



NORTHERN LAND COUNCIL

Our Land, Our Sea, Our Life

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Hydraulic Fracturing Taskforce
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Dear Hon Justice Pepper

2017 SCIENTIFIC INQUIRY INTO HYDRAULIC FRACTURING IN THE NORTHERN TERRITORY – INTERIM REPORT

We thank you for the opportunity to submit comments to the Interim Report which was released for public comment on 14 July 2017. Officers of the Northern Land Council (NLC) have examined the document and have prepared a submission, which is attached.

The NLC's submission draws attention to a number of concerns in relation to the Interim Report, primarily in relation to Aboriginal people and their culture but also in terms of the statutory responsibilities (role) of the Land Councils. These concerns and other issues are further described in the NLC's submission.

The NLC advocates that a wide array of cumulative, bioregional and strategic impact assessments be undertaken to ensure that all risks associated with the development of the onshore oil and gas industry are captured and to provide maximum protection to the natural, social and cultural environments. Such assessments should not be restricted to the onshore oil and gas industry.

Should you have any queries regarding our comments, please do not hesitate to contact [REDACTED] or via email [REDACTED]

Yours sincerely

Joe Morrison
CHIEF EXECUTIVE OFFICER

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Northern Land Council Response to the
Interim Report of the Scientific Inquiry into Hydraulic Fracturing
in the Northern Territory



25 September 2017

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Preface

On 14 September 2016 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)*. On 14 July 2017 the Inquiry released an Interim Report (the Report), which details the activities undertaken by the Inquiry Panel to date and its preliminary analysis of some of the risks and benefits of hydraulic fracturing for shale gas in the Northern Territory. The Northern Land Council (NLC) is pleased to provide a submission (the Submission) in response to the Report.

The NLC believes that serious reform is required to improve regulation and management of the risks associated with hydraulic fracturing and the broader development of the onshore petroleum industry in the Northern Territory. Regulatory reform and the activities of the onshore petroleum industry must be conducted with the knowledge that Aboriginal people are key stakeholders in these processes. Aboriginal people are an integral part of the social, cultural and political fabric of the Northern Territory and as a group constitute the largest landholders in the region.

The NLC insists that leading practice principles and methodologies be employed when it comes to the implementation of regulatory reform and development of Industry and that any such approach must have regard to scientific norms and relevant principles, highlighting the precautionary principle and Ecologically Sustainable Development (ESD) as examples. Internationally recognised standards such as the United Nations Declaration on the Rights of Indigenous People (UNDRIP) need to be applied and must be consistent with the 'sustainable livelihoods' approach first proposed by the Aboriginal Peak Organisations Northern Territory (APONT) in 2011.

To ensure Indigenous environmental values are accurately represented in any onshore petroleum development proposal across all types of land tenure in the Northern Territory the goal of seeking the informed consent of the Aboriginal land owners for the relevant area should be the standard to which both Government and Industry aim for. The requirement to obtain informed consent would open the door for Aboriginal people to truly be a part of the decision making process for all development proposals that directly affect them and their country if the onshore unconventional gas industry were to be developed in those regions. The Informed consent requirement currently only applies to land governed by the Aboriginal Land Rights (Northern Territory) Act 1976 (ALRA).

It is not the role of the NLC to hold an opinion on the merits (or otherwise) of hydraulic fracturing. Although it is obvious to note that some traditional owners have significant concerns about the use of hydraulic fracturing in the NLC region particularly in relation to the contamination of water in aquifers. To date the Northern Territory Government has not been able to allay those concerns. This is probably because of the poor regulatory regime that applies in the Northern Territory which is a concern shared by the NLC.

The NLC promotes the approach represented by the UNDRIP, ESD and informed consent in the understanding that this is what must be done to achieve the best outcomes for Aboriginal people and in doing so, best represent the environmental values of the petroleum-rich regions of the Northern Territory where Aboriginal people form the majority of the population.

It is the NLC's responsibility to support the informed decisions of Aboriginal people to manage their land, waters and seas, including when engaging with the onshore petroleum industry.

This Submission provides new evidence and responds to information presented in the Report that was not previously communicated publically by the Inquiry.

The Submission is made on behalf of the NLC's Aboriginal constituents and provides information on the relevance of the Inquiry to the NLC and to Indigenous people.

Contents

| | |
|--|------------|
| Preface | iii |
| Chapter 3: Evidence and Risk Assessment Methodology | 1 |
| Chapter 5: Shale Gas Development and Management | 4 |
| 5.2.2 Stages of exploration and development..... | 4 |
| 5.3.3 Decommissioning | 4 |
| 5.5.1 Wastewater production | 5 |
| 5.5.3 Composition of flowback and produced water | 5 |
| 5.6.4 Wastewater management incidents | 6 |
| Chapter 6: Shale Gas in Australia and the Northern Territory | 6 |
| 6.5.1 Scale of development | 7 |
| 6.5.2 Rate of development | 7 |
| 6.5.3 Infrastructure needs | 7 |
| Chapter 7: Water | 8 |
| 7.2.1 Surface water resources and 7.2.2 Groundwater resources | 8 |
| 7.4.1 Water supply | 9 |
| 7.4.2 Water Quality | 10 |
| 7.4.2.1 Surface Water..... | 10 |
| 7.4.2.2 Groundwater | 10 |
| Chapter 8: Land | 11 |
| 8.3.1 Landscape amenity | 12 |
| 8.3.2 Inappropriate planning of regional development due to inadequate knowledge of biodiversity assets | 12 |
| 8.3.3 Spread of weeds | 12 |
| 8.3.4 Changed fire regimes..... | 13 |
| 8.3.5 Habitat loss and fragmentation | 13 |
| 8.3.6 Inappropriate location of infrastructure within a development area | 14 |
| Chapter 9: Greenhouse Gas Emissions | 15 |
| 9.5 Life cycle emissions | 15 |
| Chapter 11: Aboriginal People and their Culture | 16 |
| Part I: General comments to issues raised in chapter 11 | 16 |
| Part II: Specific comments to issues raised in chapter 11 | 18 |
| Part III: NLC response to questions presented on page 92 of the Interim Report | 20 |
| Chapter 12: Social Impacts | 23 |
| Chapter 13: Economic Impacts | 24 |
| Chapter 14: Regulatory Reform | 25 |
| 14.3.2 Petroleum Schedule | 25 |
| 14.3.3 Petroleum Environment Regulations | 26 |
| Meaningful community engagement | 26 |

| | |
|--|-----------|
| Incorporation of traditional knowledge | 27 |
| 14.4.6.3 Onus of proof | 29 |
| APPENDIX 1: References..... | 30 |

Chapter 3: Evidence and Risk Assessment Methodology

This chapter outlines the methodology of evidence gathering and risk assessment applicable to the work of the Inquiry. The approach applied by the Panel to identify and assess the risks associated with the hydraulic fracturing of unconventional reservoirs for shale gas in the Northern Territory has entailed:

- **Identify the spectrum of risks** (environmental, social, cultural and economic - appendix 1). This work has also entailed scoping of 'risk themes' with stakeholders through community meetings, existing literature and also written submissions to the Inquiry;
- **Assess the risks** - in terms of likelihood and consequences should the risk eventuate by applying a standardised risk assessment framework adopted by the Northern Territory Government Petroleum (Environment) Regulations an explanatory guide, which is based on Australian Standards ISO 31000:2009 Risk Management Principles and guidelines (2016), a world-recognised leading practice standard applicable to a range of situations and industries;
- **Determine mitigation measures** (if any) to reduce risk to an acceptable level (referred to as the 'As Low as Reasonably Practicable' or ALARP) and formulate these with as much precision as possible;
- **Identify and fill knowledge gaps** (where possible) for areas which require a more detailed and in depth analysis. To this end independent studies into the potential economic and social impacts of an onshore shale gas industry in the Northern Territory have been commissioned by the Inquiry.

Underpinning Evidence

The main sources of information the Inquiry has referred to in the Report includes:

- Reports from prior Inquiries the Hunter reports and Hawke reports (2014 and 2015)
- Published scientific literature which is limited;
- Unpublished reports such as the Final report of the Australian Council of Learned Academies (ACOLA);
- Stakeholder meetings, community forums/hearings conducted by the Panel and written submissions from stakeholders; and
- Interstate visits with petroleum industry representatives, State regulatory bodies and other sources of expertise.

In line with the views of many stakeholders the Inquiry has judged that there is a paucity of baseline studies.

Studies have been commissioned for the following:

- Quantifying methane emissions from the on-shore shale gas industry- contract awarded to the University Melbourne;
- Mechanisms of unconventional gas extracted and what occurs when wells are abandoned contract awarded to the University of Sydney;
- Social impact assessment framework with Beetaloo sub-basin as a case study contract awarded to Coffey Services Australia Pty Ltd; and

- Economic assessment to determine the actual and potential direct and indirect economic benefits and risks associated with development of the onshore shale gas industry in the Northern Territory - contract awarded to ACIL Allen Consulting Pty Ltd.

It is noted that some of the consultancy firms awarded contracts by the Inquiry may consequently be well placed to capitalise on their involvement with the fracking studies should the onshore shale gas industry proceed in the Northern T and other locations.

Diffusing controversy through a scientific process

The Inquiry process has identified that a lack of readily accessible and comprehensible information has plausibly contributed to hydraulic fracturing for unconventional and conventional gas, shale or coal seam to be referred to as being the same in all situations. Further confusion appears to exist about the degree to which environmental impacts associated with coal seam gas developments are transferable to the shale gas sector, regardless of the geological and geographical context.

Claim and counter claim has led to confusion and misinformation on both sides of the fracking debate. Stakeholder opinions expressed via public hearings held by, and written submissions highlight that multiple perceptions exist. In addition a number of respondents to the Inquiry voiced concerns indicating a lack of trust in the corporations, industry self-regulation and other regulatory bodies involved across both the public and private sectors.

The Report suggests that *the public just wants to know where to turn to get the facts the truth*. It is fair to say that multiple stakeholders are looking for the Inquiry to objectively filter through the plethora of information in a scientific manner which is cognisant of the context for public opinion/perceptions. Public opinion is identified as valuable to the Inquiry: *“public opinion and attitudes are relevant to determining whether or not any onshore unconventional shale gas industry holds a social licence to operate and if absent how it can be obtained” (page 18)*.

The Inquiry has identified a high level of mistrust in terms of interpreting impacts of fracking. In this context the Inquiry is attempting to establish a sound judgement environment and process which will gain trust and respect in terms of its objective rigour. However, there is sufficient elasticity in the risk assessment process for a high degree of subjective judgement to be applied in terms of the focus (aspects of impact) presented in the Interim and Final Reports and how information is treated and weighted when making final judgements (Fishchhoff et al. 1984).

Processing information

The structure of enquiry needs to be sufficiently explicit so that it may be readily viewed as objective and has the capacity to be rigorously questioned by all stakeholders. A trustworthy and precautionary examination process with an explicit structure is required to achieve the following:

- Identifying the objects/values which may be compromised;
- Filtering information and forming judgements with regards to the degree to which the objects/values may be influenced to determine the “material” risks”. The term “material risk” requires definition but could be interpreted to generally mean of sufficient magnitude to cross a threshold in terms of making a difference; and
- Forming judgements and claims and their context (e.g. specific to general) which need to be clearly defined and complemented with a means of examining the weight and or uncertainty of supporting information (e.g. quantity, quality, breadth or rigour of information sources) with appropriate caveats.

Recommendation 1: *Identify the scientific processes to filtering through the wide range of information and selecting the key themes for interrogation in the public reports. Importantly distinguish opinion and speculation from well substantiated information and evidence. For example identify the process of objective social enquiry at least in an appendix identify how themes are selected for presentation in the public report and their degree of representation (e.g. raised a number of times from different sources/sectors vs a lone example etc.).*

Recommendation 2: *define “Material Risks” and the process for judging issues as material and therefore warranting interrogation for mitigation.*

Recommendation 3: *Provide a means of weighting evidence and or claims. Strong or defamatory claims need to be backed by equally strong evidence. Judgements may need to be based on limited short term studies or results with a high degree of variability, extreme extrapolation and even speculation. In contrast some judgements may made with more certainty if backed by rigorous studies with broad sampling over a wide range of situations and undertaken by multiple different parties mostly reaching similar conclusions. A means of qualifying depth and credibility of the underpinning information would improve the risk assessment process.*

Recommendation 4: *Detail the risk assessment process. Highlight the components of a risk element and the interconnections between risk elements (e.g. surface water impacts and biodiversity). Reference all information underpinning proposed impacts and proposed mitigations. Identify the residual impacts with the proposed mitigation measures in place. Indicate the potential risks of noncompliance with mitigations or poor implementation. Clarify criteria for distinguishing examining different scales and dimensions of a risk element (e.g. the scale of impact local to extensive short term to long term impact, reversible to irreversible etc.) leading to a resultant summary statistic (refer to Fishchhoff et al. 1984 &). Chapter 8 of the Report provides some more specific definition of low to high levels of impact this should be provided for each chapter of the Final Report.*

Recommendation 5: *Clarify and quantifying uncertainty in the final risk classification. Risk is currently interpreted as uncertainty to an objective. Establish levels of certainty by means of a ranking scale (e.g. high level of certainty to low level) so that residual risks and their acceptability may be examined in the context of uncertainty to an objective (e.g. security of water quality).*

Qualify the uncertainty in claims (scientific, opinion or speculation). Provide caveats where further evidence is required to make sound judgements or whether there are limits/constraints on increasing certainty even through further studies. Indicate where there is evidence of noncompliance.

Chapter 5: Shale Gas Development and Management

5.2.2 Stages of exploration and development

Final Stage: Removal of all pipelines and other infrastructure.

- The Report refers to the removal of all pipelines and other relevant infrastructure once gas fields are no longer producing. Is it feasible that the removal of sub surface pipelines will occur? Given this would happen many years into the future it is unrealistic and potentially misleading to make such statements when no commitment has been made by companies wishing to develop gas fields. This statement should be removed from the report as it is speculative in nature.
- The Report fails to discuss what would happen to wells and other infrastructure should a company fall into receivership or close down prematurely. The Northern Territory has a large number of legacy mine issues and it would be prudent to discuss the issue of liability and who would have responsibility to remediate under such circumstances. Such discussion should capture the issue of security or rehabilitation bonds and how such bonds are calculated. Questions that should be asked by the Inquiry include: are these bond amounts sufficient to fully remediate all infrastructure and manage abandoned (legacy) wells into the future? If not what changes need to be made to the way bond amounts are determined to ensure remediation is fully funded by the bond?

5.3.3 Decommissioning

The following information was provided to the Inquiry by Pangaea Resources Pty Ltd (Pangaea):

Steel bridge plugs are inserted in the wellbore at various levels. Together with the cement plugs they provide a long term barrier and create segmented pressure cells should the steel casing ever corrode or be broken by fluids in the local geological setting or tectonic stresses or even earthquakes (page 28).

- The term 'long term' needs to be defined. There is a concern that local Aboriginal people will be the principal risk holders for existing and future legacy wells that may slowly deteriorate over time;
- Seismic activity can shear casing particularly casing weakened over time or casing damaged due to inappropriate storage and handling practices (i.e. 'pinched' or corroded casing) who will monitor abandoned wells and who will be responsible for their ongoing maintenance?

Should fluids gain access into the casing, the presence of several layers of cement plugs should mitigate the risk of and movement into a place where environmental harm would result?

- If fluids entering a casing are highly saline, can such fluids increase corrosion (rusting) and cause the casing to deteriorate?
- If saline fluids assist in the deterioration of casing what is to stop seepage of such fluids into groundwaters?

The Report refers to a single blow out event in the Northern Territory. Given that very few wells have been drilled in the Northern Territory thus far a single blow out incident is of concern as it potentially highlights a lack of robustness in the regulatory regime, limited geological knowledge within the region and/or the inexperience of persons undertaking the activity.

5.5.1 Wastewater production

Above ground, the flowback and produced water is either stored in temporary storage tanks or ponds or is conveyed to a wastewater treatment plant. It is worth noting that:

- Section 5.5.1 of the Report references wastewaters being conveyed via pipeline to a wastewater treatment plant, currently no wastewater treatment plants exist in Northern Territory and there has been little discussion relating to the construction of a facility suitable to process wastewaters. Stored wastewater is potentially problematic over the wet season. Storage facilities may overflow or floodwaters may present a hazard.
- Unlined storage ponds, damaged and incorrectly stored and transported wastewaters pose a risk to the environment as has been commented on under section 5.6.4 of the Report.

Where will the wastewater be treated and to what standard? Water can be reused but how many times, at what point does the deteriorating quality of wastewater render it unusable? How will the transport and storage of this wastewater be adequately managed and regulated?

5.5.3 Composition of flowback and produced water

On page 29 of the Report it is written:

overseas studies do suggest that flowback and produced water can contain a much greater number of potentially environmentally sensitive chemicals than are present in the original hydraulic fracturing fluid composition, and that the majority of these additional compounds originate from the minerals and organic compounds present in the shale formation. However, this does not mean that because a chemical is detected in flowback or produced water it will be harmful to human health or the environment.

In accordance with the precautionary principle the Report should also note the counterpoint which is to state that it doesn't mean that the flowback or produced waters are safe either. It is the NLC's view that stringent testing by independent laboratories must be mandated in order to define and understand the chemical composition of flowback and produced water, only then can the identified chemicals be compared with Australian guidelines to determine potential environmental or health issues and informed management plans developed.

Recommendation 6: *Water contaminated with hydrocarbons (from wet wells) must be assessed and contingency water management plans developed prior to commencement of drilling.*

Recommendation 7: *Analysis of both individual chemicals and any new chemical compounds formed as a result of the hydraulic fracturing process should be carried out and the results disclosed to the public to allow any potential environmental or health impacts to be determined.*

Recommendation 8: *There should be full, public, independent analysis and disclosure of the volume, chemical and other characteristics of all flowback and wastewaters.*

5.6.4 Wastewater management incidents

On page 31 of the Report information is provided from a 2016 assessment by the US EPA that “collated data from thousands of wells that had been drilled and hydraulically fractured over the past decade”. From this study the US EPA concluded “there was no evidence of widespread impact on shallow aquifers, and no demonstrated cases of contamination of drinking water resources from hydraulic fracturing at depth. It did however identify cases of drinking water supplies being contaminated by hydraulic fracturing fluids or flowback water, and of the contamination of aquifers as a result of failure of well integrity during and after hydraulic fracturing” (page 31) had occurred. This statement appears to contradict earlier statements in the Report that assert fracking does not impact on groundwater.

Given hydraulic fracturing is the principal technology required to facilitate exploitation of the Northern Territory’s onshore unconventional gas reserves, the NLC urges the Panel to consider the impacts on ground and surface water associated with all aspects of the onshore gas industry including but not limited to activities conducted during the construction, operation, decommissioning and abandonment of wells and associated transportation and other infrastructure. The impacts of hydraulic fracturing are best understood in the broader context of the development of the entire onshore unconventional gas industry from start to end and not as a single event or a limited process.

The aspects of the industry considered by the Panel as having the capacity to impact upon the environment should be broad, long term and include, but not necessarily be limited to employment, land clearing, well construction, perforation, hydraulic injection, flowback and produced water, chemical and wastewater storage, all transport (cartage/handling) of petroleum, wastewater, chemicals, infrastructure and any related materials, decommissioning, rehabilitation and well integrity.

Chapter 6: Shale Gas in Australia and the Northern Territory

It is disappointing that no information was provided about the Northern Territory environment in this section of the Interim Report. There are a number of factors unique to the Northern Territory, including a large Aboriginal population and diverse natural habitats covering large areas, that provides a novel context for the development of a domestic onshore gas industry. An example of this are the many Indigenous Protected Areas that are part of Australia’s National Protected Areas system recognised by the IUCN. This type of information should be provided here to fully appreciate the potential impacts of onshore gas exploration and development. Unique cultural, heritage, biodiversity and other values ascribed to large parts of the Northern Territory, including the Beetaloo sub-basin, are important and deserve to be presented in this discussion of local context. If the Territory’s unique environment is omitted from this discussion the Panel runs the risk of promoting mixed messages where different parts of the Report provides different information and draws different conclusions in relation to the same issue. Any such inconsistencies should be rectified in the Final Report. This issue is demonstrated by the different information presented (and sources of information referenced) in relation to surface impacts under both chapters 6 and 8 of the Interim Report.

6.5.1 Scale of development

Information provided by the petroleum company Origin in its submission to the Inquiry in relation to a large-scale development scenario is presented on page 43 and repeated in table 6.2 of the Report. According to the Origin submission this development would require between 400-500 wells drilled on 50-65 pads over a 20-40 year period. Pipelines and other ancillary infrastructure (compressor stations, access roads, etc.) would also be required. The Report repeats Origin's assertion that "the entire development area would cover approximately 500 km², with a directly affected surface area of less than 10 km² (or 2%) cumulatively" (page 43).

Without knowing the basis for this calculation it is the NLC's preliminary view that the comment relating to the direct impacts on surface area is misleading, as it appears to have omitted road construction. Road construction, and possibly all-weather road construction, will be essential to construct and maintain infrastructure. It appears as though the largest potential impact on the land surface has been left out of this assessment. The NLC urges the Panel to undertake caution and to employ scientific rigour in assessing the veracity of information provided to the Inquiry before this information is presented in any of its public reports.

Notwithstanding the highly speculative nature of predicting surface impacts so early in the life of a project and well before any feasibility assessments have commenced, such forecasts should be accompanied (in public reports) by information about methodology and scope (i.e. land surface area cleared per well multiplied by x number of wells, or x Kms of roads noting average road, width, etc.) and should cover all surface impacts over the life of the project. If these calculations do, as the NLC suspects, only cover limited types of infrastructure over a limited time period then this needs to be disclosed in the Report.

Footnote 94 is repeated twice in the body of the Report (page 44) leading to errors in subsequent references for footnotes 95, 96 & 97.

6.5.2 Rate of development

The Report suggests that the rate of simultaneous development of Australia's gas fields will be hindered by a lack of drilling rigs and suitably experienced people. If supply constraints dictated higher prices then companies could potentially secure additional drill rigs and more workers and equipment through new orders or international redistribution of existing stock as has been demonstrated in the offshore sector with rig movements regularly spanning the globe.

6.5.3 Infrastructure needs

At this stage, information provided to the Inquiry and presented in the Report reads "the infrastructure needs of the possible development scenario in the Beetaloo Sub-basin suggests that 200 drilling pads and more than 1,000 wells could be required. Access to the well sites would require several hundred roads in the first instance, and the installation of connecting pipelines to treatment/production facilities" (page 43).

- The phrase several hundred roads is ambiguous. The estimated total straight line Kms and Km² of surface area covered by these roads would be a more relevant reference (such as presented in table 8.1 on page 69).

Chapter 7: Water

In the Northern Territory the onshore petroleum industry is not subject to and is in fact exempt from regulation under the Water Act. The NLC considers this exemption to be a considerable oversight given the potential for rapid development of the onshore petroleum industry in the Northern Territory. In any event it should also be noted that the NT Water Act does not comply with the National Water Initiative. So there is much work to be done to ensure an appropriate regulatory framework for the management and protection of the NTs water resources is brought into existence to ensure that one can have confidence especially in relation to hydraulic fracturing.

Chapter 7 acknowledges that there is insufficient scientific information available to fully understand the potential impacts to both ground and surface waters. Given the lack of quantifiable data it is difficult if not impossible to prove that industry will meet the Northern Territory's aspiration for sustainable development, particularly with respect to key themes and concerns expressed by the public about water.

Given the lack of data available on both ground and surface waters within the Beetaloo Sub-basin (and surrounding regions) and given how little is known about ground and surface waters and their interaction with ecosystems and biota, it is disappointing to see that water use/extraction estimates used in the Report are based in the mainly on estimations. It is also disappointing to see that only water extraction for hydraulic fracturing is considered and the comprehensive water requirements of the industry as a whole does not appear to have been considered in the Report.

The Report fails to consider the multiple hydraulic fracturing events that an onshore unconventional gas well would typically be subject to over its productive life. Water requirements for infrastructure, construction, dust suppression, maintenance and drinking should also be considered and volumes calculated. This failure to properly capture and account for water use is disappointing and fails to meet community expectations as water use and potential contamination are key concerns held by both Indigenous and non-Indigenous members of the Northern Territory public. The NLC hopes this oversight will be rectified in the Final Report.

7.2.1 Surface water resources and 7.2.2 Groundwater resources

These sections of the Report highlight community concerns regarding the risk of excessive water extraction to groundwater and to the maintenance of dry season surface water flows and catchments. Overexploitation of groundwater resources, in many instances, typically leads to moderate if not strong impacts to Groundwater Dependent Ecosystems (GDEs) due to hydrological changes that occur during extraction (MacKay 2006). This can result in changes to the vegetation structure and composition of these ecosystems not to mention the potential for groundwater extraction to lower environmental flows in river systems that can result in lower carrying capacities in these rivers and river dependent ecosystems such as billabongs and wetlands. This is so also concerning the likely effect upon sacred sites such as springs and river systems if there are adverse effects upon water flows and the recharging of aquifers.

In western and southern Queensland, the flow rate of springs fed by the artesian basin have been estimated to have decreased by as much as 75%, contributing to changes to the vegetative communities associated with spring wetlands (Fensham and Fairfax 2003).

This reduction in flow rates has been demonstrated to cause salt intrusion and land subsidence (Kendy et al. 2003) and while NLC notes that conditions and the nature of industry in Queensland

may be different to what is proposed with the Northern Territory the lessons learnt from such examples should be thoroughly considered.

Classically, the application of safe or sustainable groundwater yield is defined in terms of the average recharge rate of an aquifer so as to balance the long term withdrawal and recharge rates. In respect to the Beetaloo Sub-basin, the Panel has acknowledged that little is known about the recharge pathways of the aquifer let alone the rate of recharge. Without greater scientific scrutiny of recharge pathways, aquifer flows, aquifer volumes and sustainable yield, making any assumption on what could possibly be extracted for use in hydraulic fracturing and related activities of the onshore unconventional gas sector could be detrimental to the maintenance of these systems.

The Panel does not appear to have highlighted the need for, or identified any, future research requirements pertaining to the maintenance of environmental flows in river systems. In particular, those that are supplemented by groundwater discharge during seasonal dry conditions. Little consideration has been given to GDEs and in the absence of quantifiable data defining the acceptable level to which groundwater can fall, with minimum impact to environmental values. It is the NLC's view that more research, including basin-wide baseline studies into groundwater and surface water systems, need to be conducted before an unknown level of onshore petroleum development can be entertained.

7.4.1 Water supply

Here the Report seeks to address community concerns related to water supply for petroleum development in the Beetaloo Sub-basin. By the Panel's own admission, the nature of the region necessitates the use of ground water to support onshore unconventional shale gas development. The Panel has sought to address the use of water with respect to hydraulic fracturing and its efforts to seek more information based on a 1,000 to 1,200 well development is commendable. However, the NLC is concerned that any calculation of water use will focus on a discrete temporal scenario rather than assessing water requirements over the life of a development and on a regional basis.

It is well documented that in order to maintain adequate production rates from onshore unconventional gas wells, companies are often required to perform multiple hydraulic fracturing stimulations over the course of a well's life. The Report does not clarify if the projected water usage account for this multiple stimulations over the life of well scenario or not. While the NLC is mindful the Panel may consider this outside of its scope, there are associated activities that have not been considered. These activities extend to pressure testing and flushing of pipes, worker/camp usage and civil works such as road construction and dust suppression. The NLC believes any calculations based purely on well stimulation alone could lead to a gross underestimation of the actual amount of water required to service the industry. Furthermore, unregulated water use would render any rigorous regulatory regime incapable of undertaking adaptive measures to ensure the sustainable use of groundwater in the Beetaloo Sub-basin region. Thus the NLC is strongly of the opinion that at a minimum onshore petroleum development must be subject to legislated regulation under a significantly improved Water Act in the Northern Territory.

Additionally, the NLC maintains concerns about the capacity and willingness of petroleum companies to self-regulate and to apply sustainable approaches to the management of water resources that consider both ecosystem services and the water requirements of other stakeholders during the industry's development across the Northern Territory.

Recommendation 9: *That water usage by the onshore petroleum sector be subject to regulation under a significantly improved Water Act.*

7.4.2 Water Quality

Section 7.4.2 considers five main pathways by which ground or surface waters may be contaminated. It is disappointing that contamination derived from flowback waters in sumps or other storage facilities has not been highlighted as a potential source of contamination.

Potential problems with the storage of flowback water includes:

- unlined storage ponds;
- damage to liners in ponds through poor handling/storage, livestock intrusion or other; and
- overflow of storage ponds during significant (high-intensity) rainfall events that are commonplace across the Top End of the Northern Territory.

The Report notes that there is no obligation for companies to publically divulge the composition of flowback or produced water from shale gas operations and, as noted previously in the Submission, the NLC believes that this omission from legislation should be addressed in the Final Report and taken up by the Government. The NLC advises the Panel to recommend public disclosure so that in the event of a major spill or contamination event the chemical composition of the fluids entering the environment is fully understood.

7.4.2.1 Surface Water

The Report discusses the transportation of chemicals and waste fluids and notes the potential for spill however, the Panel makes no mention about where wastewater will be transported to and by what means. Currently there are no treatment plans within the region so it is expected that wastewater will have to be transported great distances in order to be treated. The NLC believes that industry should specifically identify/nominate how wastewaters will be treated within the Northern Territory and that if the moratorium were to be removed or amended that this should occur prior to any such changes.

In the absence of a suitable facility to process wastewater within the Northern Territory the NLC believes that the petroleum companies working in the region should fund the construction of a plant capable of processing wastewater to a standard suitable for discharge and if the moratorium were to be removed or amended, that this should occur prior to the commencement of hydraulic fracturing activities.

7.4.2.2 Groundwater

The Report discusses the likelihood of groundwater contamination and comments that the chance of spills reaching groundwater is low given the depth of an aquifer. It should be noted that regionally significant aquifers such as the Tindall and Ooloo aquifers are covered by onshore petroleum exploration permits and that in some places these aquifers are unconfined (where the formation or rocks containing the groundwater comprises the upper-most geological layer) and as such are prone to contamination from spills. From this statement it appears as though the Panel is only considering a one-off spill or multiple low-volume spills and doesn't take into consideration of spills over an

unconfined or shallow aquifer or spills that occur constantly in low volumes over a period of time, such as a slow leak within a containment sump.

Given the recent experience of the Katherine Shire in the Northern Territory where groundwaters have been contaminated with PFAS chemicals, it is the NLC's belief that potential groundwater contamination from any source and its management should be of the highest priority to the Panel, Government and any petroleum companies operating in the region.

The Report does highlight that if well engineered solutions are in place the potential for spill and contamination is reduced, this is correct but to date, industry has not demonstrated how it will manage wastewaters and this should occur prior to commencement of any hydraulic fracturing or associated drilling activities.

The Report acknowledges that there is insufficient information available relating to the long term integrity (post-abandonment) of wells that have been subject to hydraulic fracturing. The Report also acknowledges more information is needed on cement plugs, a technology that is a currently used by industry to seal abandoned wells. Given the lack of long term data relating to modern well design and abandonment practices and the potential impacts of these designs and practices to the long term integrity of wells, more consideration should be given to the precautionary principle; that is taking:

- preventive action in the face of uncertainty;
- shifting the burden of proof to the proponents of an activity;
- exploring a wide range of alternatives to possibly harmful actions; and
- increasing public participation in decision making (Kriebel *et al* 2001).

The NLC urges the Panel to acknowledge in the Final Report the uncertainty that exists about exactly how long abandoned wells will maintain their integrity before materials break down and provide a potential pathway for the contamination of groundwater, even when all the required standards have been adhered to in the construction and abandonment of such wells.

Chapter 8: Land

This chapter outlines the key issues and preliminary assessment for impacts of hydraulic fracturing upon the terrestrial elements of the landscape. The following values are addressed by the Report: wilderness and biodiversity, integrity of sustaining ecological processes (such as fire and surface drainage) as well as use of the natural landscape for pastoral and tourism enterprise.

The potential risks to land based assets have been identified through literature review and public submissions. The Report introduces seven potential areas of impact all of which require mitigation. The preliminary assessment defines the categories of low to high risk (page 65) which align with legislated definitions of and material environmental harm and serious environmental harm for the Petroleum Act (Part V Division 2 page 112) which are consistent with the Environmental Offences and Penalties Act (refer to the Petroleum Environmental Regulations - explanatory guide July 2016 page 9).

The following sections each begin with a summary of the judgements made in the Report followed by NLC comments.

8.3.1 Landscape amenity

The landscape amenity impacts are judged to have a high consequence in some contexts (e.g. if detracting from iconic wilderness values). The Report acknowledges that there are guidelines only to define high value areas of high ecological value 'no go zones'. The Report suggests that amenity impacts can be mitigated firstly with clearly defined and legislated 'no go zones' with minimum offsets and secondly with a maximum density of drill pads.

The vast size and the remoteness of the landscape are particular features of the Northern Territory. The potential values to be impacted and consequently proposed mitigations do not acknowledge alternative ecological values such as the value of vast areas which are relatively devoid of human populations. Such areas are now highly rare on this planet and likely to become more so with increasing human population and therefore should be placed in a global (Venter et al. 2015) and national context (Australian Heritage Commission 2003).

8.3.2 Inappropriate planning of regional development due to inadequate knowledge of biodiversity assets

The impacts to biodiversity without further mitigation are judged to have a high likelihood and consequences due to an inadequate knowledge base to guide infrastructure placement. The impacts could be significant, widespread and long term. The main mitigations proposed are inventories to improve the biodiversity knowledge base for infrastructure placement and management and therefore avoid high value areas.

A strategic regional approach such as undertaking a basin-wide survey and ongoing monitoring is supported as assisting with identifying and potentially avoiding cumulative impacts.

The risks to biodiversity in this section require further explanation and justification for quantifying the degree of risk. There is benefit in identifying the broad scale risks to biodiversity as consisting of interconnected components. For example are the main impacts being interpreted as *direct* (such as infrastructure with associated noise and dust etc.) or *indirect* (such as changed fire regimes and weed intrusion).

8.3.3 Spread of weeds

The impacts of weed spread are judged to have high likelihood and consequences. The need for increased clarity around regulation and compliance is required. The need for a holistic and basin-wide approach is also acknowledged e.g. all land owners need to apply the same rigorous management regime.

It needs to be noted the definition of "weed" (a plant which is unwanted) is subjective and depends on the nature of the plant and impact to land use and other values (Grice and Martin 2005). There are numerous examples of declared environmental weeds which were originally wanted in a particular context (e.g. pasture or shade plants) or merely escaped from gardens which were only formally recognised as requiring management once wide-spread and their impact revealed after decades of being in the landscape.

Many environmental weed species (e.g. paddy melons, ruby dock, red natal grass) which are unwanted for conservation areas or areas currently devoid of weeds are not declared under legislation and therefore not legislatively required to be managed if they spread.

Potential impacts to biosecurity as a whole needs to be considered: movement of substrates and water which could involve translocating plant material and ants as well as increased roads enabling rapid movement of invasive species in remote areas.

Vital components to managing weeds as a threatening process include: regional weed risk assessment (inclusive of use of natives if moving seeds from different localities), early detection and rapid response to expansion of existing weed infestation or movement of weeds into new localities (particularly weed free areas) as well as capacity to implement dedicated eradication programs targeting significant invasive species (either new to the Territory and or a region) in very remote localities (Grice and Martin 2005).

There are very few assessments examining the effectiveness of wash down areas as a mitigation method. Reference to an evaluation in South Australia suggests the mitigation potential via this strategy can be questionable due to non-compliance (Rural Solutions report cited in Biosecurity SA, 2012, page 8).

Territory wide and regional capacity to address the increased weed risk needs to be considered for effective mitigation potential. Nationally a majority of experts consider that pathways management strategies of weed spread are inadequately managed (Coleman et al. 2011). In addition the capacity to improve management of machinery and vehicle pathways of weed spread are considered difficult to improve (Coleman et al. 2011).

8.3.4 Changed fire regimes

The impacts of changed fire regimes are judged to have overall medium level of likelihood and potentially high level of consequence but this would vary depending on the vegetation influenced (e.g. fire sensitive vegetation is at greater risk) and climatic zone (e.g. desert vs tropics) with the impacts potentially less so in the tropics. Overall the fire impact is judged to be medium with opportunities to mitigate through fire management partnerships with regional land holders and pursuance of carbon emission reduction programs.

The mitigation potential needs to factor in the need for investment as well as the capacity building with regional participants to establish such programs in new areas.

8.3.5 Habitat loss and fragmentation

The impacts of changed habitat fragmentation at the regional scale are judged to have medium likelihood and consequence with three main avenues of mitigation: a maximum well density, progressive rehabilitation and offsetting.

The greater impacts could be indirect e.g. fire and weeds in terms of fragmentation and disturbance due to difficulty manage extensive alterations to ecological processes.

Offsetting is not mitigation for a risk process but rather compensation for residual impacts (Cross Sector Biodiversity Initiative 2015).

While funding to Aboriginal ranger programs provides multiple benefits, development impacts which change the state of the environment (e.g. invasive species) and increase the environmental workload beyond the life of a project operating within a region has limited benefits.

Further information /clarification is required to make it clear how the Inquiry has reached the overall judgement on the degree of impact of habitat clearing and fragmentation. It would benefit distinguishing the impacts from of an extensive road network from a road network with regular traffic.

Extensive road networks can facilitate the movement of native and exotic species, people accessing areas which were previously inaccessible and also influence fire regimes and surface drainage (Donaldson & Bennett 2004). While progressive rehabilitation is promoted as best practice there are no mechanisms for enforcing the practice. Mitigations need to factor in capacity for compliance and monitoring.

Road networks with regular traffic can have significant localised impacts. Collision with vehicles and increased avenues for predator concentration could potentially lead to localised extinction of species with a small isolated populations and low dispersal capacity (refer to Donaldson & Bennett 2004; Jones 2000; Department of Environment and Resource Management 2009). The impacts are similar to existing developments within the Northern Territory.

Mitigations for construction of pipelines (e.g. open trenches) are well documented but non-compliance can be an issue if the industry does not self-regulate effectively.

An increased infiltration of roads and linear infrastructure (e.g. pipe and powerlines) in extremely remote locations warrants an increase in the knowledge base for the many and diffuse impacts to ensure appropriate management.

8.3.6 Inappropriate location of infrastructure within a development area

The impacts of changed or inappropriate location of infrastructure are judged to have medium likelihood and consequence.

There is a short supply of practical soil erosion skills especially for semi-arid and tropical environments. Alteration to surface drainage is a common issue with the placement of infrastructure. The Northern Territory has a number of recent examples of poor infrastructure design and construction to accommodate natural environmental variations (e.g. Western Desert Haul road) providing evidence that ensuring compliance with rigorous standards in remote areas is a challenge for regulatory bodies.

Recommendation 10: *Compartmentalise the risks to biodiversity as direct and indirect impacts.*

Recommendation 11: *Broaden the scope to biosecurity risks in general movement of plants and animal with substrate and water movements.*

Recommendation 12: *Accommodate in the risk assessment the limitations for weed management mitigations and capacity to implement early detection and intervention in remote locations.*

Recommendation 13: *The risk assessment should factor in the science, monitoring and time lags for capacity building for the mitigation scopes for weeds, fire and species management.*

Recommendation 14: *Compartmentalise the impacts of habitat disturbance and fragmentation into direct and indirect impacts.*

Recommendation 15: *Consider the implications ensuring sound infrastructure design for erosion management in remote localities.*

Chapter 9: Greenhouse Gas Emissions

9.5 Life cycle emissions

This section of the Report only deals with production; leakage of GHG from oil and gas wells contributes to fugitive greenhouse gas emissions as identified in Alberta, Canada (Bachu 2017 and Jackson 2014). Assessment of GHG emissions should be considered from cradle to grave, that is all of the aspects including exploration, construction, production, maintenance, decommissioning and post-abandonment should be taken into account if an accurate assessment of GHG emissions is to be tabled.

Although the amount of GHG emissions generated has been compared between coal, unconventional and conventional gas as a source of energy, no comparison to alternative renewable energy sources has been undertaken. While the Panel has identified that electricity generated by unconventional gas produces less GHG emissions compared to coal-fired power generation, to present a holistic perspective these emissions should be compared to alternatives from the renewable energy sector such as solar.

If the Panel is going to make comparisons then renewable sources of energy supply, such as solar, need to be included so that GHG emissions can be viewed across the full spectrum of industries active in the domestic energy supply sector. By not including information about GHG emissions from the renewable energy sector, the Panel may appear biased towards promoting the role of gas in reducing emissions.

Some discussion and analysis of abandoned or “orphaned wells” and GHG emissions should be included within the Final Report as it is of great concern to Indigenous people and the wider community.

Abandoned, orphaned and inactive wells are of particular concern especially in relation to the management and maintenance of the wells and as a potential source of GHG emissions. In 2014 the Alberta Energy Regulator (AER) calculated some 30,723 inactive wells within the Province with approximately 40% of these being classed as non-compliant, that is wells that do not meet the required regulatory standard.

“The AER determined that the large inventory of inactive wells in the province limits alternative land use due to a lack of abandonment and reclamation. Because the wells are no longer producing, resource recovery is not being optimized and no royalties are being generated. The non-compliant inactive wells could also potentially lead to unknown wellbore integrity issues. Even non-compliant

low- and medium-risk wells have the potential to cause the release of energy products such as oil or gas.”

This statement from the AER identifies the potential for future problems both in terms of GHG emissions and land use restrictions and lessons learnt from Alberta should be adapted to an emerging onshore gas industry in the Northern Territory regardless of differences in applied technologies or construction and other relevant standards between these jurisdictions.

Chapter 11: Aboriginal People and their Culture

This part of the Submission is set out in three parts, as follows:

1. The first, Part I provides general comments to a broad range of issues raised in chapters 11 and 12 of the Report.
2. Part II provides a more detailed analysis and response to these issues.
3. Part III provides a response to each of the questions for Land Councils raised on page 92 of the Report.

Part I: General comments to issues raised in chapter 11

The application of hydraulic fracturing technology provides the impetus for the growth of the onshore petroleum sector in the Northern Territory. This growth will undoubtedly manifest in environmental impacts, particularly in those petroleum rich regions where the industry’s footprint is expected to be greatest, such as the Beetaloo Basin. Assessments of the social and cultural impacts of this growth on the Northern Territory’s Indigenous populations have not been undertaken, and have certainly not been undertaken in accordance with any internationally recognised standards.

The NLC refers the Panel to the World Bank’s 2012 Performance Standards on Environmental and Social Sustainability, particularly Performance Standard 7 (Indigenous Peoples), and Performance Standard 8 (Cultural Heritage) . The full list of publications and other material referenced by the NLC relevant to social and cultural impact assessment is provided at Appendix 1.

The impacts of development and industrial growth on Indigenous people are globally recognised at the highest levels as being an issue of significance².

Recommendation 16: *That social and cultural impact assessments are undertaken over the Beetaloo sub-basin and other prospective petroleum-rich regions of the Northern Territory and that these assessments:*

- *be undertaken by a suitably qualified and independent party;*
- *be targeted to understand impacts and risks posed to Indigenous people, follow established participatory methodologies, and be conducted in accordance with leading practice standards; and*
- *be completed and their finding released to the public before any further development occurs and before any material impacts are realised.*

¹ International Finance Corporation World Bank Group 2012 IFC Performance Standards on Environmental and Social Sustainability Effective January 1 2012

² United Nations 2008, United Nations Declaration on the Rights of Indigenous Peoples

The Report fails to identify all potential cultural risks and impacts associated with the development of an onshore gas industry that are anticipated as a result of the application of hydraulic fracturing technology. Among the risks not adequately considered in the Report are those associated with inadequate publically accessible and reliable information about hydraulic fracturing and the onshore gas industry.

Chapter 11 of the Report rightly argues that wide-scale information dissemination targeted at Indigenous audiences is critical. The Report is wrong to imply that Land Councils have a primary responsibility in respect of public and community education. Organisational responsibility to provide members of the public with opportunity to be informed and participate in public discourse about development rests with government and civil society. Government cannot divide or abdicate its public duty on the basis of race or transfer its responsibilities that pertain to Indigenous people and communities.

The NLC's statutory role in this regard is limited to providing information to Aboriginal people in respect of specific petroleum exploration and production tenement applications and where agreements are in place for granted tenements. The dissemination of information to the Indigenous public in respect of a growing onshore petroleum industry does not fall within the scope of Land Council's statutory functions and as a result the NLC is currently neither mandated nor resourced to undertake this work.

The Report's discussion of cultural impacts is largely focused on the potential risks and impacts to sacred sites. This issue is critically important, but is certainly not the only aspect of Indigenous culture that is likely to be impacted by the development of an onshore gas industry. The Panel is referred to the NLC's original submission to the Inquiry (30 April 2017) which highlights:

- impacts on livelihoods and connection to country where access to traditional lands are restricted or otherwise compromised by the presence of the petroleum industry and location of associated infrastructure;
- impacts on relationships with country where fragmentation of landscapes occurs (such as roads or other infrastructure transecting culturally significant country such as dreaming tracks);
- impacts on traditional knowledge, including the intergenerational transfer of this knowledge³;
- impacts on the social and cultural fabric of kin-based communities where the benefits and opportunities associated with such developments are not equitably distributed; and
- recognising there are strongly held and contested views on both sides of the debate (both supportive of and against fracking), the direct engagement or recruitment of Aboriginal persons by individuals/organisations with an interest on either side of the debate may pose a risk to social cohesion and to relationships/roles associated with traditional kinship systems that may exist between such individuals.

The information provided above is not intended to constitute a comprehensive list of all potential cultural and social impacts relevant to the onshore gas industry in the Northern Territory. It does however effectively demonstrate the diversity of aspects fundamental to Indigenous society and culture which could potentially be impacted upon by the development of this industry and that these impacts are not limited to sacred sites. It is the NLC's view that even when sacred sites are

³ This potential impact is predicated on the assumption that traditional knowledge may be impacted by restricted access to country and the fragmentation of natural habitats and cultural landscapes.

afforded effective protection, it is critical that the Inquiry Panel, Government and Industry afford full consideration to the mitigation of all potential negative impacts to Indigenous society and culture.

Adequate identification of the scope of risks and impacts will only be achieved as part of a comprehensive, targeted impact assessment process. To achieve this outcome a full assessment process including adequate scoping is recommended (as detailed above). This work should be considered by the Panel to inform recommendations in the Final Report for the adequate mitigation and management of the full scope of risks and impacts.

Part II: Specific comments to issues raised in chapter 11

The Report identifies a number of issues related to cultural impacts, specifically:

- provision of adequate information to Aboriginal people;
- Aboriginal health;
- disruption of cultural practices; and
- cultural risks related to ecosystem health.

Aboriginal people not informed enough to understand risks or benefits

There is an urgent need for the dissemination of relevant, accurate information targeting Aboriginal communities, in respect of both hydraulic fracturing and the onshore petroleum industry in general. Pre-emptive public education campaigns about industrial activities are not the responsibility of the Land Councils and it would be erroneous for the Inquiry to continue publishing information to the contrary. While the NLC retains an active interest in the engagement of Aboriginal people in public discourse, public education about private enterprise is not the responsibility of the NLC, nor is the NLC resourced to undertake such tasks.

Under both the ALRA and the Native Title Act (**NTA**), the NLC has statutory responsibilities to consult with people who hold interests within a circumscribed area, when an application for a mineral or petroleum exploration or production title is received. In respect of information dissemination, the statutory responsibility of the Land Councils is to identify and consult with Aboriginal people who are traditional land owners or native title holders of a specific onshore petroleum exploration or production title application area⁴. At these consultations, to ensure that people are able to make an informed decision, the NLC provides unbiased and accurate information.

This consultation process can only be triggered by the lodgement of a petroleum or minerals exploration or production/mining title application. The capacity to conduct these consultations is limited by constraints such as seasonal and cultural restrictions to community access and Land Council resources. It should also be kept in mind that the NLC has a broad range of statutory functions beyond those applicable to the onshore petroleum sector. The ability to undertake consultations in relation to onshore petroleum applications is further dependent on a proponent's willingness to engage with the Land Council and their capacity to fund the required consultations.

Indigenous traditional land owners and native title holders with rights to country over which there is a current petroleum title application comprise only a small portion of the Northern Territory's Indigenous population. The entire Indigenous population of the Northern Territory could potentially experience the impacts associated with growth in the petroleum industry resulting from the application of hydraulic fracturing technology. These impacts will be experienced by people whose

⁴ Or people otherwise directly affected, for example via proponent access and other ancillary infrastructure or neighbouring estates.

traditional lands are not subject to petroleum exploration or production activities, and with whom the NLC would not be required to consult with about any petroleum exploration permit or production licence proposal. Because general public or community education is not a function contemplated by the ALRA or the NTA, the NLC is not resourced to undertake pre-emptive public or regional education campaigns, such as that suggested by the Panel on page 90 of the Report.

There is a risk of politicisation of petroleum consultations such as that described on page 90 of the Report, however the injection of politicised rhetoric into Aboriginal civil society is not a matter for Land Councils to engineer or control. These processes can and do have an incredibly disruptive effect on Aboriginal culture and society and on local group decision making processes and this impact (along with realistic mitigation measures) is something that should be considered by the Inquiry as part of a holistic and comprehensive impact assessment process. The NLC will consider providing further information on request, should the Panel seek to further contemplate this issue.

The NLC notes that the Report's commentary on the former Muckaty nuclear waste repository proposal is both poorly informed and irrelevant to discussion on hydraulic fracturing. This commentary should be omitted from the Final Report. Furthermore it is abundantly clear the account presented in the Interim Report does not fully capture the complexity of views held by the traditional Aboriginal owners in relation to the Muckaty matter.

The NLC effectively consults with and informs traditional Aboriginal owners and native title holders who are required to make decisions in respect of particular onshore petroleum applications. While most Indigenous Territorians may not be required to come to an NLC meeting in respect of a petroleum exploration or production proposal, all will potentially be affected by the growth of this industry and may have views in relation to hydraulic fracturing. As argued by the Report, all have a right to be better informed. To achieve this aim it is recommended that the peak body, or bodies as the case may be, with responsibility for public education and engagement in relation to the onshore gas industry allocate sufficient resources to ensure the general public, including Indigenous Territorians, are better informed about this industry.

Potential adverse impacts on the health of Indigenous communities

The Report's discussion of this theme takes place across chapters 5, 7, 10 and 12. It is of note that the scope of such impacts are not limited to physical health as it is understood in modern medical terms, and more nuanced risks to community health are not all going to be ameliorated by enforced buffer zones around residential areas or by the protection of sacred sites. Certain impacts to community health are bound up in the fabric of Indigenous law and custom and kin-based society and are discussed further under points a) to e) below. These issues will only be afforded due consideration as part of a comprehensive basin-wide impact assessment as recommended by the NLC.

Potential disruption to traditional cultural practices

The Report fairly acknowledges the diversity of potential threats to traditional cultural practices, including fragmentation of the landscape and diverse understandings of causality and of the interconnectedness of seemingly diverse landscapes (particularly in relation to traditional Aboriginal beliefs about aquifers, geological formations and other subterranean features). This discussion also relates to comments in the Report about the potential impacts to Aboriginal culture being interrelated to the impacts to ecosystems, i.e. negative impacts to ecosystems that may result in the impairment of ecosystems services such as environmental water flow/ aquifer recharge and

associated flow-on impacts to Aboriginal culture. This issue is poorly researched in the Northern Territory and warrants further investigation.

The Report states that “...there are well established laws and systems for recognising and protecting Aboriginal traditional interests in their land ...”, followed by “...there have been cases in the Northern Territory where Traditional Owners have rejected mining proposals because of their traditional beliefs about what lies underneath” (p.91). These statements may be misleading unless properly qualified. While there are well established laws on Aboriginal Land Trust (subject to ALRA), and in relation to sacred sites (subject to the Northern Territory Aboriginal Sacred Sites Act), much of the Northern Territory is not Aboriginal Land Trust land, or a sacred site. Many Aboriginal people have traditional interests in lands subject only to the NTA, whereon Indigenous people’s capacity to control industrial developments are limited. A viewpoint often expressed to the NLC is that the NTA does not afford strong protection to traditional Aboriginal land interests; under the NTA there is no right to veto petroleum or other development proposals.

Risks and impacts to the continuation of cultural practices will necessarily be subject to diverse range of variables, including but not limited to local factors such as land tenure and customary knowledge. It is recommended the analysis and mitigation of such risks be undertaken at the local level (small scale engagement with local communities and aboriginal land owners/native title holders) to enable a full consideration of such variables. The Panel’s view that “...laws protecting Aboriginal cultural heritage should be better integrated with legislation protecting the environment and regulating the petroleum and gas industries” is impossible to assess with any veracity until such time as the actual legislative reforms being proposed are presented for discussion.

Part III: NLC response to questions presented on page 92 of the Interim Report

The NLC thanks the Panel for the invitation to submit further written evidence pertaining to our “...experience and understanding of risks arising from damage to or interference with culturally significant sites”(p.92). In response the NLC wishes to draw attention to the preceding discussion, which highlights that whereas the protection of culturally significant sites is important, it is but one of the multitude of aspects of Aboriginal society and culture that needs to be considered to fully understand and mitigate the risks and impacts of hydraulic fracturing and the associated growth and development of the onshore petroleum sector in the Northern Territory.

Following are the NLC’s responses to the points in question raised on page 92 of the Report (and summarised in bold below) specifically for the Land Councils and the Aboriginal Areas Protection Authority (AAPA) to address:

Cultural significance (if any) of sub-surface features: sacred sites include sub-surface features. Ancestral beings who established law and custom in some instances traversed underground to emerge and often re-enter the sub-surface elsewhere in the landscape. Some sacred sites are known as the final resting place for such beings and in these cases the sub-surface may be considered to be the most critical and sensitive aspect of a site. There are numerous recordings of sub-surface rock features and waterbodies being identified as sacred sites. It is neither necessary nor appropriate to reference specific examples in this particular public forum, but rather to note that under Northern Territory legislation all sacred sites are protected, including the sacred sub-surface elements of these places. Some uncertainty does exist with regard to the protection afforded by legislation to ceremonial grounds and the ‘dreaming tracks’ (routes of travel often subterranean) of ancestral beings that connect sacred sites and other cultural features of the land and seascapes. Where does a sacred site end and a dreaming track start? How deep down does the subterranean feature of a

scared site or dreaming track extend? What distance 'buffer zone' is adequate to protect such sites? These questions can only be answered by the particular people with cultural responsibility for, and authority to speak on behalf of, a particular site or tradition. Hence the need for detailed cultural surveys and assessments to be undertaken in response to each specific activity proposed by onshore petroleum projects such as geological mapping, soil or stream sediment sampling, environmental monitoring, seismic surveys, drilling, hydraulic fracturing and infrastructure construction (roads, pipelines, compressor stations, laydown yards, etc.).

Cultural values relating to traditionally significant sites, including their amenity value: traditionally significant sites do not only hold cultural value, but are bound to the spiritual and physical wellbeing of Indigenous people. Damage to sacred sites can have adverse impacts on mental and physical health, social cohesion and economies of Indigenous peoples. For this reason it is important to understand the significance of a site to the relevant individuals, estate groups, communities and region (what is its relevance in a local and regional context? Is it dangerous? What are the consequences of disturbance?). Such an understanding better informs planning and enables specific risk avoidance and mitigation measures to be developed, rather than comparing relative values based on a tally of the individual number of values afforded to such sites.

Nature and extent of the impacts and risks that hydraulic fracturing and the associated activities could have on cultural values in the Northern Territory: the Panel is referred to chapter 7 (pp. 28-31) of the NLC's previous submission to the Inquiry (30 April 2017) which provides information about the diversity of potential cultural impacts related to hydraulic fracturing and the growth of the onshore petroleum sector.

Is any additional work required to understand the nature and extent of those risks: commentary to chapter 11 provided in part 1 (above) of the Submission explicates our recommendation that the nature and extent of the risks and potential impacts be analysed via a targeted, participatory and comprehensive impact assessment process undertaken in accordance with leading practice standards. Such an assessment would be the best forum within which to scope, identify and analyse hazards and risks and to enable avoidance or mitigation of the diverse and interconnected cultural, social and economic impacts under discussion.

Approach taken to mitigate the identified impacts and risks: the NLC is not an agency with responsibility for, or expertise in, cultural or social impact assessment and risk mitigation. There is a wide body of academic and applied work in this field, some of which has been referenced in the Submission. Analysis of this material will reveal that impact assessment for Indigenous populations is a field in which there is a growing body of expertise, particularly in working with Indigenous communities on the social, economic and cultural impacts of major development projects. It is recommended that a full and proper investigation is undertaken by suitably qualified experts, to identify the approach required to mitigate the impacts and risks to Aboriginal culture and society. Any such process should necessarily be participatory, with Indigenous people afforded appropriate opportunity to contribute to both the identification of hazards and potential risks and to the development of plans by which such risks can be avoided or mitigated. It should be noted that although a high-level basin-wide impact assessment would be beneficial as a starting point, further impact assessments and mitigation plans will be required when detailed development proposals are presented so that local risks and impacts can be identified in relation to the specific development proposal and suitable management plans developed and implemented. Again this assessment and planning should include relevant Indigenous participants from the very beginning.

Adequacy and effectiveness of these [mitigation] measures and any gaps in the current approach to protecting culturally significant sites that warrants attention by the Inquiry: the Report states that “current knowledge by the Aboriginal community is inadequate” (p.90) and further suggests that Aboriginal people do not have access to enough information to be informed about the potential risks and impacts of hydraulic fracturing. The NLC has argued that the Inquiry has failed to undertake the necessary steps to fully scope the diversity of social, cultural and economic impacts on Indigenous Territorians. In this regard the terms of reference for the social and economic impact assessments procured by the Inquiry are inadequate. The Inquiry is referred to the previous point (above), wherein it is evident that considerable additional investment and effort is required and recommended by the NLC to understand and mitigate the full range of potential risks and impacts posed to Indigenous people in the Northern Territory.

Risks to maintenance of traditions that underpin recognition of ownership rights under both the ALRA and the NTA: development of the petroleum industry anticipated in prospective areas resulting from the application of hydraulic fracturing technology poses risks to the maintenance of traditions underpinning Aboriginal land ownership in diverse ways, including but not necessarily limited to each point presented below.

- a. The intergenerational transfer of cultural knowledge and law is highly reliant on access to country. Fragmentation of the landscape by the development of gas exploration and production infrastructure, changing landscapes and ecosystems as a result of industrial scale (basin-wide) developments, and restricting access to particular areas as a result of such activity, all have a level of impacts on people’s capacity and inclination to access country.
- b. Indigenous land ownership is communal, based on kinship networks, and most often inherited by descent. Landowning groups are typically comprised, like all families, of people with a diversity of worldviews and opinions on any given issue. As in all families, across generations and genders particularly, individuals may consider an issue such as hydraulic fracturing with very different approaches. Decision-making processes are unique to groups, but are effective processes as they are underpinned by (locally distinct) traditional law and custom. Central to law and custom, and to the wellbeing and health of families, is country. Therefore, often when a development entails environmental change and an element of risk, it is approached by indigenous land owning groups with the greatest of care and caution. This is because while Indigenous people aspire to local and regional economic growth, opportunities for employment and other potential benefits, they also have responsibilities to consider the custodianship of their country and traditional law and custom which are inalienable, and will be inherited by their descendants for all time. In this context decisions and consultations around onshore petroleum proposals will at times inject stresses into the social and cultural fabric of land-owning groups, and can impact upon the decision making process itself. This risk can be realised where a group is required to make decisions in respect of communal land ownership in response to development proposals under both the NTA and ALRA.
- c. The injection of benefits and opportunities into particular land owning groups or local communities arising from resource development projects, where such developments are major, can create local and regional discrepancies in wealth. This can cause intra and inter family/community stress among Aboriginal people, who are typically bound to particular economic modes and relationships within and between families and communities by kin-based systems.

- d. Indigenous law and custom, including that law which pertains to land ownership, was established by ancestral beings at the time of creation. At times these ancestral beings traversed the country. Aspects of Aboriginal law, including that law which pertains to a group's or individual's land rights and responsibilities, relate directly to these travels, including the routes or 'paths' they took. Sacred sites are critically important elements of indigenous cultural heritage but it must be understood that to carve out these sites from the broader interconnected and storied landscape in which they were formed may be considered to be deeply flawed in Aboriginal logic. The process of drawing lines on maps, to delineate a sacred site so it may be identified separately from associated dreaming track(s) and the rest of the cultural and physical landscape seems illogical in a traditional context because of the intricate and inalienable interconnectivity of these features. At a regional level, it is evident that protection of sites as 'islands' while allowing the dreaming tracks between them to be subject to significant disturbance, can have direct (physical and non-physical) impacts on the traditions and cultural practices associated with these sites and on the Aboriginal people with connections to, and responsibility for the protection and maintenance of, these sites and features.
- e. Retaining control of their ancestral lands and having opportunity to participate meaningfully in negotiations in respect of land use is the most effective way to enable Indigenous people to develop their own means of avoiding or mitigating impacts related to onshore petroleum exploration and production projects. Facilitation of robust participatory processes to enable effective conceptualisation and informed group decision-making among Aboriginal people is integral to the development of conditions that best suit the location over which any given development is proposed to occur.

Approach taken by Land Councils to mitigate the impacts and risks identified above in conditions placed on mining operations on Aboriginal land: this area has been subject to a wide range of academic research. Veto provisions based on informed consent apply to both minerals and petroleum exploration applications over Aboriginal Land and so under the ALRA Aboriginal land owners who do not want exploration or mining/production activities on their land have the opportunity to say no and to veto any such proposal. The Land Council's approach to these matters is to ascertain the views of the relevant Aboriginal persons with interests in the land subject to a petroleum title application and provide them with accurate and unbiased information to ensure that decisions are made by the correct people.

Chapter 12: Social Impacts

The Inquiry has commissioned and procured a social impact assessment framework with the Beetaloo sub-basin as a case study. This contract was awarded to Coffey Services Australia Pty Ltd (Coffey). Coffey are utilising a largely pre-designed model or toolkit to undertake this work. The investigation into social impacts has been shaped by the Boomtown toolkit⁵, which was developed by the University of Queensland to analyse social impacts upon rural townships in Queensland that comprise of populations who are majority non-Indigenous. This modelling is not relevant to the socio-economic reality of many townships in the Northern Territory with majority Indigenous populations, including those in and around the Beetaloo basin. The NLC has been informed this

⁵ <https://boomtown-toolkit.org/about>

toolkit may be adjusted to measure variables relevant to majority Indigenous communities, however the Inquiry has not provided any assurance that such adjustments would be applied in the application of this toolkit for the work of the Inquiry. It is the NLC's preliminary view that this social impact assessment has failed to effectively scope and assess the impacts of hydraulic fracturing and associated growth of the onshore petroleum industry on the Indigenous people and communities of the Northern Territory.

The Report separates discussion of (Indigenous) cultural impacts and broader social impacts, with the latter considering the wider Northern Territory society. It is generally accepted that for Indigenous Australians, cultural and social health are bound and co-dependant⁶. The undertaking of separate investigations into the a) cultural and b) social impacts of hydraulic fracturing on Indigenous Territorians will overly limit and compromise effectiveness of both investigations.

A thorough, holistic and participatory approach to impact assessment and analysis should:

- i) target the Northern Territory's Indigenous people;
- ii) accord with leading practice⁷;
- iii) be properly resourced;
- iv) be undertaken prior to the impacts occurring; and
- v) be afforded sufficient time to yield meaningful results and facilitate engagement of both the general public, peak Aboriginal representative bodies and relevant government agencies.

Chapter 13: Economic Impacts

There is very little reliable and accessible data on which to underpin the assumptions needed to support modelling of the economic impacts of both developing and not developing the Northern Territory's onshore unconventional shale gas reserves. Even the most advanced of exploration projects in the Beetaloo sub-basin do not have sufficient data to proceed from exploration to development. For this reason it is difficult to see how any meaningful or definitive conclusions may be drawn regarding the potential economic impacts of this industry. Any conclusion or recommendations formed as a result of this assessment would necessarily be limited and subject to high margins of error and other uncertainties. Any conclusions made in the Final Report about economic impacts must be qualified by noting a paucity of data, margins of error and other relevant factors.

For these reasons the NLC is sceptical about both the validity and usefulness of the information presented in this section of the Report and any additional information about anticipated economic impacts to be presented in the forthcoming Final Report. The NLC recommends the Final Report be upfront about the limitations of the relevant fiscal and other data sets relied upon by the Inquiry or Contractors undertaking work on behalf of the Inquiry, including for the Economic Impact Assessment work being undertaken by ACIL Allen Consulting Pty Ltd (ACIL Allen). At such an early stage in the exploration cycle it is inevitable that very high levels of uncertainty and error will apply

⁶ Australian Government Department of the Prime Minister and Cabinet ~2013 "CULTURE AND CLOSING THE GAP" Factsheet

⁷ International Finance Corporation World Bank Group 2012 IFC Performance Standards on Environmental and Social Sustainability Effective January 1 2012

to all forecast economic impacts related to the onshore unconventional gas sector in the Northern Territory.

Chapter 13 does not appear to describe any specific analysis of economic impacts on Indigenous people. A significant body of work exists that describes Indigenous economies, and the way in which Indigenous economies engage with the type of economic growth and industrial development as projected in the Report⁸. The NLC is disappointed the potential economic aspects of, and risks and impacts to, Indigenous livelihoods and cultural values have not been included, adequately described or subject to a suitable level of interrogation in this section of the Report.

Chapter 14: Regulatory Reform

Chapter 14 addresses the issues relating to regulatory reform – that is, how the Northern Territory Government might regulate hydraulic fracturing and the broader onshore oil and gas industry.

As previously submitted⁹, the NLC has doubts about the ability of existing Government, regulatory and land management bodies in the Northern Territory in regard to the management of the rapid development of an onshore petroleum industry. Furthermore, the NLC is of the view that amendments are required to be made to the existing regulatory framework and legislative instruments in order to adequately address the development and regulation of an onshore petroleum industry.

It is relevant to the effectiveness of the Inquiry that significant reform to environmental legislation in the Northern Territory (Environmental Reforms) and the Inquiry are being conducted concurrently. Ideally any proposed amendments to environmental legislation relevant to the onshore petroleum sector would have been presented for consideration by the Panel and stakeholders prior to, or at least during, the term of the Inquiry and well before the Final Report is drafted. Had this occurred it would have better enabled the Inquiry to achieve its intended goals, especially in relation to the Inquiry's Terms or Reference (ToR) items 1 and 5, where a lack of knowledge about the exact nature of the Environmental Reforms being proposed can reasonably be considered an impediment to the Inquiry. The Government and other stakeholders should be cognisant that findings of the Inquiry related to regulatory reform may be limited in their application by uncertainty surrounding the Environmental Reforms.

14.3.2 Petroleum Schedule

Presently, the Petroleum Schedule (**Schedule**), which operates in conjunction with the Petroleum Act and Petroleum Environment Regulations (**Regulations**), is not legally enforceable and its applicability to a particular operation or operator is subject to Ministerial discretion. The Hunter Reports from 2012 and 2016 both recommend phasing out the Schedule. Subsequently the Department of Primary Industry and Resources (DPIR) has committed to replacing the Schedule with regulations governing petroleum exploration and production activities.

The NLC supports the enshrinement of the Schedule into regulation, however the process should include a review of the contents of the Schedule and regulations and this should be enacted as a matter of priority and prior to the abolition of the Schedule.

⁸ Eg. Altman, J and Kerins, S 2015 People on Country; Vital Landscapes, Indigenous Futures The Federation Press

⁹ NLC Submission to the Inquiry, 30 April 2017.

Recommendation 17: *The contents of the Petroleum Schedule should be reviewed and subsequently enshrined in regulations, which will replace the Petroleum Schedule.*

14.3.3 Petroleum Environment Regulations

The NLC is concerned that the Petroleum Act, Regulations and the associated Schedule do not contain specific and adequate processes and safeguards for assessing and managing risks and impacts associated with onshore petroleum activities. The Report states that the Regulations implement many recommendations from various previous reports, in particular the 2015 Hawke Report. Specifically, the Regulations “*require stakeholder engagement as a precursor to the submission of an environment plan*”.

The Regulations should be amended to specifically provide for:

1. meaningful and appropriate community engagement with traditional Aboriginal owners and other Indigenous stakeholders; and
2. the incorporation of traditional Aboriginal knowledge,

as mandatory measures required as part of the process for the development of environment plans for any onshore petroleum activities.

Meaningful community engagement

Culturally appropriate consultation is essential and lacking in the present system, where there is no requirement for on-country consultation (local to the area of proposed activity) in the stakeholder engagement process. Currently, crucial data is often not released until late in the process, and there is not sufficient time for it to be adequately reviewed, let alone communicated to Indigenous stakeholders who are directly affected. Documentation should at minimum include a plan outlining culturally appropriate consultation to be undertaken on-country prior to conclusion of the engagement process, and ongoing throughout the term of the project.

As outlined above, traditional knowledge can make a valuable contribution to environmental outcomes and the engagement process. In keeping with leading practice principles, it is essential that the environmental planning and assessment and processes consider social and cultural aspects as integral to the comprehensive analysis of all relevant risks and impacts. History has shown that in the Northern Territory, during ‘consultation’ with Indigenous stakeholders, project developments are presented as *fait accompli*, with little opportunity to input any changes that might be necessary to protect cultural and social values.

A survey of recent ToR and Environmental Impact Statement (EIS) guidelines issued by the Northern Territory Environment Protection Agency (NT EPA) does not demonstrate a consistent or in-depth approach to engaging Aboriginal people on questions regarding the risk a project might pose to traditional knowledge and/or Aboriginal culture and society. The main focus continues to be on protecting past aspects of culture (i.e. heritage) and not the living aspects that represent the values of current Aboriginal society. The focus for environmental planning should be shifted to structured gathering, management and use of traditional knowledge via participatory engagement.

A fully participatory engagement and planning process that carries Aboriginal people through project development from initial planning to project closure and beyond, encompassing environmental

impact assessments, risk analysis and management at all phases of the project would result if leading practice consultation methodologies were mandated in the Northern Territory. Participation at the planning and management (operational) level offers the opportunity for Aboriginal people to manage their cultural estate and apply traditional knowledge across the whole of the project's life in a practical and meaningful way (Smith 2016) ¹⁰.

The CLC and NLC have recommended that environmental assessment and approval legislation should include an obligation on the proponent to consider how they engage with Aboriginal communities and traditional Aboriginal owners and that they:

- work with the community when planning and conducting research;
- seek the prior and informed consent of the community prior to acquisition of information;
- collect traditional Aboriginal knowledge in collaboration with the community;
- respect traditional Aboriginal knowledge and Aboriginal intellectual property rights; and
- bring traditional Aboriginal knowledge and scientific knowledge together.

The same obligations should be placed on proponents in relation to engagement for environmental plans under the Regulations.

A key element of the engagement plan needs to involve engaging with Aboriginal communities and should be conducted in accordance with guidelines on matters such as:

- a presumption of on-country consultation;
- the need for plain English and local language versions of documents, or parts of documents;
- the importance of culturally appropriate practices;
- who is to be consulted, including traditional Aboriginal owners and diverse Aboriginal communities; and
- resources provided to facilitate engagement.

Failure to complete consultation reports and engagement plans adequately (for example, in accordance with the relevant guidelines) should ultimately be part of the review and assessment of the adequacy of environment plans by the Minister.

Incorporation of traditional knowledge

The significance of fully integrating traditional knowledge into the environmental planning process should not be underestimated. Aboriginal traditional knowledge has developed over millennia and is critical to the management of a variety of specific environments, yet it remains largely ignored by government, industry and by environmental scientists and project managers. This is the outcome of ineffective legislation and policies that have been implemented without consideration of the value of traditional knowledge and how it can be respectfully acquired and utilised to improve environmental protection in the Northern Territory.

Currently, recognition of traditional knowledge in the environmental planning process in the Northern Territory is not enshrined in law. There are very limited examples where this knowledge is being used to its full effect. As a consequence of the lack of a formal framework that defines how

¹⁰ Smith, HD (2016): Life of Mine Planning and Cultural Sustainability on Aboriginal Land, *First International Congress on Planning for Closure of Mining Operations*, Santiago, Chile.

traditional knowledge should be used, in most cases it is simply either being ignored or otherwise catalogued, categorised and stored in databases but not being utilised in a meaningful, rational or scientific way in the Northern Territory.

Incorporation of traditional knowledge into legislation and through every stage of the environmental planning, assessment and approvals process would address this.

Recommendation 18: *Regulations should specifically require that meaningful and culturally appropriate community engagement occurs with traditional Aboriginal owners and other Indigenous stakeholders prior to the development of environment plans that are required under the Regulations.*

Recommendation 19: *Regulations should specifically require the incorporation of Aboriginal traditional knowledge in environment plans developed under the Regulations.*

The Regulations also “operationalise the “*as low as reasonably practicable*” test (ALARP) in the decision-making process”. The Regulations provide that the Minister will approve an environmental plan if satisfied that certain approval criteria have been met. Reference is made to a reduction of “environmental impacts and risks associated with the activity to levels that are ALARP and acceptable”.

The terms ALARP and acceptable are not currently defined in legislation. There is an argument that an acceptable level of risk will vary depending on type of activity being undertaken and the environment in which such activity will occur. The NLC acknowledges that the type of activity and environment can affect what is acceptable or ALARP. However it is important to ascertain how an activity may or will affect the environment in which it is proposed to occur, and to make decisions based on reliable data. Baseline environmental data should be ascertained and included in environment plans, together with data reflecting the expected impacts (which data should be based on sufficient baseline information and accurate scientific modelling) from the proposed activity both with and without recommended mitigation measures in place. There needs to be clarity around the definition of ‘acceptable’ and ‘ALARP’ and this can be achieved by defining the terms in legislation. The environment plan should highlight residual impacts by specifying any changes anticipated to occur in relation to known baseline environmental measures with proposed mitigation strategies in place and specifically detail whether these risks are acceptable (in accordance with the definition). The environment plan should also detail how risks will be avoided or managed and reduced bearing in mind the principles of ALARP and acceptability.

Recommendation 20: *The terms ‘acceptable’ and ‘ALARP’ should be defined in legislation.*

Recommendation 21: *Baseline data should be obtained from the environment in which the proposed activity is to occur and be included in the environment plan together with the models and assumptions used to forecast any changes that will occur to the existing environment.*

Recommendation 22: *The data included in the environment plan should be used to assess whether the proposed activity presents acceptable/unacceptable risk and detail how risks will be avoided or managed and reduced having regard to the principles of ALARP and acceptability.*

14.4.6.3 Onus of proof

The NLC supports the proposition that reversal of the onus of proof for environmental harm should be incorporated into legislation such that industry proponents bear the onus of proof in matters relating to environmental and/or compliance and other disputes in the context of the onshore petroleum industry. Industry proponents have access to relevant data and information which is often required to prove or disprove the environmental impacts of a project. The above is magnified given the relatively recent introduction of onshore unconventional petroleum activities in the Northern Territory, and the unfamiliarity that traditional Aboriginal owners and other Indigenous stakeholders have with the impacts (both detrimental and beneficial) associated with the industry's activities; combined with the fact that many industry proponents are well-versed in onshore unconventional petroleum activities and associated impacts.

Further, industry is better resourced (both in terms of funding and staff) than many organisations, including the NLC, to undertake the primary lead and carriage of matters involving issues of legality and compliance.

Recommendation 23: *The onus of proof for environmental harm should be reversed such that the onus rests on industry proponents, and this should be enshrined in legislation.*

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