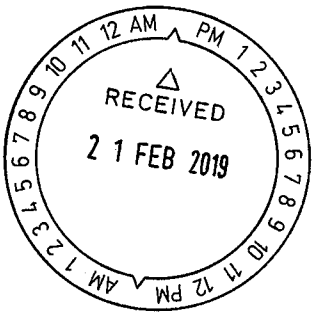
Minister for Environment; Disability Services
Deputy Leader of the Legislative Council



Our Ref: 62-12637

Hon Matthew Swinbourn MLC
Standing Committee on Environment and Public Affairs
Legislative Council Committee Office
Parliament House, 4 Harvest Terrace
WEST PERTH WA 6005

Dear Hon Matthew Swinbourn

Thank you for your correspondence, originally sent to this office on 21 November 2018, regarding Petition No 86 – Ban on Fracking. Due to a system error your correspondence was not received until 6 February 2019, so I apologise for the delay in responding to your letter.

Terms of Petition
Petitioners are concerned that the terms of reference of the independent scientific panel inquiry into hydraulic fracture stimulation (fracking) in Western Australia does not include an examination of whether or not fracking should be banned in Western Australia. Petitioners are also concerned that there is growing peer reviewed scientific evidence that fracking cannot be done without risk to human health, climate stability, water quality, air quality and the environment and requests that the Legislative Council support a permanent ban on fracking in Western Australia.

Response
In line with the McGowan Government's election commitment, a ban on fracking in the Perth Metropolitan, Peel and South West regions was put in place, together with a moratorium on fracking over the rest of the State.

On 5 September 2017, the Western Australian Government announced an independent scientific panel inquiry into hydraulic fracture stimulation (the Inquiry). The independent Panel of experts (the Panel) were appointed, under provisions of the Environmental Protection Act 1986 (EP Act), to report on the potential impacts arising from the implementation of fracking on the onshore environment of Western Australia, outside of the Perth metropolitan, Peel and South-West regions.

The Panel was appointed by the Western Australian Government to provide advice under the Terms of Reference. The Panel consisted of Dr Tom Hatton (Inquiry Chair), Philip Commander, Dr Ben Clennell, Professor Fiona Haslam McKenzie and Dr Jackie Wright. The membership of the Panel reflected a range of scientific expertise

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including hydrology, hydrogeology, geology, petrology, ecology, natural resource management, toxicology, sociology and risk assessment.

The Terms of Reference for the Inquiry were to:

- Identify environmental, health, agricultural, heritage and community impacts associated with the process of hydraulic fracture stimulation in Western Australia, noting that impacts may vary in accordance with the location of the activity;
- Use credible scientific and historical evidence to assess the level of risk associated with identified impacts;
- Describe regulatory mechanisms that may be employed to mitigate or minimise risks to an acceptable level, where appropriate;
- Recommend a scientific approach to regulating hydraulic fracture stimulation; and
- Hold community meetings in Perth, and the Midwest and Kimberley regions.

On 12 September 2018, the Panel handed its Report to the Western Australian Government, fulfilling its Terms of Reference. The Report included an examination of scientific and historical evidence associated with the impacts of fracking on public health, agricultural, heritage, community and the environment, as defined in the EP Act (which covers, climate stability, water quality and air quality). The Report made findings on risks and provided recommendations on how risks and impacts could be further reduced through changes in regulation or practice.

The Report is silent on whether or not fracking should be banned in Western Australia, as this was a decision to be made by Government.

During the Inquiry, the Panel made extensive review of many hundreds of published scientific and technical papers and reports, as well as environmental plans and compliance reports.

The vast bulk of this literature comes from outside Western Australia and has been considered by multiple technical reviews and through multiple inquiries. The Report of the Standing Committee on Environment and Public Affairs of the Western Australian Parliament 2015 Standing Committee Report acknowledged the benefit of using such information to learn from other jurisdictions and stakeholders with experience in developing unconventional gas resources.

While this information was of broad relevance to this Inquiry, great care was taken in every case to test its applicability to the Western Australian context of industry, geography and environment. A priority was to identify and access the most recent technical information and findings, particularly any emerging since the conclusion of the Standing Committee Report.

In addition, the Panel considered evidence, opinion and concerns expressed through seven public meetings attended by 204 people and more than 9,500 written public submissions, invited submissions from more than two dozen organisations including State and Federal agencies, industry, environmental groups and Aboriginal bodies, as well as direct consultation with key stakeholders.

In order to validate the research and the findings of the Panel, the Report was peer reviewed by technical experts in the fields of Greenhouse Gas emissions, water resources, toxicology and public health, seismicity and geophysics, conservation and biodiversity and social surroundings.

Submission from the principal petitioner
The submission from the principal petitioner highlighted concerns that the Panel did not include a climate scientist or medical scientist, and that several recent scientific reports relating to health and climate showed that the risks of fracking outweigh the benefits.

Response
In relation to the expertise of Panel members within the field of human health and ecological risk assessment, Dr Wright has over 25 years experience and has undertaken risk assessments for Government audits in almost every state in Australia. She is a fellow of the Australasian College of Toxicology and Risk Assessment and a member of a host of professional technical associations in the areas of health and the environment.

Her areas of expertise include human and eco-toxicological review and evaluation of chemicals in line with Australian regulatory requirements, human health and ecological risk assessment, exposure modelling, indoor air quality assessment, fate and transport assessment, air dispersion modelling, environmental chemistry, environmental monitoring and the assessment of air emissions and air toxics.

Dr Wright has undertaken human health assessments at a wide range of sites, including waste sites, residential and recreational areas, operating industrial plants that have been closed and are in the process of property sales and redevelopment and remediation. She has also undertaken ecological risk assessments which have included detailed assessments of contamination within soils and aquatic environments and is a co-developer of National and State guidelines on contaminants and remediation.

I understand that it is standard practice for toxicologists to undertake health risk assessments.

With respect to the Panel's competency on climate science, at least two Panel members have a background in the scientific understanding of climate. These are Mr Phil Commander and Dr Tom Hatton.

Mr Commander's understanding is demonstrated by his long-standing contributions to the scientific understanding of the hydrological cycle in Western Australia (such as, how climate affects the environment).

Dr Hatton has a long-standing and recognised role in the leadership and delivery of climate research and climate science, for example:

- Original research and analysis on the potential impacts of increased CO^2 on forest growth and catchment water yield:
    - **Hatton, T.J.**, Walker, J., Dawes, W.R., and Dunin, F.X. (1992). Simulations of hydroecological responses to elevated CO_2 at the catchment scale. Australian Journal of Botany 40:679-696.

- Original research and analysis on the interactions of climate on catchment behaviour, for example:

  - **Hatton, T.J.**, Pierce, L.L., and Walker, J. (1993). Hydroecological changes in the Murray-Darling Basin: Part 2 - Development and tests of a water balance model. J. Appl. Ecol. 30:274-282.

  - Pierce, L.L., Walker, J., Dowling, T.I., McVicar, T., **Hatton, T.J.**, Running, S.W., and Coughlan, J.C. (1993). Hydroecological changes in the Murray-Darling Basin: Part 3 - A simulation of regional hydrological changes. J. Applied Ecol. 30:283-294.

  - Vertessy, R.A., **Hatton, T.J.**, O'Shaughnessy, P.J., and Jayasuriya, M.D.A. (1993). Predicting water yield from a mountain ash forest using a terrain-based catchment model. J. Hydrology 150:665-700.

  - Dawes, W.R., Zhang, L., **Hatton, T.J.**, Reece, P.H., Beale, G.T.H. and Packer, I. (1997). Evaluation of a distributed parameter ecohydrological model (TOPOG_IRM) to a small cropping rotation catchment. J. Hydrology 191:67-89.

- Original research and analysis on the interactions of landuse and the atmosphere, for example:

  - **Hatton, T.J.**, Moore, S.J., and Reece, P.H. (1995). Estimating stand transpiration in a Eucalyptus populnea woodland with the heat pulse technique. Tree Physiology 15:219-227.

  - Barrett, D.J., **Hatton, T.J.**, Ash, J.E. and Ball, M.C. (1995). Evaluation of the heat pulse velocity technique for measurement of sap flow in rainforest and eucalypt forest species of south-eastern Australia. Plant, Cell and Environment 18:463-469.

  - Vertessy, R.A., **Hatton, T.J.**, Benyon, R.J. and Dawes, W.R. (1996) Long term growth and water balance predictions from a mountain ash (Eucalyptus regnans) forest catchment subject to clearfelling and regeneration. Tree Physiology 16:221-232.

  - Barrett, D.J., **Hatton, T.J.**, Ash, J.E. and Ball, M.C. (1996) Transpiration by trees from contrasting forest types. Australian Journal of Botany 44:249-263.

  - Zhang, L., Dawes, W.R. and **Hatton, T.J.** (1996) Modelling hydrologic processes using a biophysically based model - Application of WAVES to FIFE and HAPEX-MOBILHY. J. Hydrology 185:147-169.

  - Cook, P. G., **Hatton, T. J.**, Pidsley, D., Herczeg, A. L., Held, A., O'Grady, A., and Eamus, D. (1998). Water balance of a tropical woodland ecosystem Northern Australia: a combination of micro-meteorological soil physical and groundwater chemical approaches. Journal of Hydrology. 210:161-177.

  - Silberstein, R., Held, A., **Hatton, T.J.**, Viney, N. and Sivapalan, M. (2001) Energy balance of a natural jarrah (Eucalyptus marginata) forest in Western Australia: measurements during the spring and summer. Agricultural and Forest Meteorology 109:79-104.

  - Taylor, P.J, Nuberg, I. and **Hatton, T.J.** (2001). Enhanced transpiration due to wind effects at the edge of a blue gum (Eucalyptus globulus) plantation. Tree Physiology 21:403-408.

- Silberstein, R., Sivapalan, M, Viney, N.R., Held, A., and **Hatton, T.J.** (2003) Modelling the energy balance of a natural jarrah (Eucalyptus marginata) forest. Agricultural and Forest Meteorology 115:201-230.
- Ellis, T.W. and **Hatton, T.J.** (2008) Relating leaf area index of natural eucalypt vegetation to climate indices in southern Australia. Agricultural Water Management.

Dr Hatton has presented a number of significant invited keynote presentations related to climate, for example:

- Stating our Marine Environment: CSIRO and the Ocean Information Revolution, Brodie-Hall Memorial Address, 14 September 2011, Perth.
- The Millennium Drought: Lessons for Australian Water Management and Science, Latin America Water Week, March 20 2013, Vina del Mar, Chile.
- Invited presentation, Australian Academy of Sciences Symposium, Looking Out: Australia's Potential Energy Future, 31 May 2013, Canberra.
- Invited presentation, Murdoch University Law Symposium, The WA EPA's Climate Change Policy, 17 February 2017.

As Director of the CSIRO Water Research Flagship, national responsibility for the delivery of significant climate analyses of future water resources, Dr Hatton was:

- Responsible for the delivery of major commissioned science reports including Murray-Darling Basin Sustainable Yields (for which Hatton received both the CSIRO Chairman's Medal and the Public Service Medal), Northern Australia Sustainable Yields, and South-West Australia Sustainable Yields – all based on syntheses and interpretations of the latest global projections of future climates and their uncertainties; and
- Responsible for the body of work on the water resource future of the Murray-Darling Basin and the likely impact of climate change, which is the climate research acknowledged by the recent Murray-Darling Basin Royal Commission as an essential consideration in any Basin Plan.

As CSIRO Group Executive for Energy, national responsibility for the delivery of a large program of research aimed at climate change abatement and mitigation, Dr Hatton was responsible for:

- Carbon Capture and Storage;
- Energy efficiency technologies to lower emissions footprints; and
- Renewable energy technologies to lower emissions footprints.

I consider that the Panel had the relevant experience and expertise to evaluate the information provided for this Inquiry.

I note that the submission from the principal petitioner specifically makes reference to recent research released in March 2018 and published in the Compendium of Science, Medical and Media Findings Demonstrating Risks and Harms of Fracking's Fifth edition.

The scientific inquiry received many submissions which referred to this publication. The Report has included quotes from this publication and discussed its consideration of this review. Section 11.4.4.4 (Page 415) of the Report goes into detail about its consideration of this publication, specifically:

'The report published by the Concerned Health Professionals of New York (Concerned Health Professionals of New York 2018) is cited in numerous submissions to this Inquiry. The report states it draws information from database searches but does not provide the search strategy used, including its inclusion and exclusion criteria. The report combines epidemiological evidence with investigative journalist reports and commissioned reports. It does not assess the quality of the evidence, as documented in the report, but rather encourages the reader to review the evidence provided and undertake their own assessment of its strength. As such, the statements made in this report should be vetted by the reader by seeking the original source of the statement and assessing the quality of the evidence that has led to the statement.

The report indicates that available peer-reviewed literature reveals both potential and actual harms. Specifically, Hays and Shonkoff (Hays & Shonkoff 2016) conducted a statistical analysis of the body of scientific literature available from 2009 to 2015 (again, noting that this did not include any review of the studies, the quality or strength of evidence) and reported 69 percent of original research studies on water quality found potential for, or actual evidence of, water contamination; 87 percent of original research studies on air quality found significant air pollutant emissions; and 84 percent of original research studies on human health risks found signs of harm or indication of potential harm.

Despite providing no review of the available studies, including the quality of the studies or the strength of the evidence or findings, this report has included a number of predetermined outcomes that act as headings for some of the information and references provided. Hence, while the reader is directed to evaluate the information and studies for themselves, the report provides bias in the way it is presented. Regardless, the report provides a list of numerous studies and sources of information, mostly related to operations in the United States that can be reviewed in relation to a wide range of issues that may be associated with unconventional gas activities. These issues include air, water, health, public safety, climate stability, seismic stability, community cohesion and long-term economic vitality. The studies should be reviewed in detail to determine their reliability, suitability and relevance for consideration in any specific risk assessment that may be required for a state such as Western Australia, or any specific proposed hydraulic fracture stimulation activity'.

With regards to climate change, the principal petitioner makes reference to the report by Climate Analytics, that states that 'fracking the Canning Basin alone would emit carbon pollution double Australia's entire Paris Agreement energy sector budget' and that 'the domestic carbon footprint of all of WA's unconventional gas resources, which have been proposed, would be three times more than the entire nation's energy sector budget'.

The Panel has considered this literature during the Inquiry and it is discussed in section 10.7 (Page 383) of the Report. Specifically, the Report notes that 'these emissions estimates are based on a scenario of full exploitation of the entire onshore gas reserves in the Canning Basin, which is implausible and highly misleading'.

The Panel considered and estimated the direct Greenhouse Gas emissions from unconventional gas operations and the likely Greenhouse Gas emissions over the full lifecycle from the development and use of gas extracted using hydraulic fracture stimulation in Western Australia for several development scenarios. A detailed analysis is included in section 10 (Page 386) of the Inquiry Report, which can be found on the Inquiry website www.frackinginquiry.wa.gov.au

The Report also recommends additional requirements on the industry to further minimise emissions, including monitoring to detect and fix leaks, reduced emission completions for wells (green-completions) and carbon offsetting.

Conclusion
I believe that there is nothing in the petition or in the submission from the principal petitioner that is new or was not considered during the Inquiry and that:

- The banning of hydraulic fracture stimulation in Western Australia was a decision of the State Government. The Report, which informed the decision of the State Government, included an examination of scientific and historical evidence associated with the impacts of fracking on health, agricultural, heritage, community and the environment, as defined in the EP Act (which covers, climate stability, water quality and air quality).
- The Panel included expertise in the field of human health and climate science;
- Recent literature published in the Compendium of Science, Medical and Media Findings Demonstrating Risks and Harms of Fracking's Fifth edition has been reviewed by the Panel and is discussed in the Inquiry Report (Page 415); and
- Literature by Climate Analytics has been reviewed by the Panel and is discussed in the Inquiry Report (Page 383).

Thank you for the opportunity to provide comments on the Terms of the petition and the submission from the principal petitioner.

Yours sincerely

Hon Stephen Dawson MLC
MINISTER FOR ENVIRONMENT
18 FEB 2019