Mr G P Kriel
Environmental Impact
Management Services (Pty)
Ltd
gp@eims.co.za

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Dear Mr Kriel

Review of Marine Biodiversity and Ecosystem Services Assessment for proposed seismic survey in the Orange Basin off South Africa's west coast by Searcher Geodata UK Ltd.

Introduction

I was commissioned by Dr Andrea Pulfrich, the author of the marine biodiversity and ecosystem services assessment (MBESA) for Searcher's planned Orange Basin seismic survey offshore of RSA's west coast to provide a peer review of the assessment. The focus of the review is on the completeness of the provided information and interpretations of it in identifying risks posed by the proposed exploration activity to marine biodiversity.

The report provided for the review was the MBESA date June 2024. Note that the supporting document on underwater acoustic modelling (SLR Consulting Australia, 2024. 3D Seismic Survey Underwater Acoustics Modelling. Project ZA24-010_Orange Basin MC3D MSS, 61 pp) was not provided. Thus, statements and use of information from that report have been taken at face value for this review.

Review

The review is set out below broadly following the structure of the report's table of contents.

Report layout

The report is well structured, clearly written and the provided illustrations are clear and not too complex. Both in the abstract and the text clear statements are made on the adopted desk top study approach, the limitations thereof and the response of being ultra-cautious in identifying and interpreting marine biodiversity risks. This emphasis on precaution is important as, in essence, worst case scenarios are evaluated for deleterious environmental effects which, in reality, should be unlikely to occur at the intensity or scale assessed.

Project and baseline marine environment descriptions

The project description is comprehensive providing detail on the survey area, airguns to be used, their deployment, the hydrophone array, streamer towed depth and lengths. The operation of the airguns in terms of shot frequencies and shot duration plus expected sound pressure levels at source

Specialist Consultant in Applied Marine Sciences
8 Francolin St, Somerset West, 7130 South Africa
Email: robinc@cybersmart.co.za
Mobile +27 (0)82 922 3504

are provided. The survey area and water depths within the area are specified and clearly illustrated (Report Figure 2-1).

As in the project description the baseline description is complete focusing on potential direct and indirect effects areas. Direct effect areas are appropriately defined as those within the survey boundaries where seismic survey sound levels can be high. Indirect effects are those that may be exerted in the region and inclusive of other operational risks such as ship discharges. Covered topics include geophysical characteristics of bathymetry, continental shelf features, locations of Childs Bank and the Tripp seamount relative to the survey area and canyons transecting the continental shelf. As the assessment is focused on risks to marine fauna the biological environment is comprehensively described along with the inhabiting benthic, demersal, pelagic and epi-pelagic communities. The distributions of these are extracted from scientific and grey literature sources and are current. Presentation of distribution data relative to the survey area in GIS maps is useful. Details are provided on conservation status (IUCN) of species known to be in the area as well as the ecosystem threat status as defined in the SANBI assessments.

Cetaceans are important receptors in terms of acoustic effects and occurrences in the overall west coast region are well mapped with recent observations on movements of populations through the area and their seasonality. This level of detail contributes to identification of possible mitigation actions.

No information gaps are apparent in the baseline description.

Assessment of impacts

Identified impacts are assessed across mobilisation, operations, and demobilisation phases. Consequences of unplanned activities such as equipment loss are included. Impacts are defined according to the aspect, e.g., noise transmission, of a specific activity. The benefit is that this enables directed mitigation where needed. Impacts are generally specifically defined which facilitates monitoring, e.g., underwater noise modifies behaviour in cetaceans which is observable. In cases where mitigation is applied the results are thus also observable; in the example given ‘normal’ behaviour returns. This allows validation, or not, of the mitigation applied which is beneficial for the project proponent and the wider scientific community.

Seven aspects of the survey operations are identified each with its set of impacts. The most important of these is the generation of underwater noise by airgun operations with subsidiary noise sources being ship operations and helicopters. As an example of the assessment procedures applied section 4.3 describes the importance of sound in the ocean to animal communities, what is known of their hearing ranges (frequency bands) and characteristic anthropogenic sources. Detail is provided on airguns and their impacts on whales and dolphins, seals, turtles, seabirds, fish, marine invertebrates, plankton, and at the ecosystem level. In each case the impact is defined, project controls outlined, the sensitivity to sound of the receptor/receptor group summarised from their behaviour, distributions in the region, how sound can affect them, and sound pressure level thresholds specified. The latter are based on published data and are used in acoustic modelling to determine effect ranges. This is a well based and comprehensive approach to determine impact significance and allows identification of needs for mitigation, what this should be and, if properly applied, reductions in impact significance that can be obtained.

The process is logical and is consistently applied across the listed impacts. In some instances, it is acknowledged that the given impact ratings are precautionary to a high degree and, in the

reviewer's opinion, would be practically impossible to verify. The benefits of applying any mitigation in such instances would be moot.

There are no apparent gaps or inconsistencies in this section.

Conclusions

The marine biodiversity and ecosystem services assessment is comprehensive, detailed, logically constructed, and consistent in its approach to the impact analyses. It is based on current information and scientific understanding of the various effect levels on the defined receptors and, for acoustic effects, supported by sound transmission loss modelling.

No gaps have been identified in this review and it is considered fit for purpose.

Dr Robin Carter