
GROUNDINGS OF APPEAL:

Searcher Geodata UK Limited – Environmental Authorisation in terms of Regulation 24 of the NEMA EIA Regulations for 3D seismic survey activities located between approximately 256km offshore of St Helena Bay extending north along the western coastline to approximately 22km offshore of Hondeklip Bay

Reference: 12/1/043

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1.

A. INTRODUCTION

The appellant is the Green Connection NPC, a non-profit company established in terms of section 14 of the Companies Act 71 of 2008.

2.

This appeal is brought against the environmental authorisation (“authorisation”) (see Annexure “GC1”) granted by the Director-General of the Department of Mineral Resources and Energy (DMRE) on 20 December 2022 to Searcher Geodata UK Limited (“Searcher”) to undertake the list of activities specified in section 3 of the authorisation, namely listed activity 21(b) of GN983 of 04 December 2014. As the holder of the authorisation, Searcher is authorised to conduct these activities within the area described in section 4 of the authorisation (namely the area located between approximately 256km offshore of St Helena Bay, extending north along the Western Cape coastline to approximately 220km offshore of Hondeklip Bay, adjacent to the Namakwa and West Coast Municipalities: Western Cape Region and Northern Cape Region).

3.

This appeal is brought in terms of the National Appeal Regulations, 2014.¹

4.

The appeal authority considering this appeal is the Minister responsible for environmental affairs (“the Minister”), who does so in terms of section 43 of the National Environmental Management Act² (NEMA).

5.

The appellant was notified of the authorisation by the environmental assessment practitioner

¹ GNR.993 of 8 December 2014: National Appeal Regulations (as amended).

² 107 of 1998.

(EIMS) on 6 January 2023, and has substantively complied with (or will substantively comply with) the requirements of regulation 4(1) of the Appeal Regulations.³

6.

It is recorded that during the environmental impact assessment (EIA) process, the Green Connection made detailed legal and substantive Comments on the draft Basic Assessment Report (BAR) (see Annexure “GC2”). These comments should be read as specifically incorporated into these grounds of appeal.

7.

B. GROUNDS OF APPEAL

B1. PASA’S ACCEPTANCE OF SEARCHER’S RECONNAISSANCE PERMIT APPLICATION WAS UNLAWFUL; NO STATUTORY BASIS FOR SPECULATIVE MULTI-CLIENT SEISMIC SURVEYS

In its comments on the draft BAR, the Green Connection submitted that the acceptance of Searcher’s reconnaissance permit application where exploration rights are held by another person/s over the area was unlawful, that there is no statutory basis in the Mineral and Petroleum Resources Development Act, 2002 (MPRDA) for the granting of reconnaissance permits to seismic survey companies to conduct speculative multi-client seismic surveys, and that the Minister responsible for Mineral Resources and Energy (or his delegate) would be acting *ultra vires* the enabling provisions of the MPRDA should a reconnaissance permit be granted to Searcher.

8.

The rationale for this submission is detailed in the Green Connection’s comments on the draft BAR (see Annexure GC2, section B, paragraphs 4 to 13).

9.

In response to this submission, EIMS advised that Searcher was issued an Acceptance Letter

by the Petroleum Agency SA (PASA) in terms of s74(2) of the MPRDA and that the EIA application was initiated based on this acceptance letter. EIMS advised further that the Green Connection's concern had been noted and was submitted to the decision-maker for consideration.

10.

No notice of the reconnaissance permit application or of any opportunity to make representations regarding Searcher's reconnaissance permit application prior to it being accepted by PASA was given to Interested and Affected Parties (I&APs). The Green Connection records that it fully reserves its rights to seek appropriate relief in the appropriate forum should the environmental authorisation decision be upheld on appeal, and should a reconnaissance permit subsequently be granted under the MPRDA.

11.

B2. SEISMIC SURVEYS CAUSE DIRECT AND INDIRECT PHYSICAL HARM TO INDIVIDUAL SPECIES AND MARINE ECOSYSTEMS, AND PROPOSED MITIGATION MEASURES ARE NOT EFFECTIVE IN PREVENTING THE LIKELY HARM CAUSED BY SEISMIC SURVEYS TO MARINE SPECIES AND ECOSYSTEMS

The BAR *Biodiversity and Ecosystem Assessment Report* ('Pisces Report') indicates that the potential impacts to the marine fauna as a result of the proposed 3D seismic acquisition include:

- Physiological injury and/or mortality;
- Behavioural avoidance;
- Reduced reproductive success/spawning;
- Masking of environmental sounds and communication;
- Collision of turtles/marine mammals with the survey and support vessels or entanglement in towed acoustic apparatus; and
- Indirect impacts on piscivorous predators due to seismic effects on prey species.

12.

The report goes on to state that the highest sensitivities in response to the proposed 3D survey are:

- Humpback whales, which migrate through the area between June and November (inclusive);
- Sperm whales, beaked whales and other odontocetes that frequent offshore waters;
- Large migratory pelagic fish and shark species that show seasonal association with Child's Bank and Tripp Seamount;
- Leatherback turtles which frequent offshore waters in low numbers and aggregate around seamounts to feed on jellyfish; and
- Various pelagic Albatross, Petrel, Storm Petrel and Shearwater species.

13.

Notwithstanding the above, the report rates the significance of impacts on marine habitats and communities as (mostly) low to medium before mitigation, and very low to low after mitigation. The BAR in turn relies on this (and other significance ratings) to reach the conclusion that:

...there are no environmental fatal flaws that should prevent the proposed project from proceeding, provided that the recommended mitigation and management measures are implemented... it is the opinion of the EIA project team and the EAP that the significance levels of the majority of identified negative impacts can generally be reduced to an acceptable level by implementing the recommended mitigation measures and the project should be authorized.⁴ (emphasis added)

14.

This stands in stark contrast to the approach taken by our courts in recent seismic survey judgements, where it was accepted that marine seismic surveys do cause harm, as a result of which mitigation measures are proposed. For example:

- In the Shell Wild Coast Seismic Survey urgent interdict application judgment, Bloem J stated that implicit in Shell's contention that harm caused by marine seismic surveys to marine life is not irreparable and that mitigation measures are implemented to minimise this harm, *'is an acknowledgment of harm to marine life, hence the*

⁴ BAR, at p214.

mitigation measures'.⁵ Regarding the evidence of ten experts put up by the applicants to prove irreparable harm, the court noted that despite the massive body of expert evidence on the harm to marine life, Shell did not adduce any expert evidence to neutralise this evidence. Bloem J stated further that the opinions expressed by these experts '*are based on objective facts contained in their reports and affidavits. There is no reason not to accept their evidence. That evidence establishes that, without intervention by the court, there is a real threat that the marine life would be irreparably harmed by the seismic survey*'.⁶

- In the Shell Wild Coast Seismic Survey judgment in the main case, the court referred to the applicants' relying on expert reports for their contention that the anticipated harm to marine and birdlife is a fundamental consideration, noting that these experts were in agreement that there is a reasonable apprehension of harm to marine and bird life, and that the mitigation measures proposed by Shell did not adequately manage the threat of harm. The court also referred to the experts relied upon by Shell to refute the suggestion of possible harm to marine life, and noted that the respondents (Shell) suggested that the detrimental effect of seismic surveys are not known and that, in so far as there is a possibility of death or stranding of marine animals from exposure to sound from seismic surveys, there are appropriate mitigating and monitoring measures in place.⁷ The court went on to point out that '*[b]ecause of the apparent dispute between the experts as to the adequacy of the mitigation measures minimising the known effects of seismic surveys, it would be incumbent on the decision-maker to invoke the precautionary principle*'.⁸
- In the Searcher urgent interdict judgment, Thulare J pointed out that:

Physical damage to marine animals has been directly linked to the kind and level of sound emitted during the nature of seismic survey Searcher is undertaking. This is why Searcher has to mitigate the damage... Some species show physiological stress

⁵ Shell urgent interdict judgement, para 41.

⁶ Ibid, at para 64.

⁷ Shell main judgment, para 108.

⁸ Ibid, para 109.

responses and behavioural changes like moving away rapidly and this increased energy consumption and energy costs which reduced time for foraging and the ability to protect itself. There was a specific concern for beaked whales who were particularly sensitive to anthropogenic noise... The impact on fish assemblages was difficult to interpret and there was a lack of research on confounding effects and multiple stressors were a key concern... Zooplankton was the reason the West coast contained important fishery nursery grounds. As a result, impacts on zooplankton could propagate to other groups. Very little was known about the impact of seismic surveys on zooplankton. Existing observations suggested damage to larval and juvenile lobsters of up to... 1.2km from the survey sound source and that zooplankton mortality increased up to three-fold within the survey area... Snook will be impacted... a source of food for the impoverished communities of the West Coast and also provided an income to sustain the small-scale communities... Very little is known about the differential impact of seismic activity on young and smaller fish, turtles and cetaceans, and this could impact fish assemblages, abundances and availability. A precautionary approach was necessary.⁹

15.

In the Searcher urgent interdict seismic survey case,¹⁰ the applicants put up a number of expert affidavits and reports to support their contention that there was a reasonable apprehension that the marine seismic survey would cause irreparable harm to marine species and ecosystems, and that the proposed mitigation measures are not effective in addressing this harm. Given that the proposed 3D seismic survey area partially overlaps with the proposed 3D seismic survey area in the 2021 Searcher EMP,¹¹ the views expressed by these experts also have relevance to the current proposed Searcher multiclient seismic survey (taking into account differences in the extent and location of the 3D seismic survey area). These expert affidavit and reports are accessible through the link provided in the footnote below, and should be read as specifically incorporated into this Appeal.¹²

16.

In its comment on the draft BAR report, the Green Connection relied on an expert report by Harris, Olbers and Wright (Harris *et al*) titled *Report on Scientific Basis for Concerns of*

⁹ Ibid, paras 26 – 33.

¹⁰ *Christian John Adams & Others v Minister Mineral Resources and Energy & Others* - Annexure JH1 to the Applicants' Founding Affidavit, at p506 - 529, 'Report on Scientific Basis for concerns of significant harm inflicted to marine wildlife by 2D and 3D seismic surveys on the South and West Coasts of South Africa', Harris, Olbers & Wright (14 January 2022).

¹¹ Searcher EMP September 2021, see for example the Proposed 3D seismic Area depicted in figure 7-3 (at p54), compared with the reconnaissance permit area depicted in Figure 5 of the Searcher BAR (at p43).

¹² <https://drive.google.com/drive/folders/1OfFSta2iFMtY8iqoZ9zhW54zFKu8zN9r>

Significant Harm Inflicted to Marine Wildlife by 2D and 3D Seismic Surveys on the South and West Coasts of South Africa, which report was put up by the successful applicants in the Searcher Urgent Interdict judgment referred to above.

17.

For the purposes of this Appeal, the Green Connection requested WildTrust's marine scientists (Harris, Olbers and Wright) to provide comment on the environmental authorisation granted to Searcher (see Annexure "GC3") (hereinafter referred to as the 'WildTrust comment'). Some of the main points made in the WildTrust comment are summarised below:

- Should the activity be authorised, the likelihood of the reconnaissance activities causing direct harm to individual species, populations or ecosystems remains high. It remains clear that there is a high likelihood and risk that environmental harm will occur when seismic surveys are undertaken, the question is the magnitude of such harm.
- It is important that further studies be undertaken in this regard before seismic survey activities commence, and the environmental authorisation is thus considered premature and inadvisable.
- In the opinion of the authors, the mitigation measures provided by EIMS are insufficient to allay fears of environmental harm and the Environmental Authorisation (EA) should be set aside.
- Furthermore, the information provided in the Final Basic Assessment Report (FBAR) is based on the entire Orange Basin Area (i.e. "South African West Coast....study area between the Orange River mouth and Cape Point") and not specifically on the area for which the environmental authorisation was granted i.e. offshore, and straddling two provinces (the Northern Cape and Western Cape), in an area where very little biological and ecological data exists. The Orange Basin Area is significantly larger than the area for which the 3D seismic survey has been authorised for, and some mitigation measures proposed are irrelevant for species and ecosystems in this specific area. For example, on p. 130 of the final BAR EIMS includes MPA buffers with the exception of the eastern edge of Robben Island MPA, which does not occur anywhere near the proposed 3D seismic areas. The authors state that in their opinion, the final BAR should be entirely

relevant to the 3D seismic survey area, so that relevant area-specific (taking the species and ecosystems, and oceanographic conditions into account) mitigation measures are considered, and not the seemingly “cut and paste” standard mitigation measures and procedures.

- The authors disagree strongly with the statement on page xviii of the final BAR that “[t]he findings of the specialist studies conclude that there are no environmental fatal flaws that should prevent the proposed project from proceeding, provided that the recommended mitigation and management measures are implemented.” Their reasoning is summarised in the table at p2 of the WildTrust comment, and the authors also attach Comments prepared on 10 October 2022 for Natural Justice for their review of the draft BAR, as well as the Harris *et al* report referred to above, both of which the authors indicate are relevant to the West Coast and explain the scientific basis for the concerns about environmental harm.
- The authors also provide replies to the responses provided by EIMS to the WildTrust comment on the draft BAR (see Annexure “GC3” for details).

18.

In the Harris *et al* report referred to above, the authors conducted a review of peer-reviewed literature on the physiological, behavioural and ecological impacts of the Searcher 2021 proposed 3D seismic survey activities on marine wildlife, with specific attention to the relevance of the information to the context of the application, the vulnerable and endangered species known to occur there, and the proposed timing of the seismic survey in the summer austral months. Harris *et al* state that having carefully considered the available information:

...it is our opinion that seismic surveys do cause harm to both species and ecosystems, and that significant direct harm to individual animals and harm to populations of endangered species is the most likely scenario... Of specific concern is the impact on humpback whales and southern right whales which are still frequenting the west coast during the summer months (December – February), the impact on critically endangered (leatherback) turtles (migration routes in the area), the critically endangered African Penguin (changes in foraging behaviour and impacts on fitness); and the Cape fur seal (and consideration of current mass die-offs). We conclude that these seismic surveys are inadvisable in the austral summer months due to the presence of these species in the area, the increasing anthropogenic pressures, and the inability of the prescribed mitigation measures preventing harm to individuals/populations. Furthermore, recent

literature provides credible concern about ecosystem/food-chain impacts of seismic surveys, that may in turn have impact on fisheries, the severity and localisation of which will depend on coincidences with spawning and juvenile recruitment events. It is strongly recommend that further studies on the impacts of seismic activities, in the South African context, are carried out *in situ* before proceeding with further seismic surveys of this nature.¹³

19.

Harris *et al* go on to explain that marine animals use sound in a variety of ways critical to their lifecycles, with various physical and behavioural responses to acoustic disturbances documented. In their summary of findings, Harris *et al* point out that, in addition to the physical damage referred to above, 3D seismic surveys are likely to cause harm in the following ways:

20.

In their summary of findings, Harris *et al* conclude that:

- Based on peer-reviewed scientific literature, it is clear that physical damage to marine animals, including soft tissue trauma damage, embolisms, damage to organs used in balance and orientation, concussions, haemorrhaging, decompression sickness and both temporary and permanent threshold shifts to hearing ability have been directly linked to the kind and level of sound emitted during this nature of seismic surveys.
- There is plausible evidence to suggest that seismic survey activity is likely to affect the conservation status and recovery of populations of vulnerable and threatened species including (IUCN Red list species such as humpback and southern right whales), because sound and the ability to hear and interpret sound is critical for many species to reproduce (both vocalisations on breeding grounds and communications across large distances for mate detection). Therefore it must therefore be assumed that interference in sound perception or utilisation for communication (temporarily or permanently) has the potential to impact a species at the population level.

¹³ See Appendix 3, Harris, Olbers and Wright (Harris *et al*) *Report on Scientific Basis for Concerns of Significant Harm Inflicted to Marine wildlife by 2D and 3D Seismic Surveys on the South and West Coasts of South Africa*.

- Some species have been shown and documented to display physiological stress responses and behavioural changes to seismic activities, such as moving away rapidly, diving or remaining still. These responses are likely to increase their energy consumption and energy costs, reduce their time to forage, and/or affect their vulnerability to predation, thus having negative impacts on the survival of individuals (especially young or compromised animals) as well as the overall population growth and survival of a species (especially for threatened species that are already at risk of extinction).
- The impacts of seismic activities are most well studied for marine mammals, and evidence suggests that there are distinct avoidance responses such as leaving the area or ceasing to undertake everyday activities such as feeding in preferred areas. This is likely to negatively impact the "fitness" of an affected animal.
- There is genuine conservation concern for beaked whales that are particularly sensitive to anthropogenic noise, including seismic surveys. It has been demonstrated that even minor, non-lethal disturbances, resulting in changes in behaviour such as displacement from preferred habitats, could impact a population.
- The phenomenon of energy-cost (from stress and avoidance behaviour) is of particular concern for some of the species expected to be encountered in the survey area in question, particularly the humpback whales and southern right whales who are at risk of the airgun noise affecting their behaviour or interfering with the communication between mother and calf. Any impact on their energy reserves could impact on their condition (weight-loss and physiological condition) and affect survival of the animals during a vulnerable time (especially for lactating mothers and their calves) on their long migration to feeding grounds in Antarctica.
- Recent research (2017) has shown significant mortality in zooplankton up to 1.2 km from a seismic survey array. Zooplankton forms the base of many important food webs in the marine environment. Depletion of zooplankton could thus have an impact on food for their predators (such as fish) as well as impact fish eggs and larvae (Ichthyoplankton) with potential local impacts on species important in fisheries. This damage to zooplankton over 1km away from the survey array raises concern that a

500m buffer for other animals that are unable to move away from the sound, is far too small to ensure that damage is not inflicted (even if they were able to evade it).

- The impact on fish assemblages is difficult to interpret, due to multiple factors at play including but not limited to the ability of a species to move from an area as well as the receiving habitat. A global review of the effect of seismic activities on fish and invertebrates acknowledged the limits of the current research due to experimental designs used or due to the focus on single species during investigations. A key concern is a lack of research focused on confounding effects and multiple stressors, therefore potential impacts of seismic surveys that have been previously identified may be reflective of underestimation or overestimation and would depend on the type of interaction (synergistic, additive, or antagonistic).
- In South Africa, since October 2021, thousands of dead and/or dying Cape fur seals, have washed ashore along the south and west coasts. The cause of these die-offs remains unknown but avian flu has been ruled out and malnourishment appears to be the most widely accepted reason. It is of concern that although the cape fur seal population within South Africa is relatively healthy, they too are under pressure from various anthropogenic pressures. Additional stress from seismic activity at this time is inadvisable.
- The authors are of the opinion that the proposed seismic survey activities are highly likely to both disturb and have an adverse effect on (amongst others) Critical Biodiversity Areas (CBAs) and their associated fauna, which areas are ignored (thus giving no consideration to the biological importance of these areas or the likely impact at such close range). In the Searcher BAR, while it is indicated that the proposed 3D survey area does not overlap with Marine Protected Areas (MPAs) or Ecologically and Biologically Significant Areas (EBSAs), CBAs are found within the reconnaissance permit and 3D survey areas, including both CBA1: natural and CBA2: natural areas.

21.

In her expert affidavit filed in support of the Searcher urgent interdict seismic survey case, marine ecologist and Associate Professor (Department of Biological Sciences, UCT) Colleen Maloney points out that the ecosystem off the West Coast of South Africa is one of the world's

most productive marine environments, and that:

This region is fertilised on a large scale and an almost continuous basis by the transport of water rich in nutrients (e.g. nitrogen and phosphorous) from depth to the well-lit surface waters where photosynthesis can occur. This results in a proliferation of microscopic phytoplankton (photosynthetic organisms) and small zooplankton, which feed on phytoplankton and which themselves are food for fishes. The west coast thus has several nursery grounds for fishes, including species that are commercially exploited and non-commercial species. The large abundances of fishes, large crustacean zooplankton and squids also support top predator populations, such as seabirds and marine mammals...

As examples of measured short-term impacts, larval and juvenile lobsters in an Australian study were damaged up to 500 m from a seismic survey sound source...

South Africa's west coast has a large abundance of marine organisms, with much spatial and temporal heterogeneity in the environment, such that impacts need to be understood in the context of localised patches of enhanced abundance and dense aggregations of marine organisms.

In conclusion, current understanding of impacts associated with seismic surveys on zooplankton is too sparse and localised to allow definitive conclusions to be drawn about the extent and ecosystem impact of these surveys off the west coast of South Africa.¹⁴ (emphasis added)

22.

As plankton (which includes larval fish and rock lobsters) are the basis for the food chain, providing food for other species, the impacts of seismic surveys on plankton will have knock-on impacts on the rest of the ecosystem, including juvenile fish, rock lobster and others.

23.

In his expert affidavit filed in support of the Searcher seismic survey case¹⁵, Dr Alexander Claus Winkler commented on the likely effects of seismic surveys on line-fish. Winkler points to a study published in 2021 that highlights the direct lasting behavioural effects of seismic surveys on the rhythmic behavioural foraging patterns of cod in the North Sea. He points out that both hake and snoek perform rhythmic diel foraging migrations off the seafloor at night and onto the seabed during the day. Given that seismic surveys are conducted both during the

¹⁴ Available online at: https://drive.google.com/drive/folders/1m-h8MoRfdJfKHLiB_ulD1KX-dBktua, at pp1 – 2 (22. Coleen Moloney).

¹⁵ Available online at: https://drive.google.com/drive/folders/1m-h8MoRfdJfKHLiB_ulD1KX-dBktua (21. Alexander Winkler).

day and night, it is likely that these benthic fish species will migrate higher up the water column at night, bringing them within distances that may expose them to direct injury and mortality impacts from seismic surveys.

24.

With regard to the efficacy of the mitigation proposed mitigation measures relating to the acoustic impacts of seismic surveys, Harris *et al* state as follows in their summary of findings:

- While "Soft starts" mitigation for seismic impacts are likely to reduce the impact for highly mobile large animals, this is unlikely to be adequate for the many species that are prevalent in the area over the austral summer months and are unable to avoid the array or leave the area due to their lower mobility, such as smaller turtles, invertebrates, some fish species and zooplankton.
- The finding of observer efficiency (from a scientific monitoring study conducted during the 2018/19 and 2019/2020 seasons on the humpback whales on the east coast) suggests that even with trained observers up to 44% of humpback whales in an area went undetected. This casts doubt on the effectiveness and success of Marine Mammal Observer (MMO) sightings of the largest species (humpbacks) as a mitigation measure, indicating that it is most likely that whales go undetected. Furthermore, the detection rate for smaller species, such as dolphins, seals and turtles, would be expected to be much lower, obviating the effectiveness of visual observations to prevent harm to these species.
- Also of concern, is that the efficacy of a MMO is likely to be low due to the nature of the offshore marine environment in the survey area (frequent high swells and winds affecting surface visibility), putting species who are missed by MMOs and passive acoustic monitor (PAM) operators at extreme risk, particularly at night or during adverse weather conditions.
- Furthermore, the reliance on observers to do visual sightings to supplement the PAM monitoring during the day, as a mandated mitigation measure, necessitates questioning the acceptability of continuing with survey activities at night. If the visual observations are useful (perhaps sighting large animals around 65% of the time) in addition to PAM

[which only detects species that vocalise, when they are vocalising], then relying on PAM alone at night cannot be an effective mitigation measure. The authors express the opinion that surveys should not occur between sunset and sunrise each day if a real attempt of maximum avoidance of cetaceans is the objective of this mitigation measure.

25.

For the reasons provided above, the Green Connection submits that the DMRE erred in making the 'key finding' in its reasons for decision (to grant environmental authorisation to Searcher) that 3D seismic surveys are non-intrusive in nature, and that while the technology poses potential impacts to fisheries and marine fauna, the majority of impacts were assessed to range from low to very low significance with mitigation. The Green Connection submits that the DMRE also erred in making the 'key finding' that the implementation of mitigation measures in all phases of the proposed 3D seismic activities will ensure that the planned activities will not result in any detrimental impact on the environment. These 'key findings' fly in the face of the Shell Wild Coast Seismic Survey urgent interdict application judgment, the Shell Wild Coast Seismic Survey judgment and the Searcher urgent interdict judgments referred to earlier in this section of the appeal.

26.

Accordingly, the Green Connection submits that the DMRE also erred in its conclusion that the 3D seismic survey '*will not result in any detrimental risks to the environment and the public*'.

27.

Having regard to the judgments referred to above and the expert reports put up in support of this Appeal, the Green Connection submits that:

- the proposed 3D seismic survey clearly poses a threat of serious or irreversible harm

to individual species and marine ecosystems;

- there is clearly scientific uncertainty as to the magnitude of this harm; and
- that the proposed mitigation measures are not all effective in preventing or minimising this harm (especially in relation to species that are unable to avoid the seismic array, and at night given that PAM does not detect all species).

28.

Accordingly, the DMRE should have properly applied a precautionary approach¹⁶ when considering its decision on authorisation (but failed to do so), and if it had done so environmental authorisation should have been refused.

29.

For the reasons set out above, the Minister is respectfully requested to exercise her powers in terms of section 43(6) of NEMA and set aside the environmental authorisation.

30.

B3. FAILURE TO ADEQUATELY ASSESS NEED AND DESIRABILITY

The Green Connection submits that the final BAR and the decision on authorisation based thereon failed to adequately assess the need and desirability of the proposed activities.

31.

(a) Need and Desirability Assessment Requirement Summary

The BAR states at section 5 that the *‘needs and desirability analysis component of the “Guideline on need and desirability in terms of the EIA Regulations (Notice 819 of 2014)” includes, but is not limited to, describing the linkages and dependencies between human well-being, livelihoods and ecosystem services applicable to the area in question, and how the proposed development’s ecological impacts will result in socio-economic impacts (e.g. on*

¹⁶ Section 2(4)(a)(vii) of NEMA stipulates that sustainable development requires the consideration of all relevant factors, including that a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and action.

livelihoods, opportunity costs, etc.)'.¹⁷

32.

This brief statement does not do justice to the requirements relating to need and desirability.

33.

In terms of the NEMA EIA Regulations,¹⁸ when considering an application the competent authority must have regard to (among other things) s24O and s24(4) of NEMA, the need for and desirability of the undertaking of the proposed activity, and any relevant guideline published in terms of s24J of NEMA.¹⁹ Schedule 1 to the NEMA EIA Regulations states that one of the objects of the basic assessment process is to, through a consultative process, describe the need and desirability of proposed alternatives.²⁰ It provides further that a basic assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include (among other things) a motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location.²¹

34.

The Department of Environmental Affairs' published a *Guideline on Need and Desirability* ("the Guideline") in 2017. The Guideline (among other things):

- Sets out both the strategic and statutory context for the consideration of need and desirability of a development involving any one of the NEMA listed activities, and states that need and desirability is based on the principle of sustainability as set out in the Constitution, NEMA and various policies and plans (including the National Development Plan 2030 (NDP)). The Guideline states further that addressing the need and desirability

¹⁷ BAR, p20.

¹⁸ GNR.982 of 4 December 2014.

¹⁹ Ibid, regulation 18.

²⁰ Appendix 1, item 2(c).

²¹ Appendix 1, item 3(f).

of a development is a way of ensuring sustainable development, namely that a development is ecologically sustainable, and socially and economically justifiable.

- Indicates that need and desirability is a key component of any EIA application, and will be determined by considering the broader community's interests. While recognizing that it is essential that national policies and strategies support growth in the economy, the Guideline states that it is also essential that these policies take cognizance of strategic concerns such as climate change, food security, as well as the sustainability of supply of natural resources and the status of ecosystem services.
- Provides that when evaluating project-specific applications, the strategic context of such applications and the broader societal needs and the public interest should be considered. The Guideline goes on to state that while the importance of job creation and economic growth in South Africa cannot be denied, the Constitution calls for *justifiable* economic development. The specific needs of the broader community should therefore be considered, together with the opportunity costs and distributional consequences in order to determine whether or not the development will result in the securing of ecological sustainable development and the promotion of justifiable social and economic development – in other words, that the development will be socially, economically and environmentally sustainable.
- Emphasizes that NEMA and the EIA Regulations highlight specific considerations that must be taken into account for every application for environmental authorisation. In addition to the requirements set out in s24(4) and s24O of NEMA, the environmental management principles set out in s2 of NEMA. During the assessment phases of an EIA process, the need and desirability must be specifically addressed and evaluated. The Guideline indicates further that with the EIA Regulations requiring the consideration of how the geographical, physical, biological, social, economic and cultural aspect of the environment may be affected by the proposed activity, need and desirability relates to all of these considerations.
- States that in order to properly interpret the EIA Regulations' requirement to consider need and desirability, it is necessary to turn to the NEMA s2 principles. The Guideline indicates that it is important to note that need is not the same as the general purpose and requirements of the activity - 'need' relates to the interests of the and needs of the broader public. [set out relevant NEMA s2 principles?]

- Goes on to indicate that the consideration of need and desirability in EIA decision-making requires the consideration of the strategic context of the development proposal along with the broader societal needs and the public interest. Ultimately development must not exceed ecological limits in order to ensure ecological integrity, while the proposed actions of individuals must be measured against the long-short-term and long-term public interest in order to promote justifiable social and economic development. In considering the merits of an application in terms of need and desirability considerations, it must be decided which alternatives represent the 'most practicable environmental option' (i.e. that option that provides the most benefit and causes the least damage to the environment as a whole, at a cost acceptable to society, in the long-term as well as the short-term).

35.

Chapter 4 of the Guideline sets out questions to be engaged with when considering need and desirability. It provides that the need for and desirability of a proposed activity should specifically and explicitly be addressed throughout the EIA process when dealing with individual impacts and specifically in the overall impact summary by taking into account the answers to the questions.

36.

(b) Need and desirability motivation does not provide a balanced assessment of the 'Need for Seismic Data'

Under the sub-heading 'Need for Seismic Data', section 5 of the BAR states that '*a discussion of need and desirability of the project would not be complete without understanding the need for acquisition of the seismic data and possible oil and gas exploration and production that could potentially take place in the future as a result of the survey*'.²²

37.

The section goes on to provide a one-sided motivation of the [purported] need for seismic

²² BAR, p32.

data in relation to the use of natural gas for electricity generation and as a transition fuel:

The fastest growing sector for the use of natural gas is for the generation of electric power. Natural gas power plants usually generate electricity in gas turbines, directly using the hot exhaust gases from the combustion of the gas. Of the three fossil fuels used for electric power generation (coal, oil and natural gas), natural gas emits the least carbon dioxide per unit of energy produced. Natural gas emits 30% and 45% less carbon dioxide than burning oil and coal, respectively. Burning natural gas also releases lower amounts of nitrogen oxides, sulphur dioxide, particulates and mercury when compared to coal and oil.

The increased use of natural gas can, in the short term, serve as a transition fuel on the path to the carbon-neutral goal of the Paris Agreement. In addition to gas as a key transitional fuel reducing reliance on coal, the benefits of oil and gas could include significant amount of job creation, especially if local beneficiation takes place. An increase in domestic natural gas reserves would enable South Africa to take steps to secure the countries' energy supply (through diversification), assist in reducing the emissions of greenhouse gases (by reducing the country's reliance on coal for electricity generation) and reduce the need for the importation of gas. As such, exploration for additional domestic hydrocarbon reserves is considered important and supported by national policy, and any discoveries would be well received by the local market and are consistent with the objectives stated in the 2019 IRP. Natural gas emits 30% and 45% less carbon dioxide than burning oil and coal, respectively, and 65% less carbon dioxide than coal when the increased efficiency of Combined Cycle Gas Turbines versus coal fired power stations is considered. Eskom produces over 200MtCO₂/yr, over 40% of South Africa's total. South Africa also has SASOL's Secunda coal to liquids plant, the biggest single source of CO₂ in the world at 57MtCO₂/yr (~12.5% of South Africa's total) to produce 160k barrels of products per day. Supplying these products from conventional oil production and refining would generate approximately 10% of those emissions, 5 to 6MtCO₂/yr.

According to the 2019 IRP the availability of gas in the short to medium term is a risk as South Africa does not currently have gas resources. There is also a supply and foreign exchange risk associated with likely increase in gas volumes depending on the energy mix adopted post 2030 when a large number of coal fired power stations are decommissioned. South Africa's economic growth is dependent on the availability of energy, ensuring a sustainable and reliable supply of electricity with sufficient capacity is a key aspect to growing the economy of South Africa in the future. The electricity shortages experienced in South Africa over the past decade are a contributing factor to the significant slowdown in economic growth rate. To enable economic growth within the target rate of between 6% and 8% to be achieved, it will be necessary for Government to continue increasing electricity generating capacity in the country. The use of natural gas for electricity generation is identified in national policy, together with renewable energy technologies, as an alternative in diversifying the domestic energy supply away from its current reliance on coal. Gas is identified in the draft Integrated Resources Plan as significant contributor to South Africa's energy mix in the period up to 2030. Availability of gas also provides an opportunity to convert to Combined Cycle Gas Turbine and run open-cycle gas turbine plants at Ankerlig (Saldanha Bay), Gourikwa (Mossel Bay), Avon (Outside Durban) and Dedisa (Coega IDZ) on gas (IRP 2019).

...

The feasibility of using natural gas for domestic power generation is considered to be dependent on the extent of available domestic reserves of natural gas, as well as the financial cost of importing natural gas should those reserves be insufficient. The acquisition of seismic survey data is therefore considered important with respect to understanding the potential for future oil and gas production as part of the energy mix of the country going forward and the need and desirability of the project is therefore supported from an energy security perspective.²³

38.

Two recent independent studies (among others) challenge the view that natural gas is necessary for electricity generation and as a transition fuel.

39.

The International Institute for Sustainable Development's (IISD) *Gas Pressure: Exploring the case for gas-fired power in South Africa* (March 2022) report points out that while there used to be a rational view that natural gas would be necessary either during a transition to low-carbon energy or as part of the long-term energy mix for electricity production:

....revolutions first in renewable energy costs and then in battery storage costs have upended this view. Analysis of the South African electricity system shows that gas supply is not technically necessary until at least 2035, if ever. In the last few years, either the risks associated with gas have increased, or the understanding of existing risks has increased. Consequently, South Africa may see significant negative outcomes from developing a large gas-to-power system now... the trend toward decarbonization, coupled with cost reductions for renewable energy and storage, creates risks for gas investment. Investment in gas can reasonably be expected to lead to higher costs for consumers, just transition challenges for workers, and losses for investors.²⁴

The ISSD report highlights some of the risks associated with gas-to-power investment in South Africa. These risks include significant contributions to climate change (as a consequence of CO₂ emissions when natural gas is burned and methane emissions from leaks), increasing international pressure to move away from gas due to climate impacts, financial risks linked with gas-to-power, the risk of reduced security of affordable gas supply, the risk of stranded

²³ Ibid.

²⁴ IISD report, piv. Available online at: <https://www.iisd.org/publications/report/south-africa-no-need-for-gas>

assets, and the risk of creating an additional just transition burden (future gas workers and communities face a repeat of the transition hardships currently faced by the coal sector).²⁵

40.

Meridian Economics' *'Hot Air about Gas – An Economic Analysis of the Scope and Role for Gas-Fired Power Generation in South Africa'* (June 2022) report points out that while South Africa's large-scale use of gas appears to be central to current energy policy direction in South Africa, *'this rests on a 2012 vision which pre-dates dramatic reductions in renewable energy costs and carbon emissions space'*.²⁶ The report goes on to state that independent analysis of the power sector across multiple recent studies shows that South Africa's power needs can be met both now and in the future with very little use of gas, and that there is *'no evidence to support the large-scale gas envisaged in the GMP; this is uneconomical even before carbon emissions are considered'*.²⁷ Meridian point out that *'the assumption that gas-fired power generation would replace coal ignores the fact that other technology combinations are now better at replacing coal-fired power than gas, and it is against these technologies that gas-fired generation should actually be compared'*.²⁸ Meridian demonstrate that existing modelling provides no economic rationale for "big gas" in the power sector, and that *'the impact of using large volumes of gas to generate power will be borne by electricity consumers and will essentially be a subsidy provided by power consumers to otherwise unviable gas use in other sectors'*.²⁹

41.

The Green Connection submits that while the increased use of gas as a 'transitional fuel' is promoted by government and vested interest groups, the increased use of fossil gas (especially in electricity generation) will lead to increased emissions of climate warming GHGs, and methane (CH₄) in particular. While natural gas combustion is less carbon-intensive than

²⁵ IISD report, pages 8 – 12.

²⁶ Meridian report, page ii. Available online at: <https://meridianeconomics.co.za/wp-content/uploads/2022/06/Hot-Air-About-Gas.pdf>

²⁷ Ibid.

²⁸ Ibid, p1.

²⁹ Ibid, p37.

that of coal, fugitive emissions arising from the production, transport, storage and use of natural gas have a much greater climate impact than CO₂. In particular, over a 20-year period (which is particularly relevant since the next 20 years are a critical window for addressing the climate crisis) methane emissions, which make up approximately 70-90% of natural gas emissions, are projected to be 82.5 times as impactful as those of CO₂.³⁰ The desirability of using gas as a 'transitional' fuel is also questionable having regard to volatile international gas prices, as well as the potential risk of Carbon Border Taxes being introduced in the future.³¹

42.

Despite the above being included in the Green Connection's comments on the draft BAR, the final BAR makes fails to acknowledge or deal with the risks and impacts associated with the use of natural gas in energy production and as a transition fuel. Instead, EIMS provide the following response to the Green Connection's comments on the draft BAR:

Please refer to Section 5 of the BA Report in regard to the need and desirability for the proposed activities. According to the Integrated Resource Plan 2019 (IRP 2019), which is the country's energy planning strategy, there is a need for gas in South Africa's energy mix in the future. This need is driven in part by the expectation that natural gas may act as a transition fuel, whilst other greener technologies mature. According to the National Department of Forestry, Fisheries and the Environment (DFFE), targets have been determined to achieve our national GHG Emissions commitments. These targets consider the likely GHG emissions outcome of the implementation of current South African policies including the IRP. The proposed seismic activities may be used to determine whether a viable gas or oil resource is present. The outcomes of this could provide insight into potential alternative supply options to inform the future energy planning and policy for South Africa. Considering this, and other new information on supply options, as well as the rapid technological advancements in the energy sector (and specifically in the low carbon alternatives), it is crucial in our view that the energy planning for South Africa is continually reassessed and revised to ensure that the most suitable and sustainable strategy is defined.

³⁰ See the IPCC's 6th Assessment Report (AR6), Working Group 1, Chapter 6 *The Earth's Energy Budget, Climate Feedbacks and Climate Sensitivity*, Table 7.15 at p1017. Available online at:

https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Chapter07.pdf

³¹ <https://cer.org.za/wp-content/uploads/2022/10/Natural-Gas-factsheet.pdf>

43.

These points have mostly already been addressed in this section of the Appeal. However, it is pointed out that the IRP2019 (which is an electricity new generation capacity resource plan, and not the country's energy plan) does not indicate a need for significant amounts of natural gas after 2030, and an allocation of only 3000MW of new generation capacity was allocated to 'Gas & Diesel' for the period 2019 to 2030.³² Our courts have also indicated in relation to a decision-maker's reliance on the IRP2019 when making a decision on environmental authorisation that '*[p]olicy instruments developed by the Department of Energy cannot alter the requirements of environmental legislation for relevant climate change factors to be considered*'.³³

44.

The DMRE record of decision simply states that '*the motivation of need and desirability... is in line with the requirements of the EIA Regulations, 2014 and it addressed key issues raised in the Needs and Desirability Guideline*'.³⁴ And while the DMRE record of decision also indicates that information considered in taking the decision included (among other things) comments raised by various interested and affected parties (I&APs) and responses by EIMS, the decision does not make reference to substantive issues raised by I&APs in relation to the need and desirability motivation provided (or explain why such views were rejected). Nor does it provide an explanation for accepting EIMS's 'argument' that 3D seismic surveys are needed and desirable.

45.

In light of the above, the Green Connection submits that the BAR need and desirability assessment was deficient in that it failed to provide a balanced view of the need for seismic data in relation to the use of natural gas for electricity generation and as a transition fuel. As a consequence, relevant considerations (risks and impacts associated with the use of natural gas in energy production and as a transition fuel) were not put before the decision maker,

³² IRP2019, Table 5, p42.

³³ *Earthlife Africa Johannesburg and Another v Minister of Energy and Others* 2017 All SA 519 (GP).

³⁴ [Searcher EA Reasons for Decision, section 3.4 \(at page 13\)](#).

and the decision on authorisation which relied on the BAR's need and desirability analysis was also flawed as a result.

46.

In light of the above, the Minister is respectfully requested to exercise her powers in terms of section 43(6) of NEMA and set aside the environmental authorisation.

47.

(c) No consideration of need and desirability of exploring for, producing, transporting, storing and using new oil and gas from a Climate Change perspective

The 'need and desirability' section of the BAR states that the proposed project aims '*to identify oil and gas resources to be used in... energy production and/or processing or manufacturing of materials*',³⁵ and that '*[as] a result of the fact that the project entails only seismic survey activities, it is anticipated that this project will not lead to a significant impact on the receiving environment*'.³⁶

48.

In line with this, the 'need and desirability' assessment provided in the BAR limits the assessment of potential impacts to the proposed 3D seismic survey, with no consideration of the need and desirability of exploring for (and ultimately producing and using) new oil and gas reserves. The BAR states that:

From a climate change perspective, it is not currently possible to accurately assess the risks associated with oil and gas activities, given that the specific details of these potential future activities are not known and therefore climate change impacts would need to be assessed in detail during any subsequent Scoping and EIA processes for any potential subsequent oil and gas production projects.³⁷

49.

³⁵ BAR, item 1.7.1, p23.

³⁶ BAR, item 1.8.3, p23.

³⁷ BAR, p32.

As a consequence, no climate change impact assessment (even in broad terms) is included in the BAR.

50.

In its responses to the Green Connection's comments on the draft BAR on this issue, EIMS states as follows:

EIMS has conducted the impact assessment on the basis of the activities proposed by the applicant. Any subsequent authorisation would be restricted to these specifically assessed activities. Should the applicant or other applicants wish to undertake any additional exploration activities which are not addressed in the current Environmental Authorisation (EA) application, there would be a consequent need to apply for the relevant permissions. These would include a formal application for an Exploration or Production Right as well as a new EA. The impacts of such proposed activities would consequently require specific assessment and public consultation before approval. It is premature to assess the likely impacts of further invasive exploration activities or production activities as the extent, duration, location, and magnitude applicable to these activities are unknown at this stage. The NEMA EIA Regulations make a clear distinction between the reconnaissance, exploration, and production activities in that these are listed as distinct and separate listed activities. There is provision in law for these activities to be assessed on their own merits as and when they are proposed.³⁸

51.

While the Green Connection is aware that the NEMA EIA listing notices list activities requiring a reconnaissance permit separately to other stages in upstream offshore oil and gas development (such as activities requiring a production right under the MPRDA), it is submitted that the proposed 3D seismic surveys are a precursor to subsequent offshore oil and gas exploration, production and use: if new commercially exploitable offshore oil and gas resources are discovered, this would likely culminate in the production and combustion of the oil and gas discovered, which will in turn result in the emission of GHGs that will exacerbate the climate crisis, and would (among other things) impact on the livelihoods and access to food of small-scale fishers and fishing-dependent communities. The Green Connection submits that it is not logical to exclude a consideration of the climate change implications of future offshore oil and gas exploration and production when considering the need for and

³⁸ EIMS Response to the Green Connection Comments on draft BAR (28 October 2022), items 15, 17 and 18.

desirability of the proposed reconnaissance activities which aim to identify oil and gas resources to be used in energy production and/or processing or manufacturing of materials.

52.

Further to the above, the issue of whether the decision-maker properly considered climate change impacts was referred to in the judgment of the full bench of the Makhanda High Court in the Shell Wild Coast seismic survey case.³⁹ The court stated in its judgement that the intervening parties' contention that the decision-maker gave no proper consideration to climate change impacts of the decision to grant the exploration right is an important factor to be considered in the process of granting an exploration right. The court referred to expert testimony relied upon to support this contention, which showed that:

...most of the discovered reserves of oil and gas cannot be burnt if we are to stay on the pathway to keep global average temperature increases below 1.5 degrees Celsius. Authorising new oil and gas exploration, with its goal of finding exploitable oil and/or gas reserves and consequently leading to production, is not consistent with South Africa complying with its international climate change commitments'.⁴⁰

53.

The court noted that the respondents (Shell and others) had argued that climate change considerations are irrelevant when considering an application for an exploration right (also to conduct 3D seismic surveys), and these considerations are premature because they fall to be considered at a much later stage. The court disagreed, however, and pointed out that - on the authority of the *Save the Vaal* case⁴¹ - the '*processes are discrete stages in a single process that culminates in the production and combustion of oil and gas, and the emission of greenhouse gases that will exacerbate the climate crisis and impact communities' livelihoods and access to food*'.⁴² The court stated further that the respondent's thesis did not find support in *Earthlife Africa Johannesburg v Minister of Environmental Affairs and Others* either,

³⁹ *Sustaining the Wild Coast NPC & Others v Minister of Mineral Resources and Energy & Others*, High Court of South Africa, Eastern Cape Division, Makhanda – Case No. 3491/2021, at paras 120 to 125.

⁴⁰ *Ibid*, at para 121.

⁴¹ *Director: Mineral Development, Gauteng Region and Another v Save the Vaal Environment and Others* (133/98)[1999] ZASCA 9 (12 March 1999).

⁴² *Ibid*, para 123.

and referred approvingly to the following passage in Murphy J's judgement:

The absence of express provision in the statute requiring a climate change impact assessment does not entail that there is no legal duty to consider climate change as a relevant consideration and does not answer the interpretative question of whether such a duty exists in administrative law. Allowing for the respondents' argument that no empowering vision in NEMA or the regulations explicitly prescribes a mandatory procedure or condition to conduct a formal climate change assessment, the climate change impacts are undoubtedly a relevant consideration as contemplated by section 24O of NEMA for the reasons already discussed. A formal expert report on climate change impacts will be the best evidentiary means of establishing that this relevant factor in its multifaceted dimensions was indeed considered, while the absence of one will be symptomatic of the fact that it was not.⁴³

54.

The court in the Shell Wild Coast seismic survey case went on to state the following:

It seems clear from the foregoing, even taking into account the contentions raised by the respondents, that, had the decision-maker had the benefit of considering a comprehensive assessment of the need and desirability of exploring for new oil and gas reserves for climate change and the right to food perspective, the decision-maker may well have concluded that the exploration is neither needed nor desirable.⁴⁴ (emphasis added)

55.

A recent judgment of the Australian Land Court of Queensland is also instructive (notwithstanding that this matter concerned the authorisation of new coal mines) on whether subsequent GHG emissions should be taken into account and whether they are capable of assessment:

- The court pointed out that the coal is a public resource, owned by the State, to be exploited, or not, for the public good, and that there was no default position in favour of or against exploitation.⁴⁵
- Climate change was a key issue, and the court recognised that '*[t]he evidence is clear that, globally, we are struggling to achieve that goal* [i.e. the long-term temperature goals set in the Paris Agreement, namely a long-term global temperature goal of well

⁴³ Ibid, para 124.

⁴⁴ Ibid, para 125.

⁴⁵ *Waratah Coal Pty Ltd v Youth Verdict Ltd & Ors (No 6)* [2022] QLC 21, at para 5.

below 2°C above the pre-industrial level at 2100, with the ambition of keeping that temperature to 1.5°C above that level]. *The higher the temperature rises the greater the risk that the climate will move into a self-reinforcing cycle with feedback loops, exacerbating climate changes and limiting our options in response. None of this is in dispute*'.⁴⁶

- What was in dispute was whether the court could take into account the emissions from combustion of the coal. The proponents of the mine had argued that the court had no control over the emissions, because approving the mining applications did not approve the combustion of the coal. That would be a decision made in the countries to which the coal would be exported, and the emissions in generating electricity would be the responsibility of those countries and were not relevant to the mining applications.⁴⁷ On this issue, the court took the view that:

... granting permission to mine the coal cannot be logically separated from the coal being used to generate electricity. The justification for the mine is to export coal for that purpose. As a matter of law, I have decided I can take the emissions into account in applying the principles of ecologically sustainable development (for the EA application) and in considering whether the applications are in the public interest (on both the ML and the EA applications).⁴⁸ (emphasis added)

- The court accepted that wherever the coal is burnt (to generate electricity) the emissions will contribute to environmental harm, including in Queensland.⁴⁹
- Regarding how to assess the significance of those GHG emissions, the proponent of the coal mine argued that there was no certainty about what will happen with future global emissions and climate change, and that there were too many uncertainties to predict what will happen.⁵⁰ However, the court found that there was sufficient certainty in science to understand that relationship between emissions and temperature, which helped in weighing arguments about the significance of the contribution of emissions from the combustion of the coal to climate change,⁵¹ and that the volume of GHGs that

⁴⁶ Ibid, paras 22 and 23.

⁴⁷ Ibid, at para 24.

⁴⁸ Ibid, at para 25.

⁴⁹ Ibid, at para 26.

⁵⁰ Ibid, at para 27.

⁵¹ Ibid, at para 28.

would be emitted was a material contribution to the remaining carbon budgets that meet the Paris Agreement goals:⁵²

In the end, I have decided that the climate scenario consistent with a viable mine risks unacceptable climate change impacts to Queensland people and property, even taking into account the economic and social benefits of the Project.⁵³

56.

The South African judgments referred to above provide authority supporting the Green Connection's contention that:

- Authorising new oil and gas exploration (including offshore seismic surveys), with its goal of finding exploitable oil and/or gas reserves and consequently leading to production, is not consistent with South Africa complying with its international climate change commitments (as a Party to the UNFCCC that ratified the Kyoto Protocol and adopted the Paris Agreement, South Africa has committed to *'working with others to ensure temperature increases are kept well below 2°C above pre-industrial levels, which could include a further revision of the temperature goal to below 1.5°C in light of emerging science'* by reducing GHG emissions);
- A reconnaissance permit application under the MPRDA is a discrete stage in a process that will likely culminate in the production and combustion of oil and gas (the stated aim of the proposed 3D seismic survey being to identify oil and gas resources to be used in energy production and/or processing or manufacturing of materials); and
- The emission of GHGs from the production and combustion of this oil or gas will exacerbate the climate crisis and impact communities' livelihoods and access to food.

57.

The Australian judgement referred to above provides support for the Green Connection's contention that granting permission to undertaking 3D seismic surveys cannot be logically separated from further exploration, production and end-use of oil or gas resources

⁵² Ibid, at para 31.

⁵³ Ibid, para 36.

discovered, and that the resulting GHG emissions can be taken into account when applying the principles of ecologically sustainable development in EIA decision-making processes and in considering whether the application is in the public interest.

58.

The need and desirability (from a climate change perspective) of conducting a 3D seismic survey (which – as mentioned above - the BAR states aims to identify oil and gas resources to be used in energy production and/or processing or manufacturing of materials) is particularly important given that climate change has been acknowledged as a ‘crisis’ with human-induced climate change impacts being experienced in every region. It is also recognised that the climate change ‘crisis’ requires immediate, rapid and large-scale reductions in greenhouse gas (GHG) emissions to limit global warming to 1.5°C (including accelerated action in this decade to reduce global carbon dioxide emissions by 45 per cent by 2030 relative to the 2010 level and to net-zero around mid-century). In support of these submissions, some of the recent developments relating to the climate crisis are set out briefly below:

- In August 2021, the Intergovernmental Panel on Climate Change (IPCC) (an international body for assessing the science related to climate change) released its 6th Assessment Report (AR6).⁵⁴ In its summary for policymakers, the IPCC indicates (among other things) that:
 - It is unequivocal that human influence has warmed the atmosphere, ocean and land, and that widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred;⁵⁵
 - The scale of recent changes across the climate system as a whole – and the present state of many aspects of the climate system – are unprecedented over many centuries to many thousands of years;⁵⁶

⁵⁴ Climate Change 2021: The Physical Science Basis, available online at: <https://www.ipcc.ch/report/sixth-assessment-report-working-group-i/>

⁵⁵ Para A.1

⁵⁶ Para A.2

- Human-induced climate change is already affecting many weather and climate extremes in every region across the globe. Evidence of observed changes in extremes such as heatwaves, heavy precipitation, droughts, and tropical cyclones, and, in particular, their attribution to human influence, has strengthened since AR5;⁵⁷
 - Global surface temperature will continue to increase until at least mid-century under all emissions scenarios considered, and that global warming of 1.5°C and 2°C will be exceeded during the 21st century unless deep reductions in CO₂ and other GHG emissions occur in the coming decades;⁵⁸
 - Many changes in the climate system become larger in direct relation to increasing global warming. They include increases in the frequency and intensity of hot extremes, marine heatwaves, heavy precipitation, and, in some regions, agricultural and ecological droughts; an increase in the proportion of intense tropical cyclones; and reductions in Arctic sea ice, snow cover and permafrost;⁵⁹
 - Continued global warming is projected to further intensify the global water cycle, including its variability, global monsoon precipitation and the severity of wet and dry events;⁶⁰
 - Many changes due to past and future GHG emissions are irreversible for centuries to millennia, especially changes in the ocean, ice sheets and global sea level;⁶¹
 - From a physical science perspective, limiting human-induced global warming to a specific level requires limiting cumulative CO₂ emissions, reaching at least net zero CO₂ emissions, along with strong reductions in other GHG emissions. Strong, rapid and sustained reductions in CH₄ emissions would also limit the warming effect resulting from declining aerosol pollution and would improve air quality.⁶²
- On 9 August 2021, the IPCC issued a press release relating to its AR6 report. It states that the report provides new estimates of the chances of crossing the global warming

⁵⁷ Para A.3

⁵⁸ Para B.1

⁵⁹ Para B.2

⁶⁰ Para B.3

⁶¹ Para B.5

⁶² Para D.1

level of 1.5°C in the next decades, and finds that unless there are immediate, rapid and large-scale reductions in GHG emissions, limiting warming to close to 1.5°C or even 2°C will be beyond reach.⁶³

- Also on 9 August 2021, UN Secretary-General António Guterres described the AR6 report as nothing less than "a code red for humanity. The alarm bells are deafening, and the evidence is irrefutable". (emphasis added)
- Guterres is reported as noting that the internationally agreed threshold of 1.5 degrees above pre-industrial levels of global heating was perilously close, and that we are at imminent risk of hitting this threshold in the near term. Guterres is indicated as advising that the only way to prevent exceeding this threshold, is by urgently stepping up our efforts, and pursuing the most ambitious path. Guterres is reported as stating that solutions are clear: "*Inclusive and green economies, prosperity, cleaner air and better health are possible for all, if we respond to this crisis with solidarity and courage*". Ahead of the COP26 climate conference in Glasgow in November 2021, Guterres stated that all nations needed to join the net zero emissions coalition, and reinforce their promises on slowing down and reversing global heating "*with credible, concrete, and enhanced Nationally Determined Contributions (NDCs)*" that lay out detailed steps.
- In April 2022, Guterres tweeted that '*[c]limate activists are sometimes depicted as dangerous radicals. But the truly dangerous radicals are the countries that are increasing the production of fossil fuels. Investing in new fossil fuels infrastructure is moral and economic madness*'.⁶⁴ Addressing graduate students in May 2022, Guterres expressed the view that investing in fossil fuels is now "*a dead end - economically and environmentally. No amount of greenwashing or spin can change that. So, we must put them on notice: Accountability is coming for those who liquidate our future.*"⁶⁵

⁶³ <https://www.ipcc.ch/2021/08/09/ar6-wg1-20210809-pr/>

⁶⁴ <https://twitter.com/antonioguterres/status/1511294073474367488?lang=en>

⁶⁵ <https://news.un.org/en/story/2022/05/1118932>

- The 26th Conference of the Parties of the UNFCCC (COP26) was held in Glasgow in the last quarter of 2021. Recognition of the climate 'crisis', as well as the urgent need to increase effort and to accelerate action to address climate change (including by developing nations), are reflected in the outcome of COP26 and recorded in the Glasgow Climate Pact. The Glasgow Climate Pact (among other things):
 - Expresses alarm and utmost concern that human activities have caused around 1.1°C of global warming to date and that impacts are already being felt in every region;
 - Reaffirms the long-term global goal to hold the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change;
 - Recognizes that the impacts of climate change will be much lower at the temperature increase of 1.5°C compared with 2°C and resolves to pursue efforts to limit the temperature increase to 1.5°C;
 - Recognizes that limiting global warming to 1.5°C requires rapid, deep and sustained reductions in global GHG emissions, including reducing global carbon dioxide emissions by 45 per cent by 2030 relative to the 2010 level and to net zero around mid-century as well as deep reductions in other GHGs;
 - Also recognizes that this requires accelerated action in this critical decade, on the basis of the best available scientific knowledge and equity, reflecting common but differentiated responsibilities and respective capabilities and in the context of sustainable development and efforts to eradicate poverty;
 - Invites Parties to consider further actions to reduce by 2030 non-carbon dioxide GHG emissions, including methane;
 - Calls upon Parties to accelerate the development, deployment and dissemination of technologies, and the adoption of policies, to transition towards low-emission energy systems, including by rapidly scaling up the deployment of clean power generation and energy efficiency measures, including accelerating efforts towards the phasedown of unabated coal power and phase-out of inefficient fossil fuel

subsidies, while providing targeted support to the poorest and most vulnerable in line with national circumstances and recognizing the need for support towards a just transition;

- Emphasizes the importance of protecting, conserving and restoring nature and ecosystems, including forests and other terrestrial and marine ecosystems, to achieve the long-term global goal of the Convention by acting as sinks and reservoirs of GHGs and protecting biodiversity, while ensuring social and environmental safeguards.
- The climate 'crisis' is also recognised by the International Energy Agency (IEA), of which South Africa is an IEA associated country. During or about July 2021, the IEA published its *Net Zero by 2050 – A Roadmap for the Global Energy Sector* report. In the foreword to this report, the Executive Director of the IEA states (among other things) as follows:

We are approaching a decisive moment for international efforts to tackle the climate crisis – a great challenge of our times. The number of countries that have pledged to reach net-zero emissions by mid-century or soon after continues to grow, but so do global greenhouse gas emissions. This gap between rhetoric and action needs to close if we are to have a fighting chance of reaching net zero by 2050 and limiting the rise in global temperatures to 1.5 °C.

Doing so requires nothing short of a total transformation of the energy systems that underpin our economies...

Despite the current gap between rhetoric and reality on emissions, our Roadmap shows that there are still pathways to reach net zero by 2050. The one on which we focus is – in our analysis – the most technically feasible, cost-effective and socially acceptable. Even so, that pathway remains narrow and extremely challenging, requiring all stakeholders – governments, businesses, investors and citizens – to take action this year and every year after so that the goal does not slip out of reach.

This report sets out clear milestones – more than 400 in total, spanning all sectors and technologies – for what needs to happen, and when, to transform the global economy from one dominated by fossil fuels into one powered predominantly by renewable energy like solar and wind. Our pathway requires vast amounts of investment, innovation, skilful policy design and implementation, technology deployment, infrastructure building, international co-operation and efforts across many other areas.

Since the IEA's founding in 1974, one of its core missions has been to promote secure and affordable energy supplies to foster economic growth. This has remained a key concern of our Roadmap, drawing on special analysis carried out

with the International Monetary Fund and the International Institute for Applied Systems Analysis. It shows that the enormous challenge of transforming our energy systems is also a huge opportunity for our economies, with the potential to create millions of new jobs and boost economic growth.

Another guiding principle of the Roadmap is that clean energy transitions must be fair and inclusive, leaving nobody behind. We have to ensure that developing economies receive the financing and technological know-how they need to continue building their energy systems to meet the needs of their expanding populations and economies in a sustainable way. It is a moral imperative to bring electricity to the hundreds of millions of people who currently are deprived of access to it, the majority of them in Africa...

On fossil fuels used in energy production, the report states that:

There is no need for investment in new fossil fuel supply in our net zero pathway.

Beyond projects already committed as of 2021, there are no new oil and gas fields approved for development in our pathway, and no new coal mines or mine extensions are required.

59.

South Africa's international climate change commitments are also highly relevant to the need and desirability assessment, and inform the strategic context of the 3D seismic survey programme (which as stated above aims to identify oil and gas resources to be used in energy production and/or processing or manufacturing of material). In brief:

- South Africa is a Party to the UN Framework Convention on Climate Change (UNFCCC), which enjoins State Parties to take precautionary measures to anticipate, prevent or minimize the causes of climate change (Article 3.3).
- South Africa, as a Party to the UNFCCC that ratified the Kyoto Protocol and adopted the Paris Agreement, has committed to '*working with others to ensure temperature increases are kept well below 2°C above pre-industrial levels, which could include a further revision of the temperature goal to below 1.5°C in light of emerging science*' by reducing GHG emissions. South Africa has also committed (among other things) to:

- Preparing, communicating and maintaining Nationally Determined Contributions (NDCs) that it intends to achieve reach global peaking of GHG emissions as soon as possible, and to undertake rapid reductions thereafter;⁶⁶ and
 - Striving to formulate and communicate long-term GHG emission development strategies.⁶⁷
- There have been various Conferences of the Parties and meetings since, with decisions related to Nationally Determined Contributions (NDCs) contained in decisions 4/CMA.1 and 18/CMA.1 and their annexes.
- South Africa revised its NDC in 2021:⁶⁸

Table 2 - South Africa's updated NDC mitigation targets

Year	Target	Corresponding period of implementation
2025	South Africa's annual GHG emissions will be in a range from 398-510 Mt CO ₂ -eq.	2021-2025
2030	South Africa's annual GHG emissions will be in a range from 350-420 Mt CO ₂ -eq.	2026-2030

South Africa's energy sector is estimated at contributing about 84% percent to the country's overall GHG emissions (including Carbon Dioxide and Methane).⁶⁹

- In February 2020, South Africa submitted to the UNFCCC its first long-term low GHG emission development strategy titled *South Africa's Low Emission Development Strategy 2050*. It is indicated in the executive summary of this strategy that South Africa, as one of the top 20 global GHG emitters and with a high dependency on fossil fuels, will need to make substantial emission cuts to contribute its fair share to global GHG

⁶⁶ Paris Agreement, Article 4.1 – 4.3.

⁶⁷ Paris Agreement, Article 4.19

⁶⁸ Available online at:

https://www.dffe.gov.za/sites/default/files/reports/draftnationallydeterminedcontributions_2021updated.pdf#:~:text=South%20Africa%E2%80%99s%20intended%20nationally%20determined%20contribution%20%28INDC%29%28RSA%2C%20n.d.%29,Agreement.%20The%20INDC%20and%20first%20NDC%20are%20identical.

⁶⁹ <https://www.climatelinks.org/resources/greenhouse-gas-emissions-factsheet-south-africa>

emission reductions.⁷⁰

60.

The BAR does not provide any indication (or estimation) of how future GHG emissions (resulting from future exploitation of oil and gas that may be discovered through the 3D seismic survey) would impact on South Africa's ability to achieve its GHG emissions targets (as set out in South Africa's NDC) or its updated GHG emissions targets (as set out in South Africa's revised NDC), and as a consequence these relevant considerations were not taken into account by the DMRE when making its decision on authorisation. These consideration are particularly relevant given that the emissions targets for the 2026-2030 period are lower than the targets for the 2021-2025 period, while offshore oil and gas developments could take at least a decade to reach the production stage. This could result in offshore oil and gas investments (as well as associated gas infrastructure developments) in the future becoming unneeded 'stranded assets' and a burden on future generations. There is also a risk that in the future tariffs will be levied on various goods exported by fossil-fuel dependent countries – the European Union is reported to be gradually phasing in its Border Adjustment Mechanism as part of the EU's Green Deal.⁷¹

61.

The Green Connection submits that without at the very least a broad assessment of the likely climate change impacts should commercially exploitable oil and gas resources be identified through the 3D seismic survey (and should these resources ultimately be produced and utilised), the need and desirability analysis is incomplete and the EIA deficient. As a consequence, insufficient information was placed before the decision-maker to enable it to undertake a balanced and informed assessment of the environmental and socio-economic impacts of likely future GHG emissions from the production and end-use of any oil or gas identified by the 3D seismic survey. Such an assessment would need to consider these impacts in the context of ensuring sustainable development, namely that lifecycle impacts of the

⁷⁰ South Africa's Low Emission Development Strategy 2050, pviii.

⁷¹ See for example *Just Energy Transitions and Natural Gas in Africa: Balancing Climate Action and Structural Transformation*, The African Climate Foundation, August 2022, at p14. Available online at: <https://africanclimatefoundation.org/wp-content/uploads/2022/10/ACF-GAS-REPORT-V7.indd-final-1.pdf>

proposed 3D seismic survey and subsequent production and end-use of any oil and gas discovered is ecologically sustainable, and socially and economically justifiable. In making this assessment, the decision-maker would have been required to have regard to (among other things) the climate crisis, South Africa's international climate change obligations, the environmental right in s24 of the Constitution,⁷² as well the s2 NEMA environmental principles (including but not limited to the environmental principles relating to the need to avoid the disturbance of ecosystems, to prevent negative impacts on the environment and people's rights, and the requirement that the responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle).⁷³

62.

In light of the above, the Minister is respectfully requested to exercise her powers in terms of section 43(6) of NEMA and set aside the environmental authorisation.

63.

(d) No consideration of need and desirability of exploring for, producing, transporting, storing and using new oil and gas from an Ecological and Economic Risk of a Major Oil Spill

Any catastrophic oil spills that could occur as a result of an uncontrolled wellhead blowout related to future offshore oil and gas exploration and/or production drilling pose a significant threat to functioning marine ecosystems (oceans play a critical role in regulating the climate and mitigating global warming by absorbing carbon dioxide), to living organisms in South Africa's coastal waters,⁷⁴ and to communities that depend upon the oceans for their

⁷² s24 of the Constitution of the Republic of South Africa provides that 'everyone has the right:

- (a) to an environment that is not harmful to their health or well-being; and
- (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:
 - (i) prevent pollution and ecological degradation;
 - (ii) promote conservation; and
 - (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

⁷³ NEMA, s2(4)(a)(i) and (vii), and s2(4)(e) of NEMA.

⁷⁴ In terms of the National Environmental Management: Integrated Coastal Management Act 24 of 2008 (NEM:ICMA), the 'interests of the whole community' is defined as meaning the collective interests of the community determined by:

livelihoods. Small-scale fishers and fishing-dependent communities are particularly vulnerable to the negative impacts of a large uncontrolled oil spill which could (among other things) lead to a depletion in the fish stocks upon which the livelihoods of these small-scale fishers and fishing communities depend.

64.

The Green Connection submits that it is not in the interests of the broader community (including from and intra- and inter-generational perspective) to expose our oceans and coasts to the increased risk of a potentially catastrophic major oil spill during exploration drilling, or during subsequent production operations (should commercially exploitable oil or gas reserves be discovered through the seismic survey).

65.

In light of the above, the Minister is respectfully requested to exercise her powers in terms of section 43(6) of NEMA and set aside the environmental authorisation.

66.

B4. CBAs

Critical Biodiversity Areas (CBAs) do occur within the reconnaissance permit Area, including CBA1: natural and CBA2: natural areas. The draft BAR⁷⁵ indicates that approximately 39.2 % of the proposed 3D seismic survey area is covered by CBA1 and CBA2 natural areas. Exploration activities (such as seismic surveys and exploration well drilling) are classified as having 'restricted compatibility' with CBA1 and CBA2 natural areas, while petroleum production is classified as 'not compatible' in these areas. However, the draft BAR points out that the National Coastal and Marine Spatial Biodiversity Plan states that petroleum

-
- (a) prioritising the collective interests in coastal public property of all persons living in the Republic over the interests of a particular group or sector of society;
 - (b) adopting a long-term perspective that takes into account the interests of future generations in inheriting coastal public property and a coastal environment characterised by healthy and productive ecosystems and economic activities that are ecologically and socially sustainable; and
 - (c) taking into account the interests of other living organisms that are dependent on the coastal environment.

⁷⁵ At p129-131.

production may be possible in CBAs using lateral drilling or other techniques that do not result in biodiversity impacts. According to the plan, if significant petroleum resources are identified in these areas the selection of the site as a CBA could also be re-evaluated, although this would require alternative CBAs to be identified to meet biodiversity targets.

67.

In its comment on the draft BAR, the Green Connection submitted that notwithstanding that the National Coastal and Marine Spatial Biodiversity Plan stated that seismic surveys are classified as having 'restricted compatibility' (i.e. recommended to be a consent activity) with CBA natural areas, the decision-maker has the discretion to (and that properly applying a precautionary approach in consideration the application for environmental authorisation should) refuse consent for Searcher to conduct seismic surveys in these areas. The Green Connection submitted further that - given that the main objective of the seismic survey is to identify commercially exploitable oil and gas reserves, and given that petroleum production is incompatible with CBA natural areas (CBAs have been identified as conservation worthy and could in the future be declared Marine Protected Areas) - authorising the seismic survey to be undertaken in an area with 39.2% coverage by CBAs would compromise the protection of these critical biodiversity areas.

68.

In its response to the Green Connection's comments, EIMS state as follows:

The NBA 2018 has rated the South Atlantic bathyal and abyssal unconsolidated habitat types that characterise depths beyond 500 m, as being of 'Least concern', reflecting the great extent of these habitats in the South African Exclusive Economic Zone (EEZ). The CBAs within the reconnaissance permit area would therefore not be protecting benthic ecosystem types, with protection likely to apply primarily to pelagic features.

The area falls within pelagic habitat types Bb1 and Bb2 characterised by consistently low productivity, chlorophyll and temperature, with low frequency of sea surface temperature fronts (NBA 2012). Using the distribution maps in Harris et al. 2022 used to delineate the CBAs, there is some overlap of the survey area with:

- Leatherback migration routes
- Atlantic Yellow-nosed Albatross
- Wandering albatross

- Spotted gully shark (summer)
- Stability with respect to climate change

The mitigation measures proposed in the report are more than adequate to protect the first four of these, with direct climate change effects due to a seismic survey being negligible.⁷⁶

69.

In the WildTrust comment on the environmental authorisation granted to Searcher to conduct the 3D seismic survey, the authors express the opinion that this assessment by EIMS is incorrect, pointing out that EIMS clearly indicates that the CBAs in question are primarily due to pelagic features and continues to list species of concern, i.e. the Critically Endangered Leatherback Turtle. The authors point out that the mitigation measures for the risks posed by the seismic activities to turtles include 'turtle guards' (which only prevent entanglement with the gear in the water) and through visual observation by MMOs. The authors state that it is highly unlikely that an MMO would be able to adequately detect turtles, and that this would be exacerbated by wind and poor weather conditions. The authors also point out that the seismic airgun releases a blast of pressurised air and bubbles, which travel upwards at each firing. Thus, animals that find themselves in the water just above the airgun will be impacted by pressurised bubbles that increase speed as they move to the surface. The authors point out that this is a disturbance that has not been adequately considered, and which in their opinion is likely to cause harm to animals that find themselves in the path of the survey array and unable to move away.

70.

The environmental authorisation granted by the DMRE fails to mention CBAs or impose any appropriate conditions or restrictions in relation to the CBAs located within the proposed seismic survey area.

71.

Accordingly, in the event that the Minister decides to uphold the environmental authorisation

⁷⁶ At paragraph 78.

(which decision the Green Connection does not support), the Green Connection respectfully requests the Minister to exercise her powers in terms of section 43(6) of NEMA impose as a condition of authorisation that the seismic survey avoids the CBA1 and CBA3 natural areas.

72.

B5. UNDERWATER NOISE MODELLING

In its comments on the draft BAR report, the Green Connection noted that the BAR included an underwater noise modelling study, but that this is largely a desktop exercise.

73.

The Green Connection submitted that the underwater noise modelling should include *in situ* testing to 'ground truth' the modelling and accurately determine the potential noise impacts associated with various aspects of the proposed [seismic survey] (sound in the ocean is affected by pressure, salinity, temperature and temperature gradients, and can travel many kilometres from the source). The Green Connection submitted further that the impacts of noise on all species should be assessed (different species have different sensitivities to noise), including (but not limited to) potential impacts on the migration of snoek (a species that is important to the livelihoods of small-scale fishers) and juvenile turtles (which are significant from a biodiversity perspective given their endangered status) that are in turn dependent on other species.

74.

In its response to the Green Connections comments, EIMS advise that:

- The technical noise report relies on predictive modelling to predict the noise impacts associated with the seismic survey';
- The following recommendation has been included in the final EMPr regarding noise monitoring: "it is recommended that Underwater Sound Source Verification (SSV) be implemented that would include Drift Bouy deployment for underwater acoustic monitoring to establish an actual baseline prior to the commencement of the survey

and then operational levels of noise during the survey”; and

- It is also already recommended in Section 9.3.4.2 of the BA Report as well as the EMPr that Searcher should contribute to assisting with collaboration on independent research on how fish species on the West Coast such as snoek respond to seismic surveying.

75.

The Green Connection stands by its criticism of the noise modelling being a desk-top exercise, and submits that the SSV indicated to establish a baseline prior to commencement of the seismic survey should have been undertaken as part of the BAR process. Monitoring conducted after environmental authorisation has been granted cannot inform the noise modelling report, and defeats the objective of the EIA to predict potential impacts. Furthermore, the recommendations contained in the BAR and EMPr (that Searcher should contribute to assisting with collaboration on independent research on how fish species on the West Coast such as snoek respond to seismic survey) do not address the Green Connection’s complaint that the BAR failed to assess the impacts of noise on all species, including but not limited to potential impacts on the migration of snoek (a species that is important to the livelihoods of small-scale fishers) and juvenile turtles (which are significant from a biodiversity perspective given their endangered status) that are in turn dependent on other species. Assisting with future research fails to address this gap in the EIA process.

76.

In light of the above, the Minister is respectfully requested to exercise her powers in terms of section 43(6) of NEMA and set aside the environmental authorisation.

77.

B6. ALTERNATIVES

(a) Location Alternatives

The BAR indicates that no location alternatives are considered feasible, that proposed survey area was carefully selected due to the high likelihood of containing significant hydrocarbon

reserves, and that the area is considered an optimal area for a seismic survey as it is located well offshore and outside the ringfenced fisheries area.⁷⁷

78.

In its comments on the draft BAR, the Green Connection submitted that it is feasible to identify location alternatives, in particular those parts of the proposed seismic survey area (approximately 60.8% thereof) that are not classified as CBA1 and CBA2 natural areas. The Green Connection thus recommended that, in the event that environmental authorisation is granted (which authorisation the Green Connection does not support), a condition should be included in the environmental authorisation restricting the seismic survey to that portion of the proposed survey area that does not contain CBA1 and CBA2 natural areas.

79.

This recommendation has been ignored.

80.

In light of the above, the Minister is respectfully requested to exercise her powers in terms of section 43(6) of NEMA and set aside the environmental authorisation.

81.

(b) No-Go Alternative

The BAR states the following regarding the no-go alternative:

The no go alternative would imply that no seismic survey activities are undertaken. As a result, the opportunity to identify potential oil and gas resources within the survey area would not exist. This will negate the potential negative and positive impacts associated

⁷⁷ BAR, p34.

with the proposed survey activities.⁷⁸

82.

In its comments on the draft BAR, the Green Connection submitted that the no-go alternative has not been adequately assessed, and that the BAR should include consideration of the negative implications of potential future oil and gas development and attendant economic and social costs that will or may result. This would necessarily include the economic and social costs of GHG emissions that would result from future oil and gas development, as well as the social and economic costs that would result from a major oil spill arising from an uncontrolled wellhead blow-out (during any subsequent exploration or production well drilling). The Green Connection is also of the view that a proper assessment of the no-go alternative should identify and assess the potential ecological and socio-economic benefits of the no-go option for small-scale fishers and fishing dependent communities. The assessment should also necessarily include a consideration of alternative means to generate energy and provide sustainable feedstocks for associated industrial applications, including renewable energy alternatives that do not pose a significant inter-generational ecological and socio-economic risk.

83.

This recommendation has been ignored.

84.

In light of the above, the Minister is respectfully requested to exercise her powers in terms of section 43(6) of NEMA and set aside the environmental authorisation.

85.

B7. SOCIAL IMPACT ASSESSMENT

The BAR includes a Social Impact Assessment.⁷⁹

⁷⁸ BAR, at p35.

⁷⁹ Annexure C5 to the Searcher BAR, Social Impact Assessment, Equispectives Research and Consulting Services (Sept 2022).

86.

It is noted that this report states that communities feel that there are significant gaps in the available data, and that from a social perspective the non-technical or social risks can potentially cause significant impacts. The report highlights that potential social impacts identified include:

- Uncertainty;
- Further marginalisation of vulnerable groups;
- Concerns about cumulative impacts;
- Impact on livelihoods;
- Impacts on sense and spirit of place;
- Impacts on social license to operate;
- Community expectations; and
- Social unrest.

87.

The report points out that seismic reconnaissance projects are controversial in South Africa, and that while for many stakeholders it is an emotional matter, for others the potential of impacting on their livelihoods is the biggest fear. The report indicates that some stakeholders feel that the exploration for fossil fuels is not in line with sustainable development and the fight against climate change, while other stakeholders feel that it is imperative for the growth and development of the South African economy to engage in these investigations. The expert describes this as a 'complex and wicked problem'.⁸⁰

88.

The report goes on to state that from a social perspective, it is clear that the communities and the majority of local people are opposed to the project, and that because the project does not happen in a social vacuum, the social environment is much wider than the footprint of the project area. The report states further that:

If the social risks and potential damage to cultural and indigenous rights are considered

⁸⁰ Ibid, pii.

the impact on the social fabric of already vulnerable communities may be significant. From a social perspective the project can only be recommended after meaningful consultation, local research, education, and awareness raising has been done in the project affected communities. At this stage communities feel that they cannot make informed decisions.⁸¹ (emphasis added)

89.

The report goes on to make the following recommendation:

The recommendation is therefore that the project can only proceed once the social mitigation measures have been implemented and the community are sufficiently informed and educated to [be] able to engage in a meaningful manner.⁸² (emphasis added)

90.

The Green Connection submits that in light of the Social Impact Assessment's statement that the project can only be recommended **after** meaningful consultation, local research, education and awareness raising has been done in the project affected communities, as well as its recommendation that the project can only proceed once the social mitigation measures have been implemented and the community are sufficiently informed and educated to [be] able to engage in a meaningful manner, Searcher's application for environmental authorisation should have been refused. This approach would be consistent with section 2(4)(f) of NEMA, which stipulates that the participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured. It would also be consistent with section 2(4)(g) of NEMA, which requires that decisions must take into account the interests, needs and values of all interested and affected parties, and this includes recognising all forms of knowledge, including traditional and ordinary knowledge.

⁸¹ Ibid, pii-iii.

⁸² Ibid, piii.

91.

In its response to the above comment on the draft BAR and SIA Report, EIMS state as follows:

With reference to Section 7 and Appendix B of the BA Report, EIMS has undertaken the public participation and consultation processes in accordance with the requirements of the NEMA EIA Regulations. This process included notification and communication in three different languages, via Radio and Newspaper advertisements, site notices, posters, and direct notification; as well as public and focus group meetings within the potentially affected communities. Opportunity was provided to review and comment on the BA Report and associated documentation to be submitted to the decision maker.

The recommendation of the SIA is that, if the project is approved a representative from Searcher should consult with leadership of the community to determine how the communities should be consulted with in future – that is, what is the way the community members prefer to be consulted with for provision of commencement notification and/or daily updates to advise on survey schedules. This is only one of a number of community engagements that is recommended by the SIA. Efficient engagement with a community involves more than merely setting up a meeting and inviting people. In many communities there is an expectation that outsiders should enter the community via the leadership before a community meeting can take place. Searcher needs to determine what the most appropriate way would be to interact, and this may differ between communities, in order to engage with the individuals and communities in a decolonised way. Once this is done, Searcher can proceed with engaging with the communities as a whole in an appropriate way. Education is suggested as a mitigation measure to empower community members to make informed decisions where they are in a position to weigh up the pros and cons for themselves, as was requested by community members during the public meetings.

92.

This response does not address the crux of the matter, which is the statement in the SIA that the project can only be recommended **after** meaningful consultation, local research, education and awareness raising has been done in the project affected communities, as well as its recommendation that the project can only proceed once the social mitigation measures have been implemented and the community are sufficiently informed and educated to [be] able to engage in a meaningful manner. Proposing consultation after the environmental authorisation has already been granted does not address the recommendation made in the SIA, and invites an inference that meaningful consultation was not undertaken.

93.

In addition, the Green Connection notes that the Social Impact Assessment indicates that

Searcher and other seismic survey companies do not currently have a social license to operate (in large part due to a lack of meaningful consultation from a community perspective, which *‘from a community and social risk perspective is not negotiable’*),⁸³ and that the seismic survey industry should reassess their position and social license to operate as an industry in the South African context and should conduct a strategic environmental assessment of the impact of the industry.⁸⁴

94.

Notwithstanding this, the report makes a one-side assumption that the discovery of commercially exploitable fossil oil or gas resources would be beneficial to the economic development of South Africa: *‘Potential future benefits and the economic development of the country should the surveys find any significant resources are not disputed’*.⁸⁵ The Green Connection submits that the Social Impact Assessment should also have reflected the many negative socio-economic impacts that could or are likely to manifest should commercially exploitable reserves be found and developed through to production and use (including but not limited to the socio-economic costs of climate change⁸⁶). In its comments on the draft BAR, the Green Connection referred the EIA consultants and the decision-maker to report it commissioned titled *‘A Literature Review of the Socioeconomic Consequences of Offshore Oil and Gas Activities on South Africa’*,⁸⁷ and requested that the report be read as specifically incorporated into the Green Connection’s comments on the draft BAR to be taken into account by the competent authority when considering its decision on authorisation.

95.

In light of the above, the Minister is respectfully requested to exercise her powers in terms of section 43(6) of NEMA and set aside the environmental authorisation.

⁸³ Ibid p109-110.

⁸⁴ Ibid p111.

⁸⁵ Ibid, p111.

⁸⁶ In 2021 an international team of scientists published their findings that economic damage from climate change could be six times higher by the end of this century than previously estimated. See: <https://www.ucl.ac.uk/news/2021/sep/economic-cost-climate-change-could-be-six-times-higher-previously-thought>

⁸⁷ <https://thegreenconnection.org.za/wp-content/uploads/2021/10/Economic-impacts-of-offshore-oil-and-gas-on-South-Africa.12042021-1.pdf>

96.

C. CONCLUSION

For the reasons set out in the grounds of appeal above, the Green Connection submits that the appeal should be upheld, and that the environmental authorisation granted to Searcher should be set aside. Accordingly, the Minister is respectfully requested to exercise her powers in terms of section 43(6) of NEMA and set aside the environmental authorisation.

Adrian Pole

APPELLANT'S ATTORNEY

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P O Box 671 • Hillcrest • 3650Email: adrian@adrianpole.co.za**Date: 26 January 2023**

TO: **THE MINISTER OF ENVIRONMENT, FORESTRY AND FISHERIES**
c/o The Director for Appeals and Legal Review

Per Email: appealsdirector@environment.gov.za
appeals@dfre.gov.za
Appeals@environment.gov.za

COPY TO: **THE DEPARTMENT OF MINERAL RESOURCES & ENERGY**
c/o Legal Services Directorate
Attention: The Director of Legal Services

Per email: Pieter.Alberts@dmre.gov.za

AND TO: **THE PETROLEUM AGENCY SA**
Attention: The Chief Executive Officer

Per e-mail: EAppeals@petroleumagency.co.za

AND TO: **EIMS and SEARCHER**
Attention and c/o: Qaphela Magaqa

Per e-mail: searcher@eims.co.za



mineral resources & energy

Department:
Mineral Resources and Energy
REPUBLIC OF SOUTH AFRICA

Enquiries: Mr. BP Mohasoa EAP Reg No.: 2022/4684 Email Address: Peter.Mohasoa@dmre.gov.za
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BY E-MAIL

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ENVIRONMENTAL AUTHORISATION IN TERMS OF SECTION 24 OF NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT 107 OF 1998) AS AMENDED, READ WITH REGULATION 19 OF THE ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REGULATIONS, 2014 AS AMENDED, FOR 3D SEISMIC SURVEY ACTIVITIES LOCATED BETWEEN APPROXIMATELY 256KM OFFSHORE OF ST HELENA BAY EXTENDING NORTH ALONG THE WESTERN COASTLINE TO APPROXIMATELY 220KM OFFSHORE OF HONDEKLIP BAY, ADJACENT TO THE NAMAKWALAND AND WEST COAST MUNICIPALITIES: WESTERN CAPE REGION.

I, Mr. Jacob Mbele, in terms of the powers delegated to me, have in terms of regulation 24 of the National Environmental Management Act, 1998 (Act 107 of 1998): Environmental Impact Assessment Regulations, 2014 (hereafter referred to as 'EIA Regulations') decided to grant an environmental authorisation (hereafter referred to as the authorisation) in respect of the application lodged to us on 08 September 2022. Herewith attached is the copy of the authorisation and reasons for the decision to grant.

You are instructed in terms of regulation 4(2) of the EIA Regulations to notify all registered interested and affected parties (I&APs), in writing and within fourteen (14) days of the date of the decision, of the outcomes of your application. You are also required to inform registered I&APs of the procedure to submit appeals against the decision as contained in the National

Environmental Management Act, 1998 (Act 107 of 1998): National Appeals Regulations, 2014 (hereafter referred to as 'Appeals Regulations').

Should you wish to appeal the decision or any aspect thereof, you must submit an appeal in the prescribed form and in accordance with Chapter 2 of the Appeals Regulation, within twenty (20) days from the date of notification of the decision. The said must be submitted to the Minister of Forestry, Fisheries and the Environment, and copies sent to the Department of Mineral Resources and Energy (Head Office) and the Petroleum Agency SA by one of the following means:

1) Department of Forestry, Fisheries, and the Environment

Appeals and Legal Review Directorate

Attention: Director: Appeals and Legal Review

Email: appeals@dfre.gov.za

Post: Private Bag x 447, Pretoria, 0001

By Hand: Environmental House, Corner Steve Biko and Soutspansberg Street, Arcadia, Pretoria, 0083

2) Copy(s) of the lodged appeal(s) to the Petroleum Agency SA

Attention: The Chief Executive Officer

Email: EAappeals@petroleumagency.co.za

Post: Private Bag x 5111, Tygervally, 7536

By Hand: Tygerpoort Building, 7 Mispel Road, Bellville, 7530

3) Copy(s) of the lodged appeal(s) to the Department of Mineral Resources and Energy

Legal Services Directorate

Attention: Director: Legal Services

Email: Pieter.Alberts@dmre.gov.za

Facsimile: 086 710 0877

Post: Private Bag x 59, Arcadia, 0007

By Hand: Trevenna Campus, Building 2C, c/o Meintjes and Francis Baard Street, Sunnyside, 0007

The authorised activities shall not commence within twenty (20) days from the date of notification of the decision. Please also note that should the Minister of Forestry, Fisheries and the Environment receive appeals against this authorisation or conditions thereof, this authorisation will be suspended in accordance with section 43(7) of National Environmental Management Act, 1998 (NEMA) pending the decision on such appeals.

Yours sincerely,



MR JACOB MBELE

DIRECTOR-GENERAL

DATE: 20/12/2022



mineral resources & energy

Department:
Mineral Resources and Energy
REPUBLIC OF SOUTH AFRICA

Enquiries: Mr. BP Mohasoa EAP Reg No.: 2022/4684 Email Address: Peter.Mohasoa@dmre.gov.za
Ref: 12/1/043

**ENVIRONMENTAL AUTHORISATION IN TERMS OF
THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT 107 OF 1998) AS AMENDED ("NEMA")
AND THE 2014 EIA REGULATIONS AS AMENDED**

IN RESPECT OF

THE PROPOSED 3D SEISMIC SURVEY ACTIVITIES OFFSHORE, OFF THE WEST COAST, SOUTH AFRICA

APPLICATION DETAILS

Application Reference Number	12/1/043
Holder of Environmental Authorisation	Searcher Geodata UK Limited
Location of the Activity	Located between approximately 256km offshore of St Helena Bay, extending north along the western coastline to the approximately 220km offshore of Hondeklip Bay over a number of Petroleum License Blocks.
Size of the Reconnaissance Permit Application Area	Approximately 3 000 000 ha (30 000 km ²)

This authorisation does not negate the holder of the authorisation, of the responsibility to comply with any other statutory requirements that may be applicable to the undertaking of the proposed activity.

DECISION ON ENVIRONMENTAL AUTHORISATION

ACRONYMS

BAR:	Basic Assessment Report
DEPARTMENT:	Department of Mineral Resources and Energy
ECO:	Environmental Control Officer
EA:	Environmental Authorisation
EIA:	Environmental Impact Assessment
EIA REGULATIONS:	EIA Regulations, 2014, as amended
EMPr:	Environmental Management Programme
I&APs:	Interested and Affected Parties
MPRDA:	Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002), as amended
NEMA:	National Environmental Management Act, 1998 (Act 107 of 1998), as amended
Agency:	Petroleum Agency South Africa

The Department is **satisfied** with the information made available to it, and subject to compliance with the conditions of this Environmental Authorisation, that the applicant should be authorised to undertake **NEMA EIA** listed activities specified below. Details regarding the basis on which the Department reached this granting decision are set out in Section 5 and Annexure 1 of this Environmental Authorisation.

ACTIVITY (S) AUTHORISED

By virtue of the powers conferred on it by the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA") and the Environmental Impact Assessment Regulations, 2014 ("EIA Regulations"), the Department hereby **grants** the Environmental Authorisation to **Searcher Geodata UK Limited** to undertake the NEMA EIA listed activities specified in section 3 below and as described in the BAR/EMPr submitted on **01 November 2022**.

The granting of this Environmental Authorisation is subject to compliance with conditions specified under section 5 below.

1. DETAILS OF THE HOLDER OF THIS ENVIRONMENTAL AUTHORISATION

The Directors
Searcher Geodata UK Limited
Unit 6 Albion House
High Street
Working
United Kingdom
GU21 6BG

Contact Person: Ms Debbie Sewell

Tel: + 44 148 391 7339
Cell: + 44 790 028 2998
Email: d.sewell@searcherseismic.com

2. DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

Environmental Impact Management Services (Pty) Ltd
P.O Box 2083
Pinegowrie
2123

Contact Person: Mr John von Mayer
Tel: 011 789 7170
Cell: 084 404 3673
Email: john@eims.co.za

3. LIST OF ACTIVITIES AUTHORISED

The following activity as listed under EIA Regulations, 2014: Government Notice No. R983 of 04 December 2014 is authorised:

Activity Number: 21(b)

Listed Activity: Any activity including the operation of that activity which requires a reconnaissance permit in terms of section 74 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity as contained in this Listing Notice or in Listing Notice 3 of 2014, required to exercise the reconnaissance permit, excluding

-
- a) any desktop study;
 - b) any aerial survey.

The holder of this authorisation is authorised to conduct the following activities within the area described under Section 4 below:

- Seismic surveys, which involves generation of high-level, low frequency sound pulses by an acoustic instrument towed behind a survey vessel, just below the sea surface. The sounds are directed towards the seabed and the seismic signal is reflected by the geological interfaces below the seafloor. The reflected signals are received by an array of receivers or sets of hydrophones towed behind the vessel in a single streamer (2D) or in multiple streamers (3D) and are fed back to the

recording instruments on board. **The current proposed seismic survey as is a 3D seismic survey and does not include any invasive activities such as drilling.**

- The proposed survey would involve a seismic sound source and multiple hydrophone streamers, which would be approximately 8 000 m long and 2 000 m wide. The streamers would be towed at a depth of 8 m below the surface and would not be visible, except for the tail-buoy at the terminal end of the cable.
- The array has an operating pressure of 2 000 pounds per square inch. The sound source would be towed behind the vessel at a depth of between 5 – 25 m below the surface. As the survey vessel would be restricted in maneuverability, other vessels should remain clear of it and therefore a support vessel usually assists in the operation of keeping other vessels at a safe distance.
- Each triggering of a sound source is termed a seismic pulse, and these are discharged at intervals of 6 – 20 seconds (depending on water depth and other environmental characteristics). Each seismic pulse is usually only between 5 and 30 milliseconds in duration, and despite peak levels within each pulse being high, the total energy delivered into the water is low.
- Seismic sources have most of their energy in the 5-300 Hz frequency range, with the optimal frequency required for deep penetration seismic work being 50-80 Hz. Sound levels from individual sound sources used today, in the seismic industry, range from 200 to 255 dB re 1 μ Pa at 1 m, for small to large individual seismic sources, respectively.
- For sound source arrays, sound levels range from 235 dB re 1 μ Pa at 1 m for a small array (500 cubic inches) to 260 dB re 1 μ Pa at 1 m for large arrays (7 900 cubic inches). The majority of the produced energy is below 250 Hz, with 90% of the energy between 70 to 140 Hz, although pulses do contain some higher frequencies up to 16 kHz. It must be noted, however, that the sound level specifications for sound source arrays refer to sound levels in the vertical direction directly beneath the sound source array, generally near its centre, with nominal sound levels in the horizontal direction being ~ 10-20 dB lower.

4. LOCATION OF THE APPLICATION AREA

The EA application area is located between approximately 256km offshore of St Helena Bay, extending north along the western coastline to approximately 220km offshore of Hondeklip Bay, adjacent to the Namakwaland and West Coast Municipalities: Western Cape Region and Northern Cape Region.

The survey area corner coordinate points are listed in Table 1 below. Close towns or points of interest include Cape Town, Hout Bay, Saldanha, Lamberts Bay, Hondeklip Bay and Port Nolloth.

Point	Longitude	Latitude	Point	Longitude	Latitude
1	13°47'32.20"E	30°25'05.62"S	12	13°54'27.24"E	32°33'10.46"S
2	14°04'35.32"E	30°14'56.11"S	13	13°58'47.25"E	32°10'00.54"S
3	14°16'06.57"E	30°27'02.46"S	14	13°50'17.25"E	31°53'40.58"S
4	14°47'37.11"E	31°00'01.33"S	15	13°47'47.25"E	31°49'20.61"S
5	14°53'02.67"E	31°05'40.95"S	16	13°44'07.24"E	31°42'20.62"S
6	14°59'56.53"E	31°05'40.95"S	17	13°41'17.25"E	31°36'40.63"S
7	15°09'38.63"E	31°05'40.95"S	18	13°33'07.24"E	31°15'30.71"S
8	15°09'38.81"E	31°15'01.10"S	19	13°28'17.24"E	31°01'20.76"S
9	15°09'38.88"E	32°00'01.22"S	20	13°24'37.24"E	30°50'40.77"S
10	15°09'38.92"E	32°35'25.54"S	21	13°20'58.35"E	30°39'14.40"S
11	13°54'25.99"E	32°35'33.64"S	22	13°33'50.71"E	30°33'45.66"S

5. CONDITIONS OF THE ENVIRONMENTAL AUTHORISATION

5.1 SCOPE OF AUTHORISATION

- 5.1.1 The holder is authorised to undertake the activities as specified in section 3 above.
- 5.1.2 The authorised activities must only be carried out within the application area specified in section 4 above.
- 5.1.3 The holder of this environmental authorisation is responsible for ensuring compliance with the conditions of this environmental authorisation.
- 5.1.4 Any person(s) acting on behalf of the holder, inclusive of contractor(s), subcontractor(s), consultant(s), and employees are also subject to the conditions of this authorisation. This condition however does not exonerate the holder from its accountability and responsibility to ensure compliance with the conditions of this environmental authorisation.
- 5.1.5 Any changes to, or deviations from, and amendments to the proposed activities and conditions of this authorisation must be approved in writing by this Department before such changes, deviations or amendments are effected. The Department reserves the right to request the submission of information deemed necessary to assess and evaluate the significance and impacts of such changes, deviations, and amendments. Any changes, deviations and amendments may be subject to the provisions of

Chapter 5 of the EIA Regulations, 2014 pertaining to the amendments of the environmental authorisation.

- 5.1.6 The holder of this authorisation must apply for an amendment of this authorisation in the case of a change of ownership or transfer of rights and obligations.

5.2 NOTIFICATION AND APPEAL OF AUTHORISATION

- 5.2.1 The holder must, in writing, within fourteen (14) days of the date of this authorisation, notify all registered interested and affected parties (I&APs) of the outcome of the application.
- 5.2.2 The notification contemplated above must, amongst other issues:
- 5.2.2.1 Stipulate the date of the decision, and the date of issue of the environmental authorisation.
 - 5.2.2.2 Provide reasons for the decision.
 - 5.2.2.3 Inform registered I&APs of the appeals procedure provided for in terms of the National Environmental Management Act, 1998: National Appeals Regulations (GN R 993 of 08 December 2014).
 - 5.2.2.4 Draw the attention of the I&APs to the manner in which they may access the decision, including obtaining the copy of the authorisation.

5.3 COMMENCEMENT OF THE ACTIVITY(S)

- 5.3.1 This authorisation will only be effective in the event that an application for reconnaissance permit is granted in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002). None of the activities listed in this authorisation may therefore commence without a reconnaissance permit.
- 5.3.2 The authorised activities shall not commence within twenty (20) days from the date of the notification of the decision, pending potential lodgement of appeal(s).
- 5.3.3 Where an appeal is lodged against the decision by any party, the authorisation or any provision or condition thereof will be suspended in accordance with section 43(7) of the National Environmental Management Act, 1998; and as such you may not commence with any activity, until a decision on the appeal is taken.

- 5.3.4 The authorised activities must commence within a period of one (1) year from the date of issue of this environmental authorisation. If commencement of the authorised activities does not occur within the said period, the authorisation lapses, unless an extension is granted in terms of regulation 30 of the EIA Regulations, 2014. If the authorisation lapses and the holder still intends undertaking the authorised activity(s), a new application for environmental authorisation in terms of the EIA Regulations, 2014 must be obtained.

5.4 MANAGEMENT, MONITORING AND AUDITING OF OPERATIONS INCLUDING REPORTING REQUIREMENTS

- 5.4.1 The BAR/EMPr is hereby approved. It is hence mandatory for the holder to implement all the recommendations and management measures stipulated in the EMPr throughout all phases of the proposed activities.
- 5.4.2 Any non-compliance with the EMPr constitutes non-compliance with this authorisation, and any non-compliance with this authorisation may result in its suspension and may render the holder guilty of an offence in terms of section 49A of NEMA and may, if convicted be liable for penalty as contemplated in terms of section 49B (1).
- 5.4.3 Should there be changes in the operation and management of the authorised activities, the EMPr must be amended to accommodate those changes and be submitted to the competent authority for consideration and approval before implementation takes place.
- 5.4.4 The holder of the authorisation must undertake necessary measures to ensure that operators, contractors, and subcontractors have full awareness of the recommendations in the EMPr before commencing with any authorised activity.
- 5.4.5 The EMPr must be included in all contractual documentation entered thereto between the holder and contractor(s).
- 5.4.6 The holder must, before the commencement of the authorised activity, appoint the following:

5.4.6.1 An independent and experienced Environmental Control Officer (ECO) who will ensure that the conditions of this authorisation and recommendations of the EMPr are implemented and adhered to.

5.4.6.2 Independent, qualified, and experienced Marine Mammal Observers (MMO), Passive Acoustic Monitoring (PAM) Operators and Fisheries Liaison Officer (FLO) to monitor the interaction between marine mammals and survey operations, and with other marine users for the duration of the activity.

5.4.7 The holder of this authorisation must submit daily and monthly environmental monitoring reports during seismic survey operations. Furthermore, the holder must within sixty (60) days of completion of the 3D seismic survey, submit a survey closure report.

5.5 SPECIFIC CONDITIONS

5.5.1 The seismic survey must be undertaken in compliance with the applicable requirements in MARPOL 73/78 [Annex V (Discharge of biodegradable waste from vessels), Annex I (Discharge of oily water to marine, and Annex IV (Sewage and grey water discharge from vessels)].

5.5.2 Avoid operating during periods of peak fishing efforts, and migratory seasons of cetaceans and their aggregation on the summer feeding grounds between St Helena Bay and Dassen Island.

5.5.3 Develop a community engagement protocol that is based on the San Code of Research Ethics. This should be done in consultation with the affected communities and traditional leaders. It should include a communication strategy, grievance mechanism, and education and awareness campaign.

5.5.4 Ensure the seismic vessel is fitted with Passive Acoustic Monitoring (PAM) technology to detect animals through their vocalizations during the seismic survey.

5.5.5 Ensure that 'turtle-friendly' tail buoys are used by the survey contractor or that existing tail buoys are fitted with either exclusion or deflector 'turtle guards'.

5.5.6 Ensure that solid streamers rather than fluid- filled streamers are used to avoid leaks.

5.5.7 Maintain a pre-acquisition watch of sixty (60)-minutes before any instances of seismic source testing to confirm that there are no penguins or feeding aggregations of diving seabirds, shoaling large pelagic

fish, turtles, seals, or cetaceans within 500 m of the seismic source, and implement a "soft- start" procedure as defined in the approved BAR/EMPr.

- 5.5.8 Line changes and break in acquisition must follow the procedures defined in the approved BAR/EMPr and must be synchronized with "soft-start" procedures as defined in the approved BAR/EMPr.
- 5.5.9 Terminate seismic source on detection of or observation of mortality or injuries of turtles, slow swimming large pelagic fish or cetaceans within the 500m mitigation zone.
- 5.5.10 The holder or appointed ECO must, thirty (30) days before the commencement of the seismic surveys, distribute notifications to all key and registered stakeholders including the Petroleum Agency SA ("Agency"), informing them of the operational plans. The said notifications must include amongst other issues the following:
 - 5.5.10.1 Commencement date, including survey and support vessel(s) mobilization date and anticipated duration of the survey;
 - 5.5.10.2 Details of seismic survey and support vessels;
 - 5.5.10.3 Sketch plans showing the operational area(s) including survey grids;
 - 5.5.10.4 Details of the ECO; FLO, MMO, PAM operators and contact persons for reporting environmental issues associated with the planned activities; and
 - 5.5.10.5 Invitation of stakeholders to confirm if they should be included in the distribution list for daily MMO and PAM reports.
- 5.5.11 The holder must submit the Shipboard Oil Pollution Emergency Plan (SOPEP), developed in accordance with MARPOL, and the National Oil Spill Contingency Plan (NOSCP). SOPEP, which includes Emergency Response and Medical Evacuation Plans, must take into consideration all resources that may be required in case of an oil spill incident or emergency incident. The said plan must be submitted to the Agency thirty (30) days before the mobilisation of the seismic survey vessel.
- 5.5.12 Illegal dumping of waste or any equipment aboard the vessels is prohibited.
- 5.5.13 In the event of loss of any equipment that presents risks to the navigational activities, other marine users and the environment, measures to retrieve lost equipment must be undertaken, and such

incidents must be reported to the Agency and South African National Hydrographic Office within twelve (12) hours of occurrence.

- 5.5.14 During the demobilisation process, the holder must ensure that the survey area is left as it was prior to the operations and all stakeholders are informed of the completion of the survey. The holder remains accountable and liable for any residual or latent risks that may occur or identified at completion of the surveys and in this regard, will be required to implement necessary measures to address such risks.

6. GENERAL

A copy of the EA and the approved BAR/EMPr must be kept onboard the seismic survey vessel to ensure appropriate implementation of the mitigation measures.

7. DISCLAIMER

The Department of Mineral Resources and Energy in terms of the conditions of this environmental authorisation shall not be responsible for any damages or losses suffered by the holder, developer, or his/her successor in any instance where construction or operation subsequent to construction is temporarily or permanently stopped for reasons of non-compliance with the conditions as set out herein or any other subsequent document or legal action emanating from this decision.

8. RECOMMENDATIONS

In view of the above and having taken into consideration environmental management principles as set out in section 2 of NEMA, and information presented in the EA application and EIR, and subject to compliance with conditions of the EA, this Department is satisfied that the proposed activities will not be in conflict with the objectives of the Integrated Environmental Management set out in Chapter 5 of NEMA and will not result in any detrimental risks to the environment and public. **The EA is accordingly granted.**



.....
MR JACOB MBELE

DIRECTOR-GENERAL

DATE OF THE EA: 20/12/22

APPENDIX 1: REASONS FOR DECISION

1. Information considered in making the decision

All the information presented to the Department was considered in making the decision. The said information includes amongst others:

- 1.1 The provisions of Chapter 5 of the NEMA which relates to the Integrated Environmental Management and section 2 NEMA principles; the EIA Regulations, 2014 and other relevant NEMA regulations and guidelines.
- 1.2 Environmental Authorisation application submitted on 8 September 2022
- 1.3 The information contained in the final basic BAR/EMPr, compiled by an independent Environmental Assessment Practitioner (EAP) registered with the Environmental Assessment Practitioners Association of South Africa (EAPASA) John von Mayer from Environmental Impact Management Services (Pty) Ltd, submitted to the Department on 1 November 2022.
- 1.4 The information contained in the specialist reports received by the Department on 1 November 2022. The specialist reports are as follows:
 - Acoustic Technical Report [undertaken by Mr Luke Zoontjens of SLR Australia].
 - Marine Ecological Assessment [undertaken Dr Andrea Pulfrich of Pisces Environmental Services (Pty) Ltd].
 - Fisheries Impact Assessment [undertaken by Ms Sarah Wilkinson of CapMarine (Pty) Ltd].
 - Heritage Impact Assessment [undertaken by Mr Wouter Fourie of PGS (Pty) Ltd]; and
 - Social Impact Assessment [undertaken by Dr Ms Ilse Aucamp of Equispectives Research and Consulting Services (Pty) Ltd].
- 1.5 The results of the Public Participation Process submitted with the BAR, which highlighted issues, objections, concerns, and comments raised by various interested and affected parties (I&APs) and responses by the EAP.

2. Submission of the Basic Assessment Report and Environmental Management Programme

2.1 In terms of Regulation 19(1)(a) and (b), the applicant must, within ninety (90) days of receipt of the application by the competent authority, submit to the competent authority –

- (a) a basic assessment report, inclusive of specialist reports, an EMPr and where applicable a closure plan, which have been subjected to a public participation process of at least thirty (30) days and which reflects the incorporation of comments received, including any comments of the competent authority; or
- (b) a notification in writing that the basic assessment report, inclusive of specialist reports, an EMPr and where applicable, a closure plan, will be submitted within one hundred and forty (140) days of receipt of the application by the competent authority, as significant changes have been made or significant new information has been added to the basic assessment report or EMPr or, where applicable, a closure plan, which changes or information was not contained in the reports or plans consulted on during the initial public participation process contemplated in sub-regulation (1)(a) and that the revised reports or EMPr or, where applicable, a closure plan will be subjected to another public participation process of at least thirty (30) days.

2.2 An application for Environmental Authorisation was submitted on 8 September 2022 and acknowledged on 19 September 2022, informing the applicant to submit the BAR/EMPr on or before 8 December 2022. The final BAR/EMPr was submitted to the Department on 1 November 2022.

3. Key Findings

Careful consideration of information submitted to the Department has thus resulted in the following conclusions:

- 3.1 All fundamental and procedural requirements prescribed in the applicable legislation have been satisfied.
- 3.2 3D seismic survey is a widely used technology to explore for oil and gas resources worldwide. The said technology is currently used in South Africa and is generally regarded as non-intrusive in nature. The technology poses potential impacts on fisheries and marine fauna; however, the majority of the impacts were assessed to range from low to very low significance with mitigation.

- 3.3 The identification and assessment of potential impacts of the activity, including cumulative impacts, was adequately undertaken, and the proposed mitigation and management measures are aligned with potential impacts. Furthermore, the implementation of mitigation measures in all phases of the proposed 3D seismic activities will ensure that the planned activities will not result in any detrimental impact on the environment.
- 3.4 The motivation for the need and desirability of the proposed development is in line with the requirements of the EIA Regulations, 2014 and it addressed key issues raised in the Needs and Desirability Guideline.
- 3.5 Project Alternatives: The location, layout, technology, and no-go alternatives were identified. However due to the nature of proposed activities no in-depth assessments were carried out particularly on the location and technology as the targeted area has to be assessed to identify areas with potential oil and gas; and 3D seismic survey is considered as a suitable technology to achieve the intended objective.
- 3.6 Since the potential impacts will be limited to the operational phases, it is not anticipated that there will be any need for closure or rehabilitation once the 3D surveys have been concluded.
- 3.7 The Public Participation Process (PPP) complied with Chapter 6 of the EIA Regulations. The PPP included, *inter-alia*, the following:
- a) Consultation with Organs of States and key stakeholders from various sectors including oil and gas, fisheries, and Non-Governmental Organisations.
 - b) Consultation through registered letters, faxes, and emails.
 - c) Site notices in English, Afrikaans and IsiXhosa were placed at 100 onshore locations adjacent to the application area during the week of 11- 15 July 2022.
 - d) Newspaper advertisements and Government Gazette:
 - Initial advertisements announcing the project were placed in Cape Times (English and IsiXhosa), Sentinel News (English and Afrikaans), Weslander (English and Afrikaans), Ons Kontrei (English and Afrikaans), and Die Plattelander (English and Afrikaans) published between 6 and 8 July 2022.
 - Government Gazette Notice No.158 published on 19 August 2022.

- Second round of advertisements announcing public meetings were placed in the same newspapers between 13 and 15 July 2022.
- e) Poster placement in English, Afrikaans and IsiXhosa were placed at local public gathering places at various onshore locations.
- f) Radio adverts were aired on KFM, Radio Namakwaland and Radio NFM in IsiXhosa, Afrikaans and English respectively.
- g) A series of first round public meetings were held between 25 and 30 July 2022, and second round public meetings between 19 and 27 September 2022.
- h) Comments and issues raised by Interested and Affected Parties were adequately addressed in the EIAR/EMPr.

4. Conclusion

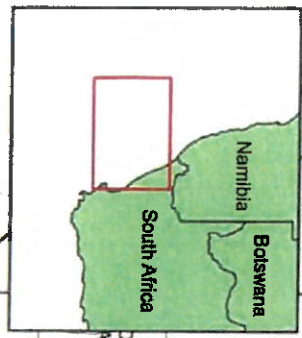
In view of the above and having taken into consideration environmental management principles as set out in section 2 of NEMA, this Department is satisfied that the proposed activities will not be in conflict with the objectives of the Integrated Environmental Management set out in Chapter 5 of the National Environmental Management Act, 1998 and will not result in any detrimental risks to the environment and public. The authorisation is accordingly **granted**.



.....
MR JACOB MBELE

DIRECTOR-GENERAL

DATE OF THE EA: 20/12/2022

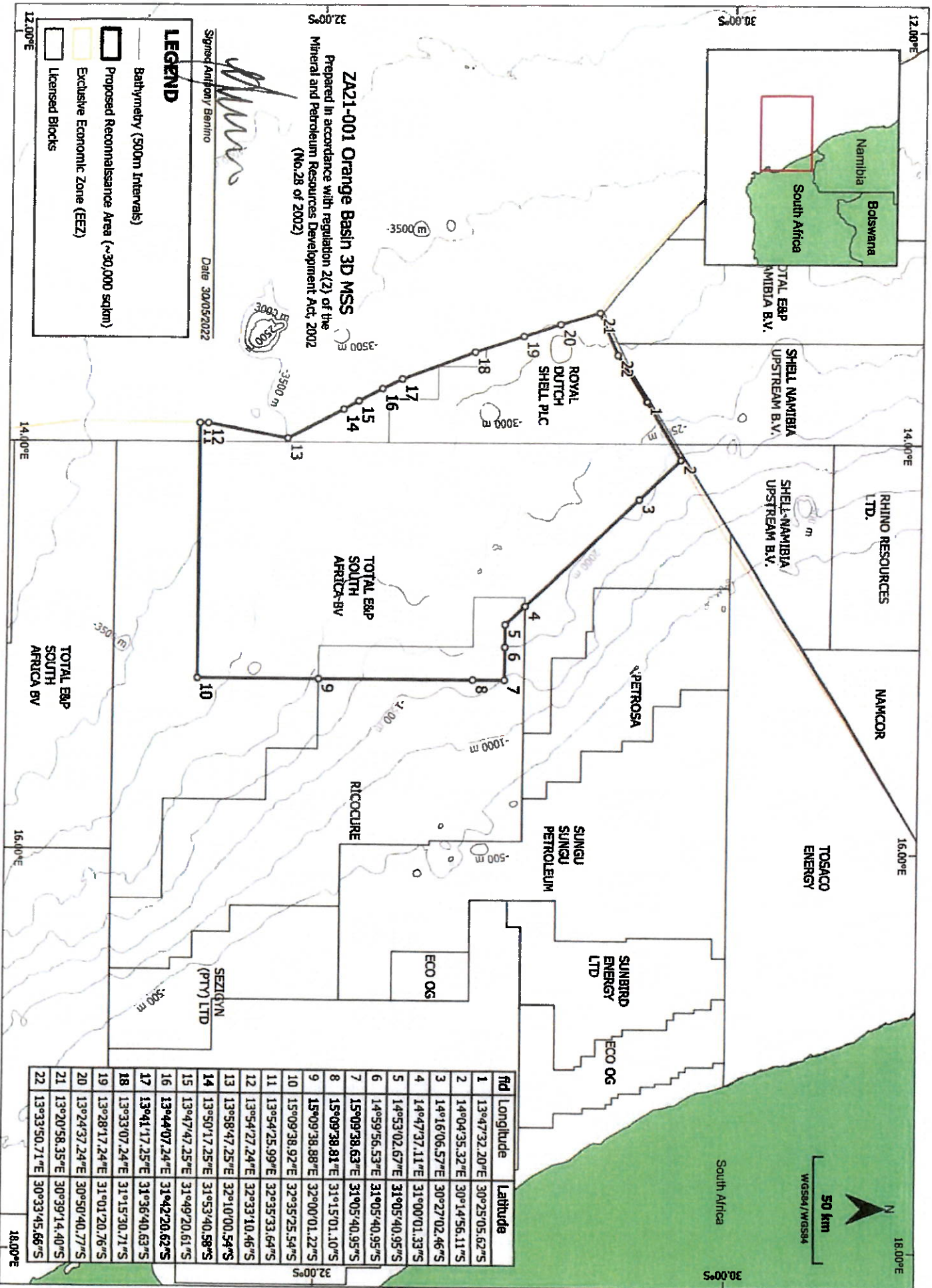


ZA21-001 Orange Basin 3D MSS
 Prepared in accordance with regulation 2(2) of the
 Mineral and Petroleum Resources Development Act, 2002
 (No.28 of 2002)

Signed Anthony Benito Date 30/05/2022

LEGEND

- Bathymetry (500m Intervals)
- Proposed Reconnaissance Area (~30,000 sqkm)
- Exclusive Economic Zone (EEZ)
- Licensed Blocks



fid	Longitude	Latitude
1	13°47'32.20"E	30°25'05.62"S
2	14°04'35.32"E	30°14'56.11"S
3	14°16'06.57"E	30°27'02.46"S
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22	13°33'50.71"E	30°33'45.66"S



P O Box 671 • Hillcrest • 3650
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 Web: www.adrianpole.co.za

Your ref: 1518

My ref: AP/GC/Searcher2.0 – Draft BAR comments

To: ENVIRONMENTAL IMPACT MANAGEMENT SERVICES (EIMS)
 (c/o Qaphela Magaqa)
 P.O. Box 2083
 Pinegowrie, 2123

By Email: searcher@eims.co.za

Re. THE GREEN CONNECTION COMMENTS ON SEARCHER DRAFT BASIC ASSESSMENT REPORT

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1.

A. INTRODUCTION

These comments are submitted on behalf of the Green Connection, a registered non-governmental organisation, that believes that economic growth and development, improvement of socio-economic status and conservation of natural resources can only take place within a commonly understood framework of sustainable development. The Green Connection aims to provide practical support to both the government and non-governmental/civil society sectors, which are an integral part of sustainable development.

2.

The comments relate to the draft Basic Assessment Report (BAR) prepared as part of the environmental impact assessment (EIA) process being undertaken in respect of an application for authorisation by Searcher Geodata UK Ltd (Searcher) to undertake a 3D seismic survey over multiple blocks off the West Coast of South Africa.

3.

The proposed project area is located between approximately 256 km offshore of St Helena Bay, extending north along the western coastline to approximately 220 km offshore of Hondeklip Bay over a number of petroleum licence blocks. The survey area at the closest point is approximately 218 km offshore of the coast of the Western and Northern Cape. The area of interest for the proposed 3D seismic survey is approximately 30 000 km² in extent. Searcher proposes that a single survey vessel equipped with seismic sources and streamers be used. The proposed 3D survey would be supported by one escort vessel. It is estimated that the 3D survey will take about 127 days (including downtime).¹

4.

B. PASA'S ACCEPTANCE OF SEARCHER'S RECONNAISSANCE PERMIT APPLICATION WAS UNLAWFUL; NO STATUTORY BASIS FOR SPECULATIVE MULTI-CLIENT

¹ BAR Executive Summary, p1.

SEISMIC SURVEYS

The Green Connection submits that the acceptance of Searcher's reconnaissance permit application in circumstances where exploration rights are held by another person/s over the area, is unlawful.

5.

The draft BAR indicates that PASA accepted Searcher's reconnaissance permit application on or about 7 June 2022 (reference is made to an *Acceptance Letter for reconnaissance permit (Ref: 12/1/043 dated 7th June 2022)*).²

6.

In terms of s74 of the MPRDA, 'any person' who wishes to apply to the Minister for a reconnaissance permit must lodge the application as indicated in subsection (1)(a) to (c), and PASA must within 14 days accept an application for a reconnaissance permit if, among other things, 'no other person holds³ a technical co-operation permit, exploration right or production right for petroleum over any part of the area' (emphasis added).⁴ If the application does not comply with the requirements of this section, the designated agency must notify the applicant in writing within 14 days of the receipt of the application and provide reasons.⁵

7.

In the Searcher judgement referred to above, Thulare J interpreted the meaning of the wording in s75(1)(c) of the MPRDA. While dealing with the issuing of a reconnaissance permit, the wording of s75(1) is similar to the wording used in s74(2): s75(1) provides that the Minister must issue a reconnaissance permit if the provisions of s75(1)(c) are met, namely that the reconnaissance will not result in unacceptable pollution, ecological

² Draft BAR, p 12.

³ Section 1 of the MPRDA defines the 'holder' in relation to *inter alia* a reconnaissance permit or exploration right as meaning 'the person to whom such right or permit has been granted or such person's successor in title'

⁴ MPRDA, s74(2)(b).

⁵ S74(4).

degradation or damage to the environment and that an environmental authorisation is granted. Thulare J explained what is required as follows:

There must be evidence that the proposed reconnaissance will not result in unacceptable pollution, ecological degradation or damage to the environment, an environmental authorization is mandatory and the Minister would act unlawfully in granting a reconnaissance permit where section 75(1)(c) was not satisfied.⁶

8.

Applying the reasoning of Thulare J to section 74(2) of the MPRDA, it follows that there must be evidence that no other person holds an exploration right for petroleum over any part of the area, and that PASA would be acting unlawfully if it accepted a reconnaissance permit application where section 74(2)(b) was not satisfied.

9.

It is noted that the draft BAR states that the reconnaissance permit project area extends over a number of petroleum license blocks, as depicted in Table 3:

Petroleum License Blocks Covered by Application Area	The following license blocks are covered by the application area: • 12/3/274 ER; • 12/3/343 ER; • 12/3/339 ER; and • Open area.
---	---

This clearly indicates that three exploration rights have been granted in respect of three of the Petroleum License Blocks covered by the application area. These exploration rights are held by other persons, not Searcher.

10.

Applying the reasoning of Thulare J to s74(2), it is submitted that PASA acted unlawfully in accepting Searcher's reconnaissance permit application (given that other persons

⁶ Searcher judgement, para 17.

hold explorations rights for petroleum over a substantial part of the application area).

11.

The Green Connection submits further that there is no statutory basis in the MPRDA for the granting of reconnaissance permits to seismic survey companies to conduct speculative multi-client seismic surveys in Blocks where exploration rights are held by other persons, and that the Minister would be acting *ultra vires* the enabling provisions of the MPRDA should he grant a reconnaissance permit to Searcher.

12.

The absence of enabling provisions in the MPRDA relating to non-exclusive multi-client speculative surveys is highlighted by proposed new enabling provisions included in the Upstream Petroleum Resources Development Bill⁷ (which has not yet been enacted and thus does not have the force of law). For example:

- In terms of section 10(b) of the Bill, PASA must formulate [an] exploration strategy that includes acquisition of seismic data through non-exclusive multi-client speculative surveys in frontier or under explored areas ahead of licensing rounds;
- Section 16(1) of the Bill provides that the Minister may, by notice in the *Gazette*, invite applications for a reconnaissance permit from seismic companies to acquire data on a non-exclusive multi-client speculative business model in respect of a block or blocks, or in respect of a wide regional area comprising multiple blocks or areas as specified in the notice. Section 16(2) specifically provides that such a notice may be in relation to multiple blocks or areas which are encumbered by (among other things) exploration rights for purposes of enabling the State to assess the geological potential and establish prospectivity of a wider regional area. Section 16(4) empowers the Minister to grant a reconnaissance permit over an area encumbered by (among other things) exploration rights subject to various conditions. Section 16(5) provides further that, notwithstanding the provisions of

⁷ B13-2021.

subsection 16(1), applications for reconnaissance permits may be lodged in terms of section 34 in the prescribed manner with the Petroleum Agency at any time;

- Furthermore, section 38(2)(b) of the Bill provides that PASA must accept an application for a reconnaissance permit if (among other things) no other person holds an exploration right over the same block or blocks. Section 38(3) of the Bill provides that PASA may accept an application for a reconnaissance permit over any part of an area subject to (among other things) an exploration right, subject to the applicant furnishing written consent from the holder of the exploration right giving PASA consent to accept and process the application, while section 38(4) provides that notwithstanding the provisions of subsections (2)(b) and (3), PASA may accept and process an application for a reconnaissance permit over an area encumbered by a permit or a right if the proposed seismic data acquisition will promote and facilitate the acquisition of petroleum geo-technical data as contemplated in section 2(l).

13.

In summary, the Green Connection submits that the acceptance of Searcher's reconnaissance permit application in circumstances where exploration rights are held by another person/s over the area, is unlawful. The Green Connection submits further that there is no statutory basis in the MPRDA for the granting of reconnaissance permits to seismic survey companies to conduct speculative multi-client seismic surveys, and that the Minister would be acting *ultra vires* the enabling provisions of the MPRDA should he grant a reconnaissance permit to Searcher.

14.

C. NEED AND DESIRABILITY

The NEMA EIA Regulations stipulate that a scoping report must include a motivation for the need and desirability for the proposed development, including the need and

desirability of the activity in the context of the preferred location.⁸

15.

Section 5 of the draft BAR includes a motivation of need and desirability for the proposed 3D seismic survey. Unsurprisingly, the BAR focusses on justifying the ‘need and desirability’ of the proposed project, and fails to reflect views critical to 3D seismic surveys and offshore oil and gas exploration (and ultimately production). As a consequence, the ‘need and desirability’ assessment provided in the draft BAR follows the pattern of previous seismic survey EIAs by (among other things) limiting the assessment of potential impacts to the proposed 3D seismic survey, with no assessment of the need and desirability of exploring for (and ultimately producing and using) new oil and gas reserves (including in the context of the climate change crisis and the right to food). The assessment also includes a section motivating the ‘need’ for seismic data.

⁸ NEMA EIA Regulations, Appendix 2, section 1(b). With regard to need and desirability, a distinction is drawn between the ‘general purpose and requirements’ of the proposed activity and ‘need and desirability’. The 2017 Guideline on Need and Desirability states as follows (at p10):

In order to properly interpret the EIA Regulations’ requirement to consider “need and desirability”, it is necessary to turn to the principles contained in NEMA, which serve as a guide for the interpretation, administration and implementation of NEMA and the EIA Regulations. **With regard to the issue of “need”, it is important to note that this “need” is not the same as the “general purpose and requirements” of the activity. While the “general purpose and requirements” of the activity might to some extent relate to the specific requirements, intentions and reasons that the applicant has for proposing the specific activity, the “need” relates to the interests and needs of the broader public.**

...

The consideration of “need and desirability” in EIA decision-making therefore **requires the consideration of the strategic context of the development proposal along with the broader societal needs and the public interest.** The government decision-makers, together with the environmental assessment practitioners and planners, are therefore accountable to the public and must serve their social, economic and ecological needs equitably. Ultimately development must not exceed ecological limits in order to secure ecological integrity, **while the proposed actions of individuals must be measured against the short-term and long-term public interest in order to promote justifiable social and economic development – i.e. ensuring the simultaneous achievement of the triple bottom-line.** Considering the merits of a specific application in terms of the need and desirability considerations, it must be decided which alternatives represent the **“most practicable environmental option”**, which in terms of the definition in NEMA and the purpose of the EIA Regulations are **that option that provides the most benefit and causes the least damage to the environment as a whole, at a cost acceptable to society, in the long-term as well as in the short-term.** (emphasis added)

The Guideline requires need and desirability assessments to **address the impact of planned activities on global and international responsibilities relating to the environment, including climate change** (at p11).

16.

The draft BAR Needs and Desirability section commences by stating that the area proposed for the seismic survey is a large under-explored area with potential for both oil and gas, and that this new application area is located further offshore and covers a smaller target area.⁹ It points out that Searcher undertook a similar project during 2021, but that Searcher now requires environmental authorisation. The reconnaissance permit application is described as a new application (rather than a renewal of the 'previous permission'). No mention is made of the fact that Searcher was taken to court by community and civil society applicants regarding the 2021 seismic survey, or that the Western Cape Division of the High Court granted an order interdicting Searcher from continuing the seismic survey pending the outcome of (among other things) Part B of the court application. And while it is correct that the application area is located further offshore and covers a smaller target area, it is relevant to note that part of the proposed 3D seismic survey area overlaps with the 2021 Searcher 3D seismic survey area of interest.

17.

It is noted that the draft BAR Needs and Desirability analysis indicates that the proposed project '*aims to identify oil and gas resources to be used in... energy production and/or processing or manufacturing of materials*'.¹⁰ It is stated further that '*[a]s a result of the fact that this project entails only survey activities, it is anticipated that this project will not lead to a significant impact on the receiving environment*'.¹¹ In line with this, the draft BAR does not consider or assess the potential impacts of subsequent oil and gas exploration, production and use.

18.

Climate change

The draft BAR states that from a climate change perspective, it is '*not currently possible*

⁹ Draft BAR, p20.

¹⁰ Draft BAR, item 1.7.1, p23.

¹¹ Ibid, item 1.8.3, p23.

*to accurately assess the risks associated with oil and gas activities, given that the specific details of these potential future activities are not known and therefore climate change impacts would need to be assessed in detail during any subsequent Scoping and EIA processes for any potential subsequent oil and gas production projects’.*¹² As a consequence, no climate change impact assessment (even in broad terms) is included in the BAR.

19.

It is relevant to note that the issue of whether the decision-maker properly considered climate change impacts was referred to in the judgment of the full bench of the Makhanda High Court in the Shell Wild Coast seismic survey case.¹³ The court stated in its judgement that the intervening parties’ contention that the decision-maker gave no proper consideration to climate change impacts of the decision to grant the exploration right is an important factor to be considered in the process of granting an exploration right. The court referred to expert testimony relied upon to support this contention, which showed that *‘most of the discovered reserves of oil and gas cannot be burnt if we are to stay on the pathway to keep global average temperature increases below 1.5 degrees Celsius. Authorising new oil and gas exploration, with its goal of finding exploitable oil and/or gas reserves and consequently leading to production, is not consistent with South Africa complying with its international climate change commitments’.*¹⁴

20.

The court noted that according to the respondents in the case, climate change considerations are irrelevant when considering an application for an exploration right, and these considerations are premature because they fall to be considered at a much

¹² Draft BAR, p32.

¹³ *Sustaining the Wild Coast NPC & Others v Minister of Mineral Resources and Energy & Others*, High Court of South Africa, Eastern Cape Division, Makhanda – Case No. 3491/2021, at paras 120 to 125.

¹⁴ *Ibid*, at para 121.

later stage.

21.

The court pointed out that on the authority of the *Save the Vaal* case,¹⁵ the ‘*processes are discrete stages in a single process that culminates in the production and combustion of oil and gas, and the emission of greenhouse gases that will exacerbate the climate crisis and impact communities’ livelihoods and access to food*’.¹⁶ The court went on to state that the respondent’s thesis does not find support in *Earthlife Africa Johannesburg v Minister of Environmental Affairs and Others* either, and referred approvingly to the following passage in Murphy J’s judgement:

The absence of express provision in the statute requiring a climate change impact assessment does not entail that there is no legal duty to consider climate change as a relevant consideration and does not answer the interpretative question of whether such a duty exists in administrative law. Allowing for the respondents’ argument that no empowering vision in NEMA or the regulations explicitly prescribes a mandatory procedure or condition to conduct a formal climate change assessment, the climate change impacts are undoubtedly a relevant consideration as contemplated by section 240 of NEMA for the reasons already discussed. A formal expert report on climate change impacts will be the best evidentiary means of establishing that this relevant factor in its multifaceted dimensions was indeed considered, while the absence of one will be symptomatic of the fact that it was not.¹⁷

22.

The court in the Shell Wild Coast seismic survey case went on to state the following:

It seems clear from the foregoing, even taking into account the contentions raised by the respondents, that, had the decision-maker had the benefit of considering a comprehensive assessment of the need and desirability of exploring for new oil and gas reserves for climate change and the right to food perspective, the decision-maker may well have concluded that the exploration is neither needed nor desirable.¹⁸ (emphasis added)

¹⁵ *Director: Mineral Development, Gauteng Region and Another v Save the Vaal Environment and Others* (133/98)[1999] ZASCA 9 (12 March 1999).

¹⁶ *Ibid*, para 123.

¹⁷ *Ibid*, para 124.

¹⁸ *Ibid*, para 125.

23.

The Green Connection submits that the draft BAR is deficient, and the Needs and Desirability analysis incomplete, without at the very least a broad assessment of the climate change impacts should commercially exploitable oil and gas resources be identified through the proposed seismic survey (and should these resources be produced and utilised). It would be pointless to authorise this (and other) 3D seismic surveys should such an assessment conclude that the development of new oil and gas fields is incompatible with South Africa's climate change commitments.

24.

The 'climate crisis'

The need and desirability (from a climate change perspective) of conducting a 3D seismic survey (which – as mentioned above - the BAR states aims to identify oil and gas resources to be used in energy production and/or processing or manufacturing of materials) is particularly important given that climate change has been acknowledged as a 'crisis' with human-induced climate change impacts being experienced in every region. It is also recognised that the climate change 'crisis' requires immediate, rapid and large-scale reductions in greenhouse gas (GHG) emissions to limit global warming to 1.5°C (including accelerated action in this decade to reduce global carbon dioxide emissions by 45 per cent by 2030 relative to the 2010 level and to net-zero around mid-century). In support of these submissions, some of the recent developments relating to the climate crisis are discussed briefly below.

25.

In August 2021, the Intergovernmental Panel on Climate Change (IPCC) (an international body for assessing the science related to climate change) released its 6th Assessment Report (AR6).¹⁹ In its summary for policymakers, the IPCC indicates (among other things)

¹⁹ Climate Change 2021: The Physical Science Basis, available online at: <https://www.ipcc.ch/report/sixth-assessment-report-working-group-i/>

that:

- It is unequivocal that human influence has warmed the atmosphere, ocean and land, and that widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred;²⁰
- The scale of recent changes across the climate system as a whole – and the present state of many aspects of the climate system – are unprecedented over many centuries to many thousands of years;²¹
- Human-induced climate change is already affecting many weather and climate extremes in every region across the globe. Evidence of observed changes in extremes such as heatwaves, heavy precipitation, droughts, and tropical cyclones, and, in particular, their attribution to human influence, has strengthened since AR5;²²
- Global surface temperature will continue to increase until at least mid-century under all emissions scenarios considered, and that global warming of 1.5°C and 2°C will be exceeded during the 21st century unless deep reductions in CO₂ and other GHG emissions occur in the coming decades;²³
- Many changes in the climate system become larger in direct relation to increasing global warming. They include increases in the frequency and intensity of hot extremes, marine heatwaves, heavy precipitation, and, in some regions, agricultural and ecological droughts; an increase in the proportion of intense tropical cyclones; and reductions in Arctic sea ice, snow cover and permafrost;²⁴
- Continued global warming is projected to further intensify the global water cycle, including its variability, global monsoon precipitation and the severity of wet and dry events;²⁵
- Many changes due to past and future GHG emissions are irreversible for centuries to millennia, especially changes in the ocean, ice sheets and global sea level;²⁶

²⁰ Para A.1

²¹ Para A.2

²² Para A.3

²³ Para B.1

²⁴ Para B.2

²⁵ Para B.3

²⁶ Para B.5

- From a physical science perspective, limiting human-induced global warming to a specific level requires limiting cumulative CO₂ emissions, reaching at least net zero CO₂ emissions, along with strong reductions in other GHG emissions. Strong, rapid and sustained reductions in CH₄ emissions would also limit the warming effect resulting from declining aerosol pollution and would improve air quality.²⁷

26.

On 9 August 2021, the IPCC issued a press release relating to its AR6 report. It states that the report provides new estimates of the chances of crossing the global warming level of 1.5°C in the next decades, and finds that unless there are immediate, rapid and large-scale reductions in GHG emissions, limiting warming to close to 1.5°C or even 2°C will be beyond reach.²⁸

27.

Also on 9 August 2021, UN Secretary-General António Guterres described the AR6 report as nothing less than "a code red for humanity. The alarm bells are deafening, and the evidence is irrefutable". (emphasis added)

28.

Guterres is reported as noting that the internationally agreed threshold of 1.5 degrees above pre-industrial levels of global heating was perilously close, and that we are at imminent risk of hitting this threshold in the near term. Guterres is indicated as advising that the only way to prevent exceeding this threshold, is by urgently stepping up our efforts, and pursuing the most ambitious path. Guterres is reported as stating that solutions are clear: "*Inclusive and green economies, prosperity, cleaner air and better health are possible for all, if we respond to this crisis with solidarity and courage*". Ahead of the COP26 climate conference in Glasgow in November 2021, Guterres stated that all nations needed to join the net zero emissions coalition, and reinforce their promises on slowing down and reversing global heating "*with credible, concrete, and enhanced Nationally Determined Contributions (NDCs)*" that lay out detailed steps.

²⁷ Para D.1

²⁸ <https://www.ipcc.ch/2021/08/09/ar6-wg1-20210809-pr/>

29.

In April 2022, Guterres tweeted that *'[c]limate activists are sometimes depicted as dangerous radicals. But the truly dangerous radicals are the countries that are increasing the production of fossil fuels. Investing in new fossil fuels infrastructure is moral and economic madness'*.²⁹ Addressing graduate students in May 2022, Guterres expressed the view that investing in fossil fuels is now *"a dead end - economically and environmentally. No amount of greenwashing or spin can change that. So, we must put them on notice: Accountability is coming for those who liquidate our future."*³⁰

30.

The 26th Conference of the Parties of the UNFCCC (COP26) was held in Glasgow in the last quarter of 2021. Recognition of the climate 'crisis', as well as the urgent need to increase effort and to accelerate action to address climate change (including by developing nations), are reflected in the outcome of COP26 and recorded in the Glasgow Climate Pact. The Glasgow Climate Pact (among other things):

- Expresses alarm and utmost concern that human activities have caused around 1.1°C of global warming to date and that impacts are already being felt in every region;
- Reaffirms the long-term global goal to hold the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change;
- Recognizes that the impacts of climate change will be much lower at the temperature increase of 1.5°C compared with 2°C and resolves to pursue efforts to limit the temperature increase to 1.5°C;
- Recognizes that limiting global warming to 1.5°C requires rapid, deep and sustained reductions in global GHG emissions, including reducing global carbon dioxide emissions by 45 per cent by 2030 relative to the 2010 level and to net zero around mid-century as well as deep reductions in other GHGs;

²⁹ <https://twitter.com/antonioguterres/status/1511294073474367488?lang=en>

³⁰ <https://news.un.org/en/story/2022/05/1118932>

- Also recognizes that this requires accelerated action in this critical decade, on the basis of the best available scientific knowledge and equity, reflecting common but differentiated responsibilities and respective capabilities and in the context of sustainable development and efforts to eradicate poverty;
- Invites Parties to consider further actions to reduce by 2030 non-carbon dioxide GHG emissions, including methane;
- Calls upon Parties to accelerate the development, deployment and dissemination of technologies, and the adoption of policies, to transition towards low-emission energy systems, including by rapidly scaling up the deployment of clean power generation and energy efficiency measures, including accelerating efforts towards the phasedown of unabated coal power and phase-out of inefficient fossil fuel subsidies, while providing targeted support to the poorest and most vulnerable in line with national circumstances and recognizing the need for support towards a just transition;
- Emphasizes the importance of protecting, conserving and restoring nature and ecosystems, including forests and other terrestrial and marine ecosystems, to achieve the long-term global goal of the Convention by acting as sinks and reservoirs of GHGs and protecting biodiversity, while ensuring social and environmental safeguards.

31.

The climate 'crisis' is also recognised by the International Energy Agency (IEA), of which South Africa is an IEA associated country. During or about July 2021, the IEA published its *Net Zero by 2050 – A Roadmap for the Global Energy Sector* report. In the foreword to this report, the Executive Director of the IEA states (among other things) as follows:

We are approaching a decisive moment for international efforts to tackle the climate crisis – a great challenge of our times. The number of countries that have pledged to reach net-zero emissions by mid-century or soon after continues to grow, but so do global greenhouse gas emissions. This gap between rhetoric and action needs to close if we are to have a fighting chance of reaching net zero by 2050 and limiting the rise in global temperatures to 1.5 °C.

Doing so requires nothing short of a total transformation of the energy systems that underpin our economies...

Despite the current gap between rhetoric and reality on emissions, our Roadmap shows that there are still pathways to reach net zero by 2050. The one on which we focus is – in our analysis – the most technically feasible, cost-effective and socially acceptable. Even so, that pathway remains narrow and extremely challenging, requiring all stakeholders – governments, businesses, investors and citizens – to take action this year and every year after so that the goal does not slip out of reach.

This report sets out clear milestones – more than 400 in total, spanning all sectors and technologies – for what needs to happen, and when, to transform the global economy from one dominated by fossil fuels into one powered predominantly by renewable energy like solar and wind. Our pathway requires vast amounts of investment, innovation, skilful policy design and implementation, technology deployment, infrastructure building, international co-operation and efforts across many other areas.

Since the IEA's founding in 1974, one of its core missions has been to promote secure and affordable energy supplies to foster economic growth. This has remained a key concern of our Roadmap, drawing on special analysis carried out with the International Monetary Fund and the International Institute for Applied Systems Analysis. It shows that the enormous challenge of transforming our energy systems is also a huge opportunity for our economies, with the potential to create millions of new jobs and boost economic growth.

Another guiding principle of the Roadmap is that clean energy transitions must be fair and inclusive, leaving nobody behind. We have to ensure that developing economies receive the financing and technological know-how they need to continue building their energy systems to meet the needs of their expanding populations and economies in a sustainable way. It is a moral imperative to bring electricity to the hundreds of millions of people who currently are deprived of access to it, the majority in of them in Africa...

32.

On fossil fuels used in energy production, the report states that:

There is no need for investment in new fossil fuel supply in our net zero pathway. Beyond projects already committed as of 2021, there are no new oil and gas fields approved for development in our pathway, and no new coal mines or mine extensions are required.

33.

South Africa's international climate change commitments

South Africa is a Party to the UN Framework Convention on Climate Change (UNFCCC), which enjoins State Parties to take precautionary measures to anticipate, prevent or

minimize the causes of climate change (Article 3.3).

34.

South Africa, as a Party to the UNFCCC that ratified the Kyoto Protocol and adopted the Paris Agreement, has committed to *‘working with others to ensure temperature increases are kept well below 2°C above pre-industrial levels, which could include a further revision of the temperature goal to below 1.5°C in light of emerging science’* by reducing GHG emissions. South Africa has also committed (among other things) to:

- Preparing, communicating and maintaining Nationally Determined Contributions (NDCs) that it intends to achieve reach global peaking of GHG emissions as soon as possible, and to undertake rapid reductions thereafter;³¹ and
- Striving to formulate and communicate long-term GHG emission development strategies.³²

35.

There have been various Conferences of the Parties and meetings since, with decisions related to Nationally Determined Contributions (NDCs) contained in decisions 4/CMA.1 and 18/CMA.1 and their annexes.

36.

South Africa revised its NDC in 2021:³³

Table 2 - South Africa's updated NDC mitigation targets

Year	Target	Corresponding period of implementation
2025	South Africa's annual GHG emissions will be in a range from 398-510 Mt CO ₂ -eq.	2021-2025
2030	South Africa's annual GHG emissions will be in a range from 350-420 Mt CO ₂ -eq.	2026-2030

³¹ Paris Agreement, Article 4.1 – 4.3.

³² Paris Agreement, Article 4.19

³³ Available online at:

https://www.dffe.gov.za/sites/default/files/reports/draftnationallydeterminedcontributions_2021updated.pdf#:~:text=South%20Africa%E2%80%99s%20intended%20nationally%20determined%20contribution%20%28INDC%29%28RSA%2C%20n.d.%29,Agreement.%20The%20INDC%20and%20first%20NDC%20are%20identical.

South Africa's energy sector is estimated at contributing about 84% percent to the country's overall GHG emissions (including Carbon Dioxide and Methane).³⁴

37.

In February 2020, South Africa submitted to the UNFCCC its first long-term low GHG emission development strategy titled *South Africa's Low Emission Development Strategy 2050*. It is indicated in the executive summary of this strategy that South Africa, as one of the top 20 global GHG emitters and with a high dependency on fossil fuels, will need to make substantial emission cuts to contribute its fair share to global GHG emission reductions.³⁵

38.

The draft BAR does not provide any indication (or estimation) of how future GHG emissions (resulting from future exploitation of oil and gas that may be discovered through the exploration drilling project) would impact on South Africa's ability to achieve its GHG emissions targets (as set out in South Africa's NDC) or its updated GHG emissions targets (as set out in South Africa's revised NDC). This is particularly relevant given that the emissions targets for the 2026-2030 period are lower than the targets for the 2021-2025 period, while offshore oil and gas developments could take at least a decade to reach the production stage. This could result in offshore oil and gas investments (as well as associated gas infrastructure developments) in the future becoming unneeded 'stranded assets' and a burden on future generations. There is also a risk that in the future tariffs will be levied on various goods exported by fossil-fuel dependent countries – the European Union is reported to be gradually phasing in its Border Adjustment Mechanism as part of the EU's Green Deal.³⁶

³⁴ <https://www.climatelinks.org/resources/greenhouse-gas-emissions-factsheet-south-africa>

³⁵ South Africa's Low Emission Development Strategy 2050, pviii.

³⁶ See for example *Just Energy Transitions and Natural Gas in Africa: Balancing Climate Action and Structural Transformation*, The African Climate Foundation, August 2022, at p14. Available online at: <https://africanclimatefoundation.org/wp-content/uploads/2022/10/ACF-GAS-REPORT-V7.indd-final-1.pdf>

39.

Need for seismic data

Under the sub-heading ‘Need for seismic data’, the draft BAR states that a discussion of the needs and desirability of the project ‘*would not be complete without understanding the need for acquisition of the seismic data and possible oil and gas exploration and production that could potentially take place in the future as a result of the survey*’.³⁷

40.

Ironically, the draft BAR then quickly goes on to state that ‘*[i]t cannot be said with absolute certainty that exploration drilling, let alone production activities, will be undertaken in the future. As such, it is not currently possible to accurately assess the risks associated with these activities, given that the specific details of these potential future activities are not known. While it is acknowledged that the risks mentioned would need assessment, such assessment falls outside of the scope of the current application and would need to be assessed in detail during subsequent Scoping and EIA processes, should exploration drilling or production be proposed. The environmental consequences applicable to the planned survey activities have been identified and assessed in this BA Report*’.³⁸ The views of the Makhanda High Court in this regard (in the context of future production, climate change and the right to food) have been traversed earlier in the Green Connection’s comments (see paragraphs 19 to 22 above), and are not repeated here. The Green Connection stands by its view that at the very least a broad assessment of the impacts and risks associated with future invasive exploration activities, production activities and use of any discovered oil reserves should be included in the BAR.

41.

The draft BAR report then proceeds with a glowing (and one-sided) endorsement of the use of natural gas:

³⁷ Draft BAR, p32-33.

³⁸ Ibid.

The fastest growing sector for the use of natural gas is for the generation of electric power. Natural gas power plants usually generate electricity in gas turbines, directly using the hot exhaust gases from the combustion of the gas. Of the three fossil fuels used for electric power generation (coal, oil and natural gas), natural gas emits the least carbon dioxide per unit of energy produced. Natural gas emits 30% and 45% less carbon dioxide than burning oil and coal, respectively. Burning natural gas also releases lower amounts of nitrogen oxides, sulphur dioxide, particulates and mercury when compared to coal and oil.

The increased use of natural gas can, in the short term, serve as a transition fuel on the path to the carbon-neutral goal of the Paris Agreement. In addition to gas as a key transitional fuel reducing reliance on coal, the benefits of oil and gas could include significant amount of job creation, especially if local beneficiation takes place. An increase in domestic natural gas reserves would enable South Africa to take steps to secure the countries' energy supply (through diversification), assist in reducing the emissions of greenhouse gases (by reducing the country's reliance on coal for electricity generation) and reduce the need for the importation of gas. As such, exploration for additional domestic hydrocarbon reserves is considered important and supported by national policy, and any discoveries would be well received by the local market and are consistent with the objectives stated in the 2019 IRP. Natural gas emits 30% and 45% less carbon dioxide than burning oil and coal, respectively, and 65% less carbon dioxide than coal when the increased efficiency of Combined Cycle Gas Turbines versus coal fired power stations is considered. Eskom produces over 200MtCO₂/yr, over 40% of South Africa's total. South Africa also has SASOL's Secunda coal to liquids plant, the biggest single source of CO₂ in the world at 57MtCO₂/yr (~12.5% of South Africa's total) to produce 160k barrels of products per day. Supplying these products from conventional oil production and refining would generate approximately 10% of those emissions, 5 to 6MtCO₂/yr.

According to the 2019 IRP the availability of gas in the short to medium term is a risk as South Africa does not currently have gas resources. There is also a supply and foreign exchange risk associated with likely increase in gas volumes depending on the energy mix adopted post 2030 when a large number of coal fired power stations are decommissioned. South Africa's economic growth is dependent on the availability of energy, ensuring a sustainable and reliable supply of electricity with sufficient capacity is a key aspect to growing the economy of South Africa in the future. The electricity shortages experienced in South Africa over the past decade are a contributing factor to the significant slowdown in economic growth rate. To enable economic growth within the target rate of between 6% and 8% to be achieved, it will be necessary for Government to continue increasing electricity generating capacity in the country. The use of natural gas for electricity generation is identified in national policy, together with renewable energy technologies, as an alternative in diversifying the domestic energy supply away from its current reliance on coal. Gas is identified in the draft Integrated Resources Plan as significant contributor to South Africa's energy mix in the period up to 2030. Availability of gas also provides an opportunity to convert to Combined Cycle Gas Turbine and run open-cycle gas turbine plants at Ankerlig (Saldanha Bay), Gourikwa (Mossel Bay), Avon (Outside Durban) and Dedisa (Coega IDZ) on gas (IRP 2019).³⁹

³⁹ Ibid.

42.

Perhaps concerned that it is making the case that seismic surveys are indeed the ‘thin edge of the wedge’ that will lead to increased fossil fuel extraction, production and use (with associated climate change impacts), the draft BAR steps back from its natural gas endorsement to repeat the point that *‘[f]rom a climate change perspective, it is not currently possible to accurately assess the risks associated with oil and gas activities, given that the specific details of these potential future activities are not known and therefore climate change impacts would need to be assessed in detail during any subsequent Scoping and EIA processes for any potential subsequent oil and gas production projects’*.⁴⁰

43.

The draft Bar then proceeds to argue that:

The feasibility of using natural gas for domestic power generation is considered to be dependent on the extent of available domestic reserves of natural gas, as well as the financial cost of importing natural gas should those reserves be insufficient. The acquisition of seismic survey data is therefore considered important with respect to understanding the potential for future oil and gas production as part of the energy mix of the country going forward and the need and desirability of the project is therefore supported from an energy security perspective.⁴¹

44.

Two recent independent studies (among others) challenge the view that fossil gas is necessary for electricity generation and as a transition fuel.

45.

The International Institute for Sustainable Development’s (IISD) *Gas Pressure: Exploring the case for gas-fired power in South Africa* (March 2022) report points out that while

⁴⁰ Ibid.

⁴¹ Ibid.

there used to be a rational view that fossil gas would be necessary either during a transition to low-carbon energy or as part of the long-term energy mix for electricity production:

....revolutions first in renewable energy costs and then in battery storage costs have upended this view. Analysis of the South African electricity system shows that gas supply is not technically necessary until at least 2035, if ever. In the last few years, either the risks associated with gas have increased, or the understanding of existing risks has increased. Consequently, South Africa may see significant negative outcomes from developing a large gas-to-power system now... the trend toward decarbonization, coupled with cost reductions for renewable energy and storage, creates risks for gas investment. Investment in gas can reasonably be expected to lead to higher costs for consumers, just transition challenges for workers, and losses for investors.⁴²

46.

The ISSD report highlights some of the risks associated with gas-to-power investment in South Africa. These risks include significant contributions to climate change (as a consequence of CO₂ and methane emissions when gas is burned), increasing international pressure to move away from gas due to climate impacts, financial risks linked with gas-to-power, the risk of reduced security of affordable gas supply, the risk of stranded assets, and the risk of creating an additional just transition burden (future gas workers and communities face a repeat of the transition hardships currently faced by the coal sector).⁴³

47.

Meridian Economics' *'Hot Air about Gas – An Economic Analysis of the Scope and Role for Gas-Fired Power Generation in South Africa'* (June 2022) report points out that while South Africa's large-scale use of gas appears to be central to current energy policy direction in South Africa, *'this rests on a 2012 vision which pre-dates dramatic reductions in renewable energy costs and carbon emissions space'*.⁴⁴ The report goes on to state

⁴² ISSD report, piv. Available online at: <https://www.iisd.org/publications/report/south-africa-no-need-for-gas>

⁴³ ISSD report, pages 8 – 12.

⁴⁴ Meridian report, page ii. Available online at: <https://meridianeconomics.co.za/wp-content/uploads/2022/06/Hot-Air-About-Gas.pdf>

that independent analysis of the power sector across multiple recent studies shows that South Africa's power needs can be met both now and in the future with very little use of gas, and that there is *'no evidence to support the large-scale gas envisaged in the GMP; this is uneconomical even before carbon emissions are considered'*.⁴⁵ Meridian point out that *'the assumption that gas-fired power generation would replace coal ignores the fact that other technology combinations are now better at replacing coal-fired power than gas, and it is against these technologies that gas-fired generation should actually be compared'*.⁴⁶ Meridian demonstrate that existing modelling provides no economic rationale for "big gas" in the power sector, and that *'the impact of using large volumes of gas to generate power will be borne by electricity consumers and will essentially be a subsidy provided by power consumers to otherwise unviable gas use in other sectors'*.⁴⁷

48.

While the increased use of gas as a 'transitional fuel' is promoted by government and vested interest groups, the Green Connection submits that the increased use of fossil gas (especially in electricity generation) will lead to increased emissions of climate warming GHGs, and methane (CH₄) in particular. While natural gas combustion is less carbon-intensive than that of coal, fugitive emissions arising from the production, transport, storage and use of natural gas have a much greater climate impact than CO₂. In particular, over a 20-year period (which is particularly relevant since the next 20 years are a critical window for addressing the climate crisis) methane emissions, which make up approximately 70-90% of natural gas emissions, are projected to be 82.5 times as impactful as those of CO₂.⁴⁸ The desirability of using gas as a 'transitional' fuel is also questionable having regard to volatile international gas prices, as well as the potential risk of Carbon Border Taxes being introduced in the future.⁴⁹

⁴⁵ Ibid.

⁴⁶ Ibid, p1.

⁴⁷ Ibid, p37.

⁴⁸ See the IPCC's 6th Assessment Report (AR6), Working Group 1, Chapter 6 *The Earth's Energy Budget, Climate Feedbacks and Climate Sensitivity*, Table 7.15 at p1017. Available online at:

https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Chapter07.pdf

⁴⁹ <https://cer.org.za/wp-content/uploads/2022/10/Natural-Gas-factsheet.pdf>

49.

Ecological and Economic Risk of a Major Oil Spill

In addition, any catastrophic oil spills that could occur as a result of an uncontrolled wellhead blowout related to future offshore oil and gas exploration and/or production drilling pose a significant threat to functioning marine ecosystems (oceans play a critical role in regulating the climate and mitigating global warming by absorbing carbon dioxide), to living organisms in South Africa's coastal waters,⁵⁰ and to communities that depend upon the oceans for their livelihoods. Small-scale fishers and fishing-dependent communities are particularly vulnerable to the negative impacts of a large uncontrolled oil spill which could (among other things) lead to a depletion in the fish stocks upon which the livelihoods of these small-scale fishers and fishing communities depend.

50.

The Green Connection submits that it is not in the interests of the broader community (including from and intra- and inter-generational perspective) to expose our oceans and coasts to the increased risk of a potentially catastrophic major oil spill during exploration drilling, or during subsequent production operations (should commercially exploitable oil or gas reserves be discovered through the seismic survey).

51.

Synthesis

The Green Connection submits that for the reasons set out above, and having regard to the need to effectively address the climate change crisis and achieve the rapid, deep and sustained reductions in GHG emissions that are required to limit global warming to 1.5°C (including accelerated action in this decade to reduce global carbon dioxide

⁵⁰ In terms of the National Environmental Management: Integrated Coastal Management Act 24 of 2008 (NEM:ICMA), the '**interests of the whole community**' is defined as meaning the collective interests of the community determined by:

- (a) prioritising the collective interests in coastal public property of all persons living in the Republic over the interests of a particular group or sector of society;
- (b) adopting a long-term perspective that takes into account the interests of future generations in inheriting coastal public property and a coastal environment characterised by healthy and productive ecosystems and economic activities that are ecologically and socially sustainable; and
- (c) taking into account the interests of other living organisms that are dependent on the coastal environment.

emissions by 45 per cent by 2030 relative to the 2010 level and to net zero around mid-century), further exploration for oil and gas is not needed, nor is it desirable. It follows that the proposed 3D seismic survey is also not needed or desirable, and environmental authorisation should be refused.

52.

D. SEISMIC SURVEYS CAUSE DIRECT AND INDIRECT PHYSICAL HARM TO INDIVIDUAL SPECIES AND MARINE ECOSYSTEMS; INEFFICACY OF MITIGATION MEASURES

The draft BAR *Biodiversity and Ecosystem Assessment Report* ('Pisces Report') indicates that potential impacts to the marine fauna as a result of the proposed 3D seismic acquisition include:

- Physiological injury and/or mortality;
- Behavioural avoidance;
- Reduced reproductive success/spawning;
- Masking of environmental sounds and communication;
- Collision of turtles/marine mammals with the survey and support vessels or entanglement in towed acoustic apparatus; and
- Indirect impacts on piscivorous predators due to seismic effects on prey species.

53.

The report goes on to state that the highest sensitivities in response to the proposed 3D survey are:

- Humpback whales, which migrate through the area between June and November (inclusive);
- Sperm whales, beaked whales and other odontocetes that frequent offshore waters;

- Large migratory pelagic fish and shark species that show seasonal association with Child's Bank and Tripp Seamount;
- Leatherback turtles which frequent offshore waters in low numbers and aggregate around seamounts to feed on jellyfish; and
- Various pelagic Albatross, Petrel, Storm Petrel and Shearwater species.

54.

Notwithstanding the above, the report rates the significance of impacts on marine habitats and communities as (mostly) low to medium before mitigation, and very low to low after mitigation. The draft BAR in turn relies on this (and other significance ratings) to reach the conclusion that:

...there are no environmental fatal flaws that should prevent the proposed project from proceeding, provided that the recommended mitigation and management measures are implemented... it is the opinion of the EIA project team and the EAP that the significance levels of the majority of identified negative impacts can generally be reduced to an acceptable level by implementing the recommended mitigation measures and the project should be authorized.⁵¹ (emphasis added)

55.

The Pisces Report downplays the impacts of marine seismic surveys by referring to them as 'potential impacts'. This approach stands in stark contrast to the approach taken by our courts in recent seismic survey judgements, where it was accepted that marine seismic surveys do cause harm, as a result of which mitigation measures are proposed. For example:

- In the Shell Wild Coast Seismic Survey urgent interdict application judgment, Bloem J stated that implicit in Shell's contention that harm is not irreparable and that mitigation measures are implemented to minimise harm to marine life, '*is an acknowledgment of harm to marine life, hence the mitigation measures*'.⁵²

⁵¹ Draft BAR, at p214.

⁵² Shell urgent interdict judgement, para 41.

Regarding the evidence of ten experts put up by the applicants to prove irreparable harm, the court noted that despite the massive body of expert evidence on the harm to marine life, Shell did not adduce any expert evidence to neutralise this evidence. Bloem J stated further that the opinions expressed by these experts *'are based on objective facts contained in their reports and affidavits. There is no reason not to accept their evidence. That evidence establishes that, without intervention by the court, there is a real threat that the marine life would be irreparably harmed by the seismic survey'*.⁵³

- In the Shell Wild Coast Seismic Survey judgment in the main case, the court referred to applicants' relying on expert reports for their contention that the anticipated harm to marine and bird life is a fundamental consideration, noting that these experts were in agreement that there is a reasonable apprehension of harm to marine and bird life and that the mitigation measures proposed by Shell did not adequately manage the threat of harm. The court also referred to the experts relied upon by Shell to refute the suggestion of possible harm to marine life, and noted that the respondents suggest that the detrimental effect of seismic surveys are not known and that, in so far as there is a possibility of death or stranding of marine animals from exposure to sound from seismic surveys, there are appropriate mitigating and monitoring measures in place.⁵⁴ The court went on to point out that *'[b]ecause of the apparent dispute between the experts as to the adequacy of the mitigation measures minimising the known effects of seismic surveys, it would be incumbent on the decision-maker to invoke the precautionary principle'*.⁵⁵
- In the Searcher urgent interdict judgment (which Searcher did not seek leave to appeal against), Thulare J pointed out that:

Physical damage to marine animals has been directly linked to the kind and level of sound emitted during the nature of seismic survey Searcher is

⁵³ Ibid, at para 64.

⁵⁴ Shell main judgment, para 108.

⁵⁵ Ibid, para 109.

undertaking. This is why Searcher has to mitigate the damage... Some species show physiological stress responses and behavioural changes like moving away rapidly and this increased energy consumption and energy costs which reduced time for foraging and the ability to protect itself. There was a specific concern for beaked whales who were particularly sensitive to anthropogenic noise... The impact on fish assemblages was difficult to interpret and there was a lack of research on confounding effects and multiple stressors were a key concern... Zooplankton was the reason the West coast contained important fishery nursery grounds. As a result, impacts on zooplankton could propagate to other groups. Very little was known about the impact of seismic surveys on zooplankton. Existing observations suggested damage to larval and juvenile lobsters of up to... 1.2km from the survey sound source and that zooplankton mortality increased up to three-fold within the survey area... Snoek will be impacted... a source of food for the impoverished communities of the West Coast and also provided an income to sustain the small-scale communities... Very little is known about the differential impact of seismic activity on young and smaller fish, turtles and cetaceans, and this could impact fish assemblages, abundances and availability. A precautionary approach was necessary.⁵⁶

56.

If one accepts (as the courts have done) that seismic surveys do cause harm to marine species, the question that arises is whether there is sufficient scientific information to predict the extent of this harm with any certainty, and whether the mitigation measures proposed to minimise this harm will be effective.

57.

In the Searcher urgent interdict seismic survey case,⁵⁷ the applicants put up a number of expert affidavits and reports to support their contention that there was a reasonable apprehension that the marine seismic survey would cause irreparable harm to marine species and ecosystems, and that the proposed mitigation measures are not effective in addressing this harm. Given that the proposed 3D seismic survey area partially overlaps with the proposed 3D seismic survey area in the 2021 Searcher EMP,⁵⁸ the views

⁵⁶ Ibid, paras 26 – 33.

⁵⁷ *Christian John Adams & Others v Minister Mineral Resources and Energy & Others* - Annexure JH1 to the Applicants' Founding Affidavit, at p506 - 529, 'Report on Scientific Basis for concerns of significant harm inflicted to marine wildlife by 2D and 3D seismic surveys on the South and West Coasts of South Africa', Harris, Olbers & Wright (14 January 2022).

⁵⁸ Searcher EMP September 2021, see for example the Proposed 3D seismic Area depicted in figure 7-3 (at p54), compared with the reconnaissance permit area depicted in Figure 5 of the Searcher BAR (at p43).

expressed by these experts also have relevance to the current proposed Searcher multiclient seismic survey (taking into account differences in the extent and location of the 3D seismic survey area). These expert affidavit and reports are accessible through the link provided in the footnote below, and should be read as specifically incorporated into these draft BAR comments for consideration by the EIA consultants and the competent authority.⁵⁹

58.

In their report titled *Report on scientific basis for concerns of significant harm inflicted to marine wildlife by 2D and 3D seismic surveys on the South and West Coasts of South Africa*, Harris, Olbers and Wright (Harris *et al*) conducted a review of peer-reviewed literature on the physiological, behavioural and ecological impacts of the Searcher 2021 proposed 3D seismic survey activities on marine wildlife, with specific attention to the relevance of the information to the context of the application, the vulnerable and endangered species known to occur there, and the proposed timing of the seismic survey in the summer austral months. Harris *et al* state that having carefully considered the available information:

...it is out opinion that seismic surveys do cause harm to both species and ecosystems, and that significant direct harm to indivual animals and harm to populations of endangered species is the most likely scenario... Of specific concern is the impact on humpback whales and southern right whales which are still frequenting the west coast during the summer months (December – February), the impact on critically endangered (leatherback) turtles (migration routes in the area), the critically endangered African Penguin (changes in foraging behaviour and impacts on fitness); and the Cape fur seal (and consideration of current mass die-offs). We conclude that the these seismic surveys are inadvisable in the austral summer months due to the presence of these species in the area, the increasing anthropogenic pressures, and the inability of the prescribed mitigation measures preventing harm to individuals/populations. Furthermore, recent literature provides credible concern about ecosystem/food-chain impacts of seismic surveys, that may in turn have impact on fisheries, the severity and localisation of which will depend on coincidences with spawning and juvenile recruitment events. It is strongly recommend that further studies on the impacts of seismic activities, in the

⁵⁹ <https://drive.google.com/drive/folders/1OfFSta2iFMtY8iqoZ9zhW54zFKu8zN9r>

South African context, are carried out *in situ* before proceeding with further seismic surveys of this nature.⁶⁰

59.

Harris *et al* go on to explain that marine animals use sound in a variety of ways critical to their lifecycles, with various physical and behavioural responses to acoustic disturbances documented. In their summary of findings, Harris *et al* point out that, in addition to the physical damage referred to above, 3D seismic surveys are likely to cause harm in the following ways:

60.

Impacts on Marine Life and Birds

In their summary of findings, Harris *et al* conclude that:

- Based on peer-reviewed scientific literature, it is clear that physical damage to marine animals, including soft tissue trauma damage, embolisms, damage to organs used in balance and orientation, concussions, haemorrhaging, decompression sickness and both temporary and permanent threshold shifts to hearing ability have been directly linked to the kind and level of sound emitted during this nature of seismic surveys.
- There is plausible evidence to suggest that seismic survey activity is likely to affect the conservation status and recovery of populations of vulnerable and threatened species including (IUCN Red list species such as humpback and southern right whales), because sound and the ability to hear and interpret sound is critical for many species to reproduce (both vocalisations on breeding grounds and communications across large distances for mate detection). Therefore it must therefore be assumed that interference in sound perception or utilisation for communication (temporarily or permanently) has the potential to impact a species at the population level.

⁶⁰ Available online at: https://drive.google.com/drive/folders/1m-h8MoRfdlJfKHLiB_uID1KX-dBktua (16. Jean Harris).

- Some species have been shown and documented to display physiological stress responses and behavioural changes to seismic activities, such as moving away rapidly, diving or remaining still. These responses are likely to increase their energy consumption and energy costs, reduce their time to forage, and/or affect their vulnerability to predation, thus having negative impacts on the survival of individuals (especially young or compromised animals) as well as the overall population growth and survival of a species (especially for threatened species that are already at risk of extinction).
- The impacts of seismic activities are most well studied for marine mammals, and evidence suggests that there are distinct avoidance responses such as leaving the area or ceasing to undertake everyday activities such as feeding in preferred areas. This is likely to negatively impact the "fitness" of an affected animal.
- There is genuine conservation concern for beaked whales that are particularly sensitive to anthropogenic noise, including seismic surveys. It has been demonstrated that even minor, non-lethal disturbances, resulting in changes in behaviour such as displacement from preferred habitats, could impact a population.
- The only existing field study in South Africa (that the authors could find) on the impacts of seismic activities in South African waters presents clear evidence that the endangered, endemic African penguin avoided preferred feeding sites when a seismic survey was active nearby. This is particularly of concern for a species which has had a 70% decrease in numbers over the past decade, is stressed by prey depletion creating a greater demand for them to forage further afield, and for which the prospect of extinction is significant.
- The phenomenon of energy-cost (from stress and avoidance behaviour) is of particular concern for some of the species expected to be encountered in the survey area in question, particularly the humpback whales and southern right whales who are at risk of the airgun noise affecting their behaviour or interfering with the communication between mother and calf. Any impact on their energy reserves could impact on their condition (weight-loss and physiological condition)

- and affect survival of the animals during a vulnerable time (especially for lactating mothers and their calves) on their long migration to feeding grounds in Antarctica.
- Recent research (2017) has shown significant mortality in zooplankton up to 1.2 km from a seismic survey array. Zooplankton forms the base of many important food webs in the marine environment. Depletion of zooplankton could thus have an impact on food for their predators (such as fish) as well as impact fish eggs and larvae (Ichthyoplankton) with potential local impacts on species important in fisheries. This damage to zooplankton over 1km away from the survey array raises concern that a 500m buffer for other animals that are unable to move away from the sound, is far too small to ensure that damage is not inflicted (even if they were able to evade it).⁶¹
 - The impact on fish assemblages is difficult to interpret, due to multiple factors at play including but not limited to the ability of a species to move from an area as well as the receiving habitat. A global review of the effect of seismic activities on fish and invertebrates acknowledged the limits of the current research due to experimental designs used or due to the focus on single species during investigations. A key concern is a lack of research focused on confounding effects and multiple stressors, therefore potential impacts of seismic surveys that have been previously identified may be reflective of underestimation or overestimation and would depend on the type of interaction (synergistic, additive, or antagonistic).

⁶¹ The Green Connection also notes that the Noise Impact Assessment (Appendix C1 to the draft BAR) states that: *Existing experimental data regarding recoverable injury and TTS impacts for fish eggs and larvae is sparse and no guideline recommendations have been provided. However, based on a subjective approach, noise impacts are expected to be moderate for fish eggs and larvae. Impact is expected to be low for all of them at intermediate and far field from the source location* (at p4). The Green Connection submits that it is not acceptable to apply a 'subjective approach' in the absence of scientific certainty or guideline recommendations to reach a conclusion on the significance of harm. Instead, the precautionary principle should be applied, and noise impacts of seismic surveys on fish eggs and larvae should be assumed to be unsafe in the absence of credible scientific data showing that the impacts on Zooplankton (which form the basis of many important food webs in the marine environment) are not significant. The Green Connection submits further that it is therefore not possible to state that there would not be irreparable harm to plankton and knock-on negative effects on the entire ecosystem, further justifying the need to properly apply a precautionary approach (see further discussion on Zooplankton in paragraph 61 of these comments below).

- In South Africa, since October 2021, thousands of dead and/or dying Cape fur seals, have washed ashore along the south and west coasts. The cause of these die-offs remains unknown but avian flu has been ruled out and malnourishment appears to be the most widely accepted reason. It is of concern that although the Cape fur seal population within South Africa is relatively healthy, they too are under pressure from various anthropogenic pressures. Additional stress from seismic activity at this time is inadvisable.
- The authors are of the opinion that the proposed seismic survey activities are highly likely to both disturb and have an adverse effect on (amongst others) Critical Biodiversity Areas (CBAs) and their associated fauna, which areas are ignored (thus giving no consideration to the biological importance of these areas or the likely impact at such close range). In the Searcher draft BAR, while it is indicated that the proposed 3D survey area does not overlap with Marine Protected Areas (MPAs) or Ecologically and Biologically Significant Areas (EBSAs), CBAs are found within the reconnaissance permit and 3D survey areas, including both CBA1: natural and CBA2: natural areas.⁶²

61.

In her expert affidavit filed in support of the Searcher urgent interdict seismic survey case, marine ecologist and Associate Professor (Department of Biological Sciences, UCT) Colleen Maloney points out that the ecosystem off the west coast of South Africa is one

⁶² Draft BAR, p14. The Pisces report downplays the ecological significance of the proposed survey area, pointing out that it falls into the Southeast Atlantic Deep Ocean Ecoregions (with the South Atlantic bathyal and abyssal unconsolidated habitat types rated at 'least threatened'), with 'only sections along the shelf edge and in the Cape Canyon... rated as 'Vulnerable and Endangered'. The report goes on to state that geological features of note in and adjacent to the proposed survey area include Child's Bank and the Tripp Seamount, while two canyons (Cape Canyon and Cape Valley) also occur to the south of the reconnaissance permit Area. Critical Biodiversity Areas (CBAs) also occur within the reconnaissance permit Area (including CBA1: natural and CBA2: natural areas). The draft BAR (at p131) indicates that seismic surveys ('non-invasive exploration') – restricted compatibility in CBAs – detailed assessment required. Petroleum production 'not compatible' in CBAs. Recommend avoid CBAs in seismic survey area if authorised given that petroleum production in these areas is not compatible with CBAs (being the intended outcome of seismic survey, notwithstanding fudging about its purpose). Proper application of the precautionary approach in relation to these CBAs and the impacts of seismic surveys (as per scientific reports). But note National Coastal and Marine Spatial Biodiversity Plan lacuna about lateral drilling and re-evaluation if significant petroleum resources are identified.

of the world's most productive marine environments, and that:

This region is fertilised on a large scale and an almost continuous basis by the transport of water rich in nutrients (e.g. nitrogen and phosphorous) from depth to the well-lit surface waters where photosynthesis can occur. This results in a proliferation of microscopic phytoplankton (photosynthetic organisms) and small zooplankton, which feed on phytoplankton and which themselves are food for fishes. The west coast thus has several nursery grounds for fishes, including species that are commercially exploited and non-commercial species. The large abundances of fishes, large crustacean zooplankton and squids also support top predator populations, such as seabirds and marine mammals...

As examples of measured short-term impacts, larval and juvenile lobsters in an Australian study were damaged up to 500 m from a seismic survey sound source...

South Africa's west coast has a large abundance of marine organisms, with much spatial and temporal heterogeneity in the environment, such that impacts need to be understood in the context of localised patches of enhanced abundance and dense aggregations of marine organisms.

In conclusion, current understanding of impacts associated with seismic surveys on zooplankton is too sparse and localised to allow definitive conclusions to be drawn about the extend and ecosystem impact of these surveys off the west coast of South Africa.⁶³ (emphasis added)

As plankton (which includes larval fish and rock lobsters) are the basis for the food chain, providing food for other species, the impacts of seismic surveys on plankton will have knock-on impacts on the rest of the ecosystem, including juvenile fish, rock lobster and others.

62.

In her expert affidavit filed in support of the Searcher urgent interdict seismic survey case,⁶⁴ Principal Researcher Lynne Shannon points out that the marine ecosystem off the West Coast of South Africa is a unique and highly productive one. It includes the southern sub-system of the Benguela Upwelling ecosystem. Upwelling systems cover less than 1% of the world's ocean area but support about one fifth of the world's marine fish catches. Shannon points out that the ecosystem is heavily influenced by

⁶³ Available online at: https://drive.google.com/drive/folders/1m-h8MoRfdflJfKHLiB_uID1KX-dBktua, at pp1 – 2 (22. Coleen Moloney).

⁶⁴ Available online at: https://drive.google.com/drive/folders/1m-h8MoRfdflJfKHLiB_uID1KX-dBktua (19. Lynne Shannon).

anthropogenic pressures. Shannon states that the 3D seismic survey proposed by Searcher will further endanger the already endangered African penguin that frequents the West Coast. Shannon points out that these penguins have been shown to suffer disrupted foraging within a 100km radius of seismic activity. Shannon notes that while the penguins returned to their favoured foraging areas once seismic activities ceased, the longer-term impacts on the penguins (stress levels, behaviour and implications of increased foraging effort required to fulfil nutritional requirements, and ultimately the influence these factors have on breeding success and survival) is not known. Shannon concludes that the poor knowledge available as to the extent of both species-level and ecosystem-level impacts of seismic surveys makes the adoption of the precautionary principal appropriate.

63.

In his expert affidavit filed in support of the Searcher seismic survey case⁶⁵, Dr Alexander Claus Winkler comments on the likely effects of seismic surveys on line-fish. Winkler points to a study published in 2021 that highlights the direct lasting behavioural effects of seismic surveys on the rhythmic behavioural foraging patterns of cod in the North Sea. He points out that both hake and snoek perform rhythmic diel foraging migrations off the seafloor at night and onto the seabed during the day. Given that seismic surveys are conducted both during the day and night, it is likely that these benthic fish species will migrate higher up the water column at night, bringing them within distances that may expose them to direct injury and mortality impacts from seismic surveys.

64.

Inefficacy of proposed mitigation measures

With regard to the efficacy of the mitigation proposed mitigation measures relating to the acoustic impacts of seismic surveys, Harris *et al* state as follows in their summary of findings:

⁶⁵ Available online at: https://drive.google.com/drive/folders/1m-h8MoRfdlJfKHLiB_uID1KX-dBktua (21. Alexander Winkler).

- While "Soft starts" mitigation for seismic impacts are likely to reduce the impact for highly mobile large animals, this is unlikely to be adequate for the many species that are prevalent in the area over the austral summer months and are unable to avoid the array or leave the area due to their lower mobility, such as smaller turtles, penguins, invertebrates, some fish species and zooplankton.
- The finding of observer efficiency (from a scientific monitoring study conducted during the 2018/19 and 2019/2020 seasons on the humpback whales on the east coast) suggests that even with trained observers up to 44% of humpback whales in an area went undetected. This casts doubt on the effectiveness and success of Marine Mammal Observer (MMO) sightings of the largest species (humpbacks) as a mitigation measure, indicating that it is most likely that whales go undetected. Furthermore, the detection rate for smaller species, such as dolphins, seals, turtles and flightless birds (penguins), would be expected to be much lower, obviating the effectiveness of visual observations to prevent harm to these species.
- Also of concern, is that the efficacy of a MMO is likely to be low due to the nature of the offshore marine environment in the survey area (frequent high swells and winds affecting surface visibility), putting species who are missed by MMOs and PAM operators at extreme risk, particularly at night or during adverse weather conditions.
- Furthermore, the reliance on observers to do visual sightings to supplement the PAM monitoring during the day, as a mandated mitigation measure, necessitates questioning the acceptability of continuing with survey activities at night. If the visual observations are useful (perhaps sighting large animals around 65% of the time) in addition to PAM, then relying on PAM alone at night cannot be an effective mitigation measure. The authors express the opinion that surveys should not occur between sunset and sunrise each day if a real attempt of maximum avoidance of cetaceans is the objective of this mitigation measure.

Synthesis

The Green Connection submits that the proposed 3D seismic survey will cause physiological, behavioural and ecological impacts on marine wildlife (including vulnerable and threatened species), and that the proposed mitigation measures are not all effective in preventing or minimising this harm (especially in relation to species that are unable to avoid the seismic array, and at night given that PAM does not detect all species). The Green Connection submits that the overwhelming majority of peer-reviewed published scientific studies shows that harm is caused or is the most likely scenario. As a consequence, the Green Connection is of the view that a precautionary approach should be followed. In an expert report prepared for the Green Connection in relation to the TOSACO EIA appeal (see Annexure A), Harris *et al* expressed it thus:

The body of scientific evidence and literature on seismic surveys has grown over the last few decades in response to significant concern about the impacts of seismic surveys on marine wildlife. Although scientists may debate the nature, magnitude and reach (distance away from the source of seismic blasts) of negative impacts of seismic surveys on marine fauna, the overwhelming majority of the multitude of peer-reviewed published scientific studies (over 538 studies on ocean noise, where the majority found negative effects on marine mammals, and/or adverse impacts on fish and invertebrates) demonstrates that harm is caused or is the most likely scenario. This is a tangible cause for concern and warrants a precautionary approach. The issue at hand is not whether harm will be caused but rather what the magnitude of that harm will be, and whether measures that would prevent or effectively mitigate this harm are in place and effective.

66.

In light of the above and the prevailing lack of information regarding in particular the broader marine ecosystem impacts of marine seismic surveys, the Green Connection disagrees with the draft BAR in respect of the conclusion that there are no environmental fatal flaws and that the project should be authorised. The Green Connection submits that a precautionary approach should be adopted, and that the proposed seismic survey (as well as other seismic survey applications) should be refused until such time as further studies on the impacts of seismic activities in the South African context are carried out *in situ* and provide credible scientific evidence that seismic

surveys do not pose a risk of unacceptable or irreparable harm to marine species and ecosystems.

67.

E. CUMULATIVE IMPACTS

It is noted that the draft BAR acknowledges that should other seismic survey campaigns be undertaken concurrently with Searcher's proposed survey programme, cumulative impacts may be likely and there would be a need for alignment in planning of such concurrent operations to reduce cumulative noise impacts to an acceptable significance.⁶⁶ The draft BAR notes that there are two current pending applications with PASA (TGS Geophysical Company and GX Technology Corporation) which both overlap the proposed Searcher 3D seismic survey area.

68.

The draft BAR states that despite the difficulty in undertaking a reliable assessment of the potential cumulative environmental impacts of future seismic acquisition in the Deep Water Orange Basin (due to likely variation in the scope, extent and duration of proposed surveys), the cumulative impacts of three potential surveys occurring concurrently needs to be considered. The draft BAR thus includes a cumulative assessment which assumes that the three surveys (Searcher, TGS and GX Technologies) occur simultaneously during the summer survey window in 2022/23.

69.

In this event, the draft BAR indicates that:

- associated impacts to marine fauna would be of **high intensity** and extend regionally, over the short-term (assuming they take place over the same summer survey window). The impact consequence for cumulative surveys is therefore considered medium.

⁶⁶ Draft BAR, para 9.3.5, p202.

- Concurrent activities could also add to the cumulative impact on fisheries. Simultaneous survey operations would result in an increase in the extent and magnitude of the impact on the large pelagic longline sector. The impact duration would remain unchanged. Three seismic surveys of regional extent, undertaken simultaneously, could be expected to result in an impact of **medium negative significance** on the large pelagic longline sector, both with and without the application of mitigation measures.

70.

Curiously, the draft BAR impact table⁶⁷ combines cumulative impacts on marine fauna and fisheries and rates the pre-mitigation environmental significance as 'medium' and the post-mitigation impact as 'low'. This does not reconcile with the preceding paragraphs which indicate with regard to cumulative impacts of three concurrent seismic surveys, an impact of medium negative significance could be expected 'both with and without the application of mitigation measures'.

71.

The draft BAR states regarding confounding and cumulative effects that the assessments of impacts of seismic sounds provided in the scientific literature usually consider short-term responses at the level of individual animals only, as the understanding of how such short-term effects relate to adverse residual effects at the population level is limited. The report goes on to state that data on behavioural reactions to seismic noise acquired over the short-term could, however, easily be misinterpreted as being less significant than the cumulative effects over the long-term (i.e. what is initially interpreted as an impact not having a detrimental effect and thus being of low significance, may turn out to result in a long-term decline in the population, particularly when combined with other stressors such as temperature, competition for food, and shipping noise). The report notes that confounding effects are, however,

⁶⁷ At p204.

difficult to separate from those due to seismic surveys.

72.

The draft BAR also states that the potential cumulative impacts on individuals and populations as a result of other seismic surveys undertaken either previously, concurrently or subsequently are difficult to assess. The report indicates that a significant adverse residual environmental effect is considered one that affects marine biota by causing a decline in abundance or change in distribution of a population(s) over more than one generation within an area. The report makes reference to numerous 2D and 3D seismic surveys having been undertaken off the West Coast over the past 17 years, and relies on reported increases in the southern right whale and humpback whale populations over a time when seismic surveying frequency has increased as '*suggesting that, for these populations at least, there is no evidence of long-term negative change to population size as a direct result of seismic survey activities*'.⁶⁸ The Green Connection questions the assumption made that an increase in whale populations suggests that there is no evidence of long-term negative change to population sizes as a direct result of seismic activities. This is an assumption that cannot be inferred from the facts (the increase could be as a result of any number of other external factors).

73.

The Green Connection submits that it cannot simply be assumed the lack of evidence of long-term negative population changes as a direct result of seismic survey activities means that there are no negative impacts (including potentially significant impacts). In their report relating to the TOSACO EIA appeal, Harris *et al* point out that although the humpback whale population is increasing, there is evidence to suggest that cetaceans in South African waters are being affected by changes in their ecosystem and it is not well understood yet what is driving these changes and what the long terms effects could potentially be to populations.⁶⁹ Concerns noted in the report include an observed decrease in southern right whale calving success of the South African population and a

⁶⁸ Draft BAR, para 9.3.1.4 at p181.

⁶⁹ Wilkinson, C. (2021) *Estimating population changes in humpback whales (Megaptera novaeangliae) migrating past Cape Vidal, South Africa*, MSc thesis, Cape Peninsula University of Technology, p108. Cited in Harris JM, Olbers JM, Wright K (6 April 2022) *Comments on Tosaco Energy Block 1 Exploration Right issued to Tosaco Energy (Pty) Ltd (PASA Reference: 12/3/362)*.

strong link between foraging success and reproduction.⁷⁰ They suggest an investigation into possible decreases and/or spatial or temporal shifts in their prey availability at higher latitudes due to environmental variability. They also highlight a concern of the continued low numbers of unaccompanied adults along the South African coast which could potentially have serious consequences for cow-calf pairs in relation to the country's whale-watching industry in the future.

74.

The draft BAR states that in the 'unlikely' event that multiple surveys would take place at the same time within the same survey area, 'the risk of cumulative noise impact must be considered and is suggested to be managed'. The draft BAR suggests that mitigation should include maintaining a distance of at least 40 km between survey vessels 'until sufficient objective evidence is obtained that a reduced buffer distance is acceptable'. Where this 40 km buffer distance cannot be maintained, the draft BAR suggests that each of the additional activities to those described in the technical noise report should be modelled or otherwise considered in terms of the cumulative noise level and with reference to the criteria described in the report.⁷¹

75.

The Green Connection submits that given the lack of certainty regarding cumulative impacts of concurrent 3D seismic survey areas, a risk averse and cautious approach should be applied by not authorising concurrent surveys, and suggests that should the decision-maker be inclined to grant environmental authorisation (which the Green Connection submits should not be granted), a prohibition against concurrent surveys should be included as a condition of any environmental authorisation. There is simply no need to take the risk of conducting concurrent 3D seismic surveys which, on the face of it, is an unnecessary and unneeded duplication.

⁷⁰ Vermeulen, E., Wilkinson, C., & G. van den Berg (2020) *Report of the 2019 South African southern right whale aerial survey*, Report to IWC 10.13140/RG.2.2.29556.37766. Cited in Harris JM, Olbers JM, Wright K (6 April 2022) *Comments on Tosaco Energy Block 1 Exploration Right issued to Tosaco Energy (Pty) Ltd (PASA Reference: 12/3/362)*.

⁷¹ Draft BAR, p204.

76.

F. CBAs

The underwater acoustics modelling report conducted for the BAR indicates that:

The proposed survey areas overlap with the proposed Ecologically or Biologically Significant Marine Areas (EBSAs), including Orange Seamount and Canyon Complex, Orange Cone, Childs Bank and Shelf Edge, and Cape Canyon and Associated Islands, Bays and Lagoon. Marine Protected Areas (MPAs) are also situated immediately adjacent to the proposed survey areas, namely the Orange Shelf Edge, Childs Bank, Benguela Muds, Cape Canyon, Robben Island, and the Southeast Atlantic Seamount MPA.⁷²

77.

The statement that the proposed survey areas overlap with proposed EBSAs is however contradicted by the Biodiversity and Ecosystem Assessment Report (Pisces Report), which states that 'there is no overlap of the 3D survey area with EBSAs'.⁷³ Instead, this report seeks to downplay the ecological significance of the proposed survey area by pointing out that it falls into the Southeast Atlantic Deep Ocean Ecoregions (with the South Atlantic bathyal and abyssal unconsolidated habitat types rated at 'least threatened'), with 'only sections along the shelf edge and in the Cape Canyon... rated as 'Vulnerable and Endangered'.⁷⁴ The report goes on to state that geological features of note in and adjacent to the proposed survey area include Child's Bank and the Tripp Seamount, while two canyons (Cape Canyon and Cape Valley) also occur to the south of the reconnaissance permit Area.

78.

Critical Biodiversity Areas (CBAs) do occur within the reconnaissance permit Area, including CBA1: natural and CBA2: natural areas. The draft BAR⁷⁵ indicates that approximately 39.2 % of the proposed 3D seismic survey area is covered by CBA1 and

⁷² BAR Appendix C1, p3.

⁷³ BAR Appendix C2, p iii.

⁷⁴ Ibid.

⁷⁵ At p129-131.

CBA2 natural areas. Exploration activities (such as seismic surveys and exploration well drilling) are classified as having 'restricted compatibility' with CBA1 and CBA2 natural areas, while petroleum production is classified as 'not compatible' in these areas. However, the draft BAR points out that the National Coastal and Marine Spatial Biodiversity Plan states that petroleum production may be possible in CBAs using lateral drilling or other techniques that do not result in biodiversity impacts. According to the plan, if significant petroleum resources are identified in these areas the selection of the site as a CBA could also be re-evaluated, although this would require alternative CBAs to be identified to meet biodiversity targets.

79.

Notwithstanding that the National Coastal and Marine Spatial Biodiversity Plan states that seismic surveys are classified as having 'restricted compatibility' (i.e. recommended to be a consent activity) with CBA natural areas, the Green Connection submits that the decision-maker has the discretion to (and that properly applying a precautionary approach in this BA application should) refuse consent for Searcher to conduct seismic surveys in these areas. The Green Connection submits further that - given that the main objective of the seismic survey is to identify commercially exploitable oil and gas reserves, and given that petroleum production is incompatible with CBA natural areas (CBAs have been identified as conservation worthy and could in the future be declared Marine Protected Areas) - authorising the seismic survey to be undertaken in an area with 39.2% coverage by CBAs would compromise the protection of these critical biodiversity areas.

80.

G. UNDERWATER NOISE MODELLING

It is noted that the BAR includes an underwater noise modelling study, but that this is largely a desktop exercise.

81.

The Green Connection submits that the underwater noise modelling should include *in situ* testing to 'ground truth' the modelling and accurately determine the potential noise impacts associated with various aspects of the proposed exploration drilling programme (sound in the ocean is affected by pressure, salinity, temperature and temperature gradients, and can travel many kilometres from the source). The Green Connection submits further that the impacts of noise on all species should be assessed (different species have different sensitivities to noise), including (but not limited to) potential impacts on the migration of snoek (a species that is important to the livelihoods of small-scale fishers) and juvenile turtles (which are significant from a biodiversity perspective given their endangered status) that are in turn dependent on other species.

82.

H. ALTERNATIVES

Location Alternatives

The draft BAR indicates that no location alternatives are considered feasible, that proposed survey area was carefully selected due to the high likelihood of containing significant hydrocarbon reserves, and that the area is considered an optimal area for a seismic survey as it is located well offshore and outside the ringfenced fisheries area.⁷⁶

83.

The Green Connection submits that it is feasible to identify location alternatives, in particular those parts of the proposed seismic survey area (approximately 60.8% thereof) that are not classified as CBA1 and CBA2 natural areas. The Green Connection thus recommends that, in the event that environmental authorisation is granted (which authorisation the Green Connection does not support), a condition should be included in the environmental authorisation restricting the seismic survey to that portion of the proposed survey area that does not contain CBA1 and CBA2 natural areas.

⁷⁶ Draft BAR, p34.

84.

Technology Alternatives

The draft BAR also includes discussion on technology alternatives, and states that Searcher must define and enforce the use of the lowest practicable seismic source volume for production, and design arrays to maximise downward propagation, minimise horizontal propagation and minimise high frequencies in seismic source pulses.⁷⁷ The draft EMPr (Annexure E to the draft BAR) includes the following as a 'Technical or Management Option' under 'Key Equipment': *'Define and enforce the use of the lowest practical seismic source volume for production. Design arrays to maximise downward propagation, minimise horizontal propagation and minimise high frequencies in seismic source pulses'*.⁷⁸

85.

The Green Connection submits that this 'Technical or Management Option' should, in the event that the seismic survey is authorised (which authorisation the Green Connection does not agree with), be made a mandatory obligation as a condition to any environmental authorisation granted.

86.

The Green Connection points out further that the draft BAR also fails to include other mitigation alternatives, such as requiring the appointment of sufficient numbers of on-board MMOs to ensure 24-hour and 360-degree visual monitoring, and the use of infra-red equipment to improve the likelihood of observing species as night that do not vocalise (and would thus not be detected by the PAM) and would not be seen by any MMOs.

⁷⁷ Draft BAR, p35.

⁷⁸ Draft EMPr, Annexure E to draft BAR, at p37 (13.13 Key Equipment).

87.

No-Go Alternative

The draft BAR states the following regarding the no-go alternative:

The no go alternative would imply that no seismic survey activities are undertaken. As a result, the opportunity to identify potential oil and gas resources within the survey area would not exist. This will negate the potential negative and positive impacts associated with the proposed survey activities.⁷⁹

88.

The Green Connection submits that the no-go alternative has not been adequately assessed, and that the BAR should include consideration of the negative implications of potential future oil and gas development and attendant economic and social costs that will or may result. This would necessarily include the economic and social costs of GHG emissions that would result from future oil and gas development, as well as the social and economic costs that would result from a major oil spill arising from an uncontrolled wellhead blow-out (during any subsequent exploration or production well drilling). The Green Connection is also of the view that a proper assessment of the no-go alternative should identify and assess the potential ecological and socio-economic benefits of the no-go option for small-scale fishers and fishing dependent communities. The assessment should also necessarily include a consideration of alternative means to generate energy and provide sustainable feedstocks for associated industrial applications, including renewable energy alternatives that do not pose a significant inter-generational ecological and socio-economic risk.

89.

I. SOCIAL IMPACT ASSESSMENT

The draft BAR includes a Social Impact Assessment.⁸⁰

⁷⁹ Draft BAR, at p35.

⁸⁰ Annexure C5 to the Searcher draft BAR, Social Impact Assessment, Equispectives Research and Consulting Services (Sept 2022).

90.

It is noted that this report states that communities feel that there are significant gaps in the available data, and that from a social perspective the non-technical or social risks can potentially cause significant impacts. The report highlights that potential social impacts identified include:

- Uncertainty;
- Further marginalisation of vulnerable groups;
- Concerns about cumulative impacts;
- Impact on livelihoods;
- Impacts on sense and spirit of place;
- Impacts on social license to operate;
- Community expectations; and
- Social unrest.

91.

The report points out that seismic reconnaissance projects are controversial in South Africa, and that while for many stakeholders it is an emotional matter, for others the potential of impacting on their livelihoods is the biggest fear. The report indicates that some stakeholders feel that the exploration for fossil fuels is not in line with sustainable development and the fight against climate change, while other stakeholders feel that it is imperative for the growth and development of the South African economy to engage in these investigations. The expert describes this as a 'complex and wicked problem'.⁸¹

92.

The report goes on to state that from a social perspective, it is clear that the communities and the majority of local people are opposed to the project, and that because the project does not happen in a social vacuum, the social environment is much

⁸¹ Ibid, pii.

wider than the footprint of the project area. The report states further that:

If the social risks and potential damage to cultural and indigenous rights are considered the impact on the social fabric of already vulnerable communities may be significant. From a social perspective the project can only be recommended after meaningful consultation, local research, education, and awareness raising has been done in the project affected communities. At this stage communities feel that they cannot make informed decisions.⁸² (emphasis added)

93.

The report goes on to make the following recommendation:

The recommendation is therefore that the project can only proceed once the social mitigation measures have been implemented and the community are sufficiently informed and educated to [be] able to engage in a meaningful manner.⁸³ (emphasis added)

94.

The Green Connection submits that in light of the Social Impact Assessment's statement that the project can only be recommended **after** meaningful consultation, local research, education and awareness raising has been done in the project affected communities, as well as its recommendation that the project can only proceed once the social mitigation measures have been implemented and the community are sufficiently informed and educated to [be] able to engage in a meaningful manner, Searcher's application for environmental authorisation should be refused. This approach would be consistent with section 2(4)(f) of NEMA, which stipulates that the participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured. It would also be consistent with section 2(4)(g) of NEMA, which requires that decisions must take into account the

⁸² Ibid, pii-iii.

⁸³ Ibid, piii.

interests, needs and values of all interested and affected parties, and this includes recognising all forms of knowledge, including traditional and ordinary knowledge.

95.

In addition, the Green Connection notes that the Social Impact Assessment indicates that Searcher and other seismic survey companies do not currently have a social license to operate (in large part due to a lack of meaningful consultation from a community perspective, which *'from a community and social risk perspective is not negotiable'*),⁸⁴ and that the seismic survey industry should reassess their position and social license to operate as an industry in the South African context and should conduct a strategic environmental assessment of the impact of the industry.⁸⁵ Notwithstanding this, the report makes a one-side assumption that the discovery of commercially exploitable fossil oil or gas resources would be beneficial to the economic development of South Africa: *'Potential future benefits and the economic development of the country should the surveys find any significant resources are not disputed'*.⁸⁶ The Green Connection submits that the Social Impact Assessment should also reflect the many negative socio-economic impacts that could or are likely to manifest should commercially exploitable reserves be found and developed through to production and use (including but not limited to the socio-economic costs of climate change⁸⁷). The Green Connection refers the EIA consultants and the decision-maker to report it commissioned titled *'A Literature Review of the Socioeconomic Consequences of Offshore Oil and Gas Activities on South Africa'*,⁸⁸ which report should be read as specifically incorporated into the Green Connection's comments on the draft BAR to be taken into account by the competent authority when considering its decision on authorisation.

⁸⁴ Ibid p109-110.

⁸⁵ Ibid p111.

⁸⁶ Ibid, p111.

⁸⁷ In 2021 an international team of scientists published their findings that economic damage from climate change could be six times higher by the end of this century than previously estimated. See:

<https://www.ucl.ac.uk/news/2021/sep/economic-cost-climate-change-could-be-six-times-higher-previously-thought>

⁸⁸ <https://thegreenconnection.org.za/wp-content/uploads/2021/10/Economic-impacts-of-offshore-oil-and-gas-on-South-Africa.12042021-1.pdf>

96.

J. EXPERT REPORT - CVs

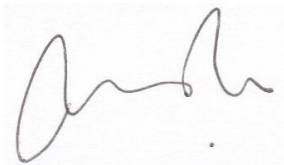
The Green Connection notes that the Pisces expert report⁸⁹ does not include the *curriculum vita* (CV) of Andrea Pulfrich. The Green Connection requests that this CV be included in the final BAR.

97.

K. CONCLUSION

The Green Connection submits that for the reasons set out in detail in these comments above, Searcher's application for environmental authorisation to conduct a speculative multiclient 3D seismic survey over various petroleum licensing Blocks located off the West Coast of South Africa should be refused.

Signed at Durban this 13th day of October 2022.



Adrian Leonard Pole

⁸⁹ Draft BAR, Appendix C2.

23 January 2023

COMMENT ON ENVIRONMENTAL AUTHORISATION GRANTED TO SEARCHER TO CONDUCT A SEISMIC SURVEY ON THE WEST COAST OF SOUTH AFRICA

This document provides comments on the Final Basic Assessment Report for Searcher Geodata UK Ltd (2 November 2022) (PASA Reference: 12/1/043) as well as on the Environmental Authorisation (EIMS Ref: 1518; 20 December 2022) granted to Searcher to conduct seismic surveys off the West Coast of South Africa in an offshore location extending from approximately 256km offshore of St Helena Bay to 220km offshore of Hondeklip Bay. These comments were prepared by WILDTRUST marine scientists, Dr Kendyl Wright, Dr Jennifer Olbers and Dr Jean Harris, and was requested by the Green Connection in relation to their Appeal on the Environmental Authorisation granted in terms of Regulation 24 of the National Environmental Management Act (act 107 of 1998): Environmental Impact Assessment Regulations (2014)

Having reviewed the Final Basic Assessment Report (FBAR), it is our opinion that the mitigation measures provided by the Environmental Assessment Practitioner (EAP), and in this case Environmental Impact Management Services (EIMS), are insufficient to allay fears of environmental harm and the Environmental Authorisation (EA) should be set aside. Should the activity be authorised, the likelihood of the reconnaissance activities causing direct harm to individual species, populations or ecosystems remains high. It is notable that in the judgement of *Sustaining the Wild Coast NPC and Others vs. Minister of Mineral Resources and Energy and Others*¹ (2021, December 28), the precautionary principle was invoked due to the reasonable apprehension of harm from such seismic survey activity, and it is our opinion that similarly, in this case, the harm to the marine environment from the noise and disturbance due to seismic noise is not sufficiently mitigated by the mitigation measures proposed to remove such harm. It remains clear that there is a high likelihood and risk that environmental harm will occur when seismic surveys are undertaken, the question is the magnitude of such harm. It is important that further studies be undertaken in this regard before seismic survey activities commence, and the EA is thus considered premature and inadvisable. This view is shared by 22 other South African marine scientists² as well as the Sub-committee on Marine Ecology and Risk Mitigation of the South African Scientific Advisory Group on Emergencies,³.

According to the EMPr (p.12), *"In the context of the EIA process in South Africa, the precautionary principle also translates to a requirement to provide sound, scientifically based, information that is sufficient to provide the decision-making authority with reasonable grounds to understand the potential impacts on the environment, the extent thereof and how impacts could be mitigated. If such information is not adequate for this purpose, the relevant authority cannot be satisfied as is required and then the authority should require that further information be collected and provided"*.

¹ *Sustaining the Wild Coast NPC and Others vs. Minister of Mineral Resources and Energy and Others*. (2021, December 28) Case No. 3491/2021 in the High Court of South Africa Eastern Cape Division, Makhanda/Grahamstown. <https://cer.org.za/wp-content/uploads/2021/12/SWC-v-Shell-Wild-Coast-Seismic-Blasting-Interdict-28.12.2021.pdf>

² <https://cer.org.za/wp-content/uploads/2021/12/open-letter-sa-marine-experts-final-2-dec-2021.pdf>

³ <https://www.assaf.org.za/files/2022/SAGE/SAGE%20Advisory%20on%20Shell%20Seismic%20Survey.pdf>

Furthermore, the information provided in the Final Basic Assessment Report (FBAR) is based on the entire Orange Basin Area (i.e. *“South African West Coast....study area between the Orange River mouth and Cape Point”*) and not specifically on the area for which the EA was granted i.e. offshore, and straddling two provinces (the Northern Cape and Western Cape), in an area where very little biological and ecological data exists.

The Orange Basin Area is significantly larger than the area for which the 3D seismic survey has been authorised for, and some mitigation measures proposed are irrelevant for species and ecosystems in this specific area. For example, on p. 130 of the FBAR the EIMS includes MPA buffers with the exception of the eastern edge of Robben Island MPA, which does not occur anywhere near the proposed 3D seismic areas. It is our opinion that the FBAR should be entirely relevant to the 3D seismic survey area, so that relevant area-specific (taking the species and ecosystems, and oceanographic conditions into account) mitigation measures are considered, and not the seemingly “cut and paste” standard mitigation measures and procedures.

We disagree strongly with the statement on page xviii of the FBAR that reads *“The findings of the specialist studies conclude that there are no environmental fatal flaws that should prevent the proposed project from proceeding, provided that the recommended mitigation and management measures are implemented.”* Our reasoning is summarised in the table below. Furthermore, we attach our Comments prepared on 10 October 2022, provided to Natural Justice for their review of the Searcher draft Basic Assessment Report (Appendix A) as well as Appendix B, our report entitled *“Report on scientific basis for concerns of significant harm inflicted to marine wildlife by 2D and 3D seismic surveys on the South and West coasts of South Africa”* which are relevant to the west coast and explain the scientific basis for the concerns about environmental harm.

In light of our significant unallayed concerns about the lack of adequate mitigation measures and the high likelihood of environmental harm, we set out in the table below comments on the FBAR and replies to the EIMS responses on the Draft BAR submitted to Natural Justice on 10 October 2022 (Appendix A).

The below table refers to the Final Basic Assessment Report:

	Key critical mitigation measures (p xviii-xix)	Concerns from the WILDTRUST
1.	<i>“Plan seismic surveys to avoid sensitive areas and periods for some marine fauna”</i>	It is unclear how this will be achieved when the EIMS and Specialist report states: <i>“It should also be kept in mind that some of the migratory species are now present year-round off the West Coast, and that certain baleen and toothed whales are resident and/or show seasonality opposite to the majority of the baleen whales.”</i> They then go on to state: <i>“Data collected by independent onboard observers should form part of a survey close-out report to be forwarded to the necessary authorities, and any incidence data and seismic source output data arising from surveys should be made available for analyses of survey impacts in Southern African waters.”</i> In our interpretation, this clearly identifies a significant risk to the resident and migratory species within the area. Close-out reports have been submitted for a number of years, yet the mitigation measures are yet to change the operations of the industry.
2.	<i>“Ensure the seismic vessel is fitted with PAM technology, which detects some animals through their vocalisations”;</i>	The comments submitted by the WILDTRUST (Appendix A) have not been adequately answered. It is our opinion that the reliance on Marine Mammal Observers (MMOs) to do visual sightings to supplement the Passive Acoustic Monitoring (PAM) during the day, as a mandated mitigation measure, necessitates that we question the acceptability of continuing with survey activities at night. If the visual observations are useful (perhaps sighting large animals around 66% of the time) in addition to PAM during the day, then relying on PAM alone at night cannot be an effective mitigation

		measure. It is our opinion that surveys should not occur between sunset and sunrise each day if a genuine attempt at maximum avoidance of cetaceans is the objective of this mitigation measure. The EIMS has acknowledged the inadequacies of both MMOs and PAM for many species but merely states that: <i>“From a seismic operator’s perspective, it is not feasible or cost-effective to cease airgun operations at night as this would prolong the duration of the survey possibly requiring multiple seasons to complete the acquisition. This would also add substantially to the overall survey duration and cumulative impact.”</i> Our concern and opinion on the cumulative impacts is addressed below in 50 (b).
3.	<i>“Define and enforce the use of the lowest practicable seismic source volume for production, and design arrays to maximise downward propagation, minimise horizontal propagation and minimise high frequencies in seismic source pulses”;</i>	While reducing potential impacts, this does not prevent the risk of impact to multiple species given that according to the EMPr (p.1) its primary purpose is to <i>“give effect to precautionary measures”</i> and support <i>“on-going proactive mitigation and the duty of care to the environment”</i>. From the Reasons for Decision in the EA, the Minister has not referred to the DFFE guidelines⁴ (Guideline on Need and Desirability, 2017 from the Department of Forestry, Fisheries and the Environment). The Guidelines states, it must be decided which alternatives represent the <i>“most practicable environmental option”</i>, which in terms of the definition in NEMA and the purpose of the EIA Regulations, are those options which provides the <i>“most benefit and causes the least damage to the environment as a whole, at a cost acceptable to society, in the long-term as well as in the short-term.”</i>
4.	<i>“Make provision for the placing of qualified MMOs on board the seismic vessel”;</i>	The effectiveness of an MMO has been questioned throughout the process, with acknowledgement from the EIMS on their inadequacies (as highlighted in 2 above). At best, visual observations by MMO detect approximately 65% of large marine mammals, leaving over a third undetected. It can be argued that a greater percentage of small and juvenile cetaceans and turtles are missed due the extreme difficulty of spotting them. In addition, MMOs provide no mitigation effect for smaller species and those that are not detectable visually, including fish and zoo-plankton.
5.	<i>“Maintain a pre-acquisition watch of 60-minutes before any instances of seismic source testing. If only a single lowest power seismic source is tested, the pre- acquisition watch period can be reduced to 30 minutes”;</i>	Our concerns around species that dive for prolonged periods, i.e. beaked whales who dive for up to 2 hours, remain.
6.	<i>“Implement a “soft-start” procedure in certain identified scenarios or if testing multiple seismic sources”;</i>	Our concerns around the use of “soft starts” as a proposed mitigation measure remain. While “soft starts” as mitigation for seismic impacts are likely to reduce the impact for highly mobile large animals, this is unlikely to be adequate for the many species that are prevalent in the area over the austral summer months and are unable to avoid the array or leave the area due to their lower mobility, such as smaller turtles, penguins, invertebrates, fish species and zooplankton.
7.	<i>“Implement a dedicated MMO and PAM pre-acquisition watch of at least 60 minutes (to</i>	As highlighted in 5 above, our concerns remain around species that dive for prolonged periods, such as beaked whales.

⁴ DEA (2017), Guideline on Need and Desirability, Department of Environmental Affairs (DEA), Pretoria, South Africa.

	<i>accommodate deep-diving species in water depths greater than 200 m);</i>	
8.	<i>“Terminate seismic source on observation and/or detection of penguins or feeding aggregations of diving seabirds, turtles, slow swimming large pelagic fish (including whale sharks, basking sharks, manta rays [and devil rays-Namibia only]) or cetaceans within the 500 m mitigation zone”.</i>	While this may be adequate to prevent Permanent Threshold Shifts, there is still the risk of Temporary Threshold Shifts, which can have multiple knock-on effects on the fitness of the animal. In addition, there is no mitigation for smaller less visible species.
9.	<i>“Terminate seismic source on observation of any obvious mortality or injuries to cetaceans, turtles, seals or mass mortalities of squid and fish (specifically large shoals of tuna or surface shoaling small pelagic species such as sardine, anchovy and mackerel) when estimated by the MMO to be as a direct result of the survey”;</i>	Post-impact termination is not a mitigation measure as the harm has already occurred.

Replies to the responses provided by EIMS (Appendix C) to the WILDTRUST comments (Appendix A) which formed part of the submission by Natural Justice in October 2022 are given below:

50.

- a) We do not believe that referring to an already noisy soundscape is a sufficient argument to justify the impact of the seismic surveys. In Environmental Assessments such as these, it is required that cumulative impacts, from all sound sources are adequately dealt with and investigated, including the additional impact that the seismic surveys will add to the ‘already noisy soundscape’. Furthermore, the sound of seismic surveys occurs at a high intensity and is sustained over long periods across a large area. The impacts cannot be reasonably compared with sounds such as ship engines.

The nature and behaviour of sound from the source is an airgun a few metres below the surface. Despite the fact that the airgun fires downwards, the pressure (and thus sound) waves will reflect, refract and echo in all directions, not just downwards, but in upwards and outwards as well. Water is a very good conductor of sound and pressure and its passage and the pressure outcomes are not as perfectly predicted as the statement would have us believe. It must be noted that:

The sound wave that goes up and reflects back downwards, interacting with other produced waves, can produce both convergence areas (amplified sound pressure levels) and shadow areas (reduced sound pressure level areas). There may be small pockets where null sound pressure is created, but these pockets do not form a continuous zone in the 0-3 m depth zone. The physics show us that “loud” and “quiet” zones will occur at the surface, and underwater, as one moves away from the source.

The sound pressure will also be carried upwards diagonally (not straight up) impacting baby turtles in surrounding surface waters in a circle away from the airgun. The radius of impact and disturbance in this circle is likely to be at least a few hundred metres away from the source (the airgun) as there is scientific evidence that zooplankton are killed by the physical disturbance up to 1.2km away in surface waters. This indicates that there is a sound shock wave in the surface waters. There is also evidence that sperm whales can experience a loud or high sound pressure level (convergence) zone up to 1.62 km away from the source (Madsen et al. 2006)

- b) According to EIMS, the cumulative assessment assumes the worst-case scenario of three seismic surveys occurring concurrently, i.e. Searcher, TGS Geophysical Company and GX Technologies Corporation, during the summer survey window in 2022/23. It is to our best knowledge that more than two concurrent seismic surveys within the same area, have never occurred within South African waters.

- c) The EIMS provides no further information on determining significance ratings except that is based on “*very extensive peer-reviewed literature together with noise modelling results (which put the threshold distances from the source array to mortality and potential mortal injury into perspective), adopting the precautionary principle as is required when undertaking such impact assessments, and taking into account the sensitivity of the receptors present in the southern African waters*”. By definition, the Precautionary Principle supports taking protective action before there is complete scientific proof of risk. We feel that sufficient evidence of risk is supplied and that the mitigation proposed by EIMS is insufficient to adequately allay these concerns (See details in Appendix A).
- d) The comment on the likelihood of penguins frequenting the area is noted. However, due to the nature of the FBAR and specialist report being for the entire Orange Basin area and not just the 3D acquisition area, as well as other multiple seismic survey applications occurring within the area, it is incredibly difficult to ensure that we include comments on species only pertinent to this area. We again advise that the FBAR process be revisited due to substantive changes needed to understand the specific area, species and ecosystems that are at risk.
- e) EIMS notes that the zones of potential injuries to “*fish species with swim bladders, turtles, and fish eggs and fish larvae are predicted to be within 160m from the array source.*” Due to the proposed mitigation measures being inadequate, this remains a concern because it is highly unlikely that these species will be spotted by the MMO aboard, especially at night.

51.

- a) We do not agree with the EIMS that the risks to species have been adequately assessed and mitigated against (Please see comments above and Appendix A).

52.

- a) We do not agree with the EIMS assessment that despite data gaps, a subjective rating system should give the Minister confidence of no harm during reconnaissance activities.

53.

- a) Although EIMS acknowledges there is a paucity of information and data available for the area (comment 52), it is unclear how they came to the conclusion “*that interaction with marine fauna in those offshore waters should remain minimal.*”
- b) EIMS has acknowledged the inadequacies of both MMOs and PAM for many species but merely states that: “*From a seismic operator’s perspective, it is not feasible or cost-effective to cease airgun operations at night as this would prolong the duration of the survey possibly requiring multiple seasons to complete the acquisition. This would also add substantially to the overall survey duration and cumulative impact.*” Therefore, the independence of EIMS is a concern.

In addition, we would like to comment with reference to the response provided to Green Connection on the Draft BAR on Critical Biodiversity Areas (CBAs) by EIMS:

COMMENT from EIMS:

*“The NBA 2018 has rated the South Atlantic bathyal and abyssal unconsolidated habitat types that characterise depths beyond 500 m, as being of ‘Least concern’, reflecting the great extent of these habitats in the South African Exclusive Economic Zone (EEZ). **The CBAs within the reconnaissance permit area would therefore not be protecting benthic ecosystem types, with protection likely to apply primarily to pelagic features.** The area falls within pelagic habitat types Bb1 and Bb2 characterised by consistently low productivity, chlorophyll and temperature, with low frequency of sea surface temperature fronts (NBA 2012). Using the distribution maps in Harris et al. 2022 used to delineate the CBAs, there is some overlap of the survey area with:*

- *Leatherback migration routes*
- *Atlantic Yellow-nosed Albatross*
- *Wandering albatross*
- *Spotted gully shark (summer)*
- *Stability with respect to climate change*

The mitigation measures proposed in the report are more than adequate to protect the first four of these, with direct climate change effects due to a seismic survey being negligible.”

It is our opinion this assessment by EIMS is incorrect. EIMS clearly indicates that the CBAs in question are primarily due to pelagic features and continues to list species of concern, i.e. the Critically Endangered Leatherback Turtle. Mitigation measures for the risks posed by the seismic activities to turtles include i) ‘turtle guards’, which only prevent entanglement with the gear in the water, and ii) through visual observation by MMOs. It is highly unlikely that an MMO is able to adequately detect turtles, and this will be exacerbated by wind and poor weather conditions.

It must also not be discounted that the seismic airgun releases a blast of pressurised air and bubbles, which travel upwards at each firing. Thus, animals that find themselves in the water just above the airgun, will be impacted by pressurised bubbles, that increase speed as they move to the surface. This is a disturbance that has not been adequately considered, and which in our opinion is likely to cause harm to animals that find themselves in the path of the survey array and unable to move away.



10 October 2022

**Comments on the Biodiversity and Ecosystem Services Assessment prepared for
Searcher Geodata UK Ltd (July 2022)**

The current Searcher application falls within the existing larger 2D and 3D seismic area previously applied for by Searcher led by SLR Consulting (South Africa) (Pty) Ltd in 2021. It is therefore our opinion that the comments provided on 14 January 2022 during this process (Annexure A) are applicable to this area and that no new information is provided by the specialist report to ease / allay fears around seismic activities. The marine specialist acknowledges a lack of knowledge of community structure for the region, without which it is difficult to assess the true impacts. However, a summary is provided below of the key concerns based on our previous literature review and assessment of the area. This is by no means a comprehensive list but is intended to highlight key concerns.

Summary comments:

- Based on peer-reviewed scientific literature, it is clear that physical damage to marine animals, including soft tissue trauma damage, embolisms, damage to organs used in balance and orientation, concussions, haemorrhaging, decompression sickness and both temporary and permanent threshold shifts to hearing ability have been directly linked to the kind and level of sound emitted during this nature of seismic surveys.

- There is plausible evidence to suggest that seismic survey activity is likely to affect the conservation status and recovery of populations of vulnerable and threatened species including (IUCN Red list species such as humpback and southern right whales), because sound and the ability to hear and interpret sound is critical for many species to reproduce (both vocalisations on breeding grounds and communications across large distances for mate detection). Therefore, it must be assumed that interference in sound perception or utilisation for communication (temporarily or permanently) has the potential to impact a species at the population level.
- Some species have been shown and documented to display physiological stress responses and behavioural changes to seismic activities, such as moving away rapidly, diving or remaining still. These responses are likely to increase their energy consumption and energy costs, reduce their time to forage, and/or affect their vulnerability to predation, thus having negative impacts on the survival of individuals (especially young or compromised animals) as well as the overall population growth and survival of a species (especially for threatened species that are already at risk of extinction).
- The impacts of seismic activities are most well studied for marine mammals, and evidence suggests that there are distinct avoidance responses such as leaving the area or ceasing to undertake everyday activities such as feeding in preferred areas. This is likely to negatively impact the "fitness" of an affected animal.
- There is genuine conservation concern for beaked whales that are particularly sensitive to anthropogenic noise, including seismic surveys. It has been demonstrated that even minor, non-lethal disturbances, resulting in changes in behaviour such as displacement from preferred habitats, could impact a population. In addition, beaked

whales are known to dive for prolonged periods, in excess of 2 hours, this means in the absence of vocalisation the proposed mitigation would not be sufficient.

- The phenomenon of energy-cost (from stress and avoidance behaviour) is of particular concern for some of the species expected to be encountered in the survey area in question, particularly the humpback whales and southern right whales who are at risk of the airgun noise affecting their behaviour or interfering with the communication between mother and calf. Any impact on their energy reserves could impact on their condition (weight-loss and physiological condition) and affect survival of the animals during a vulnerable time (especially for lactating mothers and their calves) on their long migration to feeding grounds in Antarctica.
- Recent research (2017) has shown significant mortality in zooplankton up to 1.2 km from a seismic survey array. Zooplankton forms the base of many important food webs in the marine environment. Depletion of zooplankton could thus have an impact on food for their predators (such as fish) as well as impact fish eggs and larvae (ichthyoplankton) with potential local impacts on species important in fisheries. This damage to zooplankton over 1km away from the survey array raises concern that a 500m buffer for other animals that are unable to move away from the sound, is far too small to ensure that damage is not inflicted (even if they were able to evade it).
- The impact on fish assemblages is difficult to interpret, due to multiple factors at play including but not limited to the ability of a species to move from an area as well as the receiving habitat. A global review of the effect of seismic activities on fish and invertebrates acknowledged the limits of the current research due to experimental designs used or due to the focus on single species during investigations. A key concern is a lack of research focused on confounding effects and multiple stressors, therefore potential impacts of seismic surveys that have been previously identified may be



reflective of underestimation or overestimation and would depend on the type of interaction (synergistic, additive, or antagonistic).

- In South Africa, since October 2021, thousands of dead and/or dying Cape fur seals (*Arctocephalus pusillus pusillus*), washed ashore along the south and west coasts. The cause of these die-offs remains unknown but avian flu has been ruled out and malnourishment appears to be the most widely accepted reason. It is of concern that although the cape fur seal population within South Africa is relatively healthy, they too are under pressure from various anthropogenic pressures. Additional stress from seismic activity at this time is inadvisable.
- While "Soft starts" mitigation for seismic impacts are likely to reduce the impact for highly mobile large animals, this is unlikely to be adequate for the many species that are prevalent in the area over the austral summer months and are unable to avoid the array or leave the area due to their lower mobility, such as smaller turtles, penguins, invertebrates, some fish species and zooplankton.
- The finding of observer efficiency (from a scientific monitoring study conducted during the 2018/19 and 2019/2020 seasons on the humpback whales on the east coast) suggests that even with trained observers up to 44% of humpback whales in an area went undetected. This casts doubt on the effectiveness and success of Marine Mammal Observer (MMO) sightings of the largest species (humpbacks) as a mitigation measure, indicating that it is most likely that whales go undetected. Furthermore, the detection rate for smaller species, such as dolphins, seals, turtles and flightless birds (penguins), would be expected to be much lower, obviating the effectiveness of visual observations to prevent harm to these species.
- Also of concern, is that the efficacy of Marine Mammal Observers (MMO) is likely to be low due to the nature of the offshore marine environment in the survey area



(frequent high swells and winds affecting surface visibility), putting species who are missed by MMO's and PAM operators at extreme risk, particularly at night or during adverse weather conditions.

- Furthermore, the reliance on Observers to do visual sightings to supplement the PAM monitoring during the day, as a mandated mitigation measure, necessitates that we question the acceptability of continuing with survey activities at night. If the visual observations are useful (perhaps sighting large animals around 66% of the time) in addition to PAM, then relying on PAM alone at night cannot be an effective mitigation measure. It is our opinion that surveys should not occur between sunset and sunrise each day if a genuine attempt of maximum avoidance of cetaceans is the objective of this mitigation measure.



Annexure A.

REPORT ON SCIENTIFIC BASIS FOR CONCERNS OF SIGNIFICANT HARM INFLICTED TO MARINE WILDLIFE BY 2D and 3D SEISMIC SURVEYS ON THE SOUTH AND WEST COASTS OF SOUTH AFRICA

Harris JM, Olbers JM, Wright K

14 January 2022

This report provides a summary of key findings in peer-reviewed literature on the physiological and ecological impacts of seismic survey activities on marine wildlife, with specific attention to the relevance of the information to the context of the Reconnaissance Permit Area (~297 089 km²) applied for by Searcher Geodata UK Limited, located offshore between the South African/Namibian border and Cape Agulhas, as well as with regards to vulnerable and endangered species known to occur in this area, with consideration of the proposed timing of the seismic survey operations being during the austral summer months. Having carefully considered the available information it is our opinion that seismic surveys do cause harm to both species and ecosystems, and that significant direct harm to individual animals and harm to populations of endangered species is the most likely scenario in the case of the seismic surveys off the south and west coasts of South Africa. Of specific concern is the impact on humpback whales and southern right whales which are still frequenting the west coast during the summer months (December – February), the impact on critically endangered (leatherback) turtles (migration routes in the area), the critically endangered African Penguin (changes in foraging behaviour and impacts on fitness) and the Cape fur seal (and consideration of current mass die-offs). We conclude that these seismic surveys are inadvisable in austral summer months due to the presence of these species in the area, the increasing anthropogenic



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pressures, and the inability of the prescribed mitigation measures preventing harm to individuals/populations. Furthermore, recent literature provides credible concern about ecosystem/food-chain impacts of seismic surveys, that may in turn have impact on fisheries, the severity and localisation of which will depend on coincidences with spawning and juvenile recruitment events. It is strongly recommended that further studies on these impacts, in the South African context, are carried out *in situ* before proceeding with further seismic surveys of this nature.

Summary of Findings

- Based on peer-reviewed scientific literature, it is clear that physical damage to marine animals, including soft tissue trauma damage, embolisms, damage to organs used in balance and orientation, concussions, haemorrhaging, decompression sickness and both temporary and permanent threshold shifts to hearing ability have been directly linked to the kind and level of sound emitted during this nature of seismic surveys.
- There is plausible evidence to suggest that seismic survey activity is likely to affect the conservation status and recovery of populations of vulnerable and threatened species including (IUCN Red list species such as humpback and southern right whales), because sound and the ability to hear and interpret sound is critical for many species to reproduce (both vocalisations on breeding grounds and communications across large distances for mate detection). Therefore, it must be assumed that interference in sound perception or utilisation for communication (temporarily or permanently) has the potential to impact a species at the population level.
- Some species have been shown and documented to display physiological stress responses and behavioural changes to seismic activities, such as moving away rapidly, diving or remaining still. These responses are likely to increase their energy consumption



and energy costs, reduce their time to forage, and/or affect their vulnerability to predation, thus having negative impacts on the survival of individuals (especially young or compromised animals) as well as the overall population growth and survival of a species (especially for threatened species that are already at risk of extinction).

- The impacts of seismic activities are most well studied for marine mammals, and evidence suggests that there are distinct avoidance responses such as leaving the area or ceasing to undertake everyday activities such as feeding in preferred areas. This is likely to negatively impact the "fitness" of an affected animal.
- There is genuine conservation concern for beaked whales that are particularly sensitive to anthropogenic noise, including seismic surveys. It has been demonstrated that even minor, non-lethal disturbances, resulting in changes in behaviour such as displacement from preferred habitats, could impact a population.
- The only existing field study in South Africa (that we have been able to find) on the impacts of seismic activities in our waters is illuminating in this regard. It presents clear evidence that the endangered, endemic African penguin avoided preferred feeding sites when a seismic survey was active nearby. This is particularly of concern for a species which has had a 70% decrease in numbers over the past decade, is stressed by prey depletion creating a greater demand for them to forage further afield, and for which the prospect of extinction is significant.
- The phenomenon of energy-cost (from stress and avoidance behaviour) is of particular concern for some of the species expected to be encountered in the survey area in question, particularly the humpback whales and southern right whales who are at risk of the airgun noise affecting their behaviour or interfering with the communication between mother and calf. Any impact on their energy reserves could impact on their condition (weight-loss and physiological condition) and affect survival of the animals during a



vulnerable time (especially for lactating mothers and their calves) on their long migration to feeding grounds in Antarctica.

- Recent research (2017) has shown significant mortality in zooplankton up to 1.2 km from a seismic survey array. Zooplankton forms the base of many important food webs in the marine environment. Depletion of zooplankton could thus have an impact on food for their predators (such as fish) as well as impact fish eggs and larvae (Ichthyoplankton) with potential local impacts on species important in fisheries. This damage to zooplankton over 1km away from the survey array raises concern that a 500m buffer for other animals that are unable to move away from the sound, is far too small to ensure that damage is not inflicted (even if they were able to evade it).
- The impact on fish assemblages is difficult to interpret, due to multiple factors at play including but not limited to the ability of a species to move from an area as well as the receiving habitat. A global review of the effect of seismic activities on fish and invertebrates acknowledged the limits of the current research due to experimental designs used or due to the focus on single species during investigations. A key concern is a lack of research focused on confounding effects and multiple stressors, therefore potential impacts of seismic surveys that have been previously identified may be reflective of underestimation or overestimation and would depend on the type of interaction (synergistic, additive, or antagonistic).
- In South Africa, since October 2021, thousands of dead and/or dying Cape fur seals (*Arctocephalus pusillus pusillus*), have washed ashore along the south and west coasts. The cause of these die-offs remains unknown but avian flu has been ruled out and malnourishment appears to be the most widely accepted reason. It is of concern that although the cape fur seal population within South Africa is relatively healthy, they too are

under pressure from various anthropogenic pressures. Additional stress from seismic activity at this time is inadvisable.

- While "Soft starts" mitigation for seismic impacts are likely to reduce the impact for highly mobile large animals, this is unlikely to be adequate for the many species that are prevalent in the area over the austral summer months and are unable to avoid the array or leave the area due to their lower mobility, such as smaller turtles, penguins, invertebrates, some fish species and zooplankton.
- The finding of observer efficiency (from a scientific monitoring study conducted during the 2018/19 and 2019/2020 seasons on the humpback whales on the east coast) suggests that even with trained observers up to 44% of humpback whales in an area went undetected. This casts doubt on the effectiveness and success of Marine Mammal Observer (MMO) sightings of the largest species (humpbacks) as a mitigation measure, indicating that it is most likely that whales go undetected. Furthermore, the detection rate for smaller species, such as dolphins, seals, turtles and flightless birds (penguins), would be expected to be much lower, obviating the effectiveness of visual observations to prevent harm to these species.
- Also of concern, is that the efficacy of Marine Mammal Observers (MMO) is likely to be low due to the nature of the offshore marine environment in the survey area (frequent high swells and winds affecting surface visibility), putting species who are missed by MMO's and PAM operators at extreme risk, particularly at night or during adverse weather conditions.
- Furthermore, the reliance on Observers to do visual sightings to supplement the PAM monitoring during the day, as a mandated mitigation measure, necessitates that we question the acceptability of continuing with survey activities at night. If the visual observations are useful (perhaps sighting large animals around 65% of the time) in



addition to PAM, then relying on PAM alone at night cannot be an effective mitigation measure. It is our opinion that surveys should not occur between sunset and sunrise each day if a genuine attempt of maximum avoidance of cetaceans is the objective of this mitigation measure.

- It is of our opinion that the proposed seismic survey activities are highly likely to both disturb and have an adverse effect on Marine Protected Areas (MPA), Critical Biodiversity Areas (CBA) and Ecologically or Biologically Significant Areas (EBSAs), and their associated fauna, situated adjacent to, within and surrounded by the reconnaissance permit area. The reconnaissance permit area occurs adjacent to six Marine Protected Areas and surrounds a seventh (Benguela Muds MPA). In the EMP, there is no reference or provision made regarding buffer areas around these protected areas or for areas identified with biological importance and significance. Therefore, it is assumed that the vessel can actively work within 1 km of the MPA boundaries, while ignoring EBSA's and CBA's altogether, thus giving no consideration to the biological importance of these areas or the likely impact at such close range. Although 2D surveys are proposed for these adjacent areas, the cumulative zone of impact for Permanent Threshold Shift (PTS) and Temporary Threshold Shift (TTS) for physiological injury is between 500 - 5000m respectively.

Global context – impacts of seismic surveys on marine wildlife

Despite seismic surveys having been undertaken for decades in South African waters, together with the knowledge that some impact to marine fauna does indeed occur¹, there remains very little scientific research on the effects of seismic surveys, and in addition there

¹ <https://jncc.gov.uk/our-work/marine-mammals-and-noise-mitigation>: “to reduce the risk of deliberate injury to marine mammals”.



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are no legislated guidelines for seismic surveys in South African waters (Purdon 2018). Globally, seismic surveys' environmental impacts and consequences are slightly better documented, although not uniform in results or widely accepted within all sectors. The primary mitigation measures for seismic surveys in South Africa include soft-starts, which is a gradual and systematic increase in power of the airgun array undertaken to warn and drive mobile marine species, such as cetaceans (whales and dolphins), seals, flightless birds and turtles away from the sound source before the full-power airgun blasts begin, thus attempting to minimise the negative effects of the airgun blasting activity. Various studies contest this assumption (McCauley et al. 2000; Weilgart 2013; Dunlop et al. 2016) and have revealed a growing concern for animals that are unable to avoid or out-swim the airgun arrays.

Animals use sound critical to their life cycles (Jasny et al. 2005) in three ways, by actively producing sound (Tyack 1981), by listening to sounds emitted by other living organisms (Clark et al. 2009; Van Opzeeland 2010), and taking cues from physical or non-living factors producing sounds, contributing to the ambient background noise, such as wind, waves, swell, bubbles, currents, turbulence, earthquakes, rainfall, ice cracking or breaking (Hildebrand 2005). Many marine animals produce sound for communication, reproduction, aggression, defence mechanisms, antagonistic interactions, courtship, group coordination, orientation, navigation, and prey identification (Hildebrand 2005). They rely on producing a sound that is heard while hearing a sound and interpreting the sound for their survival.

Various physical responses to acoustic disturbance have been documented, with physical responses including soft tissue damage (Balcom and Claridge 2001), embolisms (Dolman and Simmonds 2005), damage to organs used in balance (André et al. 2011), concussions in penguins (Cooper 1982), haemorrhaging (Evans et al. 2001) and decompression sickness

(Fernández et al. 2005). Hearing impairment in the form of Temporary Threshold Shift (TTS) or Permanent Threshold Shift (PTS) has also been reported (Hildebrand 2005). Threshold shift refers to an increase in the minimum sound level required for an animal to hear a sound. A TTS is followed by successful recovery to normal hearing thresholds after a given period of time in the absence of that sound, while PTS is when the sensory hair cells in the inner ear are permanently damaged and lost making recovery impossible (Weilgart 2013).

Stress caused by disturbance is associated with a change in body chemistry (Jasny et al. 2005) and can be equally disruptive as physical damage. Stress has implications on sexual maturation, inhibits growth, reproduction and general survival ability (Pickering 1992; McCormick 1999; Consten et al. 2001). Perceptual effects can occur when there is an interference of sounds of interest to a specific animal but are being drowned out or masked by anthropogenic noise. The impact of this in the long term could have implications on breeding populations, thus on reproduction within a population (Erbe 2001). Many animals may have the ability to counteract this and make minor changes to their vocalisations and behaviour; however, these modifications may come at a cost in terms of energy expenditure (Tyack 2008) and are likely to reduce breeding productivity of the population. This is of particular concern for species that are threatened.

Behavioural responses to noise are dependent on various factors, such as age, sex, presence of offspring, location and an individual animals' previous encounter with a specific sound or noise. Behavioural responses may include modification of vocal behaviour, displacement from important habitats, and other subtle responses, including increased breathing rates, change in dive duration, time spent at the surface, rapid or erratic movements (Bowles et al. 1994; Lesage et al. 1999; Williams et al. 2002; Hastie et al. 2003; Ng and Leung 2003; Aguilar de

Soto et al. 2006). These all with potentially high energetic costs (Williams et al. 2006; Koper and Plön 2012).

Most scientific research on the impacts of seismic surveys has been conducted on cetaceans, and as a result, most mitigation measures are to protect these animals. In South Africa, this is no different. However, it is becoming more and more evident that mitigation measures are not adequate (Weilgart 2013). In the Gulf of Mexico, it was recorded that ~250 male fin whales appeared to stop singing for several weeks to months during a seismic survey. These animals resumed singing within hours or days after the survey ended (IWC 2007). The assumption is that male fin whales use vocalisations for reproduction by finding and attracting mates (Croll et al. 2002); it can only be assumed that such an effect would be biologically significant (Weilgart 2013). In addition to this, a blue whale ceased calling in the presence of a seismic survey at 10 km away (Macdonald et al. 1995). Conversely, a different group of blue whales appeared to have the opposite reaction. They changed their vocalisations (De Lorio et al. 2010) by calling consistently more on days when the seismic surveys were actively ongoing, suggesting that seismic survey noise interfered with important signals used in their social interactions and feeding (De Lorio et al. 2010).

Other reactions to seismic airguns can be subtle or hard to detect (Weilgart 2013) and it has been found that Sperm whales in the Gulf of Mexico did not appear to avoid a seismic airgun survey area but reduced their swimming effort and their tendency to reduce foraging effort (Miller et al. 2009). It has also been documented that as a result of changes in behaviour, the result could be lower reproductive rates and have negative consequences for the population (Miller et al. 2009). In comparison, bowhead whales showed no avoidance or change in vocalisations in the area of seismic surveys; however, their dive duration was shorter

(Richardson et al. 1986). In Brazil, a reduction in cetacean species diversity during 2000 and 2001 was noted with the increased occurrence of seismic surveys in the area being implicated in the possible cause of these animals vacating the area (Parente et al. 2007). In other areas, marine mammals have been recorded to avoid seismic noise by leaving an area (Castellote et al. 2012; Weir 2008; Stone and Tasker 2006). The long-term impacts of various changes in behaviour is largely unknown but potentially impact their ability to feed and/or reproduce as in some species, these life-history stages are site or habitat-specific.

South Africa's south and west coasts are hosts to eight species of beaked whales (Ziphiidae) (Best 2007), including a new species described in 2021 (*Mesoplodon eueu*; Carroll et al. 2021), which are globally recognised as being sensitive to anthropogenic noise, and having raised conservation concerns. New et al. (2013) found that adult female beaked whales could survive but not reproduce in times or areas of lower habitat quality. They may extend the duration of lactation in mediocre conditions to increase their chance of survival, while still reproducing. New et al. (2013) found that some beaked whale species require high-quality habitat to meet their requirements for reproduction and survival. They suggested that even minor, non-lethal disturbances, resulting in changes in behaviour such as displacement from preferred habitats, could impact a population.

McEwen and Wingfield (2003) suggested that all organisms must gather energy for growth and reproduction throughout their life cycle and that organisms must retain reserves for predictable changes such as seasons, and challenges that are less predictable such as disturbance, predation pressure, or social conflict. Often colloquially, this is referred to as the "fitness" of the animal. The accumulated cost in the balance between energy intake and demand is called the 'allostatic load', of physiological and behavioural mechanisms that enable



allostasis or adaptation to these changes. McEwen and Wingfield (2003) use the word "allostasis" to signify mechanisms that allow an organism to regain equilibrium while dealing with external challenges; if energy demand is more than intake, then animals may activate a survival mode that may increase energy available, reduce energy demand, or both, to regain its energy balance. Implications on individuals and populations of this energy imbalance are unknown.

Several studies have reported negative impacts of acoustic signals from airguns on zooplankton (small, aquatic microorganisms living in the water column, including crustaceans, larvae, juvenile fish, juvenile invertebrates, eggs etc.) from more than 10m away (Kostyuchenko 1972; Kosheleva 1992; Parry *et al.* 2002) with some laboratory experiments on lobster larvae showing no impact at all (Day *et al.* 2016). However, Christian *et al.* (2003), showed retardation in some individuals in the development of snow crab eggs after being exposed to certain sound levels.

The effects of seismic noise on zooplankton were brought under the spotlight when McCauley *et al.* (2017) presented evidence from an *in-situ* study that suggested that seismic surveys cause significant mortality to zooplankton populations. Zooplankton, unlike vertebrates, do not have hearing structures (although they can sense pressure change) and their bodies are generally the same density as the surrounding water, so sudden pressure changes associated with seismic activities were presumed not to cause physical damage (Parry and Gason 2006). McCauley *et al.* (2017) disputed this and has shown zooplankton mortality at distances of up to 1.2km from the sound source.

Similarly, inconsistent findings occur with fish assemblages. The impacts on fish assemblages are difficult to interpret, because of multiple factors at play including but not limited to the ability of a species to move from an area as well as the receiving habitat. We acknowledge the validity of the results presented by Meekan et al. (2021) which highlights that exposure to an experimental seismic source did not have an impact on the assemblage of tropical demersal fishes found along the northwest shelf of Western Australia. However, it must be noted that the findings have been stated to be applicable only to other habitats with similar physical environments, in particular similar water depths (50 – 70 m). The proposed reconnaissance permit area on the south and west coasts of South Africa differs significantly from those reported in the Meekan et al. (2021) research, thus highlighting the need for South African-specific and local research to be undertaken.

A global review of the effect of seismic activities on fish and invertebrates by Carroll et al. (2017) acknowledged the limits of the available research due to experimental design, or to the focus on single species which prevents extrapolation to other regions, other seismic surveys, species, or biological responses. In addition, they highlighted a serious concern, that there was a lack of research focused on confounding effects and multiple stressors, therefore potential impacts of seismic surveys which had previously been identified may be reflective of under-estimation or over-estimation and would depend on the type of interaction (i.e. synergistic, additive, or antagonistic).

Furthermore, the indirect effects of seismic activity on cetaceans is a concern. It is well known that the productivity and health of the oceans are under-pinned by marine plankton (Raymont 1983; Alcaraz & Calbet 2009). While forming the basis of the food webs, plankton has been implicated in links to climate change via their role in iron fertilisation and carbon sequestration



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through whales foraging on krill and subsequent defecation (Smetacek and Nicol 2005; Smetacek 2008; Nicol et al. 2010). In 2010, Pershing et al. suggested that over-fishing of large fish and commercial whaling had compromised the ocean's ability to store and sequester carbon, thus contributing to climate change. They indicated that populations of large baleen whales now store 9.1×10^6 tonnes less carbon than before commercial whaling and that protecting whales (and other large over-exploited species), would be a form of a carbon management scheme. The cascading and knock-on effects of seismic survey impacts between the upper (cetaceans) and lower reaches (plankton) of the food web, as each are being impacted are unknown. McCauley et al. (2017) noted that the ramifications of compromised larval recruitment could be massive for higher predators and for ocean health as a whole. While traditional feeding grounds for humpback whales are in Antarctic waters, Dey et al. (2021) has recently recorded regular feeding frenzies off the west coast in recent years (see super pods below).

South African Context

It is of concern that there are a number of 'unknowns' and 'warning bells' in terms of cetacean populations on the south and west coasts. Despite various species being recorded frequently on the coasts, the location of breeding grounds of Sei (*Balaenoptera borealis*) and Fin whales (*Balaenoptera physalus*) are unknown, the seasonality of pygmy (*Kogia breviceps*) and dwarf (*Kogia sima*) sperm whales are unknown and the abundance and occurrence of the offshore common dolphin (*Delphinus delphis*) is also unknown, highlighting that encounters with these animals cannot be predicted and the generic mitigation measures may be insufficient. Further to this, it is noted in the EMP submitted by Searcher that the two very well-studied and frequently observed species on the south and west coasts, the humpback and southern right whales, ***are expected to be regularly encountered and have a year-round occurrence***



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across the entire reconnaissance permit area. The period of humpback whales in this area is between July and February, with frequent feeding encounters during the months between December to February. Barendse et al. (2010), Best & Allison (2010), and Elwen et al. (2014) highlighted that there is no existing evidence of a clear 'corridor' of migration and humpback whales appear to be spread out widely across the shelf and into deeper pelagic waters, especially during the southward migration, in the Benguela ecosystem.

Further to this, the EMP itself highlights that, **"it is highly likely that several hundreds of right whales can be expected to pass through the Reconnaissance Permit Area when migrating southwards from the feeding areas between April and June"** (page 93). Apart from this going against the spirit of avoiding whale periods by the oil and gas industry, Vermeulen et al. (2020) warned that there is an observed decrease in southern right whale calving success of the South African population and a strong link between foraging success and reproduction. They suggest an investigation into possible decreases and/or spatial or temporal shifts in their prey availability at higher latitudes due to environmental variability. They also highlight a concern of the continued low numbers of unaccompanied adults along the South African coast which could potentially have serious consequences for cow-calf pairs in relation to the country's whale-watching industry in the future.

Since 2011, South Africa has witnessed 'super-pods' of up to 200 humpback whales feeding in south and west coast waters between October to January. Research by the National DFFE, in collaboration with various academic partners, has led to the discovery of these 'feeding grounds' away from their traditional feeding grounds in the Antarctic². This phenomenon

² <https://www.news24.com/news24/travel/watch-whale-super-pods-larger-than-usual-cause-stir-off-sas-west-coast-public-urged-to-keep-their-distance-20191216>



requires understanding the ecosystem-wide impacts and benefits, while potential human/whale conflicts remain unknown. According to Dey et al. (2021), the formation of super-groups in recent years suggests that there might be a change in oceanographic or ecological characteristics which provide the conditions for this novel feeding strategy in the Southern Benguela Upwelling System. Although the humpback whale population is increasing (Wilkinson, 2021), there is evidence to suggest that cetaceans in South African waters are being affected by changes in their ecosystem and it is not well understood yet what is driving these changes and what the long terms effects could potentially be to populations.

With other mammals, it was suggested by Thompson et al. (1998) that gray seals displayed strong avoidance behavior, altered foraging behavior and suggested an increased frequency of hauling out onto land to possibly escape the noise, while harbor seals had slower heart rates during controlled playback experiments. In contrast, during a study in shallow arctic waters, sighting rates of ringed seals (*Phoca hispida*) from a seismic vessel showed no difference when a different number of airguns were in use, did however suggest local avoidances based on distance from the sound source (Harris et al., 2001).

In South Africa, the Cape fur seals (*Arctocephalus pusillus pusillus*), is the only resident seal along the west coast, occurring at numerous breeding and non-breeding sites on South Africa's mainland and on nearshore islands and reefs. Other vagrant seals occurring along the south and west coast include the southern elephant seal (*Mirounga leoninas*), subantarctic fur seal (*Arctocephalus tropicalis*), Antarctica fur seal (*Arctocephalus gazella*), crabeater (*Lobodon carcinophagus*) and leopard seals (*Hydrurga leptonyx*). Cape fur seals are highly



mobile and have large foraging areas including on the continental shelf up to 120 nautical miles offshore (Shaughnessy 1979).

According to Kirkman et al. 2016, several morbillivirus epidemics have occurred in true seal (Phocid) populations in the northern hemisphere and, at the time it was agreed that no epidemic diseases were known to have infected Cape Fur Seals historically, but there was a considerable risk for disease transmission to the population through exposure to domestic or feral dogs and terrestrial carnivores, potentially resulting in mass mortality. Kirkman et al. (2016) cautioned that the health of individuals and their vulnerability to disease can be affected by feeding conditions, including the availability of prey, and that risk of disease may be exacerbated by anthropogenic pressures on the ecosystem.

In South Africa, since 10 September 2021, thousands of emaciated, dying and dead Cape fur seals (*Arctocephalus pusillus pusillus*), have washed ashore along the south and west coasts. The cause of these die-offs remains unknown but avian flu has been ruled out and malnourishment appears to be the most widely accepted reason. It is of concern that although the Cape fur seal population within South Africa are healthy, they too are under pressure from various anthropogenic pressures, and the EMP failed to mention this mass die-off event.

In South Africa, only a single focused study on the impact of seismic surveys has been undertaken. This study, off Gqeberha, was within the foraging area of the endangered, endemic African Penguin (*Spheniscus demersus*). Pichegru et al. (2017) demonstrated that penguins avoided their preferred foraging areas during seismic surveys and foraged further from the survey vessel when in operation. Upon termination of seismic surveys, the penguins reverted to their normal behaviour (Pichegru et al. (2017), a behaviour which was also

observed in Gray whales (*Eschrichtius robustus*) off Sakhalin Island in Russia (International Whaling Commission 2005). However, the long-term effects on populations of this temporary retreat of the area are unknown. Given the results of this study by Pichegru et al. (2017), strict management measures and decisions on seismic survey activities should have been established in South Africa. Furthermore, the cumulative effect of multiple, concurrent seismic surveys within the region may cause cumulative impacts.

Significant impacts on turtle species are a concern. Adult turtles may be less vulnerable to sound damage than cetaceans as the air spaces in their cochlear are smaller than those in cetaceans, making them less sensitive to sound shockwaves (Popper et al. 2014). However, while studies have shown that adult sea turtles have a moderate ability to move from an area being surveyed (Lenhardt 1994; O'Hara and Wilcox 1990), they are prone to TTS after exposure to sound within 1 km of a sound source, with signs of recovery only two weeks after injury (Lenhardt 1994). In a study undertaken on captive turtles, it was found that loggerhead turtles (*Caretta caretta*) responded to sound by swimming to the surface and remaining there or staying slightly submerged (Lenhardt 1994), as this area, regarded as a sound shadow, and is hypothesised as being where sound waves cancel each other out and the noise is at a minimum. Cummings et al. (2004) disputed this saying that although near the surface, could be a place where animals take refuge, they are not in a 'zone of silence'. With an increasing exposure of sound levels, the behaviour of caged green (*Chelonia mydas*) and loggerhead (*Caretta caretta*) turtles increased their swimming speed, potentially showing agitation to sound (McCauley et al. 2000). Turtle behaviour is difficult to interpret (DeRuiter and Doukara 2012), given that some studies have reported that turtles do not display any signs of distress (Pendoley 1997). Globally the Leatherback turtle (*Dermochelys coriacea*) is vulnerable, but critically endangered in the Southwestern Indian Ocean where this subpopulation is declining

(Nel 2010, 2012; Nel et al. 2013). Loggerhead (*Caretta caretta*) populations are globally vulnerable but near threatened in the southwest Indian Ocean (Lombard & Kyle 2014).

The nesting grounds of the southern African loggerhead (*Caretta caretta*) and leatherback turtle (*Dermochelys coriacea*) populations are located on the east coast in iSimangaliso Wetland Park. In the Autumn months, adult turtles are moving towards their nesting beaches but stay inshore to avoid the north to south flowing Agulhas current. Once they have completed their laying of eggs, they leave the shore and into the current to be carried south once again, and by late March, they will be littered along the east and south coast in offshore waters. Both loggerhead and leatherbacks are known to occur within the reconnaissance permit area but known migration corridors of adult leatherbacks lie within the reconnaissance permit area. Harris et al. (2018) highlighted the migration path for leatherback turtles into the southeastern Atlantic (Agulhas-Benguela Corridor), through the reconnaissance permit area. Leatherback turtles inhabit deeper waters and are considered a pelagic species, traveling within the ocean currents. However, they have a moderate ability to avoid areas with an increase of noise in the water. According to Hays et al. (2004), these animals may dive to depths over 600 m and remain submerged for up to 54 minutes. Mitigation measures for turtles in seismic surveys include observers, although it is unclear how an observer would be able to observe these animals at such a distance (especially as large animals such as whales are only observed 44% of the time at best). A second mitigation measure, although only to be used if turtles are sighted by observers (EMP page 224), is to install 'turtle-guards' to prevent them from becoming entangled in the gear. These devices are accepted as being useful in terms of entrapment but not for sound in the water. Given the sighting probability of a turtle by an observer is minimal (as explained above) and that turtle guards are not a standard measure on the gear for this survey, these two mitigation measures are hardly justifiable.

Effectiveness of Mitigation [Marine Mammal Observers (MMO) and Passive Acoustic Monitoring (PAM)]

During the 2018 and 2019 humpback whale (*Megaptera novaeangliae*) migration period along the east coast of South Africa, Wilkinson (2021) estimated the relative abundance of migrating humpback whales sighted by trained observers from two towers located 22m apart (both observers viewing the same area), located at 70m above sea level on a dune with a horizontal vantage length of approximately 20 km. Over the observation periods during the peak of migration, it was estimated that observers from both towers missed between 41-44% of whale groups while distance offshore decreased the probability of sightings. Assuming that the best percentage sighting (56%) was achieved within 1-5km of the observers' vantage point, then more than 40% of whales were missed. Given that this survey was done during the northward migration when mostly larger animals are present, the sighting success may be less when small calves are present as well (as would be the case in December). This begs the question of the efficacy and reliability of the mitigation method of Marine Mammal Observers (MMO), while assuming that whales (and other cetaceans) are thus regularly missed by MMOs and could be harmed.

Despite various organisations who provide MMO's on vessels having a zero tolerance policy of intimidation it is not uncommon for an MMO to complain that he/she has been subjected to coercion, harassment and intimidation. The EMPr states that: *"The MMO has the authority to stop*

the survey activities (including seismic shooting) in response to certain circumstances related to marine mammal risk. However, due to the cost associated with terminating activities (e.g.



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an entire survey line may need to be repeated), it is recommended that the decision to terminate firing be made by the operator in consideration of the MMO's advice. The MMOs must provide full reporting of all termination decisions (including behaviour and distance of marine mammals) in a daily close out report (Part B, p.8)". This statement is highly problematic and reinforces the concern that "A risk-averse and cautious approach, which takes into account the limits of current knowledge about the consequences of decisions and actions", a principle of the National Environmental Management Act, 107 of 1998, will not be applied in full.

Furthermore, bearing in mind the examples above, i.e. blue and fin whales ceasing to sing, the use of Passive Acoustic Monitoring (PAM) technology to detect cetaceans is baseless if cetaceans do not vocalise. As per best practice, in an effort to improve mitigation, PAM technology is complemented by visual searching over an area of 500m around the vessel by qualified Marine Mammal Observers (MMO). This technique is, however, also fatally flawed because it cannot be used at night, during rain and in sea states more than three on the Beaufort Sea State Scale. Therefore, both PAM and MMO's are insufficient to detect, with certainty, cetaceans within the surrounding survey area and these types of mitigation will only be effective for all affected species if airgun firing ceases between sunset and sunrise, and adverse weather conditions that limit visibility.

The cumulative and long-term effects of seismic survey sound is not entirely understood (Jasny et al. 2005); however, it is accepted that ocean noise may have ecosystem-scale effects (Hildebrand, 2005) and the "knock-on" effects on animals, their prey and their predators will have consequences within the food chain (Koper and Plön 2012). It has been suggested that research and a critical review on mitigation measures (McCauley et al. (2017) as well as

a better understanding of ecosystem-scale effects of sound (Koper and Plön 2012), especially at the lower trophic levels are imperative. Considering the ecosystem services provided by the Benguela Current Marine Ecosystem and its associated diversity and biomass, mitigation and understanding should be a conservation imperative in South African marine waters. Up to now, there has been no effort in increasing the knowledge of the impact of these seismic surveys by industry or South African environmental departments despite them being known to have impacts on marine animals and having been undertaken in South African waters for a number of decades.

Proximity to Marine Protected Areas and Critical Biodiversity Areas

The reconnaissance permit area occurs adjacent to six Marine Protected Areas (MPAs) including the Orange Shelf Edge MPA, Child's Bank MPA, Benguela Muds MPA, Cape Canyon MPA, Robben Island MPA and the Southeast Atlantic Seamounts MPA and completely surrounds the Benguela Muds MPA (See EMP: Figure 7-20). It is a significant concern that there is no reference or mention of buffers-areas around the MPAs in the EMP, which allows the vessel to come within 1 km of these protected areas. This is of particular concern, given that the EMP indicates *the cumulative zone of impact for the 3D survey extends to 800 m for permanent threshold shifts (PTS) and to 8 000 m for temporary threshold shift (TTS) for physiological injury, and the cumulative zones for PTS and TTS while the 2D survey is 500 m and 5 000m, respectively*. For example, the reconnaissance permit allows the survey vessel to be active ~800 m from the edge of the Orange Shelf Edge MPA, which is designated as a sanctuary zone, at depths of 250-1500m. Therefore, this would be within the zone of TTS and very near to that of PTS for 2D surveys.

It should be noted that, according to the National Environmental Management: Protected Areas Act 57 of 2003: section 48A reads:

"48A Restriction of activities in marine protected areas:

Despite any other legislation, no person may in a marine protected area-

....

(e) in any manner which results in an adverse effect on the marine environment, disturb, alter or destroy the natural environment of disturb of alter the water quality or abstract sea water;

(f) carry on any activity which may have an adverse effect on the ecosystem of the area;...."

While it is acknowledged that the EMP states that only 2D seismic activities will take place near any MPAs, it cannot be ignored that the proposed seismic activity will still have potential adverse effects on the ecosystem within the area and disturb the natural environment.

Further to this, large portions of the reconnaissance permit area comprise of Critical Biodiversity Areas (CBA) both 1 and 2 (See EMP: Figure 7-21). CBA 1 areas are irreplaceable or near-irreplaceable, while CBA 2 are sites that are the best option available for representing the features in a spatial prioritisation (Harris *et al.* 2020). The primary of objective, and national policy, is that both CBA 1 and 2 areas remain in natural or near-natural states for conservation management, while portions of these areas be ear-marked for future MPAs.

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REPORT ON SCIENTIFIC BASIS FOR CONCERNS OF SIGNIFICANT HARM INFLICTED TO MARINE WILDLIFE BY 2D and 3D SEISMIC SURVEYS ON THE SOUTH AND WEST COASTS OF SOUTH AFRICA

Harris JM, Olbers JM, Wright K

14 January 2022

This report provides a summary of key findings in peer-reviewed literature on the physiological and ecological impacts of seismic survey activities on marine wildlife, with specific attention to the relevance of the information to the context of the Reconnaissance Permit Area (~297 089 km²) applied for by Searcher Geodata UK Limited, located offshore between the South African/Namibian border and Cape Agulhas, as well as with regards to vulnerable and endangered species known to occur in this area, with consideration of the proposed timing of the seismic survey operations being during the austral summer months. Having carefully considered the available information it is our opinion that seismic surveys do cause harm to both species and ecosystems, and that significant direct harm to individual animals and harm to populations of endangered species is the most likely scenario in the case of the seismic surveys off the south and west coasts of South Africa. Of specific concern is the impact on humpback whales and southern right whales which are still frequenting the west coast during the summer months (December – February), the impact on critically endangered (leatherback) turtles (migration routes in the area), the critically endangered African Penguin (changes in foraging behaviour and impacts on fitness) and the Cape fur seal (and consideration of current mass die-offs). We conclude that these seismic surveys are inadvisable in austral summer months due to the presence of these species in the area, the increasing anthropogenic pressures, and the inability of the prescribed mitigation measures preventing harm to individuals/populations. Furthermore, recent literature provides credible concern about ecosystem/food-chain impacts of seismic surveys, that may in turn have impact on fisheries, the severity and localisation of which will depend on coincidences with spawning and juvenile recruitment events. It is strongly recommended that further studies on

these impacts, in the South African context, are carried out *in situ* before proceeding with further seismic surveys of this nature.

Summary of Findings

- Based on peer-reviewed scientific literature, it is clear that physical damage to marine animals, including soft tissue trauma damage, embolisms, damage to organs used in balance and orientation, concussions, haemorrhaging, decompression sickness and both temporary and permanent threshold shifts to hearing ability have been directly linked to the kind and level of sound emitted during this nature of seismic surveys.
- There is plausible evidence to suggest that seismic survey activity is likely to affect the conservation status and recovery of populations of vulnerable and threatened species including (IUCN Red list species such as humpback and southern right whales), because sound and the ability to hear and interpret sound is critical for many species to reproduce (both vocalisations on breeding grounds and communications across large distances for mate detection). Therefore, it must be assumed that interference in sound perception or utilisation for communication (temporarily or permanently) has the potential to impact a species at the population level.
- Some species have been shown and documented to display physiological stress responses and behavioural changes to seismic activities, such as moving away rapidly, diving or remaining still. These responses are likely to increase their energy consumption and energy costs, reduce their time to forage, and/or affect their vulnerability to predation, thus having negative impacts on the survival of individuals (especially young or compromised animals) as well as the overall population growth and survival of a species (especially for threatened species that are already at risk of extinction).
- The impacts of seismic activities are most well studied for marine mammals, and evidence suggests that there are distinct avoidance responses such as leaving the area or ceasing to undertake everyday activities such as feeding in preferred areas. This is likely to negatively impact the "fitness" of an affected animal.

- There is genuine conservation concern for beaked whales that are particularly sensitive to anthropogenic noise, including seismic surveys. It has been demonstrated that even minor, non-lethal disturbances, resulting in changes in behaviour such as displacement from preferred habitats, could impact a population.
- The only existing field study in South Africa (that we have been able to find) on the impacts of seismic activities in our waters is illuminating in this regard. It presents clear evidence that the endangered, endemic African penguin avoided preferred feeding sites when a seismic survey was active nearby. This is particularly of concern for a species which has had a 70% decrease in numbers over the past decade, is stressed by prey depletion creating a greater demand for them to forage further afield, and for which the prospect of extinction is significant.
- The phenomenon of energy-cost (from stress and avoidance behaviour) is of particular concern for some of the species expected to be encountered in the survey area in question, particularly the humpback whales and southern right whales who are at risk of the airgun noise affecting their behaviour or interfering with the communication between mother and calf. Any impact on their energy reserves could impact on their condition (weight-loss and physiological condition) and affect survival of the animals during a vulnerable time (especially for lactating mothers and their calves) on their long migration to feeding grounds in Antarctica.
- Recent research (2017) has shown significant mortality in zooplankton up to 1.2 km from a seismic survey array. Zooplankton forms the base of many important food webs in the marine environment. Depletion of zooplankton could thus have an impact on food for their predators (such as fish) as well as impact fish eggs and larvae (Ichthyoplankton) with potential local impacts on species important in fisheries. This damage to zooplankton over 1km away from the survey array raises concern that a 500m buffer for other animals that are unable to move away from the sound, is far too small to ensure that damage is not inflicted (even if they were able to evade it).
- The impact on fish assemblages is difficult to interpret, due to multiple factors at play including but not limited to the ability of a species to move from an area as well as the receiving habitat. A global review of the effect of seismic activities on fish and invertebrates acknowledged the limits

of the current research due to experimental designs used or due to the focus on single species during investigations. A key concern is a lack of research focused on confounding effects and multiple stressors, therefore potential impacts of seismic surveys that have been previously identified may be reflective of underestimation or overestimation and would depend on the type of interaction (synergistic, additive, or antagonistic).

- In South Africa, since October 2021, thousands of dead and/or dying Cape fur seals (*Arctocephalus pusillus pusillus*), have washed ashore along the south and west coasts. The cause of these die-offs remains unknown but avian flu has been ruled out and malnourishment appears to be the most widely accepted reason. It is of concern that although the cape fur seal population within South Africa is relatively healthy, they too are under pressure from various anthropogenic pressures. Additional stress from seismic activity at this time is inadvisable.
- While "Soft starts" mitigation for seismic impacts are likely to reduce the impact for highly mobile large animals, this is unlikely to be adequate for the many species that are prevalent in the area over the austral summer months and are unable to avoid the array or leave the area due to their lower mobility, such as smaller turtles, penguins, invertebrates, some fish species and zooplankton.
- The finding of observer efficiency (from a scientific monitoring study conducted during the 2018/19 and 2019/2020 seasons on the humpback whales on the east coast) suggests that even with trained observers up to 44% of humpback whales in an area went undetected. This casts doubt on the effectiveness and success of Marine Mammal Observer (MMO) sightings of the largest species (humpbacks) as a mitigation measure, indicating that it is most likely that whales go undetected. Furthermore, the detection rate for smaller species, such as dolphins, seals, turtles and flightless birds (penguins), would be expected to be much lower, obviating the effectiveness of visual observations to prevent harm to these species.
- Also of concern, is that the efficacy of Marine Mammal Observers (MMO) is likely to be low due to the nature of the offshore marine environment in the survey area (frequent high swells and

winds affecting surface visibility), putting species who are missed by MMO's and PAM operators at extreme risk, particularly at night or during adverse weather conditions.

- Furthermore, the reliance on Observers to do visual sightings to supplement the PAM monitoring during the day, as a mandated mitigation measure, necessitates that we question the acceptability of continuing with survey activities at night. If the visual observations are useful (perhaps sighting large animals around 65% of the time) in addition to PAM, then relying on PAM alone at night cannot be an effective mitigation measure. It is our opinion that surveys should not occur between sunset and sunrise each day if a genuine attempt of maximum avoidance of cetaceans is the objective of this mitigation measure.
- It is of our opinion that the proposed seismic survey activities are highly likely to both disturb and have an adverse effect on Marine Protected Areas (MPA), Critical Biodiversity Areas (CBA) and Ecologically or Biologically Significant Areas (EBSAs), and their associated fauna, situated adjacent to, within and surrounded by the reconnaissance permit area. The reconnaissance permit area occurs adjacent to six Marine Protected Areas and surrounds a seventh (Benguela Muds MPA). In the EMP, there is no reference or provision made regarding buffer areas around these protected areas or for areas identified with biological importance and significance. Therefore, it is assumed that the vessel can actively work within 1 km of the MPA boundaries, while ignoring EBSA's and CBA's altogether, thus giving no consideration to the biological importance of these areas or the likely impact at such close range. Although 2D surveys are proposed for these adjacent areas, the cumulative zone of impact for Permanent Threshold Shift (PTS) and Temporary Threshold Shift (TTS) for physiological injury is between 500 - 5000m respectively.

Global context – impacts of seismic surveys on marine wildlife

Despite seismic surveys having been undertaken for decades in South African waters, together with the knowledge that some impact to marine fauna does indeed occur¹, there remains very little

¹ <https://jncc.gov.uk/our-work/marine-mammals-and-noise-mitigation>: “to reduce the risk of deliberate injury to marine mammals”.

scientific research on the effects of seismic surveys, and in addition there are no legislated guidelines for seismic surveys in South African waters (Purdon 2018). Globally, seismic surveys' environmental impacts and consequences are slightly better documented, although not uniform in results or widely accepted within all sectors. The primary mitigation measures for seismic surveys in South Africa include soft-starts, which is a gradual and systematic increase in power of the airgun array undertaken to warn and drive mobile marine species, such as cetaceans (whales and dolphins), seals, flightless birds and turtles away from the sound source before the full-power airgun blasts begin, thus attempting to minimise the negative effects of the airgun blasting activity. Various studies contest this assumption (McCauley et al. 2000; Weilgart 2013; Dunlop et al. 2016) and have revealed a growing concern for animals that are unable to avoid or out-swim the airgun arrays.

Animals use sound critical to their life cycles (Jasny et al. 2005) in three ways, by actively producing sound (Tyack 1981), by listening to sounds emitted by other living organisms (Clark et al. 2009; Van Opzeeland 2010), and taking cues from physical or non-living factors producing sounds, contributing to the ambient background noise, such as wind, waves, swell, bubbles, currents, turbulence, earthquakes, rainfall, ice cracking or breaking (Hildebrand 2005). Many marine animals produce sound for communication, reproduction, aggression, defence mechanisms, antagonistic interactions, courtship, group coordination, orientation, navigation, and prey identification (Hildebrand 2005). They rely on producing a sound that is heard while hearing a sound and interpreting the sound for their survival.

Various physical responses to acoustic disturbance have been documented, with physical responses including soft tissue damage (Balcom and Claridge 2001), embolisms (Dolman and Simmonds 2005), damage to organs used in balance (André et al. 2011), concussions in penguins (Cooper 1982), haemorrhaging (Evans et al. 2001) and decompression sickness (Fernández et al. 2005). Hearing impairment in the form of Temporary Threshold Shift (TTS) or Permanent Threshold Shift (PTS) has also been reported (Hildebrand 2005). Threshold shift refers to an increase in the minimum sound level required for an animal to hear a sound. A TTS is followed by successful recovery to normal

hearing thresholds after a given period of time in the absence of that sound, while PTS is when the sensory hair cells in the inner ear are permanently damaged and lost making recovery impossible (Weilgart 2013).

Stress caused by disturbance is associated with a change in body chemistry (Jasny et al. 2005) and can be equally disruptive as physical damage. Stress has implications on sexual maturation, inhibits growth, reproduction and general survival ability (Pickering 1992; McCormick 1999; Consten et al. 2001). Perceptual effects can occur when there is an interference of sounds of interest to a specific animal but are being drowned out or masked by anthropogenic noise. The impact of this in the long term could have implications on breeding populations, thus on reproduction within a population (Erbe 2001). Many animals may have the ability to counteract this and make minor changes to their vocalisations and behaviour; however, these modifications may come at a cost in terms of energy expenditure (Tyack 2008) and are likely to reduce breeding productivity of the population. This is of particular concern for species that are threatened.

Behavioural responses to noise are dependent on various factors, such as age, sex, presence of offspring, location and an individual animals' previous encounter with a specific sound or noise. Behavioural responses may include modification of vocal behaviour, displacement from important habitats, and other subtle responses, including increased breathing rates, change in dive duration, time spent at the surface, rapid or erratic movements (Bowles et al. 1994; Lesage et al. 1999; Williams et al. 2002; Hastie et al. 2003; Ng and Leung 2003; Aguilar de Soto et al. 2006). These all with potentially high energetic costs (Williams et al. 2006; Koper and Plön 2012).

Most scientific research on the impacts of seismic surveys has been conducted on cetaceans, and as a result, most mitigation measures are to protect these animals. In South Africa, this is no different. However, it is becoming more and more evident that mitigation measures are not adequate (Weilgart 2013). In the Gulf of Mexico, it was recorded that ~250 male fin whales appeared to stop singing for several weeks to months during a seismic survey. These animals resumed singing within hours or

days after the survey ended (IWC 2007). The assumption is that male fin whales use vocalisations for reproduction by finding and attracting mates (Croll et al. 2002); it can only be assumed that such an effect would be biologically significant (Weilgart 2013). In addition to this, a blue whale ceased calling in the presence of a seismic survey at 10 km away (Macdonald et al. 1995). Conversely, a different group of blue whales appeared to have the opposite reaction. They changed their vocalisations (De Lorio et al. 2010) by calling consistently more on days when the seismic surveys were actively ongoing, suggesting that seismic survey noise interfered with important signals used in their social interactions and feeding (De Lorio et al. 2010).

Other reactions to seismic airguns can be subtle or hard to detect (Weilgart 2013) and it has been found that Sperm whales in the Gulf of Mexico did not appear to avoid a seismic airgun survey area but reduced their swimming effort and their tendency to reduce foraging effort (Miller et al. 2009). It has also been documented that as a result of changes in behaviour, the result could be lower reproductive rates and have negative consequences for the population (Miller et al. 2009). In comparison, bowhead whales showed no avoidance or change in vocalisations in the area of seismic surveys; however, their dive duration was shorter (Richardson et al. 1986). In Brazil, a reduction in cetacean species diversity during 2000 and 2001 was noted with the increased occurrence of seismic surveys in the area being implicated in the possible cause of these animals vacating the area (Parente et al. 2007). In other areas, marine mammals have been recorded to avoid seismic noise by leaving an area (Castellote et al. 2012; Weir 2008; Stone and Tasker 2006). The long-term impacts of various changes in behaviour is largely unknown but potentially impact their ability to feed and/or reproduce as in some species, these life-history stages are site or habitat-specific.

South Africa's south and west coasts are hosts to eight species of beaked whales (Ziphiidae) (Best 2007), including a new species described in 2021 (*Mesoplodon eueu*; Carroll et al. 2021), which are globally recognised as being sensitive to anthropogenic noise, and having raised conservation concerns. New et al. (2013) found that adult female beaked whales could survive but not reproduce in times or areas of lower habitat quality. They may extend the duration of lactation in mediocre

conditions to increase their chance of survival, while still reproducing. New et al. (2013) found that some beaked whale species require high-quality habitat to meet their requirements for reproduction and survival. They suggested that even minor, non-lethal disturbances, resulting in changes in behaviour such as displacement from preferred habitats, could impact a population.

McEwen and Wingfield (2003) suggested that all organisms must gather energy for growth and reproduction throughout their life cycle and that organisms must retain reserves for predictable changes such as seasons, and challenges that are less predictable such as disturbance, predation pressure, or social conflict. Often colloquially, this is referred to as the "fitness" of the animal. The accumulated cost in the balance between energy intake and demand is called the 'allostatic load', of physiological and behavioural mechanisms that enable allostasis or adaptation to these changes. McEwen and Wingfield (2003) use the word "allostasis" to signify mechanisms that allow an organism to regain equilibrium while dealing with external challenges; if energy demand is more than intake, then animals may activate a survival mode that may increase energy available, reduce energy demand, or both, to regain its energy balance. Implications on individuals and populations of this energy imbalance are unknown.

Several studies have reported negative impacts of acoustic signals from airguns on zooplankton (small, aquatic microorganisms living in the water column, including crustaceans, larvae, juvenile fish, juvenile invertebrates, eggs etc.) from more than 10m away (Kostyuchenko 1972; Kosheleva 1992; Parry *et al.* 2002) with some laboratory experiments on lobster larvae showing no impact at all (Day *et al.* 2016). However, Christian *et al.* (2003), showed retardation in some individuals in the development of snow crab eggs after being exposed to certain sound levels.

The effects of seismic noise on zooplankton were brought under the spotlight when McCauley *et al.* (2017) presented evidence from an *in-situ* study that suggested that seismic surveys cause significant mortality to zooplankton populations. Zooplankton, unlike vertebrates, do not have hearing structures (although they can sense pressure change) and their bodies are generally the same density as the

surrounding water, so sudden pressure changes associated with seismic activities were presumed not to cause physical damage (Parry and Gason 2006). McCauley *et al.* (2017) disputed this and has shown zooplankton mortality at distances of up to 1.2km from the sound source.

Similarly, inconsistent findings occur with fish assemblages. The impacts on fish assemblages are difficult to interpret, because of multiple factors at play including but not limited to the ability of a species to move from an area as well as the receiving habitat. We acknowledge the validity of the results presented by Meekan *et al.* (2021) which highlights that exposure to an experimental seismic source did not have an impact on the assemblage of tropical demersal fishes found along the northwest shelf of Western Australia. However, it must be noted that the findings have been stated to be applicable only to other habitats with similar physical environments, in particular similar water depths (50 – 70 m). The proposed reconnaissance permit area on the south and west coasts of South Africa differs significantly from those reported in the Meekan *et al.* (2021) research, thus highlighting the need for South African-specific and local research to be undertaken.

A global review of the effect of seismic activities on fish and invertebrates by Carroll *et al.* (2017) acknowledged the limits of the available research due to experimental design, or to the focus on single species which prevents extrapolation to other regions, other seismic surveys, species, or biological responses. In addition, they highlighted a serious concern, that there was a lack of research focused on confounding effects and multiple stressors, therefore potential impacts of seismic surveys which had previously been identified may be reflective of under-estimation or over-estimation and would depend on the type of interaction (i.e. synergistic, additive, or antagonistic).

Furthermore, the indirect effects of seismic activity on cetaceans is a concern. It is well known that the productivity and health of the oceans are under-pinned by marine plankton (Raymont 1983; Alcaraz & Calbet 2009). While forming the basis of the food webs, plankton has been implicated in links to climate change via their role in iron fertilisation and carbon sequestration through whales foraging on krill and subsequent defecation (Smetacek and Nicol 2005; Smetacek 2008; Nicol *et al.*

2010). In 2010, Pershing et al. suggested that over-fishing of large fish and commercial whaling had compromised the ocean's ability to store and sequester carbon, thus contributing to climate change. They indicated that populations of large baleen whales now store 9.1×10^6 tonnes less carbon than before commercial whaling and that protecting whales (and other large over-exploited species), would be a form of a carbon management scheme. The cascading and knock-on effects of seismic survey impacts between the upper (cetaceans) and lower reaches (plankton) of the food web, as each are being impacted are unknown. McCauley et al. (2017) noted that the ramifications of compromised larval recruitment could be massive for higher predators and for ocean health as a whole. While traditional feeding grounds for humpback whales are in Antarctic waters, Dey et al. (2021) has recently recorded regular feeding frenzies off the west coast in recent years (see super pods below).

South African Context

It is of concern that there are a number of 'unknowns' and 'warning bells' in terms of cetacean populations on the south and west coasts. Despite various species being recorded frequently on the coasts, the location of breeding grounds of Sei (*Balaenoptera borealis*) and Fin whales (*Balaenoptera physalus*) are unknown, the seasonality of pygmy (*Kogia breviceps*) and dwarf (*Kogia sima*) sperm whales are unknown and the abundance and occurrence of the offshore common dolphin (*Delphinus delphis*) is also unknown, highlighting that encounters with these animals cannot be predicted and the generic mitigation measures may be insufficient. Further to this, it is noted in the EMP submitted by Searcher that the two very well-studied and frequently observed species on the south and west coasts, the humpback and southern right whales, **are expected to be regularly encountered and have a year-round occurrence across the entire reconnaissance permit area.** The period of humpback whales in this area is between July and February, with frequent feeding encounters during the months between December to February. Barendse et al. (2010), Best & Allison (2010), and Elwen et al. (2014) highlighted that there is no existing evidence of a clear 'corridor' of migration and humpback whales appear to be spread out widely across the shelf and into deeper pelagic waters, especially during the southward migration, in the Benguela ecosystem.

Further to this, the EMP itself highlights that, "***it is highly likely that several hundreds of right whales can be expected to pass through the Reconnaissance Permit Area when migrating southwards from the feeding areas between April and June***" (page 93). Apart from this going against the spirit of avoiding whale periods by the oil and gas industry, Vermeulen *et al.* (2020) warned that there is an observed decrease in southern right whale calving success of the South African population and a strong link between foraging success and reproduction. They suggest an investigation into possible decreases and/or spatial or temporal shifts in their prey availability at higher latitudes due to environmental variability. They also highlight a concern of the continued low numbers of unaccompanied adults along the South African coast which could potentially have serious consequences for cow-calf pairs in relation to the country's whale-watching industry in the future.

Since 2011, South Africa has witnessed 'super-pods' of up to 200 humpback whales feeding in south and west coast waters between October to January. Research by the National DFFE, in collaboration with various academic partners, has led to the discovery of these 'feeding grounds' away from their traditional feeding grounds in the Antarctic². This phenomenon requires understanding the ecosystem-wide impacts and benefits, while potential human/whale conflicts remain unknown. According to Dey *et al.* (2021), the formation of super-groups in recent years suggests that there might be a change in oceanographic or ecological characteristics which provide the conditions for this novel feeding strategy in the Southern Benguela Upwelling System. Although the humpback whale population is increasing (Wilkinson, 2021), there is evidence to suggest that cetaceans in South African waters are being affected by changes in their ecosystem and it is not well understood yet what is driving these changes and what the long terms effects could potentially be to populations.

With other mammals, it was suggested by Thompson *et al.* (1998) that gray seals displayed strong avoidance behavior, altered foraging behavior and suggested an increased frequency of hauling out

² <https://www.news24.com/news24/travel/watch-whale-super-pods-larger-than-usual-cause-stir-off-sas-west-coast-public-urged-to-keep-their-distance-20191216>

onto land to possibly escape the noise, while harbor seals had slower heart rates during controlled playback experiments. In contrast, during a study in shallow arctic waters, sighting rates of ringed seals (*Phoca hispida*) from a seismic vessel showed no difference when a different number of airguns were in use, did however suggest local avoidances based on distance from the sound source (Harris et al., 2001).

In South Africa, the Cape fur seals (*Arctocephalus pusillus pusillus*), is the only resident seal along the west coast, occurring at numerous breeding and non-breeding sites on South Africa's mainland and on nearshore islands and reefs. Other vagrant seals occurring along the south and west coast include the southern elephant seal (*Mirounga leonina*), subantarctic fur seal (*Arctocephalus tropicalis*), Antarctica fur seal (*Arctocephalus gazella*), crabeater (*Lobodon carcinophagus*) and leopard seals (*Hydrurga leptonyx*). Cape fur seals are highly mobile and have large foraging areas including on the continental shelf up to 120 nautical miles offshore (Shaughnessy 1979).

According to Kirkman et al. 2016, several morbillivirus epidemics have occurred in true seal (Phocid) populations in the northern hemisphere and, at the time it was agreed that no epidemic diseases were known to have infected Cape Fur Seals historically, but there was a considerable risk for disease transmission to the population through exposure to domestic or feral dogs and terrestrial carnivores, potentially resulting in mass mortality. Kirkman et al. (2016) cautioned that the health of individuals and their vulnerability to disease can be affected by feeding conditions, including the availability of prey, and that risk of disease may be exacerbated by anthropogenic pressures on the ecosystem.

In South Africa, since 10 September 2021, thousands of emaciated, dying and dead Cape fur seals (*Arctocephalus pusillus pusillus*), have washed ashore along the south and west coasts. The cause of these die-offs remains unknown but avian flu has been ruled out and malnourishment appears to be the most widely accepted reason. It is of concern that although the cape fur seal population within South Africa are healthy, they too are under pressure from various anthropogenic pressures, and the EMP failed to mention this mass die-off event

In South Africa, only a single focused study on the impact of seismic surveys has been undertaken. This study, off Gqeberha, was within the foraging area of the endangered, endemic African Penguin (*Spheniscus demersus*). Pichegru et al. (2017) demonstrated that penguins avoided their preferred foraging areas during seismic surveys and foraged further from the survey vessel when in operation. Upon termination of seismic surveys, the penguins reverted to their normal behaviour (Pichegru et al. (2017), a behaviour which was also observed in Gray whales (*Eschrichtius robustus*) off Sakhalin Island in Russia (International Whaling Commission 2005). However, the long-term effects on populations of this temporary retreat of the area are unknown. Given the results of this study by Pichegru et al. (2017), strict management measures and decisions on seismic survey activities should have been established in South Africa. Furthermore, the cumulative effect of multiple, concurrent seismic surveys within the region may cause cumulative impacts.

Significant impacts on turtle species are a concern. Adult turtles may be less vulnerable to sound damage than cetaceans as the air spaces in their cochlear are smaller than those in cetaceans, making them less sensitive to sound shockwaves (Popper et al. 2014). However, while studies have shown that adult sea turtles have a moderate ability to move from an area being surveyed (Lenhardt 1994; O'Hara and Wilcox 1990), they are prone to TTS after exposure to sound within 1 km of a sound source, with signs of recovery only two weeks after injury (Lenhardt 1994). In a study undertaken on captive turtles, it was found that loggerhead turtles (*Caretta caretta*) responded to sound by swimming to the surface and remaining there or staying slightly submerged (Lenhardt 1994), as this area, regarded as a sound shadow, and is hypothesised as being where sound waves cancel each other out and the noise is at a minimum. Cummings et al. (2004) disputed this saying that although near the surface, could be a place where animals take refuge, they are not in a 'zone of silence'. With an increasing exposure of sound levels, the behaviour of caged green (*Chelonia mydas*) and loggerhead (*Caretta caretta*) turtles increased their swimming speed, potentially showing agitation to sound (McCauley et al. 2000). Turtle behaviour is difficult to interpret (DeRuiter and Doukara 2012), given that some studies have reported that turtles do not display any signs of distress (Pendoley 1997).

Globally the Leatherback turtle (*Dermochelys coriacea*) is vulnerable, but critically endangered in the Southwestern Indian Ocean where this subpopulation is declining (Nel 2010, 2012; Nel et al. 2013). Loggerhead (*Caretta caretta*) populations are globally vulnerable but near threatened in the southwest Indian Ocean (Lombard & Kyle 2014).

The nesting grounds of the southern African loggerhead (*Caretta caretta*) and leatherback turtle (*Dermochelys coriacea*) populations are located on the east coast in iSimangaliso Wetland Park. In the Autumn months, adult turtles are moving towards their nesting beaches but stay inshore to avoid the north to south flowing Agulhas current. Once they have completed their laying of eggs, they leave the shore and into the current to be carried south once again, and by late March, they will be littered along the east and south coast in offshore waters. Both loggerhead and leatherbacks are known to occur within the reconnaissance permit area but known migration corridors of adult leatherbacks lie within the reconnaissance permit area. Harris et al. (2018) highlighted the migration path for leatherback turtles into the southeastern Atlantic (Agulhas-Benguela Corridor), through the reconnaissance permit area. Leatherback turtles inhabit deeper waters and are considered a pelagic species, traveling within the ocean currents. However, they have a moderate ability to avoid areas with an increase of noise in the water. According to Hays et al. (2004), these animals may dive to depths over 600 m and remain submerged for up to 54 minutes. Mitigation measures for turtles in seismic surveys include observers, although it is unclear how an observer would be able to observe these animals at such a distance (especially as large animals such as whales are only observed 44% of the time at best). A second mitigation measure, although only to be used if turtles are sighted by observers (EMP page 224), is to install 'turtle-guards' to prevent them from becoming entangled in the gear. These devices are accepted as being useful in terms of entrapment but not for sound in the water. Given the sighting probability of a turtle by an observer is minimal (as explained above) and that turtle guards are not a standard measure on the gear for this survey, these two mitigation measures are hardly justifiable.

Effectiveness of Mitigation [Marine Mammal Observers (MMO) and Passive Acoustic Monitoring (PAM)]

During the 2018 and 2019 humpback whale (*Megaptera novaeangliae*) migration period along the east coast of South Africa, Wilkinson (2021) estimated the relative abundance of migrating humpback whales sighted by trainer observers from two towers located 22m apart (both observers viewing the same area), located at 70m above sea level on a dune with a horizontal vantage length of approximately 20 km. Over the observation periods during the peak of migration, it was estimated that observers from both towers missed between 41-44% of whale groups while distance offshore decreased the probability of sightings. Assuming that the best percentage sighting (56%) was achieved within 1-5km of the observers' vantage point, then more than 40% of whales were missed. Given that this survey was done during the northward migration when mostly larger animals are present, the sighting success may be less when small calves are present as well (as would be the case in December). This begs the question of the efficacy and reliability of the mitigation method of Marine Mammal Observers (MMO), while assuming that whales (and other cetaceans) are thus regularly missed by MMOs and could be harmed.

Despite various organisations who provide MMO's on vessels having a zero tolerance policy of intimidation it is not uncommon for an MMO to complain that he/she has been subjected to coercion, harassment and intimidation. The EMPr states that: "*The MMO has the authority to stop the survey activities (including seismic shooting) in response to certain circumstances related to marine mammal risk. However, due to the cost associated with terminating activities (e.g. an entire survey line may need to be repeated), it is recommended that the decision to terminate firing be made by the operator in consideration of the MMO's advice. The MMOs must provide full reporting of all termination decisions (including behaviour and distance of marine mammals) in a daily close out report (Part B, p.8)*". This statement is highly problematic and reinforces the concern that "A risk-averse and cautious approach, which takes into account the limits of current knowledge about the

consequences of decisions and actions", a principle of the National Environmental Management Act, 107 of 1998, will not be applied in full.

Furthermore, bearing in mind the examples above, i.e. blue and fin whales ceasing to sing, the use of Passive Acoustic Monitoring (PAM) technology to detect cetaceans is baseless if cetaceans do not vocalise. As per best practice, in an effort to improve mitigation, PAM technology is complemented by visual searching over an area of 500m around the vessel by qualified Marine Mammal Observers (MMO). This technique is, however, also fatally flawed because it cannot be used at night, during rain and in sea states more than three on the Beaufort Sea State Scale. Therefore, both PAM and MMO's are insufficient to detect, with certainty, cetaceans within the surrounding survey area and these types of mitigation will only be effective for all affected species if airgun firing ceases between sunset and sunrise, and adverse weather conditions that limit visibility.

The cumulative and long-term effects of seismic survey sound is not entirely understood (Jasny et al. 2005); however, it is accepted that ocean noise may have ecosystem-scale effects (Hildebrand, 2005) and the "knock-on" effects on animals, their prey and their predators will have consequences within the food chain (Koper and Plön 2012). It has been suggested that research and a critical review on mitigation measures (McCauley et al. (2017) as well as a better understanding of ecosystem-scale effects of sound (Koper and Plön 2012), especially at the lower trophic levels are imperative. Considering the ecosystem services provided by the Benguela Current Marine Ecosystem and its associated diversity and biomass, mitigation and understanding should be a conservation imperative in South African marine waters. Up to now, there has been no effort in increasing the knowledge of the impact of these seismic surveys by industry or South African environmental departments despite them being known to have impacts on marine animals and having been undertaken in South African waters for a number of decades.

Proximity to Marine Protected Areas and Critical Biodiversity Areas

The reconnaissance permit area occurs adjacent to six Marine Protected Areas (MPAs) including the Orange Shelf Edge MPA, Child's Bank MPA, Benguela Muds MPA, Cape Canyon MPA, Robben Island MPA and the Southeast Atlantic Seamounts MPA and completely surrounds the Benguela Muds MPA (See EMP: Figure 7-20). It is a significant concern that there is no reference or mention of buffers-areas around the MPAs in the EMP, which allows the vessel to come within 1 km of these protected areas. This is of particular concern, given that the EMP indicates *the cumulative zone of impact for the 3D survey extends to 800 m for permanent threshold shifts (PTS) and to 8 000 m for temporary threshold shift (TTS) for physiological injury, and the cumulative zones for PTS and TTS while the 2D survey is 500 m and 5 000m, respectively*. For example, the reconnaissance permit allows the survey vessel to be active ~800 m from the edge of the Orange Shelf Edge MPA, which is designated as a sanctuary zone, at depths of 250-1500m. Therefore, this would be within the zone of TTS and very near to that of PTS for 2D surveys.

It should be noted that, according to the National Environmental Management: Protected Areas Act 57 of 2003: section 48A reads:

"48A Restriction of activities in marine protected areas:

Despite any other legislation, no person may in a marine protected area-

....

(e) in any manner which results in an adverse effect on the marine environment, disturb, alter or destroy the natural environment of disturb of alter the water quality or abstract sea water;

(f) carry on any activity which may have an adverse effect on the ecosystem of the area;...."

While it is acknowledged that the EMP states that only 2D seismic activities will take place near any MPAs, it cannot be ignored that the proposed seismic activity will still have potential adverse effects on the ecosystem within the area and disturb the natural environment.

Further to this, large portions of the reconnaissance permit area comprise of Critical Biodiversity Areas (CBA) both 1 and 2 (See EMP: Figure 7-21). CBA 1 areas are irreplaceable or near-irreplaceable, while CBA 2 are sites that are the best option available for representing the features in a spatial prioritisation (Harris *et al.* 2020). The primary of objective, and national policy, is that both CBA 1 and

2 areas remain in natural or near-natural states for conservation management, while portions of these areas be ear-marked for future MPAs.

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#	Comments	Response
	threat to the natural habitat through the impending conversion and fragmentation of the natural habitat, likely resulting in a decrease of the populations	
48	48. In light of the above, the BAR ought to have factored within its assessment that the purpose for which coastal public property is established (by the ICMA) within the mapped critical biodiversity areas and ecological support areas, includes protecting sensitive coastal ecosystems (section 7A(1)(b)) and to facilitate the achievement of the objects of the ICMA (section 7A(1)(e)). To commence with seismic surveys (which effectively serve as precursors to hydrocarbon extraction and production) within these important biodiversity areas, would be diminish the resilience of marine ecosystems to climate change impacts thereby leading to shifts in marine life size structure, spatial range, seasonal abundance, community structure and ecosystem function	See response to Item 6, 39 and 47.
49	49. The proposed seismic survey activities are very likely to disturb and harm Marine Protected Areas (MPAs), Critical Biodiversity Areas (CBAs), and Ecologically or Biologically Significant Areas (EBSAs), as well as their associated fauna, which are located adjacent to, within, and surrounded by the reconnaissance permit area. Six Marine Protected Areas are adjacent to the reconnaissance permit area, and a seventh is surrounded by it (Benguela Muds MPA). There is no mention or provision in the EMP for buffer zones surrounding these protected areas or for areas identified as having biological importance and significance. As a result, it is assumed that the vessel can actively work within 1 km of the MPA boundaries while completely ignoring EBSAs and CBAs, thereby ignoring the biological importance of these areas or the likely impact at such close range.	The potential impact on MPAs, CBA's and EBSA's is specifically noted in the BA Report. A buffer of at least 5 km is recommended around MPAs, as stated in the EMPr. No buffer requirements are proposed by the marine fauna specialist for CBAs or EBSAs as the impact on these areas is expected to be low – negligible.
50	50. We attach a report (refer to annexure A) by Drs Harris JM, Olbers JM, and Wright K ("Wild Oceans Report") with the authors having conducted a review of peer-reviewed literature on the physiological, behavioral, and ecological impacts of the proposed Searcher 2021 3D seismic survey activities on marine wildlife, paying particular attention to the relevance of the information to the context of the exploration application, the vulnerable and endangered species known to occur there, and the proposed timing of the seismic survey in the summer austral months, the content of which must be considered as forming part of Natural Justice's comments. In their report, they conclude that since the current Searcher application falls within the existing larger 2D and 3D seismic area previously applied for by Searcher led by SLR Consulting (South Africa) (Pty) Ltd in 2021, the findings of their report, provided on 14 January 2022 in respect of Adams and Others v Minister of Mineral Resources Energy and Others are applicable to the area of the current application, and that no new information is provided by the specialist report to ease / allay fears around seismic activities. A summary of some of their key findings are set out below: 50.1. Based on peer-reviewed scientific literature, it is clear that physical damage to marine animals, including soft tissue trauma damage, embolisms, damage to organs used in balance and orientation, concussions, haemorrhaging, decompression sickness and both temporary and permanent	The effects of stress on marine fauna is discussed in some detail under section 4.3.1 and 4.3.5 of the marine faunal specialist assessment. Nowhere is it denied that stress does not result in impacts to marine fauna. Purdon et al. (2020) concluded that shipping stressors and climate-related stressors are increasing more rapidly in the South African EEZ than other stressors, with the sound of shipping being the major contributor to the soundscape off the West Coast (Shabangu et al. 2022). The acoustic impacts associated with seismic surveys must therefore be seen in the context of the ambient noise in the ocean. The final significance ratings are determined using information from the very extensive peer-reviewed literature together with the noise modelling results (which put the threshold distances from the source array to mortality and potential mortal injury into perspective), adopting the precautionary principle as is required when undertaking such impact assessments, and taking into account the sensitivity of receptors present in southern African waters. Given all of the evidence, the conclusion reached for the various assessments is that impacts are either of low or very low significance. For the sake of brevity the various discussions in the impact assessments are generic in nature (and based on information from similar species in other parts of the world) and therefore does not specifically investigate potential effects on

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	threshold shifts to hearing ability have been directly linked to the kind and level of sound emitted during this nature of seismic surveys. 50.2. There is plausible evidence to suggest that seismic survey activity is likely to affect the conservation status and recovery of populations of vulnerable and threatened species including (IUCN Red list species such as humpback and southern right whales), because sound and the ability to hear and interpret sound is critical for many species to reproduce (both vocalisations on breeding grounds and communications across large distances for mate detection). Therefore, it must be assumed that interference in sound perception or utilisation for communication (temporarily or permanently) has the potential to impact a species at the population level. 50.3. There is plausible evidence to suggest that seismic survey activity is likely to affect the conservation status and recovery of populations of vulnerable and threatened species including (IUCN Red list species such as humpback and southern right whales), because sound and the ability to hear and interpret sound is critical for many species to reproduce (both vocalisations on breeding grounds and communications across large distances for mate detection). Therefore, it must be assumed that interference in sound perception or utilisation for communication (temporarily or permanently) has the potential to impact a species at the population level. 50.4. The only existing field study in South Africa (that we have been able to find) on the impacts of seismic activities in our waters is illuminating in this regard. It presents clear evidence that the endangered, endemic African penguin avoided preferred feeding sites when a seismic survey was active nearby. This is particularly of concern for a species which has had a 70% decrease in numbers over the past decade, is stressed by prey depletion creating a greater demand for them to forage further afield, and for which the prospect of extinction is significant. 50.5. The only existing field study in South Africa (that we have been able to find) on the impacts of seismic activities in our waters is illuminating in this regard. It presents clear evidence that the endangered, endemic African penguin avoided preferred feeding sites when a seismic survey was active nearby. This is particularly of concern for a species which has had a 70% decrease in numbers over the past decade, is stressed by prey depletion creating a greater demand for them to forage further afield, and for which the prospect of extinction is significant. 50.6. Furthermore, recent literature provides credible concern about ecosystem/food-chain impacts of seismic surveys, that may in turn have impact on fisheries, the severity and localisation of which will depend on coincidences with spawning and juvenile recruitment events.	individual local species, but the consequences of such are taken into consideration on assigning the ratings that ultimately determine the significance of the overall impact. It is also highly unlikely that the responses of local species will differ widely from those reported on for similar species/taxonomic groups elsewhere. Figure 27 in the Marine specialist report illustrates the substantial distance between the African penguin aggregate core areas on the west coast. The survey area thus lies well beyond the somewhat unrealistic 100 km buffer to the centroid of the seismic survey as recommended by Pichegru around penguin breeding colonies. Acoustic impacts of the proposed survey on coastal seabirds is thus highly unlikely As stated in Section 9.3 of the BA Report studies have shown that physical damage to fish caused from acoustic sources occurs only in their immediate vicinity, in distances of less than a few meters. Whilst adult fish can flee from this noise, eggs and larvae are unable to do so and therefore may be affected by an acoustic pulse. The zones of potential injuries for fish species with a swim bladder, turtles and fish eggs and fish larvae are predicted to be within 160 m from the array source. Impacts on spawning and recruitment of fish stocks are assessed in Section 8.5.2 of the BA Report.
51	51. After careful consideration of the available information, the authors of the report believe that seismic surveys cause harm to both species and ecosystems, and that significant direct harm to individual animals and harm to endangered species populations is the most likely scenario in the case of seismic surveys off South Africa's south and west coasts. The impact on humpback whales and southern right whales, which continue to visit the west coast during the summer months (December - February), the impact on	refer to response to item 50 above. Impacts on whales, turtles, seals and penguins are all identified, discussed and assessed in detail in the BA Report and marine fauna assessment.

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	critically endangered (leatherback) turtles (migration routes in the area), the critically endangered African Penguin (changes in foraging behavior and fitness impacts), and the Cape fur seal are all of particular concern (and consideration of current mass die-offs).	
52	52. Furthermore, as set out in the Wild Oceans Report, the relative scarcity of data in the South African context does not imply no harm or a low likelihood of harm. Instead, it emphasizes the importance of conducting local research on the subject, particularly with regard to microbiota and meiofauna, which typically dominate benthic faunal biomass at abyssal depths and are critical for deep-sea ecosystem functions. Furthermore, the mere fact that seismic surveys have previously been conducted in South African waters does not create an irreversible precedent, nor does it legitimize such activities in perpetuity. A risk averse and cautious approach should be applied.	The information and data gaps are specifically stated in the Assumptions and limitations, Section 12 of the BA Report. Keeping these information gaps in mind, the assessment of impacts has adopted a strongly precautionary approach. It is acknowledged that information on deep-water habitats and their associated biota is lacking. This is primarily due to the difficulties and high costs associated with sampling beyond the inner continental shelf. Virtually all of the very scant information available has been obtained during hydrocarbon exploration projects, which in themselves provide good opportunity for collecting baseline data at depths beyond which commercial fisheries operate in. Information from such ecological baseline surveys is however not always made publicly available as it is often considered proprietary information. Even given these information gaps the level of certainty (confidence rating) of the impact predictions in the marine fauna report is considered high.
53	53. In terms of the proposed mitigation measures, robust research and a critical review on the proposed mitigation measures is required as well as a better understanding of ecosystem-scale effects of sound at the lower trophic levels. With regard to the efficacy of the mitigation proposed mitigation measures with regard to the acoustic impacts of seismic surveys for seismic activities within this particular reconnaissance area, the Wild Oceans Report by Harris et al state as follows in their summary of findings: 53.1. Whilst "soft start" mitigation for seismic impacts are likely to reduce the impact for highly mobile large animals, this is unlikely to be adequate for the many species that are prevalent in the area over the austral summer months and are unable to avoid the array or leave the area due to their lower mobility, such as smaller turtles, penguins, invertebrates, some fish species and zooplankton. 53.2. The finding of observer efficiency (from a scientific monitoring study conducted during the 2018/19 and 2019/2020 seasons on the humpback whales on the east coast) suggests that even with trained observers up to 44% of humpback whales in an area went undetected. This casts doubt on the effectiveness and success of Marine Mammal Observer (MMO) sightings of the largest species (humpbacks) as a mitigation measure, indicating that it is most likely that whales go undetected. Furthermore, the detection rate for smaller species, such as dolphins, seals, turtles and flightless birds (penguins), would be expected to be much lower, obviating the effectiveness of visual observations to prevent harm to these species. 53.3. Also of concern, is that the efficacy of Marine Mammal Observers (MMO) is likely to be low due to the nature of the offshore marine environment in the survey area (frequent high swells and winds affecting surface visibility), putting species who are missed by MMO's and PAM operators	The reconnaissance permit area is located far offshore (220 km at its closest point) and therefore beyond the influence of coastal upwelling, which will influence both plankton abundance and the abundance of fish species that depend on plankton as a food source. From Figures 17, 18 and 19 in the marine ecology specialist assessment it is evident that the project area lies well beyond major fish spawning and recruitment area (and therefore zooplankton and ichthyoplankton abundance); Figure 27 shows the area in relation to Cape Gannet and African Penguin distribution; Figure 37 shows the area in relation to seal foraging areas and Figure 47 shows the area in relation to virtual turtle hatching trajectories. The survey area in relation to various marine mammal distributions is also provided and in all cases, it is evident that interaction with marine fauna in those offshore waters should be minimal. Regarding the supplementation with respect to the operating hours of the PAM monitoring: This would require the survey to likely run over two (or more) seasons. This is not only not cost effective for the seismic operator, but would greatly extend the duration of the acoustic impacts (and others) associated with surveying. Considering that the survey area is located within the major shipping lanes and that ambient sound levels (dominated by the noise of vessels) will be persistent throughout the day and night, it seems more appropriate to undertake the survey in as short a time as possible, in which case night-time operations are necessary. The studies undertaken internationally over the past 70 odd years on the impacts of noise on marine fauna (of which some 400 peer-reviewed publications have been summarised and cited in the marine faunal specialist study) have concluded that the effects of underwater sounds vary substantially and depend on a wide variety of physical and

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	at extreme risk, particularly at night or during adverse weather conditions. 53.4. Furthermore, the reliance on Observers to do visual sightings to supplement the PAM monitoring during the day, as a mandated mitigation measure, necessitates questioning the acceptability of continuing with survey activities at night. If the visual observations are useful (perhaps sighting large animals around 65% of the time) in addition to PAM, then relying on PAM alone at night cannot be an effective mitigation measure. The authors express the opinion that surveys should not occur between sunset and sunrise each day if a real attempt of maximum avoidance of cetaceans is the objective of this mitigation measure. 53.5. The proposed 3D seismic survey will have physiological, behavioural, and ecological effects on marine wildlife (including vulnerable and threatened species), and that the mitigation measures proposed are ineffective at preventing or mitigating this harm (especially in relation to species that are unable to avoid the seismic array, and at night given that PAM does not detect all species). The overwhelming majority of peer-reviewed published scientific studies show that harm is the cause or is the most probable outcome. 53.6. Because we do not yet know what the impact of seismic surveys may be in the South African context, the Precautionary Principle - a key tenet of South African environmental legislation that has been described as allowing decision-makers to "adopt precautionary measures when scientific evidence about an environmental or human health hazard is uncertain and the stakes are high" - is warranted, and in accordance with established international norms.	biological factors. When writing articles on the effects of seismic acquisition on marine fauna it is therefore not difficult to bias the literature cited to either demonstrate detrimental and irreversible impacts or only very limited impacts, depending on the personal view of the author(s) and/or the targeted readership. The marine faunal assessment has made efforts to present published results objectively, and nowhere claims that acoustic surveys do not result in impacts. Injury is likely at very short range, with behavioural disturbance occurring over greater distances. The final significance ratings are determined using information from the peer-reviewed literature together with the noise modelling results (which put the threshold distances from the source array to mortality and potential mortal injury into perspective), adopting the precautionary principle as is required when undertaking such impact assessments, and taking into account the sensitivity of receptors present in southern African waters. Given all of the evidence, the conclusion reached for the various assessments is that impacts are either of low or very low significance. It is not disputed that MMO sightings are not 100% efficient. Various approaches have been adopted over the years to improve observer efficiency, particularly at night, with infra-red binoculars and mast-mounted infra-red (IR) cameras being tested. These have, however, not proven as effective as initially anticipated, due to lack of detectable temperature differences, resulting in the implementation of the 24/7 PAM surveillance. From a seismic operator's perspective, it is not feasible or cost-effective to cease airgun operations at night as this would prolong the duration of the survey possibly requiring multiple seasons to complete the acquisition. This would also add substantially to the overall survey duration and cumulative impacts.
54	54. Cumulative effects are seldom addressed at project level EIA, and therefore developments are often approved on a piecemeal basis, without the bigger picture being considered. NEMA, together with the EIA Regulations, requires that EIAs include, amongst other things, an assessment of the nature, extent, duration and significance of the consequences for or the impacts on the environment of that activity, including the cumulative impacts. Phases of prospecting activities cannot be viewed in isolation from other prospecting activities, or from mining activities and the impacts associated therewith. The intent here is to upscale activities in the event of a positive find which will lead to considerably greater potential impacts. This application has only assessed one phase of a project, and has deliberately excluded the potential impacts of a following phase. As such it has failed to consider the whole scenario and is therefore fatally flawed.	The BA Report presents the findings of a team of qualified environmental specialists. The team considered the proposed activity (seismic survey), identified and assessed potential environmental impacts (supported by inputs from the public consultation process), and has proposed management and mitigation measures. All impacts identified in the process can be reduced to a medium or low significance with the implementation of the management and mitigation measures. Identified cumulative impacts are also included in the BA Report. See response to item 6 above.
55	55. Whilst it is accepted that reconnaissance, exploration and production are separately listed in the listing notices, and that a new and separate application for environmental authorisation will be required for any further exploration and production activities arising in the future, the	Specifically noted is that Searcher is in the business of seismic data acquisition they are not an Oil & Gas Exploration or Production company. Data from Searchers seismic libraries are not only used for petroleum and natural gas exploration and development,