Appendix B

Risks of Geological Sequestration

Numerous sources outline the risks posed by geological sequestration of captured carbon dioxide. The main ways in which geological sequestration can cause harm are as follows:

- escape to the surface of the sequestered CO₂;
- unpredicted and uncontrolled migration and effects of the sequestered CO₂; or
- unpredicted and uncontrolled effects of the pressure front.

The main categories of harm are as follows:

- Harm to human health
  - Escape to the surface of the sequestered CO₂ could harm the general public or employees. One study suggests there may be a significant local hazard to humans in the event of a CO₂ well failure, but that this risk is largely contained in the immediate vicinity of the well. There is minimal or no risk presented to humans beyond the first few hundred meters from the well.
- Geological hazards
  - Changes in subsurface pressure due to CO₂ injection could lead to seismic events, a phenomenon known as induced seismicity, or to ground heave.
- Ecological harms
  - Groundwater contamination:
    - The sequestered CO₂ or the pressure front might force brine into fresh water formations, thereby adversely impacting drinking water.

---


2 See International Risk Governance Council, supra note 1; Roger D. Aines et al., Quantifying the potential exposure hazard due to energetic releases of CO₂ from a failed sequestration well, 1 ENERGY PROCEDIA 2421 (2009).

3 See WRI Issue Brief, supra note 1.

4 See Proposed Class VI UIC Requirements, supra note 1; WRI Issue Brief, supra note 1.
The sequestered CO₂ may also alter the pH of subsurface water, leading to mobilization of metals and/or organic compounds that may contaminate underground sources of drinking water.⁵

Co-contaminates in the injected CO₂ could also harm underground sources of drinking water.⁶

- Harms specific to offshore sequestration:⁷
  - CO₂ releases could increase the acidity of the water at the site of the leakage. The resulting changes in pH in sediments and seawater could lead to effects on speciation, mobility or bio-availability of metals, nutrients and other compounds.
  - High CO₂ levels and changes in marine chemistry may have effects on metabolism of marine organisms.
  - CO₂ releases could kill benthic organisms.

- Natural resource damages
  - Escape to the surface of sequestered CO₂ could cause adverse impacts to natural resources such as forests.

- Harm to property
  - Migration of the sequestered CO₂, or the pressure front, could cause:
    - property damage to mineral reserves and/or oil and gas reservoirs;
    - diminution of value, for properties in the vicinity of sequestration sites; or
    - business interruption of neighboring properties if remediation is required.⁸
  - Escape to the surface of the sequestered CO₂ could also lead to:
    - adverse impacts to commercially exploitable resources, such as forests and croplands; or
    - restrictions to land use activities.⁹

- Adverse impacts on climate change
  - Escape to the surface of the sequestered carbon dioxide would adversely impact climate change.

If the harms listed above were to occur, they could lead to the following types of liability for the sequestration site owner/operator:

- tort liability, including trespass, nuisance, and negligence;

---

⁵ See Proposed Class VI UIC Requirements, supra note 4, at 43497; WRI Issue Brief, supra note 1.
⁶ See Proposed Class VI UIC Requirements, supra note 4, at 43497.
⁸ See International Risk Governance Council, supra note 1.
⁹ See Trabucchi and Patton, supra note 1.
statutory liability, such as a violation of the Safe Drinking Water Act, Resources Conservation and Recovery Act (“RCRA”), or Comprehensive Environmental Response, Compensation and Liability Act (“CERCLA”); regulatory liability if the harm resulted from the violation of the permit that the sequestration facility is operating under, or violation of a future cap-and-trade regime; and/or contract liability.\textsuperscript{10}

In addition, in the absence of a liability framework for sequestration, other actors in addition to the sequestration site owner/operator could incur liability. For instance, landowners could be held liable for responsibility under RCRA or CERCLA, in the absence of clarification regarding whether and under what circumstances captured CO\textsubscript{2} is a hazardous waste under RCRA or a hazardous substance under CERCLA.

\textsuperscript{10} Id.