

# Submission on the Stromlo-1 Exploration Drilling Program Draft Environment Plan

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Healthy planet, **healthy people.**

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Doctors for the Environment Australia (DEA) is an independent, self-funded, non-Government organisation of medical doctors in all Australian States and Territories. Our members work across all specialties in community, hospital and private practices. We work to prevent and address the diseases - local, national and global - caused by damage to our natural environment. We are a public health voice in the sphere of environmental health with a primary focus on the health harms from pollution and climate change.

As an organisation of medical doctors, the mission for our doctors and scientists is to prevent disease; in this quest health and the environment are indivisible. And sustainable development as detailed in the Sustainable Development Goals is essential for human health wellbeing and survival. The question for Equinor, is whether this proposal fits into this framework for the future.

We will frame our answer in the context of human and environmental health.

## **Recommendation**

The proposal should not be approved.

The risk from drilling, though small, cannot be avoided, and the outcome on the sustainability of the Bight from a major spill far outweigh any transitory economic benefits. Furthermore, impacts on climate change from expanded oil production are unacceptable.

## Introduction

While Equinor, the Australian government and Opposition might like to give an altruistic reason for supporting exploratory drilling in the Bight such as “because it’s there” we know that a major oil find will bring huge pressure for exploitation because of profit and jobs even though they may be at the price of true sustainability for the world. It is difficult to find any example of exploratory drilling when this was not so. It is our view that it is not in the national interest for NOPSEMA to assess this drilling application without concomitant consideration of the impacts of full production in the Great Australian Bight (GAB). Dangers of a significant oil spill are present even with the first drilling and subsequently from further drillings, production and transport. **The history of the industry indicates that no drilling operation is safe and to maintain it can be made safe is the same as maintaining that the most technically advanced aircraft will never crash. Both aircraft and oil development will be subject to human error, and to extreme weather events.**

In the statement “Equinor in Australia”<sup>2</sup> we note:-

***“In Equinor, safety is our top priority, we support the Paris Climate Accord, and we are guided by United Nation’s Sustainable Development Goals”***

***“We will only carry out a drilling operation in the Bight if we can do it safely”***

**No operation is safe and yes, Equinor is trying to support the Accord and Sustainable Development Goals for it is diversifying into renewable energy in Australia but its intent to develop more oil contradicts this claim and our submission below will explain why.**

Indeed, this point is illustrated by your own government’s “Norwegian Sovereign fund” which has recognised the decreasing economic use for fossil fuels if the calamities of climate change are to be avoided by humanity. They have just divested from many of the small oil companies in the portfolio<sup>3</sup> Equinor has said to Bloomberg it will “keep the big oil companies in the portfolio, citing their increased investments in renewable energy. Norway’s own oil company, Equinor ASA, is also increasing renewable energy investments”.

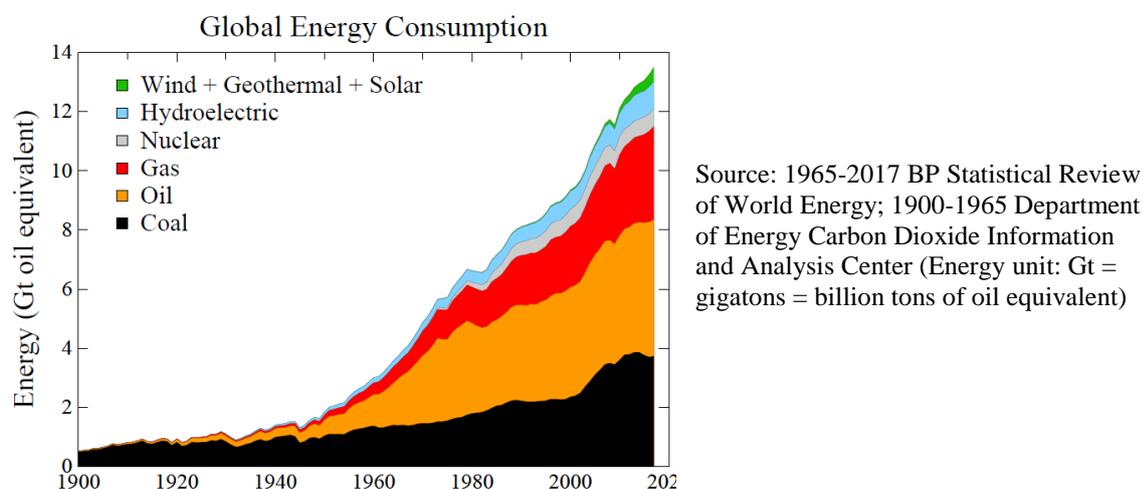
## Human use of fossil fuels

The first question to be asked is whether exploratory drilling, which may lead to development, is wise in the context of the increasingly urgent need to control greenhouse emissions which are the main cause of climate change. The leading medical journal *The Lancet* and the World Health Organization (WHO) regard climate change as the leading health issue this century based on rapidly rising death and injury from a range of climatic and environmental consequences.

In an important scientific study published in 2015 by McGlade and Ekins from University College London<sup>4</sup> determined that in order to meet the minimum target of 2°C, **“a third of oil reserves, half of gas reserves and over 80 per cent of current coal reserves should remain unused from 2010 to 2050”** and that “development of resources in the Arctic and any increase in unconventional oil production are incommensurate with efforts to limit average global warming to 2 °C”.

Despite this clear warning, exploration and exploitation of fossil fuel resources have continued unabated and/or are expanding in Australia for both domestic consumption and for generating export revenue.

The role of fossil fuels in global energy use is shown in this figure



The use of coal may have levelled off, but gas and oil continue to rise.

However, the McGlade study is now outdated by much more urgent reductions in fossil fuel emissions:-

## The current threat from methane

The situation is now focussed by the Intergovernmental Panel on Climate Change (2018) statements on the urgent need to reduce atmospheric forcers, methane being the most damaging – for these forcers will be the main cause for us exceeding 1.5 and probably 2°C in the next few decades.

"Limiting warming to 1.5°C implies reaching net zero CO<sub>2</sub> emissions globally around 2050 and **concurrent deep reductions in emissions of non-CO<sub>2</sub> forcers, particularly methane (high confidence)**".

The alarm has spread to WHO which monitors the health effects of climate change. WHO's first recommendation in its Special Report on "Health and Climate Change" at COP24 in December was "to identify and promote actions to reduce both carbon emissions and air pollution, with specific commitments to reduce emissions of short-lived climate pollutants in Nationally Determined Contributions (NDCs) to the Paris Agreement".<sup>5</sup>

Atmospheric methane is increasing due to oil and gas production. Whereas carbon dioxide, responsible for three quarters of greenhouse emissions, remains in the atmosphere to act over centuries, methane is approximately 17 per cent of greenhouse gas emissions (GHG) but is 85 times more potent than carbon dioxide and acts most powerfully over two decades. Its big punch is starting to act now and necessitates immediate action. Warming and climate change impacts seem greater than expected from rising greenhouse emissions and this could be attributed to the methane effect.

The fact is that both gas and oil production result in leakage of methane into the atmosphere; this is difficult, and in some cases impossible to control.

## Legal actions against fossil fuel developments

Greenhouse emissions from fossil fuels are subject to increasing legal action in many countries. The Rocky Hill decision has set an important precedent which can be used for all fossil fuel developments in Australia.

In his judgement, Justice Preston said that: "The Project's cumulative greenhouse gas emissions will contribute to the global total of GHG concentrations in the atmosphere. The global total of GHG concentrations will affect the climate system and cause climate change impacts. The Project's cumulative GHG emissions are therefore likely to contribute to

the future changes to the climate system and the impacts of climate change”

This has been followed by an important statement from the WA EPA that all new projects should be carbon neutral<sup>6</sup> a statement now under pressure from the fossil fuel industry.

## **Environmental and Human health aspects of Bight exploratory drilling and future development**

These are

- the long-term sustainability of the Bight as an ecological community;
- the short and long-term impacts from oil spills on sustainable occupations in the surrounding coastal areas and on the mental health and well-being of communities;
- the illness and deaths from vehicular pollution in Australia and world-wide, these are quantifiable;
- the health impacts and fatalities due to GHG emissions from oil produced in Australia and world-wide.

In 1998 one of the writers of this submission, a medical doctor and scientist, spent time in Seward, Prince William Sound, Alaska, looking at some of the terrible environmental and human health impacts of the Exxon Valdez spill ten years after the event. Many of the impacts are still present 30 years after this disaster.

We accept that the Valdez spill was from a tanker hitting a reef and the dispersal of oil would be different from a sea bed spill, nevertheless the documentation of impacts are relevant to exploration and production in the Bight.

The Deepwater Horizon spill in 2010 provides a more appropriate model for a spill from drilling at depth in the GAB. The environmental, social, and economic disaster impacts were massive for the Gulf of Mexico and its coastal communities and they persist today.

## **Ecological concerns**

We have read the 426 page Environmental Plan with the recognition that the world is undergoing an unprecedented collapse in biodiversity in parallel with the climate change emergency, and evidence is accruing that

marine ecology is being severely affected; we conclude that the GAB, as an ecological entity is under duress from a range of existing factors and it is inappropriate to risk further damage.

We have identified a number of ecological conclusions in the Environmental Plan which could be contested. We make the point that regulatory systems in Australia favour approval of developments by allowing only 30 days for open consultation and examination of a proposal. This is ridiculous; it excludes detailed assessment of human and environmental health and it excludes concerned individuals/experts who have to provide input in their own time. The authors have had time to work on only one of many concerns which are worthy of contest in the Plan;-

## **Possible impacts of Polycyclic aromatic hydrocarbons (PAH) in the Bight**

These are multi-ringed aromatic hydrocarbons including anthracene, phenanthrene, fluorene, chrysene, pyrene and others etc. They have toxic, mutagenic, and carcinogenic properties and are highly fat soluble and pass through living membrane systems.<sup>7</sup>

They affect all living systems and are released from all fossil fuels particularly those produced by the gas and oil industry.

In the Plan, 7.7.9, the biological effects thresholds used in spill modelling outputs are described and are applied to PAH. It is accepted in the Plan that PAH are toxic to biota but the assumption that these are easily weathered with time and distribution is almost certainly naive. Many are taken up into biological systems and changed into other biologically active molecules.

On p311-312 the statement is made:

*When seagrass leaves are exposed to petroleum hydrocarbons, sub-lethal quantities of the soluble fraction can be incorporated into the tissue, causing a reduction in tolerance to other stress factors (Zieman et al. 1984). The toxic components are thought to be the polycyclic aromatic hydrocarbons (PAHs), which are lipophilic and therefore able to pass through lipid membranes, accumulating in the thylakoid membranes of chloroplasts (Ren et al. 1994)\*.*

*Zieman, J, Orth, R, Phillips, R, Thayer, G & Thorhaug, A 1984, "Effects of Oil on Seagrass Ecosystems" in Restoration of Habitats Impacted by Oil Spills, eds.J Cairns & A Buikema, Butterworth, Butterworth, Boston, pp.37-64.*

\*This reference is missing from the plan bibliography- we assume it is <https://www.amsa.gov.au/files/2017-06-mp-research-article-toxic-effects-seagrasses.pdf>

*The susceptibility of seagrasses to hydrocarbon spills will therefore depend largely on distribution. Deeper communities will be protected from oiling under all but extreme weather conditions. Shallow seagrasses are more likely to be affected by dispersed oil droplets or, in the case of emergent seagrasses, direct oiling. Theoretically, intertidal seagrass communities would be the most susceptible because the leaves and rhizomes may both be affected.*

The GAB is known to have one of the largest sea grass systems in the world. The points made in 311 on seagrass and PAH are particularly important but they fail to recognise the key role for sea grass in the viability of fishing industry, its existing demise due to runoff and other factors; like the Barrier Reef it is likely the main cause of demise is rising water temperature from climate change and an increase in extreme weather events. Have these effects been modelled?

In the case of the Deepwater Horizon spill, polycyclic aromatic hydrocarbon (PAH) levels found in coastal marshes are not expected to return to pre-spill background levels for decades, Turner, R. et.al., 20154. Distribution and recovery trajectory of Macondo oil in Louisiana coastal wetlands. Marine Pollution Bulletin, Vol. 87(1-2), pp. 57-67. which is contrary to points about their likely transitory nature made in the Plan.

We apply criticism to the following

*However, the US EPA state that Oil-Related Organic Compounds are assessed jointly (via a mixture approach) as they have the same type of effect on aquatic organisms. Therefore, potency divisors are not determined from chemical-specific benchmarks, but are intermediates used in calculating aggregate toxicity (i.e. toxicity of the whole mixture).etc.....*

Joint assessment is inappropriate and biological activity as assessed by EPA benchmarks is invalid for many living systems. There are many such examples for example in human biology; air quality standards for PM<sub>2.5</sub> and fine particles do not take into account or acknowledge that lower concentrations than those in EPA benchmarks cause lung damage in some adults.

More important in assessment is the biological evidence that PAH remains active in living systems.

There is now extensive data that oil, probably through PAH has profound impacts on the heart muscles of pelagic fish; cardiac cell excitability because of damage to the potassium channel ion pores causes lack of

growth and sudden death; this was found after both the Valdez and the Deepwater Horizon spills.<sup>8, 9</sup>

These fish population deaths occurred long after the spill and points to PAH and other toxics being maintained in the environment, presumably through the food chain of fish such as the tuna. Indeed, these illnesses and deaths would be expected in species such as the blue fin tuna in the GAB. We note that these and other biological assessment data are not mentioned in 7.7.12- risk assessment.

It is also relevant to record that PAH release from well heads or waste water is a possible cause of increases in congenital heart disease and some childhood and adult cancers in the US gas fields.<sup>10</sup> This might be explained by PAH exposures being higher in individuals living near to well heads than those further away.<sup>11</sup>

## Human health concerns and impacts

Equinor's Draft Environment Plan for the Stromlo-1 Exploration Drilling Program fails to account for the significant threats to human health posed by exploratory drilling, which are linked closely with threats to the environment.

The Plan dismisses emissions of greenhouse and other gases during drilling as a temporary and local nuisance (page 189). On the contrary, continued exploration for, and subsequent combustion of, fossil fuels are major threats to human health, with climate change recognised as the greatest threat to global health in the 21<sup>st</sup> century<sup>12</sup>. The Plan's careless approach to such emissions is of great concern and necessitates a careful reconsideration of both short and long-term risks to human health, locally and globally. These risks in the short term apply particularly to methane escaping from oil and gas production (see earlier sections of submission).

Furthermore, the Plan fails to fully consider the potentially catastrophic health effects of spilled crude oil in the Bight. While the Plan acknowledges that the effects of a spill could include 'compromise to human, physical and mental health' (page 315), the type, scale and gravity of such effects have not been considered. Studies of oil spills in other parts of the world have revealed a range of physical and mental health impacts, with similar threats likely in the event of a spill in the Bight.<sup>1 - 23</sup> As demonstrated internationally, potential health impacts of a spill include immediate effects of oil and dispersant exposure, such as respiratory symptoms, irritation of the eyes, skin and throat, nausea/vomiting and neurological symptoms (e.g. headache, dizziness); other effects relating to manual clean-up activities include risk of injury and exposure to heat/cold. Those living and working close to the spill site, or closely involved in oil clean-up, are most at risk. Importantly, physical

health impacts may persist for years after exposure. Of most concern is some evidence to suggest toxic effects on genetics, the immune system, and hormone function as a result of oil-spill exposure.

Mental health impacts are significant and pervasive, with oil-exposed populations demonstrating increased prevalence and severity of depression, anxiety and post-traumatic stress disorder even many years after a spill. Economic loss, job insecurity, social disruption and uncertainty are significant stressors among those working in industries affected by oil spills, with effects on families and communities including increased rates of domestic violence and substance abuse. Effects are greatest on poorer families and communities, compounding existing disadvantage. Effects on the mental health and wellbeing of children and adolescents have also been demonstrated, including depressive symptoms, post-traumatic stress disorder, and declining academic performance.

## **Economic cost**

On page 271 it states

Since 1980, there have been approximately 59,000 offshore wells drilled world-wide. In this time there have been three large spills during drilling.

However, there are spills from Tankers and other conveyors of oil and all these have to be taken into account in assessing the risks to the world if this industry continues.

An oil spill in the GAB equivalent to the Horizon spill would have a devastating impact on the South Australian fishery and tourism industries and may well cause long-lasting effects on environmental sustainability of the region. The documented cost of the Horizon spill was US\$62 billion<sup>13</sup>.

The question is whether any risk whatsoever should be undertaken to establish the industry in the GAB when the oil industry must contract rapidly if humanity it to have any chance to control climate change.

## **Regulatory Assessment of this application**

We note that the assessment by NOPSEMA needs to find impacts on the environment to be "acceptable" (in addition to the ALARP principle that the residual risk shall be reduced as far as reasonably practicable). We make the point that the environment and human health is indivisible. This issue is of such moment it is essential that an APAP principle, regardless of cost, should be enforced.

It appears that the NOPSEMA membership has one member versed in environmental protection, all others relate to the oil industry, other resources or commerce. Amongst other needs there is no sea water ecologist, no health expert and no expert on climate change modelling. This is an inappropriate membership for consideration of an issue of great complexity and importance to the future of Australian communities and indeed for international security, particularly when members of the present government find difficulty in accepting the importance of scientific information that we have a world climate and biological crisis. NOPSEMA is the front-line for this enormous decision.

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- <sup>3</sup> <https://www.bloomberg.com/news/articles/2019-03-08/norway-gives-1-trillion-fund-go-ahead-to-divest-its-oil-stocks>
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