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The Committee Secretary
Standing Committee on Science and Innovation
House of Representatives
PO Box 6021
Parliament House
CANBERRA ACT 2600

Submission to the Inquiry into Geosequestration Technology - August 2006

CanSyd and AUSPACE are pleased to make this submission to the committee.

CanSyd is a participating SME in the CO2CRC (Cooperative Research Centre on Greenhouse Gas Technologies) and has teamed with Auspace to design and engineer monitoring and verification instrument solutions to detect near-surface and atmospheric carbon dioxide concentrations (and other hydrocarbons) at carbon capture storage sites.

The CO2CRC has provided excellent focus on the injection expertise of geosequestration, with the technologies involved in capturing and injecting carbon dioxide now much better understood through research projects supported and managed by the CRC.

However, we believe that the atmospheric detection focus and solutions achieved in the CO2CRC has to be applied to a government policy for continuous atmospheric gas concentration detection monitoring and long-term change detection assessments.

Whether the liability for the prevention of the injected carbon dioxide reaching atmosphere rests with private corporations or with government, it is important that there is a positive and factual mechanism in place to measure and assure that the injected gas is not making its way back into the atmosphere or contributing to other fugitive hydrocarbon emissions where it can, in the worst case, present a hazard to site workers and nearby communities. Although significant research is being undertaken into modeling what happens to the gas after injection, this is, in the final analysis, of limited value for providing an assurance to government or to the general public that the injected carbon dioxide is remaining underground. There are important community health and safety and assurance monitoring issues that require the best atmospheric and near surface monitoring, surveillance and verification technologies.

In some instances, the risk that the injected carbon dioxide may be linked to a methane release into the atmosphere may equally be of concern and require atmospheric monitoring. Therefore, both gases need to be actively and pervasively monitored on a long term basis to provide assurance that the investment made in sequestering the carbon dioxide below ground is not lost.

Carbon dioxide is naturally emitted by vegetation and living animals and there is always a background level of carbon dioxide detectable which varies over daily and seasonal cycles. Due to the varying nature of these background levels, concentrations need to be measured, monitored and baseline readings collected over a long period of time (i.e. up to 2 years) prior to injection in order to provide an archive of reference data. This data will form a benchmark of what actually constitutes 'normal' carbon dioxide levels, and also provides a wealth of data concerning air and wind currents around the target areas necessary to determine the optimum placement of sensors. As the target areas under consideration for geosequestration are large, multiple sensors must be deployed to provide multiple data points across these areas.

It is therefore imperative that change detection based monitoring and verification systems are deployed as early as possible prior to injection, as this provides the ability to remove speculation on whether gas or gases are escaping post injection.

The current 'user' community can be identified as consisting of both private companies and government or regulatory bodies such as the Greenhouse Gas Office. However, there is currently an absence of any regulatory framework that addresses certification and post-injection monitoring of sites. There is therefore currently little incentive or compulsion for the user community to mandate that monitoring be addressed at early stages of planning trial injections. The risk is that actual base measurements do not commence early enough to provide adequate data against which to detect changes, and could be dropped in favour of statistical escape models. Equally, if monitoring systems are deployed after injection, any increased carbon dioxide and methane levels may be wrongly assumed in relation to background levels.

CANSYD, an associated SME member of the CO2CRC and has teamed with AUSPACE, an Australian technology SME with a long track record in sensor systems and integration. Bridging the research and industry communities, CANSYD, teamed with AUSPACE, and currently using significant private funds, is using a systems engineering approach to the problems to move from a strong research foundation to actual development of solutions capable of being deployed. With collaborative input from the CO2CRC, we have fully developed a 'user requirement', matched this with the best technologies available, and combined these to provide a well defined system level solution. In this respect, the innovation is not found in developing new sensor technologies in Australia, it is in the way that Australia is developing an integrated system which is unique, and one that we hope has great export potential as geosequestration projects are commenced in other parts of the world. Key industries have approached CanSyd and Auspace but are waiting for requirement parameters in sequestration monitoring and verification (M&V).

The systems engineered instrument solution comprises multiple node detection stations operating in remote areas, "24/7", to measure and transmit back to office,

carbon dioxide, methane and composite hydrocarbon readings for immediate assurance assessment and monitoring.

Our Australian capabilities in respect to best practice assurance monitoring provide immediate solutions through innovative integration of emerging technologies.

We therefore suggest the Standing Committee endorse and recommend that:

1) **Baseline atmospheric detection monitoring of carbon dioxide (CO2)and methane (CH4) commence as soon as practicable at proposed sites, to support assurance monitoring outcomes of geosequestration injection programs.**
2) **A national regulatory framework is established to provide consistent monitoring and verification requirements which include the need for atmospheric baseline studies at target sites prior to injection**
3) **All results from baseline atmospheric assurance monitoring studies shall be used for further development of the regulatory framework that explicitly addresses long-term monitoring and certification of geosequestered carbon dioxide.**

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