

Developing projects with CCS requires significant investments in equipment and technologies to capture and compress the carbon dioxide, in pipelines and related infrastructure to transport the carbon dioxide to a storage site, and in surface equipment and facilities to drill an injection well or wells. In addition, managing and operating a carbon dioxide storage facility is a long-term commitment with ongoing operating and maintenance costs, and costs associated with monitoring, reporting and verifying safe geologic storage.

The geologic storage of carbon dioxide involves risks, some of which are not well understood at the present time. Injected carbon dioxide may be released to the atmosphere through undetected faults or poorly constructed or abandoned wells. In high enough concentrations, such releases have the potential to harm humans, animals and plants. The 'pressure front' created by injecting large quantities of carbon dioxide below ground can result in the carbon dioxide moving upwards and laterally, which could contaminate fresh water sources, hydrocarbon resources, create ground heave, or possibly trigger seismic events³. The geologic storage of carbon dioxide is not common in the United States, except in the oil and gas industry where carbon dioxide and water are injected into reservoirs to enhance oil recovery. There is much that is still to be learned about the likelihood and effects of carbon dioxide releases.

The costs and potential liabilities associated with CCS have discouraged widespread adoption. A number of different approaches can be used to drive adoption of CCS, including tax incentives, adapting renewable portfolios, clean energy and new source performance standards to promote CCS adoption, executive mandates to require the purchase of electricity from facilities fitted with carbon capture technologies, and price stabilization such as through public utility rate-making proceedings and contracts for differences. Project developers also require a legal and regulatory framework that addresses difficult questions around the liabilities associated with carbon dioxide transportation and storage, the ownership of the subsurface area (or pore space) used for geologic storage, the competing rights of mineral owners and mineral lessees, and the regulation of geologic storage operations.

At the federal level, the Environmental Protection Agency (EPA) exercises regulatory authority over carbon dioxide injection wells and geologic storage by virtue of their mandate to protect underground sources of drinking water under the Safe Water Drinking Act (42 U.S.C. Section 300f et seq.), as amended. Under federal law, the EPA will directly implement a program for the underground injection of carbon dioxide for states that have not successfully applied to the EPA for primary regulatory authority to regulate their underground injection program. The EPA requirements and approach are rigorous and only two carbon dioxide injection wells ("Class VI wells" as defined by the EPA) have been permitted so far, both in Illinois. To obtain primary regulatory authority over Class VI wells, states must show that their programs and standards are 'at least as stringent' as those established by the EPA. So far, only North Dakota has successfully applied for primary regulatory authority over Class VI wells⁴.

At the state level, regulatory frameworks for the geologic storage of carbon dioxide are less well developed. In the relatively few states that have adopted laws on the geologic storage of carbon dioxide, there are significant variances in approach on key issues. These differences in approach are understandable as any law on the geologic storage of carbon dioxide will involve a mix of considerations, some of which revolve around the rights of land owners, mineral owners and mineral lessees and affected communities, and some of which revolve around broader questions of how best to promote these long-term but valuable projects and to apportion

³ Klass & Wilson, Climate Change, Carbon Sequestration and Property Rights 010 U. Ill. Rev. 363 (2010).

⁴ https://www.epa.gov/sites/production/files/2019-04/documents/primacy_status_revised_april_17_2019_508c.pdf

associated rights and obligations between private companies and public authorities. Different states have addressed these issues differently or in many cases, not at all.

Before reviewing model state legislation, it is also important to recognize the fundamental policy debate on CCS. For many CCS is essential to achieve decarbonization goals, while for others the time, money and political energy flowing into CCS is a distraction from the main task of reducing emissions. This policy debate is important and will continue as policymakers and concerned citizens grapple with the different pathways for decarbonization.

II. OVERVIEW OF MODEL STATE LEGISLATION

Laws relating to the injection and geologic storage of carbon dioxide exist in several states, including Illinois, Kansas, Oklahoma, Louisiana, Montana, North Dakota, Texas, West Virginia and Wyoming⁵. This model state legislation draws from these existing state laws where appropriate. The model state law also takes into consideration federal laws and programs related to underground injection programs. As noted above, the EPA has ‘set the standard’ for any state programs dealing with the injection and geologic storage of carbon dioxide. Carefully structuring the state law with federal requirements in mind is crucial.

Key issues to be addressed in this model state legislation include:

- *Long-term Liability.* Geologic storage of carbon dioxide is a long-term activity with potential liability exposure extending far beyond the normal planning horizons of a commercial business. California’s Low Carbon Fuel Standard contemplates that operators must monitor a geologic storage site for at least one-hundred (100) years post-injection.⁶ The EPA requires that an owner or operator continues to conduct monitoring for at least fifty (50) years.⁷ Potential liabilities may relate to a storage operator’s responsibility for the mitigation and remediation of leaks, for personal or property damage, for subsurface trespass if carbon dioxide migrates to pore space for which storage rights were not acquired, and for the recapture of incentives associated with carbon dioxide that ceases to be stored. Addressing long-term liability is crucial for the widespread adoption of projects with CCS but a common approach does not exist at this time. A variety of different schemes have been used:
 - *Transfer of Liability at Commencement of Storage Operations.* For projects like the FutureGen Project in Illinois, the state has been authorized to indemnify the FutureGen Industrial Alliance for liability accruing from the operation of the storage facility.⁸ This is unlikely to be an approach that many states will adopt given the large potential liability exposure and potential impact on operator motivation and performance of transfer of liability to the state. However, this approach may be adopted in exceptional cases where necessary to facilitate a specific project with

⁵ Illinois (S.B. 1704 (2007)); Kansas (H.B. 2419 (2007) and H.B. 2418 (2010)); Louisiana (H.B. 661 (2009) and HB 1220 (2008)); Montana (S.B. 498); North Dakota (S.B. 2095 (2009) and S.B. 2139 (2009)); Oklahoma (S.B. 610 (2009)); Texas (S.B. 1387 (2009) and H.B. 1786 (2009)); West Virginia (H.B. 2860 (2009)); and Wyoming H.B. 89 (2008), H.B. 80 (2008), H.B. 58 (2009); H.B. 57 (2009) and H.B. 17 (2010)).

⁶ Cal. Exec. Order No. S-01-07 (2007) http://gov.ca.gov/index.php?print_version/executive-order/5172 (establishing the Low Carbon Fuel Standard).

⁷ 40 C.F.R. 146.93(b)(1).

⁸ Illinois S.B. 1704, Section 30 (2007) FutureGen was a partnership between the US government and an alliance of primarily coal-related companies. Funding was pulled by the government, ostensibly due to higher than expected costs.

unique and valued attributes.

- *Transfer of Liability at a Specified Point in Time Post-Injection.* Another approach towards liability and one that has been adopted in some states is for the state to assume responsibility for the storage facility at the conclusion of the ‘post-injection phase.’ Transfer of liability occurs after an extended period of monitoring has demonstrated that safe, long-term storage of the carbon dioxide can be expected. The period between cessation of injection operations and transfer of liability has varied state-to-state with North Dakota and Louisiana providing for a minimum 10-year period and Montana providing for a minimum 30-year period.⁹
- *No Transfer of Liability.* At the other end of the spectrum, the storage operator retains responsibility for geologic storage throughout the project life (i.e. after cessation of injection and through long-term storage). Under this approach, the state does not assume legal responsibility for the storage facility, resulting in the storage operator being responsible for potential liabilities over the long-term.¹⁰

Adopting an approach that limits an operator’s long-term liability exposure is likely essential to promote the siting of carbon dioxide geologic storage projects in a state and so facilitate projects with CCS. Limiting liability exposure is also highly controversial. For those against CCS development (or simply against using taxpayer funds to support private projects), limiting liability exposure is an egregious example of fossil fuel companies using the ‘public purse’ to secure their future and support a flawed ‘climate change solution.’ This ongoing debate ensures that the issue of releasing an operator from liability and transferring that responsibility to the state will be one of the most challenging in developing the legislation.

This model state legislation allows for the transfer of liability upon the issuance of a site closure certificate, which may be issued after a minimum period has elapsed following the cessation of injection operations. This model state legislation leaves open the ‘minimum period’ following the cessation of injection operations before a site closure certificate can be issued. This is a matter of judgment and will need to be assessed and determined by state legislators. As of this time, no commercial storage sites have reached this point in the project cycle and there is a great deal yet to be learned about long-term outcomes for geologic storage of carbon dioxide that may have implications for the statutory treatment. Different states have settled upon different periods. In any event, a storage operator must submit information in its application for a site closure certificate demonstrating compliance with the requirements and that the facility is reasonably expected to contain the stored carbon dioxide safely.

- *Financial Responsibility.* Any law governing the geologic storage of carbon dioxide must require that owners and operators of geologic storage facilities demonstrate that they

⁹ North Dakota provides for release of liability after the issuance of a certificate of project completion, which cannot be issued until at least 10-years following cessation of carbon dioxide injection, Section 38-22-17, S.B. 2095 (2009); Louisiana provides for release of liability after the issuance of the certificate of completion of injection, which cannot be earlier than 10-years from cessation of injection operations, LA Rev.Stat. 30.1109; Montana allows for a certificate of project completion after 15-years but liability can be transferred only after a least a further 15-years of monitoring. Section 4, S.B. 498; in Texas, in the offshore context, a transfer of the liability of the producer of carbon dioxide may occur when permanent storage has been verified and all requirements met for site closure (H.B. 1796).

¹⁰ In Texas, geologic storage is addressed in state law with some specificity in the onshore context but there is no provision for the transfer of long-term liability (S.B. 1387); Kansas specifies that the state is not liable for any carbon dioxide injection well or geologic storage site, H.B. 2418, Section 1 (2010).

have the financial capacity, or will provide appropriate financial assurance, to underpin their responsibilities, including those relating to performing any necessary corrective action for improperly abandoned wells, injection well plugging, post-injection site care, site closure, and emergency and remedial response. A number of different mechanisms can be considered, such as trust funds, letters of credit and surety bonds, performance bonds, insurance, and corporate guaranties (i.e. self-insurance). Each mechanism has positives and negatives from the perspective of project developers and the state:

- A *fully funded trust* where the owners/operator pays in all funds necessary to meet the anticipated requirements at the outset of the project. Assuming the project plan and cost estimates associated with the anticipated requirements are sound, this is a very secure mechanism for the state. However, front-loading the costs in this way will impact project economics and may present a challenge to project developers seeking equity and debt financing.
- A *pay-in trust* where the owners/operator funds the anticipated requirements over a specified period of time, spreading the cash flow burden over the pay-in period. This creates a risk for the state if the project developer is unable to meet the pay-in obligations. In general, this is a secure funding method and risks to the state may be mitigated by having the pay-in period towards the front-end of the project and possibly by requiring a supporting financial instrument.
- A *letter of credit* or *guaranty* where the owners/operator secure the letter of credit or guaranty from a third-party financial institution that can be drawn by the state upon the occurrence of a 'funding event'. This is a secure funding approach but has a cost to the project developer and may be best suited to specific project activities occurring over a defined period of time.
- A *performance bond* where third party has the option of either paying the bond or hiring a contractor to perform the required activity. The potential involvement of third-party in performance raises various risks of non-performance and dispute.
- A *surety bond* where an insurance company pays out under the bond if the owners/operator fails to comply with a specified obligation. Since they involve a failure to perform, they may be a more challenging mechanism to administer, and to that extent, less secure.
- An *insurance contract* where the insurer agrees to pay upon the occurrence of a certain event (similar to a surety bond). Insurance contracts may be difficult to establish in complex projects with difficult to assess technical risks and may raise dispute risks associated with seeking to obtain payment from the insurance company.
- A *corporate guaranty* where the storage operator or its parent company stand behind the obligations. As this relies upon the financial condition of the storage operator or parent company, the effectiveness of the mechanism is dependent upon the continuing financial health of the guarantor.

A state can apply one mechanism, such as a 'fully funded' or 'pay-in' trust fund, to meet all responsibilities under state law, or combine approaches. For example, a combined approach might involve a letter of credit, surety bond or other financial instrument obtained from a third party for a given period of time (i.e. or for specified activities over a certain period of time (e.g. injection well plugging, reclamation and remedial activities associated with site closure) and a trust fund for items not covered by the letter of credit or surety bond and for long-term stewardship of the site after site closure. The key is to

structure the financial responsibility mechanism(s) around the state's approach to the storage operator's responsibility during regular operations, after cessation of injection operations up to site closure, and thereafter to minimize the financial risk assumed by the state. In any event, the state will want to obtain detailed cost estimates, the project plan for a geologic storage project, and other relevant information to support their 'structuring and sizing' of the financial responsibility mechanism.

The EPA provides guidelines on financial responsibility and a state seeking primary regulatory authority over carbon dioxide geologic storage projects should ensure that the state's requirements are consistent with those required by the EPA.¹¹

This model state legislation allows for a combined approach. The Commission may require a bond or other financial assurance. Also, the model state legislation provides for the establishment of a trust fund without specifying whether the trust fund is 'fully funded' or a 'pay-in trust' fund.

- *Pore Space.* Project developers must secure the right to inject carbon dioxide into the 'pore space' in a reservoir. In some states, the question of whether the surface owner or the mineral owner owns the private property interest in the pore space for geologic storage of carbon dioxide may not be settled. In such states, statutory and regulatory clarity may be needed with respect to the geologic storage of carbon dioxide.

For purposes of this model state legislation, we have followed the general rule that pore space rights belong to the surface owner. This may mean that project developers have to obtain rights from many parties, which can be challenging. A concept of mandatory amalgamation of pore space rights has been adopted in some states, derived from the oil and gas practice of forced 'pooling' of mineral interests, whereby the state can subject the interests of non-consenting owners to the geologic storage project if enough owners have consented. Eminent domain is another possible tool to secure surface and subsurface rights for a geologic storage facility. Louisiana allows for expropriation by private entities for the underground storage of carbon dioxide, including surface and subsurface rights.¹²

This model state legislation provides for the amalgamation of pore space rights under certain conditions.

- *Mineral Rights vs. Carbon Dioxide Storage Rights.* Existing state regulatory schemes have developed where there is an existing oil and gas sector with private property rights. The issue of competing uses and rights, specifically which rights prevail where mineral and carbon dioxide storage rights intersect, has been an area of focus. In the states that have adopted laws on the geologic storage of carbon dioxide, the laws provide for the primacy of mineral rights over carbon dioxide storage rights, subject to provisions that protect against a mineral owner or lessee drilling a well or otherwise acting in a way that might undermine the structural integrity of the geologic storage.

This model state legislation protects the rights of mineral owners and mineral lessees, while also allowing for the Commission to implement protective measures where mineral

¹¹ 40 C.F.R. 146.85.

¹² LA Rev.Stat. 30.1108

owners and mineral lessees seek to drill near a geologic storage facility.

- *Ownership of Injected Carbon Dioxide.* The injection of carbon dioxide into the subsurface raises the question of who owns the injected carbon dioxide. The owners/operator of a geologic storage facility will generally be owner of the injected carbon dioxide.

This model state legislation provides for the storage operator to own the injected carbon dioxide. If the responsibility for the geologic storage facility transfers to the state, ownership of the injected carbon dioxide transfers with it. This model state legislation also recognizes the possibility that the injected carbon dioxide might have commercial value and allows the owner to extract the carbon dioxide.

- *The UIC Program and the Intersection of State and Federal Regulatory Authority.* The geologic storage of carbon dioxide involves both federal and state regulatory authorities. The EPA regulates the injection of fluids under the Safe Water Drinking Act to protect underground sources of drinking water, and maintains the accounting protocols under the Clean Air Act Greenhouse Gas Reporting Program for the injection of carbon dioxide into geologic storage. The Underground Injection Control Program (UIC Program) has been established by the EPA to protect underground sources of drinking water by ensuring the safe, long-term containment of injected carbon dioxide and displaced formation fluid. The UIC Program covers Class II wells (180,000 as of August 2019), which are mostly wells used to inject water and carbon dioxide into reservoirs for purposes of enhanced oil recovery. The UIC Program also covers 'Class VI' wells (only two wells in Illinois permitted to date), which are used for geologic storage of carbon dioxide in saline formations. States can obtain primary regulatory authority under the UIC Program by demonstrating to the EPA in an application that (i) in the case of Class II wells, its program is 'equally as effective' as the federal program, and (ii) in the case of Class VI wells, its program is 'at least as stringent' as the federal requirements. Forty-one states have obtained primary regulatory authority over Class II wells, whereas only North Dakota has achieved primary regulatory authority over Class VI wells.¹³

States may wish to seek primary regulatory authority over the UIC Program as a way of facilitating permitting and this may serve federal interests as well by appropriately sharing regulatory burden. The EPA provides detailed guidelines to assist states seeking primary regulatory authority over carbon dioxide injection wells.¹⁴

This model state legislation includes provisions to allow states to seek and obtain primary regulatory authority over the UIC Program.

¹³ The EPA maintains a status on primacy applications. https://www.epa.gov/sites/production/files/2019-04/documents/primacy_status_revised_april_17_2019_508c.pdf

¹⁴ See, Geologic Sequestration of Carbon Dioxide – Underground Injection Control (UIC) Program Class VI Primacy Manual for State Directors issued by the United States Environmental Protection Agency.

ATTACHMENT A

MODEL STATE LEGISLATION FOR THE GEOLOGIC STORAGE OF CARBON DIOXIDE

Section 1. Findings and Purposes. The Legislature hereby finds and declares that:

- (a) Carbon dioxide emissions have been shown to contribute to climate change, the effects of which pose a threat to public health and safety and the economy of the state. Fossil fuels are a major contributor to carbon dioxide emissions but also essential to meet the energy needs of industry, small businesses and consumers across the state. To meet the critical energy needs of the state, keep the economy strong and protect the environment, the state must pursue an active strategy to reduce man-made carbon dioxide emissions.
- (b) The capture and permanent sequestration of carbon dioxide emissions is a proven low carbon technology that involves capturing carbon dioxide from industrial plants, power plants and other sources, which can then be transported to carefully selected sites and safely injected into underground geologic strata for permanent storage.
- (c) Carbon capture and storage technology continues to be developed and enhanced to improve efficiency and safety and lower costs. At the present time and for the foreseeable future, developing (or retrofitting) projects with carbon capture and storage technologies remains costly relative to projects without carbon capture and storage technologies. These projects are also subject to significant legal uncertainties and risks, including in respect of the liability of owners and operators of carbon storage sites, the ownership of carbon dioxide injected into geologic storage, access to geologic strata for storage, and the respective rights of holders of mineral rights and geologic storage rights. The costs of these projects and the legal uncertainties and risks associated with them have discouraged the widespread application of carbon capture and storage technologies in the development of industrial, power and other projects that contribute to carbon dioxide emissions.
- (d) The purposes of this Act are to address the legal requirements for permitting, operating and closing a geologic storage facility in the state, address liability and other concerns associated with such activities, and thereby facilitate the development of projects with carbon capture in the state.

Notes: *Each state legislature should tailor the findings to their specific circumstances and objectives.*

Section 2. Definitions. As used in this Act, unless the context otherwise requires:

- (a) “Carbon dioxide” means carbon dioxide produced by anthropogenic sources that would otherwise have been released into the atmosphere that has been stripped, segregated or divided from any fluid stream, or captured from an emissions source, and any incidental associated substance derived from the source material for, or from the process of capturing, carbon dioxide, and any substance added to carbon dioxide to enable or improve the process of injecting the carbon dioxide.
- (b) “Carbon dioxide injection well” means an injection well used to inject or transmit carbon dioxide into a reservoir.
- (c) “Carbon dioxide trust fund” means the trust fund established to receive and disburse funds

for purposes provided in the Act.

- (d) "Class I well" means a well used to inject hazardous and non-hazardous wastes as defined in 40 C.F.R. 144.6(a).
- (e) "Class II well" means a well used to inject fluids associated with oil and gas production as defined in 40 C.F.R. 144.6(b).
- (f) "Class V well" means a well used to test new or unproven technologies as defined in 40 C.F.R. 144.6(e).
- (g) "Class VI well" means a well used to inject carbon dioxide for purposes of geologic storage as defined in 40 C.F.R. 144.11(a)(2).
- (h) "Commission" means the commission or any other competent entity established by the state for the purposes of administering the rules and any related regulations contemplated by the Act.
- (i) "Enhanced recovery operation" means the use of any process for the displacement of hydrocarbons from a reservoir other than through primary recovery and includes the use of any physical, chemical, thermal, or biological process and any co-production project.
- (j) "Geologic storage" means the long-term containment of gaseous, liquid, or supercritical carbon dioxide in subsurface geological formations. This term does not include carbon dioxide capture or transport.
- (k) "Geologic storage facility" means the reservoir, underground equipment, injection wells, and surface buildings and equipment used or to be used for the geologic storage of carbon dioxide and all surface and subsurface rights and appurtenances necessary to the operation of a facility for the geologic storage of carbon dioxide. The term includes any areal buffer and subsurface monitoring zones, and other areas as may be required by the UIC Program. This term does not include equipment or facilities used for carbon dioxide capture or transport.
- (l) "Permit" means a permit issued by the Commission allowing a person to establish and operate a geologic storage facility.
- (m) "Permit applicant" means a person applying for a permit under this Act.
- (n) "Pore space" means a cavity or void, whether natural or artificially created, in a reservoir.
- (o) "Reservoir" means a subsurface sedimentary stratum, formation, aquifer, cavity, or void, whether natural or artificially created, including oil and gas reservoirs, saline formations, and coal seams suitable for or capable of being made suitable for injecting and storing carbon dioxide.
- (p) "Post-injection site care" means the appropriate monitoring and other activities required following the cessation of injection of carbon dioxide into a reservoir to ensure that USDWs are not endangered, as required by the UIC Program.
- (q) "Safe Drinking Water Act" means the Safe Drinking Water Act (42 U.S.C. Section 300f et seq.), as amended.
- (r) "Site closure" means the point in time, as determined by the Commission, at which the owner or operator of a geologic storage facility is released from post-injection site care responsibilities.
- (s) "Site closure certificate" means the certificate issued by the Commission evidencing that the storage operator has met the requirements for site closure.

- (t) "Storage operator" means a person holding a permit.
- (u) "UIC Program" means the underground injection control program under Part C of the Safe Water Drinking Act, including the state program for underground injection control once approved by the United States Environmental Protection Agency or another federal agency.
- (v) "USDWs" means underground sources of drinking water as defined in the Safe Water Drinking Act.

Section 3. Commission Authority.

- (a) The Commission has authority over the geologic storage of carbon dioxide in, and the injection of carbon dioxide into, a reservoir in the state.
- (b) The Commission has jurisdiction over a carbon dioxide injection well regardless of whether the well was initially completed for the purpose of carbon dioxide injection or was initially completed for another purpose and has been converted for the purpose of carbon dioxide injection.
- (c) This Act shall not apply to the injection of carbon dioxide through the use of a Class II well for the primary purpose of enhanced recovery operations.
- (d) The Commission shall have the authority to perform any and all acts necessary to carry out the purposes and requirements of the federal Safe Drinking Water Act, relating to the state's participation in the UIC Program. The Commission is authorized to seek primary enforcement authority under the UIC Program.
- (e) The Commission is authorized to enter into cooperative agreements with other governments or governmental entities for the purposes of regulating the geologic storage of carbon dioxide, including in respect of the geologic storage of carbon dioxide in, and the injection of carbon dioxide into, a reservoir within the jurisdiction of the state and another governmental authority.

Notes:

- ***Section 3(c) is a carve out of the Commission's authority to regulate Class II wells, which are wells used to inject carbon dioxide for purposes of enhanced oil and gas recovery. Such a provision will be necessary where the regulation of Class II wells and carbon dioxide injection wells (i.e. Class VI wells) are administered by different state agencies. This may be the case where there is an oil and gas regulatory authority.***
- ***Section 3(d) describes the Commission's legal authority to implement all permit requirements and to regulate all carbon dioxide injection wells and geologic storage facilities in the state. A state's application to assume primary regulatory authority for its underground injection program must demonstrate this broad grant of authority. Among other things, the statement of authority should clearly encompass the authority of the Commission to implement:***
 - ***All permit requirements found in 40 C.F.R. 145.11 (including the requirements found in 40 C.F.R. 145.124);***
 - ***The necessary procedures for the state compliance evaluation program pursuant to 40 C.F.R. 145.12; and***

- ***The necessary administrative, civil and criminal enforcement penalties or remedies pursuant to 40 C.F.R. 145.13.***
- ***Section 3(e) addresses the situation where two different regulatory authorities may have authority over a project, which may be the case where the areal extent of a reservoir used for geologic storage crosses state boundary lines. This is covered in a generic way by authorizing the Commission to enter into cooperative agreements with other governments and governmental entities.***

Section 4. Rules and Procedures

- (a) The Commission may issue and enforce such orders, and may adopt, modify, repeal and enforce such rules and procedures as may be reasonably necessary to regulate a geologic storage facility, including in respect of the drilling and completion of carbon dioxide injection wells, the injection and withdrawal of carbon dioxide, the plugging and abandonment of carbon dioxide injection wells, site closure, and the long-term management of the site after site closure. Such rules and procedures may include but are not limited to those as may be reasonably required for:
 - i. Geologic storage and the regulation of carbon dioxide injection wells, including:
 - a. Reservoir characterization;
 - b. Well design and construction;
 - c. Drilling, completion and well operations;
 - d. Mechanical integrity testing;
 - e. Reservoir and environmental monitoring;
 - f. Well plugging;
 - g. Site closure; and
 - h. Long-term stewardship.
 - ii. The enforcement of this Act and the rules adopted by the Commission under this Act; and
 - iii. The collection and administration of:
 - a. Fees imposed under Section 9;
 - b. Penalties and fines imposed by this Act or the rules adopted under this Act by the Commission.
- (b) Rules adopted by the Commission under this Act must be consistent with applicable rules and regulations adopted by the United States Environmental Protection Agency or any other federal agency governing geologic storage and carbon dioxide injection wells to allow the state to apply for and obtain primary regulatory authority over the UIC Program.

Notes:

- ***To support an application to the EPA to obtain primary regulatory authority over the UIC Program for the state, the Commission must show that its program is “at least as stringent” as the federal requirements. The EPA guidance suggests either to incorporate the relevant federal rules by reference or to adopt rules that are consistent with federal rules such that the state may apply for and obtain primary***

regulatory authority over the UIC Program. This model state legislation follows the latter approach to allow the state regulators more flexibility in developing the rules.

Section 5. Permits

- (a) A person shall obtain a permit from the Commission prior to drilling a carbon dioxide injection well or constructing or operating a geologic storage facility; provided that no permit pursuant to this Act is required if the state has not obtained primary regulatory authority over the UIC Program and the person obtains permission, by permit or order, under a federally administered UIC Program and such permission authorizes the injection and storage of carbon dioxide underground consistent with the requirements of this Act.
- (b) The Commission shall establish the information and related requirements for permit applications and a permit applicant shall comply with such requirements unless waived or modified by the Commission.
- (c) Before issuing a permit, the Commission shall find that:
 - i. The reservoir into which the carbon dioxide is proposed to be injected is suitable for, or capable of being made suitable for, geologic storage;
 - ii. The permit applicant will implement proper safeguards so that both ground and surface fresh water can be adequately protected from pollution, including pollution resulting from carbon dioxide migration or displaced formation fluids;
 - iii. The injection of carbon dioxide and geologic storage will not endanger human health and safety nor significantly deplete local ecosystems;
 - iv. The permit applicant will establish monitoring facilities and protocols to assess the location and migration of carbon dioxide injected for geologic storage, or formation fluids that may be displaced by the geologic storage of carbon dioxide, and to ensure compliance with all permit, statutory, and administrative requirements;
 - v. The permit applicant has made good faith efforts to identify and obtain the consent of persons who own the pore space in the reservoir;
 - vi. The permit applicant has obtained the consent of persons who hold at least [requisite percentage] percent of the pore space in the reservoir;
 - vii. The use or installation of the carbon dioxide injection well and geologic storage will not endanger or injure any oil, gas or other mineral resource;
 - viii. The permit applicant is financially responsible and meets all statutory and regulatory requirements for the issuance of the permit; and
 - ix. The use or installation of the carbon dioxide injection well and the geologic storage of carbon dioxide are in the public interest.
- (d) A permit allows the storage operator to conduct geologic storage at a geologic storage facility, subject to any conditions or limitations identified in the permit or this Act or the rules adopted by the Commission under this Act. In the event that operations or planned operations at the geologic storage facility vary or may vary from that allowed under the permit, the Commission may require:
 - i. The storage operator to provide additional information and analysis relating to the variance;

- ii. An amendment to the permit, or the revocation and reissuance of the permit; and
 - iii. The storage operator to cease operations, or certain operations, requiring the amendment or revocation and reissuance of the permit until the amendment or reissuance of the permit has been approved and issued by the Commission.
- (e) The Commission may revoke a permit during its term, or deny a permit renewal application for the following reasons:
- i. Noncompliance with any material condition of the permit;
 - ii. A storage operator's failure in the application or during the permit issuance process to disclose all material facts, or the storage operator's misrepresentation of a material fact;
 - iii. A determination that the permitted activity endangers human health or the environment, or significantly depletes local ecosystems, and can only be addressed satisfactorily by permit revocation.
- (f) A permit shall be issued for the operating life of the geologic storage facility and the post-injection site care period, subject to the Commission's authority under Section 5(d) to require an amendment or revocation and reissuance of a permit, and under Section 5(e) to revoke a permit.
- (g) The Commission may require a storage operator to make records available to the Commission relating to the amount of carbon dioxide injected into a storage facility and other relevant information to ensure compliance with the permit.
- (h) A storage operator shall not cede, give, lease, assign or otherwise transfer its permit, or transfer ownership of the principal assets used in the performance of geologic storage that are the subject of the permit, without providing prior notice to the Commission and obtaining the Commission's prior written consent. An action taken by a storage operator in contravention of this Section 5(h) shall be null and void.

Notes:

- ***5(a) provides an exception to the requirement to obtain a permit where the state has not obtained primary regulatory authority and the person has obtained a permit under federal law (i.e. the EPA). This is a significant exception for a state geologic storage law but should be considered in light of the EPA's rigorous approach and the need to avoid creating additional regulatory hurdles.***
- ***5(d) requires a storage operator to notify the Commission if there are changes in activities or circumstances that may necessitate a modification of the permit or the revocation and issuance of a new permit. The rules should provide more granularity as to the circumstances necessitating a modification of a permit or the revocation and reissuance of a permit.***
- ***Section 5(d) allows the Commission to revoke a permit in certain circumstances.***
- ***Section 5(f) describes the term of the permit as being for the "operating life of the geologic storage facility and post-injection site care period." This reflects the reality of the long-term nature of geologic storage operations and post-injection site closure responsibilities and conforms with the EPA approach for Class VI wells.***
- ***5(h) prohibits the transfer of a permit, or the main assets of the geologic storage***

facility without prior notice to and the consent of the Commission. The rules should provide more granularity, including that a proposed transfer to a new storage operator may necessitate the revocation and reissuance of the permit.

Section 6. Permit Notice and Hearing

- (a) The Commission shall hold a public hearing before issuing a permit.
- (b) The permit applicant shall give at least [sixty (60)] days prior notice of hearing by mail, return receipt requested to the following persons whose addresses are known or could be known through the exercise of reasonable due diligence:
 - i. Surface owners of land overlying the reservoir proposed for geologic storage and within one-half mile of the reservoir's boundaries,
 - ii. Mineral owners and mineral lessees and owners of pore space in the reservoir proposed for geologic storage and within one-half mile of the reservoirs boundaries, and
 - iii. Such other persons as the Commission may require.
- (c) The permit applicant shall also give notice by publication at least [sixty (60)] days prior to the hearing as follows:
 - i. In a newspaper of general circulation published in the [state / specified county], and
 - ii. In a newspaper determined by the Commission.
- (d) The permit notice required by this Section 6 shall provide a brief description of the comment procedures and the time and place of hearing.
- (e) Additional notice requirements may be established by the Commission and a permit applicant shall comply with any such requirements.
- (f) The permit notice shall comply with the requirements for legal notice in the state.

Notes:

- ***The EPA rules provide for permit notice and hearing requirements and they should be considered in developing the detailed requirements for permit notices and hearings.***
- ***Consideration should be given to including a requirement for the Commission to provide some form of notice to oil and gas, water, environment or other state agencies that may have some regulatory interest in geologic storage activities in the state.***

Section 7. Mineral and other Property Interests

- (a) A permit applicant shall seek the consent of the owners of pore space in the reservoir proposed for geologic storage.
- (b) If a permit applicant obtains the consent of [requisite percentage] or more of the pore space owners, the Commission is authorized to require the pore space owned by nonconsenting owners to be included in a geologic storage facility covered by the permit

and subject to geologic storage.

- (c) Nothing in this law, nor the issuing of a permit:
- i. Prejudices the rights of property owners to exercise rights that have not been committed to the geologic storage facility; or
 - ii. Prevents a mineral owner or mineral lessee from drilling near a reservoir used for geologic storage to explore for or develop minerals; provided that the mineral owner or mineral lessee gives prior written notice to the Commission and the storage operator of any such proposed activity at least [ninety (90) days] before the planned drilling and the mineral owner or mineral lessee and each other person involved in the proposed activity complies with any Commission order or requirements for the preservation of the geologic storage facility's integrity and the protection of the objectives of this Act, which may include a requirement for the mineral owner or mineral lessee to stop the activity and/or provide an indemnification for any damage caused.

Notes:

- ***The requisite percentage of consenting pore space owners that allows for amalgamation of nonconsenting pore space owners should be set at a level that protects interests of pore space owners but allows for projects to proceed when broadly supported. The higher the percentage, the more likely a project can be stopped by nonconsenting pore space owners.***
- ***The provision on the rights of mineral owners and mineral lessees is general in nature. The rights of mineral owners and mineral lessees are important but once geologic storage has occurred, the priority must be on ensuring the structural integrity of the geologic storage facility. It will be important to adopt rules that provide clarity to mineral owners and mineral lessees on the information they must provide to the Commission and the process to be followed to review, approve or reject any request to drill near a geologic storage facility.***

Section 8. Title

- (a) Unless otherwise expressly provided by a legally binding document or law, carbon dioxide stored in a geologic storage facility is considered to be the property of the storage operator.
- (b) The ownership of carbon dioxide in a geologic storage facility at the time of the issuance of the site closure certificate will transfer to the state without compensation to the owner of any kind.
- (c) The owner of carbon dioxide stored in a geologic storage facility may produce, take, extract or otherwise possess carbon dioxide stored in a geologic storage facility.
- (d) This section does not apply to carbon dioxide injected for the primary purpose of enhanced recovery operations until such time as carbon dioxide is subject to geologic storage in accordance with Section 12(b).

Notes:

- ***This establishes the basic rule that the storage operator owns the carbon dioxide and that ownership is transferred upon the issuance of the site closure certificate***

and the transfer of responsibility for the geologic storage facility to the state.

- ***The regulatory distinction between Class II wells injecting carbon dioxide primarily for purposes of enhanced oil recovery and carbon dioxide injection wells for geologic storage is preserved in 8(d) by excluding Class II wells unless converted for geologic storage purposes pursuant to Section 12(b).***

Section 9. Fees

- (a) The Commission may impose fees to cover the cost of permitting, monitoring, and inspecting carbon dioxide injection wells and geologic storage facilities and enforcing and implementing this Act and the rules adopted by the Commission.
- (b) Fees collected by the Commission shall be deposited to the credit of the carbon dioxide storage trust fund established under this Act.

Section 10. Bonds and other Financial Assurance

- (a) The Commission may require that a storage operator maintain a bond or other financial assurance to ensure that funds are available for the drilling and completion or plugging of wells, post-injection site care, and site closure, or any such activity.
- (b) The bond or other financial assurance may be drawn, distributed or forfeited as determined by the Commission if the storage operator fails to perform the obligations referenced in the bond or other financial assurance.

Notes:

- ***Section 10 provides flexibility to the Commission to require a bond or other financial assurance targeting specific obligations, which may be an effective way to secure these obligations while allowing release of the bond or other financial once those obligations have been satisfied.***

Section 11. Carbon Dioxide Storage Fund

- (a) The carbon dioxide storage trust fund is created as a special fund in the state treasury.
- (b) The carbon dioxide storage trust fund is an interest-bearing fund and interest earned on the money in the fund shall be deposited to the credit of the fund.
- (c) The Commission is authorized to receive funds from the carbon dioxide storage trust fund to fund:
 - i. Inspecting, monitoring, investigating, recording and reporting on geologic storage facilities and carbon dioxide injections wells covered by this Act;
 - ii. Contracting for services needed to supplement the Commission's staff expertise related to an application or investigation;
 - iii. Long-term monitoring of geologic storage facilities and associated carbon dioxide injection wells covered by this Act;
 - iv. Remediation of mechanical problems associated with geologic storage facilities and associated carbon dioxide injection wells covered by this Act;

- v. Repairing mechanical leaks at geologic storage facilities;
 - vi. Plugging abandoned carbon dioxide injection wells covered by this Act;
 - vii. Mitigation of adverse environmental impacts;
 - viii. Emergency or long-term remedial activities;
 - ix. Compliance and enforcement activities related to geologic storage and carbon dioxide injection wells covered by this Act; and
 - x. Costs of program administration, including legal costs.
- (d) Pursuant to a cooperative agreement with another governmental agency, the Commission may use the fund to compensate the cooperating agency for expenses the cooperating agency incurs in carrying out regulatory responsibilities that agency may have over or related to a geologic storage facility, including in respect of any carbon dioxide injection wells covered by this Act.

Notes:

- ***Section 11(c) describes the permitted uses of funds in the carbon dioxide storage fund. The permitted uses of funds may depend upon the legislation's approach towards the state's assumption of liability.***
 - ***If the state does not assume liability for the geologic storage facility at any time, the coverage might cover everything but the mitigation of adverse environmental impacts and emergency or long-term remedial activities. The rationale for this approach is that the funding mechanism(s) would not have taken into consideration the costs for these types of activities and in any event the storage operator retains liability. Alternatively, it may be appropriate to allow the state to access funds for all the potential uses as described in Section 11(c), including the mitigation of adverse environmental impacts and emergency or long-term remedial activities. Given the long-term horizons for these types of projects, there is a risk that a storage operator's circumstances may have changed by the time a problem arises such that it is no longer able to meet its obligations. In this circumstance, the state should be able to access the fund.***
 - ***Where the state assumes liability for the geologic storage facility (i.e. upon the issuance of the site closure certificate), the fund should be accessible to the Commission for all the potential uses described in Section 11(c).***
- ***Section 11(d) recognizes that multiple state agencies may be involved in regulating different aspects of a geologic storage facility. This allows for the Commission to enter into cooperative arrangements with other agencies and to use funds in the carbon dioxide storage trust fund to compensate another agency for expenses it incurs consistent with the cooperative arrangement.***

Section 12. Permitting and Regulation of Class I, Class II and Class V Wells

- (a) An owner or operator of a Class I well permitted for geologic storage, a Class II well used for the primary purpose of geologic storage, or a Class V well that is no longer experimental and continues to inject carbon dioxide, shall be required to apply for a permit under this Act upon the state obtaining primary regulatory authority pursuant to Section

3(d) of this Act. The Commission shall adopt procedures for notifying owners and operators of Class I, Class II and Class V wells of the requirement to apply for a permit under this Act.

- (b) The Commission shall develop rules with regard to the permitting and regulation of Class I, Class II and Class V wells that serve or will be converted to serve as carbon dioxide injection wells, and such rules shall be consistent with regulatory requirements for carbon dioxide injection wells under this Act. The Commission shall adopt expedited permitting procedures for any Class II well used or proposed to be used for the primary purpose of geologic storage where the owners or operators of such Class II well demonstrate to the satisfaction of the Commission that the well does not represent an increased risk to USDWs. In determining if there is an increased risk, the following factors must be considered:
- i. Increase in reservoir pressure in the injection zone(s);
 - ii. Increase in carbon dioxide injection rates;
 - iii. Decrease in reservoir production rates;
 - iv. Distance between injection zone(s) and USDWs;
 - v. Suitability of the Class II area of delineation;
 - vi. Quality of the abandoned well plugs within the area of review;
 - vii. The owners or operator's plan for recovery of carbon dioxide at the cessation of injection;
 - viii. The source and properties of injected carbon dioxide; and
 - ix. Such additional factors as may be determined by the Commission
- (c) The rules relating to the permitting and regulation of Class I, Class II and Class V wells used for the primary purpose of geologic storage shall provide for fees to be paid by the owner or operator of such wells equivalent to the fees required to be paid by a storage operator pursuant to Section 9 of this Act.

Notes:

- ***Section 12(a) recognizes that the permitting of wells already occurs under federal and state laws and that such wells used for the geologic storage of carbon dioxide will need to be brought within the regulatory ambit of the state once the state has the primary authority to regulate those wells.***
- ***Section 12(b) allows the Commission flexibility to implement expedited permitting procedures in the context of Class II wells as long as they do not endanger USDWs. This is consistent with the federal approach and recognizes that where wells have been injecting carbon dioxide into reservoirs for purposes of enhanced oil recovery without endangering USDWs, it may be appropriate to expedite the permitting of those wells so that they can be used for geologic storage.***

Section 13. Liability and Transfer of Title

- (a) The storage operator is liable for the operation and management of the geologic storage facility, including the carbon dioxide injection well(s) and the injected or stored carbon dioxide until the site closure certificate is issued by the Commission.

- (b) After the cessation of the injection of carbon dioxide into a geologic storage facility, but in no event earlier than [*requisite minimum period*] following the cessation of the injection of carbon dioxide into a geologic storage facility, a storage operator may apply to the Commission for a site closure certificate. The storage operator's application for a site closure certificate shall demonstrate that:
- i. The storage operator is in full compliance with all laws and regulations governing the geologic storage facility;
 - ii. The storage operator has resolved all pending claims regarding the geologic storage facility's operations;
 - iii. The geologic storage facility is reasonably expected to contain the stored carbon dioxide safely;
 - iv. All carbon dioxide injection wells have been plugged and abandoned in accordance with applicable laws and regulations;
 - v. All equipment and facilities to be used after the issuance of the site closure certificate are in good working order and condition;
 - vi. All equipment and facilities not proposed to be used after the issuance of the site closure certificate have been removed and any remedial or reclamation work completed; and
 - vii. Such other matters as the Commission may require.
- (c) The Commission may issue a site closure certificate if the storage operator has demonstrated, based upon monitoring wells and other site specific data, that no additional monitoring is needed and that:
- i. The geologic storage facility is reasonably expected to retain mechanical integrity and the carbon dioxide is reasonably expected to remain safely contained in the reservoir; and
 - ii. After public notice and hearing on the storage operator's application in accordance with requirements established by the Commission.
- (d) Upon the issuance of the site closure certificate and transfer of title to the state, the storage operator, all producers of any injected carbon dioxide, all owners of carbon dioxide stored in the geologic storage facility, and all owners otherwise having any interest in the geologic storage facility, shall be released from any and all duties or obligations under this Act and any and all liability associated with or related to that geologic storage facility which arises after the issuance of the site closure certificate; provided that such release from liability will not apply to a person that has concealed or misrepresented material facts, including those related to the mechanical integrity of the geologic storage facility or the chemical composition of any injected carbon dioxide or fluids.

Notes:

- ***Section 13(a) establishes the basic rule that the storage operator remains liable until a site closure certificate is issued by the Commission.***
- ***Section 13(b) provides that a site closure certificate may be issued only after cessation of injection operations and the lapse of a minimum period of time for monitoring of the site. The minimum period before the site can be officially closed is a matter of judgement. As of this time, no commercial storage sites have reached***

this point in the project cycle and there is a great deal yet to be learned about long-term outcomes for geologic storage of carbon dioxide that may have implications for the statutory treatment. Different states have settled upon different time periods. In any event, a storage operator must submit information in its application for a site closure certificate demonstrating compliance with the requirements and that the facility is reasonably expected to contain the stored carbon dioxide safely.

- ***Section 13(c) requires the Commission to find that safe closure of the geologic storage facility is reasonably expected before issuing a site closure certificate and for there to be public notice and a hearing on the storage operator's application. This model state legislation incorporates a 'reasonableness' standard in light of the inherent uncertainties associated with reservoir characterization, geo-mechanics and the migration of carbon dioxide and formation fluids in a reservoir.***
- ***Section 13(d) provides for a release of liability and transfer of title to the state upon the issuance of the site closure certificate. The release of liability covers project participants 'upstream' of the geologic storage facility, not just the storage operator. Other key project participants must be released if the state legislation is to achieve its goal of promoting projects with CCS in the state.***
- ***Questions around the issue of when a geologic storage facility can be safely closed, the ongoing policy debate on CCS as a 'climate change solution', and potentially exposing taxpayers to liabilities in the future all ensure that any legislative proposal around release of liability and transfer of responsibility to the state will be closely scrutinized.***

Section 14. Enforcement Authority

- (a) In the event a person violates a provision of this Act or a Commission rule or order under this Act, the Commission shall have the authority to:
- i. Restrain immediately and effectively such person from engaging in any unauthorized activity which is endangering or causing damage to public health or the environment by order or by suit in a state court;
 - ii. Sue in any court of competent jurisdiction to enjoin any threatened or continuing violation of any provision of this Act or a Commission rule or order under this Act or requirement or condition of a permit granted under this Act;
 - iii. Assess or sue to recover in court civil penalties and to seek criminal remedies, including fines as follows:
 - a) Civil penalties shall be recoverable for any violation in at least the amount of [\$ per day];
 - b) Criminal fines shall be recoverable in at least the amount of [\$ per day] against any person who willfully violates a provision of this Act or a Commission rule or order under this Act.
- (b) The maximum civil penalty or criminal fine (as provided in Section 14(a)) shall be assessable for each instance of violation and, if the violation is continuous, shall be assessable up to the maximum amount for each day of violation.
- (c) The burden of proof and degree of knowledge or intent required under this Act for establishing a violation shall be no greater than the burden of proof or degree of knowledge

or intent the federal regulator must provide when it brings an action under the Safe Water Drinking Act.

- (d) A civil penalty assessed, sought, or agreed upon by the Commission under Section 14(a) shall be appropriate to the violation.
- (e) The payment of a penalty imposed by the Commission under this Act does not relieve a person on whom the penalty is imposed from a requirement to correct the violation or from liability for damages caused by the violation.
- (f) A person may intervene in any civil or administrative action to obtain remedies specified in Section 14(a) if such person has an interest which is or may be adversely affected.

Notes:

- ***The EPA's primacy rules have requirements for enforcement authority and this provision follows those requirements. 40 C.F.R. 145.13.***
- ***Section 14(a)(i) describes a mechanism (e.g. cease and desist order) to stop any unauthorized activity endangering public health or the environment.***
- ***Section 14(a)(iii) addresses penalties for violations. If authorized by applicable statute, the EPA may commence a separate action for penalties if the state judgments or settlements provide penalties that are 'substantially inadequate.'***
- ***The state may provide for other enforcement remedies, such as procedures (i) for assessment by the state of costs of investigations, inspections or monitoring surveys which lead to establishment of violations, (ii) which enable the state to assess or to sue any persons responsible for unauthorized activities for any expenses incurred by the state in removing, correcting, or terminating any adverse effects upon human health and the environment resulting from the unauthorized activity, or both, and (iii) for the administrative assessment of penalties.***
- ***Section 14(c) calibrates the burden of proof with the federal equivalent under the Safe Water Drinking Act. Please note, this requirement is not met if the state law includes mental state as an element of proof for civil violations.***
- ***To the extent an Indian Tribe does not assert, or is precluded from asserting, criminal enforcement authority, the federal rules call for state law to provide that the commissioner or equivalent will assume primary enforcement authority for criminal violations.***

Section 15. Financial Responsibility

- (a) A person to whom a permit has been issued must provide evidence of financial responsibility to the Commission annually that is satisfactory to the Commission.
- (b) In determining whether a person is financially responsible, and the nature and type of financial assurance that may be required under Section 10, the Commission may consider:
 - i. The person's most recent annual report filed with the United States Securities and Exchange Commission under Section 13 or 15(d), Securities and Exchange Act of 1934;

- ii. If the person does not report to the Securities and Exchange Commission as described in Section 15(b)(i), the most recent audited financial statements of the person; or
- iii. Such other information as the Commission may deem appropriate.

Section 16. Severability

If any provisions of this Act or its application to any person or circumstance is held invalid, the remainder of the Act or the application of the provision to other persons or circumstances is not affected.

Section 17. Applicability

This Act applies only to carbon dioxide injections that commence on or after [date].