PO Box 323 Penrith NSW 2750
Level 4, 2-6 Station Street
Penrith NSW 2750
Tel 1300 722 468 Fax 02 4725 2599
Email info@sca.nsw.gov.au
Website www.sca.nsw.gov.au

Ref: D2014/94257

24 September 2014

Professor Mary O'Kane
NSW Chief Scientist and Engineer
GPO Box 5477
SYDNEY NSW 2001

Dear Professor O'Kane

I refer to the meeting held with the Sydney Catchment Authority (SCA) on the 15 July 2014 attended by Graham Begg and I and your invitation for comments on the recent reports relating to your review of coal seam gas activities.

The SCA has prepared a series of comments (attached), including recommendations, for you to consider in finalising your investigations.

Both longwall mining and coal seam gas pose significant risks within the Sydney drinking water catchment. These risks are greater in the sensitive Special Areas. A key concern of the SCA is the risks associated with activities in close proximity to the water storage reservoirs and in particular the potential for loss of water either via reduced yield from catchments or loss of water from reservoirs. The SCA is obliged by section 14(1)(c) of the *Sydney Catchment Management Act 1998* to conduct its operations in compliance with the principles of ecologically sustainable development contained in section 6 (2) of the *Protection of the Environment Administration Act 1991*. One of the principles of ESD is the precautionary principle which provides 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 response to the material risks associated with mining and coal seam gas activities the SCA has developed a set of mining principles. In particular the SCA is opposed to longwall mining within dam safety notification zones, and that coal seam gas activities (including exploration and extraction) in the Special Areas (as per the current interim restriction). This position is based on current knowledge of the impacts of these activities, and reflects the duty on the SCA under legislation to adopt a precautionary approach.

Your investigations have highlighted that there is a lack of information and models to properly understand risks and that corresponding management regimes do not fully address these risks. This supports the SCA's position that a precautionary approach must be adopted as the principle provides that a lack of full scientific certainty should not be used as a reason to prevent environmental degradation. This is particularly the case where activities are proposed within very sensitive environments and in close proximity to critical water supply infrastructure such as water storage reservoirs.

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SCA agrees with your recommendations designed to address the many uncertainties and limitations in the ability to predict, model, monitor and respond to potentially catastrophic impacts. However, none of these measures are yet in place. If detailed evidence emerges which suggests SCA should adopt an alternative position, then that will be considered. In the absence of better knowledge and information the risks to the infrastructure and the Special Areas must be taken seriously and the SCA believes that its current position is both appropriate and necessary.

The SCA notes that its current position will ensure that the integrity and irreplaceable role of the catchment areas in general, and the Special Areas in particular, will be preserved for current and future generations, rather than traded off for potential short term economic benefits.

I trust that the attached comments will be of use in finalising your work. If there is any further assistance the SCA can provide to you and your Office in finalising your investigations please do not hesitate to ask.

Should you wish to discuss any matter raised in this letter and attachment please contact Graham Begg on 4724 2402.

Yours sincerely

DAVID HARRIS
A/Chief Executive

ABN 36 682 945 185

Comments by the Sydney Catchment Authority on Reports prepared by the NSW Chief Scientist and Engineer relating to Coal Seam Gas Activities

August 2014

The Sydney Catchment Authority (SCA) has prepared the following comments including recommendations in response to review of the following reports:

- On measuring the cumulative impacts of activities which impact ground and surface water in the Sydney Water Catchment – May 2014
- Environmental risk & responsibility and insurance arrangements for the NSW CSG industry – May 2014
- Placement of monitoring equipment for water resources in NSW – June 2014

The SCA has a set of principles that underpin its decision making in relation to mining and coal seam activities in the Special Areas. These principles establish the outcomes the SCA considers as essential to protect the drinking water supplies to the four and half million people of Sydney and the surrounding region.

1. Protection of water quantity
   Mining and coal seam gas activities must not result in a reduction in the quantity of surface and groundwater inflows to storages or loss of water from storages or their catchments.
2. Protection of water quality
   Mining and coal seam gas activities must not result in a reduction in the quality of surface and groundwater inflows to storages.
3. Protection of human health
   Mining and coal seam gas activities must not pose increased risks to human health as a result of using water from the drinking water catchments.
4. Protection of water supply infrastructure
   The integrity of the SCA's water supply infrastructure must not be compromised.
5. Protection of ecological integrity
   The ecological integrity of the Special Areas must be maintained and protected.
6. Sound and robust evidence regarding environmental impacts
   Information provided by proponents, including environmental impact assessments for proposed mining and coal seam gas activities must be detailed, thorough, scientifically robust and holistic. The potential cumulative impacts must be comprehensively addressed.

The SCA's policy on longwall mining is that it opposes any longwall mining within the Dams Safety Committee notification areas applying to prescribed dams managed by the Authority, or that is predicted to damage water supply infrastructure.
The SCA also opposes Coal Seam Gas activities within the Special Areas.

The SCA has the following general comments and recommendations with regard to your reports:

- The SCA agrees that it is currently not possible to build a complete model to understand the cumulative impacts of multiple activities in the Sydney drinking water catchment. The main constraint to building a reliable model is that the key impacts of concern relate to groundwater systems which are very difficult to understand when impacted by activities such as longwall mining and coal seam gas extraction (even at the project scale). Reliable modelling is an essential part of the exercise to turn data into knowledge that informs policy and decision making.

- The SCA recommends that the effort in building a model should focus on a scale which is easier to manage and which concentrates on the key concerns. In this regard the focus should be on building a model which attempts to understand the cumulative impacts arising from activities in the Metropolitan and Woronora Special Areas. These catchments are under the most pressure and are particularly sensitive to impacts. The past, current and reasonably foreseeable activities in these catchments are coal mining, coal seam gas extraction and rural and rural residential developments around the edges. The key issues such a model should address are cumulative impacts on the quality and quantity of water.

- The SCA notes the report's finding that coal seam gas is likely to have less impact than longwall mining. This is not necessarily the case if coal seam gas extraction over a wide area of the Special Areas is approved. As stated above, the SCA believes that coal seam gas exploration and extraction is not compatible with the role, function and nature of the Special Areas or the legislation that protects them. These areas by their very nature provide an essential part of the multi-barrier protection for Sydney's water supply and have extremely high ecological integrity. These long term intergenerational values should not be traded off for potential short term economic gain.

- The SCA notes that the review 'found that water quality issues can be largely managed through treatment works'. While treatment works have the ability to treat water within their design parameters, there is limited flexibility to treat water that is of a quality that is beyond these parameters. It should also be noted that amendments to treatment works can take considerable time – from design to commissioning. Impacts on water quality from extractive industries could take many years to eventuate and even longer (if ever) to be attributed to those industries. Further, the costs associated with the upgrade of treatment works is met by consumers (and it would not be practical to have, for example, a coal seam gas operator to fund these types of upgrades). The Australian Drinking Water Guidelines require the adoption of the multi-barrier approach. Accordingly every effort should be made where-ever possible to prevent impacts in the catchment.

- It has been suggested that the issue of loss of water from the catchment and/or water storage reservoirs can be addressed by constructing and operating new water supply infrastructure such as new dams or desalination plants. As with water quality impacts, such consequences could take years to emerge and attribute to specific causes. This type of infrastructure is extremely costly and has a long lead time. It is not practical to require mining or coal seam gas operators to fund such infrastructure, however it is not appropriate to shift this cost to consumers. Such impacts must be avoided. For this reason, longwall mining should not proceed within dam safety notification areas. This approach is also consistent with the precautionary principle.

- The SCA notes the finding that for all the extraction activities to proceed safely simultaneously in the catchment a more sophisticated and predictive understanding of cumulative impacts on water quantity is needed.

- The SCA notes the finding that "the approaches currently in place to manage cumulative impacts are at present insufficient to reassure us that we are able to predict a tipping point" prior to the approval of any new activity in the Catchment.

The reaching of a tipping point with respect to the loss of water from the Catchment or a reservoir is very serious issue for the SCA and must be avoided.

- In light of the above the SCA considers a precautionary approach should be adopted by Government. A heightened precautionary approach is warranted in advance of a reliable cumulative impact model being available.

- The SCA notes the finding that at this stage there is no reason for coal mining to be excluded from the drinking water catchment. As stated above, the SCA has a particular position on mining within the dam safety notification areas. Outside these areas, the SCA's position is that all coal mining should be planned, constructed, operated and decommissioned in accordance with the following hierarchy of mitigation:
  - enhance positive impacts
  - avoid negative impacts to the greatest extent possible
  - minimise (or reduce) what cannot be avoided
  - remedy (or restore) what cannot be reduced
  - compensate (or offset) what cannot be remediated.

- The SCA considers that at this stage given the poor understanding of the impacts of longwall mining on groundwater systems, the inability to determine whether performance measures can be achieved, and the lack of measures to restore groundwater systems, that longwall mining should be very carefully planned and monitored in highly sensitive parts of the Catchment (and excluded from dam safety notification areas).

- The SCA notes and endorses the recommendation for NSW Treasury to examine the establishment of a robust and comprehensive policy of appropriate insurance and environmental risk coverage (including security deposits, enhanced insurance coverage and an environmental rehabilitation fund) for the coal seam gas industry. Such a policy must consider coverage for long term and unforeseen environmental impacts as these are of most concern to the SCA. Further the SCA considers such a policy should apply to the longwall coal mining industry operating in the Catchment.

- The SCA endorses the recommendation that companies seeking to mine, extract coal seam gas as part of their initial and ongoing approvals processes should, in concert with the appropriate regulator, identify impacts to water resources, their pathways, their consequences and their likelihood, as well as baseline conditions before activities start. Further the SCA agrees that appropriate monitoring to detect these possible risks should be installed. The SCA recommends that there where a new title is issued under the *Mining Act 1992* or the *Petroleum (Onshore) Act 1991* or where a title is being reissued in situations where no mining or coal seam gas extraction has commenced, that the title should include a condition requiring the holder to establish a monitoring system. This would enable the gathering of baseline information from the earliest stage and enable more informed environmental impact assessment to be undertaken at latter stages. The costs associated with establishing and implementing a monitoring system should be fully meet by industry.

- The SCA notes the recommendation to establish an expertise-based, independent statutory body such as a commission to address monitoring, data and modelling. While the SCA considers this proposal has some merit, there are a number of existing independent bodies that have a role in these areas and this should be considered in going forward on this recommendation. It is important that roles and responsibilities are clarified to avoid confusion and that any new arrangements result in improvements. Examples of existing bodies include the NSW Planning Assessment Commission and the Commonwealth's Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development. In addition existing NSW government agencies have a role and expertise in monitoring, data management and modelling. The SCA recommends that your final report expand on the role of the proposed new body, in relationship with all these existing parties in order to clearly demonstrate the merit of the proposal.

  The SCA endorses the concept of a new body being independent and this should be considered when decisions are made about where within government such a body should sit.

- As a general principle the SCA considers the owners of land and infrastructure should be compensated for any costs or economic loss resulting from the impacts of coal mining and coal seam gas activities. In the SCA's case this includes any impacts on water supply infrastructure, catchment yield or loss of stored waters. As discussed above, compensation is not appropriate, realistic or practical in relation to impacts on the quantity or quality of Sydney's water supply. These impacts must be avoided rather than treated as economic trade-offs.

- Adaptive management techniques are advocated by many to address the impacts arising from activities in the Catchment. The SCA accepts that adaptive management can be an effective approach in some situations. However it should not be used in the following circumstances - if the risk of significant impact is extreme, if mining commences adjacent to the sensitive feature of concern and moves away from the feature, if the impacts are potentially catastrophic, if the impacts are unlikely to be measurable for extended periods and have the potential to be significant (e.g. impacts on swamps due to fracturing of the bedrock base), where there are no acceptable practices available to remediate (e.g. remediation of upland swamps impacted by longwall mining).

- The SCA recognises the value of Trigger Action Response Plans (TARPs) in managing responses. Currently TARPs identify when predictions are exceeded. While this is valuable information planning consents and Subsidence Management Plans may require impacts to not exceed levels lower than those predicted – as performance measures. The SCA therefore considers the value of TARPs could be significantly increased by requiring them to explicitly link with performance measures contained in planning consents and Subsidence Management Plan approvals. This would provide clarity as to when a particular performance measure has been exceeded, the response that is required and the accountability for the response. The SCA endorses the finding that impact definitions must be agreed on by all parties.

- The SCA agrees in-principle with the finding that if coal seam gas activities are to proceed within the drinking water Catchment (outside Special Areas), any new

venture should be required to treat on-site, remove the dissolved solids by reverse osmosis of ion exchange and, if necessary, remove the soluble organics by adsorption.

- Much discussion has occurred on the importance of upland swamps within the Catchment and in particular within the Special Areas. Such swamps clearly have important biodiversity values. Their importance in providing base flows to downstream watercourses is also general recognised most notably during droughts. Less recognised is the value of upland swamps in providing high quality water and the significant water quality impacts that can occur if there is a catastrophic failure of a swamp. There are examples of such failures and resultant water quality impacts within the Catchment and the SCA considers that these impacts are associated with mining activities.

The SCA endorses the following findings:

- Increased instrumentation and monitoring should be standard practice as should special provision for the treatment of produced water from coal seam gas production.
- The creation of a whole-of-Catchment data repository.
- The development of a whole-of-Catchment environmental monitoring system.
- The commissioning of computational models which can be used to assess the impacts on quantity and quality of surface and groundwater.
- Encouraging the use of data visualisation tools for examining 3D representations of the Catchment.
- Establishing an expert group to provide ongoing advice on cumulative impacts in the Catchment.
- The use of chemicals (apart from BTEX which is banned) in fracking fluids should be severely controlled.
- If the risks to human health cannot be known with a very high degree of certainty, if coal seam gas extraction activity is allowed, a ban on fracking within the drinking water Catchment is instigated.
- There is a need for guidelines on the design, construction and maintenance of (storage ponds), for use in the Catchment. The SCA agrees that without confidence about the integrity of these ponds, the use of such an option for produced management in the Catchment should not be allowed.
- The development of a detailed plan for the exploitation of the Catchment's resources – "as a first step in resolving conflicts over resource allocation and use."