JENNER&BLOCK

Client Alert: Carbon Dioxide Capture and Storage: A Pathway for Greenhouse Gas Emission Reductions

Publications

December 19, 2022
By: Steven Siros, Arie T. Feltman-Frank

As businesses continue to optimize their environmental, social, and governance (ESG) strategies, an important arrow in the ESG quiver may be carbon dioxide (CO_2) capture and storage (CCS). CCS involves capturing, compressing, transporting, and then injecting CO_2 into deep underground porous rock formations for long-term storage, known as geological sequestration (GS). These formations are often a mile or more beneath the surface and overlaid by impermeable, non-porous layers of rock that trap the CO_2 and prevent it from migrating upward.

The effectiveness of carbon capture,[1] coupled with the robust storage capacity available in the United States,[2] make CCS a promising method to minimize the climate-forcing effects of CO_2 emissions. Indeed, the Security and Exchange Commission's (SEC's) proposed climate-disclosure rule refers to investing in CCS technologies as one way by which companies can "take advantage of climate-related opportunities." CCS may also be a viable compliance option for "major" federal contractors which, according to a recently proposed Federal Acquisition Regulatory Council rule, will be required to set "science-based targets" to reduce their greenhouse gas (GHG) emissions in order to do business with the federal government.

Injecting CO_2 underground is not new. For decades, the oil and gas industry has been utilizing enhanced oil recovery (EOR), a process that involves injecting CO_2 into oil-bearing formations to increase the amount of oil and gas produced from oil and gas reservoirs. What is relatively new, however, is the increased focus on GS as a vital, if not indispensable,[3] part of meeting CO_2 -reduction goals. This client alert will predominantly focus on the GS component of CCS and the permitting requirements associated with GS of CO_2 for the purpose of meeting GHG reduction targets.

I. The Safe Drinking Water Act and Geological Sequestration of CO_2

The primary federal program governing GS of CO_2 is the Safe Drinking Water Act's (SDWA's) Underground Injection Control (UIC) program. According to EPA, the "chief goal" of the UIC program is the "protection" of underground sources of drinking water (USDWs).[4] Under the SDWA, EPA must publish regulations for state UIC programs that "contain minimum requirements for effective programs to prevent underground injection which endangers drinking water sources."[5] Interested states can then apply for primary enforcement responsibility of the UIC program, known as "primacy."[6]

The statutory vehicle for primacy applicable to GS of CO_2 is section 1422, whereby states must demonstrate that, among other requirements, they have adopted and will implement a UIC program that meets the "minimum requirements" established by the federal regulations.[7] While the federal regulations establish a floor, they do not preclude states from adopting or enforcing "more stringent or [] extensive" requirements or "[o]perating a program with a greater scope of coverage."[8] If EPA approves a state's UIC program, the state achieves primacy; if EPA disapproves the program (or parts thereof), or if a state fails to apply, the federal UIC program applies.

There are six classes of underground injection wells that are regulated under the SDWA.[10] Of these classes, Class VI and Class II wells are most relevant to GS of CO_2 .

Class VI wells are used for non-experimental GS of CO_2 .[11] EPA promulgated regulations governing minimum federal requirements for Class VI wells by final rule on December 10, 2010. The regulations are generally set forth at 40 C.F.R. Parts 124, 144, 145, and 146 and required EPA to establish a Federal UIC Class VI program in each state that did not submit a complete primacy application by September 6, 2011. Because no state applied by the deadline, on September 6, 2011, the federal Class VI program became effective nationwide.

Since then, only North Dakota and Wyoming have achieved Class VI primacy. In all other states, the federal program applies. Only two Class VI permits have been issued under the federal UIC program, both by EPA Region 5 to Archer Daniels Midland in Decatur, Illinois, which took EPA approximately three years to issue (measured from the date the applications were submitted to issuance). Another 28 Class VI permit applications are pending in California, Illinois, Indiana, Louisiana, Ohio, and Texas. It is anticipated that over time, the permitting process will become both faster and more efficient, especially in light of increased funding provided by the Infrastructure Investment and Jobs Act (IIJA), which appropriates $5 billion annually to EPA over the next five years for the permitting of Class VI wells as a way to facilitate more CCS.[12]

Class II wells, which include wells that inject fluids into oil and gas reservoirs for EOR,[13] are also relevant to GS of CO_2 because long-term storage of CO_2 in these wells can be incidental to the injection process. Notably, most states have achieved Class II primacy.[14] When EOR results in some “incidental storage” of CO_2 in a Class II well, the owner or operator is likely not required to seek a Class VI permit. However, if the owner or operator elects to use a Class II well originally used for EOR to inject CO_2 for the “primary purpose of long-term storage,” the regulations require that the owner or operator obtain a Class VI permit “when there is an increased risk to USDWs compared to Class II operations.”[15]

We are not aware of any instances where EPA has required an owner or operator to obtain a Class VI permit for a previously permitted Class II well. As such, one attractive option for owners or operators of Class II wells used for EOR may be to utilize these wells for long-term GS of CO_2 , given that the Class II requirements are less stringent. Because Class VI wells are the primary wells used for long-term CO_2 storage, the remainder of this client alert will predominantly focus on Class VI wells.

A. Geological Sequestration Projects in States Where the Federal UIC Class VI Program Applies.

In states in which the federal UIC Class VI program applies, to receive a Class VI permit that would allow for GS of CO_2 , businesses need to submit a Class VI permit application to the appropriate EPA regional office within “a reasonable time before construction is expected to begin.”

Because the primary requirement of the UIC program is to ensure that GS of CO_2 will not threaten any USDWs, businesses need to carefully choose where to locate their wells. In particular, wells need to be placed at sites of “suitable” geology. Of suitable geology means that the injection zone can receive the total anticipated volume of the CO_2 stream, while the confining zone, i.e., the area in which the CO_2 will be stored, must be free of transmissive faults or fractures and sufficient to contain the injected CO_2 stream. The confining zone also must be able to withstand injection without initiating or propagating fractures that would allow the CO_2 to migrate outside its bounds.[16] GS of CO_2 must also be beneath the lowermost formation containing a USDW unless a waiver of the injection depth requirements has been granted.[17]

In their applications, Class VI permit applicants must include information regarding the proposed injection well, its construction, the proposed operations, and geologic, hydrologic, and other information regarding the area around the project where USDWs may be endangered, which is known as the “area of review.” The area of review is “delineated using computational modeling.”[18] Applications must also include plans related to the area of review and the types of corrective action, testing and monitoring, injection well plugging, post-injection site care and site closure, and emergency and remedial response that will be provided. Lastly, applications must provide proof that the applicants meet financial responsibility requirements.[19]

Throughout the application process, applicants should consider whether the information submitted to EPA can be claimed as confidential business information. If so, they should be sure to make a confidential business information assertion in their applications or else risk the possibility that their applications could be subject to public disclosure.[20]

Once cessation of injection occurs, owners and operators must continue to monitor the site for "at least 50 years" or until EPA decides that the GS project no longer poses an endangerment to USDWs. Owners and operators also must report any evidence that the injected CO_2 stream or associated pressure front may cause endangerment to a USDW.[21]

If any indication of movement of any contaminant into an USDW exists, the permittee will be subject to "additional requirements . . . as are necessary to prevent such movement," which are imposed by modifying the permit or terminating the permit if "cause" exists. In addition, in the absence of "appropriate" state or local action, EPA may take "emergency action" when "a contaminant which is present in or likely to enter a public water system or [USDW] may present an imminent and substantial endangerment to the health of persons."[22]

B. Geological Sequestration Projects in States That Have Achieved Class VI Primacy

As noted previously, only North Dakota and Wyoming have achieved Class VI primacy.[23] Thus, businesses interested in pursuing GS in these states will have to do so in accordance with the states' respective Class VI regulations. North Dakota's Class VI program is administered by the North Dakota Oil & Gas Division. To date, North Dakota's Oil & Gas Division has issued two Class VI permits and has one permit application under review. Wyoming's Class VI program, on the other hand, is administered by the Wyoming Department of Environmental Quality. To date, Wyoming has received two Class VI permit applications, each of which are still under review.

In contrast to the three-year permitting time for the two Class VI permits issued by EPA Region 5, the time to review and approve the two permits issued by the North Dakota Oil & Gas Division was approximately eight months. It is expected, however, that the annual $50 billion in grant funding made available through the IIJA over the next five years[24] will drive more states to seek Class VI primacy. The likely result will be that more projects may be able to get permitted faster.

II. Obstacles, New Developments, and Other Considerations

Despite the significant funding and attention given to CCS as a climate mitigation tool, businesses interested in pursuing CCS should be aware of potential obstacles they may encounter and be required to navigate. These obstacles include high project costs, public opposition, and uncertainties associated with subsurface pore space ownership and long-term liability. While other project specific requirements are likely to arise, such as compliance with additional federal, state, and local laws,[25] a review of these additional requirements is beyond the scope of this client alert.

A. High Project Costs

High project costs are a key challenge to CCS development. Whether a project's costs are high or not will depend on several factors, including the type of facility, the facility's proximity to the injection site, the availability of CO_2 transportation infrastructure, and tax credits and grants.

Taking each of these factors in turn, certain facilities will be at an advantage when it comes to cost thanks to characteristics like the concentration of the CO_2 stream. In particular, CO_2 capture is most cost-effective for facilities that generate highly concentrated CO_2 streams.[26]

With respect to transportation, the closer the CO_2 -producing facility is to the injection site, the lower the overall costs will be. Also, CCS is likely to be most cost-effective in areas with a history of oil and gas extraction and EOR, such as California, Illinois, Kansas, Oklahoma, and Texas, where the approximately 5,000 miles of CO_2 pipelines established in the United States are largely located.[27] While the expansion of CO_2 pipeline infrastructure will be necessary for large-scale CCS development, the need for additional pipelines to deliver the CO_2 to the injection site creates not only more infrastructure costs but also more requirements with which more costs, such as permit and land acquisition and related compliance with pipeline safety regulations, are likely associated.[28]

Importantly, the cost equation may be changing owing to the expanded 45Q tax credits established by the 2022 Inflation Reduction Act (IRA), which are available in addition to funding provided by the IIJA. Although a detailed overview of these statutes' provisions is beyond the purview of this client alert, at a high level, the IRA increased the 45Q tax credits for certain facilities or equipment placed in service after December 31, 2022, to $85 per ton of CO_2 disposed of in secure geologic storage and $60 per ton of CO_2 used for EOR and disposed of in secure geologic storage or otherwise utilized in a qualified manner.[29] As mentioned above, in addition to the IRA-driven tax credits, the IIJA provided significant funding for CCS, some of which was allocated to the U.S. Department of Energy, which recently released three funding opportunity announcements and established a new finance program that may help CCS developers reduce costs further.

B. Public Opposition

Despite its upsides, it is possible that CCS projects may draw opposition from the public, which can present serious developmental challenges. To address potential opposition, businesses would be wise to consider how to authentically engage with community stakeholders at the outset of project development to try to avoid contentious permitting processes to the extent possible.

However, should public opposition escalate into formal attempts to prohibit or restrict GS of CO_2 , businesses should consider whether these efforts may be preempted.[30] Although the SDWA contains a savings clause that provides that "[n]othing in this subchapter shall diminish any authority of a State or political subdivision to adopt or enforce any law or regulation respecting underground injection,"[31] some courts have found local actions to be preempted, as best exemplified in *EQT Prod. Co. v. Wender*.[32]

In the case, the US Court of Appeals for the Fourth Circuit affirmed a district court's determination that the West Virginia UIC program established under the West Virginia Water Pollution Control Act (WPCA) preempted a county ordinance that imposed a blanket ban on the disposal of wastewater anywhere within the county.[33]

The Fourth Circuit explained that municipal ordinances that are inconsistent or in conflict with state law are preempted and further concluded that the ordinance's prohibition was inconsistent with West Virginia's UIC program because the permanent disposal of wastewater in Class II wells "is licensed and regulated by the state pursuant to a comprehensive and complex permit program." The court also rejected the county's argument that the WPCA's savings clause, which preserves the power of local entities to "suppress nuisances," permitted the county to broadly designate UIC wells as nuisances and then categorically ban them. The court refused to give the savings clause this broad and less logical reading absent express language and instead interpreted the clause as allowing local regulation that "touch[ed] on the licensed activity." This had the effect of preserving the county's right to bring a common law public nuisance action against a state permitted UIC well on a case-by-case basis.

This case suggests that local actions, at least those that have the effect of banning or prohibiting otherwise permitted GS projects, may be preempted by state or federal law.

C. Subsurface Pore Space Ownership and Long-Term Liability

Finally, businesses interested in pursuing GS should consider uncertainties associated with subsurface pore space ownership and long-term liability. Ways to circumvent pore space ownership and liability issues are described below.

First, to effectuate GS of CO_2 , businesses will need to acquire ownership or control of the pore space in which the CO_2 will be stored. This step, in turn, will require determinations as to subsurface ownership rights, which are influenced by whether the pore space is located under federal or non-federal land. For projects located under non-federal land, who owns subsurface pore space will ultimately depend on the language employed in legal instruments related to the property rights at issue and state law. The "majority rule," however, appears to be that the surface rights owner has the relevant property interest and holders of mineral rights do not, merely by virtue of these rights, have ownership or control of subsurface pore space.[34] States like Wyoming and North Dakota have enacted laws to address uncertainties associated with subsurface pore space ownership by specifying that surface rights owners own the underlying pore space.[35]

With respect to long-term liability, as explained previously, owners and operators must continue to conduct monitoring post-injection for at least 50 years or until the GS project no longer poses an endangerment to USDWs before site closure. In addition to post injection site care and site closure, owners and operators must maintain financial responsibility over emergency and remedial response.[36] Some states like Indiana, Texas, and Louisiana have established processes for transferring long-term liability to the state to alleviate the chilling effect that concerns over long-term liability might have on GS development.[37]

III. Conclusion

As businesses explore ways to execute their GHG emissions reduction targets, CCS looms large. Jenner & Block's Environmental and Workplace Health and Safety, and Transitions in Energy and Climate Solutions Practices not only can help businesses assess whether CCS is a viable option for them, but also can strategically and efficiently navigate each stage of the CCS process to accelerate desired outcomes in a cost-effective manner.

Footnotes

[1] For example, one type of CO_2capture, post-combustion capture, typically captures 85% to 95% of the CO_2. Angela C. Jones & Ashley J. Lawson, Cong. Rsch. Serv., R44902, Carbon Capture and Sequestration (CCS) in the United States 4 (2022), https://sgp.fas.org/crs/misc/R44902.pdf [hereinafter *Oct. 2022 CRS Report*].

[2] U.S. Department of Energy estimates there to be a total storage capacity of between about 2.6 trillion and 22 trillion metric tons of CO_2. Id. at 9. Theoretically, the United States contains enough storage capacity to store all CO_2emissions from large stationary sources, at the current rate of emissions, for centuries. Cong. Rsch. Serv., Injection and Geological Sequestration of Carbon Dioxide: Federal Role and Issues for Congress 3 (2022), https://crsreports.congress.gov/product/pdf/R/R46192 [hereinafter *Sept. 2022 CRS Report*].

[3] For example, according to the Council on Environmental Quality (CEQ), GS of CO_2will "likely [be] needed to deliver on the Paris Agreement goals to hold warming well below 2 degrees Celsius and pursuing efforts to hold warming to 1.5 degrees Celsius, which is necessary to prevent the worst impacts of climate change." CEQ, Report to Congress on Carbon Capture, Utilization, and Sequestration 6 (2021), https://www.whitehouse.gov/wp-content/uploads/2021/06/CEQ-CCUS-Permitting-Report.pdf [hereinafter *CEQ Report*].

[4] 75 Fed. Reg. 77,230, 77,235 (Class VI Rule); *see also* 42 U.S.C. §300h(b)(1)(B); 40 C.F.R. §144.12.

[5] 42 U.S.C. §§300h(a)-(b); 40 C.F.R. Part 145, Subpart B (imposing minimum requirements for permitting, compliance evaluation programs, enforcement authority, and sharing of information).

[6] 42 U.S.C. §300h-1(b)(1); 40 C.F.R. §144.1(f)(2). Indian tribes may, too. 42 U.S.C. §§300h-1(e); 40 C.F.R. Part 145, Subpart E.

[7] *See* 42 U.S.C. §300h-1; Class VI Rule at 77,241 (explaining that states must demonstrate that their "regulations are at least as stringent as those promulgated by EPA").

[8] 40 C.F.R. §145.1(g). Though where an approved state program has a greater scope of coverage, the additional coverage is not part of the federally approved program. *Id.* §145.1(g)(2).

[9] 42 U.S.C. §§300h-1(b)(3), (c).

[10] 40 C.F.R. §144.6.

[11] Notably, Class V wells are used for experimental injection of CO_2(e.g., U.S. Department of Energy-supported research wells). See *id.* §144.81(14). "The construction, operation, or maintenance of any non-experimental Class V GS well is prohibited." *Id.* §144.15. By December 10, 2011, owners or operators of experimental technology wells no longer being used for experimental purposes were required to apply for a Class VI permit. *Id.* §146.81(c). EPA has noted that it "anticipates that few, if any Class V experimental technology well permits will be issued under SDWA for future GS projects." 76 Fed. Reg. 56,982, 56,983.

[12] 42 U.S.C. §300h-9.

[13] 40 C.F.R. §144.6(b)(2).

[14] *Sept. 2022 CRS Report*, *supra* note *2*, at 15.

[15] *See* 40 C.F.R. §144.19(a).

[16] 40 C.F.R. §146.83(a). According to the United States Geological Survey, areas with the most storage potential are the Coastal Plains region, which includes coastal basins from Texas to Georgia, Alaska, and the Rocky Mountains – Northern Great Plains. *Which area is the best for geologic carbon sequestration?*, USGS, https://www.usgs.gov/faqs/which-area-best-geologic-carbon-sequestration (last visited Dec. 12, 2022).

[17] 40 C.F.R. §§144.6(f), 146.95

[18] *See id.* §§146.82(a), 146.81.

[19] *Id.*; *id.* §146.85(a)(2). Applicants will likely need to hire environmental consultants to provide support at every phase of the GS project.

[20] *See id.* §144.5.

[21] *Id.* §§146.93(b), 146.91(c)(1).

[22] *Id.* §144.12; 42 U.S.C. §300i.

[23] Other states are also moving towards primacy; Texas, Arizona, and West Virginia are in the "pre-application" phase, while Louisiana's primacy application is being evaluated.

[24] *Id.* §300h-9.

[25] *See CEQ Report, supra* note 3, at 30.

[26] Adam Baylin-Stern & Niels Berghout, *Is Carbon Capture Too Expensive?*, IEA (Feb. 17, 2021), https://www.iea.org/commentaries/is-carbon-capture-too-expensive.

[27] *Oct. 2022 CRS Report, supra* note 1, at 8, 23.

[28] *See CEQ Report, supra* note 3, at 25-31. Using marine vessels may also be a feasible option for CO_2transport. *Oct. 2022 CRS Report, supra* note 1, at 8.

[29] According to CEQ, "[c]arbon utilization is a broad term used to describe the many different ways that captured . . . CO_2. . . can be used [] to produce economically valuable products or services." *CEQ Report, supra* note 3, at 13. The IRA-driven tax credits are an increase from the previous tax credits of $50 and $35, respectively. To qualify for the tax credits, qualified facilities must begin construction by December 31, 2032.

[30] For example, in a recent lawsuit filed against Livingston Parish in the United States District Court for the Middle District of Louisiana, developer Air Products is arguing that the parish's attempts to restrict its proposed GS project are preempted by state and federal law.

[31] 42 U.S.C. §300h-2(d).

[32] 870 F.3d 322, 332 (2017).

[33] The court refused to decide the question of federal preemption on constitutional avoidance grounds. The court clarified that the question posed by the ordinance's prohibition was whether the county could effectively "nullify" the Class II permit issued by DEP pursuant to the WPCA. The case did not require the court to consider "the authority of a county to regulate matters that are only related to or associated with a state-permitted activity."

[34] Cong. Rsch. Serv., RL34307, Legal Issues Associated with the Development of Carbon Dioxide Sequestration Technology (2011), https://www.everycrsreport.com/reports/RL34307.html. Though the mineral rights owner could have priority over uses of the land, including the ability of the surface rights owner to make use of the pore space, that would interfere with the mineral rights holder's ability to remove minerals.

[35] Wyo. Stat. §§34 -1-152, 34-1-153 (2009); N.D. Cent. Code §47-31-02 *et seq.* (2009).

[36] 40 C.F.R. §146.85(a).

[37] *See CEQ Report, supra* note 3, at 43.

Related Capabilities

ESG: Environmental, Social, and Governance

Transitions in Energy and Climate Solutions

Stay Informed →