

# SOCIAL AND ENVIRONMENTAL IMPACT ASSESSMENT: PROPOSED EXPANSION PROJECT FOR RÖSSING URANIUM MINE IN NAMIBIA: PHASE 1

## ANNEXURE A: DRAFT SOCIAL AND ENVIRONMENTAL MANAGEMENT PLAN

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## ACRONYMS

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<b>CEO</b>	Contractor's Environmental Officer
<b>EMS</b>	International Standards Organisation 14 001 Environmental Management System
<b>GHG</b>	Greenhouse gasses
<b>H<sub>2</sub>S</b>	Hydrogen sulphide gas
<b>HAZOP</b>	Hazard and Operability Study
<b>I&amp;APs</b>	Interested and Affected Parties
<b>IEA</b>	Independent Environmental Auditor
<b>MET:DEA</b>	Ministry of Environment and Tourism: Department of Environmental Affairs
<b>PES</b>	Project Environmental Specifications
<b>PM</b>	Project Manager
<b>PMT</b>	Project Management Team
<b>REO</b>	Rössing's Environmental Officer (part of the PMT)
<b>RU</b>	Rössing Uranium
<b>S&amp;EP</b>	Social and Environmental Policy (Contractor)
<b>SEIA</b>	Social and Environmental Impact Assessment
<b>SEMP</b>	Social and Environmental Management Plan
<b>SO<sub>2</sub></b>	Sulphur dioxide

# 1 INTRODUCTION AND BACKGROUND

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## 1.1 CONTEXT OF THE SOCIAL AND ENVIRONMENTAL MANAGEMENT PLAN

Rössing Uranium (RU) has operated an open pit uranium mine in the Erongo Region of Namibia since 1976. As a result of an increase in uranium prices on the international market in recent years, RU is able to consider the possible financial benefit from an expansion of its operations. RU is thus considering extending its mine plan and consequently the associated social and environmental issues are being assessed.

In terms of the Namibian Constitution (Government of Namibia 1990) and related environmental legislation, in particular the Environmental Assessment Policy (MET 1995) and the Minerals Act (No. 33 of 1992), the proposed expansion activity would require authorisation from the responsible authorities before it can be undertaken. Insofar as the environmental acceptability of RU's proposed expansion project is concerned, the Ministry of Environment and Tourism's Directorate of Environmental Affairs (MET:DEA) would need to issue a clearance for such expansion.

A Social and Environmental Impact Assessment (SEIA) has thus been commissioned by RU for their proposed expansion project, as required by the Environmental Assessment Policy but also informed by the principles of Namibia's Environmental Assessment and Management Act (No 7 of 2007), as well as the internal standards and guidelines prescribed by Rio Tinto, RU's parent company. MET:DEA's clearance would be based on the outcomes of the SEIA process and this Draft Social and Environmental Management Plan (SEMP) is a component of the SEIA Report. As such, it is designed to inform the decision-making on the part of MET:DEA, not only insofar as the acceptability of the proposed developments is concerned but also in terms of RU's stated intentions to competently manage the social and environmental impacts that may result during the construction, operation and decommissioning of the expansion project. The acceptance of a finalised SEMP is typically a condition of approval by the environmental authorities responsible for impact assessment decision-making.

It is important that this Draft SEMP is seen in the context of it being an annexure to the SEIA Report and that the finalisation and application of its various components will follow MET:DEA's decision regarding the proposed expansion project. It should thus be read in conjunction with Volume 1, i.e. the main report, of the SEIA Report. Note that Volume 2 contains the annexures.

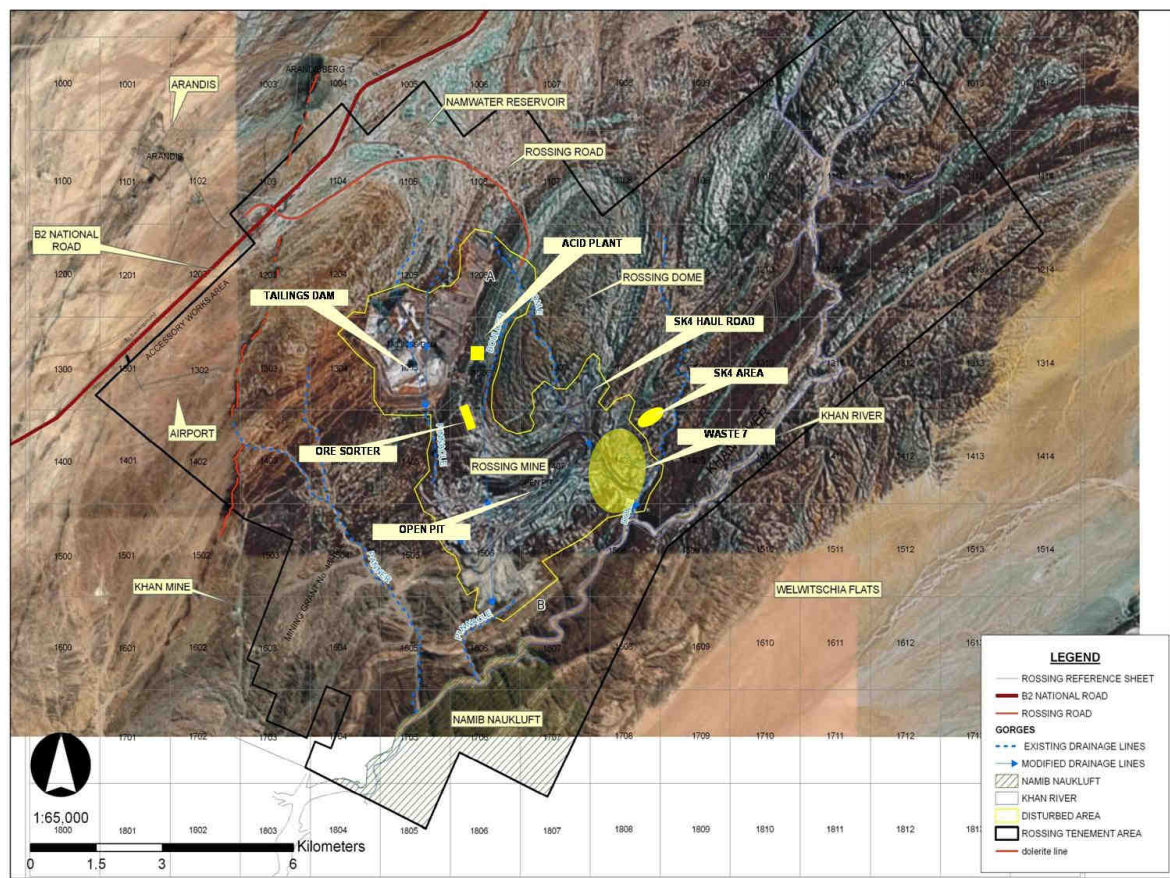
## 1.2 PHASING OF SEIA PROCESS AND COMPONENTS OF PHASE 1

The entire extent of the envisaged expansion of the Rössing mine would comprise, in summary, nine individual components. These are being dealt with in two phases of the SEIA process, as follows:



- A sulphuric acid manufacturing plant with associated sulphur storage on the mine, and the transport of sulphur from the Port of Walvis Bay;
  - A radiometric ore sorter plant;
  - Mining of an ore body known as SK4;
- } Phase 1
- 
- Extension of the current mining activities in the existing SJ pit;
  - New mining activity in the larger SK area;
  - Increased tailings disposal capacity;
  - Increased waste rock disposal capacity;
  - Establishing a acid heap leaching facility; and
  - Sulphur handling in the Port of Walvis Bay.
- } Phase 2

The reason for separating these components into the two phases is that the engineering design and detailed feasibility studies for each of the nine components are not occurring simultaneously. This is due to the complex and highly technical nature of the various expansion project components necessitating a sequential approach to the execution of the proposed developments. It is understandable that economic and engineering criteria may influence the feasibility of RU's entire expansion project during the formulation and approval stages of the project cycle.



**Figure 1: Location of the Project Components**

As indicated, Phase 1 of the proposed expansion project for the Rössing uranium mine comprises three components, namely, a sulphuric acid plant and associated sulphur storage and transport, a radiometric ore sorter plant and the mining of an ore body known as SK4. The locations of these components are illustrated in Figure 1 and are the subject of this Draft SEMP. A description of each component follows.

**Acid plant:**

- A sulphuric acid production plant to be built at the Rössing mine site;
- The existing on-site acid storage facilities to be upgraded and utilised to store the acid produced;
- Rail transport by TransNamib through Walvis Bay and Swakopmund of elemental sulphur feedstock for the acid plant; and
- Sulphur offloading, storage and handling facilities at Rössing mine to be installed.

**Ore sorter plant:**

- The system for ore reclaiming from the coarse ore stockpile;
- A pre-screening plant;
- The production ore sorting plant, comprising four screening units and two ore sorter clusters;
- The handling of rejected rock;
- Storage and transport of rejected rock to the nominated waste disposal area; and
- The tie-in for all equipment into the current operation.

**Mining of SK4 ore body:**

- Providing access to the ore body;
- The provision of water for drilling and dust suppression;
- The commissioning work to prepare for production mining, i.e. the creation of drilling platforms and excavation of two 15 m benches;
- Drilling, blasting, loading and haulage of ore;
- The transport of waste material to the Waste 7 site; and
- A haulage road to transport the ore to the primary ore crusher.

The remaining expansion project components will be dealt with as another SEIA during 2008, referred to as Phase 2. Interested and Affected Parties (I&APs) registered for the present Phase 1 of the SEIA will be kept informed once the Phase 2 process is launched.

## **1.3 PURPOSE AND STRUCTURE OF THE SOCIAL AND ENVIRONMENTAL MANAGEMENT PLAN**

The purpose of this Draft SEMP is to ensure that the key social and environmental aspects and mitigatory measures identified or recommended during the SEIA process are carried forward and meaningfully implemented during the construction, operation and decommissioning phases of the proposed project. These aspects and mitigatory measures have been derived from the SEIA Report, as well as from the findings of Hazard and Operability (HAZOP) and other risk assessments undertaken, the issues and concerns raised by Interested and Affected Parties



(I&APs) and captured during the environmental assessment process, and conditions of authorisation required by the relevant authorities. It is therefore again recommended that this Draft SEMP be read in conjunction with the SEIA Report and the conditions of the clearance<sup>1</sup> from MET:DEA once it is issued.

In addition to the key aspects and mitigatory measures stemming from the SEIA process, the SEMP is informed by industry best practice for environmental management. These considerations are to be integrated within a management system, the result being a working document that can be used as a management tool to ensure responsible environmental performance on a daily basis. This SEMP is presented in draft format, not only to inform the decision making process on the part of MET:DEA but also to provide the foundation for continued development of a finalised SEMP. In the event that the project is authorised, the SEMP will need to incorporate the conditions of such authorisation and also be further expanded and updated in line with more refined engineering and design specifications.

In addition to the Environmental Assessment Policy, the Minerals Act and RU's internal standards described in the SEIA Report, the following additional pieces of existing or pending legislation and conventions may have some bearing on the proposed expansion project:

- National Heritage Act (2004)
- Labour Act (1992), in particular the Regulations Relating to Health and Safety of Employees at Work
- Primary Health Care Policy (1990)
- National Code on HIV/AIDS and Employment (1996)
- National Employment Policy (1997)
- Decentralisation Policy (1998)
- Pending Minerals Safety Bill
- Pending Atomic Energy Board and Radiation Protection Authority Bill
- International Atomic Energy Agency Non-proliferation Treaty (1970)
- National Environmental Health Policy (2002)
- Water Act (1956) and pending Water Bill
- Water Resources Management Act (2004)
- Atmospheric Pollution Prevention Ordinance (1976) and pending Pollution Control and Waste Management Bill
- Draft Minerals Policy (2002)
- Ramsar Convention (1975)
- Convention on Biological Diversity (2000)
- Convention to Combat Desertification (1997)
- United Nations Framework Convention on Climate Change (1992)
- Environmental Management Act (2007)

The extent to which these pieces of legislation and conventions may be relevant to the SEMP is being evaluated as the process continues. To date, no specific concerns have been raised regarding other legislation or conventions.

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<sup>1</sup> Such conditions to be included in the final version of this draft.

The objectives of the Draft SEMP are:

- to establish a management framework to monitor and ensure compliance with the various social and environmental mitigation measures and conditions stemming from the supporting documentation;
- to provide tangible and measurable targets;
- to establish standard operating procedures for activities that may impact on the social and biophysical environment;
- to establish an effective communications, reporting and record keeping procedure;
- to establish an effective and meaningful environmental compliance auditing programme;
- to ensure that contractors, operational and supervisory staff are well informed and trained on general and task specific environmental considerations;
- to provide a mechanism of recourse in the event of non-compliance; and
- to ensure that a management framework exists that can effectively identify and address *ad hoc* social and environmental issues not addressed explicitly in the SEMP.

The SEMP has been structured according to the phase of the project cycle, starting with construction phase aspects and then dealing with operational and finally decommissioning phase environmental management. A subsidiary structure exists in that each of the project components, i.e. acid plant, ore sorter and SK4 mine, is dealt with separately within the respective phase of operation. Figure 2 illustrates the framework and places it in context with the SEIA process and other key supporting documentation. The content of each section of the Draft SEMP is now briefly described.

**Section 1** provides an introduction and background to the Draft SEMP document and describes its context and structure. It also makes reference to an SEMP Framework Table that is included as an appendix to the SEMP.

**Section 2** focuses on the management of environmental impacts associated with the construction of the acid plant and ore sorter. The section describes the use and implementation of the Project Environmental Specifications (PES) and an example of the content of a PES is provided. **It is important to note that the expansion of mining operations into the SK4 open pit area will not require substantial preparatory work and is thus deemed to commence at the operational phase.** The PES will deal with general environmental issues typical of construction projects as well as those environmental issues specific to the respective component. They will be written in a form and language that is consistent with tender and contract documentation typical of engineering contracts, thus allowing for integration into the tender documents and technical specifications. The integration of the environmental specifications into the tender and technical specifications is of crucial importance, since environmental compliance with the conditions of the authorising authority as well as the various non-statutory mitigation measures and environmental best practice becomes contractually binding on the successful contractor. By entering into contract with RU, the Contractor agrees to comply with the various obligations of the PES, as well as including the necessary budgetary provisions in achieving such compliance in the tendered amount.

**Section 3** of the SEMP deals with environmental management aspects associated with the operation of each of the three components. This section aims to establish an effective compliance monitoring structure to be integrated into RU's existing Occupational Health, Safety and Environment (OHS&E) management system, of which their ISO:14 001 Environmental Management System is a part. The objective is to measure, record and demonstrate ongoing compliance with relevant legislation and RU company policies regarding social and environmental management. The section is divided into three subsections dealing with the operation of each of the project components respectively.

**Section 4** of the SEMP discusses potential social and environmental considerations that should be revisited at the decommissioning phase for each of the various components. This section is not prescriptive due to there being no absolute certainty regarding the future time of the decommissioning phase and the fact that a Closure Management Plan is in place. The latter will require updating to address RU's expansion project.

## **1.4 SOCIAL AND ENVIRONMENTAL MANAGEMENT PLAN FRAMEWORK TABLE**

An SEMP Framework Table is included as an appendix to this draft document. It is intended to provide a quick reference to the elements of the envisaged final SEMP, categorised according to the project cycle phases, i.e. design, construction, operation and decommissioning, of the acid plant, ore sorter and SK4 mining. Details are provided in the table, as far as is possible at this time in the decision-making process, of the particular aspect, management objective, management action, action frequency, target or standard, performance indicator and allocated responsibility.

The purpose of the SEMP Framework Table is to indicate that a comprehensive understanding of the requirements of an SEMP is in place and that clear intent is demonstrated on the part of the proponent to fulfil such requirements. Important in this regard is that gaps in information are identified in the table, thus ensuring that these residual issues are addressed as information becomes available and engineering design specifications become fixed.

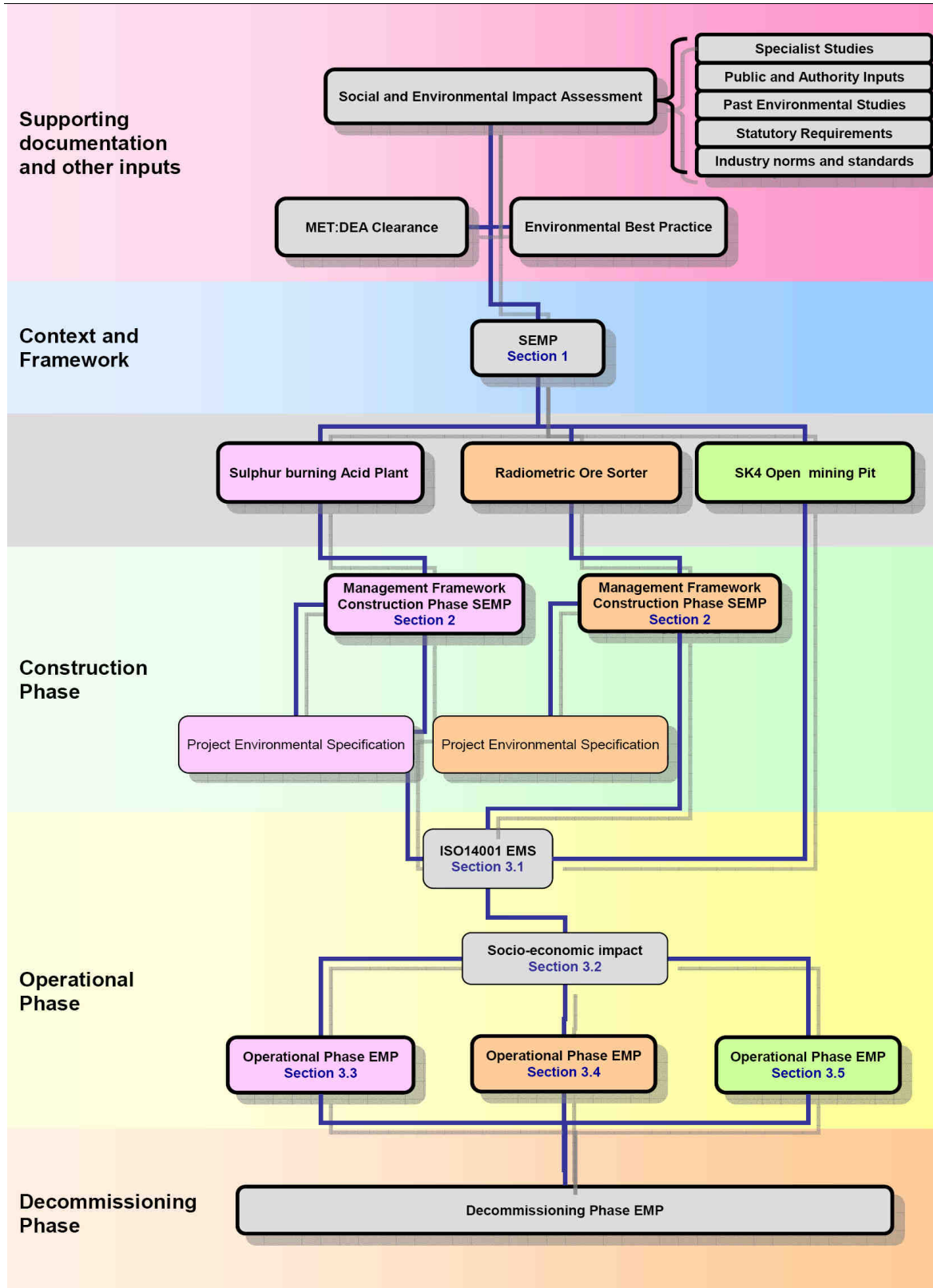


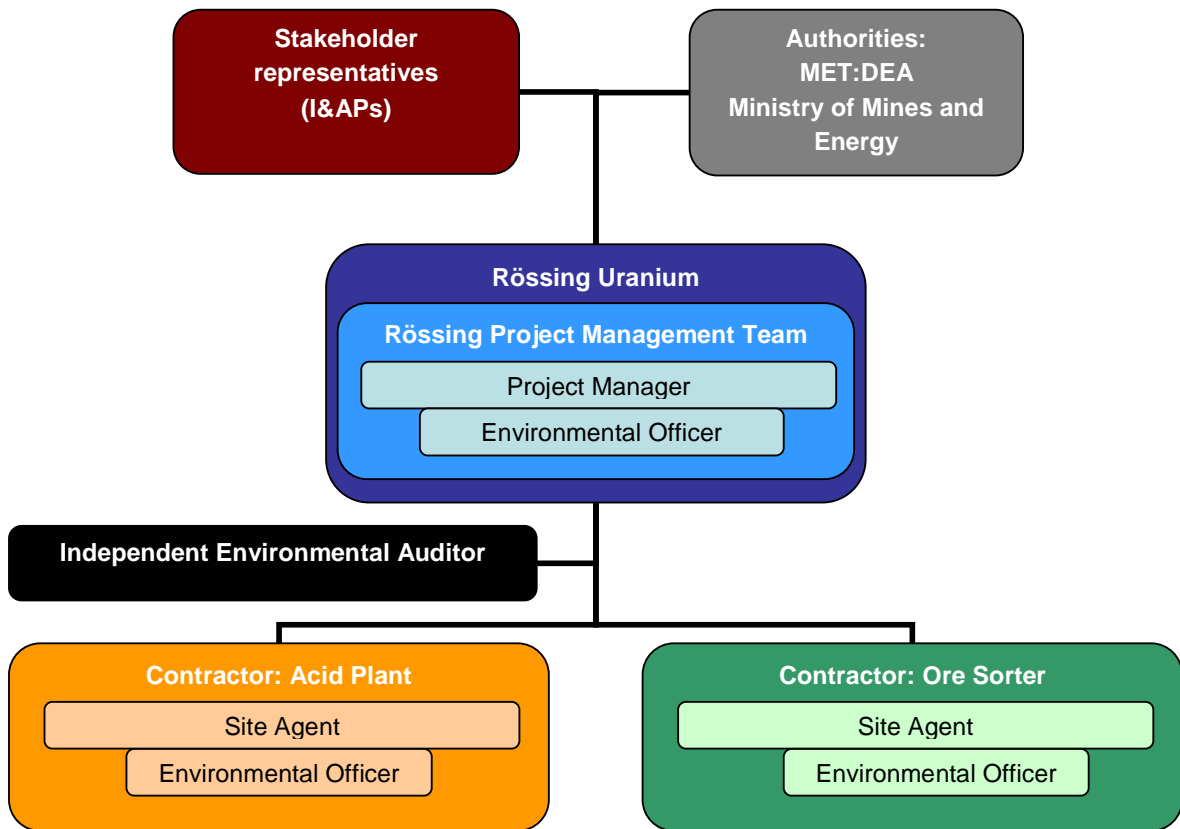
Figure 2: Context and structure of the SEMP

## 2 CONSTRUCTION PHASE SEMP

This section relates to establishment of the organisational framework necessary for the later implementation of the Project Environmental Specifications (PES) required during the construction of the proposed developments. The SK4 mining operation is not seen to have a construction phase since the commencement of activities will be operational in nature. However, it should be noted that some preparatory work in the SK4 mining area will be required before mining activity commences which are dealt with in Section 3.5.1.

### 2.1 ORGANISATIONAL FRAMEWORK

The construction phase for the various components will be administered through an Engineering Contact, of which the PES shall form part. To ensure that environmental considerations receive appropriate attention, it is recommended that an organisational framework be established and that duties and responsibilities for environmental aspects of the contract be delegated to specific individuals, thereby ensuring due diligence, capacity and accountability. To this end, the organisational framework presented in Figure 3 is proposed.



**Figure 3: Organisational framework for ensuring environmental compliance during construction** (note that the SK4 mining operation is not included, since it is not seen to have a construction phase)

Environmental management of a construction site remains highly fluid and thus the PES will not be able to cover every eventuality. It is therefore important that a well-defined organisational framework is in place, detailing delegated responsibilities and allowing for appropriate decision-making on *ad hoc* situations, thus adapting the PES or management strategies to changing or unexpected situations. The environmental organisational framework and RU's OHS&E management system also provides an opportunity for co-operative management and sharing of resources between the various contractors, RU as the Employer<sup>2</sup> and any other parties directly or indirectly involved in the construction phase. To this affect, the Contractors<sup>3</sup> and Employer should be encouraged to pool their resources to save time and cost expended on environmental management.

### 2.1.1 ROLES AND RESPONSIBILITIES

Table 1 provides an overview of the key roles and responsibilities of the various appointments discussed in this section, which are depicted in Figure 3.

**Table 1: Key roles of the various environmental posts**

Post / body	Affiliate	Key Role
Stakeholder Representatives	MET:DEA Representative, Rössing Foundation Representative, Arandis Town Council Representative and, other key stakeholders/ I&APs invited by RU	Act as observers at project meetings by invitation and table and partake in discussions on social and environmental issues
Independent Environmental Auditor (IEA)	Independent environmental practitioner	Monthly compliance reports to be tabled at the monthly progress meetings. Three month compliance auditing of the implementation of the SEMP systems, PES and functioning of the various environmental appointments
RU's Environmental Officer (REO)	Qualified environmental / construction supervisor	Facilitation between RU and various Contractors on social and environmental matters. Compiling a weekly report on the compliance of the various Contractors in terms of the Project Environment Specification
Contractors Environmental Officers (CEOs)	Suitably senior, designated Contractor employee	Day-to-day monitoring and reporting on compliance of the various Contractors in terms of the PES. Planning and implementation of the PES, statutory requirements and <i>ad hoc</i> directives

#### 2.1.1.1 STAKEHOLDER REPRESENTATIVES AND MONTHLY PROJECT MEETINGS

The purpose of the Stakeholder Representatives attending the monthly project meetings is to provide a forum for feedback on the environmental performance and compliance with regard to the SEMP, PES, authorising conditions and prevailing legislation. The forum also provides stakeholders with an opportunity to express concerns and complaints and provides a platform for continued strengthening of capacity and input regarding the environmental aspects of the

<sup>2</sup> The entity with whom the appointed Contractor will enter into contract with to undertake the construction task defined in the contract documents, in this case Rössing Uranium.

<sup>3</sup> The company or organisation appointed by the Employer to undertake the construction task defined in the relevant contract documents.



construction phase of RU's expansion project. It would also strengthen the relationships between Rössing and the various stakeholders.

The Independent Environmental Auditor (IEA) shall summarise the findings of his/ her monthly compliance report at the monthly project meetings and present the relevant monitoring and compliance records, incident reports and any other information deemed to be of significance. The Project Manager (PM), giving due consideration to the IEA's report findings, with the assistance of the meeting attendees shall determine whether the construction activities have been carried out to an acceptable level of compliance in terms of the various social and environmental requirements.

### **2.1.1.2 APPOINTMENT AND BRIEF OF THE INDEPENDENT ENVIRONMENTAL AUDITOR**

The appointed IEA should be a duly qualified, independent, environmental practitioner with the necessary experience in the construction industry. The IEA's responsibilities should include the following:

- Compile formal monthly reports for each of the Contracts, based on~
  - Physical observations during monthly site inspection,
  - RU and Contractors Environmental Officers' daily and weekly internal reports (site diaries);
- Liaise with the Project Management Team (PMT), stakeholders, the general public and the Contractors' Environmental Officers (CEOs) on *ad hoc* environmental matters;
- Undertake quarterly environmental compliance audits in terms of the SEMP on the various Contracts and present a report to the PMT;
- Have sight of and make recommendations to the PMT with regard to the Contractors' key environmental method statements; and
- Present technical matters and issues requiring discussion at the Monthly Project Meetings.

Where non-conformances are identified by the IEA during the quarterly audits and corrective action is requested, the IEA shall sign-off that the necessary corrective actions have been affected, by way of formal letter. Copies of the signed-off corrective actions shall be included in the subsequent audit report.

### **2.1.1.3 APPOINTMENT AND BRIEF OF RU'S ENVIRONMENTAL OFFICER**

A suitably senior member of the Employer's staff should be appointed to the position of RU's Environmental Officer (REO). It is recommended that this individual be otherwise affiliated with the administration of the construction contracts and should have a good aptitude for construction activities and the principles of environmental management, as well as being sufficiently familiar with RU's ISO:14 001 Environmental Management System. It is envisaged that REO will be appointed by RU's Sustainable Development Department.

The REO responsibilities should include the following:

- Advise the IEA and CEOs on RU's ISO:14 001 Environmental Management System, policies and procedures on environmental management to ensure continuity;
- Assist in the facilitation and accommodation of the Contractors' needs on matters relating to compliance with the PES;

- The establishment and implement of an environmental monitoring programme for the monitoring and recording of construction related impacts;
- The recording and reporting on environmental performance of the various Contractors against PES;
- The undertaking of a daily site inspection of each of the contract areas and compilation of an all-encompassing internal weekly environmental compliance report for submission to the IEA, PM and the respective CEOs;
- The photographing, investigation and compilation of reports on any environmental incidents, forming part of the daily report, that may occur, and to notify the IEA and PM thereof;
- Liaising with the PM and IEA regarding the review, commenting-on and approval of the Contractor's method statements;
- Liaising the IEA, PM and the CEOs on *ad hoc* environmental matters and advising the CEOs on day-to-day environmental management issues; and
- Liaise with the PM regarding the quantification and issuing of penalties for non-compliance.

#### 2.1.1.4 APPOINTMENT AND BRIEF OF THE CONTRACTORS' ENVIRONMENTAL OFFICERS

A suitably senior member of each Contractor's staff should be delegated the responsibilities of the Environmental Officer. The role of the CEO is to ensure the physical implementation of the PES. The duties of the CEO should include:

- Keeping a daily site diary detailing the key environmental events and observation for the day, copies of which shall be submitted to the REO as part of the weekly submissions.
- Compiling the required method statements, or the environmental section of the technical method statements, for review and approval by the PMT;
- Establishing and maintaining appropriate management systems for routine environmental management tasks, which may include but will not be limited to the following~
  - Waste collection, handling, storage, transport and disposal, including sewerage, domestic, construction and hazardous wastes,
  - Dust control within the area of activity,
  - Regular dust monitoring.
  - Noise control within the area of activity,
  - Regular noise Monitoring.
  - Handling, storage, distribution and storage of hazardous materials, including fuels and lubricants,
  - Establishing and maintaining a program for the maintenance of housekeeping at each of the works areas,
  - Establishing and maintaining a system for the handling and treatment of contaminated water from construction activities,
  - Acquiring and maintaining the necessary fire, spillage and other accident and emergency response materials that may be required to deal with and contain the damage caused by such accidents;
- Notifying the REO of environmental incidents as well as initiating appropriate response actions to such incidents;
- Initiating and supervising any remedial environmental actions;
- Establishing a program and undertaking or ensuring that staff receive regular environmental awareness training as part of tool-box talks;
- Liaising with the IEA and REO on technical environmental matters; and

- Furnishing the REO each week with the necessary information required for compliance monitoring, which may include certificates of waste disposal, public complaints, incidents and accidents, daily site diary entries, labour statistics, fallout dust measurement data, etc.

## **2.2 MANAGEMENT TOOLS**

The key to effective environmental management during the construction phase is to ensure that the requirements of the SEMP, specifically the PES, are adequately and appropriately implemented on site. The aforementioned environmental project organisational framework ensures that sufficient capacity for environmental management exists and that the roles and responsibilities have been adequately defined to ensure implementation and accountability. It should be noted that the roles of these various positions may be redefined as the construction phase becomes established and the primary focus of each of the designated positions may shift as the project progresses. Sufficient flexibility must be allowed for such adaptation and amendment. To ensure that these designated positions operate effectively in establishing and maintaining compliance with the PES, the following management tools are recommended.

### **2.2.1 ENVIRONMENTAL CONSIDERATIONS AT TENDER ADJUDICATION**

To ensure that the appointed Contractors have made the necessary financial and resource provisions available to meet the environmental obligations in terms of the PES and SEMP, it is essential that the environment requirements be incorporated in the tender documentation and that the tender adjudication process takes cognisance of the environmental aspects of the tender submissions. The following items are to be included in the tender submissions:

#### **2.2.1.1 CONTRACTORS' SOCIAL AND ENVIRONMENTAL POLICY**

All Contractors should be required to compile a Social and Environmental Policy (S&EP) in line with RU's existing Occupational Health, Safety and Environment (OHS&E) management system, statutory requirements and the PES. The S&EP should be compiled and submitted as part of the tender submission and considered during the tender adjudication process. The S&EP of the successful bidder will, upon award of the contract, form part of the SEMP for that Contract and the Contractor's performance in relation to it should be evaluated as part of the IEA's quarterly environmental audit.

#### **2.2.1.2 PROJECT ENVIRONMENTAL SPECIFICATIONS AND BILL OF QUANTITIES**

The PES are to be included as part of the tender documentation and the Bill of Quantities. The Contractor should be required to cost the environmental aspects that he/ she may need to commit themselves to in undertaking the construction tasks and failure to do so may result in disqualification.

## **2.2.2 METHOD STATEMENTS**

To ensure that adequate forethought is given to the rollout of the construction operations and the implications thereof, the compilation, review and approval of method statements is a well-demonstrated means of ensuring that adequate risk identification and aversion, resource allocation and general planning are in place ahead of the commencement of any major construction task. Once approved, a method statement is to be issued to the Contractor's staff responsible for the implementation, to serve as a work procedure. A method statement should

equip a suitably qualified reader with sufficient information regarding the task to allow for implementation without further instruction; in essence the method statement should answer the typical “what? why? where? how? who? when?” questions in sufficient detail. Whilst several environmental method statements are prescribed from the outset, each of the technical method statements should contain a subsection that deals with environmental, health and safety considerations specific to that task.

The Contractor shall submit the prescribed method statements within one month after commencement. All *ad hoc* method statement shall be submitted to the PMT at least two weeks prior to the commencement of the task, to allow sufficient time for the review and approval process to occur. Except for emergency works with the PM's consent, the Contractor shall not commence any activity until the respective method statement is finalised and approved.

### **2.2.3 SOCIAL AND ENVIRONMENTAL AWARENESS**

To encourage compliance with the PES and other statutory requirements, it is essential that all construction workers are made fully aware and continually reminded of these obligations. In order to achieve this, the following mechanisms are prescribed. The Contractor at his /her own discretion may wish to institute additional measures to enforce the requirements of the PES.

#### **2.2.3.1 WORKER HIV/AIDS AWARENESS PROGRAMME**

The RU HIV/AIDS Aids Policy of 14 April 2000 currently in place at the Rössing Mine must be extended to the Contractor's workforce. The four key HIV/AIDS programme elements of the Contractor's HIV/AIDS Awareness Programme shall include:

- Prevention, Awareness and Education;
- Voluntary Counselling and Testing;
- Wellness, Counselling and Affordable Treatment; and
- Monitoring and Evaluation.

The Contractor shall be required to submit an HIV/AIDS Awareness Programme, in line with the above requirements, upon the award of the Contract. All levels of the Contractor's staff shall attend an HIV/AIDS awareness course as soon after commencement as is possible, preferably as part of the induction training course. It is recommended that exiting Rössing awareness course be used for this purpose or that a specialist organisation be commissioned to deliver such a course.

#### **2.2.3.2 ENVIRONMENTAL INDUCTION TRAINING**

It has become common practice to include the environmental aspects of the project as part of the standard worker health and safety induction programme that accompanies the recruitment of new staff.

It is recommended that the Contractor submit an Environmental Induction Training syllabus to the PMT and IEA for approval before the course is delivered to the workforce. The CEO shall present the approved course to all construction staff under the auspices of the REO and IEA. All attendees shall sign an attendance register as well as a Code of Conduct booklet, which will serve as evidence that the individual has been informed, understands and accepts that fines or

other punitive measures may be instituted against an offender in the event of non-compliance with the requirements of the PES.

### **2.2.3.3 TOOL-BOX TALKS**

To ensure that the level of environmental awareness amongst the construction staff remains high, pertinent, task-related, environmental considerations shall be presented as an aspect of the toolbox talks or task briefing sessions, at least once a week. Topics shall be relevant to the type of work, and areas or aspects of poor performance may include handling of certain hazardous materials, housekeeping, dust suppression, water and electricity usage, discussions around recent incidents or issued fines, etc.

### **2.2.3.4 SIGNAGE AND INFORMATION POSTERS**

Posters and signage depicting the environmental “do’s” and don’t’s” should be erected at prominent locations throughout the site. A large signboard should be erected at the entrance to the Contract area to ensure that all visitors and day-workers are made aware of their environmental obligations whilst on the site.

The Contractor shall be held accountable for any environmental transgressions of the PES within his/her Contract area, whether by his/her personnel or not. It is therefore up to the Contractor to ensure that all persons entering his/her site are authorised to do so and are aware of the various environmental controls in effect.

### **2.2.3.5 CODE OF CONDUCT BOOKLET FOR SITE WORKERS AND VISITORS**

The Contractor shall submit a preliminary version of a Code of Conduct booklet as part of the Environmental Awareness training method statement for review and approval. All visitors to the Contractor’s site shall be issued with a Code of Conduct booklet. After reading the booklet, the front and back page of the booklet is to be signed, the back page to be removed and kept by the Contractor. The booklet shall contain key information relating to the environmental, health and safety “do’s” and “don’t’s” on the site. The booklet shall also contain contact details for the Contractor’s health, safety and environmental personnel and the applicable emergency numbers. Emergency procedures shall also be included in the booklet as well as a map of the construction site indicating the locations of fire equipment, first aid, emergency assembly points and escape routes as well as any environmental exclusion (no-go) areas.

## **2.2.4 ENVIRONMENTAL MONITORING**

The organisational framework discussed in Section 2.1 and the posts and briefs of the appointments discussed in Section 2.2 shall be the means by which responsibilities for the monitoring of construction activity in terms of this SEMP occur. The key roles of the various posts are summarised in Table 1.

The environmental monitoring role rests with CEO, who, by virtue of a daily diary entry, will record the actual physical performance of each of the Contractors in terms of the PES on a near real time basis. The CEO shall also be responsible for ensuring that work is carried out in terms of the approved method statements and that any deviations or non-compliances are captured in

the daily diary entries. The CEO's daily diary entries shall be copied to the REO at weekly intervals.

The REO shall utilise the Contractor's daily diary entries along with on-site observations, monitoring data and any other information available to compile an internal weekly report per Contract, detailing the performance of the Contractor during that week. The internal weekly report shall be submitted to the PM, who, after reviewing it will disseminate the information to the IEA as well as the respective Contractor.

The IEA's efforts shall be more focused on the implementation and functioning of the various environmental positions, systems and their functions, with lesser effort being dedicated toward the resolution of the minor technical/environmental site problems. The IEA shall compile and formal monthly compliance report, based on the REO's weekly internal reports, site observations and any other information at his or her disposal. The IEA shall present a summary of report findings at the monthly project meetings.

## **2.2.5 ENVIRONMENTAL REPORTING**

It is essential that the performance or level of compliance of the Contractors in terms of the PES and other statutory requirements are meticulously recorded to allow RU to demonstrate compliance in terms of the SEIA, SEMP, statutory requirements and conditions of authorisation. The reporting structure also serves as a management tool in that, in particular the IEA's monthly reports, will ensure that all the environmental designations, stakeholders and authorities are kept well informed of the Contractors activities and performance. Table 2 summarises the environmental reporting responsibilities.



**Table 2: Environmental Reporting Responsibilities**

Report Title	Compiled	Author	Distribution	Content / description
Contractor's Submissions (Per Contract)	Weekly	CEO	REO IEA PM	<ul style="list-style-type: none"> <li>• Daily site diary entry: <ul style="list-style-type: none"> <li>○ Site conditions</li> <li>○ General progress description</li> <li>○ Description of specific environmental problem areas and responses</li> <li>○ Description of remedial action taken</li> <li>○ Description of progress of remedial work</li> <li>○ Incident, accident and event reports</li> <li>○ Public complaints</li> <li>○ General comments</li> <li>○ Labour statistics</li> </ul> </li> <li>• Water Usage volumes</li> <li>• Fallout dust volumes</li> <li>• Noise level monitoring data</li> <li>• In house environmental fines issued</li> <li>• <i>Ad hoc</i> environmental performance related items, to be requested by the IEA or the PMT</li> </ul>
Internal Report Per Contract	Weekly	REO	CEO IEA PM	<ul style="list-style-type: none"> <li>• Site conditions</li> <li>• General progress description</li> <li>• Description of specific environmental problem areas and responses</li> <li>• Description of remedial action requests</li> <li>• Description of progress of remedial work</li> <li>• Method statement status report including those received, reviewed and approved</li> <li>• Review and comment on the dust and noise monitoring data</li> <li>• Incident, accident and event reports</li> <li>• Public complaints</li> <li>• General comments</li> </ul>
Monthly Compliance Report Per Contract	Monthly	IEA	REO CEO PM	<ul style="list-style-type: none"> <li>• Response letter to the Environmental Manager's daily reports for that week, highlighting areas of concern and making recommendations where appropriate</li> <li>• Key observations made during a weekly site inspection</li> </ul>
Quarterly Audit Per Contract	3 Months	IEA	Project Management Meeting Attendees	<ul style="list-style-type: none"> <li>• Evaluation of the performance of the REO</li> <li>• Evaluation of the performance of the CEO</li> <li>• Compliance audit of the Contractor in terms of the requirements of the PES</li> <li>• Scoring on the level of performance,</li> </ul>

### 2.2.5.1 ENVIRONMENTAL AUDITS

The IEA should undertake an environmental audit of each of the Contracts, every three months, to be presented to the Stakeholder Representatives. The objective of the audit is to ensure that various posts comprising the environmental organisational framework are functioning effectively in terms of their brief, that compliance with the PES is being achieved, that *ad hoc* decision making on environmental matters and the response to any incidents are appropriate and executed effectively. The IEA shall score the Contractor's performance in each audit report. Once the audit report is in the hands of the Stakeholder Representatives, they, together with the PMT, will consider whether the Contractor's performance in relation to the PES is of an acceptable standard.

## **2.2.6 PENALTIES FOR NON-COMPLIANCE**

The PM, on recommendation of the REO, IEA and Stakeholder Representatives, shall be the implementing agent with regard to the application of penalties. It should be recognised that when deciding on punitive measures, effective implementation of the PES is highly dependent on the maintenance of a good working relationship between the REO, CEOs and the IEA. An ill-considered or negative response to non-compliance, particularly minor or unintentional transgressions, may cause a breakdown in these relationships, which in itself could lead to increased environmental degradation over the long term. It is therefore recommended that the following penalties only be considered when the non-compliant Contractor demonstrates apathy in response to a non-compliance, or is found to be repeatedly or deliberately not meeting his/her obligations.

### **2.2.6.1 WITHHOLDING PAYMENT**

Certain aspects of complying with the PES will have been priced in the tender documentation. In the event that a Contractor underperforms with regard to a priced item, the PM shall withhold payment on such item until such time as the non-compliance has been rectified.

### **2.2.6.2 REMOVAL FROM SITE**

In the event that a certain individual or particular plant or machinery is determined to be problematic and the cause of recurring environmental degradation, the PM may issue an instruction to have such person or plant or machinery permanently removed from the site.

### **2.2.6.3 MAKING GOOD ON ENVIRONMENTAL DAMAGE**

Where the Contractor has not complied with the requirements of the PES, statutory requirements or PMT directives, all remedial work shall be to the cost of the Contractor and shall be carried out to the satisfaction of the IEA and REO.

### **2.2.6.4 SUSPENSION OF WORKS**

In the event that the above punitive measures are not having an adequate effect on the environmental performance of the Contractor or where environmental incident or degradation as a result of the construction activity is severe, the PM may suspend the works until such matters have been resolved to the satisfaction of the IEA and REO. The costs associated with such a work stoppage shall be to the account of the Contractor.

## **2.2.7 ENVIRONMENTAL INCENTIVES**

The Contractor is to be encouraged to introduce an incentives programme for employees, rewarding good health, safety and environmental performance. An incentives programme can allow an opportunity for competition and performance motivation between various teams working on the site.

## **2.3 EXAMPLE OF CONTENT OF A PROJECT ENVIRONMENTAL SPECIFICATION**

The content of a typical PES is provided below. The compilation of such a PES will follow as the details of site layout and engineering design become available for each component of RU's expansion project.

**Table 3: Typical Project Environmental Specification Contents**

Scope and interpretations	General Environmental policy Interpretations	Supporting specifications Applications
Definitions		
General requirements	General and legal obligations Environmental monitoring Site meetings Environmental induction Environmental method statements Interface with local communities and RU Public safety Protection of natural features and heritage resources Protection of drainage lines Prevention and control of fires Emergency procedures	Fire Accidental leaks and spillages
Plant and materials	Temporary site closure Plant and materials handling, use and storage Hazardous substances	Fuels Oils and curing compound Paints, solvents and other chemicals Herbicides and pesticides
Equipment	Workshop, maintenance and storage Batching plants Dust and emissions	Dust control programmes Vehicle emissions Noise control
Site establishment	Noise Lighting Site layout Site demarcation Site clearing  Temporary services and facilities	Exclusion areas Demolition and removal of existing structures Stripping and stockpiling of topsoil Erosion and sedimentation control Site structures Accommodation of site staff Services Stockpiling and stockpile areas Access roads Ablution facilities Eating areas Water use Solid waste management Contaminated water management
Surface excavations	Access to site Accommodation of traffic Site preparation Dust and noise Stabilisation Trenching Treatment of spoil	
Landscaping and rehabilitation	Scope Demolition and removal of structures Shaping	
Tolerances	Compliance Cost of non-compliance Penalties Removal from site and suspension of works	
Measurement and payment	Schedules items	

### 3 OPERATIONAL PHASE SEMP

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The operational phase SEMP aims to present the key management strategies identified through the SEIA process in a manner that allows for implementation and further development. RU has an Occupational Health, Safety and Environment (OHS&E) management system in place, of which an ISO:14 001 Environmental Management System (EMS) forms part, and it is recommended that the management strategies identified hereunder be carried forward through the Hazard and Operability (HAZOP) risk identification process and integrated into the EMS component of the OHS&E management system. In terms of the EMS structure, this operational phase SEMP would assist in the identification of the key environmental aspects and will serve to guide RU in the formulation of a suite of suitable Standard Operating Procedures. This SEMP must be continually amended through the design and construction phases of the project as and when more detailed information becomes available and potential limitations or hazards are identified.

Due to the scale and complexity of RU's operations, the use of a formalised EMS is essential in allowing the company to optimise, coordinate and manage the various operations, personnel, plant and equipment, and their interactions, in a manner that demonstrates consistent application of environmental best practice and thereby efficiently detect and minimise the potential impact of its activities on the environment.

A brief overview of an ISO 14 001 EMS is now provided. An ISO 14 001 EMS aims to develop a systematic management approach to the management of environmental controls of the organization. One of the key principles of this approach is the idea that continual improvement in the organisation's environmental management can be achieved and demonstrated.

Commencing with an environmental policy, then identifying the environmental concerns of the firm (Aspects) and defining what measures can be implemented to control or mitigate these (Objectives and Targets), planning is accomplished. An organizational structure, and system of personnel responsibilities, competency and training, are then developed and implementation begins. Communication lines, documentation control and procedural documents, operational control and emergency preparedness define the operational portion of the program. These items are usually included in an EMS Manual, which is used to document a program so as to accomplish the Objectives and Targets established at the outset. The organization's methods for measuring and monitoring its environmental impacts are also included in the Manual, along with practices for identifying non-conformances and for implementing corrective and preventive actions. This monitoring, along with routine systems audits and record keeping, constitute the EMS checking and corrective action program. The final stage in the program is a routine management review of its activities, and improvements to the system based on the performance observed during the previous cycle are effected. Figure 4 depicts the sequencing of the implementation of an EMS as well as the structure of a typical EMS.

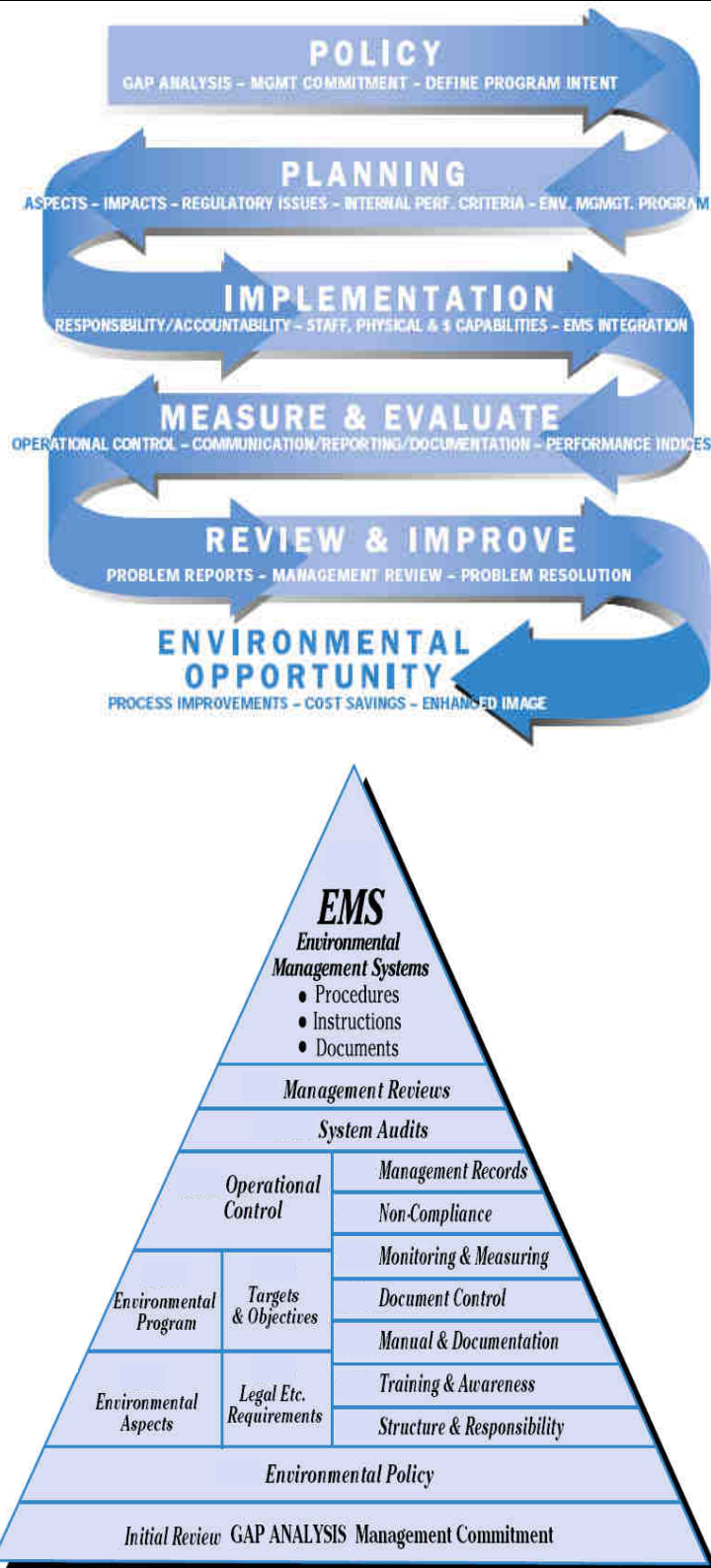


Figure 4: Sequencing and structure of an ISO 14001 EMS (Source: Modified from NCEDR. 1998)

### 3.1 OPERATIONAL SEMP AND RU'S EMS

This section is largely informed by RU's Environmental Management System Code of Practice (Revision No. 7: April 2006), which is currently under review due to a change in RU's management structure.

It is recommended that RU's EMS be extended and upgraded to include the various components forming part of the present phase of the proposed expansion project. The mitigation measures proposed in the SEIA and the SEMP should be interrogated and carried forward into RU's HAZOP risk assessment which will inform the amendments to the existing EMS. The nature of the activities of the proposed expansion project are mostly congruent with activities already occurring as part of RU's operations and thus the control procedures utilised to address generic environmental impacts associated with RU's activities can for the most part be adopted and modified for management of the proposed new activities. The recommendations put forward in this operational phase SEMP should be utilised, together with the HAZOP Risk Register, as an informant in the review of RU's EMS. The SEIA, HAZOP Risk Register and SEMP together assist in the identification of aspects and the development of procedures and operational controls normally undertaken as part of the planning phase. Figure 5 depicts the current EMS in place at RU. Key impacts and mitigation measures identified in the SEIA, HAZOP Risk Register and SEMP can be incorporated into this system, to accelerate the formulation of EMS requirements from the planning stage into the implementation phase.

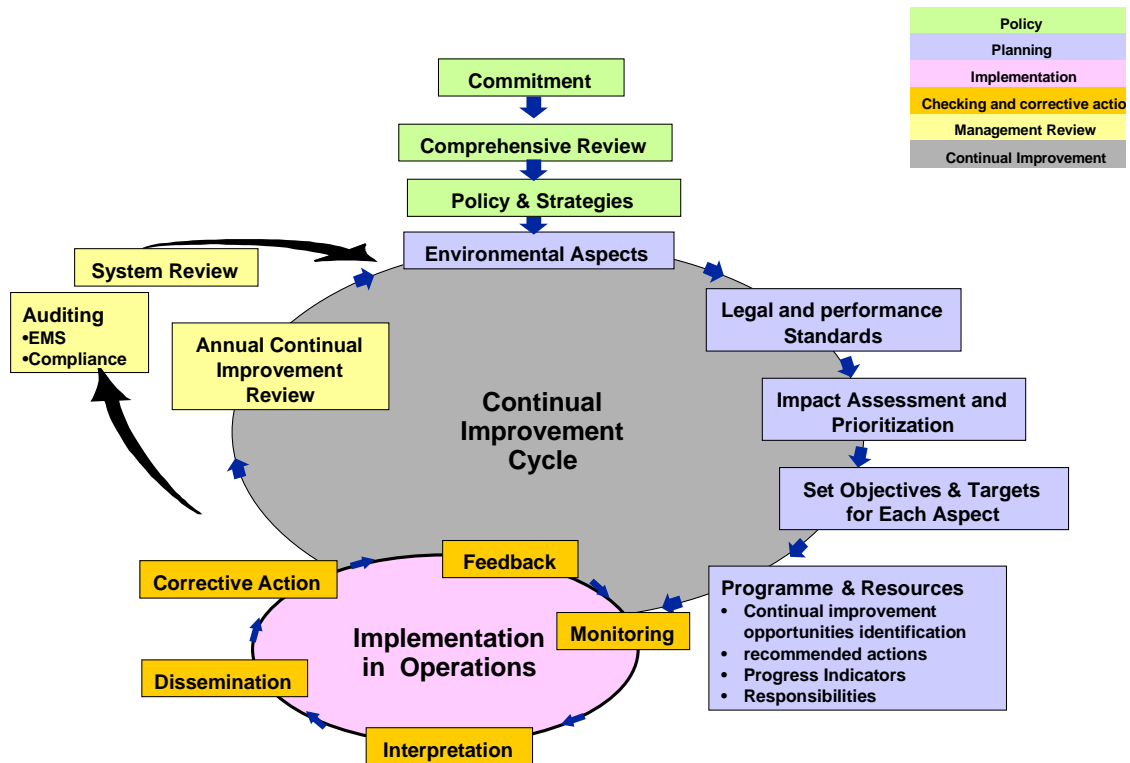
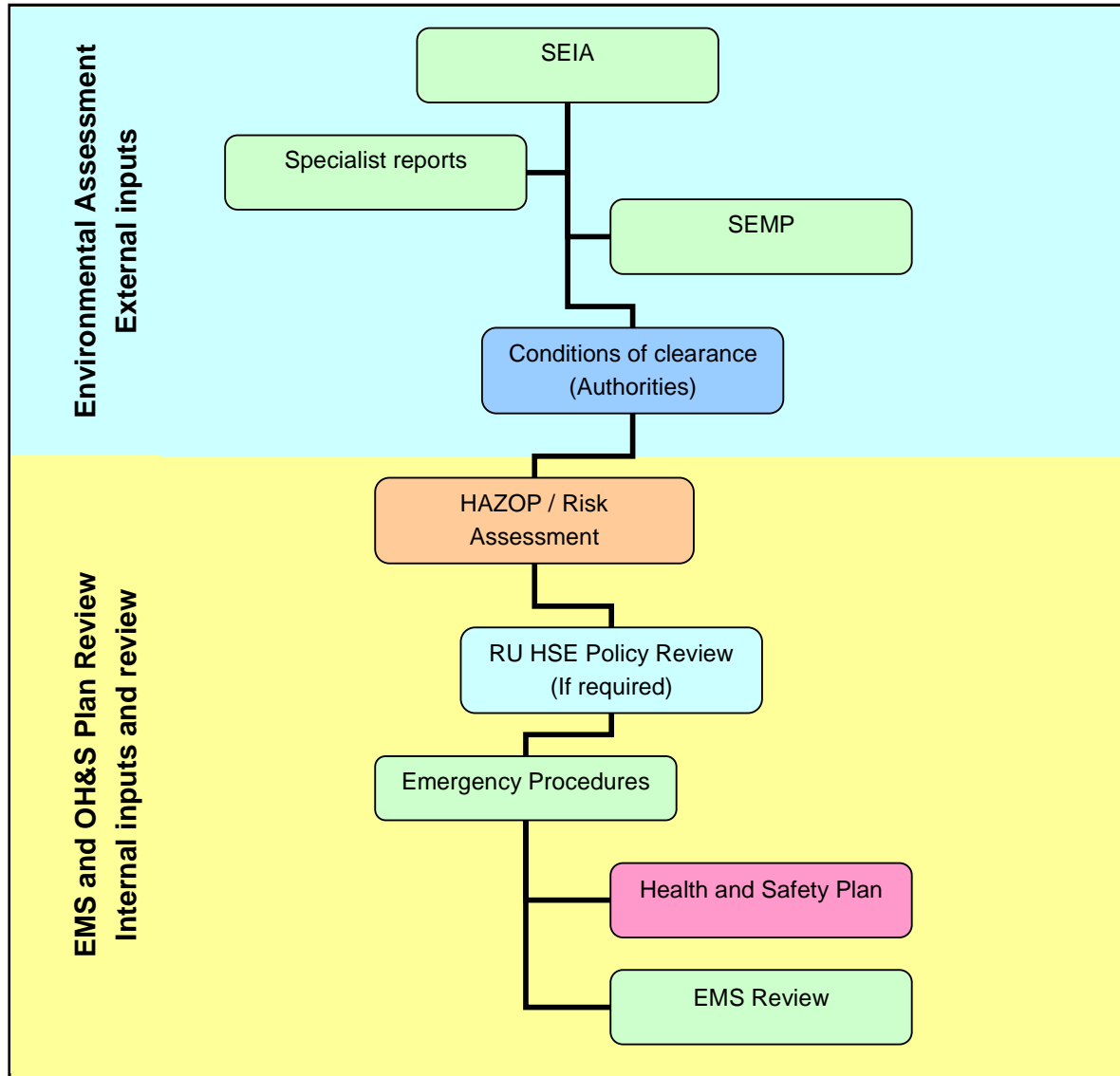


Figure 5: Overview of the EMS in effect at RU



The following document map depicts the SEMP in context and in sequence with the various documents and assessments that should be used to inform the amendments to RU's EMS.



**Figure 6: Document Map**

### 3.1.1 RU'S HSE POLICY

The RU HSE Policy is the overarching and guiding document that informs the manner in which the company conducts its business activities and manages impacts on the environment, the health and safety of its employees and on the public at large. RU's HSE Policy is attached here as Appendix C.

### 3.1.2 RU'S HAZOP ASSESSMENT

A HAZOP (Hazard and Operability) study is a system used to identify potential future problems in a new plant or operation so that measures can be put in place to address such risks. A team of specialists with specific knowledge of the plant or operation which they are studying are assembled. The plant or operation in concern is broken into manageable pieces to simplify the

study; these are called “study nodes”. Each study node is then assessed for potential “design deviations”, where the plant or operation from that which it was intended or designed. Potential causes for such deviations are then identified and the consequences considered. Once all the potential deviations, causes and consequences have been identified and recorded in a HAZOP Risk Register, management actions or design modifications that could mitigate potential hazards are then recommended.

RU is currently undertaking a risk assessment of the proposed Phase 1 components, which seeks to identify, technical, environmental safety, social and other risks associated with each of the components. The assessment will culminate in a Risk Register in which each of the risks will be described, weighted and appropriate management actions to mitigate the risks assigned and responsibilities delegated. The environmental aspects and the corresponding recommendations presented in this SEMP can be incorporated into the Risk Register and carried forward for inclusion into the EMS together with the technical, design, health and safety management aspects.

### **3.1.3 KEY STAGES IN THE EMS**

The information contained in the Risk Register, derived from the SEIA and SEMP, will assist in the operational review process, as they forego the need to undertake the initial stages of the EMS, namely, the identification of environmental aspects and impacts and the prioritisation thereof, where high priority aspects can be identified as those assessed as having a medium or high significance. The mitigation measures and recommendations proposed in the SEIA and the various specialist reports, which are carried through into the SEMP and Risk Register, can be used to inform the development of objectives and targets as well as offer direction in the formulation of the Environmental Management Programmes and Operational Controls.

An Environmental Management Programme is the all-important product of the EMS system and is vital in ensuring that the management strategies are implemented and that the effectiveness of such strategies is monitored. For each priority environmental aspect, a series of mitigation actions and an implementation programme are identified by the Environmental Coordinator (refer to Figure 7), in certain cases with the assistance of the line manager, OHS&E Management specialists or specialist outside consultants. Progress and shortcomings in the implementation of the various Environmental Management Programmes s are reported on by the Environmental Coordinator during routine OHS&E meetings.

### **3.1.4 COMPETENCE, TRAINING AND AWARENESS**

All employees and contract workers under RU's employment should possess the necessary knowledge and competence to carry out their delegated tasks in compliance with RU's EMS, especially those appointed to tasks that have the potential to inflict significant environmental damage. Both Environmental Coordinators and the OHS&E officers should identify training requirements for the various departments and work areas and undertake training of employees and contract workers in the respective areas. A generic OHS&E Induction Training Course should be delivered to all new employees, which can deal with overarching health, safety and environmental issues on the RU premises. Task-specific training can take place in the various departments and sections on an *ad hoc* basis. Records of all training courses should be kept on the EMS register.

### 3.1.5 COMMUNICATION AND REPORTING

To ensure that all levels of management are kept abreast of the performance in terms of the EMS, it is recommended that reporting occurs in a frequent and formalised fashion. The existing EMS reporting structure is adequate and should be expanded to incorporate the operational phases of the expansion project. RU should ensure that sufficient capacity exists within the OHS&E sections to ensure that the various roles and responsibilities of the respective sections can be fulfilled.

Figure 7 below represents the reporting lines used to inform the Department Managers and the General Manager of EMS performance and *ad hoc* health, safety and environmental matters.

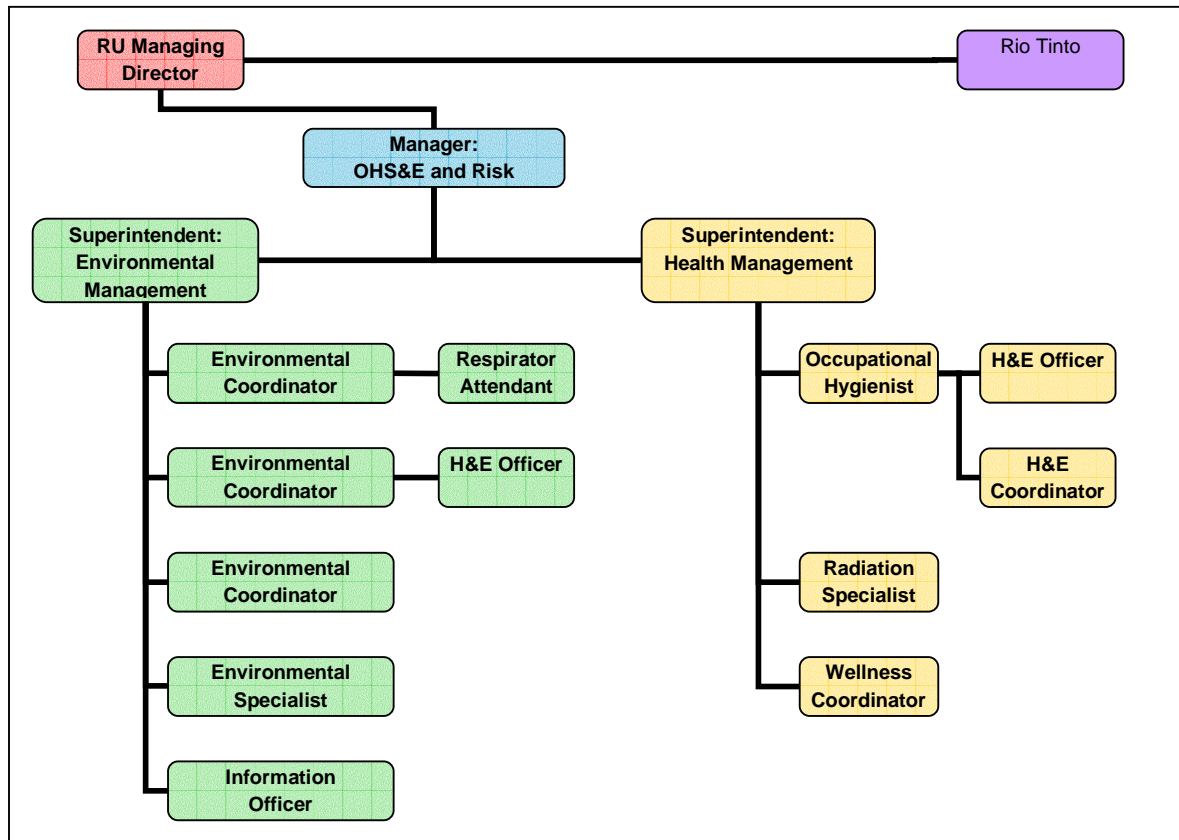


Figure 7: EMS Reporting Structure

The H&E Officer is responsible for the collection and recording of data, which is collated into a weekly report and submitted to the relevant Environmental Coordinator. The collected data in the weekly reports is then collated by the Environmental Coordinators into a monthly OH&E report which is interrogated and interpreted by the Environmental Management and Health Management sections and collated into a single OHSE & Risk Management month-end report. This report is distributed to the Superintendent: Environmental Management, who is required to review and verify the content and quality of the environmental reporting. The Superintendent: Environmental Management, when satisfied, then approves the report and distributes it to all the Departmental Managers. The Manager: OHS&E and Risk Management is responsible for

generating an annual environmental report which is a key informant in the annual review of the company's environmental policies and strategies.

The Manager: OHSE & Risk Management is responsible for compiling data on the environmental performance of RU for the corporate report, which is reviewed by the Managing Director before being forwarded to Rio Tinto. The Manager: OHSE & Risk Management is also responsible for facilitating communication between the various levels and functions of the RU organisation in response to customer, investor, stakeholder and authority requirements. The Environmental Management section is responsible for all ongoing formal and internal communications with the various regulatory agencies regarding environmental matters and RU operations.

Effective communication and reporting on environmental monitoring data and performance is key to the effective management of environmental aspects of concern and central to the EMS objective of continual improvement.

All new reporting resulting from the expansion projects shall be subject to the document control procedures in effect at RU. The document control procedures must be reviewed to ensure that provision is made for the incorporation of the expansion projects into the EMS. All new EMS operational procedures, environmental data, audit reports and Standard Operating Procedures resulting from the expansion projects must be effectively captured, distributed and controlled in terms of the EMS by the Environmental Management Section.

### **3.1.6 OPERATIONAL CONTROLS**

Operational controls are essential for the management of specific activities that may impact on the environment. The Environmental Management section is responsible for the generation of procedural documents for specific operations and activities where environmental management and mitigation measures are a priority. The Environmental Management section is responsible for monitoring performance against the operational procedures and reporting on non-conformances during the monthly OHSE meetings. Departmental Managers are responsible for the rectification of any such non-conformances and the implementation of any corrective actions defined by the Environmental Coordinator. Contractors are required to abide by RU's health, safety and environmental operational controls and procedures as well as the rectification of any non-conformances and implementation of any corrective actions deemed necessary by the Environmental Management section.

### **3.1.7 ORGANISATIONAL FRAMEWORK**

The various appointments and their associated roles and responsibilities identified as being central to the adoption and implementation of this SEMP are discussed under the respective heading to follow and are derived from RU's existing EMS.

#### **3.1.7.1 MANAGING DIRECTOR**

The Managing Director is accountable to the Board for all environmental matters and is the custodian of the HSE Policy.

### **3.1.7.2 GENERAL MANAGERS**

General Managers are responsible for ensuring that the HSE Policy is implemented and are responsible to the Managing Director for ensuring that the necessary reporting procedures and structures are in place and that the annual environmental targets are met.

### **3.1.7.3 MANAGER: OHS&E AND RISK MANAGEMENT**

The OHS&E and Risk Manager is the custodian of the EMS and is responsible for the implementation of the strategic aspects of the EMS. The strategic portion of the EMS determines the overall direction, priority, time frame and resources allocated to Environmental Management at RU. The OHS&E and Risk Manager reports directly to the General Manager: Operations.

The Manager: OHS&E and Risk Management is responsible for establishing procedures for internal communication on environmental issues between the various levels and functions within the organisation. The Manager: OHS&E and Risk Management is also responsible for the procedures for external communications on environmental issues whereby customer/investor/stakeholder requirements, changes in legislation, changes in business objectives etc. are recognised, internalised and transformed into changes in the operations. The Manager: OHS&E and Risk Management is thus responsible for ensuring that the current interface between RU, its stakeholders, shareholders, interested and affected parties and the authorities, incorporates environmental issues and that any issues identified are communicated to the organisation.

The implementation of the operational EMS in each department is the responsibility of the individual departmental manager. They do, however, work according to the guidelines (environmental programme) maintained by the Manager: OHS&E and Risk Management.

### **3.1.7.4 DEPARTMENTAL MANAGER**

The Departmental Manager for each department is responsible for the implementation of the EMS within the department (allocation of resources in the form of training and awareness, finance and operational control e.g., corrective actions, continual improvement, etc.).

### **3.1.7.5 SUPERINTENDENT: ENVIRONMENTAL MANAGEMENT**

The Superintendent: Environmental Management is the appointed management representative of the EMS at RU.

The Superintendent: Environmental Management is responsible for the overall implementation of the EMS at RU and it is this person's responsibility to coordinate implementation efforts throughout all departments. The Superintendent: Environmental Management liaises closely with the departmental managers, superintendents and the Environmental Coordinators in order to ensure that the programme is correctly managed and maintained. The Superintendent: Health Management facilitates and co-ordinates specialist environmental projects, should they be required.

The Superintendent: Environmental Management is also responsible for reporting on the performance of the EMS to top management for review.

### **3.1.7.6 LINE SUPERINTENDENT**

The Line Superintendent is responsible for all environmental aspects as a line function and is tasked with ensuring that the objectives and targets as stipulated for each environmental aspect in his/her area are met. The Line Superintendent should therefore ensure that all target dates stipulated in an Environmental Management Programme are met.

### **3.1.7.7 ENVIRONMENTAL COORDINATOR**

The Environmental Coordinator assists the Departmental Manager and Superintendents with the implementation of the EMS in their respective work areas. The Environmental Coordinator facilitates:

- Internal communication on environmental issues on a departmental level between the various levels and functions within the department;
- Collation and interpretation of monitoring results based on the objectives and targets identified for each environmental aspect;
- Setting up and the updating of Environmental Management programmes (EMPs); through the annual EMS reviews; and
- Identification of training requirements.

The Environmental Coordinator ensures that the operational EMS is aligned with the Environmental Management Programme for RU and fulfils a facilitation/communications and monitoring function.

### **3.1.7.8 H&E OFFICER**

The H&E Officer is responsible for the monitoring of those aspects within the department that are stipulated in the monitoring programme.

## **3.2 MANAGEMENT OF SOCIO-ECONOMIC IMPACTS**

RU produces a Community Plan every three years, consistent with Rio Tinto's community standards. This is integrated into RU's mine and operational plans and social issues are addressed in this way. The RU expansion project will result in the need for a substantial increase in employment. This workforce increase has the potential to cause significant positive and negative impacts to the socio-economic environment on both and local and regional scale. The mitigation and management strategies proposed here are largely derived from the specialist study undertaken by Marie Hoadley, titled *Socio-economic Component of the Social and Environmental Assessment Report for the Rössing Uranium Mine Expansion Project*.

### **3.2.1 MANAGEMENT OF THE ECONOMIC SUSTAINABILITY OF ARANDIS**

The town of Arandis is still largely dependant on the economic support of RU, with one in three households directly supported by mine employees and more than 50% of the economic input into the town being derived from RU. This dependency makes the town of Arandis extremely vulnerable to changes in the socio-economic environment and ultimately mine closure. Arandis has not been successful in diversifying its economy and broadening its sources of income, and an intensification of the economic dependency of Arandis on RU is thus not desirable.



The following recommended management strategies are proposed to minimise negative and maximise positive socio-economic impacts of the RU expansion project on the sustainability of the town of Arandis:

- RU should actively discourage and gradually reduce Arandis' dependency on RU's economic inputs. To achieve this, RU should consider phasing out property ownership and rentals in Arandis and not acquire any additional property in the town. Other towns and communities in the Erongo Region should benefit equally from RU's Corporate Social Investment and Arandis should no longer be prioritised;
- RU's Corporate Social Investment in Arandis should be aimed at achieving a satisfactory infrastructure condition to ensure effective service delivery;
- RU should continue its support of local service providers in Arandis through its local procurement policy and encourage and assist with their growth in capacity and diversification. RU should also support initiatives by other development agents to assist in the diversification of the local economy and decrease the dependence on the mineral sector;
- All new developments in Arandis should have sustainability before and after mine closure as a key objective;
- A monitoring programme with key performance indicators for monitoring the progress of Arandis toward sustainability should be developed;
- The Arandis community should be notified of the possibility of downscaling or closure at the earliest opportunity;
- Post-closure retention of skills in Arandis should be promoted by aligning training and skills development with local economic development;
- Achieving sustainability of Arandis will require concerted effort from all stakeholders and RU should maintain open and regular communications with these, and develop a commonality in vision and actions in the pursuit of sustainability for Arandis;
- When the Rössing Foundation receives significant support from other development agencies, it is recommended that the foundation's name be changed to avoid the close association in the public mind between RU and Arandis; and
- RU should investigate opportunities and mechanisms to facilitate the participation of women in the local economy.

### **3.2.2 PERMANENT EMPLOYMENT CREATION**

RU should maximise permanent employment by ensuring that not only are all positions filled but that employees continue to develop skills that will increase their employability after mine closure. The following management strategies are recommended to minimise negative and maximise positive impacts in this regard:

- RU should continue with its ongoing workforce training and should, when the possibility of retrenchments becomes apparent, introduce training courses in alternative economic sectors and self employment. Training in alternative economic sectors should be aligned with the other major economic sectors in the Erongo Region;

- RU's recruitment policy should ensure equitable employment opportunities for marginalised groups. All RU contractors should be required to adopt RU's recruitment policy. Civil contractors commissioned during the construction phase should also be required to implement the RU recruitment strategy and RU should, upon completion of the construction phase, recruit suitable personnel if required from the contractor's workforce, to continue their employment in the operational phase of the expansion projects. RU should therefore assist the civil contractor in the suitable training and development of the construction workforce for later absorption into the RU workforce;
- RU should expand its skills and capacity development programme to address the disadvantages of low skills and experience in the labour pool. Such a programme should be extended to the contractors' workforce as well; and
- RU should supply start-up funding to small and medium enterprises that could render services to the company. Priority should be given to companies that would contribute to economic diversification.

### 3.2.3 PUBLIC HEALTH AND SAFETY

RU should continue to develop and improve on its stringent Occupational Health, Safety and Environment programmes and policies relating to management and monitoring of dust, noise, radiation and water, vehicle maintenance, operator training and emergency response plans. RU should fully investigate all incidents involving the public and use the findings to inform amendments to policy and procedure.

The RU HSE Policy of August 2006, as well as the HIV/AIDS Policy of 14 April 2000, is of relevance. HIV/AIDS will be included in the five year communities plan. Rössing must continue to forge partnerships with external organisations working to assist in HIV education, awareness raising and treatment to surrounding communities.

### 3.2.4 EMPLOYEE HOUSING AND ACCOMMODATION

The following management strategies relating to the accommodation of additional workforce are recommended:

- RU should open negotiations with local authorities in Swakopmund and Walvis Bay to establish what options are available to the company for accommodating the workforce in the two towns;
- The cumulative impact of RU and other mining companies competing to accommodate their workforces in these towns could result in the destabilisation of the property market, leading to property price inflations. RU should, through the Chamber of Mines of Namibia, approach the matter collaboratively, by negotiating with the authorities and other mining houses to develop appropriate mitigation measures to address this issue;
- Housing projects should be designed to maximise the possibility for post closure use, i.e. for occupation by groups other than mine employees;
- RU should use the following avenues for the purchase of houses/erven, in order of preference: local authorities, property developers and estate agents; and

- RU should make public its housing policy as soon as possible so as to manage expectations and curtail developments which are being undertaken in anticipation of housing the RU workforce.

### 3.2.5 MIGRANT WORK SEEKERS

With the prospect of employment associated with RU's expansion projects, migration of work seekers into the area is expected. Controlling such migration is exceedingly difficult. However, the following management strategies are recommended in response to this potential impact:

- RU should contribute to the prevention of backyard dwelling, informal housing and the attendant health and social problems by promoting home ownership and ensuring, as far as feasible, that the workforce is accommodated in formal housing. RU owned or leased premises should be monitored to ensure that no backyard dwelling or illegal sub-letting of the premises is occurring;
- RU should support the Arandis Town Council in its efforts to upgrade the state of the health services so that these can cope with the inward migration of unemployed work seekers;
- RU should extend its workforce health programmes to all the company's communities of interest. The health programme should be specifically extended to include tuberculosis; and
- Programmes addressing social ills, such as alcohol abuse and violence against women and children, should be developed and extended to all the company's communities of interest through the Peer Educator Programme.

### 3.2.6 SCHOOLING IN THE SURROUNDING AREAS

The influx of new workers into the area will exert additional pressure on the schools in the region. The following management strategy is recommended to mitigate the incapacitation of the local schools:

- RU should enter into negotiations with the Ministry of Education, through the mechanisms provided by the Chamber of Mines of Namibia, for the building of additional schools in areas where the workforce will reside.

## 3.3 OPERATIONAL PHASE SEMP FOR THE ACID PLANT

This section of the SEMP covers activities related to the operation of the Acid Plant, commencing with the loading of sulphur onto the purpose built railway wagons at the Walvis Bay storage facility, RU's management of the transportation to and offloading of sulphur at the storage facility located on the mine and the management of the Acid Plant operations and associated activities, terminating with the transport via a pipeline of sulphuric acid to the two existing storage tanks. Note that the area surrounding the two sulphuric acid storage tanks is presently not bunded and satisfactory environmental controls must be installed here. The transport, storage and handling of elemental sulphur within the port of Walvis Bay is not addressed by the present SEMP, since these did not form part of the scope of the SEIA process. However, another SEIA process will be undertaken as required to address this aspect.

### 3.3.1 RISKS ASSOCIATED WITH SULPHUR AND SULPHUR DERIVATIVES

The transportation, handling, storage and processing of sulphur and sulphur derivatives present numerous health, safety and environmental risks. All design aspects of the tasks, the plant and the equipment must ensure that these risks are identified in the Risk Register and are effectively mitigated. The predominant health, safety and environmental risks associated with sulphur are described as follows:

#### 3.3.1.1 SULPHUR FIRES AND SULPHUR DUST EXPLOSIONS

Apart from the risks associated with the outbreak and spread of fire, burning sulphur emits large quantities of SO<sub>2</sub> gas, a highly toxic respiratory irritant that can be lethal at sufficient quantities. SO<sub>2</sub> is also highly corrosive and will accumulate in the headspace of sulphur storage vessels where it can form sulphurous acid when coming into contact with water. Whilst sulphur fires are not violent they can achieve incredible combustion temperatures that can easily damage the mechanical integrity of the plant and storage vessels in which the fire is contained.

Of greater concern is the potential for a sulphur dust explosion whereby excessive sulphur fines accumulate because of poor quality prills and their excessive or rough handling, and become mobilised into the air around handling operations or in storage vessels. With an electrical or static discharge or any other form of ignition, a violent explosion can result. Care must be taken to ensure that a high quality, low-dust elemental sulphur product is procured. Low speed conveyor belts and appropriate transfer point design and operation, reducing product fall heights and generally cautious handling of the sulphur will further minimise the build up and mobilisation of sulphur dust. The rail wagons should be purpose designed to ensure that spillages along the railway line are eliminated and that agitation of the sulphur prills during on- and off-loading operations are kept to the minimum.

All areas where sulphur will be handled and stored are to be built to purpose-designed specifications and in accordance with Namport's requirements, with the necessary fire prevention mechanisms and systems in place and fitted with adequate fire-fighting equipment that can effectively extinguish a worst-case scenario fire that may occur there. Other combustible installations, materials and/or sources of ignition must be kept well clear of areas where sulphur handling or storage operations are occurring. Sulphur handling and storage areas, plant and equipment must be purpose-designed and operated in a manner that reduces the build up and potential ignition of sulphur dust, including the appropriate use of grounding or earthing systems, and the use of appropriate corrosive resistant, non-sparking or non-static conducting construction materials. RU should ensure that only premium grade sulphur prills are procured so as to reduce the levels of fugitive sulphur dust in such facilities, as well as the use of dust-control systems and the application of a suitable biocide to further mitigate the dust levels and sulphur derived emissions.

#### 3.3.1.2 CORROSION

A reducing, wet, sulphur-rich atmosphere can lead to severe corrosion of carbon steel and even stainless steel components typically used in sulphur handling systems. This can cause damage to storage vessels and general plant and equipment used in the proximity, which apart from the irritation and costs associated with deterioration of equipment, can lead to a loss of containment and risk of exposure, resulting in any number of potential incidents.

Plant layout, design and construction materials must take into consideration the corrosive effects of sulphur and, where necessary, sulphur handling equipment should be constructed from aluminium which resists erosion and does not form pyrophoric iron sulphide that can initiate fires, explosions and generate SO<sub>2</sub>. Elemental sulphur should also be treated with an anti-bacterial solution to prevent biological decomposition and the resulting formation of sulphuric acid. To minimise the build-up of sulphuric acid in storage area as a result of biological decomposition, all storage areas should work on a first-in-first-out system, ensuring that no “dead” zones occur within the storage facility.

### 3.3.1.3 TOXIC H<sub>2</sub>S AND SO<sub>2</sub> GAS

The concentrations of H<sub>2</sub>S may vary considerably from source to source and from time to time in the elemental sulphur received, due to the variance in the degassing process applied during primary processing. Apart from the odour nuisance, hydrogen sulphide gas is highly toxic, even at low concentrations, is flammable and even explosive under the right conditions.

The potential for the build up of H<sub>2</sub>S and SO<sub>2</sub> in smaller storage holds means that such storage facilities must be designed to prevent the build-up of these toxic gasses and possible worker exposure.

To minimise the risk associated with the presence of these sulphur derived gasses, RU should ensure that a high quality, effectively degassed sulphur product is procured and that limits are set with regard to the moisture content and H<sub>2</sub>S content of the sulphur received. All sulphur handling and storage areas throughout the supply chain should be equipped with the appropriate detection, personal protective and emergency equipment, to ensure that employees are adequately safeguarded from the potential health effects of these deleterious gasses. All personnel working within the sulphur supply chain should be specifically trained and regularly assessed for competence with regard to safety, leaks, spills and emergency procedures. All sulphur handling facilities or areas should have adequate access control measures to prevent untrained, unsupervised persons gaining access to such facilities and exposing themselves, other employees or the facilities themselves to unnecessary risks.

All sulphur handling facilities should also be constructed with mechanisms to limit spills and leaks, including sulphuric acid transmission pipes, potentially resulting in the contamination of the environment. All facilities should be equipped with a sloped, impervious surface to prevent soil contamination, as well as a bund system and associated collection sump and contaminated water treatment systems should be utilised around facilities to prevent the migration of liquid chemicals and or contaminated storm water into the surrounding environment. All sulphur stockpiles and handling areas should be adequately protected from the wind to ensure that it is not blown into the surroundings.

The design of the acid plant shall ensure that the SO<sub>2</sub> emissions from the stack are maintained at acceptable standards. Training of plant operation staff must be undertaken to ensure that elevated emissions, and the resulting potential health, safety and environmental impacts, do not result due to operator error. The Emergency Procedures based on the Risk Register must make adequate provision for detection of elevated SO<sub>2</sub> levels at ground level and the protection

and/ or the evacuation of staff from the area in such an event. The following management actions should be implemented to mitigate the excessive release of SO<sub>2</sub>:

- During plant start-up, plant operators must ensure that the converter is preheated to striking temperature before introducing sulphur into the plant;
- In the event of equipment malfunction, plant shut-down should occur as rapidly as possible and the necessary repairs undertaken; and
- SO<sub>2</sub> analysers on the stack should be well maintained and a back-up or secondary analyser should be installed to ensure that readings are accurate and to provide assurance in the event that one analyser malfunctions.

### 3.3.2 OPERATIONAL CONTROLS

The following environmental strategies and mitigation measures are proposed for the Acid Plant and associated operations. In reiteration, it is recommended that the following management strategies be carried forward into RU's Risk Register, which will serve as the means of ensuring that they are fed into the EMS and result in the development of the necessary and appropriate control procedures.

#### 3.3.2.1 HEALTH AND SAFETY CONSIDERATIONS

Prior to the commencement of operations, RU should ensure that all health and safety procedures relating to the handling and storage of sulphur and the operation of the various plant and equipment have been developed and fully integrated into the existing health and safety management framework. A comprehensive HAZOP risk assessment of all new operations will be carried out prior to commencement of operations and protocols to minimise the identified risks should be developed and implemented.

##### *i) Worker competence, training and awareness*

All new and existing staff that will work in the sulphur handling and storage areas as well as the Acid Plant itself should undergo an intensive induction course in health, safety and environment. All workers should undergo a medical examination to ensure that they are physically fit, mentally capable and are assessed as being competent to undertake the tasks to which they have been assigned.

Each staff member should also receive task-specific instruction and will be instructed on their terms of reference, which should clearly outline their duties and responsibilities, other pertinent health, safety, environmental and general protocols, as well as any EMS control procedures that have direct bearing on the area of operation. RU should commence with recruitment/ promotion and training of plant operational personal well in advance of the commissioning of the facility to ensure a suitable level of proficiency is achieved.

Teams working in these areas should also receive *ad hoc* health, safety and environment training in the form of toolbox talks to be held at least once a week. Topics shall be based on upcoming operations or addressing areas of underperformance. An intense supervisory presence should be implemented during commissioning and for a period thereafter, to ensure that EMS protocols are clearly understood by the plant operational staff.



All facilities should also be fitted with the required health and safety warning and information signage that is required and suitable for such installations.

*ii) Emergency and evacuation procedures*

Induction training should include detailed coverage of the emergency response and evacuation procedures. An evacuation plan should be developed and presented to the staff at each work station that will clearly identify the protocols to be followed in the event of an emergency, the location and functioning of the emergency escape routes and doors, and the emergency assembly areas.

All emergency equipment and personal protective equipment should be pointed out and staff should be trained in their use. Induction training should include basic first-aid and fire-fighting training. Each work station should have a staff member that is trained in first-aid and another as a fire officer.

Environmental risks and potential impacts associated with the loading and raiing of elemental sulphur from the Walvis Bay storage facility to the mine are related to accidental spills, fire on the wagons and sulphur dust explosions. RU in association with TransNamib should develop an emergency response plan to attend to spillages and fire at loading areas as well as minor and major spillages along the railway line route. Adequate resources to respond to, contain and recover such spillages and fires should be available and should be able to be readily mobilised.

The train should be fitted with the necessary communications systems allowing the operator to notify TransNamib, RU, Namport and the relevant governmental emergency services in the event of a rail accident or product spillage. Procedures to isolate the incident area and rapidly contain and/or neutralise any spillages should be in place and sanctioned by the relevant authorities. All railway wagons, engines, railroad crossings and the railway tracks should receive regular inspections and maintenance where required. Such inspections and any resultant repair work should be appropriately documented. All statutory requirements and best practice should be observed.

*iii) Medical and first-aid provisions*

First aid actions should be co-ordinated with the mine's Medical Centre which is in close proximity to the proposed acid plant site.

*iv) Work environment*

Requirements for suitable work environments (ablutions, lighting etc) are in place at RU and new installations will be integrated with these. All staff should be equipped with the necessary personal protective equipment, including respirators where appropriate, to limit their exposure to risks presented by their task or area of operation. All work areas are to be adequately ventilated and lit.

### 3.3.2.2 WASTE MANAGEMENT

RU's existing waste management systems should be expanded to cater for the expanded operations.

*i) Domestic waste*

Requirements for proper domestic waste management are in place at RU and new installations will be integrated with these.

*ii) Hazardous waste*

Spent vanadium pentoxide catalyst used in the sulphuric acid production process would be returned to the supplier and an estimated two tonnes per year of filter cake from the sulphur filter would be disposed of in the hazardous waste disposal area on the tailings dam.

*iii) Sewage*

Sewage would be treated at the existing sewage treatment plant and the treated effluent should be reused in mine processes.

*iv) Scrap metal*

Scrap metal arising from repair and maintenance work would be collected by the on-site waste management contractor for sorting and recycling.

*v) Recycling hydrocarbons*

RU's existing ISO:EMS procedure (ENV/WMP/002) should apply to the reuse and disposal of hydrocarbons from the acid plant and associated areas. Suitable, leak-proof drums for the disposal of oils and greases should be positioned at areas where such materials are likely to be generated. Drums should be marked according to the type of hydrocarbon being deposited, namely, synthetic oil, mineral oil or grease. RU has a hydrocarbon product supply contractor who will deal with the management of such materials.

### 3.3.2.3 DUST SUPPRESSION

The Acid Plant and acid storage areas should be designed with concrete bunding and flooring and thus dust from these areas is not expected to be problematic. Areas where elemental sulphur is stored should have adequate protection measures against exposure of the stockpiles to the effects of the wind, so as to prevent the mobilisation of sulphur dust and its possible accumulation that could result in sulphur dust explosions. An open storage area for sulphur is planned and the risk of sulphur dust explosions is thus minimised.

Unpaved roads used by vehicles associated with the acid plant shall be subject to the same dust suppression measures as is elsewhere on the mine. These revolve predominately around the following principles:

- Road network area (number of roads x road length x road width) must be kept to an efficient minimum;
- Traffic controls relating to the reduction of unnecessary traffic and the setting and enforcement of speed limits; and

- The implementation of measures to bind surface material on the roads, assist in the retention of moisture or reduce the amount of dust on the road surface through manual means (sweeping, vacuuming or flushing of roads).

#### 3.3.2.4 NOISE MANAGEMENT

The operation of the Acid Plant, particularly the blower and turbine generation units, will contribute to the total mine noise level. ,

The following recommendations are proposed to manage noise levels at the Acid Plant and associated facilities:

- All plant and equipment should receive regular maintenance and should be operated in accordance with their design specifications. All mechanically powered equipment should be fitted with appropriate silencing devices which are to be inspected and repaired when necessary;
- Equipment noise audits should be carried out on all new plant and equipment upon delivery to site. These records should be used as a reference to monitor the potential deterioration of equipment noise levels during operation;
- Environmental noise monitoring should be carried out regularly to detect deviations from predicted noise levels and enable corrective actions to be implemented where necessary;
- All potential excessive sources of noise from plant or operational areas should be considered in the layout and design of the facilities. Where appropriate, such areas or equipment should be designed and/or fitted with suitable noise dampening devices or enclosures; and
- Where noise levels pose a health and safety risk, demarcate noise zones will be instituted and affected staff should wear the appropriate hearing protection equipment.

#### 3.3.2.5 VISUAL IMPACT MANAGEMENT

The only operational phase visual impact associated with the Acid Plant that requires management pertains to the use of lighting. Lighting of the facility should be kept to the efficient minimum. Aircraft warning lights on the Acid Plant stack are a prescribed requirement. Lighting in and around the facility should adopt the principle of downward facing, task-specific lighting with limited spillage of light into the surrounding areas. Flood lighting of extensive outdoor areas and up-lighting of vertical structures or topographical forms shall not be permitted.

Sound housekeeping practices in material lay-down areas and stockpiles, litter control and general facility maintenance should be undertaken to ensure that the visual appearance of the facility does not deteriorate and become visually offensive with the passing of time.

#### 3.3.2.6 WATER MANAGEMENT

##### *i) Storm water controls*

All facilities where sulphur and its derivatives are handled should be designed with an appropriate storm water control system that would ensure that such facilities are not susceptible to flooding, even during episodic flooding events. Suitably sized cut-off drains and berms, along

with the concrete containment bunding and flooring should ensure that surface flows are prevented from entering the facilities. Storm water collecting within the containment bunding of any given facility that may have been contaminated with sulphur or sulphur derivatives, hydrocarbons and other potentially hazardous chemicals should be collected in an appropriately designed drainage network and collection sump. It should then be pumped to the mine spillage collection system at the processing plant for treatment.

*ii) Process water*

It is intended that the Acid Plant makes use of water for cooling and will require between 2 500 and 3 000 m<sup>3</sup> of fresh water per day. It is envisaged that the increased regional supply of water in bulk from NamWater's desalination plant will become available before the Acid Plant becomes operational and an adequate water supply will thus be available for this purpose. RU must continue to cooperate with NamWater to ensure that the desalinisation plant is commissioned by 2010, without which the RU expansion project could be jeopardised.

*iii) Industrial effluent*

It is probable that spills and leaks will occur occasionally, and thus the Acid Plant facility should be fitted with purpose-designed, acid resistant concrete floors and a containment bund draining to an effluent collection sump. Effluent from the sump should be pumped to the mine spillage collection system at the processing plant for treatment and/ or be disposed of at the hazardous waste disposal area located at the tailings facility.

*iv) Water conservation*

RU should continue to monitor water usage and should identify, assess and implement feasible measures to reduce, reuse and recycle water as part of the water management strategy. The management of water related issues at the Acid Plant operation should be integrated with RU's existing water balance system.

### **3.3.2.7 ENERGY USE AND GREENHOUSE GAS EMISSIONS**

The Acid Plant would require an electricity supply of 4.5 MW for its operation. However, the production of sulphuric acid is an exothermic process and RU will utilise the excess heat to generate an estimated 10 MW (net) of electricity and as such the overall energy balance of the plant is positive. The plant start-up will be achieved by the use of diesel-generated electricity and will thus not exert an intermittent increased demand on the energy grid. The energy consumption of the Acid Plant process is designed to operate at an optimum and therefore there are few additional mitigation measures in this regard.

## **3.4 OPERATIONAL PHASE SEMP FOR THE ORE SORTER**

The scope of this SEMP will cover the following components associated with the ore sorting operation; four pre-screening units, various conveyor systems between the plant, the two Radiometric Ore Sorter clusters and the disposal of reject rock stream. The processing stages up- and downstream of the ore sorting plant are deemed to be operated at an acceptable standard with all mitigations and environmental procedures being observed and that the implementation of the ore sorting component will have little impact on the operation of these existing process components.

### 3.4.1 OPERATIONAL CONTROLS

#### 3.4.1.1 HEALTH AND SAFETY CONSIDERATIONS

Prior to the commencement of operations, RU should ensure that all health and safety procedures relating to the operation of the Radiometric Ore Sorter plant and its associated equipment have been developed and fully integrated into the existing health and safety management framework. The Pilot Plant should serve as a good informant for the development of procedures and health and safety mechanisms for implementation at the proposed production Radiometric Ore Sort plant. A comprehensive health and safety risk assessment of all new operations should be carried out prior to commencement of operations and protocols to minimise the identified risks should be developed and implemented.

##### *i) Worker competence, training and awareness*

All new and existing staff that will work at the Radiometric Ore Sorter plant should undergo intensive induction training in health, safety and environment. All workers should undergo a medical examination to ensure that they are physically fit and mentally capable and are assessed as being competent to undertake the tasks to which they have been assigned.

Each staff member should also receive task-specific instruction and should be issued with a booklet that includes a terms of reference, which clearly outlines their duties and responsibilities as well as other pertinent health, safety, environmental and emergency procedures, and any EMS control procedures that have a direct bearing on their area of operation.

Teams working in these areas should also receive *ad hoc* health, safety and environment training in the form of toolbox talks to be held at least once a week. Topics should be based on upcoming operations or addressing areas of underperformance.

All facilities should also to be fitted with appropriate health and safety warning and information signage that is required for such installations.

##### *ii) Security and access control*

The Ore Sorting Plant should have adequate access control and security measures in place to ensure only authorised, trained or supervised individuals gain access to the facility.

##### *iii) Emergency and evacuation procedures*

RU's existing procedures in this regard will be extended to incorporate the new ore sorter facilities. Induction training should include detailed coverage of emergency response and evacuation procedures. An evacuation plan should be developed and presented to the staff at the Ore Sorter Plant that should clearly identify the protocols to be followed in the event of an emergency, the location and workings of the emergency escape routes and the emergency assembly areas.

##### *iv) Medical and first-aid provisions*

RU's existing procedures in this regard will be extended to incorporate the new ore sorter facilities. The Ore Sorter Plant should be fitted with a first-aid station and should have a trained first-aider on duty during each shift. The first-aid station should be equipped with adequate

resources required to treat and stabilise a patient ahead of transportation to the mine Medical Centre.

v) *Work environment*

All workers should have access to a sufficient quantity of safe potable water, and ablution and washing facilities within a reasonable distance of their working area. All working areas should have sufficient ventilation and lighting to ensure that workers can undertake their task in safety. Personal protective equipment appropriate for the minimisation of occupational hazards of the task should be provided by RU and the use thereof by the employee should be mandatory. All employees working outdoors and within the vicinity of the Ore Sorting Plant should wear suitable dust masks to limit the inhalation of respirable dust as well as hearing protection to avoid exposure to high noise levels arising from the plant operation. All equipment, plant and facilities should be fitted with appropriate safety demarcations, warning and information signage to ensure that an employee can avoid foreseeable risks and navigate to safety in the event of an emergency.

### 3.4.1.2 WASTE MANAGEMENT

RU's existing waste management systems, including environmental monitoring should be expanded to cater for the expanded operations.

i) *Waste rock*

Reject ore from the ore sorter should be transported to existing waste rock dump sites. The waste rock dump site should be equipped with the necessary seepage control systems to recover potential leachate from the waste rock dumps and prevent surface and ground water pollution.

ii) *Domestic waste*

All facilities and works areas should be allocated sufficient rubbish bins for the receipt of domestic waste and litter. Rubbish bins should be collected at regular intervals and disposed of at the RU landfill site on the mine.

iii) *Hazardous waste*

Any hazardous waste generated by the ore sorter would be disposed of in the hazardous waste disposal area on the tailings dam.

iv) *Sewage*

Sewage would be treated at the existing sewage treatment plant and the treated effluent should be reused in mine processes.

v) *Scrap metal*

Scrap metal arising from repair and maintenance work would be collected by the on-site waste management contractor for sorting and recycling.

vi) *Recycling hydrocarbons*

RU's existing ISO: EMS procedure (ENV/WMP/002) should apply to the reuse and disposal of hydrocarbons from the acid plant and associated areas. Suitable, leak-proof drums for the



disposal of oils and greases should be positioned at areas where such materials are likely to be generated. Drums should be marked according to the type of hydrocarbon being deposited, namely, synthetic oil, mineral oil or grease. RU has a hydrocarbon product supply contractor who will deal with the management of such materials.

### 3.4.1.3 DUST SUPPRESSION

Although the radiological assessment of proposed RU expansion projects indicates that public radiation doses will not exceed the 300  $\mu\text{Sv/a}$  dose constraint, the Ore Sorter plant and associated disposal of waste rock would contribute to the emissions of radioactive dust and radon. Nevertheless, a precautionary approach, based on the principle of “As Low As Reasonably Achievable” (ALARA) as promoted by the International Atomic Energy Association, should be adopted in the management of radiological issues related to the ore sorting and associated operations. Of prime importance from a radiological perspective is the control of the silica in the dust.

The following management strategies are recommended for implementation for the prevention and suppression of fugitive dust emissions from the transport of reject rock from the proposed ore sorting:

- All access and haul roads should be planned and designed to minimise the total road surface area;
- Speed limits on all gravel roads should be limited to 15 km/h and speed limits should be enforced through regular monitoring. RU should also ensure that unnecessary traffic is minimised;
- The build up of fines on road surfaces should be prevented or addressed. Dump trucks entering or leaving the ore sorter premises should not be overloaded, minimising potential spillages and the accelerated build up of fines on the road surfaces. Road surface should be maintained in a good state of repair and where necessary, the wearing course should be replaced and sufficiently compacted;
- All high traffic roads should be wetted regularly. Chemical dust suppressants (Dust-a-side®, Dustex® or similar product) should be added to increase the efficacy of water and assist in binding the dust. Hard surfacing or stabilising of problem areas or very high traffic zones should be considered. Barricades maybe erected along problem areas to reduce cross winds and shade road surfaces to reduce water evaporation;
- Fall heights from earthmoving equipment and transfer points on conveyors should be kept to the minimum;
- All transfer points on the conveyor systems, as well as the ore sorter air blast chambers should be equipped with suitable dust extraction or dust suppression systems. All filter bags at the various bag-houses at the ore sorter should receive regular maintenance in order to reduce dust emissions form the facility; and
- Automated or manual clearing of accumulated fines around conveyor transfer points, loading areas and around the ore sorter’s air blast chambers or other areas where spillages may occur should be undertaken regularly to prevent a build-up of fines that may be susceptible to wind dispersion.

#### **3.4.1.4 NOISE AND VIBRATION MANAGEMENT**

The ore sorting plant is expected to operate at a noise level of between 81.0 dB(A) and 88.5 dB(A) and is thus comparable to the noise generated by surface mining operations in the proposed SK4 open pit area. Due to the ore sorter not being exposed to public receptors, it is unlikely that this noise pollution will pose a nuisance value. The impact of high noise levels relates to the potential health and safety implications for the workforce.

The following recommendations are proposed to manage and minimise noise levels at the ore sorted plant and associated facilities:

- All plant and equipment should receive regular maintenance and should be operated in accordance with their design specifications. All mechanically powered equipment should be fitted with appropriate silencing devices which are to be inspected and repaired when necessary;
- Equipment noise audits should be carried out on all new plant and equipment upon delivery to site. These records should be used as a reference to monitor the potential deterioration of equipment noise levels during operation;
- Environmental noise monitoring should be carried out regularly to detect deviations from predicted noise levels and enable corrective actions to be implemented where necessary;
- All plant staff should be instructed in the need to minimise operational noise as part of the induction training course;
- All potentially excessive sources of noise from the plant or operational areas should be considered in the layout and design of the facilities. Where appropriate, such areas or equipment should be designed and/or fitted with suitable noise dampening devices or enclosures; and
- Where noise levels pose a health and safety risk, demarcate noise zones will be instituted and affected staff should wear the appropriate hearing protection equipment.

#### **3.4.1.5 VISUAL IMPACT MANAGEMENT**

Visual impact mitigations are primarily design considerations and are thus mostly dealt with under the construction phase SEMP. The operational phase visual impact associated with the ore sorter relates to the effective minimisation of dust by day and illumination of the facility at night. Lighting of the facility should be kept to the efficient minimum. Lighting in and around the facility should adopt the principle of being downward facing and task-specific, with limited spillage into the surrounding areas. Flood lighting of extensive outdoor areas and up-lighting of vertical structures or topographical forms should not be permitted.

Sound housekeeping practices in material lay-down areas and stockpiles, litter control and general facility maintenance should be undertaken to ensure that the visual appearance of the facility does not deteriorate and become visually offensive with the passing of time.

### 3.4.1.6 WATER MANAGEMENT

*i) Storm water controls*

The ore sorting plant should be designed with an appropriate storm water control system that will ensure that the facility is not susceptible to flooding, even during episodic flooding events. Suitably sized cut-off drains and berms should ensure that surface flows are prevented from ingress into the facility. Storm water collecting within the facility that may have been contaminated with radioactive fines, hydrocarbons and other potentially hazardous chemicals, should be collected in an appropriately designed drainage network and collection sump. From here, it can should be pumped to the primary crusher spillage collection system for treatment and reuse.

*ii) Process water*

The ore sorter is expected to use 72 m<sup>3</sup> of water for dust suppression per 24 hour cycle. The majority of the dust suppression water adheres to the ore rock and thus there is limited runoff. However, a collection sump and associated drainage network is still required for the collection of wash-down water.

*iii) Industrial effluent*

The ore sorter is not expected to generate any point source effluent discharges. However, the accumulation of runoff from the various dust suppression spraying points which may have minor radioactive dust and hydrocarbon contamination, should be directed to a collection sump via the drainage network from where it should be pumped to the primary crusher spillage collection system for treatment and reuse.

*iv) Leachates from waste rock dump*

Reject ore waste rock dumps will be comparable in composition to the existing waste rock dumps around the open pit, where it has been determined that leachates containing sulphate, nitrate and uranium can form after intense rainfall events of 20 mm or more. Due to this potential leachate formation, waste rock dumps should preferably be situated where ground contamination has or is already occurring and where seepage control systems are already in operation or can be upgraded to meet the additional capacity requirement.

*v) Water conservation*

RU should continue to monitor water usage and will identify, assess and implement feasible measures to reduce, reuse and recycle water as part of the water management strategy. All site staff should be made aware of the need to use water conservatively and are to report any wastage or leakages to their supervisors immediately. All water pipes, faucets and water dependant processes should be monitored for water use efficiency. Repairs, reconfigurations or recalibration should take place promptly to ensure optimum water efficiency is realised. Treated effluent, as opposed to fresh water, can be used for the purposes of ore sorter plant wash-down.

### **3.4.1.7 ENERGY USAGE AND GREENHOUSE GAS EMISSIONS**

The ore sorter plant would require an electricity supply of 4.3 MW for its operation. Two scenarios were investigated for transporting reject rock to the waste rock disposal sites. GHG emissions and energy usage associated with both are fairly similar and would result in a 14% to 15% increase in the former and a 16% to 17% increase in the latter, when compared to 2006, pre-expansion figures. RU should continue to explore, investigate and implement options such as energy efficient motors and natural lighting to reduce GHG emissions and energy usage throughout the operational phase of the project.

## **3.5 OPERATIONAL PHASE SEMP FOR THE SK4 OPEN PIT**

### **3.5.1 PRE-COMMENCEMENT OPERATIONS AT SK4 OPEN PIT**

Prior to the commencement of mining activities in the SK4 area, pioneering work in the form of establishing access roads and ramps would need to be undertaken.

#### **3.5.1.1 SEARCH, RESCUE AND TRANSPLANTING OF PLANTS**

With the assistance of a recognised botanist, RU should conduct a search and rescue operation for plants that are of significance in all areas that will be disturbed as part of the expansion operation into the SK4 mining area, including haul roads. The botanist should assist with the identification of other significant species over and above the *Adenia perchuelii* and *Lithops ruschiorum*, and oversee the extraction of the plants and assist in the identification of a suitable area to receive the transplants.

#### **3.5.1.2 MAIN HAUL AND ACCESS ROAD**

A single two lane haul and access road between SK4 and the Primary Crusher is to be installed. The primary design criteria for the route of the road should be to ensure that it takes the shortest, flattest alignment, so as to maximise the long term efficiency of the mining operation by minimising the fetch distances and the effort expended by the various transport and earthmoving equipment traversing the route. The road should be fitted with a suitable wearing course, be stabilised or hard surfaced to meet the requirements of the volume and nature of traffic that it will accommodate. Sufficient provision should be made for the control and discharge of storm water arising from the presence of the road in the landscape. The road should be of sufficient width to accommodate two lanes of traffic and it should be fitted with appropriate traffic control and warning signs to regulate the traffic in a safe manner. Traffic management systems such as signage and movement planning should be integrated into the existing system applied for the SJ pit operation.

#### **3.5.1.3 SERVICES**

Water supply lines should be installed alongside the main access road, so as to restrict the disturbance brought about by installation and maintenance work to a limited area alongside the road.

#### **3.5.1.4 STORM WATER CONTROLS**

Cut-off drains should be instated on the upslope sides of the SK4 open pit area where drainage lines are intersected to protect the open pit against the ingress of storm water, as well as limit

such storm water from contamination by in-pit contaminants. Cut-off drains should ensure that water is diverted around or prevented from entering the open pit and is redirected into adjoining drainage lines where it can discharge freely into the natural systems.

#### **3.5.1.5 ACQUIRING PERMITS FOR THE DESTRUCTION OF ARCHAEOLOGICAL SITES**

According to a study undertaken by Quaternary Research Services in January 2007 in terms of the National Heritage Act (Act No. 27 of 2004), three archaeological sites were identified and documented within the greater SK mining area that would be disturbed by mining activities. RU has already acquired the necessary permits for the destruction of these sites, although these sites do not occur within the proposed SK4 mining area. All three sites were assessed as having a low significance and have been documented according to acceptable standards.

#### **3.5.1.6 SINKING WATER MONITORING BOREHOLES**

The following recommendations made during the previous assessments of the expansion of mining activities into the SK4 area remain valid. Recommendations for the expansion of the hydrological monitoring system include the following actions:

- Drilling of an additional five to ten boreholes;
- Taking monthly water level readings from each of the boreholes; and
- Quarterly water quality analysis of the new boreholes as well as the existing borehole DG1 at the mouth of Dome Gorge. (The first water quality analysis shall occur before the commencement of mining activities in the area and data will be retained for comparative purposes).

#### **3.5.1.7 SITE CLEARANCE**

Once the access/haul road is in place, water supply has been installed and the search and rescue of identified plant species is complete, an excavator will prepare a blasting platform. Thereafter, the drill-blast-load-haul operation will commence.

Overburden material won during site clearance can be utilised in the construction of the storm water cut-off drains and berms around the SK4 mining allotment.

### **3.5.2 OPERATIONAL CONTROLS**

To minimise the environmental impacts associated with the mining of the SK4 area, the following measures are recommended. To ensure that these recommendations are effectively instituted and monitored, they should be incorporated into a new set of operational procedures contained in RU's EMS. In line with the quality management objective of continual improvement, the procedures should also be revised and updated regularly to ensure that industry best practise and the best available technologies are being utilised and effectively implemented.

### 3.5.2.1 WATER

#### i) *Water demand and use*

Due to the extremely arid climate in which RU conducts its mining activities and the demand for water in the mining and processing operations, water conservation is at the forefront of the environmental issues at RU. Expansion of the mining operations into SK4 will exert additional pressure on water supplies. These circumstances have enabled RU to develop a comprehensive water management system to effectively manage the quantity and quality of their water resources.

The expansion of mining operations into SK4 and SJ will require an estimated 700-800 m<sup>3</sup>/day of water for dust suppression and drilling purposes. RU's current water demand for dust suppression and drilling purpose is 600-700 m<sup>3</sup>/day and thus the proposed expansion of operations will double the water demand. The Khan River can supply a maximum of 500-600 m<sup>3</sup>/day, which is pumped from the reservoirs at the toe of Waste 7 rock dump to the Waste 4 pond. The deficit will be made up from the Mine Pond, receiving treated effluent from the existing sewerage plant and recycling dam, which are capable of supplying an additional 400-500 m<sup>3</sup>/day and 400 m<sup>3</sup>/day respectively, thus satisfying the demand. The reticulation of the required water to locations where water tankers would be filled is presently being designed.

The proposed expansion of mining operations does push the mine's water demand very close to the supply capability and thus all water conservation and recycling initiatives should be identified, implemented and effectively managed to safeguard against possible shortfalls. RU has an action plan for the evaluation, design and implementation of various water management initiatives and have identified several options to offset the additional demand through the reduction in consumption or losses, which could amount to approximately 2 000 m<sup>3</sup>/day. Additional fresh water required would be from the increased bulk supply due to be received from NamWater's desalination plant. The priority projects include the following:

- Tailings paddy double deposition to reduce evaporation losses;
- Replacing hydraulic gland seals on slurry pumps with mechanical seals; and
- Supplying recycled water for dust control purposes at the fine crusher and leach tanks.
- The dust suppression operations should be carefully managed and continually optimised to ensure that water is used efficiently and that spraying regimes are modified according to climatic conditions and seasonal variances. RU should continue to increase the efficacy of the water used for dust suppression purposes through the use of chemical dust suppressants.

#### ii) *Water quality management*

RU's policy is to accept responsibility for the quality of surface and groundwater within the mining grant and for the prevention of mine-induced water quality deterioration in the Khan River, downstream of the mine. RU's water quality management strategy is to maintain suitable ground water quality for the highest beneficial use to which the groundwater resources or occurrences can presently or potentially be put, which is identified as being industrial, ecological and, to a lesser extent, agricultural purposes as a result of the naturally high salinity levels.



Water used for dust suppression spraying will be comprised of various wastewater effluents, potentially containing varying levels of contaminants. It is expected that seepage water arising from dust suppression spraying will have no significant affect on the groundwater quality, since the water mostly evaporates shortly after application. RU should however ensure that dust suppression spraying is optimised and effective, thus minimising the volume of water infiltrating the ground.

Storm water coming into contact with waste rock also presents a potential contamination problem. The SK4 pit should be designed with sufficient storm water controls and retention areas in place, to ensure that storm water is prevented from coming into contact with such sources of contamination; that water that is potentially contaminated is prevented from being released into the Khan River; and that seepage control and recovery systems in Dome Gorge are adequate in collecting the potentially contaminated seepage before it reaches the Khan River. Downstream monitoring of groundwater quality should continue.

### 3.5.2.2 DUST AND RADON EMISSIONS

Three sources of fugitive dust emissions associated directly with the expansion of operations into SK4 can be identified, namely; dust from heavily used gravel roads (treated and untreated); dust arising from drilling, blasting, excavation and loading operations within the SK4 pit; and wind blown dust from waste dumps and other material stockpiles.

Fallout dust meters should be established in addition to the existing meters located at the East of the Fine Crushing Plant; at the Processing Plant and at the Arandis residential area to assess the effect of the expansion of the operations in to the SK4 mining area. Dust samples should be collected at monthly intervals and data capture shall be as per RU's ISO procedures.

RU has systems and procedures in place to limit the respirable dust volumes to make sure that the silica content of the dust is maintained to the adopted standard, thus providing adequate protection for employees against radioactive silica dust hazards. Assuming the dust suppression program utilised elsewhere on the mine is effectively carried over to operations in the SK4 open pit, no dust issues can be expected. The SK4 ore body is a higher grade than the currently mined areas and as such a new personal and area radiation monitoring program will be established for the SK4 area.

The following management strategies are recommended for the management of these dust sources.

#### *i) Dust from gravel roads*

Management strategies to minimise the extent of fugitive dust arising from gravel roads should include, but not be limited to the following:

- Minimise the total road surface area. This entails optimising the road network by installing the minimum number of roads and minimising the length and breadth of the roads;
- Limiting the speed for heavy equipment on gravel roads to 15 km/h, so as to reduce the disturbance and entrainment of dust from road surfaces, and minimise unnecessary traffic;

- Preventing build up of fines on road surfaces. Haul trucks should not be overloaded and will therefore not cause spillages en route to the Primary Crusher. Road surfaces should be maintained in a good state of repair and where necessary, wearing course should be replaced and properly compacted. Where a build up of fines on the road occurs this should be cleared manually; and
- Binding of dust on gravel road surface. All high traffic roads should be wetted regularly. Chemical dust suppressants (Dust-a-side® or Dustex®) should be added to increase the efficacy of the water and assist in binding the dust. Particular problem areas should be hard surfaced or stabilised. Barricades could be erected along problem areas to reduce cross winds and road surfaces shaded to reduce water evaporation.

ii) *Dust from drilling, blasting, excavation and loading operations*

Management strategies to minimise dust in the SK4 pit resulting from the various mining activities occurring include the following:

- Dust from drilling. All drilling rigs should be fitted with suitable water or pneumatic dust suppression devices. All dust suppression mechanisms should be maintained in a good state of repair. Where dust suppression mechanisms on the drilling rigs are insufficient, water should be continually sprayed into the drill hole; and
- Dust from blasting. Where possible blasting should be carried out in the early mornings before sunlight enters and warms the open pit. Lower wind velocities and thermal stratification in the pit should limit the movement of dust from the pit and assist in allowing the dust to settle quickly.

### 3.5.2.3 NOISE AND VIBRATION

A public concern exists related to the effects of blasting. Mitigation measures should be applied, in the form of ensuring that blasting patterns, charge calculations, early pre-blast warnings and correct stemming of blast holes are implemented optimally to reduce potential negative noise and vibration impacts. RU employees are provided with and make use of suitable personal protective equipment and follow the appropriate health and safety procedures to limit their exposure to both noise and vibration within the SK4 mining area.

### 3.5.2.4 VISUAL ASPECT

The visual impact resulting from the expansion of mining operations into the SK4 area, the haul road and the resultant additional increase in the waste rock dump size at Waste 7 rock dump is assessed as being of medium negative significance. Although the operation as a whole does not lend itself to any alternatives, there are certain measures that can assist in mitigating the visual impact associated with SK4 mining activities, as follows:

- An effective dust control program should ensure that the attention of nearby receptors, i.e. neighbouring landowners, is not drawn to the activities of the mine;
- Litter should be strictly controlled;
- Lighting of the pits and roads should be kept to the minimum required to allow for safe operation and down lighting is encouraged;

- No further dumping of waste rock should occur on the elevated portions of Waste 7 rock dump until further assessment can be undertaken on the visual impact to the Welwitschia Flats. Such assessment needs to inform the most suitable and attainable final form and shape for the dumps. Thus, dumping should occur in the lower lying, already impacted areas outside the view of significant receptors;
- Suitable cover material should be sourced to cover the rock dumps on completion to ensure visual homogeneity with the surrounds. In this regard, topsoil and suitably coloured overburden from the commencement of operations in the SK4 mining area should be stockpiled for later use in shaping and rehabilitation; and
- All substantial man-made structures should be painted a similar colour to the surrounding landscape, so as to minimise visual contrast.

### 3.5.2.5 BIODIVERSITY

The RU mining area lies along a rainfall/fog incidence cline that gives rise to extreme climatic conditions which characterises the habitat as having a high level of biodiversity and endemism. Sixteen biotopes were delineated within the RU mining area. The SK4 area intersects one of these, namely the eastern hills biotope.

The expansion of mining activities in the SK4 area will impact on a critical biotope and thus minimising of the mining footprint in this area is considered of high importance.

Of the two Red Data species identified in the area, namely *Adenia perchuelii* and *Lithops ruschiorum*, several large specimens of *Adenia perchuelii* were found, some of which might be directly affected or destroyed through the mining area expansion. RU should acquire the necessary permits as well as expertise so as to undertake a test transplant of these plants. Once the areas to be disturbed have been fenced off, *Adenia perchuelii* specimens that will be directly affected are to be marked and a suitable transplant location identified with the assistance of an appropriately qualified botanist.

Apart from minimising environmental impacts, special measures to facilitate the recovery of critical biotopes are required. Rehabilitation practices such as preserving and re-spreading topsoil, reseeded and replanting with indigenous species should be tested and site-specific protocols developed for particular habitats. Presently very little is known about appropriate practices in this arid environment and setting up trials will be an essential part of RU's biodiversity strategy.

Although more intensive collecting over the past growing seasons have greatly improved overall plant data coverage, most parts of the extension area have only been surveyed once. Repeated sampling will be necessary, particularly in those mapping units that were only accessed along their margins, such as the Khan River Mountains and the south-east gneiss hills. Work to improve the understanding of other biodiversity components such as invertebrates, birds and reptiles is in progress. A systemic approach to selecting faunal indicator species and to link these assessments to the derived biotopes is required.

## 4 DECOMMISSIONING PHASE SEMP

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RU have been planning for mine closure since 1991. A comprehensive Closure Management Plan, updated in 2005, is in place that considered two closure scenarios, i.e. an extended mine life to 2016 or a 2009 closure. Besides being guided by Rio Tinto standards, the closure plan was also informed by technical studies and incorporates a strategy to deal with the related social issues.

The 2005 Closure Management Plan describes RU's vision for mine closure and identifies the critical areas that would require specified management. These refer to the condition of the pit void, consequences for employees and the community, the status of contaminated processing and waste sites, and plant and infrastructure implications. Stakeholder consultation is recognised as vital in finding the most sustainable post-closure situation.

Using the approach of risk identification and mitigation, the Closure Management Plan addressed social and environmental risks as well as business risks. In developing the mitigation measures required to manage the identified risks, the financial and human resources needed to achieve such mitigation were defined and quantified. The further studies that would be required to allow for comprehensive planning for decommissioning are described.

The 2005 closure management plan makes provision for the decommissioning of the mine's original acid plant mothballed in 2000, the existing pilot ore sorter and pre-screening plants and the current open pit, rock dumps and tailings facility. It therefore already covers to a large extent the requirements for decommissioning of the projects evaluated during the phase 1 assessment of expansion projects.

The present SEIA process is part of RU's evaluation of extending the life of the Rössing mine beyond 2016. The specific components being assessed, i.e. the sulphuric acid production plant, the radiometric ore sorter and the mining of the SK4 ore body, would become integral parts of the entire mine operation and subject to common operational procedures.

It is recommended that, should MET:DEA issue the necessary clearance for the acid plant, ore sorter and SK4 mine, their specific characteristics needing a modified closure strategy or decommissioning plan should be incorporated into a revision of the already existing Closure Management Plan.

This draft SEMP should be seen as the precursor to a more comprehensive plan that will follow as the approval process continues and the specifics of the engineering design become available.

## BIBLIOGRAPHY

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- Air Quality Impact Assessment for the Proposed Expansion Project for the Rössing Uranium Mine in Namibia: Phase 1 (Thomas. R. 2007)
- Closure Management Plan (Rössing Uranium Limited, October 2005).
- Draft Environmental Management Plan for SK4 (Garrard. S and Schneeweis. R. 2007).
- Energy Balance Phase 1 Expansion: Acid Plant, Ore Sorter Plant and Extension of Mining Activities into SK4 (Garrard. S. 2007).
- Environmental Management System Procedures: Environmental Management System Code of Practice (Everett. M. Revision No. 7. 2006).
- Environmental Noise Report: Proposed Infrastructure and Opencast Extension at Rössing Uranium Mine (Hassall. J. 2007).
- ISO 14001 Guidance Manual: Technical report NCEDR/98-05. (Martin. R. 1998). National Center for Environmental Decision Making Research. USA.
- Risk Assessment of the Sulphuric Acid Plant as part of the Proposed Expansion of Rössing Uranium Mine, Namibia (Oberholzer. M. P. 2008).
- Rössing Uranium Mine Proposed Expansion Projects Phase 1: Landscape Characterisation and Visual Impact Assessment (Stead. S. 2007).
- Rössing's Biodiversity Strategy: Biotope Mapping for the Rössing Uranium Mine Extension Project (Burke. A. 2007).
- Social and Environmental Impact Assessment of Rössing Mine Expansion Projects – Water Management (Müller. S. 2007).



## APPENDIX A: SEMP FRAMEWORK TABLE

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An extract of the SEMP Framework Table is provided, as an example of the intended complete table. The completed table will be submitted with the finalised submission of this Draft SEMP as an annexure to the Final SEIA Report.



D:	Aspect	Management Objective	Management Action	Action Frequency	Standard	Indicator	Responsibility
B:01	Legal compliance considerations	Compliance with legal requirements	Conditions of authorisation by authorities to be incorporated into Final SEMP	Upon receipt of authorisation	Before Construction	Verify paperwork	EIA Practitioner
B:02			Awarding of Contract not to occur before the authorisation is granted and Tendering Contractor's have received the conditions of authorisation	Once off	Without exception	Verify paperwork: Date of Contractor appointment	RU Project Management Team
B:03	Ensuring Contractor is committed to responsible environmental management and has allocated sufficient resources to realise this	Environmental and social aspects to be considered during the adjudication of tenders	Contractor's required to undergo RU's prequalification evaluate Contractor's HSE performance	Once off at pre-tender	Without exception	Verify paperwork	RU Project Management Team
B:04			Project Environmental Specification to Form part of the Tender and Contract Documentation	Once off at pre-tender	Without exception	Verify paperwork	EIA Practitioner and Project Management Team
B:05			Environmental management tasks identified in the PES and SEMP must be included in the Bill of Quantities and the Contractor shall be required to allocate finances toward environmental management requirements	Once off at pre-tender	Without exception	Verify paperwork	Project Management Team and Contractor
B:06			Contractor required to submit a Social and Environmental Policy as part of the tender submission that is in line with RU's HSE Policy and the prevailing legislation.	Once off at tender adjudication	In line with RU's HSE Policy	Verify paperwork	Contractor
B:07	Establish an environmental management framework to oversee compliance of the construction Contracts	Ensuring the implementation of environmental management best practice and recommended mitigations during construction	Project Environmental Specification to form part of the Tender and Contract Documentation	Contract term	Without exception	Verify paper work and tender documents	RU Project Management Team
B:08			RU to appoint Rössing's Environmental Officer (REO) to monitor Contractor's compliance with regard to the SEMP and PES	Appointment to occur as soon as possible after the awarding of the Contract and span the Contract Term	Without exception	Signed letter of appointment including Terms of Reference	RU Project Management Team
B:09			The PES requires Contractor to appoint a designated Contractor's Environmental Officer (CEO) to undertake compliance monitoring and guide construction activities in line with the SEMP and PES	Appointment to occur as soon as possible after the awarding of the Contract and span the Contract Term	Without exception	Signed letter of appointment including Terms of Reference	RU Project Management Team and Contractor
B:10	Contractually bind Contractor commitment to sound environmental management principles		HSE Policy submitted as part of Tender submission to implemented by the appointed Contractor. The HSE policy to form part of the Tender adjudication process	Tender Adjudication and through the Contract Term	In line with RU's HSE Policy and prevailing legislation	Verify paperwork	RU Project Management Team
B:11			Project Environmental Specification to Form part of the Tender Documentation	Pre Tender and tender adjudication	Without exception	Verify paperwork	RU Project Management Team
B:12			Contractor's to be advised as part of the tender documentation that the Contract will not be awarded to a Tenderer apportioning an unrealistically low amount to environmental management	Pre-tender and tender adjudication	Without exception	Verify paperwork: Tender Documentation	RU Project Management Team
B:13	Verification of performance through independent involvement and environmental monitoring		RU to appoint an Independent Environmental Auditor (IEA) to undertake compliance monitoring and auditing in terms of the SEMP, PES and other statutory requirements	Contract Term	Without exception	Signed letter of appointment including Terms of Reference	RU Project Management Team
B:14			Key stakeholder representatives to be invited to observe monthly site meetings	Contract Term	Representative from MET:DEA; Arandis Town Council: Rössing Foundation and MME	Attendance register of meeting minutes	RU Project Management Team
B:15			Environmental monitoring programme for the recording of dust, noise and water use to be established and implemented	Contract term	Applicable monitoring standard	Compliance with respective standard	REO CEO and IEA

ID:	Aspect	Management Objective	Management Action	Action Frequency	Standard	Indicator	Responsibility
B:16		Integrate the management of the construction Contracts into RU's existing environmental management framework to ensure continuity	RU's environmental management procedures to be made available to the Contractor during the compilation of the various method statements to ensure continuity of management style and best practice	Ad hoc	Achieve similar quality of environmental planning to that found on the mine	Method statements approved and method statement rejected	REO and CEO
B:17	Ensuring adequate environmental protections are planned at the commencement	Embodiment the need for environmental planning to form part of the regular planning of construction operations in the Contract	To be specified that each method statement shall contain subsections dealing with health and safety, social and environmental considerations specific to that task	Contract term	All method statements to have HSE subsection	Verification	EIA consultant, RU project Management Team
B:18			The following method statements are to be submitted:	Within 14 day of arriving on site	With out exception	Verify paperwork	Contractor / CEO
B:19			• <i>Environmental Awareness Course: Syllabus and logistics regarding the presentation</i>				
B:20			• <i>Construction Camp Layout and functioning (Including stormwater management)</i>				
B:21			• <i>Fuel storage area (Including environmental protection measures)</i>				
B:22			• <i>Concrete Batching Plant and the management of concrete operations</i>				
B:23			• <i>Waste Management System</i>				
B:24			• <i>Dealing with Contaminated Water</i>				
B:25			• <i>Water Use Management Plan</i>				
B:26			• <i>Extent of areas to be cleared</i>				
B:27			• <i>Method of undertaking earthworks, including topsoil handling and erosion, dust and noise controls</i>				
B:28			• <i>Method of undertaking earthworks, including topsoil handling and erosion, dust and noise controls</i>				
B:29			• <i>Use of herbicides, pesticides and other poisonous substances, including means of storage</i>				
B:30		• <i>Dust control, including methods to prevent dust generation and method to reduce dust where its generation is unavoidable</i>					
B:31		• <i>Emergency procedures for spillages of hazardous substances, fire and serious accidents;</i>					
B:32	Communication with Contractor and Contractor's staff	To ensure that ensure effective and formal communication between the Project Management Team and the Contractor on environmental issues and that communication and instruction carry sufficient weight	Environmental performance to be a item on the agenda of all monthly meetings	Contract term	Ensure environmental aspects are given adequate importance and are not sidelined by technical matters	Minutes of meetings	Project Manager
B:33			Environmental operations to be included in the Contractor's programme and reported on in progress reports	Contract term	Ensure that resources are a allocated and operations undertaken timeously	Progress reports	Contractor
B:34			The CEO to have sufficient authority in terms of the Contractor's organisational framework to initiate the necessary environmental management actions	Contract term	Environmental aspects receive adequate attention	Number of incidents to the contrary	Contractor
B:35			System regarding method statement compilation, submission, review and approval to be rigorously implemented	Contact term	No construction having commenced without approved method statement, without exception	REO / IEA reports	All, Project Manager
B:36			All correspondence relating to environmental issues between the Contractor and the Project management Team to be signed by the Contractor's Site Agent and the Project Manager respectively.	Ad hoc	Document control system in place,	Verify paperwork	Project Manager, Site Agent, CEO, REO

ID:	Aspect	Management Objective	Management Action	Action Frequency	Standard	Indicator	Responsibility
B:37	Communication with the external stakeholders	Ensure that the public and various stakeholders have a means of raising concerns and be kept informed of general project progress	Key stakeholder representatives to be invited to attend monthly site meetings: MET:DEA; Arandis Town Council; Rössing Foundation; MME.	Contract term	Stakeholder attendance and participation	Minutes of meetings and meeting attendance registers	Project Manager
B:38			Contact numbers of the Contractor to be prominently displayed at the entrance to the site	Contract term	Without exception from commencement	Physical verification	Contractor
B:39			A public complaints register to be kept by the Contractor, copies to be submitted to the Project Manager and discussed during monthly site meetings	Contract term	Without exception	Physical verification and Contractor's weekly submissions	Contractor and CEO
B:40	Social and Environmental Awareness and attitude of the Contractor's Staff toward environmental matters	Ensuring sufficient social and environmental awareness at commencement	Contractor's Environmental Induction training course and Code of Conduct Booklet to be submitted and approved	Submission within 14 days of commencement	Without exception	REO report	Contractor and CEO
B:41			Environmental Awareness induction Course to be presented to all levels of staff at the commencement of construction	28 days after commencement and a refresher course every year	All staff to have received induction training	Signed Code of Conduct Booklet held by each person on site and a signed	Contractor and CEO
B:42		Ensuring ongoing social and environmental awareness	Environmental aspects are to form part regular toolbox talks and task briefing sessions	Ad hoc / monthly	An environmental or social topic to be dealt with on at least a monthly basis	CEO daily dairies and Contractor's weekly submissions	Contractor, CEO and Contractor's team supervisors
B:43			Appropriate environmental signage and information posters to be prominently displayed and maintained at key locations across the site, as well as at the entrance to the site	Contract term	Adequate in the opinion of the REO and IEA	Physical verification. REO and IEA reports	CEO
B:44			Contractor's Social and Environmental Policy to be displayed prominently on-site where staff may congregate, as well as at the entrance to the site	Contract term	Adequate in the opinion of the REO and IEA	Physical verification. REO and IEA reports	CEO
B:45			Rössing foundations community health and safety programme and the HIV/AIDS awareness programme to be extended to cover Contractor's Staff	Ad hoc	All Contractor's staff participate in programme	Attendance register	REO
B:46			Punitive measures and incentives for Contractor's staff	Contractor to be encouraged to adopt a disciplinary system to address common, minor environmental behaviours of individual staff, such as littering, not using ablution facilities and eating areas, etc	Ad hoc	Reduction in the number of offences over time	A reduction in the number of fines issued per month, CEO's reports
B:47	Contractor to be encouraged to introduce a competition amongst teams and a monthly award for the best environmental performance	Monthly		Incentive scheme adopted	CEO and REO reports	CEO	
B:48	Road safety and Traffic control	To reduce the environmental, health and safety impacts associated with increase of traffic on site roads non-site and public roads	All site roads shall be equipped with appropriate warning and information signage	Contract term	Adequate in the opinion of the REO and IEA. Meets with industry norms and standards	REO and IEA reports	Contractor
B:49			The movement of all construction vehicles and equipment including suppliers shall be controlled so that they remain on designated routes, are distributed so as not to cause an undue concentration of traffic, are routed and operated in a manner that minimises disruption to other users and that all relevant laws are complied with	Contract term	No public complaints or incidents as a result	Public complaints register, REO and CEO reports	Contractor

ID:	Aspect	Management Objective	Management Action	Action Frequency	Standard	Indicator	Responsibility
B:50			Vehicle and plant operators to have undergone the necessary medical and competency evaluations and be in possession of the required licences	Ad hoc	Without exception	Health and safety register	Contractor
B:51			Speed limit on gravel roads shall be restricted to 15kmph	Contract term	Without exception, spot checks undertaken monthly or as required	Distance vs time observations	Contractor / REO / CEO
B:52			All gravel under the Contractor's control shall be treated to reduce the fugitive dust losses as a result of vehicle entrainment	Contract term. Dust suppression continually modified to suite climatic conditions	Fallout dust levels remain within specified tolerances	Fallout dust measurements. Data submitted as part of Contractor's weekly submission	Contractor
B:53			Vehicles shall not be overloaded or used in a manner or for a task for which they are not suited or intended	Contract term	Without exception	REO, CEO and IEA observations	Contractor
B:54			Plant and materials shall be appropriately secured to ensure safe passage between destinations. Loads that pose a risk of dust generation or spillage during transit, including but not limited to sand, stone chip, fine vegetation, refuse, paper and cement, shall have appropriate cover. The Contractor shall be held responsible for any clean-up resulting from the failure by his employees or suppliers to secure transported plant and materials properly.	Contract term	Without exception. No public complaints	REO, CEO and IEA observations.	Contractor
B:55			All construction equipment shall be equipped with a fire extinguisher	Contract term, monthly checks on fire extinguisher service validity certificates	Without exception	REO, CEO and IEA observation / physical verification	Contractor
B:56			All construction equipment shall be equipped with an audible reverse sirens	Contract term	Without exception	REO, CEO and IEA observation / physical verification	Contractor
B:57			In the event that construction work may interfere with site or public traffic, suitable warning signs shall be erected and points men shall be posted to direct the traffic accordingly	Ad hoc	Without exception and adequate in the opinion of the relevant health and safety personal and industry norms and standards	REO, CEO and IEA observation / physical verification	Contractor
B:58	Potentially hazardous materials	Appropriate storage, use and handling of hydrocarbons	The following method statements are to be compiled Contractor and reviewed and approved by the Project Management Team:	Within 14 days of arrival on site and before the commencement of construction of these items	No building before approval	REO reports and paper trail	Contractor / CEO
B:59		<ul style="list-style-type: none"> <li>Location and layout of the construction camp, including hazardous material and fuel storage areas</li> </ul>					
B:60		<ul style="list-style-type: none"> <li>Location and structure of the fuel storage area, including the type and volume of storage container and the design and capacity of the bund, and procedures for the filling and dispensing of fuel both at the fuel storage area and on Site;</li> </ul>					
B:61		<ul style="list-style-type: none"> <li>Solid waste (refuse) control and removal of waste from the Site, including the number, type and location of rubbish bins, the manner and frequency with which the waste will be removed from site and a description of the identified disposal site;</li> </ul>					
B:62		<ul style="list-style-type: none"> <li>Emergency procedures for spillages of hazardous substances, fire and serious accidents;</li> </ul>					
B:63			Diesel shall be stored in appropriate storage tanks or in bowsers. The tanks/ bowsers shall be situated on a smooth impermeable surface with a permanent bund. The impermeable lining shall extend to the crest of the bund and the volume inside the bund shall be 130% of the total capacity of all the storage tanks/ bowsers. The floor of the bund shall be sloped, draining to an oil separator.	Contract term	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor

ID: Aspect	Management Objective	Management Action	Action Frequency	Standard	Indicator	Responsibility
B:64		In the event that fuel or oil is dispensed from drums, the proper dispensing equipment shall be used, and the drum shall not be tipped in order to dispense fuel. The dispensing mechanism of the fuel/ oil storage drum shall be stored in a waterproof container when not in use.	Contract term / daily	Without exception. Spills are kept to a minimum	Physical verification and routine environmental monitoring and audit reports	Contractor
B:65		Unauthorised access into the fuel storage area shall be prevented by way of fencing and lockable gates.	Contract term / daily	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:66		The Contractor shall ensure that there is always a supply of absorbent material readily available to absorb/ breakdown and, where possible, be designed to encapsulate minor hydrocarbon spillage. The quantity of such materials shall be able to handle a minimum of 1000 l of hydrocarbon liquid spill. This material must be approved by the Project Manager prior to any refuelling or maintenance activities.	Contract terms / weekly	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:67		The Contractor shall ensure that engine oil, hydraulic oil, shutter oil, lubricants and curing compound containers that are in use are stored within a bunded area consisting of a smooth impermeable base with an earth bund. The fuel bund may be used for this purpose as long as the capacity of the bund remains 130% of all of the fuel storage tanks/ bowsers it contains.	Contract term / daily	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:68		The unopened storage containers shall be inspected regularly to ensure that no leakage occurs.	Ad hoc /daily	Meets specifications, no evidence of leaks or spills	Physical verification and routine environmental monitoring and audit reports	CEO / REO / IEA
B:69		When oil/ curing compound is dispensed, the proper dispensing equipment shall be used, and the storage container shall not be tipped in order to dispense the oil/ curing compound. The dispensing mechanism of the oil/ curing compound storage container shall be stored in a waterproof container when not in use.	Contract term / daily	Without exception resulting in no or limited spillages	Physical verification and routine environmental monitoring and audit reports	Contractor
B:70		Oil/ curing compound shall be used in moderation and shall be applied under controlled conditions using appropriate equipment. The Contractor shall take all reasonable precautions to prevent accidental and incidental spillage during the application of these compounds.	Contract term / daily	No or limited spillages	Physical verification and routine environmental monitoring and audit reports	Contractor
B:71		In the event of oil/ curing compound spill, the source of the spillage shall be isolated, and the spillage contained. The Contractor shall be required to clean up the spill, either by removing the contaminated soil or by the application of absorbent material in the event of a larger spill. Treatment and remediation of the spill area shall be undertaken	Contract term /daily	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:72		Oil from drip trays and the oil separator, used oil and any other source of liquid hydrocarbon waste shall be removed on a regular basis to an oil-recycling centre	Contract term / weekly	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor



ID:	Aspect	Management Objective	Management Action	Action Frequency	Standard	Indicator	Responsibility
B:73			The fuel storage area shall be equipped with the appropriate hazard and warning signage, no smoking or naked flame signs and will be equipped with the necessary fire fighting equipment	Contract term / weekly	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:74		Appropriate storage, use and handling of paints and solvents	The Contractor shall ensure that the use of oil based paints, chemical additives, cleaners and other chemicals is strictly controlled, and that no contamination of the environment, particularly of drainage lines, occurs as a result of there use.	Contract term /daily	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:75		Appropriate storage, use and handling of herbicides and pesticides	Where the use of herbicides, pesticides and other poisonous substances has been specified or approved by the Engineer, they shall be stored, handled and applied with due regard to their potential harmful effects and in adherence with the approved Method Statement.	Contract term /daily	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:76			The Contractor shall strictly adhered to the manufacturer's specifications regarding applications rates, storage and safety precautions.	Contract term / ad hoc	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:77			Herbicides shall not be used within 50 m of any drainage line.	Contract term /ad hoc	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:78			The Contractor shall submit a method statement relating to the use of herbicides, pesticides and other poisonous substances, including means of storage;	Before bringing such materials onto site	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:79	Site workshop, wash bay, fuel stores and oils separator	Reduce the environmental health and safety impacts associated with the design and operation of a site workshop and associated facilities arising from the maintenance and operation of site plant and equipment	The workshop shall have a smooth impermeable floor which shall be bunded and sloped towards a collection drain or sump, connected to an oil separator to contain any spillages.	Contract term /at commencement	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:80			The workshop shall be equipped with a wash bay, enclosed to prevent the loss of hydrocarbons and soap into the surrounding environment. The floor will be bunded and sloped and all waste water shall be fed through an oil separator before entering snake pit	Contract term / at commencement / daily or ad hoc inspections	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:81			The refuelling deck is to have a collection sump linked to the oil separator	Contract term / daily inspection	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor

ID:	Aspect	Management Objective	Management Action	Action Frequency	Standard	Indicator	Responsibility
B:82			The fuel storage area shall be equipped with a bund area equalling 130% the total volume of fuel stored in the area	Contract term / once off verification	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:83			The fuel storage area shall be located in a portion of the construction camp where it is unlikely to pose a significant risk in terms of water pollution or traffic safety	Contract term /daily	In the opinion of the REO, CEO and IEA	Physical verification and routine environmental monitoring and audit reports Contractor Method statement	Contractor
B:84			The workshop area shall be equipped with a hydrocarbon spill kit capable of treating a 1000ℓ spill containing the necessary spark proof shovels, personal protective equipment, sufficient collection vessels	Contract term /daily	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:85			The workshop shall have a sealed-bottom waste storage vessel for hydrocarbon contaminated items such as filters, oily rags, grease drums, contaminated soil and absorbent material from collected spills, etc	Contract term /daily	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:86			The workshop and fuel storage area shall be equipped with adequate fire fighting equipment, suitable for the type and worst-case-scenario fire than may occur there.	Contract term / weekly	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:87			The fuel storage area shall be fenced off and locked to ensure that no unauthorised entry can be gained. Appropriate safety and hazard warning signage shall be prominently displayed at the fuel storage area	Contract term /daily	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:88		Verification of adherence to specified requirements	The workshop, fuel storage area, wash bay and oil separator shall be routinely inspected to ensure compliance with the specified requirements	Contract term /daily	Without exception	Physical verification and routine environmental monitoring and audit reports	CEO/ REO/ IEA
B:89	Vehicle, plant and machine maintenance	Reduce the safety risk associated with equipment or plant malfunction and potential environmental damage	All vehicles and equipment shall be kept in good working order to ensure efficiency and safety and minimise pollution and emissions.	Contract term /daily / ad hoc	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor



ID:	Aspect	Management Objective	Management Action	Action Frequency	Standard	Indicator	Responsibility
B:90			All plant and equipment to be inspected daily by the operator to ensure fitness, all defects to be reported and repaired immediately. Leaking equipment shall be repaired immediately or removed from Site.	Contract term /daily	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:91			Where practical, all maintenance of equipment and vehicles on Site shall be performed in the workshop	Contract term /daily	Except when emergency maintenance is required in field	Physical verification and routine environmental monitoring and audit reports	Contractor
B:92			If it is necessary to do maintenance outside of the workshop area, the Contractor shall obtain the approval of the REO prior to commencing activities. The Contractor shall ensure that in his workshop and at other equipment maintenance facilities, including those areas where, after obtaining the REO's approval, the Contractor carries out emergency equipment maintenance, there is no contamination of the soil or vegetation.	Contract term /daily	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:93			When servicing equipment on Site, portable drip trays shall be used to collect the waste oil and other lubricants. Drip trays shall also be provided in construction areas for stationary equipment (such as compressors) and for "parked" equipment (such as excavators, loaders and cranes).	Contract term /daily	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:94			Drip trays shall be inspected and emptied daily. Drip trays shall be closely monitored during rain events to ensure that they do not overflow. Where practical, the Contractor shall ensure that equipment is covered so that rainwater is excluded from the drip trays	Contract term /daily	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:95			Oil from the drip trays shall be stored in externally clean drums in a bunded area as required for fuel storage at the workshop area	Contract term /daily	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:96			The washing of equipment outside of the wash bay facility located near the workshop shall be restricted to urgent or preventative maintenance requirements only and is subject to the REO's approval	Contract term /ad hoc	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:97	Establishment and operation of a concrete batching plant, concrete mixing, pouring and associated activities (IF REQUIRED)	Limiting environmental impacts associated with the position and layout of the concrete batching plant	The siting of batching plants shall take cognisance of the requirements of this Specification and shall be subject to the Project Manager's approval of a batch plant layout and operations method statement	Once off	In the opinion of the REO and Project manager through review and approval of the method statement	Physical verification and routine environmental monitoring and audit reports	Contractor / CEO
B:98			Batching plant shall be situated a safe distance away from the rivers or major drainage channels and away fro depressions that may be subject to flooding	Once off	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor

ID: Aspect	Management Objective	Management Action	Action Frequency	Standard	Indicator	Responsibility
B:99	Limiting potential environmental pollution by concrete, sand, aggregates, additives and associated chemicals	The siting of the batching plant shall be such to reduce the extend of earthworks required to achieve a suitably level platform	Once off	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:100		No batching activities shall occur directly on unprotected ground. Batching plants shall be located on a smooth impermeable surface (concrete or 250 µm plastic covered with 5 cm of sand).	Contract term /daily	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:101		All wastewater resulting from batching of concrete shall be disposed of via the contaminated water management system for disposal on the tailings dams and shall not be discharged into the environment	Contract term /daily	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:102		Empty cement bags shall be stored in weatherproof containers to prevent wind blown cement dust and water contamination. Empty cement bags shall be disposed of on a regular basis via the solid waste management system, and shall not be used for any other purpose. Unused cement bags shall be stored so as not to be affected by rain or runoff events	Contract term /daily	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:103		The Contractor shall ensure that sand, aggregate, cement or additives used during the mixing process are contained and covered to prevent contamination of the surrounding environment.	Contract term /daily	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:104		Sand stockpiles shall be protected from the dispersive effects of the wind, causing dust, by watering of stockpiles or use of wind suitable wind barriers	Contract term / ad hoc	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:105		The Contractor shall take all reasonable measures to prevent the spillage of cement/ concrete during batching and construction operations. During pouring, the soil surface shall be protected using plastic and all visible remains of concrete shall be physically removed on completion of the cement/ concrete pour and appropriately disposed of.	Contract term /daily	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:106		All spoiled and excess aggregate/ cement/ concrete shall be removed and disposed of via the solid waste management system.	Contract term / ad hoc	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:107		Cement trucks and cement mixers shall not discharge any concrete wash directly onto the ground, rather that a hole be dug into the stockpiled subsoil from the foundation excavations to receive such discharges.	Contract term /daily	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
ID: Aspect		Management Objective	Management Action	Action Frequency	Standard	Indicator

B:108			All concrete additives, curing compounds, shutter oils and other additives used in the process shall be stored in weather proof areas at the batching plant. Containers or drums shall be stored inside a bunded area and any leaks and spills shall be cleared immediately	Contract term /daily	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:109	Dust Control	to maintain a safe working environment, minimise nuisance for surrounding residential areas, prevent damage to the natural vegetation of the area and protect topsoil	Contractor to compile and Submit a method statement regarding the control of dust within the designated construction site	Contract commencement	Without exception	Verify paperwork	Contractor / CEO
B:110			There shall be sufficient water tankers of adequate capacity to enable the dampening of all working areas and access/ haul roads as frequently as required. During high wind conditions, the Contractor shall comply with the Project manager's instructions regarding additional dust-dampening measures	Contract term / hourly or as dictated by climatic conditions	Dust levels are maintained within the standard	Physical verification and routine environmental monitoring and audit reports	Contractor
B:111			Dust suppression shall take cognisance of water efficiency. The Contractor shall make use of an environmentally friendly dust suppression / wetting agent (e.g. Dust-a-side® or Dustex®) to increase the efficacy of water sprayed for dust suppression purposes and thereby allow for more efficient use.	Contract term /daily	Reduce water usage whilst maintaining an acceptable level of suppression	Physical verification and routine environmental monitoring and audit reports	Contractor
B:112			Where possible, the Contractor shall use low sediment content contaminated water for the purposes of dust suppression. The source of water used for dust suppression spraying shall be negotiated with Rössing	Contract term /daily	Without exception	Physical verification and routine environmental monitoring and audit reports and Contractor's weekly submissions	Contractor
B:113			Verification of adherence to specified requirements in terms of dust prevention and control	Dust monitoring by means of fallout dust collectors shall be used to assess the Contractor's dust control programme performance. Where the standards are exceeded, additional measures will be instituted	weekly	In line with Rössing current Standard	Fall Out dust meter results in Contractor's submissions and data captured by Rössing's existing dust meters
B:114	Vehicle Emissions	Reduce unnecessary greenhouse gas emissions by poorly maintained or malfunctioning plant and equipment	All vehicles and equipment shall be kept in good working order and serviced regularly	Contract term /daily	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:115		Verification of adherence to specified requirements in terms of dust prevention and control	Vehicles noticeably emitting excessive fumes will not be permitted to continue working on site.	Contract term / ad hoc	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:116	Noise	Noise prevention and reduction	Appropriate directional and intensity settings are to be maintained on all hooters and sirens, and the Contractor shall provide and use suitable and effective silencing devices for pneumatic tools and other plant to reduce noise levels associated with his activities	Contract term /daily/ ad hoc	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor

ID	Aspect	Management Objective	Management Action	Action Frequency	Standard	Indicator	Responsibility
B:117			The Contractor shall not use sound amplification equipment on site other than in emergencies.	Contract term /daily /ad hoc	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:118			The Contractor shall ensure that environmental awareness and training for all employees includes the need to minimise noise.	Contract term /daily	Without exception	Environmental course syllabus contained in approved method statement	Contractor
B:119		Protection of workers against the harmful affects of excessive noise	The Contractor shall provide suitable hearing protection to all of his staff and others entering areas with high noise levels. Zones of risk shall be clearly identified with warning signs.	Contract term /daily	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:120		Verification of adherence to specified requirements in terms of dust prevention and control	Noise monitoring shall occur at weekly intervals for health and safety within the works areas as well as environmental purposes near the demarcated site boundaries.	Contract term /weekly	In line with Rössing current Standard	CEO reports and Contractor's submissions	Contractor
B:121	Lighting	Reduce the visual intrusion caused by excessive lighting	Lighting installed on the site does not interfere with road traffic or cause a reasonably avoidable disturbance to indigenous fauna, surrounding communities or other users of the area.	Contract term /ad hoc	In the opinion of the CEO, REO and IEA	Physical verification and routine environmental monitoring and audit reports	Contractor
B:122			Floodlighting or up-lighting of structures or large areas shall not be permitted	Contract term /ad hoc	Excepting with project manager's consent where up lighting may be required to ensure safety of specific tasks	Physical verification and routine environmental monitoring and audit reports	Contractor
B:123			Lighting shall be limited to the minimum required to ensure that work can be undertaken safely	Contract term /daily	Minimum requirements of the applicable health and safety legislation	Physical verification and health and safety officers.	Contractor
B:124	Site demarcation and establishment of the Contractor's camp	Ensuring adequate planning is given to the layout and functioning of site establishment areas	The Contractor shall inform the Project Manager of the intended actions and programme for site establishment and of the proposed location of the construction camp/s and provide him with a plan showing the layout of the construction camp, including the positions of all buildings, stockpile and lay down areas, vehicle wash and service areas, fuel storage areas, batching areas and other infrastructure.	Contract commencement	Without exception and as per approved method statement	Physical verification and routine environmental monitoring and audit reports and method statement	Contractor
B:125			The site layout shall be planned to facilitate ready access for deliveries, facilitate future works and to curtail any disturbance or security implications for neighbours, including Rössing mine operation. The final site layout shall be subject to the Project Manager's approval, which shall not be unreasonably withheld.	Contract commencement	Without exception and as per approved method statement	Physical verification and routine environmental monitoring and audit reports and method statement	Contractor

ID: Aspect	Management Objective	Management Action	Action Frequency	Standard	Indicator	Responsibility
B:126	Site demarcation to limit the spatial extent over which the Contractor will have influence and the protection of environmentally significant areas	The Construction camp shall occupy as small an area as possible	Contract commencement	As per approved method statement	Physical verification and routine environmental monitoring and audit reports and method statement	Contractor
B:127		Site demarcation fences shall be in complete before any construction activity will be allowed to commence	Contract commencement	Without exception	Physical verification and routine environmental monitoring and audit reports	Contractor
B:128		The Contractor shall maintain in good order all demarcation fencing and barriers for the duration of construction activities, or as otherwise instructed by the Project Manager. This shall entail fencing of the construction site, within the Mine premises as well as fencing of construction camp areas	Contract term	According to technical specifications and approved method statement	Physical verification and routine environmental monitoring and audit reports	Contractor
B:129		Unless otherwise agreed to by the Project Manager, the Contractor shall ensure that all activities are restricted to within the defined Working Area. The areas outside of the defined Working Area as well as any other areas identified by the Project Manager in the Specification shall be regarded as exclusion areas. Insofar as he has the authority, the Contractor shall ensure that no unauthorised entry, stockpiling, dumping or storage of equipment, plant or materials shall be allowed within the exclusion areas.	Contract term /daily	Without exception	Physical verification and routine environmental monitoring and audit reports.	Contractor
B:130		The Project Manager with the assistance of the REO may also identify sensitive or special features inside the Working Area as exclusion areas.	Contract commencement / ad hoc	As per approved method statement	Physical verification and routine environmental monitoring and audit reports.	REO / Project Manager
B:131		The Construction camp shall occupy as small an area as possible	Contract term	Smallest area as practical, as per approved method statement	Physical verification and routine environmental monitoring and audit reports.	Contractor, PM and REO
B:132		Limit the environmental impact associated with the establishment of temporary services to the Contractor's camp	Temporary services, including pipelines, power lines and telephone lines, shall be located in a manner which will cause the least disturbance to the environment. In particular, care shall be taken to ensure that the route alignment for temporary services avoids identified sensitive areas. Where possible, the Contractor shall ensure that service infrastructure is accommodated within the same trench.	Contract commencement / ad hoc	As per approved method statement	Physical verification, approved method statement and routine environmental monitoring and audit reports.
B:133	Limit the environmental impact associated with the establishment of site structures in the Contractor's camp	All site structures shall be of a temporary nature and shall be removed at the end of the contract. All site establishment components (as well as equipment) shall be located within previously disturbed areas where possible, and shall be positioned to limit visual intrusion on neighbours and to limit the extent of the area disturbed.	Contract term / ad hoc	Limited disturbance of Contractor's camp site, as per approved method statement	Physical verification, approved method statement and routine environmental monitoring and audit reports.	Contractor and PM

ID: Aspect	Management Objective	Management Action	Action Frequency	Standard	Indicator	Responsibility	
B:134	Reducing health and safety and security risks associated with unauthorised access to the construction site	The Contractor shall limit the number and extent of concrete slabs and other building foundations as far as practical	Contract term /ad hoc	As per method statement	Physical verification and routine environmental monitoring and audit reports.	Contractor	
B:135		The Contractor shall limit, as far as practical, the extent of earthworks required for the establishment of the camp area	Contract term /daily / ad hoc	Limited disturbance in the opinion of the PM, CEO, REO and IEA	Physical verification and routine environmental monitoring and audit reports.	Contractor	
B:136		The Contractor shall ensure that access to the site and associated infrastructure and equipment is controlled throughout the construction period	Contract term /daily / ad hoc	Without exception or incident	Physical verification and routine environmental monitoring and audit reports and public complaints register	Contractor	
B:137		The Contractor shall implement the necessary gates, booms, access control points, guard houses to ensure access control and security of the site is maintained.	Contract term / daily/	Without exception or incident	Physical verification and routine environmental monitoring and audit reports.	Contractor	
B:138		No person shall be allowed into the construction areas without having undergone the necessary health and safety and environmental induction or being escorted by a senior staff member from the Contractor's staff	Contract term / daily	Without exception or incident	Physical verification and routine environmental monitoring and audit reports.	Contractor	
B:139		All authorised site personal shall carry an identification card issued by the Contractor, and all authorised vehicles, equipment and plant shall have an identification sticker	Contract term / daily/	Without exception or incident	Physical verification as part of routine environmental monitoring and audit reports.	Contractor	
B:140		Exercising control over the demolition of existing structures and the resulting waste	Clearing shall consist of the removal of all structures, scrap and all other material prohibiting the execution of the Works, including the disposal of all resultant materials, subject to the requirements of this Specification and the Project Manager. Any existing structures located within the Working Area shall only be damaged or demolished and removed with the prior approval of the Project Manager.	Contract commencement / ad hoc	Without exception or incident	Physical verification and routine environmental monitoring and audit reports. Project Manager's site instructions	Contractor
B:141		Limit the environmental impact associated with the establishment of temporary access roads	Only designated access roads shall be used to access the Working Area. The insertion of any additional roads will only be permitted with the approval of a method statement.	Contract term / ad hoc	Without exception or incident and according to the approved method statement	Physical verification and routine environmental monitoring and audit reports.	Contractor



ID:	Aspect	Management Objective	Management Action	Action Frequency	Standard	Indicator	Responsibility
B:142			Maintenance of access and haul roads within the demarcated site shall be routinely undertaken for the contract duration. The maintenance includes ensuring the provision of adequate drainage and dust control. Damage to the existing access roads outside the Construction camp because of construction activities shall be repaired to the satisfaction of the Project Manager, using material similar to that used in the original construction of the infrastructure.	Contract term / daily / ad hoc	Without exception or incident. No public complaints	Physical verification and routine environmental monitoring and audit reports.	Contractor
B:143			Where new access roads are required, these shall be subject to prior approval by the Project Manager and shall be planned and constructed to ensure that as small an area as possible is disturbed (maximum width of 5 m, with splays where appropriate and required), that they avoid all exclusion areas and, as far as possible, that they follow the natural contours.	Contract term / ad hoc	Without exception or incident. As per approved method statement	Physical verification and routine environmental monitoring and audit reports. Approved method statement	Contractor
B:144			Adequate provision shall be made for parking areas to accommodate vehicles and plant and inspections shall be undertaken continuously to prevent parking of plant or vehicles outside of these designated areas	Contract commencement / ad hoc	Without exception or incident. As per approved method statement	Physical verification and routine environmental monitoring and audit reports.	Contractor
B:145			All temporary access roads, parking areas and turning-areas and staging platforms shall be returned to their original (i.e. pre-construction) condition at the end of the Contract, including ripping the disturbed area parallel with the contours to a depth of 300 mm and reshaping to match the surrounding topography.	Contract completion / ad hoc	Without exception or incident. Returned to original condition	Physical verification and routine environmental monitoring and audit reports.	Contractor
B:146			All vehicle turning-areas shall be located within the Working Area and shall be subject to the prior approval of the Project Manager. The Contractor shall ensure that horse and trailer vehicles transporting plant and materials only turn within the designated turning-areas.	Contract term / daily	Without exception or incident. As per approved method statement	Physical verification and routine environmental monitoring and audit reports.	Contractor
B:147	Accommodation of Site Staff		With the exception of the night watchmen, none of the Contractors staff shall be accommodated on Site overnight.	Contract term / daily	Without exception or incident	Physical verification and routine environmental monitoring and audit reports.	Contractor
B:148	Erosion sedimentation control		The Contractor shall take all reasonable measures to limit erosion and sedimentation due to the construction activities and shall include in the design of the site works measures to prevent such occurrences. The Works shall be undertaken in a phased manner, and development staged so that stripped areas are kept to a minimum. The Contractor shall ensure that the stabilisation of cleared areas is actively managed in order to prevent and control erosion.	Contract term / daily / ad hoc	Without exception	Physical verification and routine environmental monitoring and audit reports.	Contractor
B:149			Erosion shall not be allowed to develop on a large scale before repairs are affected and all erosion damage shall be repaired as soon as it has been detected. In this regard, any runnels or erosion channels that develop during the construction shall immediately be backfilled and compacted and the areas restored to a proper stable condition.	Contract term / ad hoc	Without exception	Physical verification and routine environmental monitoring and audit reports.	Contractor



ID:	Aspect	Management Objective	Management Action	Action Frequency	Standard	Indicator	Responsibility
B:150			The landscaping and rehabilitation of disturbed areas shall occur as soon as practically possible following the cessation of the work in a specific area. In this regard, the Contractor's Works Programme shall clearly indicate that the rehabilitation will immediately be executed, per phase, upon the completion of the works within a specific area. Traffic and movement over stabilised areas shall be restricted and controlled, and damage to stabilised area shall be repaired and maintained to the satisfaction of the Project Manager.	Ad hoc	Without exception	Physical verification and routine environmental monitoring and audit reports.	Contractor
B:151			Topsoil and any other loose stockpiled material shall be stockpiled with consideration for the prevailing wind direction and, if required, additional windbreaks or other mechanisms to protect such material from dispersion by wind shall be instated at the request of the Project Manager.	Contract term / ad hoc	No visible dust leaving stockpiles	Physical verification and routine environmental monitoring and audit reports.	Contractor
B:152	Stockpiling, storage and staging of inert construction materials	Minimise the potential negative environmental impacts arising from the stockpiling of various inert construction materials	All materials shall be stored within the demarcated construction camp or batching areas. Where this is not feasible, the Project Manager will identify additional sites for stockpiling within the Working Area.	Contract term / daily/	Without exception or incident and as per approved method statement or PM site instruction	Physical verification and routine environmental monitoring and audit reports.	Contractor
B:153			Soil, sand and gravel stockpiles shall be convex in shape, shall be no higher than 2 m and shall be located so as to cause minimal disturbance. Stockpiles shall be so placed as to occupy the minimum width compatible with the natural angle of repose of the material, and measures shall be taken to prevent the material from being spread over too wide a surface.	Contract term / ad hoc	Without exception and in the opinion of the CEO , REO and IEA	Physical verification and routine environmental monitoring and audit reports.	Contractor
B:154			Stockpiled material shall be stockpiled with consideration for the prevailing wind directions and velocities and, if required, additional windbreaks or other mechanisms to protect such material from dispersion by wind shall be instated at the request of the Project Manager.	Contract term / ad hoc	Without exception and in the opinion of the CEO , REO and IEA	Physical verification and routine environmental monitoring and audit reports. Dust monitoring data	Contractor
B:155			The limits of the stockpiling or staging areas are to be demarcated and regular inspection shall occur to ensure that materials are being contained within the allocated areas. The Contractor excises control over such areas and not allow delivery drivers dictate the stockpiling layout	Contract term / ad hoc	Without exception and in the opinion of the CEO, REO and IEA. All vehicle delivery drivers to be issued with rules on entering the site and the actions to be supervised	Physical verification and routine environmental monitoring and audit reports.	Contractor and CEO / REO / IEA
B:156			Stockpiles area shall be regularly inspected for appropriate housekeeping practices as well as associated health and safety aspects	Contract term / weekly / ad hoc	Without exception and in the opinion of the CEO , REO and IEA	Physical verification and routine environmental monitoring and audit reports.	CEO / REO / IEA and relevant health and safety officers
B:157	Ablution facilities	Reduce health risks and environmental pollution arising from a concentration of human excreta in the environment	The contractor shall provide adequate ablution facilities for his staff in the construction camp. Mobile chemical toilets shall be provided at all other locations within the Working Area, as directed by the Project Manager. Acts of excretion and urination are strictly prohibited other than at the facilities provided.	Contract term / daily / ad hoc	Without exception and in the opinion of the CEO , REO and IEA	Physical verification and routine environmental monitoring and audit reports.	Contractor and CEO / REO / IEA and relevant health and safety officers

ID:	Aspect	Management Objective	Management Action	Action Frequency	Standard	Indicator	Responsibility
B:158			The Contractor shall not install pit latrines or septic tanks for the ablution facilities at the Construction Camp. Where mobile chemical toilets are utilised, the Contractor shall ensure the following:	Contract term / daily / ad hoc	Without exception and in the opinion of the CEO , REO and IEA	Physical verification and routine environmental monitoring and audit reports.	Contractor and CEO / REO / IEA and relevant health and safety officers
B:159			<ul style="list-style-type: none"> <li>Toilets shall be located within 100 m from any point of work but no closer than 50 m to any watercourse or water body;</li> </ul>				
B:160			<ul style="list-style-type: none"> <li>Toilets shall be secured to the ground to prevent them from toppling due to wind or any other cause;</li> </ul>				
B:161			<ul style="list-style-type: none"> <li>No spillage shall occur when the toilets are cleaned or emptied and the contents shall be properly stored and transported to the sewage treatment works;</li> </ul>				
B:162			<ul style="list-style-type: none"> <li>Discharge of waste from toilets into the environment and burial of waste is strictly prohibited;</li> </ul>				
B:163			<ul style="list-style-type: none"> <li>Toilets shall be provided with an external closing mechanism to prevent toilet paper from being blown out</li> </ul>				
B:164			<ul style="list-style-type: none"> <li>Toilets shall be emptied before long weekends and builders' holidays, and shall be locked after working hours.</li> </ul>				
B:165			All ablution facilities are to be serviced regularly and kept in a clean and hygienic fashion				
B:166	Verification of adherence to specified requirements	All ablution facilities are to be inspected on a regular basis to ensure the above requirements are being met	Contract term / daily / ad hoc	In a satisfactory state in the opinion of the CEO , REO IEA and Health and safety officer	Physical verification and routine environmental monitoring and audit reports.	Contractor and CEO / REO / IEA and relevant health and safety officers	
B:167	Eating or recess areas	Reduce littering, health risks associated with contamination of foodstuff, ecological implications associated with food spillage, preventing the dispersion of workers during recesses	The Contractor shall erect designated eating or recess areas for his staff at all suitable locations, close to each of the major works areas, to be agreed with the Project manger.	Contract commencement	As per approved method statement	Physical verification and as per the approved method statement	Contractor
B:168			Eating or recess areas shall be constructed and equipped to meet the following requirements:	Contract commencement / Contract term / daily / ad hoc	In a satisfactory state in the opinion of the CEO , REO IEA and Health and safety officer	Physical verification and routine environmental monitoring and audit reports.	Contractor and CEO / REO / IEA and relevant health and safety officers
B:169			<ul style="list-style-type: none"> <li>Recess areas is to be sufficiently sized to comfortably accommodate the maximum number of staff working within the given working area,</li> </ul>				
B:170			<ul style="list-style-type: none"> <li>Eating or recess areas shall be situated as close to the respective working areas whilst being sufficiently offset or positioned to offer occupants protection from construction noise and dust</li> </ul>				
B:171			<ul style="list-style-type: none"> <li>Tables and seating with adequate care for ergonomic design must be provided</li> </ul>				
B:172			<ul style="list-style-type: none"> <li>The eating area is to be completely shaded and the protected from prevailing winds</li> </ul>				
B:173			<ul style="list-style-type: none"> <li>A sufficient amount of potable water and soap shall be stationed at the eating area to allow for washing of hands and drinking</li> </ul>				
B:174			<ul style="list-style-type: none"> <li>Drinking water shall be maintained at a suitable temperature for consumption</li> </ul>				
B:175			<ul style="list-style-type: none"> <li>Ablution facilities shall be located within 50m of the recess area but not closer than 15m</li> </ul>				
B:176			<ul style="list-style-type: none"> <li>Recess areas shall have a staff information board, providing pertinent information, awareness materials and information posters</li> </ul>				
B:177			<ul style="list-style-type: none"> <li>The eating area shall be fitted with a fire extinguisher</li> </ul>				
B:178			<ul style="list-style-type: none"> <li>Recess areas shall make provisions for a smoking area. Smoking will not be permitted anywhere else on the site.</li> </ul>				
B:179			<ul style="list-style-type: none"> <li>Recess areas shall be receive daily maintenance and cleaning, all rubbish bins are to be emptied daily to the central waste storage area</li> </ul>				
B:180	Any cooking on Site shall be done on well-maintained gas cookers with fire extinguishers present. No cooking shall be permitted to occur on open fires.						

ID	Aspect	Management Objective	Management Action	Action Frequency	Standard	Indicator	Responsibility
B:181		Verification of adherence to specified requirements	All eating areas are to be inspected routinely to ensure that the specified requirements are being met	Contract term / daily / ad hoc	In a satisfactory state in the opinion of the CEO , REO IEA and Health and safety officer	Physical verification and routine environmental monitoring and audit reports.	CEO / REO / IEA
B:182	Water Use	Reduce the volume of water needed for construction purposes	Water is a scarce resource in Namibia and shall be conserved wherever possible. The Contractor shall minimise the use of water and shall immediately attend to any wastage. The Contractor shall be required to adhere to Rössing's water management strategies.	Contract term / daily / ad hoc	Satisfactory in the opinion of the CEO , REO and IEA	Physical verification and routine environmental monitoring and audit reports. Water usage stats as part of Contractor's submissions	Contractor
B:183		Ensure that appropriate water quality is sourced for the respective use	Subject to the prior approval of the Project Manager, water for construction purposes may be supplied via the existing sources used by RU. The Contractor shall liaise with Project Manager regarding his water use requirements and shall ensure that water quality is appropriate for the use for which it is intended. The Contractor shall be responsible for obtaining the necessary authority and approvals prior to undertaking such abstraction. The Contractor shall absolve the Employer of any and all legal obligation and risk in this regard.	Contract term / ad hoc	Without exception or incident	Physical verification and routine environmental monitoring and audit reports.	Contractor and Project Manager / Employer
B:184		Monitoring of water use during construction	Contractor shall install the necessary water metering devices on all incoming water delivery pipelines and calculate water tanker usage and submit the volumes of water utilised for each week	Contract term / daily / ad hoc	In a satisfactory state in the opinion of the CEO , REO IEA and Health and safety officer	Physical verification and routine environmental monitoring and audit reports. Water usage stats as part of Contractor's submissions	Contractor and CEO
B:185	Solid Waste Management	Ensure the appropriate handling and storage and disposal of waste and reducing the likelihood of environmental pollutions	The management of solid waste on site shall be strictly controlled and monitored. The quantities of waste generated on site shall be minimised. Littering shall be avoided.	Contract term / daily	Without exception or incident	Physical verification and routine environmental monitoring and audit reports.	CEO / REO / IEA
B:186			The Contractor shall provide sufficient weatherproof and scavenger-proof bins on Site to store the solid waste produced on a daily basis. Solid, non-hazardous waste shall be disposed of in the bins provided and no on-site burying, dumping or burning of any waste materials, vegetation, litter or refuse shall occur. Bins shall not be allowed to become overfull and shall be emptied a minimum of twice weekly. The waste may be temporarily stored on the Site in a central waste area that is weatherproof and scavenger-proof, and which the Project manager has approved.	Contract term / daily	Without exception or incident	Physical verification and routine environmental monitoring and audit reports.	Contractor
B:187			All non-hazardous solid waste shall be disposed of at the approved Rössing landfill site. The Contractor shall supply the Project Manger with a certificate of disposal.	Contract term / daily	Without exception or incident	Physical verification and routine environmental monitoring and audit reports. Waste disposal certificates	Contractor

ID:	Aspect	Management Objective	Management Action	Action Frequency	Standard	Indicator	Responsibility
B:188	Contaminated water management	Reducing the likelihood of environmental pollution arising for the release of contaminated water	Pollution could result from the release, accidental or otherwise, of contaminated runoff from construction camps and batching areas, discharge of contaminated water, chemicals, paints, solvents, oils, fuels, sewage, runoff from stockpiles, solid waste, litter, etc. Accordingly, the Contractor shall establish a contaminated water management system in association with the existing Rössing systems to address the prevention of pollution as well as suitable methods for the disposal of contaminated water.	Contract term / daily	Without exception or incident and as per approved method statement	Physical verification and routine environmental monitoring and audit reports.	Contractor
B:189			Appropriate pollution control facilities necessary to prevent discharge of water containing polluting matter or visible suspended materials into watercourses or water bodies shall be designed and implemented	Ad hoc	Without incident	Physical verification and routine environmental monitoring and audit reports.	Contractor
B:190			Runoff from the cement/ concrete batching areas shall be strictly controlled, and contaminated water shall be collected, stored and either treated or disposed of off-site, at a location approved by the Project Manager. The approval of the Project Manager shall be required prior to the release of treated runoff from batching areas into any watercourse	Contract term / daily	Without exception or incident as per approved method statement	Physical verification and routine environmental monitoring and audit reports.	Contractor
B:191			Runoff from vehicle wash bays, workshops and diesel/ fuel tank areas shall pass through oil traps. The oil sludge thus collected shall be disposed of at an approved waste disposal site, i.e. licensed for such material	Contract term	Without exception or incident	Physical verification and routine environmental monitoring and audit reports.	Contractor
B:192			All spillage of oil onto concrete surfaces shall be controlled by the use of an approved absorbent material	Contract term / daily / ad hoc	Without exception or incident	Physical verification and routine environmental monitoring and audit reports.	Contractor
B:193			The Contractor shall notify the Project Manager immediately of any pollution incidents on Site. Verbal reports must be followed up by a written report, which shall be submitted within 24 hours of the incident.	Contract term / ad hoc	Without exception.	Physical verification and routine environmental monitoring and audit reports. Verify Incident reports	Contractor / CEO
B:194			Earthworks	Minimise the potential negative health, safety and environmental impacts associated with earthworks operations	Major earthworks operations and operations outside the demarcated site shall be subject to approval by method statement	Contract term / daily	Without exception or incident and as per the approved method statement

ID: Aspect	Management Objective	Management Action	Action Frequency	Standard	Indicator	Responsibility
B:195		The Contractor shall ensure that the dust and noise control measures as specified are implemented during earthworks operations.	Contract term / daily / ad hoc	Without exception or incident	Physical verification and routine environmental monitoring and audit reports. Dust and noise data as part of Contractor's submissions	Contractor / CEO
B:196		Trenching shall be undertaken in accordance with the engineering specifications with the following environmental amplifications, where applicable:	Contract term / ad hoc	Without exception or incident	Physical verification and routine environmental monitoring and audit reports and health and safety inspection reports	Contractor / CEO / REO / IEA and Health and safety Officers
B:197		<ul style="list-style-type: none"> <li>Soil shall be excavated and immediately used for refilling trenches i.e. soil from the first trench section shall be excavated and stockpiled, thereafter soil from the second excavated trench length shall be used to backfill the trench behind it once the infrastructure has been laid. The last trench shall be filled using the soil stockpiled from the first trench section.</li> </ul>				
B:198		<ul style="list-style-type: none"> <li>Trench lengths shall be kept as short as practically possible before backfilling and compacting</li> </ul>				
B:199		<ul style="list-style-type: none"> <li>Trenches shall be re-filled to the same level as (or slightly higher to allow for settlement) the surrounding land surface to minimise erosion.</li> </ul>				
B:200		<ul style="list-style-type: none"> <li>All open trenches shall be clearly and adequately demarcated.</li> </ul>				
B:201	Minimise the extend of earthworks	The extent of the disturbance resulting from earthworks shall be minimised to the minimum required for the execution of the works	Contract term / ad hoc	In the opinion of the PM / REO / CEO / IEA in comparison with the technical drawings specifications	Physical verification and routine environmental monitoring and audit reports.	Contractor
B:202		The extend of cut-to-fill operation required for the establishment of the temporary works shall be kept to the minimum through intelligent placement of temporary structures	Contract term / ad hoc	In the opinion of the PM / REO / CEO / IEA and as per the relevant approved method statement	Physical verification and routine environmental monitoring and audit reports.	Contractor
B:203	Ensuring stability of excavations	Excavation at all the sites shall be carried out in such a way that slopes are not made dangerously steep. In general excavated slopes should be no steeper than 1:3 (approx 18 degrees), but where this is unavoidable appropriate measures shall be undertaken to stabilise the slopes. No materials, equipment or other load shall be placed so close to any excavation that the stability of the sides of the excavation is endangered.	Contract term / ad hoc	Satisfactory in the opinion of the PM / REO / CEO / IEA	Physical verification and routine environmental monitoring and audit reports.	Contractor
B:204		Contractor's Health and Safety Officer required to inspect excavation for stability	Contract term / weekly or after a slide or rain	Stability confirmed	Health and safety inspection sheets, physical verification and routine environmental monitoring and audit reports.	Contractor's Health and Safety Officer



ID:	Aspect	Management Objective	Management Action	Action Frequency	Standard	Indicator	Responsibility
B:205		Appropriate handling, stockpiling and disposal of spoil	Surplus or unsuitable material obtained from any excavations as well as rubble not required elsewhere in the Works shall be spoiled at designated spoil sites on the waste rock dumps. Before spoiling any such material the Contractor shall liaise with the Project Manager to ascertain where such spoiling shall occur depending of the nature and amount of material, or if Rössing could make use of the material elsewhere in the mine operations.	Contract term / ad hoc	Satisfactory in the opinion of the PM / REO / CEO / IEA	Physical verification and routine environmental monitoring and audit reports.	Contractor
B:206			In operating the spoil sites, the Contractor shall ensure that:	Contract term / daily / ad hoc	Without exception or incident and satisfactory in the opinion of the PM / REO / CEO / IEA	Physical verification and routine environmental monitoring and audit reports.	Contractor
B:207			<ul style="list-style-type: none"> <li>The spoil disposed of in the spoil sites is free of contaminated or hazardous materials.</li> </ul>				
B:208			<ul style="list-style-type: none"> <li>The spoiling of material shall be undertaken in accordance with Rössing's requirements.</li> </ul>				
B:209	Landscaping and rehabilitation	General management objective is to ensure disturbed areas are returned to pre-construction conditions	All areas disturbed as a result of the construction activities, irrespective of whether they occur within the defined Working Area or not, shall be subject to the landscaping and rehabilitation requirements outlined in this Specification. This includes, but is not limited to, Construction Camps, all stockpiling and lay down areas, the batching plants, all temporary access routes and all other areas from which topsoil has been stripped.	Contract term / Contract completion	Satisfactory in the opinion of the PM / REO / CEO / IEA , the approved method statement and the specifications	Physical verification and routine environmental monitoring and audit reports.	Contractor
B:210		Demolition and removal of structures	Prior to landscaping and rehabilitation, the Contractor shall demolish and remove from Site everything not forming part of the Permanent Works. This includes, but is not limited to, temporary services and facilities (including foundations), temporary fences, temporary access routes, protective works, equipment, materials (nut, bolts, washers, wire, wood, bricks, cement etc.) and settlement ponds. All material generated from the demolition and removal of structures from site shall be appropriately disposed off.	Contract completion	Satisfactory in the opinion of the PM / REO / CEO / IEA	Physical verification and routine environmental monitoring and audit reports.	Contractor
B:211		Shaping	All slopes which do not form part of the Permanent Works shall be graded so that no slope exceeds a maximum gradient of 1:3 or as otherwise directed by the Project Manager. Contour drains shall be provided to control erosion where required by the Project Manager.	Contract term / ad hoc	Satisfactory in the opinion of the PM / REO / CEO / IEA	Physical verification and routine environmental monitoring and audit reports.	Contractor
B:212			Excavation and fills for Temporary Works and spoil dumps shall be formed in such a manner that the final profile shall appear as a natural extension to the adjacent, undisturbed ground profiles.	Contract term / ad hoc	Satisfactory in the opinion of the PM / REO / CEO / IEA	Physical verification and routine environmental monitoring and audit reports.	Contractor
B:213		Traffic on rehabilitated areas	The Contractor shall not undertake the landscaping of any areas until all operations that may require construction material and equipment to pass over those areas has been completed. All landscaped and rehabilitated areas shall be regarded as exclusion areas and no equipment, other than that required for establishment and maintenance purposes, shall be allowed to operate on these areas.	Ad hoc	Satisfactory in the opinion of the PM / REO / CEO / IEA	Physical verification and routine environmental monitoring and audit reports.	Contractor

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## APPENDIX B: CONDITIONS OF AUTHORISATION

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To follow once MET:DEA clearance is issued.



## APPENDIX C: RÖSSING'S HSE POLICY



**Rössing Uranium**  
A member of the Rio Tinto Group

WORKING FOR NAMIBIA

### HEALTH, SAFETY AND ENVIRONMENTAL POLICY

August 2006

**Excellence in Health, Safety and Environmental (HSE) management is one of the foundations of Rössing's vision to be a safe, long-term supplier of U<sub>3</sub>O<sub>8</sub> to the nuclear power industry around the world. This is in line with our commitment to corporate citizenship, social responsibility and sustainability.**

**To accomplish this, Rössing will:**

- Recognise that nothing is more important than the protection of the Health and Safety of our stakeholders, specifically, our employees, contractors, host communities, clients and shareholders
- Commit to operate our business with respect and care for both the local and global Environment in order to prevent and mitigate residual pollution
- Be in full compliance with all applicable legal, standards and requirements
- Seek continual improvement in HSE performance and adopt leading practice where applicable and feasible
- Provide adequate training and resources to employees, contractors and visitors.
- Identify and assess hazards arising from our activities and manage associated risks to the lowest practical level
- Enhance biodiversity protection by assessing and considering ecological values and land-use aspects in investment, operational and closure activities
- Continue in our efforts to raise the awareness of HSE issues to our host communities
- Regularly review our performance and publicly report our progress
- Communicate our commitment to this HSE policy to all our stakeholders and ensure that this policy is readily available to all our stakeholders

**In implementing this Policy we will engage in constructive dialogue with our employees, contractors, host communities and all other stakeholders in sharing relevant information and responsibilities for meeting our requirements.**

**The HSE policy document is complimented by the HSE strategy document which is readily available to all our stakeholders.**



**MIKE LEECH**  
Managing Director