ADVISORY ON THE USE OF DEEP-SEA SEISMIC SURVEYS TO EXPLORE FOR OIL AND GAS DEPOSITS IN SOUTH AFRICAN WATERS

SAGE Sub-committee on Marine Ecology and Risk Mitigation

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Executive summary

- In the first quarter of 2013, Impact Africa Ltd submitted an application to the Petroleum Agency of South Africa (PASA) for an exploration right in terms of section 79 of the Mineral and Petroleum Resources Development Act, to survey oil and gas deposits off South Africa's Eastern Cape coast. PASA accepted the application in March 2013. Impact Africa subsequently submitted an Environmental Management Programme (EMP) in support of its application in June 2013. PASA conditionally approved the EMP in September 2013. The Deputy Director-General of the Department of Mineral Resources and Energy approved the EMP in April 2014 and granted the exploration right (Exploration Right 12/3/252).
- On 3 December 2021, the Makhanda High Court dismissed an urgent application brought by various parties for an interim interdict against the seismic survey planned by Shell Exploration and Production South Africa BV, Impact Africa Ltd, and BG International Ltd (hereinafter, collectively 'Shell' or 'Respondents'). Following this decision, the Respondents commenced their seismic survey off South Africa's Eastern Cape coast in the first week of December 2021.
- On 17 December 2021, the Makhanda High Court heard a fresh application by different parties to interdict the Respondents from conducting the said seismic survey. In Part A of the application, the Applicants asked the Court to grant them interim relief against the Respondents. Oral arguments, as well as supporting affidavits and reports of all parties involved in the matter, were put before the court.
- On 28 December 2021, the Makhanda High Court delivered its judgment, granting an interim interdict against the Respondents, until Part B of the application is heard at a later date. The Scientific Advisory Group on Emergencies (SAGE) concurs with the Court's judgment in respect of Part A of the application.
- In Part B of the application, the Applicants intend arguing that the Respondents should be interdicted from conducting a seismic survey off South Africa's Eastern Cape coast until and unless they obtain an environmental authorisation under the National Environmental Management Act (NEMA) 107 of 1998.
- Section 2(4)(a)(vii) of NEMA provides 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 actions".

- SAGE takes the following position:
    - There is a reasonable apprehension of real harm to marine life if the Respondents are permitted to resume their seismic survey. Given a relative dearth of evidence on the impact of seismic surveys on marine life in South African waters, coupled with the uncertainties about the harm that may be suffered if Shell's survey is permitted to resume, lack of full scientific certainty should not be used as a reason for refusing or postponing cost-effective measures to prevent environmental degradation. Instead, a precautionary approach is warranted.
    - No seismic survey should be conducted in South African waters without a preceding comprehensive Environmental Impact Assessment (EIA) report based on the latest science. EMPs should never be considered a valid and legitimate substitute for comprehensive EIA reports.
    - Individuals with land-based mining and generalised environmental impact experience should never be considered proxies for legitimate marine experts. Instead, EIA reports for marine environments (or for that matter, even EMPs for marine environments) should be drafted by experts with professional marine science and/or marine environmental training and experience.
    - There is a real threat that marine life would be irreparably harmed if the Respondents are permitted to resume their seismic survey. Accordingly, when the Court considers Part B of the application, the Court should grant the relief sought by the Applicants: the Respondents should be interdicted from proceeding with the seismic survey until and unless they obtain an environmental authorisation under the National Environmental Management Act.

Discussion

- Shell aims to conduct 3-dimensional seismic surveys of the sea floor off the Eastern Cape, based on a renewed permit issued in terms of section 79 of the Mineral and Petroleum Resources Development Act, 2002.
- Several companies have operated under similar permits off South Africa's coastline, with offshore oil and gas exploration continuing since the 1960s. These companies are operating under the assumption that their operations will have minimal impact on marine biota. These assumptions are based on, amongst others:(i) a lack of sufficient, detailed scientific information on South Africa's offshore marine resources (both biotic and abiotic), and (ii) a flawed legal distinction between substance-based pollutants and energy-based pollutants, such as sound.
- Shell's planned seismic operations, similar to past and ongoing explorations along our coastline, use seismic air guns to probe for the presence of shale gas deposits. These airgun arrays are considered 'disruptive technologies' which can cause

acoustic disturbance over 3,000 km from the survey vessels (Nieukerk et al. 2004). This stream of energy is significant in an aquatic environment where sound waves travel much further than in air, and where most wildlife relies on acoustic communication throughout their life cycles. It, therefore, constitutes noise pollution and a threat to marine live behavioural patterns and/or survival.

- Seismic surveys have been implicated in altering the behaviour of marine life such as whales and dolphins attempting to escape airgun surveys (Gomez et al. 2016). Several other disruptions to marine biota have been documented, including altering penguin behaviour (Pichegru et al. 2017) and decimating larval krill populations (McCauley et al. 2017), which are key prey for species such as humpback whales (*Megaptera novaeangliae*). In controlled experiments, negative impacts on zooplankton have been documented more than 1 km from the sound source; a significantly wider reach than the predicted 10 m-impact range (McCauley et al. 2017).
- Despite such potentially harmful consequences, no formal research on the effects of seismic surveys have been conducted in South Africa and the exact effects on the marine environment – and by default the people who depend on marine resources – remains largely unknown.
- There are specific issues of concern relating to the specific location and timing of Shell's survey that merit noting, and that may also be pertinent in regard to future proposed deep sea seismic surveys off South Africa's coast:
    - The surveys have purportedly been planned to minimize known disruptions to important marine fauna, e.g., avoiding whale migration season, the sardine run and turtle hatchling migration periods. However, the planned surveys will be conducted near the Amathole Offshore Marine Protected Area and in an under-explored section of the Agulhas Current, where the sea floor and biological environment are poorly characterized.
    - Species of high conservation value, such as the protected coelacanth (*Latimeria chalumnae*, originally 'rediscovered' in East London), could foreseeably inhabit this section of the South African coast. A recently-published faunal survey (Button et al. 2021) confirmed that there is a high number of endemic and endangered fish species present across the continental shelf in this particular region, including deep-water lace corals, wreckfish (*Polyprion americanus*; a data-deficient species on the IUCN red list) and critically endangered endemic seabreams (*Polysteganus undulosus, Chrysoblephus cristiceps*).
    - The proposed technology that will be utilised for the survey has been implicated in disrupting larval growth and early-life stages of a number of marine invertebrates, which are important to the developing aquaculture projects along the Wild Coast, as part of Operation Phakisa.
- There is relatively limited information on offshore South African marine biodiversity and ecosystems, including ecosystem services provided by a healthy marine environment. The long-term impacts of seismic surveys and noise pollution in

marine environments are therefore poorly understood, due to a lack of baseline information (and particularly so in the highly biodiverse South African environment).

- Compressed air sound sources constitute outdated technologies that have not changed significantly after > 50 years of use. New technologies with less environmental impact have since been developed, including Wide Azimuth data acquisition and Marine Vibroseis (e.g., Gisiner 2016).
- The drive for offshore shale gas exploration is primarily economic, based on our need for affordable and reliable energy. However, shale gas is yet another non-renewable source of energy, and our marine environment may provide alternative sources of renewable energy that could support the sustainable development of our nation. For example, seaweed has been shown to provide significantly more cost-effective biogas than shale gas. These alternative sources of energy need to be explored and encouraged.
- In 2016, the Academy of Science of South Africa (ASSAf 2016) stated that "relevant departments, with DST oversight, should initiate a major project to undertake, *prior* to the commencement of shale gas exploration/exploitation, robust multidisciplinary, regional and local baseline studies." While this consensus report focused on proposed shale gas extraction in the Karoo, its recommendations have implications for all shale gas exploration and extraction in South Africa. We, therefore, urge the government to give life to these recommendations.
- South Africa is a party to several international instruments that are relevant to exploration and exploitation of marine resources, including the following: the United Nations Convention on the Law of the Sea[1], the Convention on Biological Diversity[2], the Convention on the Conservation of Migratory Species of Wild Animals (CMS)[3], the Abidjan Convention[4], and Nairobi Convention[5]. South Africa's Integrated Coastal Management Act 24 of 2008 and NEMA also bear reference.
- These instruments have several implications:
    - The South African government has a legal duty to manage and monitor its natural resources in an environmentally responsible way, reducing negative impacts on the natural environment as far as possible.
    - All forms of pollution, including noise pollution in marine environments, need to be mitigated and reduced.
    - Broadly speaking, EIAs are required before the implementation of any operations that may negatively impact the natural environment. The

[1] 1982 United Nations Convention on Law of the Sea (UNCLOS) 1833 UNTS 3, (1982) 21 ILM 1261. Adopted: 10.12.1982; EIF: 16.11.94.
[2] 1992 Convention on Biological Diversity (CBD) 1760 UNTS 79; 31 ILM 818 (1992).
[3] 1979 Convention on the Conservation of Migratory Species of Wild Animals (CMS) 19 I.L.M. 15 (1979) EIF: 1.11.1983.
[4] 1981 Abidjan Convention for Cooperation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region (1981) 20 ILM 746; Adopted: 23.03.1981; EIF: 05.08.1984.
[5] 1987 Nairobi Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern Africa Region (1987) 91; RGDIP 1122; Adopted: 21.06.1985; EIF: 30.05.1996.

impact of these operations then needs to be monitored during the operations, as well as thereafter.
    - EIAs are specifically mandated by the Resolution 12.14 of the CMS, adopted in 2017, which mandates signatories to conduct an EIA before starting any noise-emitting operations that may negatively impact marine life.
    - When exploring natural (marine) resources, the latest and least disruptive technologies need to be used, to mitigate the potential adverse impacts of the activities.
- Although South Africa has ratified the above international instruments, domestic legislation does not mandate actions that support the recommendations of these instruments, effectively leaving the door open for the use of outdated and/or potentially harmful technologies and natural resource harvesting activities in environmentally sensitive areas.
- There is international precedent for noise pollution to be classified as a form of energy pollution, with similar impacts as substance-based pollutants (Tasker et al. 2010; report to the Convention for the Protection of the Marine Environment of the North-East Atlantic/ OSPAR Commission 2009). Furthermore, protection of marine biota is becoming increasingly prioritised internationally. To this end, several countries have declared cephalopods and related invertebrates as sentient beings, with associated rights and protections. This was most recently encapsulated in the United Kingdom's Action Plan for Animal Welfare.[6]

Recommendations

- There is a reasonable apprehension of real harm to marine life if the Respondents are permitted to resume their seismic survey. Given a relative dearth of evidence on the impact of seismic surveys on marine life in South African waters, coupled with the uncertainties about the harm that may be suffered if Shell's survey is permitted to resume, the lack of full scientific certainty should not be used as a reason for refusing or postponing cost-effective measures to prevent environmental degradation. Instead, a precautionary approach is warranted.
- No seismic survey should be conducted in South African waters without a preceding comprehensive Environmental Impact Assessment (EIA) report based on the latest science. EMPs should never be considered a valid and legitimate substitute for comprehensive EIA reports.
- Individuals with land-based mining and generalised environmental impact experience should never be considered proxies for legitimate marine experts. Instead, EIA reports for marine environments (or for that matter, even EMPs for marine environments) should be drafted by experts with professional marine science and/or marine environmental training and experience.

[6] The Rt Hon George Eustice MP, Secretary of State for the Environment, Food and Rural Affairs: Action Plan for Animal Welfare, 12 May 2021, available at https://www.gov.uk/government/publications/action-plan-for-animal-welfare

- There is a real threat that marine life would be irreparably harmed if the Respondents are permitted to resume their seismic survey. Accordingly, when the Court considers Part B of the application, the Court should grant the relief sought by the Applicants: the Respondents should be interdicted from proceeding with the seismic survey until and unless they obtain an environmental authorisation under the National Environmental Management Act.

- We urge the South African government to convene a task team to evaluate and improve our current domestic legislation. More specifically, the authority of the Department of Mineral Resource and Energy (DMRE) to exclusively issue exploration permits without the concurrence of the Department of Forestry, Fisheries, and the Environment (DFFE), should be revoked. Only a holistic approach to marine oversight will ensure the sustainable use of our natural resources while also encouraging and supporting tourism, local livelihoods, environmental health, and the maintenance of ecosystem services. Such a task team should also note:
    - Decisions that concern the marine environment cannot and should not be made by a single government department as the complex and integrated nature of marine systems demand more integrative decision-making processes amongst all stakeholders. Interdepartmental cooperation and considerations need to be mandated, bringing together the DFFE, DMRE, their affiliated entities, e.g., the South African National Biodiversity Institute, as well as conservation agencies.
    - EIAs should be mandated before exploration of natural resources, including those explorations that lead to noise ('energy') pollution, not only pollution in the form of waste products and toxins. This follows the NEMA guidelines that mandate EIAs for "any process or activity which requires a permit or license in terms of legislation governing the generation or release of emissions, pollution, effluent or waste and which is not identified in GNR. 386 of 2006". The scale and scope of monitoring activities should consider the multi-scalar dimensions of the marine system.
    - The process of EIAs should be revised to ensure a more a proactive, systems-based approach, including direct and indirect stakeholders. Such an approach to EIAs is necessary given the unique, integrated nature of the marine ecosystem which includes a multitude of temporal and spatial scales. Such proactive, inclusive approaches are necessary to ensure that negative effects on the marine ecosystem and the people who depend on it are properly accounted for and sufficiently mitigated.

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