

05 August 2015

Our Ref: J31314
Your Ref: Email received 07 August 2011

Thyspunt Alliance
St Francis Bay Resident's Association
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Dear Mr Thorpe, Thyspunt Alliance and its members, the St Francis Bay Resident's Association and the St Francis Kromme Trust

COMMENT ON THE MARINE ECOLOGY REPORT

THYSPUNT NUCLEAR 1 DRAFT ENVIRONMENTAL 2nd DRAFT IMPACT ASSESSMENT REPORT

Comment 1:

Prepared by: Trudi Malan on behalf of the Thyspunt Alliance

We are of the opinion that the Marine Ecology Report should be redone. The fact that the study does not include detailed information with regard to off-shore structures that will influence and impact the marine environment as well as the failure of the specialist to include information on species of special significance constitutes a serious flaw. The information in the DEIR is therefore incorrect and in contravention of section 81(1) of the EIA Regulations.

Response 1:

Response by the Environmental Assessment Practitioner

There is no Section 81(1) in the EIA regulations (Government Notice No. R 546 of 2010). These regulations end at Regulation 79. It is assumed that the comment refers to Section 71(1) of the EIA regulations, which deals with offences, including issues such as providing false or misleading information in reports, and that you are implying that the EIA team is guilty of such an offence.

Response by the marine specialist:

- The marine ecology report is tasked with reporting on potential impacts relating to the development in terms of the effects on the marine ecology of the area. The detailed information requested about the off-shore structures is provided in Section 3.11 of the Revised Draft EIR and in the "Intake / Outfall Structure" section of the Consistent Dataset (Appendix C of the Revised Draft EIR), (while the marine ecology report (Appendix E15 of the Revised Draft EIR) considers the implications of these structures. Please note that in Section 3 of the marine ecology report a description of the structures associated with construction, abstraction of cooling water and the release of warmed cooling water is provided.
- Assuming the comments in fact refer to section 71(1) of the EIA regulations, as specialists we have strived to base our assessment on the most complete information available. With regards to species of special significance, we assume the comment refers to the presence of abalone in the Thyspunt area. Please note that the importance of this species at this site has only recently come to light. Full attention will be given to this species at Thyspunt in the current revision of the marine ecology report.

Comment 2:

We fail to understand how in the assessment of impact tables in the Marine Ecology Report the Impact on irreplaceable resources is recorded as Medium while for Thyspunt it is reflected as low.

Our only conclusion is the failure to record certain species of special significance at Thyspunt.

Bantamsklip Table:

Refer to the table on page 1 in the attached.

Thyspunt Table:

Refer to the table on page 1 in the attached.

There seem to be a discrepancy between the impact tables in Chapter 9 of the DEIR.

The disruption during construction: Due to construction of the cooling water intake & outflow systems is recorded as HIGH for Bantamsklip but as Low-Medium for Thyspunt.

Response 2:

The assessment reflects consultation with the relevant abalone expert (Ms G. Maharaj, Inshore Resources, Fisheries Branch, DAFF). As stated above the issue of abalone at the Thyspunt site is being considered in the current revision of the report and consultation with Ms Maharaj will guide the assessment.

Please note: as detailed within the marine ecology report, the abalone populations at Bantamsklip are of particular concern as they represent the largest remaining stocks of abalone along the South African coast.

Comment 3:

1.2.1 Assumptions and limitations

The chlorination regime applied to abstracted cooling water will consist of an estimated 2 mg/kg of chlorine released on a continuous basis.

No reference is made of the 4 x daily flushing exercise

At present a technical feasibility study is underway, considering the logistics of spoil disposal at sea at the Thyspunt site. To date no technical fatal flaws have been identified (Eskom position paper 2011). As a necessity, recommendations made in this ***specialist*** report assume technical feasibility ***of the proposed disposal options at Duynefontein and Bantamsklip.***

This statement clearly indicates the bias towards the Thyspunt Site. Eskom is not awaiting the outcome of the DEIR and the document is littered with references to Eskom studies. These studies are not part of the DEIR and therefore I&AP's cannot comment on the validity of these statements.

We maintain that the specialist cannot determine impact unless they are aware of the construction methods and locations.

Response 3:

Response by the Environmental Assessment Practitioner

The chlorination rate is indicated on page 1 of the Consistent Dataset (Appendix C of the Revised Draft EIR). There is no indication in this document of four times daily flushing.

It is assumed that the proposed marine structures will be technically feasible. All indications from the technical feasibility study thus far have shown that the proposed structures are feasible. Chlorination: Information supplied to us by Eskom did not reflect that a 4 x daily flushing regime would be applied with regards to chlorination.

Comment 4:

2.3.1 General Description

No rare or endangered species are known from the site, and no sites of special biological significance occur within the designated area (Jackson and Lipschitz 1984),

We find it unacceptable that a 27 year old study can be used as a reference for an EIR of this importance.

Response 4:

The work referred to is one of the basic and important works documenting national information about our coastal zone. Exclusion of this work based on that fact that it was not completed recently would amount to ignoring important information – this would be irresponsible. The section referred to above has therefore been updated in the latest version of the report. Updated information was added based on IUCN listings and discussions with Ms G. Maharaj, Inshore Resources, Fisheries Branch, DAFF.

Comment 5:

2.3.3 The Benthic Environment

Both sandy and rocky bottoms are present in the vicinity of Thyspunt (Nuclear Site Investigation Programme; Eastern Cape 1988). Rocky shores are often steep vertical rockfaces (Figure 6). Species composition and abundance in these habitats are typical of the region. Rocky reef communities are dominated by colonial ascidians, hydroids and sponges, with coralline algae being important to a depth of about 20 m (Nuclear Power Investigations; Eastern Cape 1988). The benthic environment demonstrates medium tolerance to disturbance and as a result is rated as a medium sensitivity habitat.

We fail to understand how the specialist can so glibly brush over the benthic environment. If the description of the benthic environment for Thyspunt & Bantamsklip is compared it is clear that there has been very little done to describe or research this environment at the Thyspunt site. The specialists make no mention of the presence of abalone at the Thyspunt site but they seem to be very concerned about the abalone at Bantamsklip. They do note that abalone is a species listed as endangered in terms of CITES Appendix III (CITES 2007) in the Bantamsklip description. The CITES regulations is not limited to a specific area and the abalone present at Thyspunt has the same value as the abalone at Bantamsklip. We consider this omission as a further indication that the Marine Ecological Report should be re-done. We are of the opinion that the impacts have not been assessed due to the lack of information about the planned structures.

No mention is made of any of the review work conducted for the National Biodiversity Spatial Assessment of the benthic environment of the Agulhas Bioregion (Lombard *et al* 2004). The threat status of this biozone was defined as vulnerable, with extractive utilisation of marine resources identified as the greatest threat (Lombard *et al* 2004). Pollution, mining and climate change were listed

as additional significant threats to marine biodiversity in the Agulhas subphotic biozone (Lombard *et al*, 2004).

Response 5:

Response by the marine specialist:

- The issue of abalone at the Thyspunt site is addressed above.
- There is no difference in the way that the description of benthic environment was approached for Bantamsklip and Thyspunt. The difference in length of descriptions reflects the fact that kelpbeds are important at Bantamsklip but do not occur at Thyspunt. Discussion of abalone has also been added in the current version of the report.
- A response from the Marine specialist indicates that based on the information contained within the Consistent Dataset (Appendix C of the Revised Draft EIR Version 1) and the experience of the marine assessment team with monitoring of the marine impacts at Koeberg, that sufficient information was available to make a reasonable and accurate assessment for the purpose of the current EIA. Also keep in mind that the development will not be allowed to take place outside of the bounds set by the Consistent dataset.
- Exclusion of the publication by Lombard (2004) did not materially affect the outcome of the marine assessment. This work has now been updated by Sink *et al* 2012. This latest work has been included in the latest version of the Marine Impact Assessment which will be made available for public comment and review.

Comment 6:

2.3.5 Avifauna

The complete lack of attention to the Thyspunt site is again reflected in this point. One only has to compare the listed species to the description of the other two sites to realise that the Thyspunt site has been neglected. We believe this is in part due to the fact that the specialists are based in the Western Cape. We would like to refer the specialist to comments made by the Vertebrate (sic) Faunal Specialist in his report. It will provide more clarity on some of the threatened species occurring on the site.

Response 6:

Response by the Environmental Assessment Practitioner

Biophysical specialists on the EIA team were appointed primarily based on their knowledge and expertise in dealing with the impacts of a nuclear power station and impacts in specific biophysical environments. The marine specialist team has a wealth of knowledge of the impacts of a Pressurised Water Reactor nuclear power station, having been involved in marine monitoring at Koeberg Nuclear Power Station for a number of years. This team has worked extensively around Southern Africa and has published internationally peer-reviewed subject literature. Their professional integrity cannot be challenged based on their physical location.

The faunal specialist report was consulted and the necessary changes have been made in the current revision of the marine ecology report.

Comment 7:

3.3.1 Disruption of the marine environment during construction

As at the other sites, the construction of an intake and outfall system for cooling water will result in temporary but severe localised disruption to the marine environment.

No mention is made of the placement of pipes and pump-stations to pump the spoil 6km out to sea and the possible impacts related to this infrastructure.

There is no description or discussion of the physical damage during installation and construction.

There is no assessment of the increase in hard substrate habitat.

The presence of abalone at the site is again completely ignored.

The long discussion with regard to squid is appreciated as this issue has previously been ignored.

We still believe that the information provided is not complete and we would again state that the Marine Ecology Report should be redone in its entirety. The Scientific Squid Working Group should be afforded more time to provide comments. We find the fact that they were eventually only contacted after the second DEIR was published unacceptable.

Again no mention is made about the possible impact on abalone.

Response 7:

- Pipes and pump-stations: Conceptual descriptions of the infrastructure are available in the Consistent Dataset (Appendix C of the revised Draft EIR) and on relevant illustrations of the infrastructure layout e.g. Figure 7.13 of the Coastal Modelling Report (Appendix E16 of the Revised Draft EIR). However, your comment is noted and clarification will be included in the current revision of the marine ecology report.
- Physical damage: As explained in Section 3 of the marine ecology report, the physical damage to environment takes the form of disturbance of sediments during tunnelling and construction of the coffer dam, and smothering of the benthic habitat in the area where spoil is disposed of.
- Permanent hard substratum will only be introduced into the marine environment in the form of the ends of the two intake pipes and the ends of the outflow pipes (max 10 pipes). Note that the pipes themselves will be buried). Due to the small area of hard substratum that will be introduced the impact will be inconsequential. This point will be added to the final marine ecology report in order to make the reasons for lack of detailed discussion clear (i.e. that the impact are minimal).
- The issue of abalone at this site is addressed above.
- Squid fishery: The impact on the squid fishery has received additional consideration in the current revision of the marine ecology report. Additional information and comments by the Squid Working Group and the South African Squid Management Industrial Association are consolidated in the current revision.

Comment 8:

3.3.2 Abstraction of cooling water and subsequent entrainment of organisms

Again higher ambient water temperatures than those occurring at KNPS (i.e. maximum and minimum sea surface temperatures of 22.5 and 16.6°C respectively (Shillington 2007)) are expected to increase the toxicity of chlorination (Huggett and Cook 1991) when compared to the west coast site.

Mention is made about increased toxicity, but the possible impacts of the increased toxicity is not discussed.

However, long-term climate change induced decreases in sea-surface temperatures along this section of coast (Rouault et al.2009) may reduce this effect in the long term.

The above statement is in conflict with Coastal Engineering Report Rev 5, Appendix G, which indicates the following in Table 3.1 on page 4:

Refer to the table on page 3 in the attached.

No species of commercial value are likely to be affected by entrainment.

We fail to understand why the report will only focus on species of commercial value. We do not judge ecosystems solely on the commercial value of species. The possible impact on the biodiversity should be discussed.

The lower productivity of nearshore waters in this area is, however, expected to result in less entrainment of organisms and little effect on the marine environment at Thyspunt.

We would content that this statement is not true and not based on recent research.

The California Energy Commission commissioned a report on "Issues and environmental impacts associated with once-through cooling at California's Coastal Power Plants." (Addendum 1 to Marine Ecology Review)

The following quote is from the abstract & summary of this report:

"There is no question that the once-through cooling systems of coastal power plants cause adverse environmental impacts - the cooling systems kill vast numbers of marine plants and animals, and may alter receiving water habitats over large areas. The severity of the impact can be ecologically important - conclusions by Regional Water Quality Control Boards of "no adverse impact," based on studies done in the 1970's and early 1980's and more recent NPDES monitoring, have been shown to be wrong at all plants recently reassessed using study approaches and analyses based on present scientific knowledge."

"For example, recent studies at Moss Landing and Morro Bay have shown that power plant cooling systems previously thought to have no adverse impacts may kill 10- 30% of the larvae of particular fish species in the source water. It can be argued that while the early impact assessments were, in retrospect, of uncertain accuracy, they were acceptable given knowledge at the time. This is true relative to the ability to identify larvae and models available to evaluate impacts, but it is not true for sampling designs. Pilot studies to determine the most accurate way to sample entrained larvae and to determine putative survivorship after passing through a cooling system were poorly designed, and insufficient attention was given to sampling designs that would optimize detection of thermal and entrainment impacts."

In May 2010 Californian regulators adopted a policy requiring coastal power plants - including the state's two nuclear power plants - to phase out the use of once-through cooling systems.

Response 8:

- Impacts of chlorine toxicity: This impact is localised. A discussion has been added to the current revision of the marine ecology report to clarify this impact.
- Climate change driven changes in sea temperature: Predictions regarding climate change are notoriously difficult to make and very dependent on time scale, geographical location and input data. The marine ecology report is using the latest information available for the South African coast and a study that deals particularly with the inshore region. Offshore there is indeed predicted to be a temperature rise, as indicated in the Coastal Engineering. Discrepancies between specialist reports reflect the use of different published material or reference to different distances offshore.
- Please note: The section quoted should read "*Long-term climate change induced decreases in sea-surface temperatures along this section of coast (Rouault et al. 2009) are unlikely to offset this effect as temperatures have decreased at a rate of less than 1°C in the last two decades*". This has been corrected in the current version of the report.

- Focus on species of commercial value: The report by no means focuses only on commercial species. The report does, however, acknowledge that these species are of special concern to people who rely on them for their livelihood.
- Entrainment at Thyspunt vs. Duynefontein: The lower productivity of the south coast nearshore zone in comparison to the west coast is a very well established fact (refer, for example to Baily 1990, Bustamante *et. al.* 1995, Griffiths *et. al.* 2010). This is driven by the dominance of coastal upwelling on the west coast, which is far less prevalent on the south coast. As such, if there is less productivity in the water (i.e. plankton and larvae) then it is more than reasonable to expect that less entrainment of organisms will occur at Thyspunt than at Duynefontein. The marine specialist team does not contest that plankton taken up by the cooling system may be lost, but the lower ambient productivity will result in a lower overall impact at Thyspunt than at Duynefontein. The fact that no significant impacts have been recorded at Koeberg Nuclear Power Station (e.g. no impacts on surrounding shores have been detected and no impacts on fisheries have been reported) is a strong indication that little impact is to be expected at Thyspunt. Elaboration has been added to the marine ecology report to clarify this point.
- We thank the Thyspunt Alliance for sharing the American consultancy report on the assessment of entrainment impacts. It is important to note that the studies in this report consider power stations on the west coast of America and the plants are located in the highly productive Californian Upwelling system (analogous to the Benguela Upwelling system along our west coast). As such, the high numbers of entrained organisms recorded in the studies are to be expected. In areas of lower production, such as the Thyspunt area, lower entrainment will occur. Recent peer-reviewed work has shown that although reductions in larval supply due to entrainment occur, they generally produce only minor, localized effects on adult population density (White *et al.* 2010). This backs the findings of no significant impact at Koeberg, despite this being sited in a high productivity upwelling region.

Comment 9:

3.3.3 Release of warmed cooling water

No input of warmed water comparable to that of the proposed development exists along this section of coast. As this site lies at the warm end of the Agulhas Bioregion it could be argued that a portion of species occurring here may be near the upper end of their temperature tolerance range and hence could be particularly vulnerable to further temperature increase. Although theoretically possible, this is however, unsubstantiated.

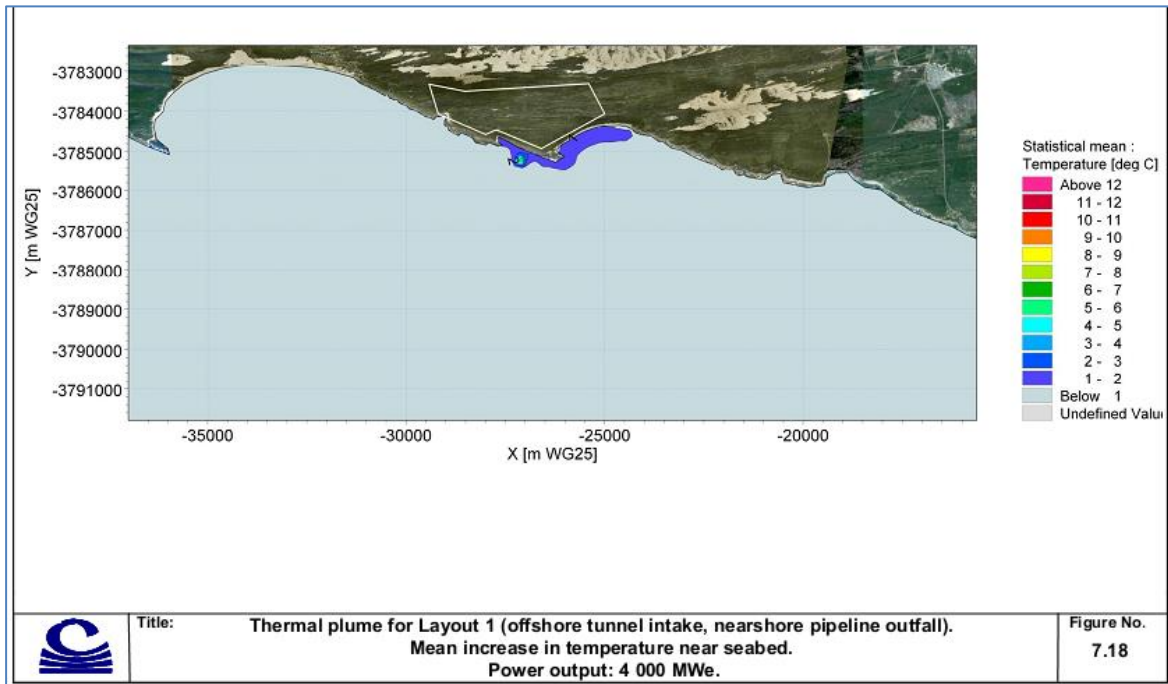
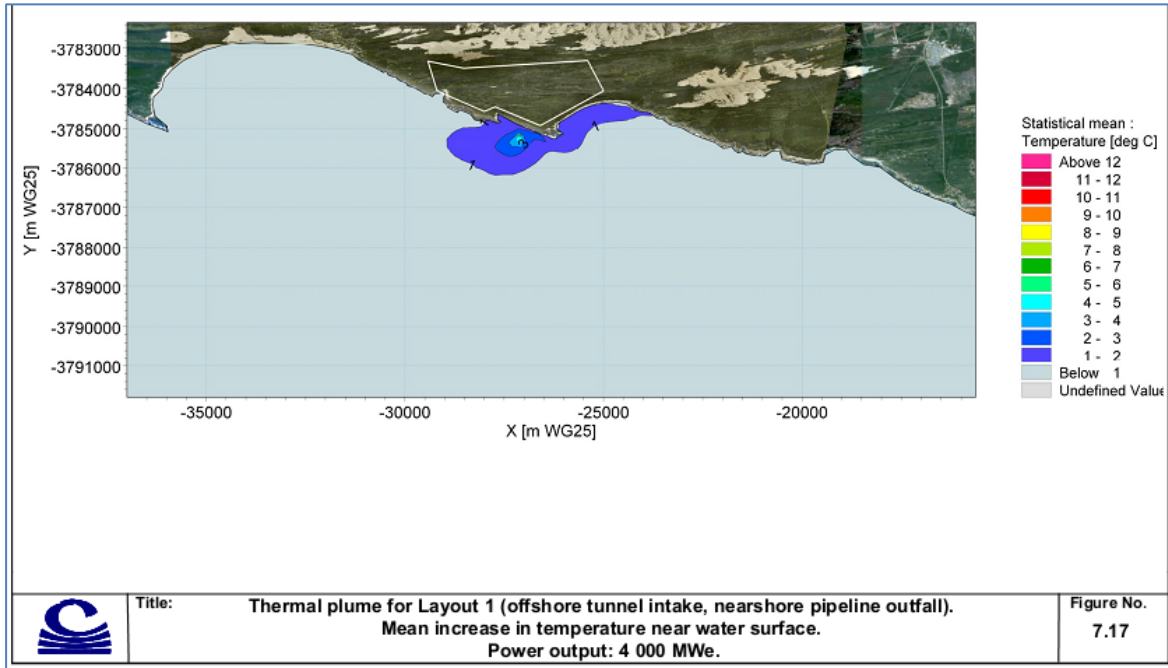
The last statement in this paragraph is cause for concern. If this is theoretically possible the specialist should either substantiate the probability or follow the precautionary principle. Either way, the report should consider all possible impacts and if this impact is possible it should be discussed.

Again the report does not discuss the impact on the abalone population found at this site.

Response 9:

Assessment of the significance of an impact is based on a number of variables, including the nature, extent, duration, intensity, etc. as indicated in Chapter 7 of the previous Revised Draft EIR and the Annexure to Chapter 10 of this RDEIR Version 2. As indicated in the Marine Ecology Assessment (Appendix E15) and in the marine specialist's response below, the extent or scale of this impact is very small. Water will be warmed over such a small area that the impact in is not considered significant.

The marine specialist's assessment of the impacts is based on detailed modeling of the impacts on temperature that have been undertaken in the Coastal Modeling Report (Appendix E16 of the Revised Draft EIR Version 1). Refer to Figures 7.17 and 7.18 below, from this report, for an illustration respectively of extent of average sea surface and seabed temperate increases for a nearshore outfall.



In terms of the thermal tolerance limit: The impacts here will be strongly dependent on which type of outfall is selected and as stated, an offshore release in which the warmed water is released in a diffused manner at 35m depth, then rising upwards due to its lower density, will have low impact and is hence preferred. An inshore outfall will have a greater impact, but given the very small area affected is still not of great concern, even if some species are eliminated from this immediate area.

Lastly the issue of abalone at this site is considered above.

Comment 10:

3.3.4 Release of desalination effluent

The South African Water Quality Guidelines for Coastal Marine Waters states a target range of 33 ppt to 36 ppt for salinity of effluents entering the sea (Department of Water Affairs and Forestry 1995). These guidelines will be met by this development during the operational phase. Although they will not be met during the construction phase, dilution will occur within 110 m of the point of release.

As the brine released during the construction phase will not meet the South African Water Quality Guidelines we believe that all possible ecological impacts should be discussed.

The statement:

“Any ecological impacts will be focused within the water column due to the high energy of the surf zone.” does not describe the possible impacts.

Response 10:

Discussion of the impacts of brine during the construction phase was added during the current revision of the marine ecology report. The revised version of the report will be made available for public comment and review as part of the Revised DEIR Version 2.

Comment 11:

3.3.5 Radiation emissions

In the improbable event of a nuclear accident affecting the marine environment, mortalities are expected to be focused in the general area of the power station. Highly mobile species, such as fish, exposed to low to intermediate levels of radiation may, however, move great distances. This could pose a threat to public health if these fish were later consumed.

As was clear from the recent events in Japan, the large discharge of radioactive water into the marine environment should be discussed in more detail. The statement: “this could pose a threat” should be changed to: “this would pose a threat”. There is no doubt in any of the scientific studies available that there will be a threat to human health in the event of an accident, the “toning down” of this threat by using semantics is unacceptable.

Response 11:

Your comment is noted. Attention was paid to the wording of this section during the current revision of the marine ecology report. The revised version of the report will be made available for public comment and review as part of the Revised DEIR Version 2.

References used by the marine specialists in their responses:

Bailey GW (1990) Organic carbon flux and development of oxygen deficiency on the modern Benguela continental shelf south of 22°S: Spatial and temporal variability, in modern and ancient continental shelf Anoxia. In: *Geol. Soc. Spec. Publ. 58* Tyson RV, Pearson TH (Eds). Bath, Geological Society UK 171– 183.

Bustamante RH, Branch GM, Eekhout S, Robertson B, Zoutendyk Z, Schleyer M, Dye A, Hanekom N, Keats D, Jurd M, McQuaid C. (1995) Gradients of intertidal primary productivity around the coast of South Africa and their relationships with consumer biomass. *Oecologia* 102: 189-201.

Griffiths, C.L., Robinson, T.B., Lange, L. & A. Mead (2010) Marine biodiversity in South Africa: an evaluation of current states of knowledge. *PLoS ONE*. Doi/10.371/journal.pone.0012008

Sink, K. Holness, S. Harris, L. Majiedt, P. Atkinson, L. Robinson, T. Kirkman, S. Hutchings, L. Leslie, R. Lamberth, S. Kerwath, S. von der Heyden, S. Lombard, A. Attwood, C. Branch, G. Fairweather, T. Taljaard, S. Weerts, S. Cowley, P. Awad, A. Halpern, B. Grantham, H. & Wolf, T. (2012) National Biodiversity Assessment 2011: Technical Report. Volume 4: Marine and Coastal Component. South African National Biodiversity Institute, Pretoria. 325 pp.

White, J.W., Nickols K.J., Clarke L., Largier J.L. (2010) Larval entrainment in cooling water intakes: spatially explicit models reveal effects on benthic metapopulations and shortcomings of traditional assessments. *Canadian Journal of Fisheries and Aquatic Sciences* 67: 2014-2031.

Yours faithfully

A handwritten signature in black ink, appearing to be 'E. J.', written in a cursive style.

For GIBB (Pty) Ltd
The Nuclear-1 EIA Team