

# ESKOM PROPOSED NUCLEAR-1 POWER STATION AND ASSOCIATED INFRASTRUCTURE



## Draft Environmental Management Plan

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# DRAFT ENVIRONMENTAL MANAGEMENT PLAN

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## ABBREVIATIONS

<b>Arcus GIBB</b>	Arcus GIBB (Pty) Ltd
<b>DEA</b>	Department of Environmental Affairs (formerly know as the Department of Environmental Affairs and Tourism (DEAT))
<b>DME</b>	Department of Minerals and Energy
<b>ECA</b>	Environment Conservation Act, 1989 (Act No. 73 of 1989)
<b>ECO</b>	Environmental Control Officer
<b>EIA</b>	Environmental Impact Assessment
<b>EIR</b>	Environmental Impact Report
<b>ELC</b>	Environmental Liaison Committee
<b>EMP</b>	Environmental Management Plan
<b>EMS</b>	Environmental Management System
<b>Eskom</b>	Eskom Holdings Limited
<b>I&amp;APs</b>	Interested and Affected Parties
<b>km</b>	kilometre
<b>KNPS</b>	Koeberg Nuclear Power Station
<b>kV</b>	kiloVolt
<b>NEMA</b>	National Environmental Management Act, 1998 (Act No. 107 of 1998)
<b>NNR</b>	National Nuclear Regulator
<b>MWe</b>	Megawatt (electrical)
<b>OHS</b>	Occupational Health and Safety
<b>PD</b>	Project Director
<b>PPE</b>	Personal Protective Equipment
<b>PM</b>	Project Manager
<b>PSM</b>	Power Station Manager
<b>WMP</b>	Radioactive Waste Management Programme
<b>SM</b>	Site Manager
<b>SSC</b>	Structures, Systems and Components
<b>WHO</b>	World Health Organisation

# 1 INTRODUCTION

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## 1.1 Project background

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Eskom proposes to construct, commission, operate and decommission a Nuclear Power Station (NPS) and associated infrastructure. The Nuclear-1 NPS would have a power generation capacity of up to 4 000 MWe, using the Pressurised Water Reactor (PWR) technology, and it is anticipated that the NPS will be in operation for approximately 60 years.

Arcus GIBB developed this draft Environmental Management Programme (EMP) as part of the EIA process, in accordance with the requirements of the National Environmental Management Act, 1998 (Act No. 107 of 1998). The purpose of this Environmental Management Plan (EMP) is to ensure that the environment is properly considered during the design, construction, operational and maintenance phases of the life-cycle (pre-construction, construction and operational phases) of the Nuclear-1 NPS, and that negative impacts are minimised or prevented and positive impacts enhanced.

The draft EMP follows on from the Environmental Impact Report (EIR), in as much as all the measures for mitigation of impacts that were identified during the EIA are incorporated, thus ensuring that recommendations contained in the Environmental Authorisation are implemented, and that the project does not deviate from the environmental profile that formed the basis of the assessment. In a similar vein the EMP serves to ensure that the requirements of the Environmental Authorisation are met and serves to provide a clear and auditable indication as to how those requirements should be implemented during project execution.

The European Environment Agency (2006) defines an EMP as follows:

*“An action plan or system which addresses the how, when, who, where and what of integrating environmental mitigation and monitoring measures throughout an existing or proposed operation or activity<sup>1</sup>”.*

As per the NEMA and the EIA Regulations of 2006, the draft EMP is published in conjunction with the draft EIR for public comment. Once public comment has been considered, the draft EIR and draft EMP will be amended if and as required. It will then be submitted as part of the EIA application process to the Department of Environmental Affairs (DEA) [previously known as the Department of Environmental Affairs and Tourism (DEAT)]. On the DEA's approval of the EIR and draft EMP, Environmental Authorisation may be granted which details the environmental conditions to be adhered to during the various developmental phases of the Nuclear-1 NPS project. It is important to note that the EMP must be amended to incorporate any additional specifications required in terms of the Environmental Authorisation and any additional requirements the proponent may find necessary.

The final EMP must be considered during pre-construction planning; incorporated in all the Contractor documents; and fully implemented prior to commencement of any construction and decommissioning activities. The EMP may also require further amendments as the project unfolds. Any significant amendments require DAEARD approval before being implemented.

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## 1.2 Location of the Nuclear Power Station (NPS)

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Application has been made for three sites namely Duynefontein, Bantamsklip and Thyspunt to be assessed as indicated in **Figure 1-1**.

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<sup>1</sup> [http://glossary.eea.eu.int/EEAGlossary/E/environmental\\_management\\_plan](http://glossary.eea.eu.int/EEAGlossary/E/environmental_management_plan)



**Figure 1-1: Location of alternative NPS sites**

Given that the proposed development could occur on any of the three alternative sites, the mitigation measures as stipulated in the EMP are applicable to all three sites. However, site specific mitigation measures are indicated, where applicable. For the purposes of this EMP, “site” refers to the area which is fenced as a construction site and includes the actual footprint of the power plant (and thus is used interchangeably with the “construction site”). Areas of the Eskom owner-controlled land that are not part of the site therefore fall outside of the “site” boundary used in this EMP, and are dealt with separately.

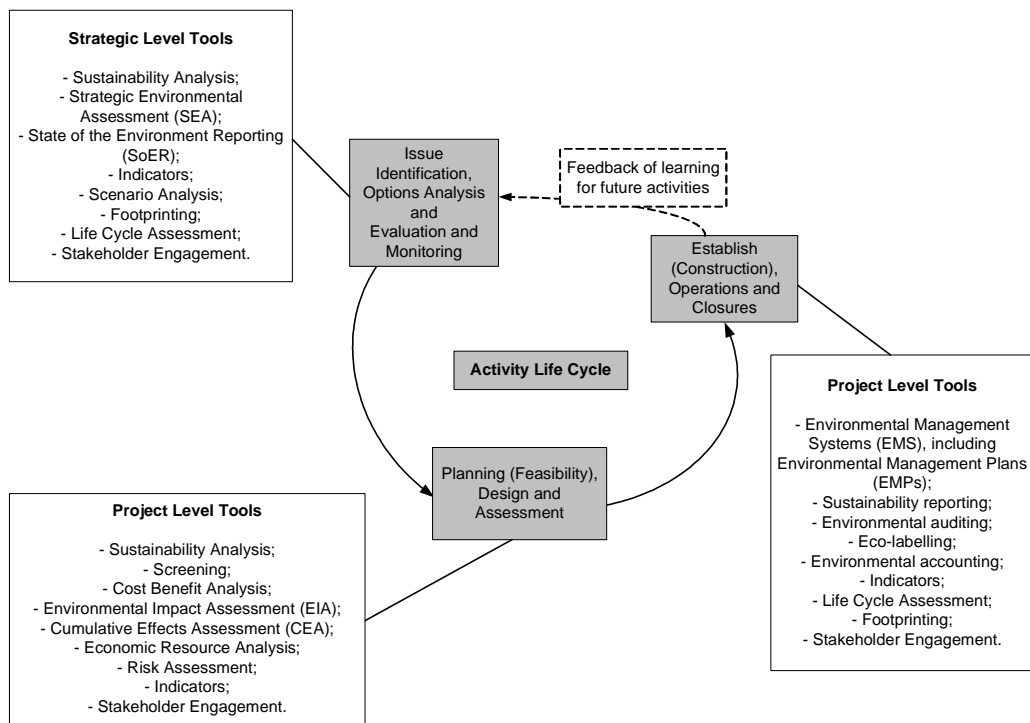
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### 1.3 Objectives of the Environmental Management Plan (EMP)

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It is imperative that the remedial and mitigation requirements identified during the EIA process are effectively realised during the implementation of the project. Thus, the EMP plays a key role in the implementation of environmental management. **Figure 1-2** contextualises EMPs within the broader environmental assessment and management processes.





**Figure 1-2: Commonly used tools in the Integrated Environmental Management toolbox, at each stage in a typical activity life cycle (adapted from DEAT 2004).**

The EMP aims to undertake the following:

- Outline functions and responsibilities of accountable persons;
- State key standards and guidelines, which are required to be achieved in terms of environmental legislation;
- Outline mitigation measures and environmental specifications which are required to be implemented during pre-construction, construction and operation phases of the project, in order to minimise the extent of environmental impacts and to manage environmental impacts associated with the project through effective control; and
- Prevent long-term or permanent environmental degradation.

The implementation, review and updating of this EMP remains the accountability of Eskom. The specifications of the EMP must be clearly stated in all contracts, work orders and job descriptions. The EMP structure captures in essence the requirements of the Environmental Authorisation through incorporating environmental specifications applicable to the project, against which the effectiveness of management of each impact will be measured and method statements which describe the specific and detailed methods will be used to comply with the listed specifications.

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## 1.4 Structure of this document

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This EMP has been divided into four chapters as described briefly below.

**Chapter 1: Introduction** provides a brief introduction to the project and objectives of the EMP;

**Chapter 2: Implementation and Management Procedures** provides an indication of the key roles and responsibilities associated with the implementation of the NPS;

**Chapter 3: Environmental Management** provides the detailed mitigation measures as determined by the relevant specialists as well as the applicable environmental guidelines; and

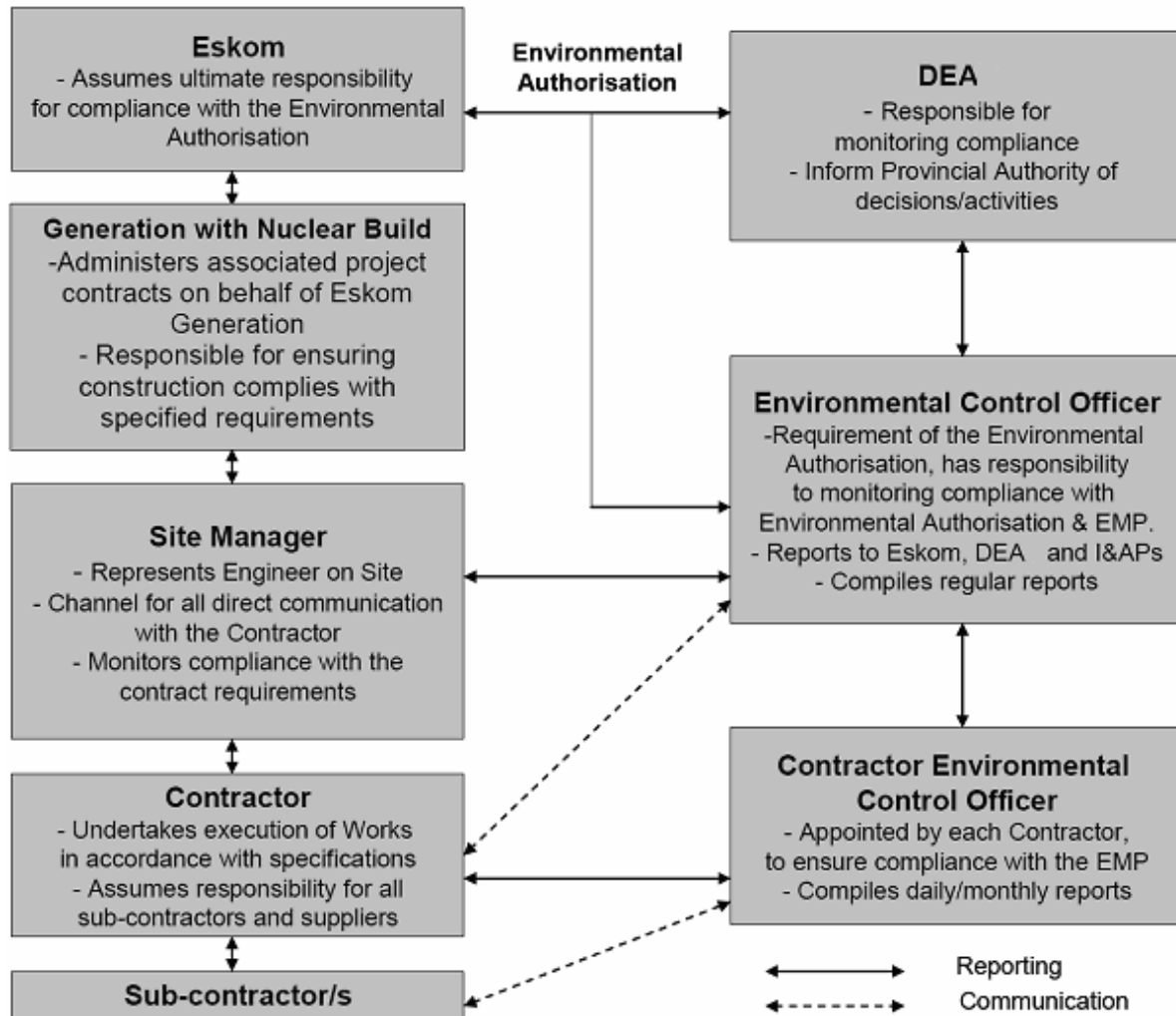
**Chapter 4: Monitoring Programmes** provides an outline of the suggested monitoring programme required as part of the environmental management of the proposed development.

## 2 IMPLEMENTATION AND MANAGEMENT PROCEDURES

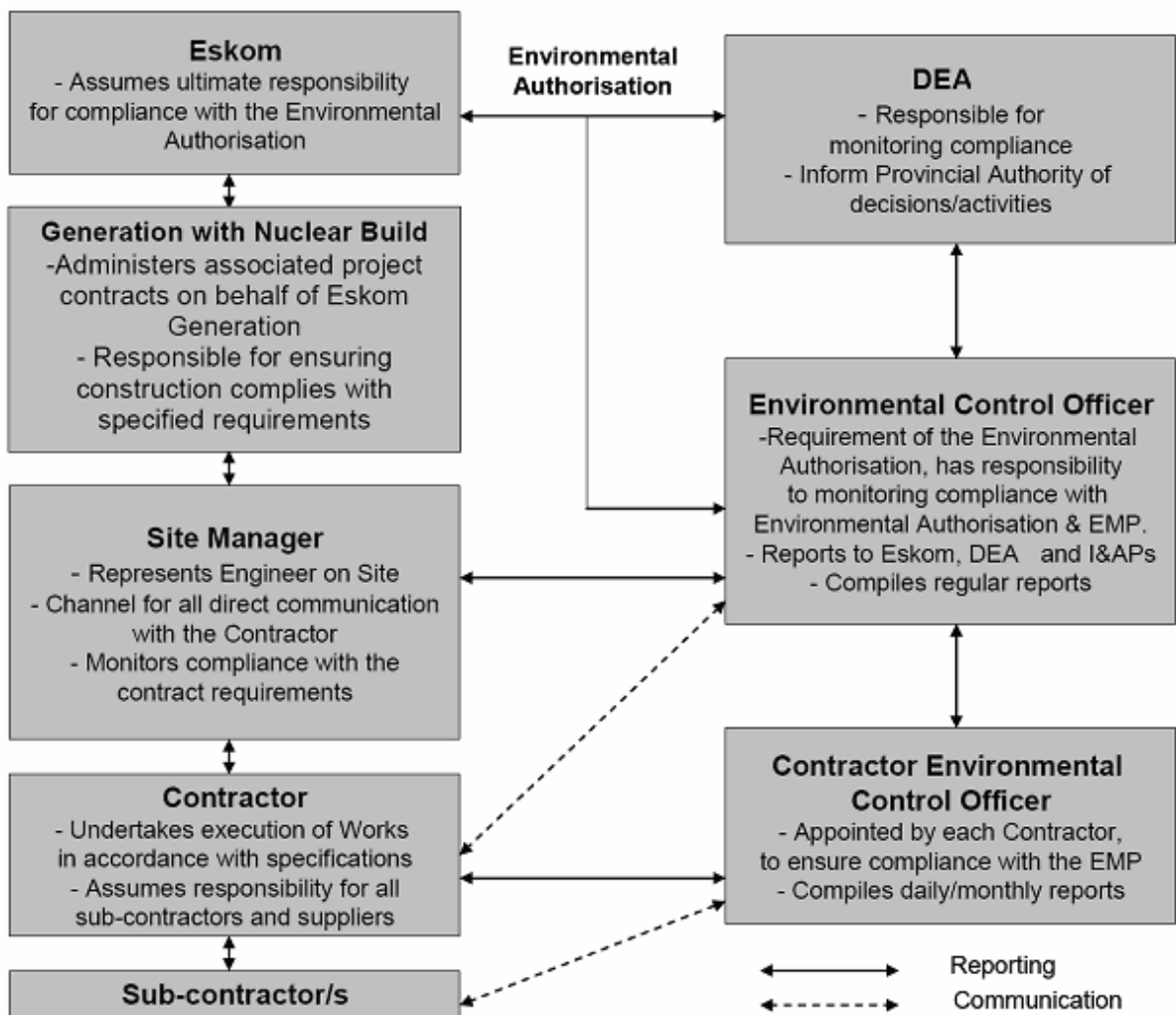
### 2.1 Organisational structure

#### 2.1.1 Construction phase

The organisational structure below identifies and defines the responsibilities and authority of the various key role-players (individuals and organisations) involved in the project's construction phase. All instructions and official communications regarding environmental matters shall follow the organizational structure shown in



**Figure 2-1.** The organisational structure reflected was developed to ensure that there are clear channels of communication and an explicit organisational hierarchy so that potential conflicting or contradictory instructions are avoided.

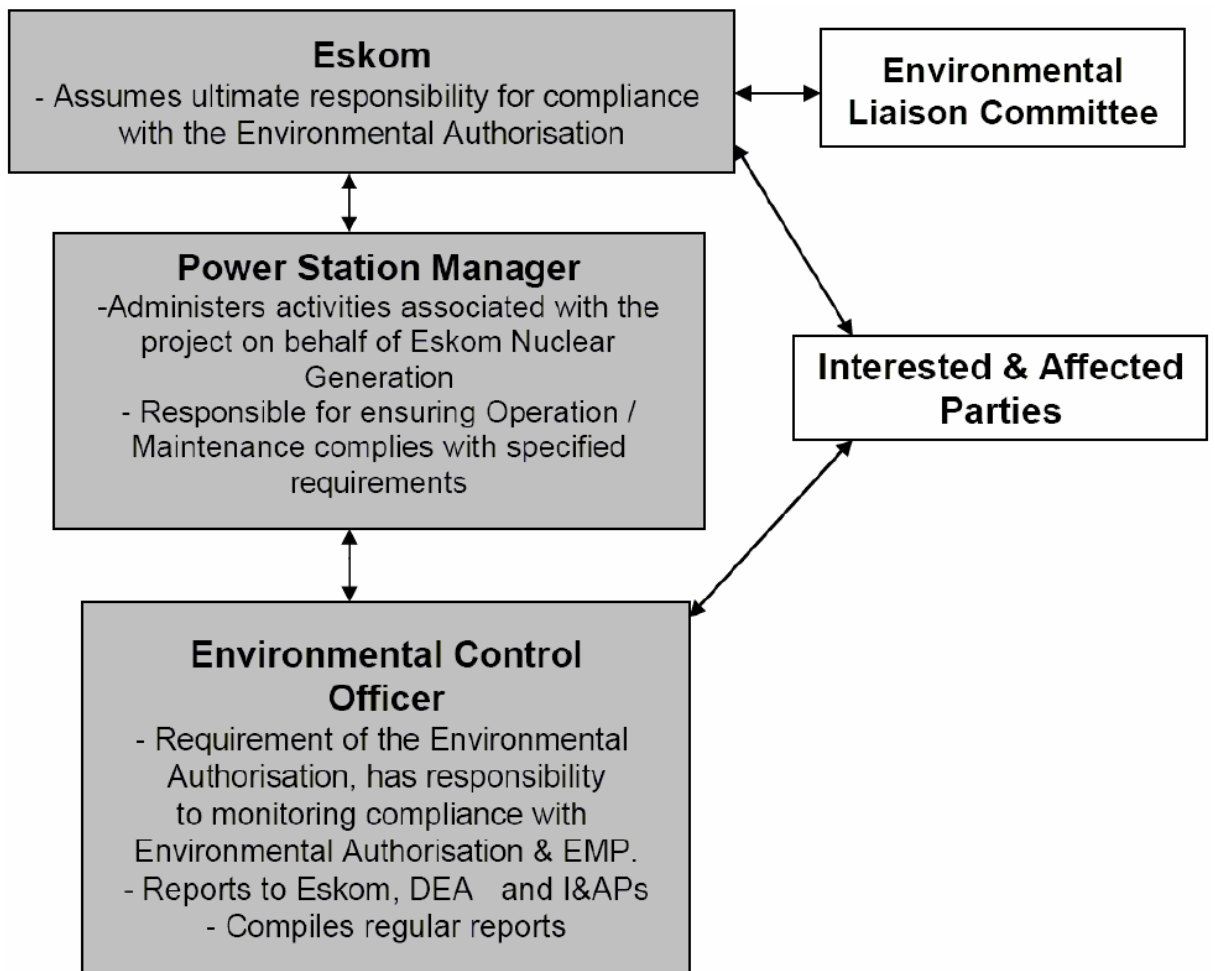


**Figure 2-1: Organisational structure – construction phase**

In terms of the defined organisational structure reflected in **Figure 2-1** above, all instructions that relate to environmental matters will be communicated to the Contractor via the Site Manager (SM). The exception to this rule would be in an emergency (defined as a situation requiring immediate action and where failure to intervene timeously would, in the reasonable opinion of the Environmental Control Officer (ECO), result in unacceptable environmental degradation), where instructions may be given directly to the Contractor. The detailed roles and responsibilities of the various role-players identified in the organisational structure are outlined in **Section 2.2**.

### 2.1.2 Operation phase

The organisational structure below identifies and defines the responsibilities and authority of the various key role-players (individuals and organisations) involved in the project's operational phase. All instructions and official communications regarding environmental matters shall follow the organizational structure shown in **Figure 2-2**. Similar to in the construction phase, the organisational structure has been developed to ensure that there are clear channels of communication and an explicit organisational hierarchy so that potential conflicting or contradictory instructions are avoided. The detailed roles and responsibilities of the various role-players identified in the organisational structure are outlined in **Section 2.2**.



**Figure 2-2: Organisational structure – operational/ maintenance phase**

## 2.2 Roles and responsibilities

### 2.2.1 Construction phase

**Table 2-1: Construction phase function and responsibility**

Function	Responsibility
Project Manager/ Engineer (PM)	<p>Responsible for the overall management of the project and implementation, administration and enforcement of the EMP. The PM shall:</p> <ul style="list-style-type: none"> <li>• Ensure that the EMP specifications are made available to the vendor, and shall ensure that the vendor/ Eskom/ Sub-contractors abide by the provisions thereof;</li> <li>• Appoint an ECO to monitor implementation of and compliance with the EMP for the duration of the works;</li> <li>• Be accountable, to the relevant authority, DEA, for any contravention/ non-compliance by any Contractor under their supervision; and</li> <li>• Issue fines or stop work orders through the SM for contravention of the EMP and give instruction regarding corrective action.</li> </ul>
Site Manager (SM)	<p>Oversees site works, liaison with Contractor, PM/ E and ECO. The SM will be responsible for monitoring, reviewing and verifying compliance with the EMP by the Contractor when the ECO is not available. The SMs duties, over and above his contractual obligations, will include the following:</p> <ul style="list-style-type: none"> <li>• Comply with the requirements of the EMP;</li> <li>• Review construction Method Statements in conjunction with the ECO;</li> <li>• Assist the Contractor in finding environmentally responsible solutions to problems with input from the ECO;</li> <li>• Inspect the site and surrounding areas on a regular basis with regard to compliance with the EMP;</li> <li>• Issue written early warnings to Contractors failing to comply with the requirements of the EMP;</li> <li>• Issue penalties for contravention of the EMP;</li> <li>• Ensure that the Contractor abides to the OHS Act and construction regulations; and</li> <li>• Ensure the undertaking of environmental awareness training of all new personnel coming on to site.</li> </ul>
Environmental Control Officer (ECO)	<p>Implementation of the EMP, liaison between Eskom, Contractor and landowners, and monitoring, reviewing and verifying compliance with the EMP by the Contractor. In particular, the ECO shall:</p> <ul style="list-style-type: none"> <li>• Keep records of all activities/ incidents concerning the environment in the site diary;</li> <li>• Be appointed by the PM to monitor all activities on site;</li> <li>• Be permanently on site to ascertain the level of compliance of works,</li> <li>• Attend Contractor's meetings when necessary and report back to the SM on the environmental issues;</li> <li>• Maintain inspection audit reports on file;</li> <li>• Assist the SM to ensure that necessary environmental authorisations and permits have been obtained;</li> <li>• Monitor and verify that the EMP is adhered to at all times and take action if the specifications are not followed;</li> <li>• Monitor and verify that environmental impacts are kept to a minimum;</li> </ul>

Function	Responsibility
	<ul style="list-style-type: none"> <li>• Review and approve construction Method Statements together with the SM;</li> <li>• Assist the Contractor in finding environmentally responsible solutions to problems;</li> <li>• Keep records of all activities/ incidents concerning the environment on site in the site diary;</li> <li>• Keep a register of complaints in the site office (to be situated in proximity to where the works are taking place) and deal with any community comments or issues;</li> <li>• Monitor the undertaking by the Contractor of environmental awareness training for all new personnel coming onto site or present environmental awareness courses themselves;</li> <li>• Provide material/ manuals and assistance for the environmental awareness courses;</li> <li>• Advise on the removal of person(s) and/ or equipment not complying with the specifications (undertaken via the SM);</li> <li>• Recommend the issuing of penalties for transgressions of non-compliance;</li> <li>• Maintain a photographic record of the site before, during and after construction;</li> <li>• Ensure that activities on site comply with legislation of relevance to the environment;</li> <li>• Complete checklists as necessary; and</li> <li>• Internally review the implementation of the EMP and submit a report to Eskom and DEA at the end of the project.</li> </ul>
Contractor	<p>Implementation and compliance with recommendations and conditions of the EMP. The Contractor shall:</p> <ul style="list-style-type: none"> <li>• Ensure that the environmental specifications of this document (including any revisions, additions or amendments) are effectively implemented. This includes the on-site implementation of steps to mitigate environmental impacts;</li> <li>• Ensure the undertaking of environmental awareness training of all Contractor personnel coming on to site;</li> <li>• Ensure that all employees and Sub-contractors employed comply with the requirements and provisions of the EMP;</li> <li>• Prepare Method Statements for submission to the ECO;</li> <li>• Monitor environmental performance and conformance with the specifications contained in this document during daily site inspections;</li> <li>• Discuss implementation of and compliance with this document with staff at routine site meetings;</li> <li>• Be responsible for Sub-contractors preparing sites;</li> <li>• Report progress towards implementation of and non-conformances with this document at site meetings with the ECO;</li> <li>• Keep copies of two-weekly reports to the Eskom Environmental Advisor;</li> <li>• Notify the ECO of the anticipated programme of works and fully disclose all details of activities involved;</li> <li>• Ensure that suitable records are kept and that the appropriate documentation is available to the ECO;</li> <li>• Notify the ECO of all incidents, accidents and transgressions on site with respect to environmental management as well as requirements of the EMP and corrective actions/ remedial</li> </ul>

Function	Responsibility
	<p>action taken;</p> <ul style="list-style-type: none"> <li>• Inform the ECO of problems arising when implementing the EMP and recommend ways of improving it;</li> <li>• Inform the ECO of any complaints received; and</li> <li>• Appoint a dedicated person (Contractor Environmental Control Officer - CECO) to work with the ECO.</li> <li>•</li> </ul>
Contractor Environmental Control Officer (CECO)	<p>The CECO is appointed by the Contractor for the implementation of the EMP, environmental control of site actions, re-mediation and rehabilitation work. The CECO shall:</p> <ul style="list-style-type: none"> <li>• Be available to investigate all problems arising on the work sites.</li> </ul>
Eskom Environmental Advisor	<p>The Environmental Advisor shall be responsible for:</p> <ul style="list-style-type: none"> <li>• Auditing compliance with the requirements of the EMP during annual audits;</li> <li>• Provide an assurance and reporting function to Eskom governance;</li> <li>• Advising the SM regarding applicable legal requirements and compliance with these requirements; and</li> <li>• Advise the SM and ECO regarding compliance with the requirements of the EMP.</li> </ul>
Environmental Liaison Committee (ELC)	<p>The Environmental Liaison Committee shall be responsible for:</p> <ul style="list-style-type: none"> <li>• Facilitation of effective communication and co-operation between Eskom, the surrounding community and I&amp;APs;</li> <li>• Facilitation of discussion on relevant issues and concerns;</li> <li>• Advise the Site Manager on various aspects of construction and environmental performance of Eskom and the Contractors;</li> <li>• Education of I&amp;APs regarding legal aspects of the project; and</li> <li>• Input into the discussion regarding Eskom's performance on issues relating to the environment.</li> </ul>

### 2.2.2 Operational phase

**Table 2-2: Operational phase function and responsibility**

Function	Responsibility
Power Station Manager (PSM)	<p>The PSM will be responsible for monitoring, reviewing and verifying compliance with the EMP. The duties of the PSM shall include:</p> <ul style="list-style-type: none"> <li>• Implementation the EMP, ensuring compliance with the contents of this document and any other environmental policies and procedures which may be applicable to the project;</li> <li>• Monitor and verify that the EMP is adhered to at all times and take action if the specifications are not followed;</li> <li>• Monitor and verify that environmental impacts are kept to a minimum;</li> <li>• Review operational Method Statements;</li> <li>• Monitor the undertaking of environmental awareness training by all new personnel coming onto site;</li> <li>• Inspect the site and surrounding areas regularly with regard to compliance with the EMP;</li> <li>• Ensure that the necessary environmental authorisations and permits have been obtained; and</li> <li>• Ensure the undertaking of environmental awareness training of all new personnel coming on to site.</li> </ul>



Function	Responsibility
Environmental Control Officer (ECO)	<p>Appointed by the PSM for the Implementation of the EMP, the ECO will be responsible for the overall implementation, administration and enforcement of the EMP. This includes interaction, environmental control of site actions, re-mediation and rehabilitation work. In particular, the ECO shall be responsible for:</p> <ul style="list-style-type: none"> <li>• Ensuring that the EMP specifications are included in all future tender documents issued for activities on site, and shall ensure that the prospective tenderers/ Contractors abide by the provisions thereof;</li> <li>• Inform the relevant authority, DEA, of any contravention/ non-compliance by any Contractor;</li> <li>• Monitor and verify that the EMP is adhered to at all times and take action if the specifications are not followed;</li> <li>• Take action against contraventions of the EMP and give instruction regarding corrective action;</li> <li>• Keep records of all activities/ incidents concerning the environment;</li> <li>• Keep a register of complaints received;</li> <li>• Provide material/ manuals and assistance for environmental awareness;</li> <li>• Complete checklists as necessary; and</li> <li>• Continually review the EMP and submit reports to the PSM.</li> </ul>
Eskom Environmental Advisor	<p>The Environmental Advisor shall be responsible for:</p> <ul style="list-style-type: none"> <li>• Auditing compliance with the requirements of the EMP during annual audits;</li> <li>• Provide an assurance and reporting function to Eskom governance;</li> <li>• Advising the PSM regarding applicable legal requirements and compliance with these requirements; and</li> <li>• Advise the PSM and ECO regarding compliance with the requirements of the EMP.</li> </ul>
Environmental Liaison Committee (ELC)	<p>The Environmental Liaison Committee shall be responsible for:</p> <ul style="list-style-type: none"> <li>• Facilitation of effective communication and co-operation between Eskom, the surrounding community and I&amp;APs;</li> <li>• Facilitation of discussion on relevant issues and concerns;</li> <li>• Education of I&amp;APs regarding legal aspects of the project; and</li> <li>• Input into the discussion regarding Eskom's performance on issues relating to the environment.</li> </ul>

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## **2.3 Awareness and competence**

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### **2.3.1 Induction of staff**

It is important to ensure that all personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and ongoing minimisation of environmental harm.

To achieve effective environmental management, it is important that employees, Contractors and Sub-contractors are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMP. Environmental training must include the following:

- A basic understanding of the key environmental features of the site and the surrounding environment;
- The requirements of the EMP and the environmental specifications as they apply to the power station;
- A basic knowledge of the potential environmental impacts that could occur and how they can be minimised and mitigated;
- The identification of archaeological artefacts, and rare and endangered flora and fauna that may be encountered on the site; and
- Awareness of any other environmental matters, which are deemed to be necessary by the ECO.

The training must include a system of certification and/ or accreditation related to training, to ensure all the workers have proof of work performed for future job applications. Records must be kept of those that have completed the relevant training. Training must include the environment, health and safety as well as basic HIV/ AIDS education.

Training can be done either in a written or verbal format but will be in an appropriate format for the receiving audience. Where training has been done verbally, persons having received training must indicate in writing that they have attended a training session and have been notified in detail of the contents and requirements of the EMP.

### **2.3.2 Communication and liaison with stakeholders**

Eskom must ensure that the public and surrounding communities are informed and updated throughout the construction and operational phases.

Sufficient signage should be erected around the site, informing the public of the construction activities taking place. The signboards should include the following information:

- The name of the Contractor; and
- The name and contact details of the site representative to be contacted in the event of emergencies or complaint registration.

An Environmental Liaison Committee (ELC) must be established by Eskom to ensure that relevant information can be reported to DEA as well as Interested and Affected Parties (I&APs) during the construction phase. The objectives of an ELC include the following:

- To facilitate proper communication and co-operation between Eskom, the surrounding community, and other interested and affected parties;
- To facilitate discussion on various issues pertaining to labour, safety, health environmental, social and other community related issues and concerns;
- To serve as an advisory forum to the Site Manager during the construction phases of the NPS;
- To provide a platform where day-to-day community concerns around the project can be raised and addressed;
- To ensure that the community and other stakeholders understand the various legal obligations imposed on the project, and Eskom's strategy to meet these obligations; and

- To provide a platform where Eskom's performance on issues relating to environment can be discussed.

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## 2.4 Compliance, non-conformance and corrective actions

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### 2.4.1 Monitoring during construction and operational phase

A monitoring programme will be put in place not only to ensure conformance with the EMP through the contract/ work specifications, but also to monitor any environmental issues and impacts which have not been accounted for in the EMP that are, or could, result in significant environmental impacts for which corrective action is required. As part of the contract or work specifications, Eskom will stipulate the period and frequency of monitoring required in consultation with relevant stakeholders and authorities. The PM will ensure that the monitoring is carried out.

Monitoring under the operational phase is covered by the National Nuclear Regulatory Act, 1999 (Act No. 47 of 1999) [NNR Act], which requires specific environmental monitoring requirements. In addition, **Section 4** of this EMP provides a monitoring plan as recommended by the EIA specialist team.

The aim of the monitoring and auditing process would be to check the implementation of the environmental specifications routinely, in order to:

- Monitor and audit compliance with the prescriptive and procedural terms of the environmental specifications;
- Ensure adequate and appropriate interventions to address non-compliance;
- Ensure adequate and appropriate interventions to address environmental degradation;
- Provide a mechanism for the lodging and resolution of public complaints;
- Ensure appropriate and adequate record keeping related to environmental compliance;
- Determine the effectiveness of the environmental specifications and recommend the requisite changes and updates based on audit outcomes, in order to enhance the efficacy of environmental management on site; and
- Aid communication and feedback to the relevant authorities.

The ECO appointed to ensure compliance with the EMP will carry out monitoring activities as identified by any specialist study accepted by Eskom or any other monitoring deemed necessary by Eskom, or reasonably requested by the ELC.

All instruments and devices used for the measurement or monitoring of any aspect of this EMP must be calibrated and appropriately operated and maintained.

### 2.4.2 Documentation and reporting during construction and operational phases

Documentation and reporting will take place throughout the life-cycle of the NPS. During the construction phase, this function will be performed by the Site Manager (SM), and during the operational phase this function will be performed by the PSM.

The following documentation must be kept on site in order to record compliance with the EMP:

- Record of complaints;
- Monitoring results; and
- Notification of emergencies and incidents.

Incidents involving employees and/ or the public that will be reported are those:

- That could potentially cause negative sentiment and perception towards the project and/ or Eskom;

- Environmental complaints and correspondence received from the public to the SM or PSM;
- Incidents that cause harm or may cause harm to the environment must be reported to the ECO;
- Record all hazardous materials used on site; and
- Maintain a record of all hazardous waste disposal manifests detailing the nature of the hazardous waste disposed of, the hazardous waste classification and the location of the site to which such waste was sent.

The above records will form an integral part of the SM' records during the construction phase, and the plant records during the operation phase. These records will be kept with the EMP, and will be made available for scrutiny if so requested. In addition, a log of all permits and permit conditions as well as copies of these permits once obtained, shall be kept and updated as necessary.

In parallel, the ECO will put in place an Environmental Register to document:

- All environmental complaints and correspondence received from the public, Eskom or the construction workforce;
- Incidents of non-compliance with the EMP;
- Any other environmental incidents related to the construction phase of the project; and
- Results of routine and non-routine monitoring completed on site.

The ECO will also ensure that the following information is recorded for all complaints/ incidents:

- Nature of complaint/ incident;
- Causes of complaint/ incident;
- Party/ parties responsible for causing complaint/ incident;
- Immediate actions undertaken to stop/ reduce/ contain the causes of the complaint/ incident;
- Additional corrective or remedial action taken and/ or to be taken to address and to prevent reoccurrence of the complaint/ incident;
- Timeframes and the parties responsible for the implementation of the corrective or remedial actions;
- Procedures to be undertaken and/ or penalties to be applied if corrective or remedial actions are not implemented; and
- Copies of all correspondence received regarding complaints/ incidents.

### **2.4.3 Non-compliance and penalties**

Non-compliance will be addressed via written early warnings and appropriate work stop orders. Remedial actions will have to be presented and accepted before work can continue.

The PM, in consultation or on the advice of the ECO, shall issue spot fines if the Contractor infringes environmental specifications. The Contractor shall be advised in writing of the nature of the infringement and the amount of the spot fine. The Contractor shall be liable for the fine and it is his responsibility to recover the fine from the relevant employee. The Contractor shall also take the necessary steps (e.g. training) to prevent a recurrence of the infringement.

The Contractor is also advised that the imposition of spot fines does not replace any legal proceedings the authorities, landowners and/ or members of the public may institute against the Contractor. Spot fines shall be between R 500.00 and R1 000.00, depending upon the severity of the infringement. The decision on how much to impose will be made by the ECO in consultation with the construction manager, CECO and the Contractor in question, and will be final. A proper guideline should be established to specify the various categories of infringements. It should also be stipulated what will happen to the funds.

In addition to the spot fine, the Contractor shall be required to make good any damage caused as a result of the infringement, at his own expense.

The PM shall retain records for fines issued. Monies for the spot fines will be deducted from the Contractors monthly certificate. The PM, on recommendation from the ECO, may also order the Contractor to suspend based on a specific category of infringement, part or all the

works if the Contractor repeatedly causes damage to the environment by not adhering to the EMP (i.e. more than 3 cases of infringements). The suspension will be enforced until such time as the offending actions, procedure or equipment is corrected. No extension of time will be granted for such delays and all costs will be borne by the Contractor.

The type and extent of the corrective measures required to address non-compliance would depend on the nature of the transgression and the Contractor's history in terms of compliance with their environmental obligations.

When deciding on the nature of any punitive actions, however, it is important to recognise that the effective implementation of the environmental specification is highly dependant on the quality of the working relationships that develop between the key role-players, specifically between the PM, the Contractor and the ECO. Accordingly, an excessive response to non-compliance, particularly for a minor or unintentional transgression, may cause significant environmental degradation in the long term due to its effect in eroding the Contractor commitment to meeting their environmental responsibilities. Other mechanisms, like an expanded environmental induction programme, may prove more effective than purely punitive measures in controlling non-compliance in the long term.

## 3 ENVIRONMENTAL MANAGEMENT

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### 3.1 Method Statements

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Mitigation measures for the project are detailed in **Section 3.2**. It is important, however, to emphasise that the Contractor and Power Station Manager (PSM) are the recognized specialists regarding construction techniques and operation practices, respectively. Therefore, so as not to hinder activities, the approach to addressing the environmental specifications is underpinned by a series of Method Statements, within which the Contractor and PSM are required to outline how they propose to mitigate any identified environmental risk.

The Contractor and PSM shall submit a written Method Statement for approval by the ECO, covering those activities that are identified (in this document and/ or by the ECO) as being potentially harmful to the environment. Method Statements should be prepared for each category of identified activity in the sections that follow, which should cover all relevant aspects in a holistic manner. During the operational phase, these method statements should take the form of an Environmental Management System (EMS) for the NPS.

The Method Statement must cover applicable details with regard to:

- Construction and/ or operation procedures;
- Safety requirements (as outlined in the OHS Act, Act 85 of 1993);
- Materials and equipment to be used;
- Movement of the equipment to and from site;
- How the equipment/ material will be moved while on site;
- How and where material will be stored;
- The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
- Timing and location of activities;
- Compliance/ non-compliance with the specifications; and
- Any other information deemed necessary by the ECO.

There are rigorous requirements in terms of the provision of Method Statements and the commencement of the activities they cover:

- Any Method Statement required by the ECO or the specification must be produced within the timeframes specified by the ECO or the specification (typically two weeks);
- The Contractor or PSM may not commence the activity covered by the Method Statement until it has been approved, except in the case of emergency activities and then only with the consent of the ECO;
- The ECO may require changes to a Method Statement if the proposal does not comply with the specification or if the proposed methodology carries an unreasonable risk of excessive damage to the environment;
- Latest version of approved Method Statements must be readily available on the site and must be communicated to all relevant personnel;
- Due to changing circumstances, it may be necessary to modify Method Statements. In such cases, the proposed modifications must be indicated and agreed upon in writing by the ECO;
- The Contractor or PSM are required to carry out the activities covered by the Method Statement in accordance with the proposed approach; and
- Approval of the Method Statement does not absolve the Contractor or PSM from their obligations or responsibilities in terms of the contract.

The following are typical Method Statements, which will be called for by the ECO:

- Location, layout and preparation of the construction site and materials storage areas;
- Location, layout and preparation of cement/ concrete batching facilities including the methods employed for the mixing of concrete and the management of runoff water from such areas;
- Contaminated water management plan, including the containment of runoff and polluted water;
- Emergency construction Method Statements (including details of methods for fuel spills and clean up operations);
- Rehabilitation of disturbed areas and revegetation after construction is complete; and
- Solid waste management and removal of waste from site.

**Annexure 3** explains Method Statements and provides a template Method Statement sheet as a guide for the compilation of the NPS Method Statements. Method Statements may be applied for health and safety, as well as for environmental purposes.

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## 3.2 Mitigation measures

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### 3.2.1 General

#### a) Legal and other requirements:

- Eskom and the Contractor must commit themselves to comply with the relevant provisions of the applicable environmental legislation and associated regulations promulgated in terms of these laws, through all phases of the project;
- Should it be required, Eskom may enter into an agreement with the relevant authority and/ or Interested and Affected Parties (I&APs) concerning any requirements directed towards protecting the environment. Contractors will be required to respect and comply with such agreements.

#### b) Social Interaction:

- A Community Liaison Officer/ Communications Practitioner from Eskom will deal with community needs and complaints;
- Open liaison channels with nearby residents and I&APs must be developed, to facilitate communication and field concerns or complaints;
- I&APs will be informed of any construction and operation activities that could affect them;
- An Emergency Management Plan with mechanisms for communicating potential risk, health and safety information to affected communities will be developed;
- A Public Safety Information Forum (as required by DoE) will be established to disseminate relevant information during the operational phase;
- Movement of construction personnel outside of the demarcated construction site (including access road) must be strictly prohibited;
- Access to the site must be controlled at all times;
- Eskom must construct and maintain adequate fencing around the site and ensure that materials used for construction on the site do not blow on or move outside the site and environs;
- All construction activities must take place within the demarcated footprint;
- No casual employment or informal trading will be allowed to take place at the entrance to the site and on-site; and
- No untrained employees will be allowed to work on-site.

**c) Labour:**

- The Contractor must, as far as possible, employ labour with appropriate qualifications and experience from the surrounding areas;
- All employment by the Contractor and his Sub-contractors will be from an office in the nearest town with proper induction and training facilities;
- The following restrictions will apply in principle, including but not limited to:
  - No overnight accommodation on site;
  - No movement outside of designated areas;
  - No indiscriminate disposal of rubbish or rubble;
  - No littering;
  - No collection of firewood;
  - No interference with any wildlife, fauna or flora;
  - No poaching of any description;
  - No use of facilities other than the toilets provided;
  - No domestic pets on site; and
  - No cooking on open fires.

**d) Employment:**

- The Contractor and Eskom commit to the requirements of Asgisa;
- Where skilled workmen, artisans and operators are not available locally, they will be employed from non-local sources;
- A skills development programme should be introduced to ensure transfer of skills; and
- A wellness implementation programme shall be implemented based on Eskom's policy and practices.



### 3.2.2 Pre-construction phase

The key activities undertaken during the pre-construction phase involve final planning of the site layout/ footprint, selection and induction of Contractor/s, and addressing certain environmental concerns in preparation for the construction phase.

**Table 3-1: Mitigation measures for the pre-construction phase**

Mitigation	Responsible Individual/s	Frequency
<b>Contractor selection and performance</b>		
<ul style="list-style-type: none"> <li>Eskom must ensure that this EMP forms part of any contractual agreements with Sub-contractors for the execution of the proposed project.</li> </ul>	Project Manager	As new Contractors are appointed
<ul style="list-style-type: none"> <li>A precautionary approach must be adopted with any works deviating from specifications being approved by both the Site Manager and ECO.</li> </ul>	Contractor, ECO	Continuous
<b>Environmental induction training</b>		
<ul style="list-style-type: none"> <li>An initial environmental awareness training session is required prior to any work commencing on-site.</li> </ul>	ECO	When new staff are contracted
<ul style="list-style-type: none"> <li>The Contractor shall ensure that all NPS site staff are aware of, and understand the contents and conditions of the EMP, the key environmental issues and the consequences of non-compliance.</li> </ul>	Contractor	When new staff are contracted and as necessary
<ul style="list-style-type: none"> <li>All NPS site staff shall attend induction training on the EMP and a record must be kept of all attendees.</li> </ul>	Contractor	When new staff are contracted and as necessary
<b>NPS site monitoring</b>		
<ul style="list-style-type: none"> <li>A baseline radiological environmental survey shall be implemented prior to operation of the NPS.</li> </ul>	Client Office Manager	Continuous
<b>Access to NPS site</b>		
<ul style="list-style-type: none"> <li>Access routes shall be planned by Eskom to ensure reduced environmental impact.</li> </ul>	Project Manager	Prior to construction
<b>Planning and NPS site footprint</b>		
<ul style="list-style-type: none"> <li>All work must be undertaken in an environmentally sensitive manner.</li> </ul>	Contractor, ECO, Project Manager	Continuous

Mitigation	Responsible Individual/s	Frequency
<ul style="list-style-type: none"> <li>Ensure that the footprint of the NPS takes into account the environmental characteristics of the site</li> </ul>	Project Manager	Prior to construction
<ul style="list-style-type: none"> <li>Where rare flora/ habitat stands to be lost, every effort should be made to minimise the impact.</li> </ul>	Contractor, ECO, Specialist	Continuous
<ul style="list-style-type: none"> <li>All road planning needs to consider the requirement to allow movement of organisms along natural corridors.</li> </ul>	Project Manager, ECO, Contractor	As necessary
<ul style="list-style-type: none"> <li>Thyspunt: footprint should be separated from the high-water mark by a coastal corridor and adequate buffer, whichever is the greater. Such a corridor shall be underpinned by the following ecological rules or criteria: <ul style="list-style-type: none"> <li>200 m wide ecological corridor as a minimum width for serving as a conduit for fauna and an enabling area for essential ecological processes, such as pollination, and preservation of major communities.</li> <li>Avoidance of the sensitive and rare coastal wetlands and Langefontein. The latter could be affected by the eastern phase of the facility.</li> <li>Avoidance of the sensitive rocky shore community.</li> <li>Avoidance of the embryo dunes and semi-mobile parabolics, particularly along the Thysbaai coastline. This will in particular affect the eastern phase of the proposed facility.</li> <li>Whichever line is the furthest from the High Water Mark (HWM), an additional buffer of 100 m should be set to protect the sensitive systems discussed above from any long-term impacts the development could have on such systems.</li> <li>All lines will need to be accurately surveyed before the footprint is fine-tuned.</li> </ul> </li> </ul>	Project Manager, Contractor	Prior to and during construction
<ul style="list-style-type: none"> <li>Thyspunt: The sensitive coastal environment should be avoided and this includes any dunes which are mobile or semi-mobile. Sensitive coastal dune systems should be buffered by a minimum of 100 m. In particular both the coastal wetlands as well as Langefontein should be avoided and a suitable buffer of minimum 100 m wide created.</li> </ul>	Project Manager, Contractor	Prior to construction
<ul style="list-style-type: none"> <li>All structures outside of the site security fence will be minimised.</li> </ul>	Project Manager, Contractor	Prior to construction
<ul style="list-style-type: none"> <li>Duynfontein: Each footprint should be separated from the high-water mark by a coastal corridor and adequate buffer, whichever is the greater. Such a corridor should be underpinned by the following ecological rules or criteria: <ul style="list-style-type: none"> <li>200 m wide ecological corridor as a minimum width for serving as a conduit for fauna and an enabling area for essential ecological processes, such as pollination, and preservation of major communities.</li> <li>Avoidance of the sensitive primary dunes at the coast.</li> <li>Avoidance of the sensitive limestone cliffs, in the north of the area.</li> <li>Whichever setback line is the furthest from the HWM, an additional buffer of 100 m should be set to protect the sensitive systems discussed above from any long-term impacts the development could have on such</li> </ul> </li> </ul>	Project Manager, Contractor	Prior to construction

Mitigation	Responsible Individual/s	Frequency
<p>systems.</p> <ul style="list-style-type: none"> <li>○ All setback lines will need to be accurately surveyed before the footprint is fine-tuned.</li> </ul>		
<ul style="list-style-type: none"> <li>• Bantamsklip: The coastal limestones should be avoided and the effects on the transverse dunes minimised.</li> </ul>	Project Manager, Contractor	Prior to construction
<ul style="list-style-type: none"> <li>• Bantamsklip: The footprint should be separated from the high-water mark by a coastal corridor and adequate buffer, whichever is the greater. Such a corridor should be underpinned by the following ecological rules or criteria: <ul style="list-style-type: none"> <li>○ 200 m wide ecological corridor as a minimum width for serving as a conduit for fauna and an enabling area for essential ecological processes, such as pollination, and preservation of major communities.</li> <li>○ Avoidance of the embryo dunes and rocky shore vegetation.</li> <li>○ Avoidance of the coastal limestones.</li> <li>○ Whichever line is the furthest from the HWM, an additional buffer of 100 m should be set to protect the sensitive systems discussed above from any long-term impacts the development could have on such systems.</li> <li>○ All lines will need to be accurately surveyed before the footprint is fine-tuned.</li> </ul> </li> </ul>	Project Manager, Contractor	Prior to construction
<ul style="list-style-type: none"> <li>• The Contractor shall produce a Site Utilisation Plan showing the construction layout, including the positions of all buildings, vehicle wash areas, diesel/ petrol storage areas and other infrastructure prior to establishment on NPS site.</li> </ul>	Project Manager, Contractor	Prior to construction
<ul style="list-style-type: none"> <li>• Natural topographical features will be used as boundaries to enable sound rehabilitation of areas (dunes, wetlands etc.).</li> </ul>	Project Manager, ECO, Contractor	Prior to and during construction
<ul style="list-style-type: none"> <li>• Installation of services, such as ablution facilities, and desalination plant shall take place as soon as possible before construction activities commence.</li> </ul>	Project Manager Contractor	Prior to construction
<ul style="list-style-type: none"> <li>• The Contractor shall supply a waste water management system that will comply with legal requirements.</li> </ul>	Project Manager, Contractor, ECO	Prior to construction
<ul style="list-style-type: none"> <li>• Storm water control berms (trench and/ or earth barriers) shall be constructed to divert rainwater around the construction site.</li> </ul>	Project Manager, Contractor	Prior to and throughout construction
<b>Demarcation of the NPS site</b>		
<ul style="list-style-type: none"> <li>• The construction site shall be fenced off to prevent wildlife from entering, and no domestic animals or livestock are to be brought on-site. Access to areas of the NPS site that are not involved in construction or operation of the plant should be controlled.</li> </ul>	Project Manager, Contractor, ECO	Prior to construction

Mitigation	Responsible Individual/s	Frequency
<ul style="list-style-type: none"> <li>Construction site shall be fenced and working areas secured before construction can proceed. An area of the site shall be dedicated to the storage of materials and plant equipment.</li> </ul>	Project Manager, Contractor	Once off
<ul style="list-style-type: none"> <li>Appropriate safety and precaution signs shall be erected prior to the start of construction.</li> </ul>	Project Manager, Contractor	Prior to construction and continuously
<ul style="list-style-type: none"> <li>“No-go” areas shall be demarcated by suitable fences.</li> </ul>	Project Manager, Contractor, ECO	Continuous
<b>Infrastructure</b>		
<ul style="list-style-type: none"> <li>All pipelines shall be clearly marked and protected.</li> </ul>	Project Manager, Contractor	Prior to construction
<b>Dune geomorphology</b>		
<ul style="list-style-type: none"> <li>Dunes should not be disturbed and should remain a “no-go” area. It is recommended that disturbed areas be stabilised with drift fences, brushwood and with pioneer indigenous dune vegetation.</li> </ul>	Contractor, Project Manager, ECO,	Prior to and during construction
<b>Geology and geologic risk</b>		
<ul style="list-style-type: none"> <li>A thorough assessment of the area excavated for NPS footprint to uncover the presence of any undetected capable faults.</li> <li>Incorporating the results of the geological investigations to aid in the selection of an appropriate NPS design</li> <li>The results of the geological and seismological studies should be used as design input for determining the Safe Shutdown Earthquake Ground Motion (SSEGM) during operation as well the regulatory period after its decommissioning.</li> </ul>	Contractor, Project Manager, ECO,	Prior to construction
<b>Seismological risk</b>		
<ul style="list-style-type: none"> <li>The geotechnical and structural civil engineers shall assign the appropriate “seismic design criteria” for the design of utilities, including on-site and off-site water reservoirs.</li> <li>To provide the expected ground motions and seismic design parameters derived there from based on geologic, seismotectonic, palaeoseismic and instrumentally recorded events.</li> <li>The ground motion and seismic design parameters are to be used as design input for determining the SSEGM while the site is active as well the regulatory period after its decommissioning.</li> <li>Additional geologic investigations aimed at reducing the uncertainties regarding the geological model for the Site Vicinity area. This includes the finalization of outstanding issues related to fault characterization, followed by the compilation of potential source models to be derived from the existing information, with the purpose to build a suite of alternative models that reflect the uncertainty that exists regarding the activities of identified sources. This information will then be utilized in a full-blown PSHA that will follow internationally accepted</li> </ul>	Project Manager	Prior to construction

Mitigation	Responsible Individual/s	Frequency
practice.		
<b>Geotechnical suitability</b>		
<ul style="list-style-type: none"> <li>To explore the feasibility of lateral support systems to retain approximately 20 m of overburden and minimise excavation volumes, all within an effectively dewatered site.</li> </ul>	Project Manager	Prior to construction
<b>Hydrology</b>		
<ul style="list-style-type: none"> <li>Plan the final locality and level of the plant area in order to minimise the impact of the flood hazards.</li> <li>Take into account the extreme water levels from the ocean the minimum level of the plant area to be 8.9 mamsl.</li> <li>Position the plant footprint outside of watercourse areas.</li> </ul>	Project Manager	Prior to construction
<b>Groundwater and geohydrology</b>		
<ul style="list-style-type: none"> <li>Roads, cables and pipelines should all avoid passing through areas identified as important hydrological corridors.</li> </ul>	Project Manager, Contractor	Prior to and during construction
<ul style="list-style-type: none"> <li>No roads, pipelines, cable routes or other structures should be passed through wetland areas other than those assessed in the EIA.</li> </ul>	Project Manager, Contractor	Continuous
<b>Flora</b>		
<ul style="list-style-type: none"> <li>Search and rescue For each phase of construction within natural veld, a search and rescue operation is required which would identify all plants which were either extremely rare (i.e. Endangered or Critically Endangered) or which could be used in site rehabilitation. Red Data species likely to be affected if development is carried out on the transverse dunes, are <i>Helichrysum cochleariforme</i> duineteebossie (NT), <i>Psoralea repens</i> duine-ertjie (NT), the succulent vygie <i>Ruschia indecora</i> (EN), and <i>Passerina ericoides</i> kusgonnabas (VU) (Red Data status in brackets – see Glossary for explanation of categories).</li> </ul>	Project Manager, ECO, Specialist	Prior to and during construction
<ul style="list-style-type: none"> <li>Development is not recommended in the transverse dunes and, by implication, the sensitive primary dunes along the coast. Rather a setback 100 m inland of the eastern edge of the transverse dunes, recommends development on the flats to the east of the transverse dunes. The recommended siting of the EIA &amp; HV Yard corridor retains the coastal corridor.</li> </ul>	Project Manager, ECO, Contractor	Prior to construction
<ul style="list-style-type: none"> <li>The development of a rehabilitation plan which would see that all areas disturbed in the development of the proposed facility are satisfactorily rehabilitated with locally occurring indigenous species.</li> </ul>	Contractor, Project Manager, ECO,	Prior to and during construction

Mitigation	Responsible Individual/s	Frequency
<b>Wetlands</b>		
<p>The establishment of “no go” development areas within the site</p> <p>The setting of “no go” development areas on site is considered essential mitigation, and requires consideration of both surface and groundwater interactions between wetlands and development-related activities on the site.</p> <p>The following restrictions on layout within the site as a whole are recommended:</p> <ol style="list-style-type: none"> <li>i. All areas outside of the EIA and the HV corridors are considered in this study as “no go” development areas, with the exception of the proposed access road routes. The portions of the areas outside of the two corridors that are of particular relevance to wetland ecosystem conservation and management comprise however: <ul style="list-style-type: none"> <li>o the seasonal wetlands south of the existing Koeberg NPS (that is, the mosaic wetlands that include Sw1 and Sw2);</li> <li>o the seasonal and permanent wetlands east of the Koeberg NPS (that is, Sw3, Sw4, Sw5 and Sw6, P1, P4, P5, P6, P7, P2b, c and d; and</li> <li>o undeveloped terrestrial areas that link these wetlands – Harrison et al (2009) recommend faunal corridors across the site, and these should be implemented between wetland areas.</li> </ul> </li> <li>ii. Within the HV corridor: development should ensure that the integrity of the remnant mobile dunes is not impacted by expansion of development into this area, thus destroying existing and potential duneslack wetlands, such as Sw7; and</li> <li>iii. Within the EIA corridor: development north into the mobile dune would impact on the flux in establishment and loss of seasonal wetlands in the dune, depending on changes in the level of interdune areas; development north of the dune would impact on the present function of the artificial recharge ponds (P3a-d) – the location of these ponds is considered important from a functional perspective, in terms of acting as a hydraulic barrier to seawater intrusion into the aquifer, and thus although they are artificial, their reconstruction elsewhere may not address this function.</li> </ol> <p>The areas specified above (i-iii) should ideally not be utilised as construction laydown, stockpile, spoil or other activities associated with the construction phase of a NPS. From a wetland perspective, however, the wetlands within the EIA and HV yards are not as important as the more extensive, least-impacted wetlands south of the Koeberg NPS. Thus implementation of the recommended development exclusion areas outlined in (i (above)) is considered of higher priority than implementation of the remaining two exclusion areas.</p>	<p>Project Manager, Contractor, ECO, Specialist</p>	<p>Prior to construction</p>
<b>Fauna protection</b>		
<ul style="list-style-type: none"> <li>• Restrict development to recommended areas. The recommended areas are those with low or medium faunal</li> </ul>	<p>Project Manager,</p>	<p>Prior to and</p>

Mitigation	Responsible Individual/s	Frequency
sensitivity (refer to Fauna specialist study in the EIR).	ECO, Specialist	during construction
<ul style="list-style-type: none"> <li>• Restrict the footprint of the development to the smallest area possible. While the actual footprints of the buildings may be fixed, other areas are likely to be more flexible in their extent, e.g. areas for lay down, storage of topsoil, parking, etc.</li> </ul>	Project Manager, Contractor	Prior to and during construction
<ul style="list-style-type: none"> <li>• Create laydowns in previously disturbed areas. Avoid creating laydowns and storage areas for overburden in areas of high quality habitat.</li> </ul>	Project Manager, ECO Contractor	Prior to and during construction
<ul style="list-style-type: none"> <li>• Use natural topographical features as boundaries. Cutting across natural features, such as dune ridges and wetlands, will make rehabilitation of the areas that remain more difficult and less effective.</li> </ul>	Project Manager, ECO Contractor	Prior to and during construction
<ul style="list-style-type: none"> <li>• Clear the site in a logical sequence. Initial site clearance should be carried out in manner that allows mobile species to escape. This means that clearance should start from an area of relatively high disturbance and progress in an orderly manner in the direction of least disturbance and least physical obstruction. For example, begin clearing from an existing fence and clear towards an area that is not yet fenced and is still covered by natural habitat.</li> </ul>	Project Manager, ECO, Contractor	During construction
<ul style="list-style-type: none"> <li>• Mark off the affected area. The footprint area, within which all construction is to take place, should be demarcated with stakes and hazard tape <i>prior</i> to site clearance, and should be fenced <i>after</i> initial site clearance. The tape and fence are important in demarcating the limits of allowable disturbance of natural areas.</li> </ul>	Project Manager, ECO, Contractor	Prior to site clearance and after site clearance
<ul style="list-style-type: none"> <li>• Compensate for loss of habitats. At Duynfontein, this form of compensation for negative impacts can only be brought about by means of improvements to the management and status of Koeberg Private Nature Reserve (KPNR). Recommended improvements are: <ul style="list-style-type: none"> <li>○ Enlarge the reserve through the acquisition of neighbouring farms;</li> <li>○ Elevation of the legal status of KPNR to a statutory nature reserve;</li> <li>○ Replacement of unsuitable mesh fences with palisade fences (see Appendix 6 of the Fauna specialist study in the EIR);</li> <li>○ Increased spending on the removal of invasive alien plants;</li> <li>○ Installation of two or three underpasses and/ or overpasses across the R27, and major on-site access roads, to facilitate animal movements (see Appendix 5 of the Fauna specialist study in the EIR ); and</li> <li>○ Commissioning of detailed surveys of inadequately surveyed animal groups, viz., reptiles and small mammals, to inform management.</li> </ul> </li> </ul>	Client Office Manager	As necessary

Mitigation	Responsible Individual/s	Frequency
<ul style="list-style-type: none"> <li>○ Commissioning of a programme to monitor the populations of sensitive species, to inform management.</li> </ul>		
<ul style="list-style-type: none"> <li>• Facilitate search-and-rescue operations before and during site clearance. Individuals of Threatened species rescued during site clearance can be re-located in neighbouring, protected areas on site.</li> </ul>	Project Manager, ECO, Specialist	Continuous
<ul style="list-style-type: none"> <li>• Facilitate collection of scientific material and information before and during site clearance. Benefit can be derived from the biological material that will otherwise be totally lost during site clearance. Appropriate specialists should be commissioned to collect specimens for deposit in museums, herbaria, etc. The information collected will also be valuable for the management of the protected parts of Duynefontein.</li> </ul>	Project Manager, ECO, Specialist	Prior to and during construction
<ul style="list-style-type: none"> <li>• Determine location and extent of sensitive bird areas and quarantine these areas. These are well known at Duynefontein and no additional fieldwork should be necessary. Areas which hold sensitive breeding colonies of Threatened birds (see Fauna specialist study in the EIR) must be made out-of-bounds to all personnel, at all times. The sensitive areas must be cordoned off, in consultation with Eskom's design team, prior to commencement of construction activities. Note that such areas are usually also important roost sites and are therefore also sensitive in the non-breeding season. Because virtually the whole coastline is sensitive owing to breeding pairs of oystercatchers and plovers, all activities at the coast need to be kept to a minimum, especially the use of off-road vehicles. (Normal, low-impact recreational activities can be allowed to resume on the beaches during the operational phase).</li> </ul>	Project Manager, ECO, Specialist	Prior to construction
<ul style="list-style-type: none"> <li>• Create a wide buffer zone. All sensitive bird breeding sites must be surrounded by a no-go buffer zone of at least 200 m width.</li> </ul>	Project Manager, ECO, Specialist	Prior to construction
<ul style="list-style-type: none"> <li>• Engineer solutions to the flow of groundwater. Where construction interacts with the flow of groundwater, ensure that such flow is redirected in such a way that downstream impacts are minimized.</li> </ul>	Client Office Manager, Project Manager, Contractor	Prior to construction
<ul style="list-style-type: none"> <li>• Engineer solutions to the flow of surface runoff. Erosion of topsoil and contamination of streams and wetlands must be avoided through proper management of runoff from hardened surfaces such as roads and buildings.</li> </ul>	Client Office Manager, Project Manager, Contractor	Prior to construction
<b>Oceanography</b>		
<ul style="list-style-type: none"> <li>• Build the NPS above the maximum predicted rise in sea level i.e. at a recommended elevation of &gt;11.04 m MSL.</li> </ul>	Project Manager, Contractor,	Continuous
<ul style="list-style-type: none"> <li>• Key mitigation measures for minimising the potential impacts of a thermal plume are already in place. If the engineering solution is amended, any new solution should ensure that results are either optimised or</li> </ul>	Client Office Manager, Project	Prior to construction



Mitigation	Responsible Individual/s	Frequency
equivalent to the current design proposal.	Manager	
<b>Visual</b>		
<p>Generic mitigation measures</p> <ul style="list-style-type: none"> <li>• Prepare mitigation design details and specifications for all actions e.g. colour and form, slope stabilisation and vegetation to blend new cut and fill landforms into the setting.</li> <li>• Include screen berms in tender documentation for pricing by Contractor.</li> </ul>	Project Manager, Contractor, ECO	Prior to construction
<p>Visual degradation of natural environment by drill rigs, vehicles and access roads</p> <ul style="list-style-type: none"> <li>• Restrict access to sensitive areas by vehicles and machinery.</li> <li>• Select routes to each location based on sensitive areas.</li> <li>• Do not allow deviation from access road or random driving through natural areas.</li> <li>• Draft specific specifications for each action and provide a “conduct” list to persons working on site during the design phase.</li> </ul>	Project Manager, Contractor, ECO	Prior to and during construction
<p>Defacing landscape elements during surveying of site e.g. painting rocks and removal of vegetation without permission</p> <ul style="list-style-type: none"> <li>• Draw up code of practice for site work by surveyors and their staff with specific reference to environmental aspects related to their work.</li> </ul>	Project Manager, Contractor, ECO	Prior to and during construction
<p>Large scale and form of the NPS and transmission towers in a visually exposed and natural coastal setting.</p> <ul style="list-style-type: none"> <li>• It is recommended that because of the scale of the NPS its form should be visually reduced by a darker band of the base colour near the top of the main structure.</li> <li>• The base colour recommended is a light grey or blue grey or a light straw. The visually prominent stack should be painted white or very light grey.</li> <li>• The light grey colour of the concrete of the Reactor Structure is suitable to reduce the visible scale.</li> <li>• The transmission line towers to the 3 km exclusion zone boundary should be the grey of the standard galvanised finish.</li> <li>• It is recommended that a Landscape Architect be consulted with regard to the simulation of the NPS to assist in the selection of colours that will fit the setting during the summer and winter seasons.</li> <li>• If possible, design a rounded roof structure for the turbine halls and reactor buildings. This will reduce straight shadow lines on the structures.</li> </ul>	Project Manager, Contractor, ECO, Specialist	As necessary
<p>Large scale of NPS and associated structures</p> <ul style="list-style-type: none"> <li>• Where reasonable, screen the lower portions of the structures by strategically positioned earth berms and tree and shrub planting. The construction of screening elements, berms, planting and fences at particular areas within and around the site. This task should be carried out by a qualified Landscape Architect.</li> </ul>	Project Manager, Contractor, ECO, Specialist	Prior to and during construction

Mitigation	Responsible Individual/s	Frequency
<p>High visibility of NPS at night as a result of security and safety lighting</p> <ul style="list-style-type: none"> <li>• The minimisation of light intensity and light spill by the analysis of lighting requirements and the selection of luminaires that direct light. A suitably experienced person should design the lighting plan for the NPS and surround security areas. The process would also involve the modelling of the light spill for various light units to achieve the required effect and to limit the “light spill”. The aspects of the lighting solution should include the following: <ul style="list-style-type: none"> <li>○ Light fittings should have shields to eliminate sight of the light source from sensitive nearby land uses e.g. nearby communities;</li> <li>○ Down lighting of areas preferred to up lighting;</li> <li>○ Perimeter lights to be directed downwards and inwards;</li> <li>○ Emitted light colour to be a low pressure sodium (yellow), preferably not mercury halide (blue-white) or fluorescent lights, as these attract insects and considerable depletion of the insect populations will result over time;</li> <li>○ Do not flood light the entire main structure but incorporate concealed lights high on the structure to shine downwards. Darker areas on the building elevations will provide a less visually noticeable structure;</li> <li>○ No light fittings should spill light upwards or be directed upwards from a distance towards the area or building to be illuminated; and</li> <li>○ The lighting plan should strive to maximise the energy efficiency. This should include a hierarchy of lights that are essential to those that are switched on only when needed.</li> </ul> </li> </ul>	Project Manager, Contractor, Specialist	As necessary
<p>Loss of visual integrity and continuity of the beach area by structures, fences and roads</p> <ul style="list-style-type: none"> <li>• Move the NPS further inland to provide at least a 200 m width above high tide line, of undisturbed beach and adjacent area (it is noted that the predicted high water line will rise as a result of climate change and therefore the setback should take this into account).</li> </ul>	Client Manager, Office Project Manager, Specialist	Prior to and during construction
<b>Heritage and archaeology</b>		
<ul style="list-style-type: none"> <li>• <i>As much mitigation work as possible</i> should happen in advance of commencement of construction activities, as attempting archaeological or palaeontological rescue work on a busy 24-hour construction site is extremely difficult. The applicant is requested to be pro-active by commissioning the required work as soon as possible. In the event of personnel having to undertake archaeological or palaeontological rescue work during the course of construction, they will need the co-operation of construction staff to allow them the necessary time to do the required rescue work.</li> </ul>	Project Manager, ECO, Specialist	Prior to and during construction

Mitigation	Responsible Individual/s	Frequency
<ul style="list-style-type: none"> <li>Where practically possible, it is strongly recommended that infrastructure is made aesthetically pleasing and at empathy with landscape, cultural and natural heritage. It is recommended that the applicant consult with urban design specialists who can assist with environment and heritage friendly layout and structures.</li> </ul>	Project Manager, ECO, Contractor	Prior to construction
<p>It is essential that an archaeologist is appointed well in advance of construction to undertake the following tasks:</p> <ul style="list-style-type: none"> <li>Undertake the sampling and curation of material from all identifiable Late Stone Age sites that will be affected by the proposed activity.</li> <li>Undertake a series of trial excavations throughout the development area and beyond to define the extent of the Pleistocene fossil bearing sediments as manifested at the site of Duynfontein 2.</li> <li>Based on these findings design and implement a sampling strategy (with consultation with other heritage I&amp;APs) to systematically record, collect and curate Pleistocene archaeological and palaeontological remains.</li> <li>Work with the applicant to ensure that a suitable facility for the safe indefinite storage of any finds is made available – be it at a museum or a specially designed facility.</li> <li>During the construction period (especially land clearing and bulk excavation) an archaeologist and/ or representative must initially be on site at all times that bulk excavation is taking place. If there is good reason to believe that certain activity areas are not sensitive, the frequency of monitoring can be decreased.</li> <li>In the event of a find of fossil bone or artefactual material, the archaeologist will need to identify the horizon that the find is associated with and, if necessary, be given the opportunity and budget to bring a “rescue” team onto site to excavate the find, expose the material and sample it accurately and adequately.</li> </ul>	Specialist	Prior to construction
<ul style="list-style-type: none"> <li>Fossil human remains may exist on or close to the site. Any find of fossil human remains from the late Pleistocene (and earlier) must be removed with appropriate care by an archaeologist. In the unlikely event of a find such as this occurring, it is requested that the applicant facilitate the necessary work in such a way that it is done to the highest standards, and as quickly as is reasonable.</li> </ul>	Project Manager, ECO	Prior to and during construction
<ul style="list-style-type: none"> <li>It is recommended that a “mitigation plan” be developed through workshopping specific mitigation proposals with the respective archaeology and palaeontology committees of SAHRA and HWC. The mitigation measures detailed in the Heritage Impact Assessment study (undertaken for the EIA) form a basis from which such a plan could be developed.</li> </ul>	Project Manager, ECO, Specialist	Prior to construction
<ul style="list-style-type: none"> <li>The archaeologist will document in detail all identified protected heritage resources in accordance with the standard practices and as prescribed by SAHRA, as defined in the National Heritage Resources Act (1999).</li> </ul>	Specialist	Prior to and during construction
<b>Transport</b>		
<ul style="list-style-type: none"> <li>The R27/ Main Access Road intersection is required to be upgraded by 2018, to enable the intersection to cope with the projected traffic demand. If the PGWC's proposal to upgrade to a grade separated intersection</li> </ul>	Client Manager, Manager	Office Project Prior to construction

Mitigation	Responsible Individual/s	Frequency
is viable then this option should be implemented. If this option is not viable, the R27/ Main Access Road intersection signalisation upgrade option should be reconsidered.		
<b>Emergency response</b>		
<ul style="list-style-type: none"> <li>Emergency procedures shall be set up prior to the commencement of work. It shall include but not be limited to fires, spills, and contamination of ground and surface water, accidents to employees and damage to services.</li> </ul>	Project Manager, Contractor, ECO	Prior to construction and as necessary

### 3.2.3 Construction phase

One of the key challenges in managing the environment on a development project is ensuring that there is a clear connection between the environmental assessment and the project implementation processes. It is therefore important to identify and use the mechanisms that are in place for project implementation as the mechanisms for ensuring implementation of the environmental management requirements. The NPS will require a variety of method statements to address the full range of environmental aspects related to its construction.

**Table 3-2: Mitigation measures for the construction phase**

Mitigation	Responsible Individual/s	Frequency	Method Statement Required
<b>NPS site monitoring, auditing and reporting</b>			
<ul style="list-style-type: none"> <li>• Records shall be kept on site in accordance with the standard Eskom site documentation. The documentation shall be signed by relevant parties. The following documentation, at a minimum, shall be kept on site:               <ol style="list-style-type: none"> <li>1. Physical access plan;</li> <li>2. Complaints register;</li> <li>3. Site daily diary;</li> <li>4. Records of all remediation/ rehabilitation activities;</li> <li>5. Copies of reports to the Environmental Control Officer;</li> <li>6. Copy of the Construction Method Statements;</li> <li>7. Fire Protection Agency Plan;</li> <li>8. Environmental Incident Log;</li> <li>9. ECO inspection audit reports;</li> <li>10. The Environmental Authorisation issued for the project ;and</li> <li>11. An appropriate fines system for non-compliance will be developed and implemented.</li> </ol> </li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>• Air quality monitoring programme will be implemented at the NPS site's nearest neighbours.</li> </ul>	Site Manager, Contractor, ECO, Specialist	Continuous	
<ul style="list-style-type: none"> <li>• Invertebrate monitoring programme will be implemented on the NPS site.</li> </ul>	Site Manager, Contractor, ECO, Specialist	Continuous	

Mitigation	Responsible Individual/s	Frequency	Method Statement Required
<ul style="list-style-type: none"> <li>All records relating to monitoring and auditing shall be made available for inspection to any relevant authority, or Eskom's Environmental Audit Team, in respect of the development.</li> </ul>	Site Manager, Contractor, ECO	As necessary	
<b>Access to NPS site</b>			
<ul style="list-style-type: none"> <li>The NPS site and associated infrastructure and equipment shall be off-limits to the public.</li> </ul>	Site Manager, Contractor	Continuous	
<ul style="list-style-type: none"> <li>All construction vehicles using public roads shall be in a roadworthy condition.</li> </ul>	Site Manager, Contractor	Continuous	
<ul style="list-style-type: none"> <li>Vehicle speeds shall abide to prescribed speed limits. Speed limits shall be indicated on the roads.</li> </ul>	Site Manager, Contractor	Continuous	
<ul style="list-style-type: none"> <li>Exceptionally heavy loads should be transported according to the appropriate Transport Permit.</li> </ul>	Site Manager, Contractor	As necessary	Yes
<b>Environmental induction training</b>			
<ul style="list-style-type: none"> <li>Environmental awareness induction training course will be presented to the Contractor employees on the NPS site.</li> </ul>	Site Manager, Contractor, ECO	As necessary	
<ul style="list-style-type: none"> <li>Induction training must include at least the following topics: <ul style="list-style-type: none"> <li>Key potential or actual environmental construction related impacts on NPS site and related environmental precautions, which need to be taken to avoid or mitigate these impacts;</li> <li>Conservation-related issues and programmes on-site;</li> <li>Archaeological issues on-site;</li> <li>Outline of all monitoring programmes on-site;</li> <li>Key mitigation measures to be implemented during construction activities;</li> <li>Emergency responses to issues on NPS site;</li> <li>Roles and responsibilities of all staff on NPS site; and</li> <li>The benefits of achieving conformance with, and consequences of transgressions of environmental specifications or requirements of the EMP.</li> </ul> </li> </ul>	Site Manager, Contractor	As necessary	
<b>Ablution facilities</b>			
<ul style="list-style-type: none"> <li>Abluting anywhere other than in the toilets shall not be permitted.</li> </ul>	Site Manager, Contractor,	Continuous	

Mitigation	Responsible Individual/s	Frequency	Method Statement Required
	ECO		
<ul style="list-style-type: none"> <li>Chemical toilets are permitted on NPS site during the excavation period.</li> </ul>	Site Manager,	Continuous	
<ul style="list-style-type: none"> <li>A sewage system must be implemented as soon as is practical after construction commences.</li> </ul>	Site Manager, Contractor		
<ul style="list-style-type: none"> <li>A service provider shall be appointed to remove sewage from the sewage system on a regular basis. This sewage is to be disposed of at a municipal sewage facility.</li> </ul>	Site Manager, Contractor/ ECO	Continuous	
<b>Waste management</b>			
<ul style="list-style-type: none"> <li>An on-site waste management plan shall be developed and implemented.</li> </ul>	Site Manager, Contractor, ECO	Once-off	Yes
<b>Batching plants</b>			
<ul style="list-style-type: none"> <li>Concrete shall not be mixed directly on the ground.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>The concrete batching activity shall be located in an area of low environmental sensitivity. The site for the batch plant shall be indicated on final site layout plan.</li> </ul>	Site Manager, Contractor, ECO	Once-off	
<ul style="list-style-type: none"> <li>All waste water resulting from batching of concrete must be cement free before disposal in a waste water management system.</li> </ul>	Site Manager, Contractor	Continuous	Yes
<ul style="list-style-type: none"> <li>Bags of cement, including empty bags, shall be stored in an area protected from the weather.</li> </ul>	Site Manager, Contractor	Continuous	
<ul style="list-style-type: none"> <li>The cleaning of concrete delivery trucks shall be carried out in a controlled cleaning zone.</li> </ul>	Site Manager, Contractor	Continuous	
<ul style="list-style-type: none"> <li>Upon completion of works, the ground of the batching plant area shall be rehabilitated and the site cleaned and left as it was found and to the satisfaction of the ECO.</li> </ul>	Site Manager, Contractor	Upon completion	
<b>Blasting and borrow material</b>			
<ul style="list-style-type: none"> <li>Blasting will be undertaken according to relevant statutes and regulations.</li> </ul>	Site Manager, Contractor	During construction	

Mitigation	Responsible Individual/s	Frequency	Method Statement Required
<ul style="list-style-type: none"> <li>All blasting to be undertaken under strict supervision of a registered specialist blaster.</li> </ul>	Site Manager, Contractor	During construction	
<ul style="list-style-type: none"> <li>All borrow pits shall be authorised in terms of the Minerals Act (No.50 of 1991) and the Minerals and Petroleum Resources Development Act (No.28 of 2002) and under no circumstances will excavations or blasting commence unless authorisations or exemptions are in place.</li> </ul>	Site Manager, Contractor, ECO	During construction	
<b>Materials use, handling, storage and transport (cement, fuel [petrol, diesel] and oils)</b>			
<ul style="list-style-type: none"> <li>Procedures for material handling shall be developed and authorised.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Relevant national, regional and local legislation regarding the transport, use and disposal of hazardous waste must be adhered to at all times.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Storage, handling and disposal of fuels, oils, lubricants and other potentially harmful chemicals (and their containers) shall be done under proper supervision in accordance with the manufacturer's instructions.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Vehicle or machinery shall only be refuelled at a purposed designed and designated refuelling area on site.</li> </ul>	Site Manager, Contractor	Continuous	
<ul style="list-style-type: none"> <li>Drip-trays filled with appropriate absorbent material shall be placed under all parked construction vehicles and regularly disposed of in an appropriate manner.</li> </ul>	Site Manager, Contractor	Continuous	
<ul style="list-style-type: none"> <li>Spills of hazardous substances will be reported to the ECO immediately. A register for spills and incidents involving hazardous materials shall be maintained.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Soil or yard stone, which has been contaminated, shall be removed and disposed of at an approved waste disposal site. Alternatively, contaminated soil can be treated on site through bioremediation.</li> </ul>	Site Manager, Contractor, ECO	As necessary	Yes
<ul style="list-style-type: none"> <li>Spills shall be cleaned and remedied to the satisfaction of the ECO. A Method Statement is required from the Contractor that details the procedure to be followed in dealing with leaks or spills.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Appropriate complete emergency spill kits shall be available on site at all times. The Contractor shall also ensure that relevant staff members are trained to use the emergency spill kit and on</li> </ul>	Site Manager, Contractor	As necessary	



Mitigation	Responsible Individual/s	Frequency	Method Statement Required
the manner in which to deal with spills of hazardous substances (oils, diesel or petrol).			
<ul style="list-style-type: none"> <li>The Contractor shall ensure that any delivery drivers are informed of all procedures and restrictions (including 'no-go' areas) required to comply with the EMP. The Contractor shall ensure that these delivery drivers are supervised during the off-loading by someone with an adequate understanding of the requirements.</li> </ul>	Site Manager, Contractor	As necessary	
<ul style="list-style-type: none"> <li>Materials shall be appropriately secured to ensure safe passage between destinations.</li> </ul>	Site Manager, Contractor	As necessary	Yes
<ul style="list-style-type: none"> <li>Concrete platforms with bund walls shall be allocated to accommodate fuel, oil, paint, bitumen, herbicide and insecticides to guard against infiltration of hazardous substances into the soil. Fuel tanks shall be banded to hold 110 % of the contents of the tank. The tanks shall be housed in a roofed area to minimise collection of water within the bund wall. Accumulated water will be removed on a daily basis.</li> </ul>	Site Manager, Contractor	Once-off	
<ul style="list-style-type: none"> <li>Materials storage areas will not be allowed in close proximity to ecologically sensitive areas and outside the 1:50 year flood line of watercourses.</li> </ul>	Site Manager, Contractor	Continuous	
<ul style="list-style-type: none"> <li>No storage of combustible materials shall be permitted in any banded area.</li> </ul>	Site Manager, Contractor	Continuous	
<ul style="list-style-type: none"> <li>All staff handling hazardous waste shall be trained accordingly.</li> </ul>	Site Manager, Contractor	Continuous	
<ul style="list-style-type: none"> <li>All necessary approvals with respect to diesel/ petrol fuel storage and dispensing shall be obtained from the appropriate authorities.</li> </ul>	Site Manager, Contractor	Continuous	
<ul style="list-style-type: none"> <li>Areas of fuels storage and other flammable materials shall comply with standard fire safety regulations and will require the approval of the SM and the Fire Prevention Officer.</li> </ul>	Site Manager, Contractor	Continuous	Yes
<ul style="list-style-type: none"> <li>No smoking shall be allowed in the vicinity of the stores and adequate fire-fighting equipment shall be accessible at fuel storage area and areas in the vicinity of the storage area. No smoking" and "Danger" signs shall be erected at hazardous substance storage areas.</li> </ul>	Site Manager, Contractor	Continuous	
<ul style="list-style-type: none"> <li>All empty and externally dirty tanks shall be sealed and stored on an area where the ground has been protected.</li> </ul>	Site Manager, Contractor	Continuous	
<b>Servicing of vehicles</b>			
<ul style="list-style-type: none"> <li>All vehicles shall be serviced in the designated area on-site. Only emergency repairs shall be</li> </ul>	Site Manager,	As necessary	

Mitigation	Responsible Individual/s	Frequency	Method Statement Required
allowed on site outside the designated area and a drip tray shall be used to prevent oil spills.	Contractor		
<b>Fire prevention</b>			
<ul style="list-style-type: none"> <li>The use of open fires on-site is strictly prohibited.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Accidental fires shall be prevented through proper sensitisation of the Contractors and their workers towards the associated risks, dangers and damage of property.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>The Contractor shall have fire-fighting equipment for each construction team readily available on site.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>The fire fighting equipment shall be regularly checked and shall be approved by the ECO/ Safety and Health Officer on site.</li> </ul>	Site Manager, Contractor,		
<ul style="list-style-type: none"> <li>An emergency preparedness plan should be in place in order to fight accidental fires should they occur. The adjacent land owners/ users/ managers should also be informed and/ or involved.</li> </ul>	Site Manager, Contractor,	Continuous	Yes
<ul style="list-style-type: none"> <li>In situations where fire breaks (temporary or permanent) are constructed to prevent accidental fires spreading from the site, as well as fires entering the site from adjacent land, these shall be constructed in accordance with the Veld and Forest Fires Act.</li> </ul>	Site Manager, Contractor, ECO	As necessary	
<ul style="list-style-type: none"> <li>Proper firebreaks shall be maintained around the entire site.</li> </ul>	Site Manager, Contractor	Continuous	
<b>Geology and geologic risk</b>			
<ul style="list-style-type: none"> <li>Foundations of the structures to be sunk into solid bedrock where possible.</li> </ul>	Site Manager, Contractor,	As necessary	
<b>Hydrology</b>			
<ul style="list-style-type: none"> <li>Separate “clean” stormwater run-off from “dirty” stormwater run-off and minimise the inflow of “clean” stormwater run-off into the construction site. The “clean” stormwater run-off is defined as surface water emanating from “virgin” undeveloped catchments and “dirty” stormwater would emanate from areas with construction activities.</li> </ul>	Site Manager, Contractor, ECO	During construction	

Mitigation	Responsible Individual/s	Frequency	Method Statement Required
<ul style="list-style-type: none"> <li>Construct a stormwater diversion embankment around the perimeter of the site to ensure that both catchment run-off as well as sea water ingress is prevented. The diversion embankment can possibly be constructed later to be incorporated with the final plant level and platform.</li> <li>Ensure that a temporary stormwater collection sump is installed during foundation excavation activities to allow excess run-off to drain to a defined low area (sump) where any transported sediment could be contained and stormwater pumped out. Depending on the nature and content of the sediment this could be pumped to a temporary holding facility and then transported to a waste disposal site. Further details would be obtained from more detailed water quality studies at a later stage. In terms of Regulation 704 (June 1999) of the National Water Act, 1998 (Act No. 36 of 1998) at least the 1:50 year run-off volume with an 800 mm freeboard would need to be contained.</li> </ul>			
<b>Groundwater and geohydrology</b>			
<ul style="list-style-type: none"> <li>The construction area and subsequent excavated areas must be dewatered by constructing a cut-off/ diaphragm wall and installing a series of wellpoints and boreholes for the implementation of a groundwater monitoring programme. The siting of the NPS within the EIA Corridor should also take into account the optimal position from this point of view.</li> </ul>	Site Manager, Contractor, ECO	During construction	
<ul style="list-style-type: none"> <li>Abstraction should preferably not take place from aquifers with direct links to freshwater ecosystems.</li> </ul>	Site Manager, Contractor, ECO	During construction	
<ul style="list-style-type: none"> <li>Roads, cables, foundations and pipelines should all avoid passing through/ intruding areas identified as important hydrological corridors and no roads, pipelines, cable routes or other structures should be passed through wetland areas other than those assessed and approved in the EIA.</li> </ul>	Site Manager, Contractor, ECO	During construction	
<p>Prevention of contamination</p> <ul style="list-style-type: none"> <li>To ensure that groundwater is not contaminated due to sea water ingress during dewatering, groundwater levels between the excavation and the coastline will have to be maintained above sea level by injecting the water abstracted from the dewatering holes into holes drilled near the coastline. This must be accompanied by routine monitoring.</li> <li>Contamination of the soil and groundwater by accidental spills of fuel, oil and/ or grease must be kept to a minimum by applying a good 'housekeeping' approach.</li> <li>Procedures/ protocols must be in place to quickly and effectively repair any leakages and remove the contaminated soil. This soil must be collected and disposed of at a suitably licensed waste disposal facility (essential mitigation measure).</li> </ul>	Site Manager, Contractor, ECO	During construction	

Mitigation	Responsible Individual/s	Frequency	Method Statement Required
<ul style="list-style-type: none"> <li>• Fuel, oil and/ or grease should be stored on paved areas surrounded by oil catches, i.e. a sump surrounding the storage area to ‘catch’ all spilled fuel, oil and/ or grease (essential mitigation measure). This should be cleaned/ removed regularly and disposed of at a suitably licensed waste disposal facility (essential mitigation measure).</li> <li>• All industrial wastewater that will be generated at the sites from various operations must be safely and effectively processed and disposed of (essential mitigation measure).</li> <li>• Contamination of the soil and groundwater by leaks and spillages from on-site sanitation facilities must be kept to a minimum by conducting regular checks and repairs of any such leaks and spillages (essential mitigation measure). All ablution facilities and the discharge process of raw sewage must be designed to prevent potential contamination (essential mitigation measure).</li> <li>• Should the results of groundwater monitoring indicate that contamination has occurred, remedial procedures (which must already have been formulated) must be put in place with immediate effect.</li> <li>• Once contamination has been detected (predominantly based on a deterioration of groundwater quality), a site assessment must be undertaken. This assessment must include identifying the source of contamination and the scale of the problem. The extent of contamination must be investigated by augering a series of shallow, temporary exploration holes and collecting samples for analysis.</li> <li>• Minor, insignificant levels of contamination can be mitigated with natural attenuation.</li> <li>• All contaminated soil and groundwater must be disposed of according to environmentally acceptable procedures, with full cooperation from the relevant authorities and full documentation on the quantities and methods of disposal.</li> <li>• Regular inspection of the aseismic vault to ensure that groundwater does not permeate through the retaining wall of aseismic vault.</li> <li>• Waterproofing system applied to external walls below ground level to prevent the ingress of groundwater into the buildings, as well as the egress of radioactive substances out of the buildings.</li> <li>• Establish a ‘lessons learned’ task team to address inadvertent, unmonitored liquid releases of radioactivity from existing commercial nuclear power stations, including that from KNPS. The task team must review previous incidents, identify lessons learned from these events, and determine what, if any, changes are needed in the proper operation of the proposed site.</li> </ul>			

Mitigation	Responsible Individual/s	Frequency	Method Statement Required
<b>Water quality</b>			
<ul style="list-style-type: none"> <li>The impact on the primary aquifer by saline water intrusion before and after de-watering should be monitored routinely.</li> </ul>	Site Manager,	Continuous	Yes
<ul style="list-style-type: none"> <li>The water level in the monitoring boreholes should be recorded weekly for at least one full hydrological cycle to establish the impact of the rainy and dry seasons on the water level.</li> </ul>	Site Manager, Contractor	Continuous	
<b>Freshwater supply</b>			
Use of groundwater <ul style="list-style-type: none"> <li>Only use deep (&gt;100 m depth) boreholes on site.</li> <li>Apply sustainable pumping rates derived from credible geohydrological testing and analysis.</li> <li>Set target groundwater levels for maximum allowable drawdown.</li> <li>Implement a monitoring programme to provide early warning of any detrimental effects of pumping.</li> </ul>	Site Manager, Contractor	During construction	
Long-term groundwater control measures around the NPS <ul style="list-style-type: none"> <li>Detailed site investigation and numerical simulation to predict effects.</li> <li>Injection of pumped groundwater back into the aquifer to maintain groundwater levels.</li> <li>Coastal location of the NPS.</li> </ul>	Site Manager, Contractor	Prior to and during construction	
Use of surface water <ul style="list-style-type: none"> <li>Tap into a regional supply scheme rather than a local scheme.</li> <li>Use desalinated water.</li> </ul>	Site Manager, Contractor	During construction	
Installation of beach wells <ul style="list-style-type: none"> <li>Draw-up an environmental management plan prior to installation.</li> <li>Monitor water levels and quality.</li> </ul>	Site Manager, Contractor, ECO	Prior to and during construction	
Disposal of brine <ul style="list-style-type: none"> <li>Disposal in the surf zone.</li> </ul>	Site Manager, Contractor	As needed	
<b>Water consumption</b>			
<ul style="list-style-type: none"> <li>Construction workforce will be encouraged to use water sparingly.</li> </ul>	Site Manager, Contractor,	Continuous	

Mitigation	Responsible Individual/s	Frequency	Method Statement Required
	ECO		
<ul style="list-style-type: none"> <li>Ensure that no natural water sources (i.e. streams, rivers) are used for construction activities or for domestic purposes by the construction workforce.</li> </ul>	Site Manager, Contractor	Continuous	
<ul style="list-style-type: none"> <li>The Contractor will not make use of/ collect water from any other source than those pointed out to them as suitable for use.</li> </ul>	Site Manager,	Continuous	
<b>Air quality</b>			
<ul style="list-style-type: none"> <li>An Air Quality Management Plan shall be developed and implemented.</li> </ul>	Site Manager, Contractor, ECO	Once off and updated as necessary	Yes
<b>Erosion and sedimentation control</b>			
<ul style="list-style-type: none"> <li>Areas susceptible to erosion shall be protected by installing temporary and permanent drainage works.</li> </ul>	Site Manager, Contractor, ECO	As necessary	Yes
<ul style="list-style-type: none"> <li>Any erosion channels which develop during the construction period must be suitably backfilled, compacted and restored to a proper condition (i.e. vegetated etc.).</li> </ul>	Site Manager, Contractor, ECO	As necessary	
<ul style="list-style-type: none"> <li>Stabilise and manage cleared areas to prevent and control erosion. The method of stabilisation shall be determined in consultation with the ECO/ Site Manager.</li> </ul>	Site Manager, Contractor, Site Supervisor	As necessary	
<ul style="list-style-type: none"> <li>Storm water management plan should outline measures to be implemented to protect the construction site from erosion by storm water.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<b>Landscaping, stabilisation and soil stockpiling</b>			
<ul style="list-style-type: none"> <li>All spoil should be removed from the site.</li> </ul>	Site Manager, Contractor	As necessary	
<ul style="list-style-type: none"> <li>Exposed and/ or destabilised areas should be landscaped to blend in with the surrounding area.</li> </ul>	Site Manager, Contractor	As necessary	
<ul style="list-style-type: none"> <li>Activities on or nearby coastal dunes shall include the preparation of appropriate coastal set back lines and buffer zones, as well as the rehabilitation of primary dune systems. Deposition of fill on the transverse and associated dunes will not be permitted.</li> </ul>	Site Manager, Contractor, ECO	As necessary	

Mitigation	Responsible Individual/s	Frequency	Method Statement Required
<ul style="list-style-type: none"> <li>All topsoil stockpiles shall be sufficiently located away from seepage zones, flood lines, water courses and other ecological sensitive areas.</li> </ul>	Site Manager, Contractor	Continuous	
<ul style="list-style-type: none"> <li>Stockpiles should be securely treated to reduce dust generation.</li> </ul>	Site Manager, Contractor	As necessary	
<b>Flora</b>			
<ul style="list-style-type: none"> <li>Areas where soil has been compacted shall be rehabilitated once construction is completed.</li> </ul>	Site Manager,	As necessary	
<ul style="list-style-type: none"> <li>Topsoil should be removed and stockpiled.</li> <li>Where pipes are to be placed, excavation should be preceded by a search and rescue operation.</li> <li>Once excavation and filling is completed, rehabilitation should be carried out. Exposed areas should be rehabilitated with the surrounding vegetation. Re-vegetated areas should be monitored until the vegetation is stabilised. Exotic weeds and invaders that might establish on the re-vegetated areas shall be controlled to allow the indigenous vegetation to properly establish.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>In any excavation and removal of material, the topsoil (minimum 300 mm) should be stored for later use in rehab. Exact methods for this should be detailed in the construction EMP, but piles should not be higher than 1.5 to 2 m to provide aeration.</li> <li>All excess fill material should be removed from the site.</li> <li>Where smaller amounts of fill are involved, such as from the inlet and outlet pipes, this could be stored locally but in a previously disturbed locality (-es). Again, topsoil must be separated from the general fill and stored appropriately.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<b>Effluent and storm water management</b>			
<ul style="list-style-type: none"> <li>Suitable means for the control and disposal of accumulated storm water which may run off from any earthworks, building or paving shall be provided.</li> </ul>	Site Manager, Contractor, ECO	As necessary	
<ul style="list-style-type: none"> <li>No mechanical plant or equipment shall be washed on NPS site, unless in an area equipped for such a purpose.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Pollutants such as cement, concrete, lime, paint, oil, chemicals and diesel/ petrol fuels shall not be discharged into any water source. A system for treating contaminated water shall be</li> </ul>	Site Manager, Contractor, ECO	Continuous	

Mitigation	Responsible Individual/s	Frequency	Method Statement Required
implemented.			
<ul style="list-style-type: none"> <li>Where dewatering is required, pumps shall be placed over a drip tray in order to contain fuel spills and leaks. The Contractor shall take all reasonable precautions to prevent spillage during the re-fuelling of these pumps. The Contractor shall ensure that none of the water pumped during any dewatering activities, is released into the environment without approval.</li> </ul>	Site Manager, Contractor, ECO	As necessary	
<ul style="list-style-type: none"> <li>A Storm water Management Plan must be compiled for the NPS.</li> </ul>	Site Manager, Contractor, ECO	Once off	
<ul style="list-style-type: none"> <li>A temporary storm water collection sump is required during foundation excavations to allow excess runoff to drain to a defined low area sump where the transported sediment could be contained and storm water pumped out.</li> </ul>	Site Manager, Contractor	During construction	
<b>Wet areas/ wetlands</b>			
<ul style="list-style-type: none"> <li>The proximity of construction activities in relation to springs, wetlands and streams shall be clearly shown on a map with a 1:10 000 scale.</li> </ul>	Site Manager,	During construction	
<ul style="list-style-type: none"> <li>Vehicular traffic shall not be allowed in permanently wet areas.</li> </ul>	Site Manager,	Continuous	
<ul style="list-style-type: none"> <li>No damage shall be caused to wet areas and an appropriately shaped and planted buffer (of 100 m [tbc] if an approved Storm-water Management Plan is in place) will be developed for wetland areas on the site.</li> </ul>	Site Manager, Contractor	Continuous	
<ul style="list-style-type: none"> <li>No excess groundwater will be pumped into the wetlands.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Wetlands and groundwater may not be used as sources of freshwater.</li> </ul>	Site Manager, Contractor	Continuous	
<ul style="list-style-type: none"> <li>Wet areas will be monitored for adverse effects of construction activities.</li> </ul>	Site Manager,	As necessary	
<ul style="list-style-type: none"> <li>Keep roads as far away from wetlands as possible.</li> </ul>	Site Manager,	As necessary	
<ul style="list-style-type: none"> <li>Measures to limit the extent of drawdown of the water table to the area in the immediate vicinity of the NPS construction site, and to prevent drawdown (and subsequent saline intrusion) affecting the seasonal wetlands need to be developed.</li> </ul>	Site Manager, Contractor	Continuous	
<ul style="list-style-type: none"> <li>The Contractor must in consultation with the ECO, assess all areas of construction well in</li> </ul>	Site Manager, Contractor,	Continuous	Yes



Mitigation	Responsible Individual/s	Frequency	Method Statement Required
advance in order to ensure the relevant Water Use License (WUL) is applied for where required.	ECO		
<p>Loss or degradation of seasonal wetlands as a result of dewatering</p> <ul style="list-style-type: none"> <li>• As a precautionary measure, the use of an impermeable or semi-permeable membrane to limit the radius of draw-down, is recommended. In addition, remodelling of the radius of draw-down by the geohydrological team should take place, once a preferred footprint has been decided on for this site, to confirm the assumed limited impact of dewatering on wetlands and allow fine-tuning of the dewatering approach.</li> <li>• Initiation and ongoing monitoring of surface/ groundwater interactions affecting seasonal wetlands on the site is recommended to ensure that this assumption is correct. This information will also inform decisions around the likely impact associated with implementation of Phase 2 and Phase 3.</li> </ul>	Site Manager, Contractor, Specialist	As necessary	
<p>Impacts associated with seawater contamination as a result of dewatering</p> <ul style="list-style-type: none"> <li>• This impact is considered improbable and no mitigatory action is required.</li> <li>• Initiation and ongoing monitoring of surface/ groundwater interactions affecting seasonal wetlands on the site is recommended to ensure that this assumption is correct. This information will also inform decisions around the likely impact associated with implementation of Phase 2 and Phase 3.</li> </ul>		As necessary	
<p>Degradation of seasonal wetlands as a result of the proximal location of spoil and laydown areas</p> <ul style="list-style-type: none"> <li>• The following mitigation measures are recommended, with the objective of achieving a reduction in the level of impact anticipated: <ul style="list-style-type: none"> <li>○ Implementation of recommended “no go” development areas, as outlined in the Wetland specialist report (refer to EIR).</li> </ul> </li> </ul>	Site Manager Contractor, ECO	As necessary	
<p>Loss or degradation of seasonal wetlands as a result of construction of internal access roads</p> <ul style="list-style-type: none"> <li>• The following mitigation measure is recommended, with the objective of avoiding these impacts: <ul style="list-style-type: none"> <li>○ An environmental programme for the site development should include detailed construction-phase specifications around methods to protect wetland Sw5 from impacts associated with the siting of stockpiles for road materials; worker’s camps; vehicle access routes – key to these measure should be the formal demarcation of no-go areas outside of the minimum disturbance area required for the construction of the road. Since the wetland in question lies some 200m from the present road edge, these recommendations are considered technically feasible.</li> </ul> </li> </ul>	Site Manager Contractor, ECO	As necessary	

Mitigation	Responsible Individual/s	Frequency	Method Statement Required
<b>Fauna (vertebrate)</b>			
<ul style="list-style-type: none"> <li>Dispose of spoil at sea. If the marine-biology assessment finds that disposal of spoil at sea is a viable option, this is the preferred option because it will greatly reduce the footprint of the development in terrestrial habitats.</li> </ul>	Site Manager,	During construction	
<ul style="list-style-type: none"> <li>Rehabilitate affected areas, where possible. Areas that are used only during the construction phase, e.g. laydowns, should be rehabilitated during the operational phase, so that their normal ecological functioning is restored. Within security areas, where high vegetation cannot be allowed, natural vegetation should also be encouraged, but be kept low by regular mowing. This will allow small and fossorial animals and many invertebrates to recolonize the area.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Construct under- and overpasses across roads. Wherever a road crosses watercourses, box culverts must be installed to facilitate animal movement under the road. Large, incised watercourses should be crossed by means of raised bridges. Where a road runs between high points for more than 500 m (e.g. in the slack between dune ridges), overpasses should be constructed at 500 m intervals.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Keep roads as far away from wetlands as possible. Wetlands are an important resource for many animals. Roads reduce access to this resource.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Use recommended types of security fencing. Suitable types of fencing can greatly improve the permeability of boundaries for small animals. Palisade fencing generally has a lower negative impact than mesh fencing (see Fauna specialist study in the EIR for further information on fencing.).</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Wherever possible, place pipelines and cables underground, and rehabilitate. Underground pipelines do not present surface barriers, especially if topsoil is replaced and the surface is rehabilitated.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Reduce the number of roads and tracks and place them carefully. Roads are a major cause of fragmentation. Wherever possible, roads should be placed within or along the edges of areas that are already disturbed or are to be developed. It is generally better to use or upgrade existing roads than to create new ones. Roads across large areas of natural habitat must be kept to the absolute minimum necessary for access to the building site and be planned in consultation with an ecologist.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Fit standard devices on all new routes. Where new transmission routes are established, the</li> </ul>	Site Manager,	Continuous	

Mitigation	Responsible Individual/s	Frequency	Method Statement Required
birds in the area will be unused to the structures and will benefit from devices that improve the visibility of the cables (e.g. “flappers” or reflectors or “balls”). Such measures are especially important in areas where fog or mist occurs regularly.	Contractor, ECO		
<ul style="list-style-type: none"> <li>Monitor routes and installations. Monitoring (as recommended below) will reveal where mortality is occurring. Mitigation measures should be applied in such areas. The details of specific types of mitigation are well known to the relevant Eskom employees.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Use appropriate curb designs. Curbs and roadside gutters should have low, sloping profiles without any vertical surfaces. Good designs facilitate the movements of small animals such as frogs, lizards and mice.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Restrict the timing of blasting. Blasting on site should take place outside of the peak breeding season of sensitive populations of seabirds, that is, <i>not</i> in the summer-autumn period of November-May. In other words, blasting <i>should be</i> carried out in the period of June - October and, therefore, these activities should be carefully planned, well in advance.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Restrict air traffic. All air traffic associated with the construction and operation of the power station, including fixed-wing aircraft and helicopters, must be kept at least one kilometre away from sensitive bird-breeding areas.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Restrict water traffic. Where breeding areas are situated on islands or in wetlands, no boating of any kind should be allowed within 300 m of the sensitive area.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Apply standard mitigation measures for airborne dust. Apply standard measures for the reduction of airborne dust at construction sites, e.g. damping down with freshwater, use of cloth or brush barrier fences, covering dumps with plastic sheeting, etc. These measures must also be applied on all dirt roads that service the construction site.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Do not use seawater. Only freshwater should be used on roads and building sites to suppress dust. Seawater would pollute and degrade natural habitats, especially any natural waterbodies near to roads.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Apply standard mitigation measures for spills. Apply standard measures for avoiding spills and mitigating those that occur at construction sites. These measures must also be applied on all roads that service the construction site, and on all laydown areas.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Remove all polluted soil and water from site. Polluted soil and water should not be left <i>in situ</i>,</li> </ul>	Site Manager,	Continuous	

Mitigation	Responsible Individual/s	Frequency	Method Statement Required
and should not be stockpiled or dumped on site, but should be removed from the site and, where necessary, to a designated hazardous-waste dump.	Contractor, ECO		
<ul style="list-style-type: none"> <li>Dispose of brine from desalination into the sea. Do this in a manner that will promote rapid dilution, e.g. outlet into surf zone.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Dispose of sewage in a sustainable manner. This would entail either the connection of an on-site sewerage system to an existing off-site system, or the creation of an on-site sewerage treatment plant. The former option would have the lesser impact. Under no circumstances should raw or treated sewage be allowed to contaminate wetlands or groundwater. Pumping sewage out to sea may be an option, but the specialist study on marine ecology should be consulted in this regard.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Reduce exterior lighting to the minimum necessary for essential functions.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Use only long-wavelength lights (red or orange) for exterior lighting.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Use directional fittings for exterior lights that direct light downward, not up or to the sides.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Screen interior lighting with blinds, curtains, etc, to prevent exterior light pollution.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Avoid sites where damage to important wetlands is inevitable. If the advice of the relevant specialists indicates that major damage to important wetlands cannot be effectively mitigated, an alternative construction site should be found.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Do not use wetlands or groundwater as sources of freshwater. Connection to local water reticulation or on-site desalinated seawater are the preferred options for the provision of freshwater, during both the construction and operational phases.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Educate workers. All workers, at all levels of responsibility, need to be informed and actively</li> </ul>	Site Manager, Contractor,	Continuous	

Mitigation	Responsible Individual/s	Frequency	Method Statement Required
educated as to the high conservation status of the fauna and flora around the construction site. Everyone must be made to understand that exploitation of wildlife resources is not permitted and will not be tolerated. Workers should be provided with controlled cooking areas and random 'braais' must not be allowed.	ECO		
<ul style="list-style-type: none"> <li>Patrol the area. The on-site ECO must patrol areas where snares and traps are likely to be set. Efforts should be made to apprehend the perpetrators and to apply penalties.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Do not allow feeding of wild animals. Feeding should be strongly discouraged by both educational information and law enforcement.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Keep attractive resources out of reach. It is of utmost importance that all food and water, including refuse, be kept completely out of reach of wild animals. This may require inventive and quite extreme measures because baboons, for example, are dextrous and intelligent animals.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Exercise rigorous control of edible refuse. All refuse must not be dumped or stored on site, but be completely removed from site at frequent and regular intervals.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Eliminate feral cats and dogs. Feral cats and dogs are a serious threat to wildlife and should be aggressively exterminated by the ECO.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Do not allow pets on site. Pets interact negatively with wildlife and must not be allowed into protected nature areas.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Enlarge the reserve through the acquisition of neighbouring farms.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Elevation of the legal status of KPNR to a statutory nature reserve.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>Increased spending on the removal of invasive alien plants.</li> </ul>	Site Manager, Contractor, ECO	Continuous	

Mitigation	Responsible Individual/s	Frequency	Method Statement Required
<b>Fauna (Invertebrate)</b>			
<ul style="list-style-type: none"> <li>• Restrict all development activities to the recommended areas:</li> <li>• <ul style="list-style-type: none"> <li>○ At Duynfontein this is immediately adjacent to the KPS on the northern side;</li> <li>○ At Bantamsklip this is as far north and east as possible within the EIA corridor (refer to Invertebrate specialists study in the EIR); and</li> <li>○ At Thyspunt, this is in the central portion of the EIA corridor.</li> </ul> </li> <li>• Fence off the entire development footprint and institute strict access control to the portions of the owner-controlled property that are to remain undisturbed as soon as possible after initial site clearance and prior to any further construction operations commencing.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>• Restrict development to the recommended areas as indicated in Section 5 of the Wetland Ecosystems specialist report (refer to EIR);</li> <li>• Take all necessary precautions to ensure that construction activities do not alter natural ground and surface water flows in areas identified as sensitive in the freshwater specialist report (refer to EIR).</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>• No solid perimeter walls should be erected. Fences should offer as little obstruction as possible to movement of both terrestrial and flying insects and other invertebrates. In general mitigation applicable to fencing that is suitable for vertebrates (see fauna report) will be more than adequate for invertebrates.</li> <li>• Utilise existing roads where possible, minimise the number of access roads and align these so as to allow movement of organisms along natural corridors; where this is not possible options such as raising the road surface to allow movement to continue unhindered beneath the road e.g. <i>via</i> multiple culverts should be considered. As far as possible use of different access routes during construction and for permanent access during the operational phase should be avoided.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>• Institute strict control over materials brought onto site, which should be inspected for potential invasive species and/ or steps taken to eradicate these before transport to the site. Two possible approaches are: <ul style="list-style-type: none"> <li>○ a visual inspection of all materials, particularly those that have been stockpiled in high-risk locations, for presence of invasive species and apply topical control (e.g. direct spraying with low residual insecticides) when necessary; and</li> <li>○ routine fumigation or spraying of all materials with appropriate low-residue insecticides prior to transport to or in a quarantine area on site. The second option requires less highly</li> </ul> </li> </ul>	Site Manager, Contractor, ECO	Continuous	

Mitigation	Responsible Individual/s	Frequency	Method Statement Required
<p>trained personnel, but would probably result in much higher usage of pesticides.</p> <ul style="list-style-type: none"> <li>Rehabilitate disturbed areas as quickly as possible to reduce the area where invasive species would be at a strong advantage and most easily able to establish;</li> <li>Institute a monitoring programme to detect alien invasive species;</li> <li>Institute an eradication/ control programme for early intervention if invasive species are detected, so that their spread to surrounding natural ecosystems can be prevented (see Appendix 7 of the Invertebrates specialist report in the EIR).</li> </ul> <p>Monitoring programmes and control measures should be developed with reference to <i>inter alia</i> information provided by the IUCN SSC Invasive Species Specialist Group (<a href="http://www.issg.org/">http://www.issg.org/</a>).</p>			
<ul style="list-style-type: none"> <li>Encourage local municipalities to enforce bylaws relating to occupation of land</li> <li>Use public awareness campaigns to reduce unrealistic expectations of employment opportunities.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<b>Marine systems</b>			
<ul style="list-style-type: none"> <li>Disposal sites for the discarding of spoil should be placed offshore.</li> </ul>	Site Manager, Contractor, ECO	During construction	
<b>Economic</b>			
<ul style="list-style-type: none"> <li>Restoration of any damage to the ecology of the area that might occur in the construction phase, the expansion and enhancement of the nature reserves surrounding each site, and the establishment of visitor information and educational centres in order to attract tourists to the area. This would be a rectification measure.</li> <li>Controls on heavy-vehicle traffic during the construction phase in order to mitigate negative impacts such as noise, night-time visual effects (vehicle lights), road damage and congestion. These impacts affect the local economy but differ from one NPS to another, and therefore the intensity of the measures will also differ. However, they should all at least encompass a scaling up of traffic policing. This would be an avoidance measure.</li> <li>The transfer, wherever possible, of construction workers to new NPS sites once their involvement at Nuclear-1 is complete. This would be a reduction measure to mitigate the adverse impacts of unemployment and attendant social ills that could affect the local economy.</li> </ul>	Client Office Manager, Project Manager, ECO	As necessary	
<b>Socio-economic</b>			
<ul style="list-style-type: none"> <li>A detailed assessment for the new residential development should be conducted once the preferred NPS location, as well as the location for residential and accommodation needs are</li> </ul>	Site Manager, Contractor	Prior to and during	

Mitigation	Responsible Individual/s	Frequency	Method Statement Required
finalised.		construction	
<p>Construction village, staff village and staff and vendor housing</p> <ul style="list-style-type: none"> <li>• Draw up the development and locative criteria/ conditions for the establishment of each.</li> <li>• Investigate possible locations for the provision of these according to the needs.</li> <li>• Identify the suitable locations and draw up a Site Development Plan in line with development planning legislation, policies and guidelines.</li> <li>• Obtain approval for the development from the appropriate authorities (e.g. town planning procedures).</li> <li>• Follow a transparent public participation process with role-players and interested and affected parties.</li> <li>• Make use of local labour and local suppliers of material for the construction as far as possible;</li> <li>• Monitor the situation once the housing units are occupied.</li> <li>• The housing units for construction staff should be located as such that the houses can be integrated into the normal property market once construction is complete and houses become available, in order to ensure integration and sustainability.</li> <li>• The Construction Village (including all the facilities) should be located in such a manner that the buildings and facilities can be utilised by the surrounding community after the construction period, in order to ensure sustainability of such infrastructure.</li> </ul>	Project Manager, Site Manager, Contractor, ECO	Prior to and during construction	
<p>Influx of job seekers</p> <ul style="list-style-type: none"> <li>• A proactive, broad-based information campaign (including site notices) to clarify the number of job opportunities that will be available. The objective is to dispel rumours and unrealistic expectations and thereby seek to curtail the inflow/ settlement of job seekers.</li> <li>• Proactive engagement by the appointed Contractor(s) with local authorities/ SAPS/ CPFs to ensure that job seekers do not settle in the vicinity of Construction Villages or the construction terrain.</li> <li>• Follow a transparent public participation process with role-players and interested and affected parties.</li> <li>• Make use of local labour and local suppliers of material for the construction as far as possible; and</li> <li>• Monitor the situation after the occupation of the Construction Village, Staff Village and housing projects, and involve the relevant role-players in such process.</li> </ul>	Project Manager, Site Manager, Contractor	Prior to and during construction	
<p>Informal illegal dwellings</p> <ul style="list-style-type: none"> <li>• Ensure that all discarded construction material that can be utilised to build informal structures, is</li> </ul>	Project Manager, Site	During construction	



Mitigation	Responsible Individual/s	Frequency	Method Statement Required
<p>properly disposed of after construction.</p> <ul style="list-style-type: none"> <li>• Ensure that any temporary accommodation utilised to house construction workers, is completely dismantled and properly disposed of after use, unless a different alternative exist.</li> <li>• Cooperate with local authorities to ensure that all legislation preventing illegal settlement, is enforced at all times; and</li> <li>• Ensure appropriate housing is available for staff.</li> </ul>	<p>Manager, Contractor</p>		
<p>Creation of employment opportunities</p> <ul style="list-style-type: none"> <li>• Establish a labour policy to facilitate the employment of locals where feasible and as far as possible. The appointment of local labour should be a priority issue, with clear targets during the pre-construction phase. Targets must be clear for BEE and local employment. Care should be taken to avoid potential conflict between people in the immediate surroundings seeking employment and those from elsewhere. Therefore, the criteria for “local” must be clearly stated.</li> <li>• The number of workers required, as well as the specific skills required in respect of each worker, should be specified as soon as possible before the commencement of construction. An employment/ skills registration agency or 'labour desk' should be established to identify prospective candidates who would meet the job specifications in consultation with the relevant local authorities. Such an agency/ desk will need to take responsibility for accurate information dissemination at community level. It is important to determine the available skills in the area and the level of training required. Experience has shown that formalizing this process through such an agency avoids duplication, misrepresentation, confusion and unrealistic expectations. It is further important to clarify project time frames and when candidates from local communities are anticipated to be needed. The identification of such an agency must be done in consultation with the local community stakeholders.</li> <li>• A labour skills, grading and assessment centre should be established to provide specific and relevant information on available employment. This should include the number and type of jobs, skills requirements for the jobs, duration of the jobs, remuneration scales, hours of work, conditions of work, procedures for the application of jobs, procedures for selecting job applicants, and training and certification available on the job. Where possible, on-the-job training should be provided to locals, to develop their existing skills and to ensure that they receive skills that are transferable to other sectors. Besides training directly done by Eskom, a process of coordination must be facilitated by Eskom to involve appropriate training providers with regards to targeting of employment and skills development initiatives.</li> <li>• Cooperation with provincial and district authorities is crucial.</li> <li>• Where feasible, create opportunities for the employment of women.</li> <li>• Where possible, use labour-intensive methods of construction.</li> </ul>	<p>Client Office Manager, Project Manager, Site Manager, Contractor</p>	<p>Prior to and during construction</p>	

Mitigation	Responsible Individual/s	Frequency	Method Statement Required
<ul style="list-style-type: none"> <li>• Develop a community labour agreement with targets for employment and for career progression.</li> <li>• Remunerate beyond the minimum wage rate and invest in local staff.</li> </ul>			
<p>Business opportunities</p> <ul style="list-style-type: none"> <li>• Open tender processes, which include improved communication of tender opportunities through advertising in local community media (including the local radio station). Eskom and the main Contractor must take up this responsibility before and during construction.</li> <li>• Expedite the process of registering local service providers on Eskom's procurement database as an ongoing concern. A supplier development programme can go a long way to assist local suppliers of goods and services with registration on Eskom's database. Assistance is required with meeting compliance standards and understanding tender requirements.</li> <li>• Provide information regarding the types of business opportunities and economic spin-offs that may arise from the proposed development to the various structures and institutions actively involved in the first and second economy.</li> <li>• Eskom must set clear targets for BEE &amp; local procurement. Criteria for 'local labour' to be agreed in consultation with local community stakeholders and communicated before construction commences.</li> <li>• Include basic business and entrepreneurial skills as part of a skills development component of the development to ensure social capital development and empowerment of the local entrepreneurs.</li> <li>• Eskom must engage in participatory workshops in which interested members of local communities can be guided regarding types of business opportunities that could arise.</li> <li>• Investigate ways of enabling potential Sub-contractors from low-income areas to tender with the support of Red Door and other economic institutions.</li> <li>• Set up linkages for small business loans, as well as small business skills training. In this regard, the role of partnerships with other role-players who could assist in these matters, should be considered, (i.e. Red Door).</li> <li>• Closer interaction with institutions that could assist with provision of support to small businesses, including the possible identification of agencies that could assist with the provision of seed finance and entrepreneurial counseling (Red Door, LED Forum, Local Council).</li> <li>• Feedback by Eskom to local suppliers and the broader community on numbers of local people employed, tenders awarded and business opportunities created to the advantage of the local community. This could strengthen the relationship between Eskom and the various role-players around the proposed NPS.</li> </ul>	Client Office Manager, Project Manager	Prior to and during construction	

Mitigation	Responsible Individual/s	Frequency	Method Statement Required
<p>Criminal activities</p> <ul style="list-style-type: none"> <li>The need to establish a Community Monitoring Committee (CMC) for the construction phase should be discussed with representatives from the local community. The role of the CMC would be to ensure that the conditions set out in the EMP are implemented and that they address any problems that arise, such as increase in thefts and burglaries associated with the construction workers. The South African Police Services (SAPS) as well as local appropriate policing should be urged by Eskom and the community forum, or a Social Monitoring and Steering Committee, to ensure that baseline statistics are available on a monthly basis regarding existing crime rates. This forum or committee should proactively engage with Eskom in developing mechanisms for the monitoring and distribution of information to counter potential community perceptions that there are perceived changes in the crime rate directly as a result of construction workers being in the immediate area.</li> <li>Eskom should arrange meetings with residents associations, community-policing forums, as well as the local police staff to discuss Contractors' plans, procedures, schedules and possible difficulties, and safety and security concerns. The number of meetings and the timing of these meetings need to be discussed with the interested and affected parties and a work plan needs to be put forward. Experience in other projects has shown that members of the community readily attribute crimes committed to the presence of construction workers, particularly where there are significant pre-existing levels of crime. This perception is entrenched by the actions of workers who may enter private properties to access taps or to ask domestic workers for water. Pro-active discussions between the Contractor(s) and project proponent have proved effective in addressing concerns and putting possible preventative measures in place. Despite being simple, cheap and effective, a measure such as compelling workers to wear identification badges at all times is often not instituted or enforced by Contractors to the discontent of local residents who find it impossible to separate workers from possible criminal 'elements'.</li> <li>Should a CMC be established the option of drafting a code of conduct for Contractors and construction workers should be considered.</li> <li>The conduct of contract workers will have to be specified in worker related management plans and employment contracts by Contractors and service providers. It is recommended that a peer-group based incentive/ fine scheme, which has been successfully used in other projects to achieve compliance, be introduced. (Schoeman, PBMR Social Impact Assessment Report - Oct 2002) explains that this scheme involves the introduction of a bonus before commencement of construction. A pre-designated group, e.g. the environmental officer and/ or the local community/ property owners and/ or fellow workers, monitor compliance/ transgressions. Every transgression carries a fine with a pre-determined value. These fines are subtracted from the bonus and the balance is divided between workers at the end of the construction period. All</li> </ul>	Project Manager, ECO	During construction	

Mitigation	Responsible Individual/s	Frequency	Method Statement Required
<p>contraventions are displayed in the site-office together with the name of the “offender”. The rationale for this system is to promote peer-group monitoring and penalizing. According to Schoeman this is usually effective, as all would benefit from keeping the bonus at the maximum. In order to keep motivation levels high it could be a consideration that the bonus period be reduced to one year, or even six months.</p>			
<p>Risk of STDs, HIV and AIDS</p> <ul style="list-style-type: none"> <li>• In consultation with local and international HIV and AIDS organisations and government structures, design and implement an STD, HIV and AIDS awareness and prevention campaign. This campaign should utilise various common practice methodologies in order to ensure social and cultural sensitivity.</li> <li>• Where possible, attempt to minimise population influx by utilising local labour.</li> <li>• State STD and HIV and AIDS awareness and prevention programmes as a condition of contract for all suppliers and sub-operators.</li> <li>• Provide an adequate supply of free condoms to all workers. Condoms should be located in the bathrooms and other communal areas on the construction site.</li> <li>• A voluntary counselling and testing programme should be introduced during the construction phase and should continue during operations.</li> <li>• Undertake a voluntary STD and HIV and AIDS prevalence survey amongst all workers on a regular basis. This would involve a voluntary test made available to 100% of the workforce. The results of the survey will assist in determining the HIV and AIDS and STD strategy. When results are obtained (on assumption that the results are statistically representative), the results should be made available to management and workers at the same time. Results should be presented as statistical returns that ensure confidentiality.</li> </ul>	<p>Project Manager, Site Manager, Contractor</p>	<p>During construction</p>	
<p>Municipal services</p> <ul style="list-style-type: none"> <li>• Liaise closely with the appropriate municipal, provincial and other relevant authorities.</li> <li>• Ensure that a proper plan is in place well before any development process commences.</li> <li>• Ensure that all essential services are in place prior to the development.</li> <li>• Ensure that non-essential facilities are upgraded in accordance with the development.</li> <li>• Ensure that the implementation process is carefully monitored and that any disruptions are immediately identified and appropriately managed.</li> <li>• Ensure that all affected communities is kept well informed of the process and of all significant dates attached to the development process.</li> </ul>	<p>Client Office Manager, Project Manager.</p>	<p>As necessary</p>	

<p>Loss of employment after construction</p> <ul style="list-style-type: none"> <li>• Introduce training initiatives aimed at up-skilling, particularly unskilled and semi-skilled workers, during construction.</li> <li>• Absorb as many workers into the operational phase of the project as is feasible.</li> <li>• Transfer as many workers as possible to other related projects available.</li> <li>• Eskom's declared policy is to transfer construction workers from Nuclear-1 to Nuclear 2 as the construction phases are likely to overlap. Such transfers might not always be possible, depending on the location of Nuclear-2, but should nevertheless be maximised wherever possible in order to mitigate the perceived adverse impacts of unemployment once the construction phase of Nuclear-1 is completed.</li> <li>• Introduce community self-help projects as part of the corporate social investment programme.</li> </ul>	<p>Project Manager, Site Manager, Contractor</p>	<p>During construction</p>	
<p>Impact on social infrastructure/ facilities</p> <ul style="list-style-type: none"> <li>• The involved authorities, local municipality as well as the Department of Health should be notified about additional needs for medical care.</li> <li>• Proper planning processes should be followed and provision of medical facilities should be based on the sustainable human settlement strategy.</li> <li>• The provision of health facilities for all staff involved as proposed for the Construction Village and Staff Village will be vital to ensure a sustainable human settlement.</li> </ul>	<p>Project Manager, Site Manager, ECO, Contractor</p>	<p>As necessary</p>	
<p>Capacity of law enforcement agencies</p> <ul style="list-style-type: none"> <li>• The involved authorities, local municipality as well as the SAPS should be notified about additional needs for law enforcement services.</li> <li>• Proper planning processes should be followed and provision of law enforcement services should be based on the sustainable human settlement strategy.</li> </ul>	<p>Project Manager, Site Manager, Contractor</p>	<p>As necessary</p>	
<p>Capacity of local schools</p> <ul style="list-style-type: none"> <li>• Provision should be made for schools to accommodate approximately 950 children into the area of the NPS. This signifies that either existing schools should be enlarged, or a new schools should be built in the area where staff will be residing.</li> <li>• The provision of schools for the children of all staff involved, as proposed for the staff village (and possible other areas), will be vital to ensure a sustainable human settlement.</li> <li>• The relevant Department of Education should be made aware of the current schooling needs in the area as well as the potential impact that the proposed development will have on the status quo.</li> </ul>	<p>Client Office Manager, Project Manager</p>	<p>As necessary</p>	

Capacity of sports facilities <ul style="list-style-type: none"> <li>The provision of sport facilities for all staff involved as proposed for the Construction Village and Staff Village will be vital to ensure a sustainable human settlement.</li> <li>Recreational facilities and sport facilities should be developed or contributed to, in order to cater for the increase in population in specific areas.</li> </ul>	Project Manager, Site Manager, ECO, Contractor	During construction	
Impact on sense of place <ul style="list-style-type: none"> <li>Consult with affected communities in an effort to identify and address issues relating to the sense of place.</li> <li>Follow the mitigation measures suggested in the visual, noise and traffic impact reports.</li> </ul>	Client Office Manager, Project Manager, ECO,	As necessary	
<b>Visual</b>			
The machinery, equipment and material at the construction site, camp and lay-down area presents visual clutter where visible to the public e.g. along roads and from residential areas. <ul style="list-style-type: none"> <li>Construction activities and material stored within the site should be screened along their perimeter.</li> <li>It is recommended that, attached to the 2 m high construction site fence should be 2 m high dark green or black shade cloth along boundaries that will be visually exposed to the public e.g. roads or residential areas.</li> </ul>	Site Manager, Contractor	As necessary	
Dust generated during earth moving and vehicles travelling in dirt roads. This is also an issue at night. <ul style="list-style-type: none"> <li>Dust generated from the area will be seen, particularly at night, as it will diffuse the light. Correct and effective dust suppression methods to be developed including the suppression techniques such as wetting down trafficked areas and the paving or temporary stabilisation of the surface of frequently used roads.</li> </ul>			
Transmission line to exclusion zone boundary are large structures and visually intrusive when grouped. <ul style="list-style-type: none"> <li>The transmission towers should be as visibly "light" as possible. The new generation of cross rope suspension or kite towers should be considered.</li> <li>The colour of transmission line pylons should be the grey that results from the galvanising of the steel. Newly galvanised metal should not be painted, as it will soon weather to a matt grey. Grey is visually neutral in the landscape and at distance blends easily into the background.</li> </ul>	Site Manager, Contractor	As necessary	
Disturbed natural areas and new landforms after construction. This includes the site and new access roads, borrow pits etc. off site. <ul style="list-style-type: none"> <li>On completion of construction of the NPS, the rehabilitation and stabilisation of all disturbed areas must be carried out to a high standard so that stabilisation, aesthetic form and ecological sustainability are able to rapidly improve with time.</li> <li>It is recommended that a Landscape Architect be appointed or consulted to design the</li> </ul>	Site Manager, Contractor	As necessary	

rehabilitation and stabilisation of all disturbed areas.			
<p>Lighting of construction areas</p> <ul style="list-style-type: none"> <li>Lighting should be directed where possible to prevent light spill. Use luminaires that conceal the light source and direct lights so as not to shine beyond the site onto adjacent residential areas.</li> </ul>	Site Manager, Contractor	As necessary	
<p>Transmission lines</p> <ul style="list-style-type: none"> <li>The transmission lines should exit the EIA corridor due east of the NPS and the spoil dump sites should be located parallel to the eastern boundary of the EIA corridor.</li> <li>The recommended mitigation of visual impacts associated with the transmission lines within the 3 km exclusion zone are as follows: <ul style="list-style-type: none"> <li>The use of guyed cross rope suspension towers will have less of a visual presence due to the lattice guyed tower legs.</li> <li>Where the line crosses a road, the crossing should be at right angles to the road to minimise the view along the line route.</li> </ul> </li> </ul>	Site Manager, Contractor	As necessary	
<p>Masts</p> <ul style="list-style-type: none"> <li>The mast colour should be a light grey or white as it will mostly be seen in silhouette.</li> <li>Any access road to the mast site should be designed and stabilised to visually fit into the surrounding landform and vegetation.</li> </ul>	Site Manager, Contractor	As necessary	
<p>Access roads</p> <ul style="list-style-type: none"> <li>The cut and fill sections need to be designed or shaped on site to blend with the adjacent landform and materials. A standard slope angle will not be appropriate.</li> <li>The rehabilitation of the road reserve requires a detailed plan showing stabilisation methods and a specification of planting type and species together with maintenance requirements. A landscape architect and an experienced rehabilitation Contractor should be engaged at the detailed design stage of the road.</li> </ul>	Site Manager, Contractor	As necessary	
<p>Spoil dumps</p> <ul style="list-style-type: none"> <li>The form of the spoil dump is most important because this will determine the primary impact. The form should therefore be considered in detail in the context of the surrounding scale and form of the dunes as well as the need to accommodate access roads and transmission lines and security patrolling of the secure areas.</li> <li>The side slopes should ideally be 1:3 but not steeper than 1:2. The direction of the prevailing wind and the way in which this has formed the dunes is an important consideration in order to reduce dust and fine sand from blowing into the works area.</li> <li>The top 300 mm of soil must be removed from the dump area and stockpiled nearby for later re-vegetation of the final dump form.</li> <li>It is recommended that a Landscape Architect be appointed together with a Landscape</li> </ul>	Site Manager, Contractor	As necessary	

Rehabilitation Contractor who has experience in rehabilitation of sand dumps in that biome. The landscape architect must, in liaison with the engineers, design the entire dump form and produce the specification in collaboration with the rehabilitation Contractor. It must be noted that the development of the dump and the rehabilitation must be done in phases as the material becomes available.			
<b>Heritage and archaeology</b>			
<ul style="list-style-type: none"> <li>Eskom will appoint an on-site archaeologist to identify and rescue artifacts having heritage significance (and will refer to the EIA specialist report).</li> </ul>	Site Manager, , Specialist	Prior to and during construction	
<ul style="list-style-type: none"> <li>The archaeologist will document in detail all identified protected heritage resources in accordance with the standard practices and as prescribed by SAHRA. as defined in the National Heritage Resources Act (1999).</li> </ul>	Site Manager, Contractor, ECO, Specialist	Prior to construction	
<ul style="list-style-type: none"> <li>If any heritage/ archaeological sites/ objects are discovered during the construction or operational processes, the ECO or other relevant person on site should note the location of the sites/ objects and ensure that such sites/ objects are not disturbed/ destroyed. The South African Heritage Resources Association (SAHRA) must be contacted immediately. Should the site activities be suspended due to this discovery, the schedule will be extended accordingly. The excavation work may only be undertaken by an archaeologist. Relevant I&amp;APs should be informed and consulted when human remains are uncovered, and if necessary the reburial of any human remains should be facilitated.</li> </ul>	Site Manager, Contractor, ECO	As necessary	
<ul style="list-style-type: none"> <li>Any sites identified by specialists as shall be demarcated with wire fencing with a radius of at least 30 m. Construction teams shall not be allowed access to these sites. No construction activities shall be allowed within 50 m of all identified archaeological sites.</li> </ul>	Site Manager, Contractor, ECO, Specialist	Prior to construction	
<ul style="list-style-type: none"> <li>A clear chain of communication is to be developed between the construction team on the favoured alternative and a heritage consultant, and his/ her team who can be on call to attend meetings, conduct NPS site inspections, emergency rescue work and resolve any queries</li> </ul>	Site Manager, , Contractor, Specialist	During construction	
<ul style="list-style-type: none"> <li>The collection of heritage/ archaeological objects/ artifacts at identified sites shall not be allowed.</li> </ul>	Site Manager, Contractor	As necessary	
<ul style="list-style-type: none"> <li>Any destruction of a site can only be allowed once a permit is obtained from SAHRA and the site has been mapped and noted.</li> </ul>	Site Manager, Contractor, ECO	As necessary	
<ul style="list-style-type: none"> <li>Permits shall be obtained from the SAHRA should the proposed construction of the NPS affect, destroyed or alter any heritage sites.</li> </ul>	Site Manager,	As necessary	



<ul style="list-style-type: none"> <li>If major bone finds are encountered, the contracted specialist should be immediately alerted. A temporary pause in activity at the limited locale will be required. The strategy is to “rescue” the material as quickly as possible.</li> </ul>	Site Manager, Contractor	As necessary	
<ul style="list-style-type: none"> <li>Prior to deep excavation, a palaeontologist will be invited to be present during excavation to investigate the presence of palaeontological resources.</li> </ul>	Site Manager, Contractor, Specialist	During construction	
<ul style="list-style-type: none"> <li>It would be of benefit to identify and invite key personnel to attend a “short heritage course” to enable them to assist in the recognition of fossil material and work out a process for consultation, collections of specimens and temporary on-site curation.</li> </ul>	Site Manager, Contractor, ECO	As necessary	
<ul style="list-style-type: none"> <li>Potential impacts to protected shipwrecks will need to be addressed by means of specific heritage impact assessments once there is further clarity as what technology is selected and how cooling water will be obtained and returned to the ocean.</li> </ul>	Site Manager, Contractor, Specialist	As necessary	
<ul style="list-style-type: none"> <li>For the purposes of planning and cost containment, the contracted specialist must be informed of the scheduled excavation planning and the progress being made.</li> </ul>	Site Manager, Contractor, ECO	As necessary	
<ul style="list-style-type: none"> <li>Isolated finds that are turned up should be handed over to a designated person for safekeeping, noting as far as possible where they came from. Excavated material with a clump of bones included can be stockpiled temporarily for safekeeping, until the site visit by the palaeontologist.</li> </ul>	Site Manager, Contractor, ECO	As necessary	
<p>When the phases of bulk excavation are near or at completion and before the walls are sheet piled/united:</p> <ul style="list-style-type: none"> <li>The excavation faces will be inspected for fossil content.</li> <li>Any already-rescued material as above will be examined, processed and packaged.</li> <li>Representative samples of fossils will be collected.</li> <li>In the case of shelly beds, bulk samples will be taken.</li> <li>If material is delicate/ poorly-preserved, it will be removed within blocks of the enclosing sediment, reinforced if required by encasement.</li> <li>Key vertical sections representative of the exposures will be identified. These will be described in detail sedimentologically (logged), photographed and sampled, to fully record the contexts of the fossils.</li> </ul>	Site Manager, Contractor, Specialist	As necessary	
<b>Agriculture</b>			
<ul style="list-style-type: none"> <li>Minimise dust by implementing a dust control programme.</li> </ul>	Project	As necessary	

	Manager, Contractor, ECO		
<b>Tourism</b>			
<p>Community public information campaign</p> <ul style="list-style-type: none"> <li>Undertake an aggressive community- orientated and comprehensive public information campaign. The proposed public information campaign would address popular misconceptions regarding the Nuclear-1 programme, and specifically the impacts of nuclear power generation on the sea, the immediate environment and the sense of place.</li> </ul>	Client office manager	As necessary	
<p>Access negotiation</p> <ul style="list-style-type: none"> <li>Negotiate specific concessions and access with the various tourism stakeholders. This is particularly important for whale-watching tours at Bantamsklip. From a nuclear safety perspective there is no reason why whale-watching tours should not be allowed access into the 1 km exclusion zone, and the security authority implementing the National Key Points Act should be approached to relax the restrictions for commercial activities.</li> </ul>	Client office manager	As necessary	
<p>Transport controls</p> <ul style="list-style-type: none"> <li>Adequate controls on heavy-vehicle traffic during the construction phase will be required in order to mitigate negative impacts such as noise, road damage and congestion.</li> </ul>	Site Manager, Contractor	As necessary	
<p>Unemployment and social issues</p> <ul style="list-style-type: none"> <li>Eskom's declared policy is to transfer construction workers from the first Nuclear-1 plant to the second and from there to the third as the construction phases are likely to overlap. Such transfers might not always be possible but should nevertheless be maximised wherever possible in order to mitigate the perceived adverse impacts of unemployment once the construction phase of Nuclear-1 is completed.</li> </ul>	Client office manager, Project Manager		
<b>Noise control</b>			
<ul style="list-style-type: none"> <li>A noise control management plan will be developed and implemented.</li> </ul>	Site Manager, Contractor	Continuous	
<ul style="list-style-type: none"> <li>Where road construction is to take place within approximately 500 m of residences, noise can be reduced where possible by selecting construction vehicles/ machinery with low noise emission levels or by minimizing the total construction time.</li> <li>Where possible, provide residents with prior knowledge of scheduling for ultra-heavy-duty vehicles and advise that that exposure to such noise will be infrequent).</li> </ul>	Site Manager, Contractor	Continuous	
<b>Transport</b>			
<ul style="list-style-type: none"> <li>Affected road users shall be notified two weeks in advance of any road closures or transport of</li> </ul>	Site Manager, Contractor	As necessary	

abnormal/ heavy loads.			
<ul style="list-style-type: none"> <li>The disruption of essential services/ roads should be kept as short as possible to minimise public inconvenience for both planned and unforeseen events.</li> </ul>	Site Manager, Contractor	As necessary	
<ul style="list-style-type: none"> <li>Construct a level crossing over the railway line at Saldanha Bay Harbour.</li> <li>Upgrade two unsurfaced road sections at Saldanha Bay Harbour.</li> <li>Three intersection widening upgrades at Saldanha Bay Harbour.</li> <li>Construction of a bypass upstream of the Modder River Bridge to traverse the Modder River;</li> <li>Construction of an access road to Nuclear-1 off the existing Emergency Access Road to the Nuclear-1 site.</li> <li>Exceptionally heavy loads should be transported during the non peak travel times while travelling on the northern sections from 00:00 to 07:00, 14:00 to 00:00 and while travelling on the southern sections from 00:00 to 06:00, 10:00 to 16:00 and 19:00 to 00:00.</li> <li>The R27/ Main Access Road intersection should be upgraded to accommodate the projected traffic if the PBMR is constructed. The intersection should be upgraded to a grade separated intersection, as per the PGWC's proposal, if viable. If this is not viable the option of upgrading the intersection to a signalised intersection should be considered.</li> <li>The R27/ Napoleon Street intersection should be upgraded to a signalised intersection. If Access 1 is grade separated then the signalisation of this intersection may not be required. These options are to be discussed with the PGWC.</li> <li>The R27 road between the R27/ Main Access and R27/ Napoleon Street intersections should be upgraded to four lanes.</li> <li>The R27/ Access 2 intersection should be upgraded to a temporary signalised intersection. If Access1 is grade separated, then the signalisation of this intersection may not be required and requires further investigation. These options are to be discussed with the PGWC.</li> <li>Relevant signage, street lighting and a reduction of the speed limit from 120 km/ hr to 80 km/ hr is required to be constructed along the R27 approaching the proposed signalised upgrades of the above-mentioned intersections.</li> <li>Eskom should acquire 130 buses to shuttle construction workers during the AM and PM peak periods and as stand-by emergency evacuation vehicles.</li> <li>Approximately 945 temporary parking bays should be provided.</li> <li>The "Koeberg NPS Emergency Plan: Transport Modelling and Evacuation Management Plan" should be updated to include the evacuation of the 8,500 PBMR and Nuclear-1 construction workers.</li> <li>A comprehensive Construction Traffic Management Plan should be completed, in conjunction with the authorities, for the duration of the construction period.</li> </ul>	Site Manager, Contractor	As necessary	

<b>Safety and security</b>			
<ul style="list-style-type: none"> <li>Ensure compliance with the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).</li> </ul>	Site Manager, Contractor	Continuous	
<ul style="list-style-type: none"> <li>A Site Security Programme will be implemented.</li> </ul>	Site Manager, , Contractor	Continuous	
<ul style="list-style-type: none"> <li>Ensure adequate signage is provided along the major roads and at the entrance of the construction site.</li> </ul>	Site Manager, Contractor	Continuous	
<ul style="list-style-type: none"> <li>Community safety &amp; community safety concerns are to be addressed.</li> </ul>	Site Manager,	Continuous	
<ul style="list-style-type: none"> <li>Identity tags complete with a photograph must be issued to all individuals that are to be present on NPS site for more than 3 consecutive calendar days.</li> </ul>	Site Manager, Contractor	Continuous	
<ul style="list-style-type: none"> <li>Visitors will be required to sign a register at the security checkpoint and must be issued with a visitor's permit. A responsible person must endorse this permit before leaving the security area.</li> </ul>	Site Manager,	Continuous	
<ul style="list-style-type: none"> <li>Eskom should work closely with the local police department and their own private security company in order to ensure that there is sufficient policing in the area during the construction phase.</li> </ul>	Site Manager,	Continuous	
<ul style="list-style-type: none"> <li>All personnel operating construction vehicles, or any other vehicle for construction purposes, must be in possession of a valid driver's license and obey the applicable speed limits and road safety regulations.</li> </ul>	Site Manager, Contractor	Continuous	
<ul style="list-style-type: none"> <li>No transportation of persons will be allowed on the back of vehicles.</li> </ul>	Site Manager, Contractor		
<b>Emergency procedures</b>			
<ul style="list-style-type: none"> <li>Key staff shall be trained in emergency response and all staff made aware of the emergency procedures.</li> </ul>	Site Manager,	Continuous	
<ul style="list-style-type: none"> <li>A register of all incidents, accidents, etc. must be maintained, which includes the action taken after the event has occurred. The ECO must be informed of the event.</li> </ul>	Site Manager, ECO	Continuous	
<ul style="list-style-type: none"> <li>The site and all operations shall comply with all National Health and Safety Standards and other relevant national, regional and local regulations. The Contractor shall appoint a Health and Safety (H&amp;S) Officer.</li> </ul>	Site Manager, Contractor, ECO	Continuous	
<ul style="list-style-type: none"> <li>The Contractor is liable for any damage caused by accidental fires.</li> </ul>	Site Manager, Contractor	As necessary	

<ul style="list-style-type: none"><li>Vehicles transporting materials such as sand, rock, scrap metal and pipes shall be covered to prevent their contents falling or blowing off, causing traffic hazards.</li></ul>	Site Manager, Contractor	Continuous	
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### 3.2.4 Operational phase

The operation phase includes activities relating to the maintenance of the NPS and long-term implementation of required environmental management and monitoring systems. In many cases, this is the continuation of procedures and standards established during the construction phase of the project.

**Table 3-3: Mitigation measures for the operational phase**

Mitigation	Responsible Party	Frequency	Method Statement Required
<b>Compliance with legislation, policies and procedures</b>			
<ul style="list-style-type: none"> <li>All legislation, policies and procedures applicable to the development must be strictly enforced.</li> </ul>	PSM	Continuous	
<b>Site monitoring, auditing and reporting</b>			
<ul style="list-style-type: none"> <li>All records relating to monitoring and auditing shall be made available for inspection to any relevant authority, or Eskom's Environmental Audit Team (EAT) (lead by the appointed Environmental Advisor), in respect of the NPS.</li> </ul>	PSM	As necessary	
<ul style="list-style-type: none"> <li>Implementation of a Quality Management Programme (ISO 9001) will ensure that confidence is maintained in meeting the plant safety requirements and performance objectives.</li> </ul>	PSM	Continuous	
<ul style="list-style-type: none"> <li>A planned groundwater monitoring programme should be implemented.</li> </ul>	PSM	Continuous	
<ul style="list-style-type: none"> <li>Establish a 'lessons learned' process to address inadvertent, unmonitored liquid releases of radioactivity from existing commercial nuclear power stations.</li> </ul>	PSM	On-going	
<b>Demarcation of areas</b>			
<ul style="list-style-type: none"> <li>Drop-off and pick-up zones for personnel and materials shall be clearly demarcated.</li> </ul>	PSM	Continuous	
<ul style="list-style-type: none"> <li>"No-go" areas shall be appropriately demarcated and personnel and equipment shall not be permitted within these areas.</li> </ul>	PSM	Continuous	
<ul style="list-style-type: none"> <li>Areas for the storage of hazardous substances including hazardous waste and industrial effluent shall be clearly demarcated.</li> </ul>	PSM	Continuous	
<b>Site access control</b>			
<ul style="list-style-type: none"> <li>Clearly communicate access policy for the properties to the public, using notice boards on access gates and by directly communicating with the communities nearby.</li> <li>Consider providing permits to allow access for fishing activities and whale watching in any coastal exclusion zone.</li> </ul>	PSM	As required	

Mitigation	Responsible Party	Frequency	Method Statement Required
<ul style="list-style-type: none"> <li>Maintain public access to the R43 where it traverses the Bantamsklip site.</li> <li>Establish a nature reserve within the owner-controlled area and provide access for scientific research.</li> <li>Facilitate a review of site control issues raised in this EIR on National Key Points via the Minister of Police.</li> <li>Confirm the availability of any required support for site control from the relevant police, military, naval and coastal management agencies.</li> <li>Integrate the site specific control measures with existing local and regional security measures.</li> </ul>			
<b>Training</b>			
<ul style="list-style-type: none"> <li>The PSM shall ensure that all site staff are aware of, and understand the contents and conditions of the EMP, the key environmental issues and the consequences of non-compliance.</li> </ul>	PSM	Quarterly or as necessary	
<ul style="list-style-type: none"> <li>All site staff shall attend induction training on the EMP and a record shall be kept of all attendees.</li> </ul>	PSM	As necessary	
<ul style="list-style-type: none"> <li>Staff shall be trained in all aspects relating to the site's operations including health and safety aspects.</li> </ul>	PSM	As necessary	
<ul style="list-style-type: none"> <li>Records of staff training shall be maintained.</li> </ul>	PSM	Continuous	
<b>Fire prevention</b>			
<ul style="list-style-type: none"> <li>No open fires shall be allowed on site.</li> </ul>	PSM	As necessary	
<ul style="list-style-type: none"> <li>The PSM shall have fire-extinguishers available on all vehicles working on site. The equipment shall be regularly checked and shall be approved by Eskom.</li> </ul>	PSM	As necessary	
<ul style="list-style-type: none"> <li>Maintain proper firebreaks around entire development footprint.</li> </ul>	PSM	Continuous	
<b>Waste</b>			
<ul style="list-style-type: none"> <li>Radioactive waste management practices must be consistent with the IAEA guidelines.</li> </ul>	PSM	Continuous	
<ul style="list-style-type: none"> <li>The NPS will minimize production of all solid, liquid, and gaseous radioactive waste, both in terms of volume and activity content.</li> </ul>	PSM	Continuous	
<ul style="list-style-type: none"> <li>Only treated liquid releases will be diverted to the seawater discharge of the NPS.</li> </ul>	PSM	Continuous	Yes
<ul style="list-style-type: none"> <li>Ensure that all conventional waste is properly disposed of and removed from the site to a</li> </ul>	PSM	Continuous	

Mitigation	Responsible Party	Frequency	Method Statement Required
permitted landfill site.			
<ul style="list-style-type: none"> <li>Sewage should be treated in a suitable plant.</li> </ul>	PSM	Continuous	
<b>Hazardous substances</b>			
<ul style="list-style-type: none"> <li>Any oil spills or leaks which occur on site shall be remediated immediately.</li> </ul>	PSM	As and when necessary	Yes
<ul style="list-style-type: none"> <li>A set of procedures will be developed and maintained to ensure that during normal operation, all releases of radioactive substances are within the limits of the NPS operational technical standards. The procedures indicate the methodologies to determine the amount of the releases and the nuclide contents.</li> </ul>	PSM	Continuous	
<b>Materials use, handling, storage and transport (cement, fuel [petrol, diesel] and oils)</b>			
<ul style="list-style-type: none"> <li>Procedures for material handling shall be undertaken in accordance with the site Environmental Management System to be developed.</li> </ul>	PSM	Once-off	
<ul style="list-style-type: none"> <li>Relevant national, regional and local legislation regarding the transport, use and disposal of hazardous waste must be adhered to at all times.</li> </ul>	PSM	Continuous	
<ul style="list-style-type: none"> <li>An emergency procedure to deal with accidents and incidents (e.g. spills) arising from hazardous substances shall be compiled and implemented.</li> </ul>	PSM	Once-off	Yes
<ul style="list-style-type: none"> <li>A register for spills and incidents involving hazardous materials shall be maintained.</li> </ul>	PSM	As necessary	
<ul style="list-style-type: none"> <li>Appropriate complete emergency spill kits shall be available on site at all times.</li> </ul>	PSM	As necessary	Yes
<ul style="list-style-type: none"> <li>Concrete platforms with bund walls shall be allocated to accommodate fuel, oil, paint, bitumen, herbicide and insecticides to guard against infiltration of hazardous substances into the soil. Fuel tanks shall be bunded to hold 110% of the contents of the tank. The tanks shall be housed in a roofed area to minimise collection of water within the bund wall. Accumulated water will be removed on a daily basis.</li> </ul>	PSM	As necessary	
<ul style="list-style-type: none"> <li>All staff handling hazardous waste shall be trained accordingly.</li> </ul>	PSM	As necessary	
<ul style="list-style-type: none"> <li>All necessary approvals with respect to fuel storage and dispensing shall be obtained from the appropriate authorities.</li> </ul>	PSM	Continuous	
<ul style="list-style-type: none"> <li>Areas of fuels storage and other flammable materials shall comply with standard fire safety regulations and will require the approval of the PSM and the Municipal Fire Prevention Officer.</li> </ul>	PSM	Continuous	



Mitigation	Responsible Party	Frequency	Method Statement Required
<ul style="list-style-type: none"> <li>No smoking shall be allowed in the vicinity of the fuel stores and adequate fire-fighting equipment shall be accessible at fuel storage area and areas in the vicinity of the storage area. "No smoking" and "Danger" signs shall be erected at hazardous substance storage areas.</li> </ul>	PSM	Continuous	
<ul style="list-style-type: none"> <li>All empty and externally dirty tanks shall be sealed and stored on an area where the ground has been protected.</li> </ul>	PSM	Continuous	Yes
<b>Dune geomorphology</b>			
<ul style="list-style-type: none"> <li>Monitor vegetated dunes and repair blowouts by placing brushwood or using drift fences on the bare sand surfaces, and then re-vegetating the bare sand with suitable pioneer species.</li> </ul>	PSM	Continuous	
<b>Seismological risk</b>			
<ul style="list-style-type: none"> <li>Undertake microseismic monitoring.</li> </ul> <p>The US Code of Federal Regulations recommends the installation of microseismic monitoring networks at NPS. Local networks should be deployed during the siting process to rate sites according to their seismic hazard potential. After the siting process, monitoring should continue so as to re-confirm the suitability of the selected site. Seismic monitoring should also continue during operation of the NPS, and even after decommissioning re-use of the site is considered. It is also recommended that strong-motion accelerographs be installed on rock outcrops at the site.</p>	PSM	Continuous	
<b>Hydrology</b>			
<ul style="list-style-type: none"> <li>Design and implement all required stormwater control and mitigation measures so as to comply with applicable design standards thereby ensuring the safety of the plant as well as conserving the surrounding environment.</li> <li>Define any "dirty" stormwater run-off from the plant area and prevent this from leaving the plant area. This is achieved by implementing "dirty" water collection channels at the perimeter of the plant area. To allow for a sufficient hydraulic gradient and flow velocity the channels should be positioned so as to drain half the site into the south-western corner and the other half into the south-eastern corner. In terms of IAEA Safety Guide No NS-G-3.5 (IAEA, 2003) the drainage system needs to handle up to the 1:10 000 year storm event.</li> <li>The entire plant run-off needs to be contained in dirty water containment ponds. This is currently a conservative approach as not all the plant run-off possibly needs to be classified as "dirty" run-off, thereby reducing the amount of storage required. Further details and refinements would can be determined from a water quality control study. In addition to the above the average monthly operating volume accumulating from the plant area due to average monthly rainfall and run-off</li> </ul>	PSM	As necessary	

Mitigation	Responsible Party	Frequency	Method Statement Required
would also need to be taken into account.			
<b>Freshwater supply</b>			
Use of groundwater <ul style="list-style-type: none"> <li>• Only use deep (&gt;100 m depth) boreholes.</li> <li>• Apply sustainable pumping rates derived from credible geohydrological testing and analysis.</li> <li>• Continue and expand the monitoring programme to provide early warning of any detrimental effects of pumping.</li> </ul>	PSM	Continuous	
Long-term groundwater control measures around the NPS <ul style="list-style-type: none"> <li>• Detailed site investigation and numerical simulation to predict effects.</li> <li>• Use of passive systems such as sheet piles/ cut-off slurry wall.</li> <li>• Coastal location of the NPS.</li> </ul>	PSM	As necessary	
Use of surface water <ul style="list-style-type: none"> <li>• Tap into a regional supply scheme rather than a local scheme.</li> <li>• Use desalinated water.</li> </ul>	PSM	Continuous	
Source of sea water <ul style="list-style-type: none"> <li>• Siphon-off from cooling water intake.</li> </ul>	PSM	As necessary	
Disposal of brine <ul style="list-style-type: none"> <li>• Disposal by mixing with cooling water discharge.</li> </ul>	PSM	As necessary	
Atmospheric releases from the NPS (normal plant operation) <ul style="list-style-type: none"> <li>• Coastal location of NPS.</li> <li>• Design containment.</li> <li>• Monitoring of atmospheric releases.</li> <li>• NRR requirement for annual release limits.</li> </ul>	PSM	As necessary	
Release of liquid effluent (normal plant operation) <ul style="list-style-type: none"> <li>• Coastal location of the NPS-only some coastal springs could be affected.</li> <li>• Containment structures.</li> <li>• Monitoring.</li> <li>• Emergency containment plans.</li> </ul>	PSM	As necessary	

<b>Air quality</b>			
<ul style="list-style-type: none"> <li>An appropriate Air-Quality Monitoring programme will be developed and implemented.</li> </ul>	PSM	Continuous	
<b>Removal of vegetation</b>			
<ul style="list-style-type: none"> <li>All declared aliens shall be identified and managed in accordance with the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983).</li> </ul>	PSM	Continuous	
<b>Re-vegetation</b>			
<ul style="list-style-type: none"> <li>Exposed areas with slopes less than 1:3 shall be rehabilitated with an indigenous grass mix that blends in with the surrounding vegetation.</li> </ul>	PSM	As necessary	
<ul style="list-style-type: none"> <li>Re-vegetated areas should be monitored on a regular basis until the vegetation is stabilised.</li> </ul>	PSM	As necessary	
<ul style="list-style-type: none"> <li>Damage to re-vegetated areas shall be repaired promptly.</li> </ul>	PSM	As necessary	
<b>Landscaping, stabilisation and soil stockpiling</b>			
<ul style="list-style-type: none"> <li>In the event that additional landscape and stabilisation is necessary during the operational phase, exposed slopes and/ or destabilised areas shall be landscaped to blend in with the surrounding area.</li> </ul>	PSM	As necessary	
<ul style="list-style-type: none"> <li>In exposed areas with slopes steeper than 1:3, re-vegetation shall not be used as the primary means of stabilisation.</li> </ul>	PSM, ECO	As necessary	Yes
<ul style="list-style-type: none"> <li>Rehabilitated areas that are susceptible to erosion due to their position in the landscape shall be adequately protected by soil conservation measures.</li> </ul>	PSM	As necessary	
<ul style="list-style-type: none"> <li>Weed control methods shall be in accordance with Eskom's Environmental Management Programme.</li> </ul>	PSM	As necessary	Yes
<b>Storm water/ erosion</b>			
<ul style="list-style-type: none"> <li>Prevent storm water contamination through regular inspection and maintenance of the storm water management system. All drainage structures shall be regularly inspected and cleared of organic and inorganic debris.</li> </ul>	PSM	Daily to Quarterly, depending on season	
<ul style="list-style-type: none"> <li>A Contractor needs to be employed to remove all grease/oils etc from the grease/oil traps, and either recycled or disposed of at a permitted hazardous landfill site.</li> </ul>	PSM	Continuous	
<b>Wet Areas/ wetlands</b>			
<ul style="list-style-type: none"> <li>Vehicular traffic shall not be allowed in permanently wet areas.</li> </ul>	PSM	Continuous	
<ul style="list-style-type: none"> <li>No damage shall be caused to wet areas, and buffers will be maintained for wetland areas on</li> </ul>	PSM	Continuous	

the site.			
<ul style="list-style-type: none"> <li>The vital (seasonal) supply of water will not be removed from the wetlands by isolating local wetland catchments or any other means.</li> </ul>	PSM	Continuous	
<p>Loss or degradation of seasonal wetlands as a result of operational phase use of internal access roads</p> <ul style="list-style-type: none"> <li>Design roads such that runoff is dissipated in side drains/ swales, rather than concentrated in lined channels.</li> <li>Landscape swales such that they resemble more natural seasonal wetlands (e.g. Sw4, created during construction of the existing Koeberg NPS access road).</li> <li>Ensure that spillage of fuels/ other contaminants on the internal roads is dealt with in terms of Best Practice, and not allowed to flow into adjacent wetlands and aquifers.</li> </ul>	PSM	As necessary	
<b>Fauna (vertebrate)</b>			
<ul style="list-style-type: none"> <li>The site fence must prevent wildlife from entering the site.</li> </ul>	PSM	Continuous	
<ul style="list-style-type: none"> <li>Rehabilitate disturbed areas as quickly as possible.</li> </ul>	PSM	Continuous	
<ul style="list-style-type: none"> <li>Institute a monitoring programme to detect alien invasive species.</li> </ul>	PSM	Continuous	
<ul style="list-style-type: none"> <li>Institute an eradication/ control programme for invasive species.</li> </ul>	PSM	Continuous	
<ul style="list-style-type: none"> <li>Institute a programme of monitoring of the regionally important breeding colonies of seabirds near to the construction site so that changes in populations are documented as an aid to effective environmental management. This is particularly relevant for Dryer Island at the Bantamsklip site.</li> </ul>	PSM	Continuous	
<ul style="list-style-type: none"> <li>Commissioning of detailed surveys of inadequately surveyed animal groups, viz, reptiles and small mammals, to inform management.</li> </ul>	PSM	Continuous	
<ul style="list-style-type: none"> <li>Commissioning of a programme to monitor the populations of sensitive species, to inform management.</li> </ul>	PSM	Continuous	
<ul style="list-style-type: none"> <li>Monitoring of radioisotope pollution to aid environmental management.</li> </ul>	PSM	Continuous	
<b>Fauna (Invertebrate)</b>			
<ul style="list-style-type: none"> <li>Control all access to undeveloped portions of the property and ensure that it is used for non-destructive recreational and/ or educational purposes only.</li> </ul>	PSM	As necessary	
<ul style="list-style-type: none"> <li>Restrict development to the recommended areas as indicated in section 5 of the Wetland Ecosystems specialist report (refer to EIR).</li> <li>Take all necessary precautions to ensure that construction activities do not alter natural ground and surface water flows in areas identified as sensitive in the freshwater specialist report (refer to EIR).</li> </ul>	PSM	As necessary	

<ul style="list-style-type: none"> <li>• No solid perimeter walls should be erected. Fences should offer as little obstruction as possible to movement of both terrestrial and flying insects and other invertebrates. In general mitigation applicable to fencing that is suitable for vertebrates (see fauna report) will be more than adequate for invertebrates.</li> <li>• Utilise existing roads where possible, minimise the number of access roads and align these so as to allow movement of organisms along natural corridors; where this is not possible options such as raising the road surface to allow movement to continue unhindered beneath the road e.g. <i>via</i> multiple culverts should be considered. As far as possible use of different access routes during construction and for permanent access during the operational phase should be avoided.</li> </ul>	PSM	As necessary	
<ul style="list-style-type: none"> <li>• Rescue and relocation is generally not recommended for invertebrate species for a number of reasons: <ul style="list-style-type: none"> <li>○ Uncertainties regarding the suitability of the receiving environment for the relocated organisms.</li> <li>○ Uncertainties regarding potential negative impacts of the translocated individuals on the receiving environment due to either the carrying capacity of a naturally occurring species being exceeded or a new species potentially harmful to the ecosystem being introduced.</li> <li>○ Low success rate worldwide of translocation attempts.</li> </ul> </li> </ul>	PSM	As necessary	
<ul style="list-style-type: none"> <li>• Ensure that correct operating procedures and safety precautions are strictly adhered to; this is clearly a complex issue that cannot be adequately addressed here.</li> </ul>	PSM	As necessary	
<ul style="list-style-type: none"> <li>• Institute strict control over materials brought onto site, which should be inspected for potential invasive species and/ or steps taken to eradicate these <u>before</u> transport to the site. Two possible approaches are: <ul style="list-style-type: none"> <li>○ a visual inspection of all materials, particularly those that have been stockpiled in high-risk locations, for presence of invasive species and apply topical control (e.g. direct spraying with low residual insecticides) when necessary.</li> <li>○ routine fumigation or spraying of all materials with appropriate low-residue insecticides prior to transport to or in a quarantine area on site. The second option requires less highly trained personnel, but would probably result in much higher usage of pesticides.</li> </ul> </li> <li>• Rehabilitate disturbed areas as quickly as possible to reduce the area where invasive species would be at a strong advantage and most easily able to establish.</li> <li>• Institute a monitoring programme to detect alien invasive species.</li> <li>• Institute an eradication/ control programme for early intervention if invasive species are detected, so that their spread to surrounding natural ecosystems can be prevented (see Appendix 7 of the Invertebrates specialist report in the EIR).</li> <li>• Monitoring programmes and control measures should be developed with reference to <i>inter alia</i></li> </ul>	PSM	As necessary	

information provided by the IUCN SSC Invasive Species Specialist Group ( <a href="http://www.issg.org/">http://www.issg.org/</a> ).			
<ul style="list-style-type: none"> <li>• Institute strict control over access to the undeveloped portions of the proposed sites.</li> <li>• Plan the layout of the proposed NPS and especially additional units, so as to minimise the area removed from the potential reserve.</li> <li>• Proclaim the undeveloped portions of the owner-controlled sites as protected areas;</li> <li>• Continue and expand alien eradication and rehabilitation programmes.</li> <li>• Investigate the possibility of expanding the reserve area by purchasing adjoining properties and incorporating these into the protected area.</li> </ul>	PSM	As necessary	
<b>Marine systems</b>			
<ul style="list-style-type: none"> <li>• The release of hypersaline effluent will be controlled in line with the Water Permit requirements.</li> </ul>	PSM	Continuous	
<ul style="list-style-type: none"> <li>• Dedicated active policing of this exclusion zone as a deterrent to poachers (especially of abalone <i>H. midae</i>).</li> </ul>	PSM	Continuous	
<ul style="list-style-type: none"> <li>• Mitigation measures ascribed in the hydrogeological specialist study to minimise organic, bacterial and hydrocarbon pollution of groundwater (and subsequently the marine environment) should be applied (refer to specialist study in the EIR).</li> </ul>	PSM	As necessary	
<ul style="list-style-type: none"> <li>• The use of exclusion screens and diversion of trapped debris for clearing of debris from intake water. The use of low-level chlorination regimes to effectively control fouling of pipes.</li> </ul>	PSM	Continuous	
<b>Oceanography</b>			
<ul style="list-style-type: none"> <li>• The impact on local aquifers and groundwater fed surface water systems should be assessed at each site prior to considering discharging brine to ground.</li> </ul>	PSM	As necessary	
<ul style="list-style-type: none"> <li>• Disposing of the spoil in deeper water (in order to reduce the suspended sediment concentrations and reduce the transport of the coarser sediment away from the disposal site).</li> <li>• Environmental management measures should be considered during the disposal operations. For example, spoil disposal should cease during stormy conditions where sediments are less likely to settle upon the seafloor. The sediment plume should also be monitored visually and via water quality sampling frequently to ensure that the relevant water quality objectives established for the project are met.</li> </ul>	PSM	As necessary	
<b>Economics</b>			
<p>The severe skills shortage in South Africa is a negative factor which will need to be mitigated. The necessary mitigation measures are:</p> <ul style="list-style-type: none"> <li>• Funding training programmes at tertiary institutions to produce more than the numbers required (in order to allow for the effects of attrition).</li> <li>• In-house training.</li> </ul>	Client Office Manager	As needed.	

<ul style="list-style-type: none"> <li>• Training abroad.</li> <li>• Recruitment programmes.</li> <li>• Salary reviews to ensure competitive employment packages and in order to attract and retrain the requisite skills.</li> <li>• Merit as the only yardstick for employment – there can be no place for any other policy in an industry in which negligence or inefficiency can have such severe repercussions on the national economy and the local community.</li> <li>• High-quality risk management and monitoring.</li> <li>• An aggressive public relations campaign directed at the local community. This should involve the wide dissemination in easily understandable form of all the specialist studies in order to overcome public fears regarding, inter alia, loss of sense of place (visual impacts, pollution), impact on the marine environment (ocean temperatures, waves, fish), and social impacts (unemployment, squatter housing, crime) all of which could have an impact on the economy. This is an avoidance measure.</li> <li>• A similar campaign should be aimed at international product markets (e.g., in the case of squid fishing) or international bodies (e.g., the International Association of Surfing Professionals) to counter negative perceptions and boycotts of local products and events. This is an avoidance measure.</li> </ul>			
<b>Socio-economic</b>			
<p>Future land-use planning</p> <ul style="list-style-type: none"> <li>• Follow a transparent public participation process with role-players and interested and affected parties regarding future planning and land use needs.</li> <li>• After the location of the NPS has been finalised, an intensive planning process should be engaged in order to: <ul style="list-style-type: none"> <li>○ Ensure adherence to applicable legislation, e.g. environmental, water, roads, sustainability, etc.</li> <li>○ Ensure revision of existing planning policy and guidelines at National, Provincial and Local level (e.g. IDPs, SDFs, WSDPs, ITPs, etc.).</li> <li>○ Ensure comprehensive and transparent public participation in all planning processes.</li> <li>○ Optimise the creation of economic opportunities at all levels.</li> </ul> </li> <li>• More detailed Spatial Development Plans should be developed as soon as the location has been finalised. These plans will also enable more detailed impact assessments to be done.</li> </ul>	Client Office Manager	As Needed	
<p>Perceived risks associated with nuclear incidents</p> <ul style="list-style-type: none"> <li>• Due to the identified complexity of the community and the highlighted impact of public perceptions and image, the first mitigation measure is an aggressive community- oriented and comprehensive public information campaign. The lack of information and the overwhelming</li> </ul>	Client Office Manager	As needed	

<p>amount of misinformation regarding nuclear power as a whole, and specifically Eskom's Nuclear-1 plans, has generated all manner of popular myth and worst-case scenarios, scepticism and particularly doubt regarding the intentions and trustworthiness of Eskom.</p> <ul style="list-style-type: none"> <li>• The proposed public information campaign would address popular misconceptions regarding the Nuclear-1 programme, and specifically the impacts of nuclear power generation on the sea, the immediate environment and the sense of place. It is quite simply a case of the better the communications are with the local communities, the more measured and balanced their reaction to a nuclear power station will be.</li> <li>• A community-focused exercise in the provision of such public information in all three NPS areas would offset the majority of concerns, especially environmental and biological issues. Most important, though, it would provide sufficient knowledge and time to the stakeholders and authorities to start adjusting their marketing strategies and brand focus, assisting to minimise the negative tourism impacts and optimise the benefits.</li> </ul>			
<b>Visual</b>			
<ul style="list-style-type: none"> <li>• Maintain and modify where required to effectively mitigate visual impacts of the NPS and associated infrastructure. This may involve the management of re-vegetated cut or fill slopes to provide the visual integration with the surrounding landform. The extension of screen berms in certain areas and other related aspects.</li> </ul>	PSM	Continuous	
<b>Heritage resources</b>			
<ul style="list-style-type: none"> <li>• Any heritage/ archaeological sites/ objects which are discovered during the operational phase shall not be disturbed or destroyed. SAHRA shall be contacted immediately to report the archaeological/ heritage find.</li> </ul>	PSM	As and when necessary	
<ul style="list-style-type: none"> <li>• Depending on the outcomes of the heritage management process, develop the information that will be gained from the process into an educational resource i.e. a booklet, pamphlet or even a small display that could be included within a visitor or information centre.</li> </ul>	PSM	As and when necessary	
<b>Tourism</b>			
<ul style="list-style-type: none"> <li>• Eskom's policy is to maintain and expand the existing nature reserves at each of the three sites. It should use these parks as catalysts to increase tourism and overcome negative public perceptions. It could do this by, for example, establishing visitor information centres with lectures and films, promoting hiking trails, funding eco-tourism and conservation education, and working in unison with the Agulhas National Park and Grootbos Private Nature Reserve in the Bantamsklip area to further develop nature tourism.</li> </ul>	Client Office Manager	As necessary	
<b>Noise</b>			
<ul style="list-style-type: none"> <li>• An appropriate Noise Monitoring Programme will be developed and implemented.</li> </ul>	PSM	Continuous	



<b>Occupational health and safety</b>			
<ul style="list-style-type: none"> <li>Ensure compliance with the Occupational Health and Safety Act (No 85 of 1993).</li> </ul>	PSM	Continuous	
<ul style="list-style-type: none"> <li>Appropriate safety and precaution signage shall be erected in applicable areas.</li> </ul>	PSM	As necessary	
<ul style="list-style-type: none"> <li>All staff and Contractors shall be informed of the hazards on the site. Suitable training on what to do in an emergency shall be provided and used by the Contractor must be equipped with the applicable PPE before they are to be permitted access to the site.</li> </ul>	PSM	As necessary	
<ul style="list-style-type: none"> <li>The radiation protection programme will be consistent with the existing NPS requirements.</li> </ul>	PSM	As necessary	
<b>Vehicles and transportation</b>			
<ul style="list-style-type: none"> <li>All vehicles shall be in a roadworthy condition.</li> </ul>	PSM	Continuous	
<ul style="list-style-type: none"> <li>Only qualified/ trained personnel shall operate equipment and vehicles.</li> </ul>	PSM	Continuous	
<ul style="list-style-type: none"> <li>Access for vehicles shall be through existing established gateways. No deviation from approved access roads or transportation routes will be allowed.</li> </ul>	PSM	Continuous	
<ul style="list-style-type: none"> <li>Personnel will not be transported on the back of vehicles.</li> </ul>	PSM	Continuous	
<ul style="list-style-type: none"> <li>No member of the workforce will be permitted to drive a vehicle under the influence of alcohol or narcotic substances.</li> </ul>	PSM	Continuous	
<ul style="list-style-type: none"> <li>Access Road 2 should be used to access Nuclear-1; and</li> </ul>	PSM	Continuous	
<ul style="list-style-type: none"> <li>Nine hundred and forty five (945) permanent parking bays should be provided.</li> </ul>	PSM	Continuous	
<b>Emergency response</b>			
<ul style="list-style-type: none"> <li>Emergency evacuation procedures must be created and maintained.</li> </ul>	PSM	As necessary	
<ul style="list-style-type: none"> <li>Key staff shall be trained in emergency response and all staff made aware of the emergency procedures.</li> </ul>	PSM	Once-off and with each revision	
<ul style="list-style-type: none"> <li>Contact details of emergency personnel shall be readily available on-site.</li> </ul>	PSM	As necessary	
<ul style="list-style-type: none"> <li>A register of all incidents, accidents etc. shall be maintained, which includes the action taken after the event has occurred.</li> </ul>	PSM ;ECO	Continuous	
<ul style="list-style-type: none"> <li>Eskom will be responsible for immediately notifying the DEA, should any serious incident occur which is likely to have detrimental effects on the environment. A record of these incidents shall be kept.</li> </ul>	PSM	Continuous	

<ul style="list-style-type: none"><li>Eskom will be responsible for rehabilitating any damage caused to the environment.</li></ul>	PSM	As required	
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### 3.2.5 Decommissioning phase

Once the NPS has reached the end of its viable lifetime, it will be decommissioned. According to the United States Nuclear Regulatory Commission (2000) decommissioning means shutting down the plant and taking steps to reduce the level of radiation in order for the land to be used for other purposes.

**Table 3-4: Mitigation measures for the decommissioning phase**

Mitigation	Responsible Party	Frequency	Method Statement Required
<b>Demolition of structures</b>			
Recommended mitigation measures, which reflect the requirements of the Waste Act, are as follows: <ul style="list-style-type: none"> <li>Remove all other hazardous substances safely and dispose thereof to an appropriately licensed hazardous landfill site.</li> <li>Dispose of all other waste and building rubble to an appropriately licensed general landfill site, recycler or building rubble site, as may be suitable or required.</li> </ul>	PSM	As needed	
<b>Site remediation for change in land use</b>			
<ul style="list-style-type: none"> <li>Remediate the site effectively to allow for the relevant change in land use.</li> <li>Follow all municipal planning requirements that would be applicable at the time.</li> </ul>	PSM	As needed	
<b>Air quality</b>			
<ul style="list-style-type: none"> <li>A site-specific decommissioning plan must be developed according to the most recent requirements stipulated by the NNR.</li> </ul>	PSM	As needed	
<b>Fauna (Invertebrate)</b>			
<ul style="list-style-type: none"> <li>Dependant on decommissioning process followed, if demolition of the structures is to be carried out, then all recommendations applying to the construction phase would also apply here.</li> </ul>	PSM	As needed	
<ul style="list-style-type: none"> <li>Restrict development to the recommended areas as indicated in section 5 of the Wetland Ecosystems specialist report (refer to EIR).</li> <li>Take all necessary precautions to ensure that construction activities do not alter natural ground and surface water flows in areas identified as sensitive in the freshwater specialist report (refer</li> </ul>	PSM	As needed	

Mitigation	Responsible Party	Frequency	Method Statement Required
to EIR).			
<ul style="list-style-type: none"> <li>No solid perimeter walls should be erected. Fences should offer as little obstruction as possible to movement of both terrestrial and flying insects and other invertebrates. In general mitigation applicable to fencing that is suitable for vertebrates (see fauna report) will be more than adequate for invertebrates.</li> <li>Utilise existing roads where possible, minimise the number of access roads and align these so as to allow movement of organisms along natural corridors; where this is not possible options such as raising the road surface to allow movement to continue unhindered beneath the road e.g. <i>via</i> multiple culverts should be considered. As far as possible use of different access routes during construction and for permanent access during the operational phase should be avoided.</li> </ul>	PSM	As needed	
<ul style="list-style-type: none"> <li>Rescue and relocation is generally not recommended for invertebrate species for a number of reasons: <ul style="list-style-type: none"> <li>Uncertainties regarding the suitability of the receiving environment for the relocated organisms.</li> <li>Uncertainties regarding potential negative impacts of the translocated individuals on the receiving environment due to either the carrying capacity of a naturally occurring species being exceeded or a new species potentially harmful to the ecosystem being introduced.</li> <li>Low success rate worldwide of translocation attempts.</li> </ul> </li> </ul>	PSM	As needed	
<ul style="list-style-type: none"> <li>Mitigation will be dependant on method of decommissioning used, and requirements may be similar to the construction phase, but this cannot be determined at present.</li> </ul>	PSM	As needed	
<ul style="list-style-type: none"> <li>Mitigation will be dependant on method of decommissioning used, and requirements may be similar to the construction phase, but this cannot be determined at present; the Air Quality Impact and Climatology Assessment Study (Airshed Planning Professionals 2009) does not provide specific mitigation for decommissioning but notes that dust generation would occur and would require management and control.</li> </ul>	PSM	As needed	
<ul style="list-style-type: none"> <li>Dependant on decommissioning procedure; ensure that correct operating procedures and safety precautions are strictly adhered to; this is clearly a complex issue that cannot be adequately addressed here.</li> </ul>	PSM	As needed	
<ul style="list-style-type: none"> <li>Institute strict speed limits on the site including the owner-controlled conservation area (recommended maximum – 40 km/hr) and construct speed humps/ rumble strips to enforce</li> </ul>	PSM	As needed	

Mitigation	Responsible Party	Frequency	Method Statement Required
these speed limits.			
<ul style="list-style-type: none"> <li>• Institute strict control over materials brought onto site, which should be inspected for potential invasive species and/ or steps taken to eradicate these <u>before</u> transport to the site. Two possible approaches are: <ul style="list-style-type: none"> <li>○ a visual inspection of all materials, particularly those that have been stockpiled in high-risk locations, for presence of invasive species and apply topical control (e.g. direct spraying with low residual insecticides) when necessary.</li> <li>○ routine fumigation or spraying of all materials with appropriate low-residue insecticides prior to transport to or in a quarantine area on site. The second option requires less highly trained personnel, but would probably result in much higher usage of pesticides.</li> </ul> </li> <li>• Rehabilitate disturbed areas as quickly as possible to reduce the area where invasive species would be at a strong advantage and most easily able to establish.</li> <li>• Institute a monitoring programme to detect alien invasive species.</li> <li>• Institute an eradication/ control programme for early intervention if invasive species are detected, so that their spread to surrounding natural ecosystems can be prevented (see Appendix 7 of the Invertebrates specialist report in the EIR).</li> <li>• Monitoring programmes and control measures should be developed with reference to inter alia information provided by the IUCN SSC Invasive Species Specialist Group (<a href="http://www.issg.org/">http://www.issg.org/</a>).</li> </ul>	PSM	As needed	
<b>Visual</b>			
<p>The physical removal of structures by demolition will have a visual impact on the surrounding land use, which will have changed significantly during the approximate 60 years of operation of the NPS.</p> <ul style="list-style-type: none"> <li>• Apply where appropriate, the construction phase measures and develop specific measure to suit the new conditions that prevail.</li> </ul>	PSM	As needed	

## 4 MONITORING PROGRAMMES

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### 4.1 Dune geomorphology

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The dynamics of mobile and vegetated dunes is well-understood at all three sites, and no periodic monitoring or measurements of dunes are required to gather further background information. Wetland and vegetation monitoring that are necessary are specified in the respective specialist reports.

Mobile dunes in the vicinity of any construction activities must be monitored by a suitably qualified ECO, particularly within the Oyster Bay dunefield. Monthly visits are required. Any *ad-hoc* issues that crop up such as obstruction of moving dunes must be addressed.

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### 4.2 Geotechnical suitability

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It is imperative that dewatering efficiency is monitored at all times to ensure excavated slope integrity. No other monitoring requirements are necessary.

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### 4.3 Hydrology

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The objectives of the monitoring programme are:

- To minimise the potential for contamination of soils and water courses through effective soil and stormwater management;
- To minimise the potential for land and water contamination due to substances utilised, stored or removed from site during operational activities; and
- To monitor the effectiveness of management measures and mitigation measures stipulated in the EIR.

#### **Monitoring points**

Specific monitoring points can only be defined on site. The non-perennial streams should be monitored upstream from the activities and again downstream and at least at two points in the ponding areas on all sites.

#### **Monitoring Parameters**

Determinants of key relevance are detailed in **Table 4-1**.

**Table 4-1: Determinants of key relevance**

Key Determinand	Relevance
<b>Physical Quality</b>	
Electrical conductivity	General Indication of change of water quality
pH	Has a bearing on the solubility of metals that may occur
Turbidity	Indicates the cloudiness of the water
<b>Chemical Quality</b>	
ICP Metal Scan	Excessive amounts can make the water poisonous for marine and aquatic environment
BTEX	Benzene, Toluene, Xylene, Ethyl Benzene ( Also known as Volatile Organic Compounds)
Nutrients	stimulate eutrophication if present in excess
Radioactive isotopes	Possible radioactive contamination

**Monitoring Frequency**

The recommended sampling frequency is detailed in **Table 4-2**.

**Table 4-2: Minimum and recommended number of samples**

Sampling Point		Minimum per point		Recommended per point	
		Number of samples per year	Sampling Frequency	Number of samples per year	Sampling Frequency
Name	GPS Coordinates *				
Duynefontein Ponding area		2	When possible in wet season	4	Quarterly (if rained)
Thyspunt Ponding area		2	When possible in wet season	4	Quarterly (if rained)
Thyspunt Non-perennial Streams		4 (2 up stream and 2 downstream of activity)	When possible in wet season	12	Bi-monthly
Bantamsklip		2	When possible in wet season	4	Quarterly (if rained)

\* To be determined on site

**4.4 Geohydrology**

Pre-construction monitoring must focus on the following:

- **Groundwater levels.** This will provide valuable information on seasonal trends and response to extreme weather conditions, i.e. high rainfall events and droughts.
- **Wetlands/ seeps.** These must be monitored to determine interaction with groundwater and the possible long-term effect (quality, water level/ flow rate, as applicable) of groundwater control measures.

- **Groundwater quality.** This must include monitoring of selected radionuclides, macro-groundwater quality and trace elements.

A comprehensive groundwater monitoring programme will be developed and implemented by Eskom taking into consideration the specific needs of the site:

- Baseline information on aquifer behaviour for at least a two-year period before construction commences;
- Information on groundwater quality at the site in order to obtain time series groundwater quality data of the selected constituents, to verify selection of management actions and to determine the effectiveness of those actions;
- A reference database from which remediation programmes can be developed, if required; and
- A legally defensible database against which any possible future claims against Eskom regarding environmental contamination or human health risk can be measured.

**Table 4-3: Recommended geohydrology impact monitoring programmes for all sites**

<b>Recommended monitoring programme</b>	<b>Duration of monitoring</b>	<b>Reporting frequency</b>	<b>Management objectives</b>
Both shallow (primary aquifer) and deeper (secondary aquifer) monitoring boreholes at the sites equipped with automatic groundwater level/ temperature recorders	Commence prior to commissioning of plant, and continue during operational phase; ongoing	Three – six months.	See bullets above.
A barometric logger is installed to record the barometric pressure variation in order to correct the groundwater level data for barometric variation	Commence prior to commissioning of plant, and continue during operational phase; ongoing	Three – Six months	See bullets above.
Macro- and micro-chemical, stable isotope and selected radionuclide analysis	Commence prior to commissioning of plant, and continue during operational phase; ongoing. Analyses will include a full suite of cations (Na, K, Ca, Mg, NH <sub>4</sub> ) and anions (Cl, SO <sub>4</sub> , NO <sub>3</sub> , NH <sub>3</sub> , PO <sub>4</sub> , HCO <sub>3</sub> ), heavy metals (Fe, Mn, Cr, Zn, Co, Pb, Cu, Cd), trace elements (F), and radionuclides (e.g. U, Th, Cs, Sr, Ra, <sup>3</sup> H <sup>14</sup> C, and any additional determinants required for assessment of aggressiveness of the water).	Three – Six months	See bullets above.



## 4.5 Air quality

A comprehensive monitoring programme will be developed and implemented by Eskom which includes measurements of levels in worker areas and areas of the community. The monitoring programme needs to include the following:

- Parameters to be monitored;
- Monitoring locations;
- Monitoring interval;
- Data and data analysis requirements for monitoring reports; and
- Reporting interval.

**Table 4-4: Recommended air quality impact monitoring programmes for all sites**

<b>Recommended monitoring programme</b>	<b>Duration of monitoring</b>	<b>Reporting frequency</b>	<b>Management objectives</b>
1) Monitoring measures outlined in the South African National Standards, SANS 1929:2004 will be included: <ul style="list-style-type: none"> <li>- Baseline sampling;</li> <li>- Control site sampling;</li> <li>- Dust deposition gauges (provides long term data);</li> <li>- High volume samplers (quantitative data over 24 hr periods);</li> <li>- Continuous particle monitors (provides data relevant to short term events);</li> <li>- Size-selective samplers (samples dust in size fractions); and</li> <li>- Personal exposure samplers (worn by workers).</li> </ul>	The monitors should be located in areas that would allow the quantification of potentially increased levels of airborne particulate matter in sensitive areas. Therefore, samplers/monitors should be placed at the residential boundary closest to the construction site. Directional sampling would ensure that observations from the construction phase are captured.	The monitoring equipment will either be filter based on-line monitors or non-filter based automatic monitors.	On-going compliance evaluation, on-going estimation of contribution to airborne particulate concentrations to background levels, and evaluation of the effectiveness of dust control measures implemented during the construction period. Control should be based on the air quality limits given in the air quality specialist study.

## 4.6 Flora

Ensure that rehabilitation with indigenous species is carried out effectively and has long-term sustainability

Ensure a coastal corridor is created in an appropriate manner and is maintained in the long-term

Ensure that where possible all Red Data species affected by development are relocated or successfully grown on in a nursery and returned to the wild.

Ensure that the natural areas of Duynefontein/ Koeberg Private Nature Reserve are maintained in a state consistent with that of a well-managed nature reserve

## 4.7 Wetlands

Implementation of a monitoring programme that allows the efficacy of mitigation measures to be evaluated during both the construction and operational phases of the proposed NPS at the Duynefontein site is strongly recommended as an essential condition of any development approval at this site.

Monitoring and evaluation would both allow the possibility of alteration of activities, within the constraints of an already-approved and possible constructed development, such that unforeseen impacts could be addressed or where mitigation measures proved ineffectual alternative measures might be introduced. Perhaps more realistically, though, given the above constraints, monitoring and evaluation provides an opportunity for refinement of both the impact assessment and the specification of mitigation measures, for any future phases of the NPS development that may be considered at this site. Monitoring data will, if the programme is appropriately designed, highlight impacts to wetlands that have not been identified in this study, for example where the significance of surface/ groundwater interactions affected by activities in this portion of the site have been underestimated. Moreover, where mitigation measures have failed, or alternatively been too intense for the impact actually experienced, their evaluation can inform the assignment of mitigation measures for future applications for NPS development at this site.

**Table 4-5** outlines a monitoring programme for wetland systems at the Duynefontein site. This programme should be integrated with monitoring recommendations made by the faunal, botanical and geohydrological specialists, and the results of the monitoring programme and its implications for wetlands and other ecosystems, should be evaluated on a regular basis. It should however be noted that the monitoring programme outlined here does not focus only on the construction and operational phases of Phase 1. It is also designed to inform potential future EIA assessments of Phases 2 and/ or 3, with timeous collection of appropriate data to a level that will allow adequate assessment of future impacts.

It should be noted that the monitoring programme should be implemented at least one full year before construction on the site starts, to allow comparative pre-impact data.

**Table 4-5: Recommended wetland impact monitoring programmes for all sites**

Recommended monitoring programme	Duration of monitoring	Reporting frequency	Management objectives
Collection of baseline data regarding patterns of succession of aquatic invertebrate in seasonal wetlands	Over one wet season, to cover period from first inundation to zero inundation.	Once-off - annual	Biodiversity maintenance – specifically, no change in wetland function/ habitat quality
Monitoring of aquatic invertebrate communities	Twice yearly – as determined by first year succession monitoring (above)	Annual	Biodiversity maintenance – specifically, no change in wetland function/ habitat quality
Water chemistry monitoring	Weekly in the wet season, tying in with groundwater monitoring and hydroperiod assessment, for a period of two years – at least one year prior to construction	Monthly	No change in natural variation in wetland chemistry

Monitoring of water depth and soil moisture (dry season) in seasonal wetlands	Weekly in the wet season; monthly in summer	Six monthly	No change in natural seasonal hydroperiod cycles, and maintenance of natural variability
Monitoring of wetland plant zonation	Annually	Annual	Biodiversity maintenance – specifically, no change in wetland function/ habitat quality

#### 4.8 Fauna (Vertebrates)

An appropriate monitoring and auditing programme should be put in place to track the efficacy of the mitigation measures. Monitoring requirements must be built into the auditing procedures of the EMPs for the construction, operational and decommissioning phases, but input during the design phase is also important for the demarcation of sensitive areas. The programme should include monitoring directed specifically at sensitive faunal populations. The recommended programmes are outlined in **Table 4-6**.

**Table 4-6: Recommended monitoring and evaluation programmes at Duynfontein.**

<b>Recommended monitoring programme</b>	<b>Duration of monitoring</b>	<b>Reporting frequency</b>	<b>Management objectives</b>
1) Condition of wetlands near to footprint	Construction phase, plus three years	Quarterly	Maintenance of pre-development wetland ecology.
2) Size and breeding success of local breeding colonies of seabirds	Commence prior to construction phase and continue during operational phase; ongoing	Annual	No reduction in colony size and average breeding success rate.
3) Mortality associated with transmission lines and substations	Commence after construction and continue until problems solved	Monthly	Reduction of frequency of bird mortality to low levels.
4) Mortality associated with roads	Commence at beginning of construction phase and continue until problems solved	Monthly	Reduction of frequency of roadkills to low levels.
5) Population strength of selected sensitive species, e.g., Blouberg Dwarf Burrowing Skink	Commence prior to construction and continue during operational phase; ongoing	Annual	Stabilization or improvement of populations, post construction.
6) Regular audits of the EMP for construction phase	Construction phase	Quarterly	Compliance with all provisions of the EMP.

7) Regular audits of the EMP for operational phase	Operational phase	Three-yearly	Compliance with all provisions of the EMP.
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Notes:

- The “reporting frequency” is the frequency at which survey results must be written up and presented to the Environmental Control Officer (ECO).
- The frequency of actual field surveys is not specified here. Survey protocols must be designed by the relevant specialists who are appointed to do the monitoring.
- The breeding colonies in monitoring programme #2 are those at Koeberg harbour. **Note that monitoring must begin prior to the construction phase so that a baseline for monitoring can be established.**
- Monitoring programmes 3 and 4 should be the responsibility of the on-site ECO.
- The sensitive species in monitoring programme #5 are those identified in 3.1.2 (above). **Note that monitoring of these species must begin before site clearance so that a baseline for monitoring can be established.**
- Audits of the EMPs (#6 and #7) should be carried out by independent consultants.

In addition to the specific monitoring programmes recommended above, it is recommended that an Environmental Liaison Committee be appointed for the site. The committee should comprise experienced and respected members of the scientific community, preferably local residents, who have specific expertise in environmental matters. The function of this committee would be to assist the ECO in achieving his objectives and specifically to provide assistance in:

- Interpretation of the results of environmental monitoring;
- Formulating action plans for specific problems;
- Communicating environmental information and recommendations to senior managers in Eskom; and
- Communicating relevant information to the public.

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## 4.9 Fauna (Invertebrates)

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Recommended monitoring of impacts only of mitigation measures specific to invertebrates is suggested here. Where suggested mitigation falls more appropriately under a different discipline (e.g. dust would be best dealt with by the air quality specialist), despite its significance for invertebrate populations, the relevant specialist would be better able to determine appropriate monitoring methods and frequency and such recommendations have been made in other specialist reports.

All monitoring programmes to be implemented must be built into the EMP for the Nuclear-1 project, and auditing of the monitoring programmes must form part of the normal ongoing EMP audit process throughout the life of the project from construction, through operation and decommissioning until closure.

**Table 4-7: Recommended invertebrate impact monitoring programmes for all sites**

Recommended monitoring programme	Duration of monitoring	Reporting frequency	Management objectives
1) Invertebrate mortality caused by external lighting	Life of project: commence prior to construction to obtain baseline, continue throughout construction and operational phases	3-monthly until target reached, annually thereafter	Reduction of light-induced mortality to insignificant levels; no measurable impact of light pollution on surrounding invertebrate populations.

2) Invasion by alien invertebrate species	Life of project: commence prior to construction to obtain baseline, continue throughout construction and operational phases.	Annual	Detection of establishment of alien species to allow early intervention in terms of eradication/ control.
3) Diversity and community structure of selected indicator groups such as ants and leafhoppers	Commence prior to construction to obtain baseline values and continue throughout construction (including post-construction rehabilitation of disturbed areas) and decommissioning phases.	Annual	Diversity and species composition of selected indicator taxa return to baseline values after successful rehabilitation.

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## 4.10 Marine systems

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### Monitoring of thermal pollution

At each site both the benthic and intertidal habitats should be sampled before construction, after construction, but before the onset of the operational phase, annually during operation and then for a minimum of five years after closure of the power station. Both benthic and intertidal sites predicted to be impacted (i.e. based on oceanographic modelling of the release plume) should be paired with comparable control sites. If suitable sites exist both sheltered and exposed rocky shores should be considered. At Bantamsklip special note should be taken of the abalone *H. midae* and dedicated surveys should be conducted to assess the densities of this gastropod. At Thyspunt surveys should be conducted to monitor for the presence of egg capsules of the Chokka squid *Loligo vulgaris*. Note: the use of indicator species is not recommended as the densities of marine invertebrates often varies dramatically through time, while changes in overall community composition are far more relevant. While sampling need not be repeated in different seasons it is important that annual monitoring take place at the same time each year.

### Monitoring of spoil disposal sites

Prior to disposal of spoil at sea, benthic communities at the disposal site, and in the areas predicted to be affected by spoil in the first ten years following disposal (Prestedge *et al.* 2009a) should be sampled for at least two years. Following disposal of spoil, these sites should be sampled at the same time of the year as the initial samples for at least ten years. Importantly, communities establishing on the actual spoil site should be monitored to establish to what extent these communities recover through time.

### Monitoring of radiation emissions

An environmental surveillance programme should be implemented to monitor for radiation emissions in the marine environment. This would form part of the strict requirement of the National Nuclear Regulator Act, 1999 (Act No. 47 of 1999). The design of such a programme is outside our area of expertise, but is likely to follow the Eskom Radiation Protection Environmental Surveillance Standard. Organisms which we recommend for inclusion in such a monitoring programme are the abalone *H. midae* at Bantamsklip and the chokka squid *Loligo vulgaris* at Thyspunt, as both are consumed commercially.

### Monitoring of sewage effluent

A routine monitoring programme of water exiting the cooling water outlets should be established to ensure that sewage effluent entering the sea meets the standards set by the Department of Water Affairs (DWA).

**Monitoring of organic, bacterial and hydrocarbon pollution resulting from polluted groundwater**

Should pollution of groundwater be detected, monitoring of seawater quality in the area of groundwater discharge should commence immediately to ensure the safety of public health.

A comprehensive marine monitoring programme will be developed and implemented by Eskom taking into consideration the specific needs of each site

**Monitoring of African penguin (*Spheniscus demersus*) populations on Dyer Island**

A long-term monitoring programme should be established to track populations of African penguins on Dyer Island near the Bantamsklip (Prof L. Underhill, University of Cape Town, *pers comm.*). Monitoring should take place before, during and after construction. Such monitoring should take place in conjunction with the penguin monitoring programme which is currently underway on the island and is run by the Avian Demography Unit at the University of Cape Town.

**Table 4-8: Recommended marine impact monitoring programmes for all sites**

Recommended monitoring programme	Duration of monitoring	Reporting frequency	Management objectives
Monitoring of thermal pollution	Benthic and intertidal habitats should be sampled before construction, after construction, but before the onset of the operational phase, annually during operation and then for a minimum of five years after closure of the power station		Both benthic and intertidal sites predicted to be impacted (i.e. based on oceanographic modeling of the release plume) should be paired with comparable control sites. If suitable sites exist both sheltered and exposed rocky shores should be considered. At Bantamsklip special note should be taken of the abalone <i>Haliotis midae</i> and dedicated surveys should be conducted to assess the densities of this gastropod. At Thyspunt surveys should be conducted to monitor for the presence of egg capsules of the Chokka squid <i>Loligo vulgaris</i> .
Monitoring of radiation emissions	An environmental surveillance programme should be implemented to monitor for radiation emissions in the marine environment before and during the operation phase.	This would form part of the requirement of the National Nuclear Regulator Act.	Same as above

Note:

- The use of indicator species is not recommended as the densities of marine invertebrates often varies dramatically through time, while changes in overall community composition are far more relevant.
- Organisms which are recommended for inclusion in a radiation monitoring programme are the abalone *Haliotis midae* at Bantamsklip and the chokka squid *L. vulgaris* and abalone at Thyspunt, as both are harvested commercially.

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## 4.11 Oceanography

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The International Atomic Energy Agency (IAEA 2003) recommends that the following monitoring networks should be considered when constructing a NPS:

### **A monitoring system of basic atmospheric parameters**

Weather stations should be installed at each of the three sites to monitor the atmospheric conditions. The results should be recorded and long term trends in the data assessed.

### **A water level gauge system**

Water levels are recorded at Cape Town, Hermanus, and Port Elizabeth for Duynefontein, Bantamsklip and Thyspunt respectively.

### **Tsunami warning system**

Parts of the world considered to be in high risk areas for tsunamis have both regional and national tsunami warning systems. There is however no specific warning system for the South African coastline. It is unlikely that this will be implemented given the low risk of seismic activity in the Southern Atlantic Ocean.

### **Construction and Operation Environmental Monitoring**

It is recommended that the construction and operation environmental management plans developed for the project include the methodology for monitoring key oceanographic parameters during construction and operation.

During construction this should include monitoring the levels of total suspended sediments within the water column during all marine works and spoil disposal operations. During operation ambient temperature and concentrations of co-discharges should be frequently measured.

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## 4.12 Social

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Eskom will initiate the establishment of Social Monitoring and Steering Committee

**Table 4-9: Recommended social impact monitoring programmes for all sites**

<b>Recommended monitoring programme</b>	<b>Duration of monitoring</b>	<b>Reporting frequency</b>	<b>Management objectives</b>
The establishment and management of the social impact by a Social Monitoring and Steering Committee	On-going for a minimum period of six months during the pre-commissioning phase and continue during the entire duration of construction, as well as a minimum period of six months from commencement of the operational or commissioning phase.	Three monthly or as defined by the Terms of Reference of the Committee	The introduction and establishment of a "Social Monitoring and Steering Committee", comprising representation from all the interested and affected parties, who should discuss, manage, address and resolve social issues, needs and problems on a continuous and sustained basis.

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## 4.13 Visual

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The magnitude and significance of a visual impact of a structure in a particular view will vary from person to person. This is because visual impact appreciation is a subjective notion.

The effectiveness of visual mitigation measures is aimed therefore at reducing rather than eliminating the visual impact to the observer. This is as a result of the large scale of the project's elements.

All proposed mitigation measures are therefore considered to be effective in reducing the visual impact. Mitigation by way of screening by vegetation will take a longer time to be effective. This measure is reliant on regular maintenance to ensure effective growth.

**Table 4-10: Recommended visual impact monitoring programmes for all sites**

<b>Recommended monitoring programme</b>	<b>Duration of monitoring</b>	<b>Reporting frequency</b>	<b>Management objectives</b>
Monitor compliance with the visual mitigation measures provided in this	Construction and operation phases.	Regular compliance checks in accordance with the ECO schedule.	To ensure that mitigation measures are effective, current and are maintained at the level required.



<b>Recommended monitoring programme</b>	<b>Duration of monitoring</b>	<b>Reporting frequency</b>	<b>Management objectives</b>
EMP.			
Monitor the vegetation establishment on new landforms, the performance of safety and security lighting, the overall visual image of the NPS. Improvements may involve the management of revegetated cut or fill slopes to provide the visual integration with the surrounding landform; the extension of screen berms in certain areas; and other related aspects	Operation phase	Annually.	Maintain and modify where required to effectively mitigate visual impacts of the NPS and associated infrastructure.

#### 4.14 Heritage and archaeology

Since heritage practitioners have no quantifiable data about the extent of the “National Estate” even at a regional level, there is no yardstick that can be used to measure the effectiveness of a mitigation programme. In terms of the author’s standards, if the archive of information and materials derived from rescue sampling can be used by others in dissertations, research publications or dissemination of public knowledge, then mitigation is deemed to be partially successful.

Unfortunately, it is more feasible to maintain a schedule of loss of heritage rather than a schedule of successful mitigation. Nevertheless the following measures are suggested as a means of judging the effectiveness of mitigation. Ideally heritage casualties should be less than the number of heritage sites which are actively conserved – a site conserved for every one that is destroyed should be a minimal goal to aspire to.

**Table 4-11: Recommended heritage impact monitoring programmes for all sites**

<b>Recommended monitoring programme</b>	<b>Duration of monitoring</b>	<b>Reporting frequency</b>	<b>Management objectives</b>
The audit/ identification of heritage	During construction phase.	On-going, as and when required.	In order to measure the success of mitigation, as much as

Recommended monitoring programme	Duration of monitoring	Reporting frequency	Management objectives
resources on the NPS sites			possible needs to be known about population diversity and age of heritage sites. The survey that has just been completed is a substantial start to this process.
A record should be maintained that records heritage findings found buried in sediments during the construction stage.	During the process of construction	On-going, as and when required.	Critical contribution towards judging the amount of palaeo- and archaeo-heritage that lies buried on the property. It would also assist in establishing an overall conservation goal

## 5 CONCLUSION

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This EMP is aimed at meeting the requirements of the EIA Regulations and the guidelines issued in respect thereof. The document is in a draft format and available for review and comment by the public, whereafter it will be finalised.

The EMP has been extensively workshopped at various integration meetings between the technical specialists and Eskom. This process facilitated the identification of relevant and practical mitigation measures and monitoring recommendations, which may be used by Eskom to ensure the fulfilment of the commitment to this EMP by the Contractor, as agreed to in the tender documentation completed between these parties. It is also critical that this document be included during any sub-consultant tendering, to allow all potential bidders for this work to seriously consider and cost for such mitigation. This will ensure that the document receives the necessary buy-in that it required right from the outset of the project. In addition, the contents of the EMP should be used in the development of the operational phase EMS for the NPS.

Penalties to be imposed for the transgression of environmental management measures are also noted, along with the roles and responsibilities of all stakeholders such as Eskom Nuclear Generation, the Environmental Auditing Team, the Environmental Control Officer, Project Manager, Site Manager or Power Station Manager, the (sub-)Contractors, landowners, interested and affected parties and the relevant environmental and project specialists.

In order to ensure environmental compliance, all parties taking part in the pre-construction, construction, operation and decommissioning of the NPS facility shall be fully acquainted with the contents of the EMP. This will ensure that potential negative impacts are identified, avoided or mitigated.

# DOCUMENT CONTROL SHEET (FORM IP180/B)




**CLIENT:** Eskom Holdings Limited – Generation Division

**PROJECT:** Environmental Impact Assessment for the proposed conventional Nuclear Power Station (NPS), 'Nuclear-1'

**TITLE:** Environmental Management Plan (EMP)

**PROJECT NO:** J27035

by **Prepared by** **Reviewed by** **Approved**

<b>ORIGINAL</b>	NAME <b>Fiona Grimett</b>	NAME <b>Rebecca Thomas</b>	NAME <b>Jaana-Maria Ball</b>
DATE <b>14 February 2010</b>	SIGNATURE 	SIGNATURE 	SIGNATURE 

<b>REVISION</b>	NAME	NAME	NAME
DATE	SIGNATURE	SIGNATURE	SIGNATURE

<b>REVISION</b>	NAME	NAME	NAME
DATE	SIGNATURE	SIGNATURE	SIGNATURE

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Arcus GIBB (Pty) Ltd  
 PO Box 2700  
 Rivonia  
 2128  
 Tel : +27 11 519 4600  
 Fax : +27 11 807 5670  
 Email : jball@arcusgibb.co.za  
 Website: www.arcusgibb.co.za

ANNEXURE A  
ESKOM EM PROGRAMME GUIDE

 Eskom	<b>Guideline</b>	
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Document type: **EPC**  
Revision: **0**  
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COMPILED BY	FUNCTIONAL RESP	AUTHORISED BY
..... <b>ELC EIA Task Team</b>	..... <b>Dave Lucas</b> <b>Chair ELC</b>	..... <b>WIJ Poulton</b> <b>General Manager: Corporate</b> <b>Sustainability</b>

This document should be read in conjunction with the Eskom Environmental Procedure, EPC 32-96.

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## **1 Introduction**

One of Eskom's environmental strategies is the development and implementation of an environmental management system (EMS). Linked to this is a requirement for the development and implementation of environmental management programmes (EMPs). Furthermore, Eskom's environmental land policy requires that all Eskom land be continually managed, through the control of operations and activities that take place on it, to ensure the sustainable utilisation of the asset. It also requires that all Eskom land be managed, operated, and maintained in terms of an established EMP.

An EMP is a plan of action that sets out a required environmental end state and sets out how activities that could have a negative impact on the environment will be managed and monitored and how impacted areas will be rehabilitated.

The main Eskom Environmental Procedure, EPC 32-96, should be consulted for all elements relating to the scope, normative references, etc.

## **2 Requirements**

### **2.1 General**

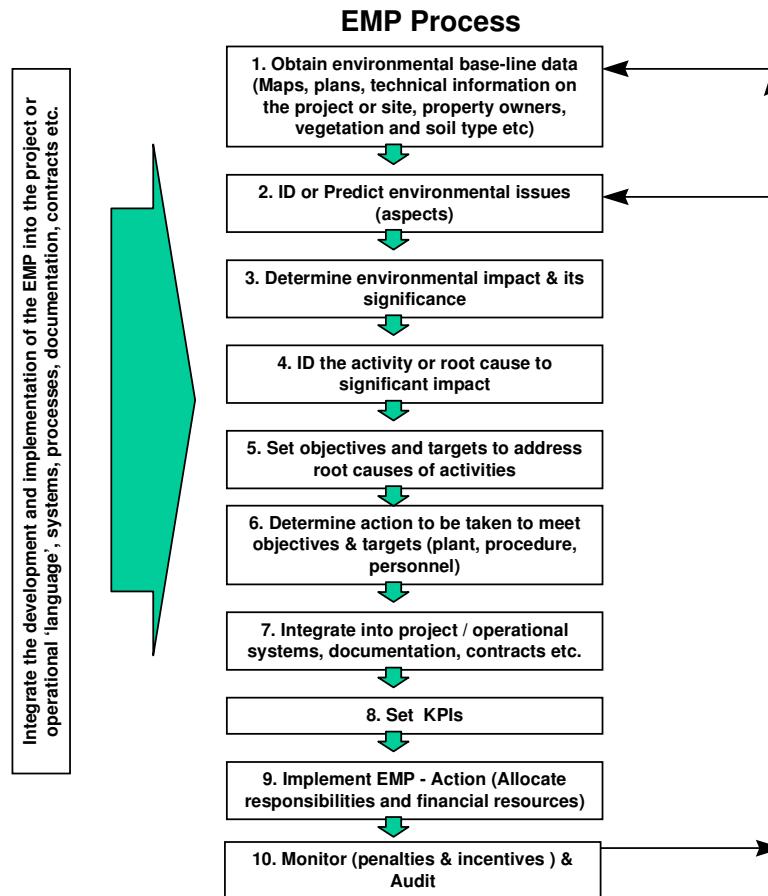
**2.1.1** An EMP shall be developed and implemented, in terms of the relevant line division EMS for:

- a) existing and future Eskom land (site, servitude); and
- b) projects for which an environmental impact assessment (EIA) or screening was undertaken.

Applicable significant environmental issues are to be included in an EMP (see 2.12 for general environmental aspect). In the development and implementation of an EMP for existing Eskom land (site/servitude) or for a proposed project, the procedures in 2.2 to 2.11 should be followed to ensure compliance with Eskom's Environmental Land Policy and national environmental legislation.

**2.1.2** Each Eskom division and subsidiary should establish key performance indicators (KPIs)/EMS for the development and implementation of EMPs. These indicators and actual performance figures should be reported for inclusion in Eskom's Annual Report where appropriate.

**2.1.3** The line business unit (BU) managers shall be accountable for the coordinated development and implementation of the environmental management programmes in their respective areas in line with the set KPIs/EMS.



## 2.2 Collect environmental baseline data

- a) This step involves the collection of baseline data or background information on:
  - 1) the proposed project (technical and project management programme);
  - 2) the existing land (site/servitude) and operations (technical and operational practices); and
  - 3) the environment (and surrounding environment) of the proposed project of existing land (site/servitude) and operation.
  
- b) Collection of data should start with obtaining existing information from:
  - 1) past EIAs;
  - 2) operational and maintenance records (including inspection reports);
  - 3) incident investigation and audit reports;
  - 4) geographical information systems (GIS); and
  - 5) landowners and government departments.
  
- c) Thereafter, gaps in data would have to be filled through specialist studies and field



sampling. For a power line route, this could involve a specialist on vegetation, bird interactions with power lines, soil types, and national heritage sites. For a site, specialist studies would be needed for soil types, vegetation control, and technical aspects of the site (that is, maintenance practices, oil traps, etc.).

- d) This information should be collated in a format that will allow it to be stored and utilised in a convenient manner.
- e) If an EIA had already been undertaken for the route or site, much of this baseline information can be obtained from that EIA report.
- f) See Annex B for a generic list of baseline information required for specific sites.
- g) Background information on the environment (land, air, water, local communities, and other interested and affected parties) should include issues that are applicable to the project or the existing site, and associated environmental impacts. It should cover the physical, biological, and social environments that could be or are adversely affected by the development or operation, respectively.
- h) This baseline information is required to identify changes, through monitoring, as a result of the project or operational impacts. Baseline information studies will provide the “control” records against which all monitoring can be measured. The information will also be used in the development of EMP actions to avoid impacts or to restore areas.

### **2.3 Identify and/or predict the environmental aspects (Aspects Register)**

**2.3.1** Identify the environmental aspect (waste, oil spills, soil erosion, air and water emissions, vegetation control, landowner requirements, etc.) that need to be addressed, managed, controlled, or avoided through the adequate control of that activity resulting in the aspect.

**2.3.2** For new developments and projects requiring an EIA, relevant statutory requirements shall be adhered to.

**2.3.3** For an existing operation or site, the assessment to identify environmental issues could be from:

- a) incident investigations and past experience (maintenance records, investigation reports, etc.);
- b) a life-cycle assessment (LCA);
- c) an EIA (for upgrades or changes to plant);
- d) routine maintenance inspections/audits;
- e) environmental due diligence;
- f) an environmental risk assessment (ERA); and
- g) an audit of the plant, site, or route.

**2.3.4** A checklist, matrix, or some other assessment tool should be used to record the issues that were identified (see Annex C).

**2.3.5** For both new projects and existing sites, a process of public participation should be undertaken to ensure that the concerns of interested and affected parties are taken into

consideration when compiling and implementing the EMP.

## **2.4 Determine the environmental impacts and their significance**

**2.4.1** The environmental impacts associated with each identified environmental aspect should be determined (that is, an oil spill is an environmental aspect, and its impact is the contamination of soil and water). Significance involves a value judgement by society concerning the importance of the effects of human activities. The primary concerns of the public are human health and safety. Thereafter, it is the concern for potential losses of important commercial species or commercially viable production and a high priority on species and areas of major recreational or aesthetic importance.

**2.4.2** The significance of each impact that is predicted or identified should be quantified. The significance should be rated as high, medium, or low. In the determination of what is significant, techniques should be adopted that remove the subjectivity from the determination.

**2.4.3** Significance can be determined with regard to:

- a) the **nature** of the proposed or existing activity with regard to the causes of the effect;
- b) the **extent** of the activity regarding whether the impact will be or is local or regional;
- c) the **duration** of the activity's impact (short, medium, long, or even permanent);
- d) the **intensity** of the activity's impact, classified in terms of the following: **low** – natural or social functions and processes are not affected; **medium** – the environment is altered, but the natural and social functions are able to continue in a modified way; and **high** – natural or social functions or processes are altered to such an extent that they will temporarily or permanently stop; and
- e) the **probability** that the impact will actually occur in terms of the following: **improbability** – due to design or historical experience, the chance of impact occurring is very low; **probable** – where there is the possibility that the impact could occur; **highly probable** – in the case where it is more than likely that the impact will occur; and **definite** – here the impact will occur regardless of any preventative measures being implemented.

**2.4.4** The criteria for significance should include the level of public concern and legal implications and impact on image should the impact occur.

**2.4.5** The significance of the environmental impact could be to use it in conjunction with the cost benefit analysis (CBA) approach, which seeks to express impacts in monetary terms.

## **2.5 Identify the activity or root cause associated with the significant impact**

**2.5.1** Once all the significant environmental aspects have been identified based on the significance of their impacts, the activity that causes them should be identified. This is, in a sense, determining the root cause of the problem, and it is the root cause that one needs to manage and control to ensure that corrective and preventative measures are implemented through the EMP.

**2.5.2** An impact is the result of a failure of plant/procedures/personnel to perform as expected (that is, no bund wall, wrong use of herbicides, uncontrolled management of storm water, ash and slurry plant inefficiency, personnel not trained, no operational procedure in place, etc.).

## **2.6 Set objectives and targets to address root cause**

**2.6.1** After identifying, determining, and quantifying the environmental aspects and their associated activities (the root causes) that need to be addressed in the EMP, translate them into specific management objectives and specific measurable targets.

**2.6.2** When these objectives and targets have been set, ensure that they conform to statutory requirements.

**2.6.3** The objectives and targets set should be based on a combination of the legal requirements, the significance of the identified environmental aspect and its impacts, technological options, alternatives, financial limitations, business requirements, and the views of interested and affected parties.

**2.6.4** The objectives should be specific and the targets measurable. These objectives and targets should address the identified root cause as identified in 2.5.

**2.6.5** When objectives and targets are set, they should be linked to measurable environmental key performance indicators (KPIs) for measuring, monitoring, and auditing purposes.

## **2.7 Determine actions to be taken to meet objectives and targets – project or operational actions**

**2.7.1** The action required to achieve the set objective and targets in order to address the root cause should be established. Solutions to problem areas should be quantified, that is, Eskom procedures or standards, specialists' reports and recommendations, and past successful solutions. The project actions could be one of the following:

- a) **Plant:** that is, waste disposal site, storm water system, hazardous material store, rehabilitation of soil erosion areas, water treatment equipment, an oil trap, storm water berms, waste collection and separation site, new plant, screening vegetation and other forms of landscaping, etc. (This should include the actual location of plant and construction and operational procedures.)
- b) **Procedures:** that is, the development of specific operational procedures for the carrying out of certain activities: to preserve archaeological sites, bush clearing, herbicide application, waste minimisation, water conservation, dust suppression, noise minimisation, etc. (The procedure should include responsibilities, reporting, monitoring, and conformance with permit requirements.)
- c) **Personnel:** that is, training and skills development, awareness, incentives, penalties, etc.

**2.7.2** The project actions are the key aspect of the EMP in that they are the actions taken that will achieve the required end state.

## **2.8 Integrate into project/operational systems, documentation, contracts**

**2.8.1** The actions in 2.7 should be integrated into applicable existing processes, systems, and documentation that are part of either the project for the development or of the existing operation.

**2.8.1.1** For new development projects: the EMP action requirements should be integrated into the scope of work or work description as part of tender documents and subsequent contracts. A register (see Annex D) should be maintained identifying the EMP requirements and where they can be located within the contract documentation, that is, design specifications, procedures, work instructions, etc.

**2.8.1.2** For existing sites: the EMP action requirements should become individual projects or specific responsibilities of an individual or team. For projects, the EMP shall be integrated into the scope of work or work description as part of the tender documents and subsequent contracts. A register (see Annex D) should be maintained identifying the EMP requirements and where they can be located within the operation.

**2.8.2** In some cases, an EMP could be represented in a single document, but for full effectiveness, it should be integrated into the appropriate project or operational systems and documentation.

## **2.9 KPIs**

**2.9.1** Link performance of the EMP to existing business performance measures and reporting practices.

## **2.10 Implement EMP action**

**2.10.1** Once the EMP has been formulated, accountabilities set, and resources made available, the EMP should be implemented. This may, for a new project, be in terms of a single contract or many contracts with contractors and subcontractors.

**2.10.2** For an existing site, it may be action undertaken by the responsible BU or individuals. It may also be in the awarding of contracts to undertake a specific project or part of operational and maintenance practices.

## **2.11 Monitoring and audit**

**2.11.1** Monitoring: the EMP will only be effective if there are mechanisms to measure and report on the KPIs. Together with the KPIs, there should be a monitoring programme in place to not only measure the EMP requirements, but also the environmental variables – that is, to measure not only conformance, but also environmental aspects and impacts that have not been accounted for in the EMP that are or could result in significant environmental impacts for which corrective action is required.

**2.11.2** The monitoring should include evaluation of compliance with statutory and other legal (contract) requirements. The results of monitoring should be analysed and used to identify areas of good performance as well as those requiring corrective and preventive action.

**2.11.3** Audit: to ensure the undertaking and conformance with the EMP requirements, an audit should be undertaken to close the EMP cycle. The audit can be used to identify non-conformances for which corrective action should be taken. The audit can also be used to identify findings that can be used to improve other EMPs.

**2.11.4** Audit findings should result in updating baseline information and the assessment techniques used in the identification of environmental issues and impacts.

## **2.12 General environmental aspects to be addressed in an EMP**

(Refer to respective division or Eskom subsidiary needs for specific aspects.)

### **2.12.1 Air quality**

**2.12.1.1** The negotiated CAPCO registration certificate requirements for power stations shall be adhered to.

**2.12.1.2** The regulations issued in terms of the Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983), section 6 (j) in respect of burning veld shall be adhered to.

**2.12.1.3** In situations where firebreaks must be constructed to prevent fires spreading from the site as well as fires entering the site from adjacent land, these shall be constructed in accordance with the National Veld and Forest Fires Act, Act No 101 of 1998.

**2.12.1.4** Vehicle drivers shall drive at moderate speed on site access roads to minimise or eliminate dust pollution. In urban areas, access roads shall be treated to reduce dust pollution (tar, concrete, chipstone, etc.).

**2.12.1.5** Fumes (black smoke) emitted from vehicles and equipment/appliances shall be monitored and action taken to avoid causing a nuisance to the public.

**2.12.1.6** Burning of waste material such as vegetation and old cleaning materials resulting from maintenance activities at a site is strictly prohibited.

**2.12.1.7** Ash disposal areas shall be managed (rehabilitated) to minimise their potential for dust pollution.

### **2.12.2 Water quality**

**2.12.2.1** In accordance with the requirements of the Water Act, surface or groundwater shall not be polluted (oil, petrol, cleaning materials, herbicides, power station “dirty water” and ash, etc.) under any circumstances. Storm water shall be managed to ensure that it does not become polluted.

**2.12.2.2** An adequate sewage facility (big enough capacity, no leaks, and emptied regularly in the case of a septic tank) shall be established, and the permit requirements of treatment equipment shall be adhered to.

**2.12.2.3** Proper toilet facilities (possibly portable) shall be provided for field staff.

**2.12.2.4** All hazardous substances at the site shall be adequately stored and accurately identified, recorded, and labelled (that is, polychlorinated biphenyls – PCB/Askarel). All waste to be disposed of at an appropriate waste facility.

### **2.12.3 Land management**

**2.12.3.1** The boundaries of the Eskom site shall be clearly identified and demarcated to ensure that the whole site is addressed in the EMP (the site usually extends far beyond the security fence).

**2.12.3.2** The site’s title deed or deed of servitude shall be obtained, and the conditions contained therein shall be adhered to.

**2.12.3.3** All bush clearing shall be undertaken in terms of an EMP and in conformance with legislation and Eskom policy and standard requirements.

**2.12.3.4** Protected or endangered plant and animal species occurring on Eskom sites and servitudes shall be identified and protected from Eskom’s activities or plant. Permits shall be obtained from the relevant authority for the clearing of protected trees (see Environmental

Procedure – Land – Procedure for vegetation clearance and maintenance within overhead power line servitudes and on Eskom-owned land).

**2.12.3.5** Eskom shall adhere to the legal requirements in terms of herbicide usage.

**2.12.3.6** Fences and gates of property owners shall not be damaged when gaining access to the site. The condition of Eskom gates and locks shall be regularly monitored to ensure that they are secure (that is, to prevent animals getting in or out as well as to prevent access to the site by unauthorised personnel). Gates shall always be kept closed.

**2.12.3.7** Access roads and site ground shall be monitored for deterioration and possible erosion. Soil erosion shall be prevented at all times. Proactive measures shall be implemented to curb erosion and to rehabilitate eroded areas.

**2.12.3.8** During construction of new sites/power lines, concrete dumping/washing is to be done on the piles of ground removed from the foundation excavations, which shall then be placed back into the foundation excavations.

**2.12.3.9** Weeds shall not be allowed to grow or spread. Invasive plants and weeds shall be identified and controlled to prevent their spreading.

**2.12.3.10** All animal fatalities due to the site infrastructure such as bird collisions and small mammal electrocutions shall be identified, and appropriate action shall be implemented to minimise or eliminate the problem. Wildlife interactions shall be reported, recorded, and investigated in compliance with BU procedure, and after action has been implemented to solve the problem, they shall be followed up to assess the effectiveness of the remedial measures taken.

**2.12.3.11** No fires shall be made for waste destruction. Firebreaks shall be constructed to prevent fires from spreading from or into the site. Regulations in respect of veld burning issued under the Conservation of Agricultural Resources Act, Act No 43 of 1983, section 6 (j) shall be adhered to. These shall align with the Forest Act, Act No 122 of 1984 and the National Veld and Forest Fires Act, No 101 of 1998.

**2.12.3.12** A plan/programme for the landscaping of the site shall be considered. This shall cover the aesthetics of the site (screening of site using embankments, walls, and/or vegetation) and rehabilitation.

## **2.12.4 Community issues**

**2.12.4.1** A list of the neighbouring properties, property owners' names, addresses, and telephone numbers, and land use shall be drawn up.

**2.12.4.2** A plan of action shall be concluded with the neighbouring property owners and the relevant authorities in the case of an emergency (veld fire, oil spillage, water contamination, etc.). Eskom contact names and telephone numbers shall be given to all neighbours, and vice versa.

**2.12.4.3** Property owners and local residents shall be treated with respect and courtesy at all times.

**2.12.4.4** The culture and lifestyles of the communities living in close proximity to the site and work sites shall be respected.

**2.12.4.5** Removal (pilfering) of agricultural products (sugar cane, fruit, vegetables, stock, fire wood, etc.) and poaching are prohibited. Receipts shall be obtained for any merchandise purchased or received from landowners.

**2.12.4.6** Environmental clauses shall be included in contract documents for all contractors (the services of contractors with proven track records of sound environmental performance shall be used).

**2.12.4.7** Graves, archaeological sites, and sites of historical interest (as defined in the National Heritage Resources Act, Act No 25 of 1999) in close proximity to an Eskom site or other work sites shall be protected and treated with respect.

**2.12.4.8** All complaints shall be reported, recorded, and investigated in compliance with the BU/procedure.

**2.12.4.9** Eskom sites shall be evaluated in terms of their contribution to noise pollution, and actions shall be implemented to ensure conformance with legal requirements and taking into consideration the views of adjacent land users/landowners.

### **3 Supporting clauses**

#### **3.1 Scope**

The purpose of this document is to ensure that:

- a) there is a process to identify existing negative environmental impacts or to predict potential negative environmental impacts;
- b) objectives and targets are set to ensure that negative impacts are mitigated and existing impacts rehabilitated;
- c) resources and responsibilities are allocated to each target;
- d) actions are implemented to mitigate the identified negative environmental impacts; and
- e) monitoring programmes are developed to track the actions that have been implemented to ensure the effectiveness of the actions.

This procedure is applicable to Eskom Holdings (Pty) Limited and its divisions and wholly owned subsidiaries.

#### **3.2 Definitions and abbreviations**

For general definitions, refer to the Environmental Procedure. Definitions specific to this document are repeated below

BU	Business unit
CAPCO	Chief Air Pollution Control Officer
EIA	Environmental impact assessment
EMP	environmental management programme
Environmental management programme	A programme that seeks to achieve a required environmental end state and describes how activities that could have a negative impact on the environment will be managed and monitored and impacted areas rehabilitated.

#### **3.3 Normative references**

The following documents contain provisions that, through reference in the text, constitute requirements of this procedure. Latest versions apply.



At the time of publication, the editions indicated were valid. All controlled documents are subject to revision, and parties to agreements based on this guideline are encouraged to investigate the possibility of applying the most recent edition of the documents listed below.

Information on currently valid national and international standards and specifications can be obtained from the Information Centre and Eskom Documentation Centre at Megawatt Park.

SANS ISO 14015, *Environmental management – Environmental assessment of sites and organisations (EASO)*

### **3.4 Implementation date**

The implementation date will be 1 January 2007.

### **3.5 Monitoring process**

Reporting on EMP implementation is included in Eskom's Annual Report. This information is subject to internal and external audit.

### **3.6 Related documents**

Environmental Land Policy EPL 32-97

Environmental Procedure – Land – Procedure for vegetation clearance and maintenance within overhead power line servitudes and on Eskom-owned land EPC 32-96

### **3.7 Authorisations**

This document has been seen and accepted by the ELC and duly authorised by the General Manager Corporate Sustainability.

### **3.8 Revisions**

Date	Rev	Compiler	Remarks
Dec 2005	2	Dave Lucas	Revised totally in terms of policy review process.

## **4 Annexes**

### **Annex A**

(Informative)

There are three main categories of documentation that one should have access to for EMP development. These three sets of documents provide the link between Eskom's activities and the legal requirements that have to be complied with.

- Eskom Legal Register that links Eskom activities to the relevant legal requirements
- Specific pieces of legislation as made mention of in the Legal Register above
- The relevant Eskom control documentation that is based on ensuring compliance with legislation through controlling how activities need to take place

The link to relevant Eskom environmental documentation and legislation can be found at the following link: <http://teknowrep/cs/>.

### **A.1 Eskom-controlled documentation**

Many of the standards and procedures are being combined into an overall Control Document for the Environmental Procedure. It contains all supporting documentation and clauses required for environmental procedures in Eskom and should be referenced in all documentation forming part of the procedure. All requirements and clauses shall apply to all supporting documentation unless specifically mentioned.

Access to the relevant environmental documentation can be gained through the following link: <http://teknowrep/cs/>.

#### **Eskom environmental documentation**

- SHE Policy
- Environmental Liaison Committee (ELC) Reporting Procedure
- ELC Terms of Reference
- Air Quality Management Policy
- Water Management Policy
- Climate Change Policy
- Environmental Land Policy
- Environmental Procedure, containing sections on the following:
  - Environmental management system
  - Environmental management programme
  - Waste management
  - Land management
  - Electro and magnetic fields
  - Due diligence
  - Reporting on environmental expenditure

**Annex A**

(Continued)

**A.2 Environmental statutory requirements**

**Eskom Environmental Legal Register**

These environmental legal registers have been developed based on the activities of Eskom and, in particular, those activities that have an impact on the environment. They are based on the relevant divisional aspect registers, which identify the aspects of the division's activities that have a significant impact on the environment.

The registers have been developed by Imbewu Legal Consultants to fulfil the ISO 14001 Environmental Management System Standard requirements for all divisions in Eskom.

The Eskom environmental legal registers can be found at <http://teknowrep/cs/legal/>.

The Eskom Environmental Legal Register consists of the following:

- Eskom Group Environmental Legal Register
- Corporate Sustainability (SHE) Legal Register
- Generation Environmental Legal Register
- Distribution Environmental Legal Register
- Finance Environmental Legal Register
- Transmission Environmental Legal Register
- Abbreviation Index and the Environmental Legal Commentary


All of these may be accessed directly from this main index or from the index of each of the registers.

The legal registers cover all South African national legislation and regulations and also refer to relevant international conventions, which are discussed in further detail in the Eskom Environmental Legal Commentary. Relevant Eskom policy documents have been referred to in the tables. It is important to note that the register covers generic legal obligations and that each facility will need to investigate its own site-specific legal requirements, for example, provincial legislation, local by-laws, permits, contracts, etc., to ensure that all legal obligations that are applicable to the particular facility are covered.

At the beginning of each aspect table, the generally applicable legal requirements that apply to that aspect are set out, for example, the requirements that are applicable to air emissions generally. Legal obligations relevant to particular components of the aspect, for example, carbon dioxide or dust emissions, are then dealt with separately.

The best way to access the applicable legal obligations is to select the aspect that one wishes to investigate by first going to the index of aspects in the Environmental Register, double-clicking on that aspect, and then perusing the legal obligations and guidelines set out in the table relating to that aspect. All of the phrases underlined in the tables on legal obligations (that is, the main source of the legal obligation, set out in abbreviated form, for example, NEMA for National Environmental Management Act) indicate that the text has been linked by Eskom to the relevant section of the particular Act or regulation included in the Eskom environmental legislation database.

A brief description of the essence of the legal provision and its relevance to Eskom is provided. Where further information has been included in the Legal Commentary on the

particular obligation listed in the table, a link  is provided under the obligation directly to that point in the Legal Commentary.

**Annex A**

(Concluded)

The Legal Commentary should be read in conjunction with the tables summarising the applicable legal obligations. It is important to note that although hard copies of the Legal Register have been provided for ease of reference, the register has been specifically compiled for electronic use and so that the legal obligations could be directly linked to the actual legislation contained in the Eskom environmental database.

The legislation database is updated on a regular basis, depending on the nature and extent of changes in relevant legislation. The legal registers have been prepared to assist Eskom with compliance with generally applicable legal obligations and are intended as a guideline only. The legal registers are not a substitute for detailed legal advice on specific issues and do not cover all legal obligations. Should you require more detailed legal advice or have any queries in regard to the content or application of the registers, kindly contact Catherine Warburton at IMBEWU Enviro-Legal Specialists (Pty) Ltd on (011) 325-4928.

**Environmental legislation**

Eskom has access to a legal database (<http://teknowrep/cs/legal/>) to access relevant environmental legislation. This database only covers national legislation, provincial legislation, and some local legislation. Please consult your local authority to get by-laws applicable to your business unit.

**Relevant external legal links**

<a href="#">ECOLEX: Gateway to Environmental Law</a>	A gateway to environmental law, (international site by UNEP, looking at international treaties, national legislation, court decisions, and literature)	This site has a good search engine.
<a href="#">SA Government</a>	Official government documents	Sometimes difficult to find specific document.
<a href="#">Acts Online</a>	Access to South African Acts	Simple to access specific acts; not sure how up to date the site is.

**Annex B**  
(Normative)

**B.1 Checklist for required power line baseline data**

Power line name: .....

Responsible person/BU: .....

Assessor's name: ..... Unique no: .....

Assessment date: .....

No	Item	Yes	No	Reference/location	Action
1	1:50,000 map with annotated power lines and towers				
2	Spanning plans/profiles				
3	Vegetation types				
4	Soil types				
5	General climate				
6	Vegetation control procedures/standards				
7	Herbicide procedures/standards				
8	Herbicide Register				
9	Bird Interaction Register				
10	Sections of power line fitted with bird markers/protectors/shields/guards				
11	Vegetation control contracts in place				
12	Affected landowners' property details, names, addresses, telephone numbers, and land use				
13	Lightning frequency				
14	Sensitive environmental areas				
15	Complaints/Communication Register				
16	Archaeological/historical sites				
17	Technical data on the power line				
18	Line slope analysis (slope and soil type and rainfall)				
19	Schedule of landowners' "special conditions"				
20					
21					
22					
23					
24					

**Annex B**

(Continued)

**B.2 Checklist for baseline data required for land, substation, and radio repeater sites**

Site name: .....

Responsible person: .....

Assessor's name: ..... Unique no: .....

Assessment date: .....

No	Item	Yes	No	Reference/location	Action
1	Map showing extent of Eskom property (servitude or property diagram)				
2	Layout map showing site layout on Eskom property				
3	Plans showing water supply, sewage discharge, oil traps/bund walls/canals/ holding dams, storm water drains, fire hydrants				
4	Register of All Hazardous Substances and their hazardous data sheets				
5	Waste Register (domestic, medical, hazardous, garden, building rubble)				
6	Herbicide Register				
7	Register of Legal Requirements				
8	Register of Operational Policies, Standards, Procedures, and Work Instructions				
9	Register of All Operations Taking Place on the Site				
10	Register of All Contracts in Place				
11	Soil type				
12	Problematic vegetation				
13	Adjacent property descriptions, landowners' names, addresses, telephone numbers, and land use				
14	Environmental emergency plan				
15	Title deeds of property				
16	Special conditions in terms of land use zoning and landowners' "special agreements"				
17	Firebreak statutory requirements and programme				
18					
19					
20					
21					
22					

**Annex B**  
(Continued)

**B.3 Checklist for baseline data required for power station sites**

Site name: .....

Responsible person: .....

Assessor's name: ..... Unique no: .....

Assessment date: .....

No	Item	Yes	No	Reference/location	Action
1	Map showing extent of Eskom properties (property diagrams)				
2	CAPCO registration certificate				
3	Water quality requirements (permits)				
4	Registration certificate of waste site				
5	Copies of title deeds of properties				
6	All lease contracts of Eskom land with third parties				
7	Special conditions in terms of land use zoning and landowners' "special agreements"				
8	Layout map showing site layout on Eskom property and associated plant and activities				
9	Plans/schematic drawings showing coal stockyard, coal bunkers and mills, coal conveyors, dumping of coal discards				
10	Plans showing location and drainage at precipitators, hoppers, ash and slurry plant, ash pipelines/conveyors, ash disposal areas				
11	Plans showing location and drainage at turbine lubricating store and processing plant, transformer oil purification and processing plant, bulk oil and lighting up plant, clean and dirty oil stores				
12	Plans showing water systems, that is, potable water treatment plant, demineralisation plant, condensate polishing plant, chemical laboratories and stores, storm water drainage system, blowdowns, dirty water effluent dam/station drain dams, clean water dams, intermediate/emergency dams, storm water disposal systems, sewage plant, raw water reservoir, diversion of streams				

**Annex B**  
(Concluded)

No	Item	Yes	No	Reference/location	Action
13	Plans showing plantations, nursery yard, rehabilitated and landscaped areas, recreational areas, degraded areas				
14	Plans showing power lines, airstrip, roads, parking areas, boundary fences, security fences, firebreaks, fire station and training area, medical centre, buildings, workshops, accommodation, leased areas, surrounding land use, waste collection and disposal areas				
15	Register of All Hazardous Substances and their hazardous data sheets				
16	Waste Register (domestic, medical, hazardous, garden, building rubble, oil, metals)				
17	Herbicide Register				
18	Register of Legal Requirements				
19	Register of Operational Policies, Standards, Procedures, and Work Instructions				
20	Register of All Operations Taking Place on the Site that Affect Environmental Performance				
21	Register of All Contracts in Place				
22	Soil type				
23	Problematic vegetation				
24	Adjacent property descriptions, landowners' names, addresses, telephone numbers, and land use				
25	Environmental emergency plans				
26	Firebreak statutory requirements and programme				
27	Climate and weather				
28	All environmentally-related permits and certificates and correspondence				
29	Environmental monitoring results, reports, and performance indicators				
30					
31					
32					
33					
34					
35					
36					
37					
38					



**Annex C**  
(Normative)

**C.1 Checklist for identification of environmental aspects and impacts  
on power line routes**

Site name: .....

Responsible person: .....

Assessor's name: ..... Unique no: .....

Assessment date: .....

From tower no: ..... To tower no: .....

(Environmental issues identified shall be marked up on a sketch or map of power line.)

Checklist for issues to be identified

Aspect	Aspect	Aspect
Access road: <ul style="list-style-type: none"> <li>• Centre line</li> <li>• Other</li> </ul>	Bird interactions <ul style="list-style-type: none"> <li>• Collisions</li> <li>• Electrocutions</li> <li>• Pollution</li> <li>• Nests</li> <li>• Need for remedial action</li> </ul>	Storm water drainage <ul style="list-style-type: none"> <li>• Natural</li> <li>• Berms</li> <li>• Channels</li> <li>• Pipes</li> </ul>
Soil erosion <ul style="list-style-type: none"> <li>• Tower position</li> <li>• Access road</li> <li>• River crossing</li> <li>• Other</li> </ul>	Eskom gates <ul style="list-style-type: none"> <li>• General condition</li> <li>• Closed and locked</li> <li>• Locks</li> </ul>	Social activities under power line <ul style="list-style-type: none"> <li>• Houses</li> <li>• Farming</li> <li>• Structures</li> <li>• Mining</li> <li>• Airfields</li> <li>• Power lines</li> <li>• Telephone lines</li> <li>• Other</li> </ul>
Bush encroachment <ul style="list-style-type: none"> <li>• Clearance</li> <li>• Fire risk</li> </ul>	Construction material <ul style="list-style-type: none"> <li>• Concrete</li> <li>• Steel works</li> <li>• Insulators</li> <li>• Conductor</li> <li>• General</li> </ul>	Visual impact
Alien/invader vegetation <ul style="list-style-type: none"> <li>• Access</li> <li>• Fire risk</li> <li>• Clearance</li> <li>• Spread</li> </ul>		Soil type <ul style="list-style-type: none"> <li>• Sandy</li> <li>• Clay</li> <li>• Rocks</li> <li>• Wet</li> </ul>
Protection of natural vegetation	Fence crossings <ul style="list-style-type: none"> <li>• General condition</li> </ul>	Lightning
Archaeological/historical/ natural heritage/cultural sites	River crossings	Complaints or requests from landowners
Noise complaints	Risk to airfields and flight paths (crop spraying and game management)	Radio/TV interference



**Annex C**

(Continued)

**C.3 Checklist for identification of environmental aspects and impacts at Eskom sites, land, substation, and radio repeater sites**

Site name: .....

Responsible person: .....

Assessor's name: ..... Unique no: .....

Assessment date: .....

(Environmental aspect identified should be marked up on this sketch.)

	Aspect	Description	Impact			
			N/A	High	Med	Low
	Erosion <ul style="list-style-type: none"> <li>• HV yard</li> <li>• Security fences</li> <li>• Storm water</li> <li>• Access road</li> </ul>					
	Vegetation control <ul style="list-style-type: none"> <li>• HV yard</li> <li>• Security fences</li> <li>• Outside fence area</li> <li>• Firebreak</li> <li>• Other</li> </ul>					
	Storm water <ul style="list-style-type: none"> <li>• Outlet</li> <li>• HV yard</li> <li>• Terraces</li> </ul>					

**Annex C**  
(Continued)

			Impact			
	Aspect	Description	N/A	High	Med	Low
	Leaching of herbicides <ul style="list-style-type: none"> <li>• Security fences</li> <li>• Outside Eskom property</li> </ul>					
	Oil spills <ul style="list-style-type: none"> <li>• HV yard</li> <li>• Oil dam</li> <li>• Storage area</li> </ul>					
	Littering <ul style="list-style-type: none"> <li>• General</li> <li>• Maintenance</li> <li>• Construction</li> </ul>					
	Waste disposal <ul style="list-style-type: none"> <li>• Waste separation</li> <li>• Bins</li> <li>• Site disposal</li> <li>• Contract for disposal</li> </ul>					
	Water <ul style="list-style-type: none"> <li>• Municipal</li> <li>• Storm water collection</li> <li>• Borehole</li> </ul>					
	Sewerage <ul style="list-style-type: none"> <li>• Municipal</li> <li>• Septic tank</li> <li>• French drain</li> </ul>					
	Hazardous material store <ul style="list-style-type: none"> <li>• Register</li> <li>• Data sheets</li> <li>• Ventilation</li> <li>• Storage</li> </ul>					
	Security of oil dam <ul style="list-style-type: none"> <li>• Security fence</li> <li>• Shade netting</li> </ul>					
	Animal interactions <ul style="list-style-type: none"> <li>• Security fence</li> <li>• HV yard (pollution/ nests)</li> <li>• Oil dam</li> </ul>					
	PCB labelling					
	Firebreak					
	Oil trap					
	Landscaping					
	Visual impact					
	Complaints and requests by landowners					
	Noise pollution and complaints					
	Eskom fences and gates <ul style="list-style-type: none"> <li>• General condition</li> </ul>					

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	<ul style="list-style-type: none"><li>• Closed and locked</li><li>• Locks</li></ul>					
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**Annex C**  
(Continued)

**C.4 Checklist for identification of environmental aspects and impacts at power station sites**

Site name: .....

Responsible person: .....

Assessor's name: ..... Unique no: .....

Assessment date: .....

(Environmental aspect identified should be marked up on a site plan.)

			Impact			
	Aspect	Description	N/A	High	Med	Low
	Erosion <ul style="list-style-type: none"> <li>• General site</li> <li>• Security fences</li> <li>• Storm water</li> <li>• Access roads</li> </ul>					
	Vegetation control <ul style="list-style-type: none"> <li>• General site</li> <li>• Security fences</li> <li>• Outside fence area</li> <li>• Firebreak</li> <li>• Leased land</li> <li>• Other</li> </ul>					
	Storm water <ul style="list-style-type: none"> <li>• Outlet</li> <li>• Internal pollution</li> <li>• Network</li> </ul>					
	Leaching of herbicides <ul style="list-style-type: none"> <li>• Security fences</li> <li>• Outside Eskom property</li> </ul>					
	Oil spills <ul style="list-style-type: none"> <li>• Oil and grit plant</li> <li>• Turbine lubricating store and processing plant</li> <li>• Transformer oil purification and processing plant</li> <li>• Bulk oil and lighting up plant</li> <li>• Silt traps</li> <li>• Oil traps</li> <li>• Oil storage areas</li> <li>• General site</li> </ul>					

**Annex C**  
(Continued)

	Aspect	Description	Impact			
			N/A	High	Med	Low
	Waste disposal <ul style="list-style-type: none"> <li>• Waste separation</li> <li>• Bins</li> <li>• Holding/separation site</li> <li>• P/S waste site</li> <li>• Site disposal</li> <li>• Contract for disposal</li> </ul>					
	Water <ul style="list-style-type: none"> <li>• Cooling towers</li> <li>• Cooling water pump house</li> <li>• Potable water treatment plant</li> <li>• Demineralisation plant</li> <li>• Condensate polishing plant</li> <li>• Chemical laboratory and stores</li> <li>• Storm water drainage system</li> <li>• Storm water discharge</li> <li>• Borehole analysis</li> <li>• Blowdowns</li> <li>• Dirty water effluent dams/station drain dams</li> <li>• Clean water dams</li> <li>• Intermediate/emergency dams</li> </ul>					
	Sewerage <ul style="list-style-type: none"> <li>• Plant</li> <li>• Maintenance</li> <li>• Capacity</li> <li>• Effluent</li> </ul>					
	Hazardous material store <ul style="list-style-type: none"> <li>• Register</li> <li>• Data sheets</li> <li>• Ventilation</li> <li>• Storage</li> </ul>					
	General infrastructure <ul style="list-style-type: none"> <li>• Security fences</li> <li>• Power lines</li> <li>• Airstrip</li> <li>• Roads</li> <li>• Parking areas</li> <li>• Boundary fence</li> <li>• Firebreaks</li> <li>• Fire station and testing area</li> <li>• Medical centre</li> <li>• Buildings</li> <li>• Workshops</li> <li>• Accommodation</li> <li>• Leased farm land</li> </ul>					
	Animal interactions <ul style="list-style-type: none"> <li>• Security fence</li> </ul>					

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	<ul style="list-style-type: none"><li>• Plant</li><li>• Dams</li><li>• Other</li></ul>					
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**Annex C**  
(Concluded)

	Aspect	Description	Impact			
			N/A	High	Med	Low
	PCB labelling					
	Firebreak					
	Landscaping					
	Visual impact					
	Complaints and requests by landowners					
	Noise pollution and complaints					
	Eskom fences and gates <ul style="list-style-type: none"> <li>• General condition</li> <li>• Closed and locked</li> <li>• Locks</li> </ul>					
	Air pollution <ul style="list-style-type: none"> <li>• Stacks</li> <li>• Coal stockyard</li> <li>• Coal discards</li> <li>• Ash disposal</li> <li>• Waste site</li> </ul>					
	Coal <ul style="list-style-type: none"> <li>• Coal stockyard</li> <li>• Coal bunkers and mills</li> <li>• Coal conveyors</li> <li>• Coal discards</li> </ul>					
	Ash <ul style="list-style-type: none"> <li>• Ash dams</li> <li>• Ash water return dams</li> <li>• Ash water canals</li> <li>• Precipitators 7 hoppers</li> <li>• Particulate emissions</li> <li>• Ash crushers</li> </ul>					
	Waste <ul style="list-style-type: none"> <li>• General littering</li> <li>• Bins</li> <li>• Collection areas</li> <li>• Contracts</li> <li>• Disposal site</li> <li>• Hazardous</li> <li>• Domestic</li> <li>• Building</li> <li>• Garden</li> <li>• Medical</li> <li>• Oil</li> <li>• Metals</li> </ul>					

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**Annex D**

(Normative)

**EMP Register**

**D.1 Environmental Management Programme Register**

Site/power line: .....

Compiled by: .....

Date: .....

Revision date: .....

Activity/location	Environmental aspect	Impact (Y/N)	Significance (H/M/L)	Regulatory requirement	Action to be taken	Responsible person/team	Due date	References/ remarks	Date completed

ANNEXURE B  
ESKOM SHE POLICY

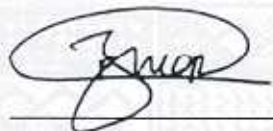
# Safety, Health and Environment (SHE) Policy

## Guiding principles by which we operate

- We are committed to safety, health and environmental excellence and will conduct business with respect and care for people and the environment and, in so doing, will ensure that adequate resources are available for SHE management.
- We will ensure that SHE is an integral part of our operations and that no operating condition, or urgency of service, can justify endangering the life of anyone or cause injury or damage to the environment

Compliance to this policy and applicable regulations shall be the responsibility of every employee and contractor.

This statement is an extract from the Eskom Safety, Health and Environment (SHE) Policy: No 32-94, Rev 2 - August 2007



**Jacob Maroga**  
Chief Executive



*With Energy, Anything is Possible*

ANNEXURE C  
TEMPLATE FOR METHOD STATEMENTS

## INFORMATION FOR METHOD STATEMENTS

- Method Statements are to be completed by the person undertaking the work (i.e. the Contractor). The Method Statement will enable the potential negative environmental impacts associated with the proposed activity to be assessed.
- The Method Statement can only be implemented once approved by the Environmental Control Officer and Project Manager/Engineer.
- The Contractor (and, where relevant, any sub-contractors) must also sign the Method Statement, thereby indicating that the works will be carried out according to the methodology contained in the approved Method Statement.
- Changes to the way the works are to be carried out must be reflected by amendments to the original approved Method Statement; amendments require the signature of the Environmental Control Officer and the Project Manager/Engineer, denoting that the changed methodology or works are necessary for the successful completion of the works, and are environmentally acceptable. The Contractor will also be required to sign the amended Method Statement thereby committing him/herself to the amended Method Statement.
- This Method Statement must contain sufficient information and detail to enable the Environmental Control Officer and the Project Manager/Engineer to apply their minds to the potential impacts of the works on the environment. It should also show that the Contractor thoroughly understands what is required of him/her to undertake the works, and must make the necessary links to the relevant sections of the EMP for the PBMR DPP.
- The Contractor must realise that the time taken to provide a comprehensive, detailed Method Statement is well spent. Insufficient detail will result in delays to the works while the Method Statement is completed to the Environmental Control Officer's and Project Manager/Engineer's satisfaction.

Overleaf is a suggested template for a Method Statement sheet, to be completed for each activity requiring a Method Statement in terms of the EMP (or as per the discretion of the Environmental Control Officer and Project Manager/Engineer).

## METHOD STATEMENT

**Contract:** ..... **Date:** .....

**Proposed Activity:** (give title of the Method Statement and reference page of the EMP)

**Work to be undertaken:** (give a brief description of the works)

**Location/Site where the work will be undertaken:** (where possible, give an annotated plan and a full description of the extent of the work)

**Start and End Date of the Work for which the Method Statement is required:**

Start Date: ..... End Date: .....

**Description of the work will be undertaken:** (provide as much detail as possible, including annotated maps and plans where possible, of how the work will be completed. Use additional pages as required.)



## DECLARATIONS

### 1) Contractor

I understand the contents of this Method Statement and the scope of work required of me. I further understand that this Method Statement may be amended on application to other signatories and that the Environmental Control Officer and Site Agent will audit my compliance with the contents of the Method Statement.

\_\_\_\_\_  
(signed)

\_\_\_\_\_  
(print name)

Dated: \_\_\_\_\_

### 2) Environmental Control Officer

The work described in this Method Statement, if carried out according to the methodology described, is satisfactorily mitigated to prevent avoidable environmental harm.

\_\_\_\_\_  
(signed)

\_\_\_\_\_  
(print name)

Dated: \_\_\_\_\_

### 3) Project Manager/Engineer

The works described in this Method Statement are approved.

\_\_\_\_\_  
(signed)

\_\_\_\_\_  
(print name)

\_\_\_\_\_  
(designation)

Dated: \_\_\_\_\_