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August 4, 2011

BY HAND DELIVERY

Lisa P. Jackson, Administrator
Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Avenue, NW
Washington, D.C. 20460

Re: Citizen Petition under Toxic Substances Control Act Regarding the Chemical Substances and Mixtures Used in Oil and Gas Exploration or Production

Dear Administrator Jackson:

The undersigned organizations ("Petitioners") hereby petition the U.S. Environmental Protection Agency ("EPA") pursuant to section 21 of the Toxic Substances Control Act ("TSCA"), 15 U.S.C. § 2620, to promulgate rules protecting public health and the environment from the serious risks posed by chemical substances and mixtures used in oil and gas exploration or production ("E&P Chemicals"). Specifically, Petitioners request that EPA adopt a rule under TSCA section 4, requiring that manufacturers and processors of E&P Chemicals conduct toxicity testing of all E&P Chemicals and identify all chemical substances and mixtures tested. *See id.* § 2603. Petitioners also seek promulgation of a rule under TSCA section 8, requiring maintenance and submission of various records related to E&P Chemicals, calling in records of allegations of significant adverse reactions to E&P Chemicals, and requiring submission of all existing health and safety studies related to E&P Chemicals. *See id.* § 2607(a), (c), (d). Rulemaking under TSCA sections 4 and 8 is necessary to ensure that the health and environmental risks posed by E&P Chemicals are fully understood.

EPA and the public lack adequate information about the health and environmental effects of E&P Chemicals, which are used in increasing amounts to facilitate the rapid expansion of oil and gas development throughout the United States. Within the next 20 years, the U.S. Department of Energy expects gas production to increase by more than four trillion cubic feet,[1] which could translate into the drilling of more than 60,000 wells in the Marcellus Shale in Pennsylvania alone.[2] Oil production, too, is on the rise for the first time in over 20 years, as a

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* All documents cited in the following footnotes are reproduced on the enclosed CD-Rom.

[1] U.S. Dep't of Energy, U.S. Energy Info. Admin., Annual Energy Outlook 2009, 77 (Mar. 2009), *available at* http://www.eia.doe.gove/oiaf/aeo/pdf/trend_4.pdf.

[2] *See* Nels Johnson, *Pennsylvania Energy Impacts Assessment, Report 1: Marcellus Shale Natural Gas and Wind,* NATURE CONSERVANCY, 12 (Nov. 15, 2010), http://www.nature.org/media/pa/ tnc_energy_analysis.pdf.

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result of the recent exploitation of unconventional plays such as the Bakken and Niobrara Shales.

The growth of the oil and gas industry is attributable to the widespread use of hydraulic fracturing, a technology that involves high-pressure injection of a mix of fluids, sand, and chemicals to stimulate the release of oil and gas from unconventional formations. Oil and gas development requires the use of both drilling muds, which are used to shorten drilling time and lubricate the drill bit, and fracturing fluids, which are used to create fractures in the formation and to hold the fractures open to release the oil and gas. Drilling muds and fracturing fluids require similar classes of chemical additives, including proppants, acids, breakers, bactericides, biocides, clay stabilizers, corrosion inhibitors, crosslinkers, friction reducers, gelling agents, iron controls, scale inhibitors, and surfactants.[3] Well operators vary the chemical additives that they use, based upon the characteristics of the well and production objectives.[4] More than ten thousand gallons of E&P Chemicals may be used to fracture a single well.[5]

Under the current regulatory scheme, manufacturers, processors, and distributors place substantial quantities of E&P Chemicals into commerce without first disclosing the chemicals' identity, toxicity, or health and environmental impacts. Chemical manufacturers and processors are, moreover, under no obligation to conduct toxicity testing or to develop or provide health and safety data for E&P Chemicals. As a result, the public lacks adequate information to evaluate the risks of harm to health and the environment posed by exposure to E&P Chemicals. Mounting reports of harm caused by E&P Chemicals, including injury to people, animals, and aquatic life, and degradation of air, water, and soil quality, demonstrate that unregulated E&P Chemicals may present an unreasonable risk of harm to health and the environment.

Congress enacted TSCA to ensure the availability of "adequate data" on the health and environmental effects of chemicals and "to assure that . . . chemical substances and mixtures do

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[3] *See* N.Y. Dep't of Envtl. Conservation, Div. of Mineral Res., Draft Supplemental Generic Environmental Impact Statement on the Oil, Gas, and Solution Mining Regulatory Program, 5-45 to 5-51 (2009), *available at* ftp://ftp.dec.state.ny.us/dmn/download/OGdSGEISFull.pdf (hereinafter "DSGEIS"); Ronald E. Bishop, Ph.D., *Chemical and Biological Risk Assessment for Natural Gas Extraction in New York*, 11 (Mar. 28, 2011), http://www.ge.tt/#2VfEsZw (stating that "most hydraulic fracturing additives are also used in drilling fluids (or 'muds')").

[4] DSGEIS, *supra* note 3, at 5-33 to 5-34, 5-99.

[5] *See id.* at 5-34 (explaining that fracturing fluids typically are composed of 98 percent fresh water and sand and two percent chemicals), 5-92 to 5-93 (stating that the entire multi-stage fracturing operation for a single well requires between 2.4 and 7.8 million gallons of water); *cf.* Travis Madsen, Jordan Schneider & Erika Staaf, *In the Shadow of the Marcellus Boom*, PENNENVIRONMENT RESEARCH & POLICY CTR., 16 (May 2011), http://www.pennenvironment.org/uploads/49/f3/49f38a45f956d58a210d7e24a17ec26a/ In-the-Shadow-of-the-Marcellus-Boom.pdf (estimating that one gas well that requires three million gallons of fluid would require approximately 250,000 pounds of chemicals).

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not present an unreasonable risk of injury to health or the environment."[6] At present, EPA and the public lack adequate data about the identity of E&P Chemicals, the number of E&P Chemicals in commerce, significant adverse reactions posed by E&P Chemicals, and health and environmental hazards, exposures, and risks posed by E&P Chemicals. Petitioners request that EPA ensure that E&P Chemicals do not present an unreasonable risk of harm to health and the environment by promulgating rules under TSCA sections 4 and 8.

I. Neither EPA's Study of the Potential Drinking Water Impacts of Hydraulic Fracturing nor a Voluntary Online Chemical Registry Is a Substitute for Rulemakings Under TSCA Sections 4 and 8.

EPA and other organizations recently have made attempts to address increased public concern about the potential risks to health and the environment posed by E&P Chemicals. EPA currently is conducting a study of the potential impacts of hydraulic fracturing on drinking water sources.[7] In addition, the Groundwater Protection Council ("GWPC") and the Interstate Oil and Gas Compact Commission ("IOGCC") recently created an online registry whereby well operators may voluntarily disclose the chemicals they use in their fracturing operations.[8] Neither EPA's study nor the voluntary registry imposes enforceable requirements upon manufacturers, processors, or distributors of E&P Chemicals, and rulemakings pursuant to TSCA sections 4 and 8 are necessary to fill this gap.

A. EPA's Study

EPA's study of the possible relationships between hydraulic fracturing and drinking water will not replace rulemakings under TSCA sections 4 and 8. Although E&P Chemicals do threaten drinking water supplies, their potential to cause harm to health and the environment does not stop there.[9] E&P Chemicals also threaten human health when they become airborne, and they pose significant risks of harm to soil quality, habitat for both terrestrial and aquatic wildlife, and the healthy functioning of complex ecosystems.

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[6] 15 U.S.C. §§ 2601(b)(1), (3) (2006).

[7] *See* EPA, Office of Research and Dev., Draft Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources, at vii (Feb. 2011), *available at* http://water.epa.gov/type/groundwater/uic/class2/hydraulicfracturing/upload/HFStudyPlanDraft_SAB_020711.pdf (hereinafter "EPA Study") ("The overall purpose of this study is to understand the relationship between hydraulic fracturing and drinking water resources.").

[8] *See* GWPC & IOGCC, FracFocus Chemical Disclosure Registry, http://fracfocus.org/ (last visited Aug. 2, 2011).

[9] *See* EPA Study, *supra* note 7, at viii ("EPA recognizes that there are important potential research areas related to hydraulic fracturing other than those involving drinking water resources, including effects on air quality, aquatic and terrestrial ecosystem impacts, seismic risks, public safety concerns, occupational risks, and economic impacts. These topics are outside the scope of the current study, but should be examined in the future.").

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To facilitate its study, EPA directed informational requests to nine hydraulic fracturing service providers, yet only five of those service providers also manufacture or process E&P Chemicals.[10] By relying largely on service providers to relay second-hand information from manufacturers, EPA's requests fail to reach many of those responsible for introducing E&P Chemicals into commerce in the first place.[11] Because manufacturers of E&P Chemicals often disclose minimal information about product compositions to their customers, any responses submitted by the service providers are likely to be incomplete.[12] Service providers, moreover, frequently resist disclosure. In fact, none of service providers responded to EPA's request within the 30-day deadline established in the letters, and one of them – Halliburton – promised compliance only after EPA subpoenaed the information.

EPA's study falls short of TSCA rulemakings because it will not require manufacturers and processors of E&P Chemicals to take proactive efforts to conduct testing or to develop health and safety data needed to evaluate the health and environmental risks of their substances and mixtures. Instead, EPA's study simply requires service providers to gather information available to them – much of which is obtained from the manufacturers – and submit it to EPA. EPA then will undertake its own efforts to evaluate the information submitted to determine the effects of hydraulic fracturing on drinking water supplies. Rulemakings under TSCA sections 4 and 8, on the other hand, would hold manufacturers and processors of E&P Chemicals responsible for gathering information, testing their products, and developing and submitting health and safety reports.[13]

B. The Voluntary Registry

The GWPC and the IOGCC recently created an online registry through which well operators may voluntarily disclose the chemicals that they use in hydraulic fracturing of oil and

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[10] EPA issued voluntary information requests to the following nine natural gas service companies: BJ Services, Complete Production Services, Halliburton, Key Energy Services, Patterson-UTI, PRC, Inc., Schlumberger, Superior Well Services, and Weatherford. *See* Press Release, EPA, EPA Formally Requests Information from Companies About Chemicals Used in Natural Gas Extraction (Sept. 9, 2010), http://yosemite.epa.gov/opa/admpress.nsf/e77fdd4f5afd88a3852576b3005a604f/ec57125b66353b7e85257799005c1d64!OpenDocument. Only five of the companies – BJ Services, Inc., Halliburton, Schlumberger, Superior Well Services, and Weatherford – also function as manufacturers or processors of E&P Chemicals. EPA did not serve information requests on other manufacturers and processors of E&P Chemicals, such as Cudd Energy Services, Nalco Energy Services, Sanjel USA, and Aquaness Chemical.
[11] *See* TEDX, Health Effects Summary Statement, 5 (Jan. 27, 2011), http://www.endocrinedisruption.com/chemicals.multistate.php (follow link to "summary statement") (explaining that drilling and fracturing contractors companies largely rely on information from chemical manufacturers when responding to requests about the identity of the chemicals they use at well sites).
[12] *Id.*
[13] *See* 15 U.S.C. § 2601(b)(1).

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gas wells.[14] Well operators that choose to use the registry have the opportunity to upload a variety of information about the chemicals they use at each well, including their functional purposes, ingredients, concentrations, and CAS numbers.[15] This voluntary registry is designed to allow the public to identify the chemicals being used at specific wells – at least those chemicals that are voluntarily disclosed.

Like EPA's study, the voluntary registry is not aimed at the manufacturers, processors, and distributors of E&P Chemicals who are answerable under TSCA. Moreover, the registry does not impose any enforceable requirements upon the well owners and operators that make – or choose not to make – voluntary disclosures. Because the registry is based upon voluntary disclosures, operators may choose to disclose only those chemicals posing the least risk to health and the environment, and the public could receive misleading or selective information.

II. Rulemakings Under TSCA Sections 4 and 8 Are Necessary to Fill Significant Gaps in Federal Regulation of E&P Chemicals.

Federal agencies have extremely limited authority to regulate E&P Chemicals.[16] Hydraulic fracturing is exempt from regulation under the Underground Injection Control program of the Safe Drinking Water Act, except when injected fluids contain diesel fuel.[17] Were hydraulic fracturing not specifically excluded from the definition of "underground injection," the oil and gas industry would be required to disclose in mandatory permit applications the "source and analysis of the physical and chemical characteristics" of all of the chemicals injected below ground to stimulate oil and gas production.[18] This exemption, commonly known as the "Halliburton Loophole," allows the oil and gas industry to conceal chemical formulas and to inject toxic fluids near drinking water supplies without EPA oversight.[19]

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[14] *See* Frac Focus Chemical Disclosure Registry, *supra* note 8.

[15] The Chemical Abstracts Service is a division of the American Chemical Society and the "worlds [sic] authority for chemical information." CAS, FAQ List and Information for New Visitors, http://www.cas.org/aboutcas/faq.html (last visited Aug. 2, 2010). A CAS Number "provides an unambiguous way to identify a chemical substance or molecular structure when there are many possible systematic, generic, proprietary, or trivial names." *Id.*

[16] *See* Memorandum from Henry A. Waxman & Edward J. Markey to Members of the Subcommittee on Energy and Environment, Examining the Potential Impact of Hydraulic Fracturing, 2 (Feb. 18, 2010), *available at* http://democrats.energycommerce.house.gov/Press_111/20100218/hydraulic_fracturing_memo.pdf.

[17] 42 U.S.C. § 300h(d)(1)(B)(ii).

[18] EPA Form 7520-6: Underground Injection Control Permit Application, 5 (rev. Dec. 2008), *available at* http://www.epa.gov/safewater/uic/pdfs/reportingforms/7520-6.pdf.

[19] *See* Tracy Carluccio, *Will We Sacrifice Our Water for Gas?*, OUTDOOR AMERICA, Spring 2010, at 27-28, *available at* http://www.iwla.org/index.php?ht=a/GetDocumentAction/i/4272.

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The oil and gas industry also avoids regulation under the Resource Conservation and Recovery Act ("RCRA"), which sets the standards for handling and disposal of hazardous wastes.[20] Wastes created by oil and gas exploration and production, including E&P Chemicals present in drilling fluids and produced waters, are not subject to regulation under RCRA.[21] Were oil and gas wastes subject to RCRA, those charged with handling the wastes would be required to demonstrate that the wastes were, for example, stored, transported, and disposed of in a way not harmful to the environment.[22]

In addition, the oil and gas industry is exempt from the provision of the Emergency Planning and Community Right to Know Act ("EPCRA"), under which EPA requires industrial and federal facilities with more than ten employees to report the toxic chemicals they release, store, and transfer.[23] Specifically, any facility that manufactures or processes a chemical in amounts over statutory thresholds must submit forms detailing the chemical identities, uses, and volumes; as well as onsite waste treatment and recycling methods and offsite transfer locations.[24] The chemical information contained in these reports, where otherwise mandated by EPCRA, is made publicly available in the Toxic Release Inventory, which is updated annually and serves to inform communities and citizens of chemical hazards to which they may be exposed.[25]

Although a few federal regulations require storage facilities and manufacturers to disclose certain information about the chemicals they store and manufacture, the information gathered pursuant to these regulations is extremely limited and not readily available to EPA or the public. First, under EPCRA, owners and operators of storage facilities holding in excess of 10,000 pounds of any hazardous chemical must submit chemical inventory information ("Tier II reports") to the state emergency response commission ("SERC"), local emergency planning committee ("LEPC"), and the local fire department in the area where the facilities are located.[26] Every state implementing the federal program has different Tier II reporting requirements, and the forms required to be completed by the storage facilities may differ by county and by

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[20] *See* 42 U.S.C. § 6921(b)(2)(A).
[21] *See id.* ("[D]rilling fluids, produced waters, and other wastes associated with the exploration, development, or production of crude oil or natural gas or geothermal energy shall be subject only to existing State or Federal regulatory programs in lieu of this subchapter . . . .").
[22] *See* 42 U.S.C. § 6922.
[23] 40 C.F.R. §§ 372.22., 372.23 (2011).
[24] *Id.* §§ 372.25, 375.28; EPA, Form R: Approved OMB No. 2025-0009 (2010), http://www.epa.gov/tri/report/formR/RY2010_FormR_010511.pdf.
[25] *See id.*
[26] 42 U.S.C. § 11022(a)(1); 40 C.F.R. § 317.10 (setting the threshold for Tier II reports at 10,000 pounds for hazardous substances and 500 pounds for extremely hazardous substances).

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company.[27] To obtain Tier II reports, moreover, the public must request them in writing from an SERC or LEPC.[28]

Second, under EPCRA and the Occupational Safety and Health Act, manufacturers and importers of E&P Chemicals are required to disclose certain chemicals on material safety data sheets ("MSDSs"), which are designed to protect employees working with hazardous chemicals by informing them about the risks associated with those chemicals.[29] MSDSs are governed by regulations promulgated by the Occupational Safety and Health Administration ("OSHA").[30] With or before the initial shipment, manufacturers and importers must provide MSDSs to any distributor or employer receiving their products, and employers must keep the MSDSs in the workplace and make them readily accessible to employees.[31] Employers required to maintain MSDSs at their facilities must file them with the SERC, LEPC, and fire department with jurisdiction over the facility.[32] The public may obtain MSDSs only upon written request to state and local agencies.[33]

MSDSs are the primary means by which the public has been able to obtain information about E&P Chemicals, yet the information they provide is inadequate to identify the full spectrum of E&P Chemicals or to evaluate the chemicals' health and environmental effects. This inadequacy results from OSHA's regulations governing MSDSs, which limit the information required to be disclosed in several ways. First, only "hazardous chemicals" need to be disclosed on MSDSs, and a chemical must have been subject to significant testing before it will be considered "hazardous" under the regulations.[34] There is, however, no requirement that E&P Chemicals ever be tested. Second, even where a chemical that has been sufficiently tested qualifies as "hazardous," the manufacturer may opt not to disclose it if it constitutes less than one percent of the volume of the product (or 0.1 percent of the volume of the product if the

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[27] *See, e.g.*, EPA, Tier II Chemical Inventory Reports/Tier II Submit, http://www.epa.gov/oem/content/epcra/tier2.htm (last visited Aug. 2, 2011) (providing links to the different reporting requirements of each of the 50 states).
[28] 40 C.F.R. § 370.61.
[29] 42 U.S.C. § 11021(a)(1); 29 U.S.C. § 655; 29 C.F.R. § 1910.1200(g)(1) (requiring chemical manufacturers and importers to "obtain or develop" an MSDS for "each hazardous chemical they produce or import").
[30] 29 C.F.R. § 1910.1200.
[31] *Id.* § 1910.1200(g)(6)(i), (8).
[32] 42 U.S.C. § 11021(a)(1).
[33] *See* 40 C.F.R. § 370.60.
[34] *See* 29 C.F.R. § 1910.1200(c). A "[h]azardous chemical means any chemical which is a physical hazard or a health hazard." *Id.* A "physical hazard" is a "chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water-reactive." *Id.* A "health hazard" is a "chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees." *Id.*

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chemical is a carcinogen).[35] Third, a "hazardous chemical" need not be disclosed if the manufacturer claims that its identity is a trade secret.[36] The manufacturer unilaterally may withhold specific chemical information as proprietary if it determines that the trade secret classification can be "supported."[37]

Above all, MSDSs are an inadequate source of information because the chemical manufacturers have wide discretion in preparing the sheets.[38] OSHA publishes little guidance as to whether a chemical is hazardous and instead directs the manufacturers to "conduct a thorough evaluation" as to whether a chemical must be disclosed.[39] OSHA recognizes four separate lists identifying chemicals that are automatically "hazardous" as defined by the regulations,[40] but these lists are incomplete, contain only chemicals that already have been tested extensively, and are neither user-friendly nor readily understood by the ordinary citizen. Moreover, federal regulators provide little oversight in the manufacturers' decision-making process.[41] Given the broad exceptions carved out in OSHA's regulations, the manufacturers' ample discretion, and OSHA's lack of oversight, the regulations do not provide much incentive for disclosure on MSDSs.

In practice, when preparing MSDSs, manufacturers of E&P Chemicals take advantage of the ample discretion provided by OSHA's regulations and omit vital information about the chemical composition of their products.[42] For example, although manufacturers have

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[35] *See id.* § 1910.1200(d)(5)(ii).
[36] *See id.* § 1910.1200(g)(2)(i).
[37] *Id.* § 1910.1200(i)(1)(i).
[38] *See, e.g.*, 29 C.F.R. § 1910.1200, App. B ("Hazard evaluation is a process which relies heavily on the professional judgment of the evaluator"); *see also* TEDX, Health Effects Summary Statement, *supra* note 11, at 1 ("The accuracy and completeness [of MSDSs] are entirely up to the company that produces the MSDS").
[39] 29 C.F.R. § 1910.1200, App. B.
[40] Chemical manufacturers must treat a chemical as hazardous and list it on an MSDS if it is listed (1) in 29 C.F.R. part 1910, subpart Z, (2) on the Threshold Limit Values for Chemical Substances and Physical Agents in the Work Environment, American Conference of Governmental Industrial Hygienists (latest edition), (3) as a carcinogen by the National Toxicology Program, or (4) as a carcinogen by the Annual Report on Carcinogens, International Agency for Research on Cancer Monographs. *See id.* §§ 1910.1200(d)(3)-(4).
[41] *See* 29 C.F.R. § 1910.1200, App. B. OSHA does not intervene in the decision-making process of the manufacturers when preparing MSDSs; however, upon OSHA's request, manufacturers must be able to "demonstrate that they have adequately ascertained the hazards of the chemicals produced or imported." *Id.*
[42] Theo Colborn, Carol Kwiatkowski, Kim Schultz, & Mary Bachran, *Natural Gas Operations from a Public Health Perspective*, INT'L J. HUMAN & ECOLOGICAL RISK ASSESSMENT (forthcoming 2011) (manuscript at 7), http://www.endocrinedisruption.com/files/Oct2011HERA10-48forweb3-3-11.pdf. TEDX studied what it refers to as chemical "products," which contain a variety of chemical substances. Although TEDX does not use the term "mixture" as it is defined under TSCA, the fracturing products evaluated in TEDX's

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distributed hundreds of MSDSs for products used in gas development, a study performed by The Endocrine Disruption Exchange ("TEDX"), a non-profit organization that provides scientific information about endocrine disruptors, demonstrates that these MSDSs are "fraught with gaps."[43] Of the 980 MSDSs gathered by TDEX, 421 of them – representing 43 percent of the chemical products – disclosed less than one percent of the products' chemical composition.[44] Of the remaining MSDSs, only 133 of them – representing only 14 percent of the chemical products – disclosed more than 95 percent of the products' chemical composition.[45] In addition, many of these MSDSs either provided functional descriptions in place of chemical ingredients or omitted CAS numbers.[46] As TEDX explained, its review demonstrates that MSDSs can "easily be inaccurate and incomplete."[47]

III. Rulemakings Under TSCA Sections 4 and 8 Are Necessary to Fill Gaps in State Regulation of E&P Chemicals.

Most states do not routinely disclose to the public information they receive about E&P Chemicals, even when the information is not claimed to be proprietary, and no state is requiring toxicity testing or development of health and safety data. Wyoming has implemented the most far-reaching regulations governing disclosure of E&P Chemicals, yet even these regulations fall short of what a rulemaking under TSCA sections 4 and 8 would provide. Wyoming's rules require that well owners and operators disclose to the state's Oil and Gas Conservation Commission ("WYOGCC") the identities and concentrations of all chemicals that will be used at each well site.[48] Wyoming's rules, however, do not require toxicity testing or disclosure of health and environmental impacts of the chemicals. Moreover, like EPA's current study, Wyoming's rules do not reach manufacturers, processors, or distributors of E&P Chemicals, unless the well owner or operator is a company such as Halliburton or Schlumberger that also manufactures, processes, or distributes E&P Chemicals.

Wyoming's newly-enacted regulations and the oil and gas industry's response to them demonstrate that the oil and gas industry is resistant to disclosure of E&P Chemicals. In fact, since Wyoming's regulations were enacted in August 2010, the WYOGCC has received more

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study meet TSCA's definition of mixture. *See* 15 U.S.C. § 2602(8) ("The term 'mixture' means any combination of two or more chemical substances if the combination does not occur in nature and is not, in whole or in part, the result of a chemical reaction; except that such term does include any combination which occurs, in whole or in part, as a result of a chemical reaction if none of the chemical substances comprising the combination is a new chemical substance and if the combination could a have been manufactured for commercial purposes without a chemical reaction at the time the chemical substances comprising the mixture were combined.").

[43] Colborn, *supra* note 42, manuscript at 7.

[44] TEDX, Health Effects Summary Statement, *supra* note 11, at 2.

[45] *Id.*

[46] *Id.* at 1.

[47] Colborn, *supra* note 42, manuscript at 7.

[48] *See* Wy. Code R. Oil Gen. Ch. 3 § 45(d).

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than 90 trade secret claims for E&P Chemicals.[49] Although some of those submitting trade secret claims disclosed all ingredients except for those chemical substances claimed to be proprietary, others submitted blanket confidentiality claims and refused to disclose any of the chemical substances used at the well sites on the grounds that some of them were proprietary.[50] Although TSCA also provides an opportunity for manufacturers, processors, and distributors to present trade secret claims, EPA currently is undertaking efforts to ensure that TSCA's limited trade secret provisions are not abused and that health and safety information submitted under TSCA is made publicly available.[51]

IV. There Is Insufficient Information Available to Permit a Reasoned Evaluation of the Health and Environmental Effects of E&P Chemicals.

In the absence of a federal rulemaking requiring disclosure of the identities of E&P Chemicals and information about the chemicals' health and environmental impacts, scientific organizations and state agencies, including TEDX and the New York State Department of Environmental Conservation ("NYSDEC"), have undertaken efforts to evaluate the health risks posed by E&P Chemicals. Two reports published by TEDX and NYSDEC, respectively, analyze the health effects of all chemical substances for which TEDX and NYSDEC could locate a CAS number.[52] These reports do not analyze any health effects related to chemical mixtures, in large part because manufacturers and processors rarely disclose the complete chemical composition of their products.[53] Read together, these reports demonstrate that the information currently

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[49] *See* Telephone Conversation between Megan Klein, Associate Attorney, Earthjustice, and Gary Strong, Project Geologist, Wyoming Oil and Gas Conservation Commission (Mar. 21. 2011). Mr. Strong stated that, to his knowledge, 91 trade secret claims had been made since the regulations became effective on August 17, 2010, but he noted that this number could include duplicate claims or claims made for chemicals never actually used at the well sites. *Id.* Wyoming's regulations provide that "confidentiality protection shall be provided" for trade secrets, and privileged and confidential information when the party seeking to withhold disclosure provides written documentation of the "nature and extent of the proprietary information." Wy. Code R. Oil Gen. Ch. 3 § 45(f).

[50] *See* Telephone Conversation between Klein and Strong, *supra* note 49.

[51] *See* 15 U.S.C. § 2613(a) (providing statutory authority under which the chemical industry, or EPA after obtaining the information from the chemical industry, may withhold certain information as confidential business information ("CBI")), *id.* § 2613(b) (indicating that, outside of limited circumstances, information disclosed as part of health and safety data may not be withheld as CBI); 75 Fed. Reg. 29,754, 29,754 (May 27, 2010) (announcing that EPA will begin reviewing CBI claims for health and safety data to ensure all CBI claims for chemical identities are supportable under TSCA); *see also id.* at 29,755 (indicating that its review of CBI claims "will make more health and safety information available to the public and support an important mission of the Agency to promote public understanding of the potential risks posed by chemical substances in commerce").

[52] *See* DSGEIS, *supra* note 3, at 5-25 (identifying 260 chemical substances); *cf.* TEDX, Health Effects Summary Statement, *supra* note 11, at 3 (identifying 649 chemical substances).

[53] *See* TEDX, Health Effects Summary Statement, *supra* note 11, at 1.

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available is insufficient to identify the full spectrum of E&P Chemicals or to permit a reasoned evaluation of their health and environmental effects.

A. TEDX Report

In an attempt to determine the identity of E&P Chemicals and to evaluate the health effects associated with them, TEDX gathered information from multiple sources, including MSDSs, state Tier II reports, Environmental Impact Statement and Environmental Assessment disclosures, rule-making documents, and accident and spill reports.[54] TEDX's review spanned several years and required TEDX to match the chemical substances that could be identified by CAS number with available health data. After performing this extensive and labor-intensive review, TEDX concluded that health data was available for "only a small percentage of the chemicals in use" in the gas industry.[55]

Using the available information, TEDX was able to form a list of 980 products containing 649 chemical substances.[56] It was not possible reliably to determine the health effects of almost half of the substances identified because TEDX could not locate CAS numbers for them.[57] The remaining substances that could be identified by CAS number were associated with multiple health effects, including effects on human sensory, respiratory, gastrointestinal, nervous, immune, cardiovascular, and endocrine systems. Specifically, over 78 percent of the substances that could be identified by CAS number were associated with serious short-term health effects such as burning eyes, rashes, coughs, sore throats, asthma-like effects, nausea, vomiting, headaches, dizziness, tremors, and convulsions.[58] Between 22 and 47 percent of the identifiable substances also were associated with longer-term health effects, including cancer, organ damage, and harm to the endocrine system.[59] In addition, 48 percent of the identifiable substances had "other" health effects not specifically classified as short- or long-term, such as changes in weight, effects on teeth and bones, and death.[60] Because the full chemical composition of the vast majority of the products was not available, TDEX was not able comprehensively to evaluate the health effects of the mixtures used in gas development.

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[54] TEDX, Health Effects Summary Statement, *supra* note 11, at 1.
[55] Colborn, *supra* note 42, manuscript at 12.
[56] *See* TEDX, Health Effects Spreadsheet (2010), http://www.endocrinedisruption.com/files/MultistateSpreadsheet3-22-11States.xls.
[57] *See* TEDX, Health Effects Summary Statement, *supra* note 11, at 3 (indicating the TEDX could not locate CAS numbers for 44 percent of the chemicals identified).
[58] *Id.*
[59] *Id.*
[60] *Id.*

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B. NYSDEC Analysis

In an attempt to analyze the health effects of fracturing chemicals likely to be used at well sites in New York State, NYSDEC collected MSDSs and sought additional information from well service providers and chemical manufacturers.[61] From the information it obtained, NYSDEC compiled a list of 260 chemical substances used within 197 fracturing products, although full chemical composition information was available for only 152 products.[62] NYSDEC's review of the identifiable chemical substances and mixtures demonstrated that "[c]ompound-specific toxicity data are very limited for many chemical additives to fracturing fluids."[63] Lacking compound-specific toxicity data, NYSDEC grouped the substances by their chemical structures and then matched each group of substances with health risks identified by the New York State Department of Health.[64] Listed below are some of the groups of chemical substances identified in the DSGEIS and the adverse health effects associated with those groups:

- BTEX compounds (benzene, toluene, ethylbenzene, and xylene): damage to the nervous system, liver, kidneys and blood cell-forming tissues;
- Petroleum distillate products: adverse effects on the gastrointestinal system and central nervous system, skin irritation, blistering, and peeling;
- Quarternary ammonium compounds, which can react with disinfectants used in drinking water systems to form nitrosamines: genetic damage and cancer;
- Microbicides: respiratory and gastrointestinal damage as well as damage to the kidneys, liver, and nervous system;
- Formaldehyde: irritation of the skin, eyes, nose, and throat, along with increased tearing; nasopharyngeal and lymphohematopoietic cancer;[65]
- Glycol ethers: damage to male reproductive systems and red blood cell formation; and
- 1,4-dioxane: eye and nose irritation, liver and kidney damage, and liver cancer.

Although NYSDEC was able to identify a range of adverse health impacts associated with groups of fracturing chemicals, NYSDEC acknowledged that its analysis of the health effects of fracturing chemicals was incomplete, because it was not able to identify health data for every chemical in each group.[66]

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[61] DSGEIS, *supra* note 3, at 5-52 to 5-62. In addition to the 260 chemicals, the products identified also contained "40 compounds which require further disclosure since many are mixtures." *Id.* at 5-35.
[62] *Id.* at 5-35.
[63] *Id.* at 5-53.
[64] *Id.* at 5-52, 5-63 to 5-66.
[65] EPA recently released a draft formaldehyde-inhalation assessment that identifies formaldehyde as a widely-recognized carcinogen. EPA, IRIS Toxicological Review of Formaldehyde-Inhalation Assessment (External Review Draft), EPA/635/R-10/002A, at § 4.1.2 (2010).
[66] *See* DSGEIS, *supra* note 3, at 5-61.

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V. E&P Chemicals May Present an Unreasonable Risk of Harm to Human Health, Terrestrial and Aquatic Life, and the Environment.

Numerous incidents of exposure to E&P Chemicals demonstrate that E&P Chemicals may present an unreasonable risk of harm to health and the environment at every stage of oil and gas development, including storage, transportation, treatment, and disposal. Leaks and spills of E&P Chemicals have been reported from Wyoming to Pennsylvania.[67] In 2010 alone, at least 34 million gallons of crude oil and E&P Chemicals were spilled nationwide.[68] The New Mexico Oil and Gas Conservation Division has identified close to 400 cases of groundwater contamination from oil and gas pits statewide.[69] Data gathered by the Colorado Oil and Gas Conservation Commission indicated that in the state of Colorado there were 134 spills of oil and gas products, including drilling muds and fracturing fluids, between 2003 and 2008.[70] The Pennsylvania Land Trust reviewed records of violations by service companies operating in the Marcellus Shale between January 2008 and August 2010, and found that there were 1,056 violations likely to have caused environmental harm.[71]

E&P Chemicals frequently are found in drinking water supplies near oil and gas development sites. Testing of drinking water wells in Dimock, Pennsylvania – a small town with more than 60 gas wells in a nine-square-mile area[72] – revealed high levels of toluene and ethylbenzene, which are carcinogenic chemicals believed to aid the fracturing process.[73] Residents of Sublette County, Wyoming tested their drinking water wells and found "fluoride – which is listed in Halliburton's hydraulic fracturing patent applications and can cause bone damage at high levels – at almost three times EPA's maximum limit."[74] A poorly lined pit near

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[67] Jad Mouawad & Clifford Krauss, *Dark Side of a Natural Gas Boom*, N.Y. TIMES, Dec. 7, 2009, at B1, *available at* http://www.nytimes.com/2009/12/08/business/energy-environment/08fracking.html.
[68] Armen Keteyian, *Oil and Gas Industry Spills Happen "All the Time,"* CBS NEWS, Apr. 12, 2011, http://www.cbsnews.com/8301-31727_162-20054042-10391695.html.
[69] New Mexico Energy, Minerals, and Natural Resources Department, Groundwater Impact Update spreadsheet (2010), http://www.emnrd.state.nm.us/ocd/documents/GW_Impact_updTbl_000.xls.
[70] Exhibit 1 to Consolidated Final Prehearing Statement of the Oil and Gas Accountability Project et al., *In re Changes to R. & Regs. of Oil & Gas Conservation Comm'n of Colo.*, No. 0803-RM-02 (2008), *available at* http://cogcc.state.co.us/RuleMaking/PartyStatus/FinalPrehearingStmts/OGAPExh1.pdf (indicating that there were 134 spills of "other" products, which "included diesel fuel, glycol, amine, lubricating oil, hydraulic fracturing fluids, drilling muds, other chemicals, and natural gas leaks").
[71] Pennsylvania Land Trust Association, Marcellus Drillers in Pennsylvania Amass 1,614 Violations Since 2008 – 1,056 Identified as Most Likely to Harm the Environment (Oct. 2010), http://conserveland.org/violationsrpt (follow link to "Download Report").
[72] *See, e.g.*, Christopher Bateman, *A Colossal Fracking Mess*, VANITY FAIR, June 21, 2010, *available at* http://www.vanityfair.com/business/features/2010/06/fracking-in-pennsylvania-201006.
[73] Michael Rubinkam, *Report: Fracking Chemicals in NE Pa. Water Wells*, ABC NEWS, Sept. 16, 2010, http://abcnews.go.com/Business/wireStory?id=11653140&page=1.
[74] Abrahm Lustgarten & ProPublica, *Drill for Natural Gas, Pollute Water*, SCIENTIFIC AMERICAN, Nov. 17, 2008, *available at* http://www.scientificamerican.com/article.cfm?id=drill-for-natural-gas-pollute-water.

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Parachute, Colorado, leaked 2,500 barrels of drilling muds into a tributary of Garden Gulch, and samples performed on the receiving waters demonstrated high levels of benzene and acetone.[75] In 2009 and again in 2010, EPA informed residents of Pavillion, Wyoming, that a number of drinking water wells in their area were contaminated with 2-butoxyethanol ("2-BE"), a chemical used as a general solvent that is associated with health effects such as narcosis, pulmonary edema, and severe liver and kidney damage.[76] More recently, samples of oil and gas wastewater discharged into public drinking water supplies in Indiana County, Pennsylvania, revealed concentrations of 2-BE at levels at more than 55 times the minimum risk level for intermediate exposure by children.[77] In response to complaints of cloudy and foul-smelling water by residents living near gas wells in Hickory, Pennsylvania, EPA performed testing of drinking water wells and found acrylonitrile, a chemical that Halliburton has listed on two U.S. patents for E&P Chemicals.[78] Water samples also have shown dramatic increases in levels of acrylonitrile, as well as benzene and styrene, in water wells located near gas development in Wetzel County, West Virginia.[79] Just recently, a breach of a containment area at a gas well in Canton, Pennsylvania, caused thousands of gallons of drilling fluids to spill, cross over farm fields, and reach a nearby stream.[80]

In addition to threatening human health via drinking water contamination, E&P Chemicals have proven fatal to animals and aquatic life. Again in Dimock, Pennsylvania, Cabot Oil and Gas reported spilling 8,500 gallons of fracturing fluid, much of which made its way into

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[75] Colorado Oil and Gas Conservation Commission, March 31, 2008 Update on Garden Gulch Releases, at slides 13-14 (2008), http://oil-gas.state.co.us/Library/PiceanceBasin/Garden_Gulch_Releases_03-31-08_Update.pdf.

[76] See Fritz Mayer, *EPA Investigates 11 Polluted Wells*, THE RIVER REPORTER, Aug. 20, 2009, http://www.riverreporter.com/issues/09-08-20/news-wells.html (indicating EPA's investigation of the contamination); EPA, Glycol Ethers Hazard Summary (rev. 2000), http://www.epa.gov/ttnatw01/hlthef/glycolet.html#ref4 (indicating the uses and associated health hazards of 2-BE); Abrahm Lustgarten, *Feds Warn Residents Near Wyoming Gas Drilling Sites Not to Drink Their Water* (Sept. 1, 2010), http://www.propublica.org/article/feds-warn-residents-near-wyoming-gas-drilling-sites-not-to-drink-their-wate (noting that EPA warned Pavillion residents not to drink their water and to use ventilation while bathing).

[77] *See* Conrad D. Volz et al., *Contaminant Characterization of Effluent from Pennsylvania Brine Treatment Inc., Josephine Facility Being Released into Blacklick Creek, Indiana County, Pennsylvania*, Mar. 25, 2011, at 10-11, http://ia600608.us.archive.org/6/items/ContaminantCharacterizationOfEffluentFromPennsylvaniaBrineTreatment/Josephine_V2_CHEC_2011.pdf.

[78] Christie Campbell, *Water Problem Gets Closer Look from DEP, EPA*, OBSERVER-REPORTER (Washington, PA), Mar. 26, 2010, at B1.

[79] Isaac Wolf, *Rural Residents Say Natural Gas Drilling Has Tainted Their Drinking Water*, METROWEST DAILY NEWS, Nov. 23, 2010, http://www.metrowestdailynews.com/lifestyle/health/x1485353677/Rural-residents-say-natural-gas-drilling-has-tainted-their-drinking-water.

[80] Associated Press, *Driller Temporarily Stops Operations at Pa. Wells*, SAN DIEGO UNION-TRIBUNE, Apr. 21, 2011, http://www.signonsandiego.com/news/2011/apr/21/driller-temporarily-stops-operations-at-pa-wells.

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Stevens Creek and killed fish and other aquatic life.[81] In May 2010, the Pennsylvania Department of Environmental Protection ("DEP") fined a drilling company $141,175 for leaking 250 barrels of diluted wastewater into a stream in Washington County, Pennsylvania, and thereby killing small fish, salamanders, and frogs.[82] A farmer living within 200 yards of gas wells in Grandview, Texas, witnessed six of his animals die after his water well became contaminated with at least one of the BTEX compounds.[83] The drilling company denied that its drilling operations had any relation to the water contamination, even though several other families living within 200 feet of the wells reported identical instances of water contamination.[84] In Spring Ridge, Louisiana, seventeen cows died after ingesting fracturing fluid that spilled into their pasture from a nearby gas well operated by Chesapeake Energy.[85]

Leaks and spills of E&P Chemicals endanger air quality as well as water supplies, sometimes even before the chemicals have a chance to reach the well sites. In June 2006, a chemical plant in Farmington, New Mexico operated by Halliburton Energy Services spilled approximately 30-60 gallons of a hydraulic fracturing product called Acidizing Composition.[86] The spill created a large cloud of acid vapors, which caused vomiting and nausea in the people living near the plant and prompted the evacuation of more than 220 people from their homes.[87] Despite the immediate health effects resulting from acute exposure to Acidizing Composition, its MSDS indicates "not determined" for all toxicity tests, including those for carcinogenicity and reproductive/developmental toxicity.[88] In addition to adverse health impacts caused by acute exposures, people also have reported injuries from prolonged exposure to E&P Chemicals. For example, a resident of Arlington, Texas, reported poor air quality and an increase in health problems immediately following the commencement of drilling operations by

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[81] Steve McConnell, *Fracturing Fluids Spill into Susquehanna County Stream*, WAYNE INDEPENDENT, Sept. 17, 2009, http://www.wayneindependent.com/archive/x576510049/Fracturing-fluids-spill-into-Susquehanna-County-stream; Abrahm Lustgarten, *Frack Fluid Spill in Dimock Contaminates Stream, Killing Fish*, ProPublica, Sept. 21, 2009, http://www.propublica.org/article/frack-fluid-spill-in-dimock-contaminates-stream-killing-fish-921.

[82] Press Release, Pennsylvania Department of Environmental Protection, DEP Penalizes Range Resources $141,175 for Spill in High Quality Waterway (May 14, 2010), http://www.portal.state.pa.us/portal/server.pt/community/newsroom/14287?id=11412&typeid=1.

[83] Peter Gorman, *Water Foul*, FORTH WORTH WEEKLY, Apr. 30, 2008, http://archive.fwweekly.com/content.asp?article=6885.

[84] *See id.*

[85] Vickie Wellborn, *Chesapeake, Schlumberger Fined $22,000 Each in Cows' Deaths*, SHREVEPORT TIMES, Mar. 25, 2010, http://www.shreveporttimes.com/article/20100325/NEWS01/100325018/Chesapeake-Schlumberger-fined-22-000-each-in-cows-deaths.

[86] *Halliburton Spill Results in Acid Cloud, More Than 220 People Evacuated to Mall*, THE DAILY TIMES, FARMINGTON, NEW MEXICO, June 7, 2006, *available at* http://www.yourlawyer.com/articles/read/11832.

[87] *See id.*

[88] Halliburton, Material Safety Data Sheet, Product Trade Name: FE-1A Acidizing Composition, 1, 4 (Dec. 2006), *available at* http://newyork.sierraclub.org/fingerlakes/gasinfo.html (follow link to product name under heading "MSDS Data Sheets").

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Carrizo Oil and Gas near her home.[89] Although Carrizo denied any responsibility, the resident received test results confirming the presence of ethylbenzene, xylene, hexane, and methylpentanes in her bloodstream, and her doctor issued an opinion that her inability to recover from her ongoing health problems was related to her continual exposure to diesel fumes and E&P Chemicals used at the Carrizo wells.[90]

E&P Chemicals can degrade soil and air quality in ways that may not be readily ascertainable to the public. In August 2006, a breach in surface casing at a gas well in Crosby, Wyoming, caused several releases of drilling muds, contaminating soil over an area of approximately 25,000 square feet.[91] Although no immediate impacts were reported, an analysis of the leaked chemicals indicated that 50 percent of them may cause ecological effects (harm to aquatic species, birds, amphibians, or invertebrates), and 32 percent of them were volatile, potentially causing injury to human respiratory systems, skin, sensory organs, and gastrointestinal systems.[92] In addition, while analysis of E&P Chemicals' effects on air quality are limited, researchers predict that emissions from Marcellus Shale gas wastewater stored in centralized impoundments have the potential to cause exceedances of the annual guidelines for acrylamide, glutaraldehyde, formaldehyde, and heavy naphtha.[93] When exposed to the air, BTEX compounds incorporated into E&P Chemicals have the potential to mix with nitrogen oxides from the exhaust of diesel-fueled equipment at the well sites and produce ground-level ozone.[94] Chemical exposures at and around well sites are exacerbated by certain common

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[89] Jason Joyce, *Pyrrhic Pollution Finding*, FORT WORTH WEEKLY, Oct. 13, 2010, http://www.fwweekly.com/index.php?option=com_content&view=article&id=4265:pyrrhic-pollution-finding&catid=76:metropolis&Itemid=377.

[90] *Id*. (including a statement by Dr. Alfred Johnson that "it is my medical opinion that [Sandra DenBraber's] current illness and inability to recover is related to her constant and continual exposure to diesel exhaust fumes and other chemicals associated with the oil and gas drilling/fractionating and compressor station").

[91] TEDX, Analysis of Products Used for Drilling Crosby 25-3 Well – Windsor Energy, Park County, Wyoming, 1 (2009), http://www.endocrinedisruption.com/files/Crosby25-3wellsummary4-20-09Final.pdf.

[92] *See id*. at 3-4.

[93] *See* Susan Harvey, Review of DSGEIS and Identification of Best Technology and Best Practice Recommendations 31-33 (Dec. 29, 2009), submitted as Attachment C to Memorandum by Philip Sears, ARKF, to Kate Sinding et al., regarding comments on the Draft Supplemental Generic Environmental Impact Statement on the Oil, Gas, and Solution Mining Regulatory Program (Dec. 30, 2009) (on file with author).

[94] Colborn, *supra* note 42, manuscript at 5 (stating that ozone has a range of serious health and environmental effects, including various lung diseases as well as damage to conifers, aspen, forage, alfalfa, and other crops); *see also* Mead Gruver, *Gas Drilling Blamed for Soaring Ozone in Wyoming*, THE TIMES TRIBUNE, Mar. 9, 2011, http://thetimes-tribune.com/news/health-science/gas-drilling-blamed-for-soaring-ozone-in-wyoming-1.1116178 (reporting that ozone levels detected near gas drilling in western Wyoming were two-thirds higher than EPA's maximum healthy limit).

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practices, such as air- and foam-lubricated drilling and the use of impoundments for flowback fluids.[95]

The health risks posed by E&P Chemicals have been most severe in cases involving direct human contact. In April 2008, an emergency room nurse in Durango, Colorado, was admitted to the intensive care unit after treating a gas industry employee who was caught in a fracturing fluid spill and tracked the chemical ZetaFlow into the hospital on his boots.[96] The nurse presented symptoms of yellow skin, vomiting, a swollen liver, erratic blood counts, and lungs filled with fluid and was diagnosed with chemical poisoning. To determine the exact nature of her chemical poisoning, the doctors looked at the MSDS for ZetaFlow, which indicated that ZetaFlow contained methanol and two undisclosed "proprietary" compounds. When the hospital requested the identity of the proprietary compounds to aid treatment of the nurse, Weatherford, ZetaFlow's manufacturer, refused to disclose the information. Weatherford continues to deny responsibility for the nurse's illness, yet it suspended its use of ZetaFlow following the incident.[97]

Finally, a recent report evaluating gas development in the Marcellus Shale demonstrates that E&P Chemicals threaten the people most vulnerable to injury from exposure to hazardous chemicals, such as children in day care facilities and schools and people hospitalized due to severe illness.[98] Children in particular face increased risk of harm due to exposure to toxic pollutants as a result of their vulnerable immune systems and their limited ability to detoxify.[99] Hundreds of well sites in Pennsylvania are situated within one or two miles of places designed to care for children and sick people, including 320 day care facilities, 67 schools, and nine hospitals.[100] In addition, at those same well sites, the Pennsylvania DEP reported almost 300 violations of regulations intended to protect water quality and the environment.[101]

The instances of harm and reports of potential harm cited above demonstrate that E&P Chemicals may present an unreasonable risk of harm to children and adults, terrestrial and aquatic life, water and air quality, and soil composition. With oil and gas exploration and production poised to grow exponentially, incidents of harm linked to it also are likely to

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[95] *See* Bishop, *supra* note 3, at 2.
[96] Jim Moscou, *A Toxic Spew? Officials Worry About Impact of "Fracking" of Oil and Gas*, Newsweek, Aug. 20, 2008, http://www.newsweek.com/id/154394.
[97] *Id.*
[98] *See* Madsen, *supra* note 5, at 30-35; *see also* EPA, Environmental Assessment, Children's Health, http://cfpub.epa.gov/ncea/CFM/nceaQFind.cfm?keyword=Children's%20Health (last visited Aug. 2, 2011) (recognizing that children and the elderly are more susceptible than healthy adults to health risks posed by pollutants in the environment).
[99] Madsen, *supra* note 5, at 30-31.
[100] *Id.* at 30.
[101] *Id.* at 34.

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increase, especially if EPA fails to promulgate regulations requiring disclosure and testing of E&P Chemicals and reporting of related health and environmental effects.

VI. Request for Relief

Petitioners hereby request that EPA take the following actions pursuant to TSCA section 21, 15 U.S.C. section 2620:

1. Adopt a rule pursuant to TSCA section 4 to require manufacturers and processors of E&P Chemicals to develop test data sufficient to evaluate the toxicity and potential for health and environmental impacts of all substances and mixtures that they manufacture and process. This rule must include a requirement for the manufacturer or processor to identify any substance or mixture for which testing is required.
2. Adopt a rule pursuant to TSCA section 8(a) requiring manufacturers and processors of E&P Chemicals to maintain records and submit reports to EPA disclosing the identities, categories, and quantities of E&P Chemicals, descriptions of byproducts of E&P Chemicals, all existing data on potential or demonstrated environmental and health effects of E&P Chemicals, and the number of individuals potentially exposed to E&P Chemicals.
3. Call in all records of allegations of significant adverse reactions received and maintained by manufacturers, processors, and distributors of E&P Chemicals pursuant to TSCA section 8(c) and 40 C.F.R. section 717.
4. Adopt a rule pursuant to TSCA section 8(d) to require submittal of all existing, not previously reported health and safety studies related to the health and/or environmental effects of E&P Chemicals.

A. Section 4 Testing

EPA and the public lack adequate data and experience upon which the health and environmental risks posed by E&P Chemicals can reasonably be determined or predicted. Petitioners request that EPA adopt a rule pursuant to TSCA section 4, requiring that manufacturers and processors of E&P Chemicals conduct acute and chronic toxicity studies sufficient to characterize and evaluate the hazards and potential health and environmental effects associated with the substances and mixtures they manufacture and process for use in oil and gas exploration and production. A TSCA section 4 rule may require testing of (1) effects on human respiratory, neurological, cardiovascular, reproductive, gastrointestinal, endocrine, sensory, and immune systems, including cancerous and developmental effects; and (2) effects on terrestrial and aquatic life and water, soil, and air quality.[102] A rule adopted under this section must function to ensure that EPA and the public can fully evaluate the hazards of all

[102] *See* 15 U.S.C. § 2603(b)(2)(A)

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substances and mixtures used in oil and gas exploration and production and thereby determine whether those substances and mixtures may pose an unreasonable risk of harm to health and the environment. In addition, this rule must require the identification of each chemical substance or mixture for which testing is performed.[103]

EPA has ample and sufficient basis to issue a TSCA section 4 test rule. First, as illustrated in detail in section V above, E&P Chemicals meet the requirements in section 4(a) that "the manufacture, distribution in commerce, processing, use, or disposal of a chemical substance or mixture, or that any combination of such activities, may present an unreasonable risk of injury to health or the environment."[104] Second, the significant volume of E&P Chemicals necessary to fracture a single well, combined with the number of wells anticipated throughout the United States, demonstrate that E&P Chemicals also meet the requirements of section 4(b) for an "exposure" finding, under which EPA shall by rule require that testing be conducted on a chemical substance or mixture that "is or will be produced in substantial quantities."[105]

B. Section 8(a) Reporting

Petitioners request that EPA adopt a rule pursuant to TSCA section 8(a) to require manufacturers and processors of E&P Chemicals to maintain certain records and submit to EPA reports on those records. Specifically, insofar as known to the person making the reports or insofar as reasonably ascertainable to that person, a rule issued pursuant to TSCA section 8(a) concerning the chemical substances and mixtures used in oil and gas exploration or production should require maintenance of records and reporting with respect to the following information:

1. The common or trade name, the chemical identity, and the molecular structure of each chemical substance or mixture for which such a report is required;
2. The categories or proposed categories of use of each substance or mixture;
3. The total amount of each substance or mixture manufactured or processed, reasonable estimates of the total amount to be manufactured or processed, the amount manufactured or processed for each of its categories of use, and reasonable estimates of the amount to be manufactured or processed for each of its categories of use or proposed categories of use;
4. A description of the byproducts resulting from the manufacture, processing, use, or disposal of each such substance or mixture;
5. All existing data concerning the environmental and health effects of such substance or mixture;

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[103] *See id.* § 2603(b)(1)(A).
[104] *Id.* § 2603(a)(1)(A)(i).
[105] *Id.* § 2603(a)(1)(B)(i).

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6. The number of individuals exposed, and reasonable estimates of the number who will be exposed to such substance or mixture in their places of employment, including the duration of such exposures; and
7. The manner or method of disposal of any such substance or mixture.

Submission of this information is necessary for the effective enforcement of TSCA. In issuing a rule under TSCA section 8(a), EPA should consider the need to require periodic reporting as needed to account for all new substances and mixtures as well as for significant new information obtained by manufacturers and processors with respect to existing substances and mixtures.

C. Section 8(c) Call-In

Under TSCA section 8(c) and 40 C.F.R. section 717.12, chemical manufacturers, processors, and distributors must record and maintain all significant adverse reactions to human health or to the environment that are reported to or known by them and that are alleged to have been caused by chemical substances or mixtures that they manufacture, process, or distribute. A significant adverse reaction is one "that may indicate a substantial impairment of normal activities or long-lasting or irreversible damage to health or the environment."[106] Petitioners request that EPA exercise its authority under 40 C.F.R. section 717.17 and request submission of copies of any information related to significant adverse reactions to human health or the environment alleged to have been caused by E&P Chemicals manufactured, processed, or distributed by the following companies:

1. Baker Hughes d/b/a AquaNess Chemical and BJ Services Company[107]
2. Halliburton Energy Services, Inc.[108]
3. Schlumberger Technology Corporation[109]
4. RPC, Inc. d/b/a Cudd Energy Services
5. Superior Well Services, Inc.[110]

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[106] 40 C.F.R. § 717.3(i).

[107] Petitioners are aware that Baker Hughes has acquired BJ Services Company. This request encompasses all records maintained by BJ Services Company prior to the acquisition as well as all records maintained by Baker Hughes following the acquisition.

[108] EPA's request should make it clear that the reports from Halliburton Energy Services must include all allegations that it has received related to its chemical substances and mixtures as manufactured by Halliburton Energy Services (in the United States and the United Kingdom) and Halliburton Australia Pty. Ltd.

[109] EPA's request should make it clear that the reports from Schlumberger Technology Corporation must include all allegations it has received related to its chemical substances and mixtures as manufactured by Schlumberger Technology Corporation in the United States, Schlumberger Canada, Ltd., and Schlumberger Ltd.

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6. Sanjel USA
7. Weatherford International Ltd.[111]
8. Calfrac Well Services
9. Frac Tech Services

Petitioners believe these companies are the primary manufacturers, processors, and distributors of E&P Chemicals in the United States. Because a request involving nine entities would not be subject to the Paperwork Reduction Act notice requirements, EPA could act quickly.[112]

D. Section 8(d) Submission Request

Petitioners request that EPA adopt a rule pursuant to TSCA section 8(d) to require manufacturers, processors, and distributors of E&P Chemicals to submit to EPA lists and copies of all existing health and safety studies conducted or initiated by or for them, known to them, or reasonably ascertainable by them. Health and safety studies are defined broadly under EPA's regulations as "any study of any effect of a chemical substance or mixture on health or the environment or both, including underlying data and epidemiological studies, studies of occupational exposure to a chemical substance or mixture, toxicological, clinical, and ecological or other studies of a chemical substance or mixture, and any test performed under TSCA."[113] Petitioners request that this rulemaking encompass all health and safety studies related to any substance or mixture used in oil and gas exploration or production, including, as called for under 40 C.F.R. section 716.3, the identity of the chemical substances and mixtures.[114] Submission of health and safety studies related to all E&P Chemicals is necessary to ensure that substances and mixtures do not present an unreasonable risk of injury to health or the environment.

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[110]Petitioners are aware that Nabors Industries Ltd. recently acquired Superior Well Services, Inc. This request encompasses all records maintained by Superior Well Services, Inc. prior to the acquisition as well as all records maintained by Superior Well Services, Inc. and Nabors Industries Ltd. following the acquisition.

[111] EPA's request should make it clear that the reports from Weatherford International Ltd. must include all allegations that it has received related chemical substances and mixtures manufactured by its subsidiary, Clearwater International, LLC.

[112] *See* 44 U.S.C. § 3502(3)(A)(i) (defining a "collection of information" subject to regulation under the Paperwork Reduction Act as a request imposed on ten or more persons).

[113] 40 C.F.R. § 716.3

[114] *See id.* ("It is intended that the term health and safety study be interpreted broadly. Not only is information which arises as a result of a formal, disciplined study included, but other information relating to the effects of a chemical substance or mixture on health or the environment is also included. Any data that bear on the effects of a chemical substance on health or the environment would be included. Chemical identity is part of, or underlying data to, a health and safety study.")

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VII. Conclusion

In the absence of rulemakings pursuant to TSCA sections 4 and 8, EPA and the public lack the information necessary to assess the potential health and environmental effects of E&P Chemicals. To hold manufacturers, processors, and distributors of E&P Chemicals accountable for the consequences of placing their products into commerce, Petitioners respectfully request that EPA initiate rulemakings under TSCA sections 4 and 8.

Respectfully submitted,

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