

**TERMS OF REFERENCE FOR THE SCIENTIFIC INQUIRY INTO  
HYDRAULIC FRACTURING OF ONSHORE UNCONVENTIONAL RESERVOIRS  
AND ASSOCIATED ACTIVITIES IN THE NORTHERN TERRITORY**

**BACKGROUND**

On 14 September the Northern Territory Government announced a scientific inquiry into hydraulic fracturing of onshore unconventional reservoirs in the Northern Territory (the **Inquiry**) under the *Inquiries Act (NT)*.

**DEFINITIONS**

For the purposes of this document:

“Associated Activities” means:

- (a) the acquisition of ground or surface water for hydraulic fracturing;
- (b) the mixing of water, chemicals and proppant to create hydraulic fracturing fluid;
- (c) the return of injected fluid and water produced from the unconventional reservoir to the surface after hydraulic fracturing, and subsequent transport for reuse, treatment or disposal; and
- (d) the reuse, treatment and release of wastewater generated by hydraulic fracturing.

“environment” means land, air, water, organisms and ecosystems and includes:

- (a) the well-being of humans;
- (b) structures made or modified by humans;
- (c) the amenity values of an area; and
- (d) economic, cultural and social conditions.

“environmental impact” means any change, or potential change, to the environment.

“environmental risk” means the chance of something happening that will have an environmental impact, measured in terms of the environmental consequences and the likelihood of those consequences occurring.

“hydraulic fracturing” means the injection of fluids under pressures high enough to fracture the gas bearing formation where the fluid is comprised of water, chemicals and proppant.

“unconventional reservoir” is a reservoir where the gas bearing formation is shale.

**TERMS OF REFERENCE**

The Inquiry will:

1. assess the scientific evidence to determine the nature and extent of the environmental impacts and risks, including the cumulative impacts and risks, associated with hydraulic fracturing of unconventional reservoirs and the Associated Activities in the Northern Territory;
2. advise on the nature of any knowledge gaps and additional work or research that is required to make the determination in Item 1, including a program for how such work or research should be prioritised and implemented, that includes (but is not limited to):
  - a. baseline surface water and groundwater studies,
  - b. baseline fugitive emissions data,
  - c. geological and fault line mapping, and

- d. focus areas for baseline health impact assessment,
3. for every environmental risk and impact that is identified in Item 1, advise the level of environmental impact and risk that would be considered acceptable in the Northern Territory context;
4. for every environmental risk and impact that is identified in Item 1,
  - a. describe methods, standards or strategies that can be used to reduce the impact or risk; and
  - b. advise whether such methods, standards or strategies can effectively and efficiently reduce the impact or risk to the levels described in Item 3;
5. identify any scientific, technical, policy or regulatory requirements or resources that are in addition to the reforms being implemented through the existing environmental reform process that are necessary to reduce environmental risks and impacts associated with the hydraulic fracturing of unconventional reservoirs to acceptable levels; and
6. identify priority areas for no go zones.

When the Inquiry makes a determination under Item 1 about whether or not there has been an impact or risk on economic, cultural and social conditions, the Inquiry will not only consider the impacts and risks of hydraulic fracturing and the Associated Activities, it will also consider the impacts and risks of the development of the onshore unconventional gas industry, including exploration activities such as seismic surveys and aerial surveys, land access and costs and benefits of the industry. This may be undertaken through a social impact assessment or similar activity.

## **METHODOLOGY**

In the course of delivering the Terms of Reference, the Inquiry will:

1. advise the timeframe for the Inquiry prior to 1 January 2017;
2. develop and implement a stakeholder engagement program, which will be publicly released prior to 1 January 2017 and which will include opportunities for the public to give written submissions and meet with the Inquiry in Darwin, Katherine, Tennant Creek and Alice Springs (and potentially other communities) prior to and following:
  - a. the release of an Interim Report on the Findings of the Inquiry; and
  - b. the release of a draft Final Report on the Findings of the Inquiry;
3. have regard to issues raised in the course of implementing the stakeholder engagement plan that relate to the Terms of Reference;
4. subject to any request for a submission or any part thereof to be kept confidential, make all submissions to the Inquiry publicly available;
5. have regard to relevant domestic and international reviews and inquiries regarding the environmental impacts and risks associated with hydraulic fracturing of unconventional reservoirs and the Associated Activities; and
6. consider the principles of ecological sustainable development and the precautionary principle.

## Government Response to Key Issues Raised in the Submissions to the Draft Terms of Reference

*Note: Nothing in the Terms of Reference will affect the terms of the Moratorium on the Hydraulic Fracturing of Onshore Unconventional Reservoirs in the Northern Territory*

	<b>Issue</b>	<b>Proposed Government Response</b>
1	The Inquiry should consider all factors and processes associated with hydraulic fracturing – not just hydraulic fracturing itself	<p><b>Agreed.</b></p> <p>The final Terms of Reference make it clear that the Inquiry must address <u>all</u> parts of the hydraulic fracturing life cycle, not just hydraulic fracturing. A definition of “Associated Activities” has been added to the Terms of Reference and means:</p> <ul style="list-style-type: none"> <li>- the acquisition of water for the purposes of hydraulic fracturing</li> <li>- the mixing of chemicals that go into hydraulic fracturing fluids</li> <li>- the treatment of flowback and produced water from hydraulic fracturing</li> <li>- the reuse, treatment and release of wastewater generated by hydraulic fracturing.</li> </ul> <p>The Inquiry must consider the environmental impacts and risks associated with hydraulic fracturing <i>and</i> the Associated Activities in the course of the Inquiry.</p> <p>The environment as defined in the final Terms of Reference also includes the well-being of humans and economic, cultural and social conditions.</p>
2	The Inquiry should examine all phases of a project, including exploration, extraction, production, decommissioning and rehabilitation	<p><b>Agreed.</b></p> <p>The Terms of Reference make it clear that the Inquiry must consider the environmental impacts and risks associated with hydraulic fracturing and the Associated Activities at all stages of a project including during the exploration and production phases of a project.</p>
3	The Inquiry should examine the <i>cumulative or regional impacts</i> of hydraulic fracturing and associated activities	<p><b>Agreed.</b></p> <p>The Terms of Reference make it clear that the Inquiry must consider the nature and extent of the environmental impacts and risks, <i>including the cumulative impacts and risks</i>, associated with hydraulic fracturing and the Associated Activities.</p>

	<b>Issue</b>	<b>Proposed Government Response</b>
4	The Inquiry should assess the social and economic benefits and costs associated with the onshore unconventional gas industry must be examined – not just impacts on the physical environment	<p><b>Agreed.</b></p> <p>The definition of “environment” in the final Terms of Reference goes beyond the physical environment (i.e. land, air, water, organisms and ecosystems) and includes “economic, cultural and social conditions”.</p>
5	The Inquiry should assess the impacts and risks of activities like seismic surveys (i.e. not just hydraulic fracturing and the Associated Activities)	<p><b>Agreed.</b></p> <p>Exploration activities that are part of the onshore unconventional gas industry that are <u>not</u> hydraulic fracturing or the Associated Activities may have an impact on landowners, especially from a land access perspective. These types of activities include aerial and seismic activities.</p> <p>The final Terms of Reference make it clear that the Inquiry must determine the impact of the <u>whole onshore unconventional gas industry</u> (which includes aerial and seismic surveys) on “economic, cultural and social conditions” in the Northern Territory. In other words, the Inquiry must consider the impacts (in terms of land access) of activities like seismic surveys and aerial surveys on landowners.</p> <p>Notwithstanding the above, an assessment of the <i>physical environmental</i> impacts and risks associated with exploration activities that are not hydraulic fracturing or the Associated Activities, such as aerial and seismic surveys, is not included in the final Terms of Reference because the physical environmental impacts and risks associated with these types of activities are well understood by the scientific community and do not require special analysis by the scientific Inquiry panel. The Inquiry must focus its time and resources on the areas of greatest concern to the Territory community, which are hydraulic fracturing and the Associated Activities (i.e. activities that may have an impact on water and the physical environment).</p>
6	The Inquiry should collect new on-ground data and do baseline water studies of groundwater and surface water in key Territory shale gas basin areas	<p><b>Not agreed.</b></p> <p>The Inquiry will review the current science to determine the nature and extent of the environmental impacts and risks associated with hydraulic fracturing and the Associated Activities and any gaps that exist in the science that limit the Inquiry’s ability to make that determination. Where there are gaps, the Inquiry will advise on additional research required to make a determination as well as a program for further work and research. It is not, however, within the scope of the Inquiry to actually collect on-ground</p>

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		<p>data and do baseline water studies.</p> <p>In addition to the above, the Inquiry is required to identify any scientific or technical requirements necessary to reduce environmental impacts and risks to a level that is acceptable. It is open to the Inquiry to recommend that the collection of on-ground data and baseline water studies is required to achieve this result.</p>
7	The Inquiry should consider prior scientific studies and the experiences of and lessons learned in other jurisdictions	<p><b>Agreed.</b></p> <p>An extensive body of work exists on the environmental impacts and risks associated with hydraulic fracturing and the Associated Activities. Many of the submissions on the draft Terms of Reference referred the Inquiry to relevant domestic and international studies. These will be provided to the Inquiry.</p> <p>The final Terms of Reference make it clear that the Inquiry must have regard to relevant domestic and international reviews and inquiries regarding the environmental impacts and risks of hydraulic fracturing and the Associated Activities.</p>
8	The Terms of Reference should require the Inquiry to estimate the water demand of a shale gas industry in the Northern Territory	<p><b>Not agreed.</b></p> <p>The absence of an actual gas production project combined with limited knowledge about the location, nature and extent of unconventional gas resources in the Northern Territory and a moratorium on hydraulic fracturing means that the Inquiry will not be able to determine the actual water demand of a hypothetical onshore unconventional gas industry.</p> <p>The Inquiry will, however, be required to</p> <ul style="list-style-type: none"> <li>(a) determine the nature and extent of the impacts and risks associated with hydraulic fracturing and the Associated Activities, including the impacts and risks associated with the acquisition of water, and</li> <li>(b) propose ways to ensure that the environmental impacts and risks are reduced to acceptable levels.</li> </ul>
9	The Inquiry should consider the impact of an onshore petroleum industry on landowners	<p><b>Agreed.</b></p> <p>The final Terms of Reference make it clear that the Inquiry must report on the impact of an onshore unconventional gas industry – including hydraulic fracturing, the Associated Activities and all other activities associated with the industry such as aerial and seismic surveys – on economic, cultural and</p>

	<b>Issue</b>	<b>Proposed Government Response</b>
		<p>social conditions in the Northern Territory.</p> <p>The Inquiry must therefore consider the impact that the onshore unconventional gas industry as a whole will have on landowners and how those impacts and risks can be reduced to “acceptable” levels.</p>
10	The Inquiry should consider the impact of an onshore petroleum industry on Traditional Owners	<p><b>Agreed.</b></p> <p>Over half the Northern Territory is Aboriginal land under the <i>Aboriginal Land Rights Act</i> and most of the remaining land is subject to a native title claim or determination under the <i>Native Title Act</i>. The impact of hydraulic fracturing, the Associated Activities and the onshore petroleum industry generally on Traditional Owners will be a key part of the Inquiry. Specifically, the final Terms of Reference provide that the Inquiry must determine the impacts of the <i>whole unconventional gas industry on economic, cultural and social conditions</i> in the Northern Territory.</p>
11	The Inquiry should consider the “unevenness” of the playing field, particular in regards to pastoralists and Traditional Owners who go up against well-resourced petroleum companies	<p><b>Agreed.</b></p> <p>The final Terms of Reference require the Inquiry to determine the nature and extent of the impacts and risks of the onshore unconventional gas industry on social, economic and cultural conditions. To the extent the industry (via land access) impacts pastoralists and Traditional Owners, it must be considered by the Inquiry, including that the Inquiry must advise on ways to reduce the impact of the land access issues on pastoralists and Traditional Owners.</p>
12	The Inquiry should identify no go zones	<p><b>Agreed.</b></p> <p>New Item 6 of the final Terms of Reference requires the Inquiry to identify priority areas for no go zones.</p>
13	The Inquiry should report on the benefits of the industry, including employment, training opportunities, improved infrastructure and benefits to Traditional Owners and landowners	<p><b>Agreed.</b></p> <p>The Terms of Reference make it clear that the Inquiry must consider the impact of the development of the onshore unconventional gas industry as a whole on economic, cultural and social conditions in the Northern Territory.</p> <p>This means that the Inquiry must consider both the benefits and costs associated with the development of the industry.</p>

	Issue	Proposed Government Response
14	The Inquiry should report on how government can create a best practice regulatory framework	<p><b>Agreed.</b></p> <p>The Government agrees that the regulatory framework is key to reducing the environmental risks and impacts associated with hydraulic fracturing and the Associated Activities to acceptable levels. The Terms of Reference require the Inquiry to identify the regulatory requirements that will ensure environmental impacts and risks are reduced to acceptable levels.</p> <p>As a general comment, the term “best practice” has not been included in the final Terms of Reference. The test of whether or not the regulatory framework is effective and efficient is not that it is “best practice”, it is whether or not the risks and impacts associated with a particular activity (e.g. hydraulic fracturing) are reduced to levels that are acceptable in the Northern Territory context. If “best practice” methods do not <i>also</i> reduce impacts and risks to <i>acceptable</i> levels, then they will not be deemed suitable in the Northern Territory context.</p>
15	The timeline for comments on the Terms of Reference is too short	<p><b>Not agreed.</b></p> <p>The Government allowed four weeks for the community to comment on the draft Terms of Reference, which is an appropriate period of time. In addition to having an opportunity to comment on the draft Terms of Reference, there will be further opportunities to make submissions and presentations to the Inquiry. The Inquiry will release a stakeholder consultation program before 1 January 2017 with further information.</p>
16	There must be comprehensive community consultation at all stages of the Inquiry process	<p><b>Agreed.</b></p> <p>The Government agrees that comprehensive and meaningful stakeholder engagement is fundamental to the integrity of the Inquiry and any subsequent report. While the details of the stakeholder engagement program will be a matter for the Inquiry, the Terms of Reference (see the “Methodology” section) require the Inquiry to develop and implement a comprehensive stakeholder engagement program, which will be publicly released. The stakeholder engagement program will include opportunities for the public to give written submissions and meet with the Inquiry in Darwin, Katherine, Tennant Creek and Alice Springs (and potentially other communities) in respect of:</p> <ul style="list-style-type: none"> <li>- an Interim Report on the Findings of the Inquiry; and</li> <li>- a draft Final Report on the Findings of the Inquiry.</li> </ul>

	<b>Issue</b>	<b>Proposed Government Response</b>
17	<p>The Inquiry panel should include:</p> <ul style="list-style-type: none"> <li>• a human health expert</li> <li>• a sociologist</li> <li>• a petroleum, civil and transport engineer</li> <li>• Traditional Owners</li> <li>• community representatives</li> <li>• a representative from the tourism industry</li> <li>• a representative from the agricultural industry</li> <li>• a representative from the pastoral industry</li> <li>• a representative from the recreational fishing industry</li> </ul>	<p><b>Agreed in part.</b></p> <p>The Inquiry is an <i>independent</i> and <i>scientific</i> inquiry into the environmental, social and economic impacts and risks of hydraulic fracturing and the Associated Activities and whether or not those impacts can be reduced to acceptable levels. The persons that are best equipped to make the determinations required by the Terms of Reference are scientific experts. The Inquiry is comprised of 10 highly regarded scientists with expertise in the following key areas: water science, geochemistry, groundwater, ecotoxicology, human health, geology, terrestrial ecology, industrial science, engineering, community engagement and natural resource management.</p> <p>Given the focus on “economic, cultural and social conditions” in the Terms of Reference, it was also deemed appropriate to include a person with expertise in social science on the Inquiry panel. Further, given that the reference to the “well-being of humans” in the Terms of Reference it was also deemed appropriate to include an expert in human health risk assessment on the Inquiry panel.</p> <p>The development and implementation of a comprehensive stakeholder engagement program is the most appropriate way to get the views of key stakeholders. The Inquiry will prepare the stakeholder engagement program for public release in 2016. The engagement program will ensure that the community has several opportunities to engage meaningfully with the Inquiry. Traditional Owners, Aboriginal people and their representatives (including Aboriginal land councils and prescribed bodies corporate) the tourism, agricultural, fishing and pastoral industries will be key stakeholders in the Inquiry’s engagement process.</p>
18	<p>The Terms of Reference should include a discussion of the prospectivity of the Northern Territory’s geology for commercial sources of onshore unconventional gas</p>	<p><b>Not agreed.</b></p> <p>Given the low level of exploration data available on unconventional gas reservoirs in the Northern Territory and the fact of the moratorium on hydraulic fracturing, it is beyond the scope of the Inquiry to make a determination on the prospectivity of unconventional gas reserves in the Northern Territory.</p>
19	<p>The Inquiry should consider the coexistence of onshore unconventional gas activities with future and existing water and land</p>	<p><b>Agreed.</b></p> <p>The final Terms of Reference make it clear that the Inquiry must determine the impacts and risks of an onshore unconventional gas industry on economic, cultural and social conditions in the Northern Territory. This includes an analysis of the extent to which the industry can coexist with future and existing water and land uses. The coexistence of the unconventional gas industry with other industries</p>

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	uses	will have a bearing on what “acceptable” levels of environmental impact and risk means for the purposes of Item 3 of the final Terms of Reference.
20	The Inquiry should consider the ability of onshore unconventional gas to contribute to the Northern Territory’s overall energy sources	<b>Agreed.</b> There is only limited information available on the location and extent of the Northern Territory’s unconventional gas reserves. This makes it difficult to quantify the impact that the industry will have on the Northern Territory’s energy supplies. However, the final Terms of Reference make it clear that the Inquiry must report on the impact of an onshore unconventional gas industry on economic conditions in the Northern Territory so the Inquiry will be required to report back on this issue to the extent possible, including identifying any additional work that needs to be done.
21	The Inquiry should consider the resource knowledge requirements and policy and regulatory safeguards that would be necessary to enable exploration and development of onshore unconventional gas resources	<b>Agreed.</b> The final Terms of Reference make it clear that the Inquiry must identify any scientific, technical, policy or regulatory requirements and resources necessary to reduce environmental risks and impacts to acceptable levels. This will be in addition to the work that is already being done by the Northern Territory Government to improve the environmental assessment and approval process.
22	The Inquiry should consider the principles of ecological sustainable development and the precautionary principle	<b>Agreed.</b> Item 6 of the Methodology for the Inquiry requires the Inquiry to consider the principles of ecologically sustainable development and the precautionary principle when fulfilling the Terms of Reference.
23	The Inquiry should consider the integrity of gas wells over the longer term (i.e. legacy issues)	<b>Agreed.</b> The final Terms of Reference make it clear that the Inquiry must consider all environmental risks and impacts associated with hydraulic fracturing and the Associated Activities (which includes drilling). This necessarily includes the integrity of petroleum wells over the long term.
24	The Inquiry must build on	<b>Agreed.</b>

	<b>Issue</b>	<b>Proposed Government Response</b>
	<p>the recommendations and findings of Dr Hawke’s <i>Report of the Independent Inquiry into Hydraulic Fracturing in the Northern Territory</i></p>	<p>Item 5 of the “Methodology” section in the final Terms of Reference requires the Inquiry to have regard to relevant domestic reviews and inquiries regarding the environmental impacts and risks associated with hydraulic fracturing. The Inquiry must have regard to the findings and recommendations made in Dr Hawke’s report.</p> <p>The final Terms of Reference require the Inquiry to conduct a different type of analysis than the Hawke report. Specifically, the final Terms of Reference require the Inquiry to:</p> <ul style="list-style-type: none"> <li>- determine the environmental, social, economic and cultural impacts and risks associated with hydraulic fracturing and the Associated Activities and recommend and propose a program for further work and research that will enable a full understanding of those impacts and risks</li> <li>- noting that all activities associated with the extraction of a non-renewable resource will have an environmental impact (even if that impact is insignificant), advise what the “acceptable” level of impact or risk for each of the aforementioned impacts and risks would be in the Northern Territory context</li> <li>- advise how those levels can be achieved and what industry and the government can do to ensure those levels are reached.</li> </ul> <p>The Inquiry is comprised of 10 scientists that are experts in their field. The fields of expertise on the panel include water science, geochemistry, groundwater, ecotoxicology, human health, geology, terrestrial ecology, industrial science, engineering, social science, community engagement and natural resource management. The Inquiry will be chaired by the Honourable Justice Rachel Pepper, who is a current judge on the Land and Environment Court in New South Wales.</p>
25	<p>The Inquiry should address mechanisms for ensuring ongoing community engagement with government and industry as the gas sector develops, including Indigenous community engagement</p>	<p><b>Agreed.</b></p> <p>The “Methodology” section of the final Terms of Reference requires the Inquiry to develop a stakeholder engagement program <i>for the Inquiry</i> for public release. That program will ensure ongoing engagement between the Inquiry and the community for the purpose of fulfilling the Terms of Reference.</p> <p>The final Terms of Reference do not pre-empt the findings and recommendations of the Inquiry by requiring the Inquiry to specify mechanisms for ensuring ongoing community engagement with the government and industry. It is open to the Inquiry to recommend that ongoing community engagement with industry and government is a key measure that will reduce impacts and risks associated with the onshore gas industry to acceptable levels.</p>

	<b>Issue</b>	<b>Proposed Government Response</b>
26	The Inquiry should address potential direct and indirect impacts of hydraulic fracturing on Aboriginal culture and society	<b>Agreed.</b> The final Terms of Reference make it clear that the Inquiry must report on the impact of an onshore unconventional gas industry – including hydraulic fracturing, the Associated Activities and all other activities associated with the industry such as seismic surveys – on economic, cultural and social conditions. This includes Aboriginal culture and society.
27	The Inquiry should have regard to empirical data, including the recent hydraulic fracture of the Amungee NW-1 well by Origin in the Beetaloo Basin	<b>Agreed.</b> The Inquiry is required to assess the “scientific evidence” and this includes empirical evidence to the extent it is available.
28	The Inquiry must ensure it consults with people who speak English as a second language	<b>Agreed.</b> The Inquiry will be advised of this issue when it prepares the stakeholder engagement program as per the Terms of Reference.
29	The Inquiry must be completely independent from the Northern Territory Government	<b>Agreed.</b> The Inquiry is comprised of scientists that are experts in their field. The fields of expertise include social science, human health risk assessment, water science, geochemistry, groundwater, ecotoxicology, human health, geology, terrestrial ecology, industrial science, engineering, community engagement and natural resource management. The Inquiry will be overseen by a member of the judiciary, providing an additional layer of impartiality to the process.  A Taskforce has been established in the Department of Chief Minister to provide logistical and administrative support to the Inquiry. The Taskforce is not a decision making body and cannot set the direction of or influence the Inquiry.
30	The Inquiry should not consult over the Christmas period	<b>Agreed.</b> The Inquiry must develop a stakeholder engagement program for public release in 2016. The face to face consultation program will not be implemented until 2017.

	<b>Issue</b>	<b>Proposed Government Response</b>
31	The Inquiry should investigate how industry can earn and maintain a social licence to operate	<p><b>Not agreed.</b></p> <p>The Inquiry will assess the impact that the onshore unconventional industry will have on social and cultural conditions in the Northern Territory. This may be done via a social impact study. An Inquiry of this kind may help industry to earn and maintain a social licence to operate.</p>