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Santos

18 August 2006

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

Dear Sir,

House of Representatives Standing Committee on Science and Innovation inquiry into the science and application of geosequestration

Thank you for the opportunity to comment on the science and application of geosequestration opportunities within Australia.

Santos supports the view that geosequestration represents a significant opportunity for future management of greenhouse gas emissions. Given the terms of reference of the inquiry outlined below, this paper seeks to address certain commercial and regulatory issues related to the application of geosequestration.

Introducing Santos

Santos is a major Australian oil and gas exploration and production company with interests and operations in every major Australian province and in the United States, Indonesia, Vietnam, Papua New Guinea, Kyrgyzstan and Egypt.

The Cooper Basin, which Santos and its joint venture partners have developed, is Australia's largest onshore resources project. Significant development projects contributing to Santos' growth include the Bayu-Undan Liquids and LNG projects in the Australia Timor-Leste Joint Petroleum Development Area, the Mutineer-Exeter oil fields and John Brookes gas field developments in the Carnarvon Basin offshore Western Australia, the Oyong oil and gas field and Maleo gas field offshore East Java, and the Casino gas development offshore Victoria.

Santos Ltd is quoted on the official list of the Australian Stock Exchange Ltd. At year end 2005, Santos had a market capitalisation of approximately $7.5 billion, making it one of Australia's top 50 companies.

Objectives of the inquiry

The House of Representatives Standing Committee on Science and Innovation has been requested to inquire into, and report on, the science and application of geosequestration technology in Australia, with particular reference to:

- The science underpinning geosequestration technology
- The potential environmental and economic benefits and risks of such technology
- The skill base in Australia to advance the science of geosequestration technology
- Regulatory and approval issues governing geosequestration technology and trials, and
- How to best position Australian industry to capture possible market applications.

Santos believes that the objectives of the inquiry will be adequately addressed at a high level by industry group submissions and other information within the public domain. In particular the Committee's attention is drawn to the Intergovernmental Panel on Climate Change's publication Carbon Dioxide Capture and Storage Summary for Policymakers and Technical Summary.

This paper seeks to draw the Committee's attention to certain issues which we believe are critical to the successful application of geosequestration, namely:

- Commercial justification through economic incentives
- Utilisation of existing reservoirs, infrastructure and skills
- Management of post-closure obligations/liabilities
- Regulatory certainty over legal rights
- Technology risk

These issues are discussed further below.

1. Commercial justification through economic incentives

In addition to providing environmental benefits, the successful commercial application of geosequestration requires justification on economic grounds. In this respect a range of economic enablers may be employed to promote geosequestration activities, including:

- Carbon pricing
- Government funding
- Tax incentives

By way of example, the Weyburn geosequestration project in Saskatchewan, Canada has proven the success of geosequestration activities when the necessary financial incentives are put in place by government. Relying on a combination of government grant funding and tax breaks the project is now injecting approximately one million tonnes per annum of carbon dioxide for long term storage in depleted oil reservoirs. The carbon dioxide is produced in North Dakota and transported by pipeline to the Weyburn oilfield where it is sequestered.

Carbon pricing

In order to meet long term objectives of reducing global greenhouse gas emissions it is necessary to place a cost on high volume emitters of carbon dioxide. The amount, or value, of this mechanism may be transferred to another company that can abate emissions at a lower cost.

On a broader scale the goal of achieving least cost abatement of emissions may be achieved through a number of mechanisms. Santos supports the introduction of a national emissions trading scheme as part of a set of mechanisms allowing the market to determine the least cost means of greenhouse gas emissions abatement. A viable carbon emission abatement

trading system with a carbon dioxide price signal does not currently exist in Australia, hence there is no economic incentive to consider geosequestration as a long term business proposition.

Government funding

Government funding provided through subsidy or other means will incentivise investment in geosequestration activities. Funding mechanisms should be designed to encourage developing carbon storage capability, not just carbon capture technologies.

Funding provided through mechanisms such as the Low Emissions Technology Development Fund (LETDF) will assist to provide the necessary commercial impetus for large scale deployment of sequestration technologies.

Tax incentives

As noted above, tax incentives have been used to promote geosequestration activities in other parts of the world. In the United States widespread tax breaks have been made available to encourage the development and application of technologies to exploit unconventional oil and gas opportunities.

Given existing Federal government policy does not support establishing a carbon price signal Santos strongly supports the introduction of a national emissions trading scheme, recognising that such a scheme will likely emerge over the long term. Therefore Santos supports the view that in the interim period a broad based preferential tax regime would provide an alternative, albeit less efficient, mechanism to encourage the commercial development of geosequestration activities.

2. Utilisation of existing reservoirs, infrastructure and skills

Santos recognises that geosequestration is one of a small number of large scale options to reduce Australian greenhouse gas emissions.

Key technical factors to be considered in the assessment for an appropriate storage location are storage capacity, injectivity potential, proximity of existing infrastructure, containment characteristics and the existence of natural resources that may be compromised. Other factors include the proximity to emission sources and population centres, and public perception of health and safety.

The utilisation of existing reservoirs and infrastructure was the subject of research conducted within the Australian Petroleum Cooperative Research Centre's GEODISC program. The GEODISC program identified potential geosequestration sites and compared their characteristics (the factors identified above) with respect to nearby known or potential carbon dioxide emission sources. The GEODISC program identified Moomba in South Australia's Cooper Basin as one of the two most likely cost effective hubs for geosequestration in Australia.

The concept of a carbon storage hub allows large quantities of carbon dioxide to be transported to a central pool of depleted oil and gas reservoirs for injection and long term storage. The use of depleted or depleting hydrocarbon provinces will maximise value by harnessing:

- Storage reservoirs that are well understood (seismic, wells, production data)
- Existing infrastructure including compression, transportation and injection facilities
- Existing skills and technical expertise of petroleum operators with a proven track record in major projects

By way of example, the Cooper Basin is centrally located between the major carbon dioxide emission sources of Gladstone-Rockhampton, Brisbane-Tarong, Newcastle-Sydney-Wollongong and Adelaide. The depleted oil and gas reservoirs of the Cooper Basin provide an effective means to develop a central geosequestration facility to service these centres, not withstanding transportation distances, the costs of which would be borne by a carbon price on emissions.

The injection of carbon into a geological reservoir containing hydrocarbons can enhance the recovery of oil or gas. Therefore one of the key synergistic benefits of the application of geosequestration technology would be the substantial enhancement of Australia's hydrocarbon security. Santos supports the view that carbon injection activities should be designed to enhance hydrocarbon recovery wherever possible.

3. Management of post-closure obligations/liabilities

Under geosequestration captured carbon will be stored for geological time, during which obligations or liabilities may arise as a result of carbon leakage. Careful storage system design and siting, together with methods for early detection of leakage are effective ways of reducing, but not completely eliminating, hazards associated with carbon leakage.

Accordingly any new legislation must clearly define the commencement of post-closure of a carbon storage reservoir. Santos supports the definition of post-closure provided by the MCMPR Regulatory Guiding Principles and endorsed by APPEA, which reads

> *"...post closure phase follows site relinquishment by the project proponent. As a general principle, site relinquishment should take place when the regulator is satisfied that the surface and subsurface conditions at the storage site has reached an acceptable level of low risk and liability"*

Santos supports the view that the government accepts post-closure responsibility for the stored carbon stream as soon as a regulator has approved site closure.

4. Regulatory certainty over legal rights

Whilst carbon dioxide capture and transportation do not provide any significant regulatory difficulties under existing law, carbon dioxide injection and storage require consideration of legal property rights in respect of the:

- Underground storage reservoir
- Physical infrastructure necessary to enable injection and monitoring
- Stored carbon dioxide

Santos argues that the assignment and application of geosequestration rights must not be allowed to conflict with the rights of existing petroleum exploration or production licensees. Santos is of the view that an owner of a petroleum exploration or production licence is the preferred candidate for granting of geosequestration rights in the same geological (licence) area. This provides the existing petroleum licensee with first right of refusal to take up geosequestration rights.

Should the existing licence holder not wish to take up the geosequestration rights the State may offer those rights to third parties as part of a structured tender process. Management of operational access then becomes subject to negotiation between the two parties under guidelines issued by the regulator. Should the parties not be able to reach agreement the

regulator will act as arbitrator, however the State should always have regard to and protect the legal and equitable rights of the existing licence holders in such situations.

Petroleum legislation in most Australian states and territories contains provisions which deal with storage of naturally occurring hydrocarbons although many do not provide sufficient certainty of rights to inject, store and recover gas. Existing legislation in Queensland and South Australia recognises the rights of petroleum licence holders to inject gas for purposes of hydrocarbon extraction or storage. Under recently proposed amendments to the Offshore Petroleum Act, offshore geosequestration activities would be governed by a licensing regime separate from the petroleum licensing regime.

The current lack of a clear licensing framework for stored carbon creates additional risk for potential geosequestration project operators in that they are unable to proceed with development options due to uncertainty over property rights.

Provision of third party access by infrastructure owners may require the simultaneous use of field infrastructure in conventional exploration and production activities and in carbon injection activities. This may create problems with respect to infrastructure usage, health and safety, remediation efforts, and apportionment of liability should an incident occur. In such situations a number of commercial options for the sequestration services will be made available (for example, tolling arrangements or CO_2 swaps) after taking into account the market price for carbon dioxide emission abatement certificates and the marginal costs of alternative sequestration solutions available to third parties.

Santos supports the view that the right to use carbon dioxide should rest with the carbon storage licensee until such time as the regulator has approved site closure.

5. Technology risk

The individual technologies used in geosequestration activities are in common use within the oil and gas industry. By way of example, injection of carbon dioxide into oil reservoirs is a well-proven technique that has been used in North America for several decades. Santos is of the view that the potential for geosequestration far outweighs the technical risks, especially when project operators are familiar with the reservoirs and have established a proven track record in major storage projects.

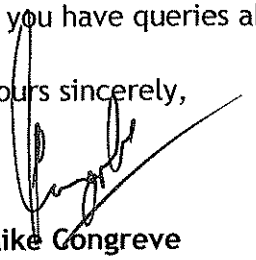
Whilst Santos believes that these proven technologies provide an acceptable level of risk for the public, but recognises the need to demonstrate in a local sense that application of these technologies is effectively executed. Through development of geosequestration technology there is the opportunity for Australia to become a world leader in project implementation, resulting in additional interstate and international trade and employment opportunities.

Summary

Santos believes that geosequestration represents a significant opportunity for future management of greenhouse gas emissions. Clarity with respect to the economic framework and regulatory certainty will provide clear incentives for commercial application of geosequestration. In particular, greater clarity over property rights and ongoing obligations, by way of pragmatic licensing regimes, will provide project operators with the necessary assurances to engage in geosequestration activities. Carbon injection and storage technologies employed will continue in line with standard industry practice.

If you have queries about this submission do not hesitate to contact me.

Yours sincerely,



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