

3 December 2015

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RE: REVIEW OF EIA FOR THE PROPOSED NUCLEAR POWER STATION ('NUCLEAR 1') AND ASSOCIATED INFRASTRUCTURE: MARINE ECOLOGY IMPACT ASSESSMENT

I was appointed to review the Marine Ecology Impact Assessment Report for the Proposed Nuclear Power Station ("Nuclear 1') prepared by Prof C.L. Griffiths, Dr T.B. Robinson and Dr SH Elwen dated June 2012.

Terms of Reference for the peer review of this specialist report included requirements listed below. I have endeavored to provide responses to each of these items as well as providing specific recommendations on error or omissions in the text of the report.

My overall impression of the report is that it is well written, accessible to all stakeholders, scientifically robust and defensible but that there are a number of important short-comings that need to be addressed in order to meet normal standards of professional practice and competence in respect of such a report. These are highlighted below.

Specific requirements to be addressed by this review and response.

1. Assess the document/ report in terms of its fulfilment of the Terms of Reference set;	Terms of reference for the report were not supplied, thus performance against these TORs could not be evaluated. What is not clear from the report and needs to be clarified is whether the study was designed to assess the potential impacts associated with the development of nuclear power stations at each of four sites or whether the four sites represented alternative options for the development of a single nuclear power station.
2. Consider whether the report is entirely objective;	I am confident that the report is entirely objective and presents an impartial assessment of impacts of the proposed development on marine biodiversity and marine resources.
3. Consider whether the report is	The report is certainly technically, scientifically and professionally credible

technically, scientifically and professionally credible;	but there are a number of short-comings that I believe need to be addressed such that it fully meets requirements of such a study. These are elaborated below.
4. Consider whether the method and the study approach is defensible;	The assessment criteria and rating scales seem logical to me but it is not explicit at what level of significance, identified impacts would influence the choice of a particular alternative or not or whether mitigation is deemed necessary or is merely optional. Generally (or at least according to my experience) low significance impacts will not necessarily influence the decision as to whether a particular alternative is selected or not, while medium significance impacts should influence the decision as to whether a particular option is chosen or not and must be mitigated (if possible), while high significance impacts are generally considered “no-go” and must be mitigated. There are numerous medium and some high level significance impacts for which no recommended mitigation measures are supplied. The significance of all impacts should be evaluated with and without mitigation in the impact tables in the report.
5. Identify whether there are any information gaps, omissions or errors;	The study makes use mostly of available information from the scientific literature (both published and unpublished sources), information supplied by acknowledged experts in their fields, and of an extensive body of information on the impacts of the Koeberg Nuclear Power Station, all of which is supplemented by data collected during dedicated field surveys at each of the proposed development sites. I believe the information base on which this study is build is sufficiently comprehensive and that there are no clear gaps, omissions or errors. The assumptions made or all logical and scientifically defensible.
6. Consider whether the recommendations presented are sensible and present the best options;	I found that the report provides a detailed and in depth assessment of the impacts of the proposed developments but the findings are not presented in a way that leaves the reader with an unequivocal message on exactly what the significance of all the identified impacts are, what the preferred alternative development options are, or what essential measures need to be adopted or implemented to mitigate impacts with a significance rating that is considered unacceptably high. The authors in fact do not provide any concrete mitigation measures for any of the identified operational impacts indicating that “all the recommended mitigation measures take place during the construction phase and reduce the severity of the particular impacts”. These identified “mitigation measures” are not even itemized in the section entitled “Recommended mitigation measures”. Rather this section is devoted almost entirely to an extensive list of recommendations for what monitoring actions should be implemented which cannot be considered mitigation in any sense of the word. Clear mitigation measures need to be identified for the construction and

	operational phases of the project that sufficient to mitigate any impacts that are considered unacceptably high..
7. Consider whether there are alternative viewpoints around issues presented in the report and if these are clearly stated;	I found the report provided an objective assessment of the potential impacts of the proposed developments at each site and that this is clearly articulated in the report. Alternative options and viewpoints have been considered but preferred options in each case have not always been identified clearly.
8. Consider whether the style of the report is written so as to make it accessible to non-specialists, technical jargon is explained and impacts are described using comparative analogies where necessary; and	He report is well written and, I believe is presented in a style that is makes it accessible to specialists and non-specialists alike. I do have some reservations (articulated above and below) in respect of how some of the key findings in the report are not all drawn together and clearly summarised in the final recommendations section.
9. Report on whether normal standards of professional practice and competence have been met.	I am comfortable that normal standards or professional practice and competence have been met in the production of this report aside from specific short comings that have been identified above and below.

Specific comments on the Marine Ecology Impact Assessment Report

1. p IV 4th bullet: DWAF standards are no longer applicable for effluent discharged to the marine environment from land-based sources. See new guideline published by DEA Oceans & Coasts
2. p 1 2nd paragraph, last line: "are" should be "were".
3. P2 §1.2.2. The assessment criteria and rating scales seem logical to me but it is not explicit at what level of significance, identified impacts would influence the choice of a particular alternative or not or whether mitigation is deemed necessary or is merely optional. Generally (or at least according to my experience) low significance impacts will not necessarily influence the decision as to whether a particular alternative is selected or not, medium significance impacts should influence the decision as to whether a particular option is chosen or not and must be mitigated (if possible), while high significance impacts are generally considered "no-go" and must be mitigated.
4. p 6 2nd paragraph: *Talorchestia quadrispinosa* is not restricted to South African waters. This species occurs in Namibia as well.
5. P 9, last paragraph: Add commercial line fishing and recreational angling.
6. p 11 2nd paragraph: Reference to "medium tolerance to disturbance". Surely this is dependent on the level of sensitivity and the nature of the disturbance (e.g. physical disturbance vs. deterioration in water quality)? Sensitivity to a change in water temperature is what is really important here I would think.
7. p 11, 3rd paragraph: "in" not "from"
8. p 11 4th paragraph: common names of species other than birds should not be capitalised. Same applies elsewhere in the document.
9. p 12 paragraph 2: Blue text?

10. P 15 paragraph 1: delete “and”
11. p 16 last paragraph, 2nd last sentence. Data from surveys in this area are now available. Check with Genevieve Maharaj from DAFF.
12. p 24 2nd paragraph: sentence starting “Although thermal stress to (Hugget 1987)”. It is not clear why this section is included here. It should be included under the next section which deals with thermal impacts.
13. p 27 3rd paragraph: The Operation Policy published by DWAF has now been superseded by a new policy issued by the Department of Environmental Affairs.
14. p 28 §3.1.7 Delete this paragraph number (superfluous).
15. p 28 §3.1.8 See comment 1 above. Note that discharge of effluent will require a Coastal Waters Discharge Permit from DEA.
16. p 30 §3.2.1. This section is titled “Disruption of the marine environment during construction” but includes both construction and operational phase impacts
17. p 30 §3.2.4. It is not clear to me why “a large intertidal area is a favourable location for a desalination plant”. Please explain.
18. p 35 § 3.2.7. Permits for kelp harvesting are obtained from DAFF not DWA.
19. p 38 5th paragraph. Sentence “Bottlenose dolphins, humpback dolphins and southern right whales all use very coastal and often murky waters as part of their natural habitat range, while the more offshore species move over large spatial scales and are likely to avoid plumes.” The sentence does not make sense.
20. P 41 1st paragraph. Reference to Bantamsklip. I suspect this should be Thyspunt.
21. p 41 §3.3.4. See comment 17 above
22. p 42 1st paragraph: Impacts have been assessed in terms of the 2006 EIA regulations. These have since been superseded by EIA regulation of 2014, as well as several additional regulations in between 2006 and 2014. I am not sure which regulations the project has been registered under. This may need to be updated.
23. p 44. §4.1.4 (and also §4.2.4, 4.3.4, and 5.4). It is stated that dispersion modelling of brine effluent indicates that the plume will be sufficiently diluted within 110 m of the point of release at all sites (Prestedge et al. 2008a). This seems a little strange given that conditions (currents, wave climate, bathymetry) at each site are very different and are likely to result in different rates of mixing and dilution.
24. P 44 §4.1.7. See comment 1 above.
25. P 45 §4.2.3. The authors make a clear case for benefits of releasing cooling water at depth (i.e. offshore) earlier in the document but make no reference to this in the evaluation of impacts. The reader is thus not left with a clear recommendation as to which is the preferred option.
26. P 46 §4.3. See comment number 11 above.
27. p 47. Again, the authors make a clear case for benefits of releasing cooling water at depth (i.e. offshore) earlier in the document (which I agree with) but in the evaluation of impacts the shallow and deep water release options are both rated as being of medium significance. This does not make sense and needs to be fixed to avoid confusion!
28. p 47. Earlier the authors indicate that brine effluent must be discharged beyond (offshore of) the surf zone (which I find to be a sensible requirement) but here the authors state that “the intensity of the impact is rated as low, as few species are restricted to the surf zone ...”. This does not make sense.
29. p 48. List of relevant legislation needs to be updated. The Sea Shore Act of 1935 has been repealed in its entirety by ICMA. Also, a Coastal Waters Discharge Permit is required for discharge of effluent to the marine environment from land based sources not a Water Use Licence.

- 30. p 52 Table 7. The significance of all impacts in this table should be evaluated with and without mitigation. Specific mitigation measures applicable to each identified impact need to be included in this table.
- 31. p 52-54. Confidence is listed as high for most impact ratings and medium for the rest. I find this very hard to accept given the fact that these findings are (1) mostly based on limited information (little or no primary data), (2) based on numerical model outputs which are inherently uncertain or (3) based largely on expert opinion and/or extrapolated from impacts measured elsewhere under very different conditions (i.e. Koeberg). Perhaps it would help if guidelines were provided as to how the level of confidence (Low/Medium/High) was identified. Definitions must be provided for each.
- 32. p 55 §5.2 and 5.2.1. This section is entitled “Recommended mitigation measures” but does not include any mitigation measures at all. The authors briefly allude to the fact that “recommended mitigation measures take place during the construction phase and reduce the severity of the particular impacts...” but make no effort to summarise what these recommended mitigation measures are. The reader is expected to troll through the entire report to find these. This is not acceptable in my opinion as it will result in mitigation measures not being translated into the Environmental Authorisation when this is prepared by the authorities. Similarly, I do not accept the statement that “it is not possible to define mitigation targets or measure ‘success’ of these actions, as we have no measure of the impact without mitigation”. There is plenty of scope for mitigation of impacts during the operational phase, some of which are alluded to in the section where the impacts are discussed (e.g. selection of alternative outfall location and designs). Most of the section on mitigation (3 pages) is devoted to monitoring actions which cannot under any circumstances be construed as mitigation. This material belongs in a separate section under an appropriate header.
- 33. p 55 2nd paragraph: Refer to comment 11 above.
- 34. P 58. DWAF guidelines are no longer applicable to effluent discharged to the marine environment.

If you or the authors of the report have any questions relating to this review, they should be encouraged to discuss these directly with me.

Sincerely

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

Barry Clark