

Our Ref: J27035

20 March 2011

Ms Renee Royal
Thyspunt Alliance

Email: reneeroyal@mweb.co.za

Attention: Ms Renee Royal

Dear Ms Royal

ESKOM ENVIRONMENTAL IMPACT ASSESSMENT (EIA: 12/12/20/944) FOR A PROPOSED NUCLEAR POWER STATION AND ASSOCIATED INFRASTRUCTURE: COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Arcus GIBB acknowledges receipt of your comments on the Draft EIA report. We thank you for your valuable comments and your participation in the Eskom Nuclear Power Station (NPS) Environmental Impact Assessment (EIA) process. Your comments concerning the Nuclear-1 have been noted.

YOUR COMMENT (1)

This submission focuses on the Thyspunt site in respect of the Draft Environmental Impact Assessment (DEIA) Report prepared by Arcus Gibb February 2010. DEA Ref No: 12/12/20/944.

Please note that in instances where verbatim extracts from the DEIA has been incorporated this has been indicated as italics. Regarding this report the right to add, revise or withdraw comments is reserved and the following is submitted without prejudice:

BACKGROUND

Scoping and Plan of Study

It is noted that the information that was presented during the scoping phase was general and for five alternative sites. At the same time press releases by Eskom announced that they would not be continuing with the Nuclear 1 program which was further confused with the PBMR program. Although the Plan of Study had not been finalised (letter DEA 19 November 2008, Final POS Sept 2009, letter DEA 19 Jan 2010) 13 of the Specialist Studies had already been completed by December 2009 (E3, E4, E5, E6, E7, E8, E9, E15, E16, E23, E25, E26, E27), 6 by January 2010 (E10, E13, E18, E19, E20, E24) and the final 5 (E2, E17, E21 and E22) by February 2010. During this time the Draft EIA was prepared and it is noted that this was made available to the public on 3 March 2010.

RESPONSE (1)

The competent authority, the DEA, in consultation with the relevant provincial environmental authorities (the Department of Environmental Affairs and Development Planning [DEA&DP] of the Western Cape and the Department of Economic Development and Environmental Affairs [DEDEA] of the Eastern Cape) approved the Scoping Report in November 2008. This approval included the recommendation that two of the original five alternative sites assessed during the Scoping Phase, namely Brazil and Schulpfontein in the Northern Cape, be excluded from further consideration in the EIA. Their exclusion was based on the fact that the alternative sites would not constitute reasonable

and / or feasible site alternatives for Nuclear-1 based on limited local demand and the lack of existing electricity transmission corridors associated with these sites. The DEA approved the Final Plan of Study (PoS) for EIA in January 2010.

The Terms of Reference for all specialist studies takes into account the requirements of the DEA. The specialist reports have further been revised and will be made available for review as part of the Revised Draft EIR Report.

YOUR COMMENT (2)

The DEIA documentation is daunting and very difficult to manage given the magnitude of the project and the fact that three sites are considered simultaneously. It is noted that only one incomplete copy (seven volumes) of the hard copy was made available to the communities of St Francis Bay, Cape St. Francis and Sea Vista. Only after the omissions were picked up by the I&APs was a complete full copy (thirteen volumes) delivered to St Francis Bay on the 23 June 2010 a week before the end of the comment period. It is also noted that the Traffic Report was incomplete with Figures and Appendices missing. These have subsequently been corrected, however the Traffic report is still difficult to understand since the anticipated volumes of heavy and exceptionally heavy vehicles are not readily apparent.

It is noted that to access and review documentation off the Eskom web site is difficult as this too is vast and complex.

RESPONSE (2)

Your comments are noted. The Draft EIR has been revised and all omissions in the report have been rectified. The Revised Draft EIR and associated specialists studies will be made available for further public comment and review. Public meetings are planned once more in order to address any questions, issues of concerns or uncertainty which I&APs and stakeholders may have. Lastly additional electronic copies of the report can be made available upon request.

YOUR COMMENT (3)

Draft EIA and EMP

For a project of this magnitude it is not possible to assess three different sites in one Draft EIA and produce mitigations for three sites in the Draft EMP. It is anticipated that this is to be a huge industrial project. By way of comparison, an International example, Olkiuoto 3 in Finland is considered. According to the Areva Website, the Olkiluoto 3 Pressurised Water Reactor, which is the first Generation III Nuclear plant in the world, is Northern Europe's largest ever industrial project. Olkiluoto 3 was started in 2005 at an estimated cost of 2.5 billion euros to be completed in 2009. Due to technical problems encountered during construction the completion date is now estimated in 2012 at more than double the cost. Further as a matter of interest it was noted in the New York Times on 29 May 2009 that the cost of a new reactor as of May 2009 would be as much as 6 billion euros and these costs could escalate if built in geologically unstable sites or where threatened by storm surges. In the same article it was further noted that at the Flamanville 3 PWR in France, nuclear safety inspectors have found cracks in the concrete base and steel reinforcements in the wrong places.

Given the above, which highlights the magnitude and complexity of the proposal, there is not enough project detail provided for the Eskom Nuclear 1 project. The use of an "Envelope" is not acceptable for a project of this complexity and size, approximately R 100 billion (reactor costs only exclusive of site specific works and infrastructure). In the context of the project it is not appropriate to conduct one EIA for three sites in parallel and this is considered a superficial comparative study. It is not appropriate to rank sites and compare them as was done in this EIA. It has merely presented site sensitivities and

site evaluations resulting in a proposed footprint for development for each site. This cannot be considered an Environmental Impact Assessment.

Individual site specific EIAs should be undertaken for each site where detailed development plans, layouts, visual models of plant on landscape, cross sections, excavation details, stock pile areas, engineering drawings, stormwater management plans, wetland delineations and functionalities, infrastructure plans, etc are developed and carefully assessed.

RESPONSE (3)

The Plan of Study which details the methodology to be used in terms of the assessment of impacts was approved by the DEA. As such the assessment of impacts and associated specialist investigations has been structured in such a way as to be able to firstly make a detailed investigation of the status quo on each site and to assess site specific impacts and secondly to make a comparative assessment between the sites in order to identify a preferred site. The forms part of the alternative assessment for the project. The preferred site was thereafter further assessed and site specific recommendations were made in Chapter 10 of the Draft EIR.

YOUR COMMENT (4)

Similarly, for a project of this magnitude it is not appropriate to compile one EMP as it needs to be site specific. At this stage many "mitigations" that have been proposed in the specialist studies, which are actually information gaps and investigations that should be done during the planning stage as part of the EIA and assessed according, have been taken through to the EMP. It is not appropriate to forward these items to the EMP with the assumption that an Authorisation will be granted for an EIA. This needs to be amended.

These have been documented in

- Appendix 1: Some of the mitigations that have been listed in the Draft EMP which actually require consideration during the EIA phase.
- Appendix 2: Further Studies required

Regarding the EMP it is also noted that there are no details pertaining to the desalination plant, road, and intake and outfall tunnels, which themselves usually require Environmental Applications and specific management. They have been incorporated into the reactor build envelop which is unrealistic. This needs to be detailed.

The Construction, Operational and Decommissioning aspects of the EMP have not been investigated further in this review and it is noted that it would be far more appropriate to consider this once more detailed planning has been undertaken and construction/ operation/ decommissioning methods / specifications associated with a highly technical construction process is developed. In this instance the management issues around radioactive waste disposal and storage, spill containment etc and its potential effects on the environment should also be carefully considered.

RESPONSE (4)

The EMP has been revised to be more specific, detailed and is focused on the preferred site.

YOUR COMMENT (5)

Alternatives:

It is noted that the original site selection undertaken in 1980 was flawed as the study was done thirty years ago in a time that there was little concern for people or the environment. One of the main requirements of the original study was that the site was not allowed to be within 100km of the Ciskei. It

is maintained that if Eskom wants to invest in something as costly as a Nuclear Power Plant, it is necessary to ensure that the basic site selection is correct. It is necessary to place the generating capacity as close to the area of need as possible where roads, sub-stations, transmission lines are already in existence and where the area would be able to cope with the social and service requirements of a development of this magnitude.

At this point is noted that in respect of the "Transmission Integration" Chapter 9.27 page 9-244, to 245 it is stated that the development of a power station is favoured in the Eastern Cape and thus from a technical point of view the most preferred site alternative is Thyspunt. In respect of this statement we note that:

- The transmission lines should be kept out of this assessment as the Transmission Lines are subject of a separate EIA. As I&APs we have requested that the Transmission Lines and Roads be incorporated into the Nuclear 1 EIA but Eskom have illogically elected, against our request, to separate these components. These elements should thus remain separate and Eskom should not bring them into the equation when it suits them.
- Alternative sites closer to areas requiring power (Coega Development Corporation) should be investigated.

In light of the above, it is our view that the entire EIA process should be discontinued pending more rigorous and appropriate site investigations beyond the three pre-determined Eskom owned sites currently under consideration.

We further note that the rest of Chapter 9: Evaluation of Alternatives, selection of preferred site and summary of impacts and Chapter 10: Conclusions and recommendations (Impact Assessment Statement) is also questioned as an element of bias is anticipated. This pertains especially to ranking and weighting of impacts (to be discussed later) and the integration workshop, all of which have been determined and conducted in a biased and non-transparent manner. The notes and minutes have been requested on numerous occasions and they have not been released by the EAP.

RESPONSE 5

Your comments are noted. A review of the NSIP reports was undertaken at the start of the EIA process and it was found that the information in the NSIP reports with respect to the initial selection of site is still valid. This information is not and was not intended to be sufficient for a detailed Environmental Impact Assessment. The process was described in the scoping report and was accepted by the authorities as an acceptable process. With feasible alternatives available the EIA proceeded to determine the detailed environmental sensitivities of the sites, to compare the environmental suitability of the alternative sites and to undertake sensitivity analyses to confirm the positions on each of these sites where it would cause the least environmental impact. Furthermore, a series of specialist studies was undertaken to confirm the technical suitability of the site for a nuclear power station, these included detailed studies on Freshwater Supply Assessment (Appendix E8 of the Draft EIR) and geohydrological but more importantly the geological and seismic assessments which are critical to ensure that the plant can be safely operated in the longer term.

In terms of Transmission Integration issues whilst it is not practical to incorporate the Transmission line and Nuclear-1 Nuclear Power Station into one Application for Authorisation it does not mean that Transmission **Integration** issues can be overlooked in terms of the Nuclear-1 site assessment process. Impacts and issues from the Tx EIA have been considered where applicable in this EIA.

YOUR COMMENT (6)

No-Go Alternative

In most of the specialist reports it is noted as a conclusion that if the NPS does not go ahead, that

Eskom could sell the site and there could be unforeseen negative impacts on the sites created by other developments as the stringent controls implemented for a nuclear site may not materialise for any other development. Please could you in all honesty justify this ridiculous statement?

This PWR Nuclear III, if it can be equated to the Olkiluoto 3 in Finland, is equivalent to “the largest industrial project Northern Europe has ever experienced”. The proposed Nuclear Power Plant at Thyspunt has an enormous footprint ranging from 31 hectares (assume reactor only) to 125.11 hectares (73.79 ha the Main Plant and 51.32 ha for the HV yard) as well as huge cumulative impact (if residential village, roads, transmission lines) are factored in. At this point the cumulative impacts created by the storage areas for the High Level Radio Active waste should also be considered.

It is noted that the reports dealing with Fresh Water Supply, Geo-Hydrology, Terrestrial Invertebrate Fauna, Terrestrial Vertebrate Fauna, Wetlands and Floral Assessment, all of which conclude that the impact of the proposed PWR results in a define high negative impact on the environment, cite a conservation area as a mitigation resulting in a “medium to high POSITIVE” impacts (wetlands, roads page 9-253, vertebrate fauna page 9-254, and social / economic conditions).

This is not accepted and should be removed from the DEIA. The No-Go option is where no development is undertaken and the status quo on site remains unchanged. In this instance given the sensitivity of the site, consideration should be given to declaring it a RAMSAR and National Heritage site.

RESPONSE 6

Your comment is noted. The No-Go alternative would imply that potential benefits that emanate from the proposed project would not be realised. In this respect, it is important to balance the interest, needs and perceptions of neighbouring communities with the national interest for a secure electricity network that facilitates long-term sustained development of South Africa’s economy. Although potential negative impacts of the proposed project would be avoided with the No-Go alternative, it is imperative that South Africa develops its power generation capacity, particularly in the Western and Eastern Cape. There is will also be job creation and development brought to the area which will have social benefits much needed in the Eastern Cape.

YOUR COMMENTS 7

Peer Review

Due to the flaws in many of the specialist reports (documented by other submissions under separate cover) as well as the irrational conclusions and reluctance by the specialists to recommend a No-Go, no development at all and status quo remaining the same, outcome where it is scientifically compelling, it is demanded that peer reviews be undertaken by specialist with local knowledge and that these reports are made available to I&APs for scrutiny.

RESPONSE 7

Your comments are noted however all appointed specialists have signed declarations of independence and all initial specialist studies were reviewed by a peer reviewers who are recognized specialists in their fields. This list is available for scrutiny in Chapter 7 of the Draft and Revised Draft EIR.

YOUR COMMENT 8

Sustainability

Sustainability of Nuclear Energy should be considered carefully, especially since:

- The whole question of Nuclear Power is still debatable
- International precedent points to the financial and technical challenges and subsequent time delays associated with the Generation III PWR,
- international trends for the provision of base loads through renewable energy and smart grids as SA has abundant solar and wind power,
- costs vs. safety and decisions on material information such as the specific technology to be used (Generation 11 and Generation 111) needs to be clarified.

RESPONSE 8

Your comment is noted. The purpose of this EIA process, being a project-specific process for a nuclear power station, is not to assess the electricity generation alternatives i.e. the sustainability of Nuclear Energy. It is the function of the Integrated Resource Plan to weight the options in this regard and to define an appropriate mix of renewable and non-renewable energy resources for South Africa. Renewable generation alternatives such as wind and solar need to be included in South Africa's strategy to meet its future energy demands. However, wind power is not an alternative to base-load power such as nuclear and needs to be pursued in parallel to nuclear power. Concentrated solar power has the potential to become a base load option when storage is included. This technology however is still in demonstration phase and to date these potential high load factors have not been achieved. It has been made clear in the EIR that nuclear generation is not proposed as an alternative to renewable technologies, and that a number of relevant technologies need to be pursued in parallel.

A high level assessment of the implications of a wind farm as an alternative to a 4 000 MW nuclear power station has been included in Chapter 5 of the Revised Draft EIR. This analysis indicates an area of between 273 000 ha and 345 600 ha will be required for 13 333 MW of installed capacity (depending on the rotor diameter). Due to the fact that wind is not available at all times, a capacity factor of 30% is assumed and the effective power produced will be 4 000 MW.

Due to the variable availability of wind, it is not a simple solution to replace base load power generation such as nuclear with wind generation. In the case of wind turbines the output is a direct function of the local wind speed, and cannot be dispatched on request. This results in a requirement to have alternative means to supply the demand when there is too little or too much wind.

YOUR COMMENT 9

Comments on Chapter 3: Project Details

There is not enough project detail and the use of an "envelope" is not acceptable for an EIA of this magnitude. This is a huge project and it is thus necessary for detailed site specific project information to be made available to the key stakeholders, I&AP's and specialist consultants. This would include a detailed layout showing exact foot print of reactor and associated infrastructure (including High Level Radio Active waste Storage areas), cross sections of structures and of excavations, positions of stock piles, intake and outfall tunnels, desalination plants, visual impression in the landscape, details of

associated infrastructure, roads, transmission lines, residential village for employees and labour etc.

RESPONSE 9

The assessment of impacts is based on a comprehensive envelope of criteria. Considering the principle of a technology envelope, it is not necessary to know the exact type of reactor. GIBB considers this envelope satisfactory in terms of the detail provided for use in the assessment of significance.

YOUR COMMENT 10

CHAPTER 9: IMPACT ASSESSMENT

The Project Description provided in Chapter 3 is not detailed enough for an Environmental Impact Assessment to be undertaken. At this point it is noted that for a realistic assessment to be made of this project, cumulative impacts and impacts relating to Health and Safety issues, and supporting infrastructure like transmission lines, access roads, housing for workers, town planning aspects should also be included. This has not been done and in this respect the full implications of the proposal cannot be assessed.

It is not appropriate to forward Mitigations to the EMP especially since many of the Mitigations call for more detailed project information or further studies. See Appendix 1. This should be done during the EIA stage. As indicated in 9.2.1 Limitations, it is recorded that most studies had recorded limitations as well as some specialist studies that were undertaken outside of ideal sample season and that further studies are required. It is noted that further studies with regards seismic risk implications are required. These additional studies are listed in Appendix 2.

The assumptions as listed in 9.2.2 confirms that project information is generic, and that the mitigation measures (although inappropriately taken through to the EMP) will be implemented. As a receiving community we have no guarantee that this is achievable. This is onerous as shortfalls / gaps of information and assurances cannot be addressed after Authorisation is granted. Similarly the NNR application needs to be considered in parallel as Health and Safety issues / storage of High Level Radioactive waste contribute to cumulative impacts of the proposal.

The impacts of the proposed NPS are threefold,

- the impacts of the environment on the NPS
- the impacts of the NPS on the bio-physical environment
- impacts of the NPS on the socio-economic environment

RESPONSE 10

Please see response 9. Whilst it might be ideal to consider the potential impacts of the power station and all three transmission corridors and housing for workers etc. in a single document, this is not practically possible and would result in an unmanageable process and in all likelihood a set of documentation that would make understanding of the key issues impossible. Furthermore although it would be ideal to consider the cumulative impacts of the power station and all transmission lines holistically, the time frames of the power station and transmission line EIAs do not overlap (neither do the time frames of the individual transmission EIAs) and therefore, practically, it would only be possible to assess all cumulative impacts in detail after studying the findings of the transmission EIA reports. Potential cumulative impacts of the power plant will, however, be assessed in the EIAs for the power lines as they will be completed after the EIA for the power plant. Cumulative impacts of the transmission line EIAs are, however, assessed in general terms. Cumulative impacts have been explicitly included in the decision not to consider Bantamsklip as an alternative for Nuclear-1.

In terms of the EMP (which is a legally binding document) it has been recommended in the Draft EIR that further detailed “walkdown” assessments of the sites be undertaken by a team of specialists to determine detailed on-site mitigation measures. Further detailed site-specific mitigation will therefore be added to the EMP after authorisation, should it be granted.

Lastly the agreement between the DEA and the NNR indicates that the DEA would not “make a pronouncement on the acceptability” of radiological safety issues, and that this issue falls firmly within the ambit on the NNR licensing process. However, at the DEA’s request, information relevant to radiological safety issues has been included in the Draft EIR. The impacts of handling and storage of radioactive waste is a matter that is firmly within the ambit of the NNR and the newly established National Radioactive Waste Disposal Institute. The disposal of low and intermediate level radioactive waste will be undertaken at a facility that is licensed for this purpose (Vaalputs waste disposal site) and the impacts of disposal are therefore adequately managed within legally accepted criteria. This disposal site is audited on a regular basis against legal requirements.

YOUR COMMENT 11

Sensitivity maps

More detailed sensitivity mapping at a larger scale is required. The maps that have been provided are not very clear and are not readily available. Maps for all the surveys as well as a composite sensitivity map is required. These maps should indicate setback lines and buffers. The exact layout of the facility, all associated infrastructure, inclusive of excavations and slopes are to be overlaid on this map, at a large and detailed scale.

RESPONSE 11

Your comments are noted. The maps will be reviewed and revised if found necessary.

YOUR COMMENT 12

Impact Assessment:

Given the time constraints it has not been practically possible to comment on all impacts. In this respect the right to add, revise or withdraw comments is reserved. It is also noted that given the points above (ranking and weighting), as well as the individual submissions (under separate cover) pertaining to the specialist studies and Fatal Flaws that have been identified that the assessments should be re-evaluated. This is to be done in conjunction with peer-review (preferably local expertise) as well as participation of the receiving community.

RESPONSE 12

Your comment is noted.

YOUR COMMENT 13

Impacts of the environment on the NPS are recorded as follows:

Geotechnical conditions of the site E5

It is noted in the DEIA that as the over burden increases as one moves away from the coast and the existence of the water table, the design engineer is faced with dewatering issues and limiting the extent of the excavations to make the design economically and environmentally feasible. The DEIA notes that this will be an engineering challenge. As the proposed site is to be positioned at least 200m

from the coast and as far east (west?) as possible to prevent disturbance to the wetlands, this it would fall in an area where the excavated volumes are estimated to be 2600% greater. Page 34. It is anticipated that the need for larger excavations, larger areas for cut back in respect of site stability and a greater need for spoil disposal would have a significant negative (and knock-on impact) on the site.

It should be recorded in the DEIA that this would have a definite high negative impact permanently and would have a knock on effect on the hydrology, dune geomorphology etc. It is recommended that the exact excavations / dewatering be determined by the engineer and impacts assessed accordingly during the planning stages.

RESPONSE 13

Detailed studies have been completed to determine the geohydrology of the site to avoid impacting on the wetland. This study has provided a sufficient level of confidence that the impact on the wetlands can be minimized and avoided.

YOUR COMMENT 14

Seismic suitability of the site E4

The EIA is based on the historical Parametric-Historic methodology previously (1980s) employed for Seismic Hazard assessments of the site and thus does not include all the aspects recommended in the latest regulatory guides for NPPs. As a result, the ground-motion values calculated using the Parametric-Historic PSHA are not directly comparable in a meaningful manner to those calculated using a PSHA as defined in RG 1.208 and this would need to be confirmed. In this respect a new and advanced Probabilistic Seismic Hazard Analysis (PSHA) will therefore need to be undertaken, and it is noted that additional studies will still need to be completed during the course of the siting process, which may impact and even change conclusions reached to date. This is not considered adequate information on which to base the EIA and it is not accepted that this be forwarded to the EMP as a mitigation. This mitigation states that additional geologic investigations aimed at reducing the uncertainties regarding the geological model for the Site Vicinity area will be required. It is noted in the EMP that this would include the finalization of outstanding issues related to fault characterization, followed by the compilation of potential source models to be derived from the existing information, with the purpose to build a suite of alternative models that reflect the uncertainty that exists regarding the activities of identified sources. This information will then be utilized in a full-blown PSHA that will follow internationally accepted practice.

This site is traversed by two fault lines the Plettenberg Bay and the Cape St Francis fault lines as well as several new and inferred faults identified. Detailed seismic investigations need to be done in the planning stages prior to the EMP and impacts assessed accordingly before authorisation is granted.

RESPONSE 14

Your comments are noted however the current hazard at this site is a PGA of 0.16g. With the current state of knowledge stemming from the work done to date, there are no disqualifiers for the construction of a nuclear power station at the Thyspunt site.

YOUR COMMENT 15

Geological Stability of the site E3

Is relates to the seismic hazard of the site but also to water quality of the site. The report concludes

that for all the three sites under consideration there is a low geological risk to the NPS. Mitigation measures that have been recommended relate to founding to be sunk into rock, shock absorbers and thorough assessment of excavated area for undetected capable fault lines and developing suitable NPS design.

Although not highlighted in this report, given the nature of the Thyspunt Dune headland the possibility of liquefaction of the dune/wetland/aquifer should be investigated both in respect of the NPS and access roads.

Detailed geotechnical investigations should be undertaken prior to authorisation being granted.

RESPONSE 15

Your comment is noted. Liquefaction has been investigated in appendix E30 of the Revised Draft EIR.

YOUR COMMENTS 16

Hydrological suitability of the site E6

The analysis in the DEIA for Thyspunt is not understood (page 9-22) as it states “The potential cumulative impacts have a low significance at a local level, the reason being that the site is isolated and the most significant cumulative impact relates to the commercial and residential activities in the surrounding area. Lesser impact is expected during the construction phase than the operational phase as residential development is only expected to take place in time. Increased run off from hardened surfaces will impact on the surface water bodies and the ocean, should mitigation measures not be implemented.” There is and will not be any commercial or residential development in the area. Please explain.

It is concluded in the report that that the major characteristics that differentiate the impacts on the environment at the three sites mainly relate to rainfall, the presence of seasonal wetlands and non-perennial watercourses. It is noted that Thyspunt has the highest rainfall as well as seasonal wetlands and a non-perennial water courses. When considering the hydrology in association with the dune geomorphology and the wetlands it becomes evident that the impact of the site on the proposed PWR, and visa versa, at Thyspunt would have a definite negative impact. In this respect it is recommended that this be re-assessed, in respect of site-specific conditions, especially in the light of liquefaction and recent debris flows as well as dewatering and draw-backs. In addition an appropriate Stormwater Management Plan and Dewatering Plan are to be prepared prior to authorisation being granted.

RESPONSE 16

Your comments are noted however as per response 16 please refer to appendix E30 of the Revised Draft EIR for a discussion on debris flow and liquefaction.

YOUR COMMENTS 17

Suitability of the site in respect of freshwater supply E8

The DEIA report concludes that there extensive use of groundwater in the area and coastal springs at Thyspunt. Local and regional water resources are under stress and additional drawoff of the NPS (and associated infrastructure) would exacerbate the situation. In this respect a desalination plant has been recommended.

More details in respect of the desalination plant are required in respect of exact locality (is it within the 200m buffer strip), design, intake / discharge and impacts are to be assessed prior to the authorisation being granted. Please see above Hydrological suitability of the site E6.

RESPONSE 17

Your comment is noted.

YOUR COMMENT18

Conclusion

Cumulatively there is clearly the potential for the physical environment to negatively impact on the NPS, especially in respect of possible fault lines, dune/wetland dynamics in respect of debris flow, liquefaction, ground water and excavations. In this respect detailed investigations are required to be undertaken prior to the authorisation being granted.

RESPONSE 18

Your comment is noted. The physical characteristics of the individual sites and its impact on the NPS had indeed been taken into consideration not only individually as well as cumulatively. Specialist studies have not been undertaken in isolation from one another and all impacts have been assessed relatively to each other.

YOUR COMMENT(19)

Impacts of the NPS on the bio-physical environment are recorded as follows:

It is noted that the various specialist studies have been reviewed by experts and are submitted under separate cover. Points raised should be incorporated into the process and assessed accordingly.

Dune geomorphology E2

The DEIA notes that that the Geomorphologic conservation value of the Thyspunt headland-bypass dunefields is high, as they are the only remaining large dunefields of this type that are still active in South Africa. The headland-bypass dunefields at Cape St Francis are thus unique on a local, regional and probably global scale (Illenberger,1998, DEIA Feb 2010).The vegetated dunefield is a classic, almost pristine example of a suite of Holocene and Pleistocene dune ridges with a variety of origins: parabolic dunes, hairpin parabolic dunes, and sidewalls of previously mobile headland-bypass dunefields, including fairly unique examples of such sidewalls. The dunefield has high interpretive value for elucidating coastal dune dynamics.

Given the above, the study should include the No-Go option (retain status quo) given that the site is considered highly sensitive. This globally unique ecosystem should be declared a RAMSAR site forming part of the coastal cluster of the Baviaanskloof Mega-reserve. This should be indicated in the report.

RESPONSE 19

The impact of the proposed Nuclear Power Station on the Biophysical Environment has been assessed a number of specialists appointed in terms of the Nuclear-1 project who are recognised leaders in their field and well respected in terms of their academic track records. In addition, the specialist reports have been peer reviewed for technical quality and accuracy. Although the specialists have identified numerous sensitivite features on all sites, all specialists agree that none of the sites pose any fatal flaws in terms of the construction of a Nuclear Power Station. Lastly, all

specialists have reviewed the Draft EIR to ensure it provides an accurate representation of their results and recommendations. This applies to comments 19 – 33.

Your comments are noted. The Dune Geomorphology Assessment indeed confirms that overall the dunefields at Thyspunt has high interpretive value for elucidating coastal dune dynamics.. Although the specialist has identified sensitive features on all sites, the specialist does not report any fatal flaws in terms of the construction of a Nuclear Power Station at the Thyspunt site.

YOUR COMMENT 20

Flora and Ecosystem functioning E11

As quoted from the specialist study the following is noted:

Thyspunt will experience potentially the highest level of impact (i.e. is least preferred), if compromising the functioning of the wetlands at Thyspunt cannot be avoided, then this site is not recommended for the establishment of a NPS, especially as these systems are endemic to this coast, and the Langefontein is a “one-of-a-kind”, endemic system. If the engineers could satisfy the natural requirements for water supply, both in quality and seasonally to these wetlands sites, then Thyspunt might be a possibility. However, a south-north access road across the mobile transverse dunes would severely compromise the functioning of this sensitive and rare system; there is insufficient information at this stage to provide a clear indication, at high confidence, as to the nature and extent of such impact. Thyspunt has low confidence for mitigation for possible impacts on both the Langefontein and coastal wetlands, as well as the functioning of the transverse dunes.

It is noted that the key impact is the loss of habitat (Figure 5.3.1), albeit of vegetation of low rarity and sensitivity; for good quality habitat loss there is no mitigation, other than indirectly through providing an offset elsewhere on the site or in another area (sensu Brownlie, 2007, DEIA Feb 2010). This is not considered appropriate or acceptable .

It is further noted that crucial to development on the coast is a setback which satisfies the long-term (i.e permanent) protection of representative rare habitats as well as ecosystem functioning, at the same time providing a conduit for the movement of fauna between the HWM and the facility. An NPS could be built in the north and west of the EIA Corridor (Figure 5.3.11) and this would substantially reduce impacts on the coastal systems and their functioning. However, complicating the siting of the facility is the presence of highly sensitive and extremely rare wetlands both at the coast and inland at the Langefontein (Figure 5.3.11). These wetlands should be in no way be compromised by the planned development, either in the construction or operational phases. Likewise, the rare coastal limestones should be avoided at all costs.

It is further noted in the DEIA report that the loss of stable dune habitat is not regarded as a key issue as this habitat is not rare. However, there is some cause for concern given the poor conservation status of Algoa Dune Strandveld (4.1%). Southern Cape Dune Fynbos on the other hand is far better protected (>16%). Thus an important positive impact, admittedly potential, arising from the development, would be a well-managed conservation area catering for this habitat as well as the others represented at Thyspunt.

The report concludes that this site is supported, but with the proviso that:

- a) The coastal wetlands and limestones are not in any way compromised
- b) that a functional coastal corridor is created and managed, as part of a bigger conservation area, comprising the remainder of the site. Eskom should be part of a wider initiative which sees such a conservation area being expanded to include the whole headland bypass dune system between Oyster Bay and Cape St. Francis, despite losses of dune habitat and function at either end of this remarkable system (Figure 5.3.9). The balance (i.e. non-developed part) of the Thyspunt site would be a major contribution to the broader conservation area.
- c) Any powerlines crossing the transverse dunes would need to employ long spans so that pylons do

not physically sit on the mobile dunes. A south-north access road (Figure 5.3.6) across these dunes is not supported as mitigation would not exclude permanent structures from this routing. In addition it is believed that insufficient understanding of this system could compromise any decision on whether or not to construct such structures in the mobile zone. Such information would come from a study currently being undertaken by Rhodes University. The transverse dune functioning is likely to be seriously compromised in the long-term, and responses to recommendations regarding construction of a road across the dunes cannot be met with high confidence. Likewise, were a road to be constructed along this route, careful consideration would need to be taken in order to bring such a structure across the rare and sensitive sandstone wetlands lying north of the transverse dunes.

Since there are no detailed designs and the footprint is not confirmed, how can there be any confidence in these mitigations. We cannot confirm that the proposed development will not encroach into these sensitive areas, the notion of a 200m corridor between the plant and the sea is questioned as this area would accommodate the desalination plants, tunnels, pipework and associated infrastructure as well as fencing etc. This needs to be clarified.

The DEIA report concludes that of the three alternative sites, Thyspunt will experience the highest level of potential impact (i.e. is least preferred), followed by Duynefontein (intermediate preferred) and Bantamsklip (most preferred). Of the three alternative sites, Bantamsklip and Thyspunt will potentially benefit the most from the establishment of a protected area (provided it is handed over to conservation authorities after decommissioning), as neither of these sites currently has formal protected status. Thus the Thyspunt and Bantamsklip sites may also get the greatest possible benefit from the establishment of a power station, provided that it is placed and constructed in such a way that the most sensitive ecosystems are not affected. The No-Go alternative in the case of these alternative sites may be even more costly than the development of a power station, since the sites would then in all probability be sold and may be subject to residential or other forms of development that could result in impacts of greater significance than the development of a power station. Due to the large safety zones of a nuclear power station (at least 800 m radius from the nuclear power station), a sizable portion of the site would effectively be conserved. There is no such guarantee of a portion of the site being conserved in the event of other forms of development.

The above is refuted in the strongest possible terms and this should be taken out of the assessment. It is illogical and should be replaced with a recommendation for a No-go option, with regards to the NPS and conserving this globally unique ecosystem as a RAMSAR site forming part of the coastal cluster of the Baviaanskloof Mega-reserve.

RESPONSE 20

Your comments are noted. The impact of the proposed Nuclear Power Station on the Biophysical Environment has been assessed a number of specialists appointed in terms of the Nuclear-1 project who are recognised leaders in their field and well respected in terms of their academic track records. In addition, the specialist reports have been peer reviewed for technical quality and accuracy. Although the specialists have identified numerous sensitive features on all sites, all specialists agree that none of the sites pose any fatal flaws in terms of the construction of a Nuclear Power Station. Lastly, it has been recommended in the Revised Draft EIR that further detailed “walkdown” assessments of the sites be undertaken by a team of specialists to determine detailed on-site mitigation measures. Further detailed site-specific mitigation will therefore be added to the EMP after authorisation, should it be granted.

YOUR COMMENT 21

Wetlands E12

At Thyspunt issues to be considered in terms of potential impacts to wetland systems is more complex. There is a high degree of interaction between the dune systems and the wetlands. Thus, from a wetlands perspective, by far most serious potential impacts would occur at Thyspunt.

The DEIA concludes that Potential impacts at Thyspunt would be associated with the greatest number, intensity and complexity of impacts to important wetland systems. The main impacts include:

- Permanent loss and degradation of coastal seep wetlands as a result of dewatering /groundwater diversion, concentration of groundwater flows and proposed new roads;
- Risks of impacts to the Langefonteinvlei and its associated hillslope seep to the south, as a result of possible draw-down effects;
- Fragmentation, infilling and physical disturbance to duneslack wetlands in the Oyster Bay mobile dune system as well as to wetlands immediately north of the Oyster Baydunefield, as a result of impacts associated with the proposed passage of transmission lines, roads and potential options for sediment transport across the dunes;
- Potential infilling and fragmentation of important valley bottom wetlands to allow the construction of access routes to the site, as well as laying of sewage and water pipelines; and
- Degradation of depressional and other wetlands as a result of transporting excess spoil over the dunes to the HVY platform.

The above impacts are likely to result in profound degradation of a system that presently exists as a relatively unimpacted mosaic of terrestrial and wetland habitats, with high levels of interconnectivity and high overall biodiversity value, to which the wetland systems make a significant contribution. The potential cumulative impacts of the proposed development of a single nuclear power station at the Thyspunt site without implementation of mitigation measures has been assessed as of very high negative significance. It is important to keep in mind that additional research and monitoring will effectively increase the certainty of mitigation and the onus is on the applicant to ensure that mitigation measures are put in place to meet the requirements in terms of protecting the wetlands, reducing the potential significance of the impact.

Given the high sensitivity of the site the above study should include the No-Go option (retain status quo) given that the site is considered highly sensitive. A number of stringent mitigations are specified, as a receiving community we have no guarantee that this is achievable. This is onerous as shortfalls / gaps of information and assurances cannot be addressed after Authorisation is granted.

RESPONSE 21

Your comments are noted. Section 6.1 of the revised Wetland Assessment discussed the no-go option at the various sites. In terms of Thyspunt the report states that resort development is expanding rapidly in the non-Eskom owned areas between Oyster Bay and Cape St. Francis. The “no development” alternative at the Thyspunt site would probably result in ongoing low-levels of ribbon development along the coast and abutting the dunes, valley bottom and dune slack wetlands, and gradual formalisation of existing roads through and along the dune areas. The incorporation of the entire dune system into a managed conservancy with Ramsar status is a possibility, assuming support from all landowners and funding to secure adequate management of the area, which is a prerequisite for the declaration of Ramsar status. However, to date this option has not achieved success, and the problems associated with managing a conservation area with multiple landowners are likely to be considerable. At least low-level development across all erven would probably form part of the no-go alternative, and would be accompanied by “edge effects” into the mobile dune system, and likely degradation to wetlands such as the Langefonteinvlei of at least moderate levels, over time. The kind of fragmentation of the mobile dune that has been linked in this study to potential road and pylon construction across the dune is also likely in a no-development scenario, with landowners crossing the dune on an ad hoc basis, as is the case at present. Considerable resources would need to be allocated for conservation purposes, in order to reduce and control alien vegetation across the area.

Such alien clearing, although not carried out effectively to date on many of these erven, is a legal obligation of any landowner in terms of the Conservation of Agricultural Resources Act (CARA).

Incorporation of the site into a coastal cluster of the Baviaanskloof megareserve is also currently being considered. In this scenario, management of the site would fall under the auspices of the Eastern Cape Parks Board.

None of the “no development” options for the Thyspunt site appear to allow for incorporation of dune or wetlands outside of the current Eskom NPS site into conservation areas, and it is assumed that, if development of a NPS did not take place, development in and around these systems would continue, with existing development rights being renewed or implemented.

With this being said, however, it is fully acknowledged that ideally, none of the wetlands within and associated with the Oyster Bay dunefield should form part of any development offset. In the event that a no development alternative was available that provided adequate funding opportunities for alien control, and did not include piecemeal fragmentation of the area into multiple small developments, then a no-go alternative would clearly be preferred (from an ecological perspective) to any development of a nuclear power facility at this site.

YOUR COMMENT 22

Terrestrial vertebrate fauna E13

The DEIA notes; At Thyspunt, Nuclear-1 would have significant potential negative impacts because of the direct impacts on faunal habitats within the footprint areas, the development of two major new access roads, and the need for a development corridor across a large field of mobile dunes, making this site highly problematic with respect to fauna and faunal habitats. On the other hand, highly significant potential offsets are possible at Thyspunt if undeveloped land is declared a nature reserve and is effectively managed as such. Such offsets could be significantly strengthened by acquisition of additional land. The no-development option at Thyspunt is not positive because it can be assumed that it will lead to a change of land ownership and probable residential and/or resort development at the coast, and a probable increase in intensity of agricultural exploitation on the inland portion.

As above, this is refuted in the strongest possible terms and this should be taken out of the assessment. It is illogical and should be replaced with a recommendation for a No-go option, with regards to the NPS and conserving this globally unique ecosystem as a RAMSAR site forming part of the coastal cluster of the Baviaanskloof Mega-reserve.

RESPONSE 22

Your comments are noted. The revised Faunal Assessment states that Negative impacts arising from Nuclear-1 not being developed at Thyspunt are similar to those of Bantamsklip in that they are largely dependent on land ownership. If the land remains in the hands of Eskom, and if Eskom maintains current land use and management, there would be few, if any, negative impacts other than those currently operating. Current negative impacts are the spread of invasive alien vegetation, uncontrolled access by the public and their vehicles, and poaching. However, it is apparent that these issues have been addressed by Eskom and are largely under control.

On the other hand, if Eskom were to dispose of the land and land use were to change to, for example, residential or resort at the coast, and agriculture on the inland portion, massive negative impacts could potentially occur. It is apparent from existing developments on site, and the spread of new holiday residences from the Cape St Francis side, that the trend is decidedly towards creeping development

sprawl into this important nature area. The inland portion is already used for agriculture, but further degradation of natural habitats is certainly possible. Eskom ownership, must, therefore, be viewed as an important positive factor for nature conservation.

YOUR COMMENT 23

Terrestrial Invertebrate fauna E14

The DEIA concludes that Thyspunt has in all probability the highest butterfly diversity and conservation value of the three sites studied. From the point of view of other invertebrate groups no further evidence was found to suggest that the site was of high significance, but the combination of high butterfly and ant diversity and the Onchyophoran species indicate that Thyspunt has significant conservation value. Thyspunt is identified as higher sensitivity than Duynefontein, and only marginally lower than Bantamsklip. The description of the sites (in order of increasing sensitivity and suitability) is Duynefontein (most suitable), Thyspunt and Bantamsklip (least suitable). From the viewpoint of potential positive impacts of the nuclear power station, the suitability of the sites is different. Duynefontein already enjoys substantial benefits under the management of Eskom, which means that of all the sites it would experience the least improvement in its status if the nuclear power station was sited there. Bantamsklip and Thyspunt on the other hand would benefit substantially from formalisation of their protected status. It is probable that construction of the nuclear power station at either Bantamsklip or Thyspunt would have a potential net positive impact on invertebrate communities.

The above is refuted in the strongest possible terms and this should be taken out of the assessment. It is illogical and should be replaced with a recommendation for a No-go option, with regards to the NPS and conserving this globally unique ecosystem as a RAMSAR site forming part of the coastal cluster of the Baviaanskloof Mega-reserve.

RESPONSE 23

Your comments are noted. The no-go option is discussed in section 4.6 of the Revised Terrestrial Invertebrate Assessment. The report find that Thyspunt would benefit substantially from formalisation of their protected status and the guarantee that Eskom's management would continue in the long term. Given the relatively low significance of most potential negative impacts if these are correctly mitigated, it is probable that construction of the NPS at either of these sites would have a net positive impact on invertebrate communities.

YOUR COMMENT 24

Marine Biology E15 / Oceanographic Impacts E16

This specialist study is considered fatally flawed and until it is redone to incorporate the local conditions further assessment is reserved. This needs to reconsider the Chokka situation and the effects of spoil deposit. Volumes of spoil are to be re-checked in respect of Excavation estimates (more details pending further studies in respect of exact locality of footprint and excavation cross-sections) . Also needs to consider in more detail the tunnels and desalination plant.

RESPONSE 24

Your comment is noted. The Marine Biology Assessment has been revised and the revised report will be made available for public review as part of the Revised Draft EIR.

YOUR COMMENT 25

Impacts of the NPS on the socio-economic environment are recorded as follows:

It is noted that the various specialist studies have been reviewed by experts and are submitted under separate cover. Points raised should be incorporated into the process and assessed accordingly.

RESPONSE 25

Your comment is noted. Please provide us with more detail as to which reports you are referring to.

YOUR COMMENT 26

Economics E17

The economic impact assessment gives greater weight to the cost-effectiveness analysis. This is not considered appropriate and needs to be recalculated taking economics of eco-system services into account. Furthermore this report is considered flawed as it is based on other reports that are fatally flawed (Marine, Agriculture and Social) and until it is redone to incorporate the local conditions further assessment is reserved.

RESPONSE 26

The Terms of Reference of the Economic Assessment was to evaluate the three sites in terms of economic impacts, identify any fatal flaws and identify economic benefits. The specialists firstly used a detailed Cost Effectiveness Assessment Model (CEA) for each of the three sites, which is constructed for a very large number of detailed items. This model in affect gave the specialist the so-called Least-cost Option to the society at large. Secondly a separate model to calculate the Macro-Economic Impacts of the construction of the NPS was used. This macro-economic model is an econometric model based on the provincial Social Accounting Matrix (SAM) of each of the two provinces involved. In reaching the final economic conclusion, current local economic activities and the possible impact of the construction of of a NPS, together with the projected benefits to the country and population at large, were weighed and a decision was made.

The Economic Assessment has been revised and will be made available for review as part of the Revised Draft EIR. As stated in response 19, the impact of the proposed Nuclear Power Station on the Biophysical Environment has been assessed a number of specialists appointed in terms of the Nuclear-1 project who are recognised leaders in their field and well respected in terms of their academic track records. In addition, the specialist reports have been peer reviewed for technical quality and accuracy. GIBB is therefore satisfied with the result of their assessment.

YOUR COMMENT 27

Social E18

This specialist study is considered fatally flawed and until it is redone to incorporate the local conditions further assessment is reserved. Particularly important to consider the sustainability / inability of Municipality to provide services / capacity constraints. It is not appropriate to include gaps of knowledge as mitigations in the EMP. These studies need to be done prior to authorisation being

granted.

RESPONSE 27

The Social Assessment has been revised and will be made available for review as part of the Revised Draft EIR. As stated in response 19, the impact of the proposed Nuclear Power Station on the Biophysical Environment has been assessed a number of specialists appointed in terms of the Nuclear-1 project who are recognised leaders in their field and well respected in terms of their academic track records. In addition, the specialist reports have been peer reviewed for technical quality and accuracy. GIBB is therefore satisfied with the result of their assessment.

YOUR COMMENT 28

Visual Impacts E19

Need model / plans etc, cannot be mitigated.

RESPONSE 28

Your comment is noted. A photo simulation for the Thyspunt site has been compiled and will be included in the Revised Draft EIR for public comment and review.

YOUR COMMENT 29

Heritage 20

This specialist study is considered fatally flawed and until it is redone to incorporate the local conditions further assessment is reserved.

The review of the HIA results show that a project of this nature will not only have an impact on the resources of a local KhoiSan community, but that the cost to the national estate may be high. In this respect the Thyspunt study area should be declared as a National Heritage Site as well as afforded the environmental protection due to such a sensitive site. The value and spiritual significance of this site for the First Nations of South Africa should not be ignored.

RESPONSE 29

Your comments are noted. The Heritage Impact Assessment has been revised and finds that at Thyspunt the archaeological and palaeontological heritage is diverse and prolific. Mitigation without excessive impacts is going to be technically difficult to achieve due to the character of the site and difficulties with respect to accessibility, however the final location of the proposed facility will play a role in the degree of impact expected.

The wilderness qualities of this portion of the coast in contiguity with the archaeological heritage are exceptional and make a substantial contribution to the character of the region. Given the mass and bulk of the proposed activity, unmitigatable cultural landscape impacts are expected.

YOUR COMMENT 30

Agricultural Impacts E21

This report is considered flawed as and until it is redone to incorporate the local conditions further assessment is reserved.

RESPONSE 30

Your comments are noted. Please see response 19 however please note that the report has been revised and will be made available for review as part of the Revised Draft EIR.

YOUR COMMENTS 31

Tourism E22

Given the above comments on the economic and social reports, consequently this report too is considered flawed and until it is redone to incorporate the local conditions further assessment is reserved.

RESPONSE 31

The Tourism Assessment has been revised and will be made available for review as part of the Revised Draft EIR. As stated in response 19, the impact of the proposed Nuclear Power Station on the Biophysical Environment has been assessed a number of specialists appointed in terms of the Nuclear-1 project who are recognised leaders in their field and well respected in terms of their academic track records. In addition, the specialist reports have been peer reviewed for technical quality and accuracy. GIBB is therefore satisfied with the result of their assessment.

YOUR COMMENT 32

Transportation E25

Thyspunt requires significant transport upgrades with regard to transport network and access during the construction phase. These upgrades also contribute to financial cost of construction of the power station at this site. This report is considered flawed as and until it is redone to incorporate the local conditions further assessment is reserved.

RESPONSE 32

The Transport Assessment has been revised and will be made available for review as part of the Revised Draft EIR. As stated in response 19, the impact of the proposed Nuclear Power Station on the Biophysical Environment has been assessed a number of specialists appointed in terms of the Nuclear-1 project who are recognised leaders in their field and well respected in terms of their academic track records. In addition, the specialist reports have been peer reviewed for technical quality and accuracy. GIBB is therefore satisfied with the result of their assessment.

YOUR COMMENT 33

Noise

Associated with road and heavy vehicles and the same comments as recorded for the Transportation report apply.

RESPONSE 33

Your comments are noted. Please see our response to your comment 32.

Should you have any queries with respect to the above please do not hesitate to contact Arcus GIBB.

Yours faithfully
For Arcus GIBB (Pty) Ltd

A handwritten signature in black ink that reads "JMBall". The signature is written in a cursive style with a large, looped 'J' and 'M'.

Jaana-Maria Ball
Nuclear-1 EIA Manager

Appendix 1:

Some of the mitigations that have been listed in the Draft EMP which actually require consideration during the EIA phase.

(Please note that these are listed here verbatim from the specialist reports.)

Most of the specialist reports are factually incorrect and require further detailed investigations. These shortcomings have been transferred to the EMP as “mitigations” and are listed as further detailed investigations that should be done prior to construction. It is not appropriate to forward these unresolved items into the EMP with the assumption that an Authorisation will be granted for an EIA.

The items listed below all need to be considered in greater detail in the planning stages, incorporated into the Specialist Studies and taken through the Impact Assessment process. These items are listed as follows:

Pre-construction Phase:

- Access routes shall be planned by Eskom to ensure reduced environmental impact.
- Ensure that the footprint of the NPS takes into account the environmental characteristics of the site.
- All road planning needs to consider the requirement to allow movement of organisms along natural corridors.

Specifically with regards to Thyspunt: footprint should be separated from the high-water mark by a coastal corridor and adequate buffer, whichever is the greater. Such a corridor shall be underpinned by the following ecological rules or criteria:

- 200 m wide ecological corridor as a minimum width for serving as a conduit for fauna and an enabling area for essential ecological processes, such as pollination, and preservation of major communities.
 - Avoidance of the sensitive and rare coastal wetlands and Langefontein. The latter could be affected by the eastern phase of the facility.
 - Avoidance of the sensitive rocky shore community.
 - Avoidance of the embryo dunes and semi-mobile parabolics, particularly along the Thysbaai coastline.
This will in particular affect the eastern phase of the proposed facility.
- Whichever line is the furthest from the High Water Mark (HWM), an additional buffer of 100 m should be set to protect the sensitive systems discussed above from any long-term impacts the development could have on such systems.
- All lines will need to be accurately surveyed before the footprint is fine-tuned.
- Thyspunt: The sensitive coastal environment should be avoided and this includes any dunes which are mobile or semi-mobile. Sensitive coastal dune systems should be buffered by a minimum of 100 m. In particular both the coastal wetlands as well as Langefontein should be avoided and a suitable buffer of minimum 100 m wide created.
- The Contractor shall supply a waste water management system that will comply with legal requirements.
- Storm water control berms (trench and/ or earth barriers) shall be constructed to divert rainwater around the construction site.

These mitigation and conditions should be incorporated into the planning process, sensitivities mapped in detail and layout overlaid, tested and then assessed during the EIA phase.

Dune Geomorphology:

Dunes should not be disturbed and should remain a “no-go” area. This needs to be incorporated into the planning stages, they need to be mapped and shown on detailed layout plan.

Geology and Geologic Risk:

- A thorough assessment of the area excavated for NPS footprint to uncover the presence of any undetected capable faults.
- Incorporating the results of the geological investigations to aid in the selection of an appropriate NPS design. The results of the geological and seismological studies should be used as design input for determining the Safe Shutdown Earthquake Ground Motion (SSEGM) during operation as well the regulatory period after its decommissioning.

This needs to be done prior to the authorisation and incorporated in the planning and assessment phases.

Seisological Risk:

- The geotechnical and structural civil engineers shall assign the appropriate “seismic design criteria” for the design of utilities, including on-site and off-site water reservoirs.
- To provide the expected ground motions and seismic design parameters derived there from based on geologic, seismotectonic, palaeoseismic and instrumentally recorded events.
- The ground motion and seismic design parameters are to be used as design input for determining the SSEGM while the site is active as well the regulatory period after its decommissioning.
- Additional geologic investigations aimed at reducing the uncertainties regarding the geological model for the Site Vicinity area. This includes the finalization of outstanding issues related to fault characterization, followed by the compilation of potential source models to be derived from the existing information, with the purpose to build a suite of alternative models that reflect the uncertainty that exists regarding the activities of identified sources. This information will then be utilized in a full-blown PSHA that will follow internationally accepted practice.

As above, this needs to be done prior to the authorisation and incorporated in the planning and assessment phases.

Geotechnical suitability:

- To explore the feasibility of lateral support systems to retain approximately 20 m of overburden and minimise excavation volumes, all within an effectively dewatered site.

As above, this needs to be done prior to the authorisation and incorporated in the planning and assessment phases.

Hydrology:

- Plan the final locality and level of the plant area in order to minimise the impact of the flood hazards.
- Take into account the extreme water levels from the ocean the minimum level of the plant area to be 8.9 mamsl.
- Position the plant footprint outside of watercourse areas.

As above, this needs to be done prior to the authorisation and incorporated in the planning and assessment phases.

Groundwater and geohydrology:

- Roads, cables and pipelines should all avoid passing through areas identified as important hydrological corridors.

- No roads, pipelines, cable routes or other structures should be passed through wetland areas other than those assessed in the EIA.

As above, this needs to be done prior to the authorisation and incorporated in the planning and assessment phases.

Wetlands:

No mention of Thyspunt refer to Duynefontein only, yet the Thyspunt wetlands are the most sensitive. Not acceptable that this important aspect is omitted.

Fauna Protection:

- Restrict development to recommended areas. The recommended areas are those with low or medium faunal sensitivity (refer to Fauna specialist study in the EIR).
- Restrict the footprint of the development to the smallest area possible. While the actual footprints of the buildings may be fixed, other areas are likely to be more flexible in their extent, e.g. areas for lay down, storage of topsoil, parking, etc.
- Create laydowns in previously disturbed areas. Avoid creating laydowns and storage areas for overburden in areas of high quality habitat.
- Engineer solutions to the flow of groundwater and where construction interacts with the flow of groundwater, ensure that such flow is redirected in such a way that downstream impacts are minimized.
- Engineer solutions to the flow of surface runoff. Erosion of topsoil and contamination of streams and wetlands must be avoided through proper management of runoff from hardened surfaces such as roads and buildings.

As above, this needs to be done prior to the authorisation and incorporated in the planning and assessment phases.

Oceanography

Build the NPS above the maximum predicted rise in sea level i.e. at a recommended elevation of >11.04 m MSL.

As above, this needs to be done prior to the authorisation and incorporated in the planning and assessment phases. Needs information on design and construction of tunnels and desalination plant.

Visual

- Generic mitigation measures
- Prepare mitigation design details and specifications for all actions e.g. colour and form, slope stabilisation and vegetation to blend new cut and fill landforms into the setting.

As above, this needs to be done prior to the authorisation and incorporated in the planning and assessment phases.

Heritage

It is essential that an archaeologist is appointed well in advance of construction to undertake the following tasks:

- Undertake the sampling and curation of material from all identifiable Late Stone Age sites that will be affected by the proposed activity.
- Undertake a series of trial excavations throughout the development area and beyond to define the

- extent of the Pleistocene fossil bearing sediments as manifested at the site of Duynefontein 2.
- Based on these findings design and implement a sampling strategy (with consultation with other heritage I&APs) to systematically record, collect and curate Pleistocene archaeological and palaeontological remains.
- It is recommended that a “mitigation plan” be developed through workshoping specific mitigation proposals with the respective archaeology and palaeontology committees of SAHRA and HWC. The mitigation measures detailed in the Heritage Impact Assessment study (undertaken for the EIA) form a basis from which such a plan could be developed.
- The archaeologist will document in detail all identified protected heritage resources in accordance with the standard practices and as prescribed by SAHRA, as defined in the National Heritage Resources Act (1999)

As above, this needs to be done prior to the authorisation and incorporated in the planning and assessment phases.

Transport

Nothing inserted in the EMP.

Construction Phase

Wetlands

- The proximity of construction activities in relation to springs, wetlands and streams shall be clearly shown on a map with a 1:10 000 scale.
- Measures to limit the extent of drawdown of the water table to the area in the immediate vicinity of the NPS construction site, and to prevent drawdown (and subsequent saline intrusion) affecting the seasonal wetlands need to be developed.
- Loss or degradation of seasonal wetlands as a result of dewatering
- As a precautionary measure, the use of an impermeable or semi-permeable membrane to limit the radius of draw-down, is recommended.
- In addition, remodelling of the radius of draw-down by the geohydrological team should take place, once a preferred footprint has been decided on for this site, to confirm the assumed limited impact of dewatering on wetlands and allow fine finetuning of the dewatering approach.
- Degradation of seasonal wetlands as a result of the proximal location of spoil and laydown areas

The following mitigation measures are recommended, with the objective of achieving a reduction in the level of impact anticipated:

- Implementation of recommended “no go” development areas, as outlined in the Wetland specialist report (refer to EIR).

As above, this needs to be done prior to the authorisation and incorporated in the planning and assessment phases.

Fauna

Dispose of spoil at sea. If the marine-biology assessment finds that disposal of spoil at sea is a viable option, this is the preferred option because it will greatly reduce the footprint of the development in terrestrial habitats. (Requires further studies)

Construct under-and overpasses across roads. Wherever a road crosses watercourses, box culverts must be installed to facilitate animal movement under the road. Large, incised watercourses should be crossed by means of raised bridges. Where a road runs between high points for more than 500 m (e.g. in the slack between dune ridges), overpasses should be constructed at 500 m intervals.

Keep roads as far away from wetlands as possible. Wetlands are an important resource for many animals. Roads reduce access to this resource. (Detailed layout plan and site plans)

Reduce the number of roads and tracks and place them carefully. Roads are a major cause of fragmentation. Wherever possible, roads should be placed within or along the edges of areas that are already disturbed or are to be developed. It is generally better to use or upgrade existing roads than to create new ones. Roads across large areas of natural habitat must be kept to the absolute minimum necessary for access to the building site and be planned in consultation with an ecologist. (Detailed layout plan and site plans)

Dispose of brine from desalination into the sea. Do this in a manner that will promote rapid dilution, e.g. outlet into surf zone. (Detailed plans and project description, inclusive of operation)

Dispose of sewage in a sustainable manner. This would entail either the connection of an onsite sewerage system to an existing off-site system, or the creation of an on-site sewerage treatment plant. The former option would have the lesser impact. Under no circumstances should raw or treated sewage be allowed to contaminate wetlands or groundwater. Pumping sewage out to sea may be an option, but the specialist study on marine ecology should be consulted in this regard. (Engineering Report)

Avoid sites where damage to important wetlands is inevitable. If the advice of the relevant specialists indicates that major damage to important wetlands cannot be effectively mitigated, an alternative construction site should be found.

As above, this needs to be done prior to the authorisation and incorporated in the planning and assessment phases.

Economic

Restoration of any damage to the ecology of the area that might occur in the construction phase, the expansion and enhancement of the nature reserves surrounding each site, and the establishment of visitor information and educational centres in order to attract tourists to the area. This would be a rectification measure. (I do not think so)

Controls on heavy-vehicle traffic during the construction phase in order to mitigate negative impacts such as noise, night-time visual effects (vehicle lights), road damage and congestion. These impacts affect the local economy but differ from one NPS to another, and therefore the intensity of the measures will also differ. However, they should all at least encompass a scaling up of traffic policing. This would be an avoidance measure. (This would not be possible)

The transfer, wherever possible, of construction workers to new NPS sites once their involvement at Nuclear-1 is complete. This would be a reduction measure to mitigate the adverse impacts of unemployment and attendant social ills that could affect the local economy. (We cannot be assured of this).

Socio-Economic

A detailed assessment for the new residential development should be conducted once the preferred NPS location, as well as the location for residential and accommodation needs are finalised. (This needs to be done during the planning stages of the project).

Construction village, staff village and staff and vendor housing:

- Draw up the development and locative criteria/ conditions for the establishment of each.
- Investigate possible locations for the provision of these according to the needs.
- Identify the suitable locations and draw up a Site Development Plan in line with development planning legislation, policies and guidelines.

- Obtain approval for the development from the appropriate authorities (e.g. town planning procedures).
- Follow a transparent public participation process with role-players and interested and affected parties
- The housing units for construction staff should be located as such that the houses can be integrated into the normal property market once construction is complete and houses become available, in order to ensure integration and sustainability.
- The Construction Village (including all the facilities) should be located in such a manner that the buildings and facilities can be utilised by the surrounding community after the construction period, in order to ensure sustainability of such infrastructure.

As above, this needs to be done prior to the authorisation and incorporated in the planning and assessment phases.

Municipal services

- Liaise closely with the appropriate municipal, provincial and other relevant authorities
- Ensure that a proper plan is in place well before any development process commences.
- Ensure that all essential services are in place prior to the development.
- Ensure that non-essential facilities are upgraded in accordance with the development.

As above, this needs to be done prior to the authorisation and incorporated in the planning and assessment phases. Requires service agreement.

Impact on social infrastructure/ facilities

- The involved authorities, local municipality as well as the Department of Health should be notified about additional needs for medical care.
- Proper planning processes should be followed and provision of medical facilities should be based on the sustainable human settlement strategy.
- The provision of health facilities for all staff involved as proposed for the Construction Village and Staff Village will be vital to ensure a sustainable human settlement.

As above, this needs to be done prior to the authorisation and incorporated in the planning and assessment phases.

Capacity of local schools

- Provision should be made for schools to accommodate approximately 950 children into the area of the NPS. This signifies that either existing schools should be enlarged, or a new schools should be built in the area where staff will be residing.
- The provision of schools for the children of all staff involved, as proposed for the staff village (and possible other areas), will be vital to ensure a sustainable human settlement.
- The relevant Department of Education should be made aware of the current schooling needs in the area as well as the potential impact that the proposed development will have on the status quo.

As above, this needs to be done prior to the authorisation and incorporated in the planning and assessment phases.

Transport:

Only for Duynefontien, nothing for Thyspunt.

Appendix 2: Further Studies required

(Please note that these are listed here verbatim from the specialist reports.)

Further to the information required as listed in Appendix 1 the following has been identified in the specialist studies that were presented in the DEIA. Review of the specialist studies may indicate further studies.

Hydrological Corridors (E6):

This report notes the following further studies /information required:

- Estimation of a possible tsunami level at each of the sites;
- Detailed footprint and layout of plant area and ancillary works;
- Locality and extent of possible future residential / commercial developments; and
- Quantification of the rainfall difference due to climate change at each of the sites.

Regarding Flood Control measures (E6 page 107) notes that at the construction phase it is important to consider:

- Separate “clean” stormwater run-off from “dirty” stormwater run-off and minimise the inflow of “clean” stormwater run-off into the construction site. The “clean” stormwater runoff is defined as surface water emanating from “virgin” undeveloped catchments and “dirty” stormwater would emanate from areas with construction activities.
- Ensure that a stormwater diversion embankment is constructed around the perimeter of the site to ensure that both catchment run-off and sea water ingress is prevented. This diversion embankment could possibly be constructed to later be incorporated with the final plant level and platform.
- Ensure that a temporary stormwater collection sump is installed during foundation excavation activities to allow excess run-off to drain to a defined low area (sump) where any transported sediment could be contained and stormwater pumped out. Depending on the nature and content of the sediment this could be pumped to a temporary holding facility and then transported to a waste disposal site.

In respect of the above a Stormwater Management Plan is to be prepared during the planning stages.

The report further notes that additional details are to be obtained from more detailed water quality studies at a later stage. In terms of Regulation 704 (June 1999) of the National Water Act, 1998 (Act No. 36 of 1998) at least the 1:50 year run-off volume with an 800 mm freeboard would need to be contained. The 1:50 year flood event is significant in the design of the pollution mitigation measures while the 1:10 000 flood event parameter is relevant to nuclear safety.

Geohydrological (E7)

This report notes the following information is required:

- Siting of the NPS on the site within the EIA Corridor such that the impacts identified can be reduced in significance, e.g. avoiding faults/fracture zones, >500 m from sensitive wetlands, >300 m from coastal seeps/wetlands(assumes groundwater control mitigation measures in place). Setting the footprint back from the coast is in any case favoured by Eskom to reduce plant corrosion. Ie; Require detailed layout indicating these constraints.
- Development of a remediation/mitigation protocol prior to construction so that measures are documented and in place to deal rapidly with any on-site contamination incidents or signs of exceedence of predicted drawdown levels.

Dewatering to prevent: Flooding by Groundwater

- To mitigate this, the construction area and subsequent excavated areas must be dewatered

by constructing a cut-off / diaphragm wall and installing a series of wellpoints and boreholes. The design of a dewatering scheme is beyond the scope of this specialist study, but the dewatering activity and associated groundwater monitoring programme are considered essential mitigation measures. A form of cutoff wall is considered to be the most suitable and reliable design to minimise the extent of drawdown. The siting of the NPS within the EIA Corridor should take this aspect/impact into account.

- Cut off Wall and Monitoring to prevent: Depletion of Local Aquifers This impact may be mitigated by constructing a cut-off or diaphragm wall, and by carrying out groundwater level monitoring to assess the efficiency of such a design. Monitoring is considered an essential mitigation measure so that remedial actions can be carried out timeously, if required. The final design of dewatering schemes has not been established. However, based on results from this EIR study, the construction of such a barrier is considered to be an essential mitigation measure at the Duynefontein and Thyspunt sites. The siting of the NPS within the EIA Corridor should take this aspect/impact into account.
- Cut off wall and Monitoring to prevent: Degradation of Ecologically Sensitive Wetlands / Seeps/Springs. This impact may be mitigated by constructing a cut-off or diaphragm wall, and by carrying out groundwater level monitoring. Groundwater monitoring is considered an essential mitigation measure so that timeous remediation measures can be taken, if required. The final design of dewatering schemes has not been established. However, based on results from the EIR study, the construction of such a barrier is considered to be an essential mitigation measure at the Duynefontein and Thyspunt sites. The siting of the NPS within the EIA Corridor should also take into account the optimal position from this point of view. Abstraction should preferably not take place from aquifers with direct links to freshwater ecosystems Roads, cables, foundations and pipelines should all avoid passing through/intruding areas identified as important hydrological corridors and no roads, pipelines, cable routes or other structures should be passed through wetland areas.

Dune geomorphology (E2)

The investigation at Thyspunt includes addressing a known information gap regarding interdune wetland and surface and groundwater dynamics in the area, and this knowledge is critically needed to address other tasks relating to the remainder of the Thyspunt Terms of Reference.

The following limitations are relevant to the Thyspunt site:

- the geohydrological investigation undertaken for the EIA was focused on the NPS site itself, with only two boreholes drilled within the mobile Oyster Bay dunefield; and
- the hydrological investigation undertaken for the EIA focused on the NPS site itself, with no investigation of the mobile Oyster Bay dunefield. These limitations have not seriously compromised this investigation, as field observations and aerial photo interpretation has provided sufficient information to achieve a moderate to high degree of confidence in the results of the investigation and deductions made.
- If construction of roads or other structures through the mobile Oyster Bay dunefield does go ahead, detailed investigation of surface water and shallow groundwater flow within the dunefield is needed, particularly in relation to wetland functioning.
- In addition, geotechnical test holes should be drilled through the interdune sediments, and these must be perused by a suitably qualified specialist to confirm that the assumptions made in this report are valid.

Floral Assessment (E11)

Powerlines and south-north access road

- Where possible, planned powerlines and their associated service roads should be routed away from rare and sensitive systems, in particular wetlands and the transverse dunes. Correspondingly, powerlines can serve as useful ecological corridors and conduits for pollinators and fruit-translocating fauna if the containing habitat is kept in acceptable condition and is ecologically functional.
- The south-north crossing of the transverse dunes by powerlines, between the NPS and the HV Yard, needs careful study.
- Presently there is insufficient information on the long-term mobility of the dunes. At least a model of dune mobility needs to be developed which would indicate whether the width of the mobile systems is likely to increase or decrease. Examination of a sequence of aerial photographs from as far back as the 1940's seems to indicate shrinking mobility (Gert Greeff, pers.comm.) but this needs to be tested, based upon current dune behaviour and likely future mobility trends. If transmission lines are to cross the transverse dunes then the individual pylons should be located away from the edge of the mobile zone and given a buffer which would accommodate any future growth in dune mobility. This buffer should be no less than 100 m but would need to be tested once the mobility model is developed.
- There is presently too little detail on the behaviour of the transverse dune system and its annual mobility to recommend any mitigation with confidence. Any permanent structure on these dunes is viewed as an unmitigatable impact for the time-being.
- The contribution of the Rhodes University research team, led by Prof. Fred Ellery, is of fundamental importance to our understanding of this rare and endemic system.

Vertebrate Faunal Assessment E13

An important negative factor is the lack of definitive information on whether adequate engineering solutions are available to avoid serious negative impacts of groundwater flows and sensitive wetlands at Thyspunt.

There are similar needs for more information on the dynamics of the mobile-dune field, and better mapping of dune forests and thickets of alien vegetation. It is essential that the necessary studies be carried out as a matter of urgency to inform the EIA process.

From the perspective of faunal conservation, the following overall conclusions are reached:

- Given the present uncertainty around groundwater and wetlands as well as other aspects of the biophysical environment, and the inadequate amount of suitable land for development, the proposal for development at Thyspunt is currently flawed. This situation must be improved by completion of relevant studies, and acquisition of additional land, if necessary.
- Outstanding issues at Thyspunt should be satisfactorily resolved before final decisions are made and in time for full specification of necessary mitigation measures. This may have the effect of postponement of development at Thyspunt.
- Nuclear-1 could be developed at either Duynfontein or Bantamsklip, without further faunal EIA investigations.

Invertebrate faunal study E14

Limitations of the study

- This study was commissioned at a very late stage during the Nuclear 1 EIA process, allowing only three weeks in 2008 to complete the field surveys, analyses, impact assessments and reporting. Only a very superficial survey was thus possible at that time, with approximately two days being available to inspect each of the three sites, which have a combined area of 5 885 hectares (ha).
- The limitations resulting from the very short duration of the field surveys were further exacerbated by inappropriate timing (the majority of the field visits being between 25 August and 2 September), as most invertebrate species present exhibit very low levels of activity at

this time of year.

- The extreme time and seasonal constraints on the surveys carried out in 2008 introduced uncertainty to the site sensitivity ranking and prevented sufficiently detailed coverage of the sites to enable selection, from a terrestrial invertebrate conservation perspective, of preferred areas for development within the sites. The additional butterfly studies carried out in March 2009 went some way toward rectifying this, but both the taxonomic and seasonal scope of these surveys were also very limited.
- The sensitivity mapping and recommendations regarding preferred infrastructure locations must therefore be regarded as tentative as they do not take into account the vast majority of the invertebrate groups present on the sites.
- The additional detailed inspections of consensus preferred footprint areas in December 2009 / January 2010 further mitigated the limitations and allow firmer conclusions to be drawn regarding impacts and mitigation, but do not eliminate the need for detailed investigations of invertebrate fauna of the selected site prior to construction; Eskom has committed to carrying out such studies.
- Carry out more detailed invertebrate surveys of all three sites to enable sound recommendations to be made regarding the most suitable portions of the sites for development.

Oceanography E16

In addition to the increased temperature and potential for recirculation, the cooling water discharge may also contain co-discharges such as chlorine. Since these co-discharges have not yet been quantified, they have been treated as conservative tracers, i.e. they undergo dilution by physical mixing only and any additional biochemical or physical processes are not modelled. The model results provide the achievable dilutions for any discharged constituent. Once the concentration of these constituents has been quantified, the potential impact of these constituents can be assessed by comparing the achievable dilutions from the model results to the dilution required to reduce the concentration at discharge to a level at which no impacts occur.

The study highly recommended that a comprehensive and site-specific marine environmental mitigation and management strategy is developed for the project site ultimately selected. This should include detailed marine environmental management measures that are based on the specific sensitivities of the site, the final design and the construction plans.

Social Assessment E18

The Construction Village will be required to accommodate approximately 3 750 people. The positioning of the Construction Village still needs to be determined, and is a sensitive issue with valuable opportunities and benefits, but also the potential for negative impacts on human wellbeing.

Regarding the Construction Village

- Draw up the development and location criteria / conditions for the establishment of the Construction Village;
- Investigate possible locations for the Construction Village;
- Identify the suitable location and draw up a Site Development Plan Staff and vendor housing
- Draw up the development and locative criteria / conditions for the establishment of the total housing need for Vendor and Eskom Staff (Partnerships will be important for the planning phase);
- Investigate possible locations for the provision of housing according to the needs;
- Identify the suitable locations and draw up a Site Development Plan in line with development planning legislation, policies and guidelines;

- Obtain approval for the development from the appropriate authorities (e.g. town planning procedures);
- Follow a transparent public participation

Staff Village

- Draw up the development and locative criteria / conditions for the establishment of the Staff Village;
- Investigate possible locations for the Staff Village;
- Identify the suitable location and draw up a Site Development Plan in line with development planning legislation, policies and guidelines;
- Follow a transparent public participation process with role-players.
- Water and sanitation infrastructure for residential development:
- The following two statements were made by the St Francis Bay Residents Association and the St Francis Kromme Trust to emphasise their concern: "The Greater St Francis area is not well served in terms of infra-structure. Its water supply is dependent on two sources, namely the pipeline from the Churchill dam, and a series of vulnerable boreholes. The pipeline is dependent on the good will of the NM Metro, who has the right to refuse supply under drought conditions.

Mitigation measures:

- Liaise closely with the appropriate municipal, provincial and other relevant authorities;
- Ensure that a proper plan is in place well before any development process commences;
- Ensure that all essential services are in place prior to the development;
- Ensure that non-essential facilities are upgraded in accordance with the development;
- Ensure that the implementation process is carefully monitored and that any disruptions are immediately identified and appropriately managed; and
- Ensure that all affected communities is kept well informed of the process and of all significant dates attached to the development process.

Due to the exact location and area of land needed for new residential development, the social impact of the actual footprint could not be assessed at this stage. A detailed assessment should be conducted once the preferred NPS location, as well as the location for residential and accommodation needs are finalised. The level of the social impact of the Construction Village in the Humansdorp area will differ from the Sea Vista area.