



ESKOM PROPOSED NUCLEAR-1 POWER STATION AND ASSOCIATED INFRASTRUCTURE

DRAFT ENVIRONMENTAL MANAGEMENT PLAN – REVISION 1.5

BRIEF PROJECT SYNOPSIS

Eskom proposes to construct a 4 000 MW Nuclear Power Station and associated infrastructure, known as the Nuclear-1 Project. A new nuclear power station would strengthen South Africa's diversification of power sources and allow power generation closer to the demand centres that are far away from the coal mines.

Eskom therefore commissioned a study to find the most suitable sites for potential nuclear power plants in South Africa. The results identified five coastal sites. As a next step Eskom commissioned an Environmental Impact Assessment (EIA) process, in accordance with the requirements of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) as part of their application for Environmental Authorisation for the proposed Nuclear-1 Project. Three of the five sites were assessed as site alternatives in the EIA Process. Indicative dates for the start of construction and commissioning of Nuclear-1 are 2013 and 2021, respectively (optimistic dates).

This document forms part of a set of documents that were produced as a deliverable of the EIA for the proposed Nuclear-1 Project. Note that these volumes may be in draft or various stages of revision. Refer to <http://www.eskom.co.za/> for the latest version of the reports.



ESKOM PROPOSED NUCLEAR-1 POWER STATION AND ASSOCIATED INFRASTRUCTURE

DRAFT ENVIRONMENTAL MANAGEMENT PLAN – REVISION 1.4

CONTENTS

Chapter	Description	Page
1	INTRODUCTION	1
	1.1 Background	1
	1.2 Purpose and application of this document	2
	1.3 Detail of the Environmental Assessment Practitioners	4
	1.4 Structure of this Document	6
2	SETTING THE CONTEXT	7
	2.1 Overview of the proposed project	7
	2.1.1 Brief Technical Description	7
	2.1.2 Site selection and description	8
	2.2 Objectives of the EMP	12
	2.3 Scope of the EMP	14
	2.3.1 Environmental Impact Assessment and Report	14
	2.3.2 EMP Revisions and Authorisation	15
	2.3.3 Environmental Authorisation	16
	2.4 Eskom's Environmental Management Policies and Commitments	16
	2.4.1 Vision and Policy	16
	2.4.2 Environmental Management System	17
	2.4.3 United Nations Global Compact	18
	2.5 Environmental Specification's Structure and Application	19
	2.6 Residual and Unexpected Environmental Issues	19
	2.7 Compliance with Other Policies and Legislation	20
3	SPECIFIC ORGANISATIONAL ARRANGEMENTS FOR PROJECT PHASES	22
	3.1 Preconstruction Planning and Design Phase	22
	3.1.1 Additional Specialist Studies	22
	3.1.2 Walk-down Assessment	23
	3.1.3 Integration of Environmental Considerations into Project Design	23



3.1.4	Integration of the EMP into Contracts	24
3.2	Construction Phase	25
3.2.1	Organisational Structure	26
3.2.2	Method Statements Implementation	27
3.2.3	General and Legal Obligations	28
3.2.4	Communication and liaison with stakeholders	28
3.3	Operational Phase	28
3.3.1	Organisational Structure	29
3.3.2	Environmental Management System	29
3.4	Decommissioning and Site Closure Phase	30
3.4.1	Organisational Structure	30
4	DEFINITION AND ASSIGNMENT OF ENVIRONMENTAL ROLES AND RESPONSIBILITIES	31
4.1	Environmental Authorities	31
4.1.1	Department of Environmental Affairs	31
4.1.2	Other Authorities	32
4.2	Public and Community Representatives	32
4.2.1	Interested and Affected Parties	32
4.2.2	Environmental Monitoring Committee	33
4.3	Applicant	34
4.3.1	Environmental Advisor	34
4.3.2	Eskom Project Manager – Pre-construction and Construction Phases	34
4.3.3	Site Manager – Construction Phase	35
4.3.4	Power Station Manager – Operational and Decommissioning Phases	38
4.3.5	Environmental Manager – Construction, Operational and Decommissioning Phases	38
4.3.6	Community Liaison Officer	40
4.3.7	Eskom Conservation Officer	40
4.4	Independent Environmental Control Officer and Auditor	41
4.4.1	Environmental Control Officer – Construction Phase	41
4.4.2	Independent Environmental Auditor – Operational and Decommissioning Phases	43
4.5	Contractors, Subcontractors, Service Providers and Vendors	43
4.5.1	Contractor – Construction Phase	43
4.5.2	Contractor Environmental Officer	45
4.5.3	Sub-contractors	46
5	INDUCTION AND AWARENESS OF SITE STAFF AND VISITORS	48
6	COMMUNICATION AND LIAISON WITH STAKEHOLDERS AND THE PUBLIC	49



6.1	Information Dissemination	49
6.2	Environmental Monitoring Committee	49
6.3	Community Liaison Officer	50
6.4	Day-to-day Social Responsibility and Management	50
7	LIBRARY OF ENVIRONMENTAL SPECIFICATIONS TO ADDRESS SPECIFIC ASPECTS AND IMPACTS	52
7.1	Protection of Biophysical Environments	54
7.1.1	Geology and Dunes	54
7.1.2	Hydrology, Erosion and Sedimentation and Surface Water Quality	55
7.1.3	Groundwater and Geohydrology	56
7.1.4	Loss of Habitat Compensation	59
7.1.5	Wet areas and Wetlands	60
7.1.6	Flora	64
7.1.7	Fauna	66
7.1.8	Oceanographic and Marine Systems	70
7.2	Protection of Socio-Economic Environments	72
7.2.1	Public Health and Safety	72
7.2.2	Perceived Risk Associated with Nuclear Incidents	73
7.2.3	Public and Social Services and Service Infrastructure Use and Impact	73
7.2.4	Traffic and Use of or Impact on Public Roads	75
7.2.5	Construction Village, Staff Village and Vendor Housing	76
7.2.6	Economic Impacts	77
7.2.7	Influx of Job Seekers	78
7.2.8	Informal Illegal Dwellings	79
7.2.9	Creation and Securing of Employment Opportunities	79
7.2.10	Business Opportunities	80
7.2.11	Criminal Activities	81
7.2.12	Risk of STDs, HIV and AIDS	82
7.2.13	Loss of Employment	83
7.2.14	Visual Impact and Aesthetics	83
7.2.15	Sense of Place	87
7.2.16	Future Land Use	87
7.3	Protection of Heritage Resources	88
7.3.1	Completion of test excavations and completion of Heritage Mitigation Plan	88
7.3.2	Overall Management of Protected Heritage Resources	88
7.3.3	Surveying for, Sampling and Identification of Protected Heritage Resources	90
7.3.4	Procedures on Discovery of Potential Heritage Artefacts and or Features	91
7.3.5	Prohibitions	92
7.4	Overall Site Management	93
7.4.1	General Preparedness and Administration	93



7.4.2	Geological and Seismological Risk Profiling, and Geotechnical Suitability Assessment	95
7.4.3	Site Elevation and Footprint Development, Layout Planning and Establishment	96
7.4.4	Site Demarcation, Signage, Fencing and “No-go” Control	99
7.4.5	Site Remediation, Rehabilitation and Re-vegetation	100
7.4.6	Access Roads Development, Maintenance and Use	102
7.4.7	Staff Facilities Development, Operation and Maintenance	103
7.4.8	Water Supply, Abstraction and Consumption	104
7.4.9	Materials Management	105
7.4.10	Waste Management	108
7.4.11	Stormwater Management	109
7.4.12	Wastewater Management	112
7.4.13	Brine Management	113
7.4.14	Air Quality	113
7.4.15	Noise	114
7.4.16	Site Access Control, Safety and Security	114
7.4.17	Emergency Preparedness and Response	116
7.4.18	Fire Prevention and Response	117
7.5	Specific Construction Activities	118
7.5.1	Site Clearance	118
7.5.2	Soil Stockpiling	119
7.5.3	Dewatering	120
7.5.4	Blasting and Sourcing of Borrow Material	120
7.5.5	Concrete Batching	121
7.5.6	Refuelling, Servicing and Cleaning of Vehicles, Plant, Equipment and Machines	121
7.5.7	Spill Clean-up and Disposal	122
7.5.8	‘Non-hazardous’ Spoil Disposal and Dumps	123
7.5.9	Demolition of Structures and Buildings	124
8	METHOD STATEMENTS AND STANDARD OPERATING PROCEDURES	125
8.1	Method Statements	125
8.1.1	Required Method Statements	125
8.1.2	Procedures and Content	126
8.2	Standard Operating Procedures	127
9	MONITORING PROGRAMMES	128
9.1	Dune geomorphology	128
9.2	Geotechnical suitability	128
9.3	Hydrology	128
9.3.1	Management Objectives	128
9.3.2	Monitoring points	128
9.3.3	Monitoring Parameters	128
9.3.4	Monitoring Frequency	129



9.4	Geohydrology	129
9.4.1	Management Objectives	129
9.4.2	Monitoring Programme	130
9.4.3	Monitoring Parameters	130
9.5	Air quality	131
9.6	Flora	132
9.7	Wetlands	132
9.8	Vertebrate fauna	135
9.9	Invertebrate fauna	136
9.10	Marine systems	137
9.11	Oceanography	139
9.12	Social Conditions	139
9.13	Visual Impacts	140
9.14	Heritage and archaeology	141
10	CONFIRMING COMPLIANCE, NON-CONFORMANCE AND CORRECTIVE ACTION	143
10.1	Confirming Compliance	143
10.1.1	Compliance Monitoring	143
10.1.2	Record keeping and reporting	143
10.2	Addressing Non-compliance	145
10.2.1	Construction Phase	145
10.2.2	Operational Phase	147
11	CONCLUSION	148
12	REFERENCES	149

LIST OF ANNEXURES

ANNEXURE A:	Environmental Authorisation (<i>To be included</i>)
ANNEXURE B:	Eskom Environmental Policy
ANNEXURE C:	Environmental Legislation List
ANNEXURE D:	Preliminary List of Method Statements
ANNEXURE E:	Method Statement Template
ANNEXURE F:	Residual Environmental Issues List
ANNEXURE G:	Terms of Reference for Environmental Monitoring Committee
ANNEXURE H:	Monitoring and Control Report Templates



ANNEXURE I: Penalty Schedule
ANNEXURE J: Document Control Sheet



ABBREVIATIONS

ASGISA	Accelerated and Shared Growth Initiative for South Africa
CEMP	Construction Environmental Management Plan
CESA	Consulting Engineers South Africa
DEA	Department of Environmental Affairs (formerly known as DEAT)
DEAT	Department of Environmental Affairs and Tourism (now DEA)
DMR	Department of Mineral Resources
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act, 1989 (Act No. 73 of 1989)
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMC	Environmental Monitoring Committee
EMP	Environmental Management Programme
EMS	Environmental Management System
CECO	Contractor Environmental Control Officer (also known/referred to as the Environmental Officer (EO))
CSES	Contract Specific Environmental Specification
Eskom	Eskom Holdings Limited
FIDIC	International Federation of Consulting Engineers
FIDIC CCC	FIDIC Conditions of Contract for Construction
GIBB	Arcus GIBB (Pty) Ltd
GHG	Greenhouse gas
HV	High Voltage
I&APs	Interested and Affected Parties
ISO	International Organisation for Standardisation
IUCN SSC	International Union for Conservation of Nature Species Survival Commission
km	kilometre
KNPS	Koeberg Nuclear Power Station
kV	Kilo Volt
MWe	Mega Watt (electrical)
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NERSA	National Energy Regulator of South Africa



NSIP	Nuclear Site Investigation Programme
NNR	National Nuclear Regulator
OEMP	Operational Environmental Management Plan
OHS	Occupational Health and Safety
PD	Project Director
PLA	Project Labour Agreement
PM	Project Manager
PPE	Personal Protective Equipment
PSM	Power Station Manager
PWR	Pressurised Water Reactor (technology)
WMP	Radioactive Waste Management Programme
SES	Standard Environmental Specification
SHE	Safety, Health and Environment
SM	Site Manager
SOP	Safe Operating Procedure
SSC	Structures, Systems and Components
UN	United Nations
WHO	World Health Organisation



1 INTRODUCTION

1.1 Background

Eskom generates approximately 95% of the electricity used in South Africa and approximately 45% of the electricity used in Africa. Eskom generates, transmits and distributes electricity to industrial, mining, commercial, agricultural and residential customers and redistributors. In an effort to meet the rising demand for electricity in South Africa, Eskom has embarked on a massive build programme, currently already in the implementation phase. As an extension to this programme, Eskom proposes to also construct a 4 000 megawatt electrical (MWe) nuclear power station and associated infrastructure, known as the Nuclear-1 Project, as the first of an anticipated series of nuclear power station projects.

New nuclear power stations would strengthen South Africa's diversification of power sources and allow power generation closer to the demand centres that are located far away from coal mines.

Over a period of about 10 years, Eskom undertook a comprehensive study that aimed to find the most suitable sites for potential nuclear power plants in South Africa. The results of this study indicated likely feasibility of five coastal sites in particular. These sites are Brazil (Northern Cape), Schulpfontein (Northern Cape), Duynefontein (Western Cape), Bantamsklip (Western Cape, near Pearly Beach) and Thyspunt (Eastern Cape, near Cape St. Francis).

As a next step Eskom commissioned an Environmental Impact Assessment (EIA) process, in accordance with the requirements of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) as part of its application for environmental authorisation for the proposed Nuclear-1 project. Eskom appointed Arcus GIBB (Pty) Ltd (hereafter referred to as GIBB) as independent Environmental Assessment Practitioners (EAP) to undertake the EIA process. After the Scoping Study found two of the sites to be infeasible on technical grounds, three of the initial five sites were assessed as alternatives in EIA phase of the EIA process. These sites were Duynefontein, Bantamsklip and Thyspunt. The EIA process commenced in May 2007, whereafter it proceeded through various draft and final scoping phases and draft and final Environmental Impact Report phases and associated public participation processes (refer to **Section 2.3.1** for a brief overview of the EIA process).

In accordance with the requirements of the NEMA EIA Regulations (Government Notice Numbers R 385, 386 and 387 of 2006), GIBB developed a draft Environmental Management Programme (EMP) as part of the EIA process for the proposed nuclear power station. The EMP, which was specifically developed for the Thyspunt site, is attached as an appendix to the Environmental Impact Report (EIR), which documents the findings of the EIA process. The EIR contains a number of mitigation measures that must be implemented in order to ensure that the environmental impacts of the proposed power station are adequately mitigated. These mitigation measures form the basis of the EMP.



Since the EIA was undertaken in terms of legal requirements, **the EMP will become legally binding for all activities undertaken for the Nuclear-1 Project**, once (and if) the project is authorised by the Department of Environmental Affairs.

A Draft EMP was appended to the Draft EIR issued for comment in March 2010. The current EMP represents the Revised Draft EMP that will be provided for a second round of public comments on the Revised Draft EIR.

- NOTES:**
- The EIA Regulations requires an EMP to be developed as part of the EIA Process in the form of a 'draft EMP'. Should the project receive Environmental Authorisation, the final 'draft EMP' is effectively also authorised and as such becomes legally binding.
 - The reason for authorising a 'draft EMP', opposed to a 'final EMP', is to allow for the EMP to be amended and finalised after the Environmental Authorisation. This mostly allows for the incorporation of any conditions of the Environmental Authorisation that may be necessary. At the same time certain information contained in the EMP might require to be updated by the time the project construction starts. Environmental Authorities generally requires that a 'final EMP' be submitted for their approval prior to any construction activities commencing.
 - It is accepted that an EMP must be a dynamic document that is subject to change, as the circumstances surrounding the project change. Following the authorisation, several updates of the EMP may be necessary. Such updates, if they are substantive, would have to be approved by the environmental authority.
 - The EMP is thus at this stage presented as a revised draft for public comment and may thus require amendment as the project unfolds. An EMP is, by definition, a dynamic document that must be updated as circumstances change.
 - The EMP has been specifically developed for the Thyspunt site (based on the recommendation of the Draft EIR that this site is recommended for authorisation), with the assumption that the EMP would be appropriately amended should the DEA ultimately select or authorise another site.
 - While the EIA for the Nuclear-1 project covers the transmission lines within the power station site and between the power station and the High Voltage (HV) yard as; the EMP does not apply to the transmission lines beyond the lead from the HV yard outside the boundary of the power station site, as the transmission lines are covered in a separate EIA. The HV yard itself is however covered in this EMP.

1.2 Purpose and application of this document

The purpose of the EMP is to ensure that the environment is properly considered during the life-cycle (pre-construction, design and planning, construction, operation, and decommissioning phases) of the Nuclear-1 Project, and that negative impacts are minimised or prevented and positive impacts enhanced.

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”¹

¹ http://glossary.eea.eu.int/EEAGlossary/E/environmental_management_plan



As mentioned above, this draft EMP follows on from the EIR, in as much as all the measures for mitigation of impacts that were identified during the EIA were incorporated. This therefore ensures that recommendations flowing from the EIA are implemented, and that the project does not deviate from the environmental profile that formed the basis of the assessment and its associated stakeholder and public consultation processes. In a similar vein the draft EMP with all its components will be updated to serve as the final EMP, once the Environmental Authorisation is issued, to ensure that the conditions of, the authorisation are incorporated. The final EMP will therefore provide a sound basis for environmental management for the life cycle of the project, as it ensures that requirements of the Environmental Authorisation are met. It also serves to provide a clear and auditable indication as to how those requirements should be implemented during project execution.

Since the EMP represents an extension of the Nuclear-1 Project's EIA process, it must therefore be read and understood in conjunction with and in the context of the EIR and the Environmental Authorisation, should this be issued. However, the EMP is also considered a 'living' document, as it may require further amendments as the project unfolds and/or as environmental requirements (e.g. legislation) change. In addition to being fully accountable for the implementation of the EMP, Eskom must take full responsibility to ensure that the EMP remains current. Any significant amendments to the EMP will require DEA approval before being implemented, with the understanding that DEA has the right to determine what constitutes significant amendments and what not. DEA must therefore be consulted prior to making any amendments that could potentially be regarded as significant.

The EMP has been developed as a set of environmental specifications (and guidelines) that apply to the Nuclear-1 Project and all associated activities (includes site investigation and surveying activities). As such the EMP must be:

- Considered during pre-construction planning and design;
- Integrated and form part of tender and contractual document for Eskom's appointment of contractors prior to commencement of any construction activities;
- Integrated and form part of all commissioning procedures, bearing in mind that various commissioning activities could form part of the construction phase, a dedicated commissioning phase and/or the operational phase of the project;
- Integrated and form part of the Environmental Management System (EMS) during the construction and operational phases of the power station; and
- Serve as guidance for decommissioning and final site remediation procedures.

While the EMP applies to all activities associated with Nuclear-1 throughout the project life-cycle, it is assumed that most activities will take place at the proposed nuclear power station site, with the understanding that:

- During the construction phase "site" refers to the construction "footprint" within which construction activities will take place, as well as entire Eskom-owned area. The construction footprint includes all land-based and sea-based areas that will be affected by construction, including the area that is fenced as a construction site (the actual footprint of the power station) and its associated infrastructure, such as the HV yard, access roads, cooling water extraction and discharge structures, pipelines for release of brine from the desalination



plant, pipelines for marine spoil disposal, lay down areas, etc². Where relevant, the EMP will, however, also apply to off-site activities such as transport outside the Eskom owner-controlled boundary.

- During the commissioning and operational phases “site” refers to the footprint of the power station, including the sites for service infrastructure such as the access roads, cooling water extraction and discharge structures, the discharge pipeline for brine from the desalination plant, etc, but excludes the power lines that transmit power from the HV yard, as these are covered by a separate EIA and associated EMP³; and
- During the decommissioning and site rehabilitation plan “site” would refer to all areas affected by decommissioning and rehabilitation activities associated with the decommissioning of the Nuclear-1 Project.

- NOTES:**
- The EMP does not cover Occupational Health and Safety (OHS) requirements, although some OHS and environmental requirements might overlap and link. Eskom will make separate provision for OHS issues and may decide to have an integrated environmental, health and safety management plan, or to keep these aspects separate.
 - The EMP does not cover any activity associated with sources of radioactivity. For such activities, Eskom will develop and implement a separate Safe Operating Procedure (SOP) in accordance with the requirements of the National Nuclear Regulator (NNR).

1.3 Detail of the Environmental Assessment Practitioners

GIBB undertook the EIA and compiled the EMP on behalf of Eskom.

GIBB is an integrated group of professional scientists, project managers and engineers providing cost-effective solutions and specialist services within a wide range of disciplines. The multi-disciplinary consulting, management and design approach allows for the development of projects in a holistic manner, as this is believed to be the best environment to fully meet the needs of our clients.

Specific to environmental management, GIBB has a team of specialists comprising environmental scientists, environmental engineers, geologists and geohydrologists that form a national environmental team. These specialists have broad experience of working on a range of environmental projects within the public and private sector. The Environmental Services Division has a formidable track record and exemplary reputation in southern Africa. The Division comprises a number of highly qualified and experienced technical staff with over 450 years of combined consulting experience.

The Environmental Services Division is based throughout South Africa. The team has been purposely set up to mobilise and co-ordinate any given range of environmental services wherever these may be geographically required.

² Referring to the activities covered in the EIA process.

³ However, it is recommended that the mitigation measures specified in the EMPs for the power station and transmission lines should be integrated, as far as possible, specifically for the area around the HV Yard.



The details of the Senior Environmental Assessment Practitioners for the proposed development are provided in **Table 1.1**.

Table 1.1: Details of the Environmental Assessment Practitioner

<p>Environmental Consultant</p> <p>Contact Persons</p> <p>Postal address</p> <p>Postal code</p>	<p>Arcus GIBB (Pty) Ltd</p> <p>Ms Jaana-Maria Ball Mr Reuben Heydenrych Ms Gisela Fechter</p> <p>P.O. Box 2700, Rivonia</p> <p>2128</p>
<p>Professional affiliation(s): Ms J-M Ball</p>	<p>International Association for Impact Assessment (IAIA) South African Council for Natural Scientific Professions (SACNASP) South African Association of Botanists (SAAB) South African Institute of Ecologists and Environmental Scientists (SAIEES)</p>
<p>Expertise to carry out the EIA Process:</p> <p>Ms J-M Ball M.Sc. (Botany); MBA; PrSciNat</p> <p>Mr R Heydenrych B.L. (Landscape Architecture) M.Phil (Environmental Management)</p> <p>Ms G Fechter B Eng (Chemical Engineering)</p>	<p>Ms Ball is a Professional Environmental Scientist, Ecologist and Botanist. She is a Director of GIBB with 18 years experience in the environmental field, having been the Project Manager or Director of many high profile projects in Southern Africa. Jaana is currently the Discipline Leader of Arcus GIBB's Environmental Services Discipline. She specialises in strategic and operational planning as well as the management of complex Strategic Environmental Assessments (SEAs), EIAs and EMPs, co-ordination and execution of public involvement processes, Integrated Development Planning (IDP), environmental auditing and the management of large, multi-disciplinary project teams. Ms Ball is the Project Manager for this EIA.</p> <p>Mr Heydenrych is a Professional Landscape Architect and an Environmental Scientist with 17 years experience. He has been involved in project management, EIAs, environmental policy and guideline development, environmental auditing and implementation of environmental management systems, GIS-based environmental management frameworks and other decision-support systems, development of integrated environmental management guidelines, strategic planning, legislation development, landscape design and rehabilitation planning.</p> <p>Ms Fechter is chemical engineer with 17 years of experience in environmental engineering, environmental assessments, environmental auditing and related projects. She was employed as a Process Engineer at ISCOR, ICI-UK and AECI before joining GIBB's Environmental Division almost 10 years ago. Since then her key experience includes <i>inter alia</i> environmental management and planning, EIAs, EMPs, ECO services and environmental auditing for a wide range of projects. Projects include for example the EIA for the Widening of the Port of Durban, Port of Durban Sub-aqueous Tunnel EMP and ECO, Kelvin Power Station water and wastewater project and Ottawa-Tongaat Overhead Transmission line EIA. In addition to hands-on involvement in rendering the services and compiling reports, Ms Fechter acted as GIBB's Project Leader on these projects.</p>



1.4 Structure of this Document

The EMP has been divided into twelve sections, each of which addresses a different aspect:

- | | |
|------------|--|
| Section 1 | Provides a brief introduction to the project and explains the purpose of the EMP document. |
| Section 2 | Sets the context for the EMP in terms of the project; the processes and measures that direct, guide and define environmental management requirements during the project life cycle; and the overall EMP objectives. This section provides an overview of how mitigation measures that were described in the EIA to address identified issues have been incorporated in environmental specifications in the EMP. Residual environmental issues, which resulted from inadequate technical information; and dealing with unexpected environmental issues are also discussed. |
| Section 3 | Defines specific organisational arrangements for the different project phases. |
| Section 4 | Assigns responsibilities to different role players for the construction, operational and decommissioning phases. |
| Section 5 | Defines what environmental training and awareness raising activities must take place to ensure that construction personnel have the necessary environmental competence to understand their potential impacts on the environment and to avoid and mitigate these impacts. |
| Section 6 | Defines how communication about the environmental consequences and performance of the project must take place between Eskom, the environmental authorities, other stakeholder and the broader public. |
| Section 7 | Provides a library of environmental specifications to which Eskom and the Contractors must comply. The specifications contain specific instructions or objectives to ensure that potential environmental impacts are mitigated. |
| Section 8 | Contains requirements for the development of method statements and standard operating procedures by the contractors to specify in detail how they will ensure compliance with the EMP. |
| Section 9 | Defines monitoring requirements for different environmental media, to determine what the actual impacts are on the environment during construction and operation. |
| Section 10 | Defines how non-compliance with the EMP and/or environmental authorisation must be addressed and what corrective action needs to be taken to ensure that the consequences of incidents are minimised and that recurrence of incidents is prevented. |
| Section 11 | Provides a conclusion to the EMP. |
| Section 12 | Provides a number of references that were consulted during the preparation of this EMP. |

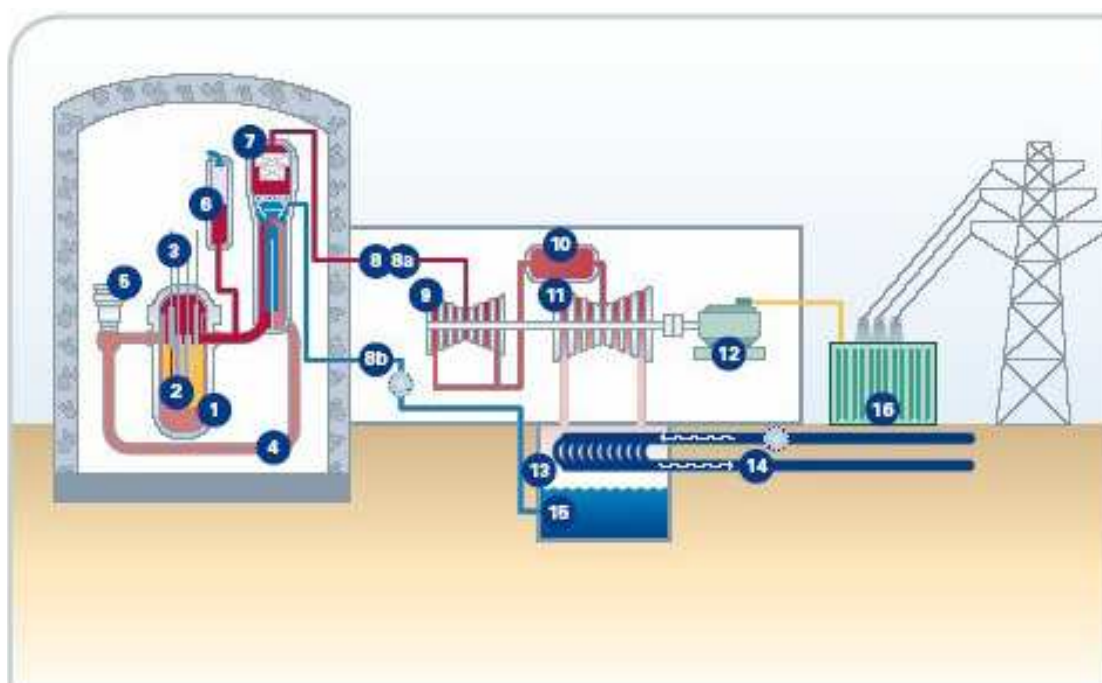


2 SETTING THE CONTEXT

2.1 Overview of the proposed project

2.1.1 Brief Technical Description

For the Nuclear-1 Project Eskom's proposed nuclear power station would have a power generation capacity of up to 4 000 megawatt electrical (MWe), using the Pressurised Water Reactor (PWR) technology. Refer to **Figure 2.1** for an illustration of the basic process. Eskom anticipates that after a construction period of approximately seven years, the nuclear power station will have a life span of approximately 60 years before being decommissioned.



(1) Reactor	(2) Core	(3) Control rods	(4) Primary circuit (w water circuit)	(5) Main reactor coolant pump
(6) Pressuriser	(7) Steam generator	(8) Secondary circuit (steam)	(8a) Steam for the turbine	(8b) Water for steam generators
(9) High pressure turbine	(10) Reheater	(11) Low pressure turbine	(12) Generator	(13) Condenser
(14) Cooling circuit	(15) Condensation water	(16) Transformer		

Figure 2.1: Key features of a Pressurised Water Reactor

The proposed power station complex will include *inter alia*:

- Containment/Reactor building;
- Nuclear auxiliary building;
- Turbine halls;
- Spent fuel and nuclear fuel storage building/facilities;



- Diesel buildings;
- Diesel storage tanks;
- Waste handling facilities;
- Intake and outfall structures required to obtain/release water used to cool the process;
- Desalination plant;
- Water tanks and water pump houses;
- Transmission and distribution lines;
- Roads (including on-site and two new access roads);
- High voltage yard; and
- Other auxiliary service infrastructure (administration and emergency control and support buildings, warehouses and stores, sewage pump and treatment, etc.).

Note that these project elements are covered in the Environmental Authorisation and associated EIA process.

2.1.2 Site selection and description

(a) Site selection process

As part of the long-term power generation strategy for South Africa, Eskom intends to prepare for more than one nuclear power station in the long term. Five alternative sites which were identified during the Nuclear Site Investigation Programme (NISIP) were initially considered during the EIA process. However, based on the recommendations from the Scoping Study, two alternative sites (Brazil and Schulpfontein) were not taken through to the Assessment Phase. The Assessment Phase of the EIA thus continued with the full assessment of the three remaining sites (Duynefontein, Bantamsklip and Thyspunt) (refer to **Figure 2.2** for the locations of the sites). While the EIA did not eliminate any of the three sites, after due consideration, Eskom decided to pursue the Thyspunt site as it's preferred site in its application for Environmental Authorisation for Nuclear-1.

Eskom preferred the Thyspunt site from a technical point of view, as it provided a completely new generation pool for the Eskom transmission system to supply both the Eastern Cape loads as well as export excess power to the rest of the network. Besides the advantages of diversity of generation, the Thyspunt site would link up to the new transmission lines under construction to Port Elizabeth, thus maximising the benefits of the new transmission infrastructure. It would also provide a voltage controllable busbar in the Eastern Cape, which would be of significant value to the operation of this network and the transmission system as a whole.



Figure 2.2: Three sites considered in the Assessment Phase of the EIA process

(b) Brief description of the Thyspunt site

Thyspunt is situated in the Eastern Cape on the coast between the towns of Oyster Bay in the west and St. Francis Bay in the east. The site for the proposed Nuclear-1 power station is currently vacant. There are a number of houses on the adjacent properties but these are far outside the proposed Emergency Planning Zone (EPZ) of 800 m from the nuclear power station. To the north of the sand dunes of the Oyster Bay Mobile Dune System, which span the northern portion of the site, the dominant land use is dairy farming. (Refer to **Figure 2.3**, **Figure 2.4** and **Figure 2.5**).

It is estimated that the total area required for the nuclear power station is approximately 250 to 280 ha. However, the area that has been recommended for the footprint of the power station (taking into account the environmentally sensitive portion of the site) is approximately 174 ha. Thus, in order to fit in all activities within the recommended footprint, Eskom and the contractor will have to optimise the layout and design of the power station. The recommended footprint of 174 ha excludes the transmission line servitudes beyond the HV yard.



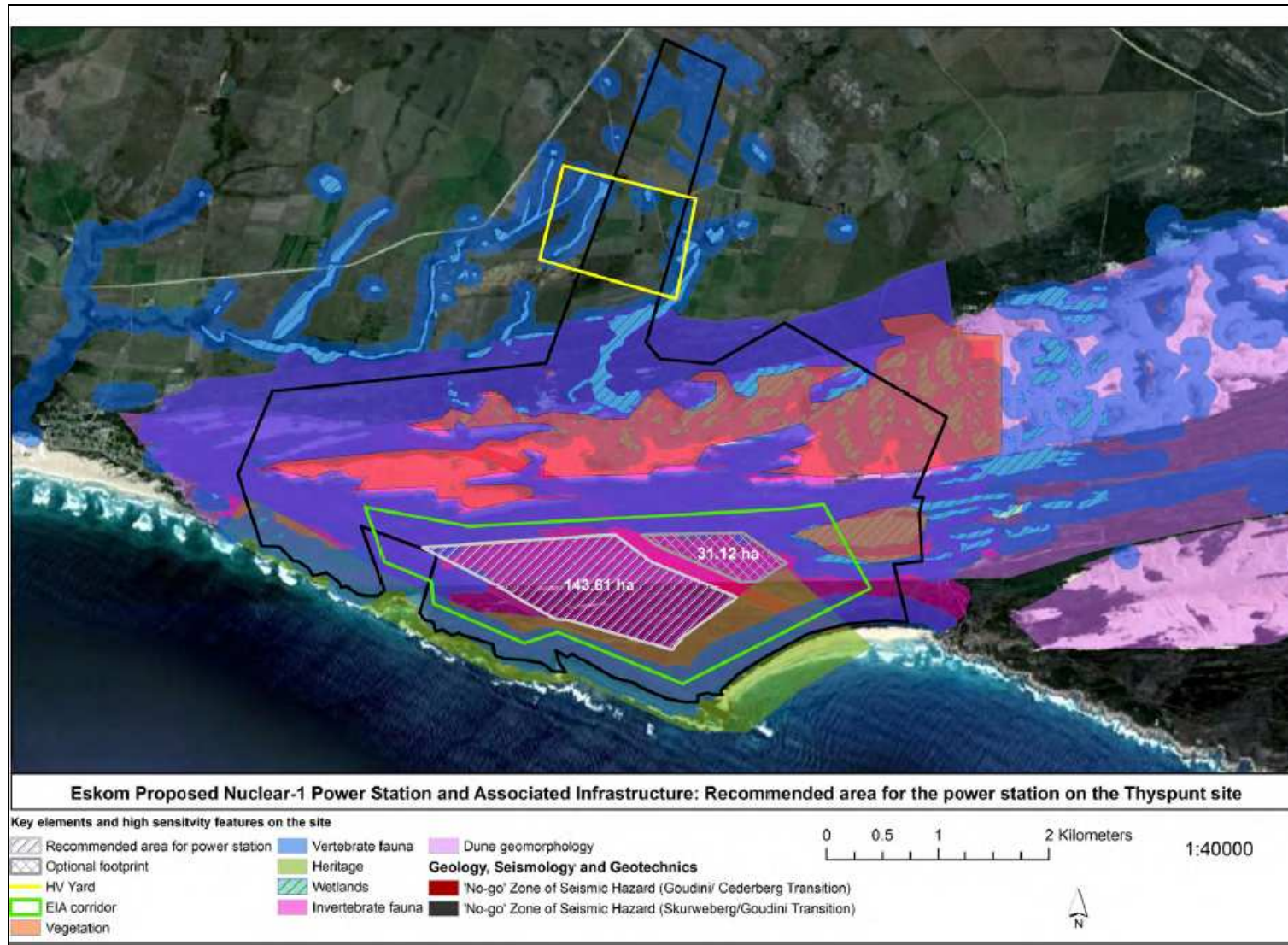
Figure 2.3: Thyspunt site relative to nearby landmarks



Figure 2.4 View of the coastal portion of Thyspunt looking east towards St. Francis



Figure 2.5: Site Environmental Map with Sensitive Environments and EIA Recommended Footprint





2.2 Objectives of the EMP

It is imperative that the remedial and mitigation requirements identified during the EIA process are effectively realised during construction, operation through to the final decommissioning of the project. Accordingly, the EMP plays a key role in the implementation of consistent and continued environmental management for the duration of the project life cycle. **Figure 2.6** contextualises EMPs within the broader environmental assessment and management processes. It also illustrates the links between the various activity life cycles, processes and mechanisms specific to the development of Nuclear-1.

The EMP structure captures 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.

Specifically, this Nuclear-1 Project EMP aims to:

- Draw attention to all the key environmental management requirements applicable to the project;
- Organise environmental management requirements for the various life-cycle phases, as were determined through the EIA process, in a meaningful and structured way;
- Provide an environmental management planning document for incorporation into construction tender and contract documents, commissioning procedures, operational EMS, and decommissioning and final site remediation procedures;
- Provide information to be included as part of the vendor tender pack, with the understanding that the selected vendor(s) will provide for compliance to the EMP in his/her/their tender submission(s);
- Define and outline the functions, roles and responsibility of accountable persons for effective environmental management;
- 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, operation, decommissioning and closure 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;
- Identifies the requirements for detailed Method Statements (construction phase) and Safe Operating Procedures (operational and decommissioning phases) for certain aspects or activities;
- Prevent long-term or permanent environmental degradation;
- Define requirements and procedures for monitoring; and
- Outline procedures for environmental management and control, in the event of pollution or similar incidents.

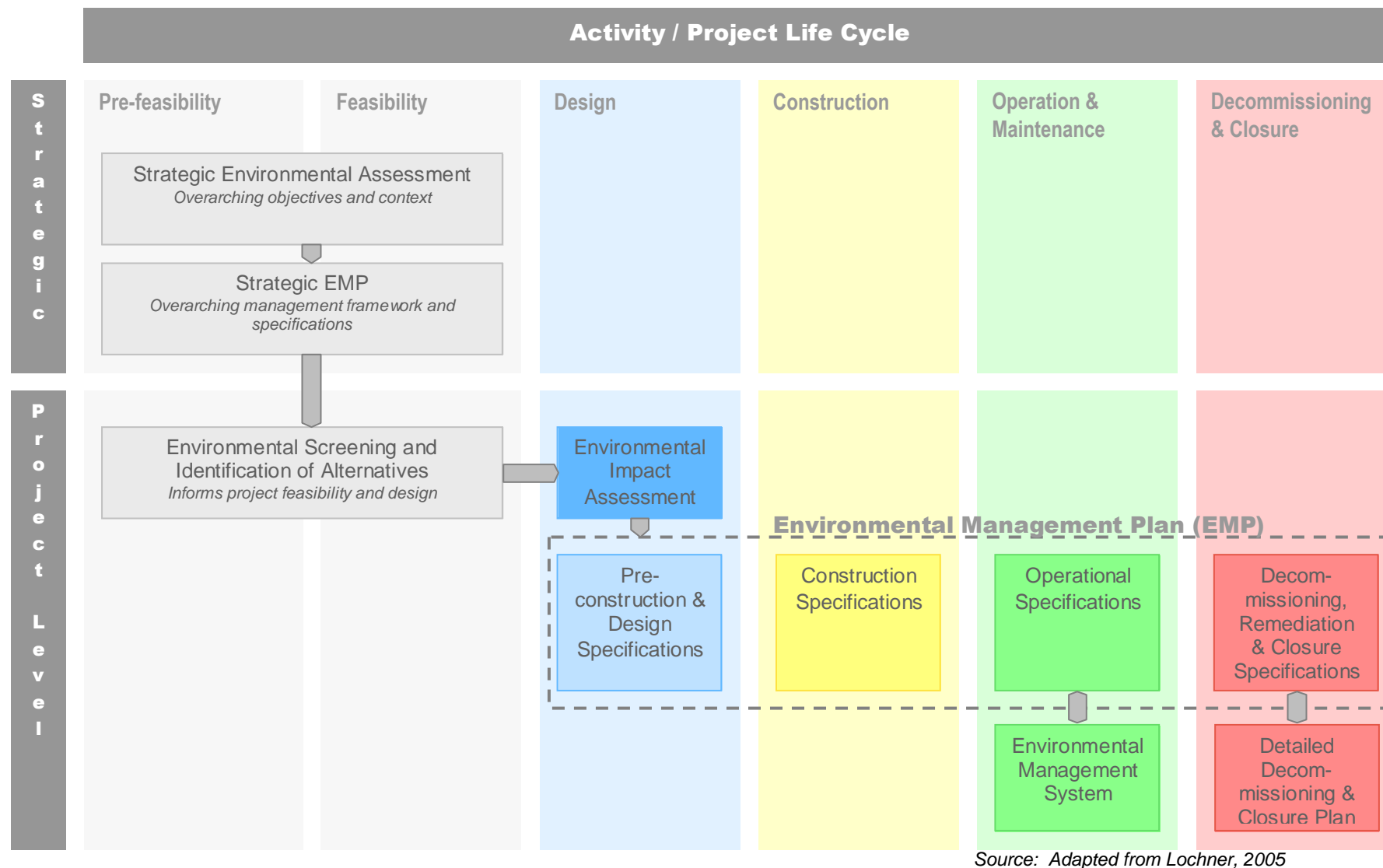


Figure 2.6: Environmental Management Plan context in environmental planning and management processes



2.3 Scope of the EMP

2.3.1 Environmental Impact Assessment and Report

As mentioned, the EIR forms the basis for the EMP. Also, since the EIA was undertaken in terms of environmental legislation, the EMP becomes legally binding for all activities undertaken for the Nuclear-1 Project, once endorsed by an Environmental Authorisation.

Comprehensive specialist studies undertaken during the Assessment Phase of the EIA process provide an in-depth understanding of the potential positive and negative impacts of the proposed development on the social, biophysical and economic facets of the environment. Specialists were required to assess and rate potential environmental impacts and to recommend appropriate mitigation measures. The specialist study findings have been integrated in the EIR and EMP.

Specialists in the following fields were involved in the EIA:

- Technical specialists, including geological, seismic hazards, geotechnical, hydrological and geo-hydrological assessments;
- Biophysical specialists, including flora, invertebrate fauna, vertebrate fauna, air quality, marine, dune geomorphology and wetlands assessments;
- Social specialists, including social impact assessment, tourism, human health risk, heritage, noise, and visual impact assessments; and
- Economic specialists.

The EIA identified the following key issues:

- Geological and geotechnical suitability;
- Depth of water table and associated dewatering requirements as well as the implications for surrounding and downstream water users;
- Source of water supply for construction and operation of the nuclear power station;
- Disturbance and disruption of terrestrial ecological processes such as loss of habitat and associated flora and fauna;
- The disruption of faunal migration patterns between the coast and inland;
- Potential disruption of movement of the Oyster Bay mobile dune system;
- Disturbance of the marine ecology (especially chokka squid) through release of warmed water into the ocean, release of brine from the desalination plant and offshore disposal of sediment;
- Health, safety and security of the site as well as limitations on surrounding land use;
- Changes to community structures through the influx of workers and associated infrastructural requirements;



- Change in tourism activities;
- Visual disturbance;
- Loss of heritage and cultural resources;
- Dust generation;
- Construction of required facilities and infrastructure associated with accessibility to the site, transport and integration of the generated power into the networks;
- Security; and
- Transport of low-level and intermediate-level waste from the site and storage of high level waste on site.

Potential positive impacts identified during the process included:

- Improved generation capacity in the Cape region and South Africa as a whole, which could stimulate much-needed local economic growth and prevent future electricity shortages and provide greater security of supply by improving the current reserve margin;
- Potential establishment of formal conservation areas on Eskom-owned land;
- Significantly lower Green House Gas (GHG) emissions when compared with that of coal fired power stations; and
- Direct economic injection into the local economies.

2.3.2 EMP Revisions and Authorisation

In accordance with NEMA and the EIA Regulations, a draft EMP must be published in conjunction with the draft EIR for public comment. Therefore both a first Draft EIR and first Draft EMP had been distributed for public review. The current Revised Draft EMP has been amended and improved based on comments received from various stakeholders; and based on the revised draft EIR and associated specialist reports.

While every effort was made to render the EMP comprehensive, as indicated in **Section 1.1**, the EMP may need to be revised after the receipt of public comments and finalised after the issue of an authorisation by the DEA. It is therefore important to incorporate any additional specifications required in terms of the Environmental Authorisation and any additional requirements the applicant may find necessary at the time of finalisation.

Once the EMP has been finalised it may again be necessary to amend the EMP as the project unfolds. Any such significant amendments require approval from the Department of Environmental Affairs prior to implementation.

Thus the EMP and its associated environmental specifications may be amended at various stages of the Nuclear-1 project. Anticipated events that would 'trigger' the need for update and amendment of the EMP are as follows:

- Receipt of the Environmental Authorisation;
- Significant change in applicable environmental legislation;



- Instructions from DEA to do so;
- Requests from the Environmental Monitoring Committee (EMC) to do so;
- Changing circumstances;
- Changes in the project scope (which have been approved by the DEA); and
- Amendments of the Environmental Authorisation by the DEA.

The EMP may also need to be amended should relevant authorities or key EMP role-players consider it necessary.

As mentioned, Eskom shall consult with DEA to establish whether the DEA requires approving specific EMP amendments, and if yes, Eskom shall follow due process to gain approval for such amendments. Eskom may consult with the EMC, the ECO and/or another suitably experienced party to assist with and/or accept the amendment of the EMP; and/or assist with the application for approval of the amendments.

2.3.3 Environmental Authorisation

(This section will be inserted once the Environmental Authorisation has been issued. It will provide a brief overview of the requirements and conditions of the authorisation and how these have been incorporated in the EMP.)

2.4 Eskom's Environmental Management Policies and Commitments

2.4.1 Vision and Policy

In terms of Eskom's Safety, Health and Environmental (SHE) Policy (Refer to **Appendix B**), Eskom's vision is to build the powerbase for sustainable growth and development, thereby generating a sustainable foundation for growth and creating value for stakeholders and society, while reducing the safety, health, and environmental impact of its operations. This policy provides the framework within which all other commitments, including this EMP, are given effect. Through this policy, Eskom commits to excellence in safety, health, and the environment and confirms to all employees, contractors, visitors, stakeholders, and the public that it will conduct its business in a caring, responsible manner. Eskom pledges to implement sustainable strategies to develop and manage the entire electricity value chain so as to deliver high-quality, affordable electricity in a changing business, social, natural, and political environment, without compromising future sustainability. Furthermore, Eskom pledges to continuously advance its business practices in line with international best practice (e.g. United Nations (UN) Global Compact), legislative requirements, and corporate best practice innovations. Eskom undertakes to measure the implementation of this policy progressively to ensure sustainable excellence in SHE management. Accountability for safety, occupational health, and environmental management rests with the Board of Directors, including the Chief Executive. Compliance with the SHE Policy and applicable regulations shall be the responsibility of every employee and contractor (Eskom, 2010).



In accordance with its Policy, Eskom will:

- Establish appropriate management systems to address safety, occupational health, and environmental issues with a view to minimising risk and ensuring duty of care and the management of pollution and environmental degradation, performance monitoring, and continuous improvement;
- Comply with all legislative and policy requirements and, in the absence of appropriate principles, set standards to meet the objectives of this policy;
- Promote open communication on SHE issues with employees and all stakeholders;
- Educate, train, motivate, and develop its employees in terms of occupational health, safety, and environmental issues;
- Provide and maintain a safe and healthy work environment and protect individuals against risk associated with occupational health and safety arising out of Eskom's business; and
- Contribute towards sustainable development through cost-effective resource use and efficient production, distribution, and use of energy (Eskom, 2010).

2.4.2 Environmental Management System

Environmental performance is managed as an integral part of Eskom's governance structure, from the board sustainability committee, to the executive management committee (Exco) sustainability and safety subcommittee. Eskom commits to ensure the effective implementation of Environmental Management Systems (EMSs) throughout its business through holding its environmental managers and environmental practitioners accountable.

Through this commitment, Eskom's objective remains to ensure continual improvement in its environmental performance by setting appropriate indicators and controlling its activities through EMSs and ensuring that Eskom's decision-making processes are based on balanced criteria. These commitments are set out in Eskom's SHE Policy (refer to **Section 2.4.1**).

Eskom's environmental commitment is based on the principles of efficient use of natural resources through controlling its activities that impact on the environment. Through its EMSs Eskom puts oversight and control measures in place to achieve its 'environmental duty of care' commitments. The EMSs also highlight the environmental impacts of Eskom's varied activities and checks that effective controls are in place.

In terms of its EMS Policy Eskom undertakes the following:

- We are committed to SHE 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 believe that all injuries and occupational illnesses, as well as safety and environmental incidents, are preventable, and our goal for all is zero. We will also promote off-the-job safety for all our employees.
- We will engage key stakeholders, including employees and organised labour, on all elements of SHE issues.



- We will continuously evaluate our SHE performance with the objective of continual sustainable improvement.
- 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 causing injury or damage to the environment.
- Management in each division will be responsible for educating, training, and motivating employees and contractors in relation to SHE issues.
- We will work with suppliers and customers to integrate SHE issues into their operations, and contractors working under our supervision or on Eskom premises will comply with this policy.
- This policy will apply wherever Eskom operations exist or Eskom operates, including subsidiaries.
- This policy will apply during the evaluation of all contracts, projects, and proposals.
- While many parts of Eskom's business have received ISO 14001 standard certification, the rest of the group undertakes audits and management reviews to ensure that the standards are adhered to.

It is Eskom's objective that all currently operational power stations must have certified Environmental Management Systems by March 2010. Koeberg Nuclear Power Station was, at the time of writing this EMP, in the final stages of certification. It is anticipated that the same will be required of the proposed Nuclear-1 Power Station.

To give specific effect to certain EMP specifications, Eskom will be required to develop, implement and maintain Safe Operating Procedures (SOPs), which will form part of the EMS, once these have been approved by the Power Station Manager.

2.4.3 United Nations Global Compact

Eskom is a signatory to the United Nations (UN) Global Compact and as such strives to implement the principles of the compact through sustainable practices. The compact requests companies to embrace, support and enact the following nine universal principles in the areas of human rights, labour standards and the environment:

Human rights

Principle 1 Businesses should support and respect the protection of internationally proclaimed human rights within their sphere of influence.

Principle 2 Make sure that they are not complicit in human rights abuses.

Labour standards

Principle 3 Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining.

Principle 4 The elimination of all forms of forced and compulsory labour.



- Principle 5 The effective abolition of child labour.
- Principle 6 Eliminate discrimination in respect of employment and occupation.

Environment

- Principle 7 Businesses should support a precautionary approach to environmental challenges.
- Principle 8 Undertake initiatives to promote greater environmental responsibility.
- Principle 9 Encourage the development and diffusion of environmentally friendly technologies.

Eskom has engaged in several activities to implement these principles and thus expects all its contractors and their sub-contractors to uphold these principles. Eskom will therefore include these principles as criteria in its contracts with the contractors on this project.

2.5 Environmental Specification's Structure and Application

As mentioned, environmental specifications for the Nuclear-1 Project are based on sets of mitigation measures, which the Environmental Assessment Practitioner and specialists had specified in the EIR, to address a range of environmental aspects and potential impacts, and associated issues and concerns identified during the EIA process (refer to **Section 2.3.1** for an overview and the EIR for details).

The EMP was developed by transferring and translating the mitigation measures into:

- Overall organisational requirements for the various phases: i.e. **Sections 3 – 6** and **Sections 9 – 10** of the EMP.
- Specific and relatively detailed environmental specifications to address specific issues raised during the EIA; i.e. the Library of Environmental Specifications (**Section 7**) and additional requirements for Monitoring Programmes (**Section 8**).

2.6 Residual and Unexpected Environmental Issues

While every effort was made to identify and assess all potential activities and associated significant environmental impacts during the EIA process, a number of residual environmental issues remain and unexpected environmental issues and impacts may well arise which have not been, or not been adequately considered and addressed during the EIA.



Residual Environmental Issues are issues that have been identified during the EIA, but are considered unresolved at the time of compilation of this EMP. These issues are as such therefore not yet addressed or not yet fully addressed by the mitigation measures derived in the EIA. Opposed to 'resolved' issues, specific environmental specifications for Residual Environmental Issues were thus still outstanding at the time of compiling this EMP. The reasons for residual issues vary, but are generally associated with lack of information at the time; e.g. lack of project design details, Environmental Authorisation conditions, contractor specific designs, etc.

However, Eskom shall resolve Residual Environmental Issues as the Nuclear-1 project unfolds; most notably during the Pre-construction Planning and Design Phase. This will be done through e.g. additional specialist studies followed by appropriate amendments to the EMP (and associated environmental specifications) and/or through Method Statements or Standard Operating Procedures.

In summary, key Residual Issues include the following:

- Geo-hydrological monitoring to model the impact of the abstraction of groundwater on wetlands and the interpretation of these results by the geo-hydrological and wetlands specialists;
- Data from additional fieldwork for invertebrates; and
- The excavation of heritage features from the sites prior to construction of the power station.

Unexpected Environmental Issues may arise for a number of reasons; e.g. substantial designs and associated activities changes, use of unusual materials or procedures, site footprint changes, etc.

During the construction phase an unexpected environmental impact or potential impact may be identified by the Environmental Control Officer (ECO) or brought to his/her attention. The ECO should then in turn establish whether such an impact is potentially significant, and if yes bring such an impact to the attention of the Project Manager (PM) and the Department of Environmental Affairs (DEA). In his submission the ECO may include recommendation on additional assessment (e.g. specialist study) and/or mitigation of such impacts. The PM should liaise with the DEA to agree on the way forward with regard to any recommended action.

2.7 Compliance with Other Policies and Legislation

Eskom and the Contractor shall commit to complying with the relevant provisions of the applicable environmental legislation and associated regulations promulgated in terms of these laws, through all phases of the project. In order to achieve this, these parties need to acquaint themselves with relevant environmental legislation and/or seek advice from the relevant authorities and/or a suitably qualified legal specialist.

In addition to the environmental authorisation in terms of NEMA, the proposed power station requires a number of other authorisations from various departments, such as



the Department of Mineral Resources (DMR), the Department of Water Affairs (DWA), the Department of Environment Affairs (DEA), as well as the regulatory authorities such as the National Nuclear Regulator (NNR) and the National Energy Regulator of South Africa (NERSA). The processes associated with the legal requirements are documented in **Chapter 6** of the EIR.

A list of applicable legislation is contained in **Annexure C** to this EMP.



3 SPECIFIC ORGANISATIONAL ARRANGEMENTS FOR PROJECT PHASES

While the project might well be divided into many more phases and sub-phases, for ease of reference, this EMP covers the following phases:

- Preconstruction Planning and Design;
- Construction;
- Operational; and
- Decommissioning and Site Closure.

Refer to the definition for phases as included in the introduction of the Library of Specifications (**Section 7**)⁴.

3.1 Preconstruction Planning and Design Phase

Due to the sensitivity of the environment, the complexity of the environmental requirements for the Nuclear-1 project and the fact that a number of Residual Environmental Issues remain (refer to **Section 2.6** for the latter), it is important for Eskom to consider environmental management requirements during the Preconstruction Planning and Design Phase of the project. It is for this reason that such a phase is specifically covered in this EMP and associated environmental specifications.

The key activities undertaken during this phase involve:

- Undertaking additional specialist studies and/or investigations to address any residual environmental issues;
- Final planning and design of the site layout/ footprint and nuclear power station;
- Development of a set of site management master plans, e.g. for stormwater, water supply, facilities, waste, remediation, etc. (as indicated in **Section 7**).
- Tendering, adjudication and induction of Contractor/s; and
- Addressing certain environmental requirements, concerns, roles and responsibilities in preparation for the construction phase; e.g. through contract negotiations.

3.1.1 Additional Specialist Studies

Additional specialist studies will be undertaken to address Residual Environmental Issues (refer to **Section 2.6**) in accordance with and based on recommendations of specialists and direction from the relevant environmental authorities.

⁴ The definitions were included in the Library of Specifications section, to ensure that they are read and understood as part of the specifications.



Considering that extensive specialist studies have already been undertaken, these studies are in effect a 'fine tuning' of information to aid detail site layout planning and design. Specialists will thus as such also assist Eskom in such planning and design.

The following additional studies are required:

- Monitoring of the interaction between water levels in wetlands and groundwater, in order to model the impact that the drawdown of groundwater (during excavation of the foundations of the power station) would have on wetlands at the site; and
- Invertebrate studies.

3.1.2 Walk-down Assessment

After authorisation, but prior to decisions about the detailed location of elements of infrastructure on the site, a team of specialists must perform a detailed "walk-down" assessment of the site. This assessment must investigate, in detail, the recommended footprint for the power station (in accordance with the recommendations of the Final EIR) and associated infrastructure, as well as **all** elements of the construction site.

In addition to the Eskom project representatives, the walk-down team must consist of appropriately qualified and experienced specialists from the following fields:

- Archaeology / Heritage
- Wetlands;
- Vertebrate Fauna;
- Vegetation;
- Dune Geomorphology; and
- Invertebrates.

Should the ECO be appointed at this stage he/she should also form part of the walk-down team.

Based on the findings of the walk-down assessment, the layout of the power station and elements of construction infrastructure must be planned and placed on site to ensure that environmental impacts are minimised. The layout plan produced at the end of this process must be regarded as binding on Eskom and the contractor and may not be changed without their approval.

3.1.3 Integration of Environmental Considerations into Project Design

The Library of Specifications in accordance with **Section 7** includes several specifications that must already be considered during pre-construction planning and project design in order to prepare for effective and consistent environmental management. These include, for example, specifications relevant to siting of the nuclear power station and associated facilities and infrastructure; access route planning; development of various master plans (e.g. stormwater management, rehabilitation, emergency procedures); community sensitisation, etc).



3.1.4 Integration of the EMP into Contracts

(a) Eskom Policy Requirements

In line with the Eskom environmental policies and commitments, the EMP shall form an integral part of all construction tender, contract, work orders and job description documents of Nuclear-1. It is assumed that for a project of this size and complexity, Eskom may well enter into various contracts for construction sub-projects at various stages of the construction phase. Thus, whether appointments are for activities such as surveying, civil works, mechanical, electrical, remediation etc., the EMP shall be incorporated as part of the contractual arrangements.

The EMP and all its associated environmental specifications and requirements that are relevant to the work the contractor and his subcontractors would be appointed for, therefore shall be fully considered by the tenderer in his bid submissions and by Eskom as an important component during tender evaluation and adjudication. To render a bid submission responsive, due consideration of environmental requirements must be reflected in the tenderer's proposed staffing and organisational structure, experience and expertise, approach, methodology and cost and programme schedules. In addition, a tenderer shall in his/her bid submission *inter alia*:

- Include a copy of their company environmental policy statement;
- Identify which senior staff member would have overall responsibility for ensuring the Contractor's compliance with the EMP and associated environmental specifications;
- Identify a suitably qualified and competent staff member (or subcontractor) proposed to act as the Contractor's Environmental Officer (EO) (refer to **Section 4.5.2**) for the associated roles and responsibilities); and
- Provide sufficient allowance in his/her tender price for implementing full compliance with the EMP and associated environmental specification. Failure to do so will not qualify the Contractor to claim for compensation events / variation orders.

In evaluating and adjudicating construction tenderers' bid submissions, as part of covering evaluation and adjudication of compliance with the EMP, Eskom shall allocate an environmental competency score as part of the tender process. The Eskom evaluation and adjudication team shall include a person qualified and competent in environmental issues/costing.

The EMP shall be endorsed contractually for all Eskom's appointments of contractor activities associated with Nuclear-1 for the duration of the construction phase and will as such become legally binding. All contractors to the project shall thus take full responsibility for implementing the environmental specifications in accordance with the requirements of the EMP. Equally, contractors shall ensure that this responsibility is effectively incorporated and transferred in their contractual arrangements with their sub-contractors and shall make adequate provision for effective management and control of all the sub-contractors they chose to appoint to the project, with regard to full implementation of the EMP.

Eskom and its contractors shall therefore carefully consider and evaluate/re-evaluate all the requirements and specifications of the EMP at the tendering stage and regularly during the contract period to ensure that the plan remains current and



applicable in terms of the latest legislation as well as specific activities on site. Should Eskom and/or a contractor require any amendments to the EMP, due process must be followed (refer to **Section 2.3.2**), where after Eskom will formally confirm any EMP revision or amendments to the contractor(s) in writing (e.g. by means of a variation order).

(b) Requirement for Method Statements

In compliance with this EMP, Eskom will require contractors to develop and submit Method Statements for a range of work aspects and impact mitigation relevant to environmental management during the construction phase; and shall cover such requirements in their contractual arrangements with contractors. These Method Statements are required to indicate and describe in detail how contractors will implement and achieve environmental compliance (Refer to **Section 8.1** for further details).

By way of including this EMP (or relevant components thereof) in the tender and contract documents, contractors are required to consider, provide for and incorporate the Method Statement requirements into their tender submissions (e.g. costing and programme). While a preliminary list of required Method Statements is included in this EMP, it should be noted that the list could be expanded or requirements amended as the project unfolds.

3.2 Construction Phase

Environmental management addresses not only the operation of the Power Plant but also how the construction is carried out. Hence it is a requirement that the Contractor shall comply with the environmental requirements of the EMP on an ongoing basis.

The Contractor shall take full responsibility for protecting the natural environment and, where possible, mitigating all negative impacts on the environment while carrying out all his/her construction activities. The Contractor shall prevent or limit the possibility of incidents that may cause damage to the environment and, if any damage does occur, shall rehabilitate the environment to a state as close as possible to its condition prior to any such disturbance occurring.

The requirements of this specification apply to the entire construction footprint and those areas under the Contractor's control, including but not limited to the construction areas, all borrow pits, the construction camp and offices, all access/ haul routes and all labour accommodation areas.

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 objectives for the EMP thus also apply to the construction phase of the project.



As such, the environmental specifications apply to the following typical activities:

- Site surveying and related investigations;
- Borehole drilling and groundwater monitoring;
- Construction of temporary access roads;
- Fencing and erection of the construction camp;
- Provision of power supply to construction site;
- Site clearing and terrace construction (e.g, dewatering, levelling, excavations);
- Sourcing of resources;
- Transportation of equipment and material;
- Infrastructure construction and installation of plant; and
- Site remediation.

3.2.1 Organisational Structure

In order to ensure sound development and effective implementation of the EMP, it is necessary to clearly identify and define the responsibilities and authority of the various individuals and organisations that will be involved in the construction phase of the project. The organisational structure presented in **Figure 3.1** identifies and defines the responsibilities and authority of the various key role-players (individuals and organisations) involved in the project's construction. This organisational structure 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. Therefore, all instructions and official communications regarding environmental matters shall follow this organisational structure. The structure may require revision as the project unfolds; however, any such revision must be agreed with and communicated in writing to all the key role-players.

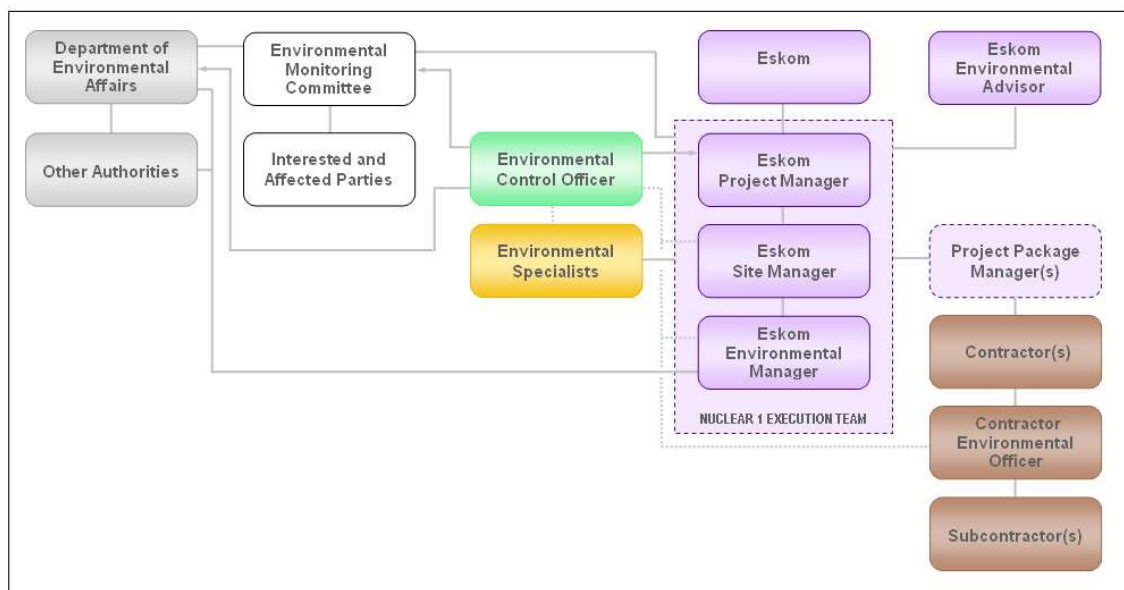




Figure 3.1: Organisational Structure for Environmental Management during the Construction Phase of the Project

In accordance with this organisational structure, key role-players that hold environmental roles and responsibilities are thus:

- Department of Environmental Affairs (DEA);
- Environmental Monitoring Committee (EMC);
- Interested and Affected Parties;
- Eskom Project Manager (PM);
- Eskom Site Manager (SM);
- Eskom Environmental Advisor;
- Eskom Environmental Monitoring Committee (EMC);
- Eskom Environmental Manager (EM);
- Environmental Control Officer (ECO);
- Contractor;
- Contractor Environmental Officer (EO); and
- Subcontractors.

In terms of the defined organisational structure reflected in **Figure 3.1**, all instructions that relate to environmental matters associated with construction activities will be communicated to the Contractor by the Site Manager (SM). The exception to this rule would be in an emergency, in which case instructions may be given directly to the Contractor. The ECO must inform the SM as soon as possible and in writing of the instructions given to the contractor. An emergency is defined as a situation requiring immediate action and where failure to intervene timeously would, in the reasonable opinion of the relevant Environmental Authority or the ECO, result in unacceptable environmental degradation. The detailed roles and responsibilities of the various role-players identified in the organisational structure are outlined in **Section 4**.

In addition to this structure that will ultimately guide the day-to-day operation of the construction of Nuclear-1 and in terms of Eskom's public and social obligation, Eskom shall set up an Environmental Monitoring Committee (EMC) and appoint a Community Liaison Officer (also known as Communications Practitioner / Stakeholder Manager) that will facilitate liaison with the public.

3.2.2 Method Statements Implementation

While Method Statements defined in this EMP requires the necessary attention and consideration during the contractor tendering stage; some Method Statements may require additional information or time to compile and may thus only become available after the tendering stage. The timeframe in which the Contractor shall submit and/or implement such Method Statements are to be agreed before the start of construction.⁵

⁵ EMP-specific method statements must typically be submitted one month prior to construction commencing for acceptance by the ECO and approval by the SM or his delegate. These should be reviewed two months after relevant construction activities commence to ensure that the process takes account of site-specific issues and mitigation measures.



As mentioned, additional Method Statements or amendments to some that are already in place may also be required at different stages of construction as the project unfolds. Once Method Statements have been approved, these need to be fully implemented and adhered to for the duration of construction. (Refer to **Section 8.1** for further details)

3.2.3 General and Legal Obligations

The Contractor shall commit 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 and ensure that construction activities are undertaken in a manner that will minimise impacts on the surrounding environment.

The Contractor shall construct and/or implement all the necessary environmental protection measures in the construction footprint, in accordance with this EMP and associated Environmental Specifications, prior to the commencement of any construction activities. The SM may suspend work at any time or issue penalties to the Contractor, should the Contractor, at the SM's discretion, fail to implement, operate or maintain any of the environmental protection measures adequately. The Eskom Environmental Manager (EM), ECO, EMC and/or Eskom Environmental Advisor may advise the SM on such work suspensions and penalties.

3.2.4 Communication and liaison with stakeholders

The Contractor shall ensure that the public and surrounding communities are informed and updated on all information regarding construction activities that may affect or interest them throughout the construction phase. In doing so, however, the Contractor shall follow the following procedures:

- Submit any notices, notice boards, warning signs, displays and the like to Eskom for approval prior to them being erected.
- Strictly direct any other communication with the public (whether written or verbal) through Eskom (i.e. through the SM and/or EM), who in turn may direct such communication through Community Liaison Officer or the EMC.

3.3 Operational Phase

The operational phase includes, in addition to all activities associated with the day-to-day operation of the nuclear power station, activities relating to the commissioning of the power station (with the exception of those undertaken as part of the construction phase), maintenance of the nuclear power station and long-term implementation of required environmental management and monitoring systems.

It is assumed for the purposes of this EMP that Eskom will implement an Environmental Management System (EMS) during the operation phase. The relevant provisions of the EMP specifications and organisational structure will be integrated and incorporated into the EMS.



3.3.1 Organisational Structure

The proposed organisational structure is indicated in **Figure 3.2**. Similar to 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 4**.

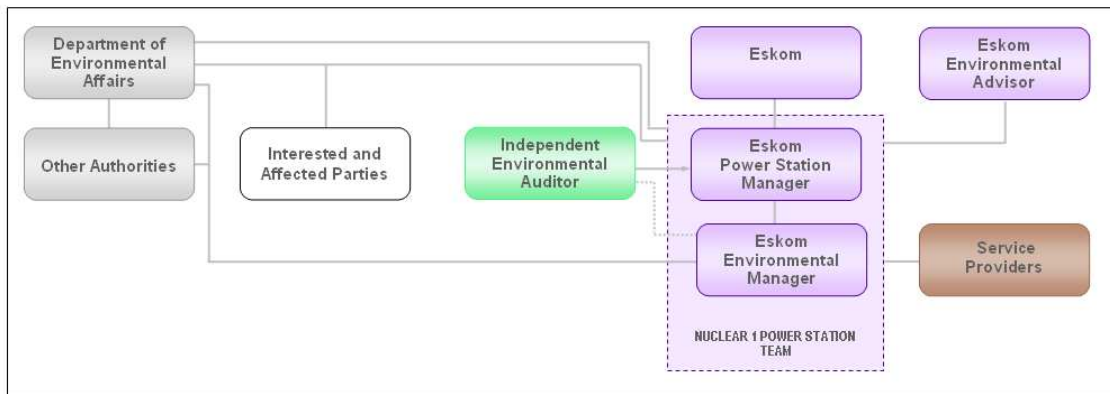


Figure 3.2: Organisational structure – operational phase

In line with this organisational structure, key role-players that hold environmental roles and responsibilities during the operational phase are thus:

- Department of Environmental Affairs (DEA);
- Interested and Affected Parties (I&APs)
- Power Station Manager (PSM);
- Eskom Environmental Advisor; and
- Eskom Environmental Manager (EM)

The detailed roles and responsibilities of the various role-players identified in the organisational structure are outlined in **Section 4**.

3.3.2 Environmental Management System

Eskom shall develop and implement an Environmental Management System (EMS) in line with the requirements of ISO 14001: 2004 for the operational phase of the nuclear power station, prior to any operational activities commencing. This EMS shall incorporate and give affect to the relevant requirements of the EMP, and as such include relevant Safe Operating Procedures (SOPs). It is recommended that the implementation of the EMS is subjected to internal and external audits.



3.4 Decommissioning and Site Closure Phase

Once the power station 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 prevent the release of radiation in order for the land to be used for other purposes and to ensure that the land can continue to be used for nature conservation purposes.

Sound environmental remediation and closure to enable future re-use of the site will be essential. While remediation to a 'green' site, while not impossible, is probably unlikely; re-use would likely be for an upgraded power station or an alternative industrial use.

For this reason a detailed Remediation and Closure Plan must be compiled towards the end of the project's operational life cycle, assuming that the plant will not be refurbished. Such a plan must incorporate all the relevant remediation, rehabilitation and closure requirements of the EMP, as well as any requirements the environmental authorities may have at the time. The plan must take any potential future re-use into consideration.

3.4.1 Organisational Structure

A suitable organisational structure would need to be developed and implemented specifically for the decommissioning and site closure phase(s) to facilitate effective environmental management during this phase; and to meet the requirements the environmental authorities, the applicant and/or stakeholders may have at the time.

Since much of the decommissioning would probably be effectively done by operational staff, it may be appropriate to simply retain the organisational structure and arrangements that was already in place during operation.



4 DEFINITION AND ASSIGNMENT OF ENVIRONMENTAL ROLES AND RESPONSIBILITIES

Roles and responsibilities in relation to the implementation and compliance with this EMP throughout the project life cycle can effectively be defined for the following main groups:

- Environmental Authorities;
 - Public and Community Representatives;
 - Applicant (Eskom);
 - Independent Environmental Control Officer or Auditor; and
 - Contractors and Service Providers.
-

4.1 Environmental Authorities

4.1.1 Department of Environmental Affairs

The Department of Environmental Affairs (DEA) as the competent environmental authority has, in addition to its responsibility of considering the Environmental Authorisation of the project and prescribing legally binding conditions to the authorisation (should it be issued), the role of ensure that Eskom complies with these conditions and enforcing compliance, if necessary. As such, the DEA is the authority that shall hold Eskom responsible and accountable for compliance with environmental legislation on behalf of the public. To achieve this DEA shall monitor compliance with the conditions of Environmental Authorisation and issue notices and/ or directives to Eskom as it deems fit. At its discretion, the DEA may also direct and advise Eskom on requirements in terms of pertinent and relevant framework or other environmental legislation and any amendments thereto, with the understanding that Eskom will remain fully accountable for legal compliance.

The DEA may, at its discretion:

- Make a decision in terms of the Environmental Authorisation and specify the conditions of the authorisation;
- Give directives in terms of specific requirements for EMP specifications;
- Review draft, final and revised EMPs;
- Undertake spot inspections of the site at its own discretion;
- Review Environmental Control Officer (ECO) Audit Reports;
- Request and view Environmental Incident Reports;
- Request and view the Complaints Register;
- Give instructions for temporary or permanent cassation of construction, based on serious non-conformance with the authorisation or EMP requirements;
- Suspend or cancel the authorisation; and



- Issue directives, notices and/or fines for significant transgressions with the EMP or environmental legislation.

4.1.2 Other Authorities

While the DEA is ultimately the authority responsible for ensuring compliance with the EMP, various other authorities play a critically important role in directing and advising on matters relating to environmental compliance.

These include *inter alia* the following:

- The relevant provincial environmental authorities (the Eastern Cape Department of Economic Affairs Environment and Tourism). Although this department does not have a direct decision-making role with respect to the environmental authorisation, it does provide the DEA with advice and input through the principle of co-operative governance. It may also report transgressions of concerns to the DEA as its personnel are likely to be “on the ground” in the affected area more often than the DEA’s personnel.
- The South African Heritage Resource Agency (SAHRA) has legal competence over the management of heritage resources. In spite of the DEA’s authorisation (assuming it is granted, SAHRA may issue authorisations for the excavation and curation of heritage features and in general for the mitigation of heritage impacts.
- The Department of Water Affairs (DWA) has legal competence with respect to water-related issues and compliance with Water Use Licenses in terms of the National Water Act. It will also need to license the sewage treatment works that will be constructed and operated on the Nuclear-1 site and monitoring compliance with the conditions of approval during its operation.
- The National Nuclear Regulator, with respect to issues of radiation safety.
- The local authority (Kouga Local Municipality) has competence with respect to zoning and land use, as well as health-related issues, noise and other nuisance bylaws.
- The Department of Labour has competence over labour conditions and occupational health and safety, and may conduct inspections of investigations in the event of disabling injuries. Although this is not strictly environmentally-related, there are a number of overlaps between environmental and occupational health issues where the Department may have an input.

4.2 Public and Community Representatives

4.2.1 Interested and Affected Parties

While Interested and Affected Parties (I&APs) were given ample opportunity to participate during the EIA process, I&APs will be encouraged to continue participating as ‘watch-dogs’. Eskom shall support public and community liaison through arrangements as described in **Section 6**.



4.2.2 Environmental Monitoring Committee

Environmental Monitoring Committees⁶ (EMCs) are structures made up of representatives from stakeholders affected by a development activity. Their constitution and function differs from case to case as a result of the specific circumstances and needs determined by the specific development project. This basic function is to monitor the implementation of the environmental management plan (EMP), but they also fulfil an important communication function. The EMC will have an advisory, monitoring and “watch-dog” role that should extend at least for the duration of the construction of Nuclear-1. An EMC function, in one form or another, should also be retained for subsequent phases; i.e. commissioning, operation, etc.

With regards to decision-making, EMCs have no decision-making powers. It is generally recognised that EMCs can submit advice and information, while environmental authorities retain the power of decision-making for environmental management aspects of the project. The EMC has the power to make decisions relating to their own administration activities.

One of the key purposes of the EMC will be to ensure that environmental management does not end with the conclusion of the EIA process and the production of the final document (i.e. the Environmental Impact Report or the EMP). Instead, EMCs aim to ensure an on-going process of monitoring to assist in minimising negative impacts and maximising the benefits of development.

It is strongly recommended that the EMC be established well before construction commences; preferably at least six (6) months prior to construction.

In conclusion the key functions the EMC are to:

- Regularly monitor and review the progress towards adhering to the EMP and meeting the requirements contained in the Environmental Authorisation;
- Consider any modification or additions to the original version of the EMP that was approved by the DEA;
- Inform the DEA when there is non-compliance with conditions of authorisation; and
- Promote the participation of key stakeholders in a structured forum that provides exchange of information and insights.

The EMC should include experienced and respected members of the scientific community (preferably local residents, if possible) who have specific expertise in environmental matters related to the local environment (e.g. fauna and flora). As such the function of the EMC would include assisting 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 through the CLO.

⁶ See DEA Guideline Document on Environmental Monitoring Committees



4.3 Applicant

Eskom, as the applicant for environmental authorisation, will be responsible for effective implementation of all environmental requirements, whether this is in terms of EMP, legal or good management practice compliance. As such Eskom shall ensure that the organisational structure, the assignment of roles and responsibilities and the availability of appropriate resources remain appropriate, adequate and effective throughout implementation of the Nuclear-1 project.

4.3.1 Environmental Advisor

The Eskom Environmental Advisor, Eskom Head Office, shall advise the PM and SM on environmental compliance matters – throughout project life cycle.

The advisor shall be responsible for:

- Auditing compliance with the requirements of the EMP during spot checks and regular scheduled audits;
- Provide an assurance and reporting function to Eskom governance;
- Provide overall assurance that environmental issues are appropriately addressed and managed and that conditions of the Environmental Authorisation and EMP are adhered to at the site;
- Ensure that appropriate reporting on environmental performance/issues takes place to all the relevant key stakeholders;
- Advise the PM, SM and ECO regarding applicable legal and EMP requirements and compliance with these requirements;
- Recommend procedures to be followed and ways to improve environmental compliance and address non-compliances; and
- Advise on appropriate environmental lessons that have been learnt on similar Eskom construction projects, particularly with respect to the handling of incidents and the content and structure of the Environmental Management System for the Nuclear-1 site.
- Where necessary, liaise on a strategic level with environmental authorities on Environmental Authorisation and EMP-related issues and non-compliances.

4.3.2 Eskom Project Manager – Pre-construction and Construction Phases

The Eskom Project Manager (PM) is responsible for the overall management of the project and implementation, administration and enforcement of the EMP, and as such the EMP. The PM must:

- Be fully conversant with the EIA and EMP for the project, the conditions of the Environmental Authorisation, and all relevant environmental legislation;
- Is accountable for the implementation of the EMP;



- Address residual or unexpected issues appropriately, e.g. by way of project design or defining additional environmental specifications for incorporation into the final or revised EMP (if required shall solicit the assistance from suitably qualified specialists); and submit any associated documentations and applications for approval to the EMC and DEA;
- Ensure that site master plans are developed, including those specified in the EMP;
- Review the EMP in comparison with the final EIA, EMP, conditions of Environmental Authorisation and project design / procedures to check whether all identified environmental requirements are adequately addressed; and where this is not the case follow the procedure for EMP amendment (Refer to **Section 2.3.2**). If required the PM shall solicit the assistance from the ECO and/or suitably qualified environmental specialist. (Note, that the PM may delegate this function to the Environmental Manager {EM});
- Ensure that the 'amended' EMP and associated environmental specifications are made available to potential tenderers and thereafter incorporated as part of all construction contractor contracts;
- Ensure that Eskom and the Contractor are aware of all specifications, legal constraints and Eskom standards and procedures pertaining to the project specifically with regards to the environment;
- Ensure that all stipulations within the EMP are communicated and adhered to by Eskom and its Contractor(s);
- Ensure that the SM, EM and Contractors are made aware of all applicable DEA-approved changes to the EMP.
- Appoint an ECO to monitor implementation of and compliance with the EMP for the duration of the works and ensure that the ECO conducts audits and submits audits reports regularly to ensure compliance to the EMP;
- Authorise all Method Statements in accordance with a formal ISO-type document quality management system, and provide approved and signed controlled copies to the Site Manager (SM), ECO, Contractor and, if required relevant environmental authorities;
- Monitor the implementation of the EMP throughout the project by means of site inspections and meetings. This will be documented as part of the site meeting minutes;
- Be accountable, to the relevant authority, DEA, for any contravention/ non-compliance, whether by Eskom or any Contractor under their supervision; and

4.3.3 Site Manager – Construction Phase

The Eskom Site Manager (SM) is responsible for overseeing all site works, liaison with the Contractor, PM and Environmental Control Officer. The SM is responsible for coordinating, monitoring, reviewing and verifying compliance with the EMP of all construction activities by Eskom site staff and Contractors. Eskom may choose to appoint more than one SM for different portions of the overall construction site.

The SM's duties in terms of the EMP include the following:



- Be fully conversant with the EIA; i.e. Environmental Impact Report (EIR) and Specialist Reports;
- Be fully conversant with the conditions of the Environmental Authorisation;
- Be fully conversant with the latest version of the EMP and its associated environmental specifications;
- Be fully conversant with all relevant environmental legislation and Eskom environmental policies and procedures, and ensure compliance with these;
- Have overall responsibility for the implementation of the EMP on site;
- Ensure that all required and relevant environmental roles are identified and filled with adequately suitable and qualified personnel;
- Review all master plans (throughout the construction phase), make recommendations to the PM on any required amendments and ensure effective implementation / adherence to these on site;
- Advise the PM and ECO on any Unexpected Environmental Issue (refer to **Section 2.6**);
- Oversee all site works and ensure implementation of all relevant aspects and specifications of the EMP and approved Method Statements before activities commence;
- Designate and manage the working and “No-go” areas (including sensitive environments) in accordance with approved construction site layout, including sensitive environments;
- Confine activities to the demarcated working area of the construction site;
- Ensure full compliance with the requirements of the EMP and environmental legislation and associated regulations and standards, by everyone working on or visiting the site;
- Ensure the undertaking of environmental awareness (induction) training of all new personnel and visitors coming on to site;
- Review construction Method Statements in conjunction with the ECO and send Method Statements to the PM for authorisation ;
- Discuss implementation of and compliance with the EMP and Method Statement with Contractors at routine site meetings as a fixed agenda item;
- Enforce, oversee, monitor and verify Contractors’ compliance with environmental legislation, the EMP and specifications and the approved Method Statements;
- Assist Contractors in finding environmentally responsible solutions to problems with input from the Contractor’s Environmental Officer (EO);
- Inspect the site and surrounding areas on a regular basis with regard to compliance with the EMP;
- Monitor and verify that environmental impacts are kept to a minimum at all times;
- Ensure that audits are conducted to ensure compliance to the EMP;



- Assist and cooperate with the ECO, EMC and any authority on any audits they undertake and avail relevant documentation for their review;
- Prevent actions that will harm or may cause harm to the environment, and take steps to prevent pollution on the site;
- Liaise with the Project Manager or his delegate, the ECO and others on matters concerning the environment;
- Inform the PM and ECO of problems arising when implementing the EMP or a Method Statements and recommend ways of improving it;
- Take appropriate action to address all EMP, Method Statement and/or environmental legislation non-compliances;
- Issue written early warnings to Contractors failing to comply with the requirements of the EMP;
- Issue penalties/fines or stop work orders for contravention of the EMP and issue instructions regarding corrective action.
- Notify the PM and ECO of all incidents, accidents and transgressions on site with respect to environmental management and non-compliance with the latest EMP version and approved Method Statements; and, if necessary, seek advice from the PM and/or ECO for required corrective actions and/or site remediation;
- Instruct the Contractor on the requirements and procedures in terms of environmental non-compliance 'near misses', incidents and public complaints recording, investigation and reporting;
- Report all major (definition to be defined and agreed with PM and ECO) 'near miss' incidents, actual incidents and public complaints of environmental legislation and/or EMP non-compliances immediately to the PM and ECO;
- Keep and maintain a register and record all 'near miss' incidents, actual incidents and public complaints, along with the consequent corrective actions/remedial action taken in associated reports and submit these within one week of the occurrence to the PM and ECO for signing off;
- Report progress towards implementation of and non-conformances with the latest EMP version and approved Method Statements at site meetings with the PM and ECO;
- Prepare compliance status/feedback reports and submit these to the PM and ECO and keep copies thereof on record for the duration of the contract and at least three years after the contract expired;
- Ensure that suitable records are kept of all compliance status/feedback reports, incident reports and complaints register and that these documents are available for auditing by the environmental authorities, PM and ECO at all times: and
- Notify the ECO of any area that has been rehabilitated in order for the ECO to inspect the area and advise on his acceptance or additional requirements.



4.3.4 Power Station Manager – Operational and Decommissioning Phases

The Power Station Manager (PSM) will be responsible for monitoring, reviewing and verifying compliance with the EMP. The duties of the PSM shall include:

- Ensure that all required and relevant environmental roles are identified and filled with adequately suitable and qualified personnel;
- Ensure that the latest version of the EMP is reviewed and if necessary revised and that any revision is approved by the DEA; to ensure that it remains current;
- Implementation the EMP through the development of an Environmental Management System (EMS) and associated Standard Operating Procedures (SOPs), ensuring compliance with the contents of this document and any other environmental policies and procedures which may be applicable to the project;
- Ensure that the EMP specifications are included in all future tender documents issued for activities on site, and that the prospective tenderers/ contractors abide by the provisions thereof;
- Monitor and verify that the EMP is adhered to at all times and take action if the specifications are not followed;
- Monitor and verify that environmental impacts are kept to a minimum;
- Review and approve operational SOPs;
- Monitor the undertaking of environmental awareness training by all new personnel coming onto site;
- Inspect the site and surrounding areas regularly with regard to compliance with the EMP;
- Ensure that the necessary environmental authorisations and permits have been obtained; and
- Ensure the undertaking of environmental awareness training of all new personnel coming on to site.

4.3.5 Environmental Manager – Construction, Operational and Decommissioning Phases

The PM (or SM) and PSM will appoint an EM with the role and responsibility for the overall implementation, administration and enforcement of the EMP for the Construction Phase and Operational/Decommissioning Phase respectively. This includes interaction, environmental control of site actions, re-mediation and rehabilitation work.

In particular, the EM will be responsible to:

- Be fully conversant with the EIA; i.e. Environmental Impact Report (EIR) and Specialist Reports;
- Be fully conversant with the conditions of the Environmental Authorisation;



- Be fully conversant with the latest version of the EMP and its associated environmental specifications;
- Be fully conversant with all relevant environmental legislation and Eskom environmental policies and procedures, and ensure compliance with these;
- Assist Eskom in ensuring necessary environmental authorisations, permits and licenses have been obtained;
- Assist the PM (and/or SM) / PSM with ensuring that all required and relevant environmental roles are identified and filled with adequately suitable and qualified personnel;
- Assist and support the ECO / Independent Environmental Auditor, the EMC and any environmental authority that may wish to do so in carrying out any EMP compliance monitoring tasks they require efficiently;
- Promote a holistic view of the environmental impacts of the project activities and ensure that environmental impacts are kept to a minimum as far as practically possible;
- Provide guidance, assistance and input to the project team with regards to environmental management on a strategic level;
- Review all master plans (throughout the construction phase), make recommendations to the SM on any required amendments and ensure effective implementation / adherence to these on site;
- Ensure that activities on site comply with all the relevant environmental legislation;
- Develop and manage the implementation of an Environmental Management System (EMS)
- Review the EMP and EMS continually and submit reports to the PM / PSM on the status of and compliance therewith;
- Make recommendations on any requirements in terms of EMP / EMS revision and updates to the PM / PSM and ECO;
- Assist the PM (or SM) / PSM in ensuring that the EMP specifications are included in all future tender documents issued for activities on site, and that the prospective tenderers/ contractors abide by the provisions thereof;
- Ensure all environmental aspects and impacts are identified for all activities taking place and for all major plant and equipment and advise the PM and ECO on any Unexpected Environmental Issue (refer to **Section 2.6**);
- Review and make recommendations to the SM, PM and/or PSM on the acceptance of Method Statements / SOPs;
- Inspect the site and surrounding areas regularly with regard to compliance with the EMP;
- Monitor and verify that the EMP / EMS is adhered to at all times;
- Take action against contraventions of the EMP and give instruction regarding mitigation and corrective action;
- Advise on the removal of person(s) and/or equipment not complying with the specifications;



- Assist the PM / PSM, SM and/or Contractor in finding environmentally responsible solutions to problems;
- Maintain records of all activities/ incidents concerning the environment and how they were addressed;
- Maintain a register of public complaints received and how they were addressed;
- Maintain a non-compliance register;
- Maintain a register of audits;
- Provide material/ manuals and assistance for environmental awareness raising and training;
- Monitor the undertaking by Eskom and Contractors of environmental awareness training for all new personnel coming onto site;
- Complete checklists as necessary;
- Compile progress reports on a regular basis on environmental management for submission to PM / PSM, SM and the ECO / Independent Environmental Auditor; and
- Inform the relevant authority, DEA, of any significant contravention/ non-compliance by any contractor.

4.3.6 Community Liaison Officer

A Community Liaison Officer (communications practitioner) from Eskom shall:

- Deal with community needs and complaints;
- Develop and open liaison channels with nearby residents and I&APs, to facilitate communication and field concerns or complaints;
- Publish public notices that provides information on the progress with the Nuclear-1 Project and associated environmental management planning and implementation regularly; and
- Pro-actively inform I&APs through the Environmental Monitoring Committee (EMC) and appropriate media notices of any future construction activities that could affect them.

4.3.7 Eskom Conservation Officer

The Eskom Conservation Officer will act as the custodian of the conservation and declared “No-go” areas on behalf of Eskom. As such he/she shall advise the project team on all matters related to safe-guarding and protection of these areas; as well as remediation and rehabilitation of any impacted areas.



4.4 Independent Environmental Control Officer and Auditor

4.4.1 Environmental Control Officer – Construction Phase

Eskom shall appoint a suitably qualified person or consultancy, approved by the DEA and preferably also the EMC, to act as an Environmental Control Officer (ECO) for the duration of the construction phase. The ECO must be independent from Eskom and the Contractors; and DEA and Eskom with the assistance from the EMC must ensure that this independence is not compromised in any way. The main role of the ECO shall be to frequently monitor, review and verify the implementation and compliance with environmental legislation, the Environmental Authorisation and the EMP; and secondly, to liaise with the environmental authorities, PM, SM, Contractor and EMC to provide advice and support in terms of the implementation of the EMP.

Eskom shall appoint the ECO at least one (1) month, but preferably more than three (3) months before the start of construction. Eskom must then immediately notify the DEA; other relevant authorities and the EMC of such an appointment for communication purposes. Eskom shall bear the costs of the ECO.

It must be noted that on a project as complex as this, the ECO may in fact consist of a team, with a chief ECO assisted by various deputy ECOs.

The ECO must:

- Be accountable to and report to the DEA and EMC;
- Be fully conversant with the EIA; i.e. Environmental Impact Report (EIR) and Specialist Reports;
- Be fully conversant with the conditions of the Environmental Authorisation;
- Be fully conversant with the latest version of the EMP and its associated environmental specifications;
- Be fully conversant with all relevant environmental legislation and Eskom environmental policies and procedures, and ensure compliance with these;
- Be responsible for inspecting and approving all rehabilitation works (except where such rehabilitation involves small scale rehabilitation, e.g. removal of small spills, gardening);
- Establish whether any Unexpected Environmental Issues (refer to **Section 2.6**) exist, which may relate to any significant environmental impacts; and bring such issues to the attention of the Project Manager (PM) and the Department of Environmental Affairs (DEA) along with any recommendations for additional assessment (e.g. specialist study) and/or mitigation of such impacts;
- Revise and update the EMP as and when necessary and submit such updates to the PM for review and approval procedures;
- Submit copies of revised EMP to all relevant stakeholders for their information and review;



- Convey the contents of this document to the site staff and discuss the contents in detail with the PM, SM, EM and Contractor;
- Advise the PM on necessary environmental authorisations and permits that would be required;
- Prepare EMP introduction and environmental awareness training course material/manual and present this course to the PM, SM, Contractor and possibly sub-contractors, including any employee member they deem necessary, prior to them starting any work on site;
- Monitor the Contractors' undertaking of environmental awareness training (induction and refresher) for contractor personnel;
- Review and comment on all Method Statements relevant to environmental management and make recommendations to the PM (or SM) on whether or not to accept the Method Statement and/or any amendments or revisions required;
- Make recommendations on any additional Method Statements or Method Statement Amendments that may be required as the construction process progresses;
- Develop a strategy and system (e.g. checklist) for site inspections and EMP compliance monitoring and audits;
- Undertake regular (frequency to be determined) site inspections and liaison with the SM and/or Contractor (meetings) to monitor, audit and verify that all works comply with environmental legislation and the EMP compliance; that environmental impacts are kept to a minimum; and ascertain the level of such compliance and impact minimisation;
- Make recommendations for corrective action on non-conformances / non-compliances to the project team;
- Keep record of EMP implementation, monitoring and audits;
- Prepare regular monitoring/audit reports which reflect the EMP compliance status, findings, issues and recommended actions for addressing non-compliances and submit these to the relevant members of the project team (most notably the PM), the relevant environmental authorities (including the DEA, provincial and local authorities) and the EMC;
- Review 'near miss' reports, incident reports and complaints register and recommend corrective actions;
- Report any serious environmental incidents or environmental impacts immediately to the PM, SM, EM, relevant environmental authorities and the EMC;
- Advise the SM on required work stoppages and on the removal of person(s) and/or equipment not complying with the specifications as and when necessary;
- Issue instructions directly to the Contractor (strictly only in an emergency) and inform the SM as soon as possible and in writing of the instructions given to the contractor.
- Keep records of all activities/incidents concerning the environment on site;



- Maintain a photographic record of the site before, during and after construction; and
- Make recommendations to the PM and SM on the issuing of fines for transgressions of site rules and penalties for contravention.

Depending on Eskom's requirements, the ECO may:

- Assist the PM to ensure that necessary environmental authorisations, permits and licenses have been obtained and updated if necessary.

4.4.2 Independent Environmental Auditor – Operational and Decommissioning Phases

Eskom shall appoint a suitably qualified and experienced independent environmental auditor ('the Auditor') to undertake regular (e.g. annual) EMP and EMS compliance audits in accordance with internationally accepted norms. The details of the roles and responsibilities will be determined and agreed with the relevant stakeholders prior to commencement of the operational and decommissioning phases.

4.5 Contractors, Subcontractors, Service Providers and Vendors

The Contractor(s) and his/her subcontractors are responsible for the implementation and compliance with recommendations and conditions of the EMP during the Construction Phase. During the Operational and Decommissioning Phases Eskom may also appoint contractors and other service providers or vendors that would need to consider Eskom's environmental management requirements.

All contractors (including subcontractors and staff), service providers and vendors are ultimately responsible for complying with Eskom's environmental management specifications (including this EMP) where applicable.

4.5.1 Contractor – Construction Phase

The Contractor shall:

- Be fully conversant with the latest version of the EMP and its associated environmental specifications;
- Appoint a dedicated person (Contractor Environmental Officer - EO) to work with the EM and ECO before commencement of any construction work on site;
- Appoint a team of Environmental Officers to assist the EO (as detailed in **Section 4.5.2**);
- Ensure that a copy of the Environmental Authorisation and latest version of the EMP are available on site at all times;
- Advise the SM, EM and ECO on any Unexpected Environmental Issue (refer to **Section 2.6**) that the Contractor may be aware of;
- Implement the EMP and any associated relevant environmental specifications (including any revisions, additions or amendments) effectively before a



construction activity commences; which includes the on-site implementation of steps to mitigate environmental impacts;

- Be responsible for his/her sub-contractors;
- Adhere to any environmental instructions issued by the Site Director/Project Manager on the advice of the ECO;
- Arrange and ensure the effective undertaking of environmental awareness training of all the Contractor and his Sub-contractors personnel coming on to site (Note that training must be appropriate for the level of the tasks and functions undertaken);
- Maintain a training register of all training modules, staff that had received training, dates that training had occurred; and ensure that staff sign a training register on completion of a training session;
- Ensure that compliance to the Environmental Authorisation and EMP is contractually binding with all sub-contractors, suppliers and service providers;
- Ensure that all employees and Sub-contractors employed comply with the requirements and provisions of the EMP;
- Prepare required Method Statements (refer to **Section 8.1**) for submission to the PM, SM, EM and ECO within the time period agreed with the PM (or SM);
- Implement all relevant approved Method Statements effectively before a construction activity commences;
- Ensure that all contract staff are provided with, trained on and make use of the relevant and latest version of the EMP specifications and Method Statements all the time;
- Ensure that emergency procedures are in place and effectively communicated to personnel;
- Monitor environmental performance and conformance with all the EMP specifications relative to the Contractor's and his Sub-contractor's construction activities continually (i.e. at least daily site inspections);
- Discuss implementation of and compliance with the EMP with staff at routine site meetings (preferably daily, but at least weekly) as a fixed agenda item;
- Attend regular (typically fortnightly to monthly) project site meetings with the SM / EM and ECO and report progress towards implementation of and non-conformances with this EMP at the meetings;
- Prepare and submit or table written monthly EMP progress and compliance reports to the SM/EM and ECO; and avail these reports to the Environmental Monitoring Committee (EMC), should they request to see them;
- Notify the SM and ECO of the anticipated programme of works and fully disclose all details of activities involved;
- Notify the SM as well as 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 action taken;
- Report all 'near miss' and actual environmental incidents (spills, impacts, legal transgressions, etc) and public complaints received immediately to the SM and ECO;



- Investigate all 'near misses and actual environmental incidents and public complaints received immediately and implement appropriate preventative and corrective action as soon as possible.
- Maintain a record of all 'near miss' and actual environmental incidents in the required report formats and all public complaints in a complaints register; including a report on the associated investigation undertaken and corrective actions taken to address the issue;
- Submit the 'near miss' and actual environmental incident reports/registers to the SM, EM and ECO within a week of the incident for review and signing of; and keep records available on site all the time for the ECO for inspection and review;
- Retain abovementioned records for at least 3 years after the completion of the contract;
- Inform the ECO of problems arising when implementing the EMP and recommend ways of improving it;
- Inform the SM as well as the ECO of any complaints received;
- Assist and cooperate with the ECO, EMC and any authority on any audits they undertake and avail relevant documentation for their review: and
- Notify the SM of any area that has been rehabilitated in order for the SM to arrange ECO inspection of the area and advise on approval or additional requirements.

4.5.2 Contractor Environmental Officer

The Contractor shall appoint a suitably qualified senior staff member with adequate environmental knowledge and experience as Contractor Environmental Officer (EO) to assist with the effective implementation of the EMP and to render environmental control of site actions, re-mediation and rehabilitation work. This Environmental Officer shall be supported by a team of suitably qualified Environmental Officers to a minimum one (1) Environmental Officer (including the EO) per 500 Contractor personnel on site at any particular time⁷. As such, the Contractor shall provide for and ensure that this ratio of Environmental Officers is maintained until the end of construction and until all rehabilitation measures, as required for implementation due to construction damage, are completed and the Contractor has handed the site over to Eskom. The EOs must be full time employees. Furthermore, the Contractor shall ensure that the EO (or, where applicable, team of Environmental Officers) focuses exclusively on matters related to environmental management, compliance and enhancement.

The EO shall:

- Be fully conversant with the latest version of the EMP and its associated environmental specifications, as well as all the environmental Method Statements;
- Assist with the implementation and addressing all the requirements of the EMP;

⁷ The number of personnel on the site will vary through the construction process, thus the number of EOs will vary accordingly.



- Keep register and a library of all the latest Method Statements up-to-date;
- Assist the Contractor with issuing staff with the latest version of the EMP Specifications and Method Statements and ensuring that these are accurately and fully implemented / used;
- Assist the Contractor in the drafting of environmental Method Statements, verifying whether these remain up-to-date / effective and making recommendations for amendments / improvements to Method Statements and EMP specifications;
- Assist with arrangement of environmental training of personnel and associated record keeping;
- Attend regular site meetings (scheduled and ad hoc);
- Conduct regular internal inspections and audits to monitor, verify and ensure that all relevant environmental specifications and procedures are adhered to effectively at all times;
- Be available to investigate all environmental problems arising on the work sites;
- Advise the Contractor on the rectification of any pollution, contamination or damage to the project site, rights of way and adjacent land in line with the EMP specifications, Method Statements and or instructions received from the SM.
- Assist the ECO and EM with identifying and/or assessing any actual or potential impacts of construction activities on the environment, including Unexpected Environmental Issue (refer to **Section 2.6**);
- Assist with the Contractors environmental record keeping; and
- Provide the EM and ECO with weekly and monthly reports detailing environmental management, performance and compliance in their respective areas of control in a format to be decided and/or agreed upon by the EM and ECO.

The Contractor may task the EO to:

- Assist with the development of Method Statements;
- Present environmental awareness training courses to contractor staff; and
- Assist with the contractor's environmental reporting and recording obligations.

4.5.3 Sub-contractors

Compliance to the relevant Environmental Authorisations and EMPs shall be contractually binding on all sub-contractors, suppliers and service providers. It is the Sub-contractor's responsibility to implement and comply with recommendations and conditions of the EMP at all times.

Subcontractors shall:

- Study all relevant EMP sections, specifications and approved Method Statements carefully and gain a full understanding of the implications thereof;



- Prepare and provide Method Statement(s) in accordance with the Contractor's (or SM's) instructions;
- Implement and comply with all relevant EMP sections, specifications and approved Method Statements;
- Notify the Contractor of the anticipated programme of works and fully disclose all details of activities involved;
- Avail him/her, as well as any employee he/she may identify, for induction training on the environmental requirements in accordance with the Contractor's (or SM's) instructions;
- Implement on-site steps to mitigate environmental impacts;
- Be responsible for the actions of employees in as far as they may impact on the environment;
- Report progress towards implementation of and non-conformances with the relevant sections of the latest EMP version and approved Method Statements to the Contractor;
- Inform the Contractor and ECO of problems arising when implementing the EMP and recommend ways of improving it;
- Notify the Contractor of all 'near misses', incidents, accidents and transgressions on site with respect to environmental management and non-compliance with the latest EMP version and approved Method Statements and seek advice from the Contractor for required corrective actions and/or site remediation;
- Record all incidents and the corrective actions/remedial action taken in incident report and submit these to the Contractor for signing off; and
- Record all complaints received and immediately inform the Contractor thereof.



5 INDUCTION AND AWARENESS OF SITE STAFF AND VISITORS

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 necessary that Eskom employees, service providers, Contractors and Sub-contractors and visitors are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMP.

Environmental training to all personnel must include at least the following:

- A basic understanding of the key environmental features of the site and the surrounding environment;
- The requirements of the EMP and associated environmental specifications as they apply to the Nuclear-1 project;
- 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;
- The requirements in terms of procedures and conduct when dealing with the public and/or using or impacting public or private places, services or infrastructure; and
- Awareness of any other environmental matters, which the Project Manager (PM), Power Station Manager (PSM), Site Manager (SM) and/or ECO deemed to be necessary.

The training must include a system of certification and/ or accreditation, 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 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.

Induction training is compulsory for all Eskom and Contractor staff members prior to commencing with any survey, inspection, construction, operation and/or decommissioning activity on site. Thereafter training must be repeated and enhanced regularly to ensure ongoing awareness of everyone working at the site for the duration of their work on-site. Special training arrangements may be required for project activities taking place at the site during the pre-construction phase.

Appropriate induction training on relevant topics must also be offered to all service providers and visitors to the site, including for example, delivery services, transporters, surveyors, caterers and inspectors, to name but a few.



6 COMMUNICATION AND LIAISON WITH STAKEHOLDERS AND THE PUBLIC

Eskom must ensure that the public and surrounding communities are informed and updated on the project and EMP compliance status throughout the project life cycle.

6.1 Information Dissemination

Information dissemination shall be aligned with and form part of the Eskom emergency planning procedures and system.

Sufficient signage must be erected around the site, informing the public of the construction, operational and/or commissioning activities taking place that could potentially affect or inconvenience them. The signboards should include the following information:

- The project activity and phase;
- The applicant, i.e. Eskom;
- The name of the organisation and/or person appointed as Environmental Control Officer (ECO) to monitor EMP compliance;
- The name of the lead Contractor (during construction); and
- The name and contact details of the site representative to be contacted in the event of emergencies or complaint registration.

Eskom will develop an Emergency Management Plan that will include mechanisms for communicating potential risk, health and safety information to affected communities. Effective signage must thus also be erected and information disseminated (leaflets drops, broadcasts, community meetings, etc.) where necessary, to inform the public of any hazards or safety risk associated with any project related activity or operation; e.g. road works, blasting, heavy loads, etc.

Eskom will develop and implement a campaign to keep Interested and Affected Parties (I&APs) effectively informed of the Nuclear-1 project and its progress.

6.2 Environmental Monitoring Committee

As mentioned in **Section 3.2.1** and **Section 4.2.2**, Eskom shall establish an Environmental Monitoring Committee (EMC) to ensure that relevant information can be reported to DEA as well as I&APs during the Construction Phase, and possibly subsequent phases of the project.

The objectives of an EMC include to:



- Facilitate proper communication and co-operation between Eskom, the surrounding community, and other interested and affected parties;
- Facilitate discussion on various issues pertaining to labour, safety, health environmental, social and other community related issues and concerns;
- Serve as an advisory forum to the Site Manager during the construction phases of the nuclear power station;
- Provide a platform where day-to-day community concerns around the project can be raised and addressed;
- 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
- Provide a platform where Eskom's performance on issues relating to environment can be discussed.

6.3 Community Liaison Officer

In addition and as mentioned in **Section 4.3.6** Eskom's Community Liaison Officer will deal with community needs and complaints and open liaison channels with nearby residents and I&APs, to facilitate communication and field concerns or complaints. I&APs will be informed of any construction and operation activities that could affect them.

6.4 Day-to-day Social Responsibility and Management

In terms of day-to-day social responsibility and management, the following principles will apply:

- All public members will be treated with respect and will not be affected or inconvenienced unnecessarily;
- Access to the site must be controlled at all times;
- No casual employment or informal trading will be allowed to take place at the entrance to the site and on-site. Vendor/contractor recruitment may only take place at designated centres in the surrounding towns. Eskom operational recruitment will take place on site in a planned fitness for duty building.
- No untrained employees will be allowed to work on-site;
- Eskom and the Contractor must, as far as possible and practical, 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 to staff, including but not limited to:
 - No overnight accommodation on site (with the exception of security guards);
 - 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.
- Eskom and the Contractor 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.







7 LIBRARY OF ENVIRONMENTAL SPECIFICATIONS TO ADDRESS SPECIFIC ASPECTS AND IMPACTS

This section covers the requirements for managing and controlling various specific aspects and environmental impacts of project related activities associated with the Nuclear-1 development, to ensure that impacts on the environment are appropriately mitigated. The specifications are based on the mitigation measures identified through the EIA process.

The specifications are worded in the form of instructions, which indicate that such a specification **'must' / 'shall'** be followed or adhered to. This is unless the wording clearly indicates a specification to be conditional or a recommended option.

For ease of reference, colour coded bars have been added on the left side of each specification to indicate the relevant primary responsible party or parties:

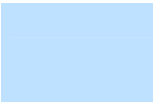
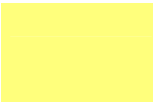


Applicant:	Eskom Project Manager, Site Manager, Resident Engineer and/or Power Station Manager, as the case may be.	
Contractor:	All contractors and/or subcontractors working on the site to implement the nuclear power station project, with the lead contractor(s) fully responsible for compliance.	
ECO or Auditor:	Environmental Control Officer or Independent Environmental Auditor (individual or company).	
Specialist:	A variety of specialists that may be consulted or appointed during the role-out of the project.	

Ultimately the applicant remains [accountable for effective and complete implementation of the EMP throughout the nuclear power station life cycle. However, the Applicant may award lead responsibilities to a contractor or specialist by way of contractual arrangements in combination with this EMP. For ease of reference, the following coding forms part of the specifications:

"#":	Indicates, where applicable, the party with the lead responsibility; with any other indicated parties either having an advisory, supporting and/or monitoring role, or in the case of the applicant a 'directory' and/or approval role.
More than one "#":	Indicates both the contractor and applicant as lead parties but for different phases of the project; namely the contractor 'must' / 'shall' take the lead responsibility for the specification during the construction phase while the applicant is responsible for the operational phase and/or the decommissioning phase.
No "#"	Indicates full responsibility for all indicated parties to consider, implement and/or adhere to the specification in all the work / tasks they do on the nuclear power station projects.
"&"	Indicates where ECO or specialist consultation is compulsory.



To provide for consistency and continuity in EMP compliance throughout the project life-cycle and to minimise duplication of specifications, colour coded bars in the right margin indicate for which phase or phases of the development a specification applies:

Planning & Design:	Spans the pre-construction phase; including master planning, contractor tendering and appointment, detail site surveys / investigations.	
Construction:	Spans the period from site demarcation for construction purposes up to the handover of the site to the applicant for main commissioning.	
Operation:	Spans the phase from the start of the main commissioning phase until operation of the facility finally ceases before full decommissioning.	
Decommissioning:	Spans decommissioning, dismantling, demolition and clearing of nuclear power station facilities, structures and infrastructure; as well as the final site remediation.	

For purposes of this EMP, the main commissioning of the plant is considered forming part of the Operational Phase. However, certain commissioning activities, e.g. commissioning of ancillary facilities, may for practical reasons form part of the Construction Phase. The exact handover phasing will be determined through contract negotiation.

Furthermore:

- []:** While specifications should generally be considered an 'ongoing' responsibility; where applicable and appropriate, specific time or frequency requirements are flagged or shown in block brackets.
- {Method Statement}:** Indicates specifications that require an appropriate Method Statement to be developed, submitted for approval to the applicant (and accepted by the ECO) and thereafter implemented for effective implementation of the specification.
- {SOP}:** Indicates specifications that require a Standard Operating Procedure (SOP) to be developed, endorsed by the Power Station Manager (PSM) and ECO, incorporated and implemented as part of the site's Operational and/or Decommissioning Environmental Management Plan (EMP).

For ease of reference, specifications have been organised and grouped in the following subsections:

- Protection of Biophysical Environments;
- Protection of Socio-economic Environments;
- Protection of Heritage;
- Overall Site Management; and
- Specific Construction Activities.



7.1 Protection of Biophysical Environments

Applicant (Eskom)	Contractor	ECO / Auditor	Specialist	Environmental Specifications	Planning & Design	Construction	Operation	Decommissioning
-------------------	------------	---------------	------------	------------------------------	-------------------	--------------	-----------	-----------------

7.1.1 Geology and Dunes

In accordance with the EIA conclusions and recommendations, development is prohibited in the Oyster Bay mobile dune system. The siting of the nuclear power station and HV yard should thus be such that the coastal corridor (a 200 m width from the high water mark) is retained. The offset from the southern side of the Oyster Bay Mobile Dune system must also be maintained as a 'No-go' area. Should any designs be changed that necessitates a change in footprint, the relevant specialists must to be consulted.

				1. Avoid impact on the sensitive coastal environment, including any dunes which are mobile or semi-mobile (this is apart from a minimised impact that may result from erecting and stringing the overhead transmission line pylons for connecting the HV yard to the Nuclear Power Plant (Refer to Specification 9 to 12 in this subsection for details).				
#			&	2. Buffer the sensitive coastal dune systems by a minimum of 100 m.				
				3. Refrain from disturbing mobile dunes and thus declare and retain mobile dunes as a "No-go" area, apart from designated access tracks and the construction of the pylons in the middle of the mobile dune field and temporary access roads for construction and operational maintenance.				
	#		&	4. Define, design and include on the <i>Site Master Plan</i> any necessary access tracks to the beach through the dunes in a way that minimises impact on dune and associated habitat (e.g. bird roosting sites), minimises the track footprint, prevents dune blow-out and allows for effective and complete dune rehabilitation. {Method Statement}				
	#			5. Demarcate, develop and maintain any access tracks/walkways through the dunes in accordance with the design specifications and the abovementioned <i>Site Master Plan</i> .				
	#			6. Stabilise any disturbed dune areas with drift fences, brushwood and with pioneer indigenous dune vegetation, should any dunes be disturbed.				
#	#			7. 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. [Regularly]				
#			&	8. Develop a rehabilitation plan that considers geological features and the				



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
			rehabilitation thereof.				
#			9. Prohibit permanent access roads/walkways from being constructed through the mobile dunes between the power station and the HV yard, with the exception of temporary access for the construction of pylons. Access during operation will be by 4x4 vehicles, but without permanent access roads.				
#		&	10. Allow for <u>not more than one</u> pylon per unit to be placed in the middle of the mobile dune system for the transmission of electricity between the power station and the HV yard. In addition, one pylon for the 132kV line may be placed in the middle of the mobile dune field.				
#	#		11. Provide and arrange for the construction of these pylons and the stringing of the conductors to be accomplished primarily by helicopters, with the assistance of 4x4 vehicles and quad bikes on designated tracks. {Method Statement}				
#	#	&	12. Access to the pylons for inspection, testing and maintenance purposes must be achieved by 4x4 vehicles along tracks. {Method Statement}				
		# &	13. Monitor mobile dunes in the vicinity of any construction activities, particularly within the Oyster Bay dune field. [Monthly]				
	#		14. Address any ad-hoc issues such as obstruction of moving dunes that are identified during the abovementioned mobile dune monitoring.				

7.1.2 Hydrology, Erosion and Sedimentation and Surface Water Quality

			1. Prohibit use of natural surface water sources (i.e. streams, rivers, wetlands) for potable and other water use, as only desalinated water may be used on site; with the exception of the period up to commissioning of the desalination plant during which borehole and/or trucked water from legal sources may be used.				
			2. Minimise impacts on natural watercourse areas, by taking all necessary precautions to ensure that construction activities do not alter natural ground and surface water quality or flows in areas identified as sensitive (in accordance with the Freshwater Specialist Report of the EIA).				
			3. Prevent and minimise as far as possible the impact of flood hazards.				
#	#		4. Engineer proper management solutions (e.g. slopes shaped at a natural angle of the repose, discharge rates, discharge quality, scouring minimisation) to the flow of surface runoff to minimise erosion of topsoil and contamination of streams and wetlands, most notably from hardened surfaces such as roads and buildings.				
#	#		5. Locate roads, cables, foundations, pipelines and other structures such that they avoid passing through/ intruding areas identified as important wetland areas as were identified in the wetland assessment (Appendix				



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
#	#						
#	#						
#							
#							
#							
#							
#	#						

E12 of the EIR).

6. Develop, implement and maintain a *Stormwater Management Plan* and associated stormwater management system (refer to **Section 7.4.11** for further details). **{Method Statement} / {SOP}**
7. Stabilise and manage cleared areas to prevent and control erosion by applying a suitable method of stabilisation. **{Method Statement} / {SOP}**
8. Remediate any erosion channels which develop on open ground by suitably backfilling, compacting and restoring to a proper condition (i.e. landscaped, vegetated etc.).
9. Define specific hydrological (stormwater) monitoring points on site in accordance with the requirements detailed in **Section 9.3**.
10. Monitor the stormwater quality at the abovementioned monitoring points in accordance with the requirements detailed in **Section 9.3**.
11. Report on the stormwater quality monitoring results to the ECO, Environmental Monitoring Committee, Department of Environmental Affairs and the Department of Water Affairs. **[At a frequency of every 3 to 6 months, or any other frequency prescribed by an authority]**
12. Address any issues identified during the abovementioned stormwater quality monitoring.

7.1.3 Groundwater and Geohydrology

#	#						
#	#						
#							
#							

1. Establish a 'lessons learned' task team to:
 - Address inadvertent, unmonitored liquid releases of radioactivity from existing commercial nuclear power stations, including that from the Koeberg Nuclear Power Station;
 - Review previous incidents, identify lessons learned from these events, and determine what, if any, changes are needed in the proper development and operation of the proposed site; and
 - Develop a *Groundwater Management Master Plan* for the site in accordance with all the relevant requirements of this EMP.

[Ongoing]
2. Inspect the aseismic vault regularly to ensure that groundwater does not permeate through its retaining wall.
3. Engineer solutions to the flow of groundwater where construction interacts with the flow of groundwater, to ensure that such flow is redirected in such a way that downstream impacts are minimised.
4. Avoid abstraction from aquifers with direct links to freshwater



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
#	#	&	<p>ecosystems, as much as reasonably feasible; by ensuring that the specific mechanisms determined by the groundwater monitoring report (contained in Visser <i>et. al.</i> 2011) are implemented and applied.</p> <p>5. Design / Develop, implement and maintain effective measures to provide for and limit the extent of drawdown of the water table to the area in the immediate vicinity of the nuclear power station construction / operational site, and to prevent drawdown (and subsequent saline intrusion) affecting the seasonal wetlands and/or groundwater quality; including the following:</p> <ul style="list-style-type: none"> • Provide for the dewatering of the construction area and subsequent excavated areas by constructing a suitable a cut-off wall that effectively limits the radius of draw down and minimises the impact on seasonal wetlands and/or groundwater quality; • Limit the intrusion of saline water into the groundwater as much as possible by taking appropriate mitigation measures, as identified in Visser <i>et. al.</i> (2011) or as recommended by a competent and experienced groundwater specialist. • Install boreholes for the implementation of a groundwater monitoring programme for ongoing monitoring of groundwater quality, that would allow for the assessment of surface / groundwater / seawater interactions and the affect thereof on seasonal wetlands and/or groundwater quality; • Consider the abovementioned requirements for optimal siting (positioning) of the nuclear power station within the corridor considered during the EIA with the aid of geohydrological modelling/ remodeling (by suitably qualified specialists) of the radius of the draw-down area. <p>{Method Statement} / {SOP}</p>				
#	#		6. Monitor dewatering efficiency to ensure excavated slope integrity. [At all times]				
	#		<p>7. Prevent soil and groundwater contamination (most notably that of the primary aquifer) by seawater resulting from sea water ingress during dewatering by implementing and maintaining appropriate measures and procedures, including but not necessary limited to the following:</p> <ul style="list-style-type: none"> • Record the water level in the monitoring boreholes weekly for at least one full hydrological cycle to establish the impact of the rainy and dry seasons on the water level; • Undertake routine groundwater monitoring to monitor the impact on the primary aquifer by saline water intrusion before and after dewatering; and to check whether the measure are effective, and if not come up and implement a plan for corrective intervention and/or 				



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
			procedures.				
			{Method Statement} / {SOP}.				
			8. Prevent soil and groundwater contamination by hazardous substances by implementing and maintaining appropriate measures and procedures, including but not necessarily limited to the following:				
			<ul style="list-style-type: none"> Minimise contamination by accidental spills of hazardous substances (e.g. fuels, oils, greases, paints, dissolvents, herbicides, pesticides), by applying 'good' materials management and spill clean-up procedures (refer to Section 7.4.9 and Section 7.5.7 for further details); Bund all bulk hazardous chemical tanks and hazardous stores with impermeable floors and bund walls to contain at least 110% of the volume of material stored; or apply SANS10089-1:2008 to multiple large tanks in bunds. Contain, process, treat and dispose of all construction and industrial wastewater generated at the sites from various activities and operations safely and effectively (refer to Section 7.4.12 for further details) and in line with the site Water Use License, once issued; and Design, implement and maintain all ablution facilities and the discharge process of raw sewage to prevent potential contamination (refer to Section 7.4.7 for further details). 				
#			&				
			9. Develop and implement a comprehensive groundwater monitoring programme in accordance with the requirements detailed in Section 9.4. [Commence 2 years prior to construction and continue until the end of the project life cycle]				
#			&				
			10. Report on the groundwater monitoring results to the ECO, Environmental Monitoring Committee, Department of Environmental Affairs and the Department of Water Affairs. [At a frequency of every 3 to 6 months, or any other frequency prescribed by a statutory authority]				
#	#						
			11. Address any issues, such as groundwater contamination, that are identified during the abovementioned groundwater monitoring.				
			12. Develop effective groundwater remediation procedures, and make the arrangements and take preparations required to put these in place, to allow for immediate implementation prior to any potential impact on groundwater quality (with only minor, insignificant levels of contamination allowed to be mitigated with natural attenuation). {Method Statement} / {SOP}				
#	#						
			13. Implement the groundwater remediation procedures, should the results				



Environmental Specifications				Applicant (Eskom)	Contractor	ECO / Auditor	Specialist	Planning & Design	Construction	Operation	Decommissioning
			of groundwater monitoring indicate that contamination has occurred. [Immediately]								
			14. Undertake a site assessment, once contamination has been detected (predominantly based on a deterioration of groundwater quality), as follows: <ul style="list-style-type: none"> Identify the source of contamination and the scale of the problem; Investigate the extent of contamination by auguring a series of shallow, temporary exploration holes and collecting samples for analysis. 								
#	#		15. Treat and/or dispose of all contaminated soil and groundwater according to environmentally acceptable procedures or in accordance with any applicable authorisation (e.g. a Waste Management License or Water Use License), with full cooperation from the relevant authorities and full documentation on the quantities and methods of treatment and/or disposal. {Method Statement} / {SOP}								
#	#		16. Apply appropriate waterproofing system 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.								
#		&	17. Undertake credible geohydrological investigation (e.g. site investigations, numerical simulation, testing and analysis) of groundwater for abstraction as freshwater supply prior to such abstraction occurring; and follow specification for such abstraction in accordance with Section 7.4.8 .								

7.1.4 Loss of Habitat Compensation

	#	&	1. Develop a <i>Loss of Habitat Compensation Plan</i> in accordance with the recommendations of Fauna Specialist Study of the EIA and that meets the requirements of the relevant environmental authorities; and ensures that this plan addresses the areas that have been proposed to be added to the conserved Eskom property following the Construction Phase to secure the conservation of wetland habitats.								
			2. Plan for and provide budget and resources for the implementation of the <i>Loss of Habitat Compensation Plan</i> .								
#			3. Include relevant requirements from the <i>Loss of Habitat Compensation Plan</i> in contractor tendering and agreement processes / operating EMS / decommissioning and closure plan.								
#			4. Implement the <i>Loss of Habitat Compensation Plan</i> .								
#			5. Proclaim, develop, manage and maintain owner-controlled areas outside the nuclear power station footprint as a natural conservation area (nature reserve) after conclusion of the Construction Phase.								



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
#			6. Provide access for scientific research to conservation areas (nature reserve) within the owner-controlled area.				
#			7. Investigate the possibility of expanding the reserve area by purchasing adjoining properties and incorporating these into the protected area.				
#			8. Develop, implement, maintain and expand alien eradication and rehabilitation programmes.				

7.1.5 Wet areas and Wetlands

An environmental programme for the site development should include detailed specifications around methods to protect wetlands (whether permanent or seasonal) from impacts associated with the siting of the power station, stockpiles for road materials, topsoil and fill, vehicle access routes, use of hazardous material, etc.

Key to these measures is the formal declaration and demarcation of setbacks and buffer zones and inclusion of such zones into site layout master planning and “No-go” areas outside of the minimum disturbance area required for construction and operation. Since wetlands are integrated and complex systems, positioning and the setting of “no go” development areas on and off site is considered essential mitigation, and requires consideration of both surface and groundwater interactions between wetlands and development-related activities on the site. It is thus essential that Eskom consults with suitably qualified wetland, ecological, hydrological and geohydrological specialist during the site layout planning process.

#			&				
			1. Provide for the wetlands to the north of the Oyster Bay mobile dune field to be formally delineated in accordance with the Department of Water Affairs requirements; and for the required setbacks defined.				
			2. Include a 1:10 000 scale map on the <i>Site Master Layout and Utilisation Plan</i> and <i>Detailed Construction Site Utilisation Plan</i> (refer to Section 7.4.3) which clearly shows the proximity of site footprint and construction activities in relation to springs, wetlands and streams and associated buffer zones.				
			3. Avoid impact on the sensitive coastal environment, including the coastal wetlands as well as Langefontein; and declare these areas and their associated buffer zones as “No-go” areas in accordance with the recommendations from the EIA’s Wetland Specialist Report (Appendix E12 of the EIR).				
			4. Buffer the sensitive wetlands and streams by a minimum of 100 m, the western edge of the Langefontein wetland by 200m and provide a buffer of at least 150m from the upstream edge of each coastal seep; and				



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
			provide for such to be incorporated and considered in site layout, utilisation and stormwater management planning (refer to Section 7.4.3 for further details).				
			5. Take all necessary precautions to ensure that activities do not alter natural ground and surface water flows in areas identified as sensitive in the freshwater specialist report (refer to Appendix E12 of the EIR).				
			6. Locate roads, pipelines, cable routes or other structures as far as reasonably possible away from wetlands and at least such that they avoid passing through or intruding on wetland areas or affecting their water supply; unless the areas have been specifically included, covered and assessed in the EIA for such impact.				
	#		7. Develop, implement and maintain special protective measures during construction of roads and associated bridges or culverts in close proximity of wetlands / streams to prevent / minimise the impact on these resources. {Method Statement}				
			8. Clean up any spills close to a wetland and streams immediately (refer to Section 7.5.7)				
			9. Prohibit vehicular traffic in or close to any wetland and it's associated buffer zone.				
			10. Prohibit use of wetlands as sources of water.				
			11. Prohibit any excess groundwater from being pumped into the wetlands.				
	#		12. Design / Develop, implement and maintain effective measures to limit the extent of drawdown of the water table in the immediate vicinity of the excavation, and to prevent saline intrusion from affecting the seasonal wetlands (in accordance with Section 7.1.3).				
			13. The proposed drawdown mitigation design should meet the following design criteria as a minimum to mitigate loss or degradation of duneslack depressions and/or hillslope seep wetlands (e.g. Langefonteinvlei) :				
			<ul style="list-style-type: none"> The extent of drawdown should not extend beneath the Langefonteinvlei (that is, there should be no change in groundwater levels at any point of the Langefonteinvlei, as a result of groundwater draw-down. This measure is conservative, as data indicate that only the northern and eastern portions of the Langefonteinvlei are directly linked to the groundwater table (Visser et al. 2011); There should be no change in natural fluctuations of the water table in the transverse dune system (this impact is considered unlikely); The cutoff wall should extend around all sides of the drawdown 				



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
			<p>area, to limit the extent of impacts to coastal seep wetlands;</p> <ul style="list-style-type: none"> • If necessary, more than one cutoff wall (or other similarly functioning system) should be utilised, to control the extent of dewatering required across the nuclear power station site as a whole (e.g. dewatering of construction areas where groundwater may be exposed by site levelling, even though construction to bedrock as in the case of the Nuclear Island is not required; • The short-term drawdown effects and dune instability that would occur during installation of the proposed cutoff wall/ membrane / other appropriate device would need to be such that they too did not result in any drawdown of the Langefonteinvelei and its associated wetlands or the duneslack wetlands in the mobile dune; and • the specifications outlined in Section 5.4.2B of Day (2011) for mitigation against dewatering-related loss of coastal seep wetlands should be met in the design. • The detailed design of the proposed drawdown mitigation measure should be fine-tuned on the basis of the results of longer term surface and groundwater monitoring, being carried out at the Thyspunt site. 				
			<p>14. The following design criteria should be adhered to as a minimum to mitigate loss or degradation of coastal seep wetlands as a result of interference with surface or groundwater flows during construction:</p> <ul style="list-style-type: none"> • The proposed membrane / alternative structure would also need to facilitate the controlled passage of water to downstream coastal seeps, by allowing drainage of water through the cobble layer – Eskom (2009) proposes the use of a semi-permeable slurry wall, potentially used in combination with a series of wells which will improve drainage through the sand down to the cobble layer, and thus contribute to improved control of the downstream (southerly) water table. • Given the risk of seawater intrusion during dewatering, and the fact that the impacts of seawater intrusion on wetland soils may be long-lasting, measures should be in place during construction to ensure that groundwater in the cobble layer is not interrupted even on a short-term basis. Thus a system should be in place throughout the construction and operational phases of the development to facilitate the spread of dewatered or diverted flows from the terrace area, back into the lower levels (i.e. the cobble layer) of the aquifer. • The approach taken should ensure that the downstream passage of groundwater along the cobble layer of the Algoa aquifer is not 				



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
			<p>interrupted south of the terrace, by the NPS excavation to bedrock or by the shallower NPS terrace excavation. This means that provision should be made for the re-introduction and spread of diverted or dewatered groundwater flows into the cobble bed layer downstream of the excavation, such that the coastal seeps are neither starved of fresh water, nor exposed to concentrated flows that result in erosion of shallow surface soils at areas where discharge occurs.</p> <ul style="list-style-type: none">• In this regard, drilling of recharge wells downstream of the dewatered area has been suggested (SRK 2009). Eskom (2009) propose a system that makes use of a semi-permeable slurry wall, constructed between the NPS terrace and the Langefonteinvelei with its associated southern hillslope seep, to control the extent of surface dewatering beyond the terrace, and to allow rapid passage of surface water to the cobble layer of the aquifer within the NPS terrace, through the use of a series of recharge wells. The proposed system includes a permanent impermeable barrier around the deeper NPS excavation, which would be drawn down to bedrock during excavation, but would be maintained at about 2mamsl after construction, to facilitate drainage of groundwater into the intake basin and avoid upwelling of salt water into groundwater outside of the terrace area (Eskom 2009). Previous versions of this EIA (e.g. Day 2008) have suggested the use of a rock-filled recharge basin in the form of a longitudinal channel that runs the east-west length of the site, thus facilitating the spread of flows into the downstream seeps.• Whatever approach is taken should demonstrate in its detailed design how the multiple requirements of achieving groundwater recharge, lateral spread of groundwater flows and management of saltwater intrusion both now and as sea levels rise, can be achieved (see below). Detailed design should include input by a team comprising the project design engineers, specialist geohydrologists and wetland ecologists. <p>15. The proposed drawdown mitigation design should meet the following design criteria as a minimum to mitigate <i>degradation of coastal seep wetlands as a result of receipt of concentrated volumes of potentially sediment-rich water from dewatered areas:</i></p> <ul style="list-style-type: none">• Implementation of the recommended development setbacks should take place to distance wetlands from the sources of impact;• Sediment settlement ponds should be provided for water pumped from the excavation site during construction;• The location of such ponds should be decided on in collaboration				



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
			<p>with the botanical and wetland specialists;</p> <ul style="list-style-type: none"> • The “Cleaned” water from sediment settlement areas should be passed back into the aquifer recharge system. Important components of the recharge system include the need for adequate redistribution of flows downstream of any groundwater diversion structures; • Adequate space should be left between the coastal seeps and the edge of the power station terrace to allow for re-distribution of groundwater in the lower section of the aquifer. The coastal setback of 200 m should be strictly adhered to. • Provision should be made for adequate maintenance of the functions of sediment settlement ponds 				
			16. Implement and adhere to all conditions of the Water Use Licence (WUL) (refer to Section 7.4.8 and Section 7.4.12), and the relevant water use, stormwater, wastewater specifications and plans referred to in this EMP.				
#			&				
#			17. Develop and implement a comprehensive wetland monitoring programme which includes evaluation of the efficacy of mitigation measures in accordance with the requirements detailed in Section 9.7 .				
#	#		18. Report on the wetland monitoring results to the ECO, Environmental Monitoring Committee and Department of Environmental Affairs. [At a frequency as detailed in Section 9.7]				
#	#		19. Address wetland impact issues that are identified during the abovementioned wetland monitoring.				

7.1.6 Flora

The EIA identified a number of ‘Red Data’ (extremely rare) species likely to be affected if development is carried out on the transverse dunes. These are *Helichrysum cochleariforme* duineteebossie (NT), *Psoralea repens* duineertjie (NT), the succulent vygie *Ruschia indecora* (EN), and *Passerina ericoides kusgonnabas* (VU) (Red Data status in brackets – see Glossary for explanation of categories).

			&				
			&				
			1. Make every effort to minimise the impact where rare flora/ habitat stands to be lost.				
			2. Identify and manage all declared aliens in accordance with the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) and eradicate alien invasive vegetation systematically and fully. [Ongoing], {Method Statement} / {SOP}				
			3. Minimise areas to be cleared as much as reasonable, whether off-site or on-site; and rehabilitate affected areas, where possible and appropriate,				



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
			as soon as reasonably possible after it had been impacted; for 'normal' indigenous (local) ecological function to be retained / restored.				
			4. Keep retained or re-established indigenous (local) vegetation low by regular mowing to provide habitat for small and fossorial animals and invertebrates, rather than clearing vegetation altogether, in such limited areas where this is necessary; e.g. within areas where high vegetation cannot be tolerated for security and safety reasons.				
#			5. Appoint an appropriately qualified specialist (e.g. botanist) well in advance of construction to undertake the planning and management for collection of scientific material and floral specimen search and rescue (and where appropriate establishment of and/or safekeeping of specimens in a nursery for rehabilitation purposes).				
		#	6. Facilitate collection of scientific material and information before and during site clearance for deposit in museums, herbaria, etc. by collecting specimens for the benefit of deriving biological material that will otherwise be totally lost during site clearance.				
		#	7. Undertake, for each phase of site clearing and construction within natural veld, a search and rescue operation to identify and safely rescue and relocate all plants which are either extremely rare (i.e. Endangered or Critically Endangered) or which could be used in site rehabilitation or released under controlled conditions for resource utilisation.				
			8. Prohibit collection of fire wood by staff; unless it is wood from controlled alien vegetation and site clearance made available by Eskom at a specific outlet point for collection by staff and the public.				
		#	9. Provide for effective rehabilitation of all areas disturbed during the development of the proposed facility, outside the nuclear power station site footprint and natural areas inside the site boundaries, and provide for such rehabilitation to make use of locally occurring indigenous species (refer to Section 7.4.5.)				
#	#		10. Provide for and implement the appropriate and effective removal, stockpiling and safekeeping of top soil in accordance with Section 7.5.2.				
#	#		11. Apply effective dust control measures to prevent excessive or harmful dust accumulation on habitats (refer to Section 7.4.14.)				
		#	12. Monitor rehabilitated areas to ensure that rehabilitation with indigenous species is carried out effectively and has long-term sustainability.				
		#	13. Monitor the area around the site to ensure a coastal corridor is created in an appropriate manner and is retained and maintained in the long-term.				
		#	14. Monitor site clearing to ensure that where possible all Red Data species affected by development are relocated or successfully grown on in a				



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
			nursery and returned to the wild.				
			15. Address all flora related issues identified during the abovementioned rehabilitation and flora monitoring.				

7.1.7 Fauna

The most important aspect of protection of fauna is, for obvious reasons, the protection and rehabilitation of the habitat in which they reside and breed. Specifications that cover protection and rehabilitation of habitats and vegetation which have been incorporated in the preceding sub-sections thus also forms part of faunal protection. Fauna protection measures also include measures associated with good management and housekeeping of stormwater, various hazardous substances, etc. To avoid duplication these specifications are not repeated in this sub-section.

Because virtually the entire 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). Note that such areas are usually also important roost sites and are therefore also sensitive in the non-breeding season.

			1. Prohibit / control access to portions of the property that is to remain undeveloped; and ensure that it is used for research or non-destructive recreational and/or educational purposes only.				
			2. Prohibit the exploitation of wildlife resources <u>strictly</u> , e.g. prohibit snaring, trapping, hunting and fishing; and inspect the site and surrounding area regular for any evidence of such activities.				
			3. Prohibit feeding of wild animals; unless it forms part of a conservation programme and is undertaken under the control of a zoologist.				
		#	4. Commission and implement the following faunal related monitoring programmes and / surveys on the nuclear power station site to inform effective environmental management:				
			<ul style="list-style-type: none"> Invertebrate monitoring programme (see details below); Seabird breeding population survey; Survey of formerly inadequately surveyed animal groups, viz, reptiles and small mammals; and Sensitive species. 				
#			5. Develop and implement a comprehensive vertebrate monitoring programme which includes monitoring sensitive faunal populations in				



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
			accordance with the requirements detailed in Section 9.8 .				
#			6. Report on the vertebrate monitoring results to the ECO, Environmental Monitoring Committee and Department of Environmental Affairs. [At a frequency as detailed in Section 9.8]				
#	#		7. Address vertebrate impact issues that are identified during the abovementioned vertebrate monitoring.				
#		&	8. Develop and implement a comprehensive invertebrate monitoring programme which includes monitoring sensitive faunal populations in accordance with the requirements detailed in Section 9.9 .				
#			9. Report on the invertebrate monitoring results to the ECO, Environmental Monitoring Committee and Department of Environmental Affairs. [At a frequency as detailed in Section 9.9]				
#	#		10. Address invertebrate impact issues that are identified during the abovementioned invertebrate monitoring.				
#		&	11. Where rare fauna (vertebrate and invertebrate) stands to be lost, every effort should be made to minimise the impact, bearing in mind that rescue and relocation of invertebrate species is generally not recommended as an option due to uncertainties and low success rate.				
#		&	12. Consider the requirement to allow movement of organisms along natural corridors and their access to resources (e.g. wetlands) by incorporating such in the design layout and features (e.g. road, culvert bridge, pipeline and fence design); including but not limited as follows: <ul style="list-style-type: none"> Define these protected habitat corridors on the <i>Site Master Layout and Utilisation Plan</i>; Minimise the number of access roads and tracks, and limit use of roads to as few as practically possible; Minimise fragmentation of land by roads, tracks and other linear infrastructure; e.g. by avoiding / minimising cutting across large areas of natural habitat, locating roads within or along the edges of areas that are already disturbed or are to be developed, and using or upgrading existing roads rather than to create new ones. Cross large, incised watercourses by means of raised bridges; Construct overpasses at 500 m intervals, where a road runs between high points for more than 500 m (e.g. in the slack between dune ridges); Provide multiple culverts for long raised road sections; Use appropriate curb and roadside gutter designs with low, sloping profiles without any vertical surfaces, to facilitate the movements of 				



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
			<p>small animals (e.g. frogs, lizards, mice).</p> <ul style="list-style-type: none"> Place pipelines and cables underground to prevent surface barriers, wherever possible, and fill in trenches and rehabilitate the affected area as soon as reasonably possible; Make use of types of security and boundary fencing that allows for high permeability of boundaries for small animals (vertebrate and invertebrate); e.g. palisade fencing generally has a lower negative impact than mesh fencing (refer to the Fauna Specialist Study of the EIA for further information / details on fencing). 				
			13. Maintain the habitat corridors effectively in accordance with the <i>Site Master Layout and Utilisation Plan</i> , e.g. by refraining from ‘blocking’ such corridors, incorporation in buffer zones and other “No-go” areas, demarcation, awareness raising through induction training (see Section 7.4.1), signage, etc.				
			14. Restrict development to recommended areas, i.e. areas with low or medium faunal sensitivity (refer to Fauna specialist study of the EIA).				
#			15. Appoint an appropriately qualified specialist (e.g. zoologist) well in advance of construction to undertake the planning and management for collection of scientific material and faunal specimen search and rescue.				
			16. Facilitate collection of scientific material and information before and during site clearance for deposit in museums, zoos, etc. by collecting specimens for the benefit of deriving biological material that will otherwise be totally lost during site clearance.				
			17. Facilitate search-and-rescue operations before and during site clearance, by rescuing at least but not limited to individuals of threatened species and re-locating these in neighbouring protected areas.				
			18. Clear the site in a logical sequence and manner that allows mobile species to escape.				
			19. Determine location and extent of sensitive bird areas and quarantine these areas, including areas that hold sensitive breeding colonies of threatened birds (see Fauna specialist study of the EIA); by incorporating and strictly maintaining these as “No-go” areas (out-of-bounds to all personnel, at all times) and by cordoning the sensitive areas off prior to commencement of construction activities.				
#			20. Define, create and maintain a “No-go” buffer zone of at least 200 m width surrounding all sensitive bird breeding sites.				
#			21. Fit standard devices that effectively improve the visibility of the overhead transmission lines (e.g. “flappers”, reflectors or “balls”) on all new transmission routes and cables to deter birds from flying into them and				



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
			consider effectiveness in all regular weather conditions (e.g. rain, fog or mist).				
			22. Monitor overhead transmission routes and installations to reveal and identify areas where bird mortality associated with these installations is occurring; and implement / apply additional mitigation measures in such areas.				
#			23. Develop a blasting plan that minimises the impact on sensitive populations of breeding seabirds and other non-resident sensitive birds (refer to Section 7.5.4). {Method Statement}				
#			24. Restrict all air traffic associated with the construction and operation of the nuclear power station, including fixed-wing aircraft and helicopters, to an air space at least one kilometre away from sensitive bird-breeding areas. This is with the exception of using helicopters for power line pylon dressing and using helicopters for the placement of pylons in the mobile dunes.				
		&	25. Protect wildlife from artificial light at night by implementing and applying the following measures (refer to Section 7.2.14 for further lighting requirements): <ul style="list-style-type: none"> • Reduce exterior lighting to the minimum necessary for essential functions; • Use only long-wavelength lights (red or orange) for exterior lighting; • Use directional fittings for exterior lights that direct light downward, not up or to the sides; and • Screen interior lighting with blinds, curtains, etc, to prevent exterior light pollution. 				
			26. Prohibit pets on site, since these interact negatively with wildlife and must not be allowed into 'protected' natural areas.				
			27. Avoid attracting pests and unwanted animals as follows: <ul style="list-style-type: none"> • Keep attractive resources such as food, water and edible refuse completely out of reach of wild animals (e.g. baboons) by implementing effective and where necessary inventive and extreme measures to achieve this; and • Exercise rigorous control of edible refuse, by providing for such refuse to be completely removed from site at frequent and regular intervals. 				
#		&	28. Eliminate feral cats and dogs from the site humanely but completely, through appointing suitably qualified eradication specialists (e.g. SPCA) to either catch for placement in the care of the SPCA or extermination; since such animals are a serious threat to wildlife.				



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
			&				
			<p>29. Develop and institute an eradication/ control programme for early detection and intervention of invasive invertebrate species, so that their spread to surrounding natural ecosystems can be prevented; and in doing so refer to Appendix 7 of the Invertebrates Specialist Study of the EIA (Appendix E14 of the EIR) for further details, including but not necessarily limited to:</p> <ul style="list-style-type: none"> • Develop the monitoring programmes and control measures with reference to inter alia information provided by the IUCN SSC Invasive Species Specialist Group (http://www.issg.org/) • Institute strict control over materials brought onto site, which could potentially contain invasive species (pests); and implement effective measures to eradicate these before transport to the site, e.g.: <ul style="list-style-type: none"> – Undertake 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; or – Fumigate or spray of all relevant materials routine with appropriate low-residue insecticides prior to transport to or in a quarantine area on site (with this option generally requiring less highly trained personnel than the former, but possibly resulting in much higher usage of pesticides.) • Develop and institute a monitoring programme to detect alien invasive species as early as possible; and • 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; 				
#	#		30. Compile a problem animal capture and release procedure that include contact details of people who can remove problem animals on the construction site, in order to protect the safety of the animals and people.				
	#		31. Ensure that all openings in structures are closed off during the construction phase to prevent birds (especially owls) from nesting in the structures.				

7.1.8 Oceanographic and Marine Systems

Key mitigation measures for minimising the potential impacts of a thermal plume are already in place i.e. an outfall design for heated seawater to ensure that maximum mixing and heat dissipation takes place. The recommendations in terms of the depth and distance from shore where warmed seawater must be released are contained in the marine specialist report (Appendix E15 of the EIR) that formed part of the EIA process.



Applicant (Eskom)
Contractor
ECO / Auditor
Specialist

Environmental Specifications

Planning & Design
Construction
Operation
Decommissioning

32. The design of the warmed water release system must comply to the following criteria, as it was an assumption of the marine impact assessment that the following mitigation measures would be integrated in the design:

- There must be multiple points of release to aid dissipation of excess heat;
- Warmed cooling water must be released above the sea bottom to minimise thermal pollution of the benthic environment; and
- There should be a very high flow rate at the point of release to maximise mixing with cool surrounding water.

The marine-biology assessment also found spoil disposal at sea to be a viable and the preferred option as it will greatly reduce the footprint of the development in terrestrial habitats.

&

&
&

#

1. Ensure that results of any new engineering solutions for offshore outfall of heated seawater are either optimised or equivalent to the current design proposal; should the engineering solution be amended.
2. Provide appropriate measures and/or interventions to prevent sea water flooding of the site.
3. Dispose of spoil at sea (based on the marine-biology assessment of the EIA process, which found this to be the preferred option); bearing in mind that it is important to comply with the pumping rates and areas of disposal (i.e. distance from shore) as recommended in the marine assessment (Appendix E15 of the EIR) to minimise impact on sea floor habitat.
4. Use exclusion screens and diversion of trapped debris for clearing of debris from intake water.
5. Make use of low-level chlorination regimes to effectively control fouling of pipes.
6. Introduce and maintain dedicated active policing of the marine exclusion zone as a deterrent to poachers.
7. Develop and implement a comprehensive marine systems monitoring programme in accordance with the requirements detailed in **Section 9.10**.
8. Report on the marine system monitoring results to the ECO, Environmental Monitoring Committee and Department of Environmental Affairs. **[At a frequency as detailed in Section 9.10]**
9. Address marine system impact issues that are identified during the

Planning & Design
Construction
Operation
Decommissioning



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
#			&				
			abovementioned marine system monitoring.				
#			10. Develop and implement an appropriate oceanographic monitoring programme in accordance with the requirements detailed in Section 9.11 .				
#			11. Report on the oceanographic monitoring results to the ECO, Environmental Monitoring Committee and Department of Environmental Affairs. [At a frequency to be determined]				

7.2 Protection of Socio-Economic Environments

Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				

7.2.1 Public Health and Safety

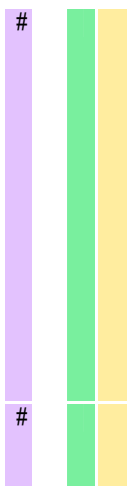
			1. Take appropriate and effective precautions and all reasonable measures to ensure the safety of people in the surrounding area.				
			2. Use all public roads responsibly (refer to Section 7.2.4 for further details).				
#			3. Ensure that all the relevant specifications in this EMP are incorporated in the Project Labour Agreement (PLA).				
#			4. Implement a continuous education programme in all schools that may potentially be impacted, well before the commencement of construction, to sensitise school-going children about traffic safety and about the expected increase in construction traffic in the area.				
#	#		5. Work with the Department of Education and school governing bodies to ensure that scholar patrols are implemented at all places where school-going children cross the road to and from school.				
#	#		6. Minimise air pollution by implementing the <i>Air Quality and Dust Control Programme</i> (refer to Section 7.4.14); to minimise impact on public health.				



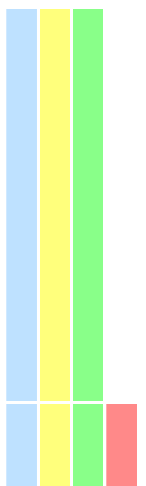
7.2.2 Perceived Risk Associated with Nuclear Incidents

The lack of information and the overwhelming 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 amongst the identified complex community.

As a first step to mitigate this situation a community-oriented and comprehensive public information campaign should be undertaken. This should be followed by regular updates. A community-focused exercise in the provision of such public information 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.



1. Undertake a community-oriented and comprehensive public information campaign that addresses the popular misconceptions regarding the Nuclear-1 programme, including but not limited to specifically the impacts (or lack thereof) of:
 - Nuclear power generation on marine life;
 - Nuclear power generation on the immediate environment;
 - The risks of radionuclide pollution, as well as naturally occurring radiation in the environment; and
 - The nuclear power station on the sense of place.
2. Disseminate information related to the nuclear power station regularly. **[Ongoing]**

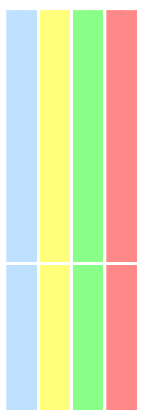


7.2.3 Public and Social Services and Service Infrastructure Use and Impact

A project of this magnitude will place a high demand on local and in some cases even regional and provincial public and social services, and would thus also impact on such services. Appropriate planning well in advance of such demands or impact is essential.



1. Negotiate with local authorities, well before construction, to determine what the needs are for upgrading of essential infrastructure such as sewage treatment plants and waste disposal sites that the Project will utilise and/or impact on; including *inter alia* to what extent Eskom will, in co-operation with the local authority, provide resources to assist with the upgrading of these facilities to ensure that they are capable of providing in the needs of the peak number of construction personnel.
2. Liaise closely with the relevant municipal, provincial and other authorities on all matters related to potential use of or impact on public services or service infrastructure, e.g. roads, pipelines, telecommunication, waste facilities, health services, emergency





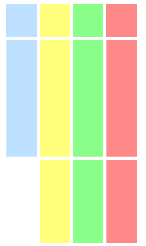
#			&
#	#		
#			
#			
#			
#			
#			
#			
#			
#			

- services, law enforcement services, etc.; including development and mitigation plans.
3. Develop and implement a proper and detailed *Social Services Plan* for the project well in advance before any development process commences, and maintain such a plan for the duration of the project amending it as necessary.
 4. Keep the disruption of essential services as short as possible to minimise public inconvenience for both planned and unforeseen events.
 5. Provide for and ensure adequate capacity of medical facilities are available:
 - Base planning for provision of medical facilities on the sustainable human settlement strategy; which implies that that 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; and
 - Make the relevant Department of Health aware of the requirements.
 6. Ensure that adequate capacity for law enforcement is made available by notifying the involved authorities, local municipality as well as the SAPS about additional needs for law enforcement services as based on the sustainable human settlement strategy.
 7. Eskom must enter into negotiations with education authorities in order to allow these authorities to plan to ensure local schools have sufficient capacity. The following actions need to take place in this respect:
 - Make provision of schools for the children of all staff involved, as proposed for the staff village (and possible other areas), as vital to ensure a sustainable human settlement;
 - Provide for schools to accommodate children (number to be confirmed) into the area of the nuclear power station, signifying that either existing schools should be enlarged, or a new schools should be built in the area where staff will be residing; and
 - Make the relevant Department of Education 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.
 8. Provide for and ensure adequate capacity of sports facilities, as follows:
 - Make provision of sport facilities for all staff involved as proposed for the Construction Village and Staff Village, as vital to ensure a sustainable human settlement.
 - Develop or contribute to recreational facilities and sport facilities, in order to cater for the increase in population in specific areas.
 9. Ensure that all affected communities are kept well informed of the process and of all significant dates attached to the development process. **[Ongoing]**
 10. Protect all public service infrastructures (e.g. pipelines) by clearly marking these or incorporating the relevant servitudes into “No-go”



areas.

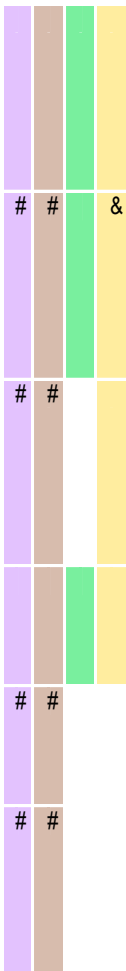
11. Ensure that all essential services are in place prior to the development and all other facilities to be used are appropriately upgraded and equipped.
12. Ensure that the implementation process is carefully monitored and that any disruptions are immediately identified and appropriately managed.



7.2.4 Traffic and Use of or Impact on Public Roads

Based on the Traffic Impact Assessment that was conducted as part of the EIA, significant traffic impacts will result from construction transport. In addition to strict compliance to the relevant road rules and regulations, upgrades with regard to public transport and access are required during the construction phases.

The R330 will be used for heavy load transport and may require pavement structural upgrades to cope with the increased heavy loads. The Humansdorp - Oyster Bay Road is proposed to be upgraded to a surfaced road to be used during the construction and operational phase for surrounding staff access, construction traffic and as a required emergency evacuation route for areas such as Oyster Bay.



1. Keep all traffic rules and road safety regulations on public roads, including e.g. speed limits, vehicle registration, transport emergency card listing the hazards and emergency information for a material being transported (tremcards); and follow all orders from traffic police and the Department of Transport.
2. Develop, implement and maintain a comprehensive *Construction Traffic Management Plan*, in conjunction with the authorities and based on the information from Traffic Impact Assessment; and ensure that this plan includes *inter alia* embargo times for large vehicles to ensure that the impact on local peak time traffic is minimised.
3. Ensure that construction workers are transported to and from the site in a way that reasonably minimises traffic impact; i.e. implement recommendations from the Traffic Impact Assessment, for example that the construction workers should be transported to and from the site by contracted buses. **{Method Statement}**
4. Exercise controls on heavy-vehicle traffic in order to mitigate negative impacts such as noise, night-time visual effects (vehicle lights), road damage and congestion; including at least a scaling up of traffic policing.
5. Maintain all construction / operational vehicles using public roads in a roadworthy condition and refrain from using non-roadworthy vehicles on public roads.
6. Arrange for exceptionally heavy loads to be transported according to the appropriate time as recommended by the transport report (or according to their conditions of a Transport Permit), as follows:
 - During the evening (21h00 to 05h00); or





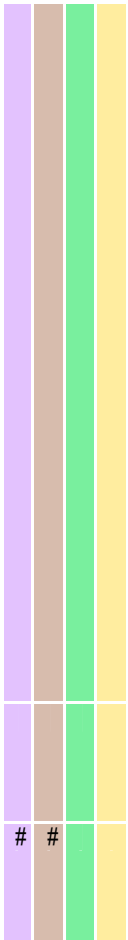
- In daylight hours during non-peak periods.
- Detailed traffic detours and logistics should be investigated in a comprehensive *Construction Traffic Management Plan*, which should include a specific plan for transporting at night.

[As necessary], {Method Statement}

7. Notify affected road users two weeks in advance of any road closures or transport of abnormal/ heavy loads.
8. Notify adjacent landowners within 500m of roads to be used by exceptionally heavy vehicles of the approximate times when these vehicles will be using the roads.
9. Keep the disruption of public roads as short as possible to minimise public inconvenience for both planned and unforeseen events.
10. Secure all loads for transport effectively and cover vehicles transporting materials such as sand, rock, scrap metal and pipes effectively, to prevent their contents falling or blowing off, causing traffic hazards.
11. Implement the following mitigation actions to provide for the daily construction phase transport and traffic of the Nuclear-1 Project (in accordance with the Traffic Impact Assessment):
 - Upgrade the Oyster Bay road (DR1763) to a surfaced road to allow access to the site from the west;
 - Build an eastern access road off the R330 towards the site;
 - Build a new western access to connect the site to the DR1763;
 - Upgrade intersections in accordance with the recommendations of the Traffic Impact Assessment (Appendix E 25 to the EIR); and
 - Investigate the pavement structure of the R330 to determine whether it can accommodate the increased heavy load trips during the construction period.

7.2.5 Construction Village, Staff Village and Vendor Housing

1. Conduct a detailed assessment for a new residential development, once the preferred nuclear power station location, as well as the location for residential and accommodation needs are finalised.
2. Establish the construction village, staff village and staff and vendor housing (if any) as follows (subject to the conclusions and recommendations of a project-specific EIA for such developments):
 - Draw up the development and locative criteria/ conditions for the establishment of each;
 - Investigate possible locations for the provision of these according to the needs;
 - Identify the suitable locations and draw up a Site Development Plan and Environmental Management Programme in line with development planning legislation, policies and guidelines;

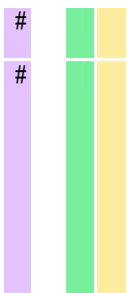


- Obtain relevant approvals for the development from the appropriate authorities (e.g. follow an EIA process if necessary, follow town planning procedures);
 - Follow a transparent public participation process with role-players and interested and affected parties;
 - Make use of local labour and local suppliers of material for the construction as far as possible;
 - Monitor the situation once the housing units are occupied;
 - Locate the housing units for construction staff 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;
 - The Construction Village, including all the buildings and facilities, can be utilised by the surrounding community after the construction period, in order to ensure sustainability of such infrastructure; and
 - The wholesale clearing of land for the construction of these houses is minimised to limit the need for rehabilitation.
3. Service, manage and maintain the villages and associated structures effectively in accordance with appropriate social and 'clean' town standards; until its placement under local municipal control.
 4. Consider, plan for, adhere to and implement all the requirements of the Eskom Strategy for vendor accommodation (Eskom Strategy 238-99, or relevant update thereof).



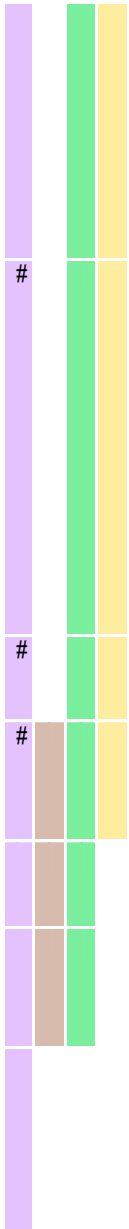
7.2.6 Economic Impacts

While the nuclear power station in itself is motivated by securing long-term economic sustainability as it provides for a reliable and strategically placed electricity source, the project would also stimulate local and regional economic growth during construction and operation. The latter should be enhanced while negative impacts on the socio-economic environment should be mitigated by introducing measures as specified in this section (**Section 7.2**). In addition an important mitigation for minimising the negative economic impacts on the local economy consists of measures to retain, protect and enhance as much of the natural environment as possible (as covered in much detail in **Section 7.1**). This subsection thus only covers and highlights some additional specifications and cross-references to minimise and mitigate negative economic impact.

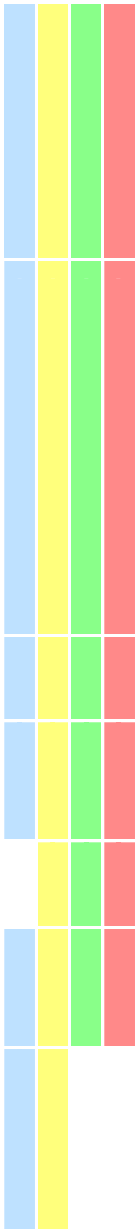


1. Apply high-quality risk management and monitoring.
2. Introduce a public relations campaign as an avoidance measure directed at:
 - The local community, involving the wide dissemination in easily understandable form of all the specialist studies in order to overcome public fears regarding, *inter 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.
- 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.
3. Use the Eskom policy the establishment of a nature reserves at the site as catalysts to increase tourism and overcome negative public perceptions; e.g.:
 - Establish a visitor information centres with promotional lectures and films;
 - Promote hiking trails, funding eco-tourism and conservation education to further develop nature tourism; and
 - Work in unison with Conservation Authorities and, where possible, other nature reserves.
 4. Consider the establishment of visitor information and educational centres in order to attract tourists to the area
 5. Negotiate with security authorities such as the National Intelligence Agency to determine whether controlled access for fishing could be granted.
 6. Exercise controls on use of public roads particularly by heavy-vehicle traffic during the construction phase (refer to **Section 7.2.4**).
 7. Minimise dust by implementing the *Air Quality and Dust Control Programme* (refer to **Section 7.4.14**); to minimise impact on surrounding agricultural and tourist activities.
 8. Transfer construction workers to new nuclear power station sites and/or other construction sites once their involvement at Nuclear-1 is complete, wherever possible, to mitigate the adverse impacts of unemployment and attendant social ills that could affect the local economy (refer to **Section 7.2.13**).

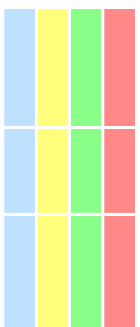


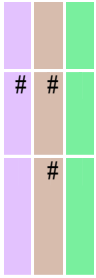
7.2.7 Influx of Job Seekers

Management and control of influx of job seekers is important to avoid social problems such as public unrest.



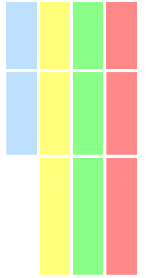
1. Engage proactively with local authorities/ SAPS/ Community Policing Forums to ensure that job seekers do not settle in the vicinity of Construction Villages or the construction terrain or site.
2. Follow a transparent public participation process with role-players and interested and affected parties.
3. Undertake a proactive, broad-based information campaign (including site notices) to clarify the number of job opportunities that will be available with the objective to dispel rumours and unrealistic





expectations and thereby seek to curtail the inflow/ settlement of job seekers.

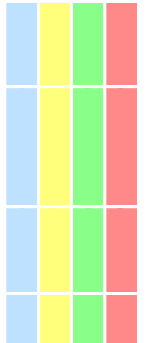
4. Make use of local labour and local suppliers of material for the construction as far as possible; and
5. Monitor the situation after the occupation of the Construction Village, Staff Village and housing projects, and involve the relevant role-players in such process.



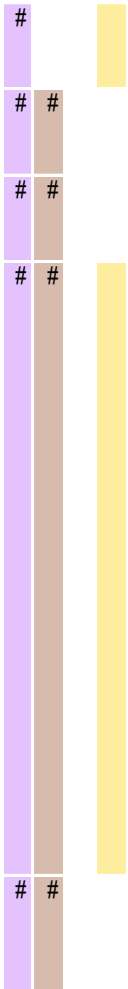
7.2.8 Informal Illegal Dwellings



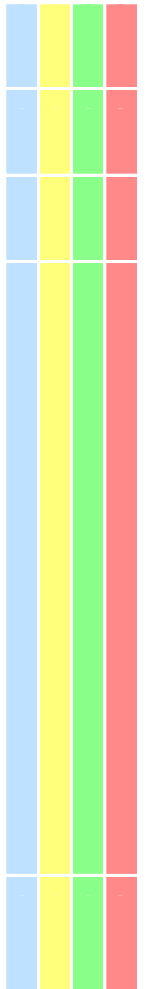
1. Ensure that all discarded construction material that can be utilised to build informal structures, is properly disposed of after construction.
2. Ensure that any temporary accommodation utilised to house construction workers, is completely dismantled and properly disposed of after use, unless a different alternative exist.
3. Cooperate with local authorities to ensure that all legislation preventing illegal settlement is enforced at all times.
4. Ensure appropriate housing is available for staff.

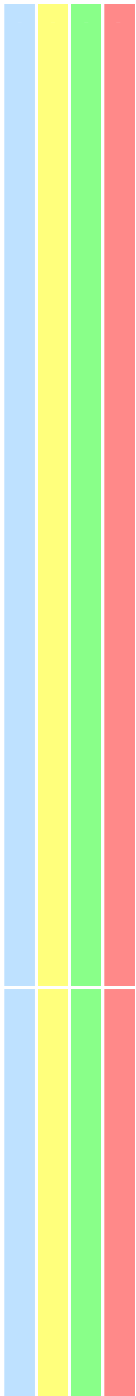
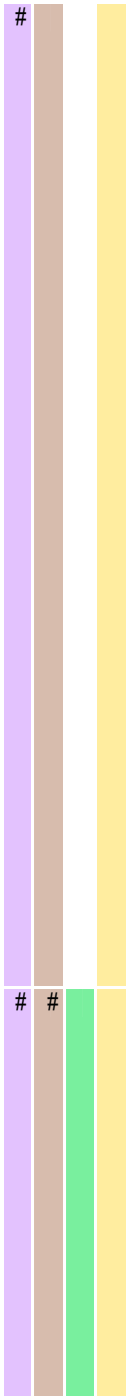


7.2.9 Creation and Securing of Employment Opportunities



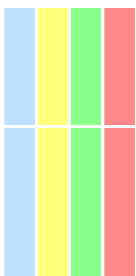
1. Cooperate with provincial and district authorities with regard to matters relating the creation employment opportunities.
2. Develop a community labour agreement with targets for employment and for career progression.
3. Undertake salary reviews to ensure competitive employment packages and in order to attract and retrain the requisite skills.
4. Establish a labour policy to facilitate the employment and skills training of locals, where feasible and as far as possible, and the achievement of requirements for staff population demographic representation (e.g. BEE, women) as matter of priority.
 - Set clear targets and criteria for local employment (at least 25 %), local employee skills training and population demographic representation; and state these clearly in all relevant publications, tender documents, etc.;
 - Take care to avoid potential conflict between people in the immediate surroundings seeking employment and those from elsewhere;
 - Create opportunities for the employment of women, where feasible; and
 - Use labour-intensive methods of construction, where possible.
 - {Method Statement} / {SOP}
5. Define a recruitment programme and specify the number of workers required, as well as the specific skills required in respect of each worker, as soon as possible before the commencement of the work.





6. Appoint or establish an employment / skills registration agency or 'labour desk', in consultation with the local community stakeholders, to:
 - Implement a formalised system to clarify, publish and distribute information on employment opportunities (e.g. time frames, vacancies, skills requirements, etc.) and deal with employment / skills registration in a coordinated and organised manner, that avoids duplication, misrepresentation, confusion and unrealistic expectations amongst employment 'givers' and seekers;
 - Establish a labour skills, grading and assessment centre to provide this specific and relevant information on available employment, including:
 - 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;
 - Training and certification available on the job.
 - Determine the available skills in the area and the level of training required;
 - Identify prospective candidates who would meet the job specifications in consultation with the relevant local authorities; and
 - Take responsibility for accurate information dissemination at community level.
7. Provide, where possible, on-the-job training to locals and support training programmes to develop their existing skills and to ensure that they receive skills that are transferable to other sectors, by facilitating a combination of the following:
 - Training directly done or done in-house;
 - Training as part of a process of coordination by Eskom to involve and support appropriate training providers (e.g. funding training programmes at tertiary institutions) with regards to targeting of employment and skills development initiatives; and
 - Training abroad.

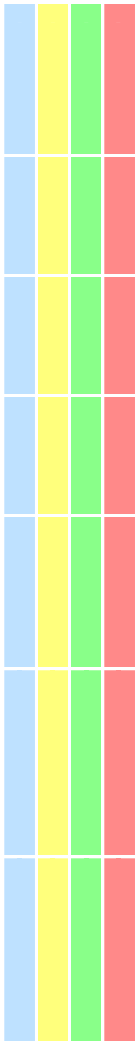
7.2.10 Business Opportunities



1. Follow open tender processes, which include improved communication of tender opportunities through advertising in local community media (including the local radio station).
2. Expedite the process of registering local service providers on Eskom's procurement database as an ongoing concern, to assist local suppliers of goods and services with registration on Eskom's database and with meeting compliance standards and understanding tender requirements.



3. 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 formal and informal economy.
4. 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.
5. Engage in participatory workshops in which interested members of local communities can be guided regarding types of business opportunities that could arise.
6. Investigate ways of enabling potential sub-contractors from low-income areas to tender with the support of Red Door and other economic institutions.
7. 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).
8. Interact closely 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 counselling (Red Door, Local Economic Development Forum, local authority).
9. Provide feedback 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; in order to strengthen the relationship between Eskom and the various role-players around the proposed nuclear power station.

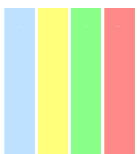


7.2.11 Criminal Activities

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, e.g. enter or use private properties without permission (e.g. to take shortcuts, access taps or to ask for water or use of ablution facilities). Pro-active discussions between the Contractor(s) and project applicant 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'.



1. Engage with and urge the South African Police Services (SAPS) as well as local appropriate policing (with the assistance from the Environmental Monitoring Committee), to ensure that baseline statistics are available on a monthly basis regarding existing crime rates.

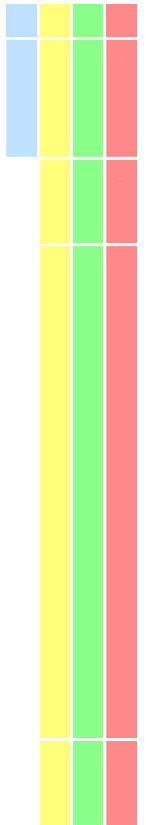
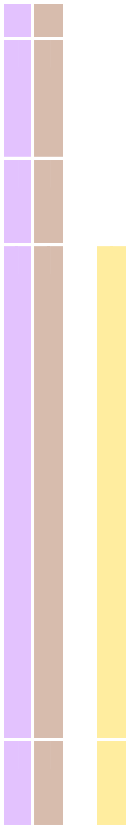




2. Arrange meetings with residents associations, community-policing forums, as well as the local police staff to discuss contractors' plans, procedures, schedules and possible difficulties, and safety and security concerns; with the number of meetings and the timing of these meetings to be discussed with the interested and affected parties and a work plan to be put forward.
3. Include social issues on the agenda and terms of reference of the Environmental Monitoring Committee to:
 - Monitor and ensure that the conditions set out in the EMP are implemented;
 - Address any problems that arise, such as increase in thefts and burglaries associated with the construction workers;
 - 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; and
 - Drafting a code of conduct for all staff that will be present on site during construction.
4. Specify the conduct of contract workers in worker related management plans and employment contracts by contractors, sub-contractors and service providers; e.g. (recommendation):
 - Introduce a peer-group based incentive/ fine scheme to promote peer-group monitoring and penalising, as this has proven to be effective on other projects, as all would benefit from keeping the bonus at the maximum; as follows:
 - Introduce a 'substantial' bonus before commencement of construction;
 - Provide for a pre-designated group, e.g. the environmental officer and/or the local community / property owners and/or fellow workers, to monitor compliance / transgressions;
 - Pre-determine a fine value which every transgression carries;
 - Subtract a fine for every transgression from the bonus;
 - Display all contraventions in the site-office together with the name of the "offender"; and
 - Divided and pay out the balance of the bonus between workers at the end of the construction period; or, in order to keep motivation levels high, once a year or once every six months;

7.2.12 Risk of STDs, HIV and AIDS

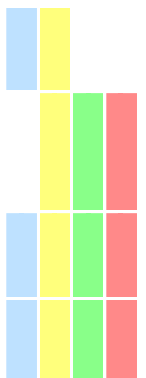
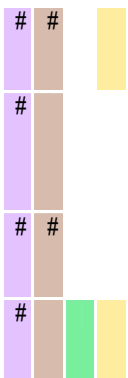
1. Develop, implement and maintain a STD, HIV and AIDS awareness and prevention campaign, in consultation with local and international HIV and AIDS organisations and government structures; and by utilising various common practice methodologies in order to ensure social and cultural sensitivity.
2. Attempt to minimise population influx by utilising local labour, where



- possible.
3. Implement STD and HIV and AIDS awareness and prevention programmes as a condition of contract for all contractors, subcontractors, service providers, suppliers and sub-operators.
 4. Provide an adequate supply of free condoms to all workers, by locating such in the bathrooms and other communal areas on the site.
 5. Undertake a voluntary STD and HIV and AIDS prevalence survey amongst all workers on a regular basis, as follows:
 - Avail a voluntary test to 100% of the workforce as a basis for the survey;
 - Follow a policy whereby all test results are considered strictly confidential and thus presented survey information only as statistical returns that ensure confidentiality;
 - Use the results of the survey to assist in determining the HIV and AIDS and STD strategy; and
 - Make results available to management and workers at the same time, when results are obtained (on assumption that the results are statistically representative).
 6. Introduce and maintain a voluntary counselling and testing programme. **[Ongoing]**

7.2.13 Loss of Employment

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, if possible, in order to mitigate the perceived adverse impacts of unemployment once the construction phase of Nuclear-1 is completed. Other opportunities and measures to enhance re-employability of employees and reduce the loss of employment, once the construction period closes, should also be actively sought, implemented and promoted.



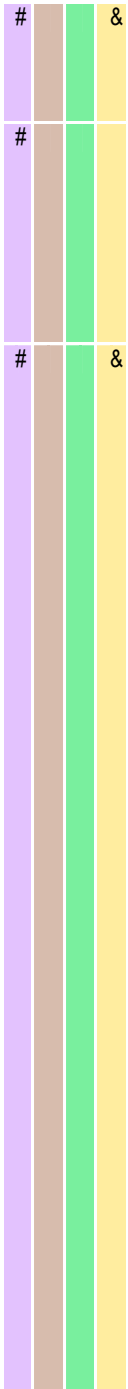
1. Introduce training initiatives aimed at up-skilling, particularly unskilled and semi-skilled workers.
2. Absorb as many construction staff / workers into the operational phase of the project as is feasible; and similarly operational staff into decommissioning phase.
3. Transfer as many workers as possible to other related projects available (e.g. Nuclear-2).
4. Introduce community self-help projects as part of the corporate social investment programme.

7.2.14 Visual Impact and Aesthetics

The specifications included in this section comprise the mitigation measures

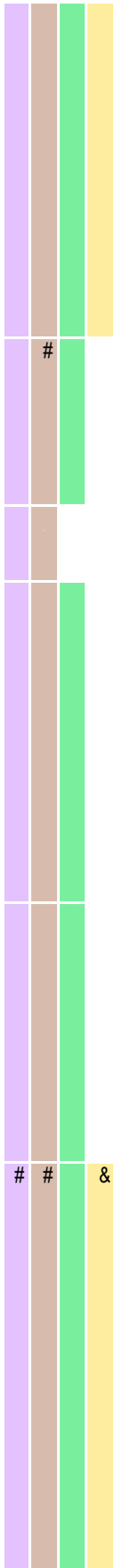


recommended in the Visual and Aesthetic Impact Assessment which was undertaken as part of the EIA for the project. While these specifications were regarded as preferred mitigation at the time of compilation of this EMP, suitable alternatives may well be established during the detail design of the project. In this case, Eskom must consult with an appropriately qualified specialist to confirm this suitability. Thereafter Eskom needs to submit proposed revised mitigation measures to the DEA and any other relevant stakeholder for their consideration and approval. (Note that it is possible that the authorities may require a public consultation process to be followed, should they consider changes to the specification as substantial.)

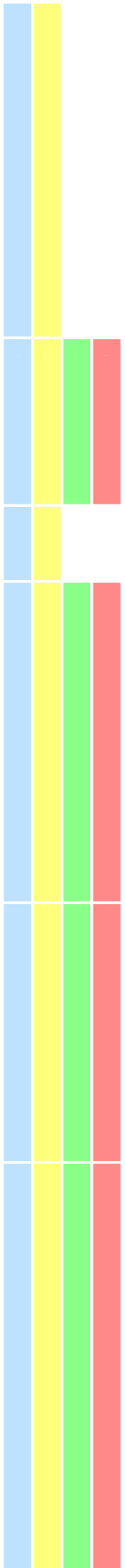


1. Prepare mitigation design details and specifications for all actions e.g. colour and form, slope stabilisation and vegetation to blend new cut and fill landforms into the setting.
2. Reduce the loss of visual integrity and continuity of the beach area resulting from structures, fences and roads; by moving the nuclear power station at least 200 m inland from the high water mark (this has been taken into consideration in the development of a preferred footprint in accordance with preferred footprint figure in the Environmental Impact Report (EIR)).
3. Minimise the visual impact of the large scale and form of the nuclear power station and transmission towers in a visually exposed and natural coastal setting, based on the following recommendations:
 - Use / apply a base colour of light grey, blue grey or a light straw, as it is visually neutral in the landscape and at distance blends more easily into the background:
 - Consider the light grey colour of the concrete of the reactor structure as suitable to reduce the visible scale;
 - Use / apply a darker band of the base colour near the top of the main structure to provide a visual illusion of a reduced scale and form of the nuclear power station;
 - Paint the visually prominent stack and all masts white or very light grey as it will mostly be seen in silhouette against the sky (where this does not conflict with the marking requirements of the Civil Aviation Authority); and
 - Consider the grey of the standard galvanised finish of the transmission line towers to a 3 km radius from the site as suitable (newly galvanised metal should not be painted, as it will soon weather to a matt grey);
 - Design a rounded roof structure for the turbine halls and reactor buildings, if possible, to reduce straight shadow lines on the structures;
 - Design transmission infrastructure and routing that are as visibly "light" as possible within a 3 km radius of the site, e.g.:
 - Consider making use of the new generation of guyed cross rope suspension or kite towers; and
 - Align the transmission servitude corridor such that the lines cross a road at right angles to the road to minimise the view along the line route.



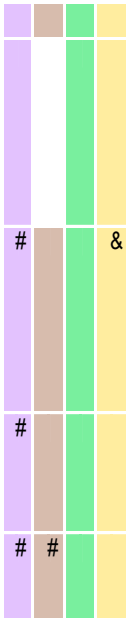


- Screen the lower portions of the large scale nuclear power station and associated structures, where reasonable, by strategically positioned and designed screening elements such as earth berms, fences and tree and shrub plantings at particular areas within and around the site; and
 - Consult a suitably qualified Landscape Architect with regard to the simulation of the nuclear power station to assist in the selection of colours that will fit the setting during the summer and winter seasons and design (layout and form) and simulation of other landscape design features (e.g. berms, fences, plants, etc.)
4. Subject construction buildings and infrastructure to Visual Impact Assessment mitigation measures that the Applicant may specify; e.g. construction buildings (e.g. workshops, storage building) and storage tanks must be painted in a specified green, while taller structures such as cranes are to be white or light grey.
 5. Include screen berms in tender documentation for pricing by the relevant contractor, if applicable.
 6. Minimise visual degradation of natural environment by drill rigs, vehicles and access roads, as follows:
 - Restrict access to sensitive areas by vehicles and machinery;
 - Select routes to each location based on sensitive areas;
 - Do not allow deviation from access road or random driving through natural areas; and
 - Draft specific specifications for each action and provide a “conduct” list to persons working on site during the design phase.
 7. Prohibit the defacing landscape elements of site e.g. painting rocks and removal of vegetation without permission; including but not limited to:
 - Draw up a code of practice for site work by surveyors and their staff with specific reference to environmental aspects related to their work; and
 - Incorporate this prohibition as a training topic in environmental induction and refresher training.
 8. Minimise the visibility of the nuclear power station at night as a result of security and safety lighting, by minimisation of light intensity and light spill by the analysis of lighting requirements and the selection of light fittings that direct light; as follows (refer to **Section 7.1.7, Specification 25** for further lighting requirements):
 - Appoint a suitably qualified and experienced lighting engineer to design the *Lighting Plan* for the nuclear power station and surrounding security areas through utilisation of a process that involves the modelling of the light spill for various light units to achieve the required effect and to limit the “light spill”.
 - Provide for the *Lighting Plan* to include the following lighting solutions/ principles:



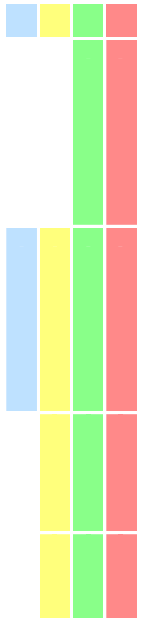


- Direct lights so as not to shine beyond the site onto adjacent residential areas, roads and / or into the air;
 - Provide light fittings with shields to eliminate sight of the light source from sensitive nearby land uses e.g. nearby communities;
 - Direct light where possible to prevent light spill, e.g. use down lighting of areas preferred to up lighting;
 - Direct perimeter lights to downwards and inwards;
 - Specify 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;
 - Prohibit flood lighting the entire main structure but incorporate concealed lights high on the structure to shine downwards, so as to render darker areas on the building elevations less visually noticeable structure;
 - No light fittings should spill light upwards or be directed upwards from a distance towards the area or building to be illuminated; and
 - The lighting plan should strive to maximise the energy efficiency, including a hierarchy of lights that are essential to those that are switched on only when needed;
- Keep to the lighting principles during the construction phase and for any other temporary lighting; and
 - Implement and maintain the Lighting Plan.
9. Minimise the visual impact caused by the visual clutter presented by machinery, equipment and material at construction / demolition sites, camps and lay-down areas which are visible to the public e.g. along roads and from residential areas, as follows:
- Locate construction camps away from public places, where reasonably practical;
 - Practice good housekeeping;
 - Provide and maintain stable and neat screens along boundaries of construction footprints and sections of the site perimeter fence where construction activities and material stored within the site will be visually exposed to the public from public places such as roads and residential areas; e.g. by attaching dark green or black shade cloth to 2 m high fences (perimeter or screening fences).
10. Apply effective dust suppression techniques (refer to **Section 7.4.14**) to suppress dust generated during earth moving and vehicles travelling on dirt roads to and from exposed areas, bearing in mind that airborne dust is often visible from far, and is visible at night as it diffuses light and coats vegetation with an unsightly layer of settled dust.
11. Rehabilitate disturbed natural areas and new landforms effectively and as soon as reasonably possible to blend with the adjacent landform and materials in accordance with **Section 7.4.5** and maintain such rehabilitation effectively.
12. Minimise the visual impact of spoil dumps on land in accordance with

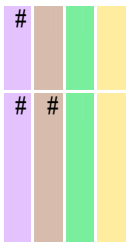


Section 7.5.8.

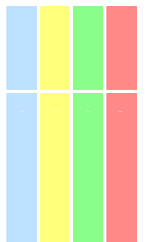
13. Maintain and modify the visuals where required and feasible to effectively mitigate visual impacts of the nuclear power station and associated infrastructure, e.g. re-vegetated cut or fill slopes to provide the visual integration with the surrounding landform, extension of screen berms in certain areas, etc.
14. Monitor the implementation and maintenance of visual mitigation measures to ensure that these meet all the relevant specifications of the EMP and Visual Impact Assessment that formed part of the EIR, and undertake such monitoring with the requirements detailed in **Section 9.13**.
15. Report on the visual impact monitoring results to the ECO, Environmental Monitoring Committee and Department of Environmental Affairs. **[At a frequency as detailed in Section 9.13]**
16. Address the visual impact issues that are identified during the abovementioned visual impact monitoring.



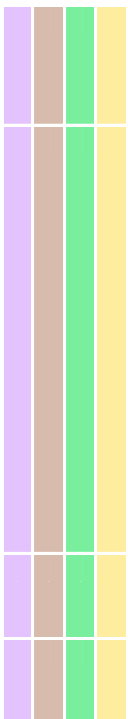
7.2.15 Sense of Place



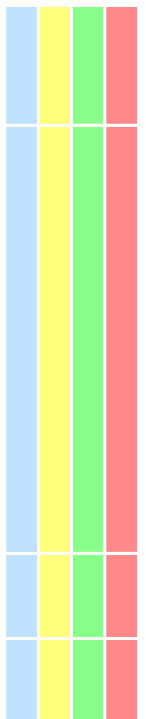
1. Consult with affected communities in an effort to identify and address issues relating to the sense of place.
2. Follow the mitigation measures suggested in the visual, noise and traffic impact reports as well as the various specifications for protection of the biophysical environment (**Section 7.1**) to minimise the impact on sense of place.



7.2.16 Future Land Use



1. Follow a transparent public participation process with role-players and interested and affected parties regarding future planning and land use needs.
2. Engage in an intensive planning process, after the location of the nuclear power station has been finalised, in order to:
 - Ensure adherence to applicable legislation, e.g. environmental, water, roads, sustainability, etc.;
 - Ensure revision of existing planning policy and guidelines at National, Provincial and Local level (e.g. IDPs, SDFs, WSDPs, ITPs, etc.);
 - Ensure comprehensive and transparent public participation in all planning processes; and
 - Optimise the creation of economic opportunities at all levels.
3. Develop more detailed *Spatial Development Plans* as soon as the location has been finalised.
4. Undertake more detailed impact assessments based on the abovementioned detailed *Spatial Development Plans*. **[As necessary]**





7.3 Protection of Heritage Resources

The Heritage Impact Assessment identified a number of heritage features on the site, particular in the coastal zones within 200 m of the high water mark. Although unlikely, fossil human remains may exist on or close to the site.

A detailed mitigation plan, to be approved by the SAHRA, needs to be prepared. This plan will have to be approved by the SAHRA. In the interim, much mitigation work as possible must be arranged and happen in advance of commencement of construction activities. No construction will be allowed until heritage mitigation (e.g. excavation) measures have been completed. The timing of heritage mitigation may be arranged so that the areas that are most critical for construction are addressed first in the heritage mitigation plan.

Attempting archaeological or palaeontological rescue work on a busy 24-hour construction site is extremely difficult. It is therefore strongly recommended that the applicant be pro-active by commissioning the required archaeological surveys and work as soon as possible. It is thus essential that an archaeologist be appointed well in advance of construction to undertake the various detailed heritage and archaeological surveys, sampling, curation, etc.

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.

Note: The specialist indicated in this sub-section refers to a suitably qualified and experienced archaeologist.

Applicant (Eskom) Contractor ECO / Auditor Specialist	Environmental Specifications	Planning & Design Construction Operation Decommissioning
--	------------------------------	---

7.3.1 Completion of test excavations and completion of Heritage Mitigation Plan

1. At the time of completing the Revised Draft EIR and EMP, an application to SAHRA for test excavations in the central portion of the proposed power station footprint was still pending.
2. The specialist must perform the test excavations according to the requirements of the SAHRA authorisation (if granted) and the findings of such excavations need to inform the requirements of the Heritage Mitigation Plan.

7.3.2 Overall Management of Protected Heritage Resources

- | | | |
|---|---|--|
| # | & | <ol style="list-style-type: none"> 1. Appoint an archaeologist well in advance of construction and during |
|---|---|--|



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
#							
#	#						
#	#						
	#						
	#						
	#						
#							

<p>construction to undertake the heritage / archaeological planning and management; and on-site monitoring and control related thereto.</p> <p>2. Appoint an archaeologist to be present during deep excavation to investigate the presence of palaeontological resources.</p> <p>3. Develop a <i>Heritage / Archaeology Mitigation Plan</i> by means of a proposal of specific mitigation measures based on the Heritage Impact Assessment study (Appendix E20 of the EIR); through engagement and workshoping with the respective archaeology and palaeontology committees of the South African Heritage Resources Association (SAHRA) and any provincial heritage authority. [The mitigation plan may need to be developed and/or implemented sequentially, as the archaeological survey is undertaken]</p> <p>4. Submit the <i>Heritage / Archaeology Mitigation Plan</i> or any significant amendments thereto for SAHRA's approval and assist with the implementation of the approved plan.</p> <p>5. Keep the contracted archaeologist informed of the scheduled excavation planning and the progress being made, for the purposes of planning and cost containment;</p> <p>6. Monitor archaeological trial excavations, land clearing or bulk excavation on site at all times that such activities are taking place; unless the archaeologist has good reasons to consider it acceptable for certain activities to continue at a specified reduced monitoring frequency (e.g. in areas of low sensitivity);</p> <p>7. Develop a clear chain of communication 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 nuclear power station site inspections, emergency rescue work and resolve any queries.</p> <p>8. Include a "short heritage course" in induction training of staff (refer to Section 7.4.1) that will be involved in site clearing and excavations, to enable them to assist in the recognition of potential fossil and other archaeological material; and where applicable work out a process for consultation, and assistance with collections of fossil specimens and temporary on-site curation.</p> <p>9. Monitor excavations to establish any heritage finds.</p> <p>10. Maintained records of heritage findings found buried in sediments.</p> <p>11. Report heritage finds to the ECO and Site Manager.</p> <p>12. Report heritage finds to the heritage authorities.</p> <p>13. Report heritage finds to Environmental Monitoring Committee and Department of Environmental Affairs.</p>	<p>construction to undertake the heritage / archaeological planning and management; and on-site monitoring and control related thereto.</p> <p>2. Appoint an archaeologist to be present during deep excavation to investigate the presence of palaeontological resources.</p> <p>3. Develop a <i>Heritage / Archaeology Mitigation Plan</i> by means of a proposal of specific mitigation measures based on the Heritage Impact Assessment study (Appendix E20 of the EIR); through engagement and workshoping with the respective archaeology and palaeontology committees of the South African Heritage Resources Association (SAHRA) and any provincial heritage authority. [The mitigation plan may need to be developed and/or implemented sequentially, as the archaeological survey is undertaken]</p> <p>4. Submit the <i>Heritage / Archaeology Mitigation Plan</i> or any significant amendments thereto for SAHRA's approval and assist with the implementation of the approved plan.</p> <p>5. Keep the contracted archaeologist informed of the scheduled excavation planning and the progress being made, for the purposes of planning and cost containment;</p> <p>6. Monitor archaeological trial excavations, land clearing or bulk excavation on site at all times that such activities are taking place; unless the archaeologist has good reasons to consider it acceptable for certain activities to continue at a specified reduced monitoring frequency (e.g. in areas of low sensitivity);</p> <p>7. Develop a clear chain of communication 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 nuclear power station site inspections, emergency rescue work and resolve any queries.</p> <p>8. Include a "short heritage course" in induction training of staff (refer to Section 7.4.1) that will be involved in site clearing and excavations, to enable them to assist in the recognition of potential fossil and other archaeological material; and where applicable work out a process for consultation, and assistance with collections of fossil specimens and temporary on-site curation.</p> <p>9. Monitor excavations to establish any heritage finds.</p> <p>10. Maintained records of heritage findings found buried in sediments.</p> <p>11. Report heritage finds to the ECO and Site Manager.</p> <p>12. Report heritage finds to the heritage authorities.</p> <p>13. Report heritage finds to Environmental Monitoring Committee and Department of Environmental Affairs.</p>
---	---



Applicant (Eskom)
Contractor
ECO / Auditor
Specialist

Environmental Specifications

Planning & Design
Construction
Operation
Decommissioning

7.3.3 Surveying for, Sampling and Identification of Protected Heritage Resources

1. Undertake sampling and curation of material from all identifiable Late Stone Age, Iron Age, or any other sites of significant heritage / archaeological value that will be affected by the proposed activity.
2. Undertake a series of trial excavations throughout the development area and beyond to define the extent of any archaeological sites, prior to construction.
3. Design and implement a sampling strategy (with consultation with other heritage I&APs) to systematically record, collect and curate Pleistocene archaeological and palaeontological remains, based on the findings from the abovementioned trial excavations.
4. Identify, in the event of a find of fossil bone or artefacts, the horizon that the find is associated with and, if necessary, bring a “rescue” team onto site to excavate the find, expose the material and sample it accurately and adequately.
5. 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).
6. Notify an archaeologist well in advance, when the phases of bulk excavation are near or at completion but before the walls are sheet piled / united, to allow him/her to undertake a survey of the excavations, in order to:
 - Inspect the excavation faces for fossil content;
 - Examine any already-rescued material as above will be examined, processed and packaged;
 - Collect representative samples of fossils;
 - Take bulk samples in the case of shelly beds, bulk samples will be taken.
 - Remove material within blocks of the enclosing sediment, reinforced if required by encasement, if material is delicate and/or poorly-preserved.
 - Identify key vertical sections representative of the exposures and describe (sedimentologically logged), photograph and sample these in detail to fully record the contexts of the fossils.
7. Develop the information that will be gained from the heritage investigation process into an educational resource, e.g. a booklet, pamphlets or display that could be availed or included within a visitor or

&



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
			information centre; depending on the outcomes of the heritage management process / investigations.				

7.3.4 Procedures on Discovery of Potential Heritage Artefacts and or Features

			1. Provide and arrange the opportunity and budget for any required rescue events mentioned above, such that it would allow the archaeologist to conduct the rescue operation to the highest standards, and as quickly as is reasonable.				
			2. 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.				
#	#	&	3. Follow the following procedures on discovery of any potential heritage/ archaeological sites/ objects (including artefacts, fossils, bones, etc.):				
			<ul style="list-style-type: none"> • Pause all further clearing, excavation and/or other construction at the discovery site and surrounding area immediately on making the find until further notice from the appointed archaeologist; • Notify the site supervisor / manager, ECO and/or on-site archaeologist immediately [without any delay]; • Note the location of the sites/ objects and ensure that such sites/ objects are not disturbed/ destroyed (any further), e.g. notify all staff working in the vicinity of the ‘temporary “No-go” area and cordon off the location with danger tape; and • Hand over isolated finds that are turned up immediately to a designated person for safekeeping, noting as far as possible where they came from; and • Keep excavated material which includes a clump of bones without further disturbance in a temporary stockpile for safekeeping, for inspection by a palaeontologist. 				
		#	4. Follow the following procedures after discovery of any potential heritage/ archaeological sites/ objects were made or reported:				
			<ul style="list-style-type: none"> • Inspect the location where the find was made, record the details of the find (coordinates, description, etc.); • Demarcate the archaeological site, should the find indeed be of potential archaeological value, and give instruction as to the required work stoppages and “No-go” arrangements and procedures, if any; • Contact SAHRA must be contacted immediately to report and register the find; • Apply and obtain permits from SAHRA should the proposed 				



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
			<p>construction of the nuclear power station affect, destroyed or alter any heritage sites</p> <ul style="list-style-type: none"> Undertake the excavations, removal, exhumations, etc. appropriately and as quickly as possible; Remove any find of fossil human remains from the late Pleistocene (and earlier) with appropriate care to the highest standards, and as quickly as is reasonable. 				
			<p>5. Secure any site that an archaeologist has confirmed as archaeological sites as follows:</p> <ul style="list-style-type: none"> Demarcate the site with wire fencing with a radius of at least 30 m or any other radius which the archaeologist has specified; Prohibit all access unless it is by an archaeologist or under his/her supervision; and Prohibit any construction activities within 50 m of all identified archaeological sites, unless such a prohibition has been lifted by the archaeologist or SAHRA; Extend the work schedule accordingly, should the site activities be suspended due to this discovery The excavation work may only be undertaken by an archaeologist. Relevant I&APs should be informed and consulted when human remains are uncovered, and if necessary the reburial of any human remains should be facilitated. 				
			<p>6. Address potential impacts to protected shipwrecks, if any, by means of specific heritage impact assessments, once there is further clarity as what nuclear power station technology is selected and how cooling water will be obtained and returned to the ocean.</p>				

7.3.5 Prohibitions

			<p>1. Prohibit the collection of heritage/ archaeological objects/ artefacts at identified heritage sites <u>strictly</u>.</p>				
			<p>2. Prohibit any destruction of a declared heritage site unless a permit is obtained from SAHRA and the archaeologist has mapped and noted the site in accordance with the SAHRA requirements.</p>				
			<p>3. Prohibit anyone from undertaking excavation work at an archaeological site, unless that person is an archaeologist or working under the supervision or instructions from an archaeologist.</p>				



7.4 Overall Site Management

Applicant (Eskom)	Contractor	ECO / Auditor	Specialist	Environmental Specifications	Planning & Design	Construction	Operation	Decommissioning
-------------------	------------	---------------	------------	------------------------------	-------------------	--------------	-----------	-----------------

7.4.1 General Preparedness and Administration

#	#	#	#	1. Undertake <u>all</u> work in an environmentally sensitive manner and <u>strictly</u> prohibit any impact on any declared “No-go” areas.	#	#	#	#
#	#	#	#	2. Enforce all legislation, policies and procedures applicable to the development <u>strictly</u> .	#	#	#	#
#	#	#	#	3. Adhere to this EMP and all approved Method Statements / SOPs strictly, and where this is not possible / feasible follow the relevant procedures to apply for approval of an appropriate update or amendment thereto.	#	#	#	#
#	#	#	#	4. Develop, implement and maintain a Quality Management Programme (in line with the ISO 9001 principles) to ensure effective site monitoring, auditing and reporting in order to maintain confidence in meeting the Eskom, site and plant safety requirements and performance objectives.	#	#	#	#
#	#	#	#	5. Ensure that the latest version of this EMP (or any applicable parts thereof) form part of any contractual agreements with Contractors and Sub-contractors for any appointments related to the execution of the nuclear power station project (e.g. site inspections, site probes, site surveys, site clearing, construction, commissioning, services, maintenance, upgrade, decommissioning, demolition, remediation, rehabilitation, etc.).	#	#	#	#
#	#	#	#	6. Ensure that the latest version of this EMP forms part of an Environmental Management System (EMS) for the construction, operational and decommissioning phases of the nuclear power station project (in line with ISO14001).	#	#	#	#
#	#	#	#	7. Adopt a precautionary approach with any works deviating from specifications and all Method Statements and Safe Operating Procedures being approved by <u>both</u> the Site Manager / Power Station Manager and accepted by the ECO.	#	#	#	#
#	#	#	#	8. Provide for and ensure that any new staff, at all levels of responsibility, that are to work on site undergo an ECO-accepted initial / induction environmental awareness training session on the following topics; prior to any work commencing on-site and keep; and retain attendance records for at least five years: <ul style="list-style-type: none"> • Key potential or actual environmental nuclear power station project activity related impacts and related environmental precautions, which need to be taken to avoid or mitigate these impacts; 	#	#	#	#



Environmental Specifications			Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor Specialist				
		<ul style="list-style-type: none"> • The high conservation status of the fauna and flora around the site; • Conservation-related “No-go” areas, issues and programmes that need to be considered and/or implemented; • Archaeological issues and procedures; • Outline of all monitoring programmes; • Key mitigation measures to be implemented during project activities; • Emergency responses to issues; • Responsibilities towards the public; • Linkages between environmental and occupational health and safety protection and management (taken that a separate Occupational Health and Safety Programme will be introduced); • Roles and responsibilities of all staff on nuclear power station site; • The benefits of achieving conformance with, and consequences of transgressions of environmental specifications or requirements of the EMP. 				
#	#	<p>9. Ensure that all site staff are appropriately trained, aware of and understand the contents and conditions of the EMP, the key environmental issues and the consequences of non-compliance that are relevant to the activities in which they are or will be involved, including but not limited to the following:</p> <ul style="list-style-type: none"> • Inspect work regularly to ensure that environmental requirements are appropriately implemented, maintained and adhered to and address staff to encourage good and discourage poor environmental management practices; • Maintain ‘environmental compliance’ as a standing topic on routine site management meetings; • Hold regular ‘tool-box’ talks to train and raise environmental awareness amongst staff; and • Discipline staff for serious and/or repeat offences. <p>[Ongoing], {Method Statement} / {SOP}</p>				
#	#	<p>10. Keep the following records on site in accordance with the standard Eskom site documentation and ensure that such documents are signed by all the relevant parties:</p> <ul style="list-style-type: none"> • Physical access plan; • Complaints register; 				



Environmental Specifications			Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor Specialist				
			<ul style="list-style-type: none"> • Site daily diary; • Records of all remediation/ rehabilitation activities; • Copies of reports to the Environmental Control Officer; • Copy of the Construction Method Statements / Safe Operating Procedures; • Fire Protection Association Plan; • Environmental Incident Register; • ECO inspection audit reports; • The Environmental Authorisation issued for the project ;and • An appropriate fines system for non-compliance will be developed and implemented. 			
#		&	11. Introduce a monitoring system in accordance with the monitoring requirements indicated in various sections of this report and the monitoring programme that is provided as separate chapter to this EMP; as well as any monitoring requirements imposed by authorities, authorisations and licenses.			
			12. Avail all records relating to monitoring and auditing in respect of the nuclear power station development for inspection to any relevant authority, Environmental Monitoring Committee, ECO or Eskom's Environmental Audit Team. [As necessary]			

7.4.2 Geological and Seismological Risk Profiling, and Geotechnical Suitability Assessment

The US Code of Federal Regulations recommends the installation of microseismic monitoring networks at nuclear power stations. 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 nuclear power station, 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.

#	&	1. Undertake thorough geological investigations and assessment of the area excavated for nuclear power station footprint to uncover the presence of any undetected capable faults.
#	&	2. Consider and incorporate the results of the geological investigations to aid in the selection of an appropriate nuclear power station design.



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
#			&				
#			&				
#			&				
#			&				
#			&				
#			&				
#			&				

3. Use the results of the geological and seismological studies as design input for determining the Safe Shutdown Earthquake Ground Motion (SSEGM) during operation as well the regulatory period after its decommissioning.
4. Explore the feasibility of lateral support systems to retain approximately 20 m of overburden and minimise excavation volumes, all within an effectively dewatered site.
5. Appoint suitably qualified geotechnical and structural civil engineers to assign the appropriate “seismic design criteria” for the design of utilities, including on-site and off-site water reservoirs and to provide the expected ground motions and seismic design parameters derived there from based on geologic, seismotectonic, palaeoseismic and instrumentally recorded events.
6. Use the ground motion and seismic design parameters as design input for determining the SSEGM while the site is active as well the regulatory period after its decommissioning.
7. Undertake additional geologic investigations aimed at reducing the uncertainties regarding the geological model for the Site Vicinity area; including the finalisation of outstanding issues related to fault characterisation, 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 utilised in a full-blown Probabilistic Seismic Hazard Assessment that will follow internationally accepted practice.
8. Implement an appropriate permanent seismic monitoring system (consider including installation of strong-motion accelerographs on rock outcrops at the site)
9. Continue with seismic monitoring (even after decommissioning, if re-use of the site is considered).

7.4.3 Site Elevation and Footprint Development, Layout Planning and Establishment

#			&				
#			&				

1. Ensure that the footprint of the construction of the nuclear power station, associated infrastructure and access road routes take all the environmental characteristics of the site into account as indicated in **Section 7.1**; bearing in mind that the preferred position of the power station has been indicated in Chapter 9 of the EIR.
2. Take all the relevant biophysical environment protection specification into consideration when planning and designing the site and construction areas footprints and layout as well as access routes (in



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
#							
			accordance with Section 7.1).				
			3. Plan the final locality and level of the plant area in order to minimise the impact of the flood hazards; and in doing so and by taking the extreme water levels from the ocean into account, keep the minimum level of the plant area to at least 8.9 meters above mean sea-level (mamsl) (with a recommended minimum elevation of 11.04 mamsl for oceanographic reasons).				
			4. Plan the layout of the proposed nuclear power station and especially additional units, so as to maximise the potential conservancy / nature reserve and to minimise the area removed from the potential reserve.				
			5. Proclaim the undeveloped portions of the Eskom-owned sites as protected areas.				
			6. Restrict the footprint of the development to the smallest area possible, taking into consideration that 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.				
#	#		7. Clear areas mentioned in point 6 only as and when necessary to avoid having large portions of land void of vegetation for long periods of time in order to mitigate against water and wind erosion, dust, etc.				
			8. Separate the footprint from the high-water mark by a coastal corridor and adequate buffer, whichever is the greater; by underpinning such a corridor by the following ecological rules or criteria:				
			<ul style="list-style-type: none"> • Maintain a 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; • Avoid the sensitive mobile and semi-mobile dunes, rare coastal wetlands and the Langefontein wetland, with the latter possibly being affected by the eastern phase of the facility; • Provide a minimum setback of 200m from the western edge of the Langefonteinvlei wetland⁸; • Provide a minimum setback of 150m from the upstream edge of the coastal seeps⁹; and • Avoid the embryonic dunes and semi-mobile parabolic dunes; particularly along the Thysbaai coastline, with the latter possibly being affected by the eastern phase of the facility. 				
			9. Avoid creating laydown and storage areas for overburden in areas of				

⁸ This condition has been complied with in the footprint recommended in the EIR.

⁹ This condition has been complied with in the footprint recommended in the EIR.



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
			high quality habitat; and, where possible, restrict such laydown and storage areas in previously disturbed areas.				
			10. Minimise all structures outside of the site security fence.				
			11. Use, where reasonably feasible, natural topographical features boundaries for layout planning to enable sound rehabilitation of areas (dunes, wetlands etc.); e.g. refrain from cutting across natural features, such as dune ridges and wetlands as this would make rehabilitation of the areas that remain more difficult and less effective.				
#			12. Develop and provide a <i>Site Master Layout and Utilisation Plan</i> , which takes the above listed environmental specifications into consideration, by showing the overall site layout, including but not limited to: <ul style="list-style-type: none"> • Site boundaries; • Contractor yard site allocations; • On-site “No-go” areas, that are to remain undisturbed; • Footprint of the nuclear power station and associated service infrastructure and facilities; • Access roads and security access points / gates; • Staging area and pick-up zones for personnel and materials shall be clearly demarcated. • On-site main road servitudes; • On-site main stormwater management system and sedimentation traps; and • Areas earmarked for central construction service facilities, e.g. water system and facilities, sewage and wastewater treatment facilities and systems, waste handling facilities, construction offices, ablutions, canteens, vehicle wash bays and service station, fuel storage and station, topsoil and spoil stockpile, concrete batching facilities, excess concrete storage and crushing-for-re-use areas, etc. 				
#			13. Develop and provide a <i>Detailed Construction Site Utilisation Plan</i> , which takes the above listed environmental specifications and the <i>Site Master Layout and Utilisation Plan</i> into consideration; and which shows the contractors construction area/site layout, including but not limited to: <ul style="list-style-type: none"> • All buildings; • Ablution facilities; • Construction vehicle wash areas; • Large vehicle turning areas; 				



Applicant (Eskom)	Contractor	ECO / Auditor	Specialist	Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
				<ul style="list-style-type: none"> • Crane clearance areas; • Drop-off and pick-up zones for personnel and materials • Material (e.g. construction material, diesel/ petrol) and equipment storage and lay-down areas • Topsoil and spoil stockpile areas; and • Any other infrastructure that may be required. <p>{Method Statement}</p>							

7.4.4 Site Demarcation, Signage, Fencing and “No-go” Control

#										
	#									



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
			activities.				
#			9. Erect and maintain appropriate safety and environmental risk precaution signs prior to commencing with construction activities.				
#			10. Dedicate and demarcate on-site "No-go" areas and off-site "No-go" areas that are at risk by suitable fences where reasonably practical; and if not with danger tape and/or "No-go" sign boards.				

7.4.5 Site Remediation, Rehabilitation and Re-vegetation

Although site remediation and rehabilitation are particularly important at the end of construction and for final preparation of change in use at the end of the project life cycle, it is important to consider, plan for and implement site remediation and rehabilitation systematically and continually through the life cycle of the project.

All areas impacted outside the footprint of the nuclear power station and its associated infrastructure, whether off-site or on site must be suitably and effectively remediated and rehabilitated as soon as reasonably possible. Considering the very long construction phase, intermediate remediation may be necessary in certain areas which may again be disturbed later on, to minimise soil erosion.

#	#						
#	#		1. Refrain from and <u>strictly</u> prohibit deposition of fill on the transverse and associated dunes.				
#	#		2. Provide for adequate budget planning and funding specific for site remediation, rehabilitation and re-vegetation (include insurances, fund securing / retention, etc.);				
#			3. Develop a <i>Rehabilitation Master Plan</i> that provides for effective, systematic and continual remediation and rehabilitation of the site and impacted areas outside the site to a high standard in accordance with all the relevant requirements of this EMP and the EIA specialist studies; including but not limited to the following:				
			<ul style="list-style-type: none"> Appoint or consult a suitably qualified Landscape Architect to design the rehabilitation and stabilisation of all the significantly disturbed areas and to assist with the development of the <i>Rehabilitation Master Plan</i>; Landscape exposed and/or destabilised areas to blend in with the surrounding area; Provide for and arrange for the safe removal and legal disposal of any and all hazardous substances from the area to be rehabilitated; Provide for all buildings and structures that are no longer required 				



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
			and have been fully decommissioned to be demolished (refer to Section 7.5.9);				
			<ul style="list-style-type: none"> • Provide for all areas disturbed during the development of the proposed facility; including areas outside the nuclear power station site footprint (e.g. access roads, borrow pits) and the natural areas inside the site boundaries, to be effectively rehabilitated with locally occurring indigenous species; • Provide for ultimate remediation of the nuclear power station plant footprint to be remediated effectively to allow for the relevant change in land use; and in doing so, follow all relevant planning requirements that would be applicable at the time; • Include the preparation of appropriate coastal set back lines and buffer zones, as well as the rehabilitation of primary dune systems, as part of activities on or nearby coastal dunes; and • Undertake carry rehabilitation out to a high standard so that stabilisation, aesthetic form and ecological sustainability are able to rapidly improve with time. 				
#	#		4. Develop and implement a <i>Detailed Rehabilitation Plan</i> , based on the abovementioned <i>Rehabilitation Master Plan</i> . {Method Statement} / {SOP}				
#	#	&	5. Design and stabilise all access roads to the main and satellite sites (e.g. the mast site) to visually fit into the surrounding landform and vegetation, as best as reasonably possible; as follows: <ul style="list-style-type: none"> • Design and/or shape cut and fill sections to blend with the adjacent landform and materials, thus adjusting the curves, slope angles and material (applying merely a standard curve, slope angle and/or material is not appropriate). • Develop, implement and maintain a detailed rehabilitation design and plan of the road reserve showing stabilisation methods and a specification of planting type and species together with maintenance requirements; and do so with the engagement of a suitably qualified and experienced landscape architect and rehabilitation contractor. 				
#	#		6. Re-use spoil appropriately based on a hierarchical approach for creation of visual barrier berms, landscaping, etc.				
#	#		7. Remove all 'waste' spoil regularly from the site to appropriately authorised / approved off-site disposal; or deposit it in a controlled manner and in accordance with Section 7.5.8 at the spoil dump.				
#	#		8. Provide for and implement the appropriate and effective stockpiling and safekeeping of top soil in accordance with Section 7.5.2 .				



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
			<p>9. Rehabilitate areas effectively where excavation and filling is completed as well as exposed areas where construction has been completed, including but not limited as follows:</p> <ul style="list-style-type: none"> • Landscape where necessary in accordance with the relevant rehabilitation plan; • Loosen compacted soil; • Apply topsoil from the relevant stockpile as a top layer at exposed areas; • Mulch, fertilise and water the re-vegetated areas as necessary and in a manner that would prevent erosion or pollution; • Stabilise exposed slopes as follows: <ul style="list-style-type: none"> – Re-vegetate slopes less steep than 1:3 with an indigenous grass mix that blends in with the surrounding vegetation (as the primary stabilisation); and – Provide additional and adequate soil conservation measures (e.g. bio mats) to slopes steeper than 1:3 and other areas susceptible to erosion due to their position in the landscape, before re-vegetation. • Rehabilitate exposed areas (and areas stabilised by grass mix) with the surrounding indigenous vegetation; • Control exotic weeds and invaders that might establish on the re-vegetated areas, to allow the indigenous vegetation to properly establish; • Monitor re-vegetated areas until the vegetation is stabilised; and • Repair any damage to re-vegetated areas promptly. <p>{Method Statement} / {SOP}</p>				

7.4.6 Access Roads Development, Maintenance and Use

#			&	1. Plan access routes to ensure minimised environmental impact.				
			&	2. Consider the requirement to allow movement of organisms along natural corridors for all road planning.				
#	#			3. Design, implement and maintain roads such that runoff is dissipated in side drains/ swales, rather than concentrated in lined channels.				
#				4. Define and demarcate limited access tracks, where travelling / transportation through sensitive environments cannot be avoided.				
				5. Refrain from using off-road vehicles outside designated and demarcated roads or tracks, when travelling / transporting outside the demarcated				



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
			construction / operations footprint.				
#			6. Declare and display / indicate appropriate speed limits that would effectively mitigate potential environmental impacts; e.g. dust, noise, spills, accidents, etc.				
			7. Use public roads in accordance with specifications in accordance with Section 7.2.4.				

7.4.7 Staff Facilities Development, Operation and Maintenance

			1. Develop an overall <i>Site Facility and Services Master Plan</i> for effective provision and phasing in / out of staff facilities and services, based on best estimates of such requirements by all the resident staff, contractors and their sub-contractors on site; and include such a plan in the contractor tendering and agreement process / operational EMS.				
#			2. Install services, such as drinking water, canteens, cooking areas, ablution and sewage facilities, as soon as possible after construction activities commence; and ensure this is done in accordance with the <i>Site Facility and Services Master Plan</i> , unless the Project Manager permits or directs otherwise. {Method Statement}				
#			3. Install a limited number of appropriately designed central canteens for the use of construction personnel (and catering for the maximum number of personnel likely to be on site at the peak of construction) to facilitate effective waste management and ensure that the availability of food scraps over the site that would promote vermin is limited.				
#			4. Install and commission permanent services, such as drinking water, canteens, kitchens, ablution and sewage facilities for the operational phase, and prior to commissioning of the nuclear power station and in accordance with the <i>Site Facility and Services Master Plan</i> .				
#	#		5. Design, implement and maintain sanitation facilities and associated systems for containment, treatment and/or disposal of raw sewage and sewage sludges such that potential leakage or spillage is effectively prevented and that any 'clean' wastewater is discharged in accordance with all legal requirements (e.g. Water Use License). {Method Statement} / {SOP}				
#	#		6. Provide adequate temporary chemical toilets on site, during periods where more permanent ablution facilities have not yet been provided, are insufficient and/or located far away from an area of work, as follows: <ul style="list-style-type: none"> • [Provide for a suitable ratio of toilets per number of employees (at least 1 toilet per 30 employees according to the requirements of the OHS Act and SA National Standard 10400-F); • Provide for toilets to have a hand wash facility either within the toilet 				



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
			<p>cubicle or adjacent thereto;</p> <ul style="list-style-type: none"> Locate toilets within 100 m from any point of work but no closer than 50 m to any watercourse or water body and preferably away and/or hidden from public roads, residential areas and other public places; Secure toilets firmly to prevent them from toppling over due to wind or any other cause; Provide for and ensure that toilets are emptied and maintained hygienically on a regular basis all the time; and that they are emptied before and left emptied over long weekends and builders' holidays; Ensure that no spillage occurs when the toilets are cleaned or emptied and that the contents is properly stored and removed from site; and Keep toilets locked after working hours. <p>{Method Statement} / {SOP}</p>				
#	#		7. Prevent any sewage from on site sanitation facilities to leak, seep or spill onto the ground or into the surface or groundwater; and conduct regular checks and if necessary repairs.				
	#		8. Appoint a service provider to remove sewage from the chemical toilets and/or sewage sludge from package plants on a regular basis; and provide and ensure for this sewage / sewage sludge to be disposed of at a municipal sewage treatment plant or alternatively on an appropriately designed on-site sewerage treatment plant. {Method Statement}				
			9. Prohibit staff from abluting anywhere other than in toilets.				

7.4.8 Water Supply, Abstraction and Consumption

#			1. Develop and maintain an overall site <i>Water Supply Master Plan</i> for effective provision of freshwater for all on-site processes, operations, facilities and services for resident staff, contractors, subcontractors, based on best estimates of such requirements; and include such a plan in the contractor tendering and agreement process / operational EMS.				
#	#		2. Assess all project activities and associated water use requirements (e.g. water abstraction) well in advance in order to ensure the relevant Water Use License (WUL) is applied for where required; and ensure that such a WUL is in place and all associated conditions complied with prior to such use commencing. {Method Statement} / {SOP} .				
#	#		3. Install site services for water provision, as soon as possible before the main construction / operation activities commence but provided that the				



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
			<p>required approvals/licenses have been obtained, e.g.:</p> <ul style="list-style-type: none"> • Connect to a water reticulation system, preferably tapping into a regional supply scheme rather than a local scheme; • Provide an on-site or local desalination plant and associated beach wells; • Develop and install groundwater abstractions wells and system; and/or • Provide for water to be brought in by tanker from an appropriately licensed local water supplier (temporary arrangement). <p>{Method Statement} / {SOP}</p>				
#			4. Design and maintain seawater cooling water intake in accordance with the requirements specified in Section 7.1.8 .				
#			5. Siphon off seawater from the cooling water intake, if required for seawater desalination purposes				
			6. Refrain from making use of and/or collect water from any source other than those pointed out in the approved Method Statement / SOP.				
			7. Ensure that no natural surface water sources (i.e. streams, rivers, wetlands) are used; e.g. in situ to wash / clean plant or equipment, and/or for any water abstraction (other than for emergency fire fighting).				
			8. Minimise use of freshwater, prohibit water wastage, and train and encourage all staff to use water sparingly.				
			9. Follow dewatering specifications in accordance with Section 7.5.3 , whenever dewatering is required.				

7.4.9 Materials Management

			1. Develop, implement and maintain a set of procedures to ensure that during normal operation, all releases of radioactive substances are within the limits of the nuclear power station operational technical standards; with the procedures indicating the methodologies to determine the amount of the releases and the nuclide contents.				
			2. Prohibit pollutants such as cement, concrete, lime, paint, oil, chemicals and diesel / petrol fuels from discharging into any water source and/or polluting open ground.				
			3. Adhere to all relevant national, regional and local legislation regarding the transport, use and disposal of hazardous waste at all times.				
			4. Provide and design sufficient materials handling facilities that provides for and meets all the relevant specifications of this EMP.				



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
#							
#	#						
#	#						
#	#						
#	#						
#	#						
#	#						
#	#						
#	#						
#	#						
#	#						
#	#						
#	#						
#	#						
#	#						
#	#						

5. Avoid locating materials storage areas in close proximity to ecologically sensitive areas and inside the 1:50 year flood line of watercourses.
6. Develop, implement and maintain an overall site *Materials Management Master Plan* for effective management and legal and safe transportation and handling of materials; and include such a plan in the contractor tendering and agreement process / operational EMS.
7. Obtain, keep on record, make use and avail Material Safety Data Sheets (MSDSs) for all hazardous substances brought / used on site; and compile MSDSs for all liquid and solid hazardous substances and wastes that are generated on site over prolonged periods, are generated in large quantities, are very hazardous and/or hazards are unknown.
8. Develop and implement procedures for safe material transportation, storage and handling. **{Method Statement} / {SOP}**
9. Develop and implement emergency procedures / protocols to quickly and effectively repair any hazardous substance leakages and follow effective spill clean-up procedures (refer to **Section 7.5.7**) **{Method Statement} / {SOP}**
10. Maintain a register of spills, incidents and 'near-misses' involving hazardous materials; and compile and keep on record investigation reports for all such events involving significant quantities and/or very hazardous substances or where the Site Manager / Power Station Manager and/or ECO requires such a report to be compiled.
11. Clearly dedicate and demarcate areas for the storage of hazardous substances including hazardous waste and industrial effluent.
12. Train all staff handling hazardous substances and waste on the requirements in terms of the specific substance they handle, including requirements in accordance with the substance's MSDS and abovementioned procedures and protocols.
13. Obtain all necessary approvals with respect to storage of hazardous substances from the appropriate authorities; e.g. diesel/ petrol fuel storage and dispensing, keeping and using of explosives, keeping of pesticides, etc.
14. Ensure that areas of fuels storage and other flammable materials comply with standard fire safety regulations and any conditions of approval of the local Fire Prevention Officer as well as the Major Hazardous Installation Regulations (OHS Act) if required. **{Method Statement} / {SOP}**
15. Provide some appropriate form of secondary containment to all portable chemical containers.
16. Design, construct and allocate bunded areas (i.e. concrete platforms



Environmental Specifications			Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor Specialist				
		with bund walls or inward slopes) to accommodate hazardous liquid substances (such as e.g. fuel, oil, paint, bitumen, herbicide and insecticides) to guard against infiltration of hazardous substances into the soil, groundwater or surface water, in accordance with the following design criteria:				
		<ul style="list-style-type: none"> • Adhere to all relevant legislation; • Effective containment of the particular material stored by selecting an appropriate impermeable material for the construction of the bund; • Effective segregation for safe storage of incompatible material; • Bunded area to have a holding capacity of 110 % of the total volume of the hazardous substance to be contained; or apply SANS10089-1:2008 to bunding for multiple large tanks; • A roof over the bunded area, wherever reasonably practical, to minimise collection of rain water within the bunded area; • Means for safe access to the bund for regular inspections and maintenance; • Appropriate emergency and safety equipment, e.g. tank failure alarm, fire alarm, fire fighting system and equipment, etc. • A system or for means to safely mop up or remove any spilled hazardous material without causing any environmental pollution; and • A system, e.g. valve or submersible pump, to effectively drain or remove any accumulated rainwater on a daily basis when it is raining. 				
#	#	17. Refrain from storing any material in a bund, other than what the bund provides for in terms of the design criteria given above.				
		18. Keep bunded areas spill free by removing and mopping up any spilled material immediately in accordance with the spill clean-up specifications referred to in Section 7.5.7 ; and remove or drain any accumulated uncontaminated water on a daily basis.				
#	#	19. Provide for storage, handling and disposal of fuels, oils, lubricants and other potentially harmful chemicals (and their containers) to be done under proper supervision in accordance with the manufacturer's instructions (e.g. Material Safety Data Sheets (MSDS)).				
		20. Provide suitable measures for all on-site purification of transformer oil. {Method Statement} / {SOP}				
#	#	21. Follow the vehicle and refuelling procedures as specified in Section 7.5.6 .				



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
#	#						
#	#						
#	#						
#	#						
#	#						
#	#						

22. Follow the spill clean-up procedures as specified in **Section 7.5.7**.
23. Ensure that any delivery drivers are informed of all procedures and restrictions (including “No-go” areas) required to comply with the EMP and ensure that these delivery drivers are supervised during the off-loading by someone with an adequate understanding of the requirements.
24. Ensure that materials are appropriately secured and contained to ensure safe passage between destinations without any loss or spill of material along the way.
25. Prohibit smoking in the vicinity of hazardous substance storage areas and erect and maintain “No smoking” and “Danger” signs at such areas.
26. Consider and treat all empty and externally dirty containers (e.g. tanks and drums) that contained hazardous substances as hazardous materials, e.g. by ensuring safe storage in bunded areas or by providing other means to prevent any spillage from these; this is unless the containers have been appropriately and fully drained and cleaned to render them non-hazardous. **{Method Statement} / {SOP}**
27. Ensure that adequate spill management equipment is available in the immediate vicinity where hazardous substances are used and/or stored. Where spill kits are used, they need to be properly stocked at all times.

7.4.10 Waste Management

#							
#	#						

1. Develop and maintain an overall site *Integrated Waste Management Master Plan* for effective and legal management and disposal of general waste, hazardous waste and building rubble, based on best estimates of such wastes being collectively generated by all the resident staff, contractors and their sub-contractors on site; and include such a plan in the contractor tendering and agreement process / operational EMS.
2. Develop and implement a detailed on-site *Waste Management Plan*, prior to the relevant waste generating activities commencing, covering *inter alia*:
 - Identification, classification and keeping of a register of type of waste generated;
 - Planning for the construction / establishment / operation / decommissioning of a centralised waste management facility and/or designated waste management areas;
 - Procedures to be followed for waste separation at source as well as reduce, re-use, recycle, recover and treatment of waste prior to the disposal option; and



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
			<ul style="list-style-type: none"> Waste management procedures for waste disposal, e.g. storage, disposal, keeping of waste consignment certificates, etc. 				
			{Method Statement} / {SOP}				
#			&				
#			3. Provide for and ensure radioactive waste management practices to be consistent with the National Nuclear Regulator requirements.				
#			4. Minimise production of all solid, liquid, and gaseous radioactive waste, both in terms of volume and activity content				
#			5. Provide for and ensure only treated liquid releases to be diverted to the [cooling water discharge system of the nuclear power station.				
#	#		6. Ensure that all conventional waste is properly disposed of and removed from the site to a permitted landfill site, or where applicable to an appropriately licensed waste recycling facility.				
			7. Dispose of sewage in a sustainable manner that will <u>fully</u> prevent any raw or treated sewage to contaminate surface water, wetlands or groundwater; entailing one of or a combination of the following: <ul style="list-style-type: none"> Connect an on-site sewerage system to an existing off-site system (probably the least impact); Design and construct an appropriate on-site sewerage treatment plant, with the treated sewerage effluent being pumped out to sea; and Provide for the collection by tanker and transportation and disposal to a local municipal sewerage treatment work. 				
			8. Provide for appropriate recycling of waste, e.g. disposal of waste oils to an oil recycler.				

7.4.11 Stormwater Management

Effective stormwater management is necessary at all phases of the project and is vital in terms of protecting the site from being flooded as well as ensuring that environmental degradation is prevented / mitigated.

In the case of a nuclear power station site the stormwater management system for the nuclear power island area itself needs to be designed in accordance with the standards specified in the Integrated Water Use License for the power station by the Department of Water Affairs.

Note: For the purposes of this EMP the following definitions apply:

“Dirty” water – means water that is directly or indirectly contaminated as a



Applicant (Eskom)
Contractor
ECO / Auditor
Specialist

Environmental Specifications

Planning & Design
Construction
Operation
Decommissioning

result of project activities to such an extent that it does not meet the applicable discharge standards; and where contaminants may include suspended or dissolved construction material, sewage, litter, eroded soil, etc;

“Clean” water – means water that has either not been contaminated directly / indirectly as a result of project activities; or that has been treated to a quality that meets the applicable discharge standards.

&

#

1. Develop and maintain an overall site *Stormwater Management Master Plan* for appropriate, effective and legal management of stormwater; and include such a plan in the contractor tendering and agreement process / operational EMS.
2. Design, implement and maintain 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.
3. Design and construct storm water control berms (e.g. trench and/or earth barriers) to divert rainwater around and away from the construction impacted areas, operational areas and/or decommissioning impacted areas in a way that would retain such rainwater as uncontaminated. **{Method Statement} / {SOP}**
4. Design, implement and maintain the permanent stormwater system for the nuclear power island area, as [follows;
 - Define any “dirty” stormwater run-off from the plant area and prevent this from leaving the plant area, achieving this by implementing “dirty” water collection channels at the perimeter of the plant area;
 - Allow for positioning and design of the channels to allow for a sufficient hydraulic gradient and flow velocity in the channels so as to drain half the site into the south-western corner and the other half into the south-eastern [corner.
 - Provide for the stormwater drainage and containment system to handle up to the 1:10 000 year storm event, in terms of IAEA Safety Guide No NS-G-3.5 (IAEA, 2003).
 - Provide for the entire plant run-off 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 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

Planning & Design
Construction
Operation
Decommissioning



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
#	#		rainfall and run-off would also need to be taken into account.)				
#	#		<p>5. Design, implement and maintain a stormwater system during construction and thereafter in all areas <u>outside the nuclear power island area</u> (temporary or permanent, central system or several separate systems) as follows:</p> <ul style="list-style-type: none"> • Provide appropriate measures to reasonably protect the site from erosion by stormwater (these may need to be adjusted to ensure efficiency); e.g. provide for appropriate stormwater channelling and energy dissipation ; • Define any areas where “dirty” stormwater run-off may arise and prevent such “dirty” stormwater from leaving the site without appropriate treatment to render it “clean” prior to discharge; • Minimise the inflow of “clean” (virgin) stormwater run-off into impacted areas where the stormwater could potentially be contaminated; • Provide for effective containment (e.g. dam, sump) and treatment (e.g. sediment settling, oil traps/skimers) of contaminated stormwater in order to render it “clean” for discharge purposes • Provide for containment of at least the 1:50 year run-off volume with an 800 mm freeboard from areas with a high contamination potential; in terms of Regulation 704 (June 1999) of the National Water Act, 1998 (Act No. 36 of 1998) [while this specification is fully applicable to the Operational Phase, it is also recommended for construction areas where risk of contamination with hazardous substances are high]; and • Obtain further details from more detailed water quality studies at a later stage. <p>{Method Statement} / {SOP}</p>				
#	#		6. 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 (collection system); where any transported sediment could be contained and clean stormwater pumped out, while, 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.				
#	#		7. Prohibit stormwater pollution; and implement appropriate measures to prevent stormwater pollution.				
#	#		8. Inspect and maintain all the storm water management system (drainage structures, silt / debris / oil traps, etc) to retain it cleared of organic and inorganic debris in order to prevent storm water contamination. [Regularly]				



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
#	#						
			9. Dispose of any hazardous substances cleared from stormwater systems, e.g. oils/greases/chemicals from traps in accordance with the appropriate hazardous substances and waste management procedures.				

7.4.12 Wastewater Management¹⁰

#							
			1. Develop an overall site <i>Wastewater Treatment Master Plan</i> for effective and legal management and disposal of wastewater during the construction and operational phases of the project, based on best estimates of wastewater generation; and include such a plan in the contractor tendering and agreement process / operational EMS.				
#	#						
			2. Assess all project activities and associated water use requirements (e.g. treated wastewater discharge) well in advance in order to ensure the relevant Water Use License (WUL) is applied for where required; and ensure that such a WUL is in place and all associated conditions complied with prior to such use commencing. {Method Statement} / {SOP} .				
#	#						
			3. Design and construct a waste water management system and associated facilities for the safe and effective containment (including emergency containment), processing, treatment, re-use and disposal of all construction and industrial wastewater (including contaminated stormwater) from various activities and operations that complies fully with all relevant legal requirements; and aligns suitably with the <i>Wastewater Treatment Master Plan</i> .				
#	#						
			4. Obtain all the relevant authorisations for discharge of treated wastewater and ensure that all the conditions of authorisation are effectively implemented and/or adhered to.				
#							
			5. Provide only treated liquid waste releases to be diverted to the cooling water discharge of the nuclear power station under a valid WUL. {SOP}				
#	#						
			6. Provide for the effective treatment and legal disposal of any sludge generated at the wastewater treatment facilities.				
#	#						
			7. Monitor treated wastewater to ensure that it complies with all the conditions for discharge				
#	#						
			8. Remove (do not leave <i>in-situ</i>) all polluted water, including contaminated stormwater, immediately from an area or system where such polluted water could spill or wash into the surrounding water resources or onto open ground and transfer it to a impermeable tanker, sump or container for safekeeping before transportation for treatment and/or disposal to an appropriate wastewater treatment facility or alternatively to an				

¹⁰ A water use license will have to be obtained in terms of Section 21 of the National Water Act, 1998. This section will have to be augmented with conditions in the Water Use License once this has been obtained. The water use license application was not included in the scope of the EIA process for Nuclear-1.



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				

appropriately licensed landfill site.

7.4.13 Brine Management

#	#						
#							

1. Develop an overall site master plan for effective and legal management and disposal of brine during the construction and operational phases of the project, based on best estimates of brine generation; and where applicable include such a plan in the contractor tendering and agreement process / operational EMS.
2. Provide for brine to be disposed of in the sea, either in the surf zone (during construction and decommissioning) or further out to sea (during operation) through an appropriately designed diffuser for rapid mixing and dilution with seawater; and [in line with the requirements of the applicable authorisations, including the Water Use License and Waste Management Activity License.
3. Provide for brine to be co-disposed with released cooling water during the operational phase.

7.4.14 Air Quality

#							
#							
#							
#	#						
#	#						
#	#						

1. Develop, implement and maintain an *Air Quality Management Master Plan*, including but not limited to:
 - An 'off site' Air Quality Monitoring Programme;
 - Guidelines for on-site dust suppression; and
 - Appropriate air emission and air quality targets / criteria (e.g. for dust levels, exhaust fumes / gasses, etc.).
2. Develop, implement and maintain a comprehensive air quality monitoring programme which includes measurements of levels in worker areas and areas of the community in accordance with the requirements detailed in **Section 9.5**.
3. Report on the air quality monitoring results to the ECO, Environmental Monitoring Committee and Department of Environmental Affairs. **[At a frequency of every 3 to 6 months]**
4. Address any air pollution issues that are identified during the abovementioned air quality monitoring.
5. Develop, implement and maintain an 'on site' *Air Quality and Dust Control and Monitoring Programme*, to meet the requirements of the abovementioned *Air Quality Management Master Plan*; including but not limited to the following:
 - Apply mitigation measures to effectively suppress airborne dust at construction sites and on all dirt roads that service the nuclear



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
			<p>power station, e.g.:</p> <ul style="list-style-type: none"> - Pave or temporary stabilise surface of frequently used roads; - Damp / wet down trafficked areas with freshwater, and where appropriate, apply suitable additives to reduce the application frequency and use of fresh water; - Implement and enforce appropriate speed limits on dusty roads - Use of cloth or brush barrier fences; and - Cover dumps with plastic sheeting (except for topsoil stockpiles). <ul style="list-style-type: none"> • Prohibit the use seawater for dust suppression since seawater would pollute and degrade natural habitats, especially any natural water bodies near to roads. • {Method Statement} / {SOP} 				
#			6. Design, implement and maintain measures to maintain any contaminant releases to atmosphere to within the National Nuclear Regulator's specified annual release limits.				
			7. Monitor atmospheric releases and ensure that such releases are maintained within legislated and <i>Air Quality Management Master Plan</i> target limits.				

7.4.15 Noise

#	#		1. Develop and implement a <i>Noise Control Management Plan</i> with associated <i>Noise Monitoring Programme (based on SANS10103:2004)</i> . {Method Statement} / {SOP}				
#	#		2. Reduce / mitigate noise, where construction (e.g. of roads) is to take place within approximately 500 m of residences; for example: <ul style="list-style-type: none"> • Provide residents with prior knowledge of scheduling for ultra-heavy-duty vehicles and advise on the frequency and day periods of exposure to such noise; • Select construction vehicles/ machinery with low noise emission levels (e.g. fitted with silencers); • Minimise the total construction time; and • Restrict construction close to residential areas to daytime hours, if feasible. If not, obtain authorisation from the local authority for alternative arrangements and inform the Environmental Monitoring Committee of such arrangements. 				

7.4.16 Site Access Control, Safety and Security

			1. Facilitate a review of site control issues raised in the EIA on National				
--	--	--	---	--	--	--	--



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
			Key Points via the Minister of Police.				
			2. Confirm the availability of any required support for site control from the relevant police, emergency services, military, naval and coastal management agencies.				
#			3. 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.				
#			4. Integrate the site specific control measures with existing local and regional security measures, where appropriate.				
#			5. Develop, implement and maintain a <i>Site Security Programme</i> .				
#			6. Develop, implement and maintain a <i>Radiation Protection Programme</i> which complies with all legislation and other requirements the National Nuclear Regulator may have.				
			7. Declare and retain the nuclear power station site and associated infrastructure and equipment off-limits to the public.				
#	#		8. Inform all staff of the hazards on the site and provide suitable training on how to protect themselves, others and the environment from such hazards; how to react and what to do in an emergency.				
#			9. Ensure adequate signage is provided along the major roads and at the entrance of the construction site.				
#	#		10. Clearly communicate access policy for the properties to the staff and public, using notice boards on access gates and by directly communicating with the nearby communities. (Refer to Section 7.1.4 and Section 7.2.6 , for specifications related to special access permissions).				
#	#		11. Provide and declare the access gateways and what use they are intended for; control access at all these gateways; prohibit access via any other places; and prohibit use of any deviation from approved access roads or transportation routes unless written approval has been received therefore from the Site Manager / Power Station Manager.				
#	#		12. Raise awareness and clearly communicate any public safety risk to the public, using appropriate safety and precaution signage erected in applicable areas, radio broadcasts, notice boards and/or by directly communicating with the nearby communities (meetings, flyers).				
			13. Ensure compliance with the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), and specifically for the purposes of this EMP, such sections and regulations that have environmental relevance, e.g. handling of flammable liquids, asbestos management (if applicable), Major Hazard Installation Risk Assessment, etc.				



Environmental Specifications				Applicant (Eskom)	Contractor	ECO / Auditor	Specialist	Planning & Design	Construction	Operation	Decommissioning
#	#										
#	#										
#											
#											
#											
#	#										
#	#										
#	#										
#	#										
#	#										
#	#										
#	#										
#	#										

14. Ensure that the site and all associated operations are and remain in compliance with all National Health and Safety Standards and other relevant international, national, regional and local regulations.
15. Appoint a Health and Safety (H&S) Officer.
16. Address community safety & community safety concerns.
17. Issue identity tags complete with a photograph to all individuals that are to be present on nuclear power station site for more than 3 consecutive calendar days.
18. Require visitors to sign a register at the security checkpoint; issue all visitors with a visitor's permit; and require an employee responsible for receiving / accompanying the visitor to endorse this permit before the visitor leaves the security area.
19. Maintain all vehicles used on site in a roadworthy and leak free condition and maintain all equipment in a safe working condition and such that any accidental emissions, spills, explosions, etc. are avoided.
20. Allow only qualified/ trained personnel to operate equipment and vehicles.
21. Prohibit anyone from driving or operating construction / operation / demolition vehicles, or any other vehicle, without being in possession of a valid driver's license; and without obeying the applicable speed limits and road safety regulations that apply on or off site.
22. Prohibit the transportation of persons on the back of vehicles.
23. Prohibit driving under the influence of alcohol or narcotic substances.
24. Rehabilitate any damage caused to the environment.
25. Develop, implement and follow a site-specific decommissioning plan for the nuclear power station in accordance with all the most current requirements of the National Nuclear Regulator, environmental authorities and any other relevant authorities and/or stakeholders.

7.4.17 Emergency Preparedness and Response

#	#										

1. Develop and implement an *Emergency Preparedness Plan* consisting of appropriate emergency procedures and information prior to commencing with any work that may potentially result in an emergency; which includes but is not limited to fires, spills, and contamination of ground and surface water, accidents to employees and damage to services.¹¹
[Ongoing and where necessary], {Method Statement} / {SOP}

¹¹ Emergency response related to possible radiological releases will be dealt with in terms of the NNR's licensing of the facility and is therefore not included here.



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
#	#						
			2. Include contact details of all relevant emergency services and response teams and neighbouring land owners/ users/ managers in the Emergency Preparedness Plan; keep and display such contact details in appropriate places; and ensure that these are regularly checked und updated if necessary.				
#	#						
			3. Appoint an on-site emergency response team, train key staff in emergency response and make all staff aware of the emergency procedures. [Ongoing]				
#							
			4. Work closely with the local emergency services departments in order to ensure that required services are sufficient in the area; particular due to increased population and traffic on roads; for providing support in case of making fire breaks and site emergencies; and for assistance with evacuation procedures once the site is operational.				
#	#						
			5. Maintain a register of and compile reports on all incidents, accidents, 'near miss', etc., which includes the action taken after the event has occurred; and inform at least the Site Manager / Power Station Manager as well as the ECO of the event.				
#	#						
			6. Notify any relevant authority immediately and keep detailed record of such notifications, should any serious incident occur, including e.g.: <ul style="list-style-type: none"> • The local Emergency Services Department for all incidents that may affect the local community and road users • The Department of Environmental Affairs for incidents which likely has a detrimental effect on the environment; • The Department of Labour for reportable incidents as defined in the Occupation Health and Safety Act (Act No 85 of 1993); • The relevant roads authority, for accidents on public roads; and • The Department of Water Affairs for any emergencies that affect water resources. 				
#							
			7. Develop, implement and maintain emergency evacuation procedures in case of a nuclear risk incident. {SOP} .				

7.4.18 Fire Prevention and Response

#	#						
			1. Responsible parties will be liable for any damage caused by fires resulting from their operation, negligence or lack of protection of the site from veld fires (e.g. the failure to maintain fire breaks).				
#	#						
			2. Include a fire emergency preparedness plan for fighting accidental fires in the <i>Emergency Preparedness Plan</i> (refer to Section 7.4.17).				
#	#						
			3. Define, implement and maintain a proper firebreaks around the entire				



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
#	#		site footprint (permanent), satellite facilities (permanent) and where appropriate on-site (temporary or permanent), to prevent accidental fires spreading to, from or across the site; and ensure that this is done in accordance with the requirements of Veld and Forest Fires Act.				
#	#		4. Fire-fighting equipment for each construction / operational / demolition team and/or area must be readily available on site; bearing in mind that these should be approved by the local Fire Prevention Officer, ECO, Safety and/or Health Officer.				
#	#		5. Avail and maintain appropriate fire-extinguishers on all vehicles carrying flammable materials.				
#	#		6. Keep a register and inspection log of all fire fighting equipment; and inspect and check fire fighting equipment regularly and record such inspection on the inspection log that is retained on-site. {Method Statement} / {SOP}				
#	#		7. Prevent accidental fires through proper sensitisation of staff towards the associated risks, dangers and damage of property.				
#	#		8. Prohibit the use of open fires and random “braais” on-site, <u>strictly</u> , unless they are effectively contained and designated areas far away from vegetation.				
#	#		9. Inform and/or involve neighbouring land owners/ users/ managers should there be a risk of a fire spreading to their land.				

7.5 Specific Construction Activities

Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				

7.5.1 Site Clearance

#	#		1. Restrict the area to be cleared to a minimum, and clear areas sequentially as needed; to benefit from the stormwater absorption, erosion protection and dust control properties of the vegetation cover. {Method Statement}				
#	#		2. Demarcate all areas to be cleared and those not to be cleared (e.g. “No-go” areas) clearly and effectively, prior to clearing.				



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
#	#						
#			&				
#			&				

3. Designate stockpile areas for various materials (topsoil, subsoil, rock and blasted materials and building rubble/excess concrete that can be crushed and re-used as fill material) and communicate these to the contractors.
4. Facilitate collection of scientific material and information before and during site clearance as specified in **Section 7.1.6** and **Section 7.1.7**
5. Facilitate search-and-rescue operations before and during site clearance, as specified in **Section 7.1.6** and **Section 7.1.7**.
6. Clear the site in a logical sequence and manner that allows mobile species to escape, by starting clearance from an area of relatively high disturbance and progressing in an orderly manner in the direction of least disturbance and least physical obstruction; e.g. begin clearing from an existing fence and clear towards an area that is not yet fenced and is still covered by natural habitat.
7. Co-stockpile cleared vegetation with cleared topsoil and manage it in such a way that cleared vegetation is chipped and mulched and placed on top of stockpiled soil, and that the mixing of the materials is minimised as much as is reasonably practical.
8. Prohibit burning of cleared vegetation.

7.5.2 Soil Stockpiling

#	#						
#	#						
#	#						

1. Restrict the removal of topsoil to areas where excavation or preparation for coverage by hardstanding are imminent, and there is a high risk of imminent topsoil contamination (e.g. areas of heavy traffic, areas in proximity of cement batching facilities, etc.).
2. Remove the topsoil material (minimum 300 mm) from any areas to be excavated, covered by hardstanding or from which the topsoil needs to be stripped for topsoil protection.
3. Store the topsoil separately (from general fill, rubble, etc.), effectively and securely for later use in rehabilitation in stockpiles in a manner that would limit erosion and dust. **{Method Statement}**
4. Locate all soil stockpiles (topsoil and fill) as follows:
 - Sufficiently away from seepage zones, flood lines, water courses and other ecological sensitive area;
 - Preferably in areas that were already disturbed before the nuclear power station project activities commenced on site;
 - In areas as indicated in the relevant approved and latest site utilisation and/or layout plans; and



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
			<ul style="list-style-type: none"> Allow for soil from construction areas which are a distance away from the main site (e.g. such as from the inlet and outlet pipes) to be stockpiled locally at the 'away - area', provided that specifications above are adhered to. 				
#	#		5. Plan for and adhere to a minimum of topsoil handling (preferably handle stockpile only during initial stockpiling and for eventual removal for rehabilitation purposes).				
#	#		6. Secure and treat soil stockpiles to reduce dust generation and erosion effectively.				
#	#		7. Reseed topsoil stockpiles that are to be kept for extended periods, to prevent excessive dust or erosion.				
	#		8. Remove all excess fill material from an area or the site, once construction therein has been completed.				

7.5.3 Dewatering

			1. Minimise dewatering requirements and prohibit any non-essential dewatering.				
#	#		2. Place drip trays under pumps in order to contain fuel and/or oil spills and leaks, when dewatering. Also place suitable spill absorbent material in each tray to absorb such spills.				
#	#		3. Take all reasonable precautions to prevent spillage during the re-fuelling of dewatering pumps.				
#	#		4. Refrain from pumping / releasing any water from the dewatering activities into the environment without the necessary approvals.				
			5. Follow the groundwater monitoring programme in accordance with Section 7.1.3.				

7.5.4 Blasting and Sourcing of Borrow Material

	#		1. Undertake blasting according to all relevant statutes and regulations and strictly prohibit and refrain from undertaking any blasting without the required authorisations.				
			2. Plan blasting well in advance to <u>restrict blasting to the period of June to October</u> ; in order to <u>strictly</u> avoid blasting in the peak bird-breeding season of sensitive populations of seabirds (thus <u>strictly</u> avoid the period of November-May).				
	#		3. Notify and consult with the ECO to establish whether any species				



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
			rescue operation, e.g. removal / chasing away of large animals and birds, would be required prior to any blasting event.				
#			4. [Undertake all blasting in accordance with all the relevant legislation under strict supervision of a registered specialist blaster.				
#			5. Obtain authorisation of all borrow pits in terms of the Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), prior to any mining / retrieval of borrow pit material commencing.				
#			6. Refrain from sourcing / acquiring any borrow pit material unless it has been legally retrieved / mined, and retain copies of relevant permits / licenses / authorisations on record.				
#			7. Implement and/or adhere to all the conditions of the borrow pit authorisation, including any related environmental management plans/programmes.				

7.5.5 Concrete Batching

#			1. Avoid mixing concrete directly on the ground, in sensitive areas or near water resources.				
#			2. Locate concrete batching activity / facilities in an area of low environmental sensitivity and indicate such location on the <i>Detailed Construction Site Utilisation Plan</i> .				
#			3. Treat all waste water resulting from batching of concrete and concrete equipment washing areas to a quality that meets the relevant specification of the applicable Water Use License before re-use (e.g. road wetting) and/or discharge. {Method Statement}				
#			4. Store bulk cement, bags of cement and empty cement bags in an area or a facility protected from the weather and in a way that minimises cement dust being wind blown into the environment.				
#			5. Carry out the cleaning and/or washing of concrete transporters and delivery trucks, concrete mixers and other concrete equipment in controlled cleaning zones/facilities only; and refrain from undertaking any such cleaning elsewhere; with the cleaning zones/facilities designed to contain all concrete waste and wash water effectively. {Method Statement}				
#			6. Clean up any accidental concrete spills that occur outside the designated concrete batching area immediately.				
#			7. Rehabilitate the ground of the batching plant area and any area where concrete has been spilled to render it uncontaminated, upon completion of works.				

7.5.6 Refuelling, Servicing and Cleaning of Vehicles, Plant, Equipment and



Applicant (Eskom)	Contractor	ECO / Auditor	Specialist	Environmental Specifications	Planning & Design	Construction	Operation	Decommissioning
-------------------	------------	---------------	------------	------------------------------	-------------------	--------------	-----------	-----------------

Machines

#	#		1. Refuel vehicle or machinery only at a purposely designed and designated bunded refuelling area on site; unless in cases of an emergency repairs or for refuelling stationary equipment (e.g. generator) in which case drip trays are to be used. {Method Statement}					
#	#		2. Design the bunded refuelling area to be provided with a hard standing surface that protects the fuel island from ingress of stormwater and prevent egress of water from the contaminated areas.					
#	#		3. Place drip-trays that are suitably and practically designed to effectively contain spills (i.e. sufficient capacity and freeboard), and where necessary filled with appropriate absorbent material, under all parked construction vehicles and machines that are or may leak oil or fuel, maintained daily and regularly disposed of in an appropriate manner; unless such a vehicle is parked in an area provided with hardstanding that drains towards an oil-water separator to handle the amount of water expected to fall within the hard standing area.					
				4. Prohibit washing of any mechanical plant or equipment on the nuclear power station site, unless in an area specifically equipped for such a purpose in a way that would prevent ground, stormwater and groundwater contamination.				
				5. Undertake all vehicle maintenance (unless where on-site emergency repairs are necessary) in a designated vehicle maintenance area/workshop, which is provided with a roof, appropriate spill containment (bunding), waste water treatment facility, fire protection, etc. {Method Statement}				
				6. Undertake stationary plant and vehicle emergency repairs <i>in-situ</i> only if there is good reason why these are impractical to carry out in a workshop; and if doing so, implement and adhere to appropriate spill prevention and containment measures (e.g. drain fuel / oil into drums, make use of drip-trays, cover the ground for part and tool lay-down areas with tarpaulins, construct temporary containment berms etc.). {Method Statement}				
				7. Ensure skirts are placed around static plant (e.g. generators) to prevent rainwater build-up that could result in overflow of contaminated water.				

7.5.7 Spill Clean-up and Disposal

#	#		1. Make every effort to avoid spills of hazardous materials.				
			2. Develop and implement a <i>Spill Clean-up Procedure</i> that takes staff safety and environmental protection appropriately into consideration. {Method Statement} / {SOP}				



Environmental Specifications				Planning & Design	Construction	Operation	Decommissioning
Applicant (Eskom)	Contractor	ECO / Auditor	Specialist				
#	#						
#	#		3. Provide stock and maintain appropriate complete emergency spill kits at locations close to where hazardous substance are stored or used and ensure full availability at all times. {Method Statement} / {SOP}				
#	#		4. Train all relevant staff members to use the emergency spill kit and on the procedures to deal with spills of hazardous substances such as e.g. oils, diesel, petrol, paints, pesticides, etc.				
#	#		5. Contain and clean-up any spills as soon as possible after the incident and thereafter remediate the affected area effectively and to the satisfaction of the ECO; including spills on unbunded hard surfaces, stormwater drains, roads, laydown areas, etc..				
#	#		6. Report spills of hazardous substances immediately to the ECO and maintain a register for spills and all incidents involving hazardous materials.				
#	#		7. Dispose of spilled material recovered from bunded areas by either appropriate re-use, recycling or disposal to a suitably licensed disposal facility.				
#	#		8. Remove contaminated soil or yard stone immediately (do not leave <i>in-situ</i>) and disposed of this soil at a suitably licensed waste disposal site; or alternatively treat contaminated soil on site but <i>ex-situ</i> through bioremediation on an impermeable bunded area, provided such a method proof to be effective and prevents further or ongoing environmental contamination.				

7.5.8 'Non-hazardous' Spoil Disposal and Dumps

Note: For the purposes of this EMP the following definition applies:

Soil – means excavated natural soil and crushed rock which is uncontaminated with any 'man-made' material such as concrete, cement, packaging, oils, fuel, etc.

#							
#	#						
			1. Dispose of 'non-hazardous' spoil in the ocean at the distances from shore and at the pumping rates recommended in the Oceanographic Assessment (Appendix E16 of the EIR) and the Marine Assessment (Appendix E15 of the EIR). {Method Statement}				
			2. Minimise the visual impact of temporary spoil dumps				
			<ul style="list-style-type: none"> Consider and design the location and form of temporary spoil dumps 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; and do so with great care and in detail as the form of the spoil dump is most important as it 				



Applicant (Eskom)			Environmental Specifications				Planning & Design			
Contractor							Construction			
ECO / Auditor							Operation			
Specialist							Decommissioning			
			<p>determines the primary visual impact;</p> <ul style="list-style-type: none"> • Provide for side slopes to ideally be 1:3 but not steeper than 1:2, taking 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 sensitive environmental features (e.g. wetlands) and work areas; • Provide for the effectively planned and carefully controlled development and rehabilitation of the dump in phases as the material becomes available; and • Develop, implement and maintain a detailed design and rehabilitation plan in accordance with these specifications for the spoil dump showing the entire dump form, stabilisation methods and a specification of planting type and species together with maintenance requirements; and do so with the engagement of a suitably qualified and experienced landscape architect and rehabilitation contractor who are experienced in rehabilitation of sand dumps in the relevant biome. 							

7.5.9 Demolition of Structures and Buildings

#	#	#								
#	#	#	1. Obtain all relevant approvals and clearances prior to demolition.							
#	#	#	2. Ensure that all hazardous substances (e.g. radioactive materials, oils, greases, asbestos, mercury containing light bulbs, etc.), are safely removed and disposed of in accordance with legislative requirements to an appropriate facility for safe storage, treatment and/or disposal.							
#	#	#	3. Remove any re-usable / recyclable material for re-use to an appropriately licensed recycler / recycling facility, where feasible.							
#	#	#	4. Dispose of any rubble to an appropriately licensed disposal facility (e.g. building rubble site, recycler).							



8 METHOD STATEMENTS AND STANDARD OPERATING PROCEDURES

While the EMP is considered to be reasonably comprehensive, it does not necessarily prescribe all the environmental compliance requirements and methods in detail. Also additional information might be gathered or become available as the project develops. For certain aspects or activities, the contractors will thus be required to develop and implement Method Statements to explain and document the specific and detailed methods they will use to comply with and implement the EMP. In a similar vein, Eskom will develop Safe Operating Procedures (SOP) that amongst other are based on or give effect to certain EMP specification during the operational and/or decommissioning phases of the project.

8.1 Method Statements

Eskom will require contractors to develop and submit Method Statements for a range of work aspects, including for example for certain managerial, technical, health, safety and environmental aspects of construction activities. However, in the context of this EMP and thus specific to environmental management, Method Statements are required to indicate and describe in detail how contractors will implement and achieve compliance with environmental legislation, the specifications included in this EMP per the indications in the Library of Specifications (**Section 7**) and general good management practice, while undertaking their construction activities. Method Statements may be required for any identified activity or group of activities (or aspects) for which it is considered necessary to implement a detailed method to mitigate potential environmental impacts or incorporate EMP requirements in the day-to-day environmental management of construction activities.

This EMP specifies for which construction activities or aspects the contractors are required to develop and submit Method Statements (refer to **Section 8.1.1** below) and the procedures and content requirements for Method Statements (refer to **Section 8.1.2**). However, this does thus not preclude the development and implementation of additional Method Statements for environmental management aspects, provided that these do not conflict with the EMP.

8.1.1 Required Method Statements

Specifications for Method Statements that are required are tagged as such in the Library of Specifications (**Section 7**). A consolidated preliminary list of these compulsory Method Statements that are required from the Contractor in terms of this EMP is provided in **Annexure D**. These cover, for example, but are not necessarily limited to, categories of activities such as:

- Location, layout and preparation of the construction camp(s);
- 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;
- Storm water management;



- Contaminated water management plan, including the containment of runoff and polluted water;
- Environmental incident response (including details of methods for fuel spills and clean up operations); and
- Solid waste management (general and hazardous) and removal of waste from site (excluding nuclear waste).

Note that additional Method Statements may be identified and required by an environmental authority, Eskom and/or the Environmental Control Officer (ECO) as the project unfolds, in which case the list in **Annexure D** may require amendment. In this case Eskom shall consult with the DEA of such an amendment and if required request their approval thereof in writing.

8.1.2 Procedures and Content

The Contractor shall submit all required Method Statement in writing to the ECO for acceptance and the Site Manager (SM) for approval. On receipt, the SM shall review and approve the Method Statement in consultation with the ECO. The SM shall then send the approved Method Statement to the Eskom Project Manager (PM) for authorisation and registration. Once authorised, the PM shall forward a copy of the authorised Method Statement to the SM, EM and ECO. The PM is therefore responsible for the authorisation of all Method Statements. The Contractor shall only implement a Method Statement once he/she has received the PM's written authorisation thereof.

The Method Statement shall clearly state the following information:

- Timing of activities;
- Construction procedures;
- Materials to be used and how and where they will be acquired, transported, stored, contained and used;
- Materials spill management procedures (e.g. spill containment, spill clean-up kit and procedure, action to be taken if containment is not possible, etc.);
- Equipment to be used and how it would be brought to the site (from the manufacturer or supplier) and taken from the site (for re-use or disposal);
- Staffing requirements;
- Proposed construction procedure designed to implement the relevant environmental specifications;
- Compliance / non-compliance with the environmental specifications (this has to do with planning to assess compliance and instituting corrective action if non-compliance is detected);
- The system to be implemented to ensure compliance with the above; and
- Other information deemed necessary by the Contractor, SM and/or ECO.

The Contractor shall submit Method Statements in a timeframe specified by the SM/ PM (typically 14 working days) prior to the projected commencement of work on an activity, to allow the SM and ECO time to study and approve the Method Statement.



The PM shall strive to review and authorise the Method Statement within 7 working days of receipt thereof.

The Contractor may not commence with any activity covered by the Method Statement until it has been authorised, except in the case of emergency activities and then only with the consent of the SM (or ECO).

Once a Method Statement is authorised it binds the Contractor. The Contractor must therefore ensure that all activities to which the authorised Method Statement applies is carried out accordingly.

Due to changing circumstances, it may be necessary to modify Method Statements on instruction from the SM or his delegate on advice of the ECO. In such cases, the proposed modifications must be reviewed by the SM and ECO. The SM and/or ECO may require changes to a Method Statement if it does not comply with the specification or if the stated methodology carries an unreasonable or unacceptable environmental risk. The Contractor may only implement a revised Method Statement once he receives formal written authorisation from the PM to do so. The Contractor must also obtain written approval from the SM (or ECO) for any deviation from a Method Statement.

The Contractor, PM and ECO shall retain records of any amendments to any Method Statement and ensure that the most current version of all Method Statements are being used. The Contractor shall keep the latest version of approved Method Statements readily available on the site and shall communicate such version to all relevant employee and subcontractors.

Approval of the Method Statement does not absolve the Contractor from his/her obligations or responsibilities in terms of the contract.

Annexure E explains Method Statements and provides a template Method Statement sheet as a guide for the compilation of Method Statements.

8.2 Standard Operating Procedures

Standard Operating Procedures (SOPs), once approved, must be incorporated into and form part of the nuclear power station's Environmental Management System. As such they bind Eskom and its employees in terms of their commitment to sound environmental management.

Similar to Method Statements, SOPs provide detail on 'how' specific environmental requirements will be developed, implemented, maintained and/or adhered to.



9 MONITORING PROGRAMMES

9.1 Dune geomorphology

The dynamics of mobile and vegetated dunes is well-understood at the Thyspunt 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 dune field. Monthly visits are required. Any ad-hoc issues that crop up such as obstruction of moving dunes must be addressed.

9.2 Geotechnical suitability

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

9.3 Hydrology

The monitoring requirements have been incorporated in **Section 7.1.2**.

9.3.1 Management Objectives

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.

9.3.2 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.

9.3.3 Monitoring Parameters

Determinants of key relevance are detailed in **Table 9.1**.



Table 9.1: Determinants of key relevance

Key Determinand	Relevance
Physical Quality	
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
Chemical Quality	
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

9.3.4 Monitoring Frequency

The recommended sampling frequency is detailed in **Table 9.2**.

Table 9.2: Minimum and recommended number of samples

Sampling Point		Minimum per Point		Recommended per Point	
Name	GPS Coordinates *	Number of Samples (per Year)	Sampling Frequency	Number of Samples (per year)	Sampling Frequency
Thyspunt Ponding Area		2	When possible in wet season	4	Quarterly (if it had rained)
Thyspunt Non-perennial Streams		4 (2 up stream and 2 downstream of activity)	When possible in wet season	12	Bi-monthly

* To be determined

9.4 Geohydrology

The monitoring requirements have been incorporated in **Section 7.1.3**.

9.4.1 Management Objectives

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.

9.4.2 Monitoring Programme

Eskom will develop and implement a comprehensive groundwater monitoring programme by 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.

The following programme is recommended:

- Commence prior to commissioning of plant, and continue during operational phase and beyond as relevant authorities may specify **[Ongoing]**;
- Adhere to a reporting frequency of 3 to 6 months **[Ongoing]**;;
- Install both shallow (primary aquifer) and deeper (secondary aquifer) monitoring boreholes at the site equipped with automatic groundwater level/ temperature recorders;
- Install a barometric logger at the boreholes to record the barometric pressure variation in order to correct the groundwater level data for barometric variation; and
- Take samples for macro- and micro-chemical, stable isotope and selected radionuclide analysis.

9.4.3 Monitoring Parameters

In addition to monitoring the physical geohydrological characteristics such as water level, barometric pressure and temperature; the following macro- and micro-chemical, stable isotope and selected radionuclide analysis is to be included:

- A full suite of cations (Na, K, Ca, Mg, NH₄);
- A full suite of anions (Cl, SO₄, NO₃, NH₃, PO₄, HCO₃);
- Heavy metals (Fe, Mn, Cr, Zn, Co, Pb, Cu, Cd);
- Trace elements (F);
- Radionuclides (e.g. U, Th, Cs, Sr, Ra, ³H, ¹⁴C, and any additional determinants required for assessment of aggressiveness of the water).



9.5 Air quality

As referred to in **Section 7.4.14**, 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 9.3: Recommended air quality impact monitoring programme

Recommended monitoring programme	Duration of monitoring	Reporting frequency	Management objectives
<p>Monitoring measures outlined in the South African National Standards, SANS 1929:2004 will be included:</p> <ul style="list-style-type: none"> • Baseline sampling; • Control site sampling; • Dust deposition gauges (provides long term data); • High volume samplers (quantitative data over 24 hr periods); • Continuous particle monitors (provides data relevant to short term events); • Size-selective samplers (samples dust in size fractions); and • Personal exposure samplers (worn by workers). 	<p>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.</p>	<p>The monitoring equipment will either be filter based on-line monitors or non-filter based automatic monitors.</p>	<p>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.</p>



9.6 Flora

The monitoring requirements have been incorporated in **Section 7.1.6**, covering the following:

- 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.
-

9.7 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 nuclear power station is strongly recommended as an essential condition of any development approval at this site. (Refer to **Section 7.1.5**.)

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 nuclear power station 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 nuclear power station development at this site.

Table 9.4 outlines a monitoring programme for wetland systems. 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 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 9.4: Recommended wetland impact monitoring programmes for all sites

Recommended monitoring programme	Rationale	Target wetlands	Frequency and duration of monitoring	Reporting frequency	Management objectives
Monitoring of water depth / depth to water table and soil moisture in key wetlands over time	This will set a pre-construction baseline and allow identification of impacts after construction and establish with high certainty the extent of groundwater dependency of the different wetlands	<ul style="list-style-type: none"> • Langefonteinvelei and southern counterpart– monitoring points should be located upstream and downstream of the wetlands; • Selected dune slack wetlands in the mobile (Oyster Bay) dunes • Selected depressional wetlands immediately north of the Oyster Bay dunefield; and • Selected coastal seep wetlands 	<p>Recommend that well points / boreholes make allowance for installation of a water level recording device, to allow collection of data at more frequent intervals than allowed by physical site visits. Soil moisture monitoring devices are also recommended in Visser et al (2011).</p> <p>Data should be collected over at least one full year before dewatering plans are finalised and must continue until at least the end of the first three years of the operational phase.</p>	Annual (baseline) Monthly (construction phase)	No change in wetland hydroperiod with drawdown; no change in wetland soil moisture regime
Monitoring of water quality – major nutrients; EC	This will allow identification of impacts associated with contaminated seepage from various activities associated with the NPS site, including stormwater runoff	<ul style="list-style-type: none"> • Key coastal seep wetlands in vicinity of site and control wetlands further away; • Langefonteinvelei; and • Selected valley bottom wetlands in Slang River catchment. 	<p>Monthly baseline data collection over at least one year</p> <p>Weekly data collection during construction phase</p> <p>Monthly data collection for first three years of operational phase</p>	Annual (baseline) Monthly (construction phase)	No change in natural water quality fluctuations



Recommended monitoring programme	Rationale	Target wetlands	Frequency and duration of monitoring	Reporting frequency	Management objectives
Plant zonation	Mapping of plant zonation at selected wetland sites should allow tracking of changes in wetland function associated with diversion of flows, and allow measurement of the efficacy of groundwater infiltration and dispersion mitigation measures Monitoring of climate change impacts will also be enabled.	Control and potentially affected coastal seeps	Annual - ongoing for first five years of operational phase (due to assumed slow response rate).	Annual	No change in wetland zonation or shrinkage / expansion of wetland edge
Monitoring of selected radioactive isotopes in coastal seeps and Langefonteinlei – surface water and selected plant tissue.	There are no background data for radioactive isotopes for this site, against which to gauge possible future contamination.	Langefonteinlei and selected coastal seeps	Two-monthly for one year (baseline) – annual after five years of operational phase	Annual	No change over time from baseline conditions



9.8 Vertebrate fauna

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 9-5**.

Table 9.5: Recommended monitoring and evaluation programme

Recommended monitoring programme	Duration of monitoring	Reporting frequency	Management objectives
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.

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 the Environmental Monitoring Committee include experienced and respected members of the scientific community and local residents who have specific expertise in environmental matters. The function of this committee would be to assist the ECO in achieving his objectives. Refer to Section 4.2.2 for further details.

9.9 Invertebrate fauna

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 9.6: Recommended invertebrate impact monitoring programme

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.



9.10 Marine systems

Institute a monitoring programme to monitoring the following:

- Impacts on marine species, both in terms of possible radiological releases and the impacts of construction. Radiological monitoring must be commenced at the start of the construction phase to establish reliable baseline values.
- The success of re-establishment of sea floor biota in areas that have been disturbed by construction activities (e.g. the laying of outfall pipes for the desalination plant, marine spoil disposal and cooling water pipes)

Monitoring of thermal pollution

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 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.

Table 9.7: 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 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 <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.



9.11 Oceanography

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

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 Thyspunt.

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 environmental management plan 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.

9.12 Social Conditions

Eskom will initiate the establishment of Social Monitoring and Steering Committee. Monitoring of social conditions as indicated in **Table 8-9** is recommended.



Table 9.8: Recommended social impact monitoring programmes for all sites

Recommended monitoring programme	Duration of monitoring	Reporting frequency	Management objectives
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.

9.13 Visual Impacts

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 9.9: Recommended visual impact monitoring programmes for all sites

Recommended monitoring programme	Duration of monitoring	Reporting frequency	Management objectives
Monitor compliance with the visual mitigation measures provided in this EMP.	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.



Recommended monitoring programme	Duration of monitoring	Reporting frequency	Management objectives
Monitor the vegetation establishment on new landforms, the performance of safety and security lighting, the overall visual image of the nuclear power station. 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 nuclear power station and associated infrastructure.

9.14 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 9.10: Recommended heritage impact monitoring programmes for all sites

Recommended monitoring programme	Duration of monitoring	Reporting frequency	Management objectives
The audit/ identification of heritage resources on the nuclear power station sites	During construction phase.	On-going, as and when required.	In order to measure the success of mitigation, as much as 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.



Recommended monitoring programme	Duration of monitoring	Reporting frequency	Management objectives
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



10 CONFIRMING COMPLIANCE, NON-CONFORMANCE AND CORRECTIVE ACTION

10.1 Confirming Compliance

10.1.1 Compliance Monitoring

A monitoring programme will be put in place not only to ensure conformance with the EMP, 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. A Monitoring Programme has been incorporated as **Section 9** of this EMP.

The PM shall ensure that the monitoring is carried out.

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 SM, with the assistance from the ECO, shall monitor compliance with the EMP and 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 Environmental Monitoring Committee.

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

10.1.2 Record keeping and reporting

Documentation and reporting shall take place throughout the life-cycle of the Nuclear-1 Project and at various levels of the organisational hierarchy.



(a) Eskom's internal records

While contractors shall keep their own records, Eskom has assigned the role of implementing and retaining 'internal' records in terms of EMP compliance during the construction phase, as a key function of the Site Manager (SM). As such and in terms of this EMP, the SM shall keep the following documentation in good order to record compliance with the EMP:

- Results of routine and non-routine monitoring completed on site;
- Notification, records and reports of emergencies, EMP or environmental non-compliance incidents and 'near-miss' incidents; and
- Record of complaints (including all environmental complaints) received from the public and how these were responded to.

The SM shall ensure that the following information is recorded for all incidents/complaints:

- Nature of incident/complaint;
- Causes of incident/complaint;
- Party/ parties responsible for causing incident/complaint;
- Immediate actions undertaken to stop/ reduce/ contain the causes of the incident/complaint;
- Additional corrective or remedial action taken and/ or to be taken to address and to prevent reoccurrence of the incident/complaint;
- 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.

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
- 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's records during the construction 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.

(b) Reporting to external parties

The ECO shall prepare regular monitoring and/or audit reports to reflect the EMP compliance status, findings, issues and recommended actions for addressing non-compliances and submit these to the project team, the relevant environmental authorities (DEA, provincial and local environmental authorities) and through the CLO to the Environmental Monitoring Committee. Two report types are envisaged, namely:

- Routine Environmental Compliance Reports – i.e. ‘checklist’/‘corrective action plan’ type reports

These will be typically in table format which cover compliance based on a checklist of environmental specifications against non-compliance issues and associated corrective action plans. The frequency of these reports may vary depending on requirements, but will be typically on a monthly basis. The report may be supplemented by a photo record.

- Detailed Environmental Performance Audit Reports

These will be in a normal report format and will give an audit-type account of management planning and management of Nuclear-1 project overall environmental performance and compliance with the EMP and relevant environmental legislation. While a thorough site visit will be undertaken as part of each audit, the report will mainly cover the period since the previous audit report. The Environmental Performance Audit Reports should include comments and recommendations on overall site environmental management (where things are working well, where they are not working well and what can be done to improve), as well as looking ahead at potential issues and how to mitigate any impacts. Various documents such as the latest ‘corrective action plan’, photo record, incident and ‘near miss’ records, public complaints register, etc. may be appended to the report. The frequency of these reports may vary depending on requirements, but will be typically on a quarterly basis.

10.2 Addressing Non-compliance

10.2.1 Construction Phase

The Contractor shall effectively address and/or remedy all EMP non-compliances at his/her own cost.

Eskom will address any such non-compliances or transgressions on behalf of the Contractor in accordance with mechanisms set out in the ‘overall’ contract. Non-compliance will be addressed via written early warning notifications, non-compliance penalties and appropriate work stop orders as described in the subsections below. At the discretion of the SM, ECO and/or the environmental authorities, remedial actions may have to be presented and accepted before work can continue.



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.

(a) Early warning notifications

Although not a requirement in terms of this EMP, the SM and/or ECO may at their own discretion issue early warning notifications to the contractor once they become aware of a potential non-compliance and or transgression. The SM and ECO shall inform each other of any notification they had issued. It is recommended that such warnings are issued as soon as possible and that records of any such notifications are kept by all three parties, i.e. the Contractor, SM and ECO.

(b) Non-compliance penalties

In terms of this EMP, it is recommended that the SM, in consultation or on the advice of the ECO, shall issue penalties (e.g. 'spot fines') deductible from the Contractor's payment certificates, if the Contractor infringes environmental specifications set out in this EMP. The decision on when to impose a penalty will be at the discretion of the SM and/or ECO and will be final. The Contractor shall be advised in writing of the nature of the infringement and the amount of the penalty. The Contractor shall be liable for the fine and it remains his/her responsibility to recover the fine from the relevant employee or sub-contractor. 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 penalties does not replace any legal proceedings the authorities, landowners and/or members of the public may institute against the Contractor. In addition to a penalty, the Contractor shall be fully liable and required to make good any damage caused as a result of the infringement at his own expense.

Penalties shall be set depending upon the severity of the infringement. For each subsequent similar offence, the penalty may, at the discretion of the SM be doubled in value to the maximum value to be determined in the contract (i.e. typically in accordance with FIDIC CCC).

A list of typical EMP non-compliance incidents for which penalties may incur and associated fine value is included as a Penalty Schedule in **Annexure I**. Eskom may amend this schedule provided that the amended list is formally issued to the Contractor prior to an incident for which a penalty is imposed.

Infringements for which spot fines will be imposed on the contractor are, for example but not limited to:

- Using any areas outside the working areas without permission;
- Clearing and/or levelling areas outside of the working areas without permission;
- Spillage onto the ground or water bodies of oil, diesel, etc;
- Picking/damaging plant material;
- Injuring/killing animals/birds;



- Untidiness and litter at the construction site;
- Poor waste management on site;
- Making fires on site;
- Discharging effluent and/or contaminated stormwater onto the ground or into surface water;
- Repeated contravention of the specifications or failure to comply with instructions; and
- Damage to public or private property or any identified heritage sites.

The SM and Contractor shall retain records of all penalties issued for the duration of the contract.

Monies for the penalties will be deducted from the Contractor's payment certificate.

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 SM, 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.

(c) 'Suspended work' orders

The SM at his own discretion, or on recommendation from the ECO, may also order the Contractor to place on-hold or suspend 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.

Work may also be placed on hold if a heritage artefact or feature or grave is uncovered or to prevent a potential significant incident from occurring or spreading.

(d) Insistence on remedying damage or impact

In addition to the abovementioned interventions Eskom shall insist and contractually bind the Contractor to make good any damage caused as a result of the infringement, at his own expense.

10.2.2 Operational Phase

EMP non-compliance and environmental transgressions by staff members during the operational phase of the project will be addressed and handled through the normal employee disciplinary procedures of the nuclear power station.



11 CONCLUSION

This revised draft 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; in what is the second round of public review of the suite of draft EIA documents. The draft EMP has been substantially revised since the initial draft was published, to address issues and concerns raised by Interested and Affected Parties and to incorporate subsequent recommendations from specialist. After the current public review period the draft EMP will be finalised as the final 'draft EMP' for submission to the Department of Environmental Affairs (DEA) as part of the EIA Application for Environmental Authorisation of the proposed Nuclear-1 project.

It should also be noted that 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 nuclear power station and ultimately to develop Decommissioning and Closure plans.

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 nuclear power station facility shall be fully acquainted with the contents of the EMP. This will ensure that potential negative impacts are identified, avoided or mitigated.



12 REFERENCES

CESA (Consulting Engineers South Africa). 2010. *CESA Code of Conduct*. Accessed at: http://www.saace.co.za/public_downloads/code_of_conduct.pdf

DEAT. 2005. *Environmental Monitoring Committees (EMCs), Integrated Environmental Management Information Series 21*. Department of Environmental Affairs and Tourism (DEAT), Pretoria.

Eskom. 2009. *Annual Report 2009*. Accessed from: http://www.eskom.co.za/annreport09/ar_2009/

Eskom. July 2010. *Sustainable Development Overview*. Accessed at: <http://www.eskom.co.za/>

Eskom. July 2010. *United Nations Global Compact*. Accessed at: <http://www.eskom.co.za/>

Lochner, P. 2005. *Guideline for Environmental Management Plans*. CSIR Report No ENV-S-C 2005-053 H. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.




Ninham Shand. September 2007. *Bravo Project Construction Environmental Plan*. Report No.446/401281. Unpublished Report commissioned by Eskom Holdings Ltd. Eskom Generation




Visser, D, Dennis, I and Day, D. 2011. *Additional Wetlands Monitoring on Proposed Eskom Nuclear Sites Thyspunt, Bantamsklip and Duynefontein*. Unpublished report commissioned by Eskom Generation.









DOCUMENT CONTROL SHEET (FORM IP180/B)

CLIENT : Eskom Holdings Limited
PROJECT NAME : Nuclear-1 EIA and EMP **PROJECT No.** : J27035
TITLE OF DOCUMENT : Draft Construction EMP
ELECTRONIC LOCATION : C:\Documents and Settings\GFECHTER\My Documents\J27035 - Nuclear 1 EMP_BRIEFCASE\Nuclear-1 EIA Revised EMP Rev 1.2 2010-11-22_For Eskom Workshop.doc

	Approved By	Reviewed By	Prepared By
ORIGINAL	NAME J-M Ball	NAME Reuben Heydenrych	NAME Gisela Fechter
DATE 29 July 2010	SIGNATURE 	SIGNATURE 	SIGNATURE 

	Approved By	Reviewed By	Prepared By
REVISION 1.3	NAME J-M Ball	NAME Reuben Heydenrych	NAME Gisela Fechter
DATE 05 December 2010	SIGNATURE 	SIGNATURE 	SIGNATURE 

	Approved By	Reviewed By	Prepared By
REVISION 1.4	NAME J-M Ball	NAME Reuben Heydenrych	NAME Gisela Fechter
DATE February 2011	SIGNATURE 	SIGNATURE 	SIGNATURE 

	Approved By	Reviewed By	Prepared By
REVISION 1.5	NAME J-M Ball	NAME Reuben Heydenrych	NAME Gisela Fechter
DATE April 2011	SIGNATURE 	SIGNATURE 	SIGNATURE 

This report, and information or advice, which it contains, is provided by Arcus GIBB solely for internal use and reliance by its Client in performance of Arcus GIBB duties and liabilities under its contract with the Client. Any advice, opinions, or recommendations within this report should be read and relied upon only in the context of the report as a whole. The advice and opinions in this report are based upon the information made available to Arcus GIBB at the date of this report and on current SA standards, codes, technology and construction practices as at the date of this report. Following final delivery of this report to the Client, Arcus GIBB will have no further obligations or duty to advise the Client on any matters, including development affecting the information or advice provided in this report. This report has been prepared by Arcus GIBB in their professional capacity as Consulting Engineers. The contents of the report do not, in any way, purport to include any manner of legal advice or opinion. This report is prepared in accordance with the terms and conditions of the Arcus GIBB contract with the Client. Regard should be had to those terms and conditions when considering and/or placing any reliance on this report. Should the Client wish to release this report to a Third Party for that party's reliance, Arcus GIBB may, at its discretion, agree to such release provided that:



- (a) Arcus GIBB written agreement is obtained prior to such release, and
- (b) By release of the report to the Third Party, that Third Party does not acquire any rights, contractual or otherwise, whatsoever against Arcus GIBB and Arcus GIBB, accordingly, assume no duties, liabilities or obligations to that Third Party, and
- (c) Arcus GIBB accepts no responsibility for any loss or damage incurred by the Client or for any conflict of Arcus GIBB interests arising out of the Client's release of this report to the Third Party.

Arcus GIBB (Pty) Ltd

Postal Address :	Website :	www.arcusgibb.co.za
Contact Person :	Physical Address :	
Telephone No. :	Email Address :	
	Fax No. :	