

**Independent Expert Scientific Committee on Coal Seam Gas and
Large Coal Mining Development (IESC)
Meeting 93, 31 January – 2 February 2023**

**MINUTES
Adelaide**

ATTENDANCE AND APOLOGIES

IN ATTENDANCE

Dr Chris Pigram (Chair)
Dr Andrew Boulton
Professor Jenny Davis
Dr Jenny Stauber
Dr Juliette Woods
Associate Professor Phil Hayes (Items 1.5-1.8, 2.2, 3 & 4)
Professor Wendy Timms (Items 1, 2 & 3)

APOLOGIES

Professor Rory Nathan

INVITED GUESTS

Item 3.1

SOUTH AUSTRALIAN DEPARTMENT FOR ENVIRONMENT AND WATER

Peter Baker, Water Science and Monitoring
Christopher Wright, Water Science and Monitoring
Mark Keppel, Water Science and Monitoring
Kumar Savadamuthu, Water Science and Monitoring
Darren Alcoe, Water Science and Monitoring
David Way, Water Science and Monitoring

SOUTH AUSTRALIAN DEPARTMENT FOR ENERGY AND MINING

Michael Malavazos, Engineering Operations
Jarrod Spencer, Engineering Operations

Item 3.3

Dr Luk Peeters, Principal Research Scientist, CSIRO
Hugh Middlemis, Director and Principal Groundwater Engineer, HydroGeoLogic Pty Ltd

Item 3.5 (by videoconference)

Dr Joseph Guillaume, IWF Research Fellow, Australian National University
Louisa Rochford, Research Assistant, Australian National University
Leila Noble, Research Assistant, Australian National University

Item 3.6 (by videoconference)

Fiona Chandler, Principal Consultant, Alluvium Consulting

OFFICE OF WATER SCIENCE (OWS)

Sarah Taylor, Acting Director

James Rae

Jason Smith

Katrina Bourke

By videoconference

Amelia Lewis

Andriana Stoddart

Ben Klug

Christina Fawns

Frances Knight

Isabelle Francis

Laura Richardson

Mio Kuhnen

Note: OWS attendees include those with full or partial attendance.

1. Welcome and Introductions

The Chair acknowledged the traditional owners, past and present, on whose lands this meeting was held, and welcomed members of the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (IESC) to the meeting.

The Chair especially welcomed Dr Juliette Woods to her first meeting since her appointment as a member of the IESC on 1 January 2023.

The Chair recognised the decade of service to the IESC of Professor Craig Simmons whose final day as a member of the IESC was 31 December 2022.

1.1 Attendance and Apologies

IESC members in attendance and apologies are recorded above.

1.2 Disclosure of Interests

Committee members were invited to make disclosures. Committee members also completed a Meeting Declaration of Interests before the meeting commenced. Details on disclosures of interests are at Attachment A.

1.3 Confirmation of Agenda

The Committee endorsed the agenda for Meeting 93.

1.4 Confirmation of Out-of-Session Decisions

The Committee noted that:

- minutes of the Committee's ninety-second meeting on 12 – 14 December 2022 were agreed out-of-session and published on 4 January 2023.
- advice on the Moorlands Open Cut Coal Mining Project was provided to the regulator on 16 December 2022 and published on 4 January 2023.
- advice on the Ashton Coal Operations Ravensworth Underground Mine was provided to the regulator on 19 December 2022 and published on 4 January 2023.

1.5 Correspondence

The Committee noted the status of correspondence to 19 January 2023.

1.6 Action Items

Ongoing items were noted and updates were provided on the timing of completion.

1.7 Forward Planning Agenda

The Committee noted the forward planning agenda.

It was agreed that the next meeting be scheduled to be in-person in Brisbane on 8 – 9 March 2023.

1.8 Environmental Scan

The OWS reported on recent events.

2. Advice on Projects referred by governments

2.1 Surat Basin Carbon Capture and Storage Project

The Surat Basin Carbon Capture and Storage Project (the project) is a proposed greenhouse gas (GHG) stream injection and storage testing site located in the Darling Downs of Queensland. The project will inject GHG as a supercritical fluid into the Precipice Sandstone aquifer within the southern Surat Basin at a rate of up to 110,000 tonnes annually for three years. Within the project's operational lands, the Precipice Sandstone aquifer is approximately 2,300 m below ground level. The injected GHG is expected to remain trapped and stored as a mixture of dense fluid and mineral solids within the aquifer and within the bounds of the operational lands with increasing storage containment over time.

Substantial project infrastructure was constructed by the proponent in 2021 as permitted under Queensland Environmental Authority (EA) EPPG00646913, including West Moonie-1 Injection Well and West Moonie-2 Monitoring Well, both targeting the Precipice Sandstone aquifer, and a water quality monitoring bore targeting the shallow Griman Creek formation. Construction of a final monitoring bore targeting the Gubberamunda Sandstone aquifer is planned for 2024. In addition to the existing infrastructure, the project will require the construction of a 7.35-ha Transportation Facility and a 9.5-km buried flowline to carry the GHG stream from the Transportation Facility to West Moonie-1 Injection Well.

Limited site-specific data have been used to develop the models relied on by the proponent to predict plume behaviour and potential impacts from the project. Despite this, given the small scope of the project and geological stability of the storage complex at the project location, impacts from the project are expected to be minimal and manageable in both the immediate and long term.

Potential impacts from this project that require further consideration are:

- changes to groundwater quality in the Precipice Sandstone aquifer, within the GHG plume extent, which may have implications for future usability; and
- leakage of GHG into aquifers overlying the Precipice Sandstone due to corrosive-mechanical failure of bore casings and seals, resulting in groundwater quality and pressure changes.

The IESC has identified additional work to address the potential impacts, as detailed in this advice. These are summarised below.

- Improved baseline groundwater quality data for the Precipice Sandstone aquifer near the injection site are required to enable the proponent to establish a robust baseline and set appropriate trigger values for water quality.
- Improved estimates should be made of the maximum likely extent of plume migration. Once the local-scale groundwater model has been updated with information from the planned 3D-seismic survey, a scenario analysis should be conducted, considering combinations of possible factors that could maximise plume migration. These results should also be used to inform adaptive management.
- A more comprehensive spatial monitoring network and sampling program should be established to reflect the project's status as a feasibility study which aims to provide 'proof-of-concept' for geological storage of GHG in the Surat Basin. This should include:
 - Collection of data to measure groundwater quality within the Precipice Sandstone aquifer beyond the predicted GHG plume extent. Monitoring should continue throughout the project, and for at least 3 years after injection ceases, to enable the proponent to confirm the prediction that groundwater quality will not be impacted outside of the GHG plume extent.
 - Additional bores targeting shallower aquifers should be added to the groundwater monitoring program to ensure that groundwater resources are not being impacted by the project. Sampling of these bores should be undertaken prior to GHG injection to establish a baseline which will facilitate detection of any impacts.
 - The integrity of the caprock seal and containment of injected GHG without impacts to the environment could also be verified by suitable environmental tracers (e.g., carbon-13), and monitoring of soil gas at several key sites (e.g., near the injection bore) above the expected plume and at unimpacted reference sites.

Consistent with the *Environment Protection and Biodiversity Conservation Regulations 2000*, advice will be published on the IESC's website within 10 business days of being provided to the regulators.

2.2 Moolarben Coal Complex OC3 Extension Project

Moolarben Coal Operations is seeking to expand the Moolarben Coal Complex, located approximately 40 km north of Mudgee, New South Wales. Moolarben Coal Complex OC3 Extension (the project) would extend the OC3 open-cut pit, with the development area occupying approximately 826 ha of the Moolarben Valley and partly surrounded by the Munghorn Gap Nature Reserve. Operations are expected to occur from 2025 until 2034.

The extension will comprise five open-cut pits to a maximum depth of 125 m, with an average depth of 34 m. All pits would be backfilled and rehabilitated as mining progresses, and a 200-m buffer zone implemented along Moolarben and Murdering creeks (excluding surface infrastructure such as road crossings).

Groundwater-dependent vegetation along Moolarben Creek may include Central Hunter Valley eucalypt forest and woodland, a threatened ecological community (TEC) listed as critically endangered under the *Environmental Protection and Biodiversity Conservation Act (1999)* (EPBC Act). Groundwater-fed pools also occur along Moolarben Creek and may provide valuable aquatic habitat and connectivity.

Key potential impacts from this project are:

- predicted drawdown of up to 6 m in the Moolarben Creek alluvium, potentially leading to impacts on groundwater-dependent ecosystems (GDEs), and reduced surface water habitat and baseflow;
- up to 16% reduction in the size of the Moolarben Creek catchment, including the loss of at least 16 km of ephemeral drainage channels, and associated infiltration pathways, and reductions to the extent, quality and availability of aquatic habitats; and
- construction of culverts and creek crossings (90-306 m wide), which are likely to disrupt aquatic and riparian habitat connectivity.

The IESC has identified key areas in which additional work is required to address the key potential impacts, as detailed in this advice. These are summarised below.

- Further conceptualisation of the alluvium along Moolarben Creek and assessment of how drawdown may propagate through the alluvium are required. This includes description of the extent, thickness and degree of saturation of the alluvium and its geometry in relation to the proposed mine extension.
- Given the limitations of the regional-scale groundwater model, an assessment of local-scale impacts on drawdown within the project area and any impact on baseflow.
- The extent and degree of groundwater use by potential terrestrial GDEs along Moolarben Creek should be assessed in the field and monitored in areas of predicted drawdown.
- Additional alluvial monitoring bores, surface water flow and water quality monitoring sites should be placed further upstream on Moolarben Creek, with baseline monitoring (including macroinvertebrate biomonitoring) data to be collected for at least two years before commencing mining operations.
- Surface water quality monitoring of metals and other parameters should be undertaken at least every six months throughout operations at monitoring locations along Moolarben Creek and the Goulburn River (including event-based sampling).
- Water quality monitoring of mine-water and sediment dams for additional relevant parameters (e.g., metals) is needed.
- Trigger action response plans (TARPs) for water-dependent assets associated with Moolarben and Murdering creeks are required.

Consistent with the *Environment Protection and Biodiversity Conservation Regulations 2000*, advice will be published on the IESC's website within 10 business days of being provided to the regulators.

3. Other business

3.1 South Australian Regulator Roundtable

An informal roundtable discussion was held with various invitees from the South Australian Government. The discussion covered various topics of mutual interest.

3.2 Ecohydrological Conceptual Models Explanatory Note

The Committee discussed the draft revised by IESC member Dr Andrew Boulton, including its suitability, and provided comments on its structure, content and the worked example.

3.3 Uncertainty Analysis Explanatory Note

The Committee discussed with Dr Luk Peeters and Hugh Middlemis, the authors of the draft *Uncertainty Analysis for Groundwater Models* Explanatory Note, the review of comments from consultation and the resulting final draft.

3.4 IESC Information Guidelines

Committee members commented on the draft *Information guidelines for proponents preparing coal seam gas and large coal mining development proposals* (IESC Information Guidelines) and, following discussion, agreed on next steps for the update of the IESC Information Guidelines.

3.5 National Minimum Groundwater Monitoring Guidelines

The Committee discussed with Dr Joseph Guillaume, Louisa Rochford and Leila Noble, feedback from targeted consultation and their revised draft of the *National Minimum Groundwater Monitoring Guidelines* developed by the Fenner School of Environment & Society and Institute for Water Futures at the Australian National University. The draft will be revised further before distribution for public consultation.

3.6 2023 IESC Stakeholder Forum

The Committee discussed the 2023 stakeholder event with Fiona Chandler, Alluvium Consulting.

4. Close of Meeting

The meeting closed at 3.00 pm on Thursday 2 February 2023.

Next Meeting

The next meeting is scheduled for 8 – 9 March 2023 in Brisbane.

Minutes confirmed as true and correct:

Dr Chris Pigram AM, FTSE

IESC Chair

9 February 2023

Attachment A

Item(s)	IESC Member	Disclosure	Determination
2.1	Associate Professor Phil Hayes	I have a direct or indirect pecuniary interest in a matter being considered or about to be considered by the IESC, as follows: In my role at The University of Queensland in 2020/21 our research group has worked for CTSCo including on the Surat Basin Carbon Capture and Storage Project.	The Committee determined that due to having declared a pecuniary interest that Associate Professor Phil Hayes not be present during agenda item 2.1 (Surat Basin Carbon Capture and Storage Project), so as to not be present during any deliberation of the Committee about the matters, and so as to not take part in any decision of the Committee about the matters.