references on chemicals:

http://endocrinedisruption.com/files/NaturalGasManuscriptPDF09_13_10.pdf and
<http://democrats.energycommerce.house.gov/index.php?q=news/waxman-markey-and-degette-investigation-finds-continued-use-of-diesel-in-hydraulic-fracturing-f> and
<http://endocrinedisruption.com/chemicals.multistate.php> and
<http://63.134.196.109/documents/RiskAssessmentNaturalGasExtraction.pdf> and
<http://bpoilspillcrisisinthegulf.webs.com/corexit.htm> and
<http://www.energyindepth.org/frac-fluid.pdf> and
http://archive.durangoherald.com/asp-bin/article_generation.asp?article_type=news&article_path=/news/08/news080717_2.htm

- **Waste Management and Radioactivity**

Waste from gas drilling operations should be treated as hazardous.

There is currently no safe way to process the waste which contains radioactive elements, brine and gases.

http://www.youtube.com/watch?v=tWwjWfcClgY&feature=player_detailpage

Shales, more than any other kind of rock, also selectively trap heavy metals such as lead, arsenic, barium, strontium, and chromium.

Soluble elements have, over the past 350 million years or so, leached into the water trapped in the rock formation creating extremely salty “brine”, at least 5-10X the salinity of the sea, and that is brought to the surface during gas extraction.

And also brought up are hydrocarbons which are volatile organics such as benzene, ethylene, toluene, and xylene (BETX).

By law (federal exemption changed the designation from “toxic” to “industrial”), wastewater from drilling does not need to be handled as “hazardous”. It is, nonetheless, “hazardous”.

By calling it industrial waste rather than toxic waste, some Pennsylvania waste has been moved to NY State for disposal. They have also put it through municipal wastewater treatment plants in Pennsylvania which are not equipped to handle it.

<http://citizensvoice.com/news/drilling/environmental-watchdog-outlines-fracking-risks-1.1115694#ixzz1NEg9cva7>

So they dump it, lose it or use it on roads as “dust control” or “de-icer” or also as “soil application”.

The New York State Department of Environmental Conservation currently allows three western New York landfills to import Marcellus well cuttings from Pennsylvania, and a fourth landfill operated by Steuben County will soon accept them.

Radium, an alpha-particle emitter, is at issue here and yet the DEC considers this not a risk and are instead measuring gamma radiation.

The following are NYSDOH Bureau of Environmental Radiation Protection Comments to the DEC, made on July 21, 2009:

“Analysis of three production brine samples provided by DEC shows elevated gross alpha and gross beta results, ranging 14,530 - 123,000 picocuries per liter (pCi/L). Isotopic analysis of these samples found concentrations of radium-226 in the production brine in the range of 2,472 - 16,030 pCi/L. If these measurements are representative of production brine from gas wells in the Marcellus, handling and disposal of this wastewater could be a public health concern.

Furthermore, these data suggest that similar radiological sampling and analysis of frac flowback water is needed. Additional production brine sampling results as well as from the water treatment systems should provide information on how to resolve the concerns listed below.

Radium is a naturally occurring radioactive material (NORM). The presence of high levels of radium-226 in the production brine brings up several issues that need to be considered for gas drilling of the Marcellus. The issues raised are not trivial but are also not insurmountable, many can be addressed using common engineering controls and industry best practices. The issues are summarized below:

- References to the Marcellus Shale as having a higher radioactive material content than other shale formations, along with results of analysis performed on production brine from Marcellus Shale showing radium-226 levels ranging 2,600 - 16,000 pCi/L, indicate that naturally occurring radioactive materials (NORM) will need to be evaluated for gas wells in this formation. This conclusion is based on data from three wells, so it is suggested that additional production brine samples be collected to determine whether this is a common occurrence and what precautions may need to be taken during operations.

- An assessment of the levels of NORM in production brine is needed to determine if there is a need for additional treatment for their removal. Water filtration or treatment media may concentrate the radioactive materials and require them to be disposed of at a facility prepared to handle this waste. If production brine is to be sent to the POTW for treatment, additional precautions and personnel monitoring for radiation doses (dosimetry) should be considered for the workers.

- Production brine from other formations has been used as spray-down water for dust suppression on unpaved roads or vehicle race tracks. It has also been used to deice roadways. The high levels of NORM in production brine from the Marcellus may prohibit this or other potential beneficial uses unless the radium can be substantially removed.
- NORM may concentrate in piping or other equipment as precipitates or scale and may require their disposal as radioactive waste. Personnel monitoring for exposure to gamma radiation may be required if buildup of NORM as pipe scale, sediment in settling ponds or on water treatment media is detected. Also, the facility may need to apply for a radioactive materials license pursuant to 10 NY CRR Part 16.
- Disposal of the NORM waste produced may be problematic due to the potentially high concentrations of radioactive materials in the waste stream. For reference, the effluent water discharge limit for radium-226 is $6E-08$ microCi/ml (60 pCi/L) (NYCRR Part 16, Appendices), and the drinking water standard (maximum contaminant level) for radium-226 and radium-228 combined is 5 pCi/L and for gross alpha activity is 15 pCi/L. (NYCRR 10, 5-1.52, Table 7” <http://www.nyhealth.gov/environmental/water/drinking/part5/tables.htm#table1>

The NYS DOH further wrote “Until more data are available, gas drilling in the Marcellus should include sampling of drill tailings, frac flowback water and production brine. Analysis of gross alpha activity, gross beta activity and some gamma spectroscopy analysis should be adequate to assess whether further characterization of radioactive material is needed. The counting efficiency for a total gross alpha sample that has high dissolved solids is very low, resulting in considerable uncertainty (error) for estimating possible radiation exposure. However, total gross alpha activity is an inexpensive (but effective) screening tool, and if the value is greater than 15 pCi/L then additional analysis is performed. These data also suggest that baseline sampling of residential or public wells prior to drilling should include analysis of radioactivity (gross alpha and gross beta).

The New York State Department of Environmental Conservation has regulatory authority for releases of radioactive material to the environment and disposal of radioactive waste. This includes the drill tailings and fluids generated from Marcellus shale drilling. We can provide technical support on the issues raised in these comments as necessary.”

However, the DEC (in chapter 5.2.4.2 of the SGEIS on Naturally Occurring Radioactive Materials in Marcellus Cuttings), on the basis of a few screenings using gamma ray spectroscopy, including some museum pieces, determined that “The results, which indicate levels of radioactivity that are essentially background values, do not indicate an exposure concern for workers or the general public associated with Marcellus cuttings.”

This is in contrast to the peer-reviewed article by Steinhausler on radionuclide exposures of workers in the oil and gas industry. “ABSTRACT: Radiation exposure of workers in the oil-gas industry can occur by inhalation of high-levels of radon gas; increased gamma dose rates; increased gamma dose rate due to ^{226}Ra , ^{210}Pb , ^{228}Ra , and ^{228}Th . The waste also has elevated contents of long-lived radionuclides. Finally, the recycling of waste originating within the oil-gas industry can pose a contamination problem. The various exposure pathways and a regulatory framework are discussed...” Further in the article, Steinhausler states that “non-occupational exposure via the incorporation of radionuclides can result due to practices associated indirectly with the oil and gas industry, such as:

- The use of sewage sludge from oil processing plants in agriculture. Since this waste can contain long-lived radionuclides (e.g. ^{226}Ra), this can lead to an undesirable contamination of

agricultural products. Typically the total ²²⁶Ra activity brought to the surface equals about 918 GBq/yr [10];

- Disposal of large amounts of contaminated wastes (scales, sludge) in so-called “lagoons” near platforms.
- Spent oil-shale piles are frequently located in regions with increased precipitation (e.g., Scandinavia). Leaching of these piles has the potential for groundwater contamination, since the leachate can contain ²²⁶Ra up to 42 Bq/l.”

source: RADIOLOGICAL IMPACT ON MAN AND THE ENVIRONMENT FROM THE OIL AND GAS INDUSTRY: RISK ASSESSMENT FOR THE CRITICAL GROUP by F. STEINHÄUSLER

Center for International Security and Cooperation
Stanford University, CA, USA, 2006.

<http://dcbureau.org/201105101335/Bulldog-Blog/new-york-state-dismisses-radiation-threat-from-gas-drilling-cuttings.html>

Three experts have testified in this case before the DEC and their testimonies can be found here:
<http://www.garyabraham.com/ChemungLF.html>

Additional references regarding waste and radioactivity:

<http://pubs.usgs.gov/fs/fs-0142-99/fs-0142-99.pdf> and

http://s3.amazonaws.com/propublica/assets/natural_gas/nysdoh_marcellus_concerns_090721.pdf and

http://63.134.196.109/documents/10sep28_Otsego2000EPACommentsFINAL.pdf and

<http://www.rwma.com/Marcellus%20Shale%20Report%205-18-2010.pdf> and

http://63.134.196.109/documents/10sep21_RadioactiveWasteFromHorizontalHydrofracking.pdf

and <http://www.scientificamerican.com/article.cfm?id=marcellus-shale-natural-gas-drilling-radioactive-wastewater>

and <http://www.nyscho.org/files/CEHD%20Gas%20Drilling%20Comments%20final%2012%2029%2009.pdf> and

http://www.nytimes.com/2011/02/27/us/27gas.html?_r=3&hp and

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

and <http://www.scientificamerican.com/article.cfm?id=wastewater-sediment-natural-gas-mckeesport-sewage> and

http://63.134.196.109/documents/10sep21_RadioactiveWasteFromHorizontalHydrofracking.pdf

- **Noise**

Can cause **Vibro-Acoustic Disease** which can lead to heart disease, neurological and gastrointestinal problems.

From the 1992 GEIS Vol 1 Ch 8

Subject Noise Level Ranges (dBA)* at 50 feet

Rotary rig with capacity of 150,000 pounds and 400 horsepower 95 – 105

Trucks **82 - 94**

Backhoes **72 - 94**

Tractors **75 - 95**

Concrete Mixing **75 - 88**

For comparison, the following list of familiar activities and places is given:

Quiet residential 40

Average residence daytime activities 50

Typical office 60

Ordinary conversation 65

Noise Level Ranges (dBA)

*dBA is a measurement of noise levels (decibels) with special equipment that selectively filters sound similar to the human ear.

The following "rules of thumb" are helpful for understanding noise levels.

1. An increase of 3 (dBA) is the smallest increase that can be perceived by the human ear.

2. **dBA levels are logarithmic in nature, so a 10 dBA increase is double the perceived loudness.**

3. The nighttime sound level in quiet rural New York where most oil and gas drilling occurs is about 30 dBA (Vessels. 1986, personal communication t58).

4. An Ldn = 55 dBA is identified by the USEPA as an outdoor noise level which will protect the public health and welfare with an adequate margin of safety. The day/night equivalent sound level (Ldn) is a weighted equivalent for a 24-hour period with 10 dBA added to equivalent sound levels at night.

In the 2009 dSGEIS 7.10.4 Mitigating Noise Impacts – Conclusions included use of the New York State DEC guidance document “DEP-00-01 Assessing and Mitigating Noise Impacts” along with a site plan ... for this purpose.

Additional references on noise:

<http://www.elkcapital.net/screamingsilence/> and

<http://www.elkcapital.net/screamingsilence/voices/Sound010.wav> and

<http://www.citidep.pt/papers/articles/alvesper.htm> and

<http://teeic.anl.gov/er/oilgas/impact/drilldev/index.cfm> and

<http://shaleshock.org/2009/01/noise-and-health/> and

<http://www.fastcompany.com/1744151/air-pollution-causes-europeans-to-lose-16-million-years-of-healthy-living-annually-study> and

http://www.euro.who.int/_data/assets/pdf_file/0008/136466/e94888.pdf and

http://un-naturalgas.org/resources_and_documents.htm

- **Traffic/Road Use and Accidents**

Accidents can occur at any point of gas production, from transport of gear and chemicals to the site, to construction and operation of the well, to the processing of the gas and to the delivery of it via pipelines, and at any of those points, explosions are possible with serious threat to life.

In an article in the SUN (12/2010) "Town officials from Smyrna and Plymouth in Chenango County, where much of the county's natural gas activity is occurring, asked for maps so that residents and future property owners would know where the infrastructure was buried.

But according to Beckwith, the U.S. Department of Homeland Security prohibits public disclosure of natural gas pipeline locations. While he assured the committee that Norse Energy, Inc., the company currently developing Chenango County's Herkimer Sandstone reserves, has

given him the coordinates – and that both lines and well heads have been assigned 911 addresses – he said disclosing that information publicly could result in it landing in the hands of terrorists.”

Consideration must be given to emergency preparedness, and whether the locale will be able to handle such an emergency.

<http://www.mcclatchydc.com/2010/06/10/95701/oil-gas-worker-safety-record-weak.html>

http://www.osha.gov/pls/oshaweb/searchresults.relevance?p_text=gas%20workers%20safety&p_status=CURRENT&p_title= numerous references on worker safety

http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=NEWS_RELEASES&p_id=19776

[p_table=NEWS_RELEASES&p_id=19776](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=NEWS_RELEASES&p_id=19776)

http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=NEWS_RELEASES&p_id=19575

[p_table=NEWS_RELEASES&p_id=19575](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=NEWS_RELEASES&p_id=19575)

- **Psychological stressors, Health infrastructure, Socioeconomic issues**

People already under stress from an underlying illness, or poor socioeconomic status, or because they are simply very young or very old and therefore a vulnerable population, suffer environmental insults less well than people who are not so stressed.

Consider the Southern Tier and the already very poor health outcomes; Sullivan County where I reside is 61st in the State in health outcomes <http://www.countyhealthrankings.org/new-york> .

Exposing the vulnerable populations of the Southern Tier to environmental stressors will place undue stress on their health <http://envirn.org/pg/pages/view/1334/harmful-environmental-exposures-and-vulnerable-populations> .

OIL AND GAS INDUSTRY EXEMPTIONS FROM FEDERAL STATUTES

There are documented instances of illness, and there has been air and water contamination in drilling areas; is this due to gas drilling?

In 2005 the federal government granted sweeping exemptions to the gas industry from major provisions of public health and environmental laws.

Due to a 2004 EPA Study which was misrepresented, Congress passed the 2005 Energy Policy Act. A 2004 (EPA) study had concluded that the process was safe and didn't warrant further study, because there was "no unequivocal evidence" of health risks, and the fluids were neither necessarily hazardous nor able to travel far underground. That study, however, was not intended as a general study of hydraulic fracturing, but only of its use in coalbed methane deposits, and the study did not consider impacts above ground.

So when Congress granted the gas industry these exemptions from the federal public health and environmental laws which were instituted specifically to protect public health, (such as the Superfund Act in 1980 which was an act to provide for liability, compensation, cleanup, and emergency response for hazardous substances released into the environment and the cleanup of inactive hazardous waste disposal sites, and others following the Love Canal investigation) and key provisions of the Clean Air Act, Clean Water Act, Safe Drinking Water Act, CERCLA Comprehensive Environmental Response, Compensation, and Liability Act (Superfund Act),

health effects became almost impossible to track.

{LOVE CANAL: public health emergency was declared in 1978 by President Jimmy Carter, after 900 homes and 2 schools had been built over a toxic waste site where people were becoming ill. Eventually, the government relocated more than 800 families and reimbursed them for their homes, and the United States Congress passed the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), or the Superfund Act, that holds polluters accountable for their damages.

Love Canal is important in United States environmental history as one of two sites (the other was Times Beach in Missouri) that in large part led to the Comprehensive Environmental Response Compensation and Liability Act (CERCLA).}

http://www.citizenscampaign.org/PDFs/cce_hvhf_wp_final.pdf

<http://www.earthworksaction.org/pubs/PetroleumExemptions1c.pdf>

- **Safe Drinking Water Act (SDWA)**

Hydraulic fracturing operations are exempted from regulation under the SDWA, and Underground Injection Control of fracking fluid was defined to exempt it from EPA regulation.

The recommendation is to avoid all harmful chemicals in gas exploration and development operations and that includes a total ban on the use of diesel fuel as one of the additives in the hydraulic fracturing process.

- **Clean Water Act (CWA)**

Expanded the definition of oil and gas exempted operations and activities to include the construction of the drill site, waste management pits, access roads, in-field treatment plants and transportation infrastructure.

It eliminated "sediment" as a pollutant in managing stormwater run-off from drill pad site and all oil and gas field construction activities and operations.

Recommend that stormwater discharges from all oil and gas development must again be regulated under the Clean Water Act by the federal government in order to provide the states with a proper foundation from which to build adequate stormwater programs that will protect human health and the environment from expanding oil and gas development.

- **National Environmental Policy Act (NEPA)**

Weakened environmental review process by presuming that some oil and gas related activities should be analyzed and processed by the Interior and Agricultural Departments under categorical exclusions, which does not provide for a public comment period.

Recommend that because of the disruptive nature of oil and gas activities on human health and the environment, none of these activities ought to qualify for the categorical exclusion under the National Environmental Policy Act. All oil and gas activities must be assessed for impacts on the environment under the

more comprehensive environmental assessment and environment impact statement in order to properly fulfill the intentions of the statute.

- **Comprehensive Environmental Response, Compensation and Liability Act (a.k.a. Superfund)**

The list of covered hazardous substances section 101(14) excludes crude oil and petroleum.

Recommend that to protect human health and the environment from spills and leaks of hazardous and carcinogenic materials on well sites this must be reversed.

- **Resource Conservation and Recovery Act (RCRA)**

The Solid Waste Disposal Act of 1980 exempts oil field waste from Subchapter III of RCRA until the EPA could prove the wastes were a danger to human health and the environment. In 1988 EPA made a regulatory determination that oil field waste should be exempted because of adequate state and federal regulations. This includes produced waters, drilling fluids, and associated wastes.

Recommend that oil field wastes must be regulated under the Resource Conservation and Recovery Act in order to ensure the proper handling and disposal of hazardous and carcinogenic wastes generated by oil and gas development.

- **Clean Air Act (CAA)**

The CAA states that the oil and gas industry will not be aggregated together to determine if they are subject to Maximum Achievable Control Technology for each source. The exemption also extends to pipeline compressors and pump stations in some instances.

Recommend that emissions from all oil and gas facilities must be aggregated under the Clean Air Act in order to ascertain the true hazardous effect on air quality.

Also, hydrogen sulfide must be again considered a hazardous air emission under the CAA in light of the current available data regarding its negative impacts on human health and the environment.

- **Toxic Release Inventory under the Emergency Planning and Community Right-to-Know Act (EPCRA)**

The oil and gas industry is exempted from reporting under section 313 of EPCRA.

Recommend that the oil and gas industry must be made to disclose the chemicals used during the development stages.

Two years ago a group of 23 doctors and scientists wrote to their Congressmen (letter attached): "As scientists and health professionals, we are writing to express our collective view that oil and gas companies, like any other industry, should be required to fully comply with all health and environmental protections in U.S. law, including the Safe Drinking Water Act, Clean Water Act, Clean Air Act and others, rather than being exempt from any of their safeguards.

"Oil and gas operations are known to release substances into the environment that are known to be very hazardous to human health, including benzene, arsenic, mercury, hydrogen sulfide, and radioactive materials. The demonstrated health effects caused by these substances include cancers, central nervous system damage, skin and eye irritation, and lung diseases. For example, fluids used in the hydraulic fracturing process may contain toxic chemicals such as 2-butoxyethanol, formaldehyde, sodium hydroxide, glycol ethers, and naphthalene. For these reasons, we support regulation of hydraulic fracturing under the Safe Drinking Water Act and the disclosure of all chemical constituents in hydraulic fracturing fluids to public agencies, including the disclosure of constituent formulas in cases of medical need. Moreover, we support full regulation of stormwater runoff, which can pollute drinking water supplies, under the Clean Water Act.

"We are also concerned that wells, compressor stations, generators, and truck traffic produce significant air pollution in the form of hazardous air pollutants, volatile organic compounds, ozone, hydrogen sulfide, particulates, and nitrogen oxides, contributing to asthma and other serious diseases. In addition, there are billions of gallons of oil and gas waste nationally, some of it very hazardous, that go unregulated by federal hazardous waste provisions in the Resource Conservation and Recovery Act.

There are growing reports of individuals living near oil and gas operations who suffer illnesses that are linked to these activities, yet there has been no systemic attempt to gather the necessary data, establish appropriate monitoring, analyze health exposure or assess risk related to any of these activities. This should be done, in addition to full Health Impact Assessments to inform future planning and policy efforts.

HEALTH CONCERNS EXPRESSED BY THE MEDICAL COMMUNITY

There are clear indications that the production and development of natural gas will cause adverse health effects. There are good indications that this has already happened. The question is not whether, but where and how many people will be affected.

Attached is a list of “cases” reported in the press, as well as a few additional stories from people who live near gas wells in Pennsylvania and whose health has been impacted, and they have submitted these for your consideration. These people are at this point considered “anecdotes” because there has not been a systematic study done on health effects which has been published in a peer-reviewed journal. In the interest of social justice as well as science, these people must receive medical attention and their cases studied by the public health agencies tasked with protecting the health and safety of their citizens. That should be addressed at all levels, from local to the federal public health systems.

Also attached are lists of doctors and scientists who have asked that NY State pause to evaluate the available scientific data, as well as conduct studies to establish exposure pathways and evaluate the risk to human health.

<http://gdacc.wordpress.com/medical-professionals-information/>

The American Academy of Pediatrics, District II, NYS, representing more than 6,000 pediatricians and millions of children across the state, strongly supported a moratorium.

Mt. Sinai Children’s Environmental Health Center wrote testimony for the NYC Council and EPA hearing. Their comments focused primarily on the impacts gas drilling would have on children. They urged that potential health threats be part of a comprehensive study on this matter. “It is imperative that the health effects on pregnant women, infants, and children are adequately studied.”

The NYS Conference of Environmental Health Directors and the NYS DOH had serious concerns about the radioactive material in the drilling waste.

The Medical Society of the State of New York Resolution states that any permitting should be based on adequate science and has called for a Moratorium

“RESOLVED, That the Medical Society of the State of New York supports a moratorium on natural gas extraction using high volume hydraulic fracturing in New York State until valid information is available to evaluate the process for its potential effects on human health and the environment.”

December 10, 2010

THE MEDICAL SOCIETIES of the Counties of ONEIDA, HERKIMER, MADISON, CHENANGO, OSWEGO, CAYUGA, ONONDAGA and TOMPKINS have issued a statement saying:

“When an activity raises potential harm to human health, precautionary measures should be taken until cause and effect relationships are fully established scientifically.

The exploitation of natural gas in the Marcellus shale involves high-pressure injection of over 200 billion gallons of water and billions of gallons of chemicals into the shale formations to allow the release of natural gas. Backflow from this process contains heavy metals, radioactive materials and volatile organic

compounds. The effects of this process on human health have not been subject to rigorous medical research. The review reported by the New York State Department of Environmental Conservation in the draft Supplemental Generic Environmental Impact Statement contains no high quality medical data. These physicians of the southern tier support a moratorium on natural gas extraction using high volume hydraulic fracturing in New York State until completion of the recently announced Environmental Protection Agency (EPA) study to evaluate its effects on human health and the environment.”

A letter to the NYS DOH Commissioner is attached; in it hundreds of signatories and thousands of doctors represented by their organizations are requesting that the
-SGEIS be expanded to include human health impacts, and that the
-DOH take a lead role in the drafting of an expanded SGEIS as it is clear from the contents of that document we last saw two years ago that human health was not addressed adequately.

THE INADEQUACY OF THE DRAFT SGEIS TO PROTECT HUMAN HEALTH

There is no chapter dedicated to human health risk assessment, and no health risk assessment has been done. The NYS DOH must take a more active role in the issue and conduct health impact studies.
http://www.epa.gov/region02/spmm/pdf/Marcellus_dSGEIS_Comment_Letter_plus_Enclosure.pdf
Please refer to the 2009 draft SGEIS <http://www.dec.ny.gov/energy/58440.html> Chapter 5. Repeatedly, the 2009 draft SGEIS refers to data from the 1992 GEIS <http://www.dec.ny.gov/energy/47368.html>. Although hydraulic fracturing was in established use before 1992, slickwater fracturing fluids were first introduced in 1996 (citation 14-- Matthews, 2008, as cited by ICF International in the GEIS). As a result the technology changed to allow for bigger, deeper and more complex operations. On page 19-2 of the 1992 GEIS, are listed “Unavoidable adverse impacts are those adverse environmental effects that can be expected to occur regardless of mitigation measures.” and include:

- Short term negative noise impacts ...
- Short term minor adverse air quality impacts resulting from the dust and diesel exhaust fumes generated at the drill site cannot be totally mitigated.
- Some minor adverse impacts will continue throughout the life of a well, such as atmospheric emissions, noise and the potential for operational accidents.
- Minor increases in trace metals and hydrocarbons near drilling rigs may occur in the immediate vicinity.
- The potential adverse impacts and conflict associated with the disposal of drilling and production solid and liquid wastes cannot be entirely eliminated.

So it appears that back in 1992 the DEC in the GEIS was able to predict that there were some health concerns. However, exposure pathways were not completed at that time, to the best of our knowledge. On pg 5-65, the DEC’s SGEIS Conclusions on the issue of chemicals spilled or released:
The hydraulic fracturing product additives proposed for use in NYS and used for fracturing horizontal Marcellus shale wells in other states contain similar types of chemical constituents as the products that have been used for many years for hydraulic fracturing of traditional vertical wells in NYS. Some of the same products are used in both well types. The total amount of fracturing additives and water used in hydraulic fracturing of horizontal wells is considerably larger than for traditional vertical wells. This suggests the potential environmental consequences of an upset condition could be proportionally larger for horizontal well drilling and fracturing operations. As mentioned earlier, the 1992 GEIS addressed hydraulic fracturing in Chapter 9, and NYSDOH’s review did not identify any potential exposure situations associated with

horizontal drilling and high-volume hydraulic fracturing that are qualitatively different from those addressed in the GEIS.

Therefore, the conclusion of the NYS DOH that essentially there has been no change since the 1992 GEIS is in error. The DEC itself identified possible exposure pathways in the 1992 GEIS.

The Agency for Toxic Substances and Disease Registry outlines the steps to complete such an assessment. The NYS DOH could surely accomplish this with DEC's assistance.

Following are some tools which can help inform the policies regarding gas drilling and the impacts on human health.

Obtain the site information <http://www.atsdr.cdc.gov/hac/phamanual/ch3.html>

Identify the exposure pathway

An exposure pathway (from <http://www.atsdr.cdc.gov/glossary.html>) is the route a substance takes from its source (where it began) to its end point (where it ends), and how people can come into contact with (or get exposed to) it. This exposure pathway has five parts: a source of contamination; an environmental media and transport mechanism (such as movement through groundwater); a point of exposure (such as a private well); a route of exposure (eating, drinking, breathing, or touching), and a receptor population (people potentially or actually exposed). When all five parts are present, the exposure pathway is termed a completed exposure pathway.

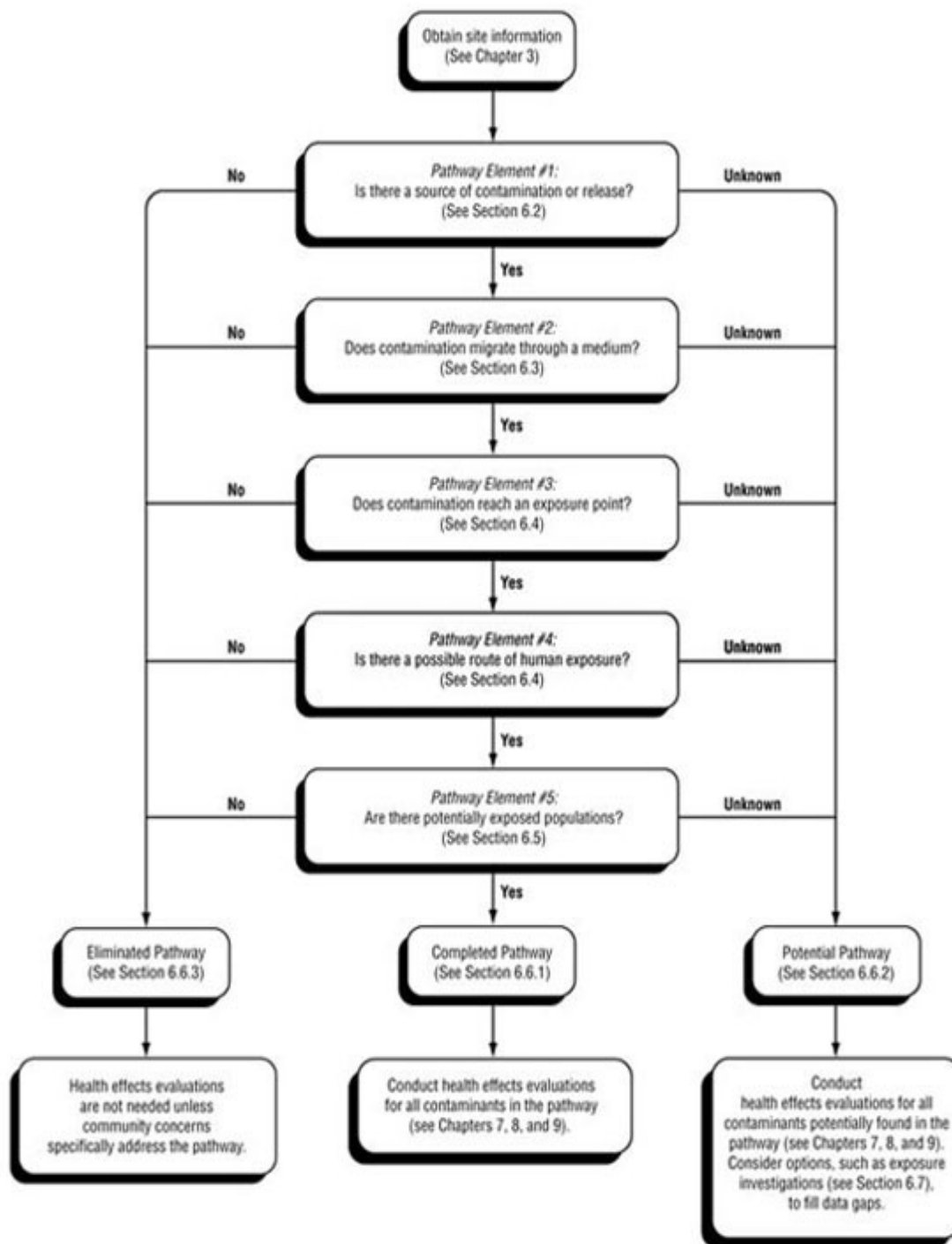


Figure 6-1. Evaluating Exposure Pathways

<http://www.atsdr.cdc.gov/hac/phamanual/ch6.html>

INFORM THE REGULATIONS VIA A HEALTH IMPACT ASSESSMENT

A HEALTH IMPACT ASSESSMENT is a useful process which has been done twice to assess the risks to human health from gas drilling. It may be defined as a combination of procedures, methods and tools

that systematically judges the potential, and sometimes unintended, effects of a policy, plan, program or project on the health of a population and the distribution of those effects within the population. The HIA identifies appropriate actions to manage those effects.

An HIA aims to identify how development induces unintended changes in health determinants and resulting changes in health outcomes. HIA provides a basis to proactively address any risks associated with health hazards. HIA also addresses health improvement opportunities in development.

Adapted from the WHO, Gothenburg Consensus Paper 1999

The practice of a Health Impact Assessment (HIA) elevates the role of health in decision-making. Health Impact Assessment is a practical tool that can provide a structured process to determine a policy or project's impact on health; bring both immediate and long term health benefits; and ensure project dollars are used efficiently to provide the highest benefit to communities. They help create healthier communities by addressing the root causes of many prominent health problems ... HIAs have demonstrated success in a variety of issue areas, ranging from land use and transportation to housing policies, labor standards, natural resource extraction, education and economic policies. It must be done wherever gas drilling permitting is sought in order to determine whether the people and the government wish to take the risks to human health which will ensue if development of gas proceeds under current laws and regulations and technology.

<http://www.hiaquide.org/hia/national-petroleum-reserve-alaska-oil-development-plan> and

<http://www.garfield-county.com/public-health/battlement-mesa-health-impact-assessment-ehms.aspx>

and http://www.hiaconnect.edu.au/files/HIA_International_Best_Practice_Principles.pdf and

<http://www.iaia.org/iaia/wiki/hia.ashx> and <http://www.healthimpactproject.org/hia/process> and

Quigley, R., L. den Broeder, P. Furu, A. Bond, B. Cave and R. Bos 2006 Health Impact Assessment International Best Practice Principles. Special Publication Series No. 5. Fargo, USA: International Association for Impact Assessment.

http://www.euro.who.int/_data/assets/pdf_file/0003/98283/E90794.pdf and

http://www.healthimpactproject.org/resources/#presentations_webinars and

<http://www.cdc.gov/healthyplaces/hia.htm> and

[http://www.apha.org/NR/rdonlyres/171AF5CD-070B-4F7C-A0CD-](http://www.apha.org/NR/rdonlyres/171AF5CD-070B-4F7C-A0CD-0CA3A3FB93DC/0/HIABenefitHlth.pdf)

[0CA3A3FB93DC/0/HIABenefitHlth.pdf](http://www.apha.org/NR/rdonlyres/171AF5CD-070B-4F7C-A0CD-0CA3A3FB93DC/0/HIABenefitHlth.pdf) and <http://www.ph.ucla.edu/hs/health-impact/> and

<http://www.who.int/hia/en/> and

<http://www.naccho.org/topics/environmental/landuseplanning/HIAresources.cfm>

State Departments of Health should be actively involved in all rulemaking and regulations regarding gas drilling to maximize positive health impacts and minimize negative ones. Human health impacts should be considered at least as significant as the permitting of mining, or other considerations which are under DEC's authority. It seems that the scope of the impacts did not take human health into consideration. Otherwise the medical community and the DOH would have been more involved and the DOH would have had co-lead agency status on the draft SGEIS. I am concerned that human health impacts continue to be inadequately addressed in the revised draft SGEIS.

The Agency for Toxic Substances and Disease Registry on the federal level should be informed of all incidents involving spills or releases at or near a gas well, or in the transport of gas or products associated with the operation of a well site. The Public Health Assessment petition process is a way for the ATSDR to find out if people have been adversely affected by hazardous chemicals

http://www.atsdr.cdc.gov/hac/products/pha_petition.html and to take appropriate action.

The medical community requests that our elected leaders take the time to study the health effects of gas

drilling. In science and medicine we follow the Precautionary Principle, which states that *“When an activity raises threats of harm to the environment or human health, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically”* All statements of the Precautionary Principle contain a version of this formula: When the health of humans and the environment is at stake, it should not be necessary to wait for scientific certainty to take protective action.

The principle applies to human health and the environment. The thought behind the precautionary principle is that humans are responsible to protect, preserve, and restore the global ecosystems on which all life, including our own, depends.

When evidence gives us good reason to believe that an activity, technology, or substance may be harmful, we should act to prevent harm, not cause more harm. If we always wait for scientific certainty, people may suffer and die and the natural world may suffer irreversible damage. Therefore, do the studies, but stop the practice of harm until the studies can be evaluated.

<http://www.worldinbalance.net/intagreements/1992-rio-environmentanddevelopment.php>

<http://www.un.org/documents/ga/conf151/aconf15126-1annex1.htm>

<http://www.sehn.org/wing.html>

May 26, 2011

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