

5 August 2015

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Your Ref: Email received 07 August 2011

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Dear Andrew Stuart Marshall

**RE: ESKOM EIA CONCERNS FOR THE PROPOSED NUCLEAR POWER STATION AND ASSOCIATED INFRASTRUCTURE (DEA Ref. No: 12/12/20/944)**

**BOKSPRUIT FAMILY TRUST: OBJECTION TO NUCLEAR-1 REVISED DRAFT EIA REPORT**

**Comment 1:**

We refer to the above. Please take note of the following objection.

**1 Introduction**

- 1.1. This submission is made on behalf of the Trustees for the time being of the Bokspruit Family Trust, who in that capacity own portion 25 (Portion of portion 7) of the Farm Ongegunde Vryheid Number 746, Division of Humansdorp. The property lies on the coast at Thysbaai, approximately 3 km from the proposed site of Nuclear 1 at Thyspunt.
- 1.2. The writer will comment on the Revised Draft Environmental Impact Assessment Report (the "EIA") for the Eskom Nuclear Power Station and Associated Infrastructure ("Nuclear 1") produced by Arcus GIBB (Pty) Ltd ("the Consultant") and dated March 2011 insofar as it relates to the Thyspunt site ("Thyspunt").
- 1.3. The objection will deal with the site selection process followed, the methodology followed in reaching a conclusion as to the preferred site, and finally certain selected aspects of the specialists' findings.

**Response 1:**

Your comment is noted.

**Comment 2:**

**2. Assumptions**

- 2.1. The writer assumes that the statements set out in this paragraph are not disputed by the Consultant, and are accordingly common cause.
- 2.2. Thyspunt is a valuable heritage site, both as a result of the wealth of archaeological material that is known to be extant at the site, and also due to the cultural significance of the site for



the local Khoi people. While steps may be taken to mitigate any loss of such material, and to minimise damage to the site from a cultural perspective, such damage as occurs would be irreversible.

**Response 2:**

Your comment is noted. Where GIBB and the Heritage Specialist differs from the writer of the comment, this will be pointed out.

Your statement regarding the heritage value of the Thyspunt site refers. There is a dense concentration of heritage sites in a good state of preservation along the western coastline of the site, and to a more limited extent along the eastern coastline. However, the recommended footprint area within which the power station is proposed to be placed has very few heritage sites and is situated in an inland area within the vegetated dunes, within which very few heritage sites are found. This finding is based on extensive trial excavations (under a permit issued by the South African Heritage Resource Agency) undertaken in late 2011.

Any damage to archaeological sites is essentially, by its very nature, irreversible, since heritage resources are non-renewable resources. However, mitigation measures such as responsible excavation, research and housing of the heritage resources in a museum can increase knowledge about the value of the Khoi heritage on the site. Whilst the heritage resources on the site are undoubtedly left by Khoi people, direct links between KhoiSan people who lived on the site and groups of present-day people who claim Khoi descent cannot be demonstrated beyond doubt, due to the poor written history for the Khoi people.

**Comment 3:**

- 2.3. Thyspunt is a biodiversity hotspot, particularly insofar as the richness of the flora at the site is concerned. This richness is to a large degree dependent upon the unique dune / wetland combination at the site. The interaction of the dune system with the wetlands is not well understood by experts. Once again, while steps may well be attempted to mitigate any damage, any damage that did result from construction of Nuclear 1 may well be irreversible.
- 2.4. The Thyspunt site includes and / or is profoundly linked with the only remaining dune headland bypass system in the country.
- 2.5. The Thyspunt site has significant wilderness qualities, as noted in the EIA.
- 2.6. The coastal waters near Thyspunt support a chokka fishery that is of great importance to the economy of the surrounding district.

**Response 3:**

The Thyspunt site in itself cannot be said to be a biodiversity hotspot. The Thyspunt site does possess a diversity of habitats (e.g. mobile dune fields, wetlands, vegetated dunes, forest and scrub) but cannot be said to qualify as a centre of endemism.

The interactions between the dune systems, water tables and wetlands are in fact well understood. several years' worth of monitoring data of groundwater levels and wetlands was used to model the interaction between these systems and the results are interpreted in an Addendum to the freshwater Ecology Assessment (Appendix E12 of the Revised Draft EIR), based on monitoring carried out since 2010. This monitoring is still ongoing at present and confirms the findings in the Revised Draft EIR Version 1 that critical wetlands such as Langefonteinvelei are not geo-hydrologically linked to the

groundwater table in the portion of the site where groundwater will be extracted from the excavation for the “nuclear island”.

Your comment regarding the rarity of the headland bypass dune system is noted. The headland bypass dune system at Thyspunt is not the only one in South Africa. Other examples are found at Cape Agulhas, Waenhuiskrans, Buffelsbaai and Cape Recife (Port Elizabeth). Please refer in this regard to the Dune Geomorphology Assessment (Appendix E2 of the Revised Draft EIR Version 1).

Your statement regarding the wilderness qualities of the Thyspunt site are noted.

Your statement regarding the importance of the chokka industry to the local economy is noted. This and the fact that chokka is caught (amongst other locations) in areas immediately offshore of the Thyspunt site is not disputed. However, analysis of independent commercial chokka fishery data provided by the Department of Agriculture Forest and Fisheries and its scientific advisory group (the Squid Working Group), shows that claims of a negative impact of up to 30% on the chokka fishery is not substantiated. Data provided by these bodies shows that 14.7% of total catches are taken in the wider area (two quarter degree squares of approximately 22 x 27 km each) around the Thyspunt site – itself a much larger area what will in fact be impacted. In this regard, it must also be noted that the total area affected by a temperature increase of 3°C or more will be less than 1km<sup>2</sup>. In the current revision of the Marine Ecology Report the area potentially lost to the fishery (based on the commercial info provided by DAFF) is presented. While still under review, this figure ranges from 2.86% (worst-case scenario) to 2.53% (least-case scenario) to the fishery in the **local area** under question, and between 0.42% and 0.37% for the fishery as a whole.

#### **Comment 4:**

### **3. Site of nuclear power station**

- 3.1. The proposed sites for Nuclear 1 are derived from a study conducted during the 1980s (the “NSIP Report”)<sup>1</sup>. At the time, policy requirements dictated that a nuclear power station could not be built within 100 km of the Ciskei or Transkei. Accordingly, the site selection process at that stage did not take account of a large stretch of the South African coastline.
- 3.2. The political environment during the 1980s severely restricted the ambit of public participation in any such process, particularly one as sensitive from a national security perspective as a nuclear power station. The process was accordingly not conducted in an open and transparent manner.
- 3.3. The statutory framework relating to the environment was radically different in the 1980s, so much so that there is a strong possibility that the findings of the NSIP report would be rejected if it were submitted today; nonetheless, the site selection for Nuclear 1 is based upon that report.
- 3.4. An example of the current process’ weakness in respect of site selection is the manner in which the proposed inclusion of the Coega industrial area near Port Elizabeth was dealt with. The NSIP Report excluded the area as a possible site. Subsequent to that report, the Coega area was developed, and now not only has appropriate infrastructure to support the construction and operation of Nuclear 1, but is also located near an existing industrial hub where electricity generation capacity is required.
- 3.5. When it was suggested that Nuclear 1 be sited at Coega, the Consultant noted that seismic studies would be required before Coega could be approved as a nuclear power station site,

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<sup>1</sup> Nuclear Siting Investigation Programme (NSIP) Eastern Cape Summary Report” of December 1994

and that such studies would take approximately 5 years. This, however, cannot be used as a justification for building the nuclear power station in an environmentally sensitive area when a site such as Coega is available, which is not environmentally sensitive and has existing infrastructure. The copy of the NSIP Report available to the writer was produced in December 1994, which is a year of no small significance in the Republic's history. It would have been clear to all persons involved in the site selection process after 1994 that the political environment had changed radically, as had the restrictions upon site selection. Nonetheless, in the 17 years since, no effort has been made to re-assess the findings of the NSIP Report.

- 3.6. "While the writer is aware that the Consultant was not given the option of exploring other possible sites, it is nonetheless submitted that it is a fatal flaw in the process to approve the construction of a nuclear facility on an environmentally sensitive site where a proper site selection process has not been carried out."
- 3.7. It would appear that the two proposed sites located in the Northern Cape, "Brazil" and "Schulfontein", were excluded from the current EIA process due to political pressure being placed on the parties to reach a decision quickly. The writer submits that given the environmental and financial implications of building a nuclear power station, the decision cannot be rushed.

#### **Response 4:**

- 3.1 Your comment is noted.
- 3.2 Your comment is noted.
- 3.3 The environmental governance framework has indeed changed completely since the NSIP was completed. Environmental considerations have become mainstream issues in project development since the first EIA regulations were implemented in South Africa in 1997. However, apart from environmental management frameworks (EMFs), EIA remains the only legislated tool of environmental management in South Africa. EIA, in terms of legislated requirements, has always been and continues to be a project-specific tool of environmental management i.e. it is applied once a specific project has been identified on a specific site. As such, public participation, which forms an integral part of EIA processes, would not be applicable to strategic planning or feasibility study such as the NSIP. Thus, it cannot be said that site a feasibility investigation such as the NSIP would be rejected today based on a lack of public participation. Consequently, even under the current legislative regime, stakeholder engagement processes for pre-feasibility or feasibility studies are typically undertaken at a very strategic level and include high-level stakeholders such as authorities, but do not include broad-based public participation.
- 3.4 and 3.5 Your comments regarding the consideration of the Coega Industrial Development Zone as an alternative site for Nuclear-1 are noted. Section 5.2.5 of the Revised Draft EIR deals with the reasons why Coega could not be considered as an alternative for the Nuclear-1 EIA. A delay of a further five years for consideration of seismic information from Coega may well result in further electricity generation capacity being developed too late to ensure that current and likely future electricity backlogs are addressed. Coega may well be considered as a feasible and reasonable alternative in future EIA processes.
- 3.6 Your comment is noted.
- 3.7 Your comment regarding political pressure having been brought to bear on the exclusion of the Northern Cape sites is noted. Should you have substantiation for this statement, it would be appreciated if you could provide it. The reasons for the rejection of the Northern Cape sites in the scoping phase of the Nuclear-1 EIA process were clearly set out in the Nuclear-1 Scoping Report, which report has been accepted by the Department of Environmental

Affairs. The decision is certainly not being rushed - the Nuclear-1 EIA process has already taken more than seven years.

**Comment 5:**

**4. Conservation benefit: a red herring**

- 4.1. Eskom currently owns the property on which the proposed site is located. The EIA makes much of the conservation benefits of locating Nuclear 1 at Thyspunt. In particular the Consultant states that should the plant be built at the site, a conservation area would be established, and that the wetlands at Thyspunt, as well as the vertebrate and invertebrate fauna, would benefit from protection that they would otherwise not receive.

**Response 5:**

Your comment is noted.

As indicated in the Revised Draft EIR Version 1, a maximum area of approximately 280 ha is required for the power station. Thus, only a small portion of the site will be developed. The land currently owned by Eskom at Thyspunt is 1638 ha. Thus, if 280 ha is used for development, it would leave approximately 83% of the site undeveloped. At Duynfontein, where the Eskom owned property is 2849 ha, even a larger proportion of the site is undeveloped and dedicated to nature conservation. Development of the nuclear power station is proposed to be focused on a specific concentrated footprint, which has been defined for its low environmental sensitivity, leaving more than 80% of the property free for conservation. In the absence of any significant efforts to establish conservation areas along the affected stretch of coastline (with the exception of the Rebelrus conservancy) and the vigorous alien vegetation encroachment throughout the St. Francis region, the possibility of the development of a *de facto* nature reserve is indeed considered to be a significant offset benefit for conservation.

**Comment 6:**

- 4.2. This argument is based upon an unknown: while it is possible that Eskom will sell Thyspunt property if the EIA is not approved, there is no indication as to what the fate of the site would be in such an instance. If the site were subsequently developed as a high-density holiday resort the environmental impact would doubtless be severe indeed, perhaps more severe than construction of a nuclear power station. This scenario is possible but unlikely, given the property's environmental sensitivity and current zoning, as well as the environmental and heritage sensitivities of surrounding communities. Even if the site were sold to a private party, it is more likely that low-density development would result, in a similar fashion to the current land usage between Oyster Bay and Cape St Francis.
- 4.3. Because significant environmental degradation cannot be shown to be a likely outcome should Eskom not build a nuclear power station at Thyspunt, the conservation benefit factor cannot be presented as a positive factor for locating Nuclear 1 at Thyspunt.

### **Response 6:**

- 4.2 Your comment is noted. However, the history of recent development in the St. Francis area indicates that residential and golf estate developments in the St. Francis region, even though they are subjected to EIA process, contradicts your opinion. Even though these developments have been subjected to EIA processes, such developments have caused extensive destruction of heritage resources and lead to the stabilisation of a portion of the eastern part of the sensitive Oyster Bay Bypass Dune System. There is, therefore, reason to believe that other developments having a severe impact would be permitted. It must be borne in mind that developments are not always planned on a large scale. Small developments that individually have insignificant impacts can eventually have highly significant impacts when their cumulative impact is considered. This is especially the case with the development of urban areas along the coastline.
- 4.3. Your comment is noted. For the reasons given in Response 5, conservation benefits are contended to be a significant positive impact.

### **Comment 7:**

#### **5. The EIA has been prejudiced by site selection**

- 5.1. The Consultant has for various reasons taken the approach of combining an EIA in respect of three potential sites for Nuclear 1 with a comparative assessment of these three sites to determine the site most suitable for construction of Nuclear 1.

### **Response 7:**

- 5.1 Thank you for your comment. Based on comments received from the DEA during the review of the RDEIR Version 1, The National Department of Environmental Affairs requested the EAP to review the impact assessment methodology used in the Revised Draft Environmental Impact Report (Version 1), so as to simplify the criteria for assessment of significance and identification of a preferred site. In response, an approach has been developed that identifies and describes key decision-making issues contained in the individual specialist studies. This updated assessment no longer utilises the ranking / scoring system for the sites, but rather considers the residual risks associated with the proposed Nuclear power station at the proposed sites. These decision-making issues apply to both the acceptability of the proposed Nuclear Power Station as well as to the preferred site. Please refer to Chapter 10 for the updated assessment approach.

### **Comment 8:**

- 5.2. The decision as to site location necessarily involves two enquiries. Firstly, is a particular site suitable for construction of a nuclear plant at all, from an environmental perspective? Secondly, if a number of sites are suitable, which site is to be preferred?

### **Response 8:**

- 5.2 Your comment is noted. The EIA and specialist studies have concluded that both sites (Thyspunt and Duynfontein) are environmentally acceptable for a nuclear power station. The Thyspunt site is considered the preferred site and it is recommended that it be authorised by the DEA (with conditions) for Nuclear-1. Eskom must ensure that the required

mitigation measures are effectively implemented. It is important to remember that none of the specialist assessments identified fatal flaws at any of the remaining sites, and both the proposed sites remain viable sites for nuclear power station development, either for Nuclear 1, which is now proposed, or for some future power station. As such, the site selected is the one that provides the greatest immediate return from an electricity supply point of view. Thyspunt will strengthen the eastern grid and help create a generation centre along the east coast.

**Comment 9:**

- 5.3. These two enquiries would necessarily turn on different sets of factors. The first enquiry would place a greater emphasis on such environmental factors as impacts on dune geomorphology, impacts on heritage resources, impacts on flora and fauna, local economic impacts, and social impacts.
- 5.4. The second enquiry would place a greater emphasis on technical factors that are internal to Eskom, such as transmission integration and any factors impacting on the final cost of constructing and operating the plant<sup>2</sup>

**Response 9:**

5.3 & 5.4 Your comments are noted. Owing to the fact that none of the specialists identified fatal flaws at any of the sites, the answer to the “first enquiry” would be that all three of the alternative sites are potentially suitable. The “second enquiry” is discussed in Section 9.32 of the Revised Draft EIR Version 1.

**Comment 10:**

- 5.5. The Consultant, however, has not separated the two enquiries, and has conflated the decision as to whether a particular site is environmentally suitable at all with the question as to whether that site is to be preferred to other sites.

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<sup>2</sup> Factors that would have weight in such a second enquiry include the following factors set out in the EIA:

- Geotechnical suitability: the impacts described here relate to technical challenges in constructing Nuclear 1, which are an internal Eskom consideration.
- Geo-hydrology: while several factors identified here are external to Eskom, the danger of flooding by groundwater and degradation of infrastructure by corrosion is internal to Eskom.
- Economic Impacts: “cost effectiveness” is identified as a factor, and a positive one at that. The report indicates that this factor gave Thyspunt an edge over the other two sites considered. However, it is not valid to give an internal Eskom cost such significance in this EIA.
- Impact on transportation systems: the EIA notes that transportation system upgrades would be required for certain sites, and that these costs would make one of the alternative sites to Thyspunt unfeasible; however, as these upgrades would be costs internal to Eskom, they should not be accorded great weight at EIA stage.
- Impacts of nuclear and non-nuclear waste: while potential harm caused by such waste is clearly an environmental concern, the Consultant seems to have assumed that the risk of such harm occurring is equal at each site, and examines the various possibilities in dealing with such waste. Again, this factor is internal to Eskom.
- Transmission integration: this factor relates wholly to Eskom’s internal technical considerations. While the Consultant has made out a case for economic and social benefits by securing a secure supply of electricity, such factor would apply to the whole of the Eastern Cape Province, and not the immediate area of Thyspunt. Accordingly, while the factor is certainly noteworthy, it cannot be given high significance in an EIA. It would doubtless be decisive if an EIA had been approved in respect of one site in the Eastern Cape and one in the Western Cape, but it cannot be a significant factor in the EIA itself.

**Response 10:**

Your comment is noted. As indicated in Response 9, “Enquiry 1” has been answered since the specialists did not identify fatal flaws at any of the sites.

**Comment 11:**

5.6 The effect of this approach is that in deciding whether the Thyspunt site is to be recommended as the site of Nuclear 1, the recognised heritage and biodiversity sensitivities of Thyspunt are weighed directly against technical factors and economic factors particular to Eskom, particularly transmission integration, transportation infrastructure and seismic suitability. This approach in effect compares factors that do not bear comparison. The Consultant should first have determined whether the site was suitable from an environmental perspective at all before making a site comparison.

**Response 11:**

Your comment is noted. As indicated in the responses above, it has been determined that all of the sites are potentially suitable, and the Revised Draft EIR Version 1 therefore focused on determining the most suitable site from the three alternatives considered. Your comment is noted that technical factors and environmental impacts can in effect not be compared. The same could potentially be said for different categories of environmental impact e.g. impacts on the natural environment vs. impacts on the social environment, or even of impacts on one natural resource vs. impacts on another natural resource. This would imply that none of the categories of environmental impact could be compared to each other and no comparison of alternative sites could be done at all.

There are, however, several techniques such as multi-criteria analysis that compare apparently very disparate sets of data to identify a preferred alternative amongst options for which a wide variety of dataset are available.

**Comment 12:**

5.7. That is not to say that Eskom’s cost factors should not play a role in deciding upon an appropriate site for Nuclear 1, merely that these factors should play a significant role only after environmentally acceptable sites have been finalised.

**Response 12:**

5.7 Whilst your opinion is noted, the EIA process in South Africa is defined to consider all forms of environmental impact, which include both biophysical and social factors. Economic impacts are one of the categories of social impact. There is no policy or principle in South African environmental legislation that prioritises biophysical impacts over social and economic impacts. Your opinion that economic impacts should be considered only after biophysical impacts are considered is therefore not supported.

**Comment 13:**

5.8. Even then however, the recognised biodiversity and heritage value of the Thyspunt site cannot be outweighed by any but the direst economic need, and only then when no other suitable sites are available. While power generation is doubtless of great national



importance, it is not sufficiently important to risk damaging the unique biodiversity and heritage artefacts located at Thyspunt.

- 5.9 Consequently the writer is of the view that the Consultant's general approach in arriving at a decision was flawed in that it mixed the requirement for an EIA with the requirement for site selection.

**Response 13:**

Your comments are noted. Even though the Thyspunt site as a whole can be regarded as sensitive in terms of the occurrence and quality of heritage sites, the Oyster Bay Headland Bypass Dune System, wetlands and other factors, these sensitive features are not distributed evenly all over the site. They are concentrated in specific areas of the site. For instance, the highest quality heritage sites are concentrated by and large in a narrow strip 200m from the coastline. Similarly, the Headland Bypass Dune System occurs across the northern portion of the site but is missing from the southern portion of the site. Accordingly, the power station can be positioned to avoid impacts on scarce and valuable resources. The area that has been recommended for placement of the power station is therefore in the last sensitive portion of the site.

**Comment 14:**

**6. Weighting Allocation was Flawed**

- 6.1. The EIA does not follow any internationally recognised methodology when arriving at the weighting to be given to the various environmental and technical factors taken into account in selecting a site for Nuclear 1. Indeed, no reference was made to international best practice. The Consultant admits on page 314 of the EIA that the weighting methodology was decided upon at a workshop of specialists. In other words, the weighting methodology was developed "in-house" by the Consultant and the specialists that contributed to the EIA.
- 6.2. It is clear from the report that the weighting applied in respect of each of the factors was decided upon only after the specialist reports had been completed. Consequently, the weightings can have no objective basis, but were decided upon with the knowledge of the specialists' findings.
- 6.3. It would be difficult indeed for the Consultant to rebut the allegation that the weightings were deliberately allocated in such a way as to skew the choice of site towards Thyspunt. This allegation is given further force by the fact that the Duynefontein site is a clear favourite from a purely environmental perspective, while the weightings applied shift the results conclusively in favour of Thyspunt.
- 6.4. Accordingly the weighting allocation and consequent numerical comparison in the EIA are fatally flawed. Given that the Consultant has been tainted by the subjective manner in which it conducted this process, any new comparison would require the appointment of a new Consultant.

**Response 14:**

- 6.1 Your comments with respect to the weighting system are noted. It is questioned why "in-house" development of a weighting system would necessarily imply that the weighting system is flawed. As indicated, the principles of the weighting were agreed during a specialist integration meeting, where a total of 25 specialist teams (and even more individuals, as some teams consisted of more than 1 person) contributed to the discussion about the principles. Such a large number of participants ensured that a variety of viewpoints

on the weighting principles were heard and that no one team's viewpoints overruled the decisions on weighting.

- 6.2 Your statement that the weightings that have been applied have no objective basis refers. The EIA regulations (Government Notice No. R 543 of 2010) requires in Regulation 31(2)(n) that the Environmental Assessment Practitioner must provide "*a reasoned opinion as to whether the activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation*". Clearly, from the content of this regulation, the EAP can provide an opinion, provided that it is reasoned. Accordingly, the rationale behind the weighting criteria has been fully explained in Section 9.35 of the Revised Draft EIR Version 1.
- 6.3 Your comment is noted. The reasons for the weightings are clearly articulated in section 9.32 of the Revised Draft EIR Version 1. Should you have any substantive motivation for rejecting the weightings, GIBB can consider this.
- 6.4 Your opinion in this regard is noted.

#### **Comment 15:**

#### **7. Weighted Numerical Comparison**

- 7.1. Without prejudice to the arguments set out in paragraphs 5 and 6, the writer takes issue with the weightings given to the factors described in this paragraph.
- 7.2. "Transmission integration factors" and "seismic suitability" are both factors that are of high significance to Eskom internally, but there is no clear justification to give these factors a higher weighting than any other factor. While there is certainly a place for economic and technical factors, these cannot have the effect of crowding out environmental factors. These factors certainly do not warrant a higher weighting than for example "impacts on heritage resources".
- 7.3. "Potential conservation benefits" are entirely speculative as pointed out in paragraph 4. They should not be included as a factor at all, let alone given a weighting as high as 3 out of 5.
- 7.4. "Economic Impacts" largely relate to Eskom's internal costs, and should not be given a weighting as high as "impacts on heritage resources" for example.
- 7.5. "Floral impact" is given the lowest possible weighting, despite Thyspunt having an acknowledged high biodiversity in flora. This is justified by the Consultant on the basis that mitigation would reduce the risk of damage to flora, but given the uniqueness of the resource at Thyspunt, mitigation is no reason to reduce its significance.
- 7.6. "Marine ecology impact" is given the lowest possible weighting. The chokka fishery is an important aspect of the economy of the region around Thyspunt, and damage to this fishery would have severe consequences for local communities. The low rating is not justified. See paragraph 10 below.
- 7.7. Certain factors were removed from consideration due to the fact that they were insignificant, equal across all three sites, or not applicable to all sites compared. Such an approach in (sic) interferes with the EIA process by imposing the requirements of site selection on the EIA.
- 7.8. The inappropriate weightings to various factors as set out above all appear to favour Thyspunt as a preferred site for Nuclear 1, which adds force to the contention that the Consultant deliberately allocated weightings so as to skew the results, given that Duynefontein was the favoured site on environmental grounds alone.

### **Response 15:**

- 7.1 Your comment is noted.
- 7.2 Seismic factors, as explained in the Revised Draft EIR Version 1, are one of the most critical factors for the location of a nuclear power station as it affects the safety of the power station as well as the feasibility, cost and timing of construction. The importance of this factor is underscored by the large difference in the seismic values of the three alternative sites.
- 7.3 Your comment is noted. Please refer to Response 5 regarding the reason why conservation benefits are regarded as important.
- 7.4 Economic impacts do not in fact relate to Eskom's internal costs, but to the cost to the country, since Eskom is a publicly owned institution and money spent on the power station would therefore be taxpayers' money. Furthermore, the Revised Draft EIR Version 1 deals not only with economic costs but also with benefits to the regional economies in the respective provinces in which the alternative sites are located.
- 7.5 Your comment is noted. Although the Thyspunt site has high habitat diversity, the particular habitat within which the power station is proposed to be placed is vegetated dunes. This is one of the least sensitive ecological communities on the Thyspunt site.
- 7.6 Your comment is noted. The Marine Ecology Assessment (Appendix E15 of the Revised Draft EIR Version 1) indicated that the impacts on the chokka fishery will be small. Please refer to Response 3 in this regard. These impacts can be effectively mitigated by the recommended measures to disperse warmed cooling water and to pump spoil offshore to a deep disposal site, beyond the depths at which it would have an impact on the relatively shallow chokka spawning grounds.
- 7.7 Your comment is noted. It is the duty of the Environmental Assessment Practitioner to interpret the data and information provided in the EIR and to make a reasoned recommendation with respect to the preferred site, since the application for Nuclear-1 is for a single nuclear power station that can only be constructed on a single site.
- 7.8 Your comment is noted. Please refer to our responses above regarding the rationale for weighting of the decision factors. Furthermore, subsequent to the RDEIR version 1 being available for public comment, the DEA requested the EAP to review the impact assessment methodology used in the Revised Draft Environmental Impact Report (Version 1), so as to simplify the criteria for assessment of significance and identification of a preferred site. In response, an approach has been developed that identifies and describes key decision-making issues contained in the individual specialist studies. These decision-making issues apply to both the acceptability of the proposed Nuclear Power Station as well as to the preferred site.

### **Comment 16:**

#### **8. Non-numerical comparison**

- 8.1. The arguments applied in paragraph 7 apply equally to the non-numerical comparison, in that technical factors have trumped environmental ones. Moreover, the importance given to the conservation benefits at Thyspunt is misplaced, as discussed above.

### **Response 16:**

Your comment is noted. Please refer to Response 5 above regarding the conservation benefits.

**Comment 17:**

**9. Lack of Peer-review**

- 9.1. The methodology used to assign weightings to the various factors was arbitrary and not subject to peer review.

**Response 17:**

Thank you, your comment is noted. Please note that every discipline has different method and approaches to evaluating data and information. In the field of environmental management, the assessment and evaluation of environmental impacts has developed over the last three decades and includes a number of criteria that are applied almost universally in EIAs. These criteria typically include nature (is the impact negative or positive?), extent (or scale), duration, intensity (degree of change), consequence (seriousness), reversibility, probability (how certain is it that the impact will occur?) and significance (overall importance of the potential impact). Although there is general agreement about the nature of the criteria for assessment and there are local and international guidelines on this, there is no single agreed method. It is up to the discretion of the environmental assessment practitioner (EAP) to apply his or her mind to determine the most appropriate combination of criteria, as well as any requirements that the environmental authority might have regarding the criteria. In the case of the Nuclear-1 EIA the EAP sought assistance from other senior EAPs, namely Mr. Neal Carter and Mr. Reuben Heydenrych, as well as an advisor on EIA process, Mr. Sean O'Beirne.

Furthermore, based on comments received from the DEA during the review of the RDEIR Version 1, The National Department of Environmental Affairs requested the EAP to review the impact assessment methodology used in the Revised Draft Environmental Impact Report (Version 1), so as to simplify the criteria for assessment of significance and identification of a preferred site. In response, an approach has been developed that identifies and describes key decision-making issues contained in the individual specialist studies. This updated assessment no longer utilises the ranking / scoring system for the sites, but rather considers the residual risks associated with the proposed Nuclear power station at the proposed sites. These decision-making issues apply to both the acceptability of the proposed Nuclear Power Station as well as to the preferred site. Please refer to Chapter 10 for the updated assessment approach.

**Comment 18:**

**10. Impacts on marine biology**

- 10.1. The following paragraph appears at page 51 of the Specialist's report on impacts on marine biology:
- 10.2. The following appears at page 43 of the same report:
- 10.3. The above paragraphs support the temperature and chlorine changes on the West coast (based on the Koeberg NPS experience), and describe increased chlorine toxicity in the warmer waters of the South coast, but then rely on potential sea temperature cooling as a result of climate change to mitigate that temperature increase.
- 10.4. This may be possible to extrapolate for the Duynefontein site but the other two potential NPS sites are on the Southern Cape coast. Both marine conditions (average water temperature) and the marine ecosystems are significantly different to that at the Duynefontein site, and thus and this conclusion is invalid.

- 10.5. Moreover, reference to climate change as an ameliorating factor is at best speculative, and cannot be used to support any conclusion in this regard.
- 10.6. Even in worst case scenarios those temperature changes are predicted to be only a few degrees, and nothing like the measured 4.1 degree sea water temperature difference between Duynfontein and Thyspunt. What the term “long term” means in the paper’s reference is unclear. The NPS building period is anticipated to be 8-10 years, and thereafter the water temperature differential will start. This is not long-term at all and does not apply unless the predicted cooling of seawater secondary to climate change is predicted to occur in the next 10-20 years.

**Response 18:**

10.3 – 10.6 The ambient seawater temperatures at the respective sites are indeed very different. Your comment seems to assume that the only basis for the marine specialist team’s conclusion about the impacts of warmed cooling water is their professional judgement and reference to the KNPS experience. However, their prediction of the impact in this respect is based on very detailed oceanographic modelling, which takes account of seawater temperatures and movement patterns. The results of the oceanographic modelling, which has been referred to in the Marine Ecology Assessment (Appendix E15) is contained in Appendix E16 of the Revised Draft EIR Version 1. The Marine Ecology Assessment considers the site-specific conditions at each site and to this end makes reference to a number of academic sources of information about each of the alternative sites.

Mitigation is not dependent on potential climate-change induced seawater changes. Mitigation measures for warmed cooling water (multiple release points, release above the ocean floor to prevent impact on the benthic environment and a very high flow rate at the point of release to maximise mixing with cool surrounding water) are well-documented in the Marine Ecology Assessment.

“Long-term” with reference to climate-induced changes in seawater temperature refers to a time scale of several decades. As stated above, the Marine Ecology Assessment does not rely on long-term climate-change induced changes in seawater temperature to offset the impacts of warmed cooling water. Thus, the issue of the time scale is largely academic as it does not materially affect the mitigation of the impact. Furthermore, the area that will be affected by the release of warmed cooling water at Thyspunt is very limited in extent. The Marine Ecology Assessment indicates that *“if a nearshore outfall is used a mean increase of 3°C near the seabed will be limited to an area of roughly 0.2 km<sup>2</sup> (2 ha) around the outlets of a 4 000 MW plant and an area of 0.7 km<sup>2</sup> will experience a maximum increase of 3°C or more at any time”*.

**Comment 19:**

- 10.7. The conclusions reached on page 24 of the report are questionable: there is no evidence that meeting the DWAF Water Quality Guidelines will result in no impact on the marine environment. There are certainly marine changes in sites such as Mouille Point in Cape Town and Cape Recife near Port Elizabeth where waste water is released into the marine environment, so there would need to be some monitoring and assessment around the Thyspunt site. It cannot simply be stated that there will be “no impact on the marine environment”.

- 10.8. Moreover, DWAF's water quality guidelines for marine coastal waters clearly state how increases in seawater temperature (the primary environmental impact in this case) can have an effect on primary producers (plants) and secondary consumers (animals) in the natural marine environment – refer to pages 105 and 188 thereof.

Temperature is the main reason why the South African Coastline is divided into 'West Coast, South Coast and East Coast'. Consequently, comparisons between Duynefontein and the other two sites have little standing.

**Response 19:**

Your comments regarding the impact of an increase in seawater temperature are noted. However, the increase in seawater temperature will be of very small spatial extent and concentrated near the surface, as warm water rises. The assessment of the significance of impact is based on oceanographic modelling and on the marine ecology specialist team's collective expertise and experience in this matter, including their monitoring of the marine environment at the KNPS.

**Comment 20:**

- 10.9. The following paragraph appears on page 32:

The invalidity of an argument depending upon speculative effects of global warming have been highlighted above.

**Response 20:**

Your comment is noted. Please refer to Response 18, where it is pointed out that the predictions of seawater temperature are based on detailed site-specific oceanographic assessments.

**Comment 21:**

- 10.11. The following appears on page 44 of the report:

- 10.12. The report states that there is no marine conservation benefit for Duynefontein and Thyspunt, but there would be a benefit for Bantamsklip because of the resident abalone population. However near-shore disposal near Bantamsklip poses a significant threat to the juvenile abalone population in this critical area for the species. Consequently the conservation benefit for Bantamsklip is dependent on successful far off-shore dumping of spoil, and this is not guaranteed. Should this not be successful then the high allocation of points awarded to this site in the final chapter is not valid.

**Response 21:**

Our comment is noted. Successful mitigation of the impact on abalone at the Bantamsklip site is dependent on offshore release of both spoil and warmed cooling water. Should such release not be possible at Bantamsklip, it would influence the environmental acceptability of the Bantamsklip site, since abalone is a species of great conservation concern at this site.

### **Comment 22:**

- 10.13. The report deals with disposal of spoil at sea at page 32. Thyspunt is located on a particularly rough stretch of coastline. The report appears to assume that no technical difficulties would exist in disposing of spoil a significant distance from the shore so as to mitigate negative effects. The nature of the coastline however renders any such assumption invalid, and a proper study would have to be conducted before any conclusions could be made in this regard.
- 10.14. Moreover, the impact on the marine environment of the spoil would depend to a large extent upon the nature of the spoil itself – a small particle size would remain suspended in the water column for a longer period than a larger particle size, with greatly differing effects. A proper study of this aspect would have to be conducted before any conclusions as to the impact of the spoil on the squid spawning grounds or any other aspect of the marine environment could be reached.
- 10.15. The inclusion of a mitigating strategy that is not feasible, could result in an EIA approval based on an incorrect premise, and if a site is chosen in that flawed process, inadequate mitigation could occur if the development proceeded incorrectly.
- 10.16. Thus the feasibility study for a 5km off-shore disposal at Thyspunt needs to be concluded, and included in the EIA, before the document can be assessed in a holistic fashion.
- 10.17. Moreover, the report clearly describes the planned dumping of 6.37 million cubic metres (Thyspunt and Duinefontein) and over 10 million cubic metres (Bantamsklip) of spoil, the environmental consequences of this, and need the need to mitigate this by dumping this spoil 5km or more out to sea (Thyspunt), and yet in the final analysis of points for the consideration of various sites the consequences on the marine environment are entirely omitted.
- 10.18. Report states that “no sites of special biological significance occur within the designated area”. The writer submits that Thyspunt lies within an unspoilt area which is subjected to limited fishing activity. It consequently has a high conservation potential that would be ruined by construction of a nuclear power station at the site.
- 10.19. Moreover, the writer is aware from personal experience as well as from anecdotal sources that Thyspunt supports a large and diverse shark population. The sensitivity of this population and the possible impact upon it, especially by spoil pumping and temperature change, has not been explored in the impact analysis.

### **Response 22:**

- 10.13 – 10.16 Your comment is noted. Indeed the mitigation of the marine impacts at this site are dependent on pumping the spoil 5-6 km offshore. Should this, or any of the other key assumptions of the EIA prove not to be feasible, the EIR has stated that it would no longer be valid. In the event that an environmental authorisation is issued, it would be conditional on the implementation of the recommended mitigation measures.

The oceanographic modelling that was used in the Marine Ecology Assessment’s prediction of impacts considers the particle size of the spoil and turbidity that results from suspension of spoil in the water column. It is for this very reason that a medium pumping rate is recommended for spoil disposal at the Thyspunt site, since a high pumping rate would have resulted in unacceptably high turbidity.

- 10.17 Feasibility of the proposed offshore spoil disposal pipeline is based on international experience with the construction of nuclear power stations, and liaison with construction and marine engineering companies.
- 10.18 Your comment is noted. Your statement that the site is subjected to limited fishing activity seems to contrast with the statement of the high importance of the area for the chokka fishery.
- 10.19 Your comment is noted. Should the respondent be able to provide substantiated evidence of the claimed large shark population, this claim could be considered.

**Comment 23:**

**11. Oceanographic impacts and surf breaks**

- 11.1. No conclusions can be drawn as to the potential impact of dumping spoil at sea until a study has been done of the physical makeup of the spoil, as this would impact on the distance which the spoil spreads after being disposed of, and the nature of the spoil deposits when it eventually settles.

**Response 23:**

Your comment is noted. A sediment grading analysis has been performed individually for all three sites and the modeling of sediment movement is based on this analysis.

**Comment 24:**

**12. Decommissioning factors**

- 12.1. While the EIA has addressed the environmental impacts associated with constructing and operating a nuclear power station, it has not properly dealt with the decommissioning of the nuclear power station. Given the scale of the task of decommissioning a nuclear power station, which would include dismantling an extraordinarily large construction, as well as removing and storing radioactive materials from the site, this oversight is fatal to the EIA.

**Response 24:**

Your comment is noted. Decommissioning is addressed in the Revised Draft EIR Version 1 commensurate with the level of information available on the proposed decommissioning strategy.

Yours faithfully  
For GIBB (Pty) Ltd



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The Nuclear-1 EIA Team