Aboriginal Medical Services Alliance NT

AMSANT submission on the draft Final Report of The Scientific Inquiry into Hydraulic Fracturing in the Northern Territory

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Introduction

AMSANT is the peak body for community controlled health services. We represent 25 members providing comprehensive primary health care (and some speciality care) to Aboriginal communities from Darwin to the most remote parts of the Northern Territory (NT). AMSANT has played a leading role in Aboriginal health policy and advocacy at an NT and national level. Due to competing priorities, consideration by the AMSANT Board was delayed to its November 2017 board meeting, preventing an earlier submission. The board expressed substantial concerns about the health, social and cultural impacts of fracking and took a position, based on these concerns, that fracking should not proceed in the Northern Territory.

The Aboriginal primary health care sector provides primary health care to 80-90% of Aboriginal people in the NT. The Aboriginal PHC sector comprises both government and community controlled health services. The community controlled sector has grown substantially over the last five years and now is a larger provider than the government sector, delivering around 60% of all care provided, and with over 43,000 regular Aboriginal patients. Thus, the ACCHS sector is a significant part of the health system and has a great depth of health expertise and community and cultural knowledge.

AMSANT will make comments across key areas of the report with a strong focus on public health and cultural aspects of fracking. We recognise that we do not have technical expertise across some important areas but nonetheless have relevant comments to provide, including concerns about the degree of uncertainty and knowledge in some of these areas. After review of the comprehensive report, AMSANT believes that there are sufficient concerns around the impact of fracking on health, cultural, ecological, spiritual and cultural aspects of life of NT residents to warrant a ban on fracking in the Northern Territory.

If the total ban on fracking is lifted (not our preferred option), we believe it would not be reasonable to allow exploration licenses to proceed with the current limited information available to the Traditional Owners. The report has found that much more detailed work is required in the one area that has been studied in depth (Betaloo Basin). Traditional Owners need to be appraised of all the information around fracking before being asked to agree to it. Thus, we agree with other key organisations, including the Central Land Council and Northern Land Council, that detailed risk assessments should occur before exploration and not just before the production phase. Furthermore, where exploration licenses have been granted on Aboriginal land, Traditional Owners should be able to refuse to allow fracking once a full risk assessment and environmental impact assessment has been completed.

The process of the Inquiry

The Panel has substantial technical expertise across critical areas and has produced an impressive report. However, we do note that there was no Aboriginal representation on the panel and no alternative mechanism to ensure that there was meaningful Aboriginal input into the design of the review's engagement strategy—rather than simply being consulted by the review. An anthropologist expert advice is not a substitute for the direct perspectives of Aboriginal leadership and the lived experience of coming from a remote community.

It was very disappointing that the community consultations have been proven to be inappropriate and had to be redone and that detailed accounts are not available to review as part of this report. Consultation and engagement with communities is complex and requires in-depth cultural

understanding, sensitivity, networks and local knowledge, including the systematic use of interpreters. We believe that some Aboriginal input into decision-making about how consultations were undertaken, including who was selected to undertake them, could have averted the corruption of this crucial work. Even with the community consultations being redone, it is likely that there has been some damage to the trust in the findings of this inquiry which resulted from the consultant's unethical behaviour. As the report outlines, trust is a critical factor in developing a social license to operate. We believe that there can be no valid social license to operate when the communities most likely to be affected (remote Aboriginal people) are opposed or divided on this issue. We also question why the panel did not consider cultural licence to operate when considering the impact of fracking.

Precautionary principle.

The precautionary principle was a key part of the report with the Panel stating that the precautionary principle requires mitigation measures to reduce the risk if a risk is not easily quantifiable and the impact of the risk could be severe.

A working definition from UNESCO states that

> *When human actions may lead to morally unacceptable harm that is scientifically plausible but uncertain, actions must be taken to avoid or diminish that harm.*
>
> *Morally unacceptable harm refers to harm to humans or the environment that is*
>
> - *Threatening to human life or health OR*
> - *Serious and effectively irreversible OR*
> - *inequitable to present and future generations OR*
> - *Imposed without adequate consideration of those affected.*
>
> *The judgement of plausibility should be grounded in scientific analysis. Analysis should be ongoing so that actions are subject to review. Uncertainly may be applied but not limited to plausibility or the bounds of possible of harm.*
>
> *Actions are interventions that are taken before the harm occurs that seek to avoid or diminish the harm. Actions should be chosen that are proportionate to the seriousness of the potential harm and consideration of the positive and negative consequences and an assessment of the implications of both action and inaction.* ***The choice of action should be the result of a participatory process.***
>
> Reference. The Precautionary Principle World Commission on the Ethics of Scientific Knowledge and Technology (COMEST) 2005.

AMSANT believes this is a more suitable definition, although the definition of scientific analysis must encompass a consideration of the world views of those affected. In the NT, this requires consideration of Aboriginal world views, given that Aboriginal people will often be the Traditional Owners and native title holders of the lands in question and who collectively own over 50% of the Northern Territory in freehold title. The Panel has made a reasonable attempt to describe Aboriginal world views but has given much more weight to Western scientific evidence and has made the assumption that Aboriginal views will change if provided with enough scientific information. This is not necessarily the case. In the absence of Aboriginal experts on the panel itself, the report has

failed to reflect and take into consideration the depth of hydrological knowledge (tens of thousands of years) which Aboriginal people hold over their lands and waters in the areas concerned. This knowledge far precedes the admittedly limited and recent knowledge acquired by Western hydrological research in less than 100 years over some areas.

The actions chosen by the Panel are invariably actions to reduce the harm rather than to avoid the harm altogether and continue a ban or moratorium on fracking. AMSANT believes that the Panel should have directly addressed the issue of continuing a ban on fracking as a first option, particularly given that much of the feedback received by the panel was in support of a ban, including from Indigenous people in potentially affected communities.

Addressing potential bias.

Scientific inquiry is critical but can still be subject to bias as has been documented in selective reporting of findings in the peer reviewed literature, including influencing of interpretation and reporting of results by funders with a vested interest in particular outcomes such as drug companies (Rennie 2006, Smith 2005). Almost inevitably, eminent and well-qualified experts on the panel have worked in the petroleum and mining industries. This certainly does not disqualify panel members from providing their expertise but may well influence their judgement. Similarly, advocates from environmental organisations will also be influenced by their values and background. At times, the report seems to criticise environmental groups for advocating to Aboriginal and mainstream communities. The inquiry noted with some concern that there were no requirements on advocacy organisations seeking to engage with Aboriginal communities beyond the normal protections available for all citizens whereas concerns from community members about limited and selected information from gas companies was somewhat overlooked.

AMSANT agrees with a recommendation that unbiased scientific advice needs to be available not only to Traditional Owners but also to the broader Aboriginal community, with availability of interpreters and cross cultural expertise in communicating this complex technical information. This needs to be funded at arm's length from government and industry who have a financial interest in mining proceeding. We disagree that this information should be provided in partnership with government and gas companies. It should also be provided to the broader community affected by fracking. When provided with this information, community members will be better placed to interpret information provided by both gas companies and their advocates and environmental groups or others who oppose fracking. We certainly do not think that government needs to impose requirements on outside advocates seeking to engage with Aboriginal communities – communities and individuals in communities have the right to consult and speak with whoever they please.

However, given that the report has found that unbiased information has not been made available to communities, it is difficult to suggest that the ban on fracking should be lifted until this information has been provided and communities have had further opportunities to review this information and make their views known. Furthermore, the report has already found that more detailed work is required in the one area reviewed in detail (Betaloo Basin). If the Traditional Owners for that area are really to be the decision-makers, they should make their final decision only after reviewing the results of detailed studies. A neutral third party should provide that information to the Traditional Owners.

There is also a critical distinction between being consulted and being able to engage and make one's views heard, especially when there is such a critical power imbalance between disadvantaged, impoverished populations and dominant economically and politically backed mining lobby groups and governments, particularly when, as pointed out by the report, the regulatory mechanisms are inadequate.

Regulation

The Inquiry agreed with the view held by many concerned citizens that the regulatory framework for mining /gas extraction in the NT was very inadequate. The inquiry has made some excellent suggestions for improving this framework that we hope can be enacted as these deficiencies have been noted for some time.

However, the inquiry also found that many communities were sceptical about the capacity of the NT Government to reform mining regulation and to enforce the regulatory framework. Unfortunately, this is based on bitter experience for some Aboriginal communities who have been badly affected by mining projects that have resulted in serious and severe environmental and cultural impacts. For instance, the McArthur River mine has been expanded twice resulting in the diversion of this very important river against the wishes of Traditional Owners, their representatives including the NLC, Environmental Defenders Office and most importantly – most of the Borroloola community. Damning reports in 2009 and 2014 found a complete failure to monitor and regulate the mine – resulting in unacceptable environmental, social, health and cultural damage. Many community members in Borroloola have been vocal anti-fracking advocates. Other examples of mining ventures that have damaged cultural and environmental aspects of Aboriginal communities and traditional lands, including irreparable damages to sacred sites whilst bringing little real benefits have been documented extensively (Kearns 2015). The NT is a small jurisdiction with a limited public service and technical capacity. It also has been somewhat politically unstable over the last six years with the previous CLP Government losing their majority during their term of office. Therefore, we believe it is realistic to be sceptical that the NT will develop and maintain a robust regulatory framework over the very long period of time that will be required to properly monitor all phases of fracking including exploration, fracking and the very long legacy phase of rehabilitation and monitoring old wells.

Public Health Chapter

Narrow view of Public health

This chapter dealt with potential effects of chemicals /dust on physical human health. Mental health and social impacts are dealt with in other chapters as are the effects on Aboriginal people/culture. The chapter takes a very narrow view of public health which is not in keeping with either Indigenous or contemporary holistic Western understandings of public health. The inquiry has found that the imposition of fracking, despite the objections of a significant proportion of the population, can lead to discord stress and tension. Given that connection to country and community connectivity is central to Aboriginal culture and spirituality, it is highly likely that these adverse psychosocial and mental health effects are likely to be more pronounced for Aboriginal people.

The relationship that Aboriginal and Torres Strait Islander peoples have to land is a deep spiritual connection. Moreton-Robinson described Indigenous relationships with land as an ontological belonging. The Aboriginal and Torres Strait Islander peoples' spiritual beliefs are based on ancient systems that tie one into the land, to other members of the group and to all things of nature. Connection to country is the Aboriginal and Torres Strait Islander people's connection to their

environment, to their family and community. It is their sense of belonging and spiritual strength. If one's connection to land becomes fractured or decimated then like a domino effect, all aspects of what maintains strong social emotional wellbeing, health and mental health becomes affected. The holistic view of health and wellbeing is illustrated by the Gayaa Dhuwi Declaration which states that the Aboriginal and Torres Strait Islander peoples connect their mental health to strong Indigenous identities, that includes participation in their cultures, families and communities, and to their relationship to their lands and seas, ancestors, and the spiritual dimension of existence. The Gayaa Dhuwi (Proud Spirit) Declaration is part of an international movement of Indigenous leaders working in the mental health systems in post-colonial countries, including Canada, the US, Australia, Samoa and New Zealand, who developed the seminal Wharerata Declaration in 2010. The Wharerata Declaration was endorsed in Australia by key government mental health agencies including the: National, Western Australian and ACT Mental Health Commissions as well as NT, South Australian Victorian and Tasmanian governments. Clearly the NT Government acknowledgement of this Declaration implies an understanding of the integral connection between the natural world and Health for Aboriginal peoples.

The connectedness of spirit, mind and body is an integral part of Aboriginal culture and makes it impossible to neatly separate out physical mental, SEWB and spiritual issues related to fracking, as they are all intertwined.

The public health chapter characterised the evidence about the mental health and social disruption of fracking as weak and therefore dismissed this evidence. The chapter on social impacts did note an increase in mental health conditions in Queensland communities impacted by fracking. AMSANT is concerned at the dismissal of this very important public health aspect of fracking. It is clearly a complex area to research but there is a growing evidence base in the United States and elsewhere. A qualitative study in West Virginia described deep distress, grief and anxiety in many people living in communities with extensive fracking, including those who acknowledged the economic benefit of fracking to their families. Almost all residents self-identified that they were suffering from fear anxiety and stress. The study documented community discord and an increasing distrust of government by those who felt that fracking was imposed and they had little real say. The unequal distribution of benefits with many well-paying jobs going to FIFO workers from interstate was a key issue that is also likely to occur in the NT (Sangaramoorth et al. 2017). A 2014 review also found that people who gained little economic benefit from fracking generally had a much more negative perception of the impact of fracking on their community compared to those who did receive a benefit (Jacquet et al. 2014). Another review of the literature found similar findings, including that Indigenous people were especially vulnerable to psychosocial impacts as were poorer people. Fracking can also cause a boom bust mentality and community tensions from fears of outsiders and increase in crime (Hirsch et al. 2017). Psychosocial impacts are likely to lead to higher rates of stress, depression and anxiety. Any mental health impacts will add to an already heavy burden with NT Aboriginal people having a suicide rate 2.3 times higher than the non-Aboriginal rate, with the rate also being significantly higher than the national Aboriginal suicide rate from 2010 to 2015. The hospitalisation rate for mental health conditions was over three times higher than the non-Aboriginal rate. (AIHW, 2017).

Stress, anxiety and depression are also likely to adversely affect physical health. Indigenous understanding of the mind- body (and land) connection is increasingly being recognised in Western science with studies showing stress, anxiety and depression increasing the risk of cardiovascular disease and a range of other chronic illnesses including diabetes and stroke (Clarke et al. 2009).

Given that Aboriginal life expectancy in the NT is the lowest in the nation and is now stalling after a period of improvement and that rates of chronic diseases such as diabetes stroke and heart disease (which are linked to poor emotional health) are very high, this is unacceptable (AIHW 2017).

The history of mining impact on Aboriginal people in the NT in terms of public health is not promising. The health of people in the West Arnhem region is not significantly better than other areas in the NT despite a long history of uranium mining. Indeed a 2000 review found that the fears of many Aboriginal people had been realised in that living conditions were third-world, social and health indicators were among the worst of any community in Australia and alcohol abuse was impacting on many families (Parks et al. 2000). To our knowledge, the health of people in Jabiru has not substantially improved beyond that of other Aboriginal communities since that time. Certainly, increasing alcohol and other drug use has been raised in the review as a potential adverse effect on communities. This is not to say that all mining in Aboriginal communities will adversely affect health outcomes – but divisive and unwanted development is likely to adversely affect the health of remote communities through causing increases in stress, depression and possibly alcohol and other drug use with a flow on effect to physical health outcomes.

Review of public health studies.

The review also briefly described some of the public health evidence from the United States on the effects of fracking on physical health through direct toxic effects of chemicals in air or water and dust exposure.

There is a growing peer reviewed body of literature studying the effect of fracking on physical health largely focusing on the United States which has mixed findings but with the majority of public health studies indicating concerns and the need for more research (Hays et al. 2016). A review of findings in three key areas: public health, air quality and water, finding that in the public health area, 31 studies were assessed and 84% of publications reported adverse health risks whilst 16% found no adverse risks (Hays et al. 2016). Most studies concluded that more research was needed. The National Institute of Environmental Health Sciences is one of 27 prestigious government funded academic institutes that comprise the National Institutes of Health in the United states. It concluded that the health impacts of fracking on people living close to wells is not known. The NIEHS is undertaking studies in a range of areas including birth defects, asthma and stress and cardiovascular health (National Institute for Environmental Health Science). A 2014 Lancet review also found that the need to transport large amount of toxic materials over long distances was a key risk along with air and water issues (Kovats et al. 2014).

The inquiry noted this evidence but found that the NT experience was likely to be different than the United States experience where fracking has been poorly regulated and allowed to occur very close to residential areas. AMSANT does not find this sufficiently reassuring. Aboriginal communities and outstations occur in the most remote areas of the NT and they are generally already serviced by roads which could be upgraded for fracking. Therefore, it is quite likely that fracking will occur relatively close to remote communities/outstations without strong and robustly enforced regulation. As noted already, communities do not have high levels of confidence in the capacity of the government to regulate fracking adequately. Also, the health of Aboriginal people in remote communities is particularly poor as already noted. Communities already bear higher rates of stress, asthma, low birth weight and cardiovascular disease – all of which have been linked to fracking (National Institute for Environmental Health Science).

The report only reviewed three risk assessments commissioned by gas companies and the report noted that all three had significant limitations. This is an inadequate assessment of public health risks and points to the need for a thorough, extensive public health risk assessment to be commissioned and undertaken by independent bodies if it is to be robust.

The report also did not fully cover the impact of the exploration phase. During this phase, communities will be subject to much heavier traffic, dust, noise, chemicals and risk of spills. The NT already has a high rate of death and serious injury from traffic accidents – this is likely to worsen.

The Hays review found 46 studies related to air pollution, of which 87% showed significant air pollution. Categories of positive studies included those that documented emissions above recommended air quality standards, public health risks due to toxic air emissions and measurements of emissions/atmospheric concentration that were very elevated above regional background levels (Hays et al. 2016).

A recent study in the Darling Downs region of Queensland found that admissions for acute respiratory disease increased by 142%, and cardiovascular admissions increased by 133% (after controlling for population increases) between 2007 to 2014. Over the same time period, Coal seam gas extraction increased rapidly in the region with an increase of CSG emissions of 489% for nitrogen dioxide, 800% for carbon monoxide and 337% for volatile organic compounds (McCarron 2017). The study did not provide that the CSG industry caused all or some of the rise in hospital admissions and the significant limitations of the study were well described including that levels of atmospheric levels of air pollutants could not be measured. However, the author concluded that there were significant concerns about the safety of CSG in the Darling Downs. She also noted that adverse health effects are possible from air pollutants within national guidelines (McCarron 2017). This study has been attacked by the industry, whereas a more responsible reaction would have been to suggest further studies to see if there really is an issue.

Potential positive effect of employment in improving health outcomes

Sustainable, safe and reasonably remunerated employment through mining could potentially be a pathway to better health and social outcomes for Aboriginal people in the NT, since poverty and unemployment are strongly linked with poor health. However, again the history in the NT has not been promising. The report makes an upper estimation of over 600 new jobs a year averaged over a long time period. This has been challenged by other experts including Rod Campbell from the Australian Institute. There was no estimate on the number of these jobs that would be FIFO or NT based and how many of the NT based jobs would be likely to be taken by Aboriginal people. There was some anecdotal evidence presented of training and employment benefits for Aboriginal people in Queensland and no evidence about the track record of mining companies in the NT employing Aboriginal people in the NT. Thus, there is little to base an estimate of Aboriginal employment benefits from fracking. However, we assert that the impact of fracking on Aboriginal employment is likely to be low given past experience of individual communities, the fact that Aboriginal unemployment in remote communities remaining high during the years of the mining boom and evidence suggesting that the bulk of the benefits do not go to Aboriginal communities (Keans 2015). This is not to suggest that individual mining companies have not made some efforts to increase Aboriginal employment, however, it is unrealistic to expect major employment in remote Aboriginal communities based on past experience. Therefore, it is unlikely that improved employment prospects in the medium term would improve health and social outcomes for Aboriginal people.

Water

The report has acknowledged that preservation of clean water resources is a crucial issue for many concerned citizens. For Aboriginal people, water is central to spirituality and wellbeing.

Key issues

1) **Water depletion.** Underground aquifers are finite - and fracking uses large amounts of water. If we are to sustain communities over the long term, investing in industries which use non-renewable water resources at a high rate is not wise or fair to future generations. The report has acknowledged this concern in part and suggested fracking may not be suitable for arid or semi-arid regions. Aboriginal people have lived sustainably across the varied terrains of the NT and have a deep knowledge of how to look after the environment. Understandably, water is a central concern. Water plans have been made for several regions and many of these have been almost fully allocated with some pressure on water allocation. Water allocation has been the subject of considerable controversy and debate in the NT including recently - http://www.abc.net.au/news/2017-12-13/nt-water-licences-review-should-be-referred-to-new-icac-says-nlc/9254182. The inquiry has focused on the Beetaloo Basin which is the most likely site for fracking to commence in the NT. The inquiry was not able to be sure that ground water resources were adequate even in the wetter Northern Region of this Basin and was concerned about the drier Southern area of the basin. Given that study of one Basin has found that ground water use is likely to be unsustainable in the South and there is some risk in the North, it is hard to understand why the overall conclusion is that fracking is safe and sustainable for the Territory.
2) **Climate change** has also been factored into water use with the prediction being that rainfall will not change overall but there is likely to be heavier and more unpredictable rainfall. However, climate change is subject to some uncertainty which was not discussed at all in this modelling.
3) **Petroleum and gas industry not subject to the Water Act.** At present the Petroleum and Gas industries and the pastoral industry are not subject to the Water Act which is a major issue that should have been rectified and which highlights highly inadequate regulation in the NT.
4) **Lack of knowledge of water systems**. The panel noted there is a lack of knowledge of the water systems across the NT and recommended detailed study as part of a Strategic regional environmental and baseline assessment (SREBA) to obtain an in-depth understanding of "surface and groundwater resources, hydrogeology, aquatic ecosystems and terrestrial ecosystems using data that is representative of the geographic, climatic, and hydrogeological characteristics of any prospective basin, and an assessment of the vulnerability of these systems to any hydrological changes associated with any onshore shale gas development". Although AMSANT does not have technical expertise across these fields, it seems a very ambitious undertaking to carry out such assessment in a time limited process that is leading to fracking approval, particularly given there is likely to be pressure to expedite assessments in order to enable the commencement of fracking.
5) **Lack of knowledge about aquatic ecosystems.** The report notes the lack of knowledge of aquatic ecosystems in the NT which must be cause for caution about predicting the effects on those ecosystems of exploration and fracking. The report found that there was a particular lack of knowledge about animals in underground aquifers. It is unlikely that these knowledge deficits can be rectified as part of a Strategic regional environmental and

baseline assessment (SREBA) given that there is almost no scientific knowledge about these animals.

6) **Contamination of Water**. Eight pathways for contamination of water were provided and discussed. Even if each individual risk is estimated as relatively low, the cumulative risk will be higher because of the multiple mechanisms. We note that the Panel also said that there were areas where more knowledge was needed (e.g. on page 135 re the issue of methane oxidization). Again, we note that that on page 136, a risk was described as being extremely unlikely if it was <5%. However, in the introductory chapter on risk assessment, a low risk was characterised as being <1%. It depends on the severity of the consequences, but in this in instance, many community members may feel that a risk of 1% was too high. The community should be provided with a more accurate description of the risk rather than being described in terms such as extremely unlikely or low which are subjective and which differ from the descriptions provided in the introductory chapter.
7) **Remediation of water contamination.** The conclusion was that the report could not definitely say that contamination of ground water in the Beetaloo basin was unlikely. This is critical. Monitoring and remediation is suggested if contamination does occur with reassurance that this will be able to be done safely with intensive monitoring. However, given community concerns about the capacity of the NT Government to regulate the mining industry, and the acknowledgement of the limited understanding of circulation of water between aquifers, this seems to be an unacceptable risk. Again, it does raise the question of why the overall conclusion of the panel was that fracking is likely to be safe if one of the key community concerns could not be answered even for one region.
8) **Spills**. Spills were considered to be likely to occur with the suggested remediation by two gas companies considered to be inadequate given climatic conditions. Road spills are particularly likely to occur given hazardous driving conditions in the Northern Territory and existing high rates of serious road accidents. These are all significant risks to the public health of population within the region. The panel characterised the risk of spills as being low only in the Betaloo basin – this could not be generalised.
9) **Contamination from old wells**. Contamination from old /legacy wells was considered unlikely if wells were built to world leading standards. This assumes that the companies would comply with world leading standards and that there would be sufficient regulation /monitoring to ensure that they do. This is a big assumption given past failures of mining companies (e.g. McArthur river)
10) **Human failure and failure of regulation**. In multiple areas, including in the critical area of aquifer contamination, risk reduction required the mining company to make sound decisions and abide by all regulations. Human error and lax regulation are both likely to occur at some point in time and this has seldom been addressed by the Panel. It was addressed on page 148 in regard to erosion and environmental damage being common in Queensland CSG operations despite best practice guidelines—clearly suggesting that mining companies were not following these guidelines.

A review of the public health impacts of fracking found that two thirds of 58 peer reviewed papers found a risk from water contamination. One study of water contamination from shale gas fracking found elevated levels of heavy metals in about one third of wells. Methane was found in the majority of wells tested. One damaged well was definitely identified (Alawttegama et al. 2015). Another study used isotopes to trace contamination from fracking in water sources and found that

contamination from unconventional fracking was significant and could be distinguished from conventional fracking (Warner et al. 2014). Conversely another study found that methane and other chemicals were found in water supplies in the Pennsylvania region based on geography/topography and this was not related to fracking (Molofsky et al. 2013). Clearly these studies cannot be directly applied to the NT but they are a cause for concern.

Protection of culture

This chapter is largely focusing on protection of sacred sites. AMSANT recognises this is critical but also not sufficient due to inconsistencies in the way sacred features of the landscape are afforded protection (or not) as sacred sites in the NT under the Sacred Sites Act. Rarely are large areas registered as sacred sites despite the fact that sacred features associated with ancestral beings and their paths through the landscape can comprise large tracts of country and frequently include subsurface features. This includes water from springs and aquifer systems that is regarded as a living entity and creation of ancestral beings, most notably associated with Rainbow Serpents but also many other Dreamings (Cooper and Jackson 2008). Through cultural and religious knowledge Aboriginal Traditional Owners possess an extensive understanding of the hydrological cycle and hydromorphological features of the landscape.

The uncertainty of protection of such extensive features under the Sacred Sites Act is compounded by the situation, as pointed out in the report, that most sacred sites in the NT are not recorded or registered by the Aboriginal Areas Protection Authority. In addition, fracking poses a unique threat to sacred sites because of extensive horizontal drilling and potential damage to underground bodies of water which might be connected to sacred sites. The report noted that the system of sacred site protection had weaknesses in that the issuing of a Sacred Site Authority Certificate was the key process which allowed robust protection for sacred sites. However, mining companies are not obliged to obtain one of these certificates and often do not. This suggests that mining companies need to be strictly regulated in order to ensure maximum protection for sacred sites. The issuing of a certificate in itself does not prevent site damage, as many cases in the NT have sadly demonstrated.

The report makes some strong recommendations in this area, including the need to protect underground sacred sites. Traditional Owners and site custodians have so far not always been successful in utilising the Sacred Sites Act in preventing physical and environmental damage caused by mining activities and pollution. Mining proposals, in particular, result in considerable pressure being placed on Traditional Owners and site custodians to agree to exploration and mining for the greater economic good. This is inappropriate and unacceptable. It is also inappropriate that Aboriginal groups should be expected to consider approving exploration or mining activities when basic understandings and assessment of environmental risk pertaining to sacred sites and features of the landscape are incomplete.

It also needs to be noted that the overall landscape within which the sacred sites are located is also central to Aboriginal identity and wellbeing. The chapter on social impacts highlights the impact on landscapes for all people using the term solastalgia (a sense of powerlessness and lack of control amid change). The effect of an imposed unwanted and rapid change on Aboriginal land and an influx of outsiders who are involved in rapid imposed development is likely to be even more significant for Aboriginal people given the deep connection to land and culture. Some of the issues outlined in the social impact chapter, such as increased use of alcohol and other drugs and community discord, are

in addition to being threats to physical health and wellbeing, are also a threat to the maintenance and transmission of traditional culture.

Key issues include:

1) Exploration licenses have already been granted across multiple areas, leaving little option for improved protection of these areas.

2) Many sacred sites are not recorded nor registered thus leaving these sites vulnerable to damage.

3) Flow on effects to sacred sites and features distant from the sacred site being protected are possible.

4) The legal definition of a sacred site under the Act does not reflect the wide and complex web of cultural significance that can be attached to bodies of water whether surface or underground.

Environment

A key concern here is that there are major gaps in biodiversity mapping in the NT. It seems likely that it would take many years to rectify large knowledge gaps. Even a detailed environmental impact assessment statement is unlikely to be able to conclusively map all the key impacts given the knowledge deficits. Increased encroachment of pest species and fire are additional threats. The impact on the environment and the loss of habitat and diversity will affect Aboriginal culture given the strong links between Aboriginal people and the natural world.

Aboriginal groups have pointed to the need to develop and control their own knowledge systems about their traditional lands which can facilitate developing a position on fracking based on this mapping and this has been highlighted in some key submissions (Yap M and Yu E, 2016). This points to a need for stronger Aboriginal control over mapping of Aboriginal land and a wider view that incorporates Indigenous values and priorities rather than being limited to a narrow process of identifying and protecting individual species.

Social licence to operate (SLO)

The report outlines the concept of a social license to operate (SLO). SLO requires trust and transparent and open communication. Some sound points are made about factors that influence SLO including procedural and distributive fairness access to unbiased clear information and a transparent process of assessing all the impacts including social impacts. However, it is somewhat concerning that the report is working from a premise that if the “right information“ is provided to community members, it is likely that fracking will obtain a SLO. This is clearly not a given since it is well known that there is substantial community opposition, other states have instituted moratoriums or bans based on a lack of a SLO, and there is sustained opposition to fracking in many communities both in Australia and other countries where it is well established. There are also clearly major deficits in knowledge about the likely impacts of fracking in several critical areas in the NT. Most importantly, in the NT, culture and Indigenous world view values need to be incorporated into negotiations about a social license to operate. These may not always accord with Western scientific views. This concern has led to the use of the term – cultural license in several key Aboriginal fields of study including data sovereignty. The significant point here is that provision of the “right information” may well result in a rejection of a social license to operate.

Conclusion

The report is comprehensive but we believe that the conclusion is flawed. The report documents many uncertainties and areas where critical knowledge is lacking. It also documents widespread community opposition to fracking in both Aboriginal and non-Aboriginal communities. As outlined in this submission, imposing fracking against the wishes of large sections of the Aboriginal community is likely to worsen health and wellbeing through increased community discord, and heightened levels of depression and anxiety with subsequent effects on physical health and wellbeing. Aboriginal health is connected to the health of the land and water- so threatening the physical environment directly affects Aboriginal wellbeing. Aboriginal people already suffer unacceptable rates of mental health issues and chronic disease. The benefits in terms of employment are likely to be limited and short term. AMSANT considers fracking to be an unacceptable risk to the health and wellbeing of Aboriginal people in the NT with the risks clearly outweighing the benefits.

References

AIHW (2017). Aboriginal and Torres Strait Islander Health Performance Framework.

Calma T, Brideson T & Holland C (2016): The Gayaa Dhuwi (Proud Spirit) Declaration – a Call to Action for Aboriginal and Torres Strait Islander leadership in the Australian mental health system, *Advances in Mental Health*, DOI:10.1080/18387357.2016.1198233

Clarke D, Currie K (2009), Depression, anxiety and their relationship with chronic diseases: a review of the epidemiology, risk and treatment evidence. *Med J Australia*, 2009; 190 (7 Suppl): S54-S6

Cooper, D and S Jackson, 2008. *Preliminary Study on Indigenous Water Values and Interests in the Katherine Region of the Northern Territory*. Report prepared for NAILSMA's Indigenous Water Policy Group. CSIRO Sustainable Ecosystems, Darwin, Northern Territory. https://www.nailsma.org.au/hub/resources/publication/preliminary-study-indigenous-water-values-and-interests-katherine-region.html Accessed 2 Feb 2018.

Hays J, Shonkoff SB. Toward an Understanding of the Environmental and Public Health Impacts of Unconventional Natural Gas Development: A Categorical Assessment of the Peer-Reviewed Scientific Literature, 2009-2015. *PLOS One*. 2016;11(4).

Hirsch J. Bryant Smalley K, Selby Nelson E, Hamel Lambert J, Rosmann M, Barnes T, Abrahamson D, Meit S, GreyWold I, Beckman S, LaFromboise T (2017). Psychosocial Impact of Fracking: a Review of the Literature on the Mental Health Consequences of Hydraulic Fracturing *International Journal of Mental Health and Addiction*. accessed at https://link.springer.com/article/10.1007/s11469-017-9792-5

Jacquet J (2014). Review of Risks to Communities from Shale Energy Development. *Environ. Sci. Technol*., 2014, 48 (15), pp

Kearns S (2015). Indigenous-communities are losing out in the development of Northern Australia. *The Conversation*. Accessed at https://theconversation.com/indigenous-communities-are-losing-out-in-the-development-of-northern-australia-46736

Kovats S, Depledge M, Haines A, Fleming L, Wilkinson P, Shonkoff S, Scovronick N (2014). The health implications of fracking. *Lancet*

McCaron G (2017). Air Pollution and human health hazards: a compilation of air toxins acknowledged by the gas industry in Queensland's Darling Downs. *International Journal of Environmental studies*. 8th January 2017. page 1-15

Moreton-Robinson A, Ahmed S, Castaneda C, Fortier A, Sheller M. (2003). I still call Australia home: Indigenous belonging and place in a white post colonising society. In Ahmed, Sarah(Ed.) *Uprootings/Regroundings: Questions of Home and Migration.* Berg Publishing, pp. 23-40.

National Institute for Environmental Health Science Hydraulic fracturing and health accessed at https://www.niehs.nih.gov/health/topics/agents/fracking/index.cfm

Rennie D (2016). Let's make peer review scientific. Nature Comment. 535/7610

https://www.nature.com/news/let-s-make-peer-review-scientific-1.20194

Sangaramoorthy T, Jamieson A, Boyle M, Payne-Sturges D, Sapkota A, Milton D, Wilson S et al, (2016). Place-based perceptions of the impacts of fracking along the Marcellus Shale. Social Science and Medicine. Vol 151, Feb 27-37/

Smith R (2006). Peer review: a flawed process at the heart of science and journals. Journal of the royal society of medicine. J R Soc Med. 2006 Apr; 99(4): 178–182.

Yap M and Yu Eunice (2016). Chapter 3 Data Sovereignty in Practice- Data Sovereignty for the Yarawu in Western Australia - in Indigenous Data Sovereignty Research monograph. Centre for Aboriginal Economic Policy Research College of Arts and Social Sciences the Australian National University, Canberra.

UNESCO (2005). World Commission on the Ethics of scientific knowledge and technology- COMEST (2005). The precautionary principle accessed at http://unesdoc.unesco.org/images/0013/001395/139578e.pdf

Vos, T., Barker, B., Stanley, L., & Lopez, A. D. (2007). The burden of disease and injury in Aboriginal and Torres Strait Islander peoples 2003. Brisbane: School of Population Health, University of Queensland.

Wellings P (2000). Uranium mining and indigenous social impact issues Kakadu Region, Australia.