

Fracking onshore Australia 2019

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SUMMARY

Australia is at last seeing common-sense with some of its key politicians at State level moving to remove barriers to the use of fracking as an exploration and production technique. The most recent and politically important have been the decisions of Western Australia and the Northern Territory to allow fracking under controlled conditions and apparently strict regulations. Based on publicly available material this extended abstract will explore exactly how far those two Governments are prepared to go in 2019 and the best indications of the areas of regulation and the conditions that will be applied.

This abstract will not address any political, social, health or cultural issues focusing only on technical scientific matters including some of the environmental aspects.

INTRODUCTION

For years we have been battling environmental groups and their biased views of life to the oil and gas industry, whether that be shale, conventional or coal seam based and whether the plays may be closer to built up areas or in very remote areas such as the Beetaloo Basin in the NT. Emotionalism has been the basis of their arguments and science has only been used where the group can misconstrue any issues that may arise in the USA.

At this point in history Australia still has a complete ban on fracking in onshore Victoria, is working to remove bans in NSW, with partial bans and moratoriums in SA and the NT and is getting to understand what the WA Government is loosening its control over for very limited areas in that State (2% of the landmass).

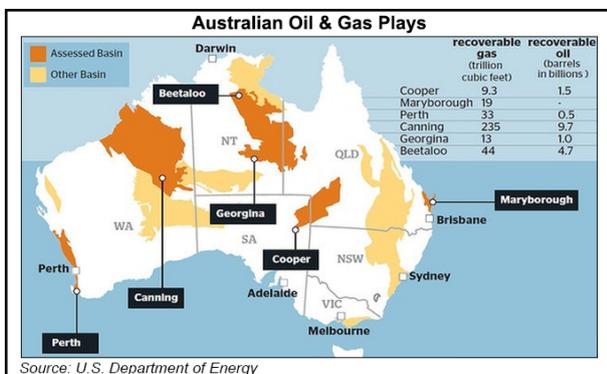


Figure 1. Map of Australia where the current areas of interest are emphasised.

A paper was written for the first AEGC (Williamson, 2018) entitled Fracking Onshore Australia and presented in February 2018 to the assembled in Sydney. There is no point in revisiting that paper other than to note that this abstract is a very important update to the 2018 paper.

The reality to the industry progress was the independent government Inquiries referred to in that paper and most importantly the USA Environment Protection Authority Report (U.S. EPA) into the impact of hydraulic fracking on drinking water in the USA. The NT Inquiry (Scientific Inquiry into Hydraulic Fracturing in the Northern Territory, 2018) is the most compelling from a technical regulations insight perspective. The most recent Report from the WA Environment Protection Authority (Independent Scientific Panel Inquiry into Hydraulic Stimulation in Western Australia, 2018) is probably the strongest political statement after it was adopted by the WA Labor Government headed by Mark McGowan.

Following a CSIRO report to an NT Inquiry into fracking (Scientific Inquiry into Hydraulic Fracturing in the Northern Territory, 2018) and the unequivocal adoption of the findings of the CSIRO, the industry “should” be able to demonstrate the safety and efficiency of fracking, thus limiting the debate to what are the appropriate Regulations that need to be applied when a drilling company uses fracking procedures onshore Australia.

This abstract will reproduce and comment on the most recent government reports and suggest the areas of new regulation that will be applied.

There arguably is no conclusion to be made because the areas of Regulation will become more apparent over the next year or so, as applications to fracc wells are lodged with the relevant authorities. At best it is preferable to conclude the oil and gas industry now has a clear pathway to pursue economic plays onshore Australia which are non-conventional.

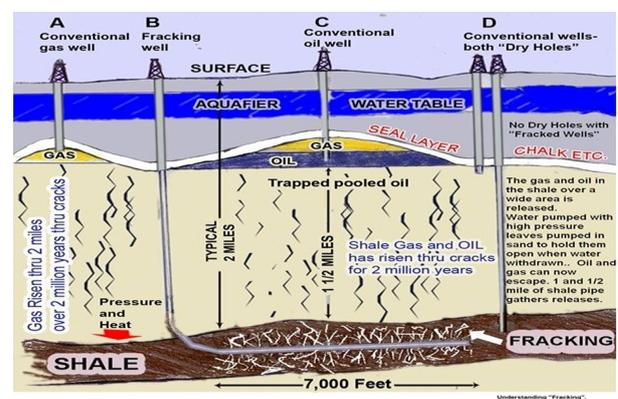


Figure 2. Industry representation.

It is emphasised that this abstract has been written in a style to eliminate as much jargon as is possible without detracting from its usefulness.

EPA USA IDENTIFIED ISSUES

Figure 3 is a graphic generated by one of the green based bodies in the USA, but in one picture it basically shows most of the potential exposures that were in evidence in the USA EPA Report (U.S. EPA). Such a graphic does not indicate levels of potential exposure or comparatives with natural existing sources of leaks in the same area of land. The EPA also identified others including the following:

- when wells are drilled, they pass through smaller pockets of hydrocarbons that are released as the trap is broken, allowing gasses for example to travel up the well stem outside the concreted stem;
- in parts of the USA wells have been fraced far too close to the surface and aquifers, in some cases less than half a kilometre in vertical distance;
- there are considerable differences between the States where fracing occurs as to their disclosures, particularly as to chemicals added to the fracc fluids and the levels at which spills must be advised;
- there are massive shortfalls of pre-data and base data preventing comparison of pre-fracc conditions as against post; and
- the US has been subject to massive fraces (the size of which are basically not possible to be replicated in Australia because of the inability to transport the necessary volumes of fracc chemicals, sand and fluids such as water, in addition to the need for huge amounts of equipment) with the size and nature of these need to be more subject to control in particular sensitive regions.

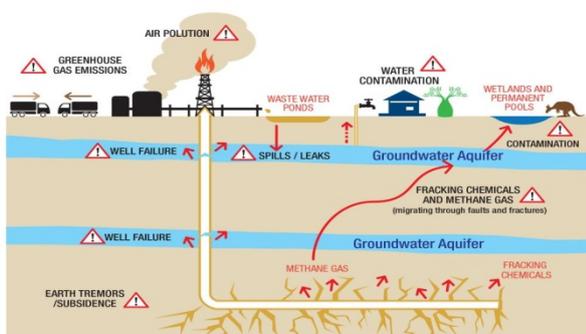


Figure 3. Graphic showing most of the potential exposures that were in evidence in the U.S.A. EPA report (U.S. EPA).

NORTHERN TERRITORY INQUIRY (FINAL REPORT)

The summary final report covers 61 pages (ignoring appendices) and the presentation slides cover 101 pages, so there is no way to be complete in the context of an abstract. What follows is a reproduction of relevant parts of the summary and the recommendations relevant.

Well Integrity

WI was subject to a stand-alone Report from the CSIRO. This report is available on the Inquiry's website. "For wells constructed to modern standards the rate of well integrity failure that has the potential to cause environmental

contamination is approximately 1 in 1000". (Note this is for multi well barriers).

"The rate for a single well barrier failure was much higher, namely 1 to 10%. However, there were very few single well barrier failures observed for wells constructed to Category 9". (Note the Inquiry had used this as their higher standard).

"Provided a well is constructed to a high standard and in a way that takes into account the local geology (i.e. a reference to local faults that could impact integrity) and has passed all of the relevant integrity tests prior to, during and after hydraulic fracturing, there is a low likelihood of integrity issues arising out of its initial construction. However, there must be a program of regular integrity testing throughout the decades long operational life of the well to ensure that if any problems develop, they are detected and remediated early. In particular, the well must pass a rigorous set of integrity tests prior to being de-commissioned because once this process has been completed it is difficult to re-enter it."

Water

The panel were concerned about the use of flowback water (water recovered post fracc that originally was injected as part of the fracc) because it may contain in suspension minerals from the subsurface or radioactive materials. Process water (water recovered post the recovery of the flowback water and as part of later extraction of the gas) was less problem-some so long as it was being stripped pre-injection as part of a new fracc into the same reservoir.

Chemical Additives in the Frac Fluids

Current Regulations seem to satisfy the Panel, except that the composition of process water to be injected later needs to be closely monitored and be part of the ongoing disclosures.

Solid Wastes

This covers a multitude of materials including drill cuttings that are recovered and stripped from the fluids. Their concern seems to be the recycling of such materials for ways like road base or filling holes around sites. This is basically the same as Chemical Additives above, with the obvious products prevented from re-use.

Seismic Activity

The Panel concluded that seismic activity greater than Richter Scale 2 was unlikely to occur as a result of hydraulic fracturing for onshore NT gas, with the possible exception of re-injected waters that may activate a local fault because of the pressures they are re-injected under.

Subsidence

The Panel concluded that as the fracing operations planned in the NT were going to be definitely and substantially below 2 kilometres in depth from the surface, it was highly unlikely there would be any surface subsidence.

Key Recommendations

There were many, as you would expect, and their wordage was lengthy. What follows is a summary of their meaning, with some dropped in context:

- | No. | Details |
|-------|--|
| 5.1 | Development and implementation of a code of practice for the de-commissioning of onshore wells. |
| 5.3 | Development and implementation of a code of practice to ensure the integrity of onshore shale gas well. |
| 5.4 | Well integrity management systems and plans mandated for all onshore gas wells to be hydraulically fractured. |
| 7.12 | Development of wastewater management framework, including auditable system for tracking movements of wastewater. |
| 7.6 | Prohibition on the use of surface water for hydraulic fracturing. |
| 7.8 | Prohibition on the installation of groundwater extraction bores to supply water for hydraulic fracturing within 1 kilometre of an existing or proposed domestic or stock water supply bore. |
| 7.9 | Prohibition on the re-injection of wastewater into deep aquifers and conventional reservoirs. |
| 7.10 | Mandatory disclosure of all chemicals (including salts, metals, and naturally occurring radio active materials) in hydraulic fracturing fluids, flowback and produced water. |
| 7.11 | Petroleum well to be constructed to at least Category 9 or equivalent.
Prohibition on petroleum wells being drilled within 1 kilometre of an existing or proposed groundwater supply bore.
Groundwater must be monitored using multilevel monitored bores. |
| 7.17 | Prohibition of discharge of treated or untreated wastewater into waterways. |
| 9.2 | Development and implementation of a code of practice for the ongoing monitoring of methane from gas wells. |
| 9.5 | Requirement for ongoing methane monitoring and reporting (<i>assuming also concentrations</i>). |
| 10.2 | Prohibition on all exploration and production activity within 2 kilometres of any habitable dwelling. |
| 14.18 | Enforceable codes of conduct be mandated for drilling and hydraulic activities. |

It is noticeable that these recommendations are extended to any form of drilling and not just over fraccs.

The NT government on 20 March 2019 has legislated some of these recommendations. By adopting a fashion of avoiding highly prescriptive regulations they have built into their system some flexibility based around world's best practice and codes of practice (see Section 118 (2) new paragraph (ra)). One matter deserves notice and that is the fact that any "person" can now bring an action in the Supreme Court to appeal a decision of the Minister even if that person has no financial or other interest in the matter subject; the consequence is likely to be protracted appeals processes by green groups.

WESTERN AUSTRALIA INQUIRY

Shortly after the Labor Government was elected in WA they imposed a moratorium on all fracking operations onshore WA and they again set up another inquiry (Independent Scientific Panel Inquiry into Hydraulic Stimulation in Western Australia, 2018); the previous WA Government had one substantial inquiry that ran for two years on essentially the same subject.

The 2018 inquiry had a panel that was headed by Dr Tom Hatton. This panel produced a report (Independent Scientific Panel Inquiry into Hydraulic Stimulation in Western Australia, 2018) in September 2018 that had essentially the same recommendations as that of the NT other than to cover some specific WA issues in lieu of NT issues. Again, we have a 609 page report and no way to summarise it in the context of this abstract.

In comparison to the NT, the WA Government has not moved to legislate the 91 findings or the 44 recommendations. This is probably because of internal party issues, but that at best is speculation. What is reasonable to suggest is that the NT does have an urgent need to get on with developing its resources to generate future cash flows whereas WA is not so pressured and it has many years of experience in dealing with onshore oil and gas projects including a quality set of regulations.

We must content ourselves with cherry picking some of the Panel's thoughts:

"Recommendation 6: All chemicals proposed for use must be approved for use in Australia. The use of Benzene, Toluene, Ethylbenzene and Xylene (BTEX) in drilling and hydraulic fracturing fluids should be banned. An enforceable Code of Practice should include the requirement to test for and assess the risk from, a comprehensive list of analytes in groundwater, produced and flowback water, including geogenic chemicals and radon.

Recommendation 10: Baseline measurements of atmospheric levels of greenhouse gas (GHG) should be acquired prior to the development of onshore wells employing hydraulic stimulation and should be the responsibility of the Regulator.

Recommendation 33: To further ensure well integrity and thus environmental protection and public safety, well design, construction and testing should be assessed by an independent, certified expert well examiner, reporting to the Regulator as a required part of commissioning, licensing and de-commissioning.

Recommendation 36: Baseline and subsequent environmental monitoring data collected as a regulatory requirement in the licensing, approval and auditing of unconventional oil and gas developments associated with hydraulic fracture stimulation should be publicly and easily available, by default."

Needless to say, there are many more that will be worked through by the WA Government Departments as they come to grips with what they have been handed. At this date and on behalf of the WA Government the Premier of WA, Mr Mark McGowan, has unequivocally accepted the science behind fracking is reliable, safe and secure and has warranted that WA will legislate to allow fracking to take place in three distinct areas of WA subject to strict Regulatory controls and monitoring.

CONCLUSIONS

While the NT and WA Governments are intent on following the Recommendations of their Inquiries it will be interesting to see exactly how any of the Recommendations are wound back into practical reality zones based on what are the terms of the "Codes of Practice".

It is obvious that if one ignores the politics behind the Inquiries, the only way fracking onshore, in States like NT and WA and possibly NSW later, will proceed is to comply and be prepared to comply at the time of seeking an exploration permit in those states and territories.

It is not appropriate for us to be overly specific with our conclusions on future regulations. The following observations are expected to be useful:

- there will be Codes of Practice legislated and these will be enforceable;
- drilling practices reviews and over engineering casing will be the norms;
- dealing with water requirements, the cleansing of those waters and their eventual disposal will be heavily regulated and monitored;
- exploration companies will need to ensure their contractors, particularly their drillers, are complying to the Code of Practice and there will need to be financial penalties upon contractors if they so breach which are capable of being recovered in a timely fashion. This is likely to open up standard drilling contracts to a total new set of clauses past best endeavours and best practice. It is also likely to change which entities will be selected as contractors and could easily impact future pricing;
- baseline data, updating that data and its collection and maintenance will be seriously important from a corporate governance perspective; and not last or least
- site staff and contractors will need considerable training and re-training to ensure they properly understand and comply with the new regulations.

ACKNOWLEDGEMENTS

All the work on this abstract has been done by the author based on publicly available documents which are referenced below.

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