NURRDALINJI NATIVE TITLE ABORIGINAL CORPORATION
ICN 9392

Senate Environment and Communications Reference Committee
Inquiry into Oil and Gas Production in the Beetaloo Sub-basin

6 August 2021

Dear colleagues,

Response to Questions on Notice, 2 August 2021 - Inquiry into Oil and Gas Production in the Beetaloo

We refer to our appearance before the Committee on 2 August 2021, and provide the following additional information:

1. General Response to NLC Testimony
2. Question 1 - What is the scientific evidence that we rely on to assert that fracking will cause damage to country and subterranean waters?
3. Question 2 - What evidence do we rely on to support our testimony that 21 million litres of water was spilt at the Tanumbirini fracking well site?

1. General response:

In his testimony to the Committee on 2 August 2021, Mr Wells claims that " [NLC] seeks to consult with all members of an affected group". Native title groups of the Beetaloo region cannot remember the last time the NLC held a meeting of the whole native title group - it was many years ago, if ever.

The NLC claims that the decision to establish Nurrdalinji as a PBC was not taken with the consent of all native title holders. We reject that claim. Yet much the same claim can be made about the absence of informed consent of native title holders throughout the Top End who have been shoehorned into the Top End (Default) PBC without being presented with any alternative options.

The NLC does not consult the right people, in the right way according to our law and custom – many of us who are senior native title holders and who are *Ngimirringki* and *Jungayi* for our respective country's have been left out of the consultation process utilised by NLC. It has been our experience that the NLC prefers to deal with families rather than native title groups because it's easier for the NLC to manage small groups. Over several years we have asked NLC to meet with us together, and haven't even received a reply.

Mr Wells admits that it is the senior knowledge holders, the *Ngiminrringki* and *Jungayi* that "hold the power to make decisions about country" and that decisions made are not a matter of numbers or votes. Yet he later criticised the number of attendees of our meeting in Daly Waters in September 2020. Those in attendance at the Nurrdalinji meeting were identified as recognised senior decision makers through consultations within our own communities. We as the Traditional Owners of the country affected by the oil and gas exploration in the Beetaloo Basin are the ones who hold the information on who the right people are to make decisions. This was accepted as being the appropriate approach to ensure that the recognised senior decision makers were in attendance at the meeting and that decisions made were by those with Cultural Authority to do so.

In relation to Mr Wells' criticism of the conduct of our meeting in Daly Waters, we asked the NLC to help us organise that meeting, and did not even receive a response. We invited NLC to attend the meeting, and we did not receive a response. When we applied to the Federal Court for approval of our new prescribed body corporate, Nurrdalinji, NLC went into full attack against us, including threatening to apply for indemnity costs orders against anyone involved.

We are trapped in an unjust relationship with NLC and NLC is using all of its powers to keep us there. NLC should be our agent, not our master. Mr Wells himself threatened costs orders against us. Now he says the NLC's door is open to us. The NLC's actions speak louder than its unreliable words. As a result of this behaviour and conduct we are left with no control over matters which affect us and our homelands.

Response to Committee's Questions on Notice

2. Question 1 - *What is the scientific evidence that we rely on to assert that fracking risks causing damage to country and subterranean waters?*

<u>Response:</u> The U.S Environmental Protection Agency (EPA) undertook a critical peer reviewed report and study spanning several years. The final report outlines clearly that hydraulic fracturing for shale gas has caused water contamination in the United States. These studies are of critical relevance to the Northern Territory and Australia, as there are no other production scale shale gas developments in Australia. Several major shale gas basin developments have occured in North America, and so we look to that place for research and case studies.

<u>The U.S. EPA report</u>

U.S. EPA. Hydraulic Fracturing for Oil and Gas: Impacts from the Hydraulic Fracturing Water Cycle on Drinking Water Resources in the United States (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-16/236F, 2016.

The full Executive Summary by the US EPA is available for download here:
https://cfpub.epa.gov/ncea/hfstudy/recordisplay.cfm?deid=332990

The report is organized around activities in the hydraulic fracturing water cycle and their potential to impact drinking water resources. The stages include: (1) acquiring water to be used for hydraulic fracturing (Water Acquisition), (2) mixing the water with chemical additives to prepare hydraulic fracturing fluids (Chemical Mixing), (3) injecting the hydraulic fracturing fluids into the production well to create fractures in the targeted production zone (Well Injection), (4) collecting the wastewater that returns through the well after injection (Produced Water Handling), and (5) managing the wastewater via disposal or reuse methods (Wastewater Disposal and Reuse).

EPA found scientific evidence that hydraulic fracturing activities can impact drinking water resources under some circumstances. The report identifies certain conditions under which impacts from hydraulic fracturing activities can be more frequent or severe:

- Water withdrawals for hydraulic fracturing in times or areas of low water availability, particularly in areas with limited or declining groundwater resources;
- Spills during the handling of hydraulic fracturing fluids and chemicals or produced water that result in large volumes or high concentrations of chemicals reaching groundwater resources;
- Injection of hydraulic fracturing fluids into wells with inadequate mechanical integrity, allowing gases or liquids to move to groundwater resources;
- Injection of hydraulic fracturing fluids directly into groundwater resources;
- Discharge of inadequately treated hydraulic fracturing wastewater to surface water; and
- Disposal or storage of hydraulic fracturing wastewater in unlined pits resulting in contamination of groundwater resources.

Key findings of the EPA report with regards to water contamination from spills, fracking chemicals, human error and equipment failure

The below are excerpts from the Summary of the U.S. EPA. Hydraulic Fracturing for Oil and Gas: Impacts from the Hydraulic Fracturing Water Cycle on Drinking Water Resources in the United States (Final Report). This is directly relevant to considerations of the Northern Territory Beetaloo Cooperative Drilling Program Instrument 2021, as slickwater hydraulic fracturing fluids are being and are proposed to be used to hydraulically fracture the shale formations in the Northern Territory.

Slickwater hydraulic fracturing fluids are water-based fluids that generally contain a friction reducer. The friction reducer makes it easier for the fluid to be pumped down the oil and gas production well at high rates. Slickwater is commonly used to hydraulically fracture shale formations.

Concentrated additives are delivered to the well site and stored until they are mixed with the base fluid and proppant and pumped down the oil and gas production well. While the overall concentration of additives in hydraulic fracturing fluids is generally small (typically 2% or less of the total volume of the injected fluid), the total volume of additives delivered to the well site can be large. Because over 1 million gallons (3.8 million liters) of hydraulic fracturing fluid are generally injected per well, thousands of gallons of additives can be stored on site and used during hydraulic fracturing.

Several studies have documented spills of hydraulic fracturing fluids or additives. Nearly all of these studies identified spills from state-managed spill databases. Data gathered for these studies suggest that spills of hydraulic fracturing fluids or additives were primarily caused by equipment failure or human error. For example, an EPA analysis of spill reports from nine state agencies, nine oil and gas well operators, and nine hydraulic fracturing service companies characterized 151 spills of hydraulic fracturing fluids or additives on or near well sites in 11 states between January 2006 and April 2012 (U.S. EPA, 2015m). These spills were primarily caused by equipment failure (34% of the spills) or human error (25%), and more than 30% of the spills were from fluid storage units (e.g., tanks, totes, and trailers). Similarly, a study of spills reported to the Colorado Oil and Gas Conservation Commission identified 125 spills during well stimulation (i.e., a part of the life of an oil and gas well that often, but not always, includes hydraulic fracturing) between January 2010 and August 2013 (COGCC, 2014). Of these spills, 51% were caused by human error and 46% were due to equipment failure.

Spilled fluids were often described as acids, biocides, friction reducers, crosslinkers, gels, and blended hydraulic fracturing fluid, but few specific chemicals were mentioned.

Spills of hydraulic fracturing fluids or additives have reached, and therefore impacted, surface water resources. Thirteen of the 151 spills characterized by the EPA were reported to have reached a surface water body (often creeks or streams).

Generally, highly permeable soils or fractured rock can allow spilled liquids to move quickly into and through the subsurface, limiting the opportunity for spilled liquids to move over land to surface water resources. In low permeability soils, spilled liquids are less able to move into the subsurface and are more likely to move over the land surface. In either case, the volume spilled and the distance between the location of the spill and nearby water resources affects whether spilled liquids reach drinking water resources. Large-volume spills are generally more likely to reach drinking water resources because they are more likely to be able to travel the distance between the location of the spill and nearby water resources.

Due to a lack of data, particularly in terms of groundwater monitoring after spill events, little is publicly known about the severity of drinking water impacts from spills of hydraulic fracturing fluids or additives.

Spills of hydraulic fracturing fluids and additives during the chemical mixing stage of the hydraulic fracturing water cycle have reached surface water resources in some cases and have the potential to reach groundwater resources.

Impacts on groundwater resources are likely to be more severe than impacts on surface water resources because of the inherent characteristics of groundwater.

Belowground pathways, including the production well itself anThere have been cases in which hydraulic fracturing at one well has affected a nearby oil and gas well or its fracture network, resulting in unexpected pressure increases at the nearby well, damage to the nearby well, or spills at the surface of the nearby well. These well communication events, or “frac hits,” have been reported in New Mexico, Oklahoma, and other locations. d newly-created fractures, can allow hydraulic fracturing fluids or other fluids to reach underground drinking water resources.

A well with insufficient mechanical integrity can allow unintended fluid movement, either from the inside to the outside of the well or vertically along the outside of the well. The existence of one or more of these pathways can result in impacts on drinking water resources if hydraulic fracturing fluids reach groundwater resources. Impacts on drinking water resources can also occur if gases or liquids released from the targeted rock formation or other formations during hydraulic fracturing travel along these pathways to groundwater resources.

Abandoned wells near a well undergoing hydraulic fracturing can provide a pathway for vertical fluid movement to drinking water resources if those wells were not properly plugged or if the plugs and cement have degraded over time. For example, an abandoned well in Pennsylvania produced a 30-foot (9-meter) geyser of brine and gas for more than a week after hydraulic fracturing of a nearby gas well.

Impacts on drinking water resources associated with the well injection stage of the hydraulic fracturing water cycle have occurred in some instances. In particular, mechanical integrity failures have allowed gases or liquids to move to underground drinking water resources.

Chemicals are present in the hydraulic fracturing water cycle. During the chemical mixing stage of the hydraulic fracturing water cycle, chemicals are intentionally added to water to alter its properties for hydraulic fracturing. Produced water, which is collected, handled, and managed in the last two stages of the hydraulic fracturing water cycle, contains chemicals added to hydraulic fracturing fluids, naturally occurring chemicals found in hydraulically fractured rock formations, and any chemical transformation products.

Produced water can contain many constituents, depending on the composition of the injected hydraulic fracturing fluid and the type of rock hydraulically fractured. Knowledge of the chemical composition of produced water comes from the collection and analysis of produced water samples, which often requires advanced laboratory equipment and techniques that can detect and quantify chemicals in produced water. In general, produced water has been found to contain:

- Salts, including those composed from chloride, bromide, sulfate, sodium, magnesium, and calcium;
- Metals, including barium, manganese, iron, and strontium;

- Naturally-occurring organic compounds, including benzene, toluene, ethylbenzene, xylenes (BTEX), and oil and grease;
- Radioactive materials, including radium; and
- Hydraulic fracturing chemicals and their chemical transformation products.

Produced water flows from the well to on-site tanks or pits through a series of pipes or flowlines before being transported offsite via trucks or pipelines for disposal or reuse. While produced water collection, storage, and transportation systems are designed to contain produced water, spills can occur. Changes in drinking water quality can occur if produced water spills reach groundwater or surface water resources.

Produced water spills have been reported across the United States. Median spill volumes among the datasets reviewed for this report ranged from approximately 340 gallons (1,300 liters) to 1,000 gallons (3,800 liters) per spill.1 There were, however, a small number of large volume spills. In North Dakota, for example, there were 12 spills greater than 21,000 gallons (79,500 liters), five spills greater than 42,000 gallons (160,000 liters), and one spill of 2.9 million gallons (11 million liters) in 2015.

Common causes of produced water spills included human error and equipment leaks or failures. Common sources of produced water spills included hoses or lines and storage equipment. Spills of produced water have reached groundwater and surface water resources. In U.S. EPA (2015m), 30 of the 225 (13%) produced water spills characterized were reported to have reached surface water (e.g., creeks, ponds, or wetlands), and one was reported to have reached groundwater.

Spills of produced water during the produced water handling stage of the hydraulic fracturing water cycle have reached groundwater and surface water resources in some cases. Several cases of water resource impacts from produced water spills suggest that impacts are characterized by increases in the salinity of the affected groundwater or surface water resource. In the absence of direct pathways to groundwater resources (e.g., fractured rock), large volume spills are more likely to travel further from the site of the spill, potentially to groundwater or surface water resources.

Additionally, saline produced water can migrate downward through soil and into groundwater resources, leading to longer-term groundwater contamination.

<u>Australian Insights</u>

The CSIRO in Australia has also worked to better understand the impact of fracking and unconventional gas. We've included excerpts below of their 2017 publication entitled *Release of geogenic contaminants from Australian coal seams: experimental studies:* https://publications.csiro.au/rpr/download?pid=csiro:EP143463&dsid=DS1

The report notes: These so-called geogenic contaminants include trace elements (such as arsenic, manganese, barium, boron and zinc), radionuclides (e.g. isotopes of radium, thorium and uranium) and organic contaminants such as hydrocarbons and phenols. Some chemicals used in hydraulic fracturing have the potential to release or mobilise geogenic contaminants in the coal seam through the effects of chelating agents, acids, surfactants and solvents. Their release into water introduced into or naturally present in the coal seams raises concerns about potential impacts on both groundwater and the effect of flowback and produced water released to surface sites.

The complex mixtures of organic chemicals released from coals present significant analytical challenges including achieving adequate sensitivity and elimination interference during analysis. Further work is needed to develop more sensitive, specific and robust analytical methods.

Based on their measured concentrations in the laboratory-based leaching studies and comparison with surface water quality benchmarks for aquatic ecosystem protection, the following inorganic geogenic contaminants have been identified as priorities for further investigations: aluminium, arsenic, beryllium, boron, cadmium, chromium, cobalt, copper, gallium, lead, manganese, nickel, selenium, silver, thallium, uranium, vanadium and zinc.

- It should be noted that water quality benchmarks are not available for a number of trace elements that were found in the leachates (e.g. barium).

- Radionuclide concentrations (radium, thorium and uranium) in the leachates generated from the coal samples tested were very low and, based on their radioactive properties, were below concentrations of regulatory concern. However, this does not preclude the preconcentration of radionuclides in precipitates forming in flowback and produced water ponds, pipeworks, or during water treatment (e.g. in micro-filtration filters and reverse osmosis membranes).

<u>Latest water contamination and health damages from fracking</u>

In 2020, the Attorney General of Pennsylvania put out a press release about the finding from an extensive grand jury process interrogating the impacts of hydraulic fracturing for shale in that state.

The title reads:

43RD STATEWIDE GRAND JURY FINDS PENNSYLVANIA FAILED TO PROTECT CITIZENS DURING FRACKING BOOM

https://www.attorneygeneral.gov/taking-action/press-releases/43rd-statewide-grand-jury-finds-pennsylvania-failed-to-protect-citizens-during-fracking-boom/

The Grand Jury's two-year investigation uncovered systematic failure by government agencies in overseeing the fracking industry and fulfilling their responsibility to protect Pennsylvanians from the inherent risks of industry operations.

The report details the initial failure of the Department of Environmental Protection to adequately respond to the unconventional oil and gas industry and also points out that missteps continue to *this day. These failures harmed Pennsylvanians living in close proximity to this industry. The grand jurors found that, while the Wolf administration has forced through some improvements at the agency, there continues to be room for meaningful change to occur.*

The Grand Jury also heard from many Pennsylvania residents who suffered severe health consequences and lived near unconventional drilling sites. Residents testified that their well water was "black sludge," "cloudy," and using the contaminated water caused "problems with breathing whenever we were in the shower." Pennsylvania farmers testified that their livestock, which used the same water source as the families, would sometimes become violently ill, infertile, and die. Other residents spoke of problems with their air, which became so polluted from stray gas or other chemicals used during industry operations that they could not leave windows open or let their children play outside. Parents testified that their children would repeatedly wake up at night with severe nosebleeds caused by increased levels of gas in the air around the fracking sites.

A copy of the full report is here:
https://www.attorneygeneral.gov/wp-content/uploads/2020/06/FINAL-fracking-report-w.responses-with-page-number-V2.pdf

3. Question 2 - *What evidence do we rely on to support our testimony that 21 million litres of water was spilt at the Tanumbirini fracking well site?*

The Tanumbirini 1 Basic Well Completion Report compiled in December 2014 by Mr David Adderley provides evidence of the cumulative subsurface losses of drilling fluid. The Daily Mud Volume Account contained in Section 9 of the Report shows that between 13 June 2014 and 31 August 2014, 138751 bbl of drilling mud, which equates to 22 million litres, was lost into the subsurface. There has never been any baseline studies to check the impact of this lost drilling fluid. This lost drilling fluid includes biocides and other compounds listed in the document, which may have an impact on the ecology of the underground water.

The full Tanumbirini Basic Well Completion Report is available to download here (the Daily Mud Volume Account begins on page 1143 of the Report):
https://geoscience.nt.gov.au/gemis/ntgsjspui/handle/1/83784

We thank the Committee for this opportunity, and would be pleased to respond to any further questions.

Yours sincerely,

Johnny Wilson
Chair