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# LEGAL LIABILITY FOR CARBON CAPTURE AND STORAGE IN AUSTRALIA: WHERE SHOULD THE LOSSES FALL?

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*This article presents a critical analysis of the current and proposed CCS legal frameworks across a number of jurisdictions in Australia in order to examine the legal treatment of the risks of carbon leakage from CCS operations. It does so through an analysis of the statutory obligations and liability rules established under the offshore Commonwealth and Victorian regimes, and onshore Queensland and Victorian legislative frameworks. Exposure draft legislation for CCS laws in Western Australia is also examined. In considering where the losses will fall in the event of leakage, the potential tortious and statutory liabilities of private operators and the State are addressed alongside the operation of statutory protections from liability. The current legal treatment of CCS under the new Australian Carbon Pricing Mechanism is also critiqued.*

## INTRODUCTION

The Australian Government has unconditionally agreed to reduce its greenhouse gas emissions by at least 5% below 2000 levels by 2020.<sup>1</sup> It has also adopted a long-term domestic target of reducing carbon pollution by 80% below 2000 levels by 2050.<sup>2</sup> These targets will have to be achieved in the context of Australia's heavy reliance upon fossil fuels for energy generation, in particular the burning of coal to produce electricity.<sup>3</sup> The

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<sup>1</sup> Conference of the Parties, United Nations Framework Convention on Climate Change, *Report of the Conference of the Parties on its Fifteenth Session, Held in Copenhagen from 7 to 19 December 2009 – Addendum – Part 2: Action Taken by the Conference of the Parties at Its Fifteenth Session*, FCCC/CP/2009/11/Add.1 (30 March 2010) at Decision 2/CP.15, Appendix I.

<sup>2</sup> Australian Government, *Securing a Clean Energy Future* (Commonwealth of Australia, 2011) at 15, <http://www.cleanenergyfuture.gov.au/wp-content/uploads/2011/07/Consolidated-Final.pdf> viewed 20 January 2012.

<sup>3</sup> For example, in the September quarter of 2011, electricity generation was the largest single source of Australia's greenhouse gas emissions at 36% of Australia's National Greenhouse Gas Inventory (excluding LULUCF): Department of Climate Change and Energy Efficiency, *Australian National Greenhouse Accounts - Quarterly update of Australia's National Greenhouse Gas Inventory - September Quarter 2011*

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implementation of carbon capture and storage (CCS) technology may assist in reducing these emissions,<sup>4</sup> by separating the carbon dioxide product produced from the generation of electricity from coal so it can be transported to a site where it is injected and stored underground.<sup>5</sup> In 2009, the Australian Government launched the Global CCS Institute with the intention of accelerating the commercial deployment of CCS projects within Australia and worldwide.<sup>6</sup> State Governments are also beginning to impose greenhouse gas emissions performance standards and/or “CCS ready” standards on new coal fired power stations.<sup>7</sup> In Queensland, for example, all new coal fired power stations must use best practice low emission technology and be CCS-ready.<sup>8</sup> However, a more ad hoc approach has been adopted in the other jurisdictions where there have been instances of recommended and final conditions of approval requiring the use of best practice low carbon technology, mandatory emissions performance standards and/or requirements that the site must be able to be retrofitted to allow for future carbon capture equipment.<sup>9</sup>

Recent years have seen the proposal and enactment of legislation for the approval of CCS projects both onshore and offshore in Australia.<sup>10</sup> These frameworks should be designed to

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(Commonwealth of Australia, 2011) at 7, <http://www.climatechange.gov.au/~media/climate-change/emissions/2011-09/NGGI-Sept-quarter-2011-PDF.pdf> (viewed 5 March 2012).

<sup>4</sup> National Low Emissions Coal Council, *National Low Emissions Coal Strategy* (Commonwealth of Australia, 2010) at 2, <http://www.ret.gov.au/resources/Documents/nleci/2010%20NLEC%20Strategy%20update%20paper.pdf> viewed 20 January 2012.

<sup>5</sup> Massachusetts Institute of Technology, *The Future of Coal: Options for a Carbon-Constrained World* (2007) at 1, [http://web.mit.edu/coal/The\\_Future\\_of\\_Coal.pdf](http://web.mit.edu/coal/The_Future_of_Coal.pdf) viewed 20 January 2012.

<sup>6</sup> Global CCS Institute “About the Institute”, <http://www.globalccsinstitute.com/institute> viewed 20 January 2012.

<sup>7</sup> The Commonwealth Government has stated that it will not proceed with an emissions standard or CCS standard for future coal-fired generation investment due to the introduction of the Australian carbon pricing mechanism: Department of Resources, Energy and Tourism, *Draft Energy White Paper: Strengthening the Foundations for Australia’s Energy Future* (Commonwealth of Australia, 2011) pp xxi and 162.

<sup>8</sup> Queensland Department of Employment, Economic Development and Innovation, *ClimateQ: Toward a Greener Queensland: Conditions for New Coal-Fired Electricity Generation* (2009) at 1, <http://www.climatechange.qld.gov.au/pdf/factsheets/1energy-n4.pdf> viewed 24 January 2012.

<sup>9</sup> For example, NSW Government Submission to the Commonwealth Department of Resources, Energy and Tourism: *A Cleaner Future for Power Stations – Interdepartmental Task Group Discussion Paper* (February 2011) pp 3, 6 (and implemented in the project approval for the Munmorah Rehabilitation and in the concept plan approvals for the Bayswater B; Mount Piper extension Power Stations, 2010); Victorian Environmental Protection Agency, *Works Approval Issued under Section 19B of the Environment Protection Act 1970* (20 May 2011) at conditions 2.1, 3.1, <http://www.epa.vic.gov.au/compliance-enforcement/comments/docs/20110520110000184.pdf> viewed 30 January 2012; Western Australian Environmental Protection Agency, *Bluewaters Power Station Expansion – Phase III and IV, Collie: Report and Recommendations of the Environmental Protection Agency* (March 2010) at 17, [http://www.epa.wa.gov.au/docs/1349/Rep1349Blue3\\_4PER8310.pdf](http://www.epa.wa.gov.au/docs/1349/Rep1349Blue3_4PER8310.pdf) viewed 27 January 2012 (note: these recommendations were not included in the final conditions of approval).

<sup>10</sup> *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (Cth) (OPGGSA Cth); *Offshore Petroleum and Greenhouse Gas Storage Act 2010* (Vic) (OPGGSA Vic); *Greenhouse Gas Geological Sequestration Act 2008*

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encourage private industry investment in CCS projects, while protecting the public and the public interest.<sup>11</sup> However, despite the agreement of the Council of Australian Governments (COAG) that all the Australian jurisdictions would work to expedite the introduction of nationally consistent regulation for CCS,<sup>12</sup> these CCS frameworks differ significantly in a number of respects. In particular, differing liability rules are presented across the jurisdictions, creating unnecessary legal uncertainty and higher transaction costs, acting as a barrier to the commercial deployment of CCS technology.<sup>13</sup> As has been stated, Australia “has some of the most extensive laws on CCS in the world, yet the differing positions currently being taken on long-term liabilities may prove a real hindrance to investment in the technology”.<sup>14</sup> This article presents a critical analysis of the current and proposed CCS legal frameworks across a number of jurisdictions in Australia in order to examine the legal treatment of the risks of carbon leakage from CCS operations. It will do so through an analysis of the statutory obligations and liability rules established under the offshore Commonwealth and Victorian regimes, and onshore Queensland and Victorian legislative frameworks. Exposure draft legislation for CCS laws in Western Australia will also be examined. In considering where the losses will fall in the event of leakage, the potential tortious and statutory liabilities of private operators and the State are addressed alongside the operation of statutory protections from liability. The current legal treatment of CCS under the new Australian Carbon Pricing Mechanism is also critiqued. This article concludes that there is an urgent need for further statutory reform of the CCS legal frameworks in Australia. Such reform should seek to clarify the key issues surrounding ownership of the sequestered carbon dioxide and storage sites; the scope, timing and conditions for the transfer of long-term liabilities for projects and the potential liabilities of CCS operators under the Carbon Pricing Mechanism.

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(Vic) (GGGSA Vic); *Greenhouse Gas Storage Act 2009* (Qld) (GGSA Qld); *Petroleum and Geothermal Energy Resources Act 1967* (WA) (PGERA WA); *Petroleum and Geothermal Energy Legislation Amendment Bill 2011* (WA) (exposure draft, 2011) (PGELA Bill WA). Also *Barrow Island Act 2003* (WA) and *Petroleum and Geothermal Energy Act 2000* (SA). The *Greenhouse Gas Storage Bill 2010* (NSW) was introduced to the NSW Parliament in November 2010 but lapsed on prorogation in December 2010.

<sup>11</sup> Flatt V, ‘Paving the Legal Path for Carbon Sequestration from Coal’ (2009) 19 *Duke Environmental Law and Policy Forum* 211 at 220.

<sup>12</sup> *Communique* (Council of Australian Governments, 2008) at 6, [http://www.coag.gov.au/coag\\_meeting\\_outcomes/2008-10-02/docs/communique20081002.pdf](http://www.coag.gov.au/coag_meeting_outcomes/2008-10-02/docs/communique20081002.pdf) viewed 20 January 2012.

<sup>13</sup> Klass A and Wilson E, ‘Climate Change and Carbon Sequestration: Assessing a Liability Regime for Long-Term Storage of Carbon Dioxide’ (2008) 58 *Emory Law Journal* 103 at 123.

<sup>14</sup> Havercroft I, Macrory R and Stewart R, *Carbon Capture and Storage: Emerging Legal and Regulatory Issues* (Hart Publishing, Oxford, 2011) p 3.

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## COST BARRIERS TO THE COMMERCIAL DEPLOYMENT OF CCS TECHNOLOGY

In order to encourage private investment in CCS technology, the capital and operational costs of CCS need to be less than the predicted carbon price.<sup>15</sup> The costs of CCS are highly variable and dependent on the rate of carbon dioxide injection as well as the characteristics and location of the storage reservoir.<sup>16</sup> Australian cost estimates range from \$16 to \$151 per tonne of carbon dioxide avoided on the East Coast, and \$10 to \$4,400 per tonne of carbon dioxide avoided on the West Coast.<sup>17</sup> Effective integration of CCS with the power generation plant is also significant to the cost and performance impact of CCS.<sup>18</sup> Carbon capture technology involves an “energy penalty” with an increase in fuel consumption and replacement power needed at the facility to offset the decrease in net power from the capture technologies.<sup>19</sup> Fitting a power plant with carbon capture technology is also estimated to increase capital costs by approximately 50%.<sup>20</sup> There will be restrictions placed on the purity of the carbon dioxide produced by the power plant and to-date these have not been factored into the predicted costs for CCS.<sup>21</sup> One of the most formidable barriers facing the commercial deployment of CCS operations is the long-term liability costs of these operations.<sup>22</sup> To be financially attractive, those liability costs should *not* outweigh the benefit derived from implementing CCS operations, including the predicted carbon price.<sup>23</sup> However, the potential

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<sup>15</sup> Shilling N, “Carbon Capture and Storage – An Equipment Manufacturer’s Perspective” in Havercroft I, Macrory R and Stewart R (eds), *Carbon Capture and Storage: Emerging Legal and Regulatory Issues* (Hart Publishing, Oxford, 2011) p 32.

<sup>16</sup> Allinson G, *The Costs of CO<sub>2</sub> Transport and Injection in Australia – Final Report* (Cooperative Research Centre for Greenhouse Gas Technologies at the University of New South Wales Consultancy Report, Commonwealth Department of Resources, Energy and Tourism, 2009) at 27.

<sup>17</sup> Allinson, n 16.

<sup>18</sup> Shilling, n 15, pp 31-32. It has been estimated that in the United States, carbon capture will increase the cost of electricity by 36% for pre-combustion and 81% for post-combustion technologies.

<sup>19</sup> Shilling, n 15, p 31. For example, the capture of 90% of the carbon dioxide present in flue gases from a coal-fired power plant has been estimated to result in a 30% efficiency loss when using a standard liquid absorbent process: Feron P and Paterson L, *Reducing the Costs of CO<sub>2</sub> Capture and Storage* (CSIRO, 2011) at 3, [http://www.garnautreview.org.au/update-2011/commissioned-work/reducing-costs-CO<sub>2</sub>-capture-storage.pdf](http://www.garnautreview.org.au/update-2011/commissioned-work/reducing-costs-CO2-capture-storage.pdf) viewed 20 January 2012.

<sup>20</sup> McKinsey and Company, *Carbon Capture and Storage: Assessing the Economics* (McKinsey Climate Change Special Initiative, 2008) at 10.

<sup>21</sup> Shilling, n 15, pp 30-31; Contaminants within the carbon dioxide stream may interact with other contaminants or fluid in the pipeline or geological formation causing health and safety risks, including corrosion.

<sup>22</sup> Klass and Wilson, n 13 at 123.

<sup>23</sup> Flatt, n 11 at 220.

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liabilities for CCS are highly uncertain and also have the potential to outweigh significantly the initial price paid to the CCS operator for the removal and storage of the carbon dioxide.<sup>24</sup>

## **RISK OF LEAKAGE FROM CCS PROJECTS**

### **Modelling the risk**

Given the presence of natural accumulations of carbon dioxide in geological formations, it is clear that it is possible to retain pure carbon dioxide in subsurface locations for very long time periods.<sup>25</sup> However, in the context of CCS, little is known about the specific probability of leakage, leakage volume or consequences from any given CCS project.<sup>26</sup> Accordingly, there is a great deal still to be learnt about the risks of CCS including learning through experimentation.<sup>27</sup> To contribute meaningfully to reductions in atmospheric concentrations of greenhouse gases, it has been said that CCS projects should maintain the level of sequestered emissions over very long timescales of at least 10,000 years.<sup>28</sup> Current risk modelling regarding the storage of carbon dioxide is seen to have a number of limitations and does not:

- Accurately predict the geo-mechanical response of injection, including fracture dilation, fault reactivation, cap-rock integrity, or reservoir dilation;
- Adequately predict the location of precipitation or dissolution, nor the effects on permeability;
- Involve good modules to handle wells, specifically including the structure, reactivity, or geo-mechanical response of wells; or
- Predict the risk of induced seismicity.<sup>29</sup>

As has been noted, these and other:

technical factors in extrapolating results of reservoir engineering models, mean that small uncertainties in the measurement of a storage site at the present day, propagate into large uncertainties further into the future... in such situations it is extremely difficult to state that there will be zero leakage in all cases.<sup>30</sup>

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<sup>24</sup> Haszeldine S, "Geological Factors in Framing Legislation to Enable and Regulate Storage of Carbon Dioxide Deep in the Ground" in Havercroft I, Macrory R and Stewart R (eds), *Carbon Capture and Storage: Emerging Legal and Regulatory Issues* (Hart Publishing, Oxford, 2011) p 9.

<sup>25</sup> Haszeldine, n 24, p 13.

<sup>26</sup> See Scherer GW, Celia MA, Prevost JH, Bachu S, Bruant R, Duguid A, Fuller R, Gasda SE, Radonjic M, Vichit-Vadakan W., 'Leakage of CO<sub>2</sub> through Abandoned Wells: Role of Corrosion of Cement' in Benson S and Thomas D (eds) *Carbon Dioxide Capture and Storage in Deep Geologic Formations – Results from the CO<sub>2</sub> Capture Project, Volume 2* (Elsevier, London, 2005) p 827.

<sup>27</sup> Haszeldine, n 24, p 17.

<sup>28</sup> Haszeldine, n 24, p 9.

<sup>29</sup> Massachusetts Institute of Technology, n 5, p 51.

<sup>30</sup> Haszeldine, n 24, p 13.

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## Risks of leakage and harm

During the injection and operation phases, the injected liquid carbon dioxide poses the highest risk of escape and must be physically contained.<sup>31</sup> Over the first years to decades, some residual saturation trapping may occur as small bubbles of carbon dioxide become trapped within the pores of the reservoir.<sup>32</sup> Where injection has occurred into saline formations, the injected carbon dioxide will tend to migrate upwards and laterally owing to the density of the carbon dioxide being less than the density of the saline water within the formation.<sup>33</sup> During the first decades to thousands of years, the injected carbon dioxide will begin to dissolve into the subsurface brine and sink below the original brine water.<sup>34</sup>

The Intergovernmental Panel on Climate Change (IPCC) has stated that the fraction of carbon dioxide retained in appropriately selected and managed geological reservoirs is “very likely” to exceed 99% over 100 years and “likely” to exceed 99% over 1,000 years.<sup>35</sup> The question then becomes whether the predicted loss of 1% of carbon dioxide in a 1000 year period is “acceptable” from a regulatory viewpoint. It has been stated that “expecting, and legislating for, total security of storage is unreasonable” given the impossibility of being able to guarantee 100% containment into the indefinite future.<sup>36</sup>

Leakage could result in the carbon dioxide migrating into linked subsurface saline reservoirs; unlinked subsurface reservoirs (through faults or fractures) including groundwater reservoirs; adjacent hydrocarbon or mineral formations or up onto the surface of the land.<sup>37</sup> These areas may reside outside the license area for the CCS project.<sup>38</sup> The potential loss and harm

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<sup>31</sup> Haszeldine, n 24, p 15.

<sup>32</sup> Haszeldine, n 24, p 15.

<sup>33</sup> De Figueiredo M and Wilson E, 'Geological Carbon Dioxide Sequestration: An Analysis of Subsurface Property Law' (2006) 36 (2) *Environmental Law Reporter* 10114 at 10115; Jacobs W and Stump D, *Proposed Liability Framework for Geological Sequestration of Carbon Dioxide* (Harvard University, Emmett Environmental Law & Policy Clinic, 2010) at Appendix B: Risks of Geological Sequestration, <http://www.law.harvard.edu/programs/about/elp/ccsappendix-b.pdf> viewed 30 January 2012.

<sup>34</sup> Haszeldine, n 24, pp 15-16.

<sup>35</sup> Intergovernmental Panel on Climate Change (IPCC), *Special Report on Carbon Dioxide and Storage: Summary for Policy Makers and Technical Summary* (Approved and Accepted by IPCC Working Group III and 24th Session of the IPCC, Montreal, Intergovernmental Panel on Climate Change, 2005) at 14.

<sup>36</sup> Haszeldine, n 24, pp 14, 17. An alternative, more pragmatic, suggestion has been to legislate in a manner that accommodates small-scale leakage, p 22.

<sup>37</sup> LoBaugh L, “Legal and Regulatory Challenges of Geological Carbon Capture and Sequestration: US Hurdles to Reducing CO<sub>2</sub> Emissions” in Havercroft I, Macrory R and Stewart R (eds), *Carbon Capture and Storage: Emerging Legal and Regulatory Issues* (Hart Publishing, Oxford, 2011) p 73.

<sup>38</sup> Haszeldine, n 24, p 17.

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resulting from the unexpected migration of the carbon dioxide could include a number of matters, such as:<sup>39</sup>

- Changes in subsurface pressure, due to the “pressure pulse” generated by the carbon dioxide injection, could lead to induced seismic activity, ground heave or fracturing of the reservoir seal.<sup>40</sup>
- Groundwater contamination. The movement of brine from the storage reservoir into fresh water formations could pollute local groundwater sources.<sup>41</sup> Contaminates within the injected substance may also contaminate groundwater sources.<sup>42</sup>
- Carbon dioxide escaping to the surface could cause adverse impacts to natural resources, such as forests and vegetation, as well as impacting on atmospheric health (climate change). Migration could also alter the pH of subsurface water, leading to mobilisation of metals and/or organic compounds.<sup>43</sup> Damage may also be caused to properties in the vicinity of the sequestration site.<sup>44</sup>
- Migration of the carbon dioxide, or the pressure front, could cause loss or damage to adjacent mineral reserves and/or oil and gas reservoirs.<sup>45</sup>

In some instances, there may also be a risk of localised explosion where there is an abrupt leakage of carbon dioxide from the site into the local environment.<sup>46</sup> However, the occurrence of gradual or diffuse pollution seems to be a much higher risk for CCS projects.

## **OWNERSHIP OF THE GAS, PORE SPACE AND CCS INFRASTRUCTURE**

A fundamental prerequisite for the broad commercial deployment of CCS technology in Australia is the presence of clear property rights with indeterminate or fragmented ownership

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<sup>39</sup> Jacobs and Stump, n 33.

<sup>40</sup> See Wilson E, DeFigueiredo MA, Trabucchi C, Larsen K, ‘Liability and Financial Responsibility Frameworks for Carbon Capture and Sequestration’ (December 2007) 3 *World Resources Institute Issue Brief: Carbon Capture and Sequestration* 1 at 3, 4; Haszeldine, n 24, p 16.

<sup>41</sup> Haszeldine, n 24, p 16; see also Bachu S, Celia M and Gasda S, ‘Spatial Characterization of the Location of Potentially Leaky Wells Penetrating a Deep Saline Aquifer in a Mature Sedimentary Basin’ (2004) 46 (6-7) *Environmental Geology* 707 at 708; Wilson et al, n 40 at 3.

<sup>42</sup> Jacobs and Stump, n 33 at B-2.

<sup>43</sup> Wilson et al, n 40 at 3.

<sup>44</sup> International Risk Governance Council, *Policy Brief: Regulation of Carbon Capture and Storage* (2008) at 10, [http://www.irgc.org/IMG/pdf/Policy\\_Brief\\_CCS.pdf](http://www.irgc.org/IMG/pdf/Policy_Brief_CCS.pdf) viewed 20 January 2012.

<sup>45</sup> Jacobs and Stump, n 33 at B-2.

<sup>46</sup> The IPCC considers that concentrations greater than 7 to 10% of carbon dioxide in the air would pose immediate dangers to human life and health, IPCC, n 35 at 31; McLaren J and Fahey J, ‘Key Legal and Regulatory Considerations for the Geosequestration of Carbon Dioxide in Australia’ (2005) 24 *Australian Resources and Energy Law Journal* 45 at 51.



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likely to affect project site selection.<sup>47</sup> There are a number of components to a CCS site that will be the subject of ownership by different parties. These include the pore space, sequestered gas, and associated infrastructure such as wells, pipelines and other equipment. Ownership of these different items could be vested in the landowner (where the project occurs on private land); the Crown as the owner of public land; the CCS project operator; or, in the case of the sequestered gas, the original generator of the emissions. The current CCS legislation adopts very different approaches to addressing ownership of these components. In some jurisdictions ownership is specifically conferred while in others the legislation remains silent.

### **Ownership of the Equipment and Infrastructure**

The Queensland CCS legislation explicitly states who owns the equipment and improvements, wells and pipelines across the various stages of the CCS project. During the injection and storage phases, all equipment and improvements, other than pipelines,<sup>48</sup> remain the property of the person who had ownership of them before they were placed at the CCS site.<sup>49</sup> When the pipelines are located within the relevant tenure area, they will be the personal property of the CCS operator,<sup>50</sup> including after the tenure has ended.<sup>51</sup> Once the pipeline has been decommissioned<sup>52</sup> the operator will have the option of transferring ownership to a third party.<sup>53</sup> All equipment or improvements, other than wells, must be removed before the relevant tenure ends.<sup>54</sup> The CCS operator must decommission any wells at which point the wells are transferred to the Crown.<sup>55</sup> Despite this, the legislation expressly states that responsibility for the wells will *remain* with the CCS operator until the end of the relevant tenure for the project or removal of the relevant land from the tenure area.<sup>56</sup> The other CCS frameworks remain silent on these matters of ownership of the relevant infrastructure, equipment, pipelines and wells across the life of the CCS project leaving these matters to be addressed through alternative legal mechanisms.

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<sup>47</sup> Krupa H, “The Legal Framework for Carbon Capture and Storage in Canada” in Havercroft I, Macrory R and Stewart R (eds), *Carbon Capture and Storage: Emerging Legal and Regulatory Issues* (Hart Publishing, Oxford, 2011) p 50.

<sup>48</sup> GGSA Qld, s 326(2).

<sup>49</sup> GGSA Qld, s 327.

<sup>50</sup> GGSA Qld, s 250.

<sup>51</sup> GGSA Qld, s 251.

<sup>52</sup> GGSA Qld, s 252.

<sup>53</sup> GGSA Qld, s 251(4).

<sup>54</sup> GGSA Qld, s 334.

<sup>55</sup> GGSA Qld, s 269(3).

<sup>56</sup> GGSA Qld, s 269(2).



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## Ownership of the gas and the pore space

In most Australian jurisdictions, the CCS storage formation, or pore space, is owned by the Crown.<sup>57</sup> This ownership extends from the commencement of injection and storage activities through to site closure and beyond. However, the Commonwealth CCS legislation remains silent on the issue of ownership of the pore space. Ownership of the sequestered gas varies at different points in time throughout the life of the CCS project. All of the Australian jurisdictions are silent on who owns the sequestered gas during the injection and storage phases of the CCS project. Following site closure and the surrender of the relevant lease or licence, the Queensland and Victorian legislation addresses ownership of the sequestered gas.<sup>58</sup> In Victoria, the Crown becomes the owner of the injected gas<sup>59</sup> while in Queensland the gas becomes the property of the Crown.<sup>60</sup> The Commonwealth and Western Australian CCS frameworks remain silent on ownership throughout the project.

## *Common law considerations of ownership*

The lack of clarity provided in the legislation means that ownership of the sequestered carbon dioxide must be determined by common law principles including the common law doctrine of fixtures and chattels. This doctrine states that a chattel brought onto land, once affixed to the land in accordance with established legal principles, by implication of law becomes a fixture and therefore part of the land owner's property.<sup>61</sup> If an item is affixed to land then it is presumed to be a fixture.<sup>62</sup> If it is not affixed in any way but merely rests by its own weight, it is presumed not be a fixture.<sup>63</sup> These presumptions can be rebutted with evidence of the objective intention of the parties, determined by an examination of all of the surrounding

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<sup>57</sup> GGSA Qld, s 27; GGGSA Vic, s 14; OPGGSA Vic, s 65; PGERA WA, proposed s 9; PGELA Bill WA, cl 9.

<sup>58</sup> GGGSA Vic, s 16; OPGGSA Vic, s 67; GGSA Qld, s 181(1).

<sup>59</sup> GGGSA Vic, s 16; OPGGSA Vic, s 67.

<sup>60</sup> GGSA Qld, s 181(2).

<sup>61</sup> *North Shore Gas Co Ltd v Commissioner of Stamp Duties (NSW)* (1940) 63 CLR 52 at 68 per Dixon J.

<sup>62</sup> *Holland v Hodgson* (1872) LR 7 CP 328 at 334-335; *Australian Provincial Assurance Co Ltd v Coroneo* (1938) 38 SR (NSW) 700 at 712.

<sup>63</sup> *Holland v Hodgson* (1872) LR 7 CP 328 at 334-335; *Australian Provincial Assurance Co Ltd v Coroneo* (1938) 38 SR (NSW) 700 at 712.

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circumstances.<sup>64</sup> Tests have been developed for determining the objective intention of the parties including:

- Whether the item is attached to the land for the better use and enjoyment of the land or the better use and enjoyment of the item;<sup>65</sup>
- Whether the item can be removed without substantial damage to the land or the item;<sup>66</sup>
- Whether the item was affixed with the intent to remain in position permanently or for an indefinite or substantial period; or only for some temporary purpose;<sup>67</sup> and
- The costs of removal and economic incentives for removal of item.<sup>68</sup>

In applying these principles to the sequestered carbon dioxide the Court will have to determine whether the sequestered carbon dioxide is affixed to the land by more than its own weight. Sequestered carbon dioxide is located in the subsurface of the land and held in place by the boundaries and trapping mechanisms of the storage formation and, in some cases, chemical reactions occurring within the storage formation. While the sequestered carbon dioxide is initially in a supercritical state, over time the stored carbon dioxide is “dominated by residual saturation and dissolution” meaning that it cannot be re-extracted from the site.<sup>69</sup> In those circumstances, the sequestered carbon dioxide is affixed to the sub-surface land by more than its own weight and is prima facie presumed to be a fixture.<sup>70</sup> In other circumstances where the carbon dioxide is sequestered in large, hollow storage formations and is floating in a gaseous state then this seems less likely to be the case.

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<sup>64</sup> *Palumberi v Palumberi* [1986] NSW ConvR 55-287 at 56,671; *Farley v Hawkins* [1997] 2 Qd R 361.

<sup>65</sup> *Holland v Hodgson* (1872) LR 7 CP 328; *Australian Provincial Assurance Co Ltd v Coroneo* (1938) 38 SR (NSW) 700.

<sup>66</sup> *Australian Provincial Assurance Co Ltd v Coroneo* (1938) 38 SR (NSW) 700; *May v Ceedive Pty Ltd* (2006) 13 BPR 24, 147 at [72].

<sup>67</sup> *Australian Provincial Assurance Co Ltd v Coroneo* (1938) 38 SR (NSW) 700 at 712-713 per Sir Frederick Jordan.

<sup>68</sup> *Metal Manufacturers Ltd v Federal Commissioner of Taxation* (1999) 99 ATC 5229; *Litz v National Australia Bank Ltd* [1986] ANZ ConvR 883.

<sup>69</sup> Haszeldine, n 24, p 19.

<sup>70</sup> *Holland v Hodgson* (1872) LR 7 CP 328 at 334-335; *Australian Provincial Assurance Co Ltd v Coroneo* (1938) 38 SR (NSW) 700 at 712.

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These presumptions are open to rebuttal given the surrounding circumstances and evidence of the objective intention of the parties at the time when the item was put in place.<sup>71</sup> It may be that the carbon dioxide was sequestered for the better use and enjoyment of the carbon dioxide, rather than the land, which will point towards the substance being characterised as a chattel. On the other hand, if the carbon dioxide has been sequestered with the intention that it remains under the land permanently then this would be more likely to indicate that the substance is a fixture. The fact that the sequestered carbon dioxide cannot be physically separated from the land is also a strong indication it will become a fixture.

The above analysis illustrates how these traditional property doctrines for fixtures and chattels have the potential to create significant uncertainty and high transaction costs for those parties attempting to clarify whether ownership of the sequestered carbon dioxide is vested in the land holder or the project operator during the life of the CCS project.<sup>72</sup> In an effort to limit civil liability, we may well see increasing reliance on contractual provisions to clarify who retains the ownership and risk for the carbon dioxide as it is transferred, injected and stored, prior to the Crown taking on ownership and responsibility for the CCS site.<sup>73</sup> However, it would be much more preferable for these matters to be clarified through clear provisions within the CCS legislation rather than relying on the application of these broad common law doctrines.

## **POTENTIAL TORTIOUS LIABILITIES FOR LEAKAGE AND MIGRATION OF CARBON DIOXIDE**

Matters of ownership will be relevant to questions of common law liability for any harm caused in the event of leakage, although this is just a starting point for determining legal responsibility. The uncontrolled migration of the injected carbon dioxide could lead to potential claims in tort against the operator of the CCS site including claims in trespass, nuisance and negligence. Queensland is the only jurisdiction to provide owners and occupiers with complete protection from any claims in tortious liability from the presence of CCS projects on their land. The legislation states that “the owner or occupier is not civilly liable to anyone else for a claim based in tort for damages” relating to the carrying out of an activity

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<sup>71</sup> *Pegasus Gold v Metso Minerals* (2003) 16 NTLR 54 at 61; *May v Ceedive Pty Ltd* (2006) 13 BPR 24, 147 at 24, 156.

<sup>72</sup> Butt P, ‘Moot Point: Fixtures and Chattels – Mutually Exclusive Terms?’ (1981) 55 ALJ 756 at 756.

<sup>73</sup> Campbell G, ‘Carbon Capture and Storage: Legislative Approaches to Liability – Managing Long Term Obligations and Liabilities’ (2009) *AMPLA Yearbook* 324 at 344; Krupa, n 47, p 60.

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on their land provided they have not caused, or contributed to, the harm that is the subject of the claim.<sup>74</sup> The Victorian legislation provides limited protection for occupiers of land on which a project is carried out and states that the holder of a greenhouse gas authority is taken to be the occupier for the purposes of establishing common law liability.<sup>75</sup>

### **Migration of sequestered gases and actions in trespass**

Trespass may occur through the unauthorised entry of the injected carbon dioxide onto the surface or subsurface of the land of another person.<sup>76</sup> Wrongful entry into the subsoil of land in the possession of another is trespass including where entry is affected through a natural aperture on the defendant's own land;<sup>77</sup> by excavation<sup>78</sup> or tunnelling.<sup>79</sup> Given that it may be some time before the owner becomes aware of the presence of the migrated substance, time limitations on the commencement of an action are likely to be relevant. Where the substance remains left on/under the land then this will be a continuing trespass and there will be a separate cause of action for each day the interference continues.<sup>80</sup> In other cases, there will be a time limit of six years from the date the cause of action accrues regardless of whether the plaintiff has become aware of the damage suffered within that period.<sup>81</sup>

To succeed in an action for trespass, the plaintiff must have actual possession of the relevant land<sup>82</sup> ("requisite title to sue") and there must be a direct and actionable interference with land for which the defendant must be at fault.<sup>83</sup> Accordingly, landholders affected directly by the leakage of carbon dioxide could bring an action in trespass.<sup>84</sup> A mere licensee would not hold the requisite title to sue<sup>85</sup> although a holder of an easement or profit a prendre may do

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<sup>74</sup> GGSA Qld, s 338A.

<sup>75</sup> GGGSA Vic, s 187.

<sup>76</sup> *Edwards v Sims* (1929) Ky 24 SW (2d) 619; *Stoneman v Lyons* (1975) 133 CLR 550 at 561-2 per Stephen J.

<sup>77</sup> See McGlone F and Stickley A, *Australian Torts Law* (LexisNexis Butterworths, 2nd ed, 2009) p 66 citing *Edwards v Sims* (1929) Ky 24 SW (2d) 619.

<sup>78</sup> *Stoneman v Lyons* (1975) 133 CLR 550 at 561-562 per Stephen J; *Di Napoli v New Beach Apartments Pty Ltd* (2004) 11 BPR 21,493 per Young CJ in Eq, SC(NSW); *Burton v Spragg* [2007] WASC 247.

<sup>79</sup> *Bulli Coal Mining Co v Osborne* [1899] AC 351.

<sup>80</sup> *Konskier v B Goodman Ltd* [1928] 1 KB 421; *Watson v Cowen* [1959] Tas SR 194.

<sup>81</sup> *Limitation of Actions Act 1974* (Qld), s 10(1)(a); *Limitations of Actions Act 1958* (Vic), s 5(1)(a); *Limitation Act 2005* (WA), s 13(1); McLaren and Fahey, n 46 at 64.

<sup>82</sup> *Newington v Windeyer* (1985) 3 NSWLR 555 at 563-564.

<sup>83</sup> *Stoneman v Lyons* (1975) 133 CLR 550; *Scott v Shepherd* (1773) 2 Wm Bl 892; McGlone and Stickley, n 77, p 55.

<sup>84</sup> Where there is a continuing trespass, a subsequent transferee of the land may sue: *Hudson v Nicholson* (1839) 5 M&W 437.

<sup>85</sup> *Hill v Tupper* (1863) 2 H & C 121.

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so.<sup>86</sup> This could include the holder of an affected minerals or petroleum tenement where it is characterised as a profit a prendre or easement.<sup>87</sup> The plaintiff must be able to show that the defendant acted intentionally or with a lack of care (“fault”).<sup>88</sup> It must also be demonstrated that the defendant’s act(s) set in train an unbroken series of consequences which resulted in the interference complained of (“direct interference”).<sup>89</sup> Where the harm caused was a consequential or indirect result of the act of the defendant, then a claim in nuisance or negligence would be more appropriate.<sup>90</sup>

In Australia, the plaintiff does not need to prove that they have suffered any loss or damage to succeed in their trespass action although this will affect the assessment of damages.<sup>91</sup> In the US case of *Cassinios v Union Oil Co of California*,<sup>92</sup> where waste fluids injected underground led to subsurface migration into a mineral estate, the damages awarded included the market rental value of the property for the duration of the trespass.<sup>93</sup> The remedies of the Court could also have included the deterioration in value of the mineral deposits and the costs of removal/remediation of the affected property.<sup>94</sup> However, case law in the US has suggested that damages would not be recoverable where the carbon dioxide migrates into a saline reservoir that does not have any foreseeable use by the landholder, for example where the reservoir is devoid of any extractable minerals of value.<sup>95</sup> The US case of *Chance v BP Chemicals*<sup>96</sup> has also demonstrated the substantial difficulties that will be faced by a landholder in attempting to establish factually that the migration of subterranean gases has occurred and has entered the substrata of the land.<sup>97</sup> In that case, the US court identified a

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<sup>86</sup> *Fitzgerald v Firbank* [1897] 2 Ch 96; *Moreland Timber Co v Reid* [1946] VLR 237.

<sup>87</sup> Commentators have argued that, in certain circumstances, a minerals or petroleum tenement constitutes a profit a prendre: for example Ryan GLJ, ‘Petroleum Royalties’ (1985) *AMPLA Yearbook* 328 at 349.

<sup>88</sup> *Nickells v Mayor, Aldermen, Councillors and Citizens of the City of Melbourne* (1938) 59 CLR 219 at 225 per Dixon J; *Public Transport Commission (NSW) v Perry* (1977) 137 CLR 107 at 132 per Gibbs J.

<sup>89</sup> *Hillier v Leitch* [1936] SASR 490 at 494 per Cleland J; *Platt v Nutt* (1988) 12 NSWLR 231 at 245 per Clarke JA.

<sup>90</sup> *Southport Corporation v Esso Petroleum Co Ltd* [1954] 2 QB 183.

<sup>91</sup> *Entick v Carrington* (1765) 19 St Tn 1029; *Halliday v Nevill* (1984) 155 CLR 1 at 10; McGlone and Stickley, n 77, p 26.

<sup>92</sup> *Cassinios v Union Oil Co of California* 14 Cal App 4th 1770 (1993).

<sup>93</sup> *Cassinios v Union Oil Co of California* 14 Cal App 4th 1770 (1993), 1778, 1784.

<sup>94</sup> *Cassinios v Union Oil Co of California* 14 Cal App 4th 1770 (1993), 1784-1786. In Australia, see *Palmer Bruyn & Parker Pty Ltd v Parsons* (2001) 208 CLR 388; *Evans v Balog* [1976] 1 NSWLR 36. An injunction may also be awarded for a continuing trespass: *Bendal Pty Ltd v Mirvac Project Pty Ltd* (1991) 23 NSWLR 464; McGlone and Stickley, n 77, p 74.

<sup>95</sup> LoBaugh, n 37, p 76; *Chance v BP Chemicals Inc* 77 Ohio St 3d 17 (1996), 25.

<sup>96</sup> *Chance v BP Chemicals Inc* 77 Ohio St 2d 17 (1996).

<sup>97</sup> *Chance v BP Chemicals Inc* 77 Ohio St 3d 17 (1996), 26; see also Bidlack C, ‘Regulating the Inevitable: Understanding the Legal Consequences of and Providing for the Regulation of the Geologic Sequestration of Carbon Dioxide’ (2010) 30 *Journal of Land, Resources and Environmental Law* 199 at 211, 216.

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number of undefined variables associated with the migration of the waste water injected by BP including the permeability, porosity and thickness of the substrata and difficulty in identifying the location and concentrations of the waste water within the substrate at any point in time.<sup>98</sup> Similar obstacles are likely to be faced by affected landholders within Australia.

### **Unreasonable interference and actions in public/private nuisance**

An action may also be brought in private nuisance for the “unreasonable interference with a person’s use or enjoyment of land, or some right over, or in connection with it”.<sup>99</sup> A successful cause of action must establish that: the plaintiff has title to sue;<sup>100</sup> the defendant has interfered with a legally recognised right;<sup>101</sup> and there is proof of physical damage to the land or any building works or vegetation on it, or intangible damage that amounts to a substantial and unreasonable interference with the enjoyment of the land.<sup>102</sup> In order to sue, the plaintiff must be the owner (or a person with exclusive possession) of a private interest in the relevant land or affected watercourse.<sup>103</sup>

Actions may also be brought by the Attorney-General in public nuisance for interference caused to the public at large, for example, impacts on public land and waterways and pollution of public waters.<sup>104</sup> Carbon dioxide leakage may also result in the committal of the crime of public nuisance.<sup>105</sup> An individual may also bring an action in public nuisance with the consent of the Attorney-General provided that the individual can show that he or she has suffered special damage over and above that suffered by the public at large.<sup>106</sup> This is not an easy threshold. For example, commercial fishermen were denied the right to sue for pollution

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<sup>98</sup> *Chance v BP Chemicals Inc* 77 Ohio St 3d 17 (1996), 24-27.

<sup>99</sup> *Hargrave v Goldman* (1963) 110 CLR 40 at 49 per Windeyer J.

<sup>100</sup> *Oldham v Lawson (No 1)* [1976] VR 654.

<sup>101</sup> *Sedleigh-Denfield v O’Callaghan* [1940] AC 880 at 896-903 per Lord Atkin; *Hargrave v Goldman* (1963) 110 CLR 40 at 59 per Windeyer J.

<sup>102</sup> *St Helen’s Smelting Co v Tipping* (1865) 11 HL Cas 642 at 650-651; *Munro v Southern Dairies Ltd* [1955] VLR 332.

<sup>103</sup> *Malone v Laskey* [1907] 2 KB 141; *Oldham v Lawson (No 1)* [1976] VR 654.

<sup>104</sup> *Esso Petroleum Co v Southport Corporation* [1956] AC 218; *Overseas Tankship (UK) Ltd v Morts Dock & Engineering Co (The Wagon Mound)* [1961] AC 388; *R v The “Sun Diamond”* [1984] 1 FC 3; *A B v South West Water Services Ltd* [1993] QB 507.

<sup>105</sup> See, for example, *Criminal Code Act 1899* (Qld), Sch 1, s 230 ‘Common Nuisance’. Offences of unlawful environmental nuisance may also apply.

<sup>106</sup> *Walsh v Ervin* [1952] VLR 361 at 371 per Scholl J.

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of waters as their fishing rights were taken to be no different from those of the general public.<sup>107</sup>

The types of harm that could give rise to a successful claim in private nuisance will include flooding of land, explosions/fire, damage to subsurface rights and intangible damage such as noxious fumes, gas, smoke, dust, vibration and noise.<sup>108</sup> The interference must be sufficiently substantial to cause material injury to the land or property or substantial interference with the comfort and convenience of the occupier of the land.<sup>109</sup> Both the person who causes the nuisance and anyone who authorises the action or inaction resulting in the nuisance can be liable.<sup>110</sup> This is particularly relevant when we consider that the injected carbon dioxide may migrate across a number of parcels of land outside of the approved storage site including across Crown land and private land. In those circumstances, an element of reasonable foreseeability will operate to determine whether the occupier of the land knew, or ought to have known, of the occurrence of the nuisance and whether it was reasonable in the circumstances to have expected them to take steps to rectify the nuisance.<sup>111</sup>

In defending a cause of action in trespass or nuisance, defendants may be able to rely on statutory authorisation for the activities giving rise to the interference. To be successful, the defendant must demonstrate that the relevant statute was expressly intended to authorise activities which, at common law, would constitute a nuisance; and that the specific harm caused was an inevitable consequence of the exercise of that statutory authorisation.<sup>112</sup> Given that these CCS projects will be authorised to operate only within defined boundaries, it seems unlikely that the defence of statutory authorisation would be available for leakages outside the storage site.

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<sup>107</sup> *Ball v Consolidated Rutile* [1991] 1 Qd R 524 where the pecuniary loss was held to not be sufficient for standing.

<sup>108</sup> *Sedleigh-Denfield v O'Callaghan* [1940] AC 880; *Hargrave v Goldman* (1963) 110 CLR 40; *Sturges v Bridgman* (1879) 11 Ch D 852; *Vincent v Peacock* [1973] 1 NSWLR 466; *Bamford v Turnley* (1862) 3 B&S 62; *Halsey v Esso Petroleum Co Ltd* [1961] 1 WLR 683.

<sup>109</sup> *Munro v Southern Dairies* [1955] VLR 332; see also *Qantas Airways Ltd v Mascot Galvanising (Holdings) Pty Ltd* (Unreported, Supreme Court, NSW, Windeyer J, 17 December 1998) at 43-44 (subsurface migration of pollution).

<sup>110</sup> *Fennell v Robson Excavations Pty Ltd* [1977] 2 NSWLR 486.

<sup>111</sup> *Montana Hotels v Fasson* (1986) 69 ALR 258; *Leakey v National Trust* [1980] QB 485 at 526; *Delaware Mansions Ltd v Westminster City Council* [2001] UKHL 55.

<sup>112</sup> *Kempsey Shire Council v Lawrence* (1996) Aust Torts Reports 81-375; *Bonnici v Ku-Ring-Gai Municipal Council* [2001] NSWSC 1124; *Bankstown City Council v Alamo Holdings Pty Ltd* (2005) 223 CLR 660.



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Potential remedies for unlawful nuisance include abatement, injunctive relief and compensatory damages.<sup>113</sup> The award of an injunction is discretionary and will depend upon a number of factors including the nature of the nuisance (and whether it is continuing and not fleeting or trivial) and the public interest – including considerations of the public benefit from permitting, or halting, the CCS project.<sup>114</sup> Where the nuisance has caused reasonably foreseeable damage to property, compensation may include the diminution in value of the property and the cost of remediation.<sup>115</sup> The Court may also consider awarding exemplary damages where the nuisance was intentional or wilful.<sup>116</sup>

### **Breach of a duty of care and potential actions in negligence**

The following elements must be satisfied in order for an injured party to successfully claim in negligence for losses suffered as a result of a CCS project:

- The existence of a duty of care owed by the CCS operator to the plaintiff;
- A breach by the CCS operator of that standard of care; and
- The presence of a causative link between the harm suffered by the plaintiff and the CCS operator's act or omission.<sup>117</sup>

The harm caused by these CCS projects could include personal injury and pure economic loss. Whether a duty of care is owed by the CCS operator to the affected landholder, for example, will depend on whether the harm caused is recognised as having been a reasonably foreseeable result of the defendant's negligent conduct.<sup>118</sup> In these novel circumstances, it will also depend upon the Court's examination of the "salient factors" of the case to determine whether a duty of care is justified.<sup>119</sup> These will include:<sup>120</sup>

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<sup>113</sup> *Moss v Christchurch Rural District Council* [1925] 2 KB 750.

<sup>114</sup> *Miller v Jackson* [1977] QB 966.

<sup>115</sup> *Murphy v Brown* (1985) 1 NSWLR 131 ; *Davidson v JS Gilbert Fabrications Pty Ltd* [1986] 1 Qd R 1 ; *Hyder Consulting (Australia) Pty Ltd v Wilh Wilhelmsen Agency Pty Ltd* (2001) 18 BCL 122.

<sup>116</sup> *Willoughby Municipal Council v Halstead* (1916) 22 CLR 352.

<sup>117</sup> *Civil Liability Act 2003* (Qld), ss 9-11; *Wrongs Act 1958* (Vic), ss 48, 49; *Civil Liability Act 2002* (WA), ss 5B, 5C.

<sup>118</sup> *Donoghue v Stevenson* [1932] AC 562 at 580 per Lord Atkin.

<sup>119</sup> *McGlone and Stickley*, n 77, 148.

<sup>120</sup> *McGlone and Stickley*, n 77, 148-149.

- The type of harm suffered and whether it constitutes a breach of a legally recognised right such as property rights or rights of personal security;<sup>121</sup>
- The context and proximity of the relationship between the plaintiff and the CCS operator and whether it should give rise to a duty of care;<sup>122</sup>
- The circumstances surrounding the alleged duty, with particular attention given to the CCS operator's control over the harm suffered by the plaintiff;<sup>123</sup>
- The plaintiff's vulnerability to risk, including the ability of the plaintiff to protect itself from the harm suffered;<sup>124</sup>
- Whether the finding of a duty of care would create incoherency in the law having regard to pre-existing legal obligations and duties such as those created by contract or legislation;<sup>125</sup>
- Public policy considerations regarding the imposition of a duty of care, such as floodgates concerns, and whether liability for the loss should properly be imposed upon the CCS operator;<sup>126</sup> and
- Any relevant case law from other jurisdictions or law reform commentary.<sup>127</sup>

In setting the objective standard of care, the Court will take into account a number of factors including the relationship between the parties, the magnitude of the risk of leakage from the CCS project to the local environment and atmosphere, the probability of that risk actually occurring and the relative expense and difficulty of demanding that a reasonable person take steps to alleviate that risk at that point in time.<sup>128</sup> A CCS operator will not have breached a duty to take precautions against a risk of harm unless: the risk was foreseeable (that is, it is a risk of which the person knew or ought reasonably to have known); the risk was not

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<sup>121</sup> *Sullivan v Moody* (2001) 207 CLR 562; *Woolcock Street Investments Pty Ltd v CDG Pty Ltd* (2004) 205 ALR 522; *Harriton v Stephens* (2006) 226 CLR 52.

<sup>122</sup> *Tame v New South Wales*; *Annetts v Australian Stations* (2002) 211 CLR 317; *Bryan v Maloney* (1995) 182 CLR 609; *Graham Barclay Oysters v Ryan* (2002) 211 CLR 540.

<sup>123</sup> *Woolcock Street Investments Pty Ltd v CDG Pty Ltd* (2004) 205 ALR 522; *Crimmins v Stevedoring Industry Finance Committee* (1999) 200 CLR 1; *Perre v Apand* (1999) 198 CLR 180.

<sup>124</sup> *Woolcock Street Investments Pty Ltd v CDG Pty Ltd* (2004) 216 CLR 515 at [23] per Gleeson CJ, Gummow, Hayne and Heydon JJ; *Hill v Van Erp* (1997) 188 CLR 159; *Gifford v Strang Patrick Stevedoring* (2003) 198 ALR 100; *Harriton v Stephens* (2006) 226 CLR 52.

<sup>125</sup> *Sullivan v Moody* (2001) 207 CLR 562; *Koehler v Cerebos (Australia) Ltd* (2005) 222 CLR 44; *Graham Barclay Oysters v Ryan* (2002) 211 CLR 540.

<sup>126</sup> *Perre v Apand* (1999) 198 CLR 180; *Caltex Oil (Australia) Pty Ltd v The Dredge 'Willemstad'* (1976) 136 CLR 529; *Harriton v Stephens* (2006) 226 CLR 52; *Leichhardt Municipal Council v Montgomery* (2007) 230 CLR 22. See also *Civil Liability Act 2003* (Qld), s 11; *Wrongs Act 1958* (Vic), s 51(2); *Civil Liability Act 2002* (WA), s 5C(2).

<sup>127</sup> *Harriton v Stephens* (2006) 226 CLR 52; *Leichhardt Municipal Council v Montgomery* (2007) 230 CLR 22; *Brodie v Singleton Shire Council* (2001) 206 CLR 512.

<sup>128</sup> *Mulligan v Coffs Harbour City Council* (2006) 80 ALJR 43 at [5] per Hayne J.

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insignificant; and in the circumstances, a reasonable person in the position of the person would have taken the precautions.<sup>129</sup> The foreseeability of the risk is assessed at the time the act or omission occurred.<sup>130</sup> A risk may be considered to have been foreseeable even though it was unlikely to occur, provided it was not far-fetched or fanciful.<sup>131</sup> Moreover, the risk does not have to be substantial to be “not insignificant”.<sup>132</sup>

It will be a challenging task for the Court to establish the reasonable standard of care for these novel CCS projects including the standard of care for selecting a suitable storage site and acceptable methods for injecting the carbon dioxide into the site and undertaking appropriate monitoring and verification of the site for hundreds, perhaps thousands, of years to protect against possible leakages from the site.<sup>133</sup>

In considering the precautions that a “reasonable person” should have taken against the risk of harm from these CCS projects, the Court will examine the:

- Probability that the harm would occur if care were not taken;
- Likely seriousness of the harm – including the magnitude and gravity of the harm;
- Burden of taking precautions to avoid the risk of harm – it should be noted that the expense and difficulty of those precautions will be considered in the context of the *gravity* of the risk of harm with reference to the “reasonable person with adequate resources for the activity in which it was engaged”;<sup>134</sup> and
- Social utility of the activity that created the risk of harm – this would be likely to include the public benefit from the sequestration of greenhouse gases through CCS activities.<sup>135</sup>

Given that early CCS projects do not yet have a consistent approach to the management of CCS, it should be noted that the fact that a risk of harm could have been avoided by doing something in a different way will not of itself give rise to or affect liability for the way in

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<sup>129</sup> *Civil Liability Act 2003* (Qld), s 9; *Wrongs Act 1958* (Vic), s 48; *Civil Liability Act 2002* (WA), s 5B(1).

<sup>130</sup> *Rosenberg v Percival* (2001) 205 CLR 434 at [16].

<sup>131</sup> *Wyong Shire Council v Shirt* (1980) 146 CLR 40 at 48; Sappideen C and Vines P, *Fleming’s The Law of Torts* (Thomson Reuters, 10th ed, 2011) p 162.

<sup>132</sup> Ipp D, Cane P, Sheldon D and Macintosh I, *Review of the Law of Negligence Report* (2 October 2002) at [7.15] <http://www.revofneg.treasury.gov.au/content/review2.asp> viewed 20 January 2012.

<sup>133</sup> Klass and Wilson, n 13 at 137.

<sup>134</sup> *PQ v Australian Red Cross Society* [1992] 1 VR 19 at 33-34 per McGarvie J; *Caledonian Collieries Ltd v Speirs* (1957) 97 CLR 202; *Romeo v Conservation Commission (NT)* (1998) 192 CLR 431; *Wyong Shire Council v Shirt* (1980) 146 CLR 40.

<sup>135</sup> *LoBaugh*, n 37, p 75; *Civil Liability Act 2003* (Qld), s 9; *Wrongs Act 1958* (Vic), s 48; *Civil Liability Act 2002* (WA), s 5B(2)(d).

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which the thing was done.<sup>136</sup> Standards, including binding regulatory standards, expert opinion and common industry practice, are of increasing relevance to the Court in determining whether a standard of care has been breached.<sup>137</sup> Compliance with the relevant standard for CCS will be taken into account by the Court although it will not be conclusive.<sup>138</sup> Indeed, common industry practice in the carrying out of the CCS activities may itself be found to have been negligent.<sup>139</sup>

In deciding whether a breach of duty caused the particular damage, the Court will consider:

- Whether the breach of duty was a necessary condition of the occurrence of the harm (“factual causation”); and
- Whether it is appropriate for the scope of the liability of the CCS operator to extend to the harm (“scope of liability”) – this will include consideration of the salient factors considered for novel cases including consideration of whether or not, and why, responsibility for the harm should be imposed on the party in breach.<sup>140</sup>

In addressing causation, the Courts have traditionally applied the common sense and experience test encompassing the “but for” test; that is, whether the plaintiff’s damage would have occurred “but for” the defendant’s act or omissions.<sup>141</sup> However, this test now operates in conjunction with additional considerations regarding the appropriate scope of liability. The plaintiff must demonstrate that, on the balance of probabilities, the CCS operator’s acts or omissions caused the risk that resulted in the damage suffered.<sup>142</sup> There must be a “more probable inference in favour of what is alleged”, not just a possibility.<sup>143</sup> An action will fail if other causes of the harm are equally probable on the facts.<sup>144</sup> Therefore, the plaintiff would need to show that carbon dioxide leakage from the storage site is capable of causing the harm

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<sup>136</sup> *Civil Liability Act 2003* (Qld), s 10; *Wrongs Act 1958* (Vic), s 49.

<sup>137</sup> Sappideen and Vines, n 131, pp 149-150.

<sup>138</sup> *Sibley v Kais* (1967) 118 CLR 424 at 427; *Tucker v McCann* [1948] VLR 222.

<sup>139</sup> *Mercer v Commissioner for Road Transport and Tramways (NSW)* (1936) 56 CLR 580 at 589.

<sup>140</sup> *Civil Liability Act 2003* (Qld), s 11; *Wrongs Act 1958* (Vic), s 51(2); *Civil Liability Act 2002* (WA), s 5C(2); *Harvey v PD* (2004) 59 NSWLR 639; *Graham v Hall* [2006] NSWCA 208; *Cattanach v Melchior* (2003) 215 CLR 1.

<sup>141</sup> *March v E & MH Stramare Pty Ltd* (1991) 171 CLR 506 at 516 per Mason CJ; *Roads and Traffic Authority v Royal* (2008) 82 ALJR 870; [2008] HCA 19 at [81] per Kirby J.

<sup>142</sup> *Barnett v Chelsea and Kensington Hospital Management Committee* [1969] 1 QB 428.

<sup>143</sup> *TNT Management Pty Ltd v Brooks* (1979) 23 ALR 345 at 349 per Gibbs J; *Seltsam Pty Ltd v McGuinness* (2000) 49 NSWLR 262 per Spigelman J at 75; *St George Club Ltd v Hines* (1961) 35 ALJR 106 at 107.

<sup>144</sup> *Chisholm v State Transport Authority* (1987) 46 SASR 148; *Tubemakers of Australia Ltd v Fernandez* (1976) 50 ALJR 720 at 724 per Mason J.

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suffered by the plaintiff *and* that leakage from the specific site caused the specific harm.<sup>145</sup> It may be difficult to prove that the leakage from the site was caused by the defendant. For example, where there are fractures in the geological formation, or joining of geological formations, it may be very difficult to establish that this was the fault of the particular CCS operator and not caused by other factors including natural events or other natural resource operators in the area.<sup>146</sup> Furthermore, if there have been multiple operators within the pore space or carbon dioxide has migrated over substantial distances, then identifying the appropriate defendant could “prove exceedingly difficult”.<sup>147</sup>

In such circumstances, the Court will have to consider whether other causes have intervened to break the chain of causation, so that other CCS operators or managers of the site were “the last wrongdoers”.<sup>148</sup> A break in the chain of causation is not necessarily determinative and will be but one factor in the considerations of the Court.<sup>149</sup>

### ***Ministerial powers to intervene in the conduct of CCS operations***

The causation issue becomes all the more problematic when we consider the complexity of the regulatory interactions between the CCS operator and the regulatory authorities that will occur in the conduct of these CCS activities. Australian CCS legislation provides a CCS operator holding a lease or licence with rights to inject and store carbon dioxide.<sup>150</sup> However, these rights are subject to the CCS operator complying with a broad range of directions from the CCS regulatory authority relating to the permissible composition and origins of the injected carbon dioxide and the volume and rate of injection. In all jurisdictions, the CCS operator must comply with an approved plan<sup>151</sup> setting out the rate of carbon dioxide

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<sup>145</sup> De Figueiredo M, *The Liability of Carbon Dioxide Storage* (PhD Thesis, Massachusetts Institute of Technology, Cambridge, Massachusetts, 2007), [http://sequestration.mit.edu/pdf/Mark\\_de\\_Figueiredo\\_PhD\\_Dissertation.pdf](http://sequestration.mit.edu/pdf/Mark_de_Figueiredo_PhD_Dissertation.pdf) viewed 20 January 2012.

<sup>146</sup> See Klass and Wilson, n 13 at 137 for commentary on the difficulties in establishing causation.

<sup>147</sup> Krupa, n 47, p 59; Klass and Wilson, n 13 at 137.

<sup>148</sup> *Home Office v Dorset Yacht Company Ltd* [1970] AC 1004.

<sup>149</sup> *Harvey v PD* (2004) 59 NSWLR 639 at [188].

<sup>150</sup> OPGGSA Cth, s 357; GGSA Qld, s 110; GGGSA Vic, s 71; OPGGSA Vic, s 372(1); PGERA WA, proposed s 62(3); PGELA Bill WA, cl 62(3).

<sup>151</sup> Known as a site plan (GGSA Qld, s 141(c)(i)); injection and monitoring plan (GGGSA Vic, s 93; PGERA WA, proposed s 66(3)(a); PGELA Bill WA, cl 66(3)(a)) and conditions of an injection licence: OPGGSA Cth, ss 358(3)(d), (e), (f), (j); OPGGSA Vic, s 374(1).

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injection,<sup>152</sup> the composition of the greenhouse gas stream that is permitted to be injected,<sup>153</sup> and for Commonwealth and offshore Victorian projects, the permitted origin/s of the carbon dioxide.<sup>154</sup> Any amendments to the plan will require the consent of the relevant Minister<sup>155</sup> and approval is discretionary.<sup>156</sup> In Queensland, if the proposed amendment involves a reduction in the rate of carbon dioxide injection the Minister will first consider whether the reduction is reasonable; and whether the CCS operator has taken all reasonable steps to prevent the reduction.<sup>157</sup> In Victoria, onshore licence holders may be required to vary the injection and monitoring plan.<sup>158</sup> The Victorian or Western Australian Minister may also direct the holder of the licence to change the volume of, or the rate at which, the carbon dioxide is injected if they consider that the direction is necessary to enable *more effective* substance injection or to *maximise* the volume of the substance able to be stored.<sup>159</sup>

Broad Ministerial powers to issue directions also exist where a “serious situation” emerges in relation to the CCS project. “Serious situation” is broadly defined and will include where carbon dioxide injected into the storage formation has leaked or will leak in the course of being injected.<sup>160</sup> In Queensland, and under the Commonwealth and offshore Victorian legislation, it also includes where there is a *significant risk* that the carbon dioxide will leak from the formation.<sup>161</sup> For the Commonwealth and offshore Victorian legislation, this includes the injected carbon dioxide migrating outside the *expected* migration path.<sup>162</sup>

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<sup>152</sup> OPGGSA Cth, s 358(3)(j); GGSA Qld, s 142(2)(c); GGGSA Vic, s 94(e); OPGGSA Vic, s 374(1)(j). In WA, the matters that must be contained in an injection and monitoring plan will be addressed in future regulations: PGERA WA, proposed s 63A(1); PGELA Bill WA, cl 63A(1).

<sup>153</sup> OPGGSA Cth, s 358(3)(d); GGSA Qld, s 142(2)(d); GGGSA Vic, s 94(c); OPGGSA Vic, s 374(1)(d).

<sup>154</sup> OPGGSA Cth, s 358(3)(f); OPGGSA Vic, s 374(1)(f). In WA, the application for the injection licence must specify the source and volume of the substance to be injected: PGERA WA, proposed s 52(1)(da); PGELA Bill WA, cl 52(1)(da).

<sup>155</sup> GGSA Qld, s 157; OPGGSA Cth, s 374(1); GGGSA Vic, s 110; OPGGSA Vic, s 399; PGERA WA, proposed s 63B; PGELA Bill WA, cl 63B.

<sup>156</sup> GGSA Qld, ss 157-159; GGGSA Vic, s 110; OPGGSA Cth, s 374(3); OPGGSA Vic, s 399(3); PGERA WA, proposed s 63B(3); PGELA Bill WA, cl 63B(3).

<sup>157</sup> GGSA Qld, s 158(c).

<sup>158</sup> GGGSA Vic, ss 107, 109.

<sup>159</sup> GGGSA Vic, ss 89-91; PGERA WA, proposed s 63B(1); PGELA Bill WA, cl 63B(1).

<sup>160</sup> OPGGSA Cth, s 379(1); GGSA Qld, s 363(1); GGGSA Vic, s 6; OPGGSA Vic, s 405(1). Unlike the other jurisdictions, the PGERA WA/PGELA Bill WA does not propose to include directions for responding to “serious situations”.

<sup>161</sup> OPGGSA Cth, s 379(1)(b); GGSA Qld, s 363(1)(b); OPGGSA Vic, s 405(1)(b).

<sup>162</sup> Explanatory Memorandum, Offshore Petroleum Amendment (Greenhouse Gas Storage) Bill 2008 (Cth) p 51; Explanatory Memorandum, Offshore Petroleum and Greenhouse Gas Storage Bill 2010 (Vic) p 102.

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Accordingly, there does not need to be a risk of “harm”, per se, in order for a “serious situation” to be triggered.<sup>163</sup>

A serious situation can also occur where the carbon dioxide being injected has behaved or is behaving otherwise than as predicted.<sup>164</sup> The Commonwealth and offshore Victorian provisions include where there is a significant risk that the carbon dioxide will behave otherwise than as predicted.<sup>165</sup> Where the injection or storage of carbon dioxide has had, or will have, a significant adverse impact<sup>166</sup> on the geotechnical integrity of the storage formation, this will also constitute a “serious situation” in the Victorian jurisdictions and offshore Commonwealth areas.<sup>167</sup>

Once a serious situation has been established, the Minister has the authority to issue a range of directions to the CCS operator at their own discretion. Those directions can require the CCS operator to take “any” action and can prohibit the operator from taking certain actions.<sup>168</sup> This could include directions to cease or suspend the injection of carbon dioxide into the storage site.<sup>169</sup> The CCS operator may also be directed to take specific steps to remedy the “serious situation”,<sup>170</sup> or be directed to carry out the injection of the carbon dioxide in a particular manner.<sup>171</sup> It will be an offence for the CCS operator not to comply with those Ministerial directions.<sup>172</sup>

Under the Commonwealth and Victorian offshore legislation, there are a number of additional directions that may be made including directions to eliminate, mitigate or manage the risk that operations may have a significant adverse impact on a geological formation that contains (or is likely to contain) a petroleum pool;<sup>173</sup> orders to protect petroleum discoveries<sup>174</sup> and directions about “any matter” in relation to which regulations may be

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<sup>163</sup> Explanatory Memorandum, Offshore Petroleum Amendment (Greenhouse Gas Storage) Bill 2008 (Cth) p 51; Explanatory Memorandum, Offshore Petroleum and Greenhouse Gas Storage Bill 2010 (Vic) p 102.

<sup>164</sup> GGSA Qld, s 363(1)(c); GGGSA Vic, s 6(c); OPGGSA Cth, s 379(1)(e); OPGGSA Vic, s 405(1)(e).

<sup>165</sup> OPGGSA Cth, s 379(1)(f); OPGGSA Vic, s 405(1)(f).

<sup>166</sup> “Significant adverse impact” is determined in accordance with the [Offshore Petroleum and Greenhouse Gas Storage](#) (Greenhouse Gas Injection and Storage) Regulations 2011 (Cth) for the purposes of resolving conflict with petroleum operations.

<sup>167</sup> GGGSA Vic, s 6(d); OPGGSA Cth, s 379(1)(g); OPGGSA Vic, s 405(1)(g). Under the Commonwealth and Victorian offshore legislation there only needs to be a significant risk this will occur: ss 379(1)(h) and 405(1)(h) respectively.

<sup>168</sup> OPGGSA Cth, ss 380(1)(g), (h); GGGSA Vic, ss 182(f), (g); OPGGSA Vic, ss 406(1)(g), (h).

<sup>169</sup> OPGGSA Cth, s 380(1)(c); GGSA Qld, s 364(2); GGGSA Vic, s 182(c); OPGGSA Vic, s 406(1)(c).

<sup>170</sup> GGSA Qld, s 364(2); GGGSA Vic, s 182(e); OPGGSA Cth, s 380(1)(f); OPGGSA Vic, s 406(1)(f).

<sup>171</sup> OPGGSA Cth, s 380(1)(a); GGGSA Vic, ss 182(a),(b); OPGGSA Vic, s 406(1)(a).

<sup>172</sup> OPGGSA Cth, s 382; GGGSA Vic, s 183; GGSA Qld, s 366; OPGGSA Vic, s 409.

<sup>173</sup> OPGGSA Cth, s 376(1); OPGGSA Vic, s 401(1).

<sup>174</sup> OPGGSA Cth, s 383(1); OPGGSA Vic, s 410(1).



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made.<sup>175</sup> The relevant Minister may also take non-compliance action against the operator including amending the lease or licence by reducing its term or area or imposing a new condition,<sup>176</sup> monetary penalties<sup>177</sup> or cancellation of the lease or licence.<sup>178</sup> The Victorian Minister may also cancel an onshore licence where it is in the “public interest”, or if the activity has caused a risk to public health or the environment.<sup>179</sup>

Additional notices or directions may also be issued by other regulatory authorities including those responsible for the protection of the environment. State environmental protection legislation allows for the issue of directions, or orders, where environmental harm, pollution or a similar situation arises.<sup>180</sup> Notices may require the recipient to cease or modify the activity in question,<sup>181</sup> conduct monitoring,<sup>182</sup> take measures to prevent, control or abate the situation,<sup>183</sup> take specified management action,<sup>184</sup> or rehabilitate the environment.<sup>185</sup> Similar directions may also be issued where a condition of an environmental approval has been contravened.<sup>186</sup> Under Commonwealth CCS legislation, the Minister may issue determinations requiring repair or mitigation of environmental damage,<sup>187</sup> backed by civil penalties for breach.<sup>188</sup> Where a person is convicted of an offence, such as unlawful environmental harm,<sup>189</sup> the Court is also generally empowered to make orders requiring rehabilitation or restoration of the environment.<sup>190</sup>

Consequently, there is a high risk of ministerial intervention in the carrying out of these CCS projects. The CCS legislation does provide some protection to CCS operators where they are complying with a “serious situation” direction issued by the regulator. In Queensland, when responding to a serious situation direction, any civil liability attaching to the operator for an

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<sup>175</sup> OPGGSA Cth, s 580(2); OPGGSA Vic, s 629(2).

<sup>176</sup> GGSA Qld, s 379(1).

<sup>177</sup> GGSA Qld, s 379(1).

<sup>178</sup> GGSA Qld, s 379(1); GGGSA Vic, s 175; OPGGSA Cth, s 447; OPGGSA Vic, s 482; PGERA WA, proposed s 99; PGELA Bill WA, cl 99.

<sup>179</sup> GGGSA Vic, s 175.

<sup>180</sup> *Environmental Protection Act 1970* (Vic) (EPA Vic), ss 31A, 31B, 62A; *Environmental Protection Act 1994* (Qld) (EPA Qld), ss 363H, 358; *Environmental Protection Act 1986* (WA) (EPA WA), ss 65, 68A, 73A.

<sup>181</sup> EPA Vic, ss 31A(2)(a), (b); EPA Qld, s 360(2).

<sup>182</sup> EPA Vic, s 31A(2)(f); EPA WA, ss 65(1a)(e), 68A(7)(a).

<sup>183</sup> EPA WA, ss 65(1a)(c), 73A(2); EPA Qld, s 363H(1)(a).

<sup>184</sup> EPA WA, s 68A(7)(c).

<sup>185</sup> EPA Qld, s 363H(1)(b).

<sup>186</sup> EPA Vic, s 31A(1)(b)(iv); EPA Qld, s 358(d)(iii).

<sup>187</sup> *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act), ss 480D, 480L, 480M.

<sup>188</sup> For example, EPBC Act, ss 481 and 485, where breach of an approval condition results in a significant impact on a matter of national environmental significance, and the person is reckless as to the contravention of the condition: EPBC Act, s 142A.

<sup>189</sup> EPA Qld, ss 437, 438; EPA WA, ss 50A, 50B.

<sup>190</sup> EPA WA, s 99X(1); EPA Qld, s 502(2)(a); EPBC Act, s 480A.

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act done or omission made under the CCS legislation will instead attach to the State – provided that the act or omission was done honestly and without negligence.<sup>191</sup> Under the Commonwealth and Victorian offshore legislation, a person acting under the specific direction or authority of the Minister or relevant authority will be protected from any action, suit or proceeding relating to an act or omission in good faith “in the exercise, or purported exercise, of any power or authority conferred by” the Act, regulations, or a direction under the Act.<sup>192</sup> This protection specifically excludes any acts or omissions in the carrying out of an approved proposal or plan under the CCS legislation.<sup>193</sup> In those circumstances, the Government has stated that the CCS operator will remain legally responsible for any deficiencies in the plan, despite receiving approval in good faith under the legislation.<sup>194</sup>

### **PRE-CONDITIONS FOR SITE CLOSURE AND TRANSFER OF RESPONSIBILITY TO THE STATE**

There are a number of pre-conditions that must be satisfied prior to closure of the CCS site and handover of responsibility for CCS operations to the State. Under the Commonwealth, Western Australian and offshore Victorian CCS legislation, the applicant must apply for a *site-closing certificate* within 30 days of cessation of injection.<sup>195</sup> The Minister must make a decision whether or not to grant a pre-certificate notice within five years.<sup>196</sup> The Minister may refuse to give the pre-certificate notice if:

- Not satisfied that the substance is behaving as predicted in the approved site plan; or
- There is a significant risk that a substance will have a significant adverse impact on the conservation or exploitation of natural resources; the geotechnical integrity of the formation or structure; the environment; or human health or safety.<sup>197</sup>

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<sup>191</sup> GGSA Qld, s 425.

<sup>192</sup> OPGGSA Cth, s 768; OPGGSA Vic, s 787.

<sup>193</sup> OPGGSA Cth, s 768(2); OPGGSA Vic, s 787(2).

<sup>194</sup> Explanatory Memorandum, Offshore Petroleum Bill 2005 (Cth) p 204; Explanatory Memorandum, Offshore Petroleum and Greenhouse Gas Storage Bill 2010 (Vic) p 166.

<sup>195</sup> OPGGSA Cth, s 386(4); OPGGSA Vic, s 415; PGERA WA, proposed ss 69JA(2), (3); PGELA Bill WA, cl 69JA(2), (3).

<sup>196</sup> OPGGSA Cth, s 388(8); OPGGSA Vic, s 420(2); PGELA Bill WA proposed, s 69JD(8); PGELA Bill WA, cl 69JD(8).

<sup>197</sup> OPGGSA Cth, s 388(4); OPGGSA Vic, s 422; PGELA Bill WA, proposed s 69JD(4); PGELA Bill WA, cl 69JD(4). The proposed WA bill is somewhat different and directs the Minister’s attention to whether there is a significant risk that a greenhouse gas substance will have a significant adverse impact on the conservation of resources of the soil or the Earth’s crust instead of ‘the conservation or exploitation of natural resources’: s 69JD(4)(b).

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Once issued, the pre-certificate notice must specify a program of operations for monitoring and verification of the carbon dioxide substance and the required level of security to cover the costs of that program.<sup>198</sup> This security is considered necessary given that the monitoring program will be carried out over a considerable period of time and “there is no certainty that the person responsible for payment of the [State]’s costs and expenses will still be in existence, or still in a financial position to reimburse the [State]”.<sup>199</sup> Once the security is lodged, the Minister must issue the site-closing certificate, which will remain in force *indefinitely*.<sup>200</sup>

Under the Commonwealth, Western Australian and offshore Victorian frameworks, the Minister may also issue site-closing directions directing the CCS operator to carry out monitoring and precautionary or remedial work<sup>201</sup> “for the purpose of ensuring that the injected carbon dioxide does not, in the future, cause damage to the environment or other resources or cause injury or loss to others”.<sup>202</sup> These directions are intended to increase the likelihood that the stored substance will behave as predicted in the approved site plan.<sup>203</sup>

For Western Australia and offshore Commonwealth areas,<sup>204</sup> the closure assurance period for the CCS site will be declared to be completed when:

- A site closing certificate has been issued;<sup>205</sup>
- It is at least 15 years after the site closing certificate was issued;<sup>206</sup>
- The Minister is satisfied that the carbon dioxide is behaving as predicted in the approved site plan for the formation;<sup>207</sup> and

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<sup>198</sup> OPGGSA Cth, s 391; OPGGSA Vic, s 426; PGELA Bill WA, proposed s 69JG; PGELA Bill WA, cl 69JG.

<sup>199</sup> Explanatory Memorandum, Offshore Petroleum Amendment (Greenhouse Gas Storage) Bill 2008 (Cth) p 56; Explanatory Memorandum, Offshore Petroleum and Greenhouse Gas Storage Bill 2010 (Vic) p 106.

<sup>200</sup> OPGGSA Cth, ss 392, 394; OPGGSA Vic, ss 427, 429; PGELA Bill WA, proposed ss 69JH, 69JJ; PGELA Bill WA, cll 69JH, 69JJ.

<sup>201</sup> OPGGSA Cth, s 593; OPGGSA Vic, s 641; PGELA Bill WA, proposed s 101; PGELA Bill WA, cl 101.

Note the WA bill does not propose to allow for the issue of site closing directions requiring monitoring.

<sup>202</sup> Explanatory Memorandum, Offshore Petroleum Amendment (Greenhouse Gas Storage) Bill 2008 (Cth) p 89 (see Attachment A, p 24 for commentary on the purpose of imposing monitoring requirements); Explanatory Memorandum, Offshore Petroleum and Greenhouse Gas Storage Bill 2010 (Vic) p 106.

<sup>203</sup> OPGGSA Cth, s 593(2)(g); OPGGSA Vic, s 641(2)(g).

<sup>204</sup> A closure assurance period has not been included in the Victorian offshore scheme.

<sup>205</sup> OPGGSA Cth, s 399(1)(a); PGELA Bill WA, proposed s 69JO(1)(a); PGELA Bill WA, cl 69JO(1)(a), Pt 3, Div 4C [Act]/Ch 2, Pt 3, Div 4C [Bill].

<sup>206</sup> OPGGSA Cth, s 399(1)(c); PGELA Bill WA, proposed s 69JO(1)(c); PGELA Bill WA, cl 69JO(1)(c).

<sup>207</sup> OPGGSA Cth, s 399(1)(c)(i); PGELA Bill WA, proposed s 69JO(1)(c)(i); PGELA Bill WA, cl 69JO(1)(c)(i).

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- There is no significant risk that the carbon dioxide will have a significant adverse impact on the geotechnical integrity of the geological formation/structure, environment or human health or safety.<sup>208</sup>

However, a site closing certificate will not be issued until “a high degree of certainty had been attained” in respect of the behaviour of the carbon dioxide within the formation.<sup>209</sup> This broad ministerial discretion will create a high degree of uncertainty for CCS operators who are unable to predict with any certainty when they will be permitted to surrender their licence and relinquish their responsibility for the site.<sup>210</sup> Indeed, the “timing is indefinite”.<sup>211</sup> If the CCS operator is unable or unwilling to carry out the ongoing monitoring program then the Commonwealth may step in and carry out the program itself. In this case, any reasonable costs or expenses incurred in carrying out the monitoring program are said to be recoverable as a debt due and payable.<sup>212</sup>

In Queensland, the lease holder for the CCS project is required to lodge a surrender application.<sup>213</sup> This application can only be made once injection ceases and all wells in the lease area have been decommissioned.<sup>214</sup> The surrender application must be accompanied by a report stating the applicant’s:

- Modelling of the behaviour of the carbon dioxide streams injected under the lease;
- Assessment of the behaviour of injected streams; the expected migration pathway/s and the short-term and long-term consequences of the migration; and
- Suggestions for the approach to be taken by the State if the surrender is approved, to monitor and verify the behaviour of the injected streams.<sup>215</sup>

Before deciding whether to approve the surrender of the lease the Minister may require the applicant to carry out stated work to reduce the risks.<sup>216</sup> The Minister will approve a

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<sup>208</sup> OPGGSA Cth, ss 399(1)(c)(ii)-(iv); PGELA Bill WA, proposed ss 69JO(1)(c)(ii)-(iv); PGELA Bill WA, cl 69JO(1)(c)(ii)-(iv).

<sup>209</sup> Explanatory Memorandum, Offshore Petroleum Amendment (Greenhouse Gas Storage) Bill 2008 (Cth) Attachment A, p 24.

<sup>210</sup> Gibbs M, ‘Greenhouse Gas Storage in Offshore Waters: Balancing Competing Interests’ (2009) 28(1) *Australian Resources and Energy Law Journal* 52 at 70.

<sup>211</sup> Clarke C, “Long-term Liability for CCS: Some Thoughts About Specific Risks, Multiple Regimes and the EU Directive” in Havercroft I, Macrory R and Stewart R (eds), *Carbon Capture and Storage: Emerging Legal and Regulatory Issues* (Hart Publishing, Oxford, 2011) p 195.

<sup>212</sup> OPGGSA Cth, s 398; OPGGSA Vic, s 433; PGELA Bill WA, proposed s 69JN; PGELA Bill WA, cl 69JN.

<sup>213</sup> GGSA Qld, s 174.

<sup>214</sup> GGSA Qld, s 176.

<sup>215</sup> GGSA Qld, s 177.

<sup>216</sup> GGSA Qld, s 178.

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surrender only if (inter alia) the Minister considers the risks associated with stream storage under the lease have been reduced, in their opinion, *as much as is reasonably practicable*.<sup>217</sup> An application must also be made for the surrender of the relevant environmental authority for the CCS project.<sup>218</sup> At that point, the environmental protection authority may require the CCS operator to pay a stated amount to address the residual risk associated with the ongoing management of the CCS project area including:

- Continuation of a monitoring and verification plan to ensure stream storage is taking place as predicted;
- Repairs to infrastructure for any wells in the relevant area; and
- The operation of pumping equipment to manage stored substances within the relevant area.<sup>219</sup>

In Victoria, the holder of an onshore authority may surrender it with the consent of the Minister.<sup>220</sup> However, the Minister must not give consent to the surrender unless, inter alia, the Minister is of the opinion that:

- The injected substance is behaving and will continue to behave in a predictable manner;<sup>221</sup>
- The licence holder has reduced the risks associated with the permanent storage of the substance as low as is reasonably practicable;<sup>222</sup>
- The stored substance will not present a risk to public health or the environment;<sup>223</sup>
- And the licence holder has provided:
  - An assessment of the processes and pathways for potential migration and leakage to the environment;<sup>224</sup>
  - An assessment of the effects that any potential leakage might have on public health or the environment or any other resources in the licence area;<sup>225</sup>
  - A risk management plan in the event of leakage;<sup>226</sup> and

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<sup>217</sup> GGSA Qld, s 179.

<sup>218</sup> GGSA Qld, s 179; EPA Qld, s 311K.

<sup>219</sup> EPA Qld, s 311T.

<sup>220</sup> GGSA Vic, s 168(1).

<sup>221</sup> GGSA Vic, s 170(1)(a)(i).

<sup>222</sup> GGSA Vic, s 170(1)(a)(ii).

<sup>223</sup> GGSA Vic, s 170(1)(a)(iii).

<sup>224</sup> GGSA Vic, s 170(1)(b)(v).

<sup>225</sup> GGSA Vic, s 170(1)(b)(vi).

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- A long-term monitoring and verification plan including an estimate of the cost of carrying out the activities in the plan.<sup>227</sup>

The Minister must approve the licence holder's long-term monitoring and verification plan before consenting to the surrender.<sup>228</sup> As a condition of the onshore injection and monitoring licence, the licence holder must pay an annual instalment of the estimated long-term monitoring and verification costs set out in the approved injection and monitoring plan.<sup>229</sup> The licence holder is then required to pay any remaining costs prior to surrender.<sup>230</sup>

From this point onward, the relevant public authority will be responsible for the CCS site including carrying out of the program of monitoring and verification on an indefinite basis.<sup>231</sup> Given the extremely long time periods involved, and the difficulties in accurately estimating the costs associated with the long-term monitoring and verification of these projects post-closure, there is a risk that government agencies may not obtain sufficient funds or security from the CCS operator to carry out these monitoring and verification programs for the life of the storage project.<sup>232</sup> It should also be noted that there is currently no statutory mechanism in place to enable public enforcement of these long-term maintenance and verification obligations against either the CCS operator or the State.<sup>233</sup>

## TREATMENT OF LONG-TERM LIABILITIES FOR CCS PROJECTS

There are very different approaches to the treatment of the long-term liabilities of CCS projects across the jurisdictions following site closure. Under the Commonwealth CCS legislation, the Commonwealth will provide an indemnity for *damages* where there is a site closing certificate in force and there is a closure assurance period provided the *liability*:

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<sup>226</sup> GGGSA Vic, s 170(1)(b)(vii).

<sup>227</sup> GGGSA Vic, s 170(1)(c).

<sup>228</sup> GGGSA Vic, s 170(2).

<sup>229</sup> GGGSA Vic, s 112.

<sup>230</sup> GGGSA Vic, s 174(1).

<sup>231</sup> OPGGSA Vic, s 500 specifically authorises the Minister to carry out operations in the offshore area for the purposes of monitoring of the stored substances.

<sup>232</sup> House Standing Committee on Primary Industries and Resources, Parliament of Australia, *Down Under: Greenhouse Gas Storage – Inquiry into the Draft Offshore Petroleum Amendment (Greenhouse Gas Storage) Bill* (2008) at 102.

<sup>233</sup> Global CCS Institute and WorleyParsons, *Strategic Analysis of the Global Status of Carbon Capture and Storage, Report 3: Country Studies, Australia* (2009) at 57, <http://www.globalccsinstitute.com/publications/strategic-analysis-global-status-ccs-country-study-australia> viewed 5 March 2012.

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- i. is of an existing person who was/is the registered holder of the greenhouse gas injection licence
    - the indemnity will not apply where the person is no longer in existence or where the person liable is/was not the registered holder of the licence.
  - ii. is incurred or accrued after the end of the closure assurance period
    - the indemnity will not apply to any liabilities incurred or accrued before the declared completion of the closure assurance period by the Minister.
  - iii. is attributable to an act done or omitted to be done in the carrying out of operations authorised by the greenhouse gas injection licence
    - the legislation does not clarify which test of causation is to be applied in determining whether to indemnify the licence holder. The selected test will be particularly relevant where there are multiple contributors to the loss or harm suffered.
    - the indemnity is limited to the carrying out of operations authorised by the licence. Therefore, it appears that any operations not authorised by the license,<sup>234</sup> for example storage of carbon dioxide outside of the approved project boundary or storage of carbon dioxide which is not of the approved origin or purity, will not fall within the indemnity of the Commonwealth. Acts or omissions prior to the issue, or following the cancellation, of the injection licence would also be excluded.
  - iv. any additional conditions specified in the regulations
    - while these conditions have not yet been specified, this provides the Commonwealth with a broad discretion to further narrow the scope of this indemnity if it, or any future Government, chooses to do so.

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<sup>234</sup> For the rights conferred by an injection licence, see OPGGSA Cth, s 357; PGELA Bill WA, proposed s 62(3); PGELA Bill WA, cl 62(3).



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It should be noted that, under this indemnity, any contractual liability will remain with the CCS operator as will any liability incurred under the relevant Federal and State environmental and health and safety legislation.<sup>235</sup>

The extremely long timescales associated with CCS projects will generally act as a limit on plaintiffs being able to recover against CCS operators, given that they will need the defendant to still be in existence with the resources to pay any damages award.<sup>236</sup> In response to this, the Commonwealth legislation includes an additional provision, in largely identical terms to s 400 (outlined above), which has the effect of attaching liability to the Commonwealth where the person liable, that is the holder of the greenhouse gas injection licence, has *ceased to exist*.<sup>237</sup> The preconditions specified above also apply to the adoption of liability by the Commonwealth where the person is no longer in existence. If the liability does not fall within those conditions then the legislation states that “the damages are irrecoverable because the person has ceased to exist”.<sup>238</sup> Consequently, where the liability falls outside the scope of this provision the injured party will be left with no ability to recover for their harm or losses under the Commonwealth scheme.

This Commonwealth model for dealing with liabilities has been adopted in the proposed Western Australian CCS bill but has otherwise been ignored throughout the other jurisdictions.<sup>239</sup> As a result, there is significant uncertainty regarding the treatment of long-term liabilities within those other jurisdictions. The International Energy Agency has reported that “in most [Australian jurisdictions], transfer of responsibility extends to all liabilities associated with a storage site (i.e including liabilities arising under the common law)”.<sup>240</sup> Unfortunately, the legislation does not provide the same level of clarity on this issue. One of the greatest concerns of private entities is the possibility that liability may be retained by the carbon dioxide producer or by the CCS operator in the long-term rather than being transferred to the State.<sup>241</sup> In Queensland, although ownership of the gas and the pore space is said to be

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<sup>235</sup> Clarke, n 211, p 195.

<sup>236</sup> Krupa, n 47, p 59.

<sup>237</sup> OPGGSA Cth, s 401.

<sup>238</sup> OPGGSA Cth, s 401(1)(f).

<sup>239</sup> PGELA Bill WA, proposed ss 69JP, 69JQ; PGELA Bill WA, cll 69JP, 69JQ.

<sup>240</sup> International Energy Agency (IEA), *Carbon Capture and Storage: Legal and regulatory review* (Organisation for Economic Co-operation and Development/International Energy Agency, Edition Two, May 2011) at 10.

<sup>241</sup> Haszeldine, n 24, p 18.

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transferred to the Crown post-closure, the transfer of liability is not addressed and the Government has noted that “the issue of long-term liability remains complex”.<sup>242</sup> In Victoria, where the Crown also becomes the owner of the gas and the storage formation, the legislation is also silent on any transfer of liability. The Victorian Government has indicated that a transfer of liability to the Crown will occur but has stated that it will *not* result in an indemnity for negligence during CCS operations as “common law liability remains with the operator”.<sup>243</sup> Clearly, there is an urgent need for greater certainty and consistency in the legislation to clarify the treatment of long-term liability and in particular, to specify the timing and scope of any protections from liabilities which may apply.

### **DUTY OF CARE OWED BY THE CCS AUTHORITY**

The intimate involvement of the State in the carrying out of CCS operations raises an interesting question in whether the State could be found to have *materially contributed* to any harm that occurs during the carrying out of the injection and storage activities.<sup>244</sup> This, in turn, requires consideration of the types of duty of care that may be owed by the State in relation to CCS operations.

#### **Breach of statutory duty by the CCS authority**

Courts have been generally reluctant to determine that a duty of care is owed by statutory authorities in the exercise of their functions given that they:

are often charged with responsibility for a number of statutory objectives and given an array of powers to accomplish them. Performing their functions within limited budgetary resources often requires the making of difficult policy choices and discretionary judgments.<sup>245</sup>

While the State will not be held liable for economic or policy decisions, the carrying out of monitoring and management powers under the CCS legislation is more likely to be considered “operational” in character.<sup>246</sup> A process of statutory interpretation will be required to determine whether the CCS legislation imposes merely discretionary powers on the

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<sup>242</sup> IEA, n 241 at 72. The report comprises of government position statements from the various jurisdictions.

<sup>243</sup> IEA, 241 at 76.

<sup>244</sup> *Orica Ltd v CGU Insurance Ltd* [2003] NSWCA 331 at [90] per Spigelman CJ; *Bendix Mintex Pty Ltd v Barnes* (1997) 42 NSWLR 307 at 312-320; *Wallaby Grip (BAE) Pty Ltd (in liq) v Macleay Area Health Service* (1998) 17 NSWCCR 355 (CA).

<sup>245</sup> *Crimmins v Australian Stevedoring Industry Finance Committee* (1999) 200 CLR 1 at 34 per McHugh J.

<sup>246</sup> *Sutherland SC v Heyman* (1985) 157 CLR 424.

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regulator or whether a statutory duty is owed. A duty of care will not arise simply because the statutory powers have been exercised in the past, the authority has knowledge that harm may result from its failure to exercise those powers, or that the exercise of its powers could prevent harm from occurring.<sup>247</sup> Whether a duty is found to be owed will depend upon the stringency of the wording of the empowering legislation, including whether:

- There was a statutory duty that was intended to confer a private cause of action for breach of that duty;
- The authority breached the duty imposed on it by statute;
- This breach caused the loss or injury to the plaintiff which the statutory duty was designed to prevent; and
- The statutory duty was imposed for the benefit of the plaintiff, or class of persons including the plaintiff, rather than for the benefit of the public generally.<sup>248</sup>

Exercising its regulatory powers to protect the public interest, natural resources or the environment will not by itself be sufficient to give rise to a duty of care on the part of the State.<sup>249</sup> This multi-faceted inquiry will include consideration of:

the degree and nature of control exercised by the authority over the risk of harm that eventuated; the degree of vulnerability of those who depend on the proper exercise by the authority of its powers; and the consistency or otherwise of the asserted duty of care with the terms, scope and purpose of the relevant statute.<sup>250</sup>

In its current form, Australian CCS legislation does not appear to meet the requirements for the existence of a statutory duty of care for affected private individuals, such as landholders but instead seems intended to protect the public more generally. It is possible that affected resource holders may have greater prospects of success given the specific provisions in the legislation expressly aimed at protecting their resource interests from harm or loss from CCS activities.

### **Scope of the duty of care of CCS authorities**

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<sup>247</sup> *Amaca Pty Ltd v New South Wales* (2004) 132 LGERA 309 at [65] per Ipp JA.

<sup>248</sup> *Graham Barclay Oysters Pty Ltd v Ryan* (2002) 2111 CLR 540; *Crimmins v Australian Stevedoring Industry Finance Committee* (1999) 200 CLR 1; *X v South Australia (No 3)* (2007) 97 SASR 180.

<sup>249</sup> *Graham Barclay Oysters Pty Ltd v Ryan* (2002) 2111 CLR 540 at [154].

<sup>250</sup> *Graham Barclay Oysters Pty Ltd v Ryan* (2002) 2111 CLR 540 at [149].

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It is not clear at this early stage whether the scope of Ministerial powers relating to the injection phases of CCS projects will be sufficient to trigger the requisite level of control for State liability for any harm caused. However, the level of control of the site will increase significantly following the closure of the site and transfer of responsibility to the State. This will place the CCS authority in the unusual position of being both the regulator and controller for the CCS project. The exercise of the authority's functions will place them in the position of an "occupier" with direct control over, and knowledge of, the state of the CCS site and responsibility for ongoing monitoring and verification programs.<sup>251</sup> However, the scope of the *duty of care* of public authorities is narrower than the duty imposed on private operators. As the Courts have noted:

the standard by which one decides whether a statutory authority has acted negligently is not the same as that applicable to a private individual or corporation, but rather is the standard of what a reasonable authority, with its powers and resources, would have done in all the circumstances of the case.<sup>252</sup>

Accordingly, in deciding whether the CCS regulatory authority owes, or has breached, a duty of care, the Court will take into account that:

- The functions required to be exercised by the authority are limited by the financial and other resources that are reasonably available to the authority for the purpose of exercising the functions;
- The functions required to be exercised by the authority are to be decided by reference to the broad range of its activities; and
- The authority may rely on evidence of its compliance with its general procedures, and any applicable standards, as evidence of the proper exercise of its functions.<sup>253</sup>

Consequently, public authorities will be able to rely on evidence of limited financial and other resources within the context of their broad range of responsibilities in demonstrating that they responded reasonably to the risk.<sup>254</sup> In relation to the resources of the authority, the Court will consider:

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<sup>251</sup> *Modbury Triangle Shopping Centre Pty Ltd v Anzil* (2000) 205 CLR 254; [2000] HCA 61 at [18]; *Australian Safeway Stores Pty Ltd v Zaluzna* (1987) 162 CLR 479 at 488 per Mason, Wilson, Deane and Dawson JJ.

<sup>252</sup> *Road and Traffic Authority of NSW v Refrigerated Roadways Pty Ltd* (2009) 77 NSWLR 360; [2009] NSWCA 263 at [265].

<sup>253</sup> *Civil Liability Act 2003* (Qld), s 35; *Wrongs Act 1958* (Vic), s 83; *Civil Liability Act 2002* (WA), s 5W.

<sup>254</sup> *Road and Traffic Authority of NSW v Refrigerated Roadways Pty Ltd* (2009) 77 NSWLR 360; [2009] NSWCA 263 at [210].

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the magnitude of the risk and the degree of probability that it will occur, the expense, difficulty and inconvenience to the authority in taking the steps described... to alleviate the danger, and any other competing or conflicting responsibility or commitments of the authority. The duty does not extend to ensuring the safety of [all persons] in all circumstances.<sup>255</sup>

Accordingly, evidence will be required of the authority's overall budget, the state of its assets, its budgetary allocations to other works and projects<sup>256</sup> and annual expenditure on monitoring and verification of CCS sites in the context of the many other functions of the authority.<sup>257</sup> The Court will also take into account the necessary time periods needed for the public authority to place itself in a financial position to make expenditures to address the risks from these sites, particularly where new types of risk are involved.<sup>258</sup> Together, these matters may result in a decision of the Court that a duty of care is not owed to injured landholders or affected resource holders, or that the authority's failure to avoid the risks to those persons was not a breach of duty, in the context of the significant costs involved in managing these CCS sites and the authority's limited resources and broader range of responsibilities. This is one possible outcome. However, it should be noted that current CCS legislation, to varying extents, requires the CCS operator to pay the long-term monitoring and verification costs for these CCS projects. The availability of this security and other CCS related payments (discussed in more detail below) would also be taken into account in assessing the resources available to the CCS regulatory authority in carrying out its various functions.<sup>259</sup> In this context, CCS authorities may not be able to claim that the discharge of their functions has been adversely affected by the unavailability of financial or other resources making it less likely that they would be relieved of their duty of care in the carrying out of CCS activities.<sup>260</sup>

## **Security, insurance and other statutory payments**

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<sup>255</sup> *Brodie v Singleton Shire Council* (2001) 206 CLR 512 at 577-578, 580-581 per Gaudron, McHugh and Gummow JJ.

<sup>256</sup> *Liverpool City Council v Turano* (2008) 164 LGERA 16 at 43 per Beazley JA.

<sup>257</sup> *Liverpool City Council v Turano* (2008) 164 LGERA 16 at 42 per Beazley JA.

<sup>258</sup> *Road and Traffic Authority of NSW v Refrigerated Roadways Pty Ltd* (2009) 77 NSWLR 360; [2009] NSWCA 263 at [282].

<sup>259</sup> *Road and Traffic Authority of NSW v Refrigerated Roadways Pty Ltd* (2009) 77 NSWLR 360; [2009] NSWCA 263 at [393].

<sup>260</sup> *Port Stephens Council v Theodorakakis* [2006] NSWCA 70 at [17] per Bryson JA; *Sami v Roads Corporation (Vic)* (2008) 51 MVR 118 at 150.

CCS operators must pay an annual fee,<sup>261</sup> annual rent<sup>262</sup> and/or a royalty on the volume of carbon dioxide injected into a storage formation within the licence area.<sup>263</sup> A CCS operator is also liable to compensate an owner or occupier of private land for any compensatable effect,<sup>264</sup> or any loss or damage,<sup>265</sup> caused by the sequestration operations. This will include damage to the *surface* of the land (only),<sup>266</sup> diminution of the value of the land<sup>267</sup> and consequential damages.<sup>268</sup> In Queensland and Western Australia, compensation for future liability is negotiated with the CCS operator prior to access and in Queensland is based on the Government's *Standard Conduct and Compensation Agreement*.<sup>269</sup> In Victoria, a CCS operator cannot carry out any activity until a compensation agreement has been entered into with the holder of resource authority for a *resource* that is likely to be contaminated or sterilised.<sup>270</sup> Compensation is required for any loss or damage to the resource, including for deprivation of access to the resource or loss of opportunity to recover or use the resource.<sup>271</sup>

Most jurisdictions impose obligations on the CCS operator to provide security and/or other forms of financial assurance, such as a rehabilitation bond, to the State.<sup>272</sup> This is generally required prior to the issue of the relevant greenhouse gas injection licences and environmental authorities. The proposed Western Australian CCS bill is currently an exception to this general trend and does not require security or another form of financial assurance to be provided by a CCS operator. In other jurisdictions, the total amount of security required is at the Minister's discretion.<sup>273</sup> In Queensland a minimum amount is

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<sup>261</sup> *Offshore Petroleum and Greenhouse Gas Storage (Annual Fees) Act 2006* (Cth), s 4A; EPA Qld, s 316; *Environmental Protection Regulation 2008* (Qld), r 120(1)(b)(i); *OPGGSA Vic*, s 689; *PGERA WA*, proposed s 138; *PGELA Bill WA*, cl 138.

<sup>262</sup> *GGSA Qld*, s 168(1); *Greenhouse Gas Storage Regulation 2010* (Qld), Sch 1; *GGGSA Vic*, s 227, where the project is located on Crown land.

<sup>263</sup> *GGGSA Vic*, s 224(1); *OPGGSA Vic*, s 694.

<sup>264</sup> *GGSA Qld*, s 320(1).

<sup>265</sup> *GGGSA Vic*, s 201(1); *PGERA WA*, proposed s 18; *PGELA Bill WA*, cl 18.

<sup>266</sup> *GGSA Qld*, s 320(4); *GGGSA Vic*, s 201(1)(b); *PGERA WA*, proposed ss 17(2), 18; *PGELA Bill WA*, cl 17(2), 18.

<sup>267</sup> *GGSA Qld*, s 320(4)(a)(ii); *GGGSA Vic*, s 201(1)(g); *PGERA WA*, proposed s 18; *PGELA Bill WA*, cl 18.

<sup>268</sup> *GGSA Qld*, s 320(4)(c); *PGERA WA*, proposed ss 17(2), 18; *PGELA Bill WA*, cl 17(2), 18.

<sup>269</sup> *PGERA WA*, proposed s 20; *PGELA Bill WA*, cl 20; *GGSA Qld*, s 321(3); Queensland Government, Department of Mines and Energy, *Standard Conduct and Compensation Agreement* (27 August 2010) at cl 13.1, 14.2. These agreements bind successors in title to the land and the holder of the greenhouse gas authority: *GGSA Qld*, s 325E.

<sup>270</sup> *GGGSA Vic*, s 104.

<sup>271</sup> *GGGSA Vic*, s 105.

<sup>272</sup> *OPGGSA Cth*, ss 364(c), 372(c); *OPGGSA Vic*, ss 387(c), 397(c); *GGSA Qld*, s 271(1); EPA Qld, s 312O. In Victoria, a 'rehabilitation bond' must be secured for any rehabilitation work, clean-up work or pollution prevention work that may be necessary as a result of the CCS operation, but does not include any costs associated with long-term monitoring or verification: *GGGSA Vic*, s 219.

<sup>273</sup> *OPGGSA Cth*, ss 454(1)(d), 454(2)(e); *GGGSA Vic*, s 220; *OPGGSA Vic*, s 462(4)(a).

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specified.<sup>274</sup> Most jurisdictions allow the Minister to increase the amount of security at any time,<sup>275</sup> if satisfied that the existing security is insufficient.<sup>276</sup> Security provided may be used to pay any liability the State incurs under the CCS legislation because of an act or omission of the holder,<sup>277</sup> amounts payable under the Act,<sup>278</sup> costs of rehabilitation work, clean-up work or pollution prevention work,<sup>279</sup> and costs of carrying out work to rehabilitate land.<sup>280</sup> In Queensland, security may also be applied to compensation payments by the State because of the exercise or purported exercise of a remedial power under the legislation.<sup>281</sup>

It should also be noted that the Victorian, Western Australian and Commonwealth CCS frameworks require the CCS operator to hold sufficient insurance against expenses and liabilities arising out of the carrying out of operations under the injection lease or licence<sup>282</sup> including the costs of compliance with remedial directions.<sup>283</sup> Insurance policies are currently available for CCS in respect of operational activities relating to bodily injury and property damage but insurance is not currently available for all other losses, including long-term liabilities.<sup>284</sup> This is primarily owing to the uncertainty surrounding the quantum of risk surrounding those future losses.<sup>285</sup>

### **Additional statutory protections for the State and its agents**

In addition to the limited scope of the duty of care, there are also a number of broad protections provided to public authorities and their authorised agents under some CCS legislation which would act as a limit on liability to injured third parties. Under the Commonwealth and Victorian offshore legislation the Minister, authority and their agents are

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<sup>274</sup> GGSA Qld, s 271(2)(b); *Greenhouse Gas Storage Regulation 2010* (Qld), s 32(2)(b).

<sup>275</sup> GGSA Qld, s 272(1); OPGGSA Cth, s 454(1); GGGSA Vic, s 221; EPA Qld, s 312(3); OPGGSA Vic, s 489(1).

<sup>276</sup> OPGGSA Cth, s 454(1); GGGSA Vic, s 221; OPGGSA Vic, s 489(1). The authority must be satisfied it is justified having regard to the degree of risk of environmental harm: EPA Qld, s 312O(3).

<sup>277</sup> GGSA Qld, s 270(2).

<sup>278</sup> GGSA Qld, s 270(2).

<sup>279</sup> GGGSA Vic, s 219; EPA Qld, s 312O(2).

<sup>280</sup> EPA Qld, s 312O(2).

<sup>281</sup> GGSA Qld, s 270(2).

<sup>282</sup> OPGGSA Cth, s 571(3); GGGSA Vic, s 218; OPGGSA Vic, s 620(1); PGERA WA, proposed s 91A; PGELA Bill WA, cl 91A.

<sup>283</sup> OPGGSA Cth, s 571(3); GGGSA Vic, s 218; OPGGSA Vic, s 620(1); PGERA WA proposed, s 91A; PGELA Bill WA, cl 91A.

<sup>284</sup> United Nations Framework Convention on Climate Change, *Report on the Technical Workshop on Modalities and Procedures for Carbon Dioxide Capture and Storage in Geological Formations as Clean Development Mechanism Project Activities, Subsidiary Body for Scientific and Technical Advice, 35th Session, Durban, FCCC/SBSTA/2011/INF.14* (8 November 2011) at [23].

<sup>285</sup> United Nations Framework Convention on Climate Change, n 285.



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broadly protected from any action, suit or proceeding for, or in relation to, an act or matter, *in good faith*, done or omitted to be done in the exercise, or purported exercise, of any power or authority conferred by the CCS legislation; regulations; or a direction under the legislation.<sup>286</sup> The proposed Western Australian bill also contains a protection against actions in tort for persons acting in good faith for anything done, or omitted to be done, in the performance or purported performance of a function under the Act.<sup>287</sup> This protection extends to public bodies.<sup>288</sup> However, the proposed bill notes that this protection *does not relieve the State* of any liability that it might have for another person as a result of the acts or omissions, in good faith, in the performance of functions under the Act.<sup>289</sup>

Similar protections for acts or omissions in good faith are not included in the Queensland or Victorian onshore legislation. However, the Queensland legislation does provide protection from civil liability to the Minister, public servants and other designated persons acting with the authority of the State for acts done, or omitted, honestly and without negligence under the CCS legislation.<sup>290</sup> In those circumstances, the civil liability of those persons attaches instead to the State.<sup>291</sup>

#### **LIABILITY FOR LEAKAGES UNDER THE CARBON PRICING MECHANISM**

Unlike the approach under the European Union emissions trading scheme, under the Australian Carbon Pricing Mechanism no carbon permits are issued for carbon dioxide sequestered through a CCS project.<sup>292</sup> Instead, in Australia, CCS is treated as a mechanism for reducing carbon pricing liabilities. Liable entities, such as coal fired power plants, are liable to surrender permits for each tonne of carbon dioxide equivalent emissions.<sup>293</sup> They are able to reduce those liabilities by transferring their emissions for sequestration using CCS. The estimate of emissions under the *National Greenhouse and Energy Reporting Act 2007* (Cth) (NGER Act) allows for a deduction of the amount of carbon dioxide captured *if* the captured carbon dioxide is intended for permanent storage in underground geological

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<sup>286</sup> OPGGSA Cth, s 768; OPGGSA Vic, s 787.

<sup>287</sup> PGERA WA, proposed ss 119A(1), (4); PGELA Bill WA, cll 119A(1), (4).

<sup>288</sup> *Interpretation Act 1984* (WA), s 5.

<sup>289</sup> PGERA WA, proposed ss 119A(3), (4); PGELA Bill WA, cll 119A(3), (4).

<sup>290</sup> GGSA Qld, s 425.

<sup>291</sup> GGSA Qld, s 425.

<sup>292</sup> Under the EU ETS, CCS operators are allocated permits but must surrender permits for any carbon leakage from the CCS project. This places CCS operators in the unusual position of addressing a liability risk that *increases* over time, as the market price of permits increases. See Haszeldine, n 24, p 18.

<sup>293</sup> *Clean Energy Act 2011* (Cth), s 4.

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formations and the carbon dioxide is captured by, or transferred to, a “relevant person”.<sup>294</sup> Carbon dioxide is captured for *permanent storage* only if it is captured by, or transferred to the holder of a greenhouse gas injection licence/lease or approval under the Commonwealth, State or Territory CCS legislation (the “relevant person”).<sup>295</sup> The relevant person must issue the liable entity with a written certificate specifying:

- The amount of carbon dioxide that was transferred;
- The volume of the carbon dioxide stream containing the transferred carbon dioxide; and
- The concentration of carbon dioxide in the stream.<sup>296</sup>

The scheme does not currently allow for deductions if the carbon dioxide is transferred to a third party intermediary.<sup>297</sup>

Provided the above conditions are met, liable entities will be able to reduce their liabilities for greenhouse gas emissions by transferring their emissions for permanent storage. But what if the transferred emissions are not stored permanently by the CCS operator? What will be the legal implications for any loss of sequestered carbon dioxide under the NGER Act or Carbon Pricing Mechanism?

### **CCS: The duty to report leakages under the NGER Act?**

The NGER Act specifies the circumstances in which an entity is required to report on its annual greenhouse gas emissions including where the trigger threshold has been met for the financial year.<sup>298</sup> The NGER Act relates only to duties to report, no additional responsibilities are imposed in relation to the reduction of greenhouse gas emissions. Currently, that trigger threshold will be met where the total greenhouse gases emitted from a group of facilities has

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<sup>294</sup> National Greenhouse and Energy Reporting (Measurement) Determination 2008 (Cth) ( NGER Determination 2008), s 1.19B; Minister for Climate Change, Energy Efficiency and Water, Senator the Honourable Penny Wong, “Explanatory statement, Issued by the Authority of the National Greenhouse and Energy Reporting (Measurement) Amendment Determination 2010 (No. 1)” (Australian Government, 2010) at 3, <http://www.climatechange.gov.au/government/initiatives/national-greenhouse-energy-reporting/publications/explanatory-statement-nger-amendment-determination-2010.aspx> viewed 20 January 2012.

<sup>295</sup> NGER Determination 2008, s 1.19A.

<sup>296</sup> NGER Determination 2008, s 1.19B; the amount of captured carbon dioxide must be estimated in accordance with s 1.19E and the carbon dioxide stream must be sampled in accordance with ISO 10715:1997, or an equivalent standard on at least a monthly basis.

<sup>297</sup> Minister for Climate Change, Energy Efficiency and Water, Senator the Honourable Penny Wong, n 295 at 3.

<sup>298</sup> *National Greenhouse and Energy Reporting Act 2007* (Cth) (NGER Act), s 12.

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a carbon dioxide equivalence of 50 kilotonnes or more; or where an individual member of the group operates a facility that causes emissions with a carbon dioxide equivalence of 25 kilotonnes or more.<sup>299</sup> However, under consequential amendments made for the passage of the *Clean Energy Act 2011* (Cth), greenhouse gas emissions will not be included in this trigger threshold unless the Minister has determined methods or criteria by which the emissions are to be measured.<sup>300</sup>

If the trigger requirements are met during any reporting year then the CCS operator would be required to report on the opening and closing stock of sequestered carbon dioxide, including the captured and injected amounts.<sup>301</sup> Any emissions that have occurred during the transportation, injection and storage operations would also be required in the operator's report.<sup>302</sup> To date, Ministerial determinations extend only to fugitive emissions arising from the transport of carbon dioxide captured for permanent storage.<sup>303</sup> As has been acknowledged by the Federal Government, "currently the NGER Measurement Determination does not specify methods for the estimation of carbon dioxide captured and stored or for the emissions associated with these activities".<sup>304</sup> Accordingly, under the current statutory requirements, CCS operators would be required to report only on emissions associated with the transport of carbon dioxide to the storage site.<sup>305</sup> In its current form, CCS operators would *not* be required to report on any loss of carbon stocks from their injection or storage activities under the NGER Act.

### **CCS: Liable entities under the Carbon Pricing Mechanism?**

This absence of determined methods or criteria for addressing emissions from the injection and storage of carbon dioxide also has implications for the application of the *Clean Energy Act* to CCS projects. An entity will be a liable entity under the *Clean Energy Act* only where:

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<sup>299</sup> NGER Act, s 13.

<sup>300</sup> NGER Act, new s 13(1A) to come into effect on 1 July 2012.

<sup>301</sup> *National Greenhouse and Energy Reporting Regulations 2008* (Cth) (NGER Regulations), r 4.12.

<sup>302</sup> NGER Regulations, r 4.12(3).

<sup>303</sup> Current methodology determinations for "2M Carbon capture and storage" address *Method 1 — emissions from transport of carbon dioxide involving transfer* and *Method 2 — emissions from transport of carbon dioxide not involving transfer*: NGER Determination 2008, ss 3.91 – 3.92.

<sup>304</sup> Minister for Climate Change, Energy Efficiency and Water, Senator the Honourable Penny Wong, n 295 at 2.

<sup>305</sup> Minister for Climate Change, Energy Efficiency and Water, Senator the Honourable Penny Wong, n 295, pp 2-3.

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- It is a *facility* under the operational control of a person throughout an eligible financial year; and
  - The total amount of *covered emissions* from the operation of the facility during the eligible financial year was *25,000 tonnes or more* of carbon dioxide.<sup>306</sup>
  - A *covered emission* is a scope 1 emission of greenhouse gas from the operation of a *facility* (facility being defined under amendments to the NGER Act to include the activity of CCS),<sup>307</sup> provided that:
    - The greenhouse gas is released into the atmosphere in Australia as a direct result of the operation of the facility; and
    - The Minister has determined methods or criteria by which the emissions are to be measured under the NGER Act.<sup>308</sup>

There are currently no determined methods or criteria for emissions from carbon injection or storage operations although it is hoped that future work is underway to correct this. The Government has made it clear that CCS is not intended to be exempt from the Clean Energy Scheme.<sup>309</sup> However, even if methods are in place for calculating CCS emissions, the operator must also have triggered the threshold test of 250,000 tonnes of carbon dioxide equivalent in a financial year before accountability under the *Clean Energy Act* will apply.

This approach has created a legal environment where a liable entity is able to reduce their liability under the Clean Energy Scheme by transferring their emissions to CCS without any equivalent accountability being placed on the CCS operator for any losses of those emissions. CCS facilities with insidious leaks that do not meet the 250,000 tonnes pa threshold, whether they be under the control of the State or CCS operator at the time, currently face no legal repercussions under Australia's Clean Energy Scheme for their release of those emissions to the atmosphere. This seems a counterproductive and highly unsatisfactory approach to addressing CCS under the Carbon Pricing Mechanism.

## CONCLUDING COMMENTS

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<sup>306</sup> *Clean Energy Act 2011* (Cth), s 20(4).

<sup>307</sup> NGER Regulations, r 2.32(2); NGER Act, s 7, new definition of activity and carbon capture and storage. These amendments will take effect on 1 July 2012.

<sup>308</sup> *Clean Energy Act 2011* (Cth), s 30(1).

<sup>309</sup> Explanatory Memorandum, *Clean Energy Act 2011* (Cth) p 53.

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It has been stated that the “greatest global challenge facing CCS today is not technology, but the uncertainty of where policy and regulation is going”.<sup>310</sup> The threat of uncertain liability costs alongside the high capital costs associated with CCS technology, pose a significant barrier to commercial investors worldwide.<sup>311</sup> There have been calls by many commentators for a clear legislative framework to resolve the “critical and unique” issues of ownership and liability associated with the long-term geological storage of carbon dioxide.<sup>312</sup> This article has undertaken a critical review of a number of key Australian CCS legal frameworks and has highlighted the significant uncertainty surrounding the ownership of the sequestered carbon dioxide and pore space, particularly during injection and prior to site closure. It is clear that further reform is required to address these uncertainties. There are also significant uncertainties associated with the transfer of liability to the State including the nature of liability to be transferred, the scope of any indemnities provided and the timing for the provision of any legal protections.

Liabilities associated with control over CCS operations, and the interactions between the CCS operator and the State, are another significant matter requiring legal clarification. This article has identified the broad range of ministerial directions available to the State, including for “serious situations”, allowing the State to mandate the manner in which the CCS operator is permitted to conduct their injection activities. The legal liabilities of the State for its actions across the CCS life cycle are ambiguous. It appears that claims are more likely to be brought against the State in the long-term, given that the CCS operator is likely to no longer be in existence or possess sufficient resources to satisfy any Court award. However, the State is subject to a number of statutory protections from liability in relation to its limited resources. Reliance on breach of statutory duty by injured individuals also appears unlikely given the difficulties in demonstrating that the legislation is designed for the protection of specific classes of persons. This is in addition to the substantial evidentiary difficulties faced by injured plaintiffs in proving a causative link between the harm suffered and the migration of the stored carbon dioxide from the storage site. Overall, it appears that these matters will place substantial limits on the ability of affected individuals to seek any meaningful redress for harm caused as a result of CCS operations, particularly in the longer term.

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<sup>310</sup> Shilling, n 15, p 35.

<sup>311</sup> Global CCS Institute, *The Global Status of CCS: 2011* (2011) at 71; Flatt, n 11 at 220.

<sup>312</sup> LoBaugh, n 37, p 71; Shilling, n 15, p 35.

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This article has also examined where potential liability for leakage from CCS projects will rest under the new Carbon Pricing Mechanism. It has concluded that Australia's key mechanism for achieving emission reductions does *not* currently extend to CCS operators, despite liable entities being permitted to reduce their liable emissions under the legislation in return for the transfer of emissions for *permanent* storage. This loophole should be addressed as a matter of urgency and proper accountability should be imposed for all leakages from CCS projects within Australia.