

05 August 2015

Our Ref: J27035/ J31314
Your Ref: Email received 07 August 2011

Email: anthony.reed@uct.ac.za

Dear Mr Reed

Cape Town

14 Kloof Street
Cape Town 8001
PO Box 3965
Cape Town 8000

Tel: +27 21 469 9100
Fax: +27 21 424 5571
Web: www.gibb.co.za

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

ANTHONY REED – SUBMISSION ON DEIR FOR NUCLEAR-1: PROBLEMS WITH THE EIA'S PROCEDURAL ISSUES

Comment 1:

The whole rationale for the urgency of the nuclear build, as well as for the decision made by Arcus-Gibbs alone to drop the Brazil and Schulpfontein sites was based on the urgent need for extra base-load. However the evidence for this as an absolute need is not supported in the EIA, and there are other options to approach this problem that are not mentioned such as considering the short-term closing of smelters that rely on cheap electricity, particularly the aluminium smelters that rely on mostly imported ores combined with Eskom's cheap, consumer subsidized electricity.

Need for urgency to increase base-load is not clear. 3 mothballed coal stations are all just about to be commissioned and we have Kusile (4800MW) and Medupi (4 800 MW) (both massive coal stations) coming on-line.

Concern and objection raised Number 1:

- So if there is no proven urgency to increase base-load, then there is no justification for dropping the Brazil and Schulpfontein sites in the EIA. This then renders the EIA procedurally flawed
- Cheaper options to the country, and to domestic consumers, may be to remove the appropriate high user smelters, and consider using a portion of the nuclear spend to subsidise those smelter's workers for lost employment. This is not considered as an option.

Response 1:

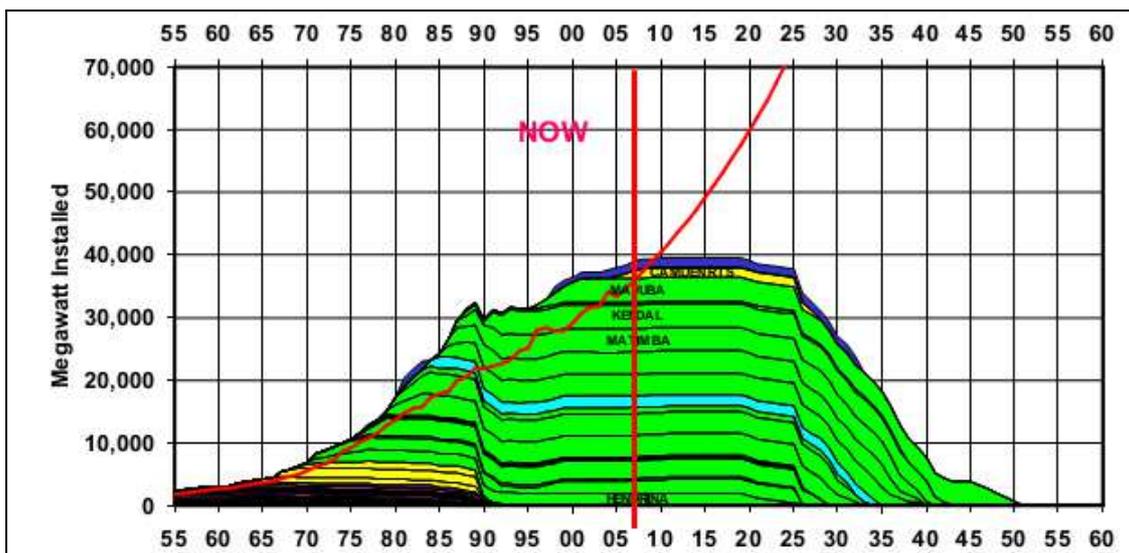
Your comments are noted. The recommendation to discontinue consideration of the Brazil and Schulpfontein sites at the end of the scoping phase, in November 2008 was made on the basis of a number of facts, including the long distances over which electricity would need to be transmitted to the Western Cape load centre (resulting in significant losses) and the fact that there are highly sensitive ecosystems like the Succulent Karoo along the transmission line routes between Northern Cape and the Cape Metropole, which would make finding an environmentally suitable transmission line corridor very difficult.

It is to be noted that the Scoping Report was accepted by the then Department of Environmental Affairs and Tourism, including the recommendation that the Brazil and Schulpfontein sites be excluded from further consideration during the EIA phase.

Your comment regarding the shutting down of smelters is noted. However, the question can be asked if any electricity consumers should be told to discontinue using electricity, how a particular sector, group of people or geographical region could equitably and justifiably be targeted for this. Who would decide and based on what criteria that some people may continue to use electricity and some not? Why should an aluminium smelter be targeted and not domestic consumers, for that matter?

Aluminium smelters, although they are large consumers of electricity, provide employment opportunities. If they are to be shut down, all the employees and thousands of people in their families will be left without an income. Added to that would be the refusal of potential investors to create new industrial facilities in a country that cannot provide security of electricity supply, and the associated loss of potential employment opportunities for millions of currently unemployed people. The long-term economic implications of a decision to close major industrial facilities and the message this would send to potential domestic and foreign investors about security of energy supply are severe. Such a decision would undoubtedly lead to an immediate slump in investor confidence in South Africa and movement of investment from South Africa into other markets where electricity supply can be guaranteed.

Your comment regarding the return to service of mothballed power stations and the construction of Medupi and Kusile is noted. However, the construction of new power stations does not make up for the future shortfall of electricity that will be experienced once existing power stations reach the end of their operational life spans. This is illustrated by the figure below (from the Nuclear-1 Scoping Report), which indicates that major coal-fired power stations such as Majuba, Kendal and Matimba will all reach the end of their operational lives by approximately 2025. Unless plans are put in place to construct power stations to replace these existing stations, which provide in existing demand, as well as to construct new power stations to increase supply of electricity, it is a given that South Africa will experience a critical shortfall of electricity supply by 2025. The Integrated Resource Plan (IRP) 2010, the strategic government policy for securing electricity supply over the next two decades, indicates that at least 40,000 MW of new generating capacity needs to be created to cater both for the expected increase in demand, as well as existing power stations that will reach the end of operation.



Comment 2:

If emissions are really the issue, then we could add scrubbers at a lesser cost than nuclear generation (for a coal plant) to deal with the sulphur residues in coal generation, and plan to fund carbon capture for all our coal generation plants when it comes on line and commercially viable around 2025. The EIA includes plans to deal with the high level nuclear waste by “technological and legislative” advances, and these are further away from being possible than carbon capture, never mind the unlikelihood of the recycling of high level nuclear waste ever becoming commercially viable; so why not use the same approach for coal as an alternative? Kusile and Medupi will both include sulphur scrubbers and it may be possible that CO₂ capture and storage for coal stations will be available quicker than the new nuclear build will take.

Concern and objection raised Number 2:

The EIA does not appraise the alternatives of a high efficiency sulphur and CO₂ scrubber coal option, against the nuclear option to mitigate greenhouse gas generation in the medium term energy planning. Thus the EIA does not place before the decision makers all the required options.

URGENCY BASED ON PEAK CHALLENGES POORLY ARGUED

Revised DEIR Chapter 4, pg6

Figure 4-7 shows a typical demand profile for the hours of the day during winter and summer of 2008. The figure clearly shows the peak in the electricity demand each day in the morning and late afternoon periods. The peak demand exceeded 36 000 MW in the late afternoon/early evening. The figure also clearly shows that in 2007 the minimum base load demand for electricity in the early hours of the morning was approximately 24 000 MW.

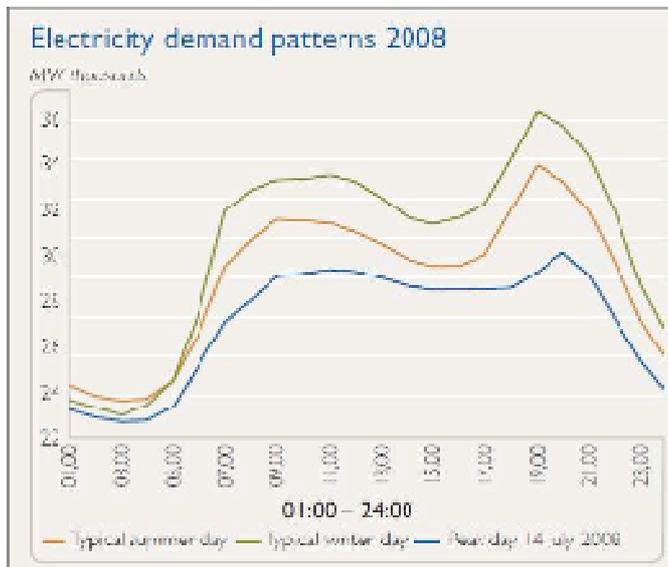


Figure 4-7: Daily electricity demand patterns (Eskom 2009)

The increasing demand for electricity impacts both the base-load demand as well as the peak-load demand. It is thus essential for Eskom to construct new base-load and peak-load power stations. The Nuclear-1 project is aimed at increasing the base-load supply capacity. Other projects are aimed at increasing the peak supply capacity.

Revised DEIR Chapter 4, pg 1

South Africa is still experiencing an electricity baseload-capacity deficit. Eskom needs to increase its generation capacity to improve the reserve margin (the difference between the peak demand and generation capacity) back to within acceptable limits. The reserve margin of 14 % in January 2009 was still below the international norm of 15 % (Eskom 2009). Eskom requires approximately 3,000 MW of generating capacity in reserve to take generating units off-line to perform essential maintenance (Eskom Integrated Report 2012 – accessed at http://financialresults.co.za/2012/eskom_ar2012/integrated-report/index.php on 23 July 2012).

Response 2:

The environmental application for Nuclear-1 is for a nuclear power station and the Nuclear-1 EIA process is not a strategic level review of potential power generation alternatives, such as the alternative of using coal-fired generation with scrubbers. Strategic review of the power generation alternatives to determine the mix of generation alternatives that need to contribute to total generation capacity, was the function of the Integrated Resource Plan (IRP) 2010 (government's strategy for security of energy supply over the next two decades) and is not the function of project-specific decision making within the scope of an EIA.

The EIA process is, by its very nature, a project-specific tool that focuses on a particular form of technology. However, government and Eskom are pursuing a number of technologies in parallel to nuclear generation. It is to be noted that the IRP requires a balanced mix of generation technologies, including 9,600 MW of nuclear and 18,700 MW of renewables. The purpose of nuclear generation is to provide reliable base-load power, which can be supplied by either coal or nuclear generation. It is also pointed out in the Revised Draft EIR that a mixture of generation technologies is required in order to

meet South Africa's future energy needs and that we cannot place reliance on only a single form of technology or a limited number of technologies.

The project-specific nature of the EIA has also been the case with other power stations such as the gas-fired power stations that have been constructed at Mossel Bay and Atlantis and the Medupi and Kusile coal fired power stations currently under construction.

As with these previous instances of power station EIAs, the scope of the Nuclear-1 EIA is restricted to a specific power station on a specific site or sites within a defined geographical area. It cannot reasonably be expected that each application for a power station must revisit strategic government decisions that have been taken on the mix of generation technologies that are necessary to meet South Africa's electricity needs. Government has, through a consultative process, already taken a decision on the mix of generation technologies required to supply South Africa's future electricity needs for the next two decades. The conclusion of the IRP 2010 process is that 9,600 MW of nuclear generation must form a part of the mix of generation technologies.

Comment 3:

The EIA is not clear in chapter 4, where it is attempting to describe "need and desirability", about whether it is the peak or base-load that has the urgent requirement. Nuclear is a base-load provider and this would be a potential argument for nuclear. Whilst peak needs a base-load to build the peak on, the EIA describes the building of Kusile and Medupi, in addition to the commissioning of 3 moth-balled coal power-stations, and these will contribute significantly to base-load in the short-term.

However on the opening page (pg1), the EIA uses peak and peak reserve margin challenges as its particular argument for the acute need for more generation capacity.

If one looks at the electricity use requirements through a 24 hour cycle as provided on DEIR page 6 chapter 4 (fig 4.7) it shows that peak nears capacity between 17.00 and 21.00.

There may be other ways (these are not discussed) of dealing with the peak problem-

- Address causes of peak (seems a lot of domestic on top of background)
- Shift peak use into base load times where spare capacity exists
- Explore different time zones in South Africa to shift peak (07.00-09.00 and 17.00-21.00). If it were possible to lengthen peak period and flatten peak requirement we would have more time to make correct decisions.

Concern and objection raised Number 3:

- The EIA use "peak" usage challenges as an argument for the building of a nuclear power station, which is described in the same paragraph as being required for improving base-load generation. *The EIA needs to place before the decision-maker the correct information.* If peak usage is the problem there are alternatives to address this issue that have not been adequately discussed. This renders the whole motivation for the need, invalid.
- Daytime base-load could be well assisted by solar, and this could include covering in to the evening peak, but the only comparison in the EIA is against coal. The omission of the solar option to increase day-time base-load is a critical omission from the EIA.

Response 3:

It has been made clear throughout the EIA process that the purpose of a nuclear power station is to supply base load electricity. The reference to peak demand in Chapter 1 of the EIR is to illustrate the fact that the reserve margin (the difference between supply and demand) is still unacceptably low and does not to provide security of supply at all times. South Africa needs both base load and peaking power stations to provide greater security of supply. Although peaking power stations may be sufficient to deal with a poor reserve margin in the short term, it is clear (with reference to Response 2), that additional base load generation is also necessary to deal with supply challenges. The introduction to Chapter 4 of the Revised Draft EIR is also clear in that it refers to the need to additional baseload generating capacity.

Your comments regarding alternative ways of dealing with peak demand and using solar power to deal with daytime peak load are noted. There is no denying that renewable electricity generation has an essential part to play in South Africa's energy supply and these alternatives are being explored. Renewable energy indeed forms an important part of recommended electricity strategy in the IRP. It is not, however, the purpose of his EIA to review all the electricity generation alternatives. The Nuclear-1 application is for a baseload generating nuclear power station. Please refer to response 2 above regarding the reasonable and feasible alternatives considered in the Nuclear-1 EIA process.

Comment 4:

**a) UNVALIDATED SCORING SYSTEM USED AND
b) INACCURATE CLAIM OF PEER REVIEW**

The scoring system Arcus Gibb have created to compare the three sites (see Ch 9 p316).

a) Scoring system used to predict best site:

I asked, at the Melkbos meeting, where your team got this scoring system and how it had been validated, especially taking into account best international practice and how the categories had been classified and weighted. At the meeting your response was that this was an "in-house" formulated classification and you were unable to explain it. On further reading of the draft EIR and your response, it is clear that this scoring system was established post-hoc i.e once you had most of the results of the specialist studies at your disposal in 2009.

Scoring systems are widely used in the medical field, particularly in critical care where I have extensive experience. Scoring systems use a number of data variables (over a range of this variable) that are measurable in each patient, a weighting is applied to each variable and the sum of the variables is used to give a severity score or a predictor score. The scoring system used in the EIA is clearly attempting to perform a similar function - to make sense and create a measurable prediction of an outcome from a complex set of data. However the scoring system in the EIA is not referenced and its development and validation is not adequately explained.

There are good descriptions of scoring system development and validation available (see below). In order to develop a scoring system, a database incorporating a large amount of detail from several sites, preferably from different sites around the world is required. Once a scoring system has been produced its performance should be measured (assessed and validated). This process must be carried out on a different data set to the one the scoring system was developed from, as a scoring system should always be predictive in its original data set. The references below are from the medical literature where there is extensive experience in developing scoring system to predict outcomes from complex sets of variables. A, excellent review of the development of scoring systems can be found in: Continuing Education in Anaesthesia, Critical care and Pain, volume 8, number 5, 2008. [This is published with the British Journal of Anaesthesia, and is available on-line]. Other good references critiquing scoring system development can be found at:

Lemeshow S, Le Gall JR. Modelling the severity of illness of ICU patients: a systematic update. *J Am Med Assoc* 1994; 271: 1049-55

1. Le Gall JR. The use of severity scoring systems in the intensive care unit. *Intens Care Med* 2005; 21: 1618-23

2. Rudky S. Severity of illness scoring systems and performance appraisal. *Anaesth* 1998; 53: 1185-94

3. Mouraugh R, Siechard G, Fowler KM. Does it 'do' is a good Assessment of scoring systems. *Crit Care (The Lancet)* 2000; 4: 176-80

b) The EIA report is also described as being peer reviewed, but this is clearly a process that additional 'consultants' have been paid to do.

Concern and objection raised Number 4:

- You cannot legitimately devise a scoring system post-hoc. There is an enormous risk of bias in such a process, and therefore the whole weighted system used to determine the most suitable site in this EIA is completely flawed.
- Once a scoring system is developed (often based on an initial data set) it needs to be tested against other data sets to ensure that it remains a useful predictor of desired risk /outcome that it

is designed to measure. Only then can it be considered a robust scoring system. Typically a scoring system will predict the outcome in the data set that was used to develop the scoring system, so you can never validate it against the original data. This "scoring system" devised in the EIA, is not a validated scoring system and therefore cannot be used to predict the best site.

- The peer review process was by 2 paid consultants, sourced and appointed by Arcus-Gibb. There is no independence in this process, this is not a peer review as would be generally accepted when using this term - this is merely an opinion by reviewers selected by the authors of the report. Peer review means independent, sometimes blinded review by acknowledged experts in the particular field. Paying two "tame" peer reviewers is not a peer review, and the EIR must therefore be declared as "not including" a formal peer review.

Page 314 (chapter 9) - below

9.32.4 Selection of key decision factors

In view of the above findings, and the fact that Table 9-93 does not provide a robust and defensible way to identify a preferred site, Arous GIBB made use of the findings of a specialist integration workshop, which was conducted in November 2009, to determine which impact categories (both environmental and technical) have more relative importance than others. This led to the ranking of impact categories and determination of the key "decision factors" to be used in site selection. Table 9-94 shows the results of the ranking of the key decision factors.

Consensus was sought at the specialist integration workshop to align the recommendations of the specialist with each other. However, this was not always possible. In many cases recommendations of particular specialists with regards to site preference are opposed to those of other specialists. Therefore, both to reduce the number of decision factors to a manageable number and to ensure that responsible trade-offs can be made between decision factors that point to contrasting preferred sites, the categories of potential impacts have been weighted in order to select a preferred site. The integration meeting therefore included the development of weightings (indications of importance) for the different decision factors (specialist disciplines). The weightings are the results of the weighting developed at the integration meeting in November 2009, as well as the Arous GIBB team's consideration of the changes to specialist studies after the integration workshop.

Response 4:

Your comments regarding the scoring system are noted.

Ranking system

Every discipline has different method and approaches to evaluating data and information. In the field of environmental management, the assessment and evaluation of environmental impacts has developed over the last three decades and includes a number of criteria that are applied almost universally in EIAs. These criteria typically include nature (is the impact negative or positive?), extent (or scale), duration, intensity (degree of change), consequence (seriousness), reversibility, probability (how certain is it that the impact will occur?) and significance (overall importance of the potential impact).

Although there is general agreement about the nature of the criteria for assessment and there are local and international guidelines on this, there is no single agreed method. It is up to the discretion of the environmental assessment practitioner (EAP) to apply his or her mind to determine the most appropriate combination of criteria, as well as any requirements that the environmental authority might have regarding the criteria. In the case of the Nuclear-1 EIA the EAP sought assistance from other senior EAPs, namely Mr. Neal Carter and Mr. Reuben Heydenrych, as well as an advisor on EIA process, Mr. Sean O'Beirne.

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

the proposed Nuclear Power Station as well as to the preferred site. Please refer to Chapter 10 for the updated assessment approach.

Peer review of the EIR

Your objection to the payment of the peer review consultants are noted. Payment for work performed is implicit in any EIA work. EIA consultants (including peer reviewers) need to be remunerated for work performed. The EIA regulatory regime (the National Environmental Management Act, 1998 and the EIA regulations thereunder - Government Notice Numbers R 543 to 546 of 2010) provided by government provides for the payment of EAPs.

In this regard, Government Notice No. R 543 of 2010 provides the following definition:

“*independent*”, in relation to an EAP or a person compiling a specialist report or undertaking a specialised process or appointed as a member of an appeal panel, means—

- (a) that such EAP or person has no business, financial, personal or other interest in the activity, application or appeal in respect of which that EAP or person is appointed in terms of these Regulations other than fair remuneration for work performed in connection with that activity, application or appeal; or
- (b) that there are no circumstances that may compromise the objectivity of that EAP or person in performing such work”.

Thus the EIA regulatory regime provides for the fair remuneration of consultants involved in compiling or reviewing an EIA.

In the context of EIA practice the term “peer review” is understood to mean review of an EIA process and the associated deliverables by another EAP. It may have a different meaning in academic circles.

The following quote from the Integrated Environmental Management Guideline Document¹ on EIA review provides an indication of the purpose of EIA peer review (or “process review” as it is called in the guideline) in the South African context: “*The principle of process review is to assess whether the EIA process has been fair to all involved parties. Process review is especially important in terms of regulatory compliance. An experienced EIA practitioner will be able to review a process ensuring that it meets legal and procedural requirements, as well as criteria for good practice*”. It is, therefore understood that review of EIRs is undertaken by other EIA practitioners. It must also be noted that the Department of Environmental Affairs has appointed an independent review panel of five members to assist in the authority review of the Nuclear-1 EIR.

Comment 5:

This workshop was done after you had the data (post hoc) and therefore you could see the impact of what you were doing with the factors, when you gave them a weighting. Post hoc weighting is not a valid assessment methodology.

Arcus Gibbs (*sic*) team then considered further changes after the integration workshop. It is not clear what these are, and they could have differed materially from the group of specialists (which in itself is methodologically questionable).

Concern and objection raised Number 5:

- This methodology would not pass on ethical, scientific or peer review methodology, and would not stand up to a true peer review of the process.
- The lack of detail as to what decided at the integration workshop and what was decided (and changed) after that by the Arcus Gibb team does not allow me to interpret this process. I therefore request that these details be provided in the report so that we can rationally interpret the critical conclusions in this final part of the report. This is crucial as these weighting are what your final recommendations are heavily based upon.

¹ DEAT (2004) Review in Environmental Impact Assessment, Integrated Environmental Management, Information Series 13, Department of Environmental Affairs and Tourism (DEAT), Pretoria.

Response 5:

Your opinion in this regard is noted. Prior to the receipt of the specialist studies, the GIBB EIA team could not have known that there were findings and recommendations in different specialist studies that were, for instance, opposed to each other.

Further changes in the methodology, based on facts that only became available after the 2009 integration workshop, are indicated in Chapter 9 of the EIR. Thus, for instance, it is indicated on page 9-317 of the EIR that impacts on heritage resources was not considered an important decision factor during the integration workshop, but that the weighting of this factor was increased in response to changes in the Heritage Impact Assessment.

Comment 6.1:

If you look further at the scoring system used (all available at <http://projects.gibb.co.za/Projects/EskomNuclear1RevisedDraftEIR/tabid/314/language/en-US/Default.aspx> (page 318 of chapter 9).

The scoring system is not based on any previous examples, or international “best practice”, but has arbitrarily been created post-hoc with weighting scores for each of the categories below:

Nuclear-1 EIA Version 2.0 / March 2011
Revised Draft Environmental Impact Report
9-318
Transmission integration factors (4);
• Seismic suitability of the sites (4);
• Impacts on dune geomorphology (3);
• Impacts on wetlands (3);
• Potential conservation benefits³³ (3);
• Impacts on heritage resources³⁴ (3);
• Economic impacts (3);
• Impacts on invertebrate fauna (3); and
• Impacts on vertebrate fauna (2).

EIA weighting scores of 1 were allocated to all of the following and then because they were weighted as 1, they were not considered when an attempt was made to create a “value driven” assessment to **compare the three sites.**

- Geohydrology
- Floral impact
- Marine ecology impact
- Noise impact
- Tourism impact
- Agricultural impact
- Social impact

Even using their scoring (which cannot be substantiated) they have left these 7 weighting points out for no validated reason.

Concern and objection raised Number 6.1 (point 1 on scoring system usage):

- You are using concluding arguments in an EIA (based on an arbitrary and unvalidated classification) that therefore excludes all factors to do with:
 - Geohydrology
 - Floral impact
 - Marine ecology impact
 - Noise impact
 - Tourism impact
 - Agricultural impact
 - Social impact

- This cannot be accepted as an environmental assessment, if these clearly environmental factors can be completely discounted in the final assessment for a nuclear power station at environmentally rich sites, on stretches of undeveloped coastline.

Response 6.1:

Your comments are noted.

The weightings allocated to different decision factors are not arbitrary or unsubstantiated. The reasons for the weightings are explained in Chapter 9 of the Revised Draft EIR.

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

Comment 6.2:

When considering the detail of the alleged “scoring system” only 2 categories score a weighting of 4 points- *seismic suitability* one can understand is important in this EIA. However *Transmission integration factors* also scores a weighting of 4 points. It is not clear how this is part of the EIA. The authors’ justification that the Eastern Cape needs electricity generation is not part of any EIA process that I can find in the literature on EIAs. So Thyspunt scores very high for a category that should not be there in an EIA scoring system. As I understand it, there is a separate EIA being undertaken for some of the sites, exploring the transmission corridors.

Concern and objection raised Number 6.2 (point 2 on scoring system usage):

- Transmission integration factors, as used in the scoring system, should not be part of the EIA. This is part of the motivation for the need, but is not a consequence of building and running a new nuclear power station.
- Transmission integration factors are what grid planners need to take into account when looking for sites, but this cannot be used in the EIA for a particular site. The EIA is designed to assess the potential impacts (positive or negative) of the planned facility.

Response 6.2:

Your comments are noted.

As indicated in the EIR, no fatal flaws were identified at any of the sites, provided that mitigation is applied (e.g. in terms of the positioning of the power station on the least sensitive portions of the site). The power station could therefore be developed at any of the potential sites. Technical factors (seismic and transmission integration factors) were considered.

Transmission integration considers the strategic location of the power station relative to the areas where electricity is needed (load centres), which are located in the Eastern Cape and Western Cape. From a transmission integration perspective, it is preferable to place a power station as close as possible to the load centre. The EIA processes for the transmission lines are indeed being conducted. However, they consider the project-specific impacts of the transmission lines but do not consider strategic factors related to matching the supply and demand of electricity.

In the case of coal-fired power stations, such transmission integration factors may be less important, because the main factor for the location of a coal-fired power station is that it needs to be close to the source of coal. There is, therefore, relatively little leeway for consideration of location alternatives for coal-fired generation. However, location of the source of fuel for the proposed Nuclear-1 power station

is not a consideration as it could be delivered at similar cost irrespective of the location of the power station. Therefore, in the absence of any fatal environmental flaws, technical factors do become important for decision-making, since the reasonable and feasible sites that have been identified for Nuclear-1 have differing implications for transmission integration, cost of transmission lines, security of supply and stability for the national grid. Ultimately these technical factors are important from a social environmental perspective, since without security of electricity supply, South Africa's economy would be at risk of suffering serious negative consequences.

The way that technical factors are considered in the Nuclear-1 EIA is no different to the way that they may be applied in any other EIA process where there is little difference between the overall potential environmental impacts of the alternatives. In the absence of significant differences in the environmental impacts of alternatives, it makes sense in an EIA to come to the conclusion that technical and financial factors can be the drivers for decision-making.

Comment 6.3:

When considering the detail of the alleged "scoring system" 6 categories score a weighting of 3 points- Those scoring a 3 are:

- ***Impacts on dune geomorphology (3);***
- ***Impacts on wetlands (3);***
- ***Potential conservation benefits (3);***
- ***Impacts on heritage resources (3);***
- ***Economic impacts (3);***
- ***Impacts on invertebrate fauna (3); and***

The first two may be acceptable, however the 3rd on conservation benefits may also be acceptable, but they give Duynfontein a very low value because it already has a no-go zone around it, making it a protected reserve. I have reservations about scoring that differently just because currently it has greater protection; because ultimately they would all have the same protection, it is just that Duynfontein already has that status so there would be no change?

The economic impacts are also a concern, because they have attributed a significant positive to this; my understanding from the Scottish and United Nations guidelines on EIAs is that the EIA process looks for negative impacts, and does not look to try to assess the positive impacts in economic terms, and that this should be looked at strictly in terms of the impact of the environmental changes, usually degradation, that the planned development will cause.

Concern and objection raised Number 6.3 (point 3 on scoring system usage):

- It is not acceptable to compare three sites that will ultimately have the same degree of restricted access, and claim that because one already has restricted access that the environmental protection offered by the exclusion will be more positive for the 2 currently unprotected sites. What should be measured is the long term change, and benefits of this exclusion.
- It is not clear what the significant benefits would be with the introduction of a restriction zone (to 800-1000 metres, or even to 3000m) would have on the environment. Whilst benefits are claimed, the proposed sites are therefore so small that the benefits may not be as clear as claimed.
- If seismic risk scores 4 points- and there would be few who would argue that this is an important factor when considering potential environmental impacts of a site in combination with a nuclear power station; then how can the "conservation benefits" of essentially a tiny parcel of land be weighted on a weighting of 3, unless it can be demonstrated that the small area around Koeberg has had a highly significant conservation benefit?

Response 6.3:

Environmental Impact Assessment is in essence the prediction of changes that could occur in the environment, i.e. the difference between the current (pre-development) condition and the predicted condition of the environment after development. In the case of Duynfontein, there would be no change in the environment with respect to its protected status. However, in the case of Bantamsklip and Thyspunt, there would be a change from unprotected status to protected status. In the case of both the latter sites, the current condition of the environment is degraded in that they are significantly invaded by alien plant species. The Duynfontein site was similarly invaded prior to the establishment of Koeberg Nuclear Power Station, but alien species have been virtually eliminated from that site by

active conservation management. Therefore, the potential conservation benefit that will be experienced at Thyspunt and Bantamsklip is indeed a factor to be considered.

Environmental protection is not simply a matter of restriction of access. Simply closing off a site to public access will not provide protection to natural resources. The invasion by alien plant species is a case in point. Natural systems are affected by a range of human influences and need active management in order to control processes such as alien plant invasion and accelerated erosion.

Regarding the benefits that restricted access² would provide, it is to be noted that the larger Bantamsklip and Thyspunt sites both contain natural and cultural features of high sensitivity and value. Provided that the proposed power station is placed in an area of low sensitivity on the sites, the elements of high value can be conserved. Clearly the sites are of small extent, but concentrations of features of high value such as the mobile dune field, coastal heritage sites and the wetlands at Thyspunt do provide an opportunity to add significant value for conservation.

Comment 6.4:

The economic impacts (weighting 3 points) are also a concern, because they have attributed a significant positive value to some of the sites. My understanding from studying the published (and freely accessible) Scottish and United Nations guidelines on EIAs, is that the EIA process looks for negative impacts, and does not look to try to assess the positive impacts in economic terms (hugely speculative), and that this (economic impacts) should be looked at strictly in terms of the impact of the environmental changes, usually degradation, that the planned development will cause.

Concern and objection raised Number 6.4 (point 4 on scoring system usage):

- The use of such positive economic impacts is purely speculative, and should not form part of the EIA in this manner

Response 6.4:

Environmental Impacts Assessment is required to assess both positive and negative environmental impacts. The National Environmental Management Act, 1998 defines “environment” as follows

*“environment’ means the surroundings within which humans exist and that are made up of -(i) the land, water and atmosphere of the earth;
(ii) micro-organisms, plant and animal life;
(iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and
(iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing”*

In terms of this definition, and in terms of the DEA's requirements for this particular EIA process, negative and positive impacts of all forms need to be assessed.

Comment 6.5:

The final two weighted categories are:

- **Impacts on invertebrate fauna (3); and**
- **Impacts on vertebrate fauna (2).**

It is quite possible to accept these values attributable to invertebrate and vertebrate fauna. However the report's authors have decided that the “floral impacts” and “marine ecology” impacts are allocated a score of one (1), and they then made the decision that these factors may be discarded from the final analysis? I would have thought that given the large “tailings” [6-10 million cubic metres] that they are going to dump into the sea (planned 5 km off Thyspunt), that they would have included the marine ecology in the equation. I also struggle to see how they can ignore the floral component, which must be so critical for the invertebrates and vertebrates that they have included. Now a scoring system may be able to say that the vertebrates and invertebrates, scored at that value in this scoring system, behave as a good indicator for the floral component and therefore they have used them as such. But

² Mr Reed's term. Note as stated above the benefits relate to active conservation and not only to restricting public access to the site.

to do that you need to produce the evidence that they are a reliable indicator, in this situation. There is no evidence for this sort of assessment having been made.

Concern and objection raised Number 6.5 (point 5 on scoring system usage):

- It cannot be acceptable to discard the marine ecology weighting for a coastal site nuclear power station, at three very different sites. Even if they are considered equal (at a very high level) for all three sites- there needs to be more detail on how these decisions were made, and on what best practice they are based.
- The decision to give the impact on the marine ecology a weighting of 1 (when the first effect of the construction of Nuclear-1 will be from dumping between 6.4 and 10 million cubic metres of sand/soil into the marine environment), AND then scoring the value of protecting the small areas around the Nuclear 1 with a weighting of 3 is not reasonable or validated. This disparity in these 2 scores highlights the failure of this non-validated scoring system.
- The floral assessment was discarded as the invertebrate and vertebrate fauna were considered to provide a reliable indicator of the floral component. However this assumption and statement are not clearly backed by fact.

Response 6.5:

Your comments regarding the weighting of marine, floral and invertebrate impacts are noted.

One of the considerations in determining the weighting of impacts is the significance of the impacts and the degree to which these impacts, in the professional opinion of the relevant specialists, could be effectively mitigated. Although several million cubic metres of spoil is proposed to be disposed in the marine environment, the marine specialist team has indicated that these impacts can be mitigated by disposing of the spoil at depths and distances from shore where they would not affect critical species like chokka squid, which spawn only at depths up to 50 m. The spoil is proposed to be discarded deeper than the spawning zone of chokka squid at a medium pumping rate to prevent excessive turbidity.

The marine specialist team's professional judgement in this regard is informed by their involvement in monitoring programme for the marine environment at Koeberg Nuclear Power Station (KNPS), which has been on-going for more than 20 years. In the case of the KNPS, no appreciable negative impacts on the marine environment have been detected.

Floral, vertebrate and invertebrate impacts cannot necessarily be regarded as synonymous or as indicators of similar impact. The relative weighting of each decision factor was based on the merits of the respective specialist findings and the professional judgement of the specialists. Although in some cases the distribution of invertebrate species is closely correlated with floral habitats, this is not always the case.

With respect to floral impacts, the impacts can be mitigated by placing the proposed power station outside of the most sensitive zones, since sensitive features are restricted to specific areas on the sites. Floral impacts were therefore allocated a low weighting.

Comment 6.6:

This scoring system that shows Thyspunt to have a value of +5 compared to values of -8 for the other 2 sites, is completely without basis. For argument's sake if you leave out *Transmission integration factors* (arguably not part of the EIA), conservation (weighting factor clearly over rated and outcomes desired not well considered) and economic (because incorrectly done) you come up with a score of -28, -31 and -32. Now I am not sure this is any better, but just shows what can be done by playing with numbers. All just a bit of pseudo-science when done like this, and about as useful as witch-craft.

Concern and objection raised Number 6.6 (point 6 on scoring system usage):

- The use of a post-hoc, unvalidated scoring system sheds more concern than clarity on the matter, and the scoring system needs to be discarded completely in its current form.

Response 6.6:

Your comments are noted.

Your comment about the economic impacts being “incorrectly done” is however rejected for the reasons provided in Response 6.4. Your comment regarding conservation not being a valid factor to consider is rejected for the reasons provided in Response 6.3.

ISSUES OF CONCERN FROM THE MARINE SPECIALIST’S REPORT ON MARINE ECOSYSTEM

Page 51 Marine Ecology Impact assessment

exploitation due to a safety exclusion zone. Experience at KNPS has shown that many of these impacts can in fact have minimal effect on marine habitats and although the proposed plant will be larger than the Koeberg plant (4 000 MW in comparison with 1 800 MW), the findings at KNPS offer a sound base from which to assess potential impacts.

Page 43 of report Marine Ecology Impact assessment

Abstraction of cooling water and subsequent entrainment of organisms

As with Bantamsklip, the effects of cooling water abstraction and the resulting impacts on plankton have not been quantified for this site. Again higher ambient water temperatures than those occurring at KNPS (i.e. maximum and minimum sea surface temperatures of 22.5 and 16.6°C respectively (Shillington 2007)) are expected to increase the toxicity of chlorination (Huggert and Cook 1991) when compared to the west coast site. However, long-term climate change induced decreases in sea-surface temperatures along this section of coast (Rouault *et al.* 2009) may reduce this effect in the long term. The lower productivity of nearshore waters in this area is, however, expected to result in less entrainment of organisms and little effect on the marine environment at Thyspunt. No species of commercial value are likely to be affected by entrainment. As at the other potential sites technical design aspects and screens will prevent the uptake of larger marine organisms, such as squid, fish and marine mammals. The exact positioning of the uptake pipes is not of importance from a marine ecology perspective. The impacts resulting from abstraction and entrainment will occur during the entire operational phase of the development.

Comment 7:

This extract above describes the heat and chlorine changes on the West coast (based on Koeberg Nuclear Power Station experience), and describes increased chlorine toxicity in warmer waters of the south coast. It then relies on potential sea temperature cooling (secondary to climate change) to mitigate that unwanted temperature difference.

Some of the heat and chlorination impacts may be possible to extrapolate for the Duynefontein site, but the other two sites are on the Southern Cape coast, and thus this statement no longer holds true as both marine conditions (average water temperature) and the marine ecosystems are significantly different to that at the Duynefontein site.

Concern and objection raised Number 7:

- The issue of the impact of seawater temperature changes needs to be addressed more comprehensively for both the Bantamsklip and Thyspunt sites as they differ significantly from Duynefontein.

Mitigation cannot depend on potential sea water temperature changes, supported by a single speculative paper that relies on the effect of long-term climate change to cool the water. Even in worst case scenarios those temperature changes are predicted to be only a few degrees, and nothing like the measured 4.1 degree sea water temperature difference between Duynefontein and Thyspunt. The clause referring to the long-term climate change induced decreases in sea-surface temperatures for the Thyspunt site (Rouault *et al.* 2009) is speculative and misleading. It should be removed from the text.

- What does the term “long term” mean in the paper references. We are looking at an 8-10 year building period, thereafter the water difference will start. This is not long-term at all and unless the

predicted cooling of seawater secondary to climate change is predicted to occur in the next 10-20 years, then this statement needs review.

treatment, this effluent *may* be discharged into the ocean via the cooling water outfall tunnels. As required by the Department of Water Affairs and Forestry this water will meet the required standards as set out in the South African Water Quality Guidelines for Coastal Marine Waters at the point of release. As such no impact on the marine environment is anticipated.

Response 7:

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

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

"Long-term" with reference to climate-induced changes in seawater temperature refers to a time scale of several decades. As stated above, the Marine Ecology Assessment does not rely on long-term climate-change induced changes in seawater temperature to offset the impacts of warmed cooling water. Thus, the issue of the time scale is largely academic as it does not materially affect the mitigation of the impact. Furthermore, the area that will be affected by the release of warmed cooling water at Thyspunt is very limited in extent. The Marine Ecology Assessment indicates that "*if a nearshore outfall is used a mean increase of 3°C near the seabed will be limited to an area of roughly 0.2 km² (2 ha) around the outlets of a 4 000 MW plant and an area of 0.7 km² will experience a maximum increase of 3°C or more at any time*".

Comment 8:

Is there evidence to back the statement that meeting the DWAF Water Quality Guidelines will result in no impact on the marine environment? There are certainly marine changes in sites such as Mouille Point in Cape Town and Cape Recife near Port Elizabeth, so there would need to be some monitoring and assessment around this site.

DWAF's water quality guidelines for marine coastal waters clearly states how increases in seawater temperature (the primary environmental impact in this case) can have an effect on primary producers (plants) and secondary consumers (animals) in the natural marine environment. Temperature is the primary reason the South African Coastline is divided into 'West Coast, South Coast and East Coast'

Concern and objection raised Number 8:

It cannot be simply stated that there will be "no impact on the marine environment"

3.3.1 Disruption of the marine environment during construction

As at the other sites, the construction of an intake and **outfall** system for cooling water will result in temporary **but severe localised** disruption to the marine environment. Under such circumstances the benthic habitat and in particular egg beds of the chokka squid *Loligo reynaudii* are at risk of damage due to smothering, while turbidity may result in adults temporarily moving out of the area. This disturbance will be focussed within the construction phase and is likely to be localised and of short duration.

Additionally, the discarding of an estimated 6.37 million m³ of spoil from the excavation of the nuclear island, turbine **hall and contractors' yards** hall poses a threat to the marine environment. As described for the previous two sites mentioned in this report, both the physical and biological marine environment would be affected. From a biological perspective impacts would occur due to

While some fish species show site fidelity and may be displaced from their home ranges during the construction phase, these species are widely dispersed along the South African coast. Thus while individuals may be affected, the species concerned will not be compromised and recovery is expected once the benthic community re-establishes.

Response 8:

Your comments regarding the impact of an increase in seawater temperature are noted. However, as indicated in Response 7, the increase in seawater will be of very small spatial extent and concentrated near the surface, as warm water rises. The assessment of the significance of impact is based on oceanographic modelling and on the marine ecology specialist team's collective expertise and experience in this matter, including their monitoring of the marine environment at the Koeberg Nuclear Power Station.

Comment 9:

To my knowledge there are several threatened reef and rocky coast fish species that are territorial on the Rebelrus/Thyspunt site and these have enjoyed relative protection within this area through the actions of the Rebelrus landowners, coupled with difficult access to the Eskom land at Thyspunt, especially since the banning in the 1990's of vehicles on the intertidal zone of the beach.

Concern and objection raised Number 9:

- The report makes:
 - No mention of these threatened fish species (pages 13-15)
 - Of the relative protection of these species, despite published work by Sauer
 - Of the potentially critical role of this "protected area" in close relation to the Tsitsikamma marine reserve, thereby creating an extended range of protection for these fish.
- To be complete, the report needs to consider these fish species and the absence of any comments is an omission.

decreases in sea-surface temperatures along this section of coast (Houait *et al.* 2009) may reduce this effect in the long term. The lower productivity of nearshore waters in this area is, however, expected to result in less entrainment of organisms and little effect on the marine environment at Thyspunt. No species of commercial value are likely to be affected by entrainment. As at the other potential sites technical design aspects and screens will prevent the uptake of larger marine organisms, such as squid, fish and marine mammals. The exact positioning of the uptake pipes is not of importance from a marine ecology perspective. The impacts resulting from abstraction and entrainment will occur during the entire operational phase of the development.

Response 9:

In respect of the marine environment specifically there is no suggestion that the proposed development will have any impacts on biodiversity at the species level, since no species are known to **be restricted to this site**. Indeed marine species generally have much wider distributions than terrestrial species, so this impact would be unlikely. The members of the Nuclear-1 marine specialist team are also themselves among the leading marine biodiversity researchers in the region, and are both authors of the most recent marine biodiversity assessment for the region (Griffiths *et al.* 2010).

The marine specialist team is well aware of and has participated in the Marine Protected Area (MPA) project of the SA National Biodiversity Institute (SANBI). They have been deeply involved in plotting biodiversity patterns on which the MPA network proposals are partially based. From the information generated by this process and from other sources considered in the Marine Ecology Assessment, there is no reason to single out the marine environment at the Thyspunt site as an area of particular significance for marine conservation.

Comment 10:

“No species of commercial value are expected to be affected by entrainment” is the quoted issue raised.

Concern and objection raised Number 10:

- Are we only interested in *commercial value* here, or is protection of species diversity not the issue, particularly for threatened or endangered species?

Response 10:

Commercial species (e.g. chokka squid) are of particular importance and concern at the Thyspunt site since a significant proportion of chokka squid vessels operate from St. Francis. Given the intensity of concern regarding the impacts on the chokka squid fishery, it would indeed be unwise to not specifically consider potential impacts on commercially important species. Therefore commercial species were singled out for special mention at the Thyspunt site.

This does not mean that non-commercial species were neglected in the assessment. The finding of the Marine Ecology Assessment is that the entrainment impacts will be insignificant at all three alternative sites, based on inclusion of screens and technical design of the cooling water intake system, which in any event needs to be designed to prevent the uptake of large organisms for effective functioning of the cooling system.

Comment 11:

The report states that there is no marine conservation benefit for Duynefontein and Thyspunt, but more for Bantamsklip because of the abalone population. However the concern expressed is that near-shore disposal near Bantamsklip poses a significant threat to the juvenile abalone population in this critical area for the species.

Concern and objection raised Number 11:

- The conservation benefit for Bantamsklip is dependent on successful far off-shore dumping, and this is not guaranteed. Should this not be successful then the high allocation of points awarded to this site in the final chapter is not valid.

Spoil disposal at sea

5.1.6 Closure of site to exploitation

This impact has the potential to have a positive effect on the marine environment. In particular a safety exclusion zone at Bantamsklip may be of great benefit, as it could offer much needed protection to the abalone *H. midae*. However, the level of organisation and the brazenness of poachers in this area will necessitate dedicated active policing of this exclusion zone if this benefit is to be realised. It should be noted that this positive impact will not compensate for the negative impacts on the abalone. No additional benefit will be gained at the Duynfontein and Thyspunt sites. Should no development occur and the sites were reopened to exploitation and development, no significant negative impact is anticipated for any of the sites.

Impacts on terrestrial vertebrate fauna (Positive)	Medium	High	High
Oceanographic impacts	Low-Medium	Medium	Low-Medium
Impacts on surf breaks	n.a.	n.a.	Low
Marine impacts	Medium	High	Medium

Additionally, spoil from the excavation of the intake tunnel, intake basin, nuclear island and turbine hall **and contractors' yards will** be discarded out at sea. At this site 6.48 million m³ of sand will need to be discarded. When disposed at sea this sediment will essentially have two impacts:

- Firstly as a sediment plume within the water column (consisting mainly of fine muds), which may block light penetration and filtering apparatus of filter feeders; and.
- Secondly as a layer covering the sea bottom (consisting mainly of coarser sands) that will bury the current benthic environment and biota.

The nature of these two impacts and how they are affected by currents and local water movement have been modelled by Prestedge *et al.* (2009a). These models considered the disposal of both the full volume (6.48 million m³) and a mitigation option of half the volume of spoil (3.24 million m³) at both a shallow and deep site. In addition, both a medium and high discharge rate were considered. **See Table 3 and Prestedge *et al.* (2009a) for details of the various disposal alternatives, including depth and rate of discharge.** At this site Alternatives 4 (i.e. disposal of all the spoil at a deep¹ site using a high discharge rate²), 5 (i.e. disposal of all the spoil at a deep site using a medium discharge rate³) and 6 (i.e. disposal of half the spoil at a deep site using a medium discharge rate) are considered preferred options from a marine ecology perspective. As the most severe impacts are associated with Alternative 4 this alternative is assessed. For this option the maximum suspended sediment concentration reaches levels above 80 mg/l near the water surface over a very limited area (*i.e. not more than 3 km²*) at any time during or after disposal (Prestedge *et al.* 2009a). This is considered to be a restricted impact as this sediment plume will occur offshore and avoids any potentially sensitive areas such as nearshore kelpbeds. The level of 80 mg/l has previously been identified as a threshold above which probable adverse ecological effects will occur, while 100 mg/l has been used as a critical value above which proven negative impacts occur (Cater 2006). These levels were applied in the environmental impact assessment of the deepening of the Ben Schoeman Dock Berth on the marine ecology of the Table Bay region. In addition, an area of only 0.5 km² will experience these elevated turbidity levels for longer than two days. Given the fact that this west coast region is exceptionally productive and this impact will be both spatially and temporally limited (and avoid sensitive areas) ***it is anticipated that the predicted increased turbidity will have*** little impact on the open water environment. **By contrast**, initial disposal of spoil will cover an area of 3 km² with sediment layered up to 2.95 m high, resulting in a dramatic affect on benthic communities, which will be totally smothered. However, this will occur over a limited area and will not affect any organisms of conservation importance. While recolonisation from surrounding areas is expected to occur, this will be over the long-term (years). In the first five years after disposal, the sediment on the sea bottom is expected to spread very little to cover an additional area of just 4.5 km² in greater than 5 cm of sediment. Very importantly, only 1 km² of this additional area ***is estimated to*** be covered by more than 10 cm of sediment (Prestedge *et al.* 2009a). In the period of six to ten years following disposal, sediment on the sea floor will continue to spread to cover 12.7 km² in more than 5 cm of sediment, with 60% of this area covered in sediment as shallow as **0.5 – 1 cm**. While benthic communities at the initial disposal site will still not have recovered, a variety of species are likely to have become established on the disposal mound by this time and areas covered in less than **1 cm** of sediment are expected to support

48 m
3.93m³/s
2.06m³/s

Response 11:

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

Comment 12:

This final statement is not clear³. Thysbaai is on a rough, open section of the Southern Cape coast, and is seldom accompanied by mild sea conditions, so to anyone who knows that part of the coast-line it is exceptionally difficult to envisage how it will be possible to establish a reliable mechanism for pumping the 6 million+ tons of sand and soil to 5-6km off-shore. The whole EIA depends on getting this distance from the shore to mitigate the effects of inshore disposal on Cape St Francis and Seal Point.

I submit that you cannot include a mitigating factor (disposal 5 km off-shore when the feasibility study is not completed and included) in the EIA, unless it is proved to be possible at that site.

Concern and objection raised Number 12:

- The inclusion of a mitigating strategy that is not feasible, could result in an EIA approval based on an incorrect premise, and if a site is chosen in that flawed process, inadequate mitigation could occur if the development proceeding incorrectly.
- Thus the feasibility study for a 5km off-shore disposal at Thyspunt needs to be concluded, and included in the EIA, before the document can be assessed in a holistic fashion.

Page 32 Marine Ecology Impact assessment

Additionally, the discarding of an estimated 6.37 million m³ of spoil from the excavation of the nuclear island, turbine **hall and contractors' yards** hall poses a threat to the marine environment. As described for the previous two sites mentioned in this report, both the physical and biological marine environment would be affected. From a biological perspective impacts would occur due to

And Pg 318 (chapter9)		
<i>Marine ecology impact</i>	<i>Marine impacts are similar at all sites, although higher at Bantamsklip, but there are no impacts of oritocal nature. The marine specialist indicated that the area that will be affected by the disposal of spoil in the sea oan be justifiably saorified.</i>	1

Comment Number 12:

Response 12:

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

Comment 13:

The report clearly describes the planned dumping of 6.37 million cubic metres (Thyspunt and Duynefontein) and over 10 million cubic metres (Bantamsklip) of spoil, the environmental consequences of this, and need the need to mitigate this by dumping this spoil 5 km or more out to sea (Thyspunt), and yet in the final analysis of points for the consideration of various sites you decide to completely omit the consequences on the marine environment.

³ With reference to this statement (GIBB's insertion): "At present a technical feasibility study is underway, considering the logistics of spoil disposal at sea at the Thyspunt site. To date no technical fatal flaws have been identified (Eskom position paper 2011). As a necessity, recommendations made in this specialist report assume technical feasibility of the proposed disposal options at Duynefontein and Bantamsklip".

Concern and objection raised Number 13:

- What is the rationale for weighting the effects on the marine environment as 1 on a scale with a maximum of 4, when your specialist's report describes significant effects with this volume of spoil, requiring the planning of expensive mitigating factors, with concomitant extreme engineering requirements?
- That you have taken a single specialist's "indication" that 6-10 million cubic metres of spoil can be disposed of in the marine environment and that the environment be "justifiably" sacrificed.
 1. This decision needs more than 1 person to make the decision
 2. What does "justifiably" mean. What is it compared to, what is the rationale for "justifiably" in this setting? Does the marine ecology specialist have the ability to take into account the marine ecosystem compared against the national requirement for energy as suggested?
- If this statement cannot be left in the report due the inappropriate comment by the marine specialist, does the argument still hold that the "Marine ecology impact" can be given a weighting of 1 (given that the whole weighting in itself is contentious)? And if the weighting is greater than 1 then the whole scoring system and results obtained are invalid.

Response 13:

The statement is based on the fact that the impact can be mitigated by pumping the spoil to an offshore location beyond where it would impact on chokka spawning areas. Based on international experience with the construction of nuclear power stations, and liaison with construction and marine engineering companies, such a disposal system for spoil is considered feasible.

The marine specialist team's finding is that although the seafloor in the area where spoil will be disposed will be completely smothered, the limited size of affected area (compared to the total seafloor environment of the South African coast), and the fact that the disposal areas would eventually be recolonized, would render the impact insignificant. This conclusion was reached by recognised and well-published marine scientists who are at the forefront of marine research in South Africa.

Comment 14:

The report claims that renewable options are not as reliable as nuclear as a low green-house gas emitting base-load supply option, but what about the "down-times" that many nuclear facilities require including Koeberg? What is the percentage of time that Koeberg has been down in the past 10 years?

Concern and objection raised Number 14:

- The "need and desirability" and "project alternatives" sections discuss nuclear power as if it is a continuous source, as compared to some of the renewable technologies.
- It is clear from being resident in Cape Town, that our current, sole NPS at Koeberg is not a constant source of power, but that on a fairly frequent basis a unit is "down" for maintenance and not infrequently during these times we have seen the second reactor being taken off-line for unscheduled reasons.
- The EIA should include an assessment of what percentage of time KNPS has had reduced output in the past 10 years.
- Therefore the complete envelope of information has not been placed in the EIA, to assist decision-makers to make the correct decision.

INCOMPLETE COMPARISON OF NUCLEAR WITH ALTERNATIVE TECHNOLOGIES

Page10 of Chapter 5

then an area of 345 600 ha will be required for 13 333 MW of installed capacity. Due to the fact that wind is not available at all times, a capacity factor² of 30 % is assumed and the effective power produced will be 4 000 MW. EPRI (2010) indicates that wind turbines at an unspecified coastal location have a capacity factor of 29.1 to 40.6 %. If a rotor diameter of 80 m is assumed instead of 90 m, the space requirement would be

Response 14:

Statistics from Koeberg Nuclear Power Station indicate that it had an average load factor (percentage of time it was operating at full generating capacity) of 79.2 % in the 5 years up to and including 2011 and an average load factor of 78.3% in the 15 years up to and including 2011 .

Downtime for maintenance purposes is a reality of any power generation technology, including nuclear, coal and some renewable technologies such as wind turbines.

Comment 15:

FAILURE TO ASSESS WORST-CASE SCENARIO AND FACTOR IN LESSONS FROM 2011:

The Revised EIA fails to assess worst-case scenario impacts, a particularly important point in light of what has happened at Fukushima. The longest time used in the risk assessment seems to be a 1:70 year flood, considered only after the R330 road collapse at St Francis Bay in 2007. There is no doubt that where-ever nuclear-1 is built, that it will be there for well over 100 years. This statement is based on the 50-60 year operational life-span and the “at least 10 years” that spent fuel will remain on-site after the operational life-span of the power station. Given these likely scenarios, coupled with the lack of a cost-effective and easy way to deal with high-level waste, it is likely that this nuclear station will be there for more than a century, with its nuclear fuel. Therefore planning needs to take place for all manner of natural events that could occur over a much longer period of time, if we are to fully assess the potential environmental impacts of this facility.

The US Nuclear Regulatory Commission’s “THE NEAR-TERM TASK FORCE REVIEW OF INSIGHTS FROM THE FUKUSHIMA DAI-ICHI ACCIDENT” (Published 12 July 2011) report finds that the Commission’s longstanding defense-in-depth philosophy, supported and modified as necessary by state-of-the-art probabilistic risk assessment techniques, should continue to serve as the primary organizing principle of its regulatory framework. **However** the Task Force concludes that the application of the **defense-in-depth philosophy can be strengthened by including explicit requirements for beyond-design- basis events.**

Concerns and objection raised Number 15:

- This Revised EIA has not dealt with potentially significant events that could threaten the nuclear power station, and by implication deal with the effect of such an event on the surrounding environment
- This Revised EIA has not factored in the lessons learnt from the Fukushima accident earlier this year, and this is in the face of many industrialised nations undertaking urgent and significant reviews of their use of nuclear generation. These include the Germany, Switzerland, Italy, Japan and the USA. The USA has taken the decision to establish a near-term task force to assess what can be learnt from the Fukushima accident, in an urgent attempt to ensure that this does not occur in the USA.

Response 15:

Risk assessment for nuclear power stations use very long return periods for the assessment of risks to plan for these risks. For instance, nuclear power station planning is based on 1:1,000 and 1:10,000 year extreme rainfall events, with and without climate change. As indicated in the Hydrology Specialist Report (Appendix E6 of the revised Draft EIR), the 1:10,000 year rainfall event is specifically selected in the case of nuclear installations with a view to build in a large safety factor to protect against flooding.

Information about radiological emissions under normal operating conditions is provided in the EIR (Appendix A10 and A32 of the Revised Draft EIR Version 2) and the environmental impact of these emissions is assessed. Assessment of the radiological emissions during emergency events and the readiness of the relevant role players to deal with such events is, however, within the ambit of the NNR owing to its legal mandate in terms of the National Nuclear Regulator Act, 1999 (Act No. 47 of 1999). As with many different forms of development, construction is dependent on authorisations by a number of different legal entities, including local, provincial and national authorities. Construction of

such developments is reliant on all these authorisations being obtained from entities with vastly different legal mandates. Reporting requirements to satisfy all these authorisations vary hugely, and it cannot reasonably be expected that information relevant to all these authorisations should be contained in the EIR.

The separation between the EIA process and the NNR licensing process is based on the legislative provisions of the relevant Acts, namely the National Environmental Management Act, 1998 and the National Nuclear Regulator Act, 1999, as well as the DEA / NNR co-operative agreement, which governs the consideration of radiological issues in EIA processes and the interaction between the DEA and the NNR in terms of their respective mandates for environmental and radiological safety (See Appendix B4 of the Revised Draft EIR). The agreement stipulates that issues of radiological safety are within the mandate of the NNR. Furthermore, it is not within the mandate of the Environmental Assessment Practitioner to question the legal mandates of either of these statutory bodies or the validity of their agreement. We must, therefore, conduct the EIA based on their mandates and their agreement.

In this regard you are also referred to the then DEA's approval of the Scoping Report, dated 19 November 2008, where the following is stated:

2.21 All radiological issues raised during the EIA process, which are not comprehensively addressed, must be explicitly referred to the NNR to be addressed as part of their process.

This response by the DEAT clearly acknowledges that there are some radiological issues that cannot be comprehensively addressed in the EIA process and can only be addressed in the NNR's nuclear licensing process. Notwithstanding this fact the current revised Draft EIR (Version 2) in recognition of requirements in the NEMA, associated legislation such as the Promotion of Administrative Justice Act, 2000 (Act No. 3 of 2000) and other legal precedents that require the consideration of all relevant socio-economic factors in an EIA process, includes an assessment of radiological impacts of the proposed power station. Although this approach of including an assessment of the radiological impacts of the proposed power station results in a risk of duplication between the EIA and the NNR licensing processes, the risk to the EIA in terms of possible appeals, based on the exclusion of substantive issues such as health issues from the EIA process, is regarded as greater than the risk of duplication. The current version of the EIR therefore departs substantially from the approach in the previous versions of the EIR in terms of the consideration of radiological impacts.

COMMENT FROM THE INDEPENDENT NUCLEAR SPECIALIST

In addition to what is said and please refer to previous comments regarding these being all matters that should and must be dealt with via the NNR licensing process - in addition to this refer to previous comments regarding the adoption of lessons learned from the Fukushima event and the need to demonstrate performance in the beyond design basis region as part of the plant safety case and licensing process.

Comment 16:

FAILURE TO ESTABLISH COSTS FROM A WORST CASE SCENARIO

At the Blouberg meeting it was asked from the floor what would be the insurance requirements for Nuclear-1. It was pointed out that the NNR decides on those requirements. However the EIA is best placed to determine the "worst case" scenario and the cost thereof. This would allow the NNR to apply their minds to the project.

Mr Stott (of Eskom) stated that Koeberg Nuclear Power station is required to carry a R3 billion insurance as determined by the NNR.

Section 29 and 30 of National Nuclear Regulation Act requires the state to carry total cost of any nuclear accident beyond any insured value. This would require consideration when making a decision on whether to go the nuclear route in energy supply.

To address this issue fully, one would be required to estimate the cost of a significant event such as a reactor “meltdown” (or other causes) of significant accidental release of radioactive emissions. Based on Chernobyl and Fukushima experiences in the recent past it would be reasonable to assume that an area with a radius of 20 - 30 km from the plant may be uninhabitable for several generations. Thus all property and livelihoods of residents with that area would need to be covered by this insurance.

Concerns and objection raised Number 16:

- The failure to consider worst-case scenario's (sic) and to cost them is a potential failing of this EIA.
- Personal 'home-owner' insurance policies specifically exclude nuclear events, so that the organization running the power station needs to insure to the required value.
- The EIA needs to put a monetary value to a catastrophic event- using Fukushima Dai-Ichi and Chernobyl long-term evacuation zones for modeling worst case scenarios, and thereby being able to assist in the generation of a realistic and reasonable insurance value. This cost then needs to be factored into the cost of nuclear in the EIA and presented to the decision makers.
- The failure of the EIA to provide a realistic estimated cost of a catastrophic event, which the state would be required to fulfill, demonstrates an *incomplete EIA and significantly limits the quality of the evidence placed before decision makers.*

Response 16:

Your comments are noted. As indicated in your comment, insurance requirements for nuclear power stations in South Africa are governed by the NNR Act and Eskom provides for the appropriate insurance as required.

As indicated in Response 15, planning for worst case scenarios is within the ambit of the NNR licensing process. The state has made a policy decision through the Integrated Resource Plan 2010 to include up to 9,600 MW of nuclear generation to provide the necessary generation capacity for the next 20 years. The state is aware that it is responsible for carrying any cost beyond the insured value that Eskom will provide for.

COMMENT FROM THE INDEPENDENT NUCLEAR SPECIALIST

The minister after consultation with the NNR makes a determination on the level and mode of financial security - this information must be gazetted.

Comment 17:

ESKOM PRE-EMPTING THE RESULTS OF THE EIA AND NNR PROCESS BY BUYING APPROACH ROAD LAND TO THYSPUNT BEFORE A DECISION

ESKOM has purchased significant amounts of land for the Eastern approach road off the R330 from late 2010 and into 2011.

Concerns and objection raised number 17:

- ESKOM is pre-judging the outcomes of the EIA process and all the processes to follow by purchasing this land.
- This advance purchase, together with the scoring system that has been weighted to extensively favour Thyspunt, despite the Heritage report suggesting that Thyspunt is the *least suitable* site, suggests that the EIA and other processes are not being undertaken as a thorough and independent process, but only as a means to satisfy the minimum requirements. If ESKOM have indeed purchased land, as I suggest, then the EIA's independence is suspect.

Response 17:

Eskom is buying land around the Thyspunt site at its own risk, pending the outcome of the EIA process. There is nothing in law that prevents Eskom from acquiring such land. In terms of NEMA, an applicant is prohibited from commencing with construction prior to receiving an authorisation. The development of a nuclear power station is dependent on long-term planning, which is why the potential sites for nuclear power stations were acquired as many as 20 years ago. It would indeed be unwise for Eskom to wait to the proverbial “last minute” before it bought the land.

Eskom's acquisition of additional land around Thyspunt must also be viewed in context of the recommendations of the Freshwater Ecology Assessment (Appendix E12 of the Revised Draft EIR) that wetlands that fall outside the current Eskom owned land must also be secured for inclusion into a de facto nature reserve. The acquisition of these wetlands for conservation is regarded as one of the key "offset" mitigation measures at Thyspunt.

With regards to the heritage assessment, it must be noted that additional test excavations at Thyspunt that were approved by the SA Heritage Resource Agency and conducted in 2011 (after the release of the Revised Draft EIR), have confirmed that the heritage sites in the recommended footprint of the power station at Thyspunt are few in number and of low quality.

Comment 18:

**INACCURATE USE OF FACTS ABOUT THE LOCAL AREA IN THE EIA
(MAINLY THE THYSPUNT SITE)**

Chapter 8, page 167 Figure 8.87 shows the R330 as a *gravel road*

Concern and objection raised Number 18:

- The R330 is the main road past St Francis Bay to Cape St Francis from Humansdorp and has been tarred for more than 30 years.
- The report's use of inaccurate information is of serious concern - did the compiler of this report use current information and have they made any site visits to the area?

Response 18:

Your comments with regards to Figure 8-87 is noted. We apologise for the incorrect information on this map with respect to the R330. The purpose of the map was to show tourism attractions in the area.

Comment 19:

CONCERNS ABOUT HERITAGE REPORT BEING UNDERTAKEN BY AN ARCHAEOLOGIST AND NOT A SOCIAL HISTORIAN OR SOCIAL ANTHROPOLOGIST

Much of the cultural and heritage value of the sites will be from the past 500 years and the use of an archaeologist, rather than an expert able to ascertain the importance of the landscape from a more recent history of the site, may well have resulted in the complete omission of important values that the site holds to descendants of the recent inhabitant of the sites.

Concern and objections raised Number 19:

- The use of an archaeologist coupled with the Heritage Agency's concerns suggest that the heritage component should be reviewed by the appropriate experts before any decision can be made to destroy the landscape at Thyspunt.
- The heritage mitigation plans cannot be seriously considered until the heritage component is adequately addressed.

Fragments of bone are numerous, however much of this is recent and out of context. Due to shifting vegetation patterns and dune movement the Middle Stone Age Howiesons Poort material was not relocated. The evidence collected by ourselves and other authors suggests that the ancient Pleistocene land surfaces that evidently lie preserved under the dune system are highly sensitive. Due to the dynamic state of the dunes, surveys should ideally be repeated over a number of years before a comprehensive picture can be determined.

Response 19:

Your comment is noted. However, your objection to the Heritage Impact Assessment appears to be based solely on the professional background of the leader of the team that compiled this assessment, rather than on substantive grounds with respect to the content of the Heritage Impact Assessment. In

the absence of substantive comment related to the quality of the report, your objection remains groundless.

The Heritage Impact Assessment (Appendix E20 of the Revised Draft EIR) was supplemented by additional test excavations at Thyspunt that were approved by the SA Heritage Resource Agency and conducted in 2011. A revised Heritage Impact Assessment that considers findings of these test excavations will be provided for public comment. The findings indicate that heritage sites in the recommended footprint of the power station at Thyspunt are few in number and of low quality.

Comment 20:

The above statement from the EIA suggests that a study over several years would be required to obtain a comprehensive picture of the heritage/historical value of the landscape

Concern and objection raised Number 20:

- The EIA has failed take the comments and recommendations of its own experts seriously; by rushing the heritage assessment, the heritage report is not comprehensive, and therefore the EIA report is flawed

Response 20:

As indicated in Response 19, additional test excavations have been conducted and these excavations significantly improve the confidence of the assessment of heritage impacts.

Comment 21:

CONCERNS ABOUT ACCURACY ABOUT THE SECTION ON THE PHYSICAL AND BIOPHYSICAL ENVIRONMENT

Pg119/173	from	chapter
-----------	------	---------

believe there would be any effect on demersal (deep-sea) fishing. Its main concern relates to the demarcation of an exclusion zone at Thyspunt of an assumed similar size to that at Koeborg which is 3.2 km wide and extends 2 km into the ocean from the shore. Eskom has advised the authors, however, that the exclusion zone at Thyspunt and Bantamsklip will not exceed 1 km of coastline and 1 km out to sea. The closure of such an area off Thyspunt would have no more than a slight impact on pelagic fishing. Longline catches of hake have averaged 2 500 tons per annum in the Eastern Cape and 800 tons per annum for Port St. Francis-based vessels at an average price of R5.50/kg. During field interviews with the local fishing industry, it was found that two of the richest fishing grounds are in Thystaal and Oyster Bay, and catching occurs between 200 metres and 4 - 5 km offshore.

Concern and objection raised Number 21:

- The inclusion of the statement "Eskom has advised the authors, however that the exclusion zone at Thyspunt and Bantamsklip will not exceed 1km of coastline and 1km out to sea" is not sufficient to address these concerns.
- There needs to be a written undertaking, preferably with reasons outlining why this would be different from the Duynfontein site, and giving a assurance from Eskom that this was indeed there (sic) plan, and it would need to be signed off by a senior manager.
- The statement in the EIA is unsupported and is so vague as to be meaningless.

Response 21:

The Revised Draft EIR contains a number of assumptions, as is the standard practice with Environmental Impact Assessments. Some of these assumptions relate to the project description and it is expressly stated in the Revised Draft EIR that if these assumptions prove to be incorrect, the information in the EIR would no longer be valid and the EIA would need to be redone. Should Eskom substantially change any information on the basis of which the EIA has been prepared, the EIA would no longer be valid, resulting in Eskom not being able to obtain authorisation. Similarly, should the project description change substantially after authorisation has been granted, a supplementary

assessment would need to be undertaken to determine how significant the changes are and if they provide to be substantive enough, the authorisation would be withdrawn.

Comment 22:

Revised DEIR Chapter 3 Pg 1 (below)

3 PROJECT DESCRIPTION

3.1 Introduction

Eskom proposes to construct a Nuclear Power Station, referred to as Nuclear-1, consisting of a combination of units with a total capacity of up to 4 000 MW and associated infrastructure for location at either Duynvontein, Bantamsdorp or Thyspunt (See Figures 1-1 to 1-4). Similar power stations in Nuclear-1 are proposed for the remaining two sites in the future. A description of the sites is provided in Chapter 5, with details of the baseline environments at each of the three sites are provided in Chapter 8.

The area of the footprint assessed in this EIA makes provision for the potential future expansion of the power station, to allow for a total capacity of approximately 10 000 MW. It is estimated that the total area required for this nuclear power station is approximately 250 - 280 hectares depending on the terrain. *This footprint includes the reactor and auxiliary buildings, laydown areas required during construction, including topsoil storage areas.*

In addition to the actual footprint of the power station, there will be two categories of exclusion zones for emergency planning purposes, around the power station complex. *The Emergency Planning zone sizes of the European Utility Requirements (EUR) have been used as a basis for these new nuclear installations.*

The proposed zone sizes are as follows (expressed as radii):

Zone	Size (km)	Function	Emergency Plan Zone	Justification
Emergency Evacuation Zone	0.8 km	Emergency evacuation zone for the power station complex	Emergency Evacuation Zone	Based on the EUR requirements for nuclear power stations, the 0.8 km radius zone is required to ensure that the power station complex is protected from external threats.
	2.0 km	Emergency evacuation zone for the power station complex and surrounding areas	Emergency Evacuation Zone	Based on the EUR requirements for nuclear power stations, the 2.0 km radius zone is required to ensure that the power station complex and surrounding areas are protected from external threats.
Emergency Evacuation Zone	0.8 km	Emergency evacuation zone for the power station complex	Emergency Evacuation Zone	Based on the EUR requirements for nuclear power stations, the 0.8 km radius zone is required to ensure that the power station complex is protected from external threats.
Emergency Evacuation Zone	2.0 km	Emergency evacuation zone for the power station complex and surrounding areas	Emergency Evacuation Zone	Based on the EUR requirements for nuclear power stations, the 2.0 km radius zone is required to ensure that the power station complex and surrounding areas are protected from external threats.

Based on the EUR requirements for nuclear power stations, the 0.8 km radius zone is required to ensure that the power station complex is protected from external threats.

These radii of the zones are measured from the extremities of the station footprint in which the nuclear installations are located. The station footprint is located within a preferred owner-controlled boundary that demarcates the property owned by Eskom. This owner-controlled boundary has a radius of 2 km. The extremity of the footprint may not be closer than 0.8 km from the owner-controlled boundary. This means that the on-site evacuation will be necessary.

And
Pg 4 of Gibbs letter to DEAT letter dated 2 September 2009

5. Response

In addition to the response provided in Response 5 it should be noted that potential land use impacts as a result of the proposed nuclear development will be assessed as part of the EIA. Although emergency planning issues will be discussed they will not be assessed, rather all assessments will focus on the various social and economic implications. In this regard a maximum EPZ of 3 000m will be utilised for all assessments.

6. Your comment: Nuclear waste management

The issue of nuclear waste handling, management, storage and disposal does not seem to be covered explicitly by any of the specialist studies. How will this matter be addressed in the EIA?

beachscapes, natural heritage and mild climate. Accelerated property development activities have had a devastating impact on the functioning of the large headland-bypass dune system which is a significant natural feature of the area. The interruption of the natural feeding and flow of aeolian sands has resulted in vegetation changes and the cessation of sand deposition at St. Francis Bay Beach, which is now severely eroded. Eskom's land holding in the area has in part, put a brake on seemingly uncontrolled westwards expanding property development.

The Thyspunt study area, which is a natural heritage site, includes a number of landforms which have played a role in the distribution and quantity of heritage sites. The most inland portion (a long panhandle of land) consists of cultivated meadows which have been leased out for dairy farming. Between the agricultural lands and the coast is an extensive dune field, a very large

Nuclear EIA

8-23

Version 1.0 / February 2010

Draft Environmental Impact Report

Pg 122/3

e) Surrounding land use

The land use between the coast and the ridgeline of inland vegetated dunes is primarily nature reserve.

The western edge of the reserve abuts the coastal village of Oyster Bay while the eastern edge borders land that is undeveloped and in private ownership.

Nuclear EIA

8-22

Version 1.0 / February 2010

Draft Environmental Impact Report

This land has a number of private houses, mostly holiday homes which are built near the edge of the consolidated dunes and overlook the rocky sea shore. Refer to Figure 8-78 and Figure 8-79.

It is noted that an application for a township has been lodged on the farm Orgegunde Vryheid east of the site and adjacent to the western town boundary of Cape St. Francis. This property is known as Rocky Coast Farm. The current proposal is for a cluster layout in the vicinity of existing houses. The balance of the area will be a nature reserve.

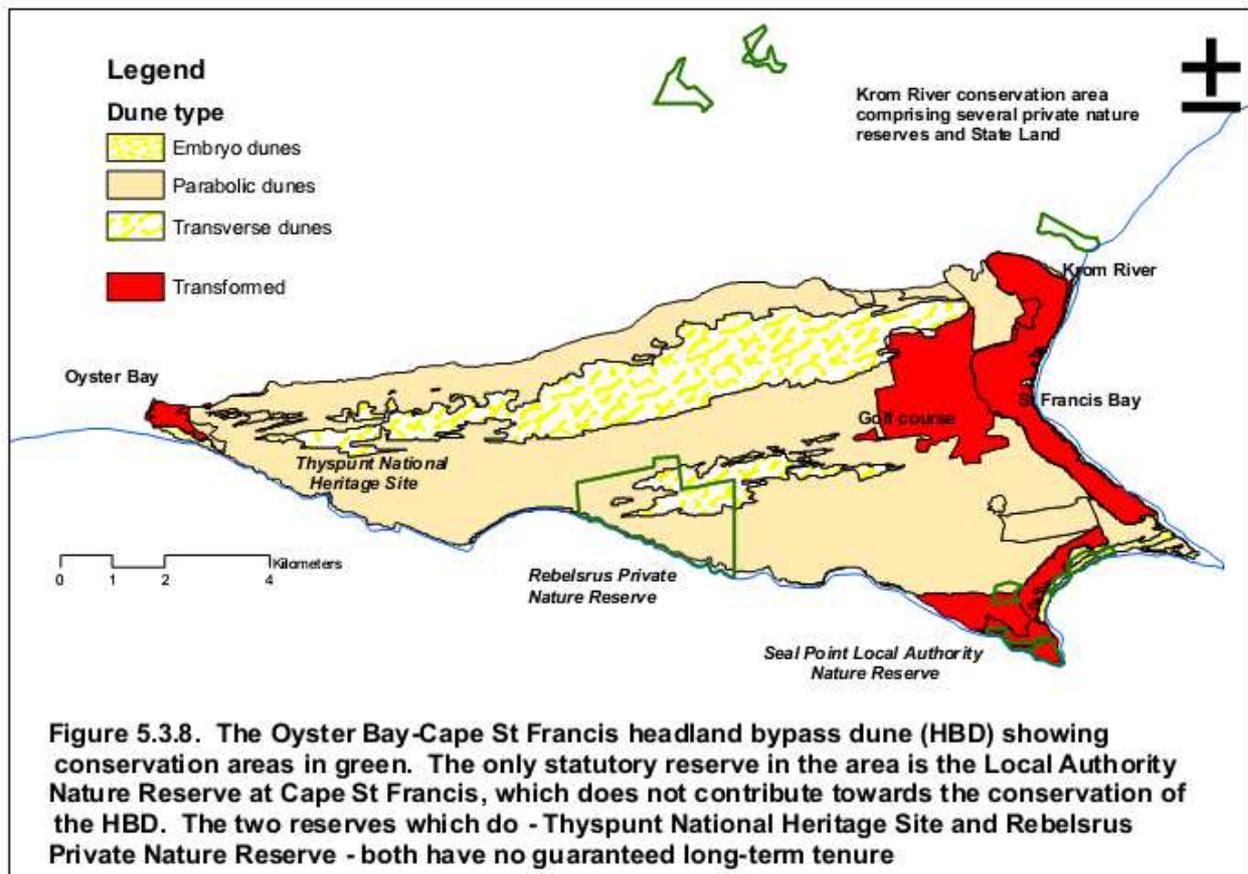
The report highlights potential development on Rocky Farms immediately west of Cape St Francis township, but does not highlight the efforts over several decades, of the Rebelsrus landowners to preserve the area. The Rebelsrus holding is not just "a number of holiday houses" but a longstanding "association" with a constitution. Several conservation strategies have been initiated, in a coordinated fashion, to preserve this area for future generations, and the report does not mention these, and therefore cannot take these initiatives into account.

Concern and objection raised Number 22

- The Rebelsrus combined property is the most significant easterly neighbour of the Eskom site and has been all but overlooked in this EIA report on the area. This is an oversight and the EIA report needs to include a comprehensive account of the Rebelsrus property, and only then can a valid conclusion be drawn on this.
- In considering the environmental impact therefore the report gives an exaggerated impact to any improved control on the Eskom land.

Response 22:

The contribution of the owners of Rebelsrus Private Nature Reserve to conservation of the natural heritage around the Thyspunt site is noted. The Botany and Dune Ecology Assessment (Appendix E11 of the Revised Draft EIR) considers the conservation areas in proximity to all three alternative sites. The figure below is from that specialist report.



As evident from the above figure, the specialist report acknowledges the conservation value of Rebelsrus Private Nature Reserve and Thyspunt Natural Heritage⁴ Site. The efforts of the Rebelsrus owners to conserve the land are to be commended. However, the conservation of the environment in Rebelsrus, in spite of the well-meaning and very valuable efforts of the landowners, has no long-term tenure as the land remains privately owned and has no statutory protection.

Pressure for development remains in the surrounding area, as evident from recent developments like St. Francis Links Golf Estate. Even in the absence of residential development, Rebelsrus remains one of the very few parcels of land that is responsibly managed from an environmental perspective. Other adjacent tracts of land in this area are virtually overrun by invasive alien species.

Comment 23:

The statement “Eskom’s land-holding in the area has in part put a brake on seemingly uncontrolled westwards expanding property development” attributes limited expansion westward to Eskom’s holdings with no evidence to substantiate the claim.

Concern and objection raised Number 23:

- Various groups of landowners including, but not limited to, the long established Mostertshoek landowners association, the well established and promulgated Rebelsrus Private nature reserve, several landowners between these 2 tracts, as well as the significant portion of land owned by other landowners have been the buffer to westwards expansion. The Rebelsrus Private Nature Reserve has launched several initiatives mitigating any exploitation of the marine environment, limiting development within the reserve and improving the terrestrial environment through the eradication of aliens on large portions of the land.
- These facts have not been included in the EIA, suggesting that *it has not made a thorough assessment of the issues at hand.*

⁴ A now defunct programme of the Department of Environmental Affairs

veritable paradise for pre-colonial people. It is quite likely that there is a drop off in the frequency of pre-colonial sites adjacent to the beach at Thyshaal as beaches were not nearly as attractive to pre-colonial people as resource rich rocky shorelines. A recent survey of land adjacent to Thyshaal beach although very restricted by dense vegetation growth indicated a drop off in the frequency of archaeological sites in this area opening up a possible less sensitive option within the proposed nuclear corridor.

Pg 134

Response 23:

Thank you for your comments. Please refer to Response 22 above regarding the valuable contributions of the Rebelsrus owners to conservation.

However, the purpose of environmental impact assessment is to assess the potential change in the conditions of the environment brought about by a specific project, namely the proposed Nuclear-1 power station on the Eskom property at Thyspunt. Bearing this purpose in mind, it is not required of the EIA to provide a detailed assessment of the activities of other landowners.

Comment 24:

What do these rail-networks have to do with this EIA? Both of these are far north-east of the area under discussion. This appears to be a *cut-and-paste error*, and if so the authors need to provide the report that this was cut from so that we are able to compare the rest of this document with the original document so that we can address any similar errors, and assess to what extent this is truly an *independent report* created to address the particular environmental issues at Thyspunt.

b) Rail network

There are currently two railway services operating on the railway lines in the Cacadu District Municipality, as shown in Figure 8-90, and these are as follows:

- Alcedale – Grahamstown; and
- Port Alfred – Bathurst.

Nuclear-1 EIA

Version 1B / February 2019

8-134

Final Environmental Impact Report

The Alcedale – Grahamstown service is mostly used by work seekers and shoppers travelling to Grahamstown, whereas the Port Alfred – Bathurst service is mostly used by tourists to explore the Bathurst area.

Concern and objection raised Number 24:

- The inclusion of the description of railways in Bathurst 100 km north-east of Port Elizabeth and 200km from the site at Thyspunt suggests that the writers of this report have made a mistake in this section.
- This raises concerns about the accuracy of the whole report

The main air access to the Cacadu District is via the national airport in the Nelson Mandela Metro as shown in Figure 8-90. However, there are other airports in the District which perform significant regional functions.

The provincial government owned air landing field in Ndlambe Municipality is leased by a private company that owns the property around the facility and is utilised for training pilots. About 200 to 250 learners are taught to fly an aircraft per year for both commercial and air transport plane licenses.

The facility has three grass runways and no sophisticated landing instruments are used due to unavailability of tarmac runways and other facilities. The private company has requested funding from the Province to surface one of the runways.

Response 24:

The Transportation Assessment (Appendix E25 of the Revised Draft EIR) considers all forms of transport within the regional environment around the sites. An assessment on both a regional scale and a more detailed scale around the site is necessary in order to gain a complete understanding of the current state of the transport facilities that may be affected or used by the proposed project.

Comment 25:

What is the relevance of this airport to the EIA in the Humansdorp area? If this airfield near Port Alfred (Ndlambe Municipality) is indeed of significance to the Thyspunt EIA then that would need to be explained.

Concern and objection raised Number 25:

- The inclusion of the description of airports in Bathurst/Port Alfred 100km north-east of Port Elizabeth and 200 km from the site at Thyspunt suggests that the writers of this report have made a mistake in this section.
- This raises concerns about the accuracy of the whole report

The main sea access to the Coega District is via the national harbour in the Nelson Mandela Metro as shown in Figure 8-90. However, there are other harbours which perform significant regional functions in the District.

There are small boat harbours, which have been constructed by private developers, at Port Alfred and Port St. Francis. These are mainly used for recreational purposes.

Response 25:

Please refer to Response 24 with respect to the consideration of transport facilities located far from the Thyspunt site.

Comment 26:

What is the significance of the Port Alfred harbour to Thyspunt?

Concern and objection raised Number 26:

- The inclusion of the description of small-boat harbours in Bathurst/Port Alfred 100km north-east of Port Elizabeth and 200km from the site at Thyspunt suggests that the writers of this report have made a mistake in this section.
- This raises concerns about the accuracy of the whole report

Response 26:

Please refer to Response 24 with respect to the consideration of transport facilities located far from the Thyspunt site.

Comment 27:

INCOHERENCE OF SITE FOOT-PRINTS AND HIGH-SENSITIVITY AREAS

The combined sensitivity maps in the last few pages of chapter 8 show Duynefontein to have a single 158 hectare site close to the coast that fits within the EIA corridor, the Bantamsklip site has a single 172 hectare site within the EIA corridor and the Thyspunt site has a 73 hectare site split into 3 portions, and a separate 51 hectare site (for the high voltage yard) that are separated by several high sensitivity areas.

Concern and objection raised Number 27:

- It is therefore impossible to exit power lines and roads from the Thyspunt site without crossing areas considered sensitive, whereas it would appear that Duynefontein offers an alternative across non-sensitive areas.

Revised DEIR Chapter 3, pg 1

The area of the footprint assessed in this EIA makes provision for the potential future expansion of the power station, to allow for a total capacity of approximately 10 000 MW. It is estimated that the total area required for this nuclear power station is approximately 250 - 280 hectares depending on the terrain. This footprint includes the reactor and auxiliary buildings, laydown areas required during construction, including topsoil storage areas.

Response 27:

Different forms of development imply different levels of transformation of the natural environment. An activity like a power station, which would completely transform a contiguous area of more than 200 ha would result in a completely different impact to a road or a power line, the latter of which is a permeable linear barrier with foundations that would have footprints in the tens of square meters each as opposed to the several hundred hectares of the proposed power station. However, in recognition of the sensitivity of the dune systems, it has been recommended that transmission line pylons and stringing of the transmission line may only be done by helicopter over the mobile dunefield at Thyspunt.

The fact that an area has been designated as sensitive does not imply that no development is possible. Certain forms of development with limited footprints may still be possible provided that the recommended mitigation measures are applied.

Comment 28:

The introduction in Chapter 3, page 1 describes site sizes of 250 - 280 hectares as being required and then mentions that the plan includes a capability to expand to 10 000 MW. It is not clear whether this footprint (is for the 4 000 MW, or for the increased 10 000 MW)? This is important - if the EIA is for 4 000 MW then we need to know what the required planning is for that size generation plant. If the application includes a potential 10 000 MW facility then we need to know what size footprint is needed for that capacity.

The EIA describes Duynefontein as having a single 158 hectare site the Bantamsklip site having a single 172 hectare site and Thyspunt site has a 73 hectare site split into 3 portions.

Concern and objection raised Number 28:

- If the EIA criteria have been based on 4 000 MW, but the planning/terms of reference are for 10 000 MW then this EIA process is fraudulent.
- It is not clear why the EIA has identified suitable sites of 158, 172 and 73 hectares when the requirement is for 250 - 280 hectares?

Response 28:

It is made clear in several places in the Revised Draft EIR and in public participation material that the EIA assesses a proposed power station with a maximum capacity of 4,000 MW. However, Eskom has also requested GIBB to provide an opinion whether additional power stations, with a capacity of up to 10,000 MW, could be constructed at any of the sites, in view of Eskom's stated intention to construct additional nuclear power stations in future.

Whilst Eskom has indicated that it wants an area of up to 280 ha for a power station, the EIA has identified what land is, from an environmental perspective, regarded to be of sufficiently low environmental sensitivity for the construction of a nuclear power station. Eskom will therefore have to consider all mitigation measures in the EMP in the design of the requested terracing layout area.

Comment 29:

EIA for power-line corridors not part of this process:

The generation of power requires transmission of that to the national grid. Bantamsklip and Thyspunt are both off the national grid so that a completely new power corridor will be required, whereas

Duynefontein already has several corridors linking it to the grid so it does already have lines spanning underlying ground and associated usage of that land.

Concern and objection raised number 29:

- The assessment of this EIA for Bantamsklip and Thyspunt in isolation from the EIA's for the transmission corridors cannot be contemplated. One of these corridors may have particular sensitivity on EIA assessment compared to the other, and in particular compared to the Duynefontein site.
- Even more critical may be the exclusion of the 2 Northern Cape sites where transmission corridors have had much lesser environmental impacts (and this is an issue raised by the Peer Review commissioned by Gibbs) (see below)

GIBB concludes, in response to DEA&DP, that on the basis of Eskom's 20 GW Nuclear Transmission Grid Draft Impact Report (2007), which was included as an Appendix to the Scoping Report the two northern Cape site alternatives are not considered to be feasible and reasonable alternatives for the short and medium term.

The use of environmental arguments as a reason for excluding the Northern Cape sites from the EIA appears thinly motivated. It is possible that the overall cumulative environmental impact of a power station in the Northern Cape (given its location), together with its associated power lines, could be less than that of the power station in the more sensitive localities in the Southern or Eastern Cape, with the shorter power line infrastructure required. It would be impossible to draw reasonable conclusions about this without having done a comparison. We also do not agree with GIBB's argument (stated elsewhere in response to questions concerning cumulative impacts) that the inclusion of power infrastructure as a part of the NSS EIA would make the study too complex to understand. It is the responsibility of the EIA team to synthesize and evaluate complex information. In circumstances where other factors (such as timing) do not make it impossible it would be better to base the decision about the preferred nuclear site on an understanding of all the key cumulative effects, and not simply those associated with the power station itself.

The main arguments supporting the exclusion of the Northern Cape sites appear to be related to network integration, time delays and costs. These are not environmental arguments and we are not in a position to comment authoritatively on their legitimacy. It would seem that the timely completion of additional generation capacity is a matter of National interest in South Africa, given the problems over the past few years, and that a significant delay in the completion of Nuclear-1 would be considered by Eskom and Government to be unacceptable. If this is the case then it may be reasonable that the two sites are excluded from the present site selection process, particularly now that Eskom has committed to an application for a single site (rather than a joint application for all three sites), which means that the three sites carried into the full EIA are genuine alternatives.

Response 29:

The Duynefontein site does indeed have existing transmission corridors from the Koeberg Nuclear Power Station. However, new viable transmission corridors from the Duynefontein site would still need to be found for the proposed Nuclear-1 power station. The fact that existing transmission corridors exist does not avert the need for identify new corridors. Due to environmental and other constraints, new corridors may not necessarily be able to run parallel to the existing transmission corridors.

The statement of lesser environmental impact for the transmission line corridors for the Northern Cape sites is not supported by fact. Whilst the social impacts for these sites may arguably be lower than for either the Western or Eastern Cape sites due to lower population densities in the Northern Cape, the biophysical impacts would undoubtedly be much higher, for instance due to crossing of the Succulent Karoo centre of endemism and Namaqua National Park (NNP) that would be required. The Northern Cape sites are located north of the NNP. The lines would either need to bisect the NNP or would need to reach the Western Cape via a detour of several hundred kilometres inland of the NNP, in which case they lines would transect the botanically highly sensitive Kamiesberg region.

One of the co-authors of the Nuclear-1 EIR has experience of the EIA for the Kudu transmission line in 2007 – a single 400 kV transmission line from the then proposed Kudu gas-fired power station⁵ near Oranjemund in Namibia – approximately 130 km north of the Schulpfontein and Brazil sites. To find a corridor for a single transmission line for this project was very challenging. To find a corridor for five parallel 400 kV transmission lines from Nuclear-1 from either of the Northern Cape sites to the Western Cape, through the same terrain as the Kudu transmission line, would be an extreme challenge in view of the biodiversity issues.

⁵ Plans for this power station, which at the time was proposed by Nampower, now appear to be on hold.

Comment 30:

INADEQUATE APPRAISAL OF NO-GO ALTERNATIVES

The No-go alternative is very poorly described as “not logical” in the EIA, and the only alternative seriously compared to nuclear is coal generation.

Concern and objection raised Number 30:

- Demand side management is not considered in the EIA despite good published evidence suggesting that it would be the cheapest and the quickest way of dealing with the short-term power crisis. Winkler in his book *“Cleaner energy, cooler climate”* HSRC Press 2009 page 222 provides a good argument for the mitigation of the need for increased electricity by improving the efficiency/insulation of domestic housing and the use of solar geysers/geyser blankets.
- In addition Winkler’s book provides a more thorough assessment of the options for balancing green-house gas emissions with electricity supply and a developmental economy (with the requirement to create more jobs).
- The lack of references to Winkler’s book (above) suggests that the authors of the EIA have not done a complete appraisal of current evidence and knowledge. This is a key flaw in the introductory section of the EIA, and really highlights *the simplistic nature of the “not logical” answer to the serious matter of considering alternatives, as required in the legislation for an EIA.*

Response 30:

The no-go alternative is not considered a feasible and reasonable alternative in this instance, given the current backlog in the construction of new electricity generation capacity and the requirement for an additional 40,000 MW of generation capacity by 2025. A mixture of generation options will be required, as indicated by the Integrated Resource Plan, and no single generation technology will be sufficient to cater for the expected increase in demand in its own. The Department of Environmental Affairs, the decision-making authority for this application, has accepted the reasonable and feasible alternatives that were identified for further assessment at the end of the Scoping Phase. These alternatives excluded the no-go alternative.

Your argument in favour of improvements in domestic demand side management is quite valid. However, as stated in Response 3, it is not the purpose of his EIA to review all the possible alternatives, including alternatives in terms of efficiency of domestic insulation and other measures such as passive heating and cooling or solar water heating. Such demand-side management (DSM) measures are factored into the IRP recommendations. The IRP 2010 comes to the conclusion that DSM would reach be capable of reaching a maximum saving of 3 420 MW by 2017. Whilst this is a valuable and necessary saving, it would not completely remove the need to additional generation capacity. Please refer in this regard to Response 1, especially with respect to replacing currently operating but ageing power stations.

Comment 31:

POOR CONSIDERATION OF CONCERNS RAISED IN: THE D.E.A.T. SUBMISSION AND THE “PEER” REVIEW PROCESS

DEIR APP B2 DEA&DP Comment on draft scoping report [POINT 1]

- 7.3. Further consideration must be given to the disposal of, handling, storage and management of waste and spent fuel;

It is not clear that this has been dealt with adequately.

DEIR APP B2 DEA&DP Comment on draft scoping report, Page 3 of Gibbs response to DEAT letter dated 2 September 2009 [POINT 2]

3. Your comment: Decommissioning

Impact methodology is presented for the construction and operation phases of the development. The decommissioning phase of the development seems to have been disregarded. Although this phase will only come onto (into) effect after 60 yrs of operation making it practically difficult to assess all the impacts associated with this phase at present, there are impacts that must be assessed in the EIA. For example, the consequences for future land use options around the sites and the economic impacts related to the decommissioning phase must be assessed. The public and authorities must be in a position to understand what the long term implications of the project on the environment will be and adequate forward planning must be done to ensure that the environment is protected for future generation. These aspects must be assessed as part of the EIA.

3. Response

The specialists will assess the potential impacts associated with the decommissioning phase to the best of their ability in the Environmental Impact Report, given the information available at present. The impacts and the management will also be determined by the selected decommissioned strategy coupled with technological and legislative advancements. Arcus GIBB will provide generic guidelines, principles and criteria based on international literature and best practice. The EMP will also contain specific 'in principle' commitments which will ensure responsible decommissioning.

Further, the EIR will also elaborate on the NNR's role and requirements on decommissioning and address the long-term impacts and the long-term sterilisation of land, as requested by DEAT in their letter dated 19 November 2008.

It is not clear where the 2 concerns expressed above have been addressed adequately. "To the best of their ability" is not good enough. There is no detail that enables us to assess what, if any, plans are in place to deal with the decommissioning phase, and the long-term handling of spent fuel at that stage. Your response then proceeds to suggest that you do not need to deal with the concern raised by the DEAT and your reply relies on "technological and legislative advancements". The pioneering nuclear facilities were built in the 1960's relying on the expectation that technology would provide a solution to the high level waste. **To date there is no evidence for this.**

As a rule there is little that legislation can do to deal with the waste to make it actually safe or to neutralize it. **All that legislation can do is define how or where we can store it-** this does not actually deal with the problem.

Concern and objection raised Number 31:

1. This EIA has not adequately with (sic) the handling of nuclear waste, and the decommissioning of the planned facility. This has been raised by several parties as a requirement in the EIA, and the EIA therefore cannot be considered complete.
2. It would be helpful if you could explain what the NNR (as quoted by you to deal with the problem) will do to manage the high level radioactive waste, all the time being mindful that technologically more advanced countries have not been able to do this yet. If there is a clear management plan to deal effectively to neutralise high level waste, then the EIA could be considered to have covered the environmental impact of nuclear power generation at this additional site. Failing that this environmental impact is incomplete.

Responses to your comments are as follows:

1. Your comment: Alternative sites

Based on the findings of the Scoping Report, the Brazil and Schulpfontein sites were not considered feasible for further assessment based on severe time constraints associated with Nuclear-1's development coupled with limited local demand and the lack of existing power corridors. Now that three nuclear power stations are being considered with the last envisaged to be constructed in 2016, it is argued that it may not be reasonable to exclude these two sites from the current EIA process. Furthermore, much needed specialist studies at these two sites may provide information to suggest that these sites are more appropriate for development than the other sites identified. It is this Department's view that the Brazil and Schulpfontein sites should be included in the EIA based on the fact that the reason for excluding them in the first place may no longer be valid.

If the DEAT have agreed in principle with Eskom's approach to submit a combined application, it is not understood why Eskom cannot pursue the proposed combined application at present i.e. why Eskom is waiting for the amended EIA regulations to be promulgated.

1. Response

As correctly highlighted by yourself, originally five (5) alternative sites were considered namely, Schulpfontein, Brazil, Thyspunt, Bantamsklip and Duynfontein. The Schulpfontein and Brazil sites were excluded during the Scoping Phase. The Final Scoping Report was approved by DEAT on the 19th of November 2008. Section 2.17.1 of the DEAT letter states that "The Department accepts the exclusion of the

and continued on next page (see over).

Brazil and Schulpfontein sites for further investigation in this EIA process, as they are not technically feasible at this stage. The Department has also however noted that these sites will be considered for future Nuclear projects."

In terms of Section 29 (b) of Government Notice No. R 385 of 2006 under the National Environmental Management Act, 1998 (Act No. 107 of 1998), scoping reports should include "a description of the proposed activity and of any feasible and reasonable alternatives that have been identified". Based on the information contained in Eskom's 20 GW Nuclear Transmission Grid Draft Impact Report (2007), which was included as an appendix to the Scoping report, it is evident that Brazil and Schulpfontein are not considered as feasible alternatives to be pursued in the EIA process for Nuclear-1.

Furthermore, your assertion that Eskom's investigation of the potential roll out of up to 20 000MW of nuclear power negates the time constraints originally identified as one of the reasons for the Northern cape sites, neglects to consider the remaining issues that prevent the development of Brazil and Schulpfontein as part of the initial phase of the 20 000MW as indicted in the Plan of Study for Scoping.

In this regard the final Scoping report states the following:

"Thus, the Brazil and Schulpfontein sites require the construction of new power corridors and the exportation of the majority of the power to areas of demand given the limited local demand (Figure 78). Thus, the Brazil and Schulpfontein sites are deemed unfeasible for the proposed NPS based on the following reasoning:

- Optimal, strategic and cost effective utilisation of existing infrastructure associated with the Duynfontein, Bantamsklip and Thyspunt sites, with respect to local integration and exportation of power via existing power corridors;*
- Prevention of lengthy time delays associated with the authorisation and construction of the new power corridors applicable to the Brazil and Schulpfontein sites, which will prevent Eskom from providing the power within the required timeframes;*
- Unnecessary environmental impacts associated with the construction of new power corridors given that there is existing infrastructure; and*
- Cost implications associated with the development of new power corridors"*

All issues identified above are considered to be relevant for nuclear development on the Northern Cape sites for the short- to medium-term.

Severe time constraints to the nuclear programme are still applicable. In spite of the current economic downturn, the programme for Eskom to meet energy demands in South Africa is very stringent. The EIA for Nuclear-1 remains on the critical path of Eskom's nuclear programme, with the first Nuclear Power Station (NPS) expected to be operational by 2018.

DEAT can only approve a proposed development in terms of current legislation. Thus there is no legal basis for approval of the combined application before the amended NEMA EIA Regulations are promulgated. In this light Eskom has only indicated its intention to apply to DEA to have all three sites approved. The realisation of such an intention will depend on the final promulgation of the amended NEMA regulations and DEA's approval thereof based on the legislation and consideration of public comment received on the revised Plan of Study for EIA.

As well as

decommissioning of a single power plant, referred to as Nuclear-1. During the scoping phase of the EIA, 5 sites were assessed as alternative options. These were based on the work done by Eskom in the Nuclear Site Investigation Programme, which had, over an extended period, evaluated the options for the location of a nuclear plant and made recommendations to Eskom to purchase portions of land on 2 of the sites.

The five sites were:

- | | | |
|-----------------|----------|--------------------------|
| - Duynfontein | W Cape | Part of the Koeberg site |
| - Bantamsklip | W Cape | Land purchased by Eskom |
| - Thyspunt | E Cape L | Land purchased by Eskom |
| - Brazil | N Cape | |
| - Schulpfontein | N Cape | |

The work done to determine these sites was mostly under the auspices of the Environmental Evaluation Unit of JCT (pers. comm. Ms. J. Ball, GIBB). The EIA provides a synopsis of the approach that was followed. In the Draft Scoping Report, GIBB advised that the Schulpfontein and Brazil sites in the Northern Cape would not be considered further in the EIA phase of the work.

In addition, during the EIA Phase of the study, a proposal was made by the Coega CTZ to site the power station in the Coega CTZ.

The main issues about alternatives that have arisen during the course of the EIA are as follows:

- (i) The exclusion of alternatives to nuclear power from the EIA
- (ii) The exclusion of the Schulpfontein and Brazil sites from detailed analysis in the EIA (DEA&DP and other stakeholders)
- (iii) Objections to the failure of the EIA to review the findings of the Nuclear Site Investigation Programme or 'NSIP', which was the basis for the selection of the 5 nuclear sites under consideration but which was completed 20 years ago (DEA&DP and other stakeholders)
- (iv) The exclusion of the Coega site as a possible alternative (Coega IDZ)
- (v) Eskom's intention to apply for the future use of all three of the sites considered in the EIA phase of the project, as long as none exhibited any fatal flaws. This objection was based on the grounds that under these circumstances, the sites could not be considered to be alternatives and that NEMA's requirements for investigation of alternatives would therefore not be met
- (vi) The absence of material process alternatives in the EIS scope of work (DE&ADP)

These issues are discussed individually below.

And DEIR APP B2 DEA&DP Comment on draft scoping report

3. Furthermore, this Directorate does not support the exclusion of the Brazil and Schulpfontein sites from the EIA phase of the project since, based on the summary table of the preliminary comparative assessment of the five proposed sites (page ix of the Executive Summary), there are other aspects of the site (e.g. geotechnical, heritage and cultural, tourism and some aspects of the ecology of the sites) that might recommend them above other sites once informed by specialist studies conducted during the EIA phase;
4. In view of the above, all five alternative sites proposed should be assessed during the EIA phase of the application;

Response 31:

The issue of nuclear waste and spent fuel is assessed in the Nuclear Waste Assessment (Appendix E29 of the Revised Draft EIR). This report contains detailed descriptions of the proposed waste storage and disposal mechanisms, which are in conformance with international requirements and the requirements of the NNR, which has legal competence over the storage and disposal of nuclear waste.

The international practice, in the absence of geological storage, is to store the used nuclear fuel safely in spent fuel pools (wet storage) or purpose-designed containers (dry storage) on the site of the nuclear power stations. It is to be noted that of all significant nuclear incidents over the past decades, they related primarily to the operation of the nuclear fuel within the power station due to the failure of the cooling systems, but less related to the release of radioactivity from the spent fuel that is kept on the site. The impacts of decommissioning are assessed in the Revised Draft EIR and all the specialists were required to assess this.

Management of the high level waste is achieved through measures as indicated in Section 5.5 of the Nuclear Waste Assessment (Appendix E29 of the Revised Draft EIR). The responsibility for management of high level waste lies with the operator of a nuclear facility (i.e. Eskom). The NNR's responsibility is to oversee and regulate the process to ensure that human health and the environment is protected at all times. The NNR itself is therefore not responsible for the management of nuclear waste. The NNR operates within a well-defined and consistent national and international regulatory framework of safety standards consisting of regulation, principles, requirements and guidelines, subject to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, 1997, of which SA is a signatory.

Technically the safe long-term management of high level waste is possible. The reason why it has not been implemented in all countries may vary, and is not necessarily technical. However, as with anything else, technological developments do play an important role, in that more advanced methods of waste management become available, thereby deferring the implementation of a given solution (such as geological storage). This may be one of the reasons why more emphasis than in the past is placed on the long-term storage of high level waste (up to 100 years). This management option has been demonstrated to be safe over some decades at existing operating facilities. What is important is that whatever short and long-term solution is pursued, that the fundamental principles of radiation safety are adhered to.

Therefore, whilst it is important as part of the overall justification of nuclear power to pursue solutions for the management of high level waste, long-term storage of high level waste remains a feasible, technically sound and safe option, while disposal solutions are being developed locally and internationally.

COMMENT FROM THE INDEPENDENT NUCLEAR SPECIALIST

In addition to what is said which confirms that the installation will adopt international best practice in so far as waste management interim storage is the responsibility of the applicant - as part of the NNR licensing requirements a decommissioning strategy will be required as part of the safety case together with waste management strategies. In addition institutional arrangement in respect of ultimate disposal arrangements are the responsibility of the NRWDI decommissioning.

Comment 32:

Your responses to these concerns raised both by the DEAT &DT and your own peer review about the ability to discard the other 2 sites during the EIA is not acceptable to me. It does appear that the main reason, if not the sole reason, for the EIA removing these sites at the outset is the haste required to complete the report, so that the nuclear power-stations can begin to be procured and commissioned.

Concern and objection raised Number 32:

1. The decision to construct a nuclear power-station is a serious and responsible one, and you cannot decide for matters of expediency that you can drop 2 sites, as these two sites may well have been the preferred sites if the EIA was completed to include them. So that decision would make any decision favouring one of the other 3 sites invalid.
2. Building nuclear has long-term consequences for any site, and for the country, and previous lack of planning cannot be allowed to determine that we now must make decisions in haste. There are potential mechanisms to mitigate medium term electricity challenges, that will not have a long-term impact. Building a nuclear power station is a commitment for at least 100-200 years, and therefore requires thorough planning, and hasty decisions are not acceptable.

Response 32:

Your comments relating to the exclusion of the Brazil and Schulpfontein sites are noted. Please refer to our Responses 1 and 29 in this regard.

The planning for future nuclear power stations post-Koeberg is not hasty. The Nuclear Site Investigation Programme (NSIP) was undertaken to identify potentially suitable sites in the 1980s and 1990s. The EIA for Nuclear-1, which is based on the alternative sites identified in the NSIP, commenced in 2007.

Comment 33:

ADDITIONAL CONCERNS

1. Could the staggering nuclear energy costs crowd out investment in cleaner, safer renewable energy sources? The EIA has failed to assess this risk.
2. Are we taking a decision to add significant cost to electricity generation, when the single biggest user (a smelter) could be closed and therefore negate the requirement for Nuclear-1 completely. Surely in a democratic age we need to consider whether we should be making household consumers (tax-payers) pay for the subsidized electricity for smelting, particularly for the benefaction of minerals that are not from South Africa?

Response 33:

It is not the role of the Nuclear-1 EIA process to assess the merits of nuclear electricity generation vs. other forms of electricity generation. As indicated in previous responses, a strategic decision on the mix of generation alternative to meet South Africa's electricity needs was taken in the IRP 2010.

With regard to the proposed closure of smelters, please refer to Response 1.

Yours faithfully

A handwritten signature in black ink, appearing to be a stylized 'S' or 'G' followed by a flourish.

For GIBB (Pty) Ltd
Nuclear-1 EIA Team