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Dear Katja, Brenda and Wilfred

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

**General Comment:**

**DYER ISLAND CONSERVATION TRUST: LETTER OF CONCERN ASSOCIATED WITH THE ESTABLISHMENT OF A NUCLEAR POWER STATION AT BANTAMSKLIP**

**1 EXECUTIVE SUMMARY**

**Response from Arcus GIBB and MEIS**

DICT is thankful for the response and is pleased that some recommendations have been implemented into Arcus GIBBs' latest version of the MEIS. In particular, the implementation of a monitoring project of the coastal dolphin species is welcomed as a key requirement.

There are however, many concerns that the response and the MEIS fail to address, including queries which remain unanswered from our first submission.

**General response:**

The Dyer Island Conservation Trust (DICT) uses the acronyms "AA", "MEIS" and "OSS", neither of which has been defined. None of these acronyms are used in the Revised Draft EIR Version 1. The DICT also does not provide references to the page numbers or paragraph / section numbers of the quotes from the Environmental Impact Report (EIR) or specialist reports it uses in its comments. Where possible, the context of the quotes has been applied to deduce which reports and sections of the reports the DICT has referred to. However, where it is not clear from the context to which sections of the Environmental Impact Report or specialist reports the DICT's comments refer, it has been stated that it is not possible to respond to the comments.

**Comment 1:**

Bantamsklip lies within an environmentally sensitive area, which is recognised internationally for its marine biodiversity. New studies have identified the South African coastline as one of the worlds' most important marine hotspots.

As with any human developments that have the potential to impact on marine habitats, the proposal to establish an NPS at Bantamsklip must follow a consultative process, involving independent researchers.

**Response 1:**

Your comment is noted. The conservation significance of the coastline in the Bantamsklip area is acknowledged in the Marine Ecology Assessment (Appendix E15 of the Revised Draft EIR Version 1).

**Comment 2:**

**2 UNANSWERED QUESTIONS FROM LAST SUBMISSION**

In DICTs' first submission, we raised concerns related to the potential establishment of a NPS at Bantamsklip. Some of these questions have not been attended to in the response from Arcus GIBB, an oversight that we feel should be rectified as soon as possible.

- a) What type of filters will be used at the intake?

**Response 2:**

Screens of similar specification to those used by the Koeberg Nuclear Power Station (KNPS) will be used to prevent the intake of large marine organisms such as kelp, fish and jellyfish. It is in the interests of the power station from a technical point of view that large marine organisms do not obstruct the flow of cooling water. Such screens have been used for more than two decades at the KNPS without any negative impacts on marine organisms.

The blockage of intake pipelines is discussed in Section 5.5 of the Coastal Engineering Report (Appendix E of Appendix E16 of the Revised Draft Environmental Impact Assessment Version 1). The conclusion of this report with regards to potential blockage of the cooling water intakes is that "*There is no extra-ordinary marine debris identified at the site which the intakes could not be designed to cope with and which would be expected to cause a complete blockage of the intake.*"

Furthermore section 3.2.2 the Marine Ecology Report (Appendix E14 of the Revised Draft EIR Version 1) concludes as follows regarding the potential for entrainment of organisms: "*Due to the slow rate at which water will be taken into the cooling system (i.e. a maximum intake rate of 1 m/s), water flow will not be strong enough to entrain large organisms, such as penguins, fish and marine mammals. In addition, filters used will have a grid size small enough to exclude fish and other larger biota from the intake pipes.*"

**Comment 3:**

- b) How deep will the pipes be mounted in the sea floor?

**Response 3:**

A description of the depths to which the intake tunnels will be constructed is provided in section 3.11.1 of the Revised Draft EIR Version 1.

The consistent data set appendix C indicates the depth of water in which the intake structure will be constructed is limited to 30 m and the outfall tunnels will be at approximately 5m..

**Comment 4:**

- c) What are the concentration levels and amounts of brine as well as other chemicals released into the ocean?

#### **Response 4:**

Brine concentrations are discussed in Section 3.1 of the Marine Ecology Assessment (Appendix E15 of the revised Draft EIR Version 1).

Brine will be released into the surf zone during the construction phase, physical mixing with surrounding seawater will result in dilution to 1 g/L above ambient salinity within 110 m from the point of release. Any ecological impacts will be focused within the water column due to the high energy of the surf zone<sup>1</sup>.

During the operational phase of this development, desalination effluent is not expected to affect the marine environment. This is due to the combination of hypersaline discharge together with the discharge of heated cooling water. Although the brine is expected to have a salinity of 58 ppt (in comparison with seawater which has a salinity of 35 ppt) this effluent will account for less than 1% of the water released. As such the brine will be diluted to undetectable levels within the outflow pipes, prior to release.

While no defined standards exist for the discharge of desalination plant effluent in South Africa, the South African Water Quality Guidelines for Coastal Marine Waters states a target range of 33 ppt to 36 ppt for salinity of effluents entering the sea. These guidelines will be met by this development during the operational phase. Although they will not be met during the construction phase, dilution will occur within 110 m of the point of release.

As indicated in Section 3.1 of the Marine Ecology Assessment, typical pre-treatment of seawater required for the desalination process includes the use of both chlorination and de-chlorination, the addition of anti-scalant agents and surfactants, and the adjustment of pH through the addition of strong acids. The brine would typically contain low concentrations of a variety of chemicals including sodium hypochlorite, ferric chlorite, sulphuric or hydrochloric acid and sodium hexamethaphosphate. It is important to note that the chemicals in the release water are approved by the United States Environmental Protection Agency for use in drinking water systems, at concentrations similar to those found in desalination effluent.

#### **Comment 5**

- d) Why is it not possible to monitor during the construction phase, and how "short-lived" will this impact actually be?

#### **Response 5:**

The impact referred to is not specified and it is therefore, not possible to provide a response to this comment.

#### **Comment 6:**

- e) What is the total amount of out- and in-put pipelines?

#### **Response 6:**

From the consistent data set, it is anticipated that there will be 3 to 4 outlet pipeline tunnels of approximately 3 m diameter each and either one or two inlet pipelines of between 5 and 10 m diameter will be installed. If a single inlet pipeline is installed, the diameter will be 10m and if two inlet pipelines are installed, the diameter will be 5m.

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<sup>1</sup> Recent marine science research indicates that release beyond the surf zone is a safer and more environmentally acceptable alternative. The Marine Ecology Assessment is being amended accordingly.

**Comment 7:**

f) How far apart will the pipelines be?

**Response 7:**

The tunnels will be placed as close as practically possible together to avoid unnecessary disturbance of the sea floor.

**Comment 8:**

g) What type of material is the cofferdam made of?

**Response 8:**

The coffer dam will be made of rock.

**Comment 9:**

h) What is the size of the cofferdam?

**Response 9:**

The coffer dam size will be dependent on the actual channel design and size. This cannot be concluded without a final design. However, the environmental sensitivity study for the marine biology impact considered the most severe impact in the construction process. Also see response 65 below.

**Comment 10:**

i) Where offshore will the 10.07 million m<sup>3</sup> sediment be dumped?

**Response 10:**

Spoil will be disposed at a depth of 52 m, 6km from shore. The recommended position of spoil disposal at the Bantamsklip site is indicated in ???. See the marine report table 4 indicates 3 alternatives 6km from the shore

**Comment 11:**

j) How deep will the pipes be mounted in the sea floor?

**Response 11:**

Please refer to Response 3.

**Comment 12:**

k) How many years will the construction phase last?

**Response 12:**

As indicated in the Revised Draft EIR Version 1, construction is planned to take place over a period of nine years.

**Comment 13:**

l) When will the construction of the NPS take place?

**Response 13:**

The start of construction is dependent on all relevant authorisations being obtained.

**Comment 14:**

m) What type of new habitat will be created?

**Response 14:**

New types of benthic habitat will be created due to the offshore disposal of spoil. At Bantamsklip spoil is recommended to be disposed at a depth of more than 50 m at a distance 6km from shore.

**Comment 15:**

n) How will the design of the NPS impact the present swells and currents?

**Response 15:**

The NPS will not affect swells and currents. It will affect the temperature of the seawater in the water column and at the surface over a small area.

**Comment 16:**

o) An estimation of the intake of phytoplankton, in particular fish larvae and abalone gametes.

**Response 16:**

Phytoplankton occur at such high concentrations in the intake water and reproduce at such a fast rate that the impact on these species is not regarded as significant enough to warrant special concern.

**Comment 17:**

p) Methods to avoid descaling of fish.

**Response 17: Response ok - TBR**

GIBB consulted the Marine Specialists Dr Robinson and Dr Griffiths who are unsure to what the above comment actually refers however the state that descaling may occur if fish are entrained in the cooling system. There are no methods to avoid this other than to avoid the uptake of the fish in the first place. As detailed in the marine ecology report this has been done through technical design. These design features include: the use of screens will prevent the uptake of fish and water will be drawn into the system slowly (1m/s or less) so as to allow fish and other organisms to swim against the flow of the water.

**Comment 18:**

q) DICT requests that the Marine Environmental Study take the impacts of the chemical pollution into deeper consideration.

**Response 18:**

Without a motivation for such a request, the request cannot be considered.

**Comment 19:**

- r) Exact details of the filters and how they are expected to prevent intake of marine life such as seals, penguins and dolphins. This should be made public.

**Response 19:**

These will be similar filters used currently at Koeberg as follows:

- High efficiency particulate air filters (HEPA) have been in use successfully at Koeberg since the start-up of the plant in 1984.
- HEPA filters are distinguished from ordinary filters by their high efficiency in trapping very fine particles in air streams, typically at an efficiency of 99,9% at a 0,3 micrometre particle size.
- Over 400 efficiency test have been carried out on these filters at Koeberg with a pass rate of 92%. Filters which fail are immediately replaced and re-tested.
- Technetium-99, a radioactive source is used for the testing of the filters. The filters are tested every eighteen months.
- Criteria for filter replacement are a high differential pressure across the filter or a failed test.

**Comment 20:**

Regarding the terms of reference for the outlet water, please amplify on the following point:

- s) Temperature – a visual model is required.

**Response 20:**

Appendix E16 (Appendix B – Figures) of the Revised Draft EIR Version 1 provides visual representations of the modeled increases in temperature of surface water due to the release of warmed cooling water.

**Comment 21:**

- t) Chemical composition and concentration of chlorine in the water (see chapter 3).

**Response 21:**

As indicated in the Consistent Dataset (Appendix C of the Revised Draft EIR Version 1), and as per the current practice at Koeberg Nuclear Power Station, it is proposed that a Circulating Water Treatment System will produce sodium hypochlorite by pumping seawater through an electrolyser. The concentration of active chlorine after the electrolyzers in the solution is approximately 1.5 mg/kg.

**Comment 22:**

- u) Cumulative effects of temperature and chemicals on the surrounding marine environment.

**Response 22:**

Considering that the Koeberg Nuclear Power Station has not resulted in any long-term cumulative impact on marine life (based on detailed monitoring by marine scientists over the entire operational life space of the Koeberg Nuclear Power Station), it is not predicted that warmed cooling water and

chemicals released from Nuclear-1 would have any long-term cumulative impacts on marine life. Although predictions were made about the establishment of warm warm-water marine species at the Koeberg Nuclear Power Station, this has never been recorded at KNPS (see Section 3.2.3 of the Marine Ecology Assessment). Neither have chemical nor radiation emissions ever been found to have a detrimental impact on marine life at the Koeberg Nuclear Power Station. Although the capacity of Nuclear-1 will be double that of the KNPS, the technology cooling technology and radiation management practices will be similar, since Nuclear-1 will be based on the same (but newer generation) pressurized water reactor technology.

**Comment 23:**

**Basis of Design**

The MEIS is flawed because there is no Basis of design used as a reference (BOD), and therefore lacks credibility.

As a mandatory requirement for a credible process, the need for a BOD was raised in the initial letter of concern and has yet to be addressed.

**Response 23:**

Your comments are noted. The EIA Team is confident that its predictions, based on the Consistent Dataset, and based on the experience with the Koeberg Nuclear Power Station; provide an adequate foundation for an accurate prediction of the environmental impacts.

**Comment 24:**

The assessments of the specialists do not have the fundament to be able to model or measure the actual impacts on the environment. They do not use exact, realistic or quantitative measure for eg. the area of the protected zone, the design of the grid on the intake pipes, the amount of pipelines, the size and how the cofferdams will be designed and build (sic).

**Response 24:**

Your comment is noted. As indicated in the Revised Draft EIR Version 1, the assessment of the impacts of the proposed power station is based on a Consistent Dataset (Appendix C of the Revised Draft EIR Version 1), which represents a worst case scenario of potential inputs and outputs from a Generation III nuclear power station operating under normal conditions. This dataset has been based on the commercially available nuclear power station designs currently available. Additionally, the Nuclear-1 EIA is based on monitoring data from almost three decades of the operation of the KNPS and the experience gained by selected EIA specialists on the operation of the KNPS, as well as similar large construction projects in similar environments.

Furthermore, sensitivity maps provided by the range of relevant specialists have been overlaid for each site and the preferred footprint for the power station has been defined to exclude areas of high sensitivity on the sites. The EIA team defined this preferred footprint independently of the spatial requirement that Eskom has stated it would require. In most cases, the environmentally recommended footprint is smaller than the area required by Eskom. Eskom will be bound by the preferred footprint, should authorisation be granted, and will have to place all necessary infrastructure within this footprint, thus avoiding sensitive areas. Should all necessary infrastructure not fit within this footprint, some of the infrastructure such as administrative buildings may have to be placed off-site.

Lastly please refer to Appendix E37 of the Revised Draft EIR (Version 2) for peer review reports of all specialist studies. All specialist studies were found to be adequate and none were found to be fatally flawed.

### **Comment 25:**

#### **Access to documents**

Documents referenced by Arcus GIBBs are not available in the public domain, which makes it impossible to verify the estimations and claims on which they are based. For example reports from Koeberg. As pointed out in the last submission, the document referred to as "Prestedge et al." has been renamed and cannot be found on the Arcus GIBBs webpage.

### **Response 25:**

Eskom has made monitoring reports on radiation around the Koeberg Nuclear Power Station available to the public through requests in terms of the Public Access to Information Act. The reports by Prestedge *et al* are integrated in the appendices of the oceanographic reports (Appendices E16 of the Revised Draft EIR, Appendices A to I). The reports by Prestedge *et al.* are not separate documents.

### **Comment 26:**

## **3 POTENTIAL IMPACTS OF THE NPS ON THE MARINE ENVIRONMENT**

### **Introduction**

This section addresses the impacts of the NPS on the marine environment.

### **ESKOMs' commitment to the mitigation objectives**

In the EIA the Arcus GIBBs' specialists refer to an "understanding" that ESKOM will adhere to their recommendations.

Clarity on Eskoms (sic) commitment to follow up on, and adhere to, the recommendations from Arcus GIBB are required to establish credibility.

### **Response 26:**

Environmental authorisations are always issued on condition that the recommendations in the applicable environmental assessment reports (Basic Assessments or Environmental Impact Reports) and/or specialist studies are implemented. These recommendations are also contained in an Environmental Management Plan – EMP (Appendix F of the Revised Draft EIR Version 1). Should an authorisation be issued, it will be issued subject to the implementation of the EMP during the construction and operational phases of the project, and subject to auditing of compliance with the EMP by an independent Environmental Control Officer. Should the detailed design of the Nuclear-1 power station differ substantively from what has been assessed in the EIA process, then a re-assessment of the design would be required.

### **Comment 27:**

## **3.1 LACK OF QUANTITATIVE AND SCIENTIFIC BACKGROUND**

### ***Quantitative***

Throughout the whole MEIS there is a lack of quantitative measurements. The specialists' use of guesstimates in place of exact quantitative measurements and scientifically based models is insufficient.

**The following information is required to further our understanding of the MEIS** (Quotations in italic are copied directly from the MEIS):



1. “continuous low- level chlorination”. What is the exact concentration and flow of chlorine that will be returned to the ocean with the cooling water?

**Response 27:**

Please refer to Response 21.

**Comment 28:**

2. The NPS safety zone is cited as 1 km x 800m. This seems to be inconsistent with international safety zone standards for nuclear power stations. Please provide reference for the source of this safety zone calculation.

**Response 28:**

There is no proposal for a 1km by 800 m safety zone. There is a proposal for a 1 km wide marine security exclusion zone (1km wide from shore along the length of the Eskom-owned land). Apart from that, the proposed radius of the Urgent Proactive Zone (the smaller of the two Emergency Planning Zones for emergency evacuation purposes), which extends inland from the power station, is 800m. These two zones are for different purposes.

**Comment 29:**

3. “Significant organic matter” – what is the exact amount being?

**Response 29:**

The quote is presumed to be with respect to spoil disposal as per the assumptions and limitations on page 2 of the Marine Ecology Assessment (Appendix E15 of the Revised Draft EIR Version 1). Spoil will be primarily sand overburden stripped from the area where the power station is proposed to be constructed. Vegetation will be removed from the overburden and used for revegetation, hence the assumption that spoil will contain insignificant organic matter.

**Comment 30:**

4. Pipelines: What is the diameter of the pipeline? And how much water will be sucked in per second?

**Response 30:**

A description of the proposed pipelines is provided in section 3.11.1 of the Revised Draft EIR. As per this description, the intake pipelines will have diameters between 5 and 10 m. The flow rate (as per the Consistent Dataset – Appendix C of the Revised Draft EIR Version 1) will be approximately 1 m/s at the point of intake.

**Comment 31:**

5. Spoil: How will the spoil be transported to the dumping site off shore?

**Response 31:**

The spoil will be transported pumped in suspension via a tunnel.

**Comment 32:**

6. How small is the “*very small*” area, which will be impacted by the thermal plume?

**Response 32:**

As indicated in Section 3.2.3 of the Marine Ecology Assessment (Appendix E15 of the Revised Draft EIR Version 1), oceanographic modeling indicates that for an offshore tunnel releasing at a depth of 25 m the mean increase in temperature will not exceed 1°C near the seabed. However, for a nearshore release a mean increase of 7°C or more near the seabed will affect an area of roughly 0.5 km<sup>2</sup> for a 4,000 MW plant and 1.5 km of shoreline will experience a maximum increase of 7°C or more at depths of 0-10 m. It must be noted that offshore release of warmed cooling water is the recommended alternative for the Bantamsklip site and that a nearshore release has been assessed to have an unacceptable impact on Abalone.

The Marine Ecology Assessment further indicates that Abalone (*Halyotis midae*) adults will be able to tolerate a maximum temperature increase near the sea bottom of 7°C. No mortality is therefore predicted for the recommended offshore release, since the maximum increase in temperature near the seabed will be less than 1°C.

**Comment 33:**

7. Water temperature will increase by 12°C in certain points – How many points will there be?

**Response 33:**

The temperature of the warmed cooling water will be 12°C higher than the intake water upon release. Please refer to Response 31 above regarding the mean temperature increase near the seabed.

**Comment 34:**

8. Water temperature will increase in an area of .75 km<sup>2</sup> with approx. 1°C. Is that based on 1 reactor or 4 reactors? A model is needed. This model must be based on the different parameters influencing the spreading of the plume and the different current systems.

**Response 34:**

As stated in the Marine Ecology Assessment the assessment is based on a 4000 MW plant. This is irrespective of the number of reactors. The total output of the power station is important as this (and not number of reactors) determines the required cooling. There may be a number of different reactor configurations (for argument's sake three smaller reactors or two large reactors) that may make up the total of 4,000 MW maximum.

**Comment 35:**

9. “*is likely to be spatially localised (hundreds of m radius)*”. How big of an area will be disrupted precisely?

**Response 35:**

As indicated in your quote, the area is hundreds of square meters. From a marine biology perspective this is an insignificant area of disruption and does not need to be quantified exactly. If the impact were to occur over an area of several km radius it would be regarded as significant.

**Comment 36:**

10. What is the “*technical design*” behind the water intake?

**Response 36:**

The “technical design” of the water intake refers to the design of the water intake as described in the Consistent Dataset (Appendix C of the Revised Draft EIR). The concept design for the intake currently involves tunnels which collect water from the sea to the channel inside the plant area. These tunnels have to be designed taking all the environmental factors into account. This design is different from the current Koeberg one and it allows the beach line to be accessible, subject to the security exclusion zone, still to be established. The implications of different intake design alternatives are discussed in Section 5 of the Coastal Engineering Report (Appendix E of Appendix E16 of the Revised Draft EIR).

**Comment 37:**

11. “*The most likely source of radiological releases into the marine environment is through the unintentional release of contaminated cooling water. This risk has been minimised through the technical design of the cooling system. This approach has proved adequate at KNPS, where no radionuclide release has been detected.*”. What is the “*technical design*” which will minimize the unintentional release of radiological contaminated water? What is the amount of intentional radiological contaminated water?

**Response 37:**

Please refer to the description of the cooling system for a typical Pressurized Water Reactor nuclear power station in section 3.6.1 of the Revised Draft EIR Version 1. There is no direct contact between the cooling water and the radioactive components of the power station since the cooling water system is a closed system.

As indicated by Section 5.1.5 of the Marine Ecology Assessment: “*At a design level the risk of radiological releases into the marine environment has been minimised through the incorporation a ‘triple cooling system’ whereby at no stage is there direct contact between the reactor and the coolant or between the coolant and the sea water.*”

The fact that it is termed “unintentional” means exactly that. It is to be noted that monitoring of the marine environment has not picked up radiological releases into the marine environment during the more than 20 years of operation of the Koeberg Nuclear Power Station (KNPS). The NNR sets strict limits with regards to such releases and the proposed nuclear power station will not be approved if it cannot be demonstrated that the proposed plant will meet these limits and there are regular sampling to monitored the radioactivity levels and to determine if they are still within regulatory limits.

As indicated in Section 5.3.4 of the Nuclear Waste Assessment (Appendix E29 of the Revised Draft EIR Version 1, the nuclear license application to the National Nuclear Regulator (NNR) is required to present discharge levels for liquid emissions based on an assessment of their expected radiological impact to the most highly exposed individual and is expected to include best estimates activity discharges for Normal Operations and Anticipated Operational Occurrences based. The NNR will review these proposed discharge levels, with the view to approve safe Annual Authorised Discharge Quantities (AADQs) for the Nuclear-1 Nuclear Power Station to ensure that there is no adverse impact on human populations or on ecosystems.

As indicated by the Consistent Dataset (Appendix C of the Revised Draft EIR Version 1), the maximum effective dose due to liquid releases from Nuclear-1 will be limited to less than 1 mSv/a. The radioactivity in liquid and gaseous discharges from the Koeberg power station during 2007 and 2008 for example contributed a projected total individual dose of 0.004 mSv to the hypothetically most exposed public group. The projected doses, as a result of gaseous and liquid discharges, were 0.00047 mSv and 0.0038 mSv respectively for 2008 (0.00094 mSv and 0.003 mSv respectively for 2007), which is well within the NNR dose constraint of 0.250 mSv per annum (NNR 2009).

**Comment 38:**

12. What is the “*worst conditions*” related to release of cooling water?

**Response 38:**

The “*worst conditions*” referred to is with reference to the current warmed cooling water release of the KNPS. It refers to the worst case scenario recorded to date.

**Comment 39:**

**3.2 ABIOTA**

***Introduction***

This chapter deals with the impacts from abiotic factors on the marine environment in relation to a NPS.

**3.2.1 Chemicals**

***Chemicals***

The MEIS fails to mention important pollution sources and does not sufficiently deal with the impacts on the marine environment or the decommission of liquid radioactive waste.

**Response 39:**

Should you be able to provide examples of the types of chemicals that you claim have not been assessed, the EIA team could consider the allegation.

**Comment 40:**

The main focus is:

- Chlorine
- Contamination related to chemicals
- Liquid waste – decommission
- Air pollution

**Response 40:**

Your comment is noted.

**Comment 41:**

***Chlorine and the disregards (sic) of its impact on the marine environment***

The impacts of chlorine from the returning cooling water have not given sufficient attention. The negative effects of chlorine, are well documented, with even small amounts of chlorine (down to 0.01 mg/L) having a lethal effect on a wide range of fish, benthic invertebrates and phytoplankton. It is stated in the EIA that chlorine levels of up to 2mg/kg will be released with the cooling water.

DICT has not been able to find any model for the potential impacts of the chlorine on the environment. The specialist claims that it is very difficult to isolate the effects of chlorination from other impacts related to entrainment and therefore does not investigate this matter further.

**Response 41:**

As chlorination and temperature interact it is not valid to consider them independently. While this does not mean that their individual actions in the environment are not important, it does mean that what is relevant at an environmental scale is the sum of their impacts. This is what the marine ecology report considers. The specialist's conclusion is based on experience of the monitoring of the impacts of the KNPS over a period of more than 20 years. No long-term impact of chlorination has been found at the KNPS. No modeling has been done of the fate of chlorine in the marine environment as early work at KNPS found that the impact is localized and heat and chlorine dissipate quickly beyond the outfall area (Huggett 1987). REF: Huggett J 1987 The effects of heat chlorination and physical stress on entrained plankton at Keoberg Nuclear power Station. Submitted to Koeberg Nuclear power Station.

**Comment 42:**

In the MEIS it states.

*“Chlorination of cooling waters is commonly used by power plants throughout the world (Huggett and Cook 1991). It is, however, very difficult to isolate the effects of chlorination from those of entrainment itself, as during entrainment organisms are also exposed to heat and physical stress, such as mechanical buffeting, acceleration and changes in hydrostatic pressure (Marcy et al. 1978). Thus, in this report, all the above impacts will be considered collectively as impacts resulting from entrainment of organisms.”*

The paragraph cited above does not address the effect of chlorine out flow on the marine life and its impact must be monitored and assessed.

*“Although the volume of water to be utilised by a 4 000 MW plant is roughly twice that of KNPS, the above conclusions are still deemed valid, as the extent of the impact is localised, heat and chlorine dissipate quickly beyond the outfall area (Huggett 1987) and plankton populations regenerate very rapidly, especially along the west coast (Huggett and Cook 1991). This impact will continue during the entire operational phase of the development.”*

**Response 42:**

Please refer to Response 41.

**Comment 43:**

It is stated in the MEIS that chlorine will be released continuously into the marine environment, and yet chlorine is not mentioned in this quote from the EIA: *“The only compounds to be released from cooling water pipes are warmed sea water, sewage (at levels meeting the South African Water Quality Guidelines for Coastal Marine Waters) and desalination effluent (undetectable at the point of release).”*

It is essential that the effects of chlorine and other chemicals returned to marine environment are analysed and modelled.

The environmental impacts of contaminants are presented in the MEIS as being minimal. It must be clarified how the chemical contamination of the local marine environment is affecting the local species as well as the specific concentrations of the expected discharge of chlorine, waste water and other contaminants. If the concentrations and effects of the chemicals and contaminants are unknown, it is not possible to make any modelling of the impacts of the contamination on the marine environment.

In the EIA it is argued that it is not possible to monitor the toxicity due to the lack of a South African baseline. The absence of a baseline does not negate the requirement for monitoring to take place.

**Response 43:**

With regards to the impacts of chlorine, please refer to Response 41.

The need for monitoring has never been contested. It is a given that monitoring must take place before construction (to establish a baseline), during construction and during operation. Recommendations for monitoring are included in the Revised Draft EIR Version 1 and in the Marine Ecology Assessment.

**Comment 44:**

**3.2.2 Brine**

***Brine***

As quoted from the MEIS below, brine will be released straight into the surf zone during the operational phase.

*“During the construction phase small volumes of hypersaline effluent will be released directly into the surf zone. Physical mixing in this high energy environment will result in sufficient dilution of the brine so as to ensure minimal impacts on the marine environment.”*

Please provide information about the effect of this release into flat calm seas as well as a model for the distribution of brine during different sea scenarios.

**Response 44:**

The movement of brine has been modeled under various scenarios (PRDW 2008 – PRDW 2008):??

**Comment 45:**

**3.2.3 Radionuclides**

***Radioactive waste***

It is not specified what happens to the 8000 m3 pr year pr unit of liquid radioactive effluent mentioned in chapter 3 in the EIA p. 3-23. It is stated that the “Liquid radioactive effluent will be collected, treated and stored in the effluent storage tanks.”

**Response 45:**

Section 5.3.2 of the Radioactive Waste Assessment (Appendix E29 of the Revised Draft EIR Version 1) contains a discussion on the mechanisms used for the management and treatment of liquid radioactive waste.

**Comment 46:**

In the EIA it is stated that “To the knowledge of marine ecology specialists the compounds listed by the DICT (i.e. Boric acid, Lithium hydroxide, Hydrazine: Ammonia, Morpholine, Ethanolamine, Trisodium phosphate, Detergents and Metals and suspended solids) will not be released into the sea.”

**Response 46:**

The Dyer Island Conservation Trust (DICT) has not stated where this quote is from. It is unclear which report is referred to as the “EIA” or which section of the “EIA” this quote is from. It is therefore not possible to provide a response.

**Comment 47:**

Information about the plan for the decommission of liquid radioactive waste is requested, as well as the listed contaminants in the EIA.

Presumably some of this radioactive waste will find its way into the ocean. As quoted below, the MEIS concedes this fact but does not link increased levels of radionuclides in the marine environment to the NPS:

*“Importantly, due to radionuclides having been recorded in very few individual organisms at KNPS, the low concentrations at which they have been recorded and the fact that compounds at equivalent levels of radioactivity have previously been recorded in these species under natural conditions, these findings are not considered indicative of any significant effect resulting from the power station on the surrounding marine environment (Griffiths and Robinson 2005).”*

Another source of radionuclides is through air pollution, which the EIA confirms will occur. It is inevitable that some of these compounds will end up in the ocean, which invalidate the specialists’ conclusions. The specialist is aware of the fact that contamination is likely to occur. Therefore the impacts need to be monitored.

**Response 47:**

Please refer to Responses 37 and 45.

Atmospheric emissions will occur at doses far below the authorised dose that ensure prevention of harm to the public. As indicated in previous responses, and in the above-mentioned quote from the Marine Ecology Assessment (which quote is based on the marine ecology team’s monitoring of the KNPS’s impacts over more than 20 years), no significant impact on marine life has ever been found at the KNPS. This monitoring programme determines the level of radioactivity in marine organisms, no matter the origin or pathway thereof (liquid or gaseous). It is therefore unclear how the DICT has deduced that the specialists’ conclusions are invalidated.

The DICT’s statement “Therefore the impacts need to be monitored” refers. This seems to infer that the Revised Draft EIR denies the need for monitoring, which is not factually correct. Section 10.3.1 of the Revised Draft recommended that “*Various baseline monitoring programmes (e.g. terrestrial vertebrate fauna and marine monitoring), as specified in the respective specialist reports, must be implemented well before the start of construction to ensure that pre- and post-construction environmental conditions can be compared.*” Furthermore Section 5.2.2 of the Marine Ecology Assessment recommends the following: “*An environmental surveillance programme should be implemented to monitor for radiation emissions in the marine environment. This would form part of the strict requirement of the National Nuclear Regulator Act. The design of such a programme is outside our area of expertise, but is likely to follow the Eskom Radiation Protection Environmental Surveillance Standard. Organisms which we recommend for inclusion in such a monitoring programme are abalone H. midae at Bantamsklip and chokka squid Loliqo reynaudii at Thyspunt, as both are consumed commercially*”.

**Comment 48:**

**3.2.4 Water temperature**

***Water temperature***

There is not sufficient information in the MEIS regarding how much energy will be released into the water, even though the AA states that there is a reliable model and sufficient information. This information is necessary to model a heat balance as well as model of how the warm water dissipates. The visual model should also take into account variations of current, swell and wind.

#### **Response 48:**

It is clearly stated in the Marine Ecology Assessment (Appendix E12 of the Revised Draft EIR Version 1), the warmed cooling water will be 12°C warmer than the intake water. The impact of the release of this water is modeled in detail for different scenarios (including offshore and inshore releases) as illustrated in Appendix B of Appendix E16 of the Revised Draft EIR. For ease of reference selected figures from this appendix are shown in the pages to follow for the Bantamsklijp site.

#### **Comment 49:**

##### **3.2.5 Spoil**

##### ***Spoil –dumping and transportation***

The MEIS does not provide any information about how the spoil will be transported to the off shore position and what the impact of this transportation might be. This information is required to complete the MEIS.

Although it is stated that the spoil will stay in the water for 2 days, it is not clear how many cumulative days of dumping will occur. This information is required.

It is stated that the amount of spoil in the water will not exceed 10.07 million m<sup>3</sup>. Information about the monitoring and regulation of this process is required.

#### **Response 49:**

As indicated in the Marine Ecology Assessment (Appendix E15 of the Revised Draft EIR Version 1), two disposal alternatives for spoil are assessed at each of the sites: a nearshore and an offshore disposal option. These alternatives are also discussed in Section 5.12 of the Revised Draft EIR Version 1. Different pumping rates for the spoil are also considered.

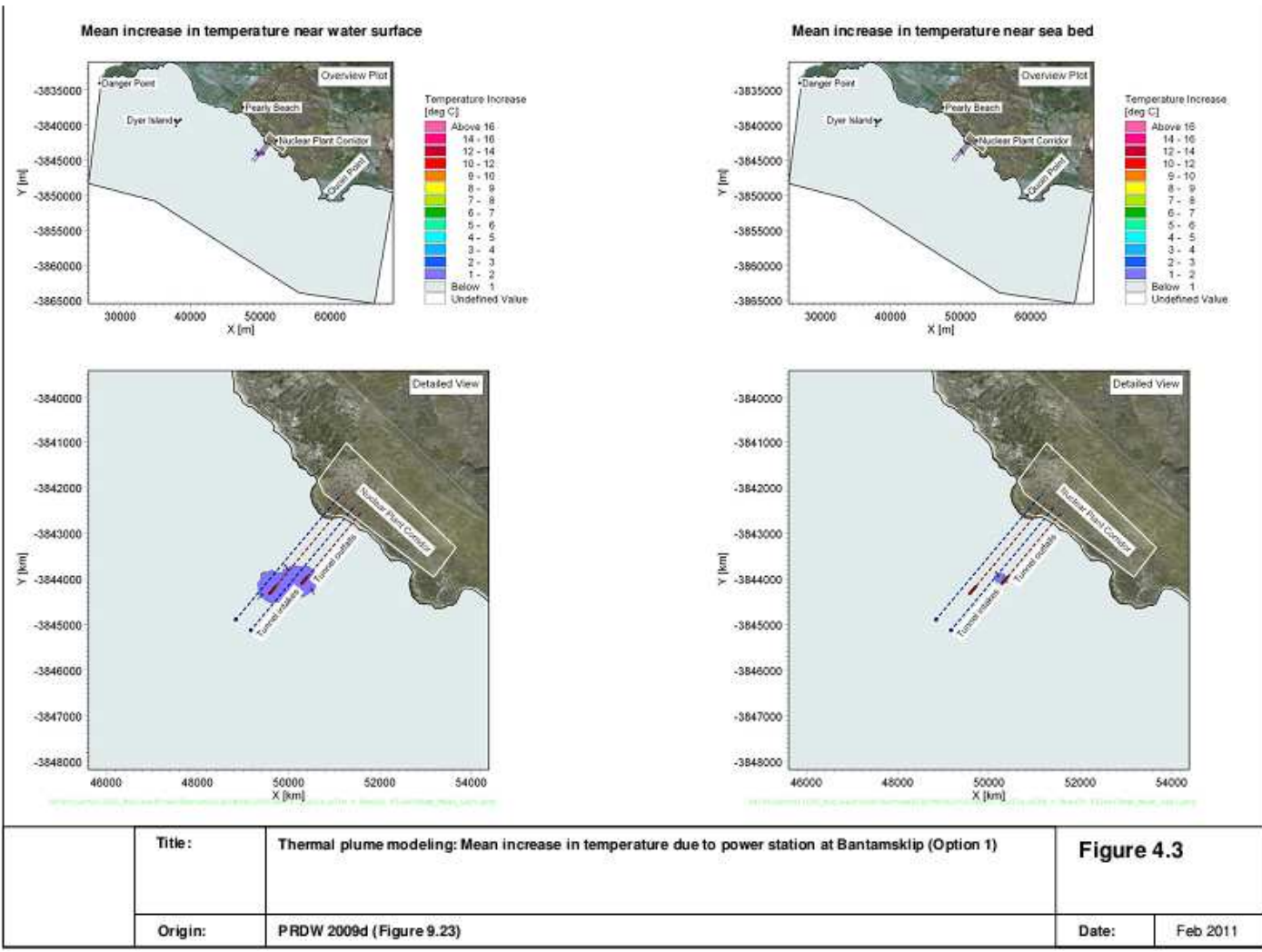
It is stated in the Marine Ecology Assessment that the impacts of spoil disposal will be twofold:

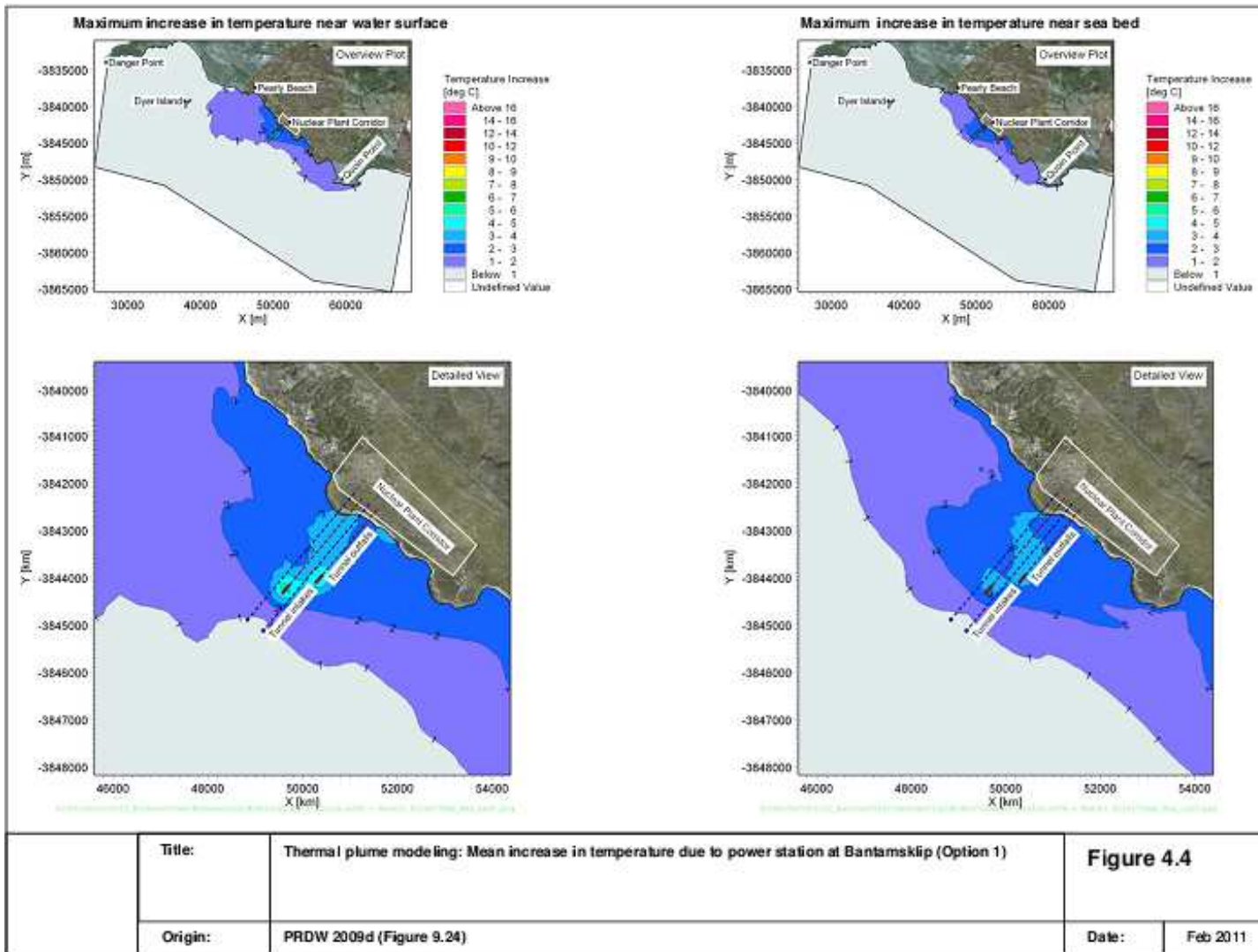
- Firstly as a sediment plume within the water column (consisting mainly of fine muds), which may block light penetration and filtering apparatus of filter feeders; and
- Secondly as a layer covering the sea bottom (consisting mainly of coarser sands) that will bury the current benthic environment and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

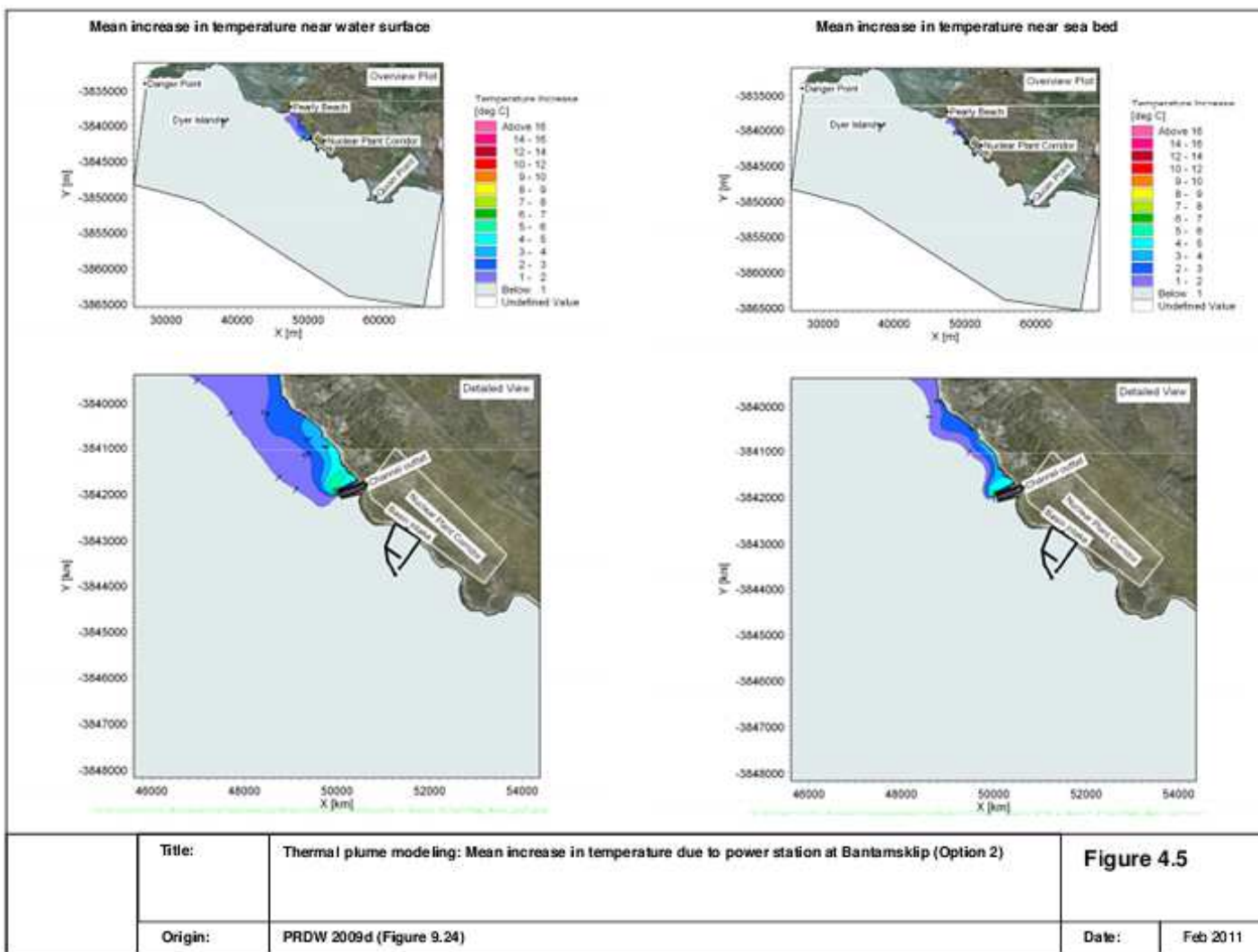
Impacts of the spoil disposal alternatives in terms of the movement of the spoil over time are assessed in Appendix I of the Oceanographic Assessment (Appendix E16 of the Revised Draft EIR Version 1). The assessment of impacts in the Marine Ecology Assessment is based on the spoil movement patterns modeled in the oceanographic assessment. Section 3.2.1 of the Marine Ecology Assessment states that "*Alternatives 4, 5 and 6 (i.e. either the full or half the volume of spoil disposed offshore at either a medium or high flow rate) are considered preferable*". Based on these alternatives, the total length of time over which disposal will occur could be 29 days (at a pumping rate of 3.93m<sup>3</sup>/s) or 56 days (at a pumping rate of 2.06m<sup>3</sup>/s) if pumping takes place without interruption, 24 hours per day.

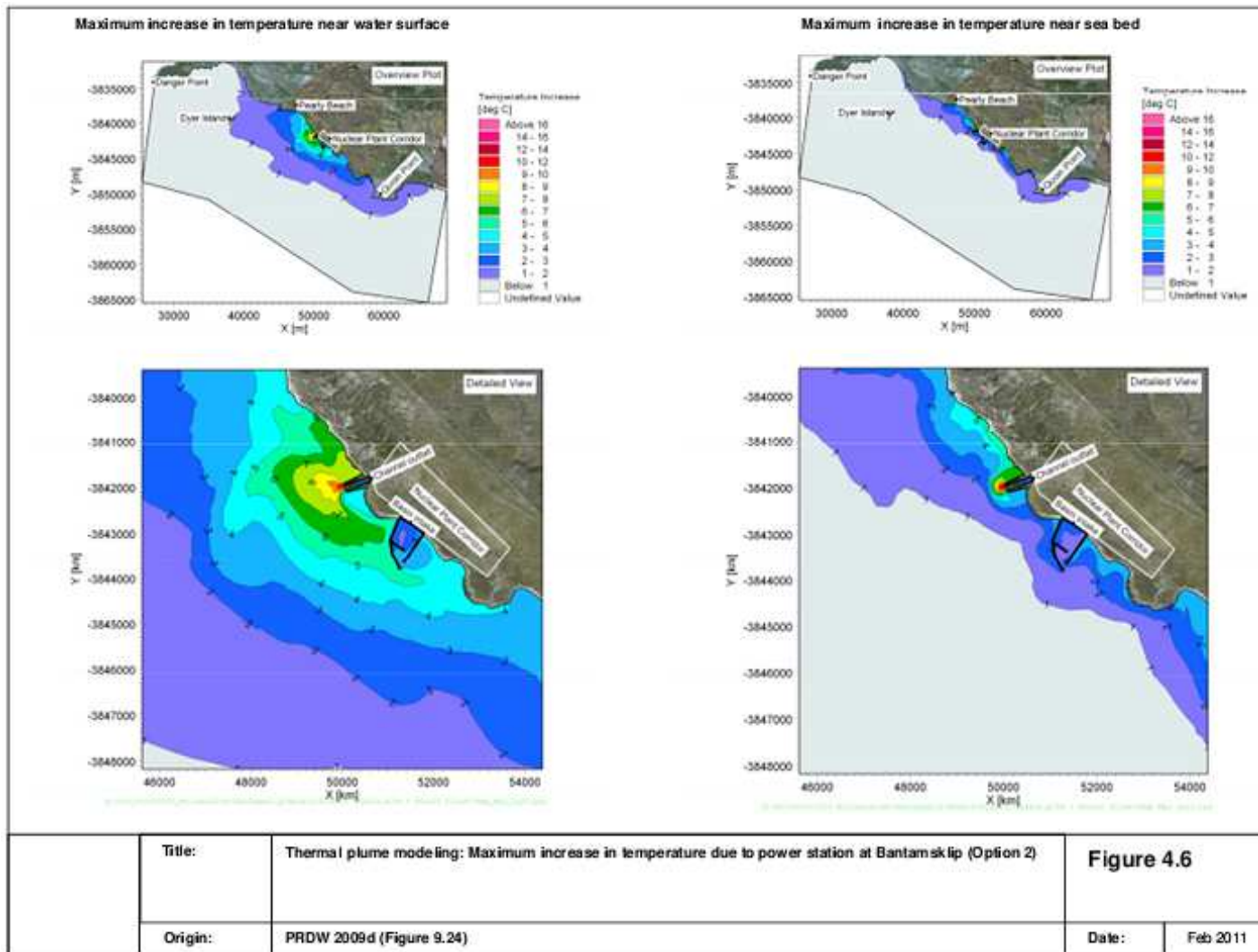
The disposal of spoil, together with other potential environmental impacts that will occur during construction, will be monitored by an independent Environmental Control Officer who will report to an independent Environmental Monitoring Committee and to the environmental authority.











**Comment 50:**

**3.2.6 Pipe drilling**

***Pipe drilling***

DICT would like to know if modern techniques for construction of the pipelines have been considered, especially those relating to digging from the shoreline into the seabed without the need for a cofferdam.

Will written guarantees will be provided to state that no explosions will occur during the construction phase?

**Response 50:**

As indicated in Response 2, the construction of the intake tunnel(s) will involve sinking of a shaft on land to a depth of approximately 65m below mean sea level and driving the tunnel seawards underneath the seabed. The coffer dam will be required only for the construction of the cooling water outlet tunnels. The intake system will be made of tunnels whilst the outfall will be channels. The latter require a different measure taken in their construction.

On a large construction projects such as this, some loosening of bedrock through the use of explosives will be required. However, Section 7.1.7 of the Draft Environmental Management Plan - EMP (Appendix F of the Revised Draft EIR Version 1) requires the development of a blasting plan to prevent impacts on sensitive seabird populations and non-resident sensitive birds. A method statement for blasting (a detailed technical description to indicate and describe in detail how contractors will implement and achieve environmental compliance) is required by the EMP. All method statements are required to be authorised by the independent Environmental Control Officer prior to the commencement of the relevant activities. Furthermore, Section 7.5.4 of the EMP requires blasting to be planned well in advance so that it is restricted to the period of June to October, in order to avoid blasting in the peak breeding season (November to May) of sensitive populations of seabirds.

A variety of low-impact blasting methods (e.g. the use of blasting mats) and micro-timing of small blasts) are available for inclusion in method statements to reduce noise, dust and vibration impacts of blasting.

**Comment 51:**

**3.2.7 Noise**

***Noise***

The vulnerability of cetaceans to increased background noise was raised in our initial letter of concern, and although the AA included a limited response to this, it did not address the long term impact over the projected 5 year construction phase.

Detailed information is requested concerning the duration of any construction phase that will involve oceanic noise pollution, such as the driving of pillars into the seafloor for a cofferdam.

It is necessary to monitor the background noise levels before and during the construction phase, to establish if these have any impact on behaviour changes in the cetacean species.

**Response 51:**

Please note that the construction period is 9 years, not 5 years as indicated in your comment. Noise is by definition a short-term impact, which occurs only over the duration of the noise occurrence. As such no long-term impact on cetaceans is expected.

No significant noise impacts are expected during the operational phase, since the most significant impacts during operation will be caused by the operation of cooling fans on the reactor buildings.

It is agreed that noise monitoring must commence prior to the start of construction. All forms of monitoring must commence prior to the start of construction in order to build up a database of background levels.

**Comment 52:**

**3.2.8 Climate change**

***Climate change***

DICT agrees with the statement in the “EIA” that it is important to include global climate change when calculating the models for Bantamsklip (or any other nuclear power station).

The point of DICT in the first Letter of Concern was that the two specialist studies (MES and OSS) use different reference temperatures in their models!

**Response 52:**

It is unclear which report is being referred to as the “OSS”. No response can therefore be provided to this comment.

**Comment 53:**

In the MES it is mentioned, more than once, that the “Climate change” would decrease the water temperature and this would be able to counter---current the effect of the warm cooling water that will be pumped into the water column. While in the OSS a temperature increase is used as reference for the “Climate change”.

Arguments like climate change should be taken into account for the models, but these models must include scenarios for temperature increases and decreases.

The fact that the MES and the OSS build their argumentation on different scenarios (respectively, a decrease in the water temperature and an increase in the water temperature) is not scientific or objective.

**Response 53:**

The Marine Ecology Assessment’s statement that cooling of water temperatures has been observed is based on empirical monitoring data. The predictions of temperature increases are based on global models of climate change. It is acknowledged that climate change models make general predictions of trends, but this does not exclude contradictory trends in some geographical areas, such as the cooling trends observed along sections of the South African coastline.

**Comment 54:**

**3.3 BIOTA**

***Introduction***

This chapter deals with the impacts on biota in relation to the potential construction of the NPS.

**3.3.1 African penguins**

***African penguins***

Although the AA refers to the African penguin being classified as “*vulnerable*”, this is incorrect. They were re--classified as “endangered” in 2010.

We recommend that DICT and CapeNature are consulted during this process, as they are collectively involved in the management of Dyer Island and research conducted in this “Important bird area”. Essential research must be carried out on African penguin foraging behaviour, as the proposed NPS lies within their feeding range.

**Response 54:**

CapeNature has been involved as an interested party in the Nuclear-1 EIA process from the commencement of this EIA.

Your comment regarding the change in the conservation status of African Penguin is gratefully acknowledged.

Extensive information is available on African Penguin foraging behaviour and it is unclear how additional site-specific research would add to the prediction of impacts resulting from Nuclear-1. It is well known that African Penguins forage at distances of 30 to 70 km per day. Recent research on their foraging behaviour by Pichegru et al<sup>2</sup> indicates that closing off an area of commercial fishing (as will be the case with the proposed 1 km wide marine exclusion zone at Nuclear-1) results in almost immediate benefits to African Penguins in terms of reduced foraging effort.

Based on oceanographic modeling recorded in the reports by PRDW (Appendix E of Appendix E16 of the Revised Draft EIR Version 1), Section 3.2.1 of the Marine Ecology Assessment reports that maximum suspended sediment concentrations reaching the Dyer Island will remain five times below the ecological threshold of 80mg/l, with turbidity above this level remaining at least 300m clear of the Island.

**Comment 55:**

**3.3.2 Cetaceans**

***Cetaceans***

Within the EIA, the following inadequacies were noted.

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<sup>2</sup> Pichegru L., Grémillet D., Crawford R.J.M. & Ryan P.G. (2010) Marine no-take zone rapidly benefit threatened penguin. *Biology Letters* 6: 498-501.



The specialists:

- Do not use references

**Response 55:**

Presuming that the “EIA” refers to the Revised Draft EIR Version 1, the specialist references to other sources have not been repeated in this document, since they are referenced in each of the specialist reports themselves.

**Comment 56:**

- Do not include relevant dolphin species in the Thyspunt area and do not reference the other information.

**Response 56:**

Section 2.3.4 of the Marine Ecology Assessment (Appendix E14 of the Revised Draft EIR Version 1) discusses the occurrence of marine mammals such as Indo-Pacific bottlenosed dolphin (*T. aduncus*), Long-beaked common dolphin (*D. capensis*), Humpback whale (*Megaptera novaeangliae*) and Southern right whales (*E. australis*) in the Thyspunt area. It is stated that these species are observed in the general vicinity of Thyspunt but that they are transient within the area and therefore of relatively low environmental concern.

Clarity is required as to what “other information” is not referenced.

**Comment 57:**

- Use incorrect information on page 11 concerning the most frequently seen species in the Bantamsklip Area

**Response 57:**

Clarity is required as to what information regarding frequently seen species is claimed to be incorrect.

**Comment 58:**

- The “EIA” neglects the fact that the area around Pearly Beach is an important area for mating and breeding where significant cow--calf interactions of the Southern Right whale occur.

**Response 58:**

Your statement is not factually correct. Section 2.2.4 of the Marine Ecology Assessment (Appendix E14 of the Revised Draft EIR) contains the following information regarding Southern Right Whales in the Bantamsklip area:

*“Four marine mammals are regularly observed in the vicinity of Bantamsklip. These are the Southern right whale (*Eubalaena australis*), Indo-Pacific bottlenosed dolphin (*Tursiops aduncus*), Long-beaked common dolphin (*Delphinus capensis*) and South African fur seal (*Arctocephalus pusillus pusillus*). Southern right whales occur mainly within 1 km of the shore from April to January, with peak abundances in September - October (Barker 1988). **During the later part of this yearly cycle inshore populations are dominated by cows with calves.** This species is not believed to feed while*



*in the region (Barker 1988). While no major calving area occurs close to Bantamsklip, Walker Bay (to the west) has been identified as an important mating ground (Barker 1988). Southern right whales are listed in the category of 'least concern' by the IUCN (IUCN 2010)".*

**Comment 59:**

- The specialists themselves mention on page 15, that according to Peter B. Best the presence of southern right whales is not random, but linked to the birth of calves.

**Response 59:**

Your comment is noted. Please see Response 58 and 60.

**Comment 60:**

- Claims that *"While no major calving area occurs close to Bantamsklip, Walker Bay (to the west) has been identified as an important mating ground (Barker 1988)." But since no studies has (sic) been carried out in the area of Bantamsklip so far – the specialist must be guessing. If the specialist holds information proving that there is no calving ground at Bantamsklip, DICT would like to see this study.*

**Response 60:**

The section in the marine ecology report dealing with marine mammals has been updated by a marine mammal expert (Please refer to the Revised DEIR (Version 2).

**Comment 61:**

- The specialist failed to cite a very important reference (Karczmarski et al. 2000, Marine Mammal Science, vol 16. No.1.), stating that; "The dolphins' dependence on this restricted type of habitat within an already restricted inshore distribution makes them particularly vulnerable to alteration or loss of this habitat" this article also confirms that the habitat of the humpback dolphins are within the 25m isobath, which can involve area further than 1.5km off shore. Within the Bantamsklip the dolphins are observed as far as Dyer Island, which is 8 km off shore. Instead the specialist reference *"While the shy Indo-Pacific humpback dolphin is likely to leave the immediate area during construction of the cooling water intake system, the disposal of spoil is unlikely to affect this species, as these animals do not venture more than 1.5 km offshore (Karczmarski et al. 1999) (spoil will be placed 6 km offshore) and show no obvious preference for clear or turbid waters (Karczmarski et al. 2000)."*

The impacts concerning marine mammals must be re-analyzed by a qualified marine mammal specialist.

**Response 61:**

A marine mammal expert has updated the relevant sections of the report and the revised report will be made available for public comment and review as part of the Revised Draft Eir Version 2.

**Comment 62:**

**3.3.3 Great white sharks**

## **Great white sharks**

Recent studies from DICT have proven that great white sharks are highly impacted by changes in water temperature and visibility. Even though they are temperature tolerant and occupy warm as well as cold water habitats, localized variations in temperature have a noticeable impact on their distribution. The population composition of great white sharks utilising the area in the Greater Dyer Island area changes particularly in the summer months, which seems to be linked to temperature changes as well as oxygen levels. At present there is a lack of research concerning the distribution and behaviour of great white sharks in the Greater Dyer Island area, and it is to (sic) early to conclude that sharks are not dependent on temperature changes.

South Africa holds more than half of the worlds' population of great white sharks, and the majority which depending on the Greater Dyer Island area. Dyer Island is recognised internationally as one of the most important areas for great white sharks.

The impacts concerning great white sharks and fish species in general must be re-analyzed by a qualified ichthyologist. The water temperature, oxygen level and visibility need to be monitored to be able to quantify the impacts on the great white sharks as well as the cage diving industry (see Chapter 4).

### **Response 62:**

Your demand for impacts to be re-analysed by a "qualified ichthyologist" refers. The Marine Ecology Report is required to comment On a full range of taxa and issues, and as such the team members need to have a wide general knowledge and to be able to synthesize information generated by specialists (rather than necessarily generate it themselves).The team, consisting of Prof Charles Griffiths, Dr Tamara Robinson and Dr Simon Elwen, are all respected, published and peer-reviewed marine scientists with collective academic experience of more than 50 years. Prof. Griffiths has also published more than a dozen research papers on the biology and fisheries of local fish species, including sharks. He has also supervised several theses on this topic, including two current studies on the population biology of Great White Sharks. The team is this well familiar with the literature, and ongoing studies, on this topic.

The specialist team recognize the importance of this area for Great white sharks (GWS), but would contest the assertion that 'the majority of South African GWS depend on the Dyer island area'. Not only are GWS highly mobile, both within the region and across its borders, but reliable population estimates are not yet available (although several researchers are currently working on such population models). GWS may be sensitive to temperature, but the area of elevated temperature predicted to result from this development is tiny and will not extend to the Dyer Island site, so is highly unlikely to adversely effect this highly-mobile, wide-ranging species

### **Comment 63:**

#### **3.3.4 Abalone**

##### ***Abalone model***

Again as mentioned in the first submission by DICT it is highly doubtful how much the abalone stock with (sic) in the protected zone will actually benefit from this "protection".

### **Response 63:**

Your comment is noted. The authors of the Marine Ecology Assessment themselves express doubt about the efficacy of the protection, since policing of the area would continue to be the responsibility of the South African Police Service, which in under-resourced with respect to abalone poaching. The

Marine Ecology Assessment therefore states that "... the level of organised crime associated with abalone poaching in this region has resulted in this practice occurring relatively unchecked, despite the best effort of the police. As such the degree of benefit derived by abalone populations remains unclear".

**Comment 64:**

The design of the cofferdam is not specified and it is important to verify, the size of the dry area within the cofferdam and how much of the abalone in the vicinity will be impacted. DICT request information about the size of the abalone occupied area that will be displaced by the cofferdam.

According to the specialist 17--26% of all zooplankton die off when entrained with the cooling water. In a relatively small area as the specialist refer to as the protected zone (1kmx800m) the gametes of the "protected abalone" will be sucked in with the cooling water, which will have an effect on the "protected stock". The effluent chlorine might also have an impact on the gametes of the abalone.

In the EIA it is argued that it is not possible to establish a model for the population in the area. DICT is questioning how it is then possible to prove if the protected zone actually benefits the abalone stock. A baseline of the current situation must be provided.

A monitoring programme during the construction, operational and final phase, must be presented.

**Response 64:**

The actual coffer dam size will be dependent on the actual channel design and size. This cannot be concluded without a final design. However, the environmental sensitivity study for the marine biology impact considered the most severe impact in the construction process.

Please provide a reference for the statement that "the AA argues that it is not possible to establish a model for the population in the area". As indicated in the Marine Ecology Assessment (Appendix E15 of the Revised Draft EIR Version 1) and in the Revised Draft EIR, the potential for protection of abalone is based on the declaration of marine exclusion zone, which is required in terms of the National Key Points Act, 1980 (Act No. 102 of 1980). The exclusion zone will definitely be required along the length of the Eskom property if it does become a nuclear power station site. The establishment of the exclusion zone (if the site does become a power station site) is therefore a *fait accompli*.

It cannot be proven that the zone will result in real benefits to abalone. As indicated in Response 62, the Marine Ecology Assessment itself has little confidence in the protection that the South African Police Service will be able to provide to abalone given the brazenness that poaching has reached. The effectiveness of the exclusion zone will be entirely determined by the policing of this zone.

It is agreed that monitoring of abalone must take place at Bantamsklip, should this site be developed.

**Comment 65:**

**3.3.5 Cape fur seals**

***Cape fur seals***

DICT agree with the "EIA" that the population of cape fur seals are doing very well and that this species is not endangered.

DICT does encourage Arcus GIBB to consult Dr. Steve Kirkman from Ocean & Coast to obtain information about the fur seals behaviour and distribution in the area. Dr. Kirkman has tagged mothers and pups and studied the colony extensively. He will be able to advise Arcus GIBB concerning the status and potential impacts of the colony.

**Response 65:**

Your comment is noted with thanks.

**Comment 66:**

**3.3.6 More research needed**

The establishment of an NPS will provide permanent changes in the present marine habitat, due to several factors such as increases in temperature, sediment, contamination and noise.

DICT stresses that more research must be carried out prior to the construction of the NPS. This research must provide data on the present distribution of fish populations, foraging penguins, sharks, seals and cetaceans in the impacted area. Potential habitat changes could lead to fish populations abandoning the area, which would be likely to change the behaviour of the predators in the area.

**Response 66:**

Your comment is noted. The marine specialist team is confident that the information at its disposal provides it with a sufficient basis on which to assess the potential impacts on marine life at the Bantamsklip site.

It is to be noted, as indicated in several responses above, that the assessment of marine impacts at all three sites is based on long-term monitoring of impacts that has taken place at the KNPS over more than two decades. Catastrophic impacts at the KNPS were predicted by many interested parties prior to the KNPS's construction, but in fact never occurred. For instance, as indicated in the Marine Ecology Assessment, the establishment of warm-water species at the KNPS was predicted, but has never occurred. Many lessons have been learnt from the KNPS experience, resulting in completely different designs for Nuclear-1 that will further reduce the environmental impact. For instance, the outlet of the KNPS's warmed cooling water is nearshore and at surface, whilst the recommended alternative for Nuclear-1 is an offshore release below surface with release points designed to dissipate the warm water as quickly as possible.

**Comment 67:**

**4 IMPACTS ON TOURISM**

***Marine tourism***

DICT are still concerned about the impact on marine tourism, primarily because this unique form of tourism provides a platform for introducing the general public to conservation issues surrounding great white sharks and cetaceans.

Aside from the obvious negative impact of the NPS on local marine life, the presence of a NPS is likely to deter many tourists from visiting this area, which will impact directly on the local economy. This may result in compensation claims from local business owners that are reliant on tourism.

### **Response 67:**

Your comments are noted. The EIA team is aware of the reliance of towns around Bantamsklip on marine-based tourism, particularly shark cage diving. Whilst short-term impacts on nature-based tourism may occur, particularly during the construction phase, the experience of the nature reserve around Koeberg shows that eco-tourists are not detracted by the presence of a nuclear power station. The presence of the KNPS has produced no long-term impacts on tourism in the Cape Metropole. On the contrary, the Koeberg Nature Reserve itself has become a tourism and recreational attraction.

The potential impacts on Nuclear-1 on the tourism market around Bantamsklip are discussed in Section 4.1.3 of the Tourism Impact Assessment (Appendix E22 of the Revised Draft EIR). This report concludes that shark cage diving is unlikely to be affected and that Nuclear-1 would directly affect approximately 10% of current whale watching activities, which would then have to move to the larger area. An even lesser impact is possible if Eskom is successful in applying (as it has indicated to the authors that it intends doing) for permission to allow access for whale-watching trips.

Although nature-based tourism may be negatively affected, the overall potential impact on bed-nights around Bantamsklip is predicted to be positive, given the increase in business-based tourism caused by an influx of construction and operational personnel.

### **Comment 68:**

#### **4.1 SHARK CAGE DIVING AND WHALE WATCHING**

DICT refer to the first Letter of concern for detailed description of the shark cage diving and whale watching tourism in the area.

DICT is highly concerned about the nature experience of tens of thousands of tourists visiting the area each year.

Tourists who care about nature conservation and who may question the South African Governments' capability to protecting the fragile environment. Tourists that travel to Kleinbaai to go shark Cage diving, whale watching, leisure fishing or for recreation, expect to experience a unique nature experience. But the impacts of NPS will in addition to changing the marine environment also have severe impacts on the visual experience. The nature that the visitors will experience will simply be ruined by the physical presence of the NPS.

### **Response 68:**

Your comment is noted. Please refer to Response 66.

It is acknowledged that there may be short-term impacts on the sense of place, particularly during construction, but that in the long-term (as is the case with the KNPS), surrounding tourism-based economies will evolve into a longer-term integration of mutual proximity and acclimatisation to the presence of a nuclear power station.

### **Comment 69:**

#### ***Shark Cage Diving***

The area is a world known for its Shark Cage Diving, which is a main tourist activity in South Africa. The area around Dyer Island and the shallow waters of Joubertsdam are one of the most popular areas in South Africa used for Shark Cage Diving.

The overall impact of visitors traveling to South Africa specifically to experience Shark Cage Diving is estimated at a staggering R2 Billion per year. It is stated in the MEIS that viewing of GWS<sup>3</sup> might be affected for a few days. Please provide reference documents supporting this statement as we know of no such studies carried out in this area.

**Response 69:**

The prediction of impact on shark cage diving due to increase turbidity is based on the oceanographic modeling in Appendix E16 of the Revised Draft EIR Version 1.

**Comment 70:**

***Whale watching***

It is stated in the "EIA" that whale watching boats are likely to be given permission to enter the exclusive zone. This aside, the visual impact of the NPS during and after construction will have a negative impact on the whale watching tour.

**Response 70:**

Your comment is noted. The Tourism Impact Assessment (Appendix E22 of the Revised Draft EIR Version 1) does indicate that the potential impact on visual amenity enjoyed by tourists at Bantamsklip would be high without mitigation and medium with mitigation.

**Comment 71:**

**5 RECOMMENDATIONS**

1. Argus GIBB to respond in full to all points raised in Sections 2, 3 and 4.

**Response 71:**

Please refer to our responses above.

**Comment 72:**

2. More research concerning the Great White shark and the fish species in the area.

**Response 72:**

Please see our responses above.

**Comment 73:**

3. More research concerning the cetacean species in the area.

**Response 73:**

Please see our responses above.

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<sup>3</sup> Presumably an acronym for Great White Sharks

**Comment 74:**

4. The DICT want to be provided with the BOD and demand a new Marine Environmental Assessments to be provided based on the actual design of the Nuclear power station.

**Response 74:**

In the absence of a definition of the term BOD it is impossible to respond to this comment.

**Comment 75:**

5. All documents referenced by Arcus GIBBs and those within the MEIS to be made available for public scrutiny.

**Response 75:**

All relevant documents have been made available on the website:

<http://projects.gibb.co.za/en-us/projects/eskomnuclear1reviseddrafteir.aspx>

**Comment 76:**

6. Request information on the process that reviewed and dismissed alternative technologies such as cooling towers, drilling pipe lines from sea shore and ultra violet light.

**Response 76:**

The cooling towers (especially dry cooling towers) are used in water starved regions. The choice of coastal sites was primarily linked to the volumes of cooling water required and the sea was seen as that source. Cooling towers would alter the environment drastically during construction and in the final outlook of the landscape. The only cooling towers considered are the smaller ones which would be an alternative/backup cooling system in case of loss of the sea. These are orders of magnitude smaller and would not be for keeping the plant at power, but for supporting the safety systems. Use of other non-industry standard biofouling prevention techniques would be considered over plant life as the nuclear industry's strength is that of continuous improvement.

As indicated in the above-mentioned responses, the intake cooling water pipelines will be drilled below the seabed.

**Comment 77:**

7. Information concerning ultra violet light used to cleanse intake water for settling organisms.

**Response 77:**

Please refer to Response 76.

**Comment 78:**

8. Information about the amount of water intake from the ocean using cooling towers compared to the amount of water used when the NPS is based solely on water intake from the ocean.

### **Response 78:**

The heat exchange process in cooling towers will require substantially more water to be used to make up. This is to replace the water that is lost as steam that is generally observed from a cooling tower.

#### General Response

Please note that as per Chapter 5 of the Revised Draft EIR (Version 2). With the completion and subsequent approval of the Scoping report in 2008, the intention was to conduct a detailed assessment of three alternative sites for Nuclear 1 namely Duynefontein, Bantamsklip and Thyspunt. All three sites have been investigated in equivalent detail subsequently as part of the assessment phase of the EIA. In those investigations it has become clear that while Bantamsklip remains a viable site for a nuclear power station, it is the least favourable of the three sites for Nuclear 1. Given that the detailed assessment of Bantamsklip has already been presented in the public domain as part of earlier drafts of the Environmental Impact Report, the decision has been made to exclude Bantamsklip from further consideration in this EIR in the interests of brevity.

The three primary reasons for excluding Bantamsklip at this point relate to transportation risks, urban planning and the level of assessment available to the Nuclear-1 EIA team on the transmission lines that will be required to evacuate power from the operational power station. In respect of transportation, the route between Cape Town Harbour and Bantamsklip is both longer and topographically more complex, with the need to traverse Sir Lowry's pass being particularly challenging, in comparison to the access routes to the other two sites. This route therefore poses major technical difficulties to heavy load transportation vehicles and thus has a greater associated safety risk (to other road users and transportation staff) than the other routes. There are also significant bridge obstructions and steep grades along this route, which are not present along the routes that would service the other two sites.

The second reason is based on an urban planning perspective. All three sites were considered and investigated by the Urban Town Planners (Appendix E34). The sites were ranked and scored in terms of development criteria for a Nuclear Power Station, in which the Bantamsklip site scored the lowest. The scoring is influenced by the limited workforce available in close proximity to the site which is a challenge experienced on the Bantamsklip site as compared to Duynefontein or Thyspunt. This shows that the site is currently not the best choice for Nuclear-1 from an urban planning perspective.

The third reason is because there is a direct obligation (as required by the EIA regulations) to assess the full suite of impacts that would be associated with not just the nuclear power station but associated infrastructure too. A large-scale associated facility is of course the transmission lines that would be needed to supply power during the construction phase, but also to evacuate power from the operational power station. For both Duynefontein and Thyspunt, detailed assessments of the power lines are available to the EIA team but not yet for Bantamsklip. The detailed environmental assessments conducted for Thyspunt and Duynefontein have been taken into consideration with the impact assessment for these sites, giving effect to cumulative impact assessment as shown in Chapter 10. Due to the fact that similar information is not available for Bantamsklip, the EIA team cannot sufficiently assess the cumulative impact for the Bantamsklip site. As such it is simply not possible currently to provide an adequately comparative assessment between the three sites.

The EIA team is confident that excluding Bantamsklip from this EIR does not undermine the obligation to thoroughly investigate alternatives or disqualify the site for future nuclear use. The inclusion of the Bantamsklip site would add significant further complexity to an already complex EIR without improving decision-making in any material way. The Bantamsklip site will therefore not be further considered in this EIR. Readers interested in the previous assessment of the Bantamsklip site can access the information at <http://projects.gibb.co.za/Projects/Eskom-Nuclear-1-Revised-Draft-EIR>.



With the above said readers should be cautioned that this does not mean that Bantamsklip can never be considered for a future Nuclear Power Station. The site is not fatally flawed as per the assessments previously conducted; however with the challenges mentioned above Bantamsklip will not be ready to meet the construction timeframe anticipated for Nuclear-1, and as such will not be further considered for this EIA.

Yours faithfully  
for GIBB (Pty) Ltd

A handwritten signature in black ink, appearing to be a stylized 'E' or similar character, followed by a horizontal line that loops back to the left.

The Nuclear-1 Team