My name is Gilbert Blanchard, and I am a member of the Kent County group, *Notre environnement, notre choix / our environment, our choice (NENC).* The summary of information I append is just one example of the many opportunities *Notre environnement, notre choix / our environment, our choice* has followed to learn about all aspects of shale gas development. With another member of our group, I attended this particular conference as NENC's representative. We then reported back to our group as part of our group's ongoing efforts to be well-informed on this issue.

Our group and others working to stop shale gas development have been repeatedly vilified and attacked by industry spokespeople, government officials in the previous government. Those same people constantly say we are "misinformed." On the contrary, our group--along with the vast majority of people in our area--base our adamant opposition to shale gas development on a vast body of scientific information. This information was produced by experts in a variety of scientific fields, by independent scientists who have zero connection with the oil and gas industry. These scientists, and the people who have suffered in areas where shale gas development has been done, are not "misinformed," and neither are we.

Here are my notes from this one-of-many group and public-informing projects we have undertaken in all sincerity.

NOTES FROM CONFERENCE HOSTED BY NEW BRUNSWICK ENERGY INSTITUTE
in Fredericton, April 24, 2014, 10:00 A.M.

The presenters were:

Mr. Tom Goldstein, professor at University of Pittsburgh, with 20 years mining and geological activities.

Dr. Lalita Bharadwaj, holds a PhD in toxicology and is an environmental health expert living in Saskatchewan.

Dr. Bharadwaj provided expertise on shale gas development. She discussed what is natural gas and where is it found; what are its potentials for contamination; principles of toxicology and understanding the risks and knowledge gaps.

She said the percentage of usage of various energy sources in the world are:

natural gas: 24%, oil: 36%; nuclear: 6%; coal:25%; hydro-electric: 6 %

In speaking of natural gas, she said that it is mostly a safe, clean energy. With hydrocarbons, however, you find methane, ethane, propane, butane, etc. Natural gas formations are found in coal and shale rock formations and in conventional wells flows upward. Some unconventional oil and gas wells are drilled very deeply.

In the world there are 1000 trillion square cubic feet of gas in 2 forms: 1) biogenic, which is organic; and 2) thermogenic, which comes from shale formations. In Canada, this second type is called "sweet." It can be dry (gas) or wet (liquid).

In hydro-fracking the stages are:

First stage exploration: clearing land, etc.; drilling of bore holes; well completion, installing

casings and cement, etc.

Second stage production: hydraulic fracturing; re-stimulation for several years

Third stage abandonment: site closing

During the third stage a number of big problems occur. No cleaning is done by the big gas company. They just go away. When problems arrive, such as with the tar ponds in Nova Scotia, it is our tax dollars that have to try to clean it up. In Pennsylvania, the bond of $25,000 per well for clean-up comes no where near being able to do the job, which costs millions of dollars, even if it could be "fixed."

Fracking uses high pressure injection of water, sand and chemicals. This is done in multiple stages, creating sequential perforation. The source of the contaminations are many. They include, but are not limited to: water and chemicals brought to the site; trucking, with its smoky exhaust; possible spillage of chemical contaminants which could come from the surface or sub-surface as fluid flows back up; waste water disposal, where poisonous chemicals evaporate, run on ground; from cracks in cement, leakage, spills, etc.

Potential source of contaminants from the cracks in casing and in cement include methane. Leaks also take place along the casings after pipes rust.

The composition of materials injected in wells is: .49% chemicals in a mixture of 95% water and 5% sand and chemicals. The water volume per well is about that of 200 backyard swimming pools, including 80 cubic meters of sand, 700 kg. of friction reducer, some antifreeze, some salt, some radioactive materials and traces of metal, etc. This makes up the composite of water.

Air emissions are another problem with hydrofracking. Diesel engines emit benzene, which is a cancer-causing agent. The air becomes reddish brown in colour, and is bad for people and animals. It can also cause asthma.

To improve the air in Canada, the government agreed in a pact to monitor the ozone level and to bring it back to 50 p.p.b., up from the danger area.

In summary, chemicals used in hydrofracking are of concern. Air pollution is also of concern, as are many other problems such as noise pollution, etc.

Human health risks in shale gas development are many, and include some that are physically direct or indirect. Human exposure in areas of development are inhalations and/or ingestions. Evidence of exposure can be found in blood and fluid. Even in small concentrations, this can cause damage to health.

Toxic agents present in shale gas development are always dangerous. A good example of this is lead that was present in paint and in gasoline in the past. That was removed some years ago. Toxic elements are present in the air and fluid around gas development. The smaller the person is, the worse is the toxic effects on the person. **Children are the most at risk!**

We do not yet have a complete understanding of what the gas industry does to health. For example, what dosage, or what level of exposure causes what harm? Everything potentially can become toxic. We need to determine the "knowledge gaps" or lack of knowledge. We need baseline information, gathered over

time, on the additive risk of chemical mixtures. We need to know the magnitude of it, the frequency of it, the duration of it, the intensity of development and how this creates a harmful dosage.

Dr. Tom Goldstein, from the University of Pittsburgh, spoke on the public health implications of gas drilling. He mentioned that both Canada and the United States will be using fossil fuels for the next two or more decades, so industries could take their time. He stated that there is no hurry, because with more time, industry may find better ways to extract with less creation of pollution.

The work done in the areas of health and safety concerns with this industry is available. The major public concerns are the following.

Psycho-social impact

There is no transparency. There is a lack of trust because the public sees a failure to protect the safety of humans, animals and the environment on which they depend for survival. Discussion of the issue must be tailored to common understandings of risk to public health. Both accidents, which are preventable, and incidents, which are not preventable, happen.

The health department and administration in the U.S.A. did not listen to people's concerns. Out of 52 people at a meeting involved in decision to allow fracking, not one was from the health system.

Some wells in Pennsylvania were dug too close to housing--only 100 feet away.

Risk assessment

Dr. Goldstein emphasized the need for a large component of risk assessment, for example, of human exposure to pollutants in air and in liquids**. With gas drilling there is a heavy dosage of hazardous material in the air.** These hazards are of all sorts. Sickness such as **pancreatic cancer, bad** nerves and more, will happen after drilling has started. The U.S.A. has evidence of **childhood cancer.**

We should become familiarized with the risks and have knowledge that there are risks. How can this be done effectively health-wise when the industry is using some of 600 different chemicals without listing any with the Health Department.

We should and must be involved in decision-making and should be more informed.

Damage to human and animal well-being

Where there is big shale gas development present, there are a number of damaging elements. The percentages of these problems found in these areas are as follows:

false information given out	79%
corruption	61%
being taken advantage of	62%
financial damage	45%
noise pollution	45%
desire to move	42%
animals have died	42%

....and, Dr. Goldstein said, the list goes on! He urged anyone who had to go to their family doctor, to make it clear to the doctor where he or she lives in relation to any gas drilling. Different effects may be caused by that proximity, such as chemical reactions.

Risks to community
Some of the risks to whole communities include, but are not limited to, rapid growth, sickness, diseases, thefts, bad roads, etc.

Further notes of comments from the two presenters and audience member
Both scientists presenting praised New Brunswick's Dr. Cleary's recommendations list.
New Brunswick Energy Institute will release information from the meeting in about 2 weeks.

Dr. Goldstein recommends that on shale gas development, governments should STALL, STALL, STALL!

He said better well casing and better pond management for waste water is demanded.

He stated that in Pennsylvania bond insurance per well is $25,000 per well. Gas companies, after well problems develop, usually leave bond money with the government and don't go and clean or fix the problem because, most of the time, they can't fix it, and clean-ups could be in millions of dollars.

There is **great risk of air pollution**. Shale gas is forced on people against their will. Benzene is often found as an air pollutant in this industry. Benzene is a major cause of leukemia. In terms of air quality, younger people are affected most, along with seniors, and women are harmed more than men.

Dr. Bharadwaj said that an environmental impact assessment should be mandatory, but emissions fall to ground and no data is available on their impacts on deer, moose, all animals, birds, fish, etc.

The two presenters felt that before any development should take place, there must be a process of collaboration with all water systems of all communities.

Most studies have been done in silence. The governments are somewhat informed, but the public is not given all the information needed. Shale gas development will be an issue for some time to come.

Dr. Goldstein pointed out that any gas development **will have a major negative impact on agriculture!** An example of the oil and gas industry's effect on water is the Gulf of Mexico, where the waterways are **gone!**

Dr. Bharadwaj mentioned that the tar sands have produced a great deal of air-born contamination, and there are studies to be looked at on the negative effects of this on birds.

The community needs to be involved and informed on all options available.

An Aboriginal man from Bathurst said, "We natives have been living here 15,000 years with less earth impacts than the European visitors who came 300 years ago. Since then our land has deteriorated greatly. They took our resources and ruined our land and water."

Dr. Bharadwaj said that another thing that has failed is the lack of better consultations with all people involved. There have been experiences of some individuals and business being scared to pick up the phone when called because, if they do, it is being called a consultation, even though it might have been only 1 or 2 minutes of conversation.

There is a need to keep all kinds of information data, good or bad. It is necessary to establish baseline conditions before any shale gas exploration can begin to be considered. One little example, would be the effect on the value of properties.

Those promoting the shale gas industry, the presenters felt, will lie, make believe, lose data, etc. The presenters urged the audience to "protect yourself."