OPI

Ontario's Subsurface Energy Association

www.ontariopetroleuminstitute.com (519) 680-1620

Geologic Carbon Storage in Ontario – *Regulation to Development*

OPI's Commercial Scale Requirements and Recommendations

August 2024

Preamble

The OPI is a non-profit industry association which represents explorationists, producers, contractors, geologists, petroleum engineers and other professionals, individuals or companies directly related to the oil and gas, hydrocarbon storage and solution mining industries of Ontario. For well over a century, Ontario has enjoyed a strong Canadian advantage of being first in understanding and developing geological formations to produce valued energy products and deliver them to competitive markets. From Petrolia to Oil City, Ontario's engineers and production developers have been leaders. Now, with the adoption and growth of renewable energy and its use of subsurface formations for new substance injection, withdrawal and storage, our collective provincial expertise will lead the repurposing of our geological formations to support the clean, green transition to electrification.

In its submissions, OPI's members have focussed on the practical implications, opportunities and limitations of using geological formations for permanent carbon storage/sequestration ("CS"). Ontario has certain available carbon repository locations that may be preferably developed taking into account many factors, such as the geological storage medium and the rights to effect this new carbon storage on both existing and future stakeholders.

OPI is confident that this consultation will result in a properly managed, safe, staged development process, which OPI posits will and should be substantially similar to Ontario's existing, proven regulatory models in energy utility and franchise development – with consideration of the current tested and proven regulatory process for Ontario's natural gas storage industry.

As the model progresses, OPI predicts that, should the Province of Ontario pursue the Carbon Storage Hub approach, the correct pathway for larger hub developments will include well-established principles of non-discriminatory open access, and regulatory concepts of incentive-based ratemaking with provision for sensible adjustments to ensure commercial sustainability, and accountability.

It should also be contemplated that private CS storage projects be possible on a first come, first served basis on privately owned or leased land. This would allow individual emitters to store their own emissions in smaller/private projects with a simplified regulatory process.

It should also be contemplated that a CS project may start as a private storage pool, with the ability to open it up to a hub model in the future as more emitters are capturing their emissions, more pipeline infrastructure is available for transportation and if the private pool can technically take additional emissions from 3rd parties. Under these circumstances the regulations associated with the operation of a Carbon Storage Hub would apply.

MNRF Discussion Papers

The MNRF staff have provided the public with two Discussion Papers in January and July 2024 as the government prepares to issue new and amended legislation and regulations to accommodate this important move towards carbon sequestration in geological formations. This consultation is appreciated.

Both papers canvass myriad issues that must be addressed prior to implementing the new framework. The July Paper culminated in the MNRF posing nine primary questions, which effectively close in on the key issues that MNRF must consider in proposing a suitable regulatory framework for CS. OPI proposes to respond directly to each of these questions and to offer supplementary descriptive explanations for its logic and suggestions.

OPI proposes to repeat the MNRF numbered questions and reply below.

Question 1.

Would initially scoping the framework to only allow commercial-scale projects to store CO2 within saline aquifers and depleted oil and gas wells in southwestern

Ontario at depths of at least 800m or more meet industry's current needs and maintain public comfort in the development of these projects?

Answer 1.

OPI believes that industry's current needs are met by initially scoping the framework to only allow commercial-scale projects to store C02 within saline aquifers and depleted oil and gas reservoirs in southwestern Ontario. The MNRF's proposed 800m depth for commercial-scale projects is workable and entirely defensible scientifically, but technically, CS can occur at any depth in any porous and permeable medium which is effectively sealed by an impermeable surrounding medium. The OPI however, is unsure as to why the MNRF would limit projects to depths greater than 800m? Southwestern Ontario has many depleted oil and gas reservoirs, salt layers and saline aquifers at depths shallower than 800 meters that could sequester CO2 safely and effectively.

It is understood that there are benefits to storage of C02 in a supercritical state but if reservoirs located less than 800m deep can prove containment as well as other project specific hurdles they should not be impeded by an 800m depth requirement. The safety of the storage container is not just a direct function of depth as there are many other technical factors at play, including cap rock integrity and communication associated with faulting.

Question 2.

Would you support using a competitive process to select projects looking to store carbon dioxide on Crown land? Why or why not?

Answer 2.

OPI is supportive of using a sensible, orderly competitive process to select suitable CS projects on Crown land, with certain important caveats to ensure respect for prior rights and obligations in an integrated approach.

Competition, where practical, feasible and desirable usually delivers tested and true results. However, as Crown land is a public land base, there should be an emphasis on fairness, accountability and transparency, when facilitating competition in any procurement process – all in balance. Careful, practical and

impenetrable respect for existing leasehold, licence-based and legal covenants must be an equal hallmark of the new framework. Existing petroleum and natural gas (P&NG) lease rights must have primacy with any proposed projects not infringing on these rights to explore and develop sub-surface reservoirs and the oil and natural gas reserve value associated with these P&NG rights.

OPI suggests that to keep the CS competitive process simple and equitable, the first stage of the application is to evaluate potential sequestration locations (on a first-come, first-served basis). The first requirement ought to be for project applicants to meet and hold existing sub-surface petroleum and natural gas rights or to acquire those rights for a given area prior to seeking CS or other storage rights. This is how other jurisdictions operate as those regulatory authorities start with existing P&NG entitlements, *then* offer storage rights based on technical support and experience for the competitive application.

This is also how the natural gas storage rights are obtained under the existing regime in Ontario., i.e. the current natural gas storage development process in Ontario typically begins with the procurement or contribution of P&NG rights. P&NG rights and the exploration and development allowed under those rights help establish the suitability of developing a reservoir for storage. With a reduced technical risk, storage rights are obtained, and application is then made to designate, develop and operate the storage facility.

This second stage would be an application to the MNRF to be granted the right to store CO2 on the lands identified in Stage 1, with significant technical support and design as the CSA standard dictates. One example could occur where there may already be multiple existing leasehold interests in a near or adjacent pattern location. In this scenario, the practical recommended response to preventing and protecting against all unwelcome anticipatory CS plume migration into existing leaseholds would be establishment of a *Designated Storage Area* ("DSA"). This is how Ontario's traditional natural gas storage areas are defined and protected, as will be for Compressed Air Energy Storage as it is being defined by the new *Porous Rock Regulation*.

The logic behind this two-staged approach is to be legally safe, prudent and quite practical. MNRF is presumably not going to want to accord to or accommodate for inexperienced subsurface operators which may not have pre-existing rights or leased lands for mineral extraction prior to granting CS leases. Further, making the process any more arduous than the two simple stages proposed would increase public risk, increase development timelines and present barriers to CS development. Once the boundaries are established, operational experience and safety record must be paramount in any competitive process, with consultation requirements remaining as secondary, mandatory, subsequent obligations.

Question 3.

How should proponents obtain rights to pore space? What are the benefits and challenges associated with adopting the models currently being used in western Canada and US States discussed above?

Answer 3.

Proponents must be able to demonstrate competency, proven operational subsurface experience and a record of strong regulatory compliance as a prerequisite to obtain pore space for CS development. There are too many risks to ever allowing an unqualified operator to enter into pore space acquisition. Technical risk, albeit minimal, associated with unintended seismic consequences, uncontrolled substance migration between/amongst formations and zones, and an inability to monitor effectively the ongoing operation through observation wells all point to establishing clear rules and protocols prior to awarding pore space to any proponent.

OPI knows that in BC (unlike Ontario presently), there is an inherent recognition of the right to store CO2 as part of their existing P&NG leases. Existing operators have those concurrent rights to store where they have existing operations. Some of OPI's members have leases which currently grant broad formation rights for their oil and gas extraction activities at all geological depths, so the legal storage rights normally associated with these leasehold interests should also be accommodated in these existing leasehold arrangements.

As stated above, where there are a series of contiguous leaseholds or near adjacent leases, MNRF should consider the anticipated likely subsurface CS plume migration. MNRF should respect the right of an existing leaseholder to non-interference, and thus draw a Designated Storage Area-type boundary around those defined leased and adjacent areas to respect and protect the existing leasehold interests from external, uncontrolled plume migration activity. Any unleased areas within the boundary area should be offered first to be leased by the prevailing operating entity to preserve its operations area, as unrelated plume migration will be a violation of existing leasehold interests.

It is OPI's opinion that onshore pore space rights should remain as current subsurface rights are – with the landowner and not be expropriated. If the province were to expropriate pore space for CO2 storage, there would be interference with existing rights holders, including current landowners and the timelines for CO2 storage development would likely be greatly increased as the province moves to change common law in existence to remove these rights from the private sector landowners. It would be a complex and challenging foray into property rights in order to follow an Alberta model for provincial pore space annexation that may not be necessary given the provinces sedimentary basin and significant potential under Lake Erie and Lake Huron.

As with existing practices in Ontario for oil and gas unitization and natural gas storage area designation, a majority of a project's leased lands should be acquired before proceeding with CS development but not necessarily 100%. In other oil and gas producing jurisdictions like Montana, Wyoming and North Dakota, specific CS unitization legislation has established a limited range of requirement of percentage of owner approval between 60-80% of the pore space. Following a similar practice would allow for majority consent by interested parties yet prevent having to obtain 100% of the required land leases, that could be a long and delayed process. It could also be contemplated that lands over a certain size (acreage) need to be leased but not the smaller properties (house lots or similar). Any remaining required lands in the project could be expropriated with adjudicated compensation by the regulator for project specific areas.

Question 4.

Would a staged approach to authorising carbon storage projects be desirable? If so, how should authorisations be staged?

Answer 4.

OPI is open to a staged approach to authorising CS projects. Continued consultation with commercial parties will be important to ensure that practical timing, security and implementation issues are addressed before they become codified. If these approaches are codified in a non-commercial vacuum, they risk thereafter further time-consuming refinements, which may have been foreseeable with deep consultation within the industry.

In a staged approach model, the stages and requirements to satisfy each stage and move to the next must be clearly defined and attainable, with the proponent holding the first stage rights being given priority to continue with the development activities if the criteria to advance are met. This will ensure the projects are financeable and can proceed as the development milestones are met.

As long as P&NG rights holders are protected i.e. as with the BC regulations, or consistent with the Alberta requirement to prove that the proposed CS cannot/does not interfere with pre-existing oil and gas leasehold rights and obligations, then the staged process seems reasonable.

Question 5.

When and how should potential impacts to the agricultural land base and the agri-food network (e.g., operations, infrastructure, agribusinesses, etc.) be considered?

Answer 5.

Potential impacts should be well anticipated and categorised with an assessment, carbon detection/monitoring and escape mitigation plan prior to authorising injection operations. As in the forthcoming LT IESO procurement processes, an *Agriculture Impact Assessment* ("AIA") could form a part of onshore commercial CS applications. The AIA could include groundwater sampling, and a Monitoring, Measurement and Verification ("MMV") program could require regular sampling

to ensure the water table is unaffected by sequestration activities. Even an offshore proponent could be required to establish an assessment, monitoring and mitigation plan if the offshore injection CS plume has a reasonable prospect of causing a migration under agricultural lands.

Another reason for the MRNF offering CS opportunities through a staged competitive process lies in the integrated nature of a CS provider being an experienced or existing downhole subsurface operator. An experienced operator is and should be fully capable of monitoring its proposed CS activities through its own, or other existing wells matrix, which could together operate as useful observation wells. This would include both vertical and lateral plume migration modelling and monitoring.

Question 6.

How should proponents of commercial-scale geologic carbon storage projects notify and engage with Indigenous communities and other parties who may be affected by their proposed projects?

Answer 6.

Indigenous and broader public consultations are welcome, duty-bound, necessary, well-known forms of advance communication to convey important project information, especially as it may relate to potential impacts on other stakeholders, including but not limited to Indigenous communities. In support of the Crown's primary consultation mandate, OPI members are fully supportive of deploying the necessary communications and consultative resources to ensure a fulsome approach to information adequacy to address concerns and ensure a high level of public confidence in these types of projects.

The government of Ontario sould also provide more general consultation sessions, not just individual project proponents. This will ensure a clear and consistent message to all stakeholders.

Question 7.

What operational controls should be put in place to help ensure commercial-scale carbon storage projects would be developed, operated, and decommissioned in a safe and responsible manner?

Answer 7.

The answer to this important question likely requires more detailed information than may be addressed in the space for this response. However, the logical starting point is the direction provided by the CSA Z-741 Geological Storage of Carbon Dioxide requirements, so no new wheels need to be reinvented.

MMV programs should be required for commercial-scale carbon storage projects. MMV programs should establish baseline measurements and then verify that C02 sequestration occurs as modelled, and that containment is achieved. Injection rates, pressures and temperatures should be monitored, as well as C02 reservoir gas migration. Proof of reservoir containment could include an integrity analysis of new and existing wells, seismic surveys, formation fluid analysis amongst other techniques.

The MNRF London Petroleum Operations Section office staff is very familiar with these types of development, operations and decommissioning requirements and the associated 'cradle to grave' well licencing regime that forms the basis of Ontario's oil and gas industry, presently. Most of those requirements and obligations can be amended accordingly if and as necessary to accommodate any modifications which should be made for CS.

One such modification, referred to earlier, could be that existing nearby oil and gas wells could become observation wells to detect any potential carbon migration, highly unlikely though this may be. Another feature of a CS regulatory control framework could be a recognition that the decommissioning of a CS facility might require special types of post-closure monitoring that have not been previously implemented here in Ontario. The post-closure monitoring should be assumed by the Province to ensure that the projects are feasible for proponents with a clear end date, once a closure certificate is obtained.

Question 8.

Would allowing proponents to transfer responsibility for the long-term monitoring and stewardship of carbon storage projects to the Crown help ensure carbon storage projects, including the wells, geologic storage areas and carbon stored in geological formations, would be adequately cared for over the long-term?

Answer 8.

Yes.

The reality is that the Crown is the only entity that would and could practically have long-term final responsibility for these CS activities. And it is right that the Crown would continue as the forever steward simply because it is highly unlikely that a corporation would ever outlive the existence of the Crown. Further, if the CS is viewed as a necessary public good, and its operations are paid for by those entities which store carbon, which is also deemed for the public benefit, then it is right that the Crown be paid for taking on that responsibility and continue to be the steward/trustee of the banked funds collected to manage the CS project after its closure.

Lastly, the Crown sets the standards prior to and throughout the project lifecycle. The Crown sets the rates for monitoring and ensures the proper decommissioning according to the Crown's standards. OPI concludes that the Crown is the correct and only entity to ensure care and control over the stored carbon and decommissioned CS facilities, which is in the public interest.

The criteria necessary to obtain a closure certificate should be clearly stated and the certificate should be granted within several years of the criteria being met by the proponent for closure. This will ensure the projects can obtain financing and the long-term closure risks to the proponent well after the life of the project are mitigated such that projects may proceed in a timely and organized manner with clear legal requirements to decommission safely.

Question 9.

Would you support components of this framework being delivered by an external entity and if so, what components?

Answer 9.

Yes, OPI members can envisage that the Crown may wish to delegate some or eventually even most of its technical framework regulatory requirements to an outside, expert entity, which would record its delegated activities and report to the Crown. However, the Crown must always retain its authority over any such delegation.

OPI believes that at the present time, Ontario's agencies have the necessary expertise to establish the CS regime, implement it, regulate it, and observe the operations and prepare for an eventual decommissioning framework.

In the development of a CS HUB, OPI recommends a bifurcated regulatory process where the MNRF (or its designate) reviews all technical data and issues technical permits, and the Ontario Energy Board ("OEB") (or similar) reviews the economic merits and structure.

If a CS DSA HUB is established through the franchise-protected, rate-regulated model to ensure longevity and commercial sustainability, then after the MNRF is completed approving and licencing the CS operation, an economic regulatory framework should be concurrently implemented by an expert quasi-judicial agency. The best example is the OEB, which OPI recommends should be engaged to determine these economic regulatory requirements, certainly for any open Hub storage projects. The OEB would also be responsible for establishing the CS franchise concept based on the DSA and ensuring adherence to the standard non-discriminatory open-access rule with which the OEB is intimately familiar for its gas and electric regulated facilities.

For private CS projects on leased land that are not open-access, OPI does not feel that OEB approval would be required, other than possibly to obtain leave-to-construct. OPI envisages a model similar to what is and has been used for natural gas storage project development in the province for many years.

Legislative amendments should accommodate this foreseeable future for a franchise protected, economically and financially sustainable CS Hub, if major private sector CS investments are expected to be made in Ontario.

Other considerations in brief point form:

1. Development of a regulatory 'just and reasonable' rate structure/framework for compensation for C02 sequestration as there is no direct value in sequestering currently.

2. Pipeline annexation/expropriation for C02 transportation. Pipeline construction regulations and what changes, if any, are required to transport and certify pipeline safety for CO2 transportation.

3. Amendments to the *Mining Act* to allow carbon storage on Crown lands – timing must align with the commercial regulations.

4. Further discussions with the federal government are required immediately to ensure recognition of the Ontario program for ITCs and also to extend the provision of ITCs beyond 2030 as current timing will prevent these credits from being considered as part of any economic assessment. The ITCs will be very important for project development, especially with the lack of certainty around the federal carbon tax policy.