



**Chief Scientist
& Engineer**

Environmental risk & responsibility and insurance
arrangements for the NSW CSG industry

NSW Chief Scientist & Engineer

May 2014



Chief Scientist & Engineer

30 May 2014

The Hon Michael Baird MP
Premier
Minister for Infrastructure
Minister for Western Sydney
Parliament House
SYDNEY NSW 2000

Dear Premier,

Environmental risk and responsibility and insurance arrangements for the NSW Coal Seam Gas industry

As the Independent Review into Coal Seam Gas Activities in NSW has progressed an issue which has been raised by concerned stakeholders relates to the adequacy of insurance coverage for the CSG industry in the event of associated impacts to the environment.

To further investigate this issue I commissioned a background study on insurance options for the industry and a peer comment paper. A covering summary report prepared by my office contains one recommendation for the Government's consideration.

In presenting this paper I wish to acknowledge the assistance of Hicksons Lawyers and Piper Alderman for their work in studying this complex matter.

Yours sincerely

Mary O'Kane
NSW Chief Scientist and Engineer

EXECUTIVE SUMMARY

As part of the independent Review into Coal Seam Gas activities in NSW, a paper was commissioned which responds to informal advice that the CSG industry in NSW is poorly insured for environmental impacts. The paper, authored by Hicksons Lawyers, examined ways in which insurance coverage could be improved along with a range of other measures to deal with environmental risk in the industry. The study and subsequent peer comment paper also commissioned by the Review fall under the second term of reference for the Review: “identify and assess any gaps in the identification and management of risk arising from coal seam gas exploration, assessment and production, particularly as they relate to human health, the environment and water catchments” (see Appendix 1 for full terms of reference).

Informal advice from insurance industry sources in Australia indicates that traditionally oil and gas companies have a higher risk appetite than other large industries. This means they generally take on their own risk, that is, self-insure or underinsure. Companies may take out general liability insurance to address a broad range of risk, or a public liability policy to focus on material damage such as third party injury or property damage. Some may take out insurance to cover sudden and accidental pollution, such as a well cover policy.

However, it is broadly acknowledged that in NSW when it comes to CSG companies, take-up of such coverage is uneven at best. It is also recognised by both industry and government that there is no mechanism to address unforeseen and/or long term environmental impacts potentially attributed to these gas extraction activities.

Indeed, broadly there has been a lag in awareness about protection for environmental damage in this country and advice suggests industry players have only recently started showing an interest in more comprehensive forms of pollution insurance. This is probably due to the fact that in Australia there hasn't been lengthy industrial experience on the scale of industry growth and expansion in the U.S. In NSW, coal seam gas extraction is a relatively new industry and it is one which is largely unprotected.

The Review was therefore interested in examining how a more robust risk management and insurance system could strengthen environmental standards, accountability and performance of industry and minimise risk to government and the people of New South Wales. Critically, information on a more comprehensive model which would help address potential long-term environmental impacts and remediation on, and beyond, licensed land parcels was sought.

The Hicksons paper acknowledges there is no CSG industry standard approach to insurance and puts forward a number of insurance policy options for consideration to strengthen the insurance coverage of CSG industry participants operating in NSW. The paper also notes there are comprehensive pollution legal liability insurance products available on the market suitable for the CSG industry.

Following submission of the paper, the Review then sought peer comment on the paper from law firm Piper Alderman which produced its own paper fleshing out an appropriate risk identification framework, and arguing that more diligent environmental investigation and assessment of CSG proposals at the application stage should be adopted to minimise future claims.

While there are differences in focus, both papers agree an improved insurance coverage regime would be beneficial to the State and both support the concept of a rehabilitation fund similar to the special purpose fidelity fund set up by the Western Australian Government for mine rehabilitation. Establishment of such a fund would enable an additional layer of

coverage and be beneficial to government in the event of long term or unforeseen environmental impacts caused by CSG activities. The fund would represent a third layer of protection in addition to the security deposit process and any new or enhanced insurance arrangements required by Government, with each layer addressing separate risks as outlined in the conclusion of this paper.

The two papers and terms of reference can be found at Appendices 2 and 3.

The examination conducted by the Review is not exhaustive but raises the issue so that more work can be done. Accordingly, the recommendation of this report is for further consideration by the appropriate government agencies of the issues raised.

ISSUES RAISED IN PAPERS (HICKSONS AND/OR PIPER ALDERMAN)

- Concern that a relatively new but fast-growing industry in NSW which does not have the same strict insurance requirements (as, for example, the offshore petroleum industry) has resulted in an underinsured industry.
- Insurance taken up tends to be third party liability coverage which protects third parties but not the insured and does not extend to natural resource damage.
- There is no requirement in the legislation for insurance although this can be included as a licence condition at the Minister's discretion (however evidence suggests this has not been required to date).
- Financial assurance which covers bonds, guarantees, insurance, sureties, indemnities etc. is ultimately at the discretion of the department as to how it is required and supervised, and could expose government to unnecessary risk if not adequately regulated.
- Security deposits typically only cover the cost of on-site rehabilitation at cessation of operations, not beyond the tenement or any long term impacts.
- Comprehensive pollution legal liability insurance policy is now available in the market which covers pollution and natural resource damage on and off site.
- Western Australia Mining Rehabilitation Fund cited as a good model for government to pursue in the form of a CSG rehabilitation fund and to maximise coverage for long term and unforeseen environmental impacts.
- Strengthening the environmental risk assessment of projects at application stage should be given appropriate consideration.

RECOMMENDATION

It is recommended the NSW Government notes the attached reports and refers the matter to NSW Treasury for further examination, in consultation with NSW Trade & Investment and the NSW Department of Planning and Environment, to consider a robust and comprehensive policy of appropriate insurance and environmental risk coverage for the CSG industry. This consideration should examine the potential adoption of a three-layered policy of security deposits, enhanced insurance coverage and an environmental rehabilitation fund administered by government. Consideration of how any additional insurance or levy is calculated would need to take into account the level of risk associated with the different stages of any proposed coal seam gas development activity.

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1 INTRODUCTION

Throughout the independent review into coal seam gas activities, the Review team has heard, through its consultation with community, concerns about the potential for environmental incidents and the long term impacts of CSG activity on the environment. These concerns have understandably arisen in response to notable oil and gas related environmental incidents around the world, and in relation to the early problems associated with CSG extraction in the U.S. The natural question to follow concerns expressed around regulatory strength and monitoring, is around the level of coverage and the financial capacity of companies to manage the repercussions of such an incident should it occur. Informal advice to the Review indicated that the CSG industry is underinsured. These concerns led the Review to examine the issue of industry insurance via a commissioned paper authored by Hicksons Lawyers and a peer comment paper authored by Piper Alderman. Both law firms have experience in matters relating to oil and gas regulation and activity in Australia, but indicated at the time of commissioning that neither had a conflict of interest in terms of having clients who were NSW-based companies engaged in coal seam gas activities.

Following the submission of both papers it became clear to the Review that there are three levels of issues which require different insurance or risk coverage approaches, as summarised in the conclusion of this paper. First, companies must be insured against known risks and expected costs of projects. Second, companies also need to be insured against any sudden accidental pollution events as a direct result of their operations on or near the tenement. Finally, as this paper posits, there is a strong argument for a third level of coverage to be examined by government which addresses any potential long term environmental impacts associated with CSG activity. The latter is, of course, a largely untested area in NSW and while the technology around CSG extraction is well established, the application and impacts of this technology in relation to the distinct geography and geology of NSW is not. That is to say that CSG is a relatively new industry in this State and it would be in the Government's best interests to explore further the matter of environmental risk and responsibility until it is satisfied of a robust and appropriate policy approach.

Under NSW legislation the holding of insurance is not mandatory however the conditions of a licence *may* require the licence holder to take out and maintain a policy of insurance. Such a policy should provide cover for the payment of costs for clean-up action, and for claims for compensation and damages resulting from pollution in connection with the activity or work authorised or controlled by the licence. The use of such a licence condition does not seem to have been used. Financial assurance is referred to many times in the *Protection of the Environment Operations Act 1997* but not as a mandatory condition and there are no explicit guidelines for use by the relevant regulatory bodies in relation to assessment of financial assurance. Evidence of an applicant's financial standing is sought under the *Petroleum (Onshore) Act 1991* as an accompaniment to a title application and can often simply constitute a letter of endorsement from a chartered accountant. Again the guidelines for use are not specified within the legislation and interpretation is at the discretion of the Minister's delegate, that is, generally, the Division of Resources & Energy or the Office of Coal Seam Gas (OCSG).

Under the *Petroleum (Onshore) Act 1991* the current process in NSW includes the requirement that all titleholders engaged in mineral and petroleum exploration, assessment and production activities, lodge a security deposit with the Government on issue of title. The security deposit is to cover the Government's full costs of rehabilitation of the land subject to the title and includes any dams or roads under the title. The security deposit is provided by way of bank guarantee or cash and is regularly reviewed by the OCSG.

The amount of the security deposit required is determined by an estimate of rehabilitation costs provided by the titleholder and reviewed by the OCSG which has access to the expertise of an internal quantity surveyor and/or can request a third party review of costs if deemed necessary. Rehabilitation cost estimates are required to include an additional 20% to allow for project management costs and contingencies. The OCSG on behalf of the Minister for Resources & Energy is responsible for determining when the rehabilitation has met the required standard, taking into account adherence to the titleholder's rehabilitation and closure plan, legal obligations and the future use of the site.

If the obligations for rehabilitation have not been met to the satisfaction of the OCSG, part or all of the security deposit can be forfeited for use by the Government to meet rehabilitation requirements (Government of New South Wales, 2012).

In coal seam gas activities the rehabilitation work undertaken by titleholders during and at the end of activities is usually limited to plugging and abandonment of wells, and maintenance and removal of surface infrastructure associated with the extraction operations. The rehabilitation security deposit process does not apply to pollution events, which are pursued separately as breaches of legislation by the regulator, the Environment Protection Authority (EPA).

The OCSG advises the security deposit system historically has worked well for its purpose and in the majority of cases titleholders are compliant with the rehabilitation requirements. However, the OCSG does concede there is a gap in policy which does not address long term or unforeseen environmental impacts and that company liability cover and insurance is a difficult space to regulate.

3 INSURANCE ARRANGEMENTS IN OTHER JURISDICTIONS

On examination the Review has determined that there is no single preferred policy package of insurance coverage in locations with an active CSG industry around the world. Indeed, other jurisdictions have adopted a range of different measures and requirements including those described briefly below.

3.1 ALBERTA, CANADA

3.1.1 Alberta Energy Regulator's Liability Programs

The Alberta Energy Regulator (AER) has the Licensee Liability Rating Program (LLR), Large Facility Liability Management Program (LFP) and the Oilfield Waste Liability (OWL) program. These are designed to minimise risk to the Orphan Well Fund, see section 3.1.3 below, and to help prevent Albertans from acquiring the costs to suspend, abandon, remediate or reclaim wells, pipelines and facilities (Alberta Energy Regulator, 2014).

The programs rate a company's deemed assets and liabilities and assess security deposits to all companies below a 1:1 ratio. Several directives clearly spell out exactly how these assets and liabilities are calculated, using a variety of provincial standards. If a company feels these standards do not accurately apply to their assets, they can obtain site specific assessments for all of their holdings and use these estimates instead. The program also rewards reclamation awaiting vegetative regrowth with a 50% reduction in fees assessed, thus encouraging companies to complete reclamation requirements as quickly as possible (Alberta Energy Regulator, 2014).

A recent review of the Licensee Liability Rating Program increased many of the costs. A review by Blake legal firm indicated under the new rules, 248 licensees will be required to post security of C\$297 million, up from the 88 licensees previous deposits of C\$13 million (Bourassa & Zahara, 2013).

3.1.2 Insurance

A licensee must have reasonable and appropriate insurance coverage (and maintain the insurance coverage) that is appropriate for the size of the company and the operation that the company carries out. The insurance policy must be issued from a company registered in Alberta to provide insurance in Alberta. Before the AER approves a Licence Eligibility Type to hold AER licences or to become an agent, it requires "evidence of insurance either in the form of a certificate of proof of insurance or a statement of the insurer describing the coverage, effective date, and termination date of the insurance" (Energy Resources Conservation Board, 2005).

"Licensees holding domestic water well licences for wells drilled expressly as water wells are exempt from insurance requirements. However, licensees converting wells drilled by the industry to domestic water well production are required to carry reasonable and appropriate insurance" (Energy Resources Conservation Board, 2005).

3.1.3 Orphan Well Fund

The Orphan Well Association (OWA) is a non-profit organisation in Alberta that deals with cleaning up orphaned wells. It is funded primarily through the Orphan Well Levy collected by the AER. The OWA set an annual budget requirement, which the AER then collects from companies based on their proportionate share of industry liability in the LLR and OWL programs. Levy calculations are all comprehensively outlined in AER Directives, and the

Orphan Well Association clearly outlines what work is being done with the funds, including naming defunct companies (Orphan Well Association, 2012).

3.2 COLORADO, U.S.A.

3.2.1 Surety bonds

The Colorado Oil and Gas Conservation Commission (COGCC) prefers a surety bond, backed by a Commission-approved company, for financial assurance, however other forms may be approved separately. Surety bond requirements are based on proposed company activity, including a single bond amount of \$10,000 per well for wells less than 3,000 feet (~914m), or \$20,000 per well for wells deeper than 3,000 feet (Rule 706, Colorado Oil & Gas Conservation Commission, n.d.). However, statewide blanket financial assurance allows \$60,000 for less than 100 wells or \$100,000 for drilling and operation of 100 or more wells (Colorado Oil & Gas Conservation Commission, n.d.). Some see this blanket amount as unacceptably low and an incentive for larger companies to lessen the amount of financial assurance with each additional well drilled (Dutzik, Davis, Van Heeke, & Rumpler, 2013).

Allowing for transparency, the public may search online for the type and amount of financial assurance individual companies have on COGIS, the COGCC database at <http://cogcc.state.co.us/cogis>.

3.2.2 Insurance

Colorado requires all operators to carry general liability insurance in the amount of \$1 million per occurrence, including property damage and bodily injury to third parties. Additionally, operators must include the COGCC as a 'certificate holder' on the policy "so that the Commission may receive advance notice of cancellation" (Rule 708, Colorado Oil & Gas Conservation Commission, n.d.).

If an operator's financial assurance is called, the amount is deposited in the Oil and Gas Conservation and Environmental Response Fund (CERF). Additionally, a 10% fund recovery fee for any additional overhead costs will be charged on remaining financial assurance. Further, until the operator replaces the balance of financial assurance, the COGCC does not allow the operator to sell gas or oil. Finally, financial assurance third party providers become an 'unacceptable provider' and must apply for an order of re-instatement if penalised (Rule 709, Colorado Oil & Gas Conservation Commission, n.d.).

3.2.3 Oil and Gas Conservation and Environmental Response Fund

As mentioned above, besides surety bonds and general liability insurance, the COGCC oversees the Oil and Gas Conservation and Environmental Response Fund, which allocates a two year capped amount of \$6 million (Rule 710, Colorado Oil & Gas Conservation Commission, n.d.) to:

investigate, prevent, monitor, or mitigate conditions that threaten to cause, or that actually cause, a significant environmental impact on any air, water, soil, or biological resource; to gather background or baseline data on any air, water, soil, or biological resource that the commission determines may be so impacted by the conduct of oil and gas operations; and to investigate alleged violations...that threaten to cause or actually cause a significant adverse environmental impact (Intermountain Oil and Gas BMP Project, n.d. citing §34-60-124 of Oil and Gas Conservation Act).

3.3 WESTERN AUSTRALIA

During the Review consultation, the Chief Scientist & Engineer met with the former Premier of Western Australia, the Hon Geoff Gallop AC, to discuss the matter of industry risk and insurance as it applied to the mining industry, who recommended looking to the example of

Western Australia. The Review of the Project Development Approvals System chaired by Dr Michael Keating AC in 2002 strongly supported enhancing the concept of sustainability as a key aim of developments, recommending a suite of policy initiatives based on this principle. The former Premier indicated that this approach towards more sustainable and accountable development projects, over time and through the actions of successive governments, led Western Australia to develop the Mining Rehabilitation Fund.

3.3.1 Mining Rehabilitation Fund

From 1 July 2014 industry participation in the Western Australian Government's Mining Rehabilitation Fund (MRF) becomes compulsory.

The Western Australian Government established the fund to address the inadequacy of the State's security bonds system which has not been able to cover the true cost of rehabilitating abandoned mines. Bonds are also seen as problematic in that they tie up significant funds which could be invested in mining projects and as each bond is only applied to a specific mine, it can't be used to address the long term problem of legacy abandoned mines (Government of Western Australia, 2013).

The MRF provides a pooled fund, levied according to the environmental disturbance existing on a tenement as reported annually (Government of Western Australia, 2013).

The fund is used for rehabilitation where the operator fails to meet rehabilitation obligations and funds cannot be recovered from the operator by other available methods. The model was adopted following consultation with industry, government and community stakeholders (Government of Western Australia, 2013).

Significantly the fund will enable the Government to manage and rehabilitate abandoned mines.

As argued in the Hicksons paper and supported by the Piper Alderman paper, a similar fund applied to the CSG industry in NSW could address issues of long term and/or unforeseen environmental impacts, although rather than replacing the security deposit regime it is proposed such a fund would provide an additional layer of protection in the existing system. This fund would complement the security deposit system and any new or enhanced industry insurance arrangements the Government may require.

3.4 THE CONCEPT OF AN ENVIRONMENTAL FUND

The concept of applying industry fees to a government administered environmental fund is not new. In NSW the following programs rely, in part, on funds from industry to address environmental remediation, conservation and efficiency measures and public awareness.

3.4.1 Derelict Mines Program

Derelict mines are former mining sites requiring rehabilitation where no individual or company can be held responsible for their management or rehabilitation. During 2012-13 the Division of Resources & Energy undertook rehabilitation works or investigations at 25 sites across NSW. The NSW Government has allocated \$4.3 million for the rehabilitation of derelict mines for the 2013-14 financial year.

The range of rehabilitation works funded by the Derelict Mines Program includes detailed site assessments, reduction of safety hazards by fencing and filling shafts, management of water and sediment movement, acid mine drainage management, monitoring and revegetation of the sites. Rehabilitation work has been undertaken in many areas of the state.

3.4.2 NSW Climate Change Fund

The NSW Climate Change Fund was established in 2007 under the Energy and Utilities Administration Act 1987 and is now administered by the NSW Department of Planning and Environment. The fund provides direct support to homes, businesses, government, schools and community organisations to implement measures to save water and power so as to reduce utility bills. The fund also provides support for emerging and proven clean energy technologies in NSW.

4 CONCLUSION

In light of the work undertaken the Review suggests it is in the best interests of the State and its people to ensure the appropriate levels of industry coverage are available and taken up by industry. Based on a better understanding of international practices and the apparent gaps in the system in NSW the Review notes that there are three primary levels of risk which need to be addressed in this regard:

- 1. Expected Costs**
Security deposit (industry to Government) – upfront cash/bank guarantee
- 2. Sudden accidental pollution**
Insurance coverage (industry) e.g. so-called ‘cover of well’ insurance
- 3. Unforeseen and long term costs**
Environmental fund (industry to Government) – addresses government cost associated with unforeseen and long term impacts including in the event of well abandonment or company insolvency.

5 RECOMMENDATION

It is recommended the NSW Government notes the attached reports and refers the matter to NSW Treasury for further examination, in consultation with NSW Trade & Investment and the NSW Department of Planning and Environment, to consider a robust and comprehensive policy of appropriate insurance and environmental risk coverage for the CSG industry. This consideration should examine the potential adoption of a 3-layered policy of security deposits, enhanced insurance coverage and an environmental rehabilitation fund administered by government. Consideration of how any additional insurance or levy is calculated would need to take into account the level of risk associated with the different stages of any proposed coal seam gas development activity.

6 REFERENCES

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APPENDICES

APPENDIX 1 TERMS OF REFERENCE FOR INDEPENDENT REVIEW OF COAL SEAM GAS ACTIVITIES IN NSW BY CHIEF SCIENTIST & ENGINEER

At the request of the NSW Government, the NSW Chief Scientist and Engineer will conduct a review of coal seam gas (CSG) related activities in NSW, with a focus on the impacts of these activities on human health and the environment.

The Chief Scientist and Engineer is to:

1. undertake a comprehensive study of industry compliance involving site visits and well inspections. The Chief Scientist's work will be informed by compliance audits undertaken by regulatory officers, such as the Environment Protection Authority and other government agencies
2. identify and assess any gaps in the identification and management of risk arising from coal seam gas exploration, assessment and production, particularly as they relate to human health, the environment and water catchments
3. identify best practice in relation to the management of CSG or similar unconventional gas projects in close proximity to residential properties and urban areas and consider appropriate ways to manage the interface between residences and CSG activity
4. explain how the characteristics of the NSW coal seam gas industry compare with the industry nationally and internationally
5. inspect and monitor current drilling activities including water extraction, hydraulic fracturing and aquifer protection techniques
6. produce a series of information papers on specific elements of CSG operation and impact, to inform policy development and to assist with public understanding. Topics should include:
 - operational processes
 - NSW geology
 - water management
 - horizontal drilling
 - hydraulic fracturing (fracking)
 - fugitive emissions
 - health impacts
 - wells and bores
 - subsidence.

The NSW Chief Scientist & Engineer will provide an initial report to the Premier and the Minister for Resources and Energy on her findings and observations by July 2013.

**APPENDIX 2 “INSURANCE AND ENVIRONMENTAL SECURITIES”,
BY BERNARD EVANS, HICKSONS LAWYERS**

Paper 1 - Insurance and Environmental Securities

Paper 1 - Insurance and Environmental Securities

1. Introduction

In this paper I consider in outline current practice and arrangements for insurance in the coal seam gas (**CSG**) industry and also consider some ways in which that coverage could be improved in the interests of government, landholders, the broader public and the industry itself (see Part 4)¹.

Security deposits are a feature of mining, petroleum and environmental legislation throughout Australia. Part 10A of the *Petroleum (Onshore) Act 1991 (NSW)* (the **POA**) includes a typical set of provisions. Some comments on these and similar “financial assurance” provisions are included in Part 5.

Insurance coverage and the provision of security deposits are not unrelated issues. In this paper I will consider their inter-relationship and the possibility of establishing a CSG rehabilitation fund of the kind recently established in Western Australia for the mining industry (see Part 6).

The objective of the paper then is to give an overview of various risk management techniques with a particular focus on protecting Government from the risk of operator default.

Before dealing in detail with each of the matters above I include an Executive Summary (Part 2) and some preliminary recommendations (Part 3).

2. Executive Summary

- We are advised existing insurance practice and arrangements are inadequate and that, as a rule, CSG operators in New South Wales are under-insured (relying on often inappropriate third party liability policies) or are effectively not insured at all (see generally Part 4).
- A more comprehensive form of pollution legal liability insurance is now available in the market to cover pollution and natural resource damage both on-site and off-site and for the benefit of the insured (generally the title holder or operator), third parties, and contractors. One advantage of such insurance is that gradual, long term loss and damage, for example to groundwater, can be covered. Another advantage, especially for Government, is that clean-up costs, whether undertaken voluntarily to

¹ In preparing this paper and in particular the sections dealing with insurance I acknowledge the assistance of Lionel Mintz, Environmental Manager, Asia Pacific Region, Marsh.

comply with a licence condition or mandated by a Government agency, can also be covered.

- Such insurance is not mandated under relevant legislation, although at a Minister's or other decision maker's discretion insurance can be included as a licence condition.
- Security deposits typically only cover the cost of on-site rehabilitation and closure (extending in some instances to immediately adjacent properties) and arguably are better suited to mining (and even conventional oil and gas operations) than CSG operations where the environmental damage is perhaps more likely to extend beyond a particular tenement or adjacent properties.
- "Financial assurance" (a broad term covering bonds, guarantees, insurance, sureties, indemnities and other forms of security) provides some more flexibility for operators but unless properly supervised could expose Government to unnecessary risk.
- A special purpose fidelity fund modelled on the recently established Western Australian Mining Rehabilitation Fund could well provide Government with the best means of covering the costs of remediation and rehabilitation of off-site damage caused by CSG operations.

3. **Recommendations**

I have attached a table to this paper (**Attachment**) which lists the various security and risk management techniques which I think are presently and potentially available to deal with environmental risk and liability caused by CSG operations. By reference to selected criteria, including:

- level of risk for Government
- administrative burden and complexity
- acceptance by industry
- stakeholder coverage
- coverage of past incidents

- coverage beyond a tenement or site
- capacity to reward good oil field and environmental practices
- risk identification (a criterion I explain in a footnote on page 1 of the Attachment),

I have considered how best these risks and liabilities can be met.

My preliminary conclusions and recommendations, in order of preference, are set out below:

- (a) A CSG rehabilitation fund (the Coal Seam Gas Rehabilitation Fund) be established similar to the Mine Subsidence Compensation Fund and the Western Australian Mining Rehabilitation Fund which would have the following features:
 - Coverage for remediation and rehabilitation caused by CSG operations which are “orphaned”, that is not covered by security deposits currently determined by the Office of Coal Seam Gas (**OCSG**). (The terms “orphaned” and “orphan” are used in this context to describe a well (and well site) which has not been “abandoned” according to petroleum industry usage, that is properly plugged and sealed and well out of harm’s way, but rather abandoned according to common usage).
 - Coverage for on-site remediation and rehabilitation of existing CSG operations (but possibly only if the current security deposit system is terminated).
 - Coverage for off-site remediation and rehabilitation including groundwater contamination and other long term, gradual onset damage (e.g., damage to farmland and waterways caused by produced water).
 - It will be evident from the above that a distinction will need to be made, so far as it is possible, between on-site and off-site remediation and rehabilitation and that if the security deposit system is retained (see para (c) and Part 5 below) that system might

appropriately be confined to damage directly caused by CSG operations at or near a site (say within the cleared area around a well or a little further) and include damage to the surface and sub-surface (so far as damage to the latter can in fact be identified) as well as failure to follow acceptable and agreed standards in well construction, operation and abandonment.

- Levy calculation to be determined by reference to risk factors and possibly including an exemption for low risk, small value exploration activities. (The Western Australian model should offer some guidance in this regard.).
- The calculation of the levy may be the most difficult aspect of the proposed rehabilitation fund. There is little certainty about it, although given the relative immaturity of CSG exploration in New South Wales it may not be too difficult to calculate the cost of remediation and rehabilitation of “orphan” wells and well sites in this State. More difficult will be the task of calculating the levy for planned and future operations. On the one hand, it is evident that good engineering practices supported by effective monitoring and regulation, in the management of produced water and in drilling, completing and abandoning wells, can substantially reduce, even eliminate, environmental risk. On the other hand, there are still areas where knowledge is incomplete and prediction is uncertain including groundwater connectivity, chemical contamination and fugitive emissions. Further, in areas of greater uncertainty the potential liability of operators may also be considerably higher or at least that may be the concern. A realistic approach then, as I see it consistent with the application of the “precautionary principle”², may be not to predict or even assume worst case scenarios and levy heavily but rather build up a fund with a target amount (adjustable

² There is a large body of literature and (to a lesser extent) case law regarding the so-called “precautionary principle”. It is also expressed in several different ways but for the purposes of this paper I refer to section 6(2)(a) of the *Protection of the Environment Administration Act 1991* (NSW) (the **PEAA**) where the principle is expressed as follows:

6(2)(a) the precautionary principle - namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

In the application of the precautionary principle, public and private decisions should be guided by:

(i) *careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and*
(ii) *an assessment of the risk-weighted consequences of various options,*

as the industry grows and as CSG operational data and knowledge of actual risk improves) but which also recognises the following principles:

- operators can be levied at different rates according to their history and performance record (if any)
- good performance should be rewarded
- the levy could wholly or partially replace the security bond system, which should mean it will be acceptable to industry (as I understand the Western Australian experience has already shown)
- the rehabilitation fund itself could serve a quasi-regulatory function in much the same way as does an insurer's refusal to provide or renew insurance or charge a higher premium
- income of the fund to be available for orphan wells / well sites and for monitoring and preventative work
- no relaxation in operator standards and obligations (possibly including an obligation to carry adequate and appropriate insurance) and a clear understanding that the proposed fund is only intended to provide for operator default and insolvency.

- (b) Assuming a CSG rehabilitation fund is not established or only partly, consideration be given to including a requirement in legislation or a mandatory licence condition that the holder of a petroleum title take out and maintain pollution legal liability insurance for **certain** CSG exploration and **all** CSG production operations. At a minimum that policy should ideally include coverage for identified pollution and natural resource damage, cover the insured (and its operating subsidiaries) and all contractors and other service providers on site, for example by nomination or as co-insureds, cover actions and directions by Government (for example, to remediate or rehabilitate a site or other area or resource) and extend beyond a tenement or particular site.

Given, as I understand, the market for such policies is only now developing, some further work will need to be undertaken to determine the general availability and cost of such policies.

It also does need to be recognised some operators may default in paying premiums or in complying with insurance policy conditions, that ensuring compliance by operators can be difficult, costly and time consuming for responsible Government agencies and that in an area of such complexity it is difficult to be overly prescriptive.

- (c) Subject to one or other of the recommendations in (a) and (b) above, security deposits in their current form be retained at least for the time being (say two to five years) with the following qualifications:
- in particular cases the amount secured may be reduced and/or apply to cover only on-site rehabilitation costs
 - companies with a sounder financial record and backing, established links to the State, a better operational and risk management record and operating and planning to use more advanced technology (e.g., horizontal drilling; no or minimal fracking) and in areas of less risk (e.g., no or minimal expected aquifer interference) could be rewarded by paying a lower security or by being given the option of providing another form of “financial assurance” (including insurance as described above), possibly in combination with a minimum cash or bank guarantee requirement.
- (d) It will be evident that I do not recommend retention of the current security deposit system on its own. As a separate exercise and subject to the adoption of one or a combination of the schemes described above, consideration be given to introducing a wider range and more flexible forms of “financial assurance”.
- (e) Finally, I note that with the possible exception of a CSG rehabilitation fund no one security and risk management scheme or technique would seem to offer a complete solution to dealing with the risk of CSG environmental harm and liability.

I think the recommendations above and my evaluation of their relative advantages and disadvantages, more particularly as set out in the Attachment, will need to be tested and should be critically reviewed. My observations and judgements are in places necessarily subjective and impressionistic. I also think there is scope for development of hybrid models, involving best elements of one or two schemes especially over the short term, say over two to five years, and while the actual level of CSG environmental risk is being assessed and more knowledge, data and information are obtained.

4. **Insurance**

I deal with insurance in detail first in this paper because I was originally asked to consider the types of insurance available to CSG participants and only later did our inquiry extend to other risk management techniques.

4.1. **Existing insurance arrangements**

Marsh advises CSG risk in New South Wales (and Australia generally) is under-insured and in some cases not insured at all. Other than as advised by Marsh and another major insurance broking firm we have only limited information about the actual level and specific types of insurance CSG industry participants do now carry or will likely take out if their operations expand. I have also separately provided you with a copy of a form of policy issued by Ironshore Specialty Insurance Company titled "Site Pollution Incident Legal Liability Select (Spills) Oil and Gas Form", which I understand is generally available for oil and gas operations in the U.S.A.. I think it would be helpful to collect more of this information.

Certainly it is clear there is no CSG industry standard approach to insurance and according to Marsh little demand, except from several larger companies, for more comprehensive insurance to cover CSG risk. I also understand several insurers have been asked to quote on more comprehensive pollution liability coverage but at this stage there has been no significant uptake of that kind of insurance cover.

As I understand, many CSG operators are likely to hold a third party liability (TPL) policy which would generally have the following features:

- it may extend to cover pollution but only if such pollution is characterised as sudden, accidental, unintended, unexpected and happening at a specific and identifiable time and place
- coverage does not generally extend to “natural resource damage”
- such insurance is generally only available to cover loss or damage to third parties (i.e., it will not cover loss to the insured, in effect the “first party”, and it may well be difficult for an insured to obtain appropriate insurance for contamination to its land, for example under an industrial special risks or property insurance policy)
- actions by regulators (including costs in complying with orders and directions to restore or rehabilitate a site) are often not covered
- coverage of business interruption will generally only be available if the pollution falls within the description above (i.e., sudden, accidental etc.)
- the level of coverage, although generally negotiable, may be inadequate (as low as \$5 to 10 million for smaller operators).

In particular, a TPL policy is not appropriate nor is it targeted to cover gradual onset, off-site groundwater contamination, which is the main perceived risk of CSG operations identified by the insurance industry.

Another type of insurance cover relevant to our inquiry is “operator’s extra expense” or “control of well” cover, which has a specific application to “blowouts” and the costs involved in regaining control of a wild or uncontrolled well, including seepage, pollution and direct clean-up and containment costs. The trigger for coverage is an unintended flow from a well of oil, gas, water, drilling fluids, proppants and chemicals which cannot be stopped promptly, for example by a blowout preventer. Again, however, the focus is on the consequences of a sudden and accidental pollution event rather than addressing the effects of gradual pollution and contamination. Separate and more specific coverage is also available for drilling operations (e.g., loss of tools downhole).

4.2. **Pollution Legal Liability Insurance**

Marsh advises some of the larger and more specialised insurers (e.g., AIG, ACE and XL (Australia), Chubb, Lloyds, Ironshore and QBE (UK) and Zurich (US)) do now offer more comprehensive, targeted and flexible pollution legal liability insurance policies which indemnify CSG risk (including groundwater contamination) and also have the following features:

- coverage can extend to most forms of pollution, both on-site and off-site, and including both gradual and sudden events
- coverage can extend to natural resource damage
- coverage can extend to first party loss (e.g., the clean-up costs of an operator and business interruption losses) as well as third party loss
- actions by regulators (including costs in complying with orders and directions to restore or rehabilitate a site and other affected property) can be covered
- typically, the main policy proponent is the permit/licence holder/operator but contractors and other service providers can effectively be joined as co-insureds or by nomination
- coverage can sometimes be available for civil/pecuniary penalties, although this is problematic in Australia as such indemnity protection is generally regarded as contrary to law or public policy (n.b., criminal fines and penalties are not covered)
- coverage is available for \$50 million plus.

Another advantage of a pollution legal liability policy (as opposed to a less flexible, generic and cheaper TPL policy) is that it is generally only written if the insurer has a better understanding and satisfies itself as to the insured's claims history, environmental record, planned operations, technical skills and supervision, and systems of operation (e.g., risk management and use of latest technology and drilling systems).

In addition, insurers under these policies:

- typically require levels of risk to be more thoroughly assessed and quantified (so far as that is possible) than would be the case for a TPL policy
- and may be more vigilant in identifying risks which are excluded (possibly giving the insured an opportunity to address or mitigate risks to obtain coverage).

In effect, such insurance provides a limited self-regulation system with “penalties” (i.e., higher premiums and the risk of policy non-renewal) if an insured does not comply with policy requirements.

4.3. **Statutory Requirements for Insurance and Financial Assurance**

The POA does **not** include any requirement that the holder of any form of petroleum title (including exploration licences (PELs), assessment leases, production leases (PPLs) or special prospecting authorities) take out or maintain insurance over the duration of the title and possibly also to cover a “tail” (in the latter case if the policy is a “claims made” rather than an “occurrence” based policy).

I think it would be helpful to interrogate both the OCSG and the Environmental Protection Authority (**EPA**) whether, as a matter of practice or in exceptional cases, insurance requirements are included in standard form PEL/PPL documents and environmental protection licences, noting in the latter case section 72 of the *Protection of the Environment Operations Act 1997* (NSW) (the **PEOA**) does provide as follows:

72 The conditions of a licence may require the holder of the licence to take out and maintain a policy of insurance for the payment of costs for clean-up action, and for claims for compensation for damages, resulting from pollution in connection with the activity or work authorised or controlled by the licence.

Even if such insurance is required it may not extend beyond on-site rehabilitation and is unlikely to offer the same level of coverage as a pollution legal liability policy of the kind described above.

Section 571 of the *Offshore Petroleum and Greenhouse Gas Act 2006* (Cth) (the **OPGGA**) (amended in May 2013 – see schedule 3 to the *Offshore Petroleum and Greenhouse Gas Storage Amendment (Compliance Measures No. 2) Act 2013* (Cth)) goes further inasmuch as it provides that the holder of a petroleum title **must** at all times while the title is in force maintain sufficient “financial assurance” to meet costs, expenses and liabilities arising in connection with, or as a result of, carrying out a petroleum activity, the doing of any other thing for the purposes of a petroleum activity or complying (or failing to comply) with any requirement under the OPGGA in relation to a petroleum activity. Examples given in the provision itself include covering the cost of dealing with the escape of petroleum and remediation of damage to the seabed or subsoil.

“Financial assurance” includes insurance and in addition self-insurance, bonds, cash deposits with a financial institution, indemnities and other sureties, letters of credit from a financial institution and mortgages (or any combination of these forms of security).

In its context it seems such insurance is, potentially at least, a substitute for a security deposit and, although financial assurance is compulsory and relates generally to a “petroleum activity” for offshore petroleum (i.e., non CSG) operations, it is possible such insurance may fall short of the coverage provided under a pollution legal liability policy.

The PEOA (and the *Environmental Protection Act 1994* (Qld)) also includes detailed provisions for “financial assurance” as a condition of environmental protection licences (and environmental authorities), although in each case the type of financial assurance appears to be fairly limited (see, for example, section 298(2) of the PEOA which refers to a bank guarantee, a bond and “another form of security that the appropriate regulatory authority considers appropriate and specifies in the condition” [of the licence]).

One generally acknowledged difficulty of mandatory insurance is that there can be no guarantee operators will continue to pay their premiums or comply with policy conditions. Ensuring the policy meets minimum standards of coverage can also be problematic. To some extent this can be addressed by the threat of licence cancellation or forfeiture but it does underline the need for “back-up” forms of security, a matter considered in more detail in Part 5.

4.4. **Further observations on insurance**

In this paper I was asked and have focused on the main types of insurance available to CSG industry participants to protect against environmental risk and damage, specifically pollution liability and third party liability insurance. A more complete review of the topic would also include references to directors' and officers', workers' compensation, product liability and professional liability insurance and a range of specialty policies available to drilling companies and other service providers.

The range and complexity of insurance policies, including the scope to amend and vary those policies with endorsements, exceptions and special wording and drafting necessarily means insurance is difficult to regulate and the search for a model form of insurance or suite of insurance products may well be elusive. It also points strongly to the fact insurance is not a substitute for proper regulation nor a complete solution to risk management in the CSG industry.

Finally, I note some industry participants could well argue in a particular case their own insurance coverage, however inadequate it may seem to insurers and insurance brokers, is sufficient, for example because they are only engaged in limited exploratory work, observe safe and proven drilling and well integrity practices and/or have a strong record of environmental compliance. In the case of the larger companies (and especially the oil majors) they may also prefer to rely on self-insurance or seek a larger excess on their policies. In such cases it may be appropriate to cover the risk of those operators by other means, for example by a higher security deposit or a different mix of financial assurance products (see Parts 4.3 and 5).

5. **Security Deposits**

Part 10A of the POA provides that the Minister may impose a condition requiring the holder of a petroleum title to give and maintain a security deposit for the fulfilment of the holder's obligations under the Act in respect of the title (including obligations that may arise in the future) and to maintain that security deposit until those obligations are fulfilled (see section 106B(1)).

The security deposit may be in such form as the Minister determines, although typically a cash deposit or unconditional bank guarantee is required³. The minimum amount for a security deposit is \$10,000 (see Reg 24A, *Petroleum (Onshore) Regulation 2007* (NSW)).

One shortcoming of the security deposit model is that it likely does not cover the rehabilitation of land which may lie at some distance from a petroleum title, a matter which will need to be confirmed by OCSG. I also understand in practice the rehabilitation of adjoining land is covered. That may be because the provisions are largely based on or are at least similar to provisions in mining legislation (e.g., Parts 11 and 12A of the *Mining Act 1992* (NSW)). The obvious point to make about conventional mining and exploration, as opposed to unconventional gas production and exploration, is the effects of the former are largely (but not always) confined to the title or at least its immediate vicinity. That may not be the case with CSG exploration and production, where if environmental damage occurs (e.g., escaped chemicals, aquifer damage, the uncontrolled flow of produced water) its impact may in fact be more damaging and costly well beyond the title and even its adjoining land.

Despite the wide wording of section 106B(1) of the POA, as I understand, security deposits are generally only required and available to cover estimated rehabilitation costs on-site and to adjoining land with added amounts for project management (10%), monitoring (5%) and contingency (10%) (see the Department of Trade and Investment's publication, *ESG1 Rehabilitation Cost Estimate Guidelines*).

As noted, the requirement for adequate "financial assurance" may also be included in an environment protection authority issued under the PEOA. Such an authority is required for CSG operations in addition to a petroleum title. (I do not know whether as a matter of practice such financial assurance is required by the EPA if a security deposit has been provided under the POA, although I know the practice in some States is not to require more than one security deposit covering

³ As a rule NSW regulators have only accepted cash bonds or bank guarantees although there is limited scope for the Minister to accept a security deposit in another form (see section 106B(1) of the POA). Further, section 1.3 of *ESG1: Rehabilitation Cost Estimate Guidelines* states Investment and Industry NSW is willing to accept other forms of security deposit proposed by industry provided there is no additional risk to the NSW Government, funds are available when required by the Minister and maintenance of the deposit is not dependent on subsequent actions by industry (e.g., periodic insurance instalments). I also note that Swiss Re International Ltd through Assetinsure Pty Ltd is presently seeking approval from the Australian Prudential Regulation Authority for a new form of (non-bank) bond which can be offered on an unsecured basis with deposits payable in instalments over a period of 5 years up to 50% of the bond amount, thereby freeing up working capital. Note also the requirements of NSW Treasury Circular TC 14/01 titled "Acceptance of Performance Bonds or Unconditional Undertakings by Government Agencies".

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essentially the same risks.) This requirement appears both broader and more flexible than the requirement in the POA for security deposits in so far as:

- financial assurance may take the form of a bank guarantee, bond or any other form of security the EPA considers appropriate and specifies in the licence as a condition; and
- given an EPA security deposit (if required) generally relates to an identified project rather than to an identified title or titles it may extend beyond remediation and rehabilitation of the site,

although both these comments would need to be checked and confirmed following discussion with the OCSG and the EPA.

6. **Special Purpose Fidelity Funds**

6.1. **Available securities**

It will be evident from the analysis above that pollution legal liability insurance provides a level of protection beyond that offered by compulsory security deposits, more particularly as the main purpose of security deposits is only to provide for on – site (and limited adjoining land) rehabilitation if the operator is in default or insolvent.

Provisions in Queensland onshore petroleum legislation and Commonwealth offshore petroleum legislation also suggest in many respects wide-reaching “financial assurance” provisions can take the place of, or at least supplement, more narrowly focused security deposit provisions.

6.2. **Establishment of a special purpose fidelity fund**

A further possibility is the establishment of a CSG rehabilitation fund similar to the Mining Rehabilitation Fund (the **MRF**) established in Western Australia under the *Mining Rehabilitation Fund Act 2012* (WA) and commencing as recently as 1 July 2013.

The MRF replaces the current system of individual or mine specific bonds with a rehabilitation fidelity fund supported by levies imposed on the industry.

In effect, tenement holders are now able (and from 1 July 2014 will be required) to pay an annual non-refundable fee or levy equivalent to 1% of their rehabilitation

liability to a central fidelity account administered by the WA Department of Mines and Petroleum (the **WADMP**).

Some features and advantages of the MRF are:

- Pooling contributions to the MRF means the State (Western Australia) can apply the fund to any long abandoned mine (or “derelict mine” as it would be described in New South Wales) rather than relying on consolidated revenue or a largely Government supported fund such as the NSW Derelict Mine Sites Fund (see generally Part 11, Division 3A of the *Mining Act* 1992 (NSW)).
- The fund is better suited to remediating off-site, cumulative and long term environmental effects of mining and not just tenement or project specific rehabilitation.
- In Western Australia it has been estimated only 25% of rehabilitation costs are in fact covered by bonds and it is hoped the MRF will provide that State with an opportunity to build up a fund of \$500 million representing 100% of its contingent rehabilitation costs. (I understand the position in New South Wales is not so serious but this should be checked).
- The MRF has received widespread industry support with approximately 300 mining companies electing to participate in the voluntary one year “opt in” period (FY 2013/2014), the reason being the MRF is regarded as cheaper, in particular because it does not require operators’ capital to be tied up in cash or cash-backed unconditional bank guarantees.
- Given most mining companies fulfil their rehabilitation and closure obligations, in the usual case deposits are fully refunded. This also means annual fees under the MRF over the life of a mine will likely only need to equate to 8 to 10% of total estimated rehabilitation costs for individual mines.
- Small operators are exempt (i.e., holders of tenements with a rehabilitation liability estimate below \$50,000 must report disturbance data but will not be required to pay a levy to the MRF).

- Each mining operator still has a statutory obligation to fund its rehabilitation and closure costs, with the MRF only funding rehabilitation and closure on sites where an operator cannot or will not do so.

I think a fund of the kind described above could be a very attractive alternative or supplement to the current security deposit system operating in New South Wales for CSG operators, especially as the main concern about such operations is off-site, long term and cumulative effects of CSG operations, particularly in regard to water management, aquifer interference and groundwater contamination, and not immediate on-site physical damage. Indeed, it seems to me there is a more compelling case for a CSG rehabilitation fund than a mine rehabilitation fund. There is also a useful model or precedent for such a fund in New South Wales, namely the Mine Subsidence Compensation Fund administered by the Mine Subsidence Board. Another point of reference may be the US *Comprehensive Environmental Response, Compensation, and Liability Act* (“CERCLA”), commonly known as Superfund, which does however (controversially) include an oil and natural gas exemption.

Very often security deposits are relied upon only at the point of mine closure and when it is evident the operator will not be able to fulfil its obligations. A fund may well be a better means of paying for ongoing and continuing costs of rehabilitation and remediation (assuming the operator is obliged to but does not pay those costs), including monitoring and necessary preventative work. It is also possible the income earned by the special purpose fund could provide some or all of the funds needed for such monitoring and preventative work.

It also seems to me that adoption of a CSG rehabilitation fund, especially if it is structured to reward good oil field and environmental practices, will more likely satisfy the Government’s own objective of “ecological sustainable development” than the existing security bond system. The term “ecologically sustainable development” is described in section 6(2) of the PEAA as requiring “the effective integration of economic and environmental considerations in decision-making processes” and along with the “precautionary principle” (referred to above) and the principle of “inter-generational equity” relevantly includes a reference to the following:

- (d) *improved valuation, pricing and incentive mechanisms - namely, that environmental factors should be included in the valuation of assets and services, such as:*
- (i) *polluter pays - that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,*
 - (ii) *the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,*
 - (iii) *environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.*

In its Preliminary Discussion Paper, *Policy Options for Mining Securities in Western Australia, December 2010*, the WADMP envisaged as a further possibility a combination of the two models (i.e., bonds and rehabilitation fund) and an insurance model (see further below). The legislation (see above), however, provides only for the rehabilitation model over the longer term. Two commentators have proposed a hybrid scheme with bonds being retained alongside the MRF but set at less than 100% of potential liability, their argument being the abolition of bonds will effectively leave the State as an unsecured creditor of insolvent companies which are unable to meet their mining rehabilitation and closure obligations. In effect, the bond system could be retained as a baseline security system which relates to a particular project or tenement identified as being at risk (e.g., because of the financial strength or otherwise of the operator and particular risks associated with the project itself) while the MRF provides a pool of funds for remediating the cumulative and long term effects of mining⁴. By analogy, in the case of CSG exploration and production a reduced security bond could be relied only for immediate well site damage and the proposed CSG rehabilitation fund could be used for remediating the cumulative and long term effects on the environment beyond the well site or affected title.

⁴ N Somner and A Gardner, *Environmental Securities in the Mining Industry: A Legal Framework for Western Australia*, 31(3) 2012 ARELJ 242
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6.3. Insurance for mine closure and rehabilitation

Finally, I note the WADMP rejected a third model which would have required operators to take out and maintain insurance, with the State named as a beneficiary and covering the full cost of government undertaking the closure and rehabilitation of a mine site. The model was rejected because:

- evidence indicated such insurance may not be available in Australia (Marsh advises that is no longer the case.)
- insurance policies are not unconditional (cf. bank guarantees) and are typically subject to exemptions
- such insurance only remains current if premiums are paid (a matter Government cannot easily control or supervise)
- policies may be cancelled or not renewed without reference to Government.

To be clear, the rejection of this model should not be understood as a repudiation of the proper and appropriate role of pollution legal liability insurance (as described in Part 4) nor necessarily as a rejection of insurance as one component in a mining security or as part of a financial assurance requirement.



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ATTACHMENT TO PAPER 1 – INSURANCE AND ENVIRONMENTAL SECURITIES
RISK MODEL EVALUATION – INSURANCE AND ENVIRONMENTAL SECURITIES

Risk Technique/Strategy	Level of risk for Government	Administrative burden/complexity	Acceptance by Industry	Coverage of all Stakeholders	Extent of Coverage (1) – Past Incidents	Extent of Coverage (2) (tenement – specific or broader?)	Capacity to reward good oil field and environmental practices	Risk Identification ¹
<p>1. Security Deposits</p>	<p>Very low, if in the form of cash or bank guarantee. (The greater risk is likely to be the amount in a particular case may fall short of actual rehabilitation and remediation costs.)</p>	<p>Relatively straightforward, although that statement would need to be confirmed by the Department/OCSG.</p>	<p>Poor, industry dislikes payment of cash bonds and cash backed bank guarantees for mining/ oil and gas production but may accept lower security bonds for low-impact exploration (i.e., not involving pilot wells).</p>	<p>The security bond system is not intended to protect a wide group of stakeholders (e.g., farmers). Its purpose is more immediate – simply to cover the cost of direct site – specific rehabilitation and remediation costs in circumstances where the operator has not done so.</p>	<p>Given the short history of the CSG industry in NSW (i.e., as far as I am aware, the security bond system has always been in place for as long as CSG exploration and production has been undertaken in NSW), the greater risk is that available security bonds may be exhausted and, if that were to occur often, Government would be very exposed. One obvious objective of any risk control system would be to avoid such an outcome and in particular the need to establish a fund similar to the Derelict Mines Sites Fund, for derelict CSG well sites.</p>	<p>Tenement specific for security bonds granted pursuant to the <i>Petroleum (Onshore) Act (POA)</i>/a petroleum title, but may extend to adjacent/contiguous areas, although that would need to be confirmed by the Department/OCSG.</p> <p>A security bond if required under an EPA licence is more likely to be project specific and therefore potentially have a broader application. Query whether and to what extent bonded funds would be available for remediation/rehabilitation well beyond a well site, a matter to be confirmed by the EPA.</p>	<p>The security bond system is, as I understand, fairly inflexible. (Again, however, that should be confirmed by the Department/OCSG/EPA).</p>	<p>In the case of security deposits, which are only intended to cover the cost of rehabilitation and remediation at or near a well-site this is unlikely to be an issue.</p>

¹ The intention of this column is to distinguish those cases where identification of the source or cause of environmental damage arising from CSG operations may be critical and may even defeat a recovery claim. For example, in areas where there is more than one CSG operator or even different sources of pollution, it may be difficult, even impossible, to establish that a particular CSG operation caused downstream environmental damage.

Risk Technique/Strategy	Level of risk for Government	Administrative burden/complexity	Acceptance by Industry	Coverage of all Stakeholders	Extent of Coverage (1) – Past Incidents	Extent of Coverage (2) (tenement – specific or broader?)	Capacity to reward good oil field and environmental practices	Risk Identification ¹
<p>2. Other forms of financial assurance (e.g., self-insurance, indemnities and securities, parent companies guarantees, mortgages etc.)</p>	<p>Assuming the more flexible forms of security (e.g., a parent company guarantee) were only available to larger operators with a proven record of environmental performance this may not be a significant issue. Protection could include requiring the proponent to make out its case for another form of financial assurance based on its capitalisation, links to the State, record of environmental compliance etc. and sanctions for breach could be swift and immediate (restoration of a cash bond/guarantee on breach and threat of licence withdrawal).</p>	<p>Relatively high, but possibly not while the NSW CSG industry is small and there are only a few operators.</p>	<p>High. I expect widening the range of financial assurance choices available to industry would be very welcome.</p>	<p>Properly managed, any widening of financial assurance choice should not affect or concern other stakeholders. However, to allay concerns one possibility may to require higher levels of cost coverage the less secure the type of financial assurance chosen. So, for example, an insured, indemnified or non-bank guaranteed amount may be twice the bond amount or even in some cases unlimited.</p>	<p>As above, except to the extent more flexible financial assurance provisions, if sufficiently secure, may give greater coverage.</p>	<p>As above</p>	<p>Flexibility should provide scope to reward good practice.</p>	<p>As above</p>

Risk Technique/Strategy	Level of risk for Government	Administrative burden/complexity	Acceptance by Industry	Coverage of all Stakeholders	Extent of Coverage (1) – Past Incidents	Extent of Coverage (2) (tenement – specific or broader?)	Capacity to reward good oil field and environmental practices	Risk Identification ¹
<p>3. Pollution legal liability insurance</p>	<p>Insurance as an alternative to security bonds has traditionally been seen as unacceptable. There are other risks with insurance – understanding and interpreting policies; difference in policy coverage and exemptions; defaults in premium payments etc. On the other hand, an appropriate and comprehensive pollution liability insurance policy which includes voluntary and mandated clean-up costs could offer a level of indemnity greater than that provided by a security bond or other form of financial assurance.</p>	<p>Administration and supervision of an insurance scheme will be complex.</p>	<p>Unknown, although there is anecdotal evidence large operators are seeking out such policies. To add to the uncertainty we have no information about the likely level of premiums insurers will charge for such insurance.</p>	<p>This is a clear advantage of a pollution legal liability insurance policy. The insured can potentially include the operator and its subcontractors and service providers on site and provide coverage to a wide range of third parties including landowners, affected businesses and even Government.</p>	<p>Insurers for reasons which are obvious enough will not generally underwrite past incident risk and in any case an insured's duty to disclose may effectively preclude such cover. No coverage for past incidents will be available under an "occurrence" based policy. (Pollution liability insurance is typically "claims made" although "occurrence" based insurance is available to drillers.)</p>	<p>Insurance of this kind can extend well beyond a tenement to cover pollution that migrates off site.</p>	<p>As we understand, premiums offered under insurance of this kind will be highly dependent on good oil field and environmental practices both on application and on annual renewal.</p>	<p>Disputes as to the immediate cause of environmental damage, especially if off-site, are likely as insurers may be keen to deny liability or seek contribution.</p>

Risk Technique/Strategy	Level of risk for Government	Administrative burden/complexity	Acceptance by Industry	Coverage of all Stakeholders	Extent of Coverage (1) – Past Incidents	Extent of Coverage (2) (tenement – specific or broader?)	Capacity to reward good oil field and environmental practices	Risk Identification ¹
<p>4. CSG Rehabilitation Fund</p>	<p>Government will be most exposed in the early years of the proposed fund (as capital in the fund grows) and also in the event of operator insolvency. Three possible resolutions are:</p> <p>(1) to retain security deposits for immediate well-site remediation/rehabilitation only (and in a lesser amount) as baseline security;</p> <p>(2) to retain security bonds for inherently more environmentally sensitive projects and/or in cases where operators cannot meet a prescribed capital adequacy requirement; or</p> <p>(3) phase in the fund over 2 to 5 years and retain the bond system with a progressive return of funds to operators.</p>	<p>Difficult to assess but note that the Mine Subsidence Compensation Fund is a model. Some intelligence could also be obtained about the Western Australian experience with its recently established Mine Rehabilitation Fund.</p>	<p>High, if the reported reaction to the Western Australian mine rehabilitation funding scheme is correct.</p>	<p>Yes, this scheme should appeal to all stakeholders although one would expect there will be concern about its capital adequacy, especially in its early years.</p>	<p>As I see it, coverage of past incidents is one of the best reasons for establishing a CSG Rehabilitation Fund (thereby hopefully avoiding the need for a consolidated revenue funded fund.) The significant point is funds can be deployed to remedy/rehabilitate land and other resources affected by CSG operations, whenever undertaken.</p>	<p>Again, the proposed CSG Rehabilitation Fund should offer coverage well beyond a well site.</p>	<p>If properly administrated there may be capacity through setting lower annual levies for proven good practice and performance. Query however the extent to which levies of this kind, which may not be significant compared to overall operating costs, can in fact influence behaviour.</p>	<p>No issue of identifying the source of CSG contamination should arise at least so far as ensuring the necessary rehabilitation remediation work is done. (For other purposes – setting an annual levy, example – such identification may be necessary.)</p>

APPENDIX 3

PEER COMMENT ON “INSURANCE AND ENVIRONMENTAL SECURITIES”, BY TONY ABBOTT, PIPER ALDERMAN

Peer Comment on Paper 1 – Insurance and Environmental Securities

1. Commentary on the Background Paper (Paper) focussing on the overall themes and recommendations of the Paper

1.1 The stated objectives of the Paper are to:

- (a) give an overview of the various risk management techniques and financial assurances available to protect each of Government, land holders and the broader public from risks arising from operator default in the CSG industry in New South Wales; and
- (b) consider existing practices and arrangements for insurance coverage in the CSG Industry in New South Wales and also consider some ways in which that coverage could be improved.

1.2 The Paper reaches the conclusions that:

- (a) existing insurances carried by CSG operators in New South Wales are inadequate and that risks identified in the Paper are underinsured;
- (b) recommends greater use of comprehensive pollution liability insurance now available and in particular suggests that such insurance be procured by CSG operators to cover potential long term loss and damage (for example to ground water and to aquifers used beneficially by other parties) outside the boundaries of the land for which the CSG operator holds a petroleum title;
- (c) the existing security deposits mechanism operating under the PO Act be extended to cover both offsite as well as onsite remediation requirements;
- (d) a new special purpose fidelity fund should be established in New South Wales by progressively requiring contributions from operators, as the most cost effective and long term means of covering remediation and rehabilitation environmental exposures extending beyond the site for each particular petroleum title; and
- (e) That fund would provide an ongoing source of funds to remediate environmental damage caused by CSG operations, in circumstances where the fund would be available state-wide rather than be confined to the particular petroleum title or wells for which the security deposit under the PO Act was established.

1.3 This peer review comment paper questions in particular whether:

- (a) before legislative and regulatory changes are finalised environmental risks in the CSG industry in New South Wales may need to be more closely considered and evaluated separately as to their likely incidence and consequences of occurrence within rational and practical levels of assessment;
- (b) more diligent environmental investigation and assessment of CSG proposals at time of application, and a thorough and robust application of conditional determination procedures should be used as suitable primary protective

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measure to reduce the incidence of claims likely to be made on the financial assurance instruments proposed in the Paper, which will also inform and assure communities of the unlikelihood of environmental damage;

- (c) the existing security deposit mechanism should be replaced by the fidelity fund more expeditiously than is contemplated by the Paper, which seems to contemplate both mechanisms continuing in place for a significant period. At the time of the establishment of the fund, consideration might be given to weighting contributions at a higher level as amounts of security deposits are progressively reduced, so as to accelerate the growth of the fund in the early years of its operation; and
- (d) as behaviour of aquifers and risks associated with possible adverse communication between aquifers varies considerably between relevant locations and geological basins (in other words the risk varies significantly) an assessment of same should be a precondition prior to evaluating the types and levels of financial assurances required to provide potential means of recourse should such an event occur as the result of default by the CSG Operator or act of God.

2. Critique of the Paper, highlighting areas of agreement or disagreement including differences in perspective and emphasis

- 2.1 The Paper assumes that unremediated environmental problems currently exist in the CSG industry in NSW which are not being adequately addressed by existing environmental control measures – for example:
- (a) reference is made on page 3 to orphaned or abandoned CSG wells being left unremediated and that the cost of such remediation is not covered by existing security deposits established under the PO Act ;
 - (b) the Paper assumes (also on page 3) that offsite ground water contamination has occurred and is likely to occur (perhaps over the long term) and that ongoing damage to farmland and waterways caused by produced water will occur;
 - (c) that because knowledge is incomplete and prediction of harm is presently uncertain it is appropriate to create additional or alternative levels of financial assurance to be provided by CSG operators (pages 4 and 5 of the Paper) ;
 - (d) the Paper focusses largely on a limited number of environmental risks associated with the CSG activity in New South Wales, and in particular the risks of contamination outside the area of the petroleum title and failure to make good or remediate areas said to require rectification after damage has occurred.
- 2.2 As is pointed out on page 4 of the Paper, it is evident that good engineering practices (which should include detailed environmental assessment and good oil field practice requirements) can substantially reduce environmental risk and the likelihood of that risk occurring.
- 2.3 In the view of the peer reviewer, greater levels of comfort may be able to be taken both by Government and the broader public where soundly scientifically based robust risk assessments are carried out and appropriate preventative control measures are implemented, before hazardous or risky activities are allowed to proceed. (This, and section 2 generally, assumes that sufficient expertise to undertake the robust risk assessment is available, and that current risk assessment methodologies are sufficient to reliably accurate preventive control measures. See paragraph 3.7 and following.)
- 2.4 In the view of the peer reviewer a different starting point for the Paper might be the identification and separate analysis of each of the risks of an environmental nature involved in the CSG industry, with prevention clearly being identified as better risk management strategy superior to cure of damage occurring. That would also allow consideration of the efficacy of particular regulatory options in particular relevant cases.
- 2.5 To illustrate the different approaches taken by the Paper and this peer review a table is attached setting out a number of environmental risks, (most of which were identified and described by parties who have lodged submissions to the Review being conducted by the OCSE), and in accordance with conventional risk analysis and management techniques an attempt is made in the attached table to give each of those identified risks an indication of the likelihood of the risk manifesting itself and secondly an estimate of what the consequence of that occurrence might be, in terms

of severity. The table is for discussion purposes and does not purport to contain definitive factual, scientific or legal judgements.

- 2.6 By reference to that table each of the risks identified can in the view of the peer reviewer be materially reduced and/or managed by appropriate levels of environmental impact assessment and the imposition of controls or conditions on operations such as to reduce or eliminate those potential impacts.
- 2.7 Areas of agreement between the peer reviewer and the findings in the Paper are as follows:
- (a) a distinction should be made (as is made in paragraph (b) on page 5 of the Paper), affecting differing levels of risk and hence need for liability insurance, between CSG exploration and CSG production activities. By extension the peer reviewer suggests that the extent or scale of the activity for which approval is sought should also materially affect the levels firstly of impact assessment carried out and secondly the appropriate levels of financial assurances required. Failure to observe and consistently apply those distinctions may result in temporary or preparatory CSG exploration work becoming uneconomic in New South Wales.
 - (b) the Paper in paragraph (e) on page 6 does not recommend the retention of the current security deposit system on its own for a number of reasons identified in the Paper namely:
 - (1) The amount secured generally applies to cover rehabilitation costs incurred in relation to the area of responsibility described by the relevant petroleum title or approved wells; the quantum of that security is not directly linked to the level of activity (and hence risk being undertaken) with the amount of the security imposed being somewhat inflexible and once established tending to be left in place at original level until such time as required remediation is in each case made good;
 - (2) The amount of the security does not appear related to the financial record and backing of the operator, their operational and environmental risk management record and whether or not the activities conducted on the petroleum title are of lower or higher environmental risk.

The peer reviewer respectfully agrees with the conclusion in the Paper that the existing security system in operation under the PO Act is inadequate and should be overhauled with a view to its progressive replacement, as is suggested in the Paper.

- 2.8 The peer reviewer generally supports the view taken in the Paper that the establishment of a special purpose fidelity fund similar to the Mining Rehabilitation Fund in Western Australia (the MRF-WA) where that fund will in future:
- (a) be available to meet rehabilitation or remediation requirements in the CSG industry across the whole State; and
 - (b) be greeted with widespread industry support similar to that reported in paragraph 6.2 on page 13 of the Paper.

- 2.9 One area of disagreement is however with the conclusion reached on page 14 of the Paper that:

"There is a more compelling case for CSG Rehabilitation Fund than a Mine Rehabilitation Fund having regard to the identified risk of long term cumulative adverse effects on water management aquifer interference from ground water contamination".

Given the vastly different surface disruption and loss of agricultural productivity between surface mining and CSG exploration and production areas, the peer reviewer suggests a more detailed analysis as to the nature and extent of the "long term cumulative effects" is required before that conclusion can be safely reached.

- 2.10 Whilst it is clear that a number of submissions to the OCSG Review quite clearly identify those risks, the occurrence of those risks either manifesting themselves in practice as adverse effects or being shown (by scientific evidence) to be sufficiently probable to be of concern is not demonstrated in Australia nor is the extent of their occurrence quantified.
- 2.11 For example, a proper evaluation and assessment of the likelihood or possibility of such ground water contamination or aquifer interference occurring as being the basis for either an approval to proceed or a rejection of a required consent (assuming such an assessment is available – see paragraph 2.3 and 3.7) may provide a greater level of comfort to those objecting to CSG operations in areas of New South Wales.
- 2.12 In the view of the peer reviewer, the better and more rigorous use of the approvals mechanism as the primary control method of reducing or eliminating environment risk, with the fidelity fund and/or pollution insurance operating to cover residual liabilities, may achieve a more balanced result both for the industry and those affected by it.
- 2.13 The Paper does not really make a distinction between perceptions of environmental risk as opposed to identification of examples where occurrence of the risk has occurred or can with a reasonable degree of probability be predicted to occur.
- 2.14 One area not covered by the Paper is the possibility that greater industry funding of independent objective and scientific evaluation (in which all relevant stakeholders are involved) may assist in a more accurate forecast of the occurrence of the relevant risks being made, and the most appropriate strategies employed to eliminate reduce or manage that risk.
- 2.15 In that connection, and as part of the risk assessment recommended, the peer reviewer agrees with the view taken in the Paper (at pages 4 and 15) that the precautionary principle, being an integral part of the legislatively adopted objective for ecological substantial development, should be utilised as part of the initial environmental investigation and assessment of CSG proposals in considering assessing and recommending measures to avoid or manage risks arising from CSG operations in NSW.
- 2.16 The peer reviewer does however suggest that a rigorous and thorough application of the precautionary principle needs to be applied to CSG operations, using for example the approach of the present Chief Justice of the Land and Environment Court of NSW

in the *Telstra v Hornsby Shire Council* decision,¹ being a particularly clear and practical example of how the principle should be applied.

- 2.17 Examples given in that judgement of the necessary process that has to initially be undertaken to determine whether the precautionary principle will have application in this context are as follows:
- (a) “rationality dictates that the precautionary principle and any preventative measure cannot be based on a purely hypothetical approach to the risk, founded on near conjecture which has not been scientifically verified” [at 159];
 - (b) “rather, a preventative measure maybe taken only if the risk, although the reality and extent of the risk have not been fully demonstrated by conclusive scientific evidence, appears nevertheless to be adequately backed up by scientific data available at the time when the measure was taken” [at 159];
 - (c) determining the existence of a threat of serious or irreversible environmental damage does not involve, an evaluation of the scientific uncertainty of the threat; that evaluation comes [at a later stage] [at 137];
 - (d) “the assessment [of whether the threats of environmental harm are serious or irreversible] involves ascertaining whether scientifically reasonably (that is, based on scientifically plausible reasoning) scenarios or models or possible harm that may result have been formulated. The threat of environmental damage must be adequately sustained by scientific evidence” [at 133 and 134].
- 2.18 In the view of the peer reviewer, consideration of the scientific assessment of the relevant risks is an inherently necessary requirement that should be taken into account in determining the proper and proportioned response to the particular identified risk involved during the initial environmental investigation and assessment process – see generally in that regard paragraph [167] of the decision referred to which states in part:

“In applying the precautionary principle, measures should be adopted that are proportionate to the potential threats. A reasonable balance must be struck between the stringency of the precautionary measures, which may have associated costs, such as financial, livelihood and opportunity costs, and the seriousness and irreversibility of the potential threat.”

¹ [2006] NSWLEC 133

3. Identification of remaining knowledge gaps, and recommendations for future work to be undertaken to address those gaps

- 3.1 The Paper in a number of places recognises the need for the provision and examination of additional information and in particular:
- (a) no data seems to have been provided to the author of the Paper on the number, extent and likely cost of remediation of “orphaned” or abandoned” wells in NSW (page 4 of the Paper).
 - (b) the Paper acknowledges that knowledge is incomplete and that prediction (of environmental harm) is uncertain in areas such as groundwater connectivity, chemical contamination and fugitive emissions (page 4 of the Paper).
 - (c) no data is quoted in the Paper of the likely cost to CSG Operators, nor as to the effect on the viability of their operations of the cost of obtaining comprehensive pollution insurance and renewing it for the period of operations plus six years as recommended in paragraph (b) on page 5 of the Paper.
 - (d) the Paper does not provide any background to the assertion on page 1 of the Paper that “as a rule, CSG operators in NSW are under insured.” From the peer reviewer’s experience, that generalisation may require examination as:
 - (1) the practice in the petroleum industry (of which CSG operations is a subset) is for operators to effect and maintain control of well insurance, which often includes seepage, pollution clean up and contamination insurance;
 - (2) in addition where CSG drilling operations are contracted out, the standard practice is for the drilling contractor as one of the preconditions required prior to commencing operations to demonstrate it has the benefit of a current and acceptable policy indemnifying both the contractor and the CSG Operator from compensable loss or damage suffered by third parties and potentially extending beyond the site of the CSG Operations.

While the new comprehensive liability policy proposed may well offer additional protection for stakeholders, further information would be useful as to:

- (3) whether a single Government required policy of insurance might be used to overcome what may be a fragmented and piece meal approach to insurances and reduce overall costs to the industry; and
- (4) what the cost of the industry relative to the risk of harm occurring compensable under the policy will be? The Paper acknowledges (at page 7) that the **actual** level of CSG environmental risk remains to be assessed, and that more knowledge data and information need to be obtained.
- (e) The Paper acknowledges (at page 7) that in recommending the new comprehensive pollution liability insurances, there has been no examination or information considered about the level or types of insurances CSG participants actually do currently have.

- 3.2 The Paper notes that further investigation and information is required from the OSCG as to where the existing security deposit system does or does not cover the rehabilitation of land outside the area covered by the petroleum title (page 11, paragraph 5 of the Paper).
- 3.3 Given the conditions under which petroleum titles are normally issued (requiring the making good of damage to land or property wherever occurring) and the licensing and remediation requirements of the POEO Act, in practice that deficiency may not be of major concern, particularly as the Paper also asserts (on page 14) that "most mining companies fulfil their rehabilitation and closure obligations, and in the usual case deposits are fully refunded."
- 3.4 It would be of relevance to ascertain whether that practice observed in the mining industry (of rehabilitating as required) extends to the CSG industry.
- 3.5 One of the peer reviewer's greatest concerns as to lack of information is the lack of a fully evaluated risk assessment which identifies the types of risks that in reality do occur in CSG operations, and assesses the likelihood and the seriousness of their occurrence. (Also see previous paragraph 2.3).
- 3.6 Whilst CSG operations in NSW have been and continue to be relatively limited, overseas and interstate experience and research is available to fill some of those knowledge gaps and should in the view of the peer reviewer be considered.
- 3.7 In the view of the peer reviewer:
- (a) there appears to be a dearth of available knowledge on the behaviour of groundwater in and between aquifers and aquitards generally in Australia, into which further uncertainty as to effect on those aquifers is introduced by the carrying out of CSG operations;
 - (b) distinction needs to be made between the possibilities of:
 - (1) chemical contamination of aquifers occurring by the introduction of drilling or fracking fluids, which can be controlled by prior approval mechanisms eliminating or limiting toxicity to mandated levels; and
 - (2) physical communications between aquifers occurring adverse to the interests of agricultural licensee users (typically higher level users) or to aquifers required for environmental flows.

Whilst considerable knowledge and experience exists in relation to reducing toxicity in fluids, the acquisition and dissemination of information from hydrological geologists and similar specialists may assist in evaluating and assessing the real risk of such potentially adverse communication between aquifers.

4. Comment on unidentified risks, Government implementation and legal implications

- 4.1 One risk area not explored in the Paper is the possibility that there may be a cumulative failure of all of the following risk management steps (assuming some or all of the recommendations in the Paper are implemented):
- (a) in the application process for a petroleum title under Division 1, Part 3 of the PO Act, inadequate consideration is given to the financial standing of the applicant for that title to fulfil all of the obligations likely to arise under that title as contemplated by section 15 of the PO Act.
 - (b) in imposing conditions on the grant of a petroleum title for CSG operations under section 23 of the PO Act, either insufficient or inadequate conditions are imposed on the holder of the title, or if adequately imposed, those conditions are ignored or not complied with.
 - (c) in obtaining the approvals required for CSG exploration or production being:
 - (1) approvals under Part 4 or Part 5 of the EP&A Act as controlled by the recently amended State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007; and
 - (2) obtaining the licence now required for coal seam gas exploration assessment or production as a Scheduled Activity under clause 9A of Schedule 1 to the POEO Act,

an insufficiently adequate environmental assessment is made of the environmental risks arising for the activity for which an approval or licence is sought, or the science on which the assessment is based turns out to be deficient or wrong.
 - (d) the holder of a petroleum title fails to comply with a direction issued under section 77 of the PO Act to comply with a condition of title originally imposed or subsequently imposed on renewal of the title;
 - (e) in requiring the provision of security under Part 10A of the PO Act an inadequate security to meet the cost of satisfying or remedying a breach of a condition of a petroleum title is required or the security is inadequate to be used to meet the full cost of that satisfaction;
 - (f) insurances available to the title holder directly or through an insured contractor, (or if the proposal contained in the Paper is adopted, through a new form of comprehensive pollution control insurance) are either inadequate or do not respond adequately to meet the cost of remediating or making environmental damage caused by CSG Operations;
 - (g) the CSG Operator and other parties legally liable to make good the damage which has occurred default in their obligations or become insolvent.
- 4.2 Given the extensive nature of the risk management and allocation measures as summarised in the steps proposed in the preceding paragraph, the Government may wish to limit any residual legal exposure that it may have or acquire by a prospective exclusionary provision to be contained in amended legislation.

- 4.3 Prior to implementation of some or all of the measures contained in the Paper, it is clearly desirable that input be sought from operators in the industry and other involved regulators as to:
- (a) providing input and commentary on existing practices and procedures, particularly in relation to insurances and risk assessments carried out by agencies having regulatory and approval functions for CSG projects;
 - (b) impacts on the industry of the range of measures proposed in the Paper, making this respective costs and likely effects;
 - (c) whether relevant agencies in NSW presently have sufficient levels of technical skill and expertise to deal with and be adequately versed in the new and perhaps unfamiliar levels of environmental exposure as may arise as new applications for approval are submitted under new guidelines and policies not in place on NSW;
 - (d) experience gained in other states and overseas that may have relevance and application in NSW.



19 March 2014

Environmental risks arising from CSG operations

Environmental Risk	Likelihood of Occurrence	Consequences of Occurrence	Existing Legislation Controls	Primary risk control measures	Secondary control measures	Role for (a) Security Deposit (b) Insurance (c) Rehabilitation Fund
Pollution occurring above ground	Some examples have occurred in NSW of overflow/spillage of produced water / drilling fluids, being (typically brine solutions) Total number of incidents not known	Effective make good and restoration normally possible by conventional methods with low risk of permanent environmental damage	(a) Breach of licence / lease conditions under PO Act and/or direction to make good (b) Breach of CLM Act (c) Breach of licence issued under the POE Act	(a) Requirement for prior approval of Water Management Plans approval detailing water management treatment and disposal methods as a condition of CSG activity approval (b) Containment measures / bunding requirements limiting area of exposure (c) Requirement to physically make good (d) Risks reduced by banning of evaporation ponds (e) Temporary ponds required to meet strict standards of construction and freeboard	(a) Verification and monitoring of primary control measures effectively in place prior to activity commencing (b) Requirement of operator to regularly inspect and report status during CSG activities (c) Ability to require cessation of CSG activity / elimination of risk by direction under PO Act if risk detected (d) A final control provision is the imposition of substantial penalties as currently exist under any of the PO Act, the POEO Act and the CLM Act	(a) Extent of make good likely to be within financial capacity of operator to effect remediation, given NSW experience to date. (b) All 3 measures potentially available if operator defaults. (c) Directions to make good usually capable of compliance.
Aquifer contamination by CSG operations, typically by hydraulic stimulation (fracking)	Few proven examples of such contamination occurring in Australia or USA – likelihood diminished by: (a) separation of alluvial aquifers from CSG aquifers, presence of aquitards (b) elimination of toxicity in chemicals permitted in stimulation techniques	Depends on: (a) maintenance of physical separation of aquifers; and (b) toxicity of chemicals introduced by CSG operations – adverse consequences able to be limited by controls on toxicity of chemicals used and requirement for prior approvals.	Conditions attaching to either – Lease or licence under PO Act Licence under POEO Act	(a) Requirement for credible prior groundwater study and analysis (b) Active monitoring and reporting of groundwater conditions during CSG operations (c) Prohibition on use of any substance likely to cause adverse contamination (d) Requirement for confidential communication of chemicals used in drilling	Prosecution and loss of title for breach, where coupled with requirement for prior vetting and approval of substances used, lessening the risk of the problems occurring	(a) All 3 measures potentially available if operator defaults. (b) Issues for insurance will be: (i) establishing causal link between CSG operations and aquifer flows (aquifer interruptions have many causes) (ii) Unlike surface contamination,

Environmental Risk	Likelihood of Occurrence	Consequences of Occurrence	Existing Legislation Controls	Primary risk control measures	Secondary control measures	Role for (a) Security Deposit (b) Insurance (c) Rehabilitation Fund
				and fracking fluids.		maybe no effective means of restoring/rehabilitating an aquifer.
Aquifer interference with available flow	Few proven examples of such contamination occurring in Australia or USA, at least where a sufficient degree of physical separation or aquitard barrier exists.	Consequences may depend on duration and extent of drawdown by CSG operations. Note flows may be also affected by variability of recharge flows and relativity of drawdown by other non CSG users of relevant aquifers	WM Act 2000 and Aquifer Interference Polices requiring compliance under that Act for potentially aquifer intervening activities.	Risk identification and assessment as part of planning process Controls and detection of consequences by ground water monitoring by CSG operators and monitoring equipment in bores of other users.	Real time monitoring of aquifers and imposition of controls during operations.	Query if insurance is available, or if would adequately respond., as for aquifer contamination
Loss of productive land capacity	Low, given exclusion zones of SRLUP lands, Critical Industry Clusters, Residential Zone exclusion (with 2km buffer) and on land generally requiring preparation and assessment of Agricultural Impact Statements.	Significantly less than traditional mining and coal (open cut or subterranean) operations – may be more disruptive in semi permanent long term production fields. Some degree of amelioration of consequences possible by careful planning of well head road and other facility installation referable to existing land use operations.	PO Act SEPP (mining and petroleum) land use restrictions.	Strategic Land Use Policies, Critical Industry Clusters and CSG exclusion and 2km buffer zones as primary controls	Requirement for Agricultural Impact Statements on other land, to be assessed on a case by case basis	(a) Insurance available to cover costs of pollution at surface (eg failure of temporary water ponds) (b) Fund and Security Deposit could also be available (c) Major differences likely between mining and CSG operations in extent of land rendered unproductive, especially open cut mining including buffer zones.
Failure to rehabilitate sites (including water management facilities)	Need information from regulating Authorities.	Potential hazard from presence of well, likely to increase if well left in place.	PO Act and conditions of title	Condition of title, usually performed where directed	Security deposits available if title holder does not perform	(a) Potential role for retention fund and insurance if security fails and operator defaults for any reason, including insolvency (b) Beneficial re-use of produced water from CSG or alternative re-use of storage facilities may reduce rehabilitation requirement and hence potential recourse to financial assurances

Environmental Risk	Likelihood of Occurrence	Consequences of Occurrence	Existing Legislation Controls	Primary risk control measures	Secondary control measures	Role for (a) Security Deposit (b) Insurance (c) Rehabilitation Fund
Subsidence at surface	Given difference in volumes of water consistently extracted alluvial irrigation the more significant risk, but some risk of subsidence over area of aquifers possible. Vaufly less risk than subsidence from underground especially long wall mining	Depends on location and extent of occurrence – studies available based on US data.	PO Act	Risk identification and assessment as part of planning process	Low probability of occurrence / attribution to CSG secondary control may not be necessary	Possibly new assurance fund may respond as might insurance, if compensable loss could be established
Loss of well control	Given pressure differential, much less likely in CSG wells	Fugitive emissions, potential fire risk	PO Act WH&S Act (protecting workers)	Good oil field practice including widespread use of blow out preventers kill strings and well plug placements.	Provision of safety case and risk assessment required for each well approval	Insurance available and commonly taken out by drilling contractors, but tends to be limited to above ground contamination. Cost per well of the order of \$10,000 approximately.
Fugitive emissions	Accurate assessments not available	Adverse consequences for green house gas control	Good oilfield practice and monitoring / reporting measures likely to be sufficient to control	Nite emissions occur naturally and distinguishing between background and CSG include levels of fugitive emissions would be required to measure increment.		Discharge of methane may not be a Pollution Condition within the terms of the proposed insurance, as methane (in small quantities) forms part of the atmosphere – query the extent of the discharge necessary for the policy to respond.
Triggering of adverse seismic activity	In Australia considered low probability, consistent with world wide experience (only one known occurrence to date, in UK)	Occurrence rates too low to quantify	Restrictions on areas imposed by SEPP as to where CSG activities can occur.	Breach of licence condition under PO Act, were it to occur.	Not Warranted ¹	Unlikely to be required.

¹ See for example papers such as:

- (a) Changing the language of gas-well induced seismicity – Mark Caslin, SLR Consulting Australia (2013)
- (b) Fracking in Hollywood – comprehensive environmental monitoring of two high volume fracturing projects Dr Daniel Tormey – Cardno Entrix Inc. (2013)