Department of
Environment

Your ref:

Our ref: CEO 563/06

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Dr Anna Dacre
Secretary
House of Representatives Standing Committee on Science and Innovation
PO Box 6021
PARLIAMENT HOUSE ACT 2600

Dear Dr Dacre

GEOSEQESTRATION TECHNOLOGY

On 3 July 2006, you wrote to Mr Kim Taylor as the Acting Director General of the Department of Environment in Western Australia seeking the Department's views on geo-sequestration. The former Department of Environment has now been amalgamated with the former Department of Conservation and Land Management to form the Department of Environment and Conservation (DEC). Mr Keiran McNamara is the Director General of the new Department and Mr Taylor is now the Acting Deputy Director General, Environment.

The Western Australian Government is actively involved in considering a proposal by Chevron Australia to inject carbon dioxide beneath Barrow Island as part of the Gorgon liquefied natural gas (LNG) proposal. Barrow Island is a class A nature reserve located 70km off the north-west coast which is home to at least 24 taxa of animals that occur nowhere else. A body of information exists in relation to this proposal and is available in the proponent's Environmental Review and Management Programme (see www.chevron.com) and the Environmental Protection Authority's (EPA's) report on the proposal (see www.environment.wa.gov.au)

Environmental risks

A number of taxa restricted to Barrow Island, live in subterranean habitats which may be affected by geo-sequestration. Leaks of carbon dioxide during injection or as a result of well-bore or reservoir failure could enter caves supporting troglofauna or fresh or saline aquifers supporting stygofauna. Many of these taxa are very restricted in distribution, which means that a local impact could conceivably drive a taxon to extinction. Subterranean fauna also often belong to relictual taxa, which means that they have remained largely unchanged for long periods of their evolution (due to the very stable environment they live in) and are often most closely related to taxa far away or even on other continents. This is of considerable interest from an evolutionary point of view as it demonstrates linkages from millions of years ago, before the break-up of the Gondwanan super-continent of which Australia was once a part.

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Subterranean fauna are widely distributed in Western Australia and often occur in the sedimentary geological settings that are attractive for geo-sequestration. Careful consideration of the subterranean environments present and the fauna therein would be important when siting a geo-sequestration operation. Attention to proper containment of the carbon dioxide would be important, particularly during injection, but also for the long period of storage.

Leaks at the surface, particularly during the injection phase, are not uncommon at existing operations such as the Rangely enhanced oil operation managed by Chevron in Colorado. While such leaks are usually small, a large leak would have the potential to collect in low lying terrain under still conditions because carbon dioxide is heavier than air. A large spill could conceivably suffocate wildlife, damage vegetation or even endanger people, as has occurred as a result of natural carbon dioxide release events at Lake Nios in Cameroon in 1986.

If geo-sequestration is to be considered at sea, then the risk of large leaks acidifying significant areas of the sea and adversely affecting marine biota is probably the most important environmental risk. The impacts of repeated seismic activity to monitor the stored carbon dioxide may also have the potential for adverse impacts at sea, as well as on land. Repeated clearing of seismic lines on land could comprise a long term impact on vegetation and biota if it occurs in an important environment like the Barrow Island nature reserve.

Environmental opportunities

The most obvious environmental opportunity is to collect the carbon dioxide which is routinely stripped from natural gas before sale and store the carbon dioxide for the long term. Such an approach would maximise the environmental benefit of using natural gas over other fossil fuels. Without sequestration, venting of carbon dioxide from natural gas reservoirs can comprise a very large source of emissions, in the order of millions of tonnes per year from a single LNG project. For example, if it is not injected underground, some 3.2 million tonnes per year of reservoir carbon dioxide would be released from the Gorgon project, in addition to the 4 million tonnes per year which would be released as a matter of course from processing equipment used to compress the gas prior to sale.

Diversion of effort

Geo-sequestration is just one of many potential technologies available over the medium term and a mix of these technologies, supported by a well designed policy and legislative framework, will be necessary to reduce greenhouse gas emissions. One issue that will require careful balancing is the risk of diversion of effort. Research and operational expenditure on geo-sequestration is likely to compete for funds with other low or zero emission technologies that have potential environmental benefits. While a healthy balance of funding for a range of solutions is likely to be beneficial, it may be unwise to view geo-sequestration as a magic bullet which then risks diverting effort from reducing power demand and hence emissions, or developing other generation technologies.

Economic considerations

When a developer obtains a right to extract mineral or petroleum resources, a royalty is paid so that the community benefits from the use of common assets. Similarly, levies are often charged to dump or emit wastes, to compensate the community for the cost of providing access to common property. Consideration could be given to charging for the right to deposit carbon dioxide underground, particularly when credits may accrue to those who store their carbon dioxide or to those who provide a service by securing access to a storage reservoir. In the long term, a big reservoir could be very valuable to the operator and the community would be relinquishing a common resource in the form of the storage space. This could also assist in addressing the question of long term liability for management costs of sequestered carbon dioxide (see below).

Transparent price signals that enable consumers to recognise the cost of carbon dioxide via the cost of sequestration, would be an important aspect of proper pricing and cost recovery, as well as aiding consumer decisions about changing their demand for power.

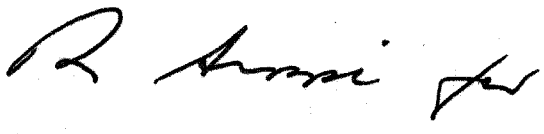
Long term liability

Careful consideration needs to be given to the pricing of licences to store carbon dioxide underground, to ensure that sufficient funds are collected to properly regulate the site during operations and to provide for remedial action if required once the operator has closed the facility and liability reverts to the state or Commonwealth. Careful consideration needs to be given to the long term liability for storage sites, including potential long term environmental liabilities. Whether such locations should be considered as contaminated sites under appropriate legislation bears consideration.

Public awareness

An informed public is likely to be a key to the debate about and long term success of geo-sequestration. At present the level of public knowledge is very low. Even interested public groups such as conservation organisations are newcomers to the science and policy of geo-sequestration. Transparent sharing of the science and costs of sequestration, and of its regulatory performance if it is implemented, would be important to obtaining the level of public trust usually needed to secure support for new technologies.

Yours sincerely



Keiran McNamara
DIRECTOR GENERAL
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

28 July 2006