Superfund to the Rescue - Seeking Potential CERCLA Response Authority and Cost Recovery Liability for Releases of Hazardous Substances Resulting from Hydraulic Fracturing

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SUPERFUND TO THE RESCUE?
SEEKING POTENTIAL CERCLA RESPONSE AUTHORITY AND COST RECOVERY LIABILITY FOR RELEASES OF HAZARDOUS SUBSTANCES RESULTING FROM HYDRAULIC FRACTURING

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I. INTRODUCTION

Water is our most vital natural resource, without which life cannot be sustained. Recognizing its importance, Congress has enacted environmental legislation in order to protect this resource for the public health and welfare. The main federal statutes concerned with the protection of this resource are the Clean Water Act ("CWA")1 and the Safe Drinking Water Act ("SDWA").2 The SDWA in particular is concerned with the protection of underground sources of drinking water ("USDW").3 However, the Energy Policy Act of 2005 amended the SDWA to exclude the practice of hydraulic fracturing ("fracking")4 from its statutory definition of an underground

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1. See generally Federal Water Pollution Control Act, 33 U.S.C. §§ 1251-1387 (2006) (stating the goals of the act “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters”). Id. § 1251(a).


3. See id. § 300h(b)(1).

4. Hydraulic Fracturing is alternately referred to as “fracing” or “fracking.” This Note will use the term fracking.
injection. This definition is somewhat ironic because fracking is the underground injection of proprietary chemicals mixed with substantial amounts of water into wells drilled deep into shale and other geologic formations to enhance the capture of natural gas. Without federal permitting requirements, the regulation of fracking is left almost exclusively to the states. Given the lack of specific federal oversight, the limited resources available to the states, the rapidly expanding scope of fracking, and the significant dangers to public health posed by fracking, there is a need for the federal government to assert a new regulatory approach to fracking using existing statutory authority.

Congress granted powerful and expansive authority to the U.S. Environmental Protection Agency ("EPA") pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"), also known as Superfund. This Note examines whether under CERCLA a framework exists for the retroactive regulation through the imposition of liability upon releases of hazardous substances resulting from hydraulic fracturing. Despite that the underground injection of fluids for the purpose


6. See infra Part II.

7. See generally 42 U.S.C. § 300(h). This section of the SDWA outlines the State programs for underground injection permits. However, the section does not include fracking in its definition of an underground injection, therefore the practice is not regulated by permit under any federal statute.

8. See 42 U.S.C. § 300(h)(b)(2)(A-B) (proscribing the Administrator of the EPA from promulgating regulations that would impede the underground injection of fluids connected with production of natural gas).


10. See infra Part III.

11. See infra Part IV.

of extracting natural gas is considered a federally permitted release, and
natural gas is exempted from the statutory definition of hazardous
substances under CERCLA, this Note seeks to determine the extent to
which these hurdles can nevertheless be surmounted and whether CERCLA
liability can be brought to bear upon releases of hazardous substances into
the environment from hydraulic fracturing.

Part II of this Note discusses the process of hydraulic fracturing and how
it is used in the extraction of natural gas. Part III examines the rapidly
expanding scope of hydraulic fracturing. Part IV details the potential
dangers to human health and the environment resulting from both
underground injections as well as surface releases of fracking fluids. Part V
explains how the federal government does not currently regulate fracking.
Part VI analyzes CERCLA cost recovery liability as a tool to regulate
hydraulic fracturing, discussing the challenges presented for such regulation
in the petroleum exclusion and the federally permitted release affirmative
defense to CERCLA liability. Part VI also examines other possible response
authorities that may be available under CERCLA.

II. WHAT THE FRACK IS FRACKING?

Hydraulic fracturing ("fracking") is a process by which natural gas is
extracted from "unconventional plays" found in subterranean geologic

13. 42 U.S.C. § 9601(10)(I) (defining any injection of fluids authorized under state
law as a federally permitted release); see also 42 U.S.C. § 9601(14) (omitting petroleum
and natural gas from the definition of hazardous substances).

Display.cfm?Term=play (last visited Oct. 11, 2011). A play is a geologic term describing
an area of hydrocarbon accumulations of a particular type. See also What is
2011/2/7/what-is-unconventional.html (last visited Sept. 23, 2011). This source discusses
several interpretations of the term ‘unconventional’ used to describe plays, however the
most useful for this Note is:

Unconventional resources cannot be produced with a vertical and/or an
unstimulated well. In other words, a horizontal well and/or some sort of
intervention to increase hydrocarbon mobility is required. Mobility depends on
the permeability of the rock and the viscosity of the hydrocarbon. By this
definition, shale gas and bitumen will always be unconventional. Id.
formations of coal or shale.\textsuperscript{15} Shale gas plays are considered unconventional because the mineral formations have low permeability.\textsuperscript{16} The shale's low permeability means that the "rock . . . does not allow gas or fluid to pass through it easily."\textsuperscript{17} Stimulation is necessary to increase the permeability of the shale in order to allow gas to flow through it more readily.\textsuperscript{18}

The natural gas trapped in the shale formation is located in the "pore space" of the shale, vertical fractures contained in the formation, and adsorbed\textsuperscript{19} on matter within the shale.\textsuperscript{20} These vertical fractures within shale formations contain trapped natural gas.\textsuperscript{21} The vertical fractures do not lend themselves to efficient extraction of gas by conventional vertical wellbores because both the fracture and the wellbore are on the same axis.\textsuperscript{22} As a result, the use of horizontal wellbores in shale plays is increasingly common because this method can reach up to 100 times the surface area of gas-producing shale by running laterally along the shale formation.\textsuperscript{23} Although horizontal drilling presents a significantly higher capital investment than

\begin{footnotesize}
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\item[18.] Arthur et al., supra note 16, at 1.
\item[20.] Arthur et al., supra note 16, at 3.
\item[21.] Orford, supra note 17.
\item[22.] Id. (noting that the vertical fractures in shale formations are more efficiently accessed via horizontal drilling).
\item[23.] Arthur et al., supra note 16, at 8.
\end{enumerate}
\end{footnotesize}
conventional vertical wellbore drilling, the return on investment is much greater than traditional vertical wellbores, with upwards of seven times the production of gas.

Operators utilize the process of fracking to stimulate the shale, thus increasing its permeability and, ultimately, the efficiency and efficacy of the gas extraction. The injection of the fluid increases pressure on the shale formation and physically fractures the "fissile shale." Proppants, such as sand or engineered ceramic beads within the fluid, prop open the micro-fractures created in the shale after the fluid is pumped out of the wellbore, allowing the gas to escape into the well for capture. This process is not entirely novel; hydraulic fracturing has been used for nearly half a century. However, development in horizontal wellbore drilling and fluid technology has greatly expanded the scope of fracking in recent years.

III. FRACKING ON THE RISE

The number of natural gas wells in the United States has steadily increased over the past twenty years to keep up with the rising demand for energy. This trend is readily visible in Pennsylvania, home to a significant

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25. Id.

26. ARTHUR ET AL., supra note 16, at 8; see also Orford, supra note 17 (noting that horizontal wellbores and fracking makes gas extraction from shale beds economically feasible).

27. Orford, supra note 17.

28. Id.


30. See id.

portion of the massive Marcellus Shale formation. The Marcellus Shale is recognized as having the potential to be the largest play of natural gas ever discovered. The estimated reserve capacity of the Marcellus Shale is 2,445 trillion cubic feet of natural gas. Of this reserve, an estimated 489 trillion cubic feet of natural gas is thought to be recoverable, however the U.S. Geological Survey ("USGS") estimates a mean of only 84 trillion cubic feet of undiscovered gas. While some controversy exists over the disparate amounts of gas estimated to be in the Marcellus Shale, an undeniably vast amount of undeveloped gas reserves lies therein. The current estimates of


34. Id. at 4.


36. Compare Ian Urbana, Geologists Sharply Cut Estimate of Shale Gas, N.Y. TIMES, Aug. 25, 2011, at A16 (discussing the revised USGS resource estimates for gas that can be extracted, and further noting that the estimate does not reflect the reserve estimates that reflect gas that can be profitably extracted); and Jim Efstathiou Jr. & Katarzyna Klimasinska, U.S. to Slash Marcellus Shale Gas Estimate 80%, BLOOMBERG.COM (Aug. 23, 2011, 4:17 PM), http://www.bloomberg.com/news/2011-08-23/u-s-to-slash-marcellus-shale-gas-estimate-80-.html (discussing that while estimates have been revised "one fifth of a large number is still a big number"); with Brad Plummer, Hold off on those gas shale obituaries, EZRA KLEIN’S WONKBLOG (Aug. 26,
recoverable gas are significantly higher than the amount thought possible in 2002 due to new technologies in horizontal drilling and hydraulic fracturing.\(^{37}\) The economic potential of this resource is driving a new gas-boom.\(^{38}\) In Pennsylvania alone, the number of permits for wells in the first four months of 2010 exceeded the number for all of 2008.\(^{39}\) Natural gas production in Northeastern Pennsylvania has increased from 400 million cubic feet of gas in January 2010, to over 2 billion cubic feet by July 2011.\(^{40}\) This rapid increase in natural gas production in the United States is seen in many other plays as well, most notably the Barnett Shale in Texas, the Haynesville Shale in Louisiana, and the Fayetteville Shale in Arkansas.\(^{41}\) Because of the ever-increasing demands for energy along with the abundant availability of natural gas in unconventional plays, frack operations will only increase in number and in scope for the foreseeable future.

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37. See CONSODINE ET AL., supra note 33, at 4.


IV. RISK TO HUMAN HEALTH AND THE ENVIRONMENT

A. Fracking Fluids: A Cocktail of Hazardous Substances

The Marcellus Shale area encompasses many watersheds; perhaps most significant is the Catskill/Delaware watershed, which supplies 17 million people—including 90% of New York City residents—with drinking water. Fracking operations use substantial amounts of water. Indeed, fracking a single horizontal well consists of four to twenty intervals, with each interval requiring anywhere from 500,000 to 1 million gallons of water. This fact is significant because for a typical frack job using three million gallons of water, fifteen thousand gallons of chemical laden frack fluid are also injected into the wellbore. In addition to the deeper shale plays like the Marcellus, fracking is used to extract natural gas from more shallow coal bed methane plays, many of which are located within USDWs.

The fluid used in fracking contains a myriad of additives to enhance its properties, including friction reducers, biocides, acids, and scale inhibitors.


44. See Hydraulic Fracturing Overview, supra note 15 (stating that a horizontal well consists of 4-20 intervals, and each interval requires 500,000 to 1,000,000 gallons of water).


47. See Arthur et al., supra note 16, at 10-11; see also U.S. Envtl. Prot. Agency, Evaluation of Impacts to Underground Sources of Drinking Water by
Superfund to the Rescue?

These additives contain chemicals that meet the CERCLA definition of "hazardous substances." The Pennsylvania Department of Environmental Protection ("PA DEP") released a list of chemicals used in fracking within the state; this list includes dozens of hazardous substances such as ethylbenzene, toluene, and xylene. The hazardous substance methanol, which is used in the acid segment of the frack process, is acutely toxic. Methanol concentrations in frack fluid can exceed EPA's maximum concentration level ("MCL") for safe drinking water by a factor of nearly 13,000 times.

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50. PA. DEP’T OF ENVTL. PROT., CHEMICALS USED BY HYDRAULIC FRACTURING COMPANIES IN PENNSYLVANIA FOR SURFACE AND HYDRAULIC FRACTURING ACTIVITIES PREPARED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION BUREAU OF OIL AND GAS MANAGEMENT COMPILED FROM MATERIAL SAFETY DATA SHEETS OBTAINED FROM INDUSTRY (2010), http://www.dep.state.pa.us/dep/deputate/minres/oilgas/new_forms/ marcellus/Reports/Frac%20list%206-30-2010.pdf; see also 40 C.F.R. § 302.4 (listing hazardous substances—includes many of the components of the frack fluid).


Cross-linkers are compounds that are added to enhance the gels containing proppants in order to make the frack more productive. These enhanced gels contain metals such as chromium, a hazardous substance with extremely adverse health effects. Other cross-linkers contain the hazardous substances ethylene glycol and monoethylamine, which can affect organ function or cause brain damage.

Possible adverse human health effects from exposure to the dozens of chemicals used in frack fluids include symptoms that “range from eye, skin, and respiratory [irritation], internal organ and reproductive disorders, to cancer.” Indeed, some of the treatment chemicals in frack fluids such as “biocides, reverse emulsion breakers, and corrosion inhibitors . . . are lethal at levels as low as 0.1 ppm.” Frack fluids contain high concentrations of chemicals that are known hazardous substances with a wide array of adverse human health effects, yet the federal government does not regulate the release of these fluids into potential sources of drinking water affecting millions of Americans.

B. Diesel Fuel Frack Fluid Additives

Diesel fuel has commonly been used as a “solvent additive, especially in liquid [fracturing] gel concentrates.” The gelling agents transport

53. EVALUATION OF IMPACTS, supra note 47, at 4-4.

54. Id. at 4-5; see also 40 C.F.R. § 302.4 (listing chromium as a hazardous substance); FRANÇOIS BARUTHIO, TOXIC EFFECTS OF CHROMIUM AND ITS COMPOUNDS 148-49 (1992) (noting the water-solubility of chromium compounds and its ease of absorption in organisms resulting in acute toxicity).

55. EVALUATION OF IMPACTS, supra note 47, at 4-5; see also 40 C.F.R. § 302.4 (listing ethylene glycol and monoethylamine as hazardous substances).


58. EVALUATION OF IMPACTS, supra note 47, at 4-4.
proppants into the wellbore. Diesel fuel concentration in the gel concentrate “slurry” can range anywhere from “30 percent to nearly 100 percent.” The prop sequence stage of a frack operation can use several thousand gallons of diesel mixed with hundreds of thousands of gallons of water.

Diesel contains benzene, toluene, ethylbenzene, and xylenes (“BTEX COMPOUNDS”). EPA designated these chemicals as hazardous substances pursuant to its authority under CERCLA, with benzene being a known human carcinogen. Short-term benzene exposure, in amounts as low as five parts-per-billion, can cause “temporary nervous system disorders.” Long-term exposure can result in mutagenic or carcinogenic effects. Furthermore, “chronic exposure to toluene, ethylbenzene, or

59. **Hydraulic Fracturing Overview, supra note 15.**

60. See [Evaluation of Impacts, supra note 47, at 4-4](#) (discussing the use and concentration of diesel in frack fluids).

61. **Hydraulic Fracturing Overview, supra note 15; see also Evaluation of Impacts, supra note 47, at 4-4** (describing the ratio of 10 gallons of diesel slurry to 1000 gallons of water to create a polymer slurry).

62. [Evaluation of Impacts, supra note 47, at 4-11](#).


64. [SUMi, supra note 56, at 10 n. 39](#).

65. Id.
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xylenes can damage the central nervous system, liver, and kidneys." When diesel is used in fracking fluids, the benzene concentration at the point-of-injection can exceed the maximum allowable five parts-per-billion MCL for safe drinking water by a factor of 9 to 800 times. This is alarming because the EPA has set the Maximum Containment Limit Goals ("MCLG") for benzene in drinking water at zero because of its significant adverse risk to human health.

In 2003, the EPA entered into a memorandum of agreement ("MOA") with the three leading fracking companies, Halliburton Energy Services, Schlumberger Technology Corporation, and BJ Services Corporation, "to eliminate diesel fuel in hydraulic fracturing fluids injected into CBM [coal bed methane] production wells in USDWs." While EPA intended the MOA to curtail the practice of using diesel fuel-based additives in frac fluids, the MOA allowed compliance to be entirely voluntary, applied only to coal-bed methane gas plays, and involved only three companies.

Illustrating what an ineffective safeguard the MOA has been, is a February 18, 2010, memorandum from U.S. Congressman Henry Waxman, then Chairman of the U.S. House Energy and Commerce Committee, to committee members regarding the oversight committee's investigation into the three companies' compliance with the MOA. Halliburton and BJ Services Corporation reported the continued use of diesel fuel in their frac fluids.

66. Waxman & Markey, supra note 63, at 5 n. 15.

67. SUMI, supra note 56, at 9 (citing EVALUATION OF IMPACTS, supra note 47, at 4-18).

68. Id. at 10 n. 39.

69. Id.

70. A Memorandum of Agreement Between the United States Environmental Protection Agency and BJ Services Company, Halliburton Energy Services, Inc., and Schlumberger Technology Corporation (Dec. 12, 2003), http://www.epa.gov/safewater/uic/pdfs/moa_uic_hyd-fract.pdf; see also SUMI, supra note 56, at 11-12 (noting that Shell refused to enter into the MOA); Waxman & Markey, supra note 63, at 10 (noting that the number of hydraulic fracturing companies is growing).

fluids, with BJ Services Corporation explicitly acknowledging violation of the MOA.\textsuperscript{72}

Subsequently, in a letter to EPA Administrator Lisa Jackson dated January 31, 2011, Representatives Henry Waxman, Edward Markey, and Diana DeGette outlined congressional findings that from 2005 through 2009, twelve major fracking operators used over 32 million gallons of diesel fuel in violation of the SDWA.\textsuperscript{73} From these Congressional findings it is apparent that diesel fuel, despite its many adverse human health effects, continues to be used in frack fluids that are injected directly into USDWs.

\section*{C. Releases of Frack Fluids and Gas into Drinking Water}

Contaminated drinking water is frequently reported immediately following fracking operations.\textsuperscript{74} In Dimock, Pennsylvania, for instance, a drinking water well became contaminated with methane due to nearby fracking operations, causing a massive explosion in a home.\textsuperscript{75} PA DEP found that gas wells were contributed to the contamination of well water.\textsuperscript{76} Specifically, PA DEP found Cabot Oil and Gas Corporation responsible for the methane contamination of several homes in Dimock.\textsuperscript{77} Earlier, a


\textsuperscript{74} See Hannah Wiseman, Untested Waters: the Rise of Hydraulic Fracturing in the Oil and Gas Production and the Need to Revisit Regulation, 20 FORDHAM ENVTL. L. REV. 115, 129-32 (2009) (citing EVALUATION OF IMPACTS, supra note 47, at 6-14-15, detailing water with diesel odors, oily water, murky water, and rashes from showers.).


\textsuperscript{76} Id.

methane-caused explosion in Pennsylvania tragically killed two adults and their young grandchild.  

Pennsylvania state officials determined that the source of the methane, which had infiltrated the home, was from one of several gas wells in close proximity to the home that had been using fracking operations. Another explosion in a house prompted the Ohio Department of Natural Resources to report their finding that faulty cement casings and hydraulic fracturing at a nearby gas well caused the accident. A recent study has definitively linked methane contamination in drinking water wells to hydraulic fracturing operations by demonstrating, through carbon dating, that the methane contamination resulted from fossil natural gas rather than other sources, with water wells within a kilometer of a gas well having seventeen times the methane levels of other water wells in the vicinity.

In Lennox Township, Pennsylvania, fracking fluids were alleged to have caused the contamination of wells and the illness of local children. Nearby in Dimock, Pennsylvania, tests on wells earlier found to have been contaminated by methane confirmed the presence of other hazardous substances that are found in frac fluids, such as the possible carcinogen ethylbenzene, the other BTEX compounds toluene and xylene, as well as ethylene glycol and propylene glycol. In Dimock, residents reported

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78. Lustgarten, supra note 75.
79. Id.
80. Id.
adverse health effects attributed to contaminated water such as headaches, dizziness, and open sores.  

A three-year study conducted by Garfield County, Colorado, officials concluded that nearby gas drilling fracking operations contributed to the methane and chloride contamination of dozens of water wells. Also in Colorado, a couple began suffering from an array of adverse health effects ranging from burning eyes, nose bleeds, numbness, ectopic rash, and rectal bleeding immediately after frack operations at a gas well was drilled close to their property. Similarly, in Texas, another family suffered many ailments such as neurological damage and nose bleeds; gas wells using hydraulic fracturing surrounded their ranch. Indeed, anecdotal evidence of “clusters of unusual health problems [have coincided with] drilling hotspots” in many areas where fracking operations have commenced.

An extensive study of residential well water in Pavillion, Wyoming, by the Agency for Toxic Substances and Disease Registry, concluded that the groundwater was significantly contaminated by a wide variety of hazardous substances including some designated as contaminants of concern, and


85. GEOFFREY THYNE, REVIEW OF PHASE II HYDROGEOLOGIC STUDY PREPARED FOR GARFIELD COUNTY 23-24 (2008), http://s3.amazonaws.com/propublica/assets/methane/thyne_review.pdf; see also Lustgarten, supra note 75 (discussing the study).

86. See Wiseman, supra note 74, at 138 (citing testimony from Oil and Gas Development: Exemptions from Health and Environmental Protections: Hearing before the Comm. on Oversight and Gov’t Reform, 110th Cong. 96-100 (2007) (statement of Steve Mobaldi), http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_house_hearings&docid=f:45610.wais.pdf (Mr. Mobaldi described a parade of horrors of symptoms including pituitary tumors and loss of livestock.).


88. See Thyne, supra note 85, at 3 (discussing instances of chronic dizziness, neurological disorders, spontaneous bleeding, and livestock deaths all occurring near hydrofracking operations).

89. See generally AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, EVALUATION OF CONTAMINANTS IN PRIVATE RESIDENTIAL WELL WATER PAVILLION, WYOMING (2010) [hereinafter EVALUATION OF CONTAMINANTS],
recommended that the residents of Pavillion use alternative water supplies.\textsuperscript{90} The report concluded that nearby natural gas exploration using fracking operations was a potential source of the water contamination.\textsuperscript{91} In light of finding frack fluid compounds in Pavillion residents' water supply, an EPA scientist stated, "it starts to finger-point stronger and stronger to the source being somehow related to the gas development . . . [and the] nexus between hydraulic fracturing and water contamination."\textsuperscript{92} Given that the complaints of contaminated water began immediately after the drilling began, this finding of a potential connection between the contamination and fracking is hardly surprising.\textsuperscript{93} These are few of the many examples that serve to illustrate the significant adverse risks to human health resulting from frack operations at wells near human habitation.

\section{Surface Releases}

The dangers of fracking do not occur only from subterranean injections. In Dimock, Pennsylvania, Cabot Oil and Gas was responsible for the release of 8,000 gallons of a proprietary compound of frack fluid containing carcinogenic chemicals, the short-term exposure to which causes "central nervous system effects" according to the Material Safety Data Sheet ("MSDS") provided by Halliburton, the manufacturer of proprietary compound.\textsuperscript{94} If this were an isolated incident, the statement that "oil and gas

\begin{footnotesize}
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\item http://www.atsdr.cdc.gov/hac/PHA/PAvillion/Pavillion_HC_Well_Water_08312010.pdf (finding elevated levels of petroleum hydrocarbons, VOCs, Methane, Arsenic, Lead, et al. in the water supply); \textit{see also} 40 C.F.R. \S 302.4 (2011).
\item \textit{See} \textit{Evaluation of Contaminants, supra} note 89, at 27.
\item \textit{Id.} at 3-4.
\item \textit{Id.} \textit{See also} Kirk Johnson, \textit{E.P.A. Links Tainted Water in Wyoming to Hydraulic Fracturing for Natural Gas}, N.Y. TIMES, Dec. 8, 2011, at A23 (discussing the EPA draft report, which stated "the data indicates likely impact [from BTEX and other hazardous substances] to ground water that can be explained by hydraulic fracturing.").
operators drill with the utmost care and concern for the environment” would not be such an absurd assertion.95

On June 3, 2010, a spectacular release occurred at a gas well—also operated by Cabot Oil and Gas—known as the “Punxsutawney Hunting Club 36H” when a blowout preventer failed following hydraulic fracturing procedures, which resulted in an uncontrolled discharge of a significant amount of fracking fluids, gas, and wastewater into the environment.96 Also indicative of the potential for damage to the environment, albeit less spectacular than the Punxsutawney blowout, was the release of 13,000 gallons of hazardous substance containing frack fluid from a storage tank at an unattended well pad in Penn Township, Pennsylvania.97 The released fluid polluted adjacent waterways and may also have contaminated nearby wells.98 Another example of the substantial dangers posed by frack fluids was the April 2009 surface release of frack fluids from a gas well in Cado Parish, Louisiana, which were ingested by a herd of cattle, killing nineteen of them with such grisly symptoms as bleeding and foaming from the mouth.99 Surface releases pose a significant risk of adverse human health

95. Deweese, supra note 94, at *1, *8. Mr. Deweese presents an alternative view, which disputes the dangers of hydraulic fracturing and advocates that federal oversight is unnecessary.


97. DEP Investigating Lycoming County Fracking Fluid Spill at XTO Energy Marcellus Well Spill Impacted Spring, Unnamed Tributary to Sugar Run, PA. Dept. Envtl. Prot. (Nov. 22, 2010), http://www.portal.state.pa.us/portal/server.pt/community/newsroom/14287?id=15315&typeid=1. A simple act of negligence, such as leaving the valve open on a tank filled with frack fluid, can cause a substantial adverse risk to human health and the environment. Id.

98. Id.

effects from direct contamination of frack fluids and demonstrate the need for a federal regulatory regime.\textsuperscript{100}

V. FRACKING IS NOT REGULATED BY THE FEDERAL GOVERNMENT

In 2005, Congress amended the SDWA to exempt specifically fracking from the definition of an underground injection with the so-called "Halliburton Loophole."\textsuperscript{101} The statute provides that the definition of "the term ‘underground injection’ . . . exclude[s] the underground injection of fluids or propping agents (other than diesel fuels) pursuant to hydraulic fracturing operations related to oil, gas, or geothermal production activities."\textsuperscript{102} This amendment to the SDWA effectively left hydraulic fracturing outside of federal regulation.\textsuperscript{103} While a bill was introduced to amend this exemption from the 2005 amendment of the SDWA, it gained no

\textsuperscript{100} At time of publication, EPA has announced that it is developing regulations that will govern discharges of wastewater resulting from the extraction of natural gas by hydrofracking. EPA plans to solicit comment for proposed rules governing wastewater from coalbed methane in 2013 and shale formations in 2014. While a positive step, this is merely an announcement that EPA intends to engage in rule-making. News release from U.S. Envtl. Prot. Agency, EPA Announces Schedule to Develop Natural Gas Wastewater Standards/Announcement is part of administration’s priority to ensure natural gas development continues safely and responsibly (Oct. 20, 2011), http://yosemite.epa.gov/opa/admpress.nsf/0/91e7fadb4b114c4a8525792f00542001?Open Document.


\textsuperscript{103} See generally Angela Cupas, The Not-So-Safe Drinking Water Act: Why We Must Regulate Hydraulic Fracturing at the Federal Level, 33 WM. & MARY ENVTL. L. & POL’Y REV. 605 (discussing the SDWA and the lack of EPA or other federal oversight with suggestions for implementing changes to SDWA implementation). See also Wiseman, supra note 74, at 116.
traction in the 111th Congress and is not likely to move anywhere in the 112th Congress.\textsuperscript{104}

VI. CERCLA AS A POTENTIAL TOOL FOR REGULATING FRACKING

Although effective federal means of proactively regulating frack operations may be nonexistent, the existing statutory framework can potentially address the risk that fracking poses to human health and the environment. One such tool is the robust and powerful statute CERCLA.\textsuperscript{105} CERCLA was created in response to abandoned hazardous wastes sites, most notably the infamous Love Canal site.\textsuperscript{106} In CERCLA section 104, Congress expressly provides presidential authority to act where there has been a release or threatened release of hazardous substances into the environment.\textsuperscript{107} Furthermore, CERCLA section 107 makes available a cost recovery action.\textsuperscript{108}

The following elements establishes the \textit{prima facie} case for CERCLA cost recovery liability:

(1) the defendant falls within one of the four categories of “responsible parties”; (2) the hazardous substances are disposed at a “facility”; (3) there is a “release” or threatened release of hazardous substances from the facility into the environment; (4) the release causes the incurrence of “response costs.”\textsuperscript{109}

The statute defines a release as “any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment.”\textsuperscript{110} With regard to fracking, either the

\begin{itemize}
\item \textsuperscript{104} Fracturing Responsibility and Awareness Act of 2009, H.R. 2766, 111th Cong. (2009-2010).
\item \textsuperscript{106} CAROL STERN SWITZER & PETER GRAY, CERCLA COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT (SUPERFUND) 3-4 (2nd ed. 2002).
\item \textsuperscript{107} See 42 U.S.C. § 9604(a)(1).
\item \textsuperscript{108} See 42 U.S.C. § 9607(a).
\item \textsuperscript{109} United States v. Alcan Aluminum Corp., 964 F.2d 252, 258-59 (3rd Cir. 1992); see also 42 U.S.C. § 9607(a).
\item \textsuperscript{110} 42 U.S.C. § 9601(22).
\end{itemize}
injection of frack fluids underground, which escape into the environment, or a surface spill of frack fluids would constitute a release.

A. The Petroleum Exclusion

Under CERCLA, the definition of a hazardous substance “does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance . . . and the term does not include natural gas.” This exception is referred to as the “petroleum exclusion.” The petroleum exclusion has been interpreted to mean any distillation of petroleum, including diesel fuel and gasoline. EPA Office of General Counsel (“OGC”) has further interpreted the petroleum exclusion to include hazardous substances listed in the National Oil and Hazardous Substances Pollution Contingency Plan that are “constituents” of diesel, such as BTEX compounds.

However, this interpretation of the petroleum exclusion was conditional because OGC stated that hazardous substances added to or mixed with petroleum would not be excluded. Indeed, “if the petroleum product and an added hazardous substance are so commingled that, as a practical matter, they cannot be separated, then the entire spill is subject to CERCLA response authority.”

111. 42 U.S.C. § 9601(14).

112. Id.


115. Aguiluz, supra note 113, at 47-50 (citing Memorandum from EPA General Counsel to Dick Whittington, Region IV Adm’r, Applicability of CERCLA to Contamination of Ground Water by Diesel Oil 1 (Dec. 2, 1982)).

In *Wilshire Westwood Assoc. v. Atlantic Richfield Corp.* the Ninth Circuit agreed with OCG’s first condition by holding that hazardous substances, which were used as additives to petroleum at the refinery, were part of the petroleum exclusion. In the landmark case, *United States v. Alcan Aluminum Corp.*, the Third Circuit supported this decision by holding that waste oil, to which hazardous substances have been added through use, did not fall within the petroleum exclusion. Other courts have agreed with this holding, determining that additives mixed with petroleum products at the refinery, though hazardous substances, are nevertheless exempted.

The second condition to the petroleum exclusion advanced by OGC, that CERCLA liability nonetheless applies where other hazardous substances are so mixed into the petroleum that they cannot be separated, has support in the courts as well. In *New York v. United States*, the court found that where hazardous substances were present in a release alongside materials that would qualify for the petroleum exclusion, CERCLA liability would still apply to the entire site. The holding in *Alcan* bears this out as well.

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117. *Wilshire*, 881 F.2d at 810. The court specifically found that lead, while a hazardous substance under CERCLA, was added to gasoline during the refining process and was therefore subject to the petroleum exclusion. The court also found that indigenous parts of petroleum such as Benzene and Toluene, despite being listed as hazardous substances, would be exempt because to do otherwise “renders the petroleum exclusion a nullity.” *Id.* at 804. *But see* 42 U.S.C. § 9601(14)(F) (stating that “[t]he term does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance” (emphasis added)).

118. *United States v. Alcan Aluminum Corp.*, 964 F.2d 252, 266-67 (3rd Cir. 1992). Another critical aspect of *Alcan* is that the court held there is no quantitative requirement in the definition of hazardous substances, rather it is only significant that the release contained materials designated as hazardous substances. *Id.* at 259-61.


120. *See Alcan*, 964 F.2d at 266-67; *see also* New York v. United States, 620 F. Supp. 374, 386 (E.D.N.Y. 1985); Porter Memo, supra note 114, at 3.

121. E.g., BTEX compounds.

122. *New York*, 620 F. Supp. at 386. The court seemed to consider the “otherwise specifically listed or designated as hazardous substances” language to be in fact an
With an eye toward crossing the petroleum exclusion threshold, it is useful to examine how the exclusion is applied to substances added to or mixed in with petroleum and natural gas. In his Comment in the San Joaquin Agricultural Law Review, Dan Green explores the status of hazardous substances added to petroleum after the refining process. To determine whether a particular hazardous substance added to petroleum after refining falls outside of the exclusion, Green looks to case law and EPA interpretation to establish a two-pronged balancing test. The test weighs the need to prevent “rendering the petroleum exemption exclusion a nullity” and the government interest in protecting human health and the environment by addressing hazardous substances, “which can reasonably be considered something other than petroleum.”

Green’s test considers four factors: 1) whether the hazardous substances added are already present in lower concentrations in petroleum or its constituents; 2) whether the additive is blended during the manufacturing process or further “down-line”; 3) whether the purpose of the additive was primarily to affect the petroleum as an energy source; and 4) whether the additive exists in such small amounts that the only threat to human health and the environment comes from the petroleum and not the additive.

Applying the Green factors to petroleum constituents, including diesel fuel mixed into frack fluids, the government’s interest in protecting human health and the environment outweighs the need to preserve the petroleum exclusion: 1) the hazardous substances found in frack fluids are not already present in the petroleum products; 2) the additives are blended “down-line”;

exception to the exclusion, but declined to address the issue because of the presence of many other hazardous substances in the groundwater that were not indigenous components of petroleum. Id.

123. See Alcan, 964 F.2d at 267-71 (finding that Defendant corporation Alcan would be responsible for the entire claim if it could not prove that the harm was divisible under a theory of joint and severable liability).

124. See generally Green, supra note 119.

125. Id. at 129.

126. Id. The balancing prongs to consider are “the need to avoid rendering the petroleum exclusion a nullity” and the government’s interest in protecting the public health and environment “by imposing liability for contamination by hazardous substances which can reasonably be considered something other than petroleum.” Id.

127. Id.
3) the purpose of the diesel additive to the frack fluids is not used as an energy source; and 4) the threat is posed not only by the petroleum but also by the other hazardous substances in the frack fluids.128

B. Overcoming the Petroleum Exclusion: Fracking Is All Mixed Up

As noted, CERCLA specifically exempts petroleum and its constituents from the statutory definition of hazardous substances.129 Therefore, to establish CERCLA cost recovery liability or response authority for a release of natural gas or diesel fuel resulting from fracking, the petroleum exclusion needs to be addressed.130

The fracking-related methane contamination of drinking water in Pavillion, Wyoming and Dimock, Pennsylvania,131 would appear on its face to be exempt from the definition of hazardous substance and therefore defeat any CERCLA cause of action.132 However, liability attaches to the entire site when multiple hazardous substances, which are so inextricably mixed with the petroleum that they cannot be separated, contaminate a site.133 The EPA study of Pavillion, Wyoming found that in addition to methane, lead, arsenic, 4-chloro-3-methylphenol, and volatile organic compounds ("VOCs") also contaminated the drinking water in several wells.134 The hazardous substances at the site of the EPA study have "been so commingled with

128. See supra Part IV A-B; see also infra Part VI B.


131. Legere, supra note 83; see also EVALUATION OF CONTAMINANTS, supra note 89.


petroleum that they cannot be separated” and therefore CERCLA liability should attach to the entire site despite the petroleum exception.  

Contamination from frack fluids using diesel would also not be exempted under the petroleum exclusion for the same reasons. When used as a component of frack fluid, diesel is mixed with, *inter alia*, the hazardous substance adiptic acid. Furthermore, as noted earlier, each “interval” of the well sees many phases of the frack process, using many different component fluids. The process only recovers a fraction of the fluid, with up to 30% left underground. The remaining fluid contains a variety of hazardous substances that would be thoroughly mixed with diesel, and therefore contamination of an entire site would be subject to CERCLA liability despite the petroleum exclusion.

**C. CERCLA Liability for Federally Permitted Releases**

1. **Scope of the Federally Permitted Release Defense**

Although federally permitted releases are an affirmative defense to CERCLA actions, the scope of the federally permitted release (“FPR”) defense is not unlimited.

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135. *See Alcan*, 964 F.2d at 266-67; *see also New York*, 620 F. Supp. at 386; Porter Memo, *supra* note 114, at 3.

136. *See Alcan*, 964 F.2d at 266-67; *see also New York*, 620 F. Supp. at 386; Porter Memo, *supra* note 114, at 3.


138. *EVALUATION OF IMPACTS*, *supra* note 47, at 4-9; *see also 40 C.F.R. § 302.4* (listing adiptic acid as a hazardous substance).

139. *Supra* Part IV B.


141. *See Alcan*, 964 F.2d at 266-67; *see also New York*, 620 F. Supp. at 386; Porter Memo, *supra* note 114, at 3.

142. *See 42 U.S.C. § 9601(10) (2006)* (listing the many circumstances of a federally permitted release); *see also 42 U.S.C. § 9607(j) (2006)* (noting that recovery for costs incurred is not allowed under CERCLA); *see also R. Sharp, CERCLA, SARA And The
a. Legislative Intent

CERCLA's legislative history demonstrates the U.S. Senate contemplated that "these exemptions are not to operate to create gaps in actions necessary to protect the public or the environment." Additionally, the legislative history reflects the belief that federally permitted releases do not exempt owner operators from CERCLA liability in case of accidents, "whatever their cause," resulting in a release or threatened release of hazardous substances into the environment.

b. Case Law

United States v. Iron Mountain Mines, Inc. illustrates that a federally permitted release may not be an aegis against liability for cost recovery from a potentially responsible party ("PRP"). In Iron Mountain, the defendant company had CWA permits only relating to copper loading, and there, the court determined that the FPR defense did not apply to the PRP because the releases were outside the scope of the permit and "full compliance with the permits was never achieved." In Idaho v. Bunker Hill, another case regarding mining and federally permitted releases under the CWA, the court stated that response costs may be recovered from any release—even from federally permitted releases—where the releases were not expressly permitted, exceeded the scope of the permit, or occurred at a time when there was no permit.

The court in Bunker Hill stated there was CERCLA liability:

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Federally Permitted Release: an "Aired" Interpretation?, 38 Hous. L. Rev. 683, 701 (2001) (citing United States v. Freter 38 F.3d 783 (9th Cir. 1994)).

144. Id. at 48.
146. Id.
147. Id. (citing Idaho v. Bunker Hill, 635 F. Supp. 665, 673-74 (D. Idaho 1986)). This statement of the court is especially significant in light of Waxman's letter to Administrator Jackson stating the frack operators were in violation of the SDWA by using diesel-based fluids. See Letter to Jackson, supra note 73. If the operators were not holding a SDWA permit, then the release was therefore expressly not a federally permitted release. Id.
[T]o the extent damage was caused by releases which were not expressly permitted in the various permits, which exceeded the limitations established by the permits or which occurred during a time period when there were no permits, then the State may seek recovery for those damages under the CERCLA statute.\textsuperscript{148}

Thus, the court found that summary judgment based on the FPR affirmative defense was not appropriate because there were substantial factual issues as to the existence of any federal permits for releases, the scope of such permits as might have been issued, whether the releases exceeded the limitations of these permits, and the extent of the damage resulting from any unpermitted releases.\textsuperscript{149}

Liability for recovery of response costs is dependent upon whether the damages to the environment are divisible at a site with both permitted and non-permitted release.\textsuperscript{150} This aspect of divisibility is evidenced in \textit{Acushnet River}, where the United States based its CERCLA liability case upon PCB contamination resulting from discharges that may have been federally permitted in part, as well as contamination from sources that were undisputedly not permitted.\textsuperscript{151} The court in \textit{Acushnet River} held that to the extent injuries to the environment from non-federally permitted releases were indivisible from federally permitted releases, the PRP was jointly and severally liable for the entire site, unless it could prove divisibility, in which case it would be liable only for the portion of damages resulting from the non-permitted releases.\textsuperscript{152}

One recent court decision maintains that the FPR affirmative defense applies only where permits are being complied with.\textsuperscript{153} In \textit{United States v. Washington State Department of Transportation}, a CERCLA action seeking recovery of costs incurred at the Commencement Bay-Nearshore Tideflats Superfund site, the United States named the Washington State Department

\begin{itemize}
\item \textsuperscript{148} \textit{Bunker Hill}, 635 F. Supp. at 674.
\item \textsuperscript{149} \textit{Id}.
\item \textsuperscript{151} \textit{Acushnet River}, 722 F. Supp. at 895.
\item \textsuperscript{152} \textit{Id} at 897.
\item \textsuperscript{153} \textit{See United States v. Wash. State Dep't of Transp.}, 716 F. Supp. 2d 1009, 1016 (W.D. Wash. 2010).
\end{itemize}
of Transportation ("WSDOT") as a PRP, in part because hazardous substances contained in storm water run-off from highways drained into the Superfund site.\textsuperscript{154} Although WSDOT held a CWA permit,\textsuperscript{155} that alone did not avail WSDOT in its motion for summary judgment because there was a genuine dispute as to whether the discharges were in compliance or had exceeded the scope of the permit.\textsuperscript{156}

Another FPR case, \textit{Pennsylvania Department of Environmental Protection v. Lockheed Martin Corp.}, relates to the release of Sr-90 from a research reactor that Lockheed Martin Corporation ("LMC") operated.\textsuperscript{157} LMC asserted the FPR defense based on the "byproduct material license" it had been granted by the Nuclear Regulatory Commission, stating that under CERCLA section 101(10)(K), the release of byproduct material subject to an enforceable license is a federally permitted release.\textsuperscript{158} However, the court denied LMC summary judgment, holding that "in order to determine whether the release of Sr-90 by LMC was ‘in compliance’ with its license, the court must examine both the license itself and the extent of the release,” and although “the Commission may have authorized LMC to leave behind some Sr-90 [\textit{it}] does not mean that it authorized the later release of that substance.”\textsuperscript{159}

2. Applying the Federally Permitted Release Defense to Hydraulic Fracturing

Underground injection of fluids for the purpose of fracking is a federally permitted release, defined by CERCLA section 101(10)(I) as:

\begin{quote}
[A]ny injection of fluids or other materials authorized \textit{under applicable State law} for the purpose of stimulating or treating wells for the production of crude oil, natural gas, or water, for the
\end{quote}

\textsuperscript{154} \textit{Id.} at 1011-12.

\textsuperscript{155} \textit{Id.} at 1016. WSDOT was issued a National Pollutant Discharge Elimination System permit through the Clean Water Act. \textit{Id.}

\textsuperscript{156} \textit{Id.}


\textsuperscript{158} \textit{Id.} at 582.

\textsuperscript{159} \textit{Id.} at 583 (emphasis added).
purpose of secondary, tertiary, or other enhanced recovery of crude oil or natural gas, or which are brought to the surface in conjunction with the production of crude oil or natural gas and which are reinjected.\footnote{160}

As discussed, fracking is the practice of injecting fluids into the wellbore to fracture shale and release the natural gas trapped therein.\footnote{161} Federal law does not regulate this practice, but it is authorized under state law.\footnote{162} Therefore, hydraulic fracturing is a “federally permitted release” under CERCLA if the process complies with a state permit.

\subsection{Pennsylvania Permits and Statutes}

Looking to the legislative history and case law, there is potential CERCLA cost recovery liability for any release (or threatened release) of a hazardous substance that is not in compliance with a state permit.\footnote{163} The Pennsylvania Department of Environmental Protection Program Oil and Gas Management Program (“OGMP”) well permit illustrates how an FPR affirmative defense could be defeated. The permit states that it is “conditioned upon operator’s compliance with all applicable law and regulation.”\footnote{164} Therefore, the broad language in Pennsylvania’s codes regulating gas well permitting, creates a larger universe for potential non-compliance, thereby eliminating the FPR affirmative defense:

A person may not drill, alter or operate an oil or gas well except in accordance with a permit or registration issued under the act and in compliance with the terms and conditions of the permit, this chapter and the statutes under which it was promulgated.\footnote{165}

\begin{itemize}
  \item \footnote{161} ARTHUR ET AL., supra note 16, at 1.
  \item \footnote{162} See 42 U.S.C. § 300h(d)(1)(B)(ii) (2006) (excluding from the definition of underground injection any injection of fluids and proppants “pursuant to hydraulic fracturing operations related to oil, gas, or geothermal production activities”) (emphasis added).
  \item \footnote{163} See supra Part VI Section C (1)-(2).
  \item \footnote{164} Pa. Dept. of Envtl. Prot. Well Permit Number 37-003-22128-00 [hereinafter Well Permit] (stating “this permit does not relieve operator from the obligation to comply with the Clean Streams Law and all statutes, rules and regulations administered by the department”) (on file with author).
  \item \footnote{165} 25 PA. CODE § 78.12 (2011).
\end{itemize}
Thus, if there were any non-compliance with Title 25 of the Pennsylvania Code, then the release or threatened release of hazardous substances would no longer be federally permitted, and therefore, subject to CERCLA cost recovery liability.

Of particular note is Pennsylvania Code section 78.81, which provides guidelines for the cementing and casing of wellbores and requires operators to be in control of the well at all times, to prevent the migration of gas or fluid into groundwater and to prevent the pollution of groundwater.\footnote{25 PA.\ CODE § 78.81(a) (2011).} Where cement casings fail to prevent contamination of groundwater by hazardous substances, the well would not comply with its permit and therefore, the operator responsible for the release would not benefit from the FPR defense. Also, Title 25 of the Pennsylvania Code section 78.51 provides that a “well operator who affects a public or private water supply by pollution or diminution shall restore or replace the affected supply with an alternate source of water.”\footnote{25 PA.\ CODE § 78.51 (2011).} The operator is under a rebuttable presumption of liability for the contamination of drinking water supply within 1000 feet of any well.\footnote{Oil and Gas Act, 58 PA.\ STAT.\ ANN. § 601.208(c) (West 1996).} Thus, if an operator pollutes a water supply with hazardous substances, and does not “restore or replace” the supply, the operator would not be in compliance with the permit. Such release would therefore not be federally permitted, thereby opening up potential CERCLA cost recovery liability.

Surface releases of produced fluids (i.e., used frack fluids and brines) are also subject to Pennsylvania law and thereby affect the scope of the permit.\footnote{25 PA.\ CODE § 78.56 (2011).} The uncontrolled release of frack fluid, well flow-back fluids, gas, and saltwater that occurred at the Punxsutawney Hunting Club gas well on June 3, 2010, was found to be in violation of several statutes.\footnote{Consent Order and Agreement: \textit{In re} C.C. Forbes, LLC, PA.\ DEP’T OF ENVTL. PROT. §§ S-AB 6-7 (July 12, 2010) (noting violations of 35 P.S. § 6018, P.S.§ 691 \textit{et al.}), http://www.dep.state.pa.us/dep/DEPUTATE/MINRES/OILGAS/PunxsutawneyHuntingClub36HWell%20Report/13.CC%20Forbes%20COA.pdf.} The permit issued to the operator was subject to compliance with applicable law and regulations administered by PA DEP.\footnote{See, e.g., Well Permit, supra note 164.} Because the release was either
outside the scope of the permit or not in compliance with the permit, Cabot Oil may not be able to avail itself of the FPR defense in a CERCLA response recovery action if one were to ensue.

b. **LEAF v. EPA**

In the 1997 case of *Legal Environmental Assistance Foundation ("LEAF") v. EPA*, the court concluded that fracking was an underground injection and that it was regulated under part C of the SDWA, contrary to prior EPA policy. As noted above, the Energy Policy Act of 2005 the amended the SDWA to exclude hydraulic fracturing from its definition of underground injection. Therefore, prior to 2005, any fracking that was not regulated under a state permit as a class II well was either not expressly permitted or occurred at a time when there was no permit. Thus, CERCLA liability arguably could be attached to any well prior to 2005 that was not expressly permitted under the SDWA because the underground injection would not have been a federally permitted release.

3. **Other CERCLA Response Authority**

a. **CERCLA Section 104**

Although a federally permitted release is precluded from CERCLA cost recovery liability, other cost recovery remedies, such as common law tort action, may still be available. Furthermore, while cost-recovery liability is precluded under CERCLA, EPA may still perform a response action. Congressional intent, as borne out in the legislative history of CERCLA, stated that the "bill authorizes response to federally permitted releases, but requires costs to be assessed against the permit holder under the liability provisions of other laws, not S. 1480."175

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172. LEAF v. EPA (LEAF I), 118 F.3d 1467, 1478 (11th Cir. 1997); see also Cupas, supra note 103, at 619-620 (discussing the LEAF decisions).


174. 42 U.S.C. § 9607(j) (2006). "Nothing in this paragraph shall effect or modify in any way the obligations or liability of any person under any other provision of State or Federal law, including common law, for damages, injury or loss resulting from a release of any hazardous substance or for removal or remedial action or the costs of removal or remedial action of such hazardous substance" (emphasis added). *Id.*

CERCLA section 104 authorizes response actions whenever there is a release or threatened release of hazardous substances into the environment. The Congressional intent for response authorization, irrespective of the FPR defense, is reflected in the legislative history of CERCLA, which stated, "[t]he President, using the Fund, is expressly authorized to respond to problems caused by federally permitted releases." Therefore, a CERCLA response action is nevertheless available where hazardous substances, resulting from a federally permitted release, have contaminated the surface water, soil, or groundwater.  

With regard to fracking, CERCLA gives EPA authority for response actions whenever there has been a contamination resulting from the hazardous material laden frack fluid, or otherwise where contamination by statutorily exempted materials (such as methane or other natural gas) is indivisible with other listed hazardous materials, whether or not the release complies with the federally permitted liability recovery exemption.

b. Unilateral Administrative Order

Looking to CERCLA section 106, there is broad authority to issue an abatement order when there is an "imminent and substantial endangerment to the public health or welfare or the environment because of an actual or threatened release of a hazardous substance from a facility." The endangerment to the public health may be a threatened harm rather than an actually occurring harm. Likewise, the imminence of the endangerment element is satisfied even where the harm may not be realized for years. This finding of endangerment is based on factors including "quantities of hazardous substances involved, the nature and degree of their hazards, or the


potential for human or environmental exposure." 183 Whether substantial endangerment exists is based upon a reasonable determination that people or the environment "may be exposed to a risk of harm by a release or a threatened release of a hazardous substance if remedial action is not taken." 184

With regard to fracking, a CERCLA section 106 unilateral administrative order ("UAO") may be issued under certain circumstances, such as where groundwater might possibly become contaminated from a potentially faulty cement casing, so long as the EPA made a reasonable determination of the "imminent and substantial harm." 185

c. Private Party Cost Recovery

CERCLA provides for private parties to seek cost recovery from PRPs under two sections of the statute. 186 Under section 113(f)(1), a private party, having been subject to liability under section 106 or section 107, can seek contribution from other PRPs. 187 Section 107(a)(4)(B) allows for a private party that has voluntarily conducted clean-up operations to pursue cost recovery from other PRPs. 188 These distinctions are important: private parties may seek contribution from other PRPs for damages only where liability has already been imposed upon them, whereas private parties may seek to recover costs where they themselves have incurred response costs as a result of voluntary clean up measures. 189


186. Switzer & Gray, supra note 106, at 67.


189. Atlantic Research, 551 U.S. at 139.
In the context of fracking, these private causes of action would be available in limited circumstances. Section 113(f)(1) would only be used for contribution where a PRP was subjected to liability under sections 106 or 107, which would have been as a result of overcoming the FPR affirmative defense and the petroleum exclusion. Likewise, section 107(a)(4)(B) would be available only for cost recovery if the FPR affirmative defense and the petroleum exclusion could be overcome. Furthermore, section 107(a)(4)(B) presents a significant practical barrier in that the private party can only recover those costs that it has already incurred; thus any significant clean up would require an outlay from the private party before any cost recovery could be available.  

VII. CONCLUSION

Given the ever-increasing demand for domestic energy sources, coupled with the vast reserves of natural gas in unconventional plays of shale and coal, hydraulic fracturing will continue to expand in scope in the foreseeable future. Under CERCLA, hydraulic fracturing—the practice of injecting hazardous substances underground for the purpose of extracting natural gas—is a federally permitted release. Although federally permitted releases provide owners and operators with an affirmative defense to CERCLA cost recovery liability for any response to a release or threatened release of hazardous substances, EPA is able to use Superfund monies to respond to such releases or threatened releases. Furthermore, if the releases were not expressly permitted, if they exceeded the scope of the permit, or if they occurred at a time when there was no permit, they would very likely fall out of the ambit of federally permitted releases. Thus, the potentially responsible parties could incur CERCLA section 107 liability for the recovery of response costs.

Therefore, where a fracking operation at a gas well does not comply with a state permit, in cases where there was no permit, or in cases of an unpermitted release occurring at the surface, CERCLA may be a powerful tool for EPA in pursuing the owners and operators of wells for cost recovery or performance of response actions. Nevertheless, attempts to establish CERCLA cost recovery liability on fracking will be highly dependent upon factual determinations as to the scope of the permit and the nature and extent of the release.

190. Id.