NSW GOVERNMENT | Chief Scientist & Engineer

Progress report on Term of Reference 1

Independent Expert Panel for Mining in the Catchment

30 April 2018

NSW GOVERNMENT | Chief Scientist & Engineer

Mr Marcus Ray
Deputy Secretary
Planning Services
NSW Department of Planning and Environment
320 Pitt Street
SYDNEY NSW 2000

Dear Mr Ray

Progress report on Term of Reference 1 of the Independent Expert Panel for Mining in the Catchment

In November 2017, the NSW Government requested that the NSW Chief Scientist & Engineer chair an independent panel of eminent experts to provide advice to the NSW Department of Planning and Environment on the impact of mining activities in the Greater Sydney Water Catchment Special Areas, with a particular focus on risks to the quantity of water in the catchment.

I now submit a progress report from the Panel on Term of Reference 1 as required.

This report outlines activities undertaken by the Panel during the initial information-gathering phase of its work, having first met on 19 February 2018. As agreed, Emeritus Professor Jim Galvin has acted as Interim Chair while the role of Chief Scientist & Engineer is being filled substantively.

In addition to reviewing a range of reports, the Panel has conducted two site visits, held initial stakeholder meetings and called for submissions. In undertaking this initial work, the Panel has noted changes in knowledge that informed previous reports, including the 2008 *Impacts of Underground Coal Mining on Natural Features in the Southern Coalfield*.

This month the Panel has begun shifting its focus from identification and discussion of high-level issues to more detailed operational matters that will inform its full Term of Reference 1 report, principally relating to the Dendrobium (South32 Illawarra Coal) and Metropolitan (Peabody Energy) mines. This change in focus has had implications for the composition of the Panel.

The expertise held by Panel members reflects a deep understanding of the area, industry activities and associated geology, water and ecology; and interests have been carefully monitored and assessed. Earlier this month Professor Bruce Hebblewhite advised he would be withdrawing from the Panel due to other roles he is undertaking. I would like to acknowledge Professor Hebblewhite's contribution to the Panel in this initial period.

At this stage, the Panel is not making recommendations. Issues and themes identified to date will be subject to more detailed analysis in the next phase of work, during which the Panel will consider submissions and have the opportunity to consult more widely.

Yours sincerely

Dr Christopher Armstrong
Acting Chief Scientist & Engineer
On behalf of the Independent Expert Panel for Mining in the Catchment
30 April 2018

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1. Introduction

Sydney's drinking water catchment areas are within the Nepean-Hawkesbury, Shoalhaven and Woronora drainage basins, with small dams also in the Blue Mountains area. Most of the supply comes from the Warragamba, the Upper Nepean (Metropolitan) and Woronora storages. The major dams, reservoirs and canals used for drinking water supply are surrounded by 'Special Areas' within which access and certain types of activities are restricted to protect the quality of stored waters.

The first Special Area, the Metropolitan Special Area, was declared in 1880 to protect the land of the Upper Nepean catchment. The first mining operations in the Illawarra Coalfields began in 1848 near Mount Keira on the Illawarra escarpment behind Wollongong, and mining has since progressed westwards below the Metropolitan Special Area. There are a number of active and inactive mines throughout the Sydney catchment; with four mines active in the Special Areas as at April 2018.

Mines in the Sydney catchment operate underground. Traditional bord-and-pillar, sometimes with partial or full pillar extraction, as well as longwall methods have been used. Mines currently active use longwalls of varying widths and lengths. This method leaves behind goafs, caverns from which the coal has been extracted, which fill with collapsed rock and overburden material. The resultant subsidence affects both subsurface groundwater and surface features such as streams, cliffs and swamps.

Concern about the level and impact of mining activities in the Sydney catchment has resulted in a number of reviews and associated recommendations about the nature and extent of permissible activities; approaches to monitoring, modelling and impact assessment; and the need for further research, data collection, oversight and reporting. These include the 1976 report of inquiry commissioned by the NSW Government into coal mining under or in the vicinity of stored waters of the Nepean, Avon, Cordeaux, Cataract and Woronora Reservoirs; the 2008 inquiry into the impacts of underground coal mining on natural features in the Southern Coalfield and more recently, the 2017 PSM Height of Cracking study at Dendrobium Mine Area 3B prepared for the Department of Planning and Environment. In addition, audits of the Sydney catchment area are undertaken as required under the *Water NSW Act 2014* and its predecessor, the *Sydney Water Catchment Management Act 1998*. In 2014 the NSW Chief Scientist & Engineer also delivered a report to government as part of the Independent Review of Coal Seam Gas activities in New South Wales on measuring the cumulative impacts of activities which impact ground and surface water.

The reviews to date demonstrate an evolving understanding about the effects of underground mining in the catchment. Most express a need to deepen this understanding through more extensive research, monitoring and modelling.

In November 2017 the NSW Government asked the Chief Scientist & Engineer to chair an independent panel to provide informed expert advice to the Department of Planning and Environment (the Department) on the impact of mining activities in the Greater Sydney Water Catchment Special Areas, with a particular focus on risks to the quantity of water in the catchment.

Advice from the Panel will include but is not confined to risks to the total water quantity and holding capacity of surface and groundwater systems, including swamps and reservoirs, and the types and reliabilities and methodologies used to predict, monitor, assess and report on mining effects, impacts and consequences.

As needed, the Panel will also provide as required, expert advice to the Department on mining applications, including monitoring and management plans. The full Terms of Reference for the Panel are at Appendix 1.

2. Panel establishment and work to date

2.1 Panel composition

The Independent Expert Panel for Mining in the Catchment is comprised of a Chair and technical experts in the areas of mining subsidence, groundwater, surface water and swamps. The membership of the Panel is:

- Emeritus Professor Jim Galvin – Mining Subsidence (Interim Chair)
- Professor Neil McIntyre – Surface Water
- Mr Michael Williams – Groundwater
- Dr Ann Young – Swamps
- Dr Christopher Armstrong – Acting Chief Scientist & Engineer

Professor Galvin is the Interim Chair while the role of Chief Scientist & Engineer is being filled substantively. The Panel may also seek expert advice on specific issues related to its inquiries. Dr Colin Mackie has been engaged to provide expert advice on particular groundwater issues. Dr Mackie has 40 years' experience in hydrological assessments and water management studies.

2.2 Management of interests

Panel members provide a diverse and in-depth range of experience and expertise necessary to address the Terms of Reference. Through employment, research, voluntary and other activities and associations, all have interests which may pose perceived, potential or actual conflicts. These are managed through:

- Confidentiality agreements
- The Office of the Chief Scientist & Engineer *Conflict of Interest Declaration*
- A call for declaration of interests at the outset of each meeting and reassessment for specific agenda items
- Maintenance of a record of any declared interests and their management in accordance with the Panel's *Policy and template for meeting records.*

Professor Bruce Hebblewhite was appointed to the Panel for his expertise in mining subsidence, including chairing the 2008 review *Impacts of Underground Coal Mining on Natural Features in the Southern Coalfield*; updating of which is a focus of Term of Reference 2. On 8 April 2018 Professor Hebblewhite advised the Department of his decision to withdraw his membership of the Panel due to other commitments that meant he would not be in a position to contribute beyond the scene-setting phase and discussion of high level issues. The Panel extended its appreciation to Professor Hebblewhite for his input.

2.3 Panel meetings, site visits and stakeholder consultations

To date the Panel has had six meetings and conducted two site visits (Appendix 3). Minutes from meetings are available on the website of the NSW Chief Scientist & Engineer.

The two initial site visits were of swamps and watercourses above past, current and proposed mine operations at the South32 Illawarra Coal (Dendrobium) mine operations and to the Peabody Energy (Metropolitan) mine operations. The Panel expressed interest in undertaking further site visits as its work progresses.

The South32 (Dendrobium) site visit of 20 February included walking and inspection at:

- Sandy Creek Tributary SC10C (located above Dendrobium Longwall 8)
- Water Course WC21 (located above Dendrobium Longwalls 9 to 14)
- Swamp Den01b (located above Dendrobium Longwall 9)
- Swamp Den14 (located above Dendrobium Longwall 16)

The Peabody (Metropolitan) site visit of 26 March included walking and inspection at:

- Waratah Rivulet, specifically:
  - Flat Rock Swamp
  - Pool A and rockbar WRS3 (located above Metropolitan Longwall 12)
  - Pool F and rockbar WRS4 (located above Metropolitan Longwall 12)
  - Flat Rock Crossing at Fire Road 9H (located above Metropolitan Longwall 12)
- Eastern Tributary Crossing at Fire Road 9J (located above Metropolitan Longwall 23b).

The Panel has had targeted consultations with key stakeholders related to Term of Reference 1. This includes presentations and discussions with representatives from:

- South32 Illawarra Coal (Dendrobium)
- Peabody Energy (Metropolitan)
- WaterNSW
- Department of Planning and Environment

Term of Reference 2 of the Panel requires Public Submissions to ensure that all key issues are identified and information gathered. To ensure that all stakeholders have sufficient time, the Panel has opened the submissions, which will be published on the website of the Chief Scientist & Engineer.

2.4 Review of available information

In accordance with Term of Reference 1, the Panel initially focussed on reviewing and analysing the significant number of inquiries, reviews, studies and reports related to the activities of the Metropolitan and Dendrobium coal mines in the Greater Sydney Water Catchment Special Areas. A bibliography of documents considered to date is at Appendix 4.

These reports, together with stakeholder meetings and site visits have provided the Panel with an overview of the history of mining in the catchment, previous mining-related reviews and changes to mining approval and licence requirements over time. This initial work has provided a framework to consider key issues for further inquiry.

2.5 Next steps

The Panel is now focusing on the development of the report for Term of Reference 1. The report will include consideration of issues associated with subsurface and surface subsidence, groundwater and surface water monitoring, modelling and accounting and the impacts and consequences on streams, swamps and reservoirs. Regional models and cumulative impacts will form part of Panel deliberations. The report will consolidate available information as well as identifying gaps and uncertainties. These will inform recommendations to improve approaches to prediction, monitoring, responses and reporting at the Metropolitan and Dendrobium coal mines.

APPENDIX 1 TERMS OF REFERENCE

Purpose

The Independent Expert Panel has been established to provide informed expert advice to the Department of Planning and Environment on the impact of mining activities in the Greater Sydney Water Catchment Special Areas, with a particular focus on risks to the quantity of water in the Catchment.

Advice will include, but is not confined to risks to the total water quantity and holding capacity of surface and groundwater systems, including swamps and reservoirs, and the types and reliabilities of methodologies used to predict, monitor, assess and report on mining effects, impacts and consequences.

As needed, the Independent Expert Panel will provide a source of expert advice to the Department of Planning and Environment on mining applications, including monitoring and management plans.

Scope of Work

The Independent Expert Panel will:

1. **Undertake an initial review and report on specific coal mining activities at the Metropolitan and Dendrobium coal mines in the Greater Sydney Water Catchment Special Areas**, including:
    a. A review of the findings and recommendations of studies and reports deemed appropriate by the Panel, including but not confined to the reports:
        i. *Height of Cracking – Area 3B*, prepared by PSM, dated 16 March 2017
        ii. *2016 Audit of the Sydney Drinking Water Catchment*, prepared by Alluvium, dated June 2017.
    b. A review of the types and reliability of prediction, monitoring and response methodologies (including mitigation, remediation and rehabilitation) currently used for assessing and managing the effects, impacts and consequences of mining activities at the Metropolitan and Dendrobium coal mines as they relate to water quantity, including having regard to historical data and performance.
    c. Provide advice and recommendations on measures required to improve approaches to prediction, monitoring, responses and reporting at the Metropolitan and Dendrobium coal mines, including having regard to cumulative risks posed to the quantity of drinking water available in the Greater Sydney Water Catchment Special Areas.
    d. Based on the outcomes TOR 1(a) to 1(c), provide advice to Government on how to respond to the findings and recommendations of reports reviewed as part of TOR 1a.
    e. In developing its advice, the Panel will meet, undertake site visits, seek information and data, and consult as needed.
    f. In delivering its report, the Panel will provide comment on and make observations or recommendations about any information or factors the Panel believes relevant; or further work that should be undertaken.
    g. A progress update on the report is to be delivered no later than 30 April 2018 and the report is to be delivered no later than 31 July 2018.

2. **Undertake a review of current coal mining in the Greater Sydney Water Catchment Special Areas with a particular focus on risks to the quantity of water available, the environmental consequences for swamps and the issue of cumulative impacts**, including:
    a. A review and update of the findings of the *2008 Southern Coalfield Inquiry (Impacts of Underground Coal Mining on Natural Features in the Southern Coalfield – Strategic Review)* for mining operations at the Dendrobium, Metropolitan, Russell Vale and Wongawilli mines, including recommending measures to improve the way mining effects, impacts and consequences in relation to water quantity are assessed and managed.
    b. In developing its advice, the Panel will meet, undertake site visits, seek information and data, and consult as needed.
    c. Establish a process for and invite public submissions, including from public authorities and special interest groups.
    d. In delivering its report, the Panel will provide comment on and make observations or recommendations about any information or factors the Panel believes relevant, including requirements to strengthen monitoring networks or undertaking further scientific research.
    e. The report is to be delivered no later than 31 December 2018.
3. **Provide advice as required to the Department of Planning and Environment on mining activities in the Greater Sydney Water Catchment Special Areas, which may include but is not confined to:**
    a. A Subsidence Management Plan application for Longwall 16 at the Dendrobium mine.
    b. An Extraction Plan application for Longwall 303 at the Metropolitan mine.
    c. An Environmental Impact Statement for the Dendrobium Extension Project.
    d. A Preferred Project Report for the Russell Vale Underground Expansion Project.
    e. A modification application for the Wongawilli mine.

APPENDIX 2 INDEPENDENT EXPERT PANEL MEMBERS

The Independent Expert Panel is comprised of a Chair and technical experts with expertise in mining, mining subsidence, surface water, ground water and swamps.

Emeritus Professor Jim Galvin is the Interim Chair during the period when the role of the NSW Chief Scientist & Engineer is being filled substantively.

- Emeritus Professor Jim Galvin (Interim Chair)
- Professor Bruce Hebblewhite (to 8 April 2017)
- Professor Neil McIntyre
- Dr Ann Young
- Mr Michael Williams
- Dr Christopher Armstrong (Acting Chief Scientist & Engineer)

The Panel draws on other sources of specialist expertise as needed at the discretion of the Chair.

Secretariat support for the Independent Expert Panel is provided by the Office of the Chief Scientist & Engineer.

APPENDIX 3 SITE VISITS AND STAKEHOLDER MEETINGS

Table 1: Site Visits

Date	Location	Present
20/02/2018	Sandy Creek Tributary SC10C, Water Course WC21, Swamp Den01b, Swamp Den14	**Panel members:** Emeritus Professor Jim Galvin Dr Ann Young Professor Neil McIntyre Mr Michael Williams (morning only) Dr Christopher Armstrong **WaterNSW:** Ms Fiona Smith, Executive Manager Water and Catchment Protection (morning only) Mr Malcolm Hughes, Manager Catchment Protection Mr Peter Dupen, Manager Mining (morning only) Mr Kel Lambkin, Senior Catchment Officer (morning only) Ms Amanda Ryan, Catchment Field Officer (morning only) **South32 Illawarra Coal:** (afternoon only, Den14 and Den01b site visit) Mr Gary Brassington, Principal Approvals Mr Kai Whitaker, Illawarra Coal Field Team **Secretariat:** Ms Suzanne Pierce Dr Jaclyn Aldenhoven
26/03/2018	Waratah Rivulet, specifically Flat Rock Swamp, Pool A and rockbar WRS3, Pool F and rockbar WRS4, Flat Rock Crossing at Fire Road 9H, and Eastern Tributary Crossing at Fire Road 9J	**Panel members:** Emeritus Professor Jim Galvin Dr Ann Young Professor Neil McIntyre Professor Bruce Hebblewhite Dr Christopher Armstrong **WaterNSW:** Mr Peter Dupen, Mining Manager **Peabody Energy Metropolitan Coal:** Mr Jon Degotardi, Technical Services Manager Mr Stephen Love, Environment & Community Superintendent Mr Andy Hyslop, General Manager Mr Peter Baker, SVP Underground Operations Mr Micheal Alexander, Director Projects & Portfolio Management NSW Ms Suzanne Cryle, Manager Community Relations **Resource Strategies:** Ms Stacey Gromadzki, Senior Environmental Manager **Secretariat:** Ms Suzanne Pierce Dr Jaclyn Aldenhoven

Table 2: Stakeholder Meetings

Date	Type	Location	Present
5/03/2018	Meeting	Pardalote Meeting Room, Level 48, MLC Centre, 19 Martin Place, Sydney	**Panel members:** Emeritus Professor Jim Galvin Dr Ann Young Professor Neil McIntyre Mr Michael Williams Professor Bruce Hebblewhite Dr Christopher Armstrong **Peabody Energy Metropolitan Coal:** Mr Jon Degotardi, Technical Services Manager Mr Stephen Love, Environment & Community Superintendent Mr Micheal Alexander, Director Projects and Portfolio Management NSW **Resource Strategies:** Ms Stacey Gromadzki, Senior Environmental Manager **Secretariat:** Ms Suzanne Pierce Dr Jaclyn Aldenhoven Mr Jerein Kailath
5/03/2018	Meeting	Pardalote Meeting Room, Level 48, MLC Centre, 19 Martin Place, Sydney	**Panel members:** Emeritus Professor Jim Galvin Dr Ann Young Professor Neil McIntyre Mr Michael Williams Professor Bruce Hebblewhite Dr Christopher Armstrong **South32 Illawarra Coal:** Mr Gary Brassington, Principal Approvals Ms Rachel Cameron, Manager External Affairs Dr Stuart Brown, Director HGEO Mr Will Minchin, Senior Hydrogeologist, HydroSimulations Dr James Barbato, Engineering Associate, Mine Subsidence Engineering Consultants (MSEC) Ms Bryony Andrew, Dendrobium Mine Operations Manager **Secretariat:** Ms Suzanne Pierce Dr Jaclyn Aldenhoven Mr Jerein Kailath
26/03/2018	Meeting	Conference Room, Metropolitan Coal, Parkes Street, Helensburgh	**Panel members:** Emeritus Professor Jim Galvin Dr Ann Young Professor Neil McIntyre Mr Michael Williams (teleconference) Professor Bruce Hebblewhite Dr Christopher Armstrong **WaterNSW:** Ms Fiona Smith, Executive Manager Water and Catchment Protection Mr Malcolm Hughes, Manager Catchment Protection Mr Peter Dupen, Manager Mining **Secretariat:** Ms Suzanne Pierce Dr Jaclyn Aldenhoven Mr Jerein Kailath (teleconference)

3/04/2018	Meeting	Pardalote Meeting Room, Level 48, MLC Centre, 19 Martin Place, Sydney	**Panel members:** Emeritus Professor Jim Galvin Dr Ann Young Professor Neil McIntyre Mr Michael Williams Dr Christopher Armstrong **South32 Illawarra Coal:** Mr Jason Economidis, Vice President Operations Mr Gary Brassington, Principal Approvals Ms Rachel Cameron, Manager External Affairs **Secretariat:** Ms Suzanne Pierce Dr Jaclyn Aldenhoven Mr Jerein Kailath

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