Legal Issues Associated with the Development of Carbon Dioxide Sequestration Technology

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Summary

In the last few years there has been a surge in interest in the geologic sequestration of carbon dioxide (CO_2), a process often referred to as carbon capture and storage, or carbon capture and sequestration (CCS), as a way to mitigate man-made CO_2 emissions and thereby help address climate change concerns. The Energy Independence and Security Act of 2007 (EISA; P.L. 110-140) contains measures to promote research and development of CCS technology, to assess sequestration capacity, and to clarify the framework for issuance of CO_2 pipeline rights-of-way on public land. Other legislative proposals have also sought to encourage the development of CO_2 sequestration, capture, and transportation technology. A number of measures have been introduced in the 111th Congress that could further development and deployment of CCS technology, including H.R. 2454, the American Clean Energy and Security Act of 2009 (ACES), which was passed by the House in June of 2009.

This report discusses the myriad legal issues associated with the development of CCS technology. These issues include, but are not limited to: determinations of ownership and control of the underground pore space where the CO_2 would be "sequestered" under most of the contemplated technology; the question of which federal and state agencies would permit and regulate CO_2 pipelines transporting the gas to the sequestration site; a lack of clarity concerning the status of CO_2 for purposes of environmental regulation; and concerns over liability exposure that may hinder the development of CCS technology.

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Introduction

The last few years have seen a surge in interest in geologic carbon sequestration, also referred to commonly as carbon capture and sequestration or carbon capture and storage (CCS), as a way to reduce carbon dioxide (CO_2) emissions, and thereby help to address concerns about climate change. The Energy Independence and Security Act of 2007 (EISA; P.L. 110-140) contained measures to promote research and development of CCS technology and assess sequestration capacity, including a measure to clarify the framework for issuance of CO_2 pipeline rights-of-way on public land. Legislative proposals introduced in the 111th Congress have sought to further encourage the development of CO_2 capture, transportation, and storage technology.

The increased discussion of CCS technology has given rise to consideration of a number of potential legal issues related to the technology as it is currently envisioned. Among these issues are questions about legal control of the underground "pore space" used for CO_2 storage in most CCS models, questions about regulation of CO_2 pipelines, issues related to the status of CO_2 as a pollutant and other environmental concerns, and liability concerns associated with CCS. This report addresses these issues and presents a picture of some of the legal hurdles that may need to be addressed if CCS technology is developed and employed.

Background

In recent years, concerns over global climate change have been at the forefront of many policy discussions. Some have suggested that recent increases in the global temperature, as well as future anticipated increases, are the result, at least in part, of emissions of large quantities of CO_2 from man-made sources. While most proposals related to climate change have focused on limiting emissions, one of the more prominent ideas to address these climate change concerns is the capture and direct sequestration of CO_2 emissions (CCS). CCS is a process whereby CO_2 emissions would be "captured" at their source and then stored or "sequestered" either underground or elsewhere, rather than being released into the atmosphere.[1] In most models, this storage/sequestration would take place underground.[2]

CCS technology is still in the early stages of development. Therefore, there are a number of operational questions to be answered before we can fully understand all the legal issues that may arise. However, because the development of CCS technology could well depend in part upon the resolution of some of these legal issues, it is important to understand them as the discussion of implementation CCS technology continues. Among the emerging legal issues associated with CCS technology are:

1. determinations of ownership and control of the underground pore space where the CO_2 would be "sequestered" under many of the CCS facility models proposed to date;
2. the question of which federal and state agencies would permit and regulate CO_2 pipelines transporting the gas from the point of emission to the sequestration site;

[1] For a detailed discussion of CCS technology, *see* CRS Report RL33801, *Carbon Capture and Sequestration (CCS)*, by Peter Folger.

[2] *Id.*

3. the status of CO_2 as a "pollutant" for purposes of environmental regulation, and how such a classification might impact development of CCS technology; and
4. concerns over liability exposure that may hinder development of CCS technology.

Discussion

Ownership and Control of Underground Pore Space

A preliminary question that likely must be resolved prior to implementation of CCS technology on a commercial scale is the question of who controls the property interest in the sort of geologic formations, often referred to as "pore space,"[3] that would be employed by the CCS facilities. Generally, a dispute about such control over property interests would take place between parties possessing the right to make use of the "surface" of the property in question and parties possessing the right to exploit the subsurface assets of the property in question, often referred to as the "mineral estate." One possible method of resolution is to enact new legislation addressing issues related to the ownership and control of this subsurface pore space. In the absence of such legislation, the courts would be called on to resolve this issue, in many instances with guidance from prior judicial opinions.

Property rights related to surface and mineral estates are typically determined by state law, not federal law. Accordingly, state law (including the interpretation of any relevant contractual terms) would likely determine whether the owner of the surface estate or the mineral estate to a particular area controls the pore space where CO_2 would be sequestered in most of the proposed CCS technology to date. Clarifying control of pore space is of particular significance to the development and implementation of CCS because entities (public and private) seeking to use a given pore space for CCS must possess the right to use the pore space. For the vast majority of states, ownership and control of the pore space would be determined by the state's courts, often with guidance from previous judicial decisions on related matters. This is known as the application of "common law." Wyoming and North Dakota, however, have enacted legislation to clarify the law that would govern control of the "pore space" that would be used in most emerging CCS technologies.[4]

Overview of Judicial Decisions on "Pore Space"

Under common law, the owner of an unfettered interest in a parcel of land generally has a right to use both the surface of the land (surface estate) and the land beneath the surface (mineral estate) unless the mineral rights are severed from the surface rights by some means.

The cases discussed below represent the decisions of several states clarifying the respective rights of surface and mineral owners over use of the pore space under the applicable common law of the

[3] For purposes of this discussion, "pore space" refers to any subsurface geological formation in which the sequestration of CO_2 has been contemplated. These pore spaces often contain some mixture of minerals, gases, water or saline solutions in varying amounts and concentrations. For further information, see Folger, *supra* note 1.

[4] See *infra* "Statutory Approaches" for an overview of North Dakota's and Wyoming's pore space statutes.

state. Although these cases reached similar conclusions, many jurisdictions have not yet addressed the issue of pore space control, so the issue has not yet been definitively resolved.

Tate v. United Fuel Gas Co.

In *Tate v. United Fuel Gas Company*,[5] the Supreme Court of Appeals of West Virginia was tasked with ascertaining who had title to the pore space beneath a 244-acre tract of land in West Virginia once the minerals contained therein had been extracted. The owner of the land ("O") owned the land in fee simple. "O" deeded the land to another man ("A") but reserved to himself the "oil, gas ... and all minerals ... underlying the surface of the land."[6] "A" later deeded the land to the plaintiff, Virgil Tate, subject to the same exceptions contained in the original deed from "O" to "A." After extracting all of the oil from the pore space beneath the surface of the 244-acre tract of land, "O" eventually leased his mineral rights to the defendant, United Fuel Gas Company. United Fuel Gas Company used this property interest to store gas produced elsewhere in the empty pore space.

Plaintiff Tate, the owner of the land subject to the underground property interest leased to United Fuel Gas Company, asserted that the lease between "O" and United Fuel Gas Company was invalid since "O" only had a right to the contents of the pore space and not the pore space itself. The Supreme Court of West Virginia agreed with Tate and held that the express reservation of mineral rights by "O" only grants to "O" (and his lessee, United Fuel Gas Company) a right to exploit the gas and minerals contained within the pore space but no right to use the pore space itself for the storage of gas produced elsewhere.[7]

According to *Tate*, the owner of the mineral rights in West Virginia likely would not have the right to the use or lease the pore space for CO_2 capture and sequestration (unless the owner of the surface estate expressly allows the owner of mineral rights to use the pore space). In West Virginia and any jurisdiction that follows the logic of the court's ruling in *Tate*, a party seeking to obtain the right would have to ensure that it obtains title from the owner of the pore space, which appears to be a property interest that would likely remain with the owner of property even after transfer of the mineral rights associated with the property. Of course, the property owner could transfer the rights to the pore space while retaining interest in the remainder of the property, but such a transfer would likely have to refer directly to the subsurface asset in question.

Emeny v. U.S.

Emeny v. United States[8] presents another scenario in which a court was required to determine whether certain subsurface property rights captured the sort of pore space that would likely be used for CO_2 sequestration in CCS technology. In *Emeny*, the United States Court of Claims[9] was

[5] 71 S.E.2d 65 (1952) (*Tate*).

[6] The pertinent language of the deed stated that "[t]he oil, gas and all minerals ... underlying the surface of the land hereby conveyed are expressly excepted and reserved from the operation of this deed ... it being under-stood [sic] that the term 'mineral' as used herein does not include clay, sand, stone, or surface minerals except such as may be necessary for the operation for the oil and gas and other minerals." *Tate* at 67-68.

[7] *Id.* at 72.

[8] 412 F.2d 1319 (1969) (*Emeny*).

[9] The U.S. Court of Claims was the original court in which claims against the United States were tried. The U.S. Court of Claims was abolished in 1982. The court's trial-level jurisdiction was transferred to the U.S. Court of Federal Claims (continued...)

tasked with deciding whether the United States had acquired the right to store helium gas within a pore space formation on a certain property when the terms of the government's lease with the owner of the pore space were limited to the sole purpose of mining and operating for oil and gas.

The plaintiffs in *Emeny* owned a tract of land in Texas which contained significant deposits of helium gas. The plaintiffs granted to a private gas company "oil and gas leases covering a total of approximately 217,000 acres of land, including the area which contains the Bush Dome."[10] The United States eventually obtained these oil and gas leases from the private oil company, along with the remaining mineral rights that had been reserved by the plaintiffs, and compensated the respective parties accordingly.[11] However, in the lease with the United States, the plaintiffs expressly reserved for themselves the surface of the leased lands, "including any such structure that might be suitable for the underground storage of 'foreign' or 'extraneous' gas produced elsewhere."[12]

Pursuant to the lease agreement, the United States commenced operations to extract the helium contained within the Bush Dome, and continued to do so for approximately three decades until the Bush Dome was empty. After the Bush Dome was emptied, the United States sought to store helium gas produced elsewhere inside of the now empty pore space.[13] The plaintiffs argued that they were entitled to just compensation for the government's use of the Bush Dome as a helium storage facility because pursuant the language of the lease agreement, the government only had a right to extract the gas contained within the pore space and no right to use the pore space for storage of helium gas produced elsewhere.

After a consideration of Texas common law, the court in *Emeny* agreed with the plaintiffs that the government's property interest did not include the right to use the pore space for gas storage, and ordered the United States to pay the plaintiffs just compensation for its use of the Bush Dome as a helium storage facility. According to the court, "[t]here is no reasonable basis on which the rights granted to the [United States] in the ... oil and gas leases could be construed as including the right to bring to the premises and store there gas produced elsewhere."[14] Accordingly, *Emeny* is instructive in instances where a party obtains mineral rights pursuant to state common law because a court may find that the owner of the surface rights may be entitled to compensation if the party uses the pore space for storage. The case also offers guidance for those wishing to enter into real estate transactions to acquire (or to reserve) the property interests needed to install a CCS facility.

(...continued)

and its appellate jurisdiction to the U.S. Court of Appeals for the Federal Circuit.

[10] *Emeny* at 1321. According to the court's opinion, the Bush Dome "is a closed geological structure, or underground dome, in which gaseous substances can be stored ... The potential storage capacity of the Bush Dome is in excess of 52 billion standard cubic feet of gas." *Id.* at 1321.

[11] *Id.* at 1321-1322.

[12] *Id.* at 1323.

[13] Pursuant to the Helium Act Amendments of 1960, 50 U.S.C. § 167 *et seq*.

[14] *Emeny* at 1323.

U.S. v. 43.42 Acres of Land

In *U.S. v. 43.42 Acres of Land*,[15] a federal district court had to determine whether the surface owners, mineral owners, or both should receive compensation from the government for land acquired for the construction of an underground crude oil storage tank.[16] One defendant owned the land under which a crude oil storage tank was to be constructed. The other defendant owned the rights to the minerals that needed to be extracted to construct the underground storage tank. The United States intended to construct this storage tank by extracting the salt contained inside of the subterranean geological structure and then using the evacuated underground formation as a storage area.[17] Both defendants claimed an exclusive right to be compensated by the United States for its taking of the property pursuant to the Energy Policy and Conservation Act.[18]

Since *Acres* was a case of first impression under Louisiana law, the court considered common law authority from other jurisdictions to inform its opinion, and concluded that "... the general rule in common law ... provides that, after the removal of minerals, the opening left by the mining operations belongs to the land owner by operation of law."[19] Since the minerals had not yet been removed from the pore space by the United States and since the resulting pore space needed to be used by the United States for crude oil storage, the court ordered the United States to compensate both the land owner and the mineral rights owner.[20]

As *Acres* illustrates, in some instances both the surface and the mineral estate owners hold property interests relevant to the use of pore space that must be acquired in order to store or sequester gas underground. If taken by eminent domain, it is possible that in some instances, both parties would need to be justly compensated pursuant to the "Takings" clause of the Fifth Amendment to the U.S. Constitution.[21]

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[15] 520 F. Supp. 1042 (1981) (*Acres*).

[16] In his opinion, Judge Veron writes, "Simply stated, the issue to be decided by this court is: who is entitled to be compensated for the value of the hole in the ground to be created by construction of the underground storage cavern[:] the land owners or the mineral owners?" *Acres* at 1043.

[17] The process by which crude oil reservoirs are created was described in *Acres*:

> To utilize the subsurface for the extraction of brine and the creation of storage facilities[,] a well is drilled so as to penetrate the salt formation. Water is forced into the formation through the well, the salt is withdrawn as brine, and a cavity is left in the salt mass because of gradual dissolving of the salt and a resulting erosion by the leaching process. The jug shaped cavity, or 'jug[,]' formed by this leaching is used for the storage of hydrocarbons. A jug is 100 feet or more in depth, with capacity for storing over a million barrels of one of the various hydrocarbons. A thick barrier of salt must be retained around each jug to form a satisfactory wall for the containment of the stored product.

Acres at 1043.

[18] 42 U.S.C. § 6249(a)-(f).

[19] *Acres* at 1045.

[20] "[Owners of a mineral servitude] have no right to claim compensation for the value of the cavern to be created by removal of the salt. They should be compensated only for the value of the right to explore for and reduce to possession the minerals on the land in question. [The] land owners ... own all remaining rights in the land, and they are entitled to be compensated for the underground storage value of the land." *Id*. at 1046.

[21] The use of eminent domain to seize property for public purposes, and the requirement that property owners be justly compensated for such a taking, is explored in detail in CRS Report RS20741, *The Constitutional Law of Property Rights "Takings": An Introduction*, by Robert Meltz.

Mapco, Inc. v. Carter

Mapco, Inc. v. Carter[22] illustrates some of the problems that can arise in instances where the mineral rights are divided among co-owners. In *Mapco*, multiple parties had interests in the surface and mineral rights of a parcel of land in Texas. As a result of a previous court-ordered partition, the surface and mineral rights were divided among the various co-owners. Although the minerals were located beneath one party's tract of the partitioned parcel of land, the mineral rights were divided among the various co-owners. Accordingly, each co-owner of the partitioned surface rights possessed an interest in the minerals even though the minerals were located beneath a single tract of the partitioned land.

Despite the fact that Mapco only possessed a minority interest in the mineral rights, Mapco nevertheless decided to extract and sell the salt contained beneath its portion of the partitioned land without the consent of the co-owners.[23] Further, when the salt was completely extracted, Mapco, Inc. "plugged" the empty cavern with concrete and abandoned it, thereby rendering it unusable as storage space for gas or petroleum products.[24]

Ultimately, the Court of Appeals of Texas ordered Mapco to compensate the co-owners of the mineral estate because, as mineral owners, they were also entitled to an amount of the proceeds from Mapco's sale of the salt equal to their respective interests in the partitioned land.[25] *Mapco* provides an illustration of the types of conflicts that can cloud title to a particular pore space that could be used for CCS. Similar to the other cases described *supra*, the court concluded that the owner of the mineral estate does not necessarily have a property interest sufficient to control the pore space.

Statutory Approaches

In the cases described above, the courts struggled to resolve issues of ownership and control of underground areas in the absence of legislative guidance. However, in recognition of the potential legal issues related to subsurface pore space ownership that may arise under the common law if CCS technology is developed and implemented, the legislatures of Wyoming and North Dakota have enacted statutes to clarify issues of ownership and control over pore space, as well as the rights and obligations between surface and mineral owners.[26] The Wyoming and North Dakota statutes are examples of another approach to resolving issues related to pore space ownership.[27]

[22] 808 S.W.2d 262 (1991) (*Mapco*).

[23] *Mapco* at 267.

[24] *Id.* at 268-269.

[25] *Mapco* at 278-279.

[26] Wyo. Stat. §§ 34 -1-152 and 34-1-153 (2009); N.D. Cent. Code § 47-31-02 *et seq* (2009). A note following Wyo. Stat. § 34-1-152 provides: "It is the intent of the legislature to clarify the ownership of pore space underlying the surface of the lands and waters of this state." Similarly, N.D. Cent. Code § 47-31-01 provides: "Undivided estates in land and clarity in land titles reduce litigation, enhance comprehensive management, and promote security and stability useful for economic development, environmental protection, and government operations."

[27] Several states have enacted legislation that could regulate other aspects of CCS. Those statutes are not discussed in this Report because they do not expressly address pore space ownership and control.

The Wyoming Statute

Wyoming's pore space statute defines the term "pore space" as "subsurface space which can be used as storage space for carbon dioxide or other substances."[28] Wyoming's statute makes it expressly clear that the owner(s) of the surface rights are entitled to "ownership of all pore space in all strata below the surface."[29] Additionally, under the Wyoming statute, a conveyance of surface rights automatically conveys ownership of any pore space below the surface.[30] Finally, the Wyoming statute clarifies the status of mineral rights with respect to the pore space by providing that "[n]o agreement conveying mineral or other interests underlying the surface shall act to convey ownership of any pore space in the stratum unless the agreement explicitly conveys that ownership interest."[31]

Wyoming has also created a statutory framework to provide for the "unitization" of a single pore space that is located beneath multiple tracts of real property.[32] Specifically, under Wyoming state law, no CCS activities within a particular pore space shall commence "until the plan of unitization has been signed or in writing ratified or approved by those persons who own at least eighty percent (80%) of the pore space storage capacity."[33]

With respect to the issue of potential liability resulting from CO_2 sequestration within pore spaces, Wyoming's pore space statute provides:

> All carbon dioxide, and other substances incidental to the injection of carbon dioxide injected into any [pore space] for the purpose of [CO_2 sequestration] shall be presumed to be owned by the injector of such material, and all rights, benefits, burdens, and liabilities of such ownership shall belong to the injector.[34]

Additionally, the Wyoming statute shields pore space owners from liability for "the effects of injecting carbon dioxide for geologic sequestration purposes" if the pore space owners consent to the use of pore space for CO_2 sequestration.[35]

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[28] Wyo. Stat. § 34-1-152(d).

[29] *Id.* § 34-1-152(a).

[30] *Id.* at § 34-1-152(b).

[31] Wyo. Stat. § 34-1-152(b). In its entirety, § 34-1-152(b) provides:

> A conveyance of the surface ownership of real property shall be a conveyance of the pore space in all strata below the surface of such real property unless the ownership interest in such pore space previously has been severed from the surface ownership or is explicitly excluded in the conveyance. The ownership of any pore space in strata may be conveyed in the manner provided by law for the transfer of mineral interests in real property. No agreement conveying mineral or other interests underlying the surface shall act to convey ownership of any pore space in the stratum unless the agreement explicitly conveys that ownership interest.

[32] See generally *id.* at §§ 35-11-314; 35-11-315; 35-11-316; and 35-11-317.

[33] *Id.* at § 35-11-316(c).

[34] Wyo. Stat. § 34-1-153(a) (2009).

[35] *Id.* at § 34-1-153(b). In its entirety, § 34-1-153(b) provides:

> No owner of pore space, other person holding any right to control pore space or other surface or subsurface interest holder, shall be liable for the effects of injecting carbon dioxide for geologic sequestration purposes, or for the effects of injecting other substances for the purpose of geologic sequestration which substances are injected incidental to the injection of carbon dioxide, solely by virtue of their interest or by their having given consent to the injection.

The North Dakota Statute

North Dakota's pore space statute defines "pore space" as "a cavity or void, whether natural or artificially created, in a subsurface sedimentary stratum."[36] Similar to Wyoming's pore space statute, North Dakota's statute provides that "[t]itle to pore space in all strata underlying the surface of lands and waters is vested in the owner of the overlying surface estate."[37] Additionally, under the North Dakota statute, a conveyance of surface rights automatically conveys ownership of any pore space below the surface.[38] The primary difference between the Wyoming and North Dakota statutes with respect to ownership of the pore space is that under the North Dakota statute, the pore space cannot be severed from the surface estate.[39]

Similar to Wyoming's statutory approach to CCS, North Dakota requires the "consent of persons who own at least sixty percent [60%] of … the pore space" as a precondition for CO_2 sequestration.

By defining exactly what pore space is, who owns it, and who has the right to convey it, Wyoming and North Dakota have eliminated some of the potential ambiguity that might be found in the common law. The statutes make clear that the owner of the surface estate owns the pore space as well, and any entity that wishes to use the pore space must negotiate directly with the owner of the surface estate. Additionally, both states' unitization requirements are intended to reduce conflicts between owners of a single pore space over the use of that particular pore space for CCS purposes.

Interstate CO_2 Pipeline Jurisdiction

Another issue relates to the authority to regulate the movement of CO_2 from the point of production/emission to the CCS facility. One possibility is that the transportation will be entirely local in nature, with CCS facilities located in the same state as the source of the CO_2 that is to be sequestered. In that case, the federal government can choose to step in if it chooses via new legislation, but the default jurisdiction would likely remain with the state governments, similar to their current exercise of jurisdiction over intrastate natural gas pipelines.

However, if an interstate pipeline system for CCS is to be developed, questions arise as to who will regulate pipeline siting and the rates to be charged for transporting CO_2 from the point of emission to the sequestration location. Based on their current regulatory roles, two of the more likely candidates to have jurisdiction over interstate pipelines transporting CO_2 for purposes of CCS are the Federal Energy Regulatory Commission (FERC) and the Surface Transportation Board (STB).

The Natural Gas Act of 1938 (NGA) vests in FERC the authority to issue "certificates of public convenience and necessity" for the construction and operation of interstate natural gas pipeline

[36] N.D. Cent. Code § 47-31-02.

[37] *Id.* at § 47-31-03.

[38] *Id.* at § 47-31-04.

[39] N.D. Cent. Code § 47-31-05. In its entirety, § 47-31-05 provides: "Title to pore space may not be severed from title to the surface of the real property overlying the pore space. An instrument or arrangement that seeks to sever title to pore space from the title to the surface is void as to the severance of the pore space from the surface interest."

facilities.[40] FERC is also charged with extensive regulatory authority over the siting of natural gas import and export facilities, as well as rates for transportation of natural gas and other elements of transportation service. FERC also has jurisdiction over regulation of oil pipelines pursuant to the Interstate Commerce Act (ICA).[41] The ICA, as amended by the Hepburn Act of 1905, provided that the Interstate Commerce Commission (ICC) was to have jurisdiction over rates and certain other activities related to interstate oil pipelines, as these pipelines were considered to be "common carriers."[42] This jurisdiction was transferred to FERC in the Department of Energy Organization Act of 1977.[43] FERC's jurisdiction over oil pipelines is not as extensive as its jurisdiction over natural gas pipelines. FERC is not involved in the oil pipeline siting process. However, as with natural gas, FERC does regulate transportation rates and capacity allocation for oil pipelines.[44]

Jurisdiction over rates for the transportation via pipeline of commodities other than oil and natural gas resides with the STB. The STB is an independent regulatory agency (administratively affiliated with the Department of Transportation) charged by Congress with the primary mission of resolving railroad disputes pursuant to the ICA. It is the successor agency to the ICC. Pipelines, like railroads, are "common carriers" used by more than one company for the transportation of goods. Therefore, the ICA also assigned the ICC (and thus the STB) oversight authority over pipelines transporting a commodity other than "water, gas or oil."[45] However, unlike FERC, the STB does not require pipeline companies to file tariffs and justify their rates. Instead, the STB acts as a forum to resolve disputes related to pipelines within its jurisdiction. Parties who wish to challenge a rate or another aspect of a pipeline's common carrier service may petition the STB for a hearing; there is no ongoing regulatory oversight.

Thus, there are two federal regulatory agencies that, generally speaking, have jurisdiction over interstate pipeline rate and capacity allocation matters. However, as explained below, both of these agencies appear to have explicitly rejected jurisdiction over CO_2 siting and rates, and there is no legislative or judicial history indicating that their rejections were improper. These decisions, the reasoning behind them, and the status of federal jurisdiction over CO_2 pipelines are covered in the next section.

Prior CO_2 Pipeline Regulation: Cortez Pipeline

Carbon dioxide is sometimes used for a process referred to as enhanced oil recovery (EOR). In EOR, a gas is injected into a well under high pressure in order to aid in extraction. In some cases companies have used pipelines to transport CO_2 over state lines (i.e., in interstate commerce) for EOR purposes. One such pipeline is the Cortez Pipeline, which runs through Colorado, New Mexico, and Texas. The Cortez Pipeline was the subject of an instructive regulatory dispute over CO_2 pipeline jurisdiction.

[40] 15 U.S.C. § 717f(c).

[41] 49 App. U.S.C. § 1.

[42] *Id.* at 1(1), 1(4), and 1(7).

[43] P.L. 95-224.

[44] Section 1801 of the Energy Policy Act of 1992 directed FERC to "promulgate regulations establishing a simplified and generally applicable ratemaking methodology" for oil pipeline transportation.

[45] 49 U.S.C. § 1-501(a)(1)(c).

FERC Decision

In December 1978, the Cortez Pipeline Company (Cortez) sought a declaratory order from FERC that the construction and operation of a proposed interstate pipeline transporting a gas comprised of 98% CO_2 and 2% methane would not be within the commission's jurisdiction. Cortez argued that the gas in question was not "natural gas" as the term is defined in Section 2(5) of the NGA,[46] so a proposed pipeline to transport this gas was not under FERC's NGA jurisdiction. FERC agreed with Cortez and issued a declaratory order disclaiming jurisdiction over the proposed pipeline.[47] In its decision, FERC explored the inherent ambiguity in the term "natural gas," explaining that it has two very different definitions. FERC recognized that in the terminology of chemistry, "natural gas" refers to any substance that is gaseous in its natural state, including carbon dioxide.[48] However, according to FERC, the more common usage of the term "natural gas" refers to a gaseous mixture of hydrocarbons.[49] FERC held that it was this more common meaning of "natural gas" that applied to the term as it was used in the NGA. FERC pointed to the goals and purposes of the NGA, which are primarily to regulate a specific "natural gas" industry.[50] Thus, the term "natural gas" as used in the statute referred to a gaseous mixture of hydrocarbons.[51] As a result, FERC held that the proposed Cortez Pipeline was not within the NGA jurisdiction of the commission.[52]

ICC Decision

In 1980, after FERC issued its CO_2 ruling, the owners of the proposed Cortez Pipeline petitioned the ICC for a similar declaratory order that the pipeline would not be subject to the ICC's jurisdiction either. As the ICC recognized at the outset of its decision, there was no controversy concerning whether ICC approval was necessary for construction or expansion of pipeline facilities—the statute and previous case law plainly state that the ICC has no pipeline siting jurisdiction whatsoever.[53] Furthermore, the ICC noted that the U.S. Department of Transportation would exercise jurisdiction over the pipeline's compliance with applicable safety standards.[54] Instead, the decision emphasized the ICC's regulation of other aspects of pipeline service (i.e., rates), and whether the statutory exception from ICC regulation for pipelines that transport "water, gas or oil" covers CO_2 pipelines.[55]

Relying on the legislative history of previous versions of the statutory language in the ICA (which excluded "natural or artificial gas") as well as the plain language of the current statute, the ICC concluded that Congress intended to exclude all types of gas, including CO_2, from ICC regulation. The ICC recognized that its initial ruling in this matter, in concert with FERC's order

[46] 15 U.S.C. § 717(a)(5).

[47] *Cortez Pipeline Company*, 7 FERC ¶ 61,024 (1979).

[48] *Id.* at 61,041.

[49] *Id.*

[50] *Id.*

[51] *Id.*

[52] *Id.* at 61,042.

[53] *Cortez Pipeline Company—Petition for Declaratory Order—Commission Jurisdiction Over Transportation of Carbon Dioxide by Pipeline*, 45 Fed. Reg. 85177 (December 24, 1980).

[54] *Id.*

[55] 49 U.S.C. § 1-501(a)(1)(c).

disavowing jurisdiction over the proposed Cortez Pipeline, created a regulatory gap of sorts. The ICC noted that generally, "[t]he opinion of a sister agency should be given weight, if possible, so that related statutes can be coordinated."[56] However, the ICC found that "in this case the FERC decision is not helpful to us because it did not construe or interpret the terms natural and artificial gas [under the ICA]. Its decision was based on other grounds."[57] Although the ICC found in this initial decision that it likely did not have jurisdiction over CO_2 pipelines, it did conclude that "the issue is important enough to institute a proceeding and accept comments on the petition and our view on it."[58] After the comment period, the ICC confirmed its view that CO_2 pipelines were excluded from the ICC's jurisdiction.[59]

Potential Issues Related to ICC Disclaimer of Jurisdiction

Notwithstanding the ICC's 1980 disclaimer of jurisdiction over CO_2 pipelines in the Cortez Pipeline case, other evidence indirectly suggests the possibility that interstate CO_2 pipelines could still be considered subject to the jurisdiction of the STB. For example, an April 1998 report by the General Accounting Office (GAO)[60] stated that interstate CO_2 pipelines, as well as pipelines transporting other gases, are subject to the board's oversight authority. The report stated that GAO had identified five products carried by 21 pipelines subject to the STB's jurisdiction.[61] One of the five identified products was CO_2 (another was hydrogen—also a gas). In fact, the report lists 14 different pipelines transporting CO_2 for purposes of EOR, including the Cortez Pipeline, which are said to be subject to the jurisdiction of the STB.[62] The GAO states that the STB reviewed its analysis and, presumably, did not object to this jurisdictional classification.[63]

It should also be noted that the Cortez Pipeline decision was issued by the ICC, not the STB. Although the STB is the successor to the now-defunct ICC and the statutory language regarding the STB's jurisdiction is virtually identical to the language at issue in the Cortez decision, they are not the same agency. The STB conceivably could determine that its jurisdiction is not governed by the ICC's decision in the Cortez Pipeline matter. Indeed, the Supreme Court has ruled that federal agencies are not precluded from changing their positions on the issue of regulatory jurisdiction. According to the Court, "an initial agency interpretation is not instantly carved in stone. On the contrary, the agency, to engage in informed rulemaking, must consider varying interpretations and the wisdom of its policy on a continuing basis."[64] Accordingly,

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[56] *Cortez Pipeline Co.*, 45 Fed. Reg. at 85178.

[57] *Id.* at 85178.

[58] *Id.*

[59] *Cortez Pipeline Company—Petition for Declaratory Order—Commission Jurisdiction Over Transportation of Carbon Dioxide by Pipeline*, 46 Fed. Reg. 18805 (March 26, 1981).

[60] Now known as the Government Accountability Office.

[61] GAO Report: SURFACE TRANSPORTATION: Issues Associated With Pipeline Regulation by the Surface Transportation Board, April 1998.

[62] *Id.* at 27.

[63] STB, personal communication (December 2007). The STB Office of Governmental and Public Affairs informed CRS that the board recognizes the conflict between this GAO report and the ICC decision (as well as the wording of 49 C.F.R. § 15301 governing STB jurisdiction over pipelines other than those transporting "water, gas or oil"). However, the office declined to state an opinion as to the current extent of STB jurisdiction over CO_2 pipelines and suggested that the STB would likely not act to resolve this conflict unless a CO_2 pipeline dispute comes before it.

[64] *Chevron U.S.A. v. Nat. Res. Def. Council*, 467 U.S. 837, at 863-64 (1984).

regulation of CO_2 pipelines for CCS purposes by the STB (or by FERC, for that matter) under existing statutes remains a possibility.

Implications of the Possible Regulatory "Gap"

If CCS technology develops to the point where interstate CO_2 pipelines become more common, and if FERC and the STB continue to disclaim jurisdiction over CO_2 pipelines, then the potential regulatory "gap" discussed above may receive attention. This gap does not necessarily demand resolution. As commentators have noted, state laws and contractual arrangements among interested parties established under the EOR model would also apply to CO_2 pipelines for CCS.[65] Interstate CO_2 pipelines would still be required to meet the safety requirements of the Department of Transportation. Also, although there would be no federal rate regulation, any anti-competitive behavior by the owners or operators of a CO_2 pipeline could probably be addressed by federal antitrust enforcement agencies, including the Federal Trade Commission and the antitrust division of the U.S. Department of Justice. Finally, any pipelines needing to cross federal lands would be required to obtain a right-of-way from the federal government, and so would be subject to any conditions such rights-of-way might impose.

Nevertheless, some analysts, drawing on the history of oil and natural gas pipeline development, anticipate a potential need for better defined federal regulatory authority over a potential expansive CO_2 pipeline network:[66]

> The growth of these sectors and the growing importance of transportation, abuses of market power, price discrimination and other issues, including conflicts between state and federal authorities led both to preemption by the federal government and administrative regulation. As the CO_2 transport and storage sector grows, similar issues of regulatory frameworks and the mix of federal and state jurisdiction are likely to have to be confronted, as has been the case for all network industries in the United States. The eventual economic regulatory development for CCS will need to consider the varying approaches taken for oil and natural gas, and the serious problems that their history experienced.

Thus, Congress may eventually be asked to consider whether the existing federal jurisdictional disclaimers and the current state-by-state regulatory structure for EOR pipelines comprise an appropriate regulatory scheme for a potential national CO_2 pipeline network in support of CCS. If Congress wishes to amend the existing regulatory structure, it could choose to amend existing statutes to provide for definitive CO_2 pipeline rate jurisdiction by the federal government.[67] FERC and the STB are two candidates for administration of such oversight. Alternatively, Congress could establish another federal regulator of CO_2 pipelines, or enact legislation addressing specific aspects of the existing regulatory structure for EOR.

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[65] See, for example, Philip M. Marston, "Doing the Deal: Legal and Regulatory Aspects of the Evolving CCS Regime in the USA," Proceedings of the *2e Collogue International Captage et Stockage Géologique du CO2*, Paris, France (October 4-5, 2007), at 3. http://www.colloqueco2.com/presentations2007/ColloqueCO2-2007_Session4_1-MARSTON.pdf.

[66] M.A. de Figueiredo, H.J. Herzog, P.L. Joskow, K.A. Oye, and D.M. Reiner, "Regulating Carbon Dioxide Capture and Storage," MIT Center for Energy and Environmental Policy Research, Working Paper 07-003 (April 2007), at 5.

[67] S. 2889, an STB reauthorization bill reported out of committee in December of 2009, would amend the STB's jurisdiction in a way that would likely refute any argument that the STB has jurisdiction over CO_2 pipelines. Section 502 of the bill would strike STB's statutory authority to regulate pipelines transporting "water, gas, or oil" and replace it with authority to regulate "water, oil, or natural or artificial gases that are used primarily as a fuel or for other energy purposes."

The Status of CO_2 as a Pollutant Under the Clean Air Act

When considering the need for CCS facilities, as well as the potential liability associated with owning or operating a CCS facility, one important factor to consider is the regulatory treatment of CO_2. For example, if CO_2 is considered a "pollutant" as that term is defined in the Clean Air Act, the use of CCS facilities could help minimize the sort of emissions that would be subject to the regulation of the Environmental Protection Agency (EPA) pursuant to the agency's authority under the Clean Air Act.[68] Regulatory treatment of CO_2 emissions would also be an important consideration for potential CCS owners and operators who are assessing the potential regulatory and liability concerns associated with the proposed facilities.

On December 7, 2009, EPA issued an endangerment finding, classifying six greenhouse gases including CO_2 as "air pollution" that, in combination, endangers public health and welfare because it causes or contributes to global warming.[69] The EPA expressly limited its finding to greenhouse gases emitted from any class or classes of "new motor vehicles and new motor vehicle engines."[70] The EPA's endangerment finding allows the agency to establish emissions standards for greenhouse gases produced by certain "moving sources" (including passenger cars, light-duty trucks, motorcycles, buses, and medium and heavy duty trucks) under section 202(a) of the Clean Air Act.[71] The legal impetus for EPA's finding was the Supreme Court's opinion in *Massachusetts v. EPA*, in which the Court held that EPA has the statutory authority to regulate CO_2 emissions from moving sources pursuant to section 202(a) of the Clean Air Act, and directed the agency to address: (i) whether greenhouse gases emitted by certain moving sources are "air pollution" within the meaning of section 202(a), and (ii) whether greenhouse gases emitted by section 202(a) source categories endanger public health and welfare.[72]

To date, EPA has only proposed greenhouse gas emissions standards for moving sources.[73] The agency's endangerment finding may potentially have implications other sectors including electricity generation and industry. Some argue that EPA regulation of CO_2 emissions from stationary sources is the next logical step to help reduce atmospheric levels of greenhouse gases. Whether EPA chooses to take this step remains to be seen. The 111th Congress is considering bills addressing greenhouse gas emissions from certain stationary sources.[74]

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[68] 43 U.S.C. § 7401 *et seq*.

[69] *Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act; Final Rule*, 74 Fed. Reg. 66,495-66,546 (Dec. 15, 2009). The EPA Administrator defines "air pollution" as a mix of six greenhouse gases: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

[70] According to the EPA Administrator's finding, "the new motor vehicles and new motor vehicle engines" addressed are: "Passenger cars, light-duty trucks, motorcycles, buses, and medium and heavy duty trucks." *Id*. at 66,537.

[71] Section 202(a) of the Clean Air Act provides:

> The [EPA] Administrator shall by regulation prescribe … standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles … which in [her] judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare.

[72] *Massachusetts v. EPA*, 549 U.S. 497 (2007).

[73] *Proposed Rulemaking To Establish Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards*, 74 Fed. Reg. 49,454 (Sept. 29, 2009).

[74] See, *e.g.*, H.R. 2454 §§ 111-116; S. 1733 §§ 121-125.

Massachusetts v. EPA

In *Massachusetts v. EPA*, the Supreme Court was tasked with determining whether EPA is authorized by the Clean Air Act to regulate greenhouse gas emissions from new motor vehicles in the event that the agency finds that such emissions cause or contribute to climate change. The factual background underlying the case involved a rulemaking petition, filed in 1999 by a group of 19 private organizations, asking EPA to regulate greenhouse gas emissions from new motor vehicles under section 202(a).[75] In September, 2003, EPA entered an order denying the rulemaking petition on the grounds that (i) the Clean Air Act did not authorize EPA to issue mandatory regulations to address global climate change; and (ii) even if EPA had the authority to set greenhouse gas emissions standards, such a course of action would be "unwise."[76]

The Court, unmoved by EPA's justifications for declining to regulate greenhouse gas emissions, held that because greenhouse gases (which, as mentioned, include CO_2) "fit well within the Clean Air Act's capacious definition of 'air pollutant,' … EPA has the statutory authority to regulate the emission of such gases from new motor vehicles."[77] Clarifying the contours of EPA's authority to regulate greenhouse gas emissions, Justice Stevens further observed:

> If EPA makes a finding of endangerment, the Clean Air Act requires the agency to regulate the emissions of [CO_2] from new motor vehicles … [O]nce EPA has responded to a petition for rulemaking, its reasons for action or inaction must conform to the [Clean Air Act]. Under the clear terms of the Clean Air Act, EPA can avoid taking further action only if it determines that greenhouse gases do not contribute to climate change or if it provides some reasonable explanation as to why it cannot or will not exercise its discretion to determine whether they do.[78]

In sum, the Court considered EPA's denial of the rulemaking petition "arbitrary, capricious … or otherwise not in accordance with the law," because the agency failed to offer a reasonable explanation for declining to determine whether greenhouse gases are "air pollution" within the meaning of section 202(a) of the Clean Air Act.[79] The Court, however, expressly noted that it was not requiring EPA to make an endangerment finding.[80] Instead, the Court held only "that EPA must ground its reasons for action or inaction in the statute."[81]

EPA's CO_2 Endangerment Finding

In response to the Supreme Court's order in *Massachusetts v. EPA*, EPA announced its final CO_2 endangerment finding on December 7, 2009.[82] The EPA's endangerment determination consisted of two findings, one addressing each component of the section 202(a) endangerment provision.

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[75] *Mass v. EPA* at 510.

[76] *Id.* at 511.

[77] *Id.* at 532.

[78] *Id.* at 533.

[79] *Id.* at 534.

[80] *Id.* at 535.

[81] *Id.*

[82] 74 Fed. Reg. 66,495-66,546. For a more detailed discussion of EPA's CO_2 Endangerment Finding, see CRS Report R40984, *Legal Consequences of EPA's Endangerment Finding for New Motor Vehicle Greenhouse Gas Emissions*, by Robert Meltz.

First, EPA found that current atmospheric levels of greenhouse gases—from all emission sources—constitute in combination "air pollution which may reasonably be anticipated to endanger public health and welfare."[83] This finding is not tied to any specific source category. Second, EPA found that emissions of greenhouse gases by new motor vehicles will in combination "cause or contribute to" the current atmospheric levels of greenhouse gases. This second determination is plainly linked to one source category—emissions from new automobiles, trucks, and motorcycles.

The EPA's bifurcated approach to its endangerment finding may affect sources of CO_2 emissions covered by other provisions of the Clean Air Act, including fuels and fuel additives, non-road engines and non-road vehicles, and aircraft engines, to name a few.[84] For the purposes of the instant discussion, however, the most important consequence of EPA's endangerment finding is that it may potentially trigger EPA regulation of CO_2 emissions from stationary sources of air pollution at some point in the near future.[85]

Implications of EPA's Endangerment Finding for Stationary Sources Covered by the Clean Air Act

As mentioned, the EPA Administrator's endangerment finding under section 202(a) of the Clean Air Act consisted of a general finding (greenhouse gas emissions from *all* sources, taken together, constitute air pollution that may reasonably be anticipated to endanger public health and welfare) and a more specific finding linked to a specific category of moving sources (greenhouse gas emissions from *motor vehicles*, taken together, constitute air pollution that may reasonably be anticipated to endanger public health and welfare). The first, more general endangerment finding may implicate other provisions of the Clean Air Act that apply to stationary sources.

Specifically, section 111(b)(1) of the Clean Air Act, which applies to stationary sources, contains an endangerment provision similar to the one found in section 202(a) of the act.[86] The difference between the two provisions is that section 111(b)(1) only authorizes an endangerment finding for those emissions from stationary sources that cause or contribute "significantly" to air pollution and which may reasonably be anticipated to endanger public health and welfare. An argument could be made that the EPA Administrator's general endangerment finding under section 202(a), coupled with her extensive discussion on the effects of greenhouse gas emissions throughout the endangerment finding, could compel a similar endangerment finding under section 111(b)(1) of the Clean Air Act.[87] In the event of such an endangerment finding, stationary sources would be required to implement the "best system of emission reduction" to comply with any new standards of performance promulgated by EPA.[88]

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[83] 74 Fed. Reg. at 66,516.

[84] See Meltz, at *supra* note 82.

[85] For a discussion and chronology of major federal actions taken in the wake of *Mass. v. EPA*, see CRS Report R41103, *Federal Agency Actions Following the Supreme Court's Climate Change Decision: A Chronology*, by Robert Meltz.

[86] Specifically, Clean Air Act section 111(b)(1) commands EPA to issue new source performance standards (NSPSs) for new or modified stationary sources of air pollution once it determines that a stationary source "causes, or contributes *significantly* to, air pollution which may be reasonably anticipated to endanger public health or welfare."

[87] See Meltz at *supra* note 82.

[88] For the purposes of section 111 generally, the term "standard of performance" means:

(continued...)

Beyond the duty to promulgate new standards of performance for stationary sources subsequent to an endangerment finding under section 111(b)(1), the EPA Administrator has considerable discretion to determine the precise content and applicability of a particular standard of performance. This discretion is inherent in the Clean Air Act's definition "standard of performance," which directs EPA to factor in the feasibility of reducing emissions with current technology (e.g., CCS), and the costs associated with implementing such technology.[89] Additionally, section 111(b)(2) allows EPA to "distinguish among classes, types, and sizes within categories of new sources" when establishing new standards of performance, adding another layer of agency discretion.[90] Accordingly, an endangerment finding under section 111(b)(1) would not necessarily result in EPA regulation of greenhouse gas emissions from *all* stationary sources. To the extent that new standards of performance established by EPA impact stationary sources (such as coal-fired factories and power plants), CCS technology could play an important role in helping stationary sources comply with such standards.

Liability Concerns Associated with CCS Technology

As with most developing technologies, implementation of CCS gives rise to a number of concerns related to both known and unknown risk of loss and liability. Generally, the liability risks associated with CCS fall into three categories: (1) groundwater contamination, either through displacement of saline groundwater into potable aquifers or through direct CO_2 contamination of the aquifers; (2) seismic events triggered by pressure changes; and (3) surface releases due to buoyant flow of CO_2 upward through pathways in undetected faults or abandoned wells.

There is a growing concern that the uncertainty regarding financial responsibility for liability associated with CCS could seriously hinder the development of CCS technology. In the words of the nonprofit U.S. Carbon Sequestration Council:

> A commercial scale power plant equipped with current CCS technology can easily cost over $2 billion. Energy companies and financial institutions (including insurers) cannot risk capital of that magnitude without a clear understanding of regulatory requirements, legal risks and long-term liabilities, before they commit the capital. Today, that understanding does not exist.[91]

Because of this uncertainty and the concern that it will hinder the development of CCS technology, some have suggested that the government create a liability scheme that will provide

(...continued)

> [A] standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated.

Clean Air Act, § 111(a)(1); 42 U.S.C. § 7411(a)(1).

[89] *Id.* The D.C. Circuit has interpreted the standard set forth in Clean Air Act section 111(a)(1) to mean that EPA should "identify the emission levels that are 'achievable' with 'adequately demonstrated technology'" and then use its discretion "to choose an achievable emission level which represents the best balance of economic, environmental, and energy considerations." *Sierra Club v. Costle*, 657 F.2d 298, 330 (D.C. Cir. 1981).

[90] 42 U.S.C. § 7411(b)(2).

[91] U.S. Carbon Sequestration Council, *Wanted: A Legal and Regulatory Framework for Carbon Capture and Storage (CCS)*, April 2009, http://www.uscsc.org/Files/Admin/Educational_Papers/CCS_Legal_Regulatory_Framework.pdf.

certainty to developers and possibly buttress against catastrophic risk. The first such proposal has been issued by EPA pursuant to its regulatory authority under the Safe Drinking Water Act.[92] Other liability schemes that provide greater protection from catastrophic risk, including the "Price-Anderson" model, have also been discussed.

The EPA Proposed Rule

On July 25, 2008, EPA issued a proposed rule for the regulation of the underground injection of CO_2 for purposes of CCS.[93] EPA issued the proposed rule pursuant to its authority to regulate underground injections under the Safe Drinking Water Act. The proposed rule would apply to owners and operators of wells that will be used for long-term CO_2 sequestration.[94] EPA proposed new technical and operational requirements that would be applicable to these owners and operators, but did not offer any specifics about the requisite financial assurances that the owners/operators must provide during the time frame in which these facilities are operational. Instead, EPA sought comments on many of these financial assurance issues.[95]

The proposed rule offered more detail on proposed financial assurance requirements for the post-injection site care period, although EPA still welcomes guidance on these issues before it issues a final rule. The proposed rule would establish a 50-year post-injection site care period, commencing when injection activities cease and the wells are plugged.[96] During this care period, the owner/operator would be required to monitor the underground CO_2 plume and provide financial assurance to address any liability associated with the facility that may arise.[97] The proposed rulemaking would give EPA's regional administrator or the director of a delegated regulatory authority the discretion to lengthen or shorten the site care period based on remaining potential danger to underground drinking water sources or the ongoing stability of the CO_2 plume.[98]

If EPA does adopt a final rule that imposes long-term stewardship requirements on CCS facilities or if any similar statutory or regulatory requirements come to pass, the issue of indemnification of liability for owners and operators of these facilities must be addressed. As other observers have noted, it is exceedingly difficult to obtain liability coverage from private insurers without a clearly defined and commercially practical coverage period.[99] However, a shorter or more clearly defined coverage period could result in harm associated with the facility that is not covered by an insurance policy or some other form of liability assurance, if the liability event occurs after the shorter coverage period. One possible solution to this problem would be for the government to take on some or all of the liability associated with CCS.

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[92] See generally 42 U.S.C. § 300f through 300j-26.

[93] *Federal Requirements Under the Underground Injection Control (UIC) Program for Carbon Dioxide (CO^2) Geologic Sequestration (GS) Wells*, 73 Fed. Reg. 43492 (July 25, 2008).

[94] *Id.*

[95] *Id.* at 43,521.

[96] *Id.* at 43,519-20.

[97] *Id.* at 43,520.

[98] *Id.*

[99] David P. Flynn and Susan M. Marriott, "Carbon Sequestration: A Liability Pathway to Commercial Viability," *ABA Journal: Natural Resources & Environment* (Summer 2009), at p. 39.

The Price-Anderson Model

One possible model for addressing potential liability concerns associated with CCS, especially the possibility of catastrophic loss, is the Price-Anderson Act,[100] which addresses liability associated with nuclear energy facilities. Under the Price-Anderson Act, nuclear power licensees are required to assume all liability for damages associated with their operations that are awarded to the public and must waive most of their legal defenses following an "extraordinary nuclear occurrence."[101] The act further requires licensees that operate reactors with at least 100 megawatts of generation capacity to obtain the maximum liability coverage readily available on the insurance market (currently $300 million).[102] Damages that exceed that amount are covered by the "Price-Anderson Fund," which is funded with retrospective premiums assessed equally against the eligible reactors.[103] That is, if a nuclear incident with liability in excess of $300 million occurs, that excess liability is covered equally by all the licensees. These retrospective payments are capped at $17.5 million per licensee in order to limit the potential financial burden following a major accident.[104] Repayment of liability beyond that amount would require congressional approval under certain procedures outlined in the act.[105]

The liability scheme established by the Price-Anderson Act helped to make the developing nuclear power industry commercially viable in the 1950s by creating a means by which parties could obtain liability coverage despite the unknown extent of the potential liability associated with the emerging technology. Without liability coverage, nuclear generation would have been a risky financial proposition and perhaps would not have been economically viable, given the substantial liability exposure of nuclear facilities.

Although it could be argued that the CCS industry might not face the same potential for catastrophic loss associated with nuclear power, the uncertainty of liability associated with CCS could limit the industry much as the nascent nuclear power industry could have been limited without a federally created liability program. As a result, some have proposed the adoption of a liability scheme for CCS projects that is similar to that found in the Price-Anderson Act. For example, in March of 2009, a panel of EPA's Financial Advisory Board announced that it would look to the Price-Anderson Act for guidance in establishing the liability scheme for geologic CO_2 sequestration.[106] Speaking about the Price-Anderson Act, the chairman of the panel noted that "[b]y limiting liability in the event of an accident, while at the same time providing some level of public compensation for damages, the legislation served as an incentive and the nuclear power industry grew from one reactor in 1957, to 104 today."[107] The chairman clarified that while he was not suggesting the adoption of the Price-Anderson model without alteration for the CCS industry, the panel would use the act as a guide for addressing long-term financial responsibility issues; for example, the panel might look to the act's three tiers of liability: individual site

[100] Primarily section 170 of the Atomic Energy Act of 1954, 42 U.S.C. § 2210. For further discussion of the Price-Anderson Act, see CRS Report RL33558, *Nuclear Energy Policy*, by Mark Holt, at section entitled "Nuclear Accident Liability."

[101] 42 U.S.C. § 2210.

[102] *Id.*

[103] *Id.*

[104] *Id.*

[105] *Id.*

[106] "EPA Finance Advisors Eye Price-Anderson Model for CCS Liability," *Inside the EPA*, March 20, 2009.

[107] *Id.*

responsibility; collective responsibility of all nuclear generators; and the responsibility of the U.S. government.[108]

Financial Assurance Requirements in Legislative Proposals

Not all proposals to address CCS liability concerns are variations on the Price-Anderson model. Other models have gained traction among legislators and regulators. For example, S. 1013, the Department of Energy Carbon Capture and Sequestration Program Amendments Act of 2009, would require CCS facility licensees to obtain liability protection in amounts "acceptable" to regulators, and would authorize the Secretary of Energy to agree to indemnify licensees who satisfy this requirement for amounts in excess of the liability protection obtained by the licensees.[109] The federal Secretary of Energy would also be authorized to collect a fee from licensees to cover this indemnification.[110] The amount of the fee would be determined by taking into account the likelihood of an incident and other factors related to the hazards associated with the indemnified project.[111] This proposal has some elements in common with the Price-Anderson model—most notably, the requirement that licensees obtain financial protection to a certain level, and indemnification through a federal program above and beyond that protection. However, this proposal would not necessarily require licensees to obtain the highest possible level of financial protection before triggering federal indemnification, and such federal indemnification would come from the Treasury rather than a separate fund comprised of monies collected retroactively from licensees.

Other bills contain fewer details regarding financial assurances from owners/operators of CCS facilities, but still recognize the need to address the issue before the technology can be deployed in a commercially viable manner. For example, Subtitle B of H.R. 2454, the American Clean Energy and Security Act of 2009, would seek to encourage CCS technology. Although the Subtitle would not establish a financial assurance system for licensed CCS facilities, it would require the EPA Administrator to promulgate regulations requiring operators of CCS facilities to provide evidence of "financial responsibility," with the details of that demonstration for the most part left to the discretion of the Administrator.[112]

[108] *Id.*

[109] S. 1013 at § 2.

[110] *Id.*

[111] *Id.*

[112] H.R. 2454 at § 112.

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