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WHAT EVERY **WYOMING LANDOWNER** SHOULD KNOW ABOUT **CARBON CAPTURE & STORAGE**

A CCS RESOURCE GUIDE AND FREQUENTLY ASKED QUESTIONS

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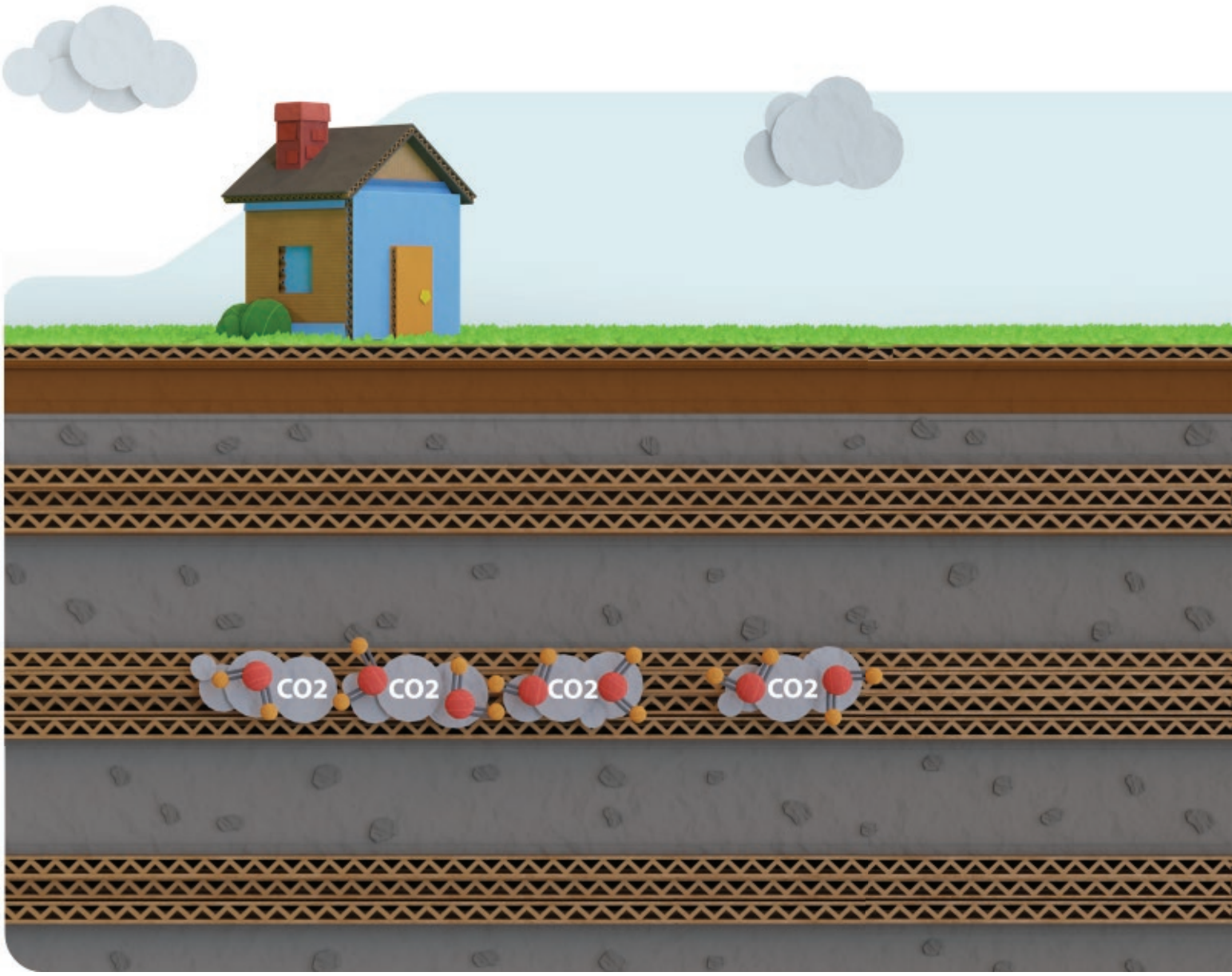

ACKNOWLEDGMENTS

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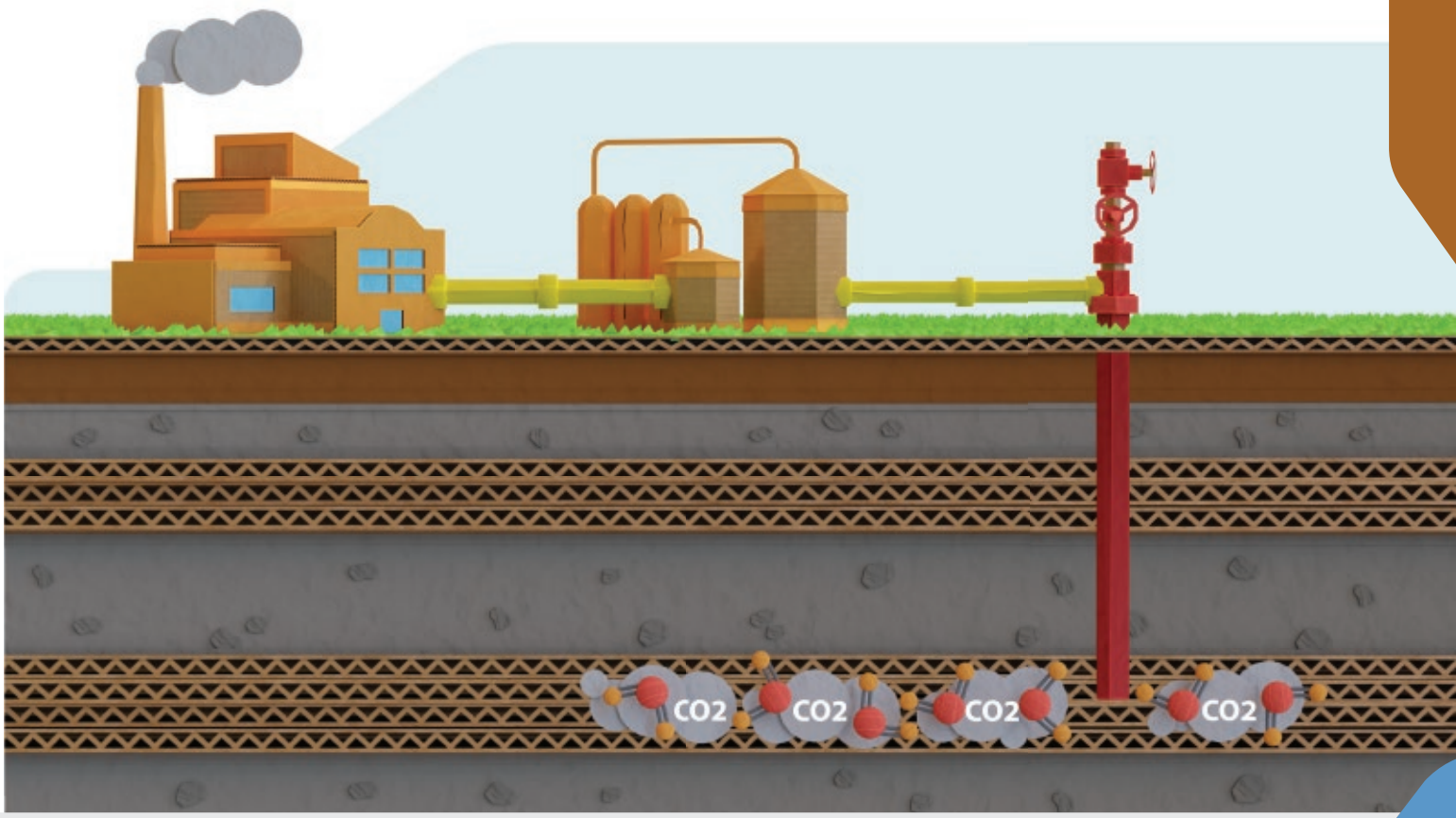
WHAT EVERY WYOMING LANDOWNER SHOULD KNOW ABOUT CARBON CAPTURE AND STORAGE[1]

WHAT IS CARBON CAPTURE AND STORAGE?

Carbon capture and storage ("CCS") is the process of capturing carbon dioxide ("CO2") molecules and storing them in underground geologic formations.[2] CCS may also involve transporting CO2 via pipelines from capture sources to injection wells.



[1] This publication was authored by Carson Tanner as part of an independent study supervised by Professor Tara Righetti. Carson graduated with a J.D./M.A. in Environment and Natural Resources at the University of Wyoming, and will be joining Yonkee & Toner, LLP as an associate attorney upon passing the 2023 Wyoming bar exam.

[2] United States Department of Energy, DOE Explains…Carbon Sequestration, https://www.energy.gov/science/doe-explainscarbon-sequestration (last visited Sept. 30, 2024).

WHAT ARE THE POTENTIAL RISKS OF CCS?

It is well established that subsurface formations are capable of safely and securing CO2. In many places, CO2 exists naturally in the subsurface. Additionally, CO2 injection operations have been conducted for decades as part of operations for enhanced oil recovery.

Concerns about CCS include the possibility of leakage into the atmosphere and into other subsurface formations, including those containing oil and gas or groundwater. While CO2 is a non-flammable gas and does not pose a risk of explosion, in rare cases, a high concentration leak from a pipeline or well could pose health and safety concerns. All stages of CCS are highly regulated to limit these potential risks to public health and the environment.

CO2 injections could also induce seismic activity and associated land subsidence issues that may impact aboveground structures and subsurface resources.[3]

Additionally, depending on the capture technology used, CCS can generate various waste by-products that could increase the possibility of leakage or have other health, safety, and environmental impacts. However, these risks can be mitigated by proper waste handling and disposal by the CCS operator.[4]

HOW IS CCS REGULATED?

CCS is regulated by Class VI of the Underground Injection Control Program of the Safe Drinking Water Act.[5] The program is administered either by the Environmental Protection Agency (the "EPA") or by state agencies who have obtained primacy over the Class VI program.[6] To achieve primacy, a state must have implemented a Class VI regulation program which meets EPA's minimum requirements. Wyoming has achieved primacy.[7]

In Wyoming, the water quality division of the Department of Environmental Quality ("DEQ") is the state agency responsible for regulating injection operations as part of CCS.[8] The Class VI permitting process requires the injector to demonstrate the ability of the subsurface formations to safely contain the CO2, establishes stringent well construction standards, and imposes monitoring obligations to limit potential risks associated with CCS.[9]

[3] Seyed Kourosh Mahjour & Salah A. Faroughi, Risks and Uncertainties in Carbon Capture, Transport, and Storage Projects: A Comprehensive Review, Gas Sci. & Engineering, November 2023, at 1, 6.

[4] Id. at 3.

[5] *See* 42 U.S.C. § 300h-9(b).

[6] *See* 42 U.S.C. § 300g-3(a)(2).

[7] *See* Environmental Protection Agency, *Primary Enforcement Authority for the Underground Injection Control Program*, https://www.epa.gov/uic/primary-enforcement-authority-underground-injection-control-program-0 (last visited Sept. 24, 2024); *see also* 42 U.S.C. § 300h-1, providing for states to be the primary regulatory authorities for the Safe Drinking Water Act.

[8] *See* Wyo. Stat. §§ 35-11-313(a), (e)-(f), providing that CCS is prohibited unless authorized by a permit issued by DEQ and providing DEQ with the authority to promulgate rules to regulate CCS operations in Wyoming.

[9] *See* 020-0011-24 Wyo. Code R. § 12(a); 020-0011-24 Wyo. Code R. § 14; 020-0011-24 Wyo. Code R. § 20.

WHO IS RESPONSIBLE IF SOMETHING GOES WRONG?

Wyoming law clarifies that an injector maintains the title and responsibility for any CO2 it injects and stores underground. . The law explicitly provides that landowners—as pore space owners—will not be liable for CCS operations "solely by virtue of their interest or by their having given consent to the injection."[10]

If certain criteria are met after a period of at least 20 years since injections have ceased, liability can be transferred to the State once an certificate of project completion is received."[11] When an injector receives a certificate of project completion, the injector is "forever released from all regulatory requirements associated with the continued storage and maintenance of the injected carbon dioxide," and "[p]rimary responsibility and liability" for the carbon dioxide transfers to the State. To cover these obligations, injectors into Class VI wells pay 7 cents per ton of injected carbon dioxide into a "geologic sequestration special revenue account" which can be used to satisfy claims associated with the release of carbon dioxide from a project after the operator has received a certificate of project completion.[12] Unless an operator has received a certificate, the State bears no responsibility for the CO2.

A landowner may also have civil claims against the injector arising under tort or contract. DEQ requires CCS injectors to maintain a public liability insurance policy until DEQ certifies that the CO2 plume has stabilized.[13] The policy must cover accidents included in the "Risk Activity Table" provided by DEQ, which includes mineral rights infringements, water quality contamination, and CO2 releases, among other risks.[14] However, the insurance coverage required by DEQ may not cover all claims. As a result, CCS agreements may include additional risk management provisions to protect landowners, including indemnity provisions, insurance, and bonding. A licensed Wyoming attorney can help protect against these risks in agreements authorizing use of pore space.

[10] Wyo. Stat. § 34-1-153(b).
[11] Wyo. Stat. §§ 35-11-319(b), (c).
[12] *See* 020-0011-29 Wyo. Code R. § 4(a); Wyo. Stat. §§ 35-11-320(c), (d).
[13] 24 Wyo. Code R. § 26(l)(iii).
[14] 24 Wyo. Code R. § 26(l)(i)(A); *see generally*, 24 Wyo. Code R. App. A.

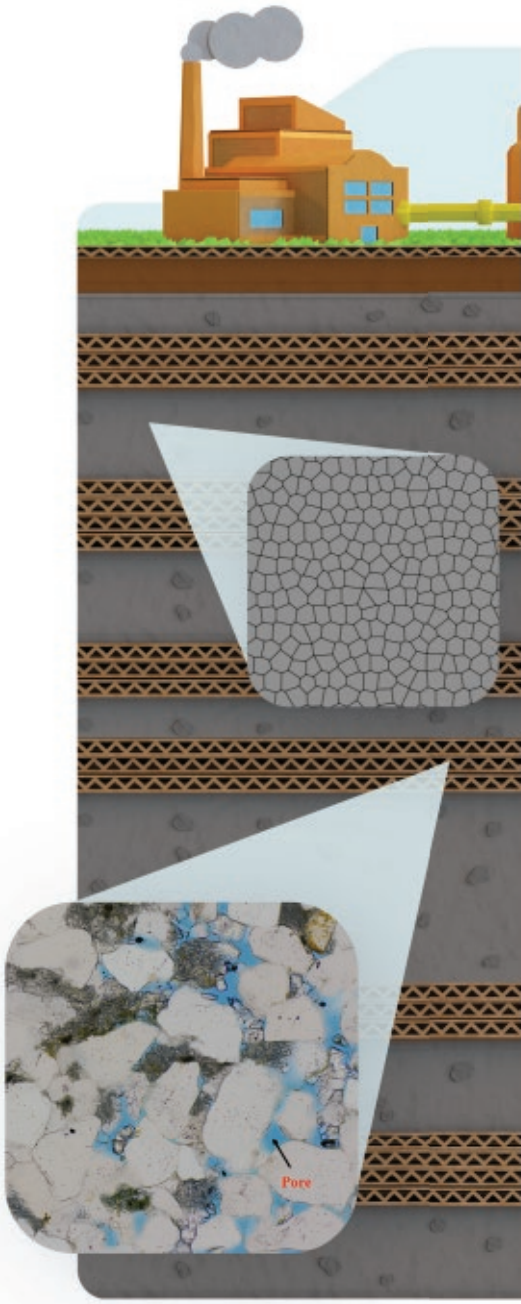
HOW WILL I KNOW IF A CCS PROJECT IS CONTEMPLATED UNDER OR NEAR MY PROPERTY?

Wyoming law requires Class VI applicants to provide landowners with notice of proposed projects anytime the landowner's interests are included in the project, or if the landowner's property is located within 1 mile of the geologic sequestration site.[15] Class VI applicants must also publish notice of the application in a newspaper of general circulation in each county of the proposed operation at weekly intervals for 4 consecutive weeks.[16] In addition, land professionals may approach Wyoming landowners to ask about acquiring injection rights.

WHAT IS PORE SPACE AND WHO OWNS IT?

In geologic CCS, CO2 is injected into the "pore space" of a subsurface geologic formation. Wyoming defines pore space as "subsurface space which can be used as storage for carbon dioxide or other substances."[17] When thinking about pore space, envision a kitchen sponge. Pore space is similar to the small holes within a sponge which hold water. The existing pore space is not empty; those pores will already be occupied by oil, gas, brine, or water.

In Wyoming, the surface owner also owns the underground pore space.[18] However, pore space can be "severed" into its own estate, meaning the owner of the surface and the owner of the subsurface pore space can be two different parties.[19] A review of historical transactions concerning the property and minerals is necessary to determine if pore space has been conveyed.



[15] Wyo. Stat. § 35-11-313(f)(2)(N)(II).
[16] Wyo. Stat. § 35-11-313(f)(2)(N)(I).
[17] Wyo. Stat. § 34-1-152(d).
[18] *See* Wyo. Stat. § 34-1-152(a).
[19] *See* Wyo. Stat. § 34-1-152(b).

HOW DO I CONTRACT FOR MY PORE SPACE?

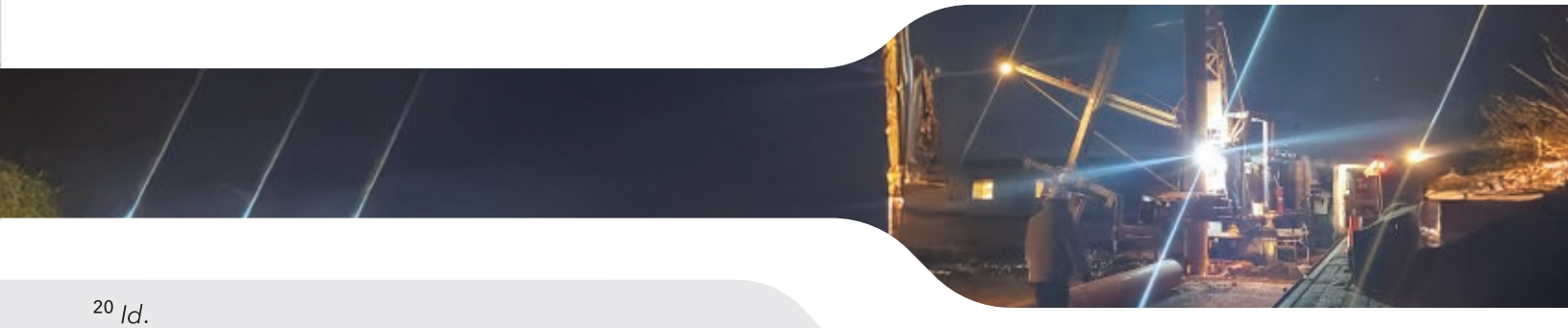
Under Wyoming law, pore space can be "conveyed in the manner provided by law for the transfer of mineral interests in real property."[20] Common methods to convey pore space interests include easements, leases, and sales. Some of these agreements limit the rights only to subsurface use of the pore space while others also grant the right to put facilities on the land.

WHAT HAPPENS IF I DON'T ENTER INTO AN AGREEMENT?

Some sequestration projects can require tens of thousands of acres of pore space. Due to the immense contracting and land acquisition challenge that presents, the Wyoming Oil and Gas Conservation Commission is permitted to create geologic sequestration units and to compulsorily include pore space in some circumstances.[21] To form a unit, a petitioner must submit a unitization plan to the Commission which includes allocation of economic benefits within the unitized area and how the area is to be operated.[22]

The Wyoming legislature defines the term "economic benefits" in statute as "the equitable proportionate share of all financial proceeds" owed to each pore space owner in a unit based on "each individual pore space owner's contribution of pore space storage capacity to a unit area."[23] Petitioners are required to provide notice to all persons having an interest in the surface or pore space estate in the unit area, encumbrance holders, and all surface estate or pore space owners located within one-half (1/2) mile from the boundaries of the proposed unit area, via certified mail at least 30 days prior to the hearing.[24]

After the hearing, the Commission must decide whether to approve the proposed unitization plan.[25] If the Commission approves, parties owning at least 75 or 80% of the pore space storage capacity included in the unitization plan must ratify the plan for it to become effective.[26] Additionally, an owner of pore space within a geologic sequestration site who is not included in the unitization plan may petition to be included in the unit.

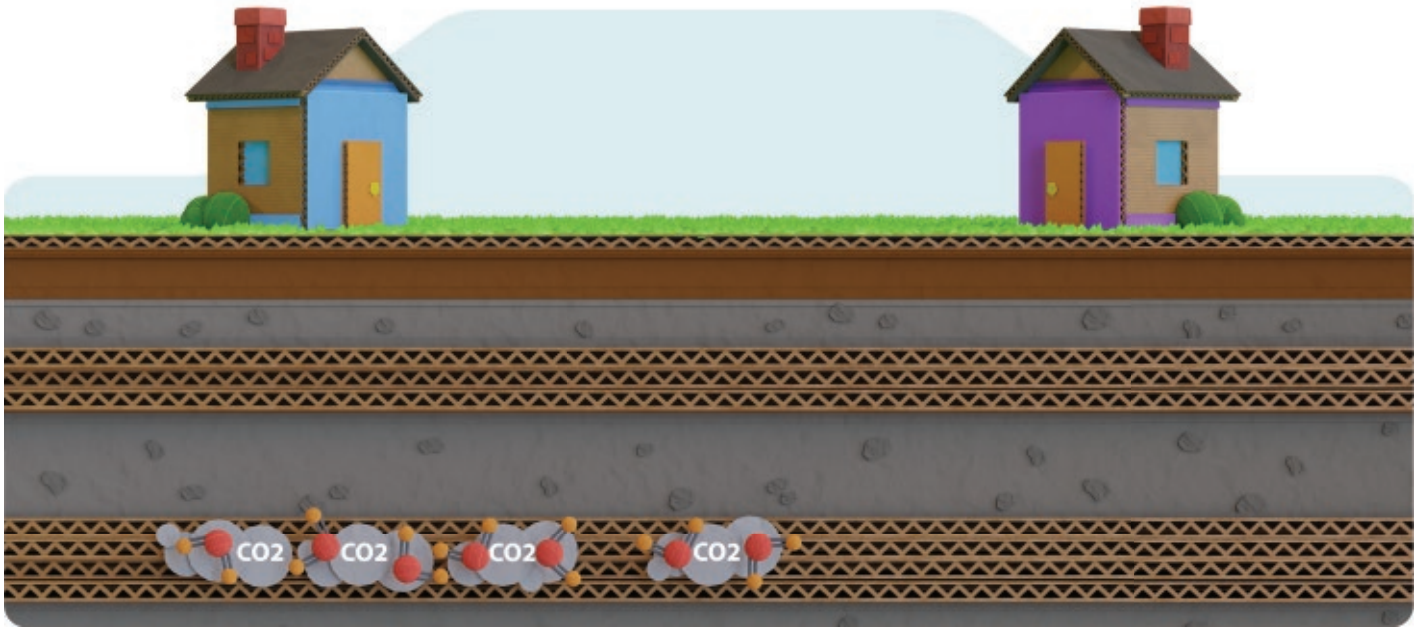


[20] *Id*.
[21] Wyo. Stat. § 35-11-315(a).
[22] Wyo. Stat. §§ 35-11-315(a)(vi)-(ix).
[23] Wyo. Stat. § 35-11-314(b)(ii).
[24] Wyo Stat. § 35-11-315(a)(iii); Wyo. Stat. § 35-11-316(a).
[25] Wyo. Stat. § 35-11-316(b).
[26] Wyo. Stat. § 35-11-316(c); 055-0001.3-43 Wyo. Code R § 43(h).

WHAT DO I DO IF CO2 MIGRATES TO MY PROPERTY?

After CO2 is injected underground it creates a plume which will expand and eventually stabilize.[27] This creates the possibility for CO2 to migrate into a landowner's pore space even if that landowner has not contracted for CCS development or been included in a CCS unitization plan. Such landowners may petition the Commission to be included within a geologic sequestration unit, where they will be afforded a hearing to present the basis for being included in a unitization plan.[28] If the landowner's petition is granted, the landowner will be "considered to have been a member of the unit since its inception and … shall be entitled to a proportionate share of all economic benefits received by unit members since the inception of the unit."[29]

Landowners affected by migrating carbon dioxide should consider consulting with an attorney to navigate the petition process. Petitioning landowners are statutorily required to provide notice of their petition to all persons specified in the unitization application, and must provide a "deposit of money sufficient to pay all costs of the inclusion of proceedings."[30] An attorney would be able to help a landowner identify the necessary parties and to provide legally sufficient notice according to Wyoming's statutory requirements. If the petition is unsuccessful, the landowner must rely on an attorney to bring a civil trespass claim. Indirect subsurface trespass is an unsettled area of law in Wyoming.[31]



[27] *See* Shelagh J. Baines and Richard H. Worden, *Geologic Storage of Carbon Dioxide*, The Geologic Society of London at 3 (2004).

[28] *See* Wyo. Stat. § 35-11-316(g).

[29] *Id*.

[30] *Id*.

[31] *See generally*, *ANR Production Co. v. Kerr-McGee Corp.*, 893 P.2d 698 (Wyo. 1995).

WHAT IS MY PORE SPACE WORTH?

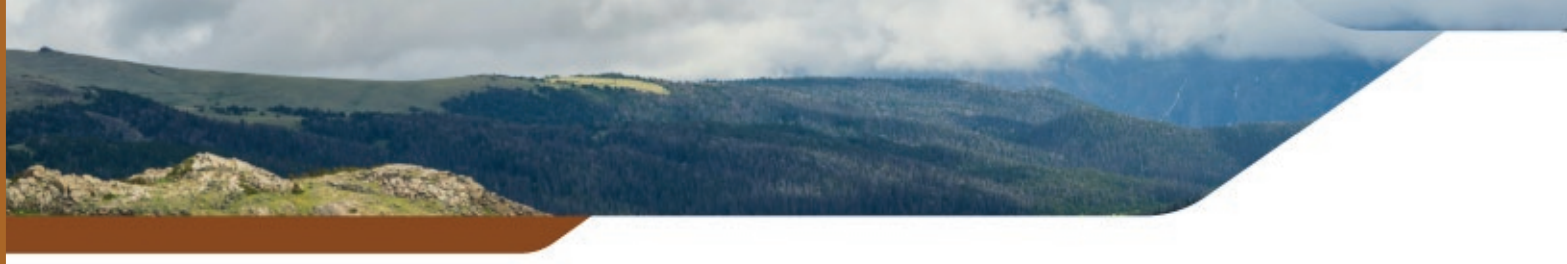
This is perhaps the most common question any landowner presented with a CCS opportunity will have. Unfortunately, this may also be the most complex question to answer. Not all pore space is equal. The characteristics of the geologic subsurface can vary even between neighboring landowners. Characteristics like porosity and depth are important economic factors in the valuation of pore space. Additionally, a landowner's proximity to sources of CO2 or CCS infrastructure such as carbon dioxide pipelines can influence the value of that landowner's pore space. The terms of the granting instrument, including how the pore space is conveyed (i.e. though a sale, lease, easement, or license), will also affect the value of the interest in pore space granted. Landowners should consider consulting with an attorney to help negotiate the best possible value for their pore space.

As of September 2024, the Wyoming Office of State Lands and Investments has entered into two agreements authorizing use of state owned pore space for carbon sequestration. Both agreements included an injection fee of $1/ton, but the bonus payments differed substantially, illustrating how values may differ even within the same basin. These agreements are publicly available and provide one example of the value that these arrangements can provide to landowners.

> *Class VI well applicants must provide an analysis of how the proposed CO_2 injection will be compatible with minerals.*

WHAT ARE THE MOST COMMON TERMS OF PORE SPACE ACQUISITION AGREEMENTS

In 2024, researchers at the University of Wyoming School of Energy Resources conducted a study analyzing pore space acquisition contracts. That study found that contracts are typically divided into three distinct periods: (1) a development period during which geologic characterization, permitting, and well construction activities are conducted; (2) an injection period; and (3) a period of post-injection stewardship during which monitoring activities are conducted until the operator receives site certification. Compensation structures are also aligned with these periods, generally including a bonus payment and annual rentals during the development period and a volumetric payment during the injection period. Since markets for carbon removal are still developing, many agreements index volumetric payments to metrics like 45Q or provide opportunities for the landowner to participate in the value of any carbon offsets or other credits generated.



I ALSO OWN MINERALS. HOW CAN CCS OPERATIONS IMPACT MY MINERAL RIGHTS OR PRODUCTION?

Under Wyoming law, development of the mineral estate has priority over other subsurface uses and is thus the dominant estate.[32] The Wyoming Oil and Gas Conservation Commission's construction standards for Class VI wells do not reference the mineral estate directly, but states that a CCS operator must construct Class VI wells to prevent the "movement of fluids into or between [underground sources of drinking water] or into any unauthorized zones."[33] Class VI well applicants must provide an analysis of how the proposed CO2 injection will be compatible with minerals. In addition, DEQ requires CCS operators to include cost estimates for mineral rights infringements in their financial assurance calculations.[34]

The Wyoming Oil and Gas Conservation Commission is prohibited from issuing unitization orders that "diminish, impair or otherwise alter the dominance of the mineral estate over the surface estate and pore space interests" or "prohibit a mineral interest owner from developing the owner's minerals above or below the unit area.[35]

Existing oil and gas wells and plugged and abandoned wells may provide a conduit for CO2 to migrate out of the injection formation. DEQ may require a CCS operator to perform corrective action on existing wells, which could include recompletions or abandonment. Access to these wells must be negotiated with the well operator.

Additionally, CCS operators who discover CO2 leaks "must provide written notice to all surface owners, mineral claimants, mineral owners, lessees, and other owners of record of subsurface interests within thirty (30) days."[36]

Finally, Wyoming mineral owners should also consider the possibility that minerals are discovered below a geologic formation where CCS operations are being conducted. Exploring for those minerals could be more costly and difficult due to the presence of CCS operations. To protect the containment system, many CCS agreements will place restrictions on the landowner's right to drill through the storage formation. DEQ's rules specify that CCS operators wishing to inject below the lowermost underground source of drinking water must submit documentation to EPA of planned or permitted "mineral resource exploitation potential of the proposed injection formation(s)."[37] This is to determine "if there are any plans to drill through the formation to access resources in or beneath the proposed injection zone(s) or formation(s)."[38]

[32] See Wyo. Stat. § 34-1-152 (e).
[33] 020-0011-24 Wyo. Code R. § 14(a)(i).
[34] 020-0011-8 Wyo. Code R. § 26(b)(ii)(B).
[35] Wyo. Stat. § 35-11-316(k)(ii)-(iii).
[36] 020-0011-24 Wyo. Code R. § 25(c)(iii).
[37] 020-0011-24 Wyo. Code R. § 15(b)(i)(G.)
[38] *Id.*

CAN CARBON SEQUESTRATION DAMAGE MY GROUNDWATER?

Class VI regulations prohibit injection of CO2 into underground sources of drinking water (USDW).[39] Even so, under current law, sequestration operations will most often target formations that are significantly deeper than could reasonably be developed for freshwater use. Under current law, aquifer exemptions are not available for sequestration operations.[40] The Class VI regulations also require operators to manage injection pressures such that formation fluids and CO2 cannot migrate into formations containing USDWs.[41]

WHO CAN AUTHORIZE SEISMIC OPERATIONS ON MY LAND?

Evaluating the suitability of subsurface formations for carbon sequestration may require seismic operations. Geophysical operations to explore the pore space require permission from the surface owner. This permission can be expressly granted by a pore space easement or lease, but may also be granted separately in a geophysical permit without any associated rights to inject.[42] Although Wyoming courts have not considered the issue, case law from Colorado supports the conclusion that a split-estate mineral owner cannot consent to geophysical exploration of surface-owned resources.[43]

[39] 020-0011-24 Wyo. Code R. § 11(c)(ii).

[40] 40 CFR § 144.7.

[41] 20-0011-24 Wyo. Code R. § 13(b)(i)(B).

[42] See Wyo. Stat. Ann. § 34-1-152(f), providing that "the owner of any pore space right shall have no right to use the surface estate beyond that set out in a properly recorded instrument.

[43] *Grynberg v. City of Northglenn,* 739 P.2d 230 (Colo. 1987).

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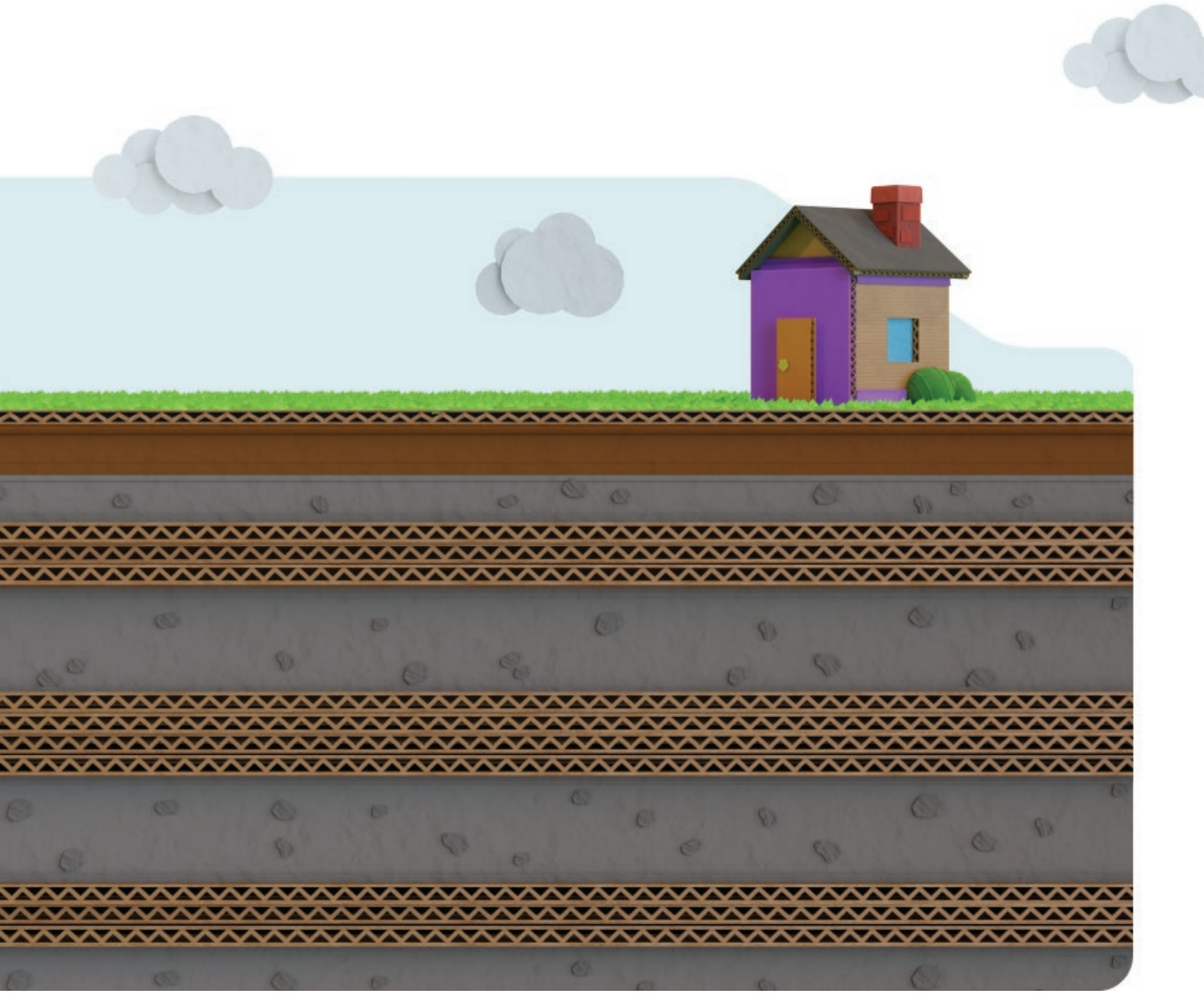

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