Alaska Community Action on Toxics *Alliance of Nurses for Healthy Environments * Breast Cancer Fund * Citizens' Environmental Coalition * Clean & Healthy New York * Concerned Health Professionals of NY * Empire State Consumer Project* FracDallas* Global Community Monitor * Healthy Child Healthy World * Idaho Concerned Area Residents for the Environment* Institute for Health and the Environment University at Albany* Los Jardines Institute * Niagara Health-Science Report * Sane Energy Project * Sciencecorps* Southern Illinoisans Against Fracturing our Environment (SAFE) * Texas Campaign for the Environment * West County Toxics Coalition * Women's Voices for the Earth

September 18, 2014

**Re: Docket ID # EPA-HQ-OPPT-2011-1019**
**Comments on the Advance Notice of Proposed Rulemaking on Hydraulic Fracturing Chemicals and Mixtures, Fed. Reg. May 14, 2014, Vol. 79, 28664-28670.**

Submitted Via Federal eRulemaking Portal at http://www.regulation.gov

We appreciate the opportunity to comment on TSCA rulemaking for the oil and gas industry. Our comments are directed to the very serious public health impacts that underlie the urgent need for the EPA to take action under TSCA to require mandatory reporting of hydraulic fracturing chemicals and all health and safety studies, as well as provide full disclosure of these chemicals in a user-friendly database for the public, researchers, and public health professionals.

Despite the weaknesses inherent in TSCA, the EPA has definite authority under TSCA that will help alter the careless use and handling of toxic chemicals associated with fracking, although we urge a broader scope to include the entire system of extraction and production. In addition, the Oil and Gas industry was given many exemptions from environmental laws based on the unsupported claim of complete safety. Even if TSCA had no weaknesses, it would not be able to make up for the absence of the applicability of our most important environmental laws to this industry, including exemptions from the Clean Water Act and Clean Air Act. Therefore, we urge EPA to also consider the magnitude of the potential harm to public health and how the Agency could use all available powers and authority to address one of the most serious problems this industry poses to public health --- the uncontrolled use and distribution of enormous quantities of toxic chemicals into the environment, in direct contravention of the national policy established under the Pollution Prevention Act.

In Summary these constitute our Recommendations to EPA:

- Issue rules for a strong federal mandatory program of reporting for all chemicals and hazardous materials used in oil and gas exploration and production, including health and safety studies by manufacturers, importers, processors and distributors with a high bar for granting trade secret claims.
- Require more efforts by the Oil and Gas Industry—under a mandatory program, not voluntary-- to provide information about how chemicals are used and their treatment and disposal. This information should be provided on a well- by- well basis. If EPA has no authority under TSCA, the Agency should use its authority under the President's Executive Order #13650, Chemical Safety and Security and work collaboratively with OSHA.
- Require full disclosure in a user-friendly database for the public, researchers, and public health professionals. There should be a high bar for trade secret claims, but management of any trade secret claims should include a state level entity involved on a 24- hour basis to handle emergency response and public health issues. A federal system is absolutely necessary but should not preclude states from adopting more stringent reporting and disclosure requirements.
- Use an expanded scope beyond hydraulic fracturing to include the entire system of oil and gas extraction and production.
- Evaluate and fully utilize all available powers and authority to address the enormous quantities of toxic chemicals used by this industry and the potential public health impacts. Authority and powers include the Pollution Prevention Act and previous Executive Orders related to Children's Health Protection (# 13045) Environmental Justice (#12898) and Chemical Safety and Security (#13650).
- Eliminate the exemption for the oil and gas industry's drilling operations from emergency planning for high hazard chemicals and processes. Work with NIOSH and OSHA to gain insights pertaining to chemical handling, use, treatment, and disposal, in order to protect workers, emergency response personnel, and the public.
- Assemble and make available to the public all Section 8 (e) reports from manufacturers, importers, processors, and distributors containing information on any of their chemical substances or mixtures that reasonably supports the conclusion that such substance or mixture presents a substantial risk of injury to health or the environment. No information was provided in the ANPR notice concerning EPA's receipt of TSCA Section 8 (e) reports related to this industry. If no reports have been received that information should be made available to the public. (Federal Register Notice, p. 28666, Section IV A.)

**What do we know already about real and potential Health and Environmental Impacts associated with toxic chemical use by this industry?**

- Millions of gallons of contaminated wastewater per well are produced (as flowback and produced water) and there is neither technical nor economic feasibility of removing the hundreds of toxic substances present in order to safely discharge this water to the environment. The toxic substances present include deliberate chemical additives as well as those present in the rock formations being fracked—arsenic, barium, chromium, lead, radium. This problem has led to illegal dumping of wastewater in rivers and streams with severe

consequences. The underlying technical problem has no viable solution in sight. It also extends exposure scenarios far beyond drilling areas.

- Some of the largest spills at drill sites have been reported and documented by federal and state agencies. Many of these have made headlines because of large-scale fish kills as well as streams devoid of any living organisms. Severe weather associated with climate change can exacerbate spills and chemical releases, as we saw with the terrific flooding in Colorado where many chemical tanks were overturned or destroyed.

- Blowouts, fires, and explosions are all too frequent occurrences at well sites resulting in deaths and injuries to workers on-site and placing the workers, emergency response personnel, as well as health professionals, in jeopardy from exposure to unknown toxic chemical exposures. It is impossible to adequately treat toxic exposures when the details of what the person was exposed to are unknown. Health professionals must know the name and CAS # of the chemical, the concentration of the chemical present, and the circumstances of the exposure without any delay in order to deliver prompt treatment. Emergency response personnel need information immediately in order to handle the incident without exacerbating the incident and to protect themselves. See later discussion of emergency planning and need for information for each individual well. There we discuss the June 28, 2014 fires, explosions, and release of chemicals from a site in Clarington, Ohio.

- Workers in this industry have seven times the fatality rate of all other industries in the US. NIOSH and OSHA are just beginning to focus on some of the unique workplace hazards associated with fracking –investigation of silica has generated a hazard alert and recently benzene exposures have been found to be excessive. Magnifying the health and safety problems is the nature of the worksites, with many widely-distributed sites that are set up temporarily until drilling and fracking are completed and production begins. In addition, there are many contractors and subcontractors involved, hindering adequate hazard training and information for all employees. It is well understood that contractors are frequently the ones involved in very serious incidents, often because of an inadequate understanding of hazards present.

- There have been documented farm animal exposure to fracking chemicals with subsequent deaths, illnesses and adverse reproductive outcomes, such as declines in births, stillbirths and malformations reported.[1] Animals are often sentinels of potential human health effects, and animals are extensively utilized in our toxicological research studies of potential human health effects for this reason. In addition, farm animals provide food for our tables with potentially contaminated milk and meat from fracking chemicals.

- Well sites emit large quantities of volatile organic compounds (VOCs) from chemicals used and stored, and from evaporation from wastewater ponds. Nitrogen oxides (NOx) are also generated at well sites. NOx + VOCs in the presence of sunlight generate Ozone, a secondary pollutant. The emissions of VOCs have been so significant as to create high levels of ozone in the middle of

winter in some areas where hydrofracking is concentrated. Ozone has been exclusively a summer phenomenon until this industry began. A substantial number of VOCs are also toxic chemicals. Other secondary toxic pollutants generated at well sites include formaldehyde, acetaldehyde, and acrolein.

- There are many early investigations, case studies, and reports of human health impacts. Such studies often contain evidence of environmental contamination that can be connected to laboratory findings and health damage in humans. Large scale epidemiological studies are far more difficult given that they are expensive, take several years to complete, and require a significant amount of funding. Below are several examples of these early investigations and case studies that point towards the need for greater reporting requirements for chemicals used in the fracking process.

  Vernal, Utah, a town experiencing an oil and gas boom saw infant deaths rise to six times the normal rate over the past 3 years. The area formerly had pristine air quality. It now has high ozone and particulate levels, which resulted in a grade of "F" from the American Lung Association for its high ozone in May 2014.[2 & 3]

  VOCs in the Uintah Basin led to 39 winter days exceeding ozone standards. Researchers at Univ. of Colorado found VOC emissions in this area to be equivalent to 100 million cars and found a causal link between oil and gas emissions and the accumulation of air toxics and ozone in ambient air. March 2014. [4]

  Federal researchers at the National Oceanic and Atmospheric Administration (NOAA) found high levels of benzene and volatile organic compounds after flying over oil and gas drilling areas in Colorado—seven times higher than previously estimated by government agencies. [5] May 2014.

  A modeling study conducted by the state of Texas projected worsening air quality in the Eagle Ford shale region—projecting a 281% increase in VOC emissions. [6] April 2014. Shortcomings in air pollution monitoring point to particular concerns for children—cumulative toxic emissions, exposure of children during critical development stages, and potential interactive effects of chemical mixtures. [7]

  A study of birth outcomes found an association between exposure to natural gas wells and congenital heart defects. Researchers noted that several chemicals associated with gas development were teratogens, known to increase birth defects. [8]
  A University of Missouri research team tested water samples associated with confirmed fracking spills for hormone disruption and found that in addition to estrogen and androgen disrupting activity, they blocked receptors for thyroid hormone progesterone and glucocorticoids. All 24 of the fracking chemicals tested interfered with hormone receptors and there is no safe level of exposure to hormone disrupting chemicals. [9 & 10]

  A Health Impact Assessment by the Colorado School of Public Health for Garfield County, CO determined that air pollution will be high enough to cause short term and long term disease for residents near gas wells including respiratory disease and neurological problems, birth defects and cancer. [11]

NIOSH reported that at least four workers have died during flowback operations, which result in high concentrations of volatile hydrocarbons that could cause acute exposures.[12]

In 2014, the AFL-CIO found that the fracking boom had made North Dakota an exceptionally dangerous and deadly place to work—a doubling of the fatality rate since 2007. The Secretary of Labor called the rising rate of workplace deaths in the oil and gas sector "unacceptable."[13]

In 2014 a top Canadian panel of scientists released a report and warning on fracking --that it poses the possibility of major adverse impacts on people and ecosystems and that more study is needed to understand the full extent of the risks and impacts including poorly understood combinations of chemicals. [14 &15]

In 2011, two medical experts cautioned that fracking poses a threat to the environment and public health, noting evidence that many chemicals used in fracking can damage the lungs, liver, kidneys, blood and brain. They stated it would be prudent to invoke the precautionary principle to protect public health and the environment. [16]

Despite the fact that this industry is relatively new, we are seeing widespread evidence of harm related to the use of toxic chemicals in the process, as well as from the toxic substances brought to the surface from the rock formations below ground. The scope and magnitude of this industry's operations across the nation coupled with the extraordinary quantities of toxic chemical additives utilized portends a public health disaster in the making. TSCA provides an important opportunity for the EPA to gain an understanding of toxic chemical usage in order to reduce the potential for harm.

The history of the US shows us that we are not good at identifying potential public health calamities and catching them early before tremendous harm is done. Dr. Norris, medical examiner at the NYC Department of Health identified the health impact to workers working with tetraethyl lead and provided a warning before its widespread adoption for use in gasoline. [17] Millions of urban children received excessive lead exposure as a result and it took decades to finally remove lead from gasoline. Asbestos was also used for decades beyond the availability of convincing evidence of its potential for harm. The entire Superfund program was necessitated by careless handling and disposal of hazardous wastes, jeopardizing public health and costing taxpayers billions of dollars.

With this ANPR, the Agency has a key opportunity to prevent harm to thousands of children and adults using its full authority under TSCA. However, TSCA may not be adequate to the task and we urge the EPA to consider all available powers and authority to address the uncontrolled use and distribution of enormous quantities of toxic chemicals into the environment.

We were pleased to see that the Federal Register Notice cited the President's Executive Order 13045: Protection of Children from Environmental Health Risks and Safety Risks. Because they are still developing, children are particularly sensitive to toxic chemicals, that can result in permanent harm, fetal death, infant mortality, birth defects and

damage to developing organs and systems. This element—the prevention of permanent or irreversible harm—should be uppermost in the Agency's consideration of the next steps it takes and we expect the Office of Children's Health Protection to play a major role in the decision-making.

We also appreciated the reference to the Pollution Prevention Act, which made *Pollution Prevention* the national policy of the United States. It is quite clear that hydraulic fracturing has turned the preferred hierarchy of environmental management on its head—with disposal and release into the environment – not used as a last resort or the least preferred option, but as the first step in the process. An exemption from hazardous waste regulation contributes to this reversal. Hydraulic fracturing is conducted in direct opposition to this national policy, resulting in serious widespread pollution that is on track to grow exponentially. EPA now has an opportunity under TSCA to realign hydrofracking industrial practices toward pollution prevention. We fully support applying the intent of the law in the Pollution Prevention Act to preventing or reducing pollution as well as providing the public with access to data.

In response to the President's Executive Order 13650 on Chemical Safety and Security, the involved agencies are apparently considering further regulation of the oil and gas industry. Such action is very important to address emergency preparedness and response to spills, explosions, fires, air releases, deaths and injuries at individual wells, support facilities and infrastructure.

**Federal Agency Involvement**

It should be noted that multiple federal agencies have been involved in assessing unconventional oil and gas development and issuing reports and recommendations to address their findings related to problems. NOAA, USGS, Army Corps of Engineers, US Fish and Wildlife, and the Department of the Interior have all been involved. Here we discuss specifically the Department of Energy's activity.

At the federal level the then Secretary of Energy moved to establish a Subcommittee of his Advisory Board focused on shale gas production utilizing hydraulic fracturing at the direction of President Obama. The first 90 Day report in August 2011 provided support for the development of unconventional shale gas production.

However, the report also noted the urgency of addressing environmental consequences:

> "As with all energy use, shale gas must be produced in a manner that prevents, minimizes, and mitigates environmental damage and the risk of accidents and protects public health and safety. Public concern and debate about the production of shale gas has grown as shale gas output has expanded.
>
> There are serious environmental impacts underlying these concerns and these adverse environmental impacts need to be prevented, reduced and, where possible, eliminated as soon as possible. Absent effective control, public opposition will grow, thus putting continued production at risk. Moreover, with anticipated increases in U.S. hydraulically fractured wells, if effective environmental action is not taken today, the potential environmental

consequences will grow to a point that the country will be faced [with] a more serious problem." [18]

This subcommittee had industrial representation, yet it still warned all involved that failure to prevent environmental and public health impacts could result in substantial opposition to further production using hydraulic fracturing.

Unfortunately, despite very strong recommendations for environmental monitoring, controls and enforcement, very few of these recommendations have seen full implementation on the ground in the real world. Since we are discussing TSCA rules we include some of the relevant quotes from this first 90 day report. (The Bolding below is ours.)

> "The common thread in all these recommendations is that **measurement** and **disclosure** are fundamental elements of good practice and policy for all parties." "The Subcommittee believes there is great merit to **creating a national database** to link as many sources of public information as possible with respect to shale gas development and production." [19]
>
> " **The Subcommittee believes that the high level of public concern about the nature of fracturing chemicals suggests that the benefit of immediate and complete disclosure of all chemical components and composition of fracturing fluid completely outweighs the restriction on company action, the cost of reporting, and any intellectual property value of proprietary chemicals. The Subcommittee believes that public confidence in the safety of fracturing would be significantly improved by complete disclosure and that the barrier to shield chemicals based on trade secret should be set very high. Therefore the Subcommittee recommends that regulatory entities immediately develop rules to require disclosure of all chemicals used in hydraulic fracturing fluids on both public and private lands. Disclosure should include all chemicals, not just those that appear on MSDS. It should be reported on a well-by-well basis and posted on a publicly available website that includes tools for searching and aggregating data by chemical, well, by company, and by geography**." The Subcommittee also identified inadequacies of Frac Focus for this information.[20]

The Subcommittee made many recommendations for Research and Development, where results could reduce safety risk and environmental damage for shale gas operations. Those related to this ANPR include:

- Determination of the chemical interactions between fracturing fluids and different shale rocks – both experimental and predictive.
- Development of "green" drilling and fracturing fluids. [21]

In the charge given to the Subcommittee, Secretary Chu also included "optimum environmentally sound composition of hydraulic fracturing chemicals." [22]

The report also addressed the availability of research funds for the purposes advocated in the report. "RPSEA is the Research Partnership to Secure Energy for America, a public/private research partnership authorized by the 2005 Energy Policy Act at a level

of $50 million from offshore royalties." [23] If a substantial amount of these research funds had been allocated to the recommendations contained in the first 90-day report, we would have made substantial progress in instituting a real program of public health protection associated with hydraulic fracturing.

The second 90-day report in November of 2011 was geared to a focus on implementation. The Subcommittee reported that the progress to date "is less than the Subcommittee hoped and it is not clear how to catalyze action at a time when everyone's attention is focused on economic issues, the press of daily business, and an upcoming election. The Subcommittee cautions that whether its approach is followed or not, some concerted and sustained action is needed to avoid excessive environmental impacts of shale gas production and the consequent risk of public opposition to its continuation and expansion." [24]

Obviously 3 years later EPA is now considering implementing some measures to address chemicals used in hydraulic fracturing. We would appreciate if EPA addressed the lack of implementation of these subcommittee recommendations and explain in their final decision how the $50 million from offshore royalties has been utilized and whether any of these monies will be dedicated to the database for chemicals and disclosure that is needed.

**The Scope of the ANPR**

The petition to EPA asked that all processes of oil and gas extraction and production (E &P) be included. EPA rejected that and proposed that their efforts would focus on hydraulic fracturing alone. We believe this is a major mistake. This industry is using new techniques and the state of the art is in flux. Many have begun to adopt the term unconventional oil and gas development to adequately characterize the industry and their developments using hydraulic fracturing, injected steam, and acidification. This industry may also use multiple methods at a single well rather than hydraulic fracturing alone.

A more practical reason to broaden the scope is that a well-bore and the target reservoir is subject to chemicals used in drilling and preparation of the well casings. It will be impossible to separate the set of chemicals used prior to hydraulic fracturing from those used during hydraulic fracturing. And what would be the point of doing so? All of the chemicals used will interact in the well with the rock formation and its toxic substances, and at the high pressures used may produce other byproducts, some of which could possess higher toxicity that the original toxic substances.

The accidental blow-out of the Crosby well in Wyoming released methane and other gases, petroleum condensates, and drilling fluids (muds) from fissures in the ground adjacent to the well. Colborn, et.al,[25] reported that this provided a unique opportunity to analyze the chemicals used during drilling, as fracking had not yet begun on that well.

"*During the 58 hours the eruption took place, 25,000 square feet of soil surface in the area were contaminated. The driller released copies of the MSDSs for the products used during the blowout and later we found the names of several more products from remedial action work plans to*

*clean up the site.*" It should be noted that the authors did not receive all information easily from the driller. Additional products and chemicals were identified only by the remedial action work plans. Twenty-two drilling chemicals were identified. Nearly 60% were associated with 'other' effects, which included mortality. A relatively high percentage of chemicals that affect the immune system were used.

Finally we wish to point out what the Secretary of Energy's Advisory Board Subcommittee had to say about the scope or definition of hydraulic fracturing.

> " The Subcommittee has considered the safety and environmental impact of all steps in shale gas production, not just hydraulic fracturing. Shale gas production consists of several steps, from well design and surface preparation, to drilling and cementing steel casing at multiple stages of well construction, to well completion. The various steps include perforation, water and fracturing fluid preparation, multistage hydraulic fracturing, collection and handling of flow-back and produced water, gas collection, processing and pipeline transmission, and site remediation. Each of these activities has safety and environmental risks that are addressed by operators and by regulators in different ways according to location. In light of these processes, the Subcommittee interprets its charge to assess this entire system, rather than just hydraulic fracturing."[26]

Without a comprehensive view of the entire system, including the use and distribution of toxic substances, the treatment and disposal of wastewater and contaminated solids and the potential exposures from the entire system, EPA will be hindered in developing rules needed to provide adequate health protection.

**An Extraordinary Number and Quantity of Chemicals of Known Toxicity are used in unconventional oil and gas development, although much of this information is not disclosed to the public, researchers or health professionals.**

A Congressional House Committee Report in 2011 found (Bolding is ours):

*"The absence of a minimum national baseline for disclosure of fluids injected during the hydraulic fracturing process and the exemption of most hydraulic fracturing injections from regulation under the Safe Drinking Water Act has left an informational void concerning the contents, chemical concentrations, and volumes of fluids that go into the ground during fracturing operations and return to the surface in the form of wastewater. As a result, regulators and the public are unable effectively to assess any impact the use of these fluids may have on the environment or public health."*[27]

*"Between 2005 and 2009, the 14 oil and gas service companies used more than* ***2,500 hydraulic fracturing products containing 750 chemicals*** *and other components. Overall, these companies used* ***780 million gallons of hydraulic fracturing products – not including water*** *added at the well site – between 2005 and 2009*." [28]

*"In many instances, the* ***oil and gas service companies were unable to provide the Committee with a complete chemical makeup of the hydraulic fracturing fluids they used.*** *Between 2005 and 2009, the companies used* ***94 million gallons of 279 products that contained at least one chemical or component that the manufacturers deemed***

***proprietary or a trade secret.*** *Committee staff requested that these companies disclose this proprietary information. Although some companies did provide information about these proprietary fluids,* ***in most cases the companies stated that they did not have access to proprietary information about products they purchased "off the shelf"*** *from chemical suppliers. In these cases,* ***the companies are injecting fluids containing chemicals that they themselves cannot identify.***" [29]

This creates a situation in which companies can inadvertantly mix chemicals that should never be mixed and create adverse interactions. It also means that if companies don't have the information, their workers are not being provided with required hazard information and cannot adequately protect themselves.

An example of a particularly toxic chemical, even by dermal exposure alone is 2-butoxyethanol:
*"Hydraulic fracturing companies used 2-butoxyethanol (2-BE) as a foaming agent or surfactant in 126 products. According to EPA scientists, 2-BE is easily absorbed and rapidly distributed in humans following inhalation, ingestion, or dermal exposure. Studies have shown that exposure to 2-BE can cause hemolysis (destruction of red blood cells) and damage to the spleen, liver, and bone marrow. The hydraulic fracturing companies injected 21.9 million gallons of products containing 2-BE between 2005 and 2009*." [30]

The problems of trade secrets, inadequate information in MSDS, sheets and the absence of CAS numbers for many ingredient chemicals were discussed in the House Committee Report and the Colburn et.al., article. The results of the Colburn review are quite significant in relation to the adequacy of toxics information.

*Of 944 products identified--*
- *Only 14 % (131) provided information on 95%+ of the ingredients.*
- *43% of the products provided information on less than 1% of the total product composition*
- *Out of 632 chemicals reported in products, the review team could only locate CAS numbers for 56%* [31]

These are very serious data limitations when trying to understand health effects and shocking to most health professionals. As a result the researchers were only able to use the data on 56% of the chemicals to assemble a profile of health effects in 12 categories. 44% of the chemicals had no CAS number listed.

*"More than 75% of the chemicals on the list can affect the skin, eyes, and other sensory organs, the respiratory system, the gastrointestinal system, and the liver. More than half the chemicals show effects on the brain and nervous system. These first four categories represent effects that would likely be expressed upon immediate exposure, such as eye and skin irritation, nausea and/or vomiting, asthma, coughing, sore throat, flu-like symptoms, tingling, dizziness, headaches, weakness, fainting, numbness in extremities, and convulsions."*[32]

*"Health categories that reflect chronic and long-term organ and system damage…..include the nervous system (52%), immune system (40%), kidney (40%), and the cardiovascular system and blood (46%). More than 25% of the chemicals can cause cancer and mutations. Notably, 37% of the chemicals can affect the endocrine system that encompasses multiple organ systems including those critical for normal reproduction and development. The category of 'other' is more*

*common, and includes effects on weight, teeth, and bone and the ability of a chemical to cause death. More than 40% of the chemicals have been found to have ecological effects, indicating that they can harm aquatic and other wildlife."*[33]

Both the House Committee and Colburn reports substantiate the inadequate knowledge of chemicals used in hydraulic fracturing and the need to require and systematically collect more comprehensive information about the chemicals used in light of their known health effects. In 2011, the SEAB committee also spoke to trade secret and proprietary information saying that the bar should be set quite high in relation to granting trade secret protection (as discussed earlier in these comments). Health professionals cannot treat health conditions caused by toxic chemicals when they don't know what their sick patient has even been exposed, and even if they suspect an exposure, without information about the particular toxic chemical or mixture, adequate treatment is impossible.

Creation of By-Products

In addition EPA has noted in the FR notice, "Chemicals and mixtures may react to create other substances and mixtures as products within an on-site mixing apparatus or the well that is being fractured."

Hydraulic fracturing involves the use of 100 or more chemicals deliberately added to a well. Some of these are pesticides with large percentages of so-called "inert" ingredients that actually have adverse impacts on human health and the environment. The term "inert" merely means that these ingredients are not the principal pesticidal agent. The geochemical nature of the rock is never described for the public so we have unknown types and quantities of toxic substances contained in the rock such as arsenic, chromium, lead, and radium. These two mixtures are then subjected to very high pressures, such as what you might have in a high-pressure industrial vessel in a chemical manufacturing facility. In addition, radioactive materials undergo decay with the generation of energetic alpha and beta particles and gamma rays and new elements, with both chemical and radioactive properties. Unknown by-products could be formed, some of which could be far more toxic than the original chemicals injected. Only extensive testing of flowback waters and produced water can determine the types and quantities of by-products that may be present.

The identification of individual newly created chemicals is likely to be a difficult research task. It may be appropriate as first steps to evaluate bioaccumulation potential and assess the toxicity of these unknown mixtures via biological tests such as survival of fish and other organisms at different dilutions of the total mixture to establish lethal doses to 50% of the populations. However, the more difficult task of identifying newly created chemicals still must be undertaken.

**Effectiveness for a particular use or function & Who Should Report to EPA**

The ANPR does not really ask questions about the proof of effectiveness for a particular function or category of use. Not until p. 28669 of the FR notice, IV. H., does EPA raise the question of effectiveness under *Safer Chemicals and Transparency*. However this

section deals with incentives and recognition programs or voluntary initiatives for safe and sustainable programs.

We believe proof of both the need and effectiveness of toxic chemicals used in the enormous quantities by this industry—approximately 50,000 gallons of chemicals for each well—are essential pieces of information for data collection and must be mandatory. Manufacturers, importers, processors and distributors should supply the information to EPA about their products and ingredients, including the information provided to downstream users, the intended uses, toxicity info, any warnings or precautions, and evidence of effectiveness for the category of use. All of this information should be required, including the CAS number for the chemical. Questions such as: What analyses have you done to evaluate the effectiveness of the chemicals you use to other chemicals in this category of use? And how do you evaluate the relative safety of the chemicals you choose to use for a particular function?, should be included.

**Oil and gas companies should also have responsibility for reporting**

Manufacturers, importers, processors, and distributors are less likely to know about the details of use and exposure at well sites and subsequent exposure associated with treatment and disposal. Currently, several entities may claim no knowledge of the products and chemicals they use, as oil and gas companies utilize many contractors and subcontractors, including service providers. From a public health perspective this absence of information is unacceptable and clearly unsustainable. In order for workers to understand the hazards they are working with they must be informed about the chemicals used and the precautions. Oil and gas companies manage the entire operation and should have principal responsibility for oversight of the chemicals used on site, keeping appropriate records, and completing required reporting.

It should be noted that service providers involved in mixing chemicals may only have a few employees on site, but the potential exposures associated with this function could impact all employees on site, from ruptured lines, spills, handling flowback, evaporation from impoundments, etc. When EPA asks for number of individuals exposed in their place of employment, they must ask not only about the number of employees of a service provider, but the maximum number of workers at a particular well site. EPA must have a basic understanding of this industry, which is dominated by many contractors and subcontractors and employees working under multiple business entities.

**Emergency Planning & Response and the Need for Data Regarding Individual Well Sites**

The easy availability of a federal chemical database is an essential element of emergency preparedness and response. We need data not just from manufacturers, importers, processors, and distributors included under TSCA, but data from the oil and gas industry on a well-by-well basis. A voluntary effort by the oil and gas industry is not acceptable as the following example should illustrate. This highlights why action under President Obama's Executive Order #13650 is absolutely essential, in order to issue requirements for this industry. In this section, we will describe the terrible incident in

Clarington, Ohio involving fires, explosions, and release of toxic chemicals on-site and to waterways, and the lack of detailed data about the chemicals at the site for five days.

The incident started at 9AM, June 28th, 2014 when a hydraulic line used during the hydraulic fracturing process broke and sprayed flammable liquid onto trucks. The fire spread quickly with twenty trucks going up in flames, and burning chemicals. Nearby residents were evacuated. The trailer holding the information pertaining to the chemicals on site was on fire and could not be accessed. The EPA and Ohio Department of Natural Resources eventually were able to obtain the chemical information, including the proprietary information, five days after the fire had started. Firefighters had to fight for access to the site to tackle the fires, with Statoil employees denying them access. The fire department asks for emergency contacts and an emergency plan for all drill sites, but since this is voluntary, the department did not get much cooperation.

After the fact, the Ohio Oil and Gas Association, argued for putting all the information on line, where it can be easily updated. Governor Kasich argued that firefighters should always have access to the list of chemicals on-site including those protected by trade secret laws. Other problems identified included the limited funds for emergency responders and the equipment necessary. [34]

A later report from EPA Region V, provided additional details about the event. As a result of fire-fighting efforts and flowback from the well, significant quantities of contaminated water and 25,000 gallons of chemical products were discharged to an unnamed tributary of Opposum Creek which discharges into the Ohio River 1.7 miles upstream of a drinking water intake. An estimated 70,000 dead fish were found as far as Opposum Creek. There are protected species in the Creek area.

Approximately 30 site explosions generated shrapnel and hindered firefighting efforts. A water curtain had to be maintained to prevent fire from affecting a trailer holding reactive chemicals and gas cylinders containing oxygen, acetylene, propane and other aerosol cans. Three Cesium -137 radiological sources were also present on site. Air and water sampling were undertaken. Some continued burning and smoldering hot spots were being addressed on July 3rd when all work had to be temporarily halted because analysis of the inventory revealed that 5 barrels of explosives were still missing. After recovery of barrels, work resumed. Full assessment of the event is ongoing. [35]

It should be noted that this is just one of many incidents that have occurred since hydraulic fracturing began. Other incidents have involved worker deaths and severe injuries. Thus far the Interagency Working Group actions under EO # 13650 have been a major disappointment with substantive action delayed for years. In the Interagency Working Group Report to the President on Executive Order 13650, *Actions to Improve Chemical Safety & Security*, May 2014 recommendation was made to remove the exemption enjoyed by oil and gas drilling and servicing operations related to hazardous materials and processes.

Recommendation in the Interagency Working Group report:

- *Covering oil and gas drilling and servicing operations that currently are exempt from PSM coverage. (PSM is OSHA's Process Safety Management program for highly hazardous materials and processes)*
- *Continuing harmonization with EPA's RMP regulation. (RMP is a similar program, Risk Management Program under EPA, which goes beyond workers and plant gates to communities.)*
- *Requiring analysis of safer technology and alternatives.*
- *Requiring coordination between chemical facilities and emergency responders to ensure that emergency responders know how to use chemical information to safely respond to accidental releases, possibly including exercises and drills* [36]

The oil and gas industry is an industry making extraordinary profits, receiving government subsidies from taxpayers and at the same time continuing to exact an incredible toll of deaths, injuries, and environmental damage. We recommend careful assessment of the total costs involved with this incident including environmental damage—in order to compare the damage costs to the costs of PREVENTION, under smart public policy and reasonable regulation.

Given that the EPA suggests that TSCA provides no opportunity to require chemical information from the oil and gas industry, we recommend immediate action under EO 13650. The exemption for the oil and gas drilling and service operations should be immediately removed. Stringent rules should be promulgated to address emergency preparedness and response, including the availability of information on chemicals, explosives and other high hazard materials at individual well sites in an easily accessible database. In fact the above incident could have been far worse if the reactive chemicals, gas cylinders and barrels of explosives had been involved in the fire.

It is extraordinary that Security Exchange Commission (SEC) required reporting (10-K reports) for the benefit of investors can be more informative than current reporting related to major public health impacts from unconventional oil and gas development.

Houston-based Noble Energy provides a representative example of the risks that at least several drilling companies include in their annual reports. Noble Energy states:

*" Our operations are subject to hazards and risks inherent in the drilling, production and transportation of crude oil and natural gas, including:*
*· injuries and/or deaths of employees, supplier personnel, or other individuals;*
*· pipeline ruptures and spills;*
*· fires, explosions, blowouts and well cratering;*
*· equipment malfunctions and/or mechanical failure on high-volume, high-impact wells;*
*· leaks or spills occurring during the transfer of hydrocarbons from an FPSO to an oil tanker;*
*· loss of product occurring as a result of transfer to a rail car or train derailments;*
*· formations with abnormal pressures and basin subsidence;*
*· release of pollutants;*
*· surface spillage of, or contamination of groundwater by, fluids used in hydraulic fracturing operations;*
*· security breaches, cyber attacks, piracy, or terroristic acts;*

*· theft or vandalism of oilfield equipment and supplies, especially in areas of increased activity such as the DJ Basin and Marcellus Shale;*

*· hurricanes, cyclones, windstorms, or "superstorms," such as Hurricane Sandy which occurred in 2012, which could affect our operations in areas such as the Gulf Coast, deepwater Gulf of Mexico, Marcellus Shale, Eastern Mediterranean or offshore China;*

*· winter storms and snow which could affect our operations in the Rocky Mountain areas;*

*· unseasonably warm weather, which could affect third party gathering and processing facilities, such as occurred in the Rocky Mountain areas during 2012;*

*· volcanoes which could affect our operations offshore Equatorial Guinea;*

*· flooding which could affect our operations in low-lying areas such as the Marcellus Shale;*

*· harsh weather and rough seas offshore the Falkland Islands, which could limit certain exploration activities; and*

*· other natural disasters.*

*Any of these can result in loss of hydrocarbons, environmental pollution and other damage to our properties or the properties of others. "*[37]

Companies also routinely warn investors of inadequate insurance to cover drilling harms. XTO Energy Corporation states, "we are not fully insured against all environmental risks, and no coverage is maintained with respect to any penalty or fine required to be paid by us."[38]

**Voluntary and Incentive Programs**

Voluntary programs should be extremely limited in contrast to mandatory ones. EPA could actively solicit voluntary information including recommendations for best practices, description of industry efforts to identify safer chemicals or processes, and to reduce the use of the most toxic chemicals. Only outstanding efforts should garner any sort of special recognition given the size of the oil and gas industry, the subsidies it receives from taxpayers, the many serious incidents, deaths and health impacts it has caused and the fact that this industry deliberately sought to be exempted from so many of our environmental laws – laws that provide a fundamental foundation for public health protection.

**EPA Research on Chemicals**

We support EPA's further research on chemicals and mixtures used in the entire system of oil and gas extraction. EPA however suggests that some chemicals have been well-characterized and EPA would focus its efforts on those that are not well- characterized.

EPA provided no definition or description of what it means by "well-characterized." We should have at least 6 categories of chemicals, but we could have a range with more categories.

- Chemicals having extensive studies for multiple health endpoints and demonstrating multiple adverse effects.
- Chemicals having extensive studies for multiple health endpoints and demonstrating no adverse effects.
- Chemicals having studies for a few health endpoints and demonstrating some adverse health effects.

- Chemicals having studies for a few health endpoints and demonstrating no health effects.
- Chemicals having almost no studies for health effects.
- Unknowns in the mixture, that need identification, and toxicological testing.

It is critical that EPA screen for those that do not degrade underground where there is a lack of oxygen or those that would tend to bioaccumulate. Well- characterized chemicals that have multiple adverse effects and are used in large quantities should be considered a high priority for elimination.

Equally, a priority for EPA attention is identification of known safe chemicals that perform the same function, and can demonstrate safety. Identifying safer chemicals can require a more rigorous Safer Alternatives Assessment to compare chemical toxicity and other factors to identify safer alternatives.

However, the vast majority of chemicals will have limited toxicity studies for just a few health systems. Reproductive and development studies have not been done on many chemicals and given that we have significant research and development findings in animals and some in humans associated with hydraulic fracturing, any chemical without these studies should not be considered well- characterized.

There can be no adequate research program unless EPA identifies a reasonably large source of funding for the research. We would appreciate if EPA would identify possible revenue sources including consideration of the use of offshore royalties.

**Use of Third Parties**

If involved industries want to work collectively through an association and possibly a contractor to collect and aggregate information to submit to EPA, we have no objection as long as the legally responsible company signs onto the information in its area of responsibility as being truthful and accurate. For individual well information, the oil or gas company must be the entity responsible for all chemicals, explosive and other hazardous materials used and stored on site, including those used by contractors and subcontractors, as well as the information submitted to EPA.

This means that EPA would receive the individual company information as well as the aggregated information for a specified manufacturer and a group of manufacturers.
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We question the use of the term "third party certification." A certification system sets up the idea that EPA is certifying a third party which we find highly questionable, particularly given the power of the oil and gas industry and therefore its ability to control any third party. It is much better that EPA maintains control of the database and quality of the data by keeping the responsibility within the agency.

We recognize that EPA may need to hire a contractor dedicated to this data collection and aggregation effort, as the effort will require a massive effort to be done correctly. However, involving a contractor is distinctly different from certifying a 3rd party entity that can be subject to industry influence.

Thank you for your attention. We would like to be kept informed on developments related to this rulemaking.

Respectfully,

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# Footnotes

**Note a number of the references below have been drawn from the:**

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