

# 1 FINAL PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT FOR ESKOM'S PROPOSED NUCLEAR-1 – SEPTEMBER 2009

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## 1.1 Introduction

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The Plan of Study for Environmental Impact Assessment (EIA) (referred to as Plan of Study) forms part of the Scoping Phase of the environmental authorisation process as depicted in **Figure 1**. The Plan of Study for EIA outlines the manner in which the detailed impact assessment phase will be undertaken. In accordance with the EIA Regulations promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA)<sup>1</sup>, the Plan of Study for the EIA is required to provide the following:

- A description of the tasks that will be undertaken as part of the detailed impact assessment process, including any specialist reports or specialised processes, and the manner in which such tasks will be undertaken;
- An indication of the stages at which the competent authority will be consulted;
- A description of the proposed method of assessing the environmental issues and alternatives, including the option of not proceeding with the activity;
- Details of the Public Participation Process (PPP) that will be undertaken during the detailed impact assessment process; and
- Any specific information required by the competent authority.

The original Plan of Study for EIA was submitted to the Department of Environmental Affairs<sup>2</sup> (DEAT) in July 2008 for review and approval in conjunction with the Final Scoping Report. In a letter dated 19 November 2008 (**Appendix 1**), the then DEAT (now the Department of Environmental Affairs – DEA) approved of the Final Scoping Report in accordance with regulation 31(1)(a) of the EIA Regulations. Section 31(1)(b) of the EIA Regulations states that the competent authority must consider the report and in writing, “*request the EAP to make such amendments to the report or the plan of study for environmental impact assessment as the competent authority may require*”. Accordingly, the DEA requested that the Plan of Study for EIA be revised. The Plan of Study for EIA was revised accordingly, whereby the DEA’s comments were incorporated into the revised document. The Revised Plan of Study was placed in the public domain for a period of 30 days (from 11 May to 09 June 2009) for Interested and Affected Parties (I&APs) to review the document and provide comments. These comments, and the responses, have been recorded in an Issues and Responses Report (**Appendix 3**) and have been incorporated into the Final Plan of Study.

In addition, in this particular instance, the Final Plan of Study for EIA serves as a mechanism to communicate that Eskom Holdings Limited (Eskom), the proposed project proponent, intends to amend the original application for environmental authorisation submitted to the the DEA in May 2007, and amended again in July 2008. The intended changes pertain to Eskom’s decision to pursue their strategy to develop a fleet of Nuclear Power Stations (NPSs), on the sites identified through the Nuclear Site Investigation Programme (NSIP) undertaken during the 1980s. It is Eskom’s intention that the amended application comprise of a combined application

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<sup>1</sup> Regulation 29 of Government Notice R.385 (as amended), promulgated in terms of sections 24 of the National Environmental Management Act, 1998 (Act No. 107 of 1998)

<sup>2</sup> Previously the Department of Environmental Affairs and Tourism (DEAT). DEAT changed their name to the Department of Environmental Affairs (DEA) in July 2009. All previous reference to DEAT has been changed to DEA throughout this document.

for environmental authorisation to develop three NPSs on all three sites regarded as suitable for further consideration during the detailed Impact Assessment Phase of the environmental authorisation process. The intended changes are discussed further in **Section 2**.

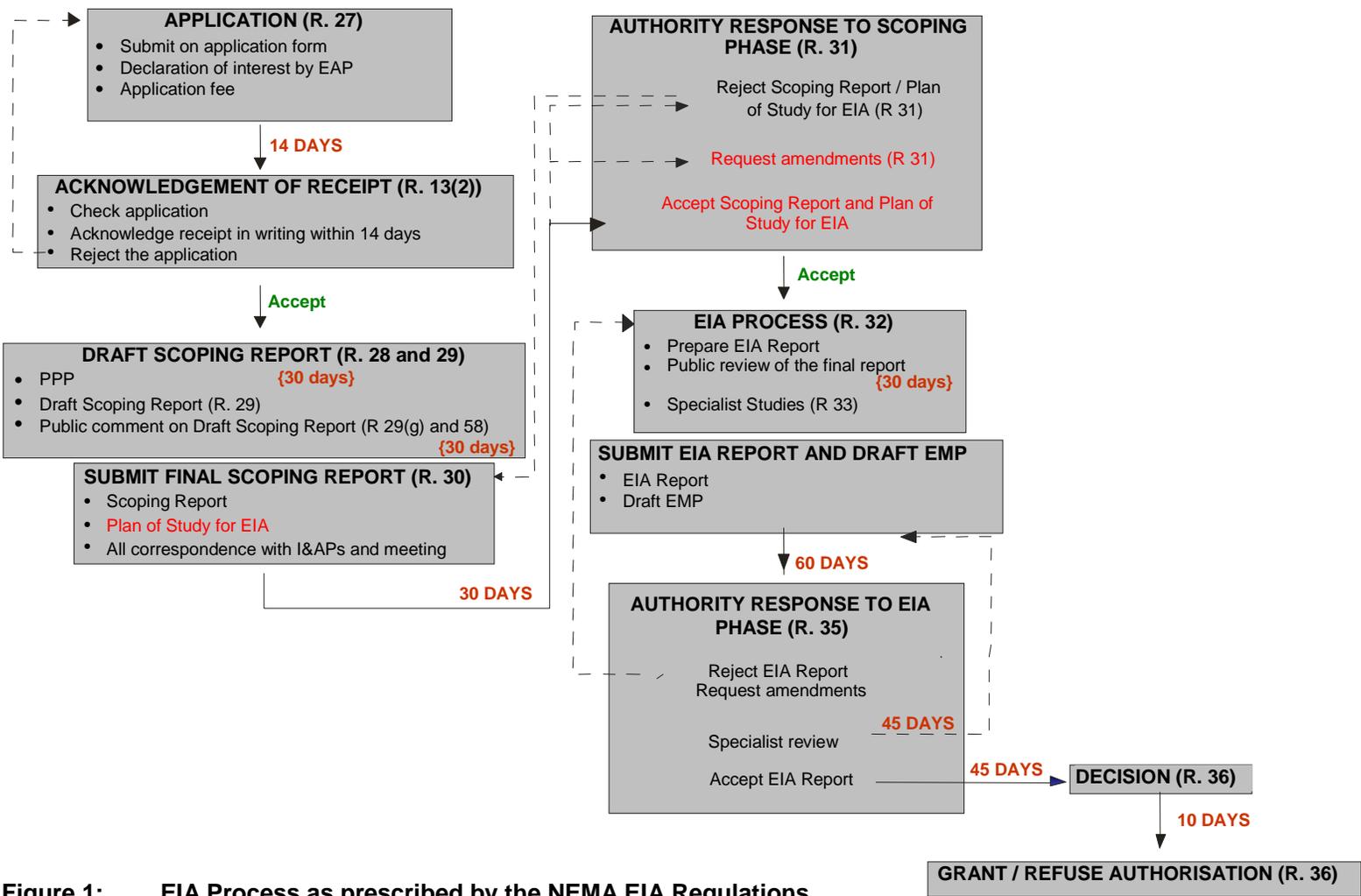


Figure 1: EIA Process as prescribed by the NEMA EIA Regulations

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## 1.2 Purpose of the Final Plan of Study for EIA

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The Final Plan of Study for the EIA Report outlines the process to be followed for the remainder of the EIA. The purpose of the Final Plan of Study for EIA is as follows:

1. Provide a summary of the key findings of the Scoping Phase of the environmental authorisation process;
2. Describe the activities to be undertaken during the detailed Impact Assessment Phase of the environmental authorisation process. The detailed assessment phase of the EIA process entails the integration of the specialist studies to form a comprehensive impact assessment report. Relevant mitigation measures will be used to compile an Environmental Management Plan (EMP). In addition, this section provides specific terms of reference and impact assessment methodology for utilisation by the specialist team;
3. Outline the remainder of the Public Participation Process (PPP); and
4. Communicate to I&APs Eskom's intended changes regarding the combined application for environmental authorisation to develop a NPS on each of the three sites investigated during the detailed Impact Assessment Phase of this environmental authorisation process.

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## 2 AMENDMENT TO THE APPLICATION FOR ENVIRONMENTAL AUTHORISATION

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### 2.1 Original Application for a single Nuclear Power Station

The original application<sup>3</sup> submitted to the the DEA in May 2007, and the amended application dated July 2008, was an application to commence with an EIA process for the proposed construction, operation and decommissioning of a single NPS, referred to as Nuclear-1. During the Scoping Phase of the environmental authorisation process, five sites were assessed as alternative sites and were compared in order to identify a single preferred site for the location of Nuclear-1.

The Scoping Phase of the EIA highlighted that two sites i.e. Brazil and Schulpfontein, would not constitute reasonable and/or feasible site alternatives for Nuclear-1 based on severe time constraints associated with Nuclear-1's development, coupled with the limited local demand and the lack of existing power corridors associated with the afore-mentioned sites. Eskom Transmission Planning Division performed high level studies of the integration into the South African electricity supply system of a large power station at each of the five coastal sites. These studies included an assessment of the contribution to the transmission network stability, the contribution of the electricity supply to and the distance from the major load centres, the amount of transmission infrastructure that would have to be constructed and the time required for the integration at each of the respective sites. These studies indicated that the Brazil and Schulpfontein sites were not feasible alternatives for the proposed nuclear power stations.

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<sup>3</sup> The submission of an application to the competent authority is the first step in the EIA process. The application is made in order to register the project with the competent authority and obtain permission to proceed with the Scoping and Detailed Impact Assessment phases of the EIA process.

Thus, Brazil and Schulpfontein were excluded from further consideration during the detailed Impact Assessment Phase of the environmental authorisation process, for the development of Nuclear-1. However, the Scoping Report explicitly stated that the exclusion of Brazil and Schulpfontein from the detailed Impact Assessment Phase of this environmental authorisation process did not preclude Brazil and Schulpfontein from the development of NPSs in future.

The DEA's comments on the Final Scoping Report, received on the 19 November 2008 (Appendix 1) provided approval of the recommendation to exclude Brazil and Schulpfontein from further assessment during the detailed Impact Assessment Phase of the environmental authorisation process.

## **2.2 Combined Applications for three Nuclear Power Stations**

Since the amended application was sent to the DEA in July 2008, the amended EIA Regulations under the National Environmental Management Act, 1998 (Act No. 107 of 1998) have been published in Government Notice 165 of 2009 and circulated for public comment. It is expected that the amended EIA Regulations will be promulgated, with or without changes, in the later part of 2009.

Section 15 (2) of the proposed amendments to the EIA regulations states that *"If an applicant intends undertaking more than one activity of the same type at different locations within the area of jurisdiction of the competent authority, different applications in respect of the locations must be submitted, but the competent authority may, at the written request of the applicant, grant permission for the submission of a single application in respect of all those activities, whether or not the application is submitted on one or more applications forms."*

It is thus Eskom's intention, that if and when the amended EIA Regulations are promulgated, and in the event that the DEA accepts Eskom's request to do so, Eskom will submit a revised application to the DEA. Furthermore, it is Eskom's intention that the revised application will comprise a combined application for environmental authorisation to sequentially develop nuclear power stations at the three sites identified as feasible and reasonable alternatives during the Scoping Phase of the EIA. The capacity of each proposed nuclear power station remains 4 000 Mega Watts (MWs). Thus, Eskom proposes to develop a NPS at each of the three sites, namely Duynefontein; Bantamsklip and Thyspunt. The amendment to the application that Eskom intends to submit to the DEA entails the inclusion of Nuclear-2 and Nuclear-3 for development on the sites considered worthy of further consideration during the detailed impact assessment phase of the environmental authorisation process. It was explicitly stated, from the onset of the project, that all original five sites identified during the NSIP will be considered for the development of NPSs in future as part of the long-term power generation strategy for South Africa.

In a meeting held with the DEA on the 13 February 2009, the DEA supported the submission of a revised application, in the event of the promulgation of the amended EIA Regulations.

It is Eskom's intention that should the Amended EIA Regulations be promulgated, Eskom will request permission from the DEA to amend the application to reflect a combined application for environmental authorisation to sequentially develop three NPSs on three sites, namely Duynefontein, Bantamsklip and Thyspunt. The three

sites are regarded as suitable for further consideration during the detailed Impact Assessment Phase of the environmental authorisation process to date.

Should the DEA grant the permission for Eskom to submit a revised combined application it is Eskom's intention to proceed with the Impact Assessment Phase of the EIA in terms of Section 15 (3) *"If a competent authority grants permission in terms of subregulation (2), the application must be dealt with as a consolidated process in respect of all the activities covered by the application, but the potential environmental impacts of each activity must be considered in terms of the location where the activity will be undertaken."*

It would be Eskom's intention to apply for environmental authorisation to sequentially construct, operate and decommission NPSs on all three sites whereby the environmental authorisation process will continue as one consolidated process. In the event that the NPSs are authorised, the proposed roll out dates for Nuclear-1; Nuclear-2 and Nuclear-3 are indicated in the **Table 1** below.

**Table 1: Indicative roll out dates of the first three Nuclear Power Stations**

| Item                                | Duration  | Due Date     |
|-------------------------------------|-----------|--------------|
| <b>Nuclear-1</b>                    |           |              |
| Site access and terrace preparation | 18 Months | January 2011 |
| Construction                        | 72 Months | July 2012    |
| Nuclear-1 Commercial Operation Date |           | July 2018    |
| <b>Nuclear-2</b>                    |           |              |
| Site access and terrace preparation | 18 Months | January 2013 |
| Construction                        | 72 Months | July 2014    |
| Nuclear-2 Commercial Operation Date |           | July 2020    |
| <b>Nuclear-3</b>                    |           |              |
| Site access and terrace preparation | 18 Months | January 2015 |
| Construction                        | 72 Months | July 2016    |
| Nuclear-3 Commercial Operation Date |           | July 2022    |

The dates in the above table are only indicative and are based current information. The roll out of the nuclear projects will be determined through the various energy planning processes and relevant government and Eskom approval processes.

The roll out dates of the first three NPSs shown in **Table 1** is as currently expected, based on the national electricity demand forecast, availability of funding and lead times of vendors. It is possible that these dates may shift in future.

### 2.3 Implications for site alternatives

Site alternatives were considered during the Scoping Phase of the environmental authorisation process. However, should the combined application be pursued by Eskom, the sites would no longer be considered as alternatives for the construction of Nuclear-1 alone. Should Eskom be granted the opportunity to pursue a combined application, each of the three sites will be investigated during the detail Impact Assessment Phase of the environmental authorisation process, to a comparable level of detail, for the long-term development of a single NPS at each of the three sites. During the EIA, site alternatives will not be pursued since it is Eskom's intention to sequentially construct NPSs on each of the following sites:

- Duynefontein;

- Bantamsklip; and
- Thyspunt.

Thus, specialists will no longer be required to compare, rank and provide recommendations with respect to a single preferred site. Nevertheless, the detailed Impact Assessment Phase of the EIA process, will evaluate alternative layouts and on site positioning within each of the three sites.

In the event that the amended EIA Regulations are not promulgated in the format that would allow Eskom to pursue a combined application, or in the event that the DEA does not accept Eskom's request to do so, it is Eskom's intention to remain with the current amended application for the proposed Nuclear-1 power station, as previously submitted to the DEA.

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### **3 ENVIRONMENTAL ISSUES IDENTIFIED DURING THE SCOPING PHASE**

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#### **3.1 Potential environmental impacts**

The primary environmental issues identified during the Scoping Phase were determined through a process of analysing the activities associated with the various project components as well as the potential sources of impacts. The initial focus of the Scoping phase was on the site alternatives that existed for location of a single NPS. The specialist investigations entailed desktop analysis; revision of existing information; historical data; consultation with I&APs and various site visits with the EIA team as well as independent site visits undertaken by the specialist team. The site visits were aimed at obtaining a view of the study area, thereby enabling the specialists and the Environmental Assessment Practitioner to conceptualise the study areas.

The issues identified were grouped into broad categories as follows:

- Physical;
- Bio-physical; and
- Socio-economic.

During the detailed Impact Assessment Phase of the EIA, the specialist studies to be undertaken for each of the three sites will need to examine the key impacts in detail. The significance of the impacts will be assessed in the Environmental Impact Report (EIR).

#### **3.2 Key impacts identified to date**

The key potential negative impacts scoped to date are listed below:

- Geological and geotechnical suitability;
- Depth of water table and associated dewatering requirements as well as the repercussions in terms of surrounding water users;
- Source of water supply for operations of the NPS;
- Disturbance and disruption of terrestrial ecological processes such as loss of habitat and associated flora and fauna. The disruption of migration patterns between the coast and inland as well as mobile dunes;

- Marine ecology disturbance through requirements for cooling water, the potential for desalination and activities associated with the disposal of brine;
- Health, safety and security of the site as well as limitations to surrounding land use;
- Changes to community structures through the influx of workers and associated infrastructural requirements;
- Change in tourism activities;
- Visual disturbance;
- Loss of heritage and cultural resources;
- Loss of potential agricultural land;
- Wind generated dust;
- Construction of required facilities and infrastructure associated with accessibility to the site, transport as well as the integration of the generated power into the networks; and
- Waste handling, management and transport.

Positive potential benefits scoped to date include:

- Improved electricity network in the coastal regions and South Africa as a whole, which could stimulate local economic growth and reduce current power shortages;
- Potential establishment of formal conservation areas;
- Significantly lower greenhouse gas emissions when compared with that of coal fired power stations; and
- Direct economic injection to the local economies.

Detailed specialist studies will be undertaken during the Impact Assessment Phase of the environmental authorisation process. The specialist studies will provide an in-depth understanding of the key issues and the potential positive and negative impacts of the proposed development on the social, biophysical and economic environments.

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## 4 DETAILED IMPACT ASSESSMENT PHASE

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### 4.1 Introduction

The purpose of the detailed Impact Assessment Phase of an EIA is as follows (DEA 2005):

- Address issues that were raised during the Scoping Phase;
- Assess various alternatives in a comparative manner;
- Assess all identified impacts and determine the significance of each impact; and
- Formulate mitigation measures.

Numerous acceptable approaches and methodologies exist by which the above objective can be achieved. The legislation in South Africa, including the guideline documents published in support thereof; do not provide a specific methodology for the assessment of impacts. Rather, an assessment framework is provided within which the Environmental Assessment Practitioners are expected to structure a project-specific assessment methodology. This assessment framework recognises that there

are different methodologies available for assessing the impact of a development but that the specific methodology selected must provide for the following (DEA, 2005):

- A clear process for impact identification, prediction and evaluation;
- The specification of impact identification techniques;
- Criteria for evaluating the significance of impacts;
- The design of mitigation measures to address impacts;
- Defining types of impacts (direct, indirect or cumulative); and
- Specification of uncertainties.

This section of the Plan of Study for EIA serves to describe the manner in which the Environmental Assessment Practitioner (EAP) intends to undertake the detailed Impact Assessment Phase of the environmental authorisation process. To ensure consistency in the assessment and allow for meaningful comparison, all the specialists will be required to utilise standard impact assessment methodology as provided to them by the EAP.

## **4.2 Impact Assessment Methodology**

The objective of the assessment of impacts is to identify and assess all the significant impacts that may arise as a result of the NPS. In the detailed Impact Assessment Phase of the EIA, additional impacts will be identified through the various specialist studies to be undertaken and through ongoing I&AP consultation.

In order to assess impacts that relate to more than one element of the environment (e.g. visual quality and land use), certain specialists may require information obtained from other specialists. An integration workshop will be held to ensure that all specialists and the applicant have a common understanding of the receiving environment and issues related to the project are addressed in a synergistic manner. For each of the two main project phases (construction and operation), the existing and potential future impacts and benefits (associated only with the proposed development) should be described using the criteria listed below.

The specialist should identify and list the relevant South African legislation and permit requirements pertaining to the development proposals. He/ she should provide reference to the procedures required to obtain permits and describe whether the development proposals contravene the applicable legislation. In accordance with Government Notice R.385, promulgated in terms of Section 24 of the NEMA and the criteria drawn from the Integrated Environmental Management Guidelines Series, Guideline 5: Assessment of Alternatives and Impacts, published by the the DEA (April 1998) specialists will be required to describe and assess the potential impacts in terms of the following criteria:

### **4.2.1 Nature**

This is an evaluation of the type of effect the construction, operation and management of the proposed NPS development would have on the affected environment. This description should include what will be affected and the manner in which the effect will transpire.

### **4.2.2 Extent**

The specialist must describe whether the impact will be: local (limited to the site and its immediate surroundings); or whether the impact will be at a regional or national scale.

#### **4.2.3 Duration**

The specialist must indicate whether the lifespan of the impact would be short-term (0 - 5 years), medium-term (6 - 10 years), long-term (>10 years) or permanent.

#### **4.2.4 Intensity**

This will be a relative evaluation within the context of all the activities and the other impacts within the framework of the project. Does it destroy the impacted environment, alter its functioning, or render it slightly altered? The specialist study must attempt to quantify the magnitude of the impacts and outline the rationale used.

#### **4.2.5 Consequence**

The consequence of the potential impacts will be determined according to the main criteria for determining the consequence of impacts, namely the extent, duration and intensity of the impacts.

#### **4.2.6 Probability of occurrence**

The specialist should describe the probability of the impact actually occurring and should be described as improbable (low likelihood), probable (distinct possibility), highly probable (most likely) or definite (impact will occur regardless of any prevention measures).

#### **4.2.7 Significance**

The overall significance of the impacts will be defined based on the result of a combination of the consequence rating and the probability rating, as defined above. The significance defines the level to which the impact will influence the proposed development and/or environment in any way. It determines whether mitigation measures need to be identified and implemented or whether the resource is irreplaceable and/or the activity has an irreversible impact.

#### **4.2.8 Cumulative**

Incremental impacts of the activity and other past, present and future activities on a common resource.

#### **4.2.9 Reversibility**

The ability of the impacted environment to return to its pre-impacted state once the cause of the impact has been removed and associated timeframes.

#### **4.2.10 Irreplaceability**

The degree to which, an environmental aspect can be replaced, if at all.

#### **4.2.11 Mitigation measures**

The development of mitigation measures in order to reduce and prevent the significance of the impact. Mitigation measures are discussed further in **Section 4.4.3**.

#### **4.2.12 Degree of confidence in predictions**

The specialist must state the degree of confidence (low, medium or high) there is in the predictions made for each impact, based on the available information and level of knowledge and expertise as well as the associated implications.

#### **4.2.13 Summary of the criteria and rating scales**

**Table 2** provides a summary of the criteria and the rating scales, which will be used. The assignment of ratings will be undertaken based on past experience of the EIA Team, the professional judgement of the specialists as well as through desktop and

field based research. Subsequently, mitigation measures will be identified and considered for each impact and the assessment repeated in order to determine the significance of the residual impacts (the impact remaining after the mitigation measure has been implemented). The criteria that will be used to determine the significance of the residual impacts will include the following:

- Probability of the mitigation measure being implemented; and
- Extent to which the mitigation measure will impact upon the assessment criteria in **Table 2**.

The result of the above assessment methodology will be linked to authority decision-making by Authorities in the following manner:

- Low – will not have an influence on the decision to proceed with the proposed project, provided that the recommended mitigation measures to mitigate impacts are implemented;
- Medium – should influence the decision to proceed with the proposed project, provided that the recommended measures to mitigate impacts are implemented; and
- High – would strongly influence the decision to proceed with the proposed project regardless of the mitigation measures.

**Table 2: Impact assessment criteria and rating scales**

| <b>Criteria</b>   | <b>Rating Scales</b>  |
|---|---|
| Cumulative impacts (incremental impacts of the activity and other past, present and future activities on a common resource) | <ul style="list-style-type: none"> <li>• Low (there is still significant capacity of the environmental resources within the geographic area to respond to change and withstand further stress)</li> <li>• Medium (the capacity of the environmental resources within the geographic area to respond to change and withstand further stress is reduced)</li> <li>• High (the capacity of the environmental resources within the geographic area to respond to change and withstand further stress has been or is close to being exceeded)</li> </ul>   |
| Nature  | <ul style="list-style-type: none"> <li>• Positive</li> <li>• Neutral</li> <li>• Negative</li> </ul>   |
| Extent (the spatial limit of the impact)  | <ul style="list-style-type: none"> <li>• Local (site-specific and/or immediate surrounding areas)</li> <li>• Regional (Western Cape)</li> <li>• National or beyond</li> </ul>   |
| Intensity (the severity of the impact)  | <ul style="list-style-type: none"> <li>• Low - where the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected</li> <li>• Medium - where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</li> <li>• High - where natural, cultural or social functions and processes are altered to the extent that it will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected</li> </ul> |
| Duration (the predicted lifetime of the impact)   | <ul style="list-style-type: none"> <li>• Short-term (0 to 5 years)</li> <li>• Medium term (6 to 15 years)</li> <li>• Long term (16 to 30 years) - where the impact will cease after the operational life of the activity either because of natural processes or by human intervention</li> <li>• Permanent – the impact will persist indefinitely based on current knowledge and technology</li> </ul>  |
| Probability (the likelihood of the  | <ul style="list-style-type: none"> <li>• Improbable – where the possibility of the impact occurring is very</li> </ul>  |

| <b>Criteria</b>   | <b>Rating Scales</b>  |
|---|---|
| impact occurring)   | <ul style="list-style-type: none"> <li>low</li> <li>• Probable – where there is a good possibility (&lt;50% chance) that the impact will occur</li> <li>• Highly probable – where it is most likely (50-90% chance) that the impact will occur</li> <li>• Definite – where the impact will occur regardless of any preventative measures (&gt;90% chance of occurring)</li> </ul>   |
| Reversibility (ability of the impacted environment to return to its pre-impacted state once the cause of the impact has been removed) | <ul style="list-style-type: none"> <li>• High (impacted natural, cultural or social functions and processes will return to their pre-impacted state within the short-term)</li> <li>• Medium (impacted natural, cultural or social functions and processes will return to their pre-impacted state within the medium term)</li> <li>• Low (impacted natural, cultural or social functions and processes will never return to their pre-impacted state)</li> </ul> |
| Impact on irreplaceable <sup>4</sup> resources (is an irreplaceable resource impacted upon)   | <ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>   |
| Confidence level (the specialist's degree of confidence in the predictions and/or the information on which it is based)               | <ul style="list-style-type: none"> <li>• Low</li> <li>• Medium</li> <li>• High</li> </ul>   |

**Table 3: Convention for assigning significance ratings**

| <b>Consequence Rating</b>    | <b>Intensity, Extent and Duration Ratings</b>  |
|------------------------------|--|
| <b>HIGH</b><br>Consequence   | <ul style="list-style-type: none"> <li>• <b>High intensity</b> at a <b>national level</b> and endure <b>permanently</b></li> <li>• <b>High intensity</b> at a <b>national level</b> and endure in the <b>long term</b></li> <li>• <b>High intensity</b> at a <b>national level</b> and endure in the <b>medium term</b></li> <li>• <b>High intensity</b> at a <b>national level</b> and endure in the <b>short term</b></li> <li>• <b>High intensity</b> at a <b>regional level</b> and endure <b>permanently</b></li> <li>• <b>High intensity</b> at a <b>regional level</b> and endure in the <b>long term</b></li> <li>• <b>High intensity</b> at a <b>regional level</b> and endure in the <b>medium term</b></li> <li>• <b>High intensity</b> at a <b>local level</b> and endure <b>permanently</b></li> <li>• <b>High intensity</b> at a <b>local level</b> and endure in the <b>long term</b></li> <li>• <b>Medium intensity</b> at a <b>national level</b> and endure <b>permanently</b></li> <li>• <b>Medium intensity</b> at a <b>national level</b> and endure in the <b>long term</b></li> <li>• <b>Medium intensity</b> at a <b>national level</b> and endure in the <b>medium term</b></li> <li>• <b>Medium intensity</b> at a <b>regional level</b> and endure <b>permanently</b></li> <li>• <b>Medium intensity</b> at a <b>regional level</b> and endure in the <b>long term</b></li> <li>• <b>Low intensity</b> at a <b>local level</b> and endure <b>permanently</b></li> <li>• <b>Low intensity</b> at a <b>national level</b> and endure in the <b>long term</b></li> </ul> |
| <b>MEDIUM</b><br>Consequence | <ul style="list-style-type: none"> <li>• <b>High intensity</b> at a <b>regional level</b> and endure in the <b>short term</b></li> <li>• <b>High intensity</b> at a <b>local level</b> and endure in the <b>medium term</b></li> <li>• <b>Medium intensity</b> at a <b>national level</b> and endure in the <b>short term</b></li> <li>• <b>Medium intensity</b> at a <b>regional level</b> and endure in the <b>medium term</b></li> <li>• <b>Medium intensity</b> at a <b>local level</b> and endure <b>permanently</b></li> <li>• <b>Medium intensity</b> at a <b>local level</b> and endure in the <b>long term</b></li> <li>• <b>Medium intensity</b> at a <b>local level</b> and endure in the <b>medium term</b></li> <li>• <b>Low intensity</b> at a <b>national level</b> and endure in the <b>medium term</b></li> <li>• <b>Low intensity</b> at a <b>regional level</b> and endure <b>permanently</b></li> <li>• <b>Low intensity</b> at a <b>regional level</b> and endure in the <b>long term</b></li> </ul>  |

<sup>4</sup> A resource for which no reasonable substitute exists, such as Red Data species and their habitat requirements

| <b>Consequence Rating</b> | <b>Intensity, Extent and Duration Ratings</b>  |
|---------------------------|--|
| <b>LOW</b><br>Consequence | <ul style="list-style-type: none"> <li>• <b>High intensity</b> at a <b>local level</b> and endure in the <b>short term</b></li> <li>• <b>Medium intensity</b> at a <b>regional level</b> and endure in the <b>short term</b></li> <li>• <b>Medium intensity</b> at a <b>local level</b> and endure in the <b>short term</b></li> <li>• <b>Low intensity</b> at a <b>national level</b> and endure in the <b>short term</b></li> <li>• <b>Low intensity</b> at a <b>regional level</b> and endure in the <b>medium term</b></li> <li>• <b>Low intensity</b> at a <b>regional level</b> and endure in the <b>short term</b></li> <li>• <b>Low intensity</b> at a <b>local level</b> and endure <b>permanently</b></li> <li>• <b>Low intensity</b> at a <b>local level</b> and endure in the <b>long term</b></li> <li>• <b>Low intensity</b> at a <b>local level</b> and endure in the <b>medium term</b></li> <li>• <b>Low intensity</b> at a <b>local level</b> and endure in the <b>short term</b></li> </ul> |

### 4.3 Public Participation Process during the detailed assessment phase of the environmental authorisation process

The extensive database of stakeholders developed during the scoping process will be used as a basis to ensure that those stakeholders involved in the Scoping Phase also participate in the detailed Impact Assessment Phase. The database will also be expanded to include any further I&APs who wish to be involved in the process. Registered I&APs will be informed of the availability of the Draft Environmental Impact Report (EIR) for review and will be given 60 days to provide their comments.

The comments received after the 60-day review period of the Draft EIR will be incorporated into an updated Issues and Response Report. Further public consultation will occur in the form of Public Open Days and Public, as well as Key Stakeholder Workshops.

The outcome of the proposed PPP will reveal whether or not further public meetings are required. The purpose of the Public Meetings would be to present the findings of the Draft EIA Report and to workshop the sites with the relevant stakeholders and the affected landowners. Registered I&APs will also be invited to this session. Arcus GIBB will use this forum to provide additional background information about the proposed development including the specialist input, and also to provide the stakeholders with the opportunity to further comment on the proposed development.

In the event that the comments reveal information that changes or influences the impact evaluation provided in the Draft EIR, the necessary amendments will be made to the report. The Final EIR will be submitted to the relevant Authorities, subsequent to the second phase of public consultation and simultaneously made available for public review.

#### 4.3.1 Advertising

In line with the EIA Regulations, the commencement of the EIA for the project was advertised in a number of local, regional and national newspapers in both English and Afrikaans, which are the predominant languages spoken in the relevant areas. Advertisements during the detailed assessment phase will follow the same process as that of the Scoping phase. Further advertising will occur during the detailed impact assessment phase and will relate to the availability of the reports for public review and announcement of public open days and public meetings.

### **4.3.2 Key Stakeholder and Public Open Days**

PPP for the detailed Impact Assessment Phase of the environmental authorisation process will be conducted in the form of public open days that will be held at strategically located sites, which will allow for maximum attendance. All public open days will be followed by a public meeting.

### **4.3.3 Interaction with the DEA and Provincial Environmental Departments**

Interaction with the the DEA and the other Provincial environmental Authorities was undertaken during the Scoping Phase and will continue into the detailed Impact Assessment Phase of the EIA. Further interaction will occur in the following manner:

- A consultation meeting with the DEA and the various provincial departments to discuss the findings of the Draft EIR;
- Invitation to the public open days and public meetings, as well as the Key Stakeholder Wokshops;
- Submission of the Final EIR, again following a public review period;
- Ad-hoc meetings, if required; and
- A meeting with the DEA to discuss the findings, recommendations and conclusions reached in the Final EIR.

## **4.4 Specialist Investigations**

An experienced team of specialists (**Table 4**) were identified to provide technical and scientific input in terms of assessing the impacts of the NPS on the environment. Once the specialists have assessed all the impacts, they must provide recommendations on their specific study areas for each of the alternative site layouts.

The specialist studies will focus on discipline-specific problems and examine each significant issue in detail. The following specialists will undertake specialist investigations, of which the results will be incorporated into the EIR.

**Table 4: Specialists Investigations, Team Leaders and their Organisations**

| <b>Discipline</b>            | <b>Specialist Team Leader</b>                          | <b>Organisation</b>               |
|------------------------------|--|-----------------------------------|
| Geology and Seismic Risk     | Urna Hattingh  | Council for Geoscience            |
| Geohydrology                 | Peter Rosewarne  | SRK Consulting                    |
| Geotechnical                 | Urna Hattingh  | Council for Geoscience            |
| Geomorphology                | Werner Illenberger                                     | Independent Consultant            |
| Flora                        | Barrie Low (South Coast)<br>Philip Desmet (West Coast) | Coastec<br>Independent Consultant |
| Fauna (Invertebrates)        | Peter Hawkes   | AfriBugs                          |
| Fauna (Vertebrates)          | James Harrison   | Independent Consultant            |
| Hydrology                    | Peter Rosewarne  | SRK Consulting                    |
| Freshwater Supply            | Peter Rosewarne  | SRK Consulting                    |
| Freshwater Ecology           | Liz Day  | The Freshwater Consulting Group   |
| Oceanography                 | Rhys Giljam  | WSP Environmental Consultants     |
| Marine Biology               | Tammy Robinson<br>Charlie Griffiths                    | University of Cape Town           |
| Air Quality and Climatology  | Lucian Burger  | Airshed Planning Professionals    |
| Social                       | Alewijn Dippenaar                                      | Octagonal Development             |
| Economic                     | Gavin Maasdorp   | Imani Development                 |
| Human Health Risk Assessment | Willie van Niekerk                                     | Infotox                           |
| Agriculture                  | Gavin Maasdorp   | Imani Development                 |
| Noise                        | Adrian Jongens   | Jongens Keet and Associates       |
| Visual                       | Alan Cave  | Bapela Cave Klapwijk              |
| Archaeology and Heritage     | Tim Hart   | University of Cape Town           |
| Tourism                      | Gavin Maasdorp   | Imani Development                 |
| Site Control                 | Peter Rosewarne  | SRK Consulting                    |
| Emergency Response           | Peter Rosewarne  | SRK Consulting                    |
| Transport and Traffic        | Andrew Bulman<br>Nuran Nordien                         | Arcus GIBB                        |

The specialists will outline their proposed methodology. Assumptions and sources of information will clearly be identified. The knowledge of local people will be incorporated in the study. The description of the study approach shall include a short discussion pertaining to the appropriateness of the methods used in the specialist study in terms of local and international trends. The following key components outlined below will form part of each of the specialist reports.

#### **4.4.1 Description of the affected environment**

A description of the affected environment must be provided. The focus of this description must be relevant to the specialist's field of expertise. The specialist must provide an indication of the sensitivity of the affected environment. Sensitivity, in this context, refers to the "ability" of an affected environment to tolerate disturbance, for example, if disturbance of the natural habitat results in the permanent loss of its biodiversity. The affected environment could be categorised as having a "low tolerance" to disturbance and is, therefore, termed a highly sensitive habitat. If, on the other hand, a habitat is able to withstand significant disturbance without a marked impact on its biodiversity, the affected environment could be categorised as having a high tolerance to disturbance (i.e. "low sensitivity" habitat). The specialists will be required to produce sensitivity maps of the sites and/or relevant portions of each site. The specialists will be required to identify 'no-go' areas within the study areas, in order to inform the design of the layout.

The specialists will also be required to consider the effects of climate change on the baseline environment using a prediction scenario as determined by the DEA. Thus, the specialists must infer changes to the baseline environmental resulting from climate change projections for each of the three sites over the next 60 years (as this is the proposed lifespan of the proposed developments).

#### **4.4.2 Impact identification and assessment**

The specialist must make a clear statement, identifying the environmental impacts of the construction, operation and management of the proposed development. As far as possible, the specialist must quantify the suite of potential environmental impacts identified in the study and assess the significance of the impacts according to the criteria set out in **Table 2**. The factors dictating the significance rating must be explained. Each impact will be assessed and rated as per the methodology described in **Section 4.2** above. The impact assessment will provide an evaluation of the significance of each of the three phases of the project (i.e. design, construction and operational phases). The assessment of the data must, where possible, be based on accepted scientific techniques, failing which the specialist must make informed judgements based on his/her professional expertise and experience. In addition, the assessment of impacts must take cognisance of the legal and policy framework in the determination of the significance of the impacts in the EIA Report.

The potential impacts of the decommissioning phase of the proposed project will be assessed as far that is practically possible, given the present available knowledge of future technology, methodology etc. trends, and expected legislation. The impacts and the management thereof will be determined by the selected decommissioned strategy coupled with technological and legislative advancements Arcus GIBB will provide guidelines based on international best

practice and current national and international policy and legislative requirements. 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 the DEA in their letter dated 19 November 2008.

#### **4.4.3 Mitigation and prevention measures**

Feasible and practical mitigation and impact prevention and project optimisation measures should be recommended in order to minimise negative impacts and to enhance the benefits of positive impacts. The mitigation measures should further address the following:

(a) Mitigation objectives: what level of mitigation is being targeted?

For each identified impact, the specialists must provide mitigation objectives, which would result in a measurable reduction of the impact. Where limited knowledge or expertise exists on such mitigation, the specialists must consult with other specialists on the team failing which the specialists must make a judgement call based on his/her professional experience.

(b) Recommended mitigation measures

For each impact the specialist must recommend practicable mitigation actions that can measurably affect the significance rating. The specialist must also identify management actions, which could enhance the condition of the environment. Where no mitigation is considered feasible, this must be stated and reasons provided.

(c) Effectiveness of mitigation measures

The specialist must provide quantifiable standards (performance criteria) for reviewing or tracking the effectiveness of the proposed mitigation actions, where possible, as this will be utilised when drafting the monitoring component of the EMP.

(d) Recommended monitoring and evaluation programme

The specialist is required to recommend an appropriate monitoring and auditing programme, which would be able to track the efficacy of the mitigation objectives. Each environmental impact will be assessed before and after mitigation measures are implemented in order to show how effective or not mitigation will be. The management objectives, design standards etc., which, if achieved, can eliminate, minimise or enhance potential impacts or benefits must, wherever possible, be expressed as measurable targets. National standards or criteria are examples, which can be stated as mitigation objectives.

Once the above objectives are stated, feasible management actions, which can be applied as mitigation, must be provided. A duplicate column in the impact assessment tables should indicate how the application of the proposed mitigation

or management actions has reduced the impact. If the proposed mitigation is of any consequence, it should result in a measurable reduction in impacts (or, where relevant, a measurable benefit).

#### **4.5 Terms of Reference for Specialist Studies**

As per the Integrated Environmental Management guidelines, specialists' terms of reference must be clearly defined and clarified in order to ensure that the specialists have addressed all the issues and topics in an appropriate manner and at an appropriate level of detail. The focus of the investigation will pertain to the proposed sites for the NPSs, however, investigation will also be undertaken along possible access routes during construction, major transport routes for nuclear fuel delivery and waste transportation off site during the operational phase.

Generally, the specialists are required to provide detailed information pertaining to each of the sites in terms of the following:

1. Discussion of relevant policies and frameworks, where applicable;
2. The affected environments (baseline information) as well as inferred changes to the baseline environment considering the effects of climate change;
3. Identification of information gaps, limitations, and additional information required;
4. Description of the anticipated impacts using the impact assessment criteria as defined in **Section 4.2** for the various phases of the project i.e. design, construction, operation;
5. Development of relevant mitigation measures;
6. Specialist will determine the effects of climate change on the proposed development and *vice versa* in terms of their fields of expertise;
7. Utilisation of information from the existing Koeberg NPS in order to determine the cumulative impacts at the Duynefontein site;
8. Assessment of the impacts associated with the desalinisation plant; and
9. Derivation of monitoring and auditing programmes, where necessary.
10. Radioactive waste management will be assessed including the storage on site, quantities produced, disposal, the transport and transport routes. The assessment will be limited to environmental and radiological aspects; and
11. As per section 2.41 of the letter received from the DEA dated 19 November 2008 (**Appendix 1**) all specialist reports must consider climate change considerations in their assessments. In addition to this requirement forming part of the terms of reference for all specialist studies, a study into the estimation of the 1:100 year flood line due to potential flooding from the sea was also compiled. The results of this study will be made available to all specialists and will inform the assessment of impacts related to the proposed development.

An overview of the Specialists' Terms of Reference for each of the various specialist studies is provided below.

#### 4.5.1 Climatology and Air Quality

The appointed specialist will be required to undertake the following:

- Detailed literature survey and information gathering session for all local climate data for the sites and surrounding areas;
- Describe the *status quo* of the climate for the various site alternatives;
- Assess the accuracy of these dispersal patterns;
- Predict likely scenarios in view of projected climatic changes and the associated implications for each site;
- Predict the dispersal of any emissions from the site, under different archetypical large-scale wind fields;
- Model the trajectory of air parcels;
- Provide estimates of the probability of dispersal around each site, which must provide information regarding the expected radius and direction of dispersal;
- Assess current conditions with respect to air quality, population distribution and general atmospheric characteristics, especially prevailing wind directions (including meso- and micro meteorological characteristics of the site and region);
- Review of previously completed reports and other available data;
- Describe local meteorological parameters, important for the prediction of future air pollution impacts;
- Provide a general description of the dispersion potential;
- The above must include the collection of and / or development of parameters that can be justified and used to predict atmospheric dispersion of materials released from the proposed facility;
- Describe the current air quality in the areas;
- List other sources of air pollution that may contribute to the area of impact;
- Identify sensitive receptors (e.g. residential areas) and potential impacts on air from both non-radioactive and radioactive air emissions;
- The receptors to be identified should include ecological (non human) as well as human receptors;
- Establish an emissions inventory, conduct dispersion simulations and health risk impacts;
- Detailed analyses of the atmospheric dispersion potential, current air quality and syntheses of legal and health criteria;
- Assess the contribution of the atmospheric pathway to a human health impact;
- Assess the intensity of the expected impacts, based on existing information along the routes;
- Simulate emissions using approved atmospheric dispersion model/s, which comply with the “Requirements for authorisation submissions involving computer software and evaluation models for safety calculations”;
- Compare non-radioactive air concentrations against the South African standards for criteria pollutants, and to internationally accepted guidelines for non-criteria pollutants;

- Determination of current and future (proposed NPS) compliance to South African legal requirements;
- Address the assumption that insignificant amounts of radionuclides would be released during the decommissioning and closure phases;
- Detailed assessment of the radio-nuclide content of ventings and purgings; decay periods involved; whether or not they could be cumulative; types of radiation predicted; and potential impact on surrounding communities under the strong prevailing wind conditions found in the Thyspunt area; and
- Assessment of potential radionuclide emissions during malfunction or accident, to determine probable time frames and significance of risk. The design-based accident scenarios will be established in consultation with Eskom (in consultation with potential vendors) and the NNR requirements.

#### **4.5.2 Geology and Geotechnical**

The appointed specialist will be required to provide technical advice on the following:

- Expected bedrock geology and soil cover for each site based on a desktop study of available data together with information obtained during site visits for each site;
- Suitable geotechnical conditions for founding;
- Depth to water table;
- Characteristics of overlying soil and sand cover including both physical and chemical properties; and
- Excavatability and the presence of shallow water, together with the presence of active soil layers and any slope stability problems.

#### **4.5.3 Seismology**

The appointed specialist will be required to provide technical advice through a review of the following:

- Analysis and summary of available data using existing seismic activity monitoring results;
- Far-field, trans-Indian Ocean impact predictions from numerical modeling of the next (imminent) Great Sumatran earthquake tsunami (1797/1833 Mentawai source zone);
- Far-field impact predictions from numerical modeling of trans-Atlantic ocean (South Sandwich Trench earthquake/tsunami source); and
- Coastal-zone geomorphology, sedimentology, onland and offshore (continental slope) Quaternary stratigraphy, for palaeo and local tsunami indicators and sources, respectively.

The specialist will also undertake the following:

- Quantitative loss estimation modeling for selected scenario earthquakes;
- Palaeoseismic investigations for identification of possible great prehistoric earthquakes and determination of site susceptibility to liquefaction during severe ground shaking;
- Earthquake frequency-size distributions and statistics;
- Determination of maximum regional magnitude/moment and determination of site susceptibility to liquefaction during severe ground shaking;
- Quantitative loss-estimation modeling for selected scenario earthquakes; and
- Coastal-zone geomorphology, sedimentology, onland and offshore.

#### **4.5.4 Dune Geomorphology**

The appointed specialist will be required to provide an assessment on the following:

- Aspects of groundwater and surface water as far as they have impact on the dunes and proposed 'activities' within the dune areas;
- Dune, wetland and groundwater dynamics in the dunefields with specific investigation into the potential impacts of the proposed infrastructure (including access roads and transmission/ distribution lines) on mobile, unvegetated dunes and interdune wetlands;
- Stability of the fixed, vegetated dunes, with specific investigation into the potential impacts of the proposed infrastructure (including access roads and transmission/ distribution lines) on the fixed, vegetated dunes;
- Potential impacts of the disposal of spoil on the dune systems;
- Potential impacts of climate change on the dune geomorphology and groundwater and surface water dynamics at the sites.
- Consider the various options for the linkage of the NPS with the transmission power lines

#### **4.5.5 Geohydrology**

The specialist undertaking these studies will have to provide an assessment on the following:

- Groundwater occurrence and characteristics;
- Hydrocensus;
- Recharge – discharge;
- Groundwater flow regime / velocities;
- Aquifer parameters, classification and vulnerability and importance of aquifer in regional context;
- Possible use of groundwater for water supply during construction and operation;
- Possibility of groundwater contamination, flooding by groundwater and material degradation due to groundwater attack;

- Effect of withdrawal of groundwater from neighbouring areas on flow of groundwater at site;
- Contaminant transport model to simulate the fate of any contaminants introduced into groundwater systems from operation of the site;
- Trace likely cause-effect pathways to determine all potentially significant direct, indirect and cumulative impacts;
- Does the proposed NPS conform to legislative guidelines (eg. Reserve);
- Potential impact of the proposed development in light of the vision for the area, including water resources and impact on baseline conditions;
- Identify and assess the potential impacts on beneficiaries and losers, with due consideration of downstream beneficiaries;
- Linkages with other specialists; and
- Risks of pollution.

#### 4.5.6 Flora

In terms of the floral assessment, the specialist will be required to describe the following with regard to the floral communities at each of the proposed sites:

- *Status quo* of the natural vegetation communities using GIS desktop and mapping;
- Assess coastline for 100 km using selected sites, to provide context and distinctiveness/ rarity index for each individual site;
- Anticipated environmental impacts on the natural vegetation during the construction and operational phases of the NPS including potential impacts of the proposed desalinisation plant and other associated infrastructure;
- How and if negative environmental impacts may be mitigated;
- Cumulative impacts of this proposed development on the natural vegetation on site;
- Dominant and typical species occurring along the proposed and alternative access routes;
- Threatened, endemic or rare species to the Province that may occur in the study area and their potential to be replanted elsewhere if necessary;
- Invasive or exotic species present in the area;
- Conservation importance of all vegetation communities in context of local, regional and national scales;
- Determine the need for offsets areas and develop the criteria that should be used to identify actual offset areas associated with each site;
- Assess the dune and coastal systems for all sites, including contextual analysis (i.e. regional context); provide a distinctiveness and rarity index for all sites (this includes the mapping of all dune systems and types and classification thereof); and
- Undertake sub-regional soil sampling at representative sites along the coastline, and analyse this material for major soil chemistry and other parameters.
- Consider the various options for the linkage of the NPS with the transmission power lines

#### **4.5.7 Fauna (Vertebrate and Invertebrate)**

The specialist will be required to undertake the following (note the same terms of reference apply to the vertebrate and invertebrate studies):

- Describe the existing and affected environments as well as the faunal communities, including micro habitats, most likely to be impacted;
- Identify and quantify (where possible) impacts (direct and indirect) of the NPS on the faunal communities;
- Address the impact of the proposed NPSs on the large colony of cormorants, which was seen roosting on the shoreline in front of the proposed terrace at the Bantamsklip;
- Assess the potential impacts on fauna and evaluate according to the methodology provided;
- Provide an impact summary table, discussing anticipated impacts both before and after the implementation of mitigation; and
- Describe and discuss the possible cumulative effects of the construction of the NPS.
- Consider the various options for the linkage of the NPS with the transmission power lines
- Take into account the potential impact on the African penguin colony on Dyer Island

#### **4.5.8 Hydrology**

The specialist will be required to provide an assessment on the following:

- Surface water / drainage lines occurrence;
- Surface water characteristics (e.g. perennial – ephemeral, effluent – influent – disconnected);
- Springs occurrence and characteristics;
- Rainfall pattern, frequency, storm events;
- Risk of flooding;
- Water quality;
- Storm water run off;
- Flow direction;
- Sediment transport, potential for erosion;
- Importance of streams in regional context and as water supply source;
- Potential impact of the proposed development in light of the vision for the area, including water resources and impact on baseline conditions;
- Possible use of surface water for water supply during construction and operation;
- Trace likely cause-effect pathways to determine all potentially significant direct, indirect and cumulative impacts;
- Linkages with other specialists; and
- Risks of pollution, particularly of key water resources.

#### **4.5.9 Freshwater Supply**

This study will provide a brief description of the water supply to alternative sites and describe the reticulation system in terms of its location and capacity. An indication of the quality of water supply will be provided.

The following will be assessed as part of the study:

- Local authority supply of fresh water;
- Hydrocensus and potential water yield;
- Community supply;
- The need and desirability of a desalinisation plant; and
- Water analyses.

#### **4.5.10 Wetland Ecosystems**

The freshwater ecosystems specialist will undertake the following:

- Broad-scale identification and assessment of sensitivity, ecological function and conservation importance of any freshwater ecosystems on or associated with the sites;
- Identification of impacts that can be mitigated and those that cannot be mitigated, red-flagging of ecological issues relating to any site that could result in a “high negative significance” (i.e. no go);
- Development of technically feasible mitigation strategies, to address identified impacts as far as possible;
- Detailed investigations would include a qualitative assessment of wetland and riverine macro-invertebrate fauna (identified to as high a taxonomic level as possible) and comment on plant community structure and function (based on botanical information provided by the botanical specialist);
- Provision of appropriate and practical mitigation options that can reduce significant negative impacts of the proposed developments for freshwater ecosystems;
- Provide maps indicating clear demarcation of wetlands;
- Assess the impact of the water extraction on the wetlands; and
- Determine and assess the potential impacts as a result of the construction of a desalinisation plant on each of the proposed sites.
- Consider the various options for the linkage of the NPS with the transmission power lines

#### **4.5.11 Oceanography**

The specialist will be required to undertake the following assessments:

- Physical processes that affect the mean sea level and temperature, coastal currents and productivity;
- Potential for flooding (sea level rise, tsunamis, astronomical tidal levels);
- Potential for the supply of cooling seawater and associated factors and

impacts such as exposure, blockages of and damage to cooling water intake and the outfall structure;

- Possibility of occurrence and mitigation which would be required in the event of storms which may result in the clogging and disruption of up / intake pipelines for seawater;
- Observed and projected water levels (including extremes);
- Tsunami risks;
- Wave height, period and direction (including extremes);
- Inshore and offshore, temporal and spatial variation, surface and sub-surface currents as well as correlations with wind patterns;
- Spatial and temporal variation in sea water temperature, salinity and chemistry (including extremes);
- Hydrographic fluctuations based on climatic changes;
- Spatial and temporal variation in sediment characteristics (physical and chemical);
- Beach surveys and coastline stability;
- Gross and net sediment transport rates;
- Suspended ingress into intake basin and future maintenance requirements;
- Blockage and fouling; and
- Bathymetry.

Model the following:

- Thermal plume dispersion; and
- Geomorphological changes induced by intake and discharge operations

#### **4.5.12 Marine Biology**

The marine specialist will undertake the following:

- Describe the marine environment at each proposed site and describe the potential impact on marine species;
- Identify the most appropriate site for the location of the power station;
- Assess the impact of the proposed NPS on the local marine fauna and flora including mammals such as but not limited to whales, dolphins and great white sharks, as well as specific marine species such as the African Penguin, Cape Fur Seals, Southern Right Whales and Great White Sharks, black mussels and abalone;
- Assess the impact of the proposed NPS on the large colony of comorants seen roosting at the Bantamsklip site;
- The Koeberg site can be assessed based on existing information (i.e. information gathered during the original Koeberg EIA) whilst the other four proposed sites require in depth specialist studies;
- Survey the sandy and rocky shores located in the vicinity of the site as well as the benthic community located in the vicinity of the proposed outlet pipe. The sandy and rocky shore surveys will be undertaken during a spring low tide, while the benthic core samples will not be collected under storm conditions;

- Analyse the surveys to establish biological community composition and diversity as well as to identify and quantify rare, threatened and alien marine species using internationally accepted scientific methods;
- Determine the sea usage adjacent to the sites, including fishing activities. The assessment will include:
  - marine protected areas, endangered and threatened fauna in the coastal zone; and
  - possible future regulatory measures relating to the coastal zone and the aquaculture industry that may be relevant to the proposed nuclear facility;
- Assess the potential impacts of the thermal plume, record the baseline and predict future changes, identify potential impacts of organisms that may affect the cooling water supply and identify mitigation measures;
- Establish predictable consequence of sea-temperature rises on all forms of marine life, with specific reference to the impact on squid spawning grounds, their levels of temperature tolerance, and likely impact on the chokka fishing industry; and
- Assess the potential impacts of the proposed desalinisation plant and other associated infrastructure on the marine environment.
- Consider the proximity of the NPS to Dyer Island
- The effect that liquid effluents containing long life radioactive isotopes like Strontium-90 and Cesium-137 on filter feeding species like black mussels and abalone

#### **4.5.13 Economic**

In order to measure all the economic impacts associated with the construction and operational phases of this project, a partial general macro-economic equilibrium analysis will be performed, based on four Social Accounting Matrices (SAM) as listed below:

- The national SAM for the South African economy developed for 2004 by Conningarth Economists;
- The regional SAM for the Eastern Cape for 2004 developed by Conningarth Economists;
- The regional SAM for the Northern Cape for 2004 developed by Conningarth Economists; and
- The regional SAM for the Western Cape for 2004 developed by the Department of Agriculture in the Western Cape.

As part of the economic study, impact analyses will be undertaken according to the following standard economic performance criteria and the results will be presented under the following headings:

- Employment impact:
  - Skilled labourers;
  - Semi-skilled labourers; and
  - Unskilled labourers.

- Impact on the poor (low-income households);
- Impact on all other households;
- Fiscal impacts;
- Balance of payment impacts;
- Social impacts;
- Land valuation (impact on property values);
- Cost implications of the proposed NPS in relation to other electricity generation activities as indicated in the Long-term Mitigation Scenario document; and
- Efficiency criteria.

The economics report shall focus on the following:

- Skills required to operate a NPS and the opportunities that this may present for educational institutions. Moreover, the capability of South Africa to provide the necessary skills;
- Attraction of new investments;
- Potential health implications to persons who reside and operate in the area of the proposed NPS and how this translates into overall social welfare;
- Accommodation for NPS employees;
- Informal sector (including micro- and small business);
- Distribution of income;
- Rural-urban migration based on job expectations and the associated repercussions in terms of social and infrastructural requirements as well as the economic implications thereof;
- Assessment of the potential impact of the proposed NPS on the wine and cut flower industries in close proximity to the proposed sites;
- Assess the propensity of local and international investors and donors to continue investing and donating funds to eco-tourism and related industries; and
- Local economic development (including potential sterilization of land and associated costs).

The economic impact assessment will assess the economic impact of the proposed NPS on utilisation of the sea in areas located adjacent to proposed sites. The data presented shall be relevant to at least the 100 km annulus, where activities occurring beyond the study area will be noted. The following aspects will form part of the assessment:

- Commercial and informal fisheries (including current and historic records), duration and dates of rights, value of fishery, fish landed (of rights holders), closed season (dates) will be considered;
- Economic implications of exclusion zones for fishing industry;
- Collation of data for the fisheries will include pelagic fisheries, demersal fisheries and inshore fisheries;
- Identification of aquaculture practices that may influence the inshore fisheries sector shall be identified;
- Impact of the NPS on kelp and abalone resources; and

- Identification of fish processing establishments.

Note: Data for any other commercial fishery not specifically listed in the list above must be included.

The economic study shall also consider the following aspects related to civil and industrial installations:

- The distribution of civil installations that include schools, day-care centres, homes, hospitals, prisons and police stations;
- Likely economic impact of disturbance of movement of sea sand in the event of the construction of a harbour at the site;
- The extent and nature of industrial development and other urban infrastructure such as power stations, refineries, coal burning installations, telephone exchanges, water supplies, sewage purification works, shopping and recreational centres; and
- Gas pipelines in the vicinity of the sites and details pertaining to the pipe size, age, operating pressure, depth of burial, location and type of isolation valves, and type of gas or liquid presently carried as well as the possibility of the change in future use of a pipeline.

For each of the above-mentioned categories, projections of the growth of activities that can reasonably be expected based on economic growth projections for these areas shall be given.

#### **4.5.14 Social**

The appointed specialist will be required to undertake the following:

- Obtain census data by enumerator area or smaller (if available) for the 80 km annulus.

Determine the following:

- Demographic profile of the area (number, age, gender etc) (as far as available an historical, current and projected demographic analysis);
- Require accurate demographic figures for peak holiday population of Greater St. Francis area, together with future projections;
- Health and social well-being of people in 80 km annulus;
- Quality of the living environment;
- Social context of how people run their lives and the key factors that affect them on a day-to-day basis;
- Level and state of infrastructure in the area as well as planning compatibility and potential conflict;
- Land use and ownership patterns in the area as well as planning compatibility and potential conflict, as well as potential land sterilization;
- Access to resources; and
- Institutional (including key service institutions), legal, political and equity impacts.

Identify the following:

- Family, community and gender impacts;
- Social trends (historic and current) and driver in the affected area;
- Main transient population nodes (spatial representation);
- Special population groups, i.e. that portion of the population that could be difficult to shelter or vacate, this includes data obtained from places such as hospitals, schools, institutions for mentally or physically handicapped, old age homes and prisons;
- Social initiatives and opportunities;
- Individuals, communities, organization's and institutions who are likely to be affected by the proposed project, with specific emphasis on vulnerable individuals, communities, organization's and institutions and the potential shift from current/ potential other livelihoods and economic activities, and the potential impacts thereof;
- Require up-date of census figures, based on rejection of 2001 census as being inadequately handled, and unprecedented growth over past five years;
- Estimated numbers of sustainable employment opportunities for skilled and semi skilled workers;
- Predict social impact of large-scale, uncontrolled influx of unemployed and unskilled job-seekers; the likelihood of their remaining in informal settlements; the pressures arising on health, educational, housing, police and other services/ social and other infrastructure; and responsibility for mitigation;
- What corporate strategy is to be undertaken in the areas affected by the development of the nuclear power station;
- Institutional arrangements and structures;
- Cultural impacts, beliefs and value systems; and
- Impact on current activities to preserve and protect the environment.

#### 4.5.15 Human Health Risk Assessment

Based on the DEA's comments on the Final Scoping Report, dated 19 November 2008, and subsequent discussions held with the DEA on the 13 February 2009, it was agreed that the human health risk assessment (HHRA) study will continue to form part of the detailed impact assessment phase of the environmental authorisation process because it was communicated to I&APs and key stakeholders as part of the scope. However, based on an agreement between the DEA and the NNR<sup>5</sup>, the study will not be assessed by the DEA and thus the DEA will not make any decisions in this regard. The NNR will be the responsible authority regarding the human health risk assessment. The human health risk assessment requires exposure concentrations of radionuclides and other toxicants, where relevant, determined from separate specialist studies, namely:

- Air dispersion and deposition modeling; and
- Conceptual hydrogeological site and groundwater models and predictions of contaminant concentrations in soil, groundwater and surface water.

All studies will be based on probabilities of exposure as no measurements are possible until the plant is constructed and operational. Experience from Koeberg and internationally, where available, will be utilised.

The specialist will undertake the following:

- Identify potential sources (for release into air and radioactive effluent);
- Explain the impacts on human health (including ;
- Extend predictions of contaminant concentrations to include potential impact on all surrounding areas, including Port Elizabeth;
- Identify the potential contamination of fresh water;
- Radio-nuclide investigation to include ventings and purges with accurate predictions of decay periods, types of radiation, whether cumulative, etc.;
- Characterise radionuclides and levels of contamination; and
- Identify potential pathways of migration;

Assess environmental fate:

- Identify potential receptors;
- Estimate exposure; and
- Quantify holistic health risks through all pathways and routes of exposure.

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<sup>5</sup> Arcus GIBB refers to a document titled "Notification of statement issued by the Department of Environmental Affairs and Tourism regarding the consideration of matters pertaining to nuclear safety in environmental impact assessment processes on nuclear installations", dated 10 February 2009 (**Appendix 2**). The document serves to communicate consensus reached between the DEA and the NNR in terms of stream lining issues relating to radiological issues. One of the main purposes of the engagement between DEA and the NNR was to "prevent unnecessary and unavoidable duplication of effort". According to Section 20 (1) of the National Nuclear Regulator Act, 1999 (Act No. 47 of 1999), no person may site, construct, operate, decontaminate or decommission a nuclear installation without a nuclear installation license. The NNR process applies specifically to issues of nuclear and radiation safety related to the siting, design, construction, operation and decommissioning of nuclear installations. The document refers to a meeting held on the 15 June 2006, whereby it was agreed that nuclear safety, radiation and radiology "are better placed within the regulatory process of the NNRA and that consideration of the same issues in an EIA process will result in unnecessary and avoidable duplication."

Additional issues to be addressed include:

- The reasons for the siting of a nuclear power station at out-of-site and out-of-the-way, naturally pristine sites;
- How this decision will be reviewed and whether it is sustainable in the context of current thinking, legislation, health, and safety risks, and the loss of an environmentally pristine coastal strip;
- The impact that a NPS will have on the effectiveness of the lighthouse at Danger Point, as far as background lighting is concerned. Also the affect on the Quion Point Lighthouse; and
- Quantify holistic health risks through all pathways and routes of exposure including:
  - Explain and investigate the risk to human health resulting from the consumption of seafood, particularly filter feeding species;
  - Investigate and assess nuclear risks associated with ongoing emissions, disasters, decommissioning, transport of nuclear fuel and waste; including possible security threats;
  - Impact of Strontium-90 and Cesium-137 emissions by deposition to land and thus into the human food chain; and
  - Impacts of emissions during normal operations particularly on risks to children of developing cancers in particular leukaemia.
- Hazards of operation to general public and property based on minimum and maximum wind speeds;
- Hazards of operation to environment, *inter alia* land including risks to agricultural land, organic farms, impacts on water bodies above and below ground, impacts on marine and other aquatic life; and
- Detailed analysis of the extent of all levels of radioactive waste that can be expected from such an NPS, in particular how these levels of emissions consistently and dramatically increase as the NPS ages.

#### **4.5.16 Agricultural**

The appointed specialist will be required to undertake the following:

- Determine and map broad soil patterns and associated dominant agricultural potential associated with the sites using the existing digitized 1:250 000 scale land type information (soil, terrain and macroclimate);
- Determine the extent and national importance and potential vulnerability of the dairy, cut flower and wine industries, and of the direct and indirect employment statistics of this sector;
- Determine the probable impact of contamination of water sources on produce;
- Implication of buffer zones on agricultural potential; and
- Assessment of impacts of the proposed NPS and associated infrastructure including the desalinisation plant, and waste emanating from the desalinisation plant on agricultural activities and the development of the relevant mitigation measures.

#### 4.5.17 Noise

The noise study will assess the potential noise impacts relating to the proposed NPS in accordance with procedures contained in the South African National Standard (SANS) 10328 "Methods for environmental noise impact assessments". The noise impacts will be assessed in terms of the following:

- SANS 10103 for "The measurement and rating of environmental noise with respect to land use, health, annoyance and to speech communication";
- Noise Control Regulations of the Environment Conservation Act, 1989 (Act No. 73 of 1989) applicable to the Western Cape Province;
- World Health Organisation Guidelines for Community Noise; and
- World Bank Environmental Guidelines.

The following will be undertaken as part of the noise investigation:

- Identify all noise sources relating to the activities of the plant during construction phase and operation phase that could potentially result in a noise impact at the identified noise sensitive sites.

Determine the following:

- Land use zoning and identify all potential noise sensitive sites that could be impacted upon by activities relating to the operation of the proposed nuclear power plant at each of the proposed sites;
- Existing ambient levels of noise at identified noise sensitive sites by conducting representative sound measurements;
- Acceptable rating level for noise at the identified noise sensitive sites; and
- Sound emission, operating cycle and nature of the sound emission from each of the identified noise sources.

Calculate the following:

- Combined sound power level resulting from the sound emissions of the individual noise sources;
- Expected rating level of sound at the identified noise sensitive sites from the combined sound power level emanating from identified noise sources; and
- Noise impact at identified noise sensitive sites.

Additional tasks:

- Investigate alternative noise mitigation procedures, if required, in collaboration with the design engineers of the plant and estimate the impact of noise upon implementation of such procedures;
- Conduct a full environmental noise impact investigation if decided upon after consultation with I&APs; and
- Explain what studies have been/will be done on the effect of subsonic

vibrations on the structure of limestone which is very porous and fragile. Also investigate and describe the integrity of the limestone to be compromised and whether wildlife would be affected by sub-sonic noise.

#### **4.5.18 Visual**

The specialist will undertake the following:

- Provide information on the size of the NPS and associated infrastructure ; what is it going to look like, and will it be visible from the sea and surroundings;
- Identify elements of particular visual quality that could be affected by the proposed NPS;
- Describe and evaluate the visual impacts of the individual components of the proposed project from identified critical areas and view fields;
- Explain how the “high visual intrusion” of a nuclear reactor fits in with regulations to coastal land-owners and Conservancy members who were not permitted to have electricity poles erected within visibility of the coast;
- Determine the extent of the visibility of the project from surrounding areas; and
- Technical viewsheds based on contour data only.

#### **4.5.19 Heritage**

The appointed specialist will be required to undertake the following:

- Conduct desk-top and field investigations of the area;
- Assess the nature and degree of significance of heritage resources including the mapping of where artifacts are located on each of the sites;
- Establish heritage informants/constraints to guide the development process;
- Provide recommendations for the appropriate heritage management of the positive and negative impacts;
- Identify and consult with the local communities, via their recognised spokesman, with particular regard to archaeological finds along the coast; and
- Establish the cause-effect pathways resulting from the proposed NPS, eg. The closure of access resulting in the loss of traditional patterns of use.

#### **4.5.20 Tourism**

The tourism impact assessment will assess the impact of the proposed NPS on sea usage and the tourism industry adjacent to proposed sites, including:

- Extent and scope of tourism in the area;
- Establish the number of workplaces that will become vacant as a result of a decline in tourism;
- Investigate whether a development of this kind is in line with the regions tourist planning strategies;

- Investigate the probable effect on the tourism economy arising from both routine and accident conditions, on the local, provincial and Garden Route regions;
- Activities and attractions of tourism;
- Assess the impact of the proposed NPS on the Great White Shark and Whale Watching tourism activities;
- Assess the impact of the proposed NPS on the nearby wine regions;
- Seasonal peaks of tourism, if any, and how this affects local infrastructure;
- Current and potential future impacts on the coastal zone and tourism, including off shore areas such as diving and recreational facilities;
- Supply economic consequences values to Social Accounting Matrix and broader economic impact assessment; and
- Description of potential impact, including tourist perceptions of safety.
- Viability of the National, Regional and Local Parks as tourism destinations; and
- The Agulhas Biodiversity Initiative as a unique and successful pilot project

#### **4.5.21 Transport**

Based on the DEA's comments on the Final Scoping Report, dated 19 November 2008, it was agreed that the evacuation times and the emergency planning zones would be determined by Eskom and will form part of the NNR process. The detailed scope of work for the transport study shall be limited to the following:

- Site visit and traffic counts at critical road links in the area of each site under consideration;
- Site access, including access roads and the upgrade of roads associated with these access roads;
- Visual inspection of the routes to the Port and waste storage site;
- Meetings with the Authorities;
- Ranking of sites based on their suitability in terms of transport requirements; and
- Identify transportation, civil and industrial facilities located outside of the owner controlled boundary (OCB) that may affect the feasibility of emergency planning.

The following information must be obtained:

- Air:
  - Aircraft and runway characteristics;
  - Flights over a five year period and regular events;
- Future development proposals for new, extensions and/or closure of airports;
  - Structures and infrastructure serving the airport i.e. runways, hangers, control towers, landing lights;

- Amount and type of fuel (litres) stored on site and frequency of delivery and source;
- Period of operation; and
- Historical accident data shall be recorded including date, type of aircraft, propeller or jet, mass, crash location, place name, distance from the OCB, flight application, private, commercial or training, emergency services, cargo over a 20 year period; and
- Air routes within the 80 km annulus shall be determined.
  
- Road and Rail:
  - Conceptual design of required upgrades for the facility or to improve evacuation times. It should, however, be noted that actual analyses required for evacuation will be determined by the National Nuclear Regulator process;
  - Background (traffic counts) and projected traffic flow;
  - Implication of NPS operation (including routing of heavy vehicles);
  - Discussion of location in terms of access, spacing, sight distance and operational requirements;
  - Calculation of trip generation and heavy vehicle movement frequency;
  - Analysis of the existing and future operational networks;
  - Existing and future projections (5, 10, 50 years) of the transport network;
  - Fuel and radioactive transporting routes;
  - The frequency and type of rail use; and
  - Hazardous materials and products regularly manufactured, stored, used or transported to/from site and within eight km of the site. Statistical data shall be provided in terms of the amounts involved, modes of transportation, frequency of shipment and maximum quantity of hazardous material likely to be processed, stored, or transported at any given time. The applicable toxicity limit for each hazardous product and/or material will be provided.
  
- Harbours and shipping:
  - Ports and harbours (activities, functions, types of vessels, produce, movements, structures and infrastructure, port or harbour control and security, commercial or recreational facility, fuel storage capacities and types of fuel stored);
  - Port/Harbour activity (total tonnage handled per month/per year for a five year period (if available)). Factors or events that may impact on volume handled;
  - Types of produce handled (per ton for imports and exports);
  - National Sea Rescue Institute (locations and activities);
  - Small craft launch facilities: description, location and general usage/types of vessels; and
  - Shipping lanes: Obtain information from the National Ports Authority.

#### **4.5.22 Site Control**

The study will assess various aspects with respect to site control, including the following:

- Site security;
- Access control (ingress and egress of both during construction and operational phases); and
- Owner control areas.

#### **4.5.23 Emergency Response**

The following tasks will be undertaken as part of the emergency response study:

- Address all emergency procedures applicable to both the construction and operational phases;
- Consider evacuation and resources required for effective execution of the emergency responses; and
- An investigation of emergency preparedness in the areas to be affected.

There are a number of separate licensing processes that are required before the construction of the proposed power station can take place. Aspects that form the core of these processes (e.g. safety aspects and radiological aspects) will however be discussed and assessed in this EIA, from an environmental perspective.

### **4.6 Specialist Reviews**

All reports produced during the detailed Impact Assessment Phase of the EIA will be peer reviewed. A comprehensive review panel has been established, which includes specialists in the respective specialist fields for all specialist studies (**Table 5**). Further peer reviews include legal review specialists, process review specialist as well as a nuclear review specialist. Once these reviews have been completed the public and authority reviews will be conducted.

**Table 5: Independent Specialist Reviewers**

| <b>Discipline</b>           | <b>Reviewer</b>   | <b>Organisation</b>   |
|-----------------------------|-------------------|---|
| Geology                     | Timothy Partridge | University of the Witwatersrand                                 |
| Seismology                  | Johan de Beer     | Independent Consultant  |
| Geohydrology                | Christine Colvin  | Council for Science and Industrial Research (CSIR) Stellenbosch |
| Dune geomorphology          | Izak Rust         | Independent Consultant  |
| Geotechnical                | Peter Day         | Jones and Wagener   |
| Flora                       | Roy Lubke         | Rhodes University   |
| Fauna (Invertebrates)       | Dawid Jacobs      | University of Pretoria  |
| Fauna (Vertebrates)         | Tony Williams     | Cape Nature Conservation  |
| Hydrology                   | Arthur Chapman    | Council for Science and Industrial Research                     |
| Freshwater Supply           | Allan Bailey      | SSI   |
| Freshwater Ecology          | Dave Blair        | SiVest Environmental Division                                   |
| Oceanography                | Geoffrey Brundrit | Independent   |
| Marine Biology              | George Branch     | UCT Zoology Department  |
| Air Quality and Climatology | Donald Lush       | Independent Consultant  |
| Social                      | Greg Huggins      | Water for Africa  |
| Economic                    | Randall Gross     | African Development Economic Consultant                         |
| Toxicology                  | Michael Holiday   | Michael Holiday and Associates (Canada)                         |
| Agriculture                 | Garry Paterson    | Agricultural Research Council                                   |
| Noise                       | Francois Malherbe | Francois Malherbe Acoustic Consulting cc                        |
| Visual and Aesthetics       | John Drummond     | John Drummond Landscape Architects                              |
| Archaeology and Heritage    | John Parkington   | University of Cape Town   |
| Tourism                     | Dave Blair        | SiVest Environmental Division                                   |
| Accessibility and Transport | Stephanus Naude   | HHO Africa  |

#### **4.7 Public Review of the Draft EIA Report and Draft EMP**

The draft EIA and EMP reports will be made available simultaneously at various public places that have been identified in consultation with I&APs for their review and comment. It is anticipated that a 60-day period will be allocated for this review.

As with the Draft Scoping Report the availability of the Draft EIA and EMP will be advertised in the relevant newspapers, again in English and Afrikaans as the predominant languages. All those I&APs that are included on the project database will be sent notification of its availability by letter. All of the above mentioned reports will also be hosted on the Eskom website: [www.eskom.co.za/eia](http://www.eskom.co.za/eia).

#### **4.8 Authority Review**

Once the public review period has closed all the comments received from the public will be considered and included into both the EIA and EMP reports. Subsequently, the final documents will be submitted to all relevant Authorities for review, comment and decision-making.

#### **4.9 Authorisation**

On receipt of an authorisation (positive or negative) all registered I&APs will be informed by letter, about the decision and the associated terms and conditions. I&APs will also be reminded of the Appeal process and the timeframes in which to submit any appeals in the event that they wish to appeal the Authorities decision.

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## **5 CONCLUSIONS AND RECOMMENDATIONS**

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The correct and appropriate standards and procedure for the EIA application, as set out in the NEMA, as amended, and the EIA Regulations of 2006, have been followed in the environmental authorisation process to date. This Scoping Study has been informed, to a large degree, by the availability of existing information as well as information compiled by a multi-disciplinary team of specialists. The Scoping Study includes an analysis of various alternatives and indicated those site alternatives, which should be pursued as part of the detailed assessment phase of the process i.e. Duynefontein; Bantamsklip and Thyspunt.

However, based on Eskom's decision to pursue a fleet of NPSs, the original application for environmental authorisation was revised to include a combined application to develop three NPS on the above-mentioned three sites opposed to one NPS for development on one of three potential sites. Thus, the consideration of site alternatives is no longer relevant, however, alternative site layouts will be considered within each of the three sites.

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## 5.1 Key impacts identified to date

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The project team undertook site visits to each of the sites in order to obtain a cursory overview of the potential risks and key issues associated with the development. Risks and key issues associated with the construction, operational and decommissioning phases were identified in consultation with I&APs. The key issues that have been identified at this stage include:

- Geological and geotechnical suitability;
- Depth of water table and associated dewatering requirements as well as the repercussions in terms of surrounding water users;
- Source of water supply for operations of the NPS;
- Disturbance and disruption of terrestrial ecological processes such as loss of habitat and associated flora and fauna. The disruption of migration patterns between the coast and inland as well as mobile dunes;
- Marine ecology disturbance through requirements for cooling water, the potential for desalination and activities associated with the disposal of brine;
- Health, safety and security of the site as well as limitations of to surrounding land use;
- Changes to community structures through the influx of workers and associated infrastructural requirements;
- Change in tourism activities;
- Visual disturbance;
- Loss of heritage and cultural resources;
- Loss of potential agricultural land;
- Wind generated dust during construction;
- Construction of required facilities and infrastructure associated with accessibility to the site, transport as well as the integration of the generated power into the networks; and
- Waste handling and management.

Positive benefits identified to date include:

- Improved electricity network in the Cape region and South Africa as a whole, which could stimulate much-needed local economic growth and reduce current power shortages;
- Large conservation areas are already in place at each site and will be declared formal conservation areas as is the case with the existing Koeberg nuclear power plant. Potential increase of these conservation areas due to offsets, access requirements and emergency zones;
- Significantly lower greenhouse gas emissions when compared with that of coal fired power stations;
- Direct long-term economic injection to the local economies;
- Job opportunities in current high unemployment areas;
- Protection of heritage and cultural resources in the undisturbed areas of the sites; and

- Possible upgrade of infrastructure in the local area (roads, bridges, sewer, water supply, communication, schools, clinics, etc.).

Detailed specialist studies will be conducted during the detailed impact assessment phase of the environmental authorisation process. These studies will provide an in depth understanding of the key issues and the potential positive and negative impacts associated with the proposed development with respect to the social, biophysical and economic environments.

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## **5.2 Public Participation during the Scoping Phase**

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This initial phase of the EIA process has included an extensive public consultation process, undertaken by independent public consultation consultants in conformance with the requirements of the EIA Regulations. The database of I&APs, who received information, attended public meetings, stakeholder workshops and focus group meetings, amounted to approximately 7000 I&APs at the time of drafting this report. These I&APs were also invited to comment on the proposed project. In total 35 meetings were held in various locations throughout the Eastern, Western, Northern and Southern Cape, the coverage and range of communities, organisations and sectors canvassed was comprehensive. The proposed project was also widely advertised, with a total of 25 advertisements placed in various local, regional and national newspapers. All relevant new issues, concerns and alternatives raised during the comment period on the Draft Scoping Report were considered and included in the Final Scoping Report as appropriate.

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## **5.3 Alternatives assessed**

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Given the urgent power demand based on economic growth in South Africa, the no go option is not considered to be a logical alternative, as Eskom must provide power. Eskom would in all likelihood, apply to develop more coal fired power stations if the 'no go' alternative is adopted. Other technological alternatives of power generation involving coal as a resource are not viable options for the Cape coast, at present, although Eskom is committed to identifying ways in which renewable energy may be utilised to assist in the supply side of its operations. Identified renewable forms of energy are inadequately developed to provide large scale power generation facilities that can supply a reliable base load and easily integrate into the existing power network in South Africa. However, the no go alternative will be further considered in the Impact Assessment Phase of the EIA.

In terms of optimal, strategic and cost effective utilisation of existing infrastructure associated with the Duynefontien, Bantamsklip and Thyspunt sites, and the provision of the power within the required timeframes, it was recommended that Brazil and Schulpfontein sites be excluded from further comparative assessments and consideration during the detailed assessment phase of the environmental authorisation process. It should, however, be noted

that despite the proposed exclusion of Brazil and Schulpfontein, from the detailed impact assessment phase for the proposed NPSs, this does not preclude these sites from the development of NPSs in the future.

Should Eskom pursue a revised combined application for environmental authorisation, it would be Eskom's intention to sequentially construct NPSs on each of the following sites (see Table 1 for the anticipated roll out of power stations):

- Duynfontein;
- Bantamsklip; and
- Thyspunt.

Thus, specialists will no longer be required to compare, rank and provide recommendations with respect to a single preferred site. Nevertheless, the detailed impact assessment phase of the process, will evaluate alternative layouts within each of the three sites (i.e. within site alternatives).

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## 5.4 Specialist studies

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The Terms of Reference for specialist studies were formulated taking cognisance of comments received during the public participation process to date. This includes comments received on the Final Scoping Report as well as comments received on the Revised Plan of Study. These terms of reference ensure that potential environmental impacts are adequately investigated during the detailed impact assessment phase of the environmental authorisation process and that any relevant shortcomings and/or gaps are addressed. Specialists will be required to assess and rate potential impacts in terms of a rigorous impact assessment methodology. This includes consideration of uncertainty and potential cumulative effects. Specialists would also be required to consider and recommended mitigation measures in light of their likely effectiveness and practicality.

Independent specialist reviewers in the various specialist study fields will review the adequacy of the specialist reports before they are finalised and integrated into the EIA Report.

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## 5.5 Way forward

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Once the DEA approve of the Final Plan of Study for EIA, the detailed specialist studies will be completed and peer reviewed. The results of the specialist studies will subsequently be integrated to form a Draft EIR, which would be distributed for public review for a period of 60 days. As with the Draft Scoping Report, a number of public interactions will be held during the comments period on the Draft EIR. Thereafter, the report will be updated and submitted as the Final EIR to the

relevant environmental Authorities for consideration and decision-making as well as for public review.

**Appendix 1: The DEA's letter of approval regarding the Scoping Report  
and their comments on the Plan of Study for EIA**

**Appendix 2: Statement by the Director-General concerning the consideration of matters pertaining to nuclear safety in Environmental Impact Assessment processes on nuclear installations**

**Appendix 3: Issues and Response Report for issues raised on the Revised Plan of Study for Impact Assessment during the 30-day Comment Period (11 May to 09 June 2009)**