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Despite the emergence of climate change as an environmental issue, there are significant obstacles to tort claims related to global warming, say attorneys James G. Derouin, Fredric D. Bellamy, and Mark E. Freeze. In this article, however, they predict that we are likely to see other environmental claims based on the effects of climate change, as well as litigation stemming from state and federal attempts to address climate change.

Climate Change Changes Everything: The Coming Waves of Environmental (Not Personal Injury) Litigation Relating to Global Warming

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In our last paper, *Global Warming Litigation: The Phantom Menace*, the authors concluded that significant legal obstacles existed that would dissuade plaintiffs from bringing toxic tort claims for personal injury or property damage alleged to be caused by climate change.[1] The recent Supreme Court decision in *United States v. Massachusetts*[2] may have eased the standing obstacle a bit, at least for state plaintiffs. However, enough of the other legal obstacles enumerated in that article remain that plaintiffs' enthusiasm for bringing such claims may be dampened.[3]

Nevertheless, as the debate over the impacts of global warming continues, there is, in the authors' opinion, a significant risk that a substantial amount of other

[1] 21 Toxics Law Reporter 39 (BNA), October 5, 2006.

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[2] 127 S. Ct. 1438 (2007).

[3] Indeed, on August 30, 2007, a federal district judge dismissed the complaint in *Comer v. Murphy Oil USA Inc.* for lack of standing. In that lawsuit, the plaintiffs sought to link the greenhouse gas emissions from coal and other energy companies to the extensive damages to residential and business property wrought by Hurricane Katrina.

In addition, on September 17, 2007, the United States District Court for the Northern District of California dismissed the complaint in People of the State of California v. General Motors Corporation et. al on the grounds that the complaint raised political questions more appropriately resolved by other branches of government. In that case, California asserted claims for public nuisance against various automakers for damages allegedly caused by climate change.

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types of environmental litigation will ensue as a result of both a political/societal focus on climate change as an issue and the efforts to address the issue. This paper will examine examples of environmental litigation that are likely to develop in each of the two categories.

Scientists have reported that the likely effects of climate change include: (1) increased risk of species extinction; (2) increased ground level ozone pollution; and (3) increased drought in certain areas. Each of these effects of climate change is likely to cause a significant amount of environmental litigation.

In addition, to the extent that toxic tort litigation proceeds, there will likely be environmental litigation concerning coverage for such claims under defendants' Comprehensive General Liability Policies. Further, in the near future, significant steps are likely to be taken to address climate change.

These steps will likely include: (1) the adoption of legal limits on the emission of greenhouse gases; (2) the adoption of programs regulating greenhouse gases by multiple states and regions of the country; and (3) the use of carbon capture and storage technology. Each of these efforts to address climate change is also likely to stimulate environmental litigation.

I. Environmental Litigation Resulting From the Effects of Climate Change.

Predictions of future climate change rely on the use of complex computer models that take into account the full range of the interactions that affect climate change.[4] One example of such an interaction involves the natural carbon cycle.[5] Pursuant to the natural carbon cycle, the land and ocean currently take up about half of the anthropogenic emissions of carbon dioxide, suppressing carbon dioxide emissions.[6]

However, this natural carbon cycle is impacted by increased temperatures that decrease the ability of the land and ocean to absorb anthropogenic carbon emissions.[7] As study continues, scientists are becoming increasingly aware of other climate change interactions.[8]

The use of computer models has improved understanding of how the world's ''climate'' is impacted by various forces, although significant uncertainties still remain.[9] Using computer models, scientists have identified numerous potential impacts of climate change, with varying degrees of confidence.

Among the potential impacts that have been identified, and are being observed, are increased temperatures, glacier reduction, sea level increases flooding, drought, forest fires, species extinction, increased range of disease vectors, ocean acidification and increased ozone pollution.

This paper will examine the likely increase in environmental litigation arising from such occurrences based on claims that they are the result of anthropogenic activities. The object of the authors is not to pick sides in the debate or to predict future climatic conditions. Our objective is to project stresses on, and trends in, the legal system generated by the debate itself and changes in the environment, short term or long term that tend to support the conclusion that anthropogenically influenced climate change is occurring.

A. Environmental Litigation Resulting From The Increased Risk of Species Extinction.

On April 6, 2007, the Working Group II Intergovernmental Panel on Climate Change (IPCC) issued its Fourth Assessment Report on Climate Change Impacts, Adaptation and Vulnerability.[10] The IPCC was established by the World Meteorological Association and the United Nations Environment Programme to evaluate the risk of climate change.[11]

The Working Group II Fourth Assessment Report concluded that during the course of this century, the resilience of many ecosystems is likely to be exceeded by changes in climate and associated disturbances such as flooding, drought, wildfire, insects and ocean acidification.[12]

The report estimates that between 20 and 30 percent of plant and animal species are likely to be at an increasingly high risk of extinction as global mean temperatures exceed a warming above pre-industrial levels of 2 to 3 degrees Celsius.[13]

Similarly, a report issued by the Pew Center on Global Climate Change concludes that climate change and associated impacts ''is expected to exacerbate the loss of biodiversity already resulting from development in the United States.''[14]

As specific endangered species are identified, environmental groups and government agencies will likely move to protect these species and their critical habitats. These efforts will likely directly conflict with commercial and industrial projects, such as home building in rural areas, and will likely lead to increased environmental litigation.

The vehicle for this litigation is the federal Endangered Species Act, passed by Congress in 1973.[15] In fact, environmental litigation under the Endangered Species Act concerning the impacts of climate change has already started. On January 9, 2007, after settling a lawsuit brought by the Center for Biological Diversity, the United States Fish and Wildlife Service (USFWS) proposed listing the polar bear as an endangered species.[16]

A consideration of the major provisions of the Endangered Species Act reveals several areas for potential environmental litigation. The Act has four major components: (1) Listing; (2) Consultation; (3) Prohibitions on Takings; and (4) Incidental Takings Permits. Environmental litigation can involve any of these four components.

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[4] V. Pope, *et al.*, *The Met Office Hadley Center Climate Modeling Capability: the Competing Requirements for Improved Resolution, Complexity and Dealing With Uncertainty*, Philosophical Transactions of the Royal Society, July 30, 2007, p. 1.

[5] *Id.,* pp. 9-10.

[6] *Id.*

[7] *Id.*

[8] *Id.,* p. 9.

[9] *Id.,* p. 15.

[10] Intergovernmental Panel on Climate Change, *Climate Change 2007: Impacts Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report* (2007) (''*Working Group II Fourth Assessment Report*'').

[11] *Id.*

[12] *Id.,* p. 213.

[13] *Id.*

[14] Pew Center on Global Climate Change, *A Synthesis of Potential Climate Change Impacts on the U.S.* (2004) (Pew Center Report), p. 14.

[15] 16 U.S.C. § 1531 *et. seq.*

[16] 72 Fed. Reg. 1064 (January 9, 2007).

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With regard to Listing, Section 4 of the Act requires the USFWS to determine whether any species is an endangered or threatened species.[17] The USFWS may list a species as threatened or endangered if the continued existence of the species is jeopardized by, among other things, the present or threatened destruction, modification or curtailment of the species' habitat or range.[18]

Once listed, the USFWS is also required to designate any habitat of the species that is deemed to be critical.[19] The listing process is initiated by filing a petition.[20] Within 90 days of receipt of the petition, the USFWS must make a finding as to whether there is ''substantial information'' that the listing may be warranted.[21]

If such a finding is made, then a status review is conducted.[22] Within one year of receipt of the petition, the USFWS must make a further finding as to whether the listing is warranted.[23] If there is a finding that a listing is warranted, then the USFWS issues a proposed rule listing the species.[24]

After a 60-day comment period, the USFWS may issue a final rule, withdraw the proposed rule, or extend the proposal for an additional six months.[25] The USFWS decision regarding the listing of a species or designation of a critical habitat is subject to judicial review,[26] and is often the focus of environmental litigation.[27]

As for Consultation, Section 7 of the Act provides that every federal agency, in consultation with the USFWS, must insure that any agency action is not likely to jeopardize the continued existence of a threatened or endangered species.[28]

This provision covers a broad spectrum of activities, including projects requiring federal permits, such as dredge and fill permits under Section 404 of the Clean Water Act. After the consultation, if the USFWS concludes that there is no likelihood of jeopardy, then the USFWS will provide a written opinion to that effect (a ''non-jeopardy opinion'').[29]

If the USFWS opinion does identify a likelihood of jeopardy, and if reasonable and prudent alternatives could be taken to eliminate that likelihood, then the USFWS will specify those measures in a jeopardy opinion.[30] On the other hand, if there are no such alternatives, then the federal agency may not proceed with the project unless it receives an exemption.[31]

The USFWS's opinion is a final agency action that is subject to challenge in court.[32] If the USFWS issues a jeopardy opinion that would prohibit the federal agency from proceeding with the action, then either the federal agency or the permit applicant may apply to the Endangered Species Committee (a.k.a. ''the God Squad'') for an exemption.[33] The decision of the Committee is also subject to challenge in court.[34]

Section 9 of the Act makes it unlawful for any person to ''take'' a listed species.[35] The word ''take'' is defined to include harming the species.[36] However, the USFWS may issue an ''incidental take permit'' that would authorize certain harmful activities.[37] In order to obtain such a permit, the taking must be incidental to, and not the purpose of, the activity.[38] In addition, a person applying for an incidental take permit must submit a Habitat Conservation Plan to the USFWS.[39]

After public comment, the USFWS will issue the permit if it finds that (1) the taking will be incidental; (2) the applicant will minimize and mitigate the impacts of the taking; (3) adequate funding for the Plan will be provided; (4) the taking will not appreciably reduce the likelihood of the survival of the species; and (5) any other measures required by the USFWS will be met.[40] The granting or denial of an incidental taking permit is often challenged in court.[41]

Finally, the Act contains a citizen suit provision. Any person with standing may commence a civil suit to enjoin any person (including the United States) who is alleged to be in violation of the Act.[42] Citizen suits are also allowed to compel the USFWS to perform any nondiscretionary act or duty with regard to the listing of endangered or threatened species and critical habitats.[43]

B. Environmental Litigation Resulting From Increased Concentrations of Ground-Level Ozone.

Ozone in the upper atmosphere filters out ultraviolet light and thus protects life on earth.[44] Ozone at ground level, however, is an air pollutant.[45] Among other things, exposure to ground-level ozone can significantly reduce lung function, and has been linked with permanent structural lung damage.[46]

Ground-level ozone is not emitted into the air by specific sources. Rather, it is created when volatile organic compounds and nitrogen oxides react with oxygen in the presence of bright sunlight and heat.[47] Both the IPCC and the Pew Center on Global Climate Change predict that warmer temperatures brought on by climate change will likely lead to higher concentrations of ground-level ozone.[48]

Increased concentrations of ground-level ozone will result in increased air quality regulation and increased

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[17] 16 U.S.C. § 1533(a)(1).
[18] 16 U.S.C. § 1533(a)(1).
[19] 16 U.S.C. § 1533(a)(3)(A)(i).
[20] 16 U.S.C. § 1533(b)(3)(A).
[21] *Id.*
[22] *Id.*
[23] 16 U.S.C. § 1533(b)(3)(B).
[24] 16 U.S.C. § 1533(b)(3)(B)(ii).
[25] 16 U.S.C. § 1533(b)(6)(A).
[26] 5 U.S.C. § 706.
[27] *See e.g., Alabama-Tombigbee Rivers Coalition v. Kempthorne,* 477 F.3d 1250 (11th Cir. 2007); *Northwest Ecosystem Alliance v. USFWS,* 475 F.3d 1136 (9th Cir. 2007).
[28] 16 U.S.C. § 1536(a)(2).
[29] 16 U.S.C. § 1536(b)(4).
[30] 16 U.S.C. § 1536(b)(4)(C)(ii).
[31] 16 U.S.C. § 1536(h)(1).
[32] *Bennett v. Spear,* 520 U.S. 154 (1997).
[33] 16 U.S.C. § 1536(g)(1).
[34] 16 U.S.C. § 1536(h)(1)(B).
[35] 16 U.S.C. § 1538(a)(1)(B).
[36] 16 U.S.C. § 1532(19).
[37] 16 U.S.C. § 1539(a)(1)(B).
[38] *Id.*
[39] 16 U.S.C. § 1539(a)(2)(A).
[40] 16 U.S.C. § 1539(a)(1)(B).
[41] *See e.g., Oregon Natural Resources Council v. Allen,* 476 F.3d 1031 (9th Cir. 2007).
[42] 16 U.S.C. § 1540(g)(1)(A).
[43] 16 U.S.C. § 1540(g)(1)(C).
[44] United States Environmental Protection Agency, *Human Health Benefits of Stratospheric Ozone Protection,* April 24, 2006, www.epa.gov/ozone/science.
[45] 40 C.F.R. § 50.10.
[46] 72 Fed. Reg. 37818, 37824-36 (July 11, 2007).
[47] 72 Fed. Reg. at 37821.
[48] *Working Group II Fourth Assessment Report,* pp. 401-02; *Pew Center Report,* p. 13.

possibilities for significant litigation. The primary vehicle for this litigation will be the federal Clean Air Act and state and local clean air laws.

Title I of the federal Clean Air Act directs the United States Environmental Protection Agency (USEPA) to issue National Ambient Air Quality Standards (NAAQS) for those air pollutants that it deems widespread and harmful.[49] USEPA has designated six ''criteria pollutants'' for which it has established a NAAQS.[50] One of these pollutants is ozone.[51] The other five criteria pollutants are carbon monoxide, particulate matter, lead, nitrogen dioxide and sulfur dioxide.[52] The current NAAQS for ozone is .08 parts per million, averaged over eight hours.[53]

On July 11, 2007, the USEPA proposed lowering the ozone standard to between .070 and .075 part per million.[54] The states are required to designate areas as either attainment or nonattainment for the NAAQS for each criteria pollutant, and they must develop a State Implementation Plan (SIP) for achieving, maintaining and enforcing the NAAQS.[55]

The SIPs are subject to USEPA approval, and additional, more stringent, minimum federal requirements exist for nonattainment areas.[56] There is a complex set of federal requirements for ozone nonattainment areas.[57]

Increased ground-level ozone concentrations brought on by higher ambient air temperatures, combined with a lower ozone NAAQS, may result in the redesignation of several areas across the country as nonattainment for ozone. As a result, states will need to revise their SIPs to provide for mechanisms for coming into compliance with the ozone NAAQS.

One mechanism will likely be the adoption of new local air quality regulations to further reduce emissions of volatile organic compounds. Industry will be a likely target of these regulations. Not surprisingly, the adoption of new air quality regulations typically leads to litigation brought by regulated entities challenging the validity of the regulations.[58]

In addition, a revised SIP will likely call for increased enforcement of air quality regulations governing ozone precursors. Increased enforcement will lead to increased litigation.

C. Environmental Litigation Resulting From Decreased Water Supplies.

The IPCC Fourth Assessment Report contains several predictions about the impact of climate change on freshwater quantity and quality. It predicts, among other things, a decrease in precipitation and runoff in the Western United States that will result in the decreased availability of surface water in lakes and reservoirs.[59]

The Fourth Assessment Report goes on to state that the demand for ground water is likely to increase in the future, in part, because of ''the need to offset declining surface water availability due to increasing precipitation variability in general and reduced summer low flows in snow-dominated basins.''[60]

Efforts to offset declining surface water availability ''will be hampered by the fact that ground water recharge will decrease considerably in some already water stressed regions, where vulnerability is often exacerbated by the rapid increase in population and water demand.''[61]

Efforts will also likely be hampered by localized ground water contamination. It is this contamination that could lead to increased litigation as water providers bring actions to force the cleanup of contaminated aquifers, or to recover the costs of cleanup.

The most likely vehicles for this litigation are two federal statutes, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA).[62] These two statutes are frequently used by water providers to sue those who contaminate their water supplies.[63]

CERCLA provides that one who incurs costs in cleaning up hazardous substance contamination may bring an action to recover those costs.[64] Liable parties under CERCLA include any person who ''arranged for disposal'' of a hazardous substance.[65]

Defenses to CERCLA liability are extremely limited, and include defenses that the contamination was caused solely by (1) an act of God; (2) an act of war; or (3) an act or omission of a third party not having a contractual relationship with the defendant.[66] In order to be recoverable, the clean up costs must be incurred consistent with the National Contingency Plan regulations.[67]

In the past several years, there has been some doubt as to whether a non-governmental plaintiff that was itself responsible for some of the contamination could bring a claim under CERCLA without first being sued by the government.[68] That question was resolved recently by the United States Supreme Court, which ruled in *United States v. Atlantic Research Corporation* that such plaintiffs could sue under CERCLA.[69]

A RCRA citizen suit may be brought against one who contributed to the handling, storage, treatment, transportation or disposal of any solid or hazardous waste

[49] 42 U.S.C. §§ 7408, 7409.
[50] 40 C.F.R., Part 50.
[51] 40 C.F.R. § 50.10.
[52] 40 C.F.R., Part 50.
[53] 40 C.F.R. § 50.10.
[54] 72 Fed. Reg. 37818 (July 11, 2007).
[55] 42 U.S.C. § 7410(a).
[56] 42 U.S.C. § 7410(k).
[57] 42 U.S.C. § 7511-7511f.
[58] *See e.g., Whitman v. American Trucking Association,* 121 S. Ct. 903 (2001); *New York v. USEPA,* 443 F.3d 880 (D.C. Cir. 2006).

[59] *Working Group II Fourth Assessment Report,* p. 175, 178-79.
[60] *Id.,* p. 185.
[61] *Id.,* p. 175.
[62] 42 U.S.C. § 9601 *et. seq*.; 42 U.S.C. § 6901 *et seq*.
[63] *See e.g., Dedham Water Co. v. Cumberland Farms Dairy,* 972 F.2d 453 (1st Cir. 1992); *Artesian Water Co. v. Government of New Castle County,* 851 F2d 643 (3rd Cir. 1988).
[64] 42 U.S.C. § 9607.
[65] 42 U.S.C. § 9607(a)(3).
[66] 42 U.S.C. § 9607(b).
[67] 42 U.S.C. § 9607(a)(4)(B).
[68] *See, e.g., Cooper Industries v. Aviall Services*, 125 S.Ct. 577 (2004); *E.I. du Pont de Nemours v. United States*, 460 F.3d 515 (3rd. Cir. 2006).
[69] 127 S. Ct. 2331 (2007).

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that may present an imminent and substantial endangerment to health or the environment.[70]

There are several important differences between the RCRA and CERCLA causes of action. Among these is the requirement that the RCRA plaintiff prove that conditions exist that may present an imminent and substantial endangerment. However, the RCRA plaintiff does not have to prove compliance with the National Contingency Plan. In addition, a RCRA plaintiff must satisfy the notice requirement contained in the statute.[71]

Unlike CERCLA, if successful, the RCRA citizen suit plaintiff is entitled to injunctive relief requiring the defendant to clean up the contamination.[72] The RCRA plaintiff may not recover clean up costs. Also unlike CERCLA, the statute authorizes courts to award ''costs of litigation (including reasonable attorney and expert witness fees) to the prevailing or substantially prevailing party whenever the court determines that such an award is appropriate.''[73]

D. Environmental Litigation Concerning Coverage Under Comprehensive General Liability Policies.

In our last paper, *Global Warming Litigation: The Phantom Menace,* the authors concluded that there were substantial legal obstacles that would dissuade potential plaintiffs from bringing toxic tort lawsuits for damages allegedly caused by climate change.[74]

In *Massachusetts v. EPA*,[75] the Supreme Court arguably eased the standing obstacle a bit, although there are other significant legal obstacles enumerated in the article that may still dissuade potential plaintiffs from bringing suit.

However, to the extent that plaintiffs do bring toxic tort lawsuits concerning alleged climate change impacts, there likely will be litigation concerning whether the liability of the defendants in such suits is covered under the defendants' Comprehensive General Liability (CGL) Policy. These lawsuits will likely focus on the definition of ''occurrence'' in the policy, as well as on the 1973 and 1986 pollution exclusion clauses.

The 1973 standard form CGL policy defines ''occurrence'' as ''an accident, including continuous or repeated exposure to conditions, which results in bodily injury or property damage neither expected nor intended from the standpoint of the insured.''[76]

Coverage litigation would likely focus on whether the greenhouse gas emissions in question were intended, and whether the resulting damage was expected.

The 1973 standard form CGL policy pollution exclusion provides that ''This policy shall not apply to liability arising out of the discharge, dispersal, release or escape of smoke, vapors, soot, fumes, acids, alkalis, toxic chemicals, liquids or gases, waste materials or other irritants, contaminants or pollutants into or upon land, the atmosphere or any water course or body of water, but this exclusion does not apply if such discharge, dispersal, release or escape is sudden and accidental.''[77]

Litigation under this exclusion will likely focus on whether carbon dioxide is an irritant, contaminant or pollutant under the policy, and whether the release was ''sudden and accidental.'' Some jurisdictions have held that the phrase ''sudden and accidental'' has a temporal meaning,[78] while others have held that the phrase ''sudden and accidental'' means ''unexpected and unintended.''[79]

The 1986 standard form CGL policy pollution exclusion provides that ''This insurance policy does not apply to (1) bodily injury or property damage arising out of the actual, alleged or threatened discharge, dispersal, release or escape of pollutants . . . Pollutants means any solid, liquid, gaseous or thermal irritant or contaminant, including smoke, vapor, soot, fumes, acids, alkalis, chemicals and waste''(aka ''the absolute pollution exclusion'').[80]

The vast majority of courts considering the absolute pollution exclusion have held that it is not ambiguous and that it excludes coverage for all pollution related claims.[81] To the extent that there is litigation regarding CGL policies containing this exclusion, it will likely focus on whether carbon dioxide falls within the definition of ''pollutant'' under the policy.

II. Environmental Litigation Resulting From Efforts to Address Climate Change.

Due to the inaction of the federal government, some states and regions of the country have already taken initial steps to cap greenhouse gas emissions. More states and regions are likely to follow. The federal government is likely to follow suit in the next few years with a national cap on greenhouse gas emissions.

This section of the paper will address the litigation that will likely arise from these efforts to cap greenhouse gas emissions.

In addition, one of the more promising technological advances in addressing greenhouse gas emissions is the capture of carbon emissions and the storage of those emissions in geological formations. This paper will identify likely litigation that will result from carbon capture and storage.

A. Environmental Litigation Resulting From the Adoption of Legal Limits on Greenhouse Gas Emissions.

There have already been over a half dozen bills introduced in the United States House and Senate to regulate greenhouse gas emissions. Most of these bills, as well as most state and regional programs, provide for the adoption of some form of market-based cap and trade system similar to the acid rain program under the Clear Air Act.

The bills differ mainly in the scope of the entities regulated, and the amount of reductions in greenhouse gas emissions required. In order to identify the poten-

[70] 42 U.S.C. § 6972(a)(1)(B).
[71] 42 U.S.C. § 6972(b)(2)(A).
[72] 42 U.S.C. § 6972(a).
[73] 42 U.S.C. § 6972(a).
[74] 21 Toxics Law Reporter 39 (BNA), October 5, 2006.
[75] 127 S. Ct. 1438 (2007).
[76] Rowland H. Long, *The Law of Liability Insurance* § 10.04[5] (Matthew Bender & Co. 2007).
[77] *Id.*, § 10.05[5].
[78] *See e.g., American Motorists Ins. Co. v. ARTRA Group,* 659 A.2d 1295 (Md. 1995).
[79] *See e.g., Claussen v. Aetna Cas. & Sur. Co.,* 380 S.E.2d 686 (Ga. 1989).
[80] Long, *The Law of Liability Insurance* § 10.05[5].
[81] *See e.g., Reliance Ins. Co. v. Moesner,* 121 F.3d 895 (3rd Cir. 1997).

tial litigation that would likely be generated by the adoption of a cap and trade system for greenhouse gas emissions, it would be useful to examine one of the more prominent federal bills.

Senate Bill 280, sponsored by Senators John McCain and Joe Lieberman, regulates all six greenhouse gases: carbon dioxide, methane, nitrous oxides, hydrofluorocarbons, perfluorocarbons, and sulfur hexaflouride.[82] It applies to entities in the electric power, industrial and commercial sectors that emit over 10,000 metric tons of greenhouse gases per year, measured in carbon dioxide equivalents.[83]

The bill also applies to entities that refine or produce petroleum products for use in transportation that when combusted will emit over 10,000 metric tons of greenhouse gases per year.[84]

Finally, the bill covers entities that produce or import hydrofluorocarbons, perfluorocarbons, or sulfur hexafluoride that when used will emit over 10,000 metric tons per year of greenhouse gases.[85]

Beginning in 2011, each ''Covered Entity'' must annually report its emissions for the preceding year to the National Greenhouse Gas Database.[86] A Covered Entity is allowed to register with the Database reductions in emissions achieved between 1990 and 2012.[87] In order to register emissions reductions, a Covered Entity must establish a baseline of its emissions and submit a report to the USEPA for approval.[88] A non-Covered Entity is also allowed to register emissions reductions.[89]

Each Covered Entity must annually submit to the USEPA one Tradeable Allowance for each metric ton of greenhouse gases that it emitted during the preceding year.[90]

A Covered Entity is not required to submit a Tradeable Allowance for those emissions that are deposited in an approved geological storage facility.[91]

However, the Covered Entity must submit Allowances for any portion of the deposited emission that later escapes from the storage facility.[92] Tradeable Allowances are allocated to Covered Entities at no charge.[93] The total number of Allowances available to be allocated is set forth in the bill, and this amount declines every several years.[94]

The USEPA must determine the allocation of Tradeable Allowances to each sector (commercial, industrial, electric power, transportation).[95] The USEPA must also determine the amount of Allowances to be allocated to the Climate Change Credit Corporation, which then sells the Allowances to support technology development, adaptation assistance and other efforts.[96]

Further, the USEPA must allocate Tradeable Allowances to each Covered Entity within each sector.[97] Before undertaking the allocations set forth above, the USEPA must allocate Tradeable Allowances to Covered Entities equal to the amount of greenhouse gas reductions registered by that entity if the Covered Entity has requested to use the registered reduction in that year.[98]

Tradeable Allowances may be used, sold, purchased, or ''banked'' for future use.[99] A Covered Entity may purchase or sell Tradeable Allowances to or from a Covered Entity in another sector.[100] A Covered Entity may then use purchased Tradeable Allowances to meet the requirement that it submit to USEPA sufficient Tradeable Allowances to cover its greenhouse gas emissions.[101]

In addition, a Covered Entity may borrow Tradeable Allowances from up to five years in the future in order to satisfy up to 25 percent of its current requirement.[102] These borrowed ''credits'' must be paid back within five years with 10 percent interest.[103]

As another option, a Covered Entity may obtain Tradeable Allowances to satisfy up to 30 percent of its requirement by taking advantage of four different types of ''Domestic Offsets'' as follows: (1) Tradeable Allowances from another nation's market in greenhouse gas emissions; (2) a registered net increase in sequestration; (3) a greenhouse gas emission reductions registered in the database by a non-Covered Entity; and (4) credits obtained under the International Credit Plan.[104]

For the first Domestic Offset, in order for a Covered Entity to be able to submit a Tradeable Allowance from another nation's market, that nation must have established enforceable limits on its emissions, and the USEPA must determine that such market is complete, accurate and transparent.[105]

For the second Domestic Offset, the term ''sequestration'' includes agricultural and conservation practices, reforestation, forest preservation, and any other appropriate method as determined by the USEPA.[106]

If a Covered Entity uses a registered net increase in sequestration to satisfy its Tradeable Allowance requirement, it must submit information to the USEPA every five years that the net increase in sequestration still exists.[107]

Unless the USEPA determines that the net increase in sequestration still exists, the Covered Entity must submit additional Tradeable Allowances to offset the loss in sequestration.[108]

As for the fourth Domestic Offset, the International Credit Plan is a program that allows Covered Entities to earn Tradeable Allowances by undertaking USEPA approved projects to reduce emissions in developing countries.[109]

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[82] S.280 (January 12, 2007), § 3(9).
[83] *Id.*, § 3(5)(A).
[84] *Id.*, § 3(5)(B)(i).
[85] *Id.*, § 3(5)(B)(ii).
[86] *Id.*, § 102(a).
[87] *Id.*, § 103(a)(1).
[88] *Id.*, § 103(c).
[89] *Id.*, § 103(a)(2).
[90] *Id.*, § 121(a).
[91] *Id.*, § 121(c)(1).
[92] *Id.*, § 121(c)(2).
[93] *Id.*, § 161.
[94] *Id.*, § 124(a).
[95] *Id.*, § 161(a)(1).
[96] *Id.*, §§ 161(a)(1); 251.
[97] *Id.*, § 162(b).
[98] *Id.*, § 164(a)(1).
[99] *Id.*, §§ 141(a), 142.
[100] *Id.*, § 141(b).
[101] *Id.*, § 122(a).
[102] *Id.*, § 143(a).
[103] *Id.*, § 143(b).
[104] *Id.*, § 144(a).
[105] *Id.*, § 144(a)(1)(A).
[106] *Id.*, § 3(16).
[107] *Id.*, § 144(c)(1).
[108] *Id.*
[109] *Id.*, § 145(a).

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In addition to EPA approval, the project must obtain independent third-party verification that the project produces real, measurable and long-term benefits and is in addition to any reductions in emissions that would have occurred anyway.[110]

By considering the above provisions, one can identify areas where litigation is likely. However, until actual legislation is passed and regulations promulgated, it is impossible to discern the specific issues that will be raised.

One of the more controversial aspects of such a program will involve the allocation of emissions allowances. There will likely be litigation between regulated entities and USEPA regarding the process for allocating emissions allowances. Indeed, this has been the subject of litigation in the Clean Air Act's acid rain program.[111]

There will also likely be litigation regarding the actual allocation of emissions allowances to specific regulated entities. This has been another area of frequent litigation in the acid rain program.[112]

Another source of litigation, which has also been a source of litigation in the acid rain program, are the regulations concerning the transfer of emissions allowances.[113]

There will also likely be future litigation regarding the approval or disapproval by USEPA of certain carbon capture and storage efforts and carbon sequestration projects, as well as determinations regarding future releases from such projects.

There will likely be future litigation regarding the agency approval or disapproval of: (1) registered early emissions reductions; (2) the use of emissions allowances from a foreign nations' market; and (3) emissions reduction projects in developing nations. There will obviously be enforcement litigation. Finally, there will be litigation between private parties arising out of contract disputes in the purchase and sale of emissions allowances.

B. Environmental Litigation Resulting From State and Regional Efforts to Regulate Greenhouse Gas Emissions.

In the absence of federal regulation, there has been a movement at the regional and state level to regulate the emission of greenhouse gases. For purposes of illustration, this paper will discuss two such programs that are the furthest along: (1) the Northeast States Regional Greenhouse Gas Initiative (RGGI); and (2) the California Global Warming Solutions Act.[114]

Once they are fully implemented, these two programs, and similar efforts, will likely generate litigation concerning their constitutional validity. This litigation will most likely involve: (1) the Commerce Clause; (2) the Supremacy Clause; and (3) the doctrine of foreign policy preemption. In fact, California's efforts to regulate greenhouse gas emissions from automobiles have generated litigation raising exactly these three issues.[115]

The RGGI Memorandum of Understanding (MOU) was signed on December 20, 2005 by the states of Connecticut, Delaware, Maine, New Hampshire, New Jersey, New York and Vermont.[116] Since that date, Maryland, Massachusetts and Rhode Island have also joined.[117]

In the MOU, the signatory states commit to propose for legislative and/or regulatory approval a cap and trade program to regulate carbon dioxide emissions from power plants with a capacity of 25 megawatts or more.[118] The program launch date is January 1, 2009.[119]

The MOU sets an initial regional carbon dioxide emissions budget, and it apportions this budget to each of the states.[120] From 2009 to 2014, the budget remains unchanged.[121] Beginning in 2015, each state's budget will decline by 2.5 percent per year to be 10 percent below the initial budget by 2018.[122]

Each state allocates the allowances from its budget to regulated entities within the state, less 25 percent, which must be allocated for a consumer benefit or a strategic energy purpose.[123] The MOU sets the compliance period at a minimum of three years.[124]

A regulated facility must have a sufficient number of allowances at the end of each compliance period to cover its emissions during that period.[125] Each state may grant early reduction credits for projects undertaken after the date of the MOU and prior to the launch of the program.[126]

The program also provides for the award of offset allowances to sponsors of approved greenhouse gas emissions offset projects.[127] Afforestation is an example of such an offset project.[128]

An entity may cover up to 3.3 precent of its emissions with offset allowances.[129] The banking of allowances and credits is allowed without limitation.[130] There are safety valves provided in the event the spot price of allowances exceeds a certain threshold level.[131]

Finally, the MOU expressly recognizes that the RGGI program may lead to increased electricity imports and associated emissions ''leakage.'' The term ''leakage'' refers to a situation where the reduction of emissions within a state or region is offset by increased emissions outside the state or region. The MOU provides for the

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[110] *Id.*, § 145(b)(4).

[111] *See Indianapolis Power & Light v. United States EPA*, 58 F.3d 643 (D.C. Cir. 1995).

[112] *See Texas Municipal Power Agency v. United States EPA*, 89 F.3d 858 (D.C. Cir. 1996); *Madison Gas & Electric v. United States EPA*, 25 F.3d 526 (7th Cir. 1994).

[113] *See American Municipal Power-Ohio v. United States EPA*, 98 F.3d 1372 (D.C. Cir. 1996).

[114] Other efforts include the Western Regional Climate Action Initiative, signed on February 26, 2007, and the New Jersey Global Warming Response Act, signed on July 6, 2007.

[115] *See Central Valley Chrysler-Jeep v. Witherspoon*, 456 F. Supp. 2d 1160 (E.D. Cal. 2006).

[116] Regional Greenhouse Gas Initiative Memorandum of Understanding (December 20, 2005), available at www.rggi.org.

[117] *See* www.rggi.org.

[118] Regional Greenhouse Gas Initiative Memorandum of Understanding, ¶ 1.

[119] *Id.*, ¶ 2(A).

[120] *Id.*, ¶ 2(B),(C).

[121] *Id.*, ¶ 2(C).

[122] *Id.*, ¶ 2(D).

[123] *Id.*, ¶ 2(G).

[124] *Id.*, ¶ 2(E)(1).

[125] *Id.*

[126] *Id.*, ¶ 2(H).

[127] *Id.*, ¶ 2(F).

[128] *Id.*, ¶ 2(F)(1)(b).

[129] *Id.*, ¶ 2(F)(2)(b).

[130] *Id.*, ¶ 2(I).

[131] *Id.*, ¶ 2(E)(2),(F)(4).

creation of a working group to consider potential options for addressing leakage, and issue its findings by December 2007.[132]

The California Global Warming Solutions Act was signed on September 27, 2006.[133] The creation of regulations to implement the program is delegated to the California Air Resources Board (CARB).[134] By January 1, 2008, regulations must be in place to require the monitoring and annual reporting of greenhouse gas emissions from regulated sources.[135]

Further, the regulations must provide for the accounting of emissions from all electricity consumed in the state, including that imported from outside the state.[136] Also by that date, CARB is to determine the level of statewide emissions in 1990, and establish a statewide emissions limit equal to that level to be achieved by 2020.[137]

CARB must also adopt regulations by January 11, 2011, to become effective January 1, 2012, establishing annual emission limits and adopting emission reduction measures.[138] The regulations must ensure that entities that have voluntarily reduced their emissions prior to the effective date of the regulations receive appropriate credit for their early reductions.[139]

Further, the regulations must minimize leakage.[140] The Act allows the adoption of a cap and trade system, but does not mandate it.[141] Nevertheless, the Governor has made clear his preference for a cap and trade program.[142]

The first potential challenge to state and regional regulation involves the Commerce Clause. The Commerce Clause limits the power of states to adopt laws that interfere with interstate commerce.[143] State laws that facially discriminate against interstate commerce are virtually per se invalid.[144] Even if the law does not facially discriminate, it is still invalid if the burden that the law places on interstate commerce is clearly excessive in relation to the putative local benefits.[145]

Litigants may argue that both programs discussed herein, and similar programs, will have some impact on interstate commerce, although it is not clear at this point exactly what that will be.

The issue in the potential litigation will be whether the interests of the state or region in regulating greenhouse gas emissions are sufficient to justify the burden placed on interstate commerce.

Potential plaintiffs will likely argue that the interest of the state or region in regulating greenhouse gases is not great because climate change is a global concern and the amount of greenhouse gas emissions from any one state or region is of relatively little consequence.

The second potential challenge involves the Supremacy Clause. The Supremacy Clause provides that ''This Constitution and the Laws of the United States which shall be made in pursuance thereof . . . shall be the supreme law of the Land; . . . any thing in the Constitution or Laws of any State to the contrary notwithstanding.''[146]

There are three ways that federal law may preempt state law. First, a federal statute may expressly state that it preempts state law.[147] Second, even in the absence of express preemption, the federal statute may indicate an intent to occupy an entire field of regulation.[148] Third, the state law may conflict with the federal law where compliance with both the state and federal law is impossible, or where the state law stands as an obstacle to accomplishment of the full purposes and objectives of Congress.[149]

As currently constituted, the Clean Air Act will likely not be deemed to preempt state attempts to regulate stationary sources of greenhouse gases. The Act and the regulations promulgated pursuant to that Act do not directly regulate greenhouse gas emissions, and the Act expressly states that there is no prohibition against states regulating air pollutants.[150]

Even if the USEPA were to designate carbon dioxide as a criteria pollutant, this would not prevent the states from adopting a more stringent standard.[151] Nevertheless, should Congress in the future pass legislation regulating greenhouse gas emissions, as is likely, this new federal statute may serve as a basis for a preemption challenge.

The Clean Air Act does expressly preempt states from regulating emissions from motor vehicles.[152] Only California is allowed to request a waiver of this preemption from the USEPA.[153] California is currently seeking such a waiver. If the USEPA grants such a waiver to California, other states may then adopt either the federal standard or the California standard.[154] Several states have already indicated that they intend to adopt the California standard if USEPA grants the waiver.

In addition to the Clean Air Act, the federal Energy Policy and Conservation Act, which sets fuel economy standards for motor vehicles, may preempt state attempts to regulate greenhouse gas emissions from motor vehicles. This is because the only way to regulate greenhouse gas emissions from motor vehicles is by regulating fuel economy.

The *Central Valley Chrysler-Jeep* case involves a claim that California's attempt to regulate greenhouse gas emissions from automobiles is preempted by both the Clean Air Act and the Energy Policy and Conservation Act.[155]

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[132] *Id.*, ¶ 6(A)(1)(a),(b).
[133] Cal. Health & Safety Code § 38500 *et seq*.
[134] *Id.*, §§ 38510.
[135] *Id.*, § 38530.
[136] *Id.*, § 38530(b)(2).
[137] *Id.*, § 38550.
[138] *Id.*, § 38562.
[139] *Id.*, § 38562(b)(3).
[140] *Id.*, §§ 38562((b)(8); 38505(j).
[141] *Id.*, §§ 38562(a); 38570.
[142] Cal. Exec. Order No. S-20-06.
[143] U.S. Const. art. I, § 8, cl. 3.
[144] *Granholm v. Heald*, 544 U.S. 460, 476 (2005); *Philadelphia v. New Jersey*, 437 U.S. 617, 624 (1978).
[145] *Oregon Waste Sys., Inc. v. Oregon Dep't of Envtl. Quality*, 511 U.S. 93, 99 (1994); *Pike v. Bruce Church Inc.*, 397 U.S. 137, 142 (1970).
[146] U.S. Const. art. VI, cl. 2.
[147] *Hillborough County v. Automated Med. Labs. Inc.*, 471 U.S. 707, 712-13 (1985).
[148] *Id.*
[149] *Int'l Paper Co. v. Ouellette*, 479 U.S. 481, 491-92 (1987); *English v. Gen. Elec. Co.,* 496 U.S. 72, 79 (1990).
[150] 42 U.S.C. § 7416.
[151] *Id.*
[152] 42 U.S.C. § 7543(a).
[153] 42 U.S.C. § 7543(b).
[154] *Id.*
[155] *See Central Valley Chrysler-Jeep,* 456 F. Supp. 2d 1167-75.

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The third potential challenge involves the doctrine of foreign policy preemption. The Constitution vests the President with ''the vast share of responsibility for the conduct of our foreign relations.''[156] A state statute that produces something more than an incidental effect in conflict with the express foreign policy of the federal government is arguably preempted.[157]

In the *Central Valley Chrysler-Jeep* case, the plaintiffs have argued that California's attempt to regulate greenhouse gas emissions from automobiles substantially interferes with and undercuts the stated foreign policy of the federal administration.[158]

This stated foreign policy, the plaintiffs argue, is to forgo unilateral United States reductions in greenhouse gas emissions in favor of using the possibility of future reductions as a bargaining chip to get certain developing nations, such as India and China, to agree to reduce their emissions.[159]

C. Environmental Litigation Resulting From Carbon Capture and Storage.

Carbon capture and storage is frequently discussed as one method of significantly reducing carbon dioxide emissions. It refers to a process by which carbon dioxide is separated from large point sources and transported via pipeline to an underground geological formation for long-term storage.[160] Carbon dioxide capture systems include both pre-combustion and post-combustion systems.[161]

Both technologies are well understood and are already used in selected commercial applications.[162]

For example, post-combustion capture is used in the natural gas processing industry.[163] Pre-combustion capture is widely applied in fertilizer manufacturing and in hydrogen production.[164] Current technology captures approximately 85-95 percent of the carbon dioxide emissions.[165] This must be offset by the fact that a power plant equipped with a carbon capture system would need approximately 10-40 percent more energy than an equivalent plant without such a system.[166] The net result is a reduction in carbon dioxide emissions of approximately 80-90 percent.[167]

Because few large sources are located near suitable geological formations, the captured carbon dioxide would need to be transported to the storage areas via pipeline.[168] Pipeline shipping of carbon dioxide is already carried out on a small scale.[169] Suitable geological formations include saline formations and oil and gas fields.[170]

Various physical and geochemical trapping mechanisms, such as the presence of a caprock, should prevent the carbon dioxide from migrating to the surface.[171]

It is estimated that more than sufficient geological storage space exists to handle carbon dioxide storage for the next 100 years.[172] Finally, the injection of captured carbon dioxide to pressurize fields and boost oil recovery could offset some of the costs of carbon capture and storage.[173]

The transport and long-term storage of carbon dioxide involves certain risks.[174] One risk is that there could be a release of carbon dioxide into the atmosphere.[175] A carbon dioxide release could occur as the result of a pipeline leak or rupture.[176] It could also occur from geologic storage sites as a result of injection well failure or migration to the surface through faults, fractures or abandoned wells.[177]

A release of carbon dioxide could pose immediate dangers to human life if there were exposures to concentrations greater than 7 to 10 percent by volume in air.[178] At concentrations above 2 percent, carbon dioxide has a strong effect on respiratory physiology.[179] Another risk is that carbon dioxide migration in the subsurface could result in an increase in dissolved carbon dioxide in ground water.[180]

Dissolved carbon dioxide forms carbonic acid, altering the pH of the ground water, which could potentially mobilize metals, sulfate and chloride present in the subsurface.[181]

Another risk is that the injection of carbon dioxide could displace brines and contaminate shallow ground water by increasing its salinity.[182] Finally, the underground injection of carbon dioxide at pressure can induce fracturing and movement along faults that could cause seismic impacts.[183]

Generally, scientists believe that, with the exercise of proper precautions, the above mentioned risks are low.[184] However, should the risks be realized, they could result in substantial litigation. Plaintiffs claiming to have suffered personal injury or property damage as a result of carbon storage activities could bring toxic tort lawsuits seeking recovery of damages against the owners and operators of pipelines and geologic storage facilities.

Potential causes of action could include common law claims of negligence, nuisance, trespass, and strict liability for ultrahazardous activity.

In addition, state or federal environmental agencies could bring lawsuits under CERCLA, RCRA or similar

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[156] *Youngstown Sheet & Tube Co. v. Sawyer*, 343 U.S. 579, 610-11 (1952).
[157] *Am. Ins. Ass'n v. Garamendi*, 539 U.S. 396, 420 (2003).
[158] *Central Valley Chrysler-Jeep*, 456 F. Supp. 2d at 1175-83.
[159] *Id.*
[160] Intergovernmental Panel on Climate Change, Working Group III, *Carbon Dioxide Capture and Storage* (2005) (CCS Report), p. 2.
[161] *Id.*, p. 4.
[162] *Id.*
[163] *Id.*
[164] *Id.*
[165] *Id.*, p. 3.
[166] *Id.*
[167] *Id.*
[168] *Id.*, pp. 7-9.
[169] *Id.*, p. 5.
[170] *Id.*
[171] *Id.*
[172] *Id.*, p. 11.
[173] *Id.*, pp. 9-10.
[174] *Id.*, pp. 242-52.
[175] *Id.*, pp. 246-47.
[176] *Id.*, p. 11.
[177] *Id.*, pp. 242-43.
[178] *Id.*, p. 246.
[179] *Id.*
[180] *Id.*, p. 247.
[181] *Id.*
[182] *Id.*, p. 248.
[183] *Id.*, pp. 249-50.
[184] *Id.*, pp. 242-52.

state statutes seeking costs to clean up ground water contamination caused by carbon dioxide storage.

Further, large scale storage of carbon dioxide emissions will likely require the acquisition of subsurface property rights throughout the country. Efforts to acquire these rights could result, in some instances, in litigation with property owners.

III. Conclusion

Although significant legal obstacles exist that may dissuade plaintiffs from bringing climate change toxic tort claims, it is likely that other significant environmental litigation will develop as a result of climate change. This litigation will be the result of both environmental changes consistent with anthropogenically caused climate change and the efforts to address climate change. This paper has examined a few examples of such environmental litigation.

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