The Feasibility of Applying Strict-Liability Principles to Carbon Capture and Storage

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I. INTRODUCTION

Carbon capture and storage (CCS) seeks to reduce the emission of carbon dioxide (CO_2) into the atmosphere by capturing, transporting, and injecting CO_2 emissions deep underground.[1] If broadly implemented, CCS could store significant quantities of emissions from power plants and other industrial sources.[2] However, the success of CCS is dependent upon injected CO_2 remaining stored for an indefinite period of time, ranging from hundreds to thousands of years.[3] Otherwise, the CCS process accomplishes little in the way of mitigating atmospheric CO_2 emissions.

Industry-wide use of underground waste disposal can serve as a model for applying a similar approach to CCS. Generally, entities within the United States store waste underground when no practicable means for adequate disposal exist.[4] For instance, cities often utilize underground disposal for sewage, sludge, and other waste.[5] Industries that produce hazardous waste also use underground disposal methods.[6] CO_2 emitters are starting to consider CCS as an acceptable method of waste disposal, but they also recognize that if implemented on a commercial scale, CCS will generate more underground storage and disposal sites.[7]

Utilizing injection methods with a demonstrated history of success will curtail a portion of the risk associated with increasing the number of underground storage sites. Oil producers have long used CO_2 injections for enhanced oil recovery (EOR),[8] which involves the injection of CO_2

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1. EMILY ROCHON ET AL., FALSE HOPE—WHY CARBON CAPTURE AND STORAGE WON'T SAVE THE CLIMATE 6 (2008), *available at* http://www.greenpeace.org/raw/content/usa/press-center/reports4/false-hope-why-carbon-capture.pdf.
2. Alexandra B. Klass & Elizabeth J. Wilson, *Climate Change and Carbon Sequestration: Assessing a Liability Regime for Long-Term Storage of Carbon Dioxide*, 58 EMORY L.J. 103, 107 (2008).
3. *Id.* at 117-18 n.55.
4. 2 FRANK P. GRAD, TREATISE ON ENVIRONMENTAL LAW § 3.05 (2009).
5. *Id.*
6. *Id.*
7. *See id.*
8. Enhanced oil recovery (EOR) increases recovery of oil from a depleted reservoir by injecting fluids including water, brine, and CO_2. PATRICK H. MARTIN & BRUCE M. KRAMER, WILLIAMS & MEYERS, MANUAL OF OIL AND GAS TERMS 351 (11th ed. 2003).

into oil fields to stimulate production.[9] Widespread acceptance of this method led to the United States using approximately thirty-two million tons of CO_2 per year for EOR.[10] With the oil industry's vast experience in EOR operations, the industry will likely lead the way in implementing CCS projects.[11] Though implementing CCS projects on a mass scale will require time and research, several CCS projects are in the testing phase on the North American continent with more large-scale projects in the works.[12] While the long-term results of these projects remain unknown, the scientific community is positive but cautious about the overall goal of adding CCS to the underground waste-disposal system.[13]

Even with widespread acceptance of EOR and several CCS projects underway, CCS creates the potential for significant environmental and economic consequences.[14] Of the projects undertaken so far, negative consequences—though not probable—threaten the viability of implementing large-scale projects.[15] Experts have identified two possible dangerous scenarios: (1) a blowout, meaning the well fails altogether with a sudden and rapid release of CO_2; and (2) a slow and diffuse leakage, eventually reaching an underground water source or the surface.[16]

A blowout would emit a very high concentration of CO_2; prolonged exposure to high concentrations of CO_2 could cause asphyxiation as well as chronic and acute health defects.[17] Those potentially affected include anyone in the general area of the well, but workers in particular are es-

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9. Donna M. Attansio, *Surveying the Risks of Carbon Dioxide: Geological Sequestration and Storage Projects in the United States*, 39 ENVTL. L. REP. NEWS & ANALYSIS 10,376 at 10,378 (2009).

10. *Id.*

11. *See* Federal Requirements Under the Underground Injection Control (UIC) Program for Carbon Dioxide (CO_2) Geologic Sequestration (GS) Wells, 73 Fed. Reg. 43,492, 43,498 (July 25, 2008) (to be codified at 40 C.F.R. pt. 144, 146) [hereinafter UIC Program for CO_2].

12. Klass, *supra* note 2, at 117; *see* Joel Sminchak et al., *Well Test Results and Reservoir Performance for a Carbon Dioxide Injection Test in the Bass Islands Dolomite in the Michigan Basin*, ENVIRONMENTAL GEOSCIENCES, Sept. 2009, at 154 (discussing some of the projects in the midwestern United States); Press Release, Kansas Geological Survey, Kansas Geological Survey Receives $5 Million Grant to Study CO_2 Storage (Oct. 26, 2009), *available at* http://www.kgs.ku.edu/General/News/2009/co2_storage.html.

13. *See generally* UIC Program for CO_2, *supra* note 11.

14. *See infra* notes 15-26 and accompanying text. Injected carbon dioxide (CO_2) may restrict access to subsurface natural resources. U.S. ENVIRONMENTAL PROTECTION AGENCY, RISK AND OCCURRENCE DOCUMENT FOR GEOLOGIC SEQUESTRATION RULEMAKING 9 (2008), *available at* http://www.regulations.gov/search/Regs/contentStreamer?objectId=0900006480683eb8&disposition=attachment&contentType=pdf [hereinafter EPA RISK AND OCCURRENCE DOCUMENT]. Later discoveries of enhanced extraction processes, which are capable of extracting resources from reservoirs once thought to be depleted, may overpower the desire not to disturb completed CCS projects. Oil and gas operations in reservoirs with CCS projects could cause the release of all the stored CO_2.

15. UIC Program for CO_2, *supra* note 11, at 43,497-98. "There are a range of potential risks associated with long-term storage of CO_2, including groundwater contamination, surface ecological damage, harm to human health, geologic hazards, and damage from hydrocarbons where CO_2 injection is linked with EOR operations." Klass, *supra* note 2, at 119. Earthquakes and increased seismic activity are another, but rare, consequence of CO_2 injection. UIC Program for CO_2, *supra* note 11, at 43,498. For example, injection in the Rocky Mountains induced measurable seismic activity. *Id.*

16. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CARBON DIOXIDE CAPTURE AND STORAGE 34 (2005), *available at* http://www.ipcc.ch/pdf/special-reports/srccs/srccs_wholereport.pdf.

17. UIC Program for CO_2, *supra* note 11, at 43,497.

pecially susceptible.[18] Based upon prior experience with CO_2 injection in the oil and gas industry, the United States Environmental Protection Agency (EPA) considers the risk of a blowout to be minimal.[19] None of the CCS projects currently underway experienced any sudden release or considerable surface accumulation.[20] Even if a worst-case scenario occurred, current monitoring practices and technology would quickly detect and remedy a sudden blowout.[21] Still, documented cases of blowouts resulting in CO_2 erupting from abandoned oil and gas wells demonstrate the risk is real.[22]

The more significant risk is slow and diffuse leaking, with the potential to cause soil and groundwater contamination.[23] Groundwater accounts for a significantly greater quantity of drinking water than surface water.[24] In the midwestern United States, the Ogallala-High Plains Aquifer underlies 174,000 square miles in South Dakota, Wyoming, Nebraska, Colorado, Kansas, Oklahoma, New Mexico, and Texas.[25] Its shallow and abundant water provides the necessary means to sustain agricultural production and meet drinking water needs for the region's population.[26] Other areas of the United States also rely exclusively on aquifers for potable water.[27] Rendering any of these resources unusable would create a catastrophe for a region's economy.

The EPA has analyzed the possibility of injected CO_2 mixing with underground fluids within geological formations called formation water.[28] Injected CO_2's contact with formation water could cause chemical reactions which compromise the structural integrity of the geological

18. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 16, at 34.

19. UIC Program for CO_2, *supra* note 11, at 43,498.

20. *Id.*

21. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 16, at 34.

22. UIC Program for CO_2, *supra* note 11, at 43,498.

23. *See* 2 GRAD, *supra* note 4, § 3.05 (noting the risks associated with groundwater contamination). "Groundwater is the water beneath the surface that can be collected with wells, tunnels, or drainage galleries, or that flows naturally to the earth's surface via seeps or springs." Purdue University, Agricultural & Biological Engineering Department, Private Water Systems (2001), http://www.purdue.edu/envirosoft/private/src/water.htm. Groundwater contamination leads to livestock poisoning, drinking water contamination, agricultural crop damage, and other injuries. 2 GRAD, *supra* note 4, § 3.05. Furthermore, elevated levels of CO_2 negatively affect plant respiration. UIC Program for CO_2, *supra* note 11, at 43,498. Without respiration, terrestrial plants—including agricultural crops—do not convert energy into growth. Ecochem, Photosynthesis, Respiration, Transpiration, http://www.ecochem.com/resource_transpiration.html (last visited Jan. 15, 2010). Increased CO_2 concentrations in the soil causes increased acidity, which harms plant and subsoil organisms. UIC Program for CO_2, *supra* note 11, at 43,498; INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 16, at 13.

24. 2 GRAD, *supra* note 4, § 3.05.

25. Kansas Department of Agriculture, Ogallala-High Plains Aquifer, http://www.ksda.gov/subbasin/content/204 (last visited Jan. 15, 2010).

26. *Id.*

27. 3 FRANK P. GRAD, TREATISE ON ENVIRONMENTAL LAW § 4A.01[3] (2009). Potable water is simply water that is safe to drink. 7 WATER AND WATER RIGHTS 306 (Robert Emmet Clark ed. 1976 ed. & Supp. 1978).

28. UIC Program for CO_2, *supra* note 11, at 43,497. "Formation water contains oil, gas and high concentrations of salt and chemicals, making it unfit for culinary or agricultural uses." MARTIN & KRAMER, *supra* note 8, at 435.

formations and cause migration of CO_2 into undesired areas.[29] Taking the potential consequences of CO_2's contact with formation fluids into account, the EPA identifies the following risks with respect to groundwater contamination: (1) formation of carbonic acid that causes metal leaching;[30] (2) increased pressure that forces saline water (brine)[31] to migrate into drinking water;[32] (3) damage from by-products injected with CO_2;[33] (4) damage to caprock[34] from prior drilling activity that permits migration into an underground source of drinking water (USDW); and (5) "mobilization of other contamin[ants]."[35]

Any of the above listed problems, in conjunction with CO_2's migration properties, may exacerbate the potential contamination problem. In particular, CO_2's buoyancy, compared to formation waters, creates a tendency for fluid migration.[36] Furthermore, the common structure of geological formations permits lateral migration of injected CO_2 beneath a caprock, which creates the potential for CO_2 to reach leakage pathways.[37] These leakage pathways could occur "through or along injection wells, abandoned wells,[38] undetected faults or those created by injecting

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29. UIC Program for CO_2, *supra* note 11, at 43,497.

30. Carbonic acid forms when CO_2 interacts with formation water—one of the fluids in the pores of formation rock. *Id.* When acidification occurs, formation waters leach naturally occurring metals, organic materials, relatively large amounts of carbonate materials, and other contaminants. *Id.*

Several problems emerge from the interaction between CO_2 and formation fluids. *Id.*; ROCHON ET AL., *supra* note 1, at 26. The leaching of carbonates, which naturally seal geological pores and fractures and is a product in cement, could contaminate formation waters and cause migration in undesirable areas. ROCHON ET AL., *supra* note 1, at 26; MASSACHUSETTS INSTITUTE OF TECHNOLOGY, THE FUTURE OF COAL 50 (2007), *available at* http://web.mit.edu/coal/The_Future_of_Coal.pdf ("Well casing and cements are susceptible to corrosion from carbonic acid."). Also, migration of formation waters, especially when acidified, could contaminate underground sources of drinking water (USDW). UIC Program for CO_2, *supra* note 11, at 43,497.

31. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 16, at 34. Brines are a general term in oil and gas production used to describe water containing salts in solution, such as sodium, calcium or bromides. Schlumberger, Oilfield Glossary: Term 'Brine,' http://www.glossary.oilfield.slb.com/Display.cfm?Term=brine (last visited Jan. 15, 2010).

32. Migration of formation waters alone, due to increased pressure from injection, may increase the salinity of USDWs. *See* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 16, at 34.

33. CO_2, as a product of industry, may contain impurities that negatively affect the quality of groundwater without acid formation or migration assistance from formation waters. *Id.* Though in trace amounts, impurities may include hydrogen sulfide, sulfurous and nitrous oxides, and other trace metals. UIC Program for CO_2, *supra* note 11, at 43,497. These impurities facilitate chemical reactions that corrode well structures. ROCHON ET AL., *supra* note 1, at 31. Inevitably, prolonged corrosion provides mobilization routes with the potential to invade drinking water sources. *See* Jeffrey W. Moore, *The Potential Law of On-Shore Geologic Sequestration of CO_2 Captured from Coal-Fired Power Plants*, 28 ENERGY L.J. 443, 456 (2007).

34. Caprock is a layer of shale and clay rock above the storage formation. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 16, at 32.

35. Attansio, *supra* note 9, at 10,386.

36. Klass, *supra* note 2, at 115-16; *see* MASSACHUSETTS INSTITUTE OF TECHNOLOGY, *supra* note 30, at 50.

37. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 16, at 32.

38. Improperly abandoned wells constitute one of the most uncontrollable risks associated with CCS. EPA RISK AND OCCURRENCE DOCUMENT, *supra* note 14, at 6. The EPA acknowledges the problem with unplugged wells and requires, pursuant to the Underground Injection Control (UIC) program, that operators identify wells requiring remedial action to protect USDWs as part of the permitting process. *Id.* at 14.

CO_2 at too high a pressure, corrosion of [caprocks] and cement plugs used to seal injection wells and diffusion into shallower geologic[al] formations."[39] To avoid these migration problems, those who engage in CCS must carefully select sites with suitable physical and chemical properties to hinder CO_2 migration.[40] According to the Intergovernmental Panel on Climate Change (IPCC), site selection that carefully considers subsurface information, accompanied by a monitoring program to detect and remediate CO_2 release if it occurs, would make the risk of CCS comparable to natural gas storage, EOR, and deep underground disposal of acid gas.[41]

Still, the IPCC's conclusion addresses only part of the leakage pathway problem.[42] The leakage pathways within geological formations, along with man-made problems, such as insufficient plugging and abandoning of wells, may cause seepage and migration of CO_2 that could result in groundwater contamination.[43] Additionally, current scientific methodology lacks the capacity to quantify the risk and magnitude of consequences associated with CCS leakage.[44] In short, experts agree that because CCS operations cause leakage and migration of injected CO_2, the subsurface environment, especially groundwater, will be negatively impacted.[45]

Midwestern states experience great difficulty managing improperly plugged or abandoned oil and gas wells because of a historical lack of regulation on the subject. The Oklahoma Corporation Commission provides a spreadsheet listing over 1,000 orphaned oil and gas wells. Oklahoma Corporation Commission, Orphaned Well Lists, http://www.occ.state.ok.us/Divisions/OG/newweb/orphan%20well%20lists.xls (last visited Jan. 15, 2010). For the state of Kansas, "abandoned oil and gas well inventory stands at 16,986 wells, which includes . . . 6,500 wells still requiring action." KANSAS CORPORATION COMMISSION, ABANDONED OIL & GAS WELL STATUS REPORT 3 (2010), http://www.kcc.state.ks.us/pi/Abandoned_Wells_Status_2010.pdf. The Commission adds hundreds of wells to this list each year. *Id.* Texas claims an inventory of over 8,000 orphaned wells. RAILROAD COMMISSION OF TEXAS, ORPHANED WELL REDUCTION PROGRAM – SUMMARY (2009), *available at* http://www.rrc.state.tx.us/compliance/orphanwells/OWRPsummary.pdf.

39. ROCHON ET AL., *supra* note 1, at 32 (internal footnote added). Experts recognize the potential for carbon capture and storage operations to cause formation breakdown and formation fracturing. *See* Sminchak et al., *supra* note 12, at 157. This presents a significant issue to formation integrity, considering that 90% of domestic wells receive fracturing treatment. John W. Broomes, *Wrestling with a Downhole Dilemma: Subsurface Trespass, Correlative Rights, and the Need for Hydraulic Fracturing in Tight Reservoirs*, 53 ROCKY MT. MIN. L. INST. 20-1, 20-25 (2007).

40. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 16, at 6. Indeed, shale and clay rock above the storage formation create an impermeable layer. *Id.* at 32. Other "capillary forces" tend to retain CO_2 in the formation's pore spaces. *Id.* Based upon past experiences with oil and gas and waste disposal, CCS operators look for whether the caprock provides an effective seal and whether other characteristics of the formation will compromise the effective storage. *Id.* at 33. Acknowledging that the success of CCS depends on selecting a geological formation with the capability to immobilize and store CO_2 in perpetuity, experts consider oil and gas fields, as well as saline aquifers, coal seams, and similar geological formations the best current options for underground injection. Klass, *supra* note 2, at 107.

41. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 16, at 12.

42. *See* 2 GRAD, *supra* note 4, § 3.05.

43. *See* MASSACHUSETTS INSTITUTE OF TECHNOLOGY, *supra* note 30, at 50.

44. ROCHON ET AL., *supra* note 1, at 7; MASSACHUSETTS INSTITUTE OF TECHNOLOGY, *supra* note 30, at 50.

45. ROCHON ET AL., *supra* note 1, at 7; INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 16, at 34; MASSACHUSETTS INSTITUTE OF TECHNOLOGY, *supra* note 30, at 50; Moore, *supra* note 33, at 455.

Given the reality of eventual harm, one can expect that those injured by CCS operations may seek judicial remedies, even when contamination occurs many years after the injection.[46] Because compensatory and punitive damages are generally not provided for in state and federal environmental statutes, property owners will continue to rely upon common law theories of recovery.[47] Some common law remedies will be preferable to others for addressing the complexity of CCS. This Note proposes that the policies behind strict liability make it a viable remedy, superior to statutory and many common law causes of action, for the potential and probable injuries that will inevitably flow from CCS operations.[48]

II. BACKGROUND

During the 1970s and 1980s, Congress adopted legislation designed to manage industrial, municipal, and agricultural waste. Even though the acts are comprehensive, common law survives to serve important purposes beyond the capabilities of statutory law. To understand strict liability's significance in CCS tort cases, one must recognize the inadequacies of statutory remedies that are relevant to CCS and understand the history and present-day framework of strict liability. Together, the statutory inadequacies and strict-liability framework will show why strict liability should be applicable to CCS operations.

A. Applying Federal Environmental Law to CCS

The Safe Drinking Water Act (SDWA)[49] established the Underground Injection Control (UIC) program, which provides protections for underground sources of drinking water.[50] Through cooperative federalism,[51] primary enforcement of the EPA's SDWA regulations remains a matter for the states after the EPA approves the state's program.[52] In the absence of state enforcement, the EPA assumes control of the UIC program.[53] The UIC program acknowledges the importance

46. *See* U.S. GOVERNMENT ACCOUNTABILITY OFFICE, GAO-08-1080, CLIMATE CHANGE: FEDERAL ACTIONS WILL GREATLY AFFECT THE VIABILITY OF CARBON CAPTURE AND STORAGE AS A KEY MITIGATION OPTION 62 (2008), *available at* http://www.gao.gov/new.items/d081080.pdf.

47. *See* JOHN S. LOWE ET AL., CASES AND MATERIALS ON OIL AND GAS LAW 326 (5th ed. 2008).

48. Because sudden releases of carbon dioxide from CCS operations are unlikely, the main focus of this Note pertains to the migratory leakage that causes environmental issues.

49. Safe Drinking Water Act, 42 U.S.C. §§ 300f to 300j-26 (2006).

50. *Id.* §§ 300h-1 to 300h-8.

51. In the context of environmental law, cooperative federalism is a system "in which the federal and state governments . . . work together to protect health, the environment, and natural resources . . . from the adverse effects of pollution-generating and developmental activities by both private and public entities." Robert L. Glicksman, *From Cooperative to Inoperative Federalism: The Perverse Mutation of Environmental Law and Policy*, 41 WAKE FOREST L. REV. 719, 719 (2006).

52. 42 U.S.C. § 300h-1(c).

53. *Id.*

of principal sources of drinking water. Accordingly, an area designated as a sole source aquifer receives special protection.[54] By virtue of the UIC program, projects with the potential to contaminate a sole source aquifer cannot receive federal financial assistance.[55] In reality, the EPA reviews the projects in areas designated as sole source aquifers but almost never denies funding.[56]

Furthermore, by limiting the application of primary drinking water regulations to public water systems, the SDWA fails to protect the groundwater of some rural areas.[57] The UIC program expressly limits its application to protecting groundwater only if the injection may contaminate a public water system.[58] Public water systems are only those water systems that serve more than fifteen service connections or more than twenty-five individuals.[59] The definition inevitably excludes many rural residents that rely on private well-water drinking sources.[60] As a result, underground injections that may threaten private wells will require other methods for redressing contamination.

Depending on the quality of the injected CO_2, the Resource Conservation and Recovery Act (RCRA)[61] may apply.[62] Broadly stated, RCRA covers the transport, storage, and disposal of hazardous and solid waste.[63] Pertinent to CCS, the act's definition of "disposal" encompasses underground injection of hazardous waste.[64] Whether the definition of "hazardous waste" includes CO_2, however, is largely dependent upon the presence of industrial by-products within the injected

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54. 42 U.S.C. § 300h-3(e) (A sole source aquifer is the sole drinking water source for an area.). *See generally id.* § 300h-3. "Under baseline conditions, owners/operators of G[eologic] S[equestration] wells need to demonstrate that an injection site is in an area with geologic formations that can receive the injected fluids, confine them (below the lowermost USDW), and provide storage with no leakage." EPA RISK AND OCCURRENCE DOCUMENT, *supra* note 14, at 12.

55. 42 U.S.C. § 300h-3(e).

56. U.S. Environmental Protection Agency, Effects of Sole Source Aquifer Designation, http://www.epa.gov/region6/water/swp/ssa/effects.htm (last visited Jan. 15, 2010).

57. 42 U.S.C. § 300f(1)(A) (2006). Primary drinking water regulations are critical to managing maximum contaminant levels and for specifying techniques leading to contaminant reduction. *Id.* § 300f(1)(C).

58. 42 U.S.C. § 300h(d)(2) (emphasis added).

59. 42 U.S.C. § 300f(4)(A).

60. 1 DONALD W. STEVER & ELIZA A. DOLIN, ENVIRONMENTAL LAW & PRACTICE § 3.12[5] (1997).

61. Resource Conservation and Recovery Act, 42 U.S.C. §§ 6901-6992k (2006).

62. *See* UIC Program for CO_2, *supra* note 11, at 43,503 (stating that the EPA will not make a categorical determination of whether CO_2 is a hazardous waste).

63. *See* 42 U.S.C. § 6903(5), (27) (defining hazardous waste, in part, as solid waste and solid waste as discarded material); 42 U.S.C. § 6925(a) (mandating a permit for the transportation, storage, and disposal of hazardous waste).

64. *See* 42 U.S.C. § 6903(3). The Resource Conservation and Recovery Act (RCRA) defines "disposal" as:

> the discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or on any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including ground waters.

Id.

CO_2 stream.[65] Consequently, the RCRA's regulations pertaining to transport, storage, and disposal of hazardous waste may not apply to CCS operations. Even if the definition of hazardous waste does not include CO_2, RCRA potentially remains a powerful tool because the "imminent hazard" provision allows a person to compel a polluting party to clean up almost any type of solid or liquid waste that poses an imminent hazard to human health or the environment.[66] Thus, if a potentially harmful situation arises from CCS, the imminent hazard provision may serve an important role in removing the contamination from groundwater.

Finally, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)[67] permits a private party or the government to clean up a contaminated site and seek reimbursement from the parties responsible for the contamination.[68] Though CERCLA generally avoids regulating activity prior to contamination, it may provide an important cleanup remedy for a landowner once contamination has occurred.[69] Whether a party harmed by CCS injection may rely upon CERCLA, however, depends upon whether the CERCLA's definition of hazardous waste encompasses CO_2.[70] Much like RCRA, the hazardous waste determination depends upon whether hazardous by-products are in the injected CO_2.[71]

Certainly, federal environmental acts play a crucial role in establishing the boundaries of acceptable activity and providing for recovery of harm that occurs due to CO_2 leakage. Nevertheless, full reliance upon the federal acts, for the purpose of remediating environmental pollution, is not feasible because of the previously-discussed shortcomings and the existence of general problems associated with statutory remedies discussed below.

The most significant problem with statutory remedies is their inability to provide adequate relief.[72] Acts allowing citizen suits seldom

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65. In deciding whether RCRA regulates a specific CO_2 injection, the EPA's proposed federal regulations, discussing CCS, opted for a case-by-case analysis of the overall quality of the injected CO_2. *See* UIC Program for CO_2, *supra* note 11, at 43,503. In effect, the EPA refrained from definitively classifying CO_2 as hazardous waste.

66. 42 U.S.C. § 6972(a)(1)(B).

67. Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. §§ 9601-9675 (2006).

68. 42 U.S.C. § 9607(a) (providing an enforcement mechanism for private citizens to seek reimbursement for voluntary cleanup activity).

69. Other environmental acts provide regulation of activity prior to contamination. *See, e.g.*, 42 U.S.C. § 6925(a) (explaining permit requirements for RCRA).

70. *See* 42 U.S.C. § 9601(29) (defining disposal by reference to 42 U.S.C. § 6903); 42 U.S.C. § 6903(3) (defining disposal as injection of solid or hazardous waste); 42 U.S.C § 6903(27) (defining solid waste as "gaseous material resulting from industrial, commercial, mining, and agricultural operations").

71. *See* UIC Program for CO_2, *supra* note 11, at 43,504 (stating that the EPA will analyze the injected CO_2 stream to determine whether it is a hazardous substance).

72. 6 DONALD W. STEVER & ELIZA A. DOLIN, ENVIRONMENTAL LAW & PRACTICE § 20.02 (1997).

provide full and comprehensive remedies.[73] Usually, the harmed party is limited to an injunction or, in the best case scenario, an order compelling cleanup.[74] Noticeably missing from the acts' remedies are the compensatory and punitive damages commonly available in environmental tort actions. As a result, the federal environmental acts fail to provide adequate damage awards to make a party whole and fail to implement monetary damage awards that deter the wrongdoer from engaging in the same conduct.

Another justification for reliance upon common law is the judicial receptiveness towards traditional common law claims.[75] As described by one author, the courts' opinions generally recognize an overall regulatory failure of the federal environmental acts.[76] Logically, it would be counterproductive to pursue a claim within a statutory framework discounted by the courts. Thus, harmed parties seek alternative methods, such as common law claims, to redress environmental contamination.[77]

Finally, a combination of underfunding by the federal government and the delegating of increased responsibility to the states does not bode well for a successful regulatory regime.[78] The EPA has acknowledged its limited budget to regulate the current UIC program for CO_2 injection.[79] If the industry makes injecting CO_2 a common practice, the EPA's budget constraints will inhibit oversight of the increased number of sites. As a result of the lack of funding, UIC regulation and allocation of primary enforcement of CCS to the states may fail to protect groundwater from contamination.[80] The combined result of all these problems is that statutory law alone cannot provide for full and comprehensive damages for environmental contamination.

B. The Historical Foundation of Strict Liability

Imposing common law liability for environmental contamination

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73. *Id.* As an example, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) only allows recovery of response costs and, therefore, a CERCLA plaintiff cannot recover damages typically available in a common law tort action. *See* 42 U.S.C. § 9607(a)(4); Alexandra B. Klass, *From Reservoirs to Remediation: The Impact of CERCLA on Common Law Strict Liability Environmental Claims*, 39 WAKE FOREST L. REV. 903, 905 (2004). Professor Klass states that:

> [o]nly common law claims, including those for strict liability, provide a vehicle to recover those damages necessary for complete relief. Thus, claims for common law strict liability remain a crucial element of a plaintiff's case, even if a statutory cause of action exists under state law, federal law, or both.

Klass, *supra*, at 905.

74. *See, e.g.*, 42 U.S.C. § 6972(a) (2006) (allowing suit to compel pollution cleanup); 42 U.S.C. § 9607 (creating a cause of action to recover costs for cleaning up a polluted site).

75. 6 STEVER & DOLIN, *supra* note 72, § 20.02.

76. *Id.*

77. 1 STEVER & DOLIN, *supra* note 60, § 3.12[3].

78. *Id.* § 3.12[5].

79. *See* U.S. GOVERNMENT ACCOUNTABILITY OFFICE, *supra* note 46, at 40.

80. *See id.*

requires choosing a system to allocate liability. In most situations, courts impose negligence liability on a party that fails to exercise due care or reasonable care.[81] Allocation of blame at common law, therefore, rests on a theory of fault—that is, one who does not exercise reasonable care shall bear the burden of loss.[82] A court should only detour from the basic premise of using fault to analyze a particular set of facts and circumstances when that system fails to properly allocate liability.[83]

The cardinal case for the strict liability detour is the English case of *Rylands v. Fletcher*.[84] In *Rylands*, the defendants, lessees and proprietors of a mill, constructed a reservoir.[85] The plaintiff's mining activity began under adjacent land but eventually intersected with abandoned mines under the reservoir.[86] Unaware of the plaintiff's mining activity, the defendants filled the reservoir, which caused one of the abandoned mines to collapse and flood the plaintiff's working mine.[87]

After losing on the issue of negligence in the lower court, the plaintiff sought review in the Court of Exchequer. The court began by noting the absence of negligence of the defendants.[88] Nevertheless, Justice Blackburn provided the groundwork for common law strict liability by stating that "the person who has brought on his land and kept there something dangerous, and fail[s] to keep it in, is responsible for all the natural consequences of its escape."[89] Lord Cains of the House of Lords affirmed the holding, except that he confined Justice Blackburn's dangerous substance analysis to "non-natural" uses of the land.[90]

Rylands eventually evolved into a rule of defendant liability for

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81. Alan O. Sykes, *Strict Liability Versus Negligence in* Indiana Harbor, 74 U. CHI. L. REV. 1911, 1918 (2007).

82. *In re* Tutu Wells Contamination Litig., 846 F. Supp. 1243, 1269 (D.V.I. 1993); Sykes, *supra* note 81, at 1918.

83. Ind. Harbor Belt R.R. v. Am. Cyanamid Co., 916 F.2d 1174, 1177 (7th Cir. 1990). For a comparison of strict liability and negligence, see *infra* Part C.

84. Fletcher v. Rylands (1866) 1 L.R. Exch. 265, *aff'd in part*, Rylands v. Fletcher (1868) 3 L.R. H.L. 330.

85. *Fletcher*, 1 LR. Exch. at 268-69.

86. *Id.* at 268.

87. *Id.*

88. *Id.* at 269.

89. *Id.* at 279. As stated by Judge Blackburn:

> [I]t seems but reasonable and just that the neighbour [sic], who has brought something on his own property which was not naturally there, harmless to others so long as it is confined to his own property, but which he knows to be mischievous if it gets on his neighbour's [sic], should be obligated to make good the damage which ensues if he does not succeed in confining it to his own property. But for his act in bringing it there no mischief could have accrued, and it seems but just that he should at his peril keep it there so that no mischief may accrue, or answer for the natural and anticipated consequences. And upon authority, this we think is established to be the law whether the thing so brought be beasts, or water, or filth, or stenches.

Id. at 280.

90. Rylands v. Fletcher (1868) 3 L.R. H.L. 330, 339. Decisions of the House of Lords are binding upon all courts within the United Kingdom. ALISDAIR GILLESPIE, THE ENGLISH LEGAL SYSTEM 191 (2d ed. 2009).

abnormally dangerous activities inappropriate to the surroundings.[91] Even today, British courts focus on the abnormality of the activity.[92] They generally examine two factors: (1) the character or activity at issue in comparison to other factual situations; and (2) the place and manner of the activity.[93] As a result, British courts only apply *Rylands* to activities that are abnormally dangerous and not natural to the chosen location.[94]

Initially, U.S. courts resisted the idea of liability without fault, as judges believed strict liability was poorly adapted to the expanding frontier.[95] Victims' claims seemed insignificant when compared to industrial development.[96] Eventually the frontier disappeared, and U.S. courts adopted strict-liability principles, especially in the context of environmental tort cases.[97]

Today, U.S. strict-liability jurisprudence consists of a hodgepodge of inconsistent decisions because courts have relied upon varying social and economic policies and uncertain methods of analysis and application.[98] Courts have used the common law and Restatements to determine the applicability of strict liability based upon the facts of each case.[99] Nonetheless, the courts' increased use of the doctrine in environmental tort cases sends a strong message to a party engaging in a dangerous activity. To appreciate the courts' message and why strict liability may change a defendant's behavior requires an understanding of the rationale behind strict liability.[100]

C. The Basic Rationale of Strict Liability in the United States

Understanding strict liability requires distinguishing it from negligence. In the U.S. tort system, fault is the dominant principle for making an activity tortious.[101] Negligence imposes liability for harms caused by a lack of reasonable care.[102] If a person can avoid hazards associated with an activity by being careful, negligence law generally provides an

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91. W. PAGE KEETON ET AL., PROSSER AND KEETON ON THE LAW OF TORTS 547-48 (5th ed. 1984).

92. 7 STUART M. SPEISER ET AL., THE AMERICAN LAW OF TORTS § 19:1 (1990 & Supp. 2010).

93. *Id.* § 19:1.

94. KEETON ET AL., *supra* note 91, at 554.

95. *Id.* at 549.

96. *Id.*

97. 5 SUSAN M. COOKE, THE LAW OF HAZARDOUS WASTE § 17.01[5][a] (2009).

98. *See* 2 JAMES T. O'REILLY, TOXIC TORTS PRACTICE GUIDE § 25:3 (2d ed. 2005) (noting the inconsistent application of strict liability); *see, e.g.*, Ind. Harbor Belt R.R. v. Am. Cyanamid Co., 916 F.2d 1174 (7th Cir. 1990) (providing an economic analysis of strict liability); Sykes, *supra* note 81, at 1911 (analyzing the *Indiana Harbor* decision).

99. *See* 3 MARGIE SEARCY-ALFORD, A GUIDE TO TOXIC TORTS § 27.06[2] (2006) (stating that strict liability is a fact-based inquiry).

100. *See* 5 COOKE, *supra* note 97, § 17.01[5][a].

101. *In re* Tutu Wells Contamination Litig., 846 F. Supp. 1243, 1269 (D.V.I. 1993).

102. Sykes, *supra* note 81, at 1918.

appropriate framework.[103] In fact, a negligence standard functions well when precautions eliminate the ordinary risk of harm.[104] Therefore, when assessing tort liability, analysis always begins with negligence.[105]

In some situations, however, the negligence framework fails to provide a method for analyzing the defendant's activity. In these situations, no matter the amount of reasonable care exercised by the defendant, the danger of the activity persists.[106] Simply put, the defendant's precautionary measures fail to eliminate the commensurate risk of the activity.[107] To supplement negligence in these situations, the common law developed strict liability to address liability for harm without fault.[108]

The theory of strict liability focuses on the abnormally dangerous nature of the defendant's actions.[109] As applied to environmental torts, liability may arise for allowing a harmful substance to escape onto the land of another.[110] A defendant must pay for the harm caused by allowing the substance to escape, even when society does not consider the defendant's activities blameworthy.[111] Strict liability thus creates a deterrent to certain activity by awarding damages to "compensat[e] for the plaintiff's personal injuries, property damages, or out-of-pocket costs for cleanup" that arise solely from engaging in the activity.[112] These features distinguish strict liability from nuisance and trespass, which focus on the plaintiff's invaded interest.[113]

Allocation of risk principles, focused on the idea of responsibility, supplies the other basic policy for applying strict liability.[114] Because the defendant is responsible for creating the abnormal risk, courts require the defendant to shoulder the cost of the activity.[115] The plaintiff may recover damages, without any negligence on the part of the defendant.[116] One article explained the concept by noting that "[i]f an enterprise can be charged for disposal of unwanted physical wastes, it is difficult to identify a moral principle that would preclude charging the enterprise for unwanted accidents for which it is responsible."[117] As a

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103. *Ind. Harbor Belt R.R.*, 916 F.2d at 1177.
104. William K. Jones, *Strict Liability for Hazardous Enterprise*, 92 COLUM. L. REV. 1705, 1714 (1992).
105. *Ind. Harbor Belt R.R.*, 916 F.2d at 1177.
106. Sykes, *supra* note 81, at 1918-19.
107. *See* Schwartzman, Inc. v. Atchison, Topeka & Santa Fe Ry., 842 F. Supp. 475, 478 (D.N.M. 1993); RESTATEMENT (SECOND) TORTS § 520 cmt. b (1977).
108. Sykes, *supra* note 81, at 1918-19.
109. 5 COOKE, *supra* note 97, § 17.01[5][a].
110. Berry v. Shell Petroleum Co., 33 P.2d 953, 957 (Kan. 1934); Fletcher v. Rylands (1866) 1 L.R. Exch. 265, 279. *See generally* RESTATEMENT (SECOND) TORTS § 520.
111. 7 SPEISER ET AL., *supra* note 92, § 19:3.
112. 5 COOKE, *supra* note 97, § 17.01[5][f].
113. *Id.* § 17.01[5][a].
114. 7 SPEISER ET AL., *supra* note 92, § 19:3.
115. *Id.*
116. Berry v. Shell Petroleum Co., 33 P.2d 953, 957 (Kan. 1934).
117. Jones, *supra* note 104, at 1775.

matter of fairness, an innocent landowner should not shoulder the costs created by the neighboring enterprise.[118]

The described allocation principles also attempt to allocate costs efficiently by shifting the burden to the responsible party that presumably understands the consequences of his or her activity.[119] In a perfect marketplace with perfect information, the choice between strict liability and negligence does not matter—the enterprise internalizes the cost of its actions by building the cost into its services so it can pay for its mistakes.[120] But in reality, nobody knows the actual cost of each action. To compensate for this shortcoming, strict liability allocates the cost to the risk-creating party.[121] The risk creator is in the best position to understand the potential risks and the exigencies associated with the selected course of action.[122] Therefore, the risk creator most efficiently bears the liability for harm created by the activity.[123]

D. Developments Within the Strict-Liability Framework

Following the English decision in *Rylands v. Fletcher,* U.S. jurisprudence developed two doctrines of strict liability for environmental torts: products liability and abnormally dangerous activity.[124] The former focuses on defective design, defective manufacture, and failure to warn, while the latter focuses on the dangerousness of the activity, the inability to abate the risk, and the prevalence of the activity.[125] Each doctrine serves a purpose separate and distinct from the other.[126]

Restatement (Second) of Torts section 402A sets forth the governing standard for products liability claims:

> One who sells any product in a defective condition unreasonably dangerous to the user or consumer or to his property is subject to liability for physical harm thereby caused to the ultimate user or consumer, or to his property, if (a) the seller is engaged in the business of selling such a product, and (b) it is expected to and does reach the user or consumer without substantial change in the condition in which it is sold.[127]

As applied, the standard makes the seller responsible even if the seller exercised all reasonable care in the manufacture and sale of the prod-

118. Cities Serv. Co. v. State, 312 So. 2d 799, 801 (Fla. Dist. Ct. App. 1975).

119. Sykes, *supra* note 81, at 1918.

120. *Id.* at 1930.

121. *Id.* at 1930-31.

122. 1 WILLIAM H. RODGERS, JR., ENVIRONMENTAL LAW: AIR & WATER 137 (1986 & Supp. 2009).

123. *Id.*

124. Abnormally dangerous activities are referred to as "abnormally dangerous," "ultrahazardous," or "non-natural" depending upon the source of law. *See* Rylands v. Fletcher (1868) 3 L.R. H.L. 330, 339; RESTATEMENT (SECOND) OF TORTS § 519 (1977); RESTATEMENT (FIRST) OF TORTS § 519 (1938). This Note uses the term "abnormally dangerous activity" as a general term.

125. 7 DONALD W. STEVER & ELIZA A. DOLIN, ENVIRONMENTAL LAW & PRACTICE § 24.02[2][b] (1997); Klass, *supra* note 73, at 914.

126. 2 JOHN D. HODSON, AMERICAN LAW OF PRODUCTS LIABILITY § 16:85 (3d ed. 2002).

127. RESTATEMENT (SECOND) OF TORTS § 402A(1) (1965).

uct.[128] Exploring the language used in this section, the drafters limited its application to "sellers of products."[129] Generally, disposable waste is not a sellable product and, therefore, the product and seller elements are not established in most waste generation and disposal cases.[130]

A common proposal for CCS is to analogize it to the ongoing products liability litigation involving the gasoline additive Methyl Tertiary Butyl Ether (MTBE); however, the similarity seems limited at best.[131] First, MTBE is a product added to gasoline, which means anyone who sold gasoline with MTBE was a seller of a product within the Restatement's definition.[132] Second, MTBE's chemical properties made it exceptionally dangerous to groundwater.[133] Accordingly, MTBE's dangerous attributes meet the defect component under factor (1) of the Restatement section 402A.

However, factual differences between MTBE and CCS mean that the framework does not apply as neatly to CCS. First, CO_2 is a by-product of the combustion process, rather than a product per se, and products liability applies only to "product[s] sold[.]"[134] For example, courts do not apply products liability to power lines because the utility company owns the power lines separate from the product (electricity) that reaches the consumer.[135] Likewise, CO_2 is not a product sold for purposes of the Restatement; consumers buy electricity, not CO_2. Industries and utilities are not "in the business of selling" by-product CO_2 for "use or consumption."[136] Rather, the end goal for these companies is disposal or storage. When viewed solely in the context of storage in

128. *Id.* § 402A(2).

129. *Id.* § 402A cmt. a.

130. 7 STEVER & DOLIN, *supra* note 125, § 24.02[2][b].

131. *See* Moore, *supra* note 33, at 482; AMERICAN PUBLIC POWER ASSOCIATION, CARBON CAPTURE AND STORAGE: ANALYSIS OF POTENTIAL LIABILITIES ASSOCIATED WITH GROUNDWATER CONTAMINATION DUE TO GEOLOGICAL SEQUESTRATION OPERATIONS 5 (2008), *available at* http://www.appanet.org/files/PDFs/APPA%20CCS%20white%20paper%20Waters%20of%20the%20US.pdf. Methyl Tertiary Butyl Ether (MTBE) increases gasoline-burning temperatures to reduce emissions of other harmful substances, and at one time, it was used in over nine-million gallons of gasoline. *In re* Methyl Tertiary Butyl Ether Prods. Liab. Litig. (*MTBE Litig.*), 175 F. Supp. 2d 593, 599 (S.D.N.Y. 2001); Wilkes University Center for Environmental Quality Environmental Engineering and Earth Sciences, MTBE Fact Sheet, http://www.water-research.net/mtbe.htm (last visited Jan. 15, 2010). As a product of large-scale use, MTBE escaped into the environment during transportation, storage, sale, and use of gasoline. *MTBE Litig.*, 175 F. Supp. 2d at 599. MTBE's qualities as a highly soluble chemical allow it to travel far and fast in water. *Id.* Significant quantities of groundwater were contaminated with high concentrations of MTBE. *Id.* This likely resulted from overfilling gas tanks and overfilling or leaking underground storage tanks. *Id.*; MTBE Fact Sheet, *supra*.

132. *See* RESTATEMENT (SECOND) OF TORTS § 402A; AMERICAN PUBLIC POWER ASSOCIATION, *supra* note 131, at 5-6.

133. *See MTBE Litig.*, 175 F. Supp. 2d at 599.

134. RESTATEMENT (SECOND) OF TORTS § 402A cmt. d; *see* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 16, at 5.

135. 2 HODSON, *supra* note 126, § 16:72.

136. RESTATEMENT (SECOND) OF TORTS § 402A cmt. f. As an exception, EOR operations use CO_2 well production because of its purity. *See* Sminchak et al. *supra* note 12, at 154. Nevertheless, the issue of whether to apply products liability to the business of buying and selling pure CO_2 for EOR operations clearly does not arise with the issue of applying products liability to CO_2 used in CCS operations.

perpetuity, the products liability framework excludes CO_2.

The abnormally dangerous activities aspect of strict liability provides a better framework for analyzing CCS operations. Though courts originally analyzed strict liability under the *Rylands* framework, the Second Restatement of Torts has become the preeminent force driving abnormally dangerous activity analysis.[137] The Second Restatement uses the term "abnormally dangerous activity," rather than the "non-natural" use language of *Rylands*, to define the constraints of strict liability.[138] The Restatement defines abnormally dangerous activities by way of a multi-factor test that examines the following:

> (a) existence of a high degree of risk of some harm to the person, land or chattels of others;
>
> (b) likelihood that the harm that results from it will be great;
>
> (c) inability to eliminate the risk by the exercise of reasonable care;
>
> (d) extent to which the activity is not a matter of common usage;
>
> (e) inappropriateness of the activity to the place where it is carried on; and
>
> (f) extent to which its value to the community is outweighed by its dangerous attributes.[139]

The drafters recognized the importance of *Rylands* because the Second Restatement incorporates the principles of *Rylands* in factors (d) and (e).[140] In jurisdictions that employ the *Rylands* framework, the non-natural use principles evolved to mean an unordinary use of the land, which is unnatural in relation to its common usage among the participants in a certain industry.[141] For the most part, the Restatement factors (d) and (e) and *Rylands* share a common analysis. Because of this overlap, courts have failed to distinguish applications of the *Rylands* non-natural use test from the Restatement factors and often apply the two tests concurrently.[142]

In any event, *Rylands*'s significance diminishes because the Restatement requires each of the six factors to share equal importance.[143] All things considered:

> the overall inquiry under [the Restatement] is whether the nature of the activity and the potential dangers associated with it, given the particular location, are so great that despite the usefulness it may have for the com-

137. Klass, *supra* note 73, at 912.

138. RESTATEMENT (SECOND) OF TORTS § 519(1) (1977); Rylands v. Fletcher (1868) 3 L.R. H.L. 330, 339.

139. RESTATEMENT (SECOND) OF TORTS § 520 (1977).

140. 3 SEARCY-ALFORD, *supra* note 99, § 27.06[2].

141. Peter B. Kutner, *The End of* Rylands v. Fletcher*?* Cambridge Water Co. v. Eastern Counties Leather PLC., 31 TORT & INS. L.J. 73, 87 (1995).

142. 7 SPEISER ET AL., *supra* note 92, § 19:2. In most cases, the court begins by going through the history of *Rylands* and then discussing the Restatement's application. *See, e.g*, Williams v. Amoco Prod. Co., 734 P.2d 1113, 1121-23 (Kan. 1987).

143. RESTATEMENT (SECOND) OF TORTS § 520 cmt. f.

> munity, it should be required as a matter of law to pay for any harm it causes without the need of a finding of negligence.[144]

Courts generally have refused to follow the Restatement's suggestion to utilize all six factors.[145] For instance, one scholar has argued that factor (c), the inability to eliminate the risk, is "outcome-determinative" because strict liability only applies when negligence cannot operate.[146] Considering that the first three factors involve a balancing of risk, harm, and reasonable care—the definition of negligence—the argument appears logical.[147] Consequently, courts tend to use the first three factors as a means to separate negligence from strict liability.[148]

The final three factors provide marginal substance to the balancing scheme by providing a means for courts to incorporate social policy concerns.[149] Factor (d), the common usage of the activity, presumes that universal participation in an activity denotes well-developed technology with reciprocal risk exchange between participants and bystanders.[150] Pursuant to the Restatement's logic, an activity uncommon in its frequency must entail significant risk, unmanageable by reasonable care.[151] Of course, not every uncommon activity creates a significant risk of harm. For instance, an innovative practice utilized by a small part of an industry is not a matter of common usage at the time of the technology's development. Yet, the innovative practice may mitigate some of the risk associated with the current industry standard. Therefore, subjecting the innovative practice to strict liability creates a disincentive to implement progressive technology.

Factor (e), the location-appropriateness of the activity, is more logically sound than factor (d) and often carries significant weight in court decisions.[152] The factor requires the court to determine whether a better location could have decreased the risk. This determination makes the location analysis similar to a negligence inquiry, which evaluates the reasonableness of carrying on the activity in respect to the selected location.[153] Courts must be cautious in using factor (e) because too much emphasis on this factor converts the strict-liability analysis into a negligence analysis focused on location.

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144. 3 SEARCY-ALFORD, *supra* note 99, § 27.06[2] (quotations omitted).

145. *See* RESTATEMENT (SECOND) OF TORTS § 520 cmt. l (instructing the courts to examine all six factors).

146. Gerald W. Boston, *Strict Liability for Abnormally Dangerous Activity: The Negligence Barrier*, 36 SAN DIEGO L. REV. 597, 635 (1999).

147. *See* Sykes, *supra* note 81, at 1918 (defining negligence).

148. Klass, *supra* note 73, at 916.

149. *See* Boston, *supra* note 146, at 629.

150. 1 RODGERS, *supra* note 122, at 137.

151. Sykes, *supra* note 81, at 1926.

152. *See In re* Tutu Wells Contamination Litig., 846 F. Supp. 1243, 1269 (D.V.I. 1993); Branch v. W. Petroleum, Inc., 657 P.2d 267, 274 (Utah 1982); KEETON ET AL., *supra* note 91, at 551.

153. *See* Ind. Harbor Belt R.R. v. Am. Cyanamid Co., 916 F.2d 1174, 1177 (7th Cir. 1990) (stating that "[e]xplosives are dangerous even when handled carefully, and we therefore want blasters to choose the location of the activity with care").

The last factor requires the court to undertake a cost-benefit analysis of the activity's value to the community and its dangerous attributes.[154] Activities to which strict liability applies must provide some utility to the community; otherwise, merely conducting the activity amounts to negligence.[155] Scholars disregard factor (f)'s utility because almost any activity has some value for the community.[156] In sum, of the last three factors, only factor (e)'s location-appropriateness analysis merits any substantial discussion for determining the applicability of strict liability to CCS.[157]

Thus, the Restatement's strict-liability analysis for abnormally dangerous activities amounts to a two-part inquiry. A court begins by examining the first three factors to determine whether reasonable care eliminates the risk attendant to the activity in question. Notably, the first step is a threshold to the second step. Only after making the determination that reasonable care cannot eliminate the risk of the activity should the court proceed to the second step. Next, a court makes a value judgment about whether the final three factors merit the application of strict liability to the activity. If the court decides that reasonable care fails to eliminate the risk of harm, the final three factors of the Restatement provide the court with a significant amount of discretion

154. Sykes, *supra* note 81, at 1928.

155. Schwartzman, Inc. v. Atchison, Topeka & Santa Fe Ry., 842 F. Supp. 475, 478 (D.N.M. 1993); *see* RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW 178 (6th ed. 2003); RESTATEMENT (SECOND) OF TORTS § 520 cmt. f (1977).

156. *See* Sykes, *supra* note 81, at 1928. The reviser of *Prosser and Keeton on Torts* noted that Restatement factor (f) is an unsuitable factor for strict liability analysis. *See* KEETON ET AL., *supra* note 91, at 555; RESTATEMENT (THIRD) OF TORTS § 20 cmt. k (Reporters' Note) (Tentative Draft No. 1, 2001) (criticizing factor (f)).

157. Due to the uncertainty of analyzing facts within the bounds of the six factor analysis, the Second Restatement receives constant scrutiny from scholars and case law. The most profound criticism recognizes the inconsistent results from applying the Restatement factors. 2 O'REILLY , *supra* note 98, § 25:3. As an example, courts have been inconsistent in deciding the issue of whether to apply strict liability to underground storage tanks. *Compare In re* Tutu Wells, 846 F. Supp. 1243 (assessing strict liability for improper placement of underground storage tanks), *with* Arlington Forest Assocs. v. Exxon Corp., 774 F. Supp. 387 (E.D. Va. 1991) (opting for a negligence standard under similar circumstances).

Another criticism points out that the Second Restatement blurs the line between negligence and strict liability. *See* KEETON ET AL., *supra* note 91, at 555. The same factors determine whether an activity crosses the negligence barrier into strict liability. *See* Boston, *supra* note 146, at 630 (indicating that the plaintiff must prove the inapplicability of negligence to apply strict liability analysis). In fact, if reasonable care would eliminate the risk of harm (factor (c)), then the court could seemingly apply negligence principles.

The Third Restatement responds to this criticism by abandoning the six factor analysis. Under the Third Restatement of Torts:

> (a) A defendant who carries on an abnormally dangerous activity is subject to strict liability for physical harm resulting from the activity.
> (b) An activity is abnormally dangerous if:
> (1) the activity creates a foreseeable and highly significant risk of physical harm even when reasonable care is exercised by all actors; and
> (2) the activity is not a matter of common usage.

RESTATEMENT (THIRD) OF TORTS § 20. The Third Restatement provides a definition much like the First Restatement, which adopted *Rylands* with few modifications. Klass, *supra* note 73, at 913, 918. Consequently, *Rylands* may again play a significant role in the strict-liability analysis if, and when, the Third Restatement becomes a tool of the courts.

based upon the facts relevant to the activity.

III. ANALYSIS

Utilizing the two-part inquiry above, this section begins by discussing the threshold inquiry of whether reasonable care eliminates the risk associated with CCS operations. Ultimately, the author determines that reasonable care does not eliminate the risk, and, therefore, the remainder of this section proposes economic, policy, and case law considerations for deciding whether the courts should apply strict liability to CCS.

A. Restatement Factors (a), (b), and (c): The Strict-Liability Threshold

A prerequisite to applying strict liability to an activity is ruling out the application of negligence. When a lack of reasonable care establishes causation of the alleged injury, strict liability ceases to be an available remedy.[158] Conversely, when the hazards persist after exercising reasonable care, the court must analyze other Restatement factors to determine whether the qualities of the activity in question merit strict-liability application.[159] Therefore, the inquiry to rule out negligence application requires a thorough evaluation of the Second Restatement's first three factors.

1. The Negligible Risk Standard

Analyzing the first three Restatement factors imitates the *Carroll Towing*[160] test, which balances the burden (B) on the risk-taking party to exercise reasonable care against the probability and degree of harm (PL) associated with the activity, or whether $B<PL$.[161] Assigning the first three Restatement factors to each respective part of the *Carroll Towing* test weighs whether reasonable care eliminates the risk of harm (variable B) against whether the activity carries a high likelihood of harm (variable P) and a high gravity of harm (variable L). Strict liability applies when variables P and L create an excessively high probability and gravity of harm to the point that the burden of reasonable care required to eliminate the risk of harm is unachievable even with the highest standard of care and precaution.[162]

The point at which activities diverge from negligence liability into strict liability is not entirely clear. Unfortunately, courts have made the problem worse by deciding not to look at whether reasonable care

158. Boston, *supra* note 146, at 636.
159. *Id.* at 635; *see* RESTATEMENT (SECOND) OF TORTS § 520(c) (1977).
160. United States v. Carroll Towing Co., 159 F.2d 169 (2d Cir. 1947).
161. Boston, *supra* note 146, at 629.
162. *Id.*

would "eliminate" the risk of harm as proposed by Restatement factor (c) and, instead, analyzing whether a "negligible" amount of inherent risk remains even with the exercise of reasonable care.[163] The chosen standard evaluates whether reasonable care could diminish the risk to a negligible level, at which point the court should not impose strict liability. Thus, the question posed is what level of risk is negligible.

The drafters of the Restatement Comments offer a solution that courts should impose strict liability only when residual risk, beyond the inherent risk associated with the activity, remains after the exercise of due care.[164] The Restatement suggests considering whether the high risk associated with any abnormally dangerous activity ceases when reasonable care is exercised.[165] Impliedly, if due care manages residual risk, then strict liability should not attach.[166] For CCS application, the court must decide whether good site selection and other industry practices effectively eliminate the extra or abnormal risk.[167] Examining the application of the residual-risk standard to similar industries provides a baseline for evaluating CCS operations.

2. Case Analysis of the Negligible Risk Standard

Natural gas transportation receives uniform treatment as an activity that is not abnormally dangerous.[168] Courts note that the high standard of care applied to natural gas transportation, significant regulation of the industry, and the industry's precautionary measures make it unnecessary to apply strict liability.[169] Though occasional natural gas leaks happen, the court does not consider the risk of a potential explosion as a "high degree of risk."[170] Given similar levels of risk and regulation, courts also do not subject transmitting electricity to a strict-liability standard.[171] Still, these activities require high standards of care under the negligence standard in order to minimize the risk of harm.[172]

The Restatement provides a feasible explanation for excluding these activities from strict liability. It states that the two bases for establishing when the degree of harm is more than negligible are an unusually high likelihood of harm and an unusually high severity of harm.[173] For

163. *See* Ind. Harbor Belt R.R. v. Am. Cyanamid Co., 916 F.2d 1174, 1179 (7th Cir. 1990); RESTATEMENT (SECOND) OF TORTS § 520 cmt. h.

164. RESTATEMENT (SECOND) OF TORTS § 520 cmt. h.

165. *Id.*

166. Boston, *supra* note 146, at 639.

167. *See id.*; INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 16, at 33.

168. *See, e.g.*, New Meadows Holding Co. v. Wash. Water Power Co., 687 P.2d 212, 216 (Wash. 1984) (en banc); Foster v. Keyser, 501 S.E.2d 165, 175 (W. Va. 1997).

169. *Foster*, 501 S.E.2d at 176.

170. *New Meadows Holding Co.*, 687 P.2d at 216.

171. Estate of Thompson v. Jump River Elec. Coop., 593 N.W.2d 901, 905 (Wis. Ct. App. 1999).

172. *Foster*, 501 S.E.2d at 175.

173. RESTATEMENT (SECOND) OF TORTS § 520 cmt. g (1977).

instance, a court has described the very low probability of a gas leak or stray electrical current when the utility providing the service exercised reasonable care.[174] Consequently, the first basis of showing a more-than-negligible risk of harm does not render the activity abnormally dangerous. The second basis requires looking at the gravity of harm. Though an electrocution or explosion may involve devastating injuries, the magnitude of the injuries does not overcome the low probability of occurrence. Instead, if the probability of injury is extremely low, then the Restatement envisions a situation involving an exceptionally high degree of harm to overcome the low probability of injury.[175]

Analysis of other examples will help clarify the line courts must draw. One of the principal cases in establishing the strict-liability framework, *Indiana Harbor Belt Railroad Co. v. American Cyanamid Co.*,[176] involved the transportation of hazardous chemicals by rail.[177] A tank car transporting acrylonitrile leaked a significant amount of the fluid out of the bottom outlet.[178] In its analysis of the cause of the leak, the court determined the substance lacked corrosive qualities, so it was unlikely that the substance damaged or weakened the tank car valves.[179] By negative implication, the court concluded that the leak resulted from failure to maintain the tank car.[180] Recognizing that acrylonitrile was noncorrosive and that taking reasonable precautions minimized the risk of a leak, the court held that rail transportation of acrylonitrile involved a negligible risk of harm.[181] As a result, the court declined to impose strict liability.[182]

The facts of *Indiana Harbor* can be compared to a CCS operation as a means to determine whether courts should apply strict liability to CCS. The potential corrosive and migratory qualities of injected CO_2, as compared to the non-corrosive qualities of acrylonitrile, must result in a different conclusion about the application of strict liability.[183] CO_2 used in CCS can generate its own leakage through carbonic-acid formation, whereas acrylonitrile will not create leakage on its own.[184] This fact alone demonstrates a point of demarcation. Furthermore, the defendant in *Indiana Harbor* clearly demonstrated a lack of reasonable

174. *See New Meadows Holding Co.*, 687 P.2d at 216; *Estate of Thompson*, 593 N.W.2d at 905.
175. RESTATEMENT (SECOND) OF TORTS § 520 cmt. g (referring to a nuclear explosion).
176. 916 F.2d 1174 (7th Cir. 1990).
177. *Id.* at 1175.
178. *Id.* Acrylonitrile is an industrial chemical used in fibers, plastics, and adhesives. DEP'T OF HEALTH & HUMAN SERVICES, AGENCY FOR TOXIC SUBSTANCES & DISEASE REGISTRY, ACRYLONITRILE 2 (2007), *available at* http://www.atsdr.cdc.gov/MHMI/mmg125.pdf.
179. *Ind. Harbor Belt R.R.*, 916 F.2d at 1179.
180. *Id.*
181. *Id.*
182. *Id.*
183. *See* MASSACHUSETTS INSTITUTE OF TECHNOLOGY, *supra* note 30, at 50.
184. *Ind. Harbor Belt R.R.*, 916 F.2d at 1179; *see* MASSACHUSETTS INSTITUTE OF TECHNOLOGY, *supra* note 30, at 50.

care; therefore, the negligence standard made sense because more precaution would have avoided the risk.

Another angle for evaluating whether an activity involves more than a negligible-risk level is to look at situations in which a change in technology diminishes the risk of a dangerous activity to a negligible magnitude. Two cases from Arkansas analyzed strict liability in relation to the technological evolution of aerial pesticide spraying. *Chapman Chemical Co. v. Taylor*[185] originally recognized that the aerial application of herbicide amounted to an abnormally dangerous activity because of the inability to manage spray drift.[186] In 2004, the same court revisited the issue in *Mangrum v. Pique*[187] and departed from the strict-liability framework for the aerial application of Roundup.[188] In its decision, the court recognized the ability of present-day technologies to control spray drift when considered with other environmental factors.[189] While some spray unavoidably drifts, technology and reasonable care on behalf of the applicator minimizes the drift to a negligible magnitude.[190]

Examining CCS in light of the above-discussed cases demonstrates that CCS entails risk beyond that which is negligible. CCS involves a degree of uncertainty because, unlike the acrylonitrile in *Indiana Harbor*, CO_2's chemical properties make it unmanageable and unpredictable even with the utmost care.[191] Unlike electricity and gas transportation, the risk of CCS leakage and contamination of groundwater, though possibly not high in *quantity*, exemplifies the *quality* of doing significant environmental damage beyond a negligible magnitude even when the operator carefully selects a CCS site and monitors the project after injection. Though preventative measures and careful planning alleviate some abnormal risk, enough unmanageable abnormal risk persists from CCS operations to weigh in favor of applying strict liability under the first three Restatement factors.

Like aerial-spray application, CCS technology may evolve to the point of making the risk negligible. At this point, however, the risks—though acknowledged in qualitative terms by the scientific community—remain quantitatively uncertain.[192] Even without a concrete statistic, the

185. 222 S.W.2d 820 (Ark. 1949).

186. *Id.* at 827 (citing the abnormally dangerous qualities of aerial spraying to hold the manufacturer liable).

187. 198 S.W.3d 496 (Ark. 2004).

188. *Id.* at 500 (citing *Chapman*, 222 S.W.2d 820, for support). "Roundup Ultra is a chemical that is commonly used in the farming community and is available for sale to the general public." *Id.*

189. *Id.* (noting the ability to control overspray with reasonable care); U.S. Environmental Protection Agency, Proposal—Pesticide Spray Drift-Reduction Technologies: Verification and Incentives for Use, http://www.epa.gov/etop/etc_at_proppsdt.html (last visited Jan. 15, 2010).

190. *See* Proposal—Pesticide Spray Drift-Reduction Technologies, *supra* note 189. The Washington Supreme Court did not agree when analyzing aerial spray application. *See* Langlan v. Valicopters, Inc., 567 P.2d 218, 223 (Wash. 1977) (en banc).

191. ROCHON ET AL., *supra* note 1, at 26.

192. *Id.* at 7; MASSACHUSETTS INSTITUTE OF TECHNOLOGY, *supra* note 30, at 50.

scientific community believes that leakage is inevitable.[193] Until technology advances, CCS should not receive the present-day treatment of aerial-spray application in *Mangrum*; instead, the technology's current unpredictable and uncontrollable features merit an approach like the original decision in *Chapman Chemical Co*.[194]

B. Restatement Factor (e): Analysis of the Location and Scale

Practically speaking, some activities will lead to unavoidable consequences. Even so, Judge Richard Posner observed that, in some cases, an accident "can be avoided, or its consequences minimized, by shifting the activity in which the accident occurs to another locale . . . or by reducing the scale of the activity[.]"[195] This quote corresponds with the original goal of *Rylands* and Restatement factor (e), which put a significant emphasis on the relationship of the activity to its surrounding.[196] A remote location or reduction in the level of activity, or both, may render an activity no longer abnormally dangerous and, thus, no longer subject to strict liability.[197]

1. Selecting a Location

Location appropriateness, as enumerated in Restatement factor (e), varies the level of the risk of harm.[198] A demolition in the middle of a city carries more risk of harm than a demolition in the middle of the Arctic, which poses no risk to anyone except those participating in the activity.[199] The scientific community investigating the feasibility of CCS projects excludes these extreme scenarios as a matter of practicality. Rather, the scientific community envisions avoiding imprudent sites, sensitive drinking water sources, and significant human populations.[200]

Evaluating whether a party selected a proper site may involve a reasonable care analysis.[201] When operators select obviously inappropriate sites, courts possess the requisite knowledge to compare potential CCS sites and assign negligence liability without resorting to strict liabil-

193. *See* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 16, at 34; Moore, *supra* note 33, at 455.

194. *See* Chapman Chem. Co. v. Taylor, 222 S.W.2d 820, 827 (Ark. 1949); *Langlan*, 567 P.2d at 223.

195. Ind. Harbor Belt R.R. v. Am. Cyanamid Co., 916 F.2d 1174, 1177 (7th Cir. 1990).

196. KEETON ET AL., *supra* note 91, at 551.

197. *See* 3 GRAD, *supra* note 27, § 4A.03[3][a] (noting an obscure location may make an activity no longer abnormally dangerous).

198. *See* RESTATEMENT (SECOND) OF TORTS § 520 cmt. g (1977) (subsuming location under the magnitude of risk inquiry). *Indiana Harbor* described a similar example with explosives, noting that "we therefore want blasters to choose the location of the activity with care." 916 F.2d at 1177.

199. RESTATEMENT (SECOND) OF TORTS § 520 cmt. h.

200. *See* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 16, at 6 (describing the need to choose sites with suitable formation qualities).

201. *See* Sprankle v. Bower Ammonia & Chem. Co., 824 F.2d 409, 416 (5th Cir. 1987) (moving one's self away from an anhydrous ammonia storage tank was a matter of reasonable care).

ity.[202] Outside of these straightforward cases, however, courts are often ill-equipped to make such determinations based upon the presentation of circumstantial evidence regarding more suitable locations.[203] In a hypothetical CCS liability case, a plaintiff would present nothing more than a scenario describing the geological qualities that could prevent any sort of harm at a potential location as compared to the selected location. Other than in cases with obvious poor site-selection, judicial guesswork would have to determine whether a potential location provides better qualities than a chosen site—a matter clearly outside the expertise of a judge or jury and barely encompassed by the capabilities of the experts.[204]

The better view acknowledges that those who engage in abnormally dangerous activities hold superior knowledge in site-selection and have the incentive (for example, liability avoidance) to choose optimal injury-avoiding locations.[205] Strict liability proceeds on this assumption and only requires the plaintiff to show that the defendant engaged in an abnormally dangerous activity that caused injury to the plaintiff's person or property.[206] Through the process of analyzing the ability to eliminate the risk of harm (factor (c)) as a threshold issue, the court unavoidably incorporates the location-based concerns of factor (e). The court focuses on the risk posed by the particular location instead of the above-described perils of factor (e) that involve determining negligence liability based upon hypothetical locales. The court then evaluates the selected site by determining whether the location creates a risk exceeding a negligible quantity and quality without comparison to other sites. By only looking at the chosen location in isolation, location choice still plays an important role in the strict liability inquiry but without the need to resort to circumstantial evidence of hypothetical locations.

2. Choosing an Activity Level

In addition to considering location appropriateness, altering the activity level may play an important role in determining whether strict li-

202. Mark Geistfeld, *Should Enterprise Liability Replace The Rule of Strict Liability for Abnormally Dangerous Activities?*, 35 U.C.L.A. L. REV. 611, 655 (1997).

203. *See id.* at 655-56. For an example of the U.S. Supreme Court's recognition of its inability to make science-based determinations, examine the *Chevron* deference standard applied by courts to administrative interpretations. *See generally* Chevron U.S.A., Inc. v. Natural Res. Def. Council, 467 U.S. 837 (1984). Congress codified the same deferential principles in the Administrative Procedure Act standards of review of administrative decisions. Administrative Procedure Act, 5 U.S.C. § 706 (2006).

204. Geistfeld, *supra* note 202, at 655. Experts recognize the difficulty in "predicting the effects of natural geologic heterogeneity, well cements, and the perforation job on the injection performance." Sminchak et al., *supra* note 12, at 156. To decrease the margin of error, experts review geological reservoirs on a site-specific basis. *Id.* at 161.

205. Boston, *supra* note 146, at 632.

206. RESTATEMENT (SECOND) OF TORTS § 519(1) (1977).

ability applies.[207] Judge Posner believes that the inability to calculate optimal activity levels in most cases amounts to a significant shortcoming of negligence theory.[208] Only in the simplest case, in which common sense dictates that the best activity level would be none at all, do courts adequately analyze the activity level.

The following example, comparing two substitute enhanced-oil recovery (EOR) methods, demonstrates the difficulty of activity-level analysis.[209] Assume that EOR method (a), when conducted with all due care, causes more accidents than EOR method (b). The costs of the environmental pollution, if placed upon a user of EOR method (a), would result in a higher operating cost than using EOR method (b). The user of EOR method (a) exercises reasonable care, however, and the costs are not assessed against the user under negligence liability. Because the operator is not forced to bear the cost of accidents, the operator continues to use EOR method (a) instead of EOR method (b) even though EOR method (a) causes more environmental pollution.

By contrast, strict liability changes the above outcome by forcing operators to pay for any harm resulting from their activity. If the operators want to counteract the potential cost burden, strict liability encourages them to either reduce the magnitude of the activity to a level in which the cost associated with the potential harm is less than the revenue generated from engaging in the activity or not participate in the activity at all.[210] Forcing operators to alter their activity level is not an unfair result. In fact, operators that participate in activities subject to strict liability should understand the potential costs of engaging in an abnormally dangerous activity and incorporate the costs into their operations.[211]

In the example above, the possibility of reducing the activity level of EOR method (a) or switching to EOR method (b) would be understood by the EOR operator but would be outside a court's negligence analysis.[212] Courts cannot properly analyze substituting EOR methods as a matter of reasonable care.[213] Likewise, in CCS, the possibility of altering injection rates or selecting alternative methods of mitigating risk may escape the court's evaluation in assessing negligence liability.[214]

207. *See* Ind. Harbor Belt R.R. v. Am. Cyanamid Co., 916 F.2d 1174, 1177 (7th Cir 1990).
208. POSNER, *supra note* 155, at 178.
209. *See id.* (utilizing a similar example with trains and canals).
210. Geistfeld, *supra* note 202, at 653.
211. *See id.*
212. *See* POSNER, *supra* note 155, at 178 (discussing a similar example).
213. *Cf. id.* at 180.
214. *See* U.S. ENVIRONMENTAL PROTECTION AGENCY, EPA430-R-08-009, VULNERABILITY EVALUATION FRAMEWORK FOR GEOLOGIC SEQUESTRATION OF CARBON DIOXIDE 8 (2008), *available at* http://www.epa.gov/climatechange/emissions/downloads/VEF-Technical_Document_072408.pdf. Experts investigate potential injection rates, storage capacity, and reservoir response when selecting a CCS location. *See* Sminchak et al., *supra* note 12, at 155-56.

Unless strict liability was applied in the factual scenario, CCS emitters could evade liability altogether, except in the most egregious cases.

Just as important, the above example demonstrates a court's inability to assess the reasonableness of switching between available practices for mitigating the risk of an abnormally dangerous activity.[215] Especially in the context of new activities like CCS, strict liability encourages industries to analyze substitutes, as well as activity magnitude and scale, and to engage in careful planning while the scientific community continues to evaluate the activity.[216] In the case of CCS, application of strict liability might force entities to consider innovative practices like photosynthesizing cyanobacteria, which could mitigate CO_2 emission and render CCS unnecessary.[217] Moreover, some environmentalists believe that using CCS as a substitute for emitting CO_2 into the atmosphere may be even worse for the environment.[218] These and other alternatives escape the courts' analysis in negligence liability because courts only see narrower pictures in determining negligence liability: The CCS activity that caused damage compared to the reasonable care applied in the other CCS activity.[219]

On the other hand, strict liability incentivizes CCS operators and CO_2 emitters to consider substitutes that may provide greater emission reductions at a lower cost and with a lesser degree of environmental risk. When given the opportunity, people and businesses respond to costs, benefits, and incentives.[220] Considering the novelty of the problem that CO_2 emission reduction poses, any policy or jurisprudence that encourages a one-track approach (for example, CCS) to decrease CO_2 in the atmosphere contravenes the best interests of society.

C. The Role of Victim Behavior

In activities subject to negligence analysis, courts expect victims to exercise reasonable care; otherwise, failure to do so amounts to comparative negligence. The situation sometimes arises, however, when in-

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215. *See* POSNER, *supra* note 155, at 180. Substitute goods are defined as different goods that satisfy the same needs of the consumers and, therefore, can be used to replace one another. Economics A-Z, THE ECONOMIST, http://www.economist.com/research/economics/alphabetic.cfm?letter=s#substitutegoods (last visited Feb. 3, 2010).

216. *See* POSNER, *supra* note 155, at 180.

217. *See* Patrick DiJusto, *Blue-Green Acres Fighting Factory CO_2 Emissions with Cyanobacteria*, SCIENTIFIC AMERICAN, Aug. 29, 2005, http://www.scientificamerican.com/article.cfm?id=blue-green-acres.

218. *See* Matthew L. Wald, *Refitted to Bury Emissions, Plant Draws Attention*, N.Y. TIMES, Sept. 21, 2009, at A17 (describing the belief held by some environmentalists that CCS "trade[s] one problem, global warming, for another one, the pollution of water supplies"), *available at* http://www.nytimes.com/2009/09/22/science/earth/22coal.html. *See generally* ROCHON ET AL., *supra* note 1.

219. *See* POSNER, *supra* note 155, at 178.

220. For example, people consumed less gasoline due to high prices in 2008. Associated Press, *Recession Blessing: CO_2 Emissions Fell in '08*, http://www.msnbc.msn.com/id/30853232 (last visited Jan. 15, 2010).

jured parties cannot change their behavior because of the set of circumstances created by the party carrying on the activity. Accordingly, negligence loses viability as an appealing method of liability allocation when one party lacks any opportunity to avert the harm associated with the activity.[221]

One of the underlying rationales for imposing strict liability recognizes the helpless nature of victims.[222] The Restatement establishes and scholars agree that the presence of a passive victim creates a strong inference that negligence liability fails to provide an adequate remedy for the situation.[223] As a result, a situation involving a passive victim often merits strict-liability application.

Determining whether the victim is passive becomes a matter of determining whether any victim's behavior may reduce the potential risks associated with the activity. In the CCS context, short of moving to a different location, victims are helpless.[224] Furthermore, requiring victims to make risk-mitigating decisions seems especially unfair when experts cannot quantify the risk.[225] Based on these facts, contributory negligence fails to allocate accurately liability for CCS activity.

As support, the Third Restatement acknowledges that when a victim can make reasonable decisions to alleviate the activity's risk, courts should generally use negligence analysis instead of strict-liability analysis to assess liability.[226] Such a conclusion makes sense considering the rule that negligence is the baseline for liability and that courts should only apply other methods of assessing liability when negligence proves unworkable.[227] Similarly, the Third Restatement's rationale clarifies the reasoning behind the Second Restatement's incorporation of negligence factors to determine whether to apply strict liability. That is, the reason "for [applying] strict liability proceeds from the premise that a negligence inquiry cannot always adequately evaluate every factor relevant to deterrence."[228] Because the CCS victim cannot alter his or her behavior to avoid the harm from a nearby CCS site, the deterrence rationale of negligence is unworkable as an analytical framework. These factors provide the policy groundwork for imposing strict liability on CCS activity.

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221. Jones, *supra* note 104, at 1751.
222. *See* Sykes, *supra* note 81, at 1924.
223. *See* Geistfeld, *supra* note 202, at 657.
224. The argument that the victim lacks the ability to mitigate the risk of CCS proceeds on the assumption that requesting the victim to move is not a viable or reasonable method to abate the risk associated with CCS.
225. *See* ROCHON, ET AL., *supra* note 1, at 7; MASSACHUSETTS INSTITUTE OF TECHNOLOGY, *supra* note 30, at 50.
226. RESTATEMENT (THIRD) OF TORTS § 20 cmt. h (Tentative Draft No. 1, 2001).
227. Ind. Harbor Belt R.R. v. Am. Cyanamid Co., 916 F.2d 1174, 1177 (7th Cir. 1990).
228. Geistfeld, *supra* note 202, at 657.

D. Case Analysis

Case analysis helps clarify the above policy rationales for imposing strict liability on CCS. Proceeding on the assumption of treating CCS risk similarly to that of natural gas storage, underground storage, and disposal of other substances, the following section evaluates courts' interpretation of activities that share traits common to CCS.[229]

1. Activities Associated with Oil and Gas Operations

Courts agree that, absent bad location choices, drilling and operating oil or gas wells are not activities subject to strict liability.[230] Similarly, utilization of the extracted resources for energy production usually evades strict-liability analysis.[231] Some practices associated with extraction of natural resources, however, receive a somewhat mixed treatment of strict-liability application. Identifying the facts and courts' analyses of these practices demonstrates trends in the application of strict liability.

A Kansas case, *Williams v. Amoco Production Co.*,[232] provides a textbook example of the factors a court considers when deciding to impose strict liability. In this case, natural gas leaked from the defendant's production wells into the plaintiff's irrigation well, which reduced the flow and amount of water for the plaintiff's crop irrigation.[233] In reaching the conclusion not to impose strict liability for natural gas leakage, the court considered the analysis of a prior Kansas case, *Berry v. Shell Petroleum Co.*,[234] which applied strict liability to surface water contamination from brines brought to the surface with oil well operations.[235] The court recognized that natural gas does not "damage the fertility of the soil or growing crops; nor does it injure livestock or affect the qual-

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229. *See* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 16, at 12.

230. *See, e.g.*, Williams v. Amoco Prod. Co., 734 P.2d 1113, 1123 (Kan. 1987); 1 J.D. LEE & BARRY A. LINDAHL, MODERN TORT LAW, LIABILITY AND LITIGATION § 3:27 (2d ed. 2009) (describing the courts' trend of not applying strict liability to oil and gas operations); 7 SPEISER ET AL., *supra* note 92, § 19:13 (same). Courts frequently impose strict liability for poor location choice. For an example, see *Sterling v. Veliscol Chemical Corp.*, 647 F. Supp. 303 (W.D. Tenn. 1986), stating:

> The farm [where chemical dumping took place] is an area that was and is well known for its abundance of water aquifers (supplies) and sandy soils. In fact, one commonly known and unique feature in West Tennessee is the excellent groundwater aquifers which serve the area. With one exception, every water supply originates from the various sands located below West Tennessee. The water in these aquifers is of a very high quality. In West Tennessee, most of the water tables or aquifers are near the surface almost anywhere.

Id. at 353-54 (internal citations and quotations omitted); *accord In re* Tutu Wells Contamination Litig., 846 F. Supp. 1243, 1269 (D.V.I. 1993) (holding it is improper to place a storage tank over an aquifer); Yommer v. McKenzie, 257 A.2d 138, 140 (Md. 1969) (holding it is improper to place a storage tank in close proximity to a residence).

231. *See, e.g.*, New Meadows Holding Co. v. Wash. Water Power Co., 687 P.2d 212, 216 (Wash. 1984) (en banc); Foster v. Keyser, 501 S.E.2d 165, 175 (W. Va. 1997).

232. 734 P.2d 1113.

233. *Id.* at 1123.

234. 33 P.2d 953 (Kan. 1934).

235. *See Williams*, 734 P.2d at 1123.

ity of water."[236] Even when mixed with water, natural gas reaches the surface and dissipates.[237] Accordingly, the *Williams* court distinguished natural gas from the native brines in *Berry*, which "ruin[ed] drinking water [and] destroy[ed] vegetation" once raised to the surface.[238]

As a threshold issue, these two cases demonstrate that strict liability requires a harmful substance.[239] If the plaintiff can show a harmful substance is the cause of groundwater contamination, Kansas courts tend to impose strict liability due to the importance of protecting scarce water sources.[240]

Other jurisdictions have followed suit. An often-cited Utah case, *Branch v. Western Petroleum, Inc.*,[241] imposed strict liability for bringing native brines to the surface as a product of oil production. In the case, the operator stored brines in a pond adjacent to water wells.[242] The brines, which contained various chemical contaminants, percolated into the subsurface water system that fed the plaintiff's water wells.[243] Citing location placement as a primary concern, the court held that holding brines in a pond adjacent to water wells creates an abnormally dangerous activity.[244] Like the Kansas cases that placed a premium on drinking water, the court noted that "Utah is one of the most arid states in the union[;] the protection of the purity of the water is of critical importance[.]"[245] Regions in the United States with limited water supplies will liberally apply strict liability to activities that threaten contamination.[246]

Courts are also willing to apply strict liability to EOR activity that

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236. *Id.* *But see* Jad Mouawad & Clifford Krauss, *Dark Side of a Natural Gas Boom*, N.Y. TIMES, Dec. 7, 2009, *available at* http://www.nytimes.com/2009/12/08/business/energy-environment/08fracking.html?_r=1&adxnnl=1&pagewanted=all&adxnnlx=1261508509-lCwrpvSYizBxIsWBIkJVGQ (discussing cases of groundwater contamination from natural gas extraction).

237. *Williams*, 734 P.2d at 1123.

238. *Id.*

239. *Compare Berry*, 33 P.2d at 957 (applying strict liability for contamination of a water supply by native brines), *with Williams*, 734 P.2d at 1123 (Kan. 1987) (declining to apply strict liability to natural gas production).

240. *Berry*, 33 P.2d at 958 ("We consider that the water supply of the people is of greater importance than the operation of a business at a reduced cost."); *see also* Koger v. Ferrin, 926 P.2d 680, 686 (Kan. Ct. App. 1996). In *Koger*, the court stated that:

> While salt water, sewage drain-off from cattle pens, or inadequately treated waste from a creamery may be dangerous or a nuisance under a given set of factual circumstances, such do not meet the definition of inherently dangerous instrumentalities. However, our Supreme Court has exempted such by-products from the traditional strict liability analysis, presumably because of the importance of clean, safe water.

926 P.2d at 686. The quote reveals that while an activity may not meet the traditional aspects of an abnormally dangerous activity, Kansas courts lower the standard of strict liability when the activity harms drinking water. *See id.*; *Berry*, 33 P.2d at 958.

241. 657 P.2d 267 (Utah 1982).

242. *Id.* at 274.

243. *Id.* at 270.

244. *Id.* at 274.

245. *See id.* at 273 (describing Utah's scarce water resources).

246. *See id.*; Berry v. Shell Petroleum Co., 33 P.2d 953, 958 (Kan. 1934) (discussing the importance of protecting groundwater in Kansas).

threatens groundwater. In *Mowrer v. Ashland Oil & Refining Co.*,[247] a defendant-lessee injected salt water at high pressure into the oil strata to enhance oil production from the defendant's wells.[248] As an unexpected result, oil seeped to the surface of the plaintiff-neighbor's property and contaminated the plaintiff's drinking water well.[249] Even though the court assessed nuisance liability, it also concluded that strict liability could apply to EOR operations.[250] The court pointed out that the defendant's EOR practice "introduced a risk of serious harm to the land of others *which could not be eliminated by the exercise of care* and was not a matter of common usage."[251] Though dicta, the court's analysis provides significant guidance as it shows that EOR operations present uncontrollable risks, even with the exercise of the utmost reasonable care.[252]

The importance of the *Mowrer* decision can further be seen in the way authors and experts often compare EOR operations with CCS to describe the oil and gas industry's breadth of experience for undertaking CCS projects.[253] Still, the goals and realities of EOR and CCS are distinguishable. EOR injections encourage fluid migration within a reservoir and seek enhanced oil flow by using highly pressurized injections.[254] CCS seeks permanent immobilization of CO_2 deep within the Earth's surface.[255] To encourage fluid movement within the formation, EOR requires high-pressure injections, whereas CCS injection seeks optimum pressures to prevent disturbing subsurface structures. Though EOR and CCS are factually distinguishable, the current policy concerns for the imposition of liability on EOR operations are equally applicable to CCS operations.

The industry-wide desire to temper common law liability for EOR

247. 518 F.2d 659 (7th Cir. 1975).

248. *Id.* at 660.

249. *Id.* at 661.

250. *Id.* at 662; *see* Gulf Oil Corp. v. A. L. Hughes, 371 P.2d 81, 83-84 (Okla. 1962) (imposing liability without fault for EOR activities).

251. *Mowrer*, 518 F.2d at 662 (emphasis added).

252. *See id.* Though a slight detour, hydraulic fracturing exemplifies many of the uncontrollable risks associated with EOR activities. "Fracing," as it is known in the industry, involves a multi-step process started by injecting fluid into a well at high pressure. Coastal Oil & Gas v. Garza Energy Trust, 268 S.W.3d 1, 6 (Tex. 2008). The pressurized fluid migrates throughout the formation creating cracks along natural fault lines in the formation. *Id.* The operator then injects proppant to prevent these cracks from closing. *Id.* Fracing is necessary but imprecise. *Id.* at 32. The operator lacks control over the length and direction of the cracks created by the injected fluids. *See id.* Thus, the fluid may migrate across subsurface property lines and potentially come into contact with groundwater, creating an issue of liability for contamination. *See generally id.* (discussing trespass liability for fracing). *See also* Donald v. Amoco Prod. Co., 735 So. 2d 161, 172 (Miss. 1999) (holding that whether labeled strict liability or trespass, Mississippi allows recovery for physical invasions of land due to the improper disposal of oil field waste, even in the absence of negligence).

253. *See, e.g.*, UIC Program for CO_2, *supra* note 11, at 43,498; Attansio, *supra* note 9, at 10,378.

254. *See* Schlumberger, Oilfield Glossary: Term "enhanced oil recovery" http://www.glossary.oilfield.slb.com/Display.cfm?Term=enhanced%20oil%20recovery (last visited Jan. 15, 2010).

255. ROCHON ET AL., *supra* note 1, at 24.

operations receives positive treatment by courts in oil-rich states.[256] Given the need for increased oil production, the courts respond to the industry demand by limiting liability for subsurface trespass from EOR activity.[257] Notably, a trespass claim and a strict-liability claim share the common feature of imposing liability without regard to any fault or negligence of the tortfeasor.[258] Due to the similarity between a trespass claim and a strict-liability claim, and the similarity of EOR and CCS, the potential policy carryover for limiting tort liability to CCS merits discussion.

EOR trespass cases hold that the greater public good created by the production of oil and gas outweighs an individual's right to a trespass tort claim.[259] From these cases, a balancing test has emerged: If society's interests, founded upon a substantial justification, outweigh the individual's right to a tort claim, the court should refrain from awarding damages to the individual.[260] As stated by a Kansas attorney, "it would appear unwise to maintain a legal environment in which honest mistakes, oversights, and even neglect could expose an operator to punitive sanctions."[261]

On one side of the balancing test, courts must alter tort liability for important technologies in a way that benefits the public.[262] Thus, a technology that provides significant environmental benefit generates a strong public policy argument that the courts "must permit commonsense accommodations for technological breakthroughs that benefit society."[263] Utilizing this policy would temper potential liability for CCS because of its importance in reducing CO_2 emissions into the atmosphere. Any merit given to this societal-benefit argument must be counterbalanced against: (1) the weight of authority represented by the *Mowrer* decision for imposing strict liability; (2) the fact that the courts still recognize a trespass cause of action for actual and substantial dam-

256. *See, e.g.*, Cities Serv. Oil Co. v. State Corp. Comm'n, 472 P.2d 257, 263 (Kan. 1970); *Coastal Oil & Gas*, 268 S.W.3d at 17; R.R. Comm'n v. Manziel, 361 S.W.2d 560, 568 (Tex. 1962); Broomes, *supra* note 39, at 20-8.

257. *Manziel*, 361 S.W.2d at 568-69.

258. *See* Donald v. Amoco Prod. Co., 735 So. 2d 161, 172 (Miss. 1999) (recognizing that strict liability and trespass share such similar attributes that distinguishing one from another is unnecessary); *Manziel*, 361 S.W.2d at 567 (defining trespass); KEETON ET AL., *supra* note 91, at 68. Prosser and Keeton cite examples of activity on one's property that may constitute a trespass of a neighbor's property. *See id.* (describing damming a stream, cutting down a tree, and other scenarios as examples of trespass without fault or negligence).

259. *See* Baumgartner v. Gulf Oil Corp., 168 N.W.2d 510, 516 (Neb. 1969) (holding that operators are not liable to non-consenting parties within the reservoir for willful trespass when an EOR project has been authorized by the state commission); *Coastal Oil & Gas*, 268 S.W.3d at 17; *Manziel*, 361 S.W.2d at 568; *Cities Serv. Oil Co.*, 472 P.2d at 263 (stating that the state should encourage practices which increase oil and gas production).

260. *Manziel*, 361 S.W.2d at 568.

261. Broomes, *supra* note 39, at 20-25.

262. *See Coastal Oil & Gas*, 268 S.W.3d at 34 (Willett, J., concurring) (stating that "[t]he interplay of common-law trespass and oil and gas law must be shaped by concern for the public good").

263. *Id.* at 36.

ages; and (3) the fact that the concept of tempering liability for CCS may not receive widespread acceptance due to the important application of EOR to the natural resource industry.[264]

Although the concept of limiting potential liability for engaging in an important activity is presently only available for EOR operations, the similarity in practice between EOR and CCS, and the similarity of the tort liability claims of strict liability and trespass, make limiting liability an appealing argument. At the same time, it is unlikely that courts will limit liability for CCS because courts have confined the above policy's application to the oil and gas industry.[265]

2. Storage and Disposal of Hazardous Waste

Though the oil and gas industry evades strict liability for most activities, other industrial waste generation does not.[266] Probably the most common form of strict-liability application to environmental tort law involves the storage and disposal of hazardous substances.[267] Today, courts recognize hazardous waste disposal as an abnormally dangerous activity because of the unmanageable risk of harm to the environment.[268] Despite the community value associated with waste disposal, the trend of allocating responsibility away from the community and towards the polluter continues.[269]

Comparing the hazardous waste disposal cases with the previously-discussed resource development waste cases reveals similar aspects of environmental degradation but uneven strict-liability application.[270] Both involve generating a seemingly "non-natural" substance that, even if properly managed, may migrate in some form and cause environmental problems. One treatise notes the differences between hazardous waste and resource development waste as a means to contrast the various applications of strict liability.[271] Because of the uneven application of strict liability to the different wastes, it is worth analyzing the trea-

264. *See* Chance v. BP Chem., Inc., 670 N.E.2d 985, 991 (Ohio 1996); *Manziel*, 361 S.W.2d at 568-69 (recognizing that "the *technical* rules of trespass have no place in the consideration" of the court's evaluation of the Commission) (emphasis added).

265. *See Chance*, 670 N.E.2d at 991 (refusing to apply the principles of *Manziel* to a deep well chemical disposal operation).

266. *See* 1 PATRICK H. MARTIN & BRUCE M. KRAMER, WILLIAMS & MEYERS: OIL AND GAS LAW § 217 (2009) (discussing liability for oil and gas operations).

267. *See* SEARCY-ALFORD, *supra* note 99, § 3.07[1][b].

268. *See, e.g.*, Dep't of Envtl. Prot. v. Ventron Corp., 468 A.2d 150,160 (N.J. 1983); 1 STEVER & DOLIN, *supra* note 60, § 3.12[3].

269. *See, e.g.*, Bunyak v. Clyde J. Yancey & Sons Dairy, Inc., 438 So. 2d 891, 894 (Fla. Dist. Ct. App. 1983); Cities Serv. Co. v. State, 312 So. 2d 799, 804 (Fla. Dist. Ct. App. 1975); *Ventron Corp.*, 468 A.2d at 160 (recognizing that disposal of toxic waste may have some use to society); 1 MICHAEL DORE, LAW OF TOXIC TORTS § 4:10 (2009).

270. *See supra* Part III.D.1.

271. 7 SPEISER ET AL., *supra* note 92, § 19:13. Situations arise in which resource waste and hazardous waste share indistinguishable features. *See, e.g.*, Donald v. Amoco Prod. Co., 735 So. 2d 161, 166-77 (Miss. 1999) (discussing liability for oil field waste disposal).

tise's factors with regard to CCS.

First, "resources must be exploited from wherever nature has placed them, so the [natural resource] developer has less control over placement of the activity than does the owner of an industrial plant."[272] CCS site selection involves evaluating a specific site's geological capability to store CO_2 in perpetuity.[273] Not every site provides the features necessary to prevent leakage. Yet, the IPCC's report on CCS indicates that many significant sources of CO_2 are within 300 kilometers of areas with potential formations for geological storage.[274] Experts consider the proximity between emission sources and storage sites significant because it diminishes the most cost-prohibitive aspects of transporting CO_2 and demonstrates that industrial plants control, at least to some degree, where to implement CCS projects.[275]

Second, "resource development is usually conducted in rural areas, so the likelihood of great harm is less and the possibility that the risk can be eliminated by the use of care is increased."[276] By contrast, large CO_2 emitters "are concentrated in proximity to major industrial and urban areas."[277] Even with the potential to move CO_2 great distances through pipelines to storage sites away from urban areas, the entity may be confronted with cost-prohibitive long-distance transportation. Nevertheless, previously-exploited areas of resource development in rural areas provide potential sites for CCS.[278] This connection to rural areas minimizes a portion of the large-scale risk associated with CCS.

Third, "a resource such as an oil deposit may be depleted rapidly, thereby presenting only a short-term risk of harm as opposed to an industrial plant that may stay intact for an extremely long time."[279] CCS requires storage in perpetuity.[280] Most of the probable environmental harm will result from slow and diffuse leaking over significant periods of time.[281] The potential for harm presents a long-term risk much like the risk that hazardous waste presents.

Analyzed under these three factors, CCS projects resemble hazardous waste storage more than disposal of resource development

272. 7 SPEISER ET AL., *supra* note 92, § 19:13.
273. *See* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 16, at 33.
274. *Id.* at 8.
275. Existing infrastructure plays a critical role in the economic viability of a selected injection site. *See* Sminchak et al., *supra* note 12, at 161. One reason is that pipeline transportation adds significant costs to the operation. It is expected that costs range from one to eight dollars per ton of carbon dioxide transported 250 kilometers. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 16, at 30. Considering that present emissions of carbon dioxide as a product of coal energy exceed 2.5 gigatons per year, the transportation cost creates a significant barrier to widespread use of CCS. *See* Moore, *supra* note 33, at 450.
276. 7 SPEISER ET AL., *supra* note 92, § 19:13.
277. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 16, at 8.
278. *See* Klass, *supra* note 2, at 107.
279. 7 SPEISER ET AL., *supra* note 92, §19:13.
280. ROCHON ET AL., *supra* note 1, at 24.
281. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 16, at 34.

waste. To some degree, the developer can choose sites up to the point at which costs become prohibitive because of the distance. As for the second factor, site selection must encompass urban areas, or areas within close proximity to urban areas, because of the location of industrial polluters. Last, and most similar to hazardous waste storage, the storage of CO_2 runs in perpetuity.

It is apparent, however, that CCS does not align perfectly with either natural resource production or hazardous waste disposal. To reconcile the different applications of strict liability to natural resource production and hazardous waste disposal, the next section discusses the social policies behind imposing strict liability on industries that utilize underground storage tanks near groundwater resources.

3. Underground Storage Tanks

Several cases address the application of strict liability for damages associated with underground storage tanks (UST).[282] More often than not, strict liability does not apply because courts consider gas stations, which are the primary sites of UST, a matter of common usage to the community with manageable risk.[283] As stated in one case, "[s]ound tanks, timely replacement of impaired tanks, modern corrosion control techniques, and adequate testing for leakage can eliminate all but a tolerably small amount [of] risk."[284] Cases holding otherwise tend to cite the inappropriateness of the location factor in the Restatement.[285] Analyzing the cases in which courts have decided to apply strict liability gives a good indication of the reasons why other courts have reached the opposite conclusion.

The court in *In re Tutu Wells Contamination Litigation*[286] cited the above quote and disagreed.[287] The storage tank in question risked seepage and contamination into an area's limited water supply because of its location above an aquifer.[288] The court acknowledged that reasonable care eliminated a great portion of risk but refuted the proposition by noting that the risk persisted even with due care.[289] Because of the inappropriate storage location near the surrounding water supply, the gravity of potential harm to the local water supply magnified the low

282. *See* RESTATEMENT (THIRD) OF TORTS § 20 cmt. j (Reporters' Note) (Tenative Draft No. 1, 2001) (providing a multitude of cases that discuss strict liability for underground storage tanks).

283. *See, e.g.*, Arlington Forest Assocs. v. Exxon Corp., 774 F. Supp. 387, 391 (E.D. Va. 1991).

284. *Id.* at 390.

285. *See, e.g.*, *In re* Tutu Wells Contamination Litig., 846 F. Supp. 1243, 1270 (D.V.I. 1993); Yommer v. McKenzie, 257 A.2d 138, 140 (Md. 1969); SEARCY-ALFORD, *supra* note 99, § 27.06(2).

286. 846 F. Supp. 1243.

287. *Id.* at 1269.

288. *Id.*

289. *Id.* at 1270.

risk of seepage.[290]

UST case analysis presents a compelling analogy to CCS site selection. In either situation, a bad site yields a magnitude of risk that society should not bear. Supporting this proposition, the *Tutu Wells* court noted the changing policy towards protecting the environment: "[T]he protection of rapidly diminishing and irreplaceable natural resources (the environment), as opposed to protection of developing industry and embryonic businesses, is of current public concern, not the 'individualism of the age.'"[291] This observation illustrates the present reality of condensed populations in which one person's actions have a greater potential to harm one's neighbor.[292]

Combine this policy, which favors protecting natural resources, with the policy that "poisoning of well water is a wrong [that is] immediate and unforgiveable," and it becomes clear that risks that are potentially massive in magnitude, like CCS, merit the application of strict liability.[293] Even so, any reliance on the policy in favor of protecting precious resources over industry must be offset against the accommodations that courts should make for "technological breakthroughs that benefit society."[294] Nevertheless, the need to protect our precious drinking water resources provides a compelling policy initiative for applying strict liability to CCS.

IV. CONCLUSION

In the context of environmental contamination activities, some risk always persists despite the exercise of reasonable care. The issue of whether to apply strict liability to CCS is really a question of the quantity and quality of contamination risk after the exercise of reasonable care. Based upon the technology that decreases the risks of CCS, the threshold question to applying strict liability is truly a one-part inquiry: Is the risk of harm negligible when considering the location with respect to nearby water sources? Because storage will often occur near a valuable water resource, the risk likely exceeds a negligible quantity and quality.

Factor (e) of the Second Restatement presents an admitted diffi-

290. *See id.* at 1269 (stating that "[s]ociety's problem with the disposal and storage of toxic substances is well documented, and this court is aware of no 'fail safe' solution"); *accord Yommer*, 257 A.2d at 140.

291. *In re Tutu Wells*, 846 F. Supp. at 1269.

292. *See* Cities Serv. Co. v. State, 312 So. 2d 799, 801 (Fla. Dist. Ct. App. 1975). The revisers of *Prosser and Keeton on Torts* recognize that "[t]here is 'a strong and growing tendency, where there is blame on neither side, to ask, in view of the exigencies of social justice, who can best bear the loss and hence to shift the loss by creating liability where there has been no fault.'" KEETON ET AL., *supra* note 91, at 536.

293. 2 RODGERS, *supra* note 122, at 96.

294. Coastal Oil & Gas v. Garza Energy Trust, 268 S.W.3d 1, 36 (Tex. 2008) (Willett, J., concurring).

culty to a strict-liability analysis because it requires the court to determine the inappropriateness of an activity and to undertake a negligence-type analysis. Courts, however, lack the tools necessary to validate the reasonableness of site selection. Strict liability supplements a court's shortcomings by confining liability to those cases especially likely to serve the function of encouraging safety in both the choice of activity and location.

"In the end, the recognition of the need to take environmental contamination seriously and address it with as many tools as possible appears to be taking precedent over the courts' focus on [Restatement] section 520(c) relating to the exercise of reasonable care or any other specific Restatement factor."[295] The cases evaluating the significance of water sources generally follow this rationale. Even so, case analysis supports applying strict liability to CCS operations unless the location selected is so desolate and removed from society and water resources that the associated risks are diminished to a negligible quantity and quality.

This is not to say that the result may change with the advent of new technology. As the industry develops, so should the law. When the industry reaches the point of technological development and prevalence (like the oil and gas industry), in which the benefit to the public clearly exceeds the risk associated with CCS, the justification for imposing strict liability diminishes as well.

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295. Klass, *supra* note 73, at 962.