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Professor Mary O'Kane
Office of the NSW Chief Scientist & Engineer
Level 49 MLC Centre
19 Martin Place
Sydney NSW 2001

By Courier

30 April 2013

Dear Professor O'Kane,

AGL Submission on the independent review of coal seam gas activities in NSW

AGL Energy Limited (**AGL**) welcomes the opportunity to provide a submission on the independent review of coal seam gas activities in NSW.

AGL is Australia's leading renewable energy company with the largest privately owned and operated renewable portfolio in the country. AGL operates across the supply chain with investments in energy retailing, coal-fired electricity generation, gas-fired electricity generation, renewable and upstream gas exploration and production projects.

AGL is also one of Australia's largest retailers of gas and electricity with more than three million customers in Victoria, NSW, South Australia and Queensland.

AGL is an experienced developer and operator of coal seam gas projects and is familiar with the challenges involved in developing natural coal seam gas (**CSG**) projects within the technical, environmental and commercial constraints to which major projects are subject.

Accordingly, the diversity of AGL's portfolio has enabled AGL to develop a detailed understanding of the risks and opportunities presented by CSG and the broader energy sector.

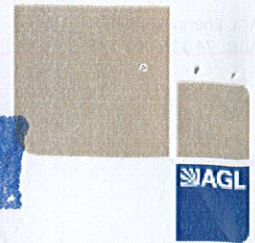
Overview of AGL's CSG Operations in NSW

AGL has invested around \$800 million in the NSW CSG industry.

AGL's Upstream Gas business has been established to create a portfolio of equity gas investments that will provide AGL with a more flexible, self-supply option to enable it to fill the gap between wholesale gas contract positions and NSW's gas demand.



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AGL is committed to ensuring that its gas exploration and production activities have a low impact on the environment and the community, and can comfortably coexist with other land uses, including residential and industrial development. AGL stands by its record of cooperative engagement with stakeholders.

AGL currently operates three wholly owned CSG exploration and production projects in NSW which are located in Camden, the Hunter Valley and Gloucester.

AGL's Camden Gas Project (PPLs 1, 2, 4, 5 and 6)

AGL wholly owns and operates NSW's largest CSG production facility at Camden, south-west Sydney, which has been supplying around 5% of NSW's gas demand since 2001.

AGL's Camden Gas Project is located in the Macarthur region and currently consists of:

1. 95 connected and producing gas wells;
2. 100 km of gas gathering lines and associated infrastructure; and
3. the Rosalind Park Gas Plant.

A further expansion to the north of the existing Camden field (the Northern Expansion project) was suspended in February 2013 to enable AGL to address community concerns.

AGL's Gloucester Gas Project (PEL 285)

On 19 December 2008, AGL purchased a 100% interest in PEL 285, approximately 100 km north of Newcastle, which included proved plus probable (2P) reserves of 170 PJ. On 24 August 2010, AGL's exploration activity resulted in an increase of its 2P reserves to 669 PJ.

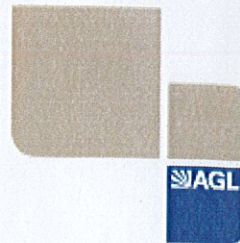
In February 2011, the NSW Planning Assessment Commission (**PAC**) approved the Gloucester Gas Project. On 11 February 2013, the Commonwealth approved Stage 1 of the Gloucester Gas Project under the *Environment Protection and Biodiversity Conservation Act 1999 (Cth)* (**EPBC Act**).

This project represents a \$300 million investment by AGL.

Exploration activities undertaken by AGL to date in Gloucester include:

- > A 3D seismic survey over Stage 1 area and 154 km of 2D seismic;
- > Drilling six core holes and three stratigraphic holes;
- > Completing 12 production test wells;
- > Plug and abandoning a further 24 exploration wells;
- > Drilling and plugging four production test wells (Waukivory);
- > Installing a network of more than 40 groundwater monitoring bores and stream monitoring points; and
- > Commencing a beneficial water re-use and irrigation trial.

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Once constructed, Stage 1 of the Gloucester Gas Project will include:

1. The Stage 1 gas field development area, including 110 gas wells and associated infrastructure;
2. A central processing facility to treat gas and water;
3. A gas transmission pipeline between the central processing facility and the existing gas supply network at Hexham; and
4. A delivery station at Hexham to connect the transported gas to the existing Sydney-Newcastle trunk pipeline.

AGL's Hunter Gas Project (PELs 4 and 267)

The Hunter Gas Project, located in the Hunter Valley, is still in the exploration stage.

In October 2010, as a result of its exploration activities, AGL announced that it had booked first reserves of an estimated 2P gas reserves of 142 PJ.

AGL has:

- > Obtained approximately 300 km of seismic data;
- > Flow tested two pilot wells;
- > Drilled 16 core holes and six stratigraphic holes; and
- > Established a groundwater monitoring program including drilling of 40 water monitoring bores.

AGL owns about 3450 acres in the Hunter region. AGL conducts agricultural activities, such as rearing cattle and growing grapes that produce award winning wines, alongside its CSG exploration, which demonstrates that CSG development and these activities can co-exist.

Submission

To assist the Office of the Chief Scientist & Engineer with the independent review of CSG in NSW, AGL has gathered several reports from its Camden, Gloucester, and Hunter Gas Projects in NSW. The attached reports have been extracted from a range of Environmental Assessment applications, Response to Submissions, and Management Plans adopted for AGL's operating CSG assets.

Approvals, Licences and General Information

- > Environment Protection Licence 12003
- > Gloucester Gas Project Part 3A Approval
- > Gloucester Gas Project EPBC Act Approval
- > Camden Gas Project Environmental Management Plan
- > AGL Submission on the proposed Mining SEPP Amendment, 12 April 2013
- > AGL Review of Environmental Factors, Yellow Rock Exploration Corehole, 2012

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Water Management/Geology

> **Camden Gas Project Groundwater Management Plan (2012) and Peer Review (2012)**

The Groundwater Management Plan (**GMP**) was prepared as a condition the industrial bore licences issued for the Camden Gas Project by the NSW Office of Water (**NOW**). This GMP also satisfies condition U2 of Environment Protection Licence (**EPL**) 12003, which requires a GMP for the Camden Gas Project. AGL has also submitted it to the Department of Sustainability, Environment, Water, Population, and Communities (**SEWPaC**).

The objective of the peer review is to evaluate the the document's adequacy as an interim monitoring plan.

> **Camden Gas Project Summary Hydrogeology Report (2013)**

This report provides a summary of the hydrogeological environment within the Camden Gas Project area. It has been compiled from available data including publicly available reports and data collected from AGL's activities in recent years.

It focuses on the geology, hydrogeology and groundwater use of the Camden Gas Project area. There is also a brief explanation of the potential (but unlikely) risks to groundwater resources across the Camden Gas Project, and the management and mitigation measures that AGL has adopted to provide a high level of confidence in water resource protection.

> **U1 PRP 1 Groundwater Attributes for EPA Groundwater Assessment**

This report was prepared to satisfy the reporting requirements of licence condition U1 PRP 1 of the Camden Gas Project Environment Protection Licence 21003, and has previously been provided to the Environment Protection Authority.

> **Gloucester (Waukivory) Surface and Groundwater Management Plan (2013)**

Version 1 of this GMP was prepared in 2011/12 as a condition of the REF approval for the Waukivory exploration drilling program at Gloucester issued by the NSW Department of Trade and Investment, Regional Infrastructure and Services (**DTIRIS**) – Resources and Energy (Environmental Sustainability Unit). The initial approval for the drilling program was dated 12 October 2011.

Version 2 of this GMP has been expanded in 2012/13 into a Surface Water and Groundwater Management Plan (SGMP) and includes more information for the proposed fracture stimulation and pilot testing Review of Environmental Factors (**REF**) for the Waukivory pilot testing program.

It focuses on the Waukivory local area and not the wider area that is the

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Stage 1 Gas Field Development Area of the Gloucester Gas Project that is approved under Part 3A of the *EP&A Act*.

> **Gloucester Phase 2 Groundwater Investigations (2012)**

The Phase 2 groundwater investigation confirms the conceptual model and connectivity of the different groundwater systems across the Stage 1 Gas Field Development Area. The investigation establishes a dedicated water monitoring network across the area, and is to obtain baseline water level and water quality attributes for each of these groundwater systems.

> **Hunter (Broke) Groundwater investigation and monitoring report (2010)**

This report provides a summary of the groundwater investigation and monitoring program that Parsons Brinckerhoff conducted in the Broke area. The main objectives of this report are to provide more information on groundwater in the area by determining whether the water bearing zones (aquifers) are connected (or not) at various depths, and to assist the community to understand what impacts, if any, there might be on local water supplies and groundwater as a result of gas exploration.

> **Gloucester (Tiedmans Irrigation) Water Management Plan (2012)**

This Water Management Plan (**WMP**) was prepared in advance of the REF approval for the further irrigation with produced water from AGL's CSG exploration programs within PEL 285 at Gloucester. This WMP relates to the exploration phase produced water that is stored on AGL's property known as Tiedmans. The proposal is not related to the Part 3A project approval for Stage 1 of the Gloucester Gas Project and is a "Pre-construction" activity.

> **Hunter Groundwater Monitoring Report (2012)**

This groundwater monitoring status report provided an interim baseline report on water level and water quality trends. This status report was also prepared for the Hunter Community Consultative Committee (**HCCC**) and their peer reviewer (Professor Garry Willgoose) in advance of the fracture stimulation and flow testing programs proposed for early 2013.

Drilling/Hydraulic Fracturing

> **PRP 5: CSG Drilling, hydraulic fracturing, well workover and chemical addition report**

This report was prepared to satisfy conditions PRP 5 of the Camden Gas Project Environment Protection Licence 21003, and has previously been provided to the Environment Protection Authority.

Appendix 6 and 7 of this report have been updated, and now form part of the Environmental Health Impact Assessment.

> **Fracture Stimulation Management Plan**

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Please note that AGL is currently completing a Fracture Stimulation Management Plan application, and will provide a copy to the Office of the Chief Scientist & Engineer as soon as it is available.

Fugitive Emissions

› **PRP 4.1: Leak Detection and Repair Program (PAE Holmes, 2012)**

This report was prepared to satisfy condition PRP 4.1 of the Camden Gas Project Environment Protection Licence 21003, and has been previously provided to the Environment Protection Authority.

› **PRP 4.2: Investigation of Best Management Practices and Monitoring Techniques, Scoping Review (Pacific Environment, 2012)**

This report was prepared to satisfy condition PRP 4.2 of the Camden Gas Project Environment Protection Licence 21003, and has been previously provided to the Environment Protection Authority.

› **AGL Fugitive Emissions Monitoring Program presentation (Pacific Environment Limited)**

This presentation summarises the proposed fugitive emissions monitoring program at the Camden Gas Project.

Health Impact Assessment

› **Environmental Health Impact Assessment – Camden Northern Expansion Project**

The Environmental Health Impact Assessment focuses on reviewing the potential health effects on the community which may be associated with AGL's proposed CSG operations for the Northern Expansion of the Camden Gas Project. It includes a Human Health and Ecological Risk Assessment for Hydraulic Fracturing Activities, Drilling Chemicals, and Workover Activities.

Air Quality Assessment

› **Northern Expansion of the Camden Gas Project:**

○ **Air Quality Assessment**

This air quality impact assessment was prepared for the Environmental Assessment of the Northern Expansion of the Camden Gas Project. The reports takes into consideration the proposed operations, and any potential effects on air quality within the surrounding area. The assessment takes into account the relevant State Government policies, guidelines and plans.

○ **Greenhouse Gas Assessment**

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This greenhouse gas assessment was prepared for the Environmental assessment of the Northern Expansion of the Camden Gas Project. The Greenhouse Gas Assessment takes into consideration aspects of the project with the potential to impact on greenhouse gases, whilst highlighting the measures that would be undertaken to minimise greenhouse gases produced by the proposed project.

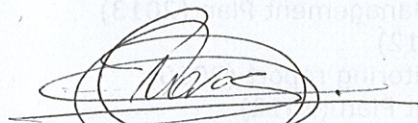
Subsidence

- > **Report on the Potential for Coal seam Methane Gas Extraction to result in Subsidence at the Surface, Mine Subsidence Engineering Consultants Pty Ltd (April 2007)**

This report was included in the Environmental Assessment for the Spring Farm/Menangle Park Part 3A application, to expand the Camden Gas Project in 2007. It considers the potential for coal seam gas extraction to result in subsidence at the surface.

In addition to the attached reports, we look forward to presenting to you on **6 May 2013**. AGL would be happy to assist the NSW Chief Scientist & Engineer and her staff with field visits to inspect any of AGL's CSG projects in NSW and provide further information as needed.

Yours sincerely,



Michael Moraza
Group General Manager, Upstream Gas
AGL Energy Limited

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Attachments

1. Environment Protection Licence 12003
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6. AGL Review of Environmental Factors, Yellow Rock Exploration Corehole, 2012
7. Environmental Health Impact Assessment – Camden Northern Expansion Project
8. PRP 5: CSG Drilling, hydraulic fracturing, well workover and chemical addition report
9. PRP 4.1 - Leak Detection and Repair Program (PAE Holmes, 2012)
10. PRP 4.2 – Investigation of Best Management Practices and Monitoring Techniques, Scoping Review (Pacific Environment, 2012)
11. AGL Fugitive Emissions Monitoring Program presentation (Pacific Environment Limited)
12. The Potential for Coal seam Methane Gas Extraction to result in Subsidence at the Surface
13. Northern Expansion of the Camden Gas Project - Air Quality Assessment
14. Northern Expansion of the Camden Gas Project – Greenhouse Gas Assessment
15. Camden Groundwater Management Plan (2012) and Peer Review (2012)
16. Camden Summary Hydrogeology Report (2013)
17. Gloucester (Waukivory) Surface and Groundwater Management Plan (2013)
18. Gloucester Phase 2 Groundwater Investigations (2012)
19. Hunter (Broke) Groundwater investigation and monitoring report (2010)
20. Gloucester (Tiedmans Irrigation) Water Management Plan (2012)
21. Hunter Groundwater Monitoring Report (2012)
22. Example of a Camden Bore Licence with conditions PLUS AGL's Compliance Report for 2011/12

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