Developing a Legal Regime for Carbon Capture and Storage in Canada

Some reflections based upon a survey of natural gas storage regimes

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ISEEE Research Paper

December 2009

ACKNOWLEDGMENTS

Funding for the research for this paper was provided by ISEEE through a grant from Natural Resources Canada.

Julia Gaunce, third-year LL.B. student in the Faculty of Law, University of Calgary, was a co-author of the working paper entitled, *Natural Gas Storage Regimes in Canada: A Survey* (December 2009), and on which this paper relies extensively.

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COMMENTS

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INTRODUCTION

This short working paper is an adjunct to a much longer paper focusing on the legal regimes relating to natural gas storage in Canada: *Natural Gas Storage Regimes in Canada: A Survey*.[1] That paper canvassed the legal regimes for natural gas storage in eight Canadian provinces (British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick and Nova Scotia)[2] with somewhat briefer discussions of the position in the three territories. The aim of this paper is to identify what we can learn from the experience of developing legal and regulatory frameworks for natural gas storage that we can apply in the context of carbon capture and storage (CCS).

CCS involves the capture of carbon dioxide (CO_2) at large point sources of emissions, the compression of the captured CO_2 to form a super critical fluid, the transportation of that substance to a storage site and then the injection of that fluid into a geological formation for long term storage or disposal. The principal storage targets are depleted oil and gas reservoirs, deep saline aquifers and unminable coal seams. Saline aquifers offer the greatest volume of storage, but depleted oil and gas reservoirs offer the potential for offsetting revenues from enhanced oil recovery projects.[3]

CCS therefore represents one option in the portfolio of mitigation options for stabilization of atmospheric concentrations of greenhouse gases that contribute to anthropogenically induced global warming and climate change. A recent assessment in Alberta by the Carbon Capture Storage and Development Council notes that:[4]

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[1] Nigel Bankes and Julia Gaunce, *Natural Gas Storage Regimes in Canada: A Survey*, 2009, available at http://www.iseee.ca/files/iseee/Bankes_and_Gaunce_NATURAL%20GAS_STORAGE_REGIMES_IN_CANADA.pdf hereafter *Natural Gas Storage Regimes.*

[2] Newfoundland and Prince Edward Island do not have storage regimes.

[3] See generally, IPCC, *Special Report on Carbon Dioxide and Storage*, 2005, http://www.ipcc.ch/pdf/special-reports/srccs/srccs_wholereport.pdf

[4] Alberta Carbon Capture Storage and Development Council, *Accelerating Carbon Capture and Storage Implementation in Alberta*, Final Report, March 2009, at 16 (hereafter Development Council Report). http://www.energy.gov.ab.ca/Org/pdfs/CCS_Implementation.pdf

> CCS is recognized globally as a technology possessing the potential to dramatically reduce GHG emissions. There is agreement among key stakeholders in Alberta that CCS holds the promise to significantly contribute to Alberta's long-term climate change strategy provided the economic and policy hurdles confronting CCS can be overcome. While contributions from renewable energy development and conservation are an important part of Alberta's carbon intensity reduction plan, some 70 per cent of Alberta's potential reductions are foreseen to arise from CCS.

Somewhat earlier, the National Round Table on the Environment and the Economy estimated that CCS could contribute up to about 400 Mt CO_{2e} per year in reduced emissions in Canada by 2050.[5]

Given the potential, governments around the world have provided economic and policy support to the development of CCS projects especially for large scale pilot projects. For example, the Government of Alberta in July 2008 promised to commit $2 billion to CCS projects[6] and has followed this up with a call for proposals and announcements during the fall of 2009 that the province will fund four different projects.[7]

Not all are supportive. Some argue that CCS will simply delay us in moving to a low carbon future. Others note that the technology for CCS is simply untested at the required large scale levels, while others emphasise the cost of CCS and question whether such vast investments can be justified, especially given the depressed state of the global economy.[8]

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[5] NRTEE, *Getting to 2050: Canada's Transition to a Low-emission Future*, 2007, at 31, http://www.nrtee-trnee.com/eng/publications/getting-to-2050/Getting-to-2050-low-res.pdf

[6] http://www.energy.gov.ab.ca/Initiatives/1438.asp

[7] *Id*.

[8] For some different views see for example: (1) the conditionally supportive views of the Pembina Institute: http://pubs.pembina.org/reports/pembina-perspective-ccs-feb-19-09.pdf, (2) the conditionally supportive views of WWF, http://assets.panda.org/downloads/wwfpositionstorage.doc and (3) the more negative views of Greenpeace Why carbon capture and storage won't save the climate, 2008 and characterizing CCS as a false hope, http://www.greenpeace.org/raw/content/international/press/reports/false-hope.pdf

The principal challenge is clearly the economic challenge and especially the cost of capture. The Alberta Carbon Capture Storage and Development Council estimated that CO_2 capture represents 70 – 90% of the overall costs of the CCS chain (capture and compression, transportation and injection and storage)[9] with capture costs beginning at $60 a ton and rising depending upon the industry and technology. While in some cases (such as enhanced oil recovery miscible floods or enhanced coal bed methane) there may be an offsetting revenue stream, in most cases there will not be.

However, in addition to the economic challenge, government task forces and the like also emphasise the importance of developing an adequate legal and regulatory regime for CCS operations, especially at the injection and storage stage of the CCS chain. For example, the final report of the ecoEnergy Carbon Capture and Storage Task Force identified the need for immediate action in clarifying the legal and regulatory framework:[10]

> Authorities responsible for oil and gas regulation should provide regulatory clarity to move the first CCS projects forward by: quickly confirming legislation and regulation related to pore-space ownership and disposition rights; clearly articulating the terms for the transfer of long-term liability from industry to government; and increasing the transparency of regulatory processes.

In developing an appropriate legal and regulatory regime for the storage phase of the CCS chain it is appropriate to consider what we can learn from the analogies to the injection and containment operations associated with CCS. These analogies include EOR operations, acid gas disposal, waste disposal and natural gas storage. Much of the writing has focused on acid gas disposal[11] for various reasons including that AGD is a disposal

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[9] Development Council Report, *supra* note 4 at 21.

[10] ecoEnergy Carbon Capture and Storage Task Force, *Canada's Fossil Energy Future: The Way Forward on Carbon Capture and Storage*, January 9, 2008, at 23. The report is available at http://www.energy.alberta.ca/Org/pdfs/Fossil_energy_e.pdf

[11] See for example Nigel Bankes and Jenette Poschwatta, "Carbon capture and storage in Alberta: learning from the acid gas disposal analogy" (2007), 97 Resources 1-6, online at http://www.ucalgary.ca/~cirl/html/resources.html. The more technical literature includes Stefan Bachu and Kristine Haug, "In Situ Characteristics of Acid-Gas Injection Operations in the Alberta Basin, Western

operation and not a temporary or cycling storage operation, the acidic quality of the gas presents challenges that are also present for CCS operations, and the reality that in a disposal operation the reservoir will be pressured up on abandonment rather than blown down (which will be the case for EOR and gas storage operations). Nevertheless, we think that there are lessons that we can also learn from the legal regimes that have developed for natural gas storage in Canada over a much longer period of time. This is especially so in terms of the options available to governments in dealing with such issues as: the ownership of pore space for the purposes of natural gas storage, the design of disposition or tenure regimes where storage rights are owned by the Crown, and the mechanisms for resolving holdout problems in situations where there are multiple private owners one or more of whom withhold consent to a proposed development which has significant public interest benefits.

In thinking about the legal issues associated with the legal issues associated with CCS and in previous writings[12] we have suggested that there are three types of legal issues that we need to clarify if CCS is to move ahead: these are, property issues, regulatory issues and liability issues. The paper on which this is based, *Natural Gas Storage Regimes in Canada: A Survey,* focuses very much on the first set of issues and hence this is also the focus of this contribution.

I have organized this short paper in the same way as the conclusion to the *Natural Gas Storage Regimes* paper. The conclusions to that paper are organized thematically around five key questions or issue areas. These are: (1) ownership of storage\disposal rights, (2)

Canada: Demonstration of CO2 Geological Storage" in Sally Benson (ed), *Carbon Dioxide Capture for Storage in Deep Geologic Formations – Results from the CO2 Capture Project*, Volume 2, *Geologic Storage of Carbon Dioxide with Monitoring and Verification*, Elsevier, 2005 at 867 – 876. H.L. Longworth, G.C. Dunn and M. Semchuk, "Underground Disposal of Acid Gas in Alberta, Canada: Regulatory Concerns and Case Histories" in *Proceedings of the Gas Technology Symposium*, 28 April – 1 May, 1996, Calgary Alberta, paper # SPE 35584, at pp.181 – 192. Steven A. Smith et al, "Acid Gas Injection and Monitoring at the Zama oil field in Alberta, Canada: a case study in demonstration-scale carbon dioxide sequestration" (2009) 1 Energy Procedia 1981-1988 (discussing acid gas injection at the rate of about 250 tons per day into a pinnacle reef with concurrent oil production).

[12] See Nigel Bankes, Jenette Poschwatta, and E. Mitchell Shier, "The Legal Framework for Carbon Capture and Storage in Alberta" (2008) 44 Alberta Law Review 585 – 630. In addition there is also the question of how CCS projects might earn credits within a cap and trade and offsets system – whether that be a hard cap such as that developed in the European Union, or a facility-based emissions intensity cap such as that developed in Alberta under the Specified Gas Emitters Regulation, Alta. Reg. 139/207.

the treatment of holdout problems where storage\disposal rights are privately owned, (3) disposition rules for government owned storage\disposal rights, (4) resource sterilization, and (5) regulation. I have also added a section dealing with the federal role in the context of storage and in the context of CCS projects.

OWNERSHIP OF STORAGE\DISPOSAL RIGHTS

The *Natural Gas Storage Regimes* paper acknowledges that the literature on the ownership of natural gas storage rights in Canada suggests that there is some uncertainty as to who owns pore space for *storage* purposes. Is pore space owned by the owner of the mineral estate (and if so the owner of which element(s) of the mineral estate)? Or is it owned by the owner of the surface estate? The same is equally true of the ownership of pore space for *disposal* rights although we have argued elsewhere that a court would likely prefer the mineral owner over the surface owner.[13] Nevertheless, there are good reasons for thinking that it is important to clarify these matters so as to minimize the risks of litigation.

The *Natural Gas Storage Regimes* paper recognized that governments in Canada have responded to the uncertainties as to pore space ownership for storage purposes in several ways. First, some governments have responded by vesting natural gas storage rights in the Crown or the government. This serves both to clarify and simplify the ownership position. A prospective storage operator need only deal with one owner and that owner is a public owner. This approach also serves to resolve the potential holdout problems that may arise when a single owner in a fragmented ownership situation refuses to agree to the assembly of the properties required for a storage project at the price offered, or indeed at any price. This is the position taken in Quebec[14] and New Brunswick:[15] both have elected to vest pore space and storage rights in the government. The position is not quite

[13] See Bankes et al, *id*; and see also Nigel Bankes, "Legal Issues Associated with the Adoption of Commercial Scale CCS Projects", 32pp http://pubs.pembina.org/reports/ccs-discuss-legal.pdf paper prepared for Carbon Capture and Storage Forum, A Pembina-ISEEE Thought Leaders Forum, November 10, 2008, Calgary (hereafter, Bankes, *Pembina Report*).
[14] *Mining Act*, R.S.Q., c. M-13.1, s.3.
[15] *Underground Storage Act*, S.N.B. 1978, c. U-1.1.

as clear in Nova Scotia, although the provincial storage legislation seems to proceed on the basis that storage rights are already vested in the Crown by virtue of provincial petroleum or mineral legislation.[16]

It would appear that, in each of these cases, the relevant legislation is specific to *storage* and does not extend to include within its ambit either: (1) ownership for the purposes of *disposal*, or, (2) ownership for the purposes of storage\disposal of non-hydrocarbons.

Second, a single jurisdiction, Alberta, has chosen to enact legislation to clarify the ownership position and, in the course of doing so, has vested natural gas storage rights with the owners of petroleum and natural gas rights.[17] Thus, in Alberta, storage rights may be owned either by the Crown, or by private parties, depending upon the background mineral titles. Since about 80% of mineral rights in Alberta are owned by the provincial Crown this makes Crown ownership dominant, although certainly not exclusive. One still encounters many townships in the settled parts of the province with fragmented (Crown\freehold) ownership patterns. In sum, the Alberta legislation has clarified the matter of ownership, but it does not completely resolve matters from the perspective of a prospective storage operator seeking to assemble the necessary block of rights. There is still the potential for holdout problems, and elsewhere we have taken the position that these provisions in the *Mines and Minerals Act* also cannot be read to deal with the disposal of captured CO_2.[18]

A third group of provinces has not seen the need to clarify the ownership rules for natural gas storage, although each seems to proceed on the *assumption* that storage rights follow mineral ownership and that, as a result, storage may be vested in the Crown or a private owner depending on the background mineral ownership. This is the case in Ontario,

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[16] *Underground Hydrocarbons Storage Act*, S.N.S. 2001, c.37, *Mineral Resources Act*, S.N.S. 1990, c.37, s.4, *Petroleum Resources Act*, R.S.N.S. 1989, c.342.
[17] *Mines and Minerals Act*, R.S.A. 2000, c. M-15, s.57; Glen Acorn and Michael W. Ekelund, "An Overview of Alberta's Recent Legislation on Natural Gas Royalty Simplification and Gas Storage" (1995) 33 Alberta Law Review 342; Robert J. McKinnon, "The Interplay Between Production and Underground Storage Rights in Alberta" (1998) 36 Alberta Law Review 400.
[18] See Bankes et al, *supra* note 13.

Manitoba, and Saskatchewan.[19] Each of these jurisdictions is equally silent in relation to the ownership of pore space for disposal purposes although in this case it would not be possible to reach the conclusion that the jurisdiction is proceeding on the assumption that disposal rights follow mineral ownership because there no (or insufficient) practice or legislative context[20] from which to draw that conclusion.

Fourth, one other jurisdiction, British Columbia, proceeds on the premise that ownership of natural gas storage rights is unclear and that such rights may be owned by the surface owner or the mineral rights owner.[21] British Columbia's response to this acknowledged uncertainty is to create a procedure for vesting storage rights in the Crown, subject to the payment of compensation where a private owner can show that it has been divested of its ownership rights.[22] The BC model provides certainty for an operator proposing to assemble a storage project, but the model delivers that certainty on a case-by-case basis rather than by the enactment of a global rule (as in Alberta) that vests storage rights in one category of owner. The BC model also puts the onus on the private party who claims compensation on the grounds that it has been divested of its storage by the operation of the scheme. The private party must establish its ownership claim. This is the case whether that party presents its claim on the basis of its ownership of surface rights, or on the basis of its ownership of mineral rights.

British Columbia amended its *Petroleum and Natural Gas Act* in 2008[23] and expanded the storage provisions so as to allow them to be applied to disposal, whether of a processing by-product (the situation of acid gas disposal),[24] or CO_2 captured at an industrial facility.

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[19] See *Natural Gas Storage Regimes*, *supra*, note 1, at 68 (Ontario), at 59 (Manitoba) and at 52 (Saskatchewan).

[20] By "legislative context" I simply mean that reading the legislative scheme read as a whole supports the assumption described in the text. Obviously one can only make that argument if the legislation deals with the subject, whether that subject be "gas storage" or "disposal".

[21] See *Natural Gas Storage Regimes*, *supra* note 1 at 21 - 27.

[22] *Petroleum and Natural Gas Act*, R.S.B.C. 1996, c.361, ss. 128 – 129.

[23] *Oil and Gas Activities Act*, S.B.C. 2008, c.36, s.152(g).

[24] Note in this context that shale gas production from the Horn River Basin in British Columbia contains approximately 12% CO_2. As a result, some operators in the basin (Spectra and EnCana) are considering disposing of CO_2 into Devonian brine formations at a disposal depth of about 2500 metres: National

DEALING WITH HOLDOUTS

The *Natural Gas Storage Regimes* paper emphasized that a storage operator needs to assemble and acquire all of the interests in the target storage formation. If it fails to do so, the operator may, at worst, not be able to proceed with its project; at best, it runs the risk of another party producing its stored gas. A storage operator will also require surface access for injection wells and other facilities. In most cases we can expect the operator to proceed by way of contract, storage agreement, lease, or voluntary unitization to acquire the necessary rights – all with the necessary consents of the relevant owners of storage rights (whether private or public). But this may not always be possible. It may not be possible to trace owners; or an owner may simply not consent, either at the offer price, or at all. For example, the owner may simply not like the idea of gas storage under his or her lands.

It seems fairly clear that an operator may face the same challenges assembling the necessary property interests for a CO_2 disposal project. But there is also some reason for thinking that the holdout issue may be even more challenging in the case of a CCS operation. First, there is the question of scale, especially in relation to aquifer storage projects. While a natural gas storage project (salt cavern or depleted reservoir) will be fairly geographically confined,[25] the pressure effects and the CO_2 plume in relation to a CCS project will likely cover much larger areas therefore encountering a larger number of owners.[26] Second, owners may be even less willing to consent to a disposal operation

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Energy Board, Briefing Note, *A Primer for Understanding Canadian Shale Gas*, November 2009 at 12 – 14, available at http://www.neb-one.gc.ca/clf-nsi/rnrgynfmtn/nrgyrprt/ntrlgs/prmrndrstndngshlgs2009/prmrndrstndngshlgs2009-eng.pdf

[25] According to Colin Q. Winter, "Alberta Gas Storage Reservoirs: A New Direction for Royalty Administration" (1993) 31 Alta. L. Rev. 107 at 108, n2 the Suffield Storage site (Alberta) is recognized to cover 7,232 ha of Crown lease lands and 400 ha of freehold lands.

[26] Modelling work conduct as part of the Wabamun Area Storage Project suggests that a single vertical injector well with an injection rate of 1Mt/year will create a saturation plume with a diameter of about 4.6 km and a pressure plume of about 65 km. The WASP project aims to examine the feasibility of storing 20 Mt-CO_2/year for 50 years in the Wabamun area of Alberta. For details see http://www.ucalgary.ca/~keith/wasp.html

than to a storage operation, especially if the economics are such that the operator will be reluctant to make significant payments to acquire or rent storage rights.

Faced with this reality in the context of gas storage operations, some jurisdictions have recognized that it may be appropriate to allow a storage operator to acquire the necessary rights compulsorily where negotiations fail. For most jurisdictions this is fairly straightforward in relation to the *surface rights* that an operator may require, but the practice suggests that it is much more contentious in relation to the *storage rights* themselves.

In relation to *surface rights*, the western jurisdictions generally have a surface rights regime either as stand-alone legislation (Alberta,[27] Saskatchewan,[28] and Manitoba[29]) or as part of petroleum and natural gas legislation (British Columbia[30]). Generally, these jurisdictions have found it fairly easy to amend this legislation over the years to accommodate new activities as they develop, including injection activities for enhanced oil recovery operations and gas storage operations. This is clearly the case for British Columbia and Alberta. Nova Scotia prescribes the surface rights access and compensation regime within the storage legislation itself,[31] as do Ontario[32] and New Brunswick[33]. While the position may be clear in relation to *surface* access for the purposes of a *storage* operation in most provinces some of these same jurisdictions may need to adjust their legislation to make sure that it includes disposal operations as well as injection for storage purposes. [34] Thus, while the legislation in Alberta and British Columbia seems adequate it is less clear that legislation in other provinces addresses

[27] *Surface Rights Act*, R.S.A. 2000, c.S-24.
[28] *Surface Rights Acquisition and Compensation Act*, R.S.S. c. S-65
[29] *Surface Rights Act*, C.C.S.M. c.S235.
[30] *Petroleum and Natural Gas Act*, R.S.B.C., c.361, ss. 16 – 21.
[31] *Underground Hydrocarbons Storage Act*, S.N.S. 2001, s.37, ss. 12 – 13.
[32] *Ontario Energy Board Act*, S.O. 1998, c. 15, s. 38.
[33] *Underground Storage Act*, S.N.B. 1978, c. U-1.1, s.9.
[34] In Saskatchewan and Quebec however it is less clear that the legislation has been amended to afford a storage operator the same access to surface rights legislation (or its equivalent) as would be available for exploration and production operations. The legislation would also need to be expanded to include surface access for disposal operations.

surface access for disposal as well as storage. For example, the Ontario legislation is very much confined to storage as is the New Brunswick legislation.

The *Natural Gas Storage Regimes* paper emphasized that the picture is considerably more diverse in relation to *the storage rights themselves*, and the same must hold true for disposal rights. The *Natural Gas Storage Regimes* paper noted that legislative measures to deal with holdouts are not necessary: (1) in those jurisdictions that vest storage rights in the government (New Brunswick and Quebec), (2) in any jurisdiction that seems to assume that it has done so (Nova Scotia), or (3) in any jurisdiction which has a means of vesting storage rights in the Crown on a case-by-case basis (British Columbia). Of these jurisdictions, the only province (as noted above in the previous section) which has extended its vesting legislation to include disposal rights is British Columbia.

The *Natural Gas Storage Regimes* paper also canvassed how those jurisdictions that contemplate private ownership of storage rights had dealt with the holdout issue. The conclusion was that only one, Ontario, had addressed the problem of how an operator might gain access to storage rights owned by a private party that is holding out in a situation where those rights are necessary to complete the storage unit. None of the other provinces (Alberta, Saskatchewan, and Manitoba) have specific legislation to deal with the issue; and we also concluded that existing provisions dealing with such matters as pooling and unitization do not, as currently framed, permit an operator to compulsorily acquire storage rights.

The Ontario legislation provides a compensation regime that allows an operator to compulsorily acquire storage rights from a private owner.[35] Compensation appears to be payable on the basis of the "going-rate" in the pool or the region, and is calculated on the basis of a per hectare fee rather than on the basis of storage capacity.[36] The Ontario regime is confined to natural gas storage. The legislation would need to be amended to accommodate disposal and a CCS project.

[35] *Ontario Energy Board Act*, S.O. 1998, c. 15, s.38.
[36] *Natural Gas Storage Regimes*, *supra* note 1, at 78 – 82.

British Columbia also provides for the possibility of compensation to the owner of private storage rights whose rights may be affected by a Crown vesting order.[37] Both Ontario and British Columbia provide that the amount of compensation is to be determined by an expert board rather than the courts: in Ontario, the Ontario Energy Board (OEB); and in British Columbia, the Mediation and Arbitration Board (the provincial surface rights board). While the OEB has decided such cases, no such cases have been brought before the BC Board. The Ontario legislation gives the OEB very general directions in terms of determining compensation (just and equitable compensation for any damage and for any rights acquired) and, as noted above, the OEB fixes compensation on the basis of the going rate in the pool. The BC legislation lists of heads of compensation that the Board must consider in assessing compensation. While typical of western surface rights legislation, it seems ill-suited to the task of determining compensation for the loss of storage rights. Unlike the Ontario legislation, the BC legislation has already been amended to take account of disposal operations as well as storage operations.

In sum, Canadian jurisdictions that recognize the possibility of privately owned storage rights have been reluctant to develop legislation to deal with holdout problems. And while Ontario has done so its legislation would need to be amended to accommodate a CCS project. At the time of writing, only British Columbia has relevant compulsory acquisition legislation that could accommodate a CCS project.

HOW DOES THE GOVERNMENT DISPOSE OF ITS NATURAL GAS STORAGE OR OTHER DISPOSAL RIGHTS?

The *Natural Gas Storage Regimes* paper concluded that governments appear to have adopted two distinct approaches to the disposition of publicly owned storage rights. Most governments have adopted a tenure scheme for the acquisition of publicly owned storage rights. Typically this is a two-step tenure, with some form of a short term exploration

[37] *Petroleum and Natural Gas Act*, R.S.B.C., c.361, ss. 16 & 129.

tenure and then a longer holding tenure. In some cases the tenure regime may take the form of dedicated free-standing gas storage legislation. This is the case, for example, in each of New Brunswick[38] and Nova Scotia,[39] and was the case originally in British Columbia.[40] However, most jurisdictions have elected to deal with tenure issues within the context of provincial petroleum or mining legislation as follows: British Columbia, the *Petroleum and Natural Gas Act*;[41] Saskatchewan, the *Crown Minerals Act*[42]; Manitoba, the *Oil and Gas Act*[43]; Ontario, the *Mining Act*[44] and the associated regulations; and Quebec, the *Mining Act*[45] and the regulations. While most jurisdictions maintain a clear separation between the disposition of the storage right on the one hand and the regulation of the storage project on the other, Manitoba's approach seems conceptually confused insofar as a permit for a storage project under the *Oil and Gas Act* seems to serve as both the regulatory and the property authorization for the project.[46] There is also some (more limited) overlapping of function in the Quebec model.

Alberta has taken a conceptually different approach and does not provide a distinct and stand-alone storage tenure. Rather, the Crown natural gas storage tenure grows out of an existing production tenure which the tenure holder extends as to both function (storage in addition to production) and duration (the tenure is continued by production and\or storage) by entering into a gas storage unit agreement with the Crown and other affected parties.[47] Alberta seems to have adopted this approach in recognition of the fact that the dominant mode of storage in that province is in depleted reservoirs. Certainly, this represents a very pragmatic response to the reality that a storage scheme in a depleted reservoir will have to take account of, and build upon, existing tenures.

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[38] *Underground Storage Act*, S.N.B. 1978, c. U-1.1
[39] *Underground Hydrocarbons Storage Act*, S.N.S. 2001, c.37.
[40] *Underground Storage Act*, S.B.C. 1964, c. 62 (now repealed).
[41] *Petroleum and Natural Gas Act*, R.S.B.C., c.361.
[42] R.S.S., 1978, c. 50.2 as amended by the *Crown Minerals Amendment Act*, 1992 c.25, at s.272.
[43] C.C.S.M. c.O34.
[44] R.S.O. 1990, c.M-14 and the Regulations for Exploration Licences, Production and Storage Leases for Oil and Gas in Ontario, O.Reg. 263/02.
[45] R.S.Q., c.M-13.1.
[46] C.C.S.M. c.O34, s.160 *et seq*.
[47] *Mines and Minerals Act*, R.S.A. 2000, c. M-15, ss.57(5) and 102.

Other jurisdictions also have to grapple with this reality even where, in theory, they have distinctive and stand-alone storage tenures. In managing the transition from production to storage, a jurisdiction will need to think about whether it is necessary for the tenure holder to acquire a new form of tenure and\or whether an existing tenure holder should have a preferential right to acquire a storage tenure. Most jurisdictions seem to accept (at least where the storage property is a depleted reservoir) that an operator will require overlapping production and storage tenure, if only because of the risk that the operator will produce some native gas for which it will be royalty liable and for which it will need a production tenure.

Alberta's scheme apparently handles this transition seamlessly. It seems messier in other jurisdictions. In British Columbia, for example, it is significant that the one active storage project (Aitken Creek) is not developed on the basis of a storage tenure but on the basis of an original production tenure combined with a scheme approval.[48] A provincial policy paper in BC[49] suggests that future storage projects will require both a production tenure and a storage tenure, and the injunction in the Quebec legislation and regulations that a storage operator cannot produce any more mineral substances than it injects[50] will also likely prompt the storage operator, at least the risk averse storage operator, to acquire a production tenure as well as a storage tenure. Most if not all storage operations in Ontario seem to be dominated by privately owned storage tenures which have evolved from a variety of production leases and storage agreements that defy orderly classification. One jurisdiction (New Brunswick) proposes to deal with the transition from production to storage by giving the holder of the production tenure a right or a preferential right to receive a storage tenure,[51] while the Nova Scotia legislation stipulates that a storage tenure will not be issued for areas that are under a production tenure.[52]

What are the implications of this for carbon capture and storage? First, the practice suggests the need for a form of tenure that specifically grants disposal rights. That said,

[48] *Natural Gas Storage Regimes*, *supra* note 1 at 30 – 32.
[49] *Natural Gas Storage Regimes*, *supra* note 1 at 27 – 30.
[50] Regulation respecting petroleum, natural gas, brine and underground reservoirs, C.M-13.1, r. 1.
[51] *Underground Storage Act*, S.N.B. 1978, c. U-1.1, s.12.1
[52] *Underground Hydrocarbons Storage Act*, S.N.S. 2001, c.37, s.12.

the practice also suggests that this might be achieved either by means of a distinct form of tenure (the practice of most jurisdictions), or by adding disposal rights to an existing tenure (the practice in Alberta in relation to storage). It seems possible that the preferred approach might depend upon the disposal target. Where the disposal target is a depleted formation the Alberta approach may be useful since the target may well be subject to existing production tenures and may even evolve out of an EOR project or other conservation scheme in relation to the reservoir. Where the target is a saline aquifer however there are less likely to be existing tenures and therefore there might be more reason to develop a distinctive form of tenure for CCS projects. Such a regime might include both an exploration tenure and a long term disposal tenure. In other work we have suggested how Alberta's petroleum and natural gas tenure might be adapted to create a new form of tenure for CCS projects.[53]

Second, the Alberta approach also shows an interesting evolution from more ad hoc arrangements based upon so-called Crown agreements to a more standardized approach based upon gas storage unitization agreements. Thus, the early Suffield storage project was developed on a Crown agreement, but current practice favours using the standard form unit agreement.[54] Some have suggested that this provides an opportunity for an adaptive management or a learning-by-doing approach which emphasises the importance of flexibility in the early stages of applying a new technology.[55]

The *Natural Gas Storage Regimes* paper also examined how governments charged for publicly owned storage rights and the practice showed a number of different approaches. First, governments may charge a rental for the storage tenure. This may be a flat rental. For example, British Columbia levies a flat rental of $7.50 per ha per year,[56] Nova Scotia

[53]Bankes and Poschwatta, *Australian Legislation on Carbon Capture and Storage: A Canadian Perspective*, Research Report, Report prepared for the Institute for Sustainable Energy, Environment and Economy (ISEEE), June 2008, 78pp, on line at http://www.iseee.ca/files/iseee/bankes_research_paper.pdf
[54] Colin Q. Winter, "Alberta Gas Storage Reservoirs: A New Direction for Royalty Administration" (1993) 31 Alta. L. Rev. 107.
[55] Alberta Carbon Capture Storage and Development Council, *Accelerating Carbon Capture and Storage Implementation in Alberta* , Interim Report, September 2008 at 19 "given the early stage of CCS, it would be more appropriate to use Crown Agreements as opposed to a specific disposal regulation" http://www.energy.gov.ab.ca/Org/pdfs/CCSInterimRept.pdf
[56] Storage Reservoir Regulation, B.C. Reg. 350/97, s.7

fixes the lease rental at $5.00 ha,[57] while in Alberta and Saskatchewan it is $3.50 per ha.[58] Both Ontario and Quebec, however, contemplate that the rental should be based on the storage capacity of the property. In Ontario this will be the greater of the bid amount or 30 cents per thousand cubic metres,[59] while the Quebec scheme reserves greater discretion to the Minister who may fix the rent for a storage lease based on the depth, thickness, extent and economic prospects of the underground reservoir.[60] Second, it is possible that governments may dispose of storage rights by means of a bonus bidding system in the same way in which they dispose of production rights. The Ontario scheme provides for bonus bidding -- both cash, and, as noted above, bidding based on a proposed storage rental.[61] In Alberta, bonus bidding is also the norm since storage rights begin as an exploration and production tenure and then roll over to a gas storage unit agreement. The original exploration and production tenure will almost invariably have been acquired at a Crown sale and on the basis of a bonus bid.[62] However, it seems implausible to think that the bidding party would have taken account of potential storage values when originally fixing on its bid for the property.

Again, what are the lessons for developing a form of disposal tenure? It seems unlikely there will be much if any economic rent to extract from publicly owned disposal rights. Certainly, in the early going, governments will be much more interested in encouraging the development of CCS projects rather than recovering rents. However, governments do still need to think about how rights will be disposed of, especially where there are no existing tenures to take account of. Should they be disposed of on application? Or by means of a competitive, bid whether a cash bonus bid or a work program bid? Governments will be interested in ensuring that disposal projects are developed by competent parties and that emitters who need access to disposal space will be able to secure access on reasonable market terms. Governments may also be interested in

[57] Underground Hydrocarbon Storage Regulations, NS Reg 148/2002, s.13.
[58] Mines and Minerals Administration Regulation, Alta. Reg. 262/97, s.20; Lease of Spaces Regulations, R.R.S. c.C-50.2 Reg.7 (1995).
[59] Regulations for the *Exploration Licences, Production and Storage Leases for Oil and Gas in Ontario* O. Reg. 262/02, ss. 16 – 19.
[60] Regulation respecting petroleum, natural gas, brine and underground reservoirs, C.M-13.1, r. 1, s. 113.
[61] *Supra*, note 59.
[62] *Mines and Minerals Act*, R.S.A. 2000, c. M-15, s.16

targeting disposal projects in particular areas and as a result they may be reluctant to adopt the industry-driven nomination process that seems to be the dominant approach across Canada in terms of deciding which lands should be put on the auction block. Perhaps significant here is the example of British Columbia where public concerns in the Lower Mainland as to oil and gas drilling in general, and storage projects particular,[63] led the government to confine the area of application of the storage legislation in that province to the Peace District.[64]

RESOURCE STERILIZATION

The *Natural Gas Storage Regimes* paper recognizes that the development of a storage facility may sterilize the development of adjacent resources (or at least lead to resource use conflicts) and may engender safety concerns. Governments respond to this in several ways. First, where the government is disposing of storage rights it may take care to protect existing production interests. For example, Nova Scotia provides that the Minister shall not accept an application for an exploratory storage licence for areas that are subject to leases under the *Mineral Resources Act*, production agreements under the *Petroleum Resources Act*, or areas for which there is in force a prohibition on exploration or development activity.[65] Second, governments and regulators may address these concerns at the regulatory stage where governments are approving storage projects. For example, a regulator may require that the applicant provide consents from the mineral rights owners of offsetting acreage. This is the practice in Alberta through the Energy Resources Conservation Board[66] and seems to be required in Saskatchewan as well.[67]

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[63] Commission of Inquiry into Fraser Valley Petroleum Exploration (B.C.) and D. Anderson, *Report of the Commission of Inquiry into Fraser Valley Petroleum Exploration* (Victoria: The Commission, 1991) [The Anderson Report]. See also, Ministry of Energy, Mines and Petroleum Resources, *Fraser Valley Drilling: Response to the Report of the Commission of the Inquiry into Fraser Valley Petroleum Exploration* (Toronto: Micromedia Ltd., July 4, 1991).
[64] Storage Reservoir Regulation, *supra* note 56.
[65] *Underground Hydrocarbons Storage Act*, S.N.S. 2001, c.37, s.12.
[66] ERCB, Board Directive 65, Resources Applications for Conventional Oil and Gas Reservoirs, at 4-20
[67] Ministry of Energy and Resources, PNG Guideline 20, Application for a Gas Storage Project, April 2003, online: <http://www.er.gov.sk.ca/adx/aspx/adxGetMedia.aspx?DocID=3623,3620,3384,5460,2936,Documents&MediaID=24873&Filename=PNG+Guideline+20+-+Application+for+a+Gas+Storage+Project.pdf>.

Governments and regulators have also discussed the need to reserve protective corridors around a project. Some government owners and regulators are uncomfortable with this idea, suggesting that it is up to the storage operator to identify its project boundaries and not transfer risk to the government or third parties. This seems to be the position in British Columbia and Alberta.[68] Ontario allows for a narrow protective corridor,[69] while the Quebec regulator contemplates that the protective perimeter shall be at least 10% of the reservoir measured at its widest place.[70] In Manitoba, the legislation goes so far as to provide that adjacent owners may be entitled to compensation in the event that development of a gas storage property results in resource sterilization and loss of value.[71] Once a storage project has been approved, jurisdictions may also address safety and resource concerns in additional ways. For example, the regulator may require special approvals for drilling and mining activities within a certain margin of the perimeter of the project. This is the case in British Columbia and most notably in Ontario.[72]

We can expect these issues to be just as significant if not more so in the context of CCS projects.[73] Thus it would seem reasonable to take account of other potential resource uses both at the disposition stage and at the regulatory stage. The various gas storage regimes provide some examples of the measures that might be taken On the other hand, industrial emitters will seek sites close to their facilities in order to reduce transportations costs and this may have to be balanced with the interests of other resource users

REGULATION

All of the provincial jurisdictions regulate the safety and conservation aspects of storage projects, whether those projects involve publicly owned storage or privately owned

[68] *Natural Gas Storage Regimes*, *supra*, note 1 at 30 (BC) and 41 (Alberta).
[69] *Natural Gas Storage Regimes*, *supra*, note 1 at 72.
[70] Regulation respecting petroleum, natural gas, brine and underground reservoirs, C.M-13.1, r. 1, s. 114.
[71] *Manitoba Oil and Gas Act*, C.C.S.M. c.O34, s.166.
[72] *Ontario Energy Board Act*, S.O. 1998, c.15, s.40; *Oil, Gas and Salt Resources Act*, R.S.O., c.P-12, s.11(2)
[73] Certainly this proved to be a contentious issue in the design of Australian CCS legislation as exploration and production interests sought to ensure that CCS operations would not compromise their interests: Bankes and Poschwatta, *supra* note 53.

storage. And, as stated above, the various jurisdictions generally try to maintain a clear separation between the government's role as owner of the storage resource (where relevant) and the government's role as regulator of storage projects. Here are some examples: in British Columbia, storage rights are acquired from the Ministry of Energy Mines and Petroleum Resources, project approval falls to the BC Oil and Gas Commission[74] and the BC Utilities Commission may subject the facility to economic regulation[75]; in Alberta, storage rights are acquired from the Department of Energy, while project approval and safety regulation is the responsibility of the Energy Resources Conservation Board; and in Ontario, government storage rights are acquired from the Ministry of Natural Resources, drilling is regulated by the same Department, and the overall project approved and regulated by the Ontario Energy Board. However, in other cases, the separation is not as clear, for example in Quebec.

In some jurisdictions storage projects will trigger the need for an environmental assessment (EA). This was the case, for example, with Nova Scotia's first gas storage project, the Alton Project,[76] but it is by no means the norm. Gas storage projects in Alberta do not trigger the need for an EA, and in British Columbia, new storage projects in depleted reservoirs in the Peace District of the province are expressly excluded as reviewable projects.[77] Salt cavern projects may present more obvious environmental issues (acquisition of water rights for the salt dissolution process and ultimate disposal of the brine) than do depleted reservoir projects.

In addition to regulation for safety, environmental and resource conservation reasons, gas storage projects may also be subject to economic regulation. Historically this seems to have occurred because storage was initially developed in association with gas distribution utilities which were natural monopolies and regulated as such. This is clearly the case for storage in Ontario, Alberta, and Quebec, but we can also see this influence in other provinces. For example, although there is no operating storage in Manitoba, the

[74] S.B.C. 1998, c.39.
[75] See the discussion of Aitken Creek in *Natural Gas Storage Regimes*, *supra* note 1 at 30 – 33.
[76] See online: <https://www.gov.ns.ca/nse/ea/AltonNaturalGasStorage.asp>.
[77] Reviewable Projects Regulation, B.C. Reg. 370/2002, s.8.

provincial regulatory scheme contemplates that storage, if developed, will be subject to rate regulation.[78] Similarly, the Nova Scotia system contemplates that storage projects will be subject to review and approval by the Nova Scotia Utility Review Board, although it is not completely clear whether such a review is directed at safety issues or at matters of economic regulation.[79] In recent years, there has been a trend to deregulate storage, in some cases to remove it from the rate base of regulated utilities (Alberta),[80] and in other cases (especially Ontario[81] but also Alberta) to emphasise that new storage will operate in a competitive market with market-based rates rather than rates based upon ideas of cost of service. While British Columbia in recent years toyed with subjecting the Aitken Creek facility to a greater degree of economic regulation, the province seems to have backed off, but has left in place a complaints-based system of regulation that might be triggered if a party believed that the operator was abusing its market power.[82]

There are several issues here that play out in the context of CCS as well as in the context of storage. First, the practice suggests a preference for separating the disposition of publicly owned disposal rights from the environmental and safety regulation of disposal projects. This seems appropriate insofar as it allows the government as owner (eg a Department of Energy) to consider the implications of a CCS project for potentially competing resources values before allowing parties to acquire rights. It also recognizes the reality (as noted above) that, in some cases, disposal projects will grow out of EOR projects or depleted gas reservoirs. This allows a regulator experienced in the upstream side of the oil and gas industry to focus on the technical issues associated with site

[78] *Oil and Gas Act*, C.C.S.M. c.O34, s.161 and *Public Utilities Board Act*, CCSM, c. P280, s.127.
[79] *Underground Hydrocarbon Storage Act*, S.N.S. 2001, c.37, s.22.
[80] See Alberta Utilities Commission (AUC) Decision 2007005: ATCO Gas South Carbon Facilities - Part 1 Module – Jurisdiction (2005/2006 Carbon Storage Plan) Application No. 1357130, February 5, 2007, online <http://www.auc.ab.ca/applications/decisions/Decisions/2007/2007-005.pdf> at 3 - 10 discussing the evolution of ATCO's Carbon Storage facility. In Decision 2006-098 the Commission decided that it was not necessary for Carbon to remain in the rate base for load balancing purposes. ATCO could achieve this goal by other means. However in Decision 2007-005 the Commission took the view that Carbon could remain in the rate base for revenue generation purposes. The Court of Appeal rejected that conclusion in *ATCO Gas and Pipelines Ltd. v. Alberta (Energy and Utilities Board)* 2008 ABCA 200. As a result of that decision Carbon Storage has been removed from ATCO's rate base effective October 2006 (Decision 2006-098); see AUC Decision 2009-067, June 26, 2009.
[81] *Natural Gas Storage Regimes, supra* note 1 at 82 – 94.
[82] *Natural Gas Storage Regimes, supra* note 1 at 30 – 33.

characterization and approval. This was the approach recommended by the EcoEnergy Task Force.[83]

Second, the experience with storage causes us to question the need for economic regulation. Governments typically resort to regulation when there are natural monopoly conditions or evidence of market failure.[84] Thus, economic regulation is rare in the upstream sector of the oil and gas industry with multiple players and multiple facilities. Regulation is most often triggered in situations where a party needs access to a facility in order to avoid drainage (i.e. drainage of oil or gas across property lines) and where access cannot be arranged on reasonable commercial terms.[85] In some cases, upstream facilities may also come under regulation as utilities where a party offers service to multiple consumers or entities[86] but this is rare; generally, the industry resists economic regulation and the regulators themselves are reluctant to interfere in areas where market forces have traditionally provided adequate access. By contrast, the natural gas distribution sector, characterized by natural monopoly conditions has traditionally throughout North America been subject to cost of service rate regulation. Gas storage closely connected with such facilities has also been subject to economic regulation although the current trend is to consider deregulation.

Is there a case for the economic regulation of the storage part of the CCS chain? Much may depend on how the sector evolves and how fast. If we have a situation of multiple storage locations with a CO_2 pipeline network that offers a genuine choice of storage locations to meet the needs of multiple emitters then we have the basis for a competitive market. But if we have a more limited number of storage locations combined with federal

[83]EcoEnergy Task Force, *supra* note 10 at 27 "Regulatory frameworks for CCS should be built from existing legislation and regulations and under the existing authorities that currently govern oil and gas and other industrial activities. Many of the regulatory requirements for CCS are already inherent to existing frameworks and authorities."

[84] Stephen Breyer, *Regulation and Its Reform*, Harvard University Press, 1982.

[85] Regulation may be triggered by a common carrier or common processor order application under oil and gas conservation legislation. See, for example, *Oil and Gas Conservation Act*, R.S.A., 2000, c. O-6 ss.48 – 56.

[86] See, for example, Alberta Utilities Commission Decision 2009-065, Application to have the Ventures Pipeline (Oil Sands Pipeline) Regulated Under the Provisions of the Gas Utilities Act, May 20, 2009, http://www.auc.ab.ca/applications/decisions/Decisions/2009/2009-065.pdf

or provincial greenhouse gas regulation which effectively requires large emitters to introduce CCS over a relatively short period of time as the only way of complying with absolute or intensity based greenhouse gas emission reduction caps, then storage operators may have undue market power and economic regulation may be required, at least on a complaint basis, to regulate either access or tolls or both.[87] In this context it seems important to note that governments in both Europe and Australia see the need to provide a framework for ensuring third party access (TPA) to disposal facilities.[88]

THE FEDERAL ROLE

The *Natural Gas Storage Regimes* paper emphasises that gas storage in Canada is fundamentally a provincial responsibility. The federal role is confined to those cases in which storage is located on federal lands (none to date) and those rare cases in which it could be shown that a storage project is either part of a single federal work or undertaking (i.e. an international or an interprovincial natural gas transmission pipeline regulated under the *National Energy Board Act*),[89] or, if not part of such a single federal work or undertaking, then so closely connected with that undertaking that it is integral to it.[90] The practice suggests that this will be very rare.[91]

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[87] Note that the BC Utilities Commission ultimately settled on a complaint based system of regulation for the Aitken Creek storage, see *Natural Gas Storage Regimes*, *supra* note 1, at 30 - 33. The common carrier\common purchaser provisions of oil and gas conservation legislation typically offer a complaint-based system to deal with each of access and rates. Historically, the NOVA system in Alberta was regulated on the basis of complaint-driven retrospective review of NOVA's tariffs: see *Nova, An Alberta Corporation v. Amoco Canada Petroleum Company Ltd.*, [1981] 2 S.C.R. 437.

[88] For Europe see Directive of the European Parliament and of the Council on the geological storage of carbon dioxide, 26 March 2009, preamble para. 38 and Articles 21 - 22. For Australia see Bankes and Poschwatta, *supra*, note 53, at 62 - 63.

[89] R.S.C. 1985, c. N-7. *Westcoast Energy Inc. v. Canada (National Energy Board)*, [1998] 1 S.C.R. 322, esp. at para 49: "In order for several operations to be considered a single federal undertaking … they must be functionally integrated and subject to common management, control and direction. … In other words, common ownership must be coupled with functional integration and common management. A physical connection must be coupled with an operational connection. A close commercial relationship is insufficient."

[90] In *Westcoast*, *id*., the court did not deal with this head since it held that in this case upstream gathering and processing were part of a single vertically integrated service offered by Westcoast.

[91] *Dome Petroleum Ltd v. National Energy Board*, (1987) 73 NR 135 (FCA) the case involved salt caverns used for the storage of ethane and ethylene liquids rather than natural gas.

Much the same conclusion holds for CCS projects and it is likely that such projects will be regulated in their entirety by provincial energy regulators.[92] The mere existence of an international CO_2 pipeline supplying product to an injection facility will not be sufficient to bring the injection and storage operation within federal regulation.[93]

[92] I offer a more detailed discussion of the prospects of federal regulation based on the *Canadian Environmental Protection Act* S.C. 1999, c.33, and the designation of CO_2 as a "toxic substance" in Bankes, *Pembina Report, supra* note 13, at 27 – 32.

[93] For example, nobody would suggest that the fact that the Souris pipeline linking the Weyburn EOR project with a CO_2 source in North Dakota, is subject to federal regulation under the *National Energy Board Act* (National Energy Board, Reasons for Decision, Souris Valley Pipeline Limited, MH-1-98, October 1998) is sufficient to bring the EOR project under federal jurisdiction.