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Attention: St Francis Bay Residents' Association, on behalf of the Thyspunt Alliance

Dear Sir

**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**

Your correspondence to Ms. Bongzi Shinga of Acer (Africa) entitled "Appendix 4, Review of the EIA with a focus on the seismic hazard, DR. MKC Roberts" refers.

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

**Your Comment (1)**

In Appendix E4 in the executive summary, page 3, it is stated that:

The available data indicate that the Thyspunt site has the lowest seismic risk of the three proposed NPS sites, and from a seismic point of view, Thyspunt is the preferred site of the three proposed NPS sites.

However within the document there is **uncertainty**. On page 27 there is the following qualifier on the need for additional studies:

With the current state of knowledge there are no disqualifiers for this site. This includes consideration of the Plettenberg and Cape St. Francis faults, although this needs to be confirmed by additional studies. The seismic hazard will be reconfirmed through implementation of the more rigorous SSHAC approach.

On page 42 there is again a claim that there is a need for further studies and the possibilities of the conclusions of this report changing.

Results indicate that, at this stage of the geo-scientific investigations, the seismic hazard does not preclude a standard export NPS at any of the proposed sites. However 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.



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**Response (1)**

No explicit question was stated, but the main concern appears to be related to the stated need for further investigations and the fact that the PSHA results may change?

The seismic hazard data presented in the EIA represents work done by the Council for Geoscience (CGS) prior to 2007, employing a methodology termed the Parametric-Historic approach (which at the time was peer-reviewed internationally and accepted by the reviewers as well as the National Nuclear Regulator).

In 2007 the United States Nuclear Regulatory Commission (or US NRC) published regulatory guide (RG) 1.208, which documented a new approach to define site specific ground motion. The US NRC regulations represent one of only two sets of internationally accepted regulations used for the siting of nuclear power plants (the other being that of the IAEA) and will be followed by Eskom since it represents the most conservative, detailed and tested regulations available. RG 1.208 requires multiple experts to be involved in the interpretation of geological, geophysical, and seismological data, and the need to address the uncertainties that are inherent to all geological and seismological models.. Hence the Probabilistic Seismic Hazard Analysis for the three sites has to be repeated and Eskom will implement a Level 3 PSHA methodology as defined by the Senior Seismic Hazard Analysis Committee (SSHAC) in the United States, which is accepted by the US NRC.

This new PSHA approach is the more conservative approach. The new data (and the interpretation of it) is what leads to the need to stay with Thyspunt for the schedule currently intended. For Dufontein site we would need to have certainty as to what the seismic criteria was before committing to a design. With Thyspunt there is enough margin with the current seismic design approach to have limited risk that the revised PSHA would exceed the standard plant design limits (0.3g).

**Your Comment (2)**

**CHAPTER 8**

Within Chapter 8, page 4 there is also uncertainty. It is stated that the Peak Ground Acceleration value that indicates that Thyspunt is suitable as a site for a nuclear power station might change:

The value does not exceed the PGA of 0.3 g typically used in the seismic design of NPSs, although the value at the Dufontein site at the 0.3 g threshold. This will necessitate additional geological investigations and implementation of an advanced PSHA that will follow internationally accepted practice, and in particular, will conform to the requirements of a Level 3 study as defined in the SSHAC Guidelines. The above will not only confirm the reliability of the above result, but may increase or decrease this value.

The seismic hazard for Thyspunt and the other two areas is explained under section 8.1.2, page 1, of chapter 8. What emerges, and is described as the primary hazard, is an estimate of the local vibratory ground motion, in other words the expected ground motion should seismic activity occur. This would be as some value of g ( $g = 9.81 \text{ m/sec}^2$ ). For a site to be suitable it appears that a value of less than 0.3g is desirable. This is written as  $\text{PGA} = 0.3g$  where PGA is Peak Ground Acceleration.

In order to determine the potential local vibratory ground motion for a particular site the magnitude and intensity of possible seismicity needs to be estimated. This is done by evaluating the potential for seismicity that could be caused by fault slip of geological faults that occur in the vicinity of the

proposed site. It is not clear if the Plettenberg Bay fault or the Cape St Francis fault were included in the assessment of evaluating the site for the potential for seismicity. See Chapter 8 page 18.

**Response (2)**

As described in Response 1, the Probabilistic Seismic Hazard Analysis for the three sites has to be repeated since the international regulatory requirements changed. As mentioned, this new PSHA approach is the more conservative approach. The new data (and the interpretation of it) is what leads to the need to stay with Thyspunt for the schedule currently intended. For Dynefontein site we would need to have certainty as to what the seismic criteria was before committing to a design. With Thypunt there is enough margin with the current seismic design approach to have limited risk that the revised PSHA would exceed the standard plant design limits (0.3g).

The Plettenberg Bay fault was incorporated into the analysis of the site seismic hazard, but not the Cape St Francis fault. The Cape St Francis fault was considered, but previous investigations indicated an age of 126Ma for the last movement on this fault, and found no neotectonic activity or seismicity associated with it. Therefore, according to the guidance provided in the Code of Federal Regulations in the US NRC document 10CFR100 Appendix A, it was concluded that the Cape St Francis is an old fault with low capability for generating a significant surface rupturing seismic event. Geophysical investigations to trace the Cape St Francis fault closer to shore proved unsuccessful.

**Your Comment (3)**

**APPENDIX E4, PAGE 27**

Once the seismic hazard has been developed for a site, it must be determined whether a standard export nuclear power station can be built on the site. The greater the margin between the site seismic design basis (i.e. the demand) and the nuclear power station seismic design basis (i.e. the capacity) the less risk involved. This is particularly so in the case of nuclear power station sites in South Africa where the seismic hazard analysis are still to be confirmed by an international accepted procedure such as the Senior Seismic Hazard Analysis Committee (SSHAC) Level 3 study.

**Response (3)**

See Response 1,2 and 4.

**Your Comment (4)**

General comment

With the uncertainty displayed above, how can meaningful recommendations be made about the most significant factor in the study?

**Response (4)**

Almost all of the uncertainty pointed out in comments 1 – 3 relates to the fact that the PSHA (Probabilistic Seismic Hazard Analysis) results are not final. The fact that a new PSHA needs to be undertaken (that will yield a different result), appears to be interpreted as evidence that the existing PSHA results should be considered invalid. That is incorrect.

The methodology previously used to conduct a PSHA for the three proposed nuclear sites (termed the Parametric-Historic approach), is based predominantly on statistical inference from the seismic catalogue, and was developed to deal with the uncertainty and incompleteness of the seismic catalogues (which is often the case). At the time of implementation the Parametric-Historic approach was peer-reviewed and accepted internationally, as well as by the National Nuclear Regulator.

However regulations for the siting of nuclear facilities are subjected to a process of continuous improvement and hence the publication of the US NRC published regulatory guide (RG) 1.208 in 2007 had a direct impact on the siting of nuclear sites in South Africa. Since there are presently no specific South African regulations regarding the licensing of nuclear power plant sites, Eskom follow the regulations of the United States Nuclear Regulatory Commission (US NRC), which is the most stringent and detailed (and tested) set of regulations in the world (by following US NRC regulations Eskom will also comply to IAEA regulations).

RG 1.208 described a new approach to define site specific ground motion and dictated that multiple experts be involved in the geological, geophysical, and seismological data, as well as the need to address the uncertainties that are inherent to all geological and seismological models.

The new PSHA represents an improvement on the previous work and will better define and constrain uncertainties contained in geological and seismological models, but does not invalidate the work done to date. Hence the existing seismic hazard results can be used to make recommendations regarding site suitability. The results of a PSHA according to the SSHAC Level 3 methodology will form the baselines in the updated relevant Chapter of a Site Safety Report (SSR). The SSR is a document that is to be submitted to the South African National Nuclear Regulator who will then, based upon this data, decide whether or not to authorize a nuclear installation.

#### **Your Comment (5)**

##### **CV's**

One of the requirements for the EIA is to provide cv's of all authors. Table 7-8 in Chapter 7 Methodology gives a list of authors. However there is no reference to these authors in many of the actual reports. When reading the reports it is extremely difficult to find the actual cv in the list of icons for cv's provided by Arcus Gibb. Also, no cv could be found for U Hattingh, author of the seismic risk and geotechnical risk reports.

I understand that you need some PDI representatives, but does "attending meetings" and "information gathering" qualify someone to make input into a report of this significance.

#### **Response (5)**

The geological and seismic hazard data presented in the EIA were compiled by a team of geologists and seismologists of the CGS over a number of years. The results of this work were summarized and presented in the Geological Hazard and Seismic Hazard chapters of the EIA, by Mrs E. Hattingh and Dr J. Neveling of the CGS. Mrs Hattingh has been the project manager for various nuclear siting projects at the CGS since January 2002. Dr Neveling has been involved in nuclear siting investigations since December 2007. Updated CV's of Mrs Hattingh and Dr Neveling are included here.

#### **Your Comment (6)**

##### **CHAPTER 8: P64: FIG 8-43**

From the historical dataset produced by Eskom (1987), it is clear that the most dominant wind direction in this region is from the west northwest to northwest.

In section 8.6.1(b) p64 the prevailing wind is identified as WNW to NW.

However in section 8.3.4 on dune geomorphology the prevailing wind is described as W to SW.

Later in Chapter 8 Figure 8-12, the diagram shows the dominant wind to be southwesterly

Meanwhile in The Field Guide to the Eastern Cape Coast, wind roses derived from data from the Weather Bureau's Port Elizabeth weather station (Schultz BR, Climate of South Africa part 8) show prevailing winds to be from the West and SW.

The EIA has failed to consistently and correctly characterise the prevailing winds.

**Response (6)**

Your comment is noted. However as explained at various public meetings the prevailing wind direction in the report is correct.

**Your Comment (7)**

**APPENDIX E17: ECONOMIC ASSESSMENT: CHOKKA INDUSTRY (P8)**

Disagree that the distribution of scientific information is a credible mitigating measure. This is a cut-throat industry. Perception is everything and competitors will have a field day highlighting the nuclear threat.

**Response (7)**

Your comment is noted.

**Your Comment (8)**

**APPENDIX E26: EMERGENCY RESPONSE ASSESSMENT**

In general the Thyspunt and Bantamsklip sites are acceptable for emergency planning considerations since the newly adopted EUR approach followed by Eskom for emergency planning suggest that a proposed nuclear installation can be built in South Africa without the need for off-site short-term emergency interventions like sheltering, evacuation or iodine prophylaxis (i.e. no countermeasures). The EUR requirements prescribe that modern nuclear power plants should have no or only minimal need for emergency interventions (e.g.,evacuation) beyond 800 m from the reactor, and provide a set of criteria which a reactor must meet in order to demonstrate that it can be built without such emergency planning requirements.

In the event of a nuclear emission, which with the prevailing winds will reach St Francis Bay in 10 minutes, it appears there are two alternatives: Try to get over the Krom bridge, or stay in your house and take iodine. If you live in Sea Vista, heaven help you. Eskom meanwhile can just tout these EUR regulations which let it off the hook from providing any kind of assistance at all. The local communities must have acceptable evacuation and temporary resettlement plans.

**Response (8)**

Your comment is noted. Evacuation and temporary resettlement plans will form part of the Emergency Response Assessment which will be dealt with during the NNR process.

**Your Comment (9)**

**APPENDIX E25: TRANSPORTATION**

P57: The pavement structural capabilities of the R330, as well as the Krom River crossing, will have to be investigated to determine whether it can accommodate the increased heavy load trips expected

during the construction period. The new Oyster Bay Road alignment and design is still to be investigated and the R330 currently accommodates most of the traffic in the area. Therefore only route 2 has been analysed in terms of traffic impacts below.

Only the R330 option (route 2) has been analysed for transporting exceptionally heavy loads. This option will have a major negative impact (visual, noise, tourist potential, devaluation of property, loss of sense of place). How will the Krom River bridge withstand these loads? Is Eskom going to upgrade it? How will the exceptionally heavy loads get across it? Recommendations have been made without even considering the alternative option, route 1 via the Oyster Bay road. The above negative factors would be greatly alleviated if route 1 was used.

### **Response (9)**

Your comment is noted. The Transportation Assessment including the analysis of routes have been revised and is attached to the Revised Draft EIR for review and comment.

### **Your Comment (10)**

#### **APPENDIX E18: SOCIAL ASSESSMENT**

Chapter 9, table 9-74: Social impacts are not seen as a critical decision factor because they can be relatively easily mitigated, compared to other impacts.

The mitigating factors proposed in Appendix E18 are vague and unspecific. I disagree that they can be easily mitigated as claimed in the chapter on Environmental Impact Analysis. The social impact should be given a much higher rating. Some examples are given below.

#### **Influx of job seekers:**

Mitigation measures are aimed at minimising the number of job seekers staying in the area.

How does Eskom propose to do this?

#### **Informal Development and Settlements:**

An increase in unplanned development and informal settlements surrounding the NPS site is associated with perceived economic opportunities. If not carefully managed, this type of uncontrolled development is also likely to result in an increase in an array of social pathologies such as crime, prostitution and alcohol and drug abuse.

Mitigation measures are aimed at controlling the threat of an increase in unplanned development and the rise of informal settlements.

Exactly how will Eskom do this successfully? Where has it ever been successfully done before in South Africa?

#### **Creation of Employment Opportunities:**

It is envisaged that at least 25% of the construction workers will be sourced from the local labour force.

Why only 25%? Who came up with this number?

**Impact on Criminal Activities:**

Mitigation measures are aimed at reducing the risk of crime

The report gives absolutely no indication how this will be done.

**Municipal Services:**

This impact deals with the probability of the new NPS placing strain on municipal services such as water, sanitation, roads, waste and refuse removal.

Mitigation measures are aimed at provision of required services.

What guarantees will be given that this will be done?

**Loss of Employment after Construction:**

A number of jobs will be lost once construction of the NPS has been completed.

Mitigation measures are aimed at minimising the extent of jobs lost after construction

What are these measures and how does anyone know that Eskom will do anything?

**Impact on sense of place:**

The proposed NPS will possibly result in a change to the local sense of place.

This concern relates to the possibility that the NPS may contribute negatively to the current characteristics, or feeling / perception held by people. Communities experience that their place has a special and unique character.

Mitigation measures are aimed at limiting the negative effects and the disturbance on the sense of place that the project may have on the environment.

Transporting exceptionally heavy loads right past St Francis Bay village certainly isn't going to achieve this.

**Response (10)**

Your comments are noted. Issues surrounding job creation, the resultant influx of job seekers due to the expectation of work related to the Nuclear Power Station, the ability of Municipalities to provide and fund the infrastructure to support the Nuclear Power Stations as well as other issues of social importance is address in both the Social Impact as well as the Economic Assessments which is attached to the Revised Draft EIR for comment and review.

**Your Comment (11)**

**CHAPTER 9: ENVIRONMENTAL IMPACT ANALYSIS**

The soils have no cohesion and when saturated, will require innovative slope stabilization techniques for any proposed excavations

Has Eskom budgeted for this?

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.

Maybe so in the limited 800 m zone but what about the rest of the area? Nobody will be allowed to go there anyway. Anyway after 9 years of construction what will be left to protect? The weighting given to this in chapter 9, table 9-74 is out of line.

The results of the calculations indicated that the existing, non-Eskom traffic causes and will continue to cause a medium potential noise impact with reference to an "urban district" during the following nine years. However, the existing and future LReq,d would comply with the 65 dBA limit. With the addition of Eskom traffic the cumulative noise impact would be high throughout the construction period. The combined road traffic would cause the noise level to exceed the 65 dBA limit contained in the NCR, necessitating noise mitigation procedures to be implemented. However, the situation has arisen due to the uncontrolled use of land typical of informal settlements. It may well be debated whether the onus for compliance with the NCR would rest with Eskom.

**Response (11)**

Your comments are noted. Chapter 9, specialist studies (including the Transportation Assessment) as well as the weighting assigned to Environmental Aspects have been revised where needed and is discussed in the Revised Draft EIR.

**Your Comment (12)**

**Another opportunity for an Eskom copout**

But if the wider coastal tourism asset of Thyspunt (including Oyster Bay, St Francis Bay, Cape St Francis and Port St Francis) is considered, the rise in sea-level could conceivably result in severe damage to the tourism attractions, facilities and general infrastructure, thereby resulting in extensive property, land and natural environment loss. The tourism asset and product of the area would then have to undergo massive reconstruction and rebranding which could incorporate the existence and operation of a nuclear power station

The entire report has documented that this is an eco-tourism area. Its difficult to imagine people being bussed in to look at a nuclear power plant.

**Response (12)**

**Your comments are noted. The**

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



Jaana-Maria Ball  
Nuclear-1 EIA Manager