

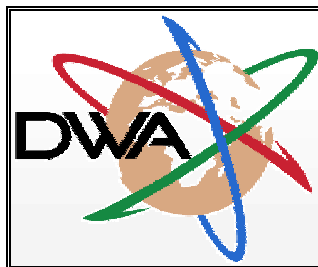
**CONCEPTUAL MINE REHABILITATION,  
DECOMMISSIONING AND CLOSURE PLAN  
FOR THE  
VALENCIA URANIUM PROJECT  
24 April 2008**

VALENCIA URANIUM (PTY) LIMITED



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## ***ACRONYMS***

AIDS	Acquired Immune Deficiency Syndrome
ARD	Acid Rock Drainage
ARV	Antiretroviral
BFS	Bankable Feasibility Study
CLO	Community Liaison Officer
DEA	Directorate of Environmental Affairs
EHS	Environment, Health & Safety
ESHIA	Environmental Socio-Economic and Health Impact Assessment
EMS	Environmental Management System
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
HIV	Human Immuno-deficiency Virus
HR Manager	Human Resources Manager
HRDP	Human Resources Development Plan
I&APs	Interested and Affected Parties
IFC	International Finance Corporation
KPI	Key Performance Indicator
MET	Ministry of Environment and Tourism
MME	Ministry of Mines and Energy
NGO	Non-Governmental Organisation
PCDP	Public Consultation and Disclosure Plan
PES	Preliminary Environmental Study
SD	Social Development

## ***DEFINITIONS***

### **Closure**

Closure refers to the cessation of production activities. The mine no longer produces ore and the plant no longer produces uranium concentrate.

### **Decommissioning**

Decommissioning involves the activities undertaken to remove material off site, demolish unnecessary infrastructure and restore the land to a post project land use.

### **Post Closure**

Post Closure follows decommissioning and rehabilitation and is the phase during which monitoring continues to ensure that residual impacts are being managed and to ensure that necessary maintenance activities are carried out. Monitoring should continue until predictable trends are established.

### **Final Closure**

Final Closure is the condition whereby the rehabilitated land has reached stability such that the regulators and the interested communities are satisfied that the land will not pose significant additional risk in the long-term future. In this condition, the project proponent can hand over responsibility for site management to a third party.

### **Planned Closure**

This is closure according to the mine plan and takes place when the orebody can no longer support a mining and processing operation profitably due to the depletion of the mineral resource.

### **Unplanned Closure**

Occurs when some event, or market conditions, causes the operation to have to accelerate its planned closure programme.

### **Temporary Closure (care and maintenance)**

As a result of economic or operational circumstances, it is possible that the operation may be required to shut down on a temporary basis. This shutdown is planned and the intention is to start up the operation again at some stage in the future.

### **Rehabilitation**

Rehabilitation involves returning land impacted on by the mining activity to a useful condition. This definition (and implied intention) includes the concepts of minimisation of loss of land use capability, and of net benefit to society.

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## ***Conceptual Mine Rehabilitation, Decommissioning and Closure Plan for the Valencia Uranium Project***

### **1 Objective of Closure**

The concepts and standards underlying mine rehabilitation and closure today are much more demanding and stringent than they were just a few years ago and reflect changing public priorities and environmental imperatives. The Namibian mining industry fully accepts the concepts and responsibility of mine-site rehabilitation and decommissioning. At issue is the development of a mine rehabilitation programme that ensures long-term sustainability of the final land condition and the development of an effective and efficient approach to the funding of closure that enables mine rehabilitation and other environmental objectives to be achieved and also facilitates and encourages industry to comply with the requirements of government and the community.

Mine rehabilitation is an ongoing programme designed to restore the physical, chemical, radiological and biological quality or potential of air, land and water regimes disturbed by mining to a state acceptable to the regulators and to post mining land users (WMI, 1994). The activities associated with mine closure are designed to prevent or minimise adverse long-term environmental impacts, and to create a self sustaining natural ecosystem or alternate land use based on an agreed set of objectives. The objective of mine closure is to obtain legal (government) and community agreement that the condition of the closed operation meets the requirements of those entities, whereupon the company legal liability is terminated.

More recently, the emphasis for management of the environmental aspects of mine closure and decommissioning has shifted towards the idea of “planning closure” (Sassoon, 1996). Mine closure is a continuous series of activities that begins with pre-planning prior to the project’s design and construction and ends with achievement of long-term site stability and the establishment of a self sustaining ecosystem (WMI, 1994). Not only will the implementation of this concept result in a more satisfactory environmental conclusion, but it will also reduce the financial burden of mine closure and rehabilitation.

**Conceptual Closure Plans**, as described in this report, are normally compiled at the start of the mine’s life during the feasibility, development and detailed design phase.

This report needs to be modified and adapted as the mining project continues and more knowledge is generated about the mine environment and the impacts of the project. This will result in the compilation of a much more detailed **Closure Plan**. The nature of the ore body, the tailings materials and the waste rock dumps really only become apparent during the operational phase. The mine’s’ closure plans need to be adapted to be able to achieve the same objectives that the plans had before the start of operations. Therefore, an appropriate continual monitoring and assessment programme is vital to the success of any closure plan. The closure plans need to be reviewed regularly. For this Project we would recommend at least every three years.

### **Reviewing required**

In addition to reviewing the closure plan as a result of additional technical knowledge acquired during ongoing operations, regular reviewing is required because mining plans change due to changing economic conditions and because the nature and extent of the orebody is imperfectly understood during the planning phase of an operation. In addition, societal needs and expectations change regularly and the mine’s closure plans need to be adapted to address these changing expectations.

The closure plan should be considered to be a “living” document that is amended in light of the learning experienced during the mine’s life and changed mine plans.

During the preparation and reviewing of rehabilitation plans a number of different factors need to be considered. These may all influence decisions about selecting a rehabilitation strategy. These include:

- The conservation value of a proposed environmental outcome;
- The importance to the local community of the economic productivity of the proposed future land capability;
- The consistency of the proposed land use with local and regional plans;
- The long-term ownership of the proposed land.

Irrespective of the rehabilitation outcome, the environmental authority must ensure that the rehabilitation will endure expected climatic variations and that the land will be sustained for a land use consistent with the surrounding area.

### **Linkages to other Environmental and Social Plans**

The following plans should be taken into consideration when reviewing and implementing this plan:

- Stakeholder Engagement Plan (to be developed)
- Social Development Plan (to be developed)
- Waste Management Plan
- Management plans and actions described in the Fauna and Flora Report
- Water Management Plan (to be developed)
- Radiation Protection Programme Management Plan

## **2 Policy statement**

The following vision statement is proposed for the Valencia Project:

“We will conserve natural resources by ensuring reduced resource consumption, effective and efficient usage of the mineral deposit and safe disposal of waste. Environmental sustainability will be maintained through integrating environmental, social, cultural and economic factors into business decisions, goals and objectives, whenever practical. We will seek improvement by continually assessing the Valencia Project’s Environmental, Social, Safety and Health performance against set objectives and regularly reviewed targets. Realising that the Mine is exploiting a finite resource all the Mine activities will be conducted in such a manner that a closure condition can be achieved which is acceptable to society. This will be achieved by integrating the required activities into the planning and operational phases of the Project where possible.”

## **3 Objectives**

The overall closure objective is to leave the mine and plant area in a condition that minimises adverse impacts on the human and natural environment and with a legacy that makes a positive contribution to sustainable development. The Project’s closure objectives include:

- Follow a process of closure that is progressive and integrated into the short- and long-term mine plans and that will assess the closure impacts proactively at regular intervals throughout Project life;
- Implement progressive rehabilitation measures, beginning during the construction phase wherever possible;
- Leave a safe and stable environment for both humans and animals;
- Return rehabilitated land-use to the pre-mining land use potential, where possible, grazing land capability (in the context of this arid area), or areas to be used by indigenous wildlife;

- Prevent any further soil and surface/groundwater contamination by managing all water on site;
- Comply with local regulatory requirements and international best practise;
- Ensure that the long term radiation exposure of the public from the tailings, and waste rock dumps are kept “as low as reasonably achievable” (ALARA).
- Form active partnerships with local communities, where possible; and
- Maintain and monitor all rehabilitated areas following re-vegetation or capping and, if monitoring shows that the objectives have been met, making an application for closure.

The cost and ease of closing down uranium mines and mills seems to depend very much on the environmental control measures practised during the mine’s operation. With good environmental practise and response to monitoring data, the cost to be incurred at mine closure can be greatly reduced.

#### **4 Overall responsibility for implementing this plan**

The overall accountability for the implementation of this plan lies with the Valencia Project Team. The mine Executive Management Team is also responsible for auditing the implementation of this plan.

The closure plan and progress with it should be reported on at Board level by the person designated to report on these matters.

The responsibility for implementing the different aspects of this plan at Construction, Operational and Decommissioning and Closure Phases lies with the Management and Staff of Valencia Uranium Limited.

#### **5 Baseline Environmental Data and Project Description**

The proposed Project site is situated in an arid area. The location is shown in Figure 1. Due predominantly to the climate and soil conditions, the area is sparsely vegetated. There is low perennial grass cover on the aeolian plains to the east of the site and sporadic growth, of species tolerant to the arid conditions occurring on the broken, rocky terrain covering most of the site. These include quiver trees, *Euphorbia species*, corkwoods and elephant’s foot.

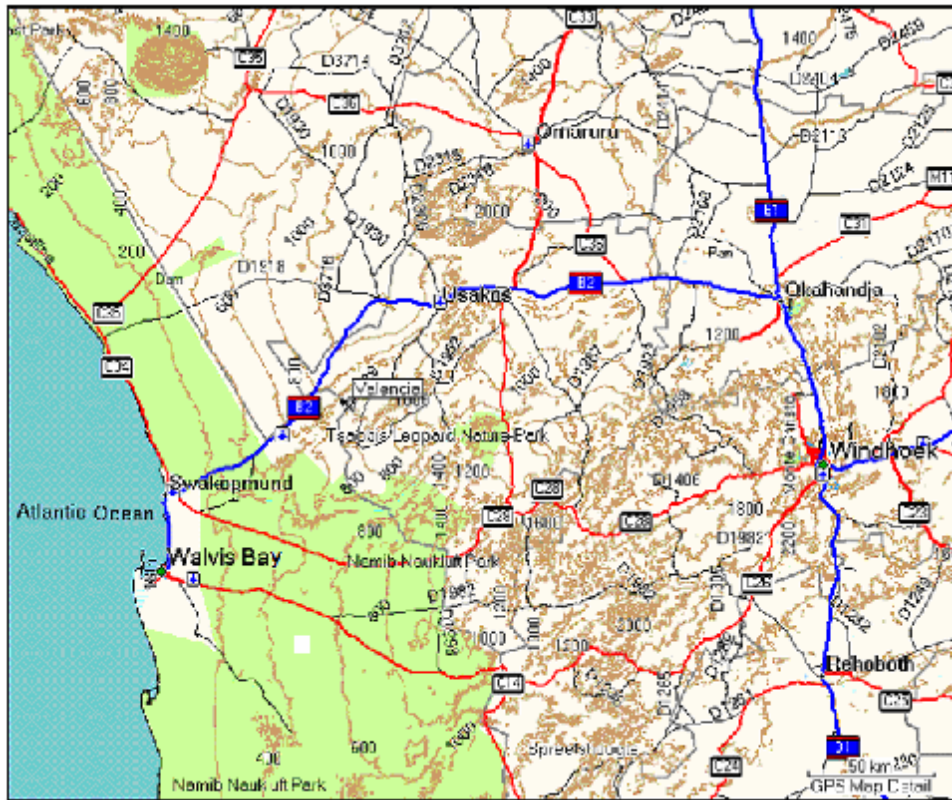


Figure 1: Valencia Uranium Mine Regional Setting.

### **Climate**

Although a weather station was installed at Valencia during October 2006 and has been operational since, a data recovery of only 62% was achieved from the station. Climate data have therefore been assessed in comparison with data obtained from other stations such as from Rössing Uranium Mine.

Namibia's climate is defined as hyper-arid, arid or semi-arid. The Country is classified as the second most arid country in Africa, with 92% aridity.

### **Mean monthly rainfall and precipitation**

Rainfall records from the Rössing tailings site (situated 25km south-west of the Valencia site) indicate an annual rainfall of between 3 and 95mm. Figure 2 shows the monthly average rainfall calculated from readings recorded at Rössing Uranium Mine, whilst Figure 3 shows the rainfall data available from the Valencia station (as monthly totals).

Although there is no comprehensive data set accumulated for the Valencia site, it is evident from this station's records and the Rössing data that arid conditions prevail in the area, which will exacerbate dust generation and pose a challenge for re-vegetation efforts. The high annual evaporation rate, 3 150mm recorded from Rössing (Eco.Plan, 2006), will also contribute to increased dust from the proposed mining operation.

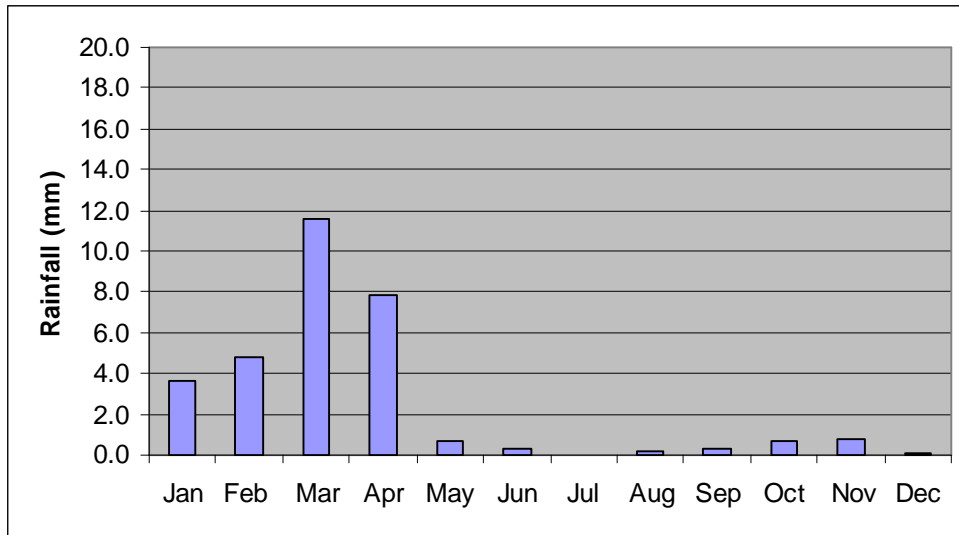


Figure 2: Average monthly rainfall from data measured at the Rössing tailings site between 1998 and 2006.

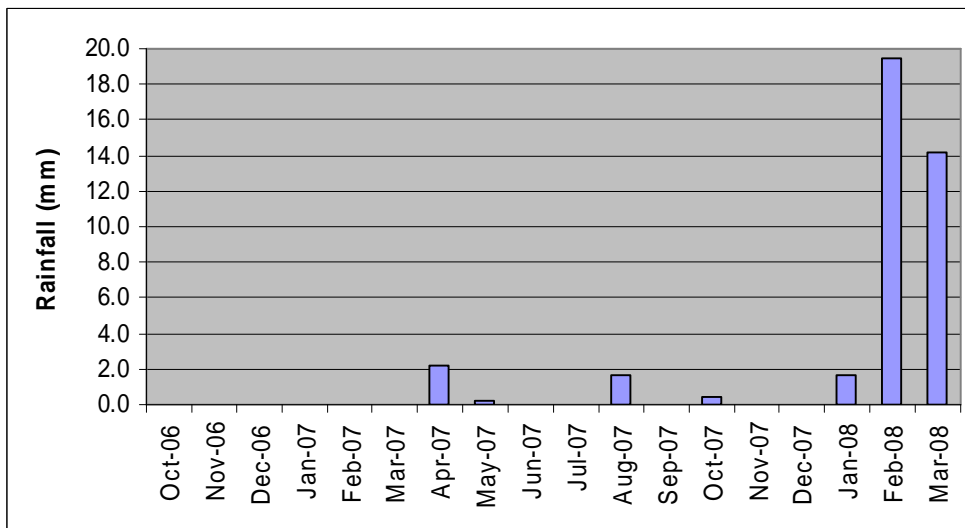


Figure 3: Total monthly rainfall data available from the Valencia station for the period between October 2006 and 6 March 2008.

**Mean monthly maximum and minimum temperatures**

Figure 4 shows the monthly average of the temperatures recorded at the Valencia site. A maximum of 38.7°C and a minimum of 5.9°C was recorded over the same time period.

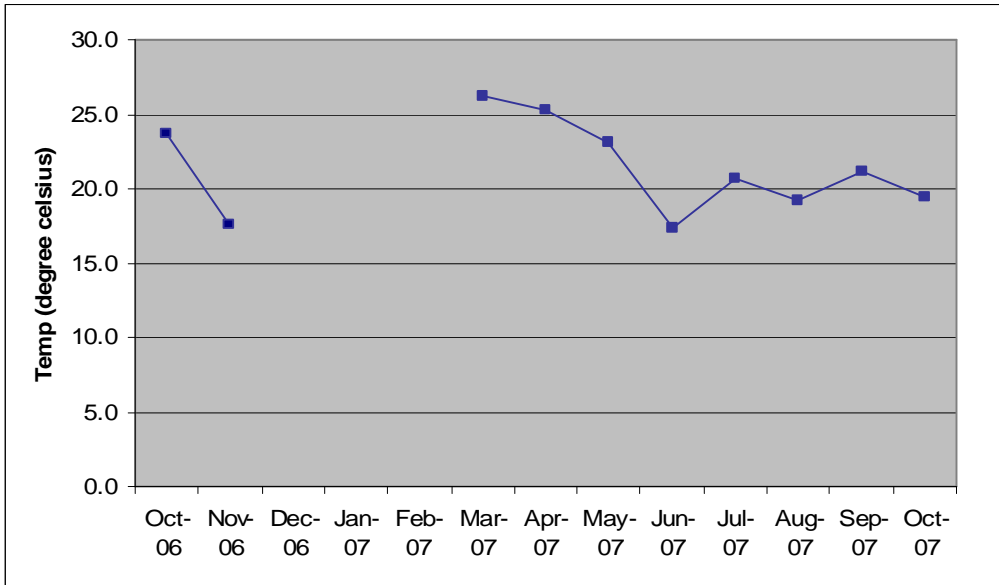


Figure 4: Average monthly temperature recorded at Valencia for the period between October 2006 and November 2007.

**Mean wind speed and direction**

Figure 5 depicts the wind rose calculated from data recorded by the Valencia station since its installation. The data capture rate for this station was low. Data from the Rössing station (Eco.Plan, 2006; Airshed, 2008), however, confirms that this is, in fact an accurate reflection of the prevailing wind direction. The predominant winds are north-east/south-west and wind speeds are mostly less than 15m.s<sup>-1</sup>, although wind speeds do occasionally exceed 30m.s<sup>-1</sup>.

The wind rose calculated for Valencia from the measured data gives a prevailing wind similar to that from the regional data, although south-west winds were more predominant during the Valencia monitoring period. Wind velocity was also more moderate during this period, with the majority of wind velocities recorded being less than 10m.s<sup>-1</sup> and there were no records of winds stronger than 20m.s<sup>-1</sup>.

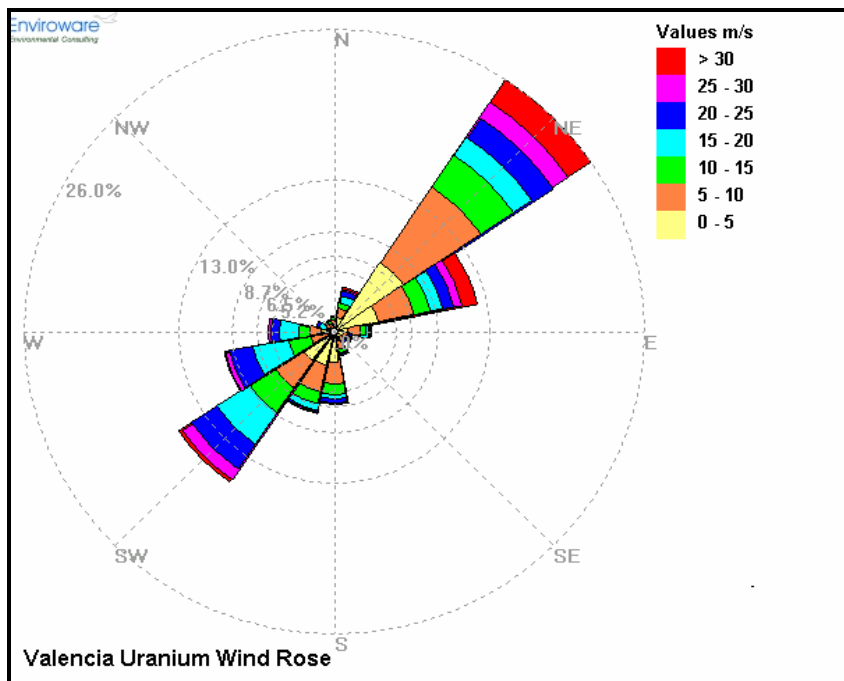


Figure 5: Valencia Uranium wind rose for the period October 2006 to October 2007.

## **Topography**

The site for the proposed Mine is located on a westerly facing slope at an approximate altitude of between 725m and 780m. This slope drains into the Khan River drainage system which runs in a south-westerly direction. The local slope at the site is at a gradient of approximately 1:72 (1.4%). Within the immediate vicinity (15km radius) the average gradient from the highest point ( $\pm 1,100\text{m}$ ) to the lowest point ( $\pm 670\text{m}$ ) is 1:22 (4.5%); thus the site for the proposed Mine is on a gentler slope relative to the surrounding area.

The general area is characterised by rugged topography, with the prominent north-east/south-west trending Rössing /Khan formation to the west of the site. The terrain becomes relatively flat towards the east until the Chuos Mountains, approximately 11km from the proposed Mine. The Khan River runs through a deeply incised valley within the Rössing/Khan formation.

The proposed Mine and plant site is broken by gulleys cut by sub-tributaries of the Khan River that currently only contain water and flow periodically after large storm events. South of the site, the surface is broken more drastically by deeper, more frequent Khan River tributaries. To the north, west and north-east, the topography rises into higher ground.

## **Land use**

The Valencia farm is currently predominantly an area used by indigenous wildlife but they are not fenced in. Cattle graze on this farm when there is sufficient grass but are not kept on it permanently. Cattle are grazed on adjoining farms. There is currently no significant development on the farm, although the farmhouse is located approximately 3.5km to the south-east of the proposed open pit. Other infrastructure currently established on the farm includes minor buildings associated with the current exploration activities, foundations and ruins from precious exploration, access tracks, fences and water supply infrastructure. The topography, climate and nature of the soils do not provide conditions suitable for agronomic activities.

## **Project description**

The uranium-rich ore will be mined from an open pit. The final pit for the Project will be approximately 1,400 m long, 700 m wide and 320 m deep.

The preliminary geotechnical surveys and pit design work have defined a probable reserve of 117 million tonnes of ore (at a grade of 0.125 kg  $\text{U}_3\text{O}_8$  per tonne of ore) and 122.4 million tonnes of waste rock (Snowden, 2007). The tailings dump will contain the fine material left over from the process after the uranium has been removed and will contain approximately 117 million tonnes.

Site construction is currently planned to commence in mid-2008 and the commissioning of the plant is anticipated towards the end of 2009. The proposed uranium processing facilities will include conventional continuous ion exchange (CIX), solvent extraction (SX), precipitation, and filtration and calcinations stages to produce the uranium oxide product in powder form. Other facilities will include two waste rock dumps, a low grade stockpile, a fine tailings dump, a crusher and conveyors.

Approximately 1,000 to 1,500 tonnes of product per annum will be packed into drums and transported by road or rail to Walvis Bay. All of the above materials will contain radionuclides of the uranium decay chain and will give rise to varying levels of radiation exposure across the Project. A number of other activities and facilities will be associated with the proposed Operation.

## **6 Legal and other Obligations**

Legal obligations are covered in detail by Envirolex (2007). The following section contains extracts from this report.

### **6.1 Local Regulations**

According to Namibia's Environmental Assessment (EA) Policy for sustainable development and environmental conservation, published in 1995, environmental guidelines aim to promote sustainable development and economic growth while protecting the environment in the long-term. The EA Policy demands that the principle of achieving and maintaining sustainable development must underpin all policies, programmes and projects undertaken within Namibia. In particular, the sensible utilisation of the country's natural resources, together with the responsible management of the biophysical environment, must be for the benefit of both present and future generations.

In addition to the EA Policy of 1995, Environmental Impact Assessments (EIAs) in Namibia are guided by the following:

- The Constitution of the Republic of Namibia (1990), Article 95 (1) - The Constitution states that Namibia will promote and maintain the welfare of the people by maintaining ecosystems, ecological processes and biological diversity, and will use living natural resources on a sustainable basis;
- The Minerals (Prospecting and Mining) Act 1992 (No. 33 of 1992) - This act requires the compilation of an EIA, specifically to minimise or prevent pollution and promote the rehabilitation of prospecting and mining areas;
- White Paper on the Energy Policy of Namibia, (1998) - Energy Policy goals are listed which includes effective governance, security of supply, social upliftment, investment and growth, economic competitiveness and efficiency and sustainability; and
- The Environmental Management Act (No. 7 of 2007). This Act is not yet in force but is expected to be gazetted soon.

Fundamentally, the Namibian Government places high priority on:

- Maintaining ecosystems and related ecological processes, in particular those important for water supply, food production, health, tourism and sustainable development;
- Observing the principle of optimum sustainable yield in the exploitation of living natural resources and ecosystems, and the wise utilisation of non-renewable resources;
- Maintaining representative examples of natural habitats; and
- Maintaining maximum biological diversity by ensuring the survival and promoting the conservation in their natural habitat of all species of fauna and flora, in particular those which are endemic, threatened, endangered, and of high economic, cultural, educational, scientific and conservation interest.

Thus, it is important to adhere to the regulations and legislative requirements for the proposed Valencia Uranium Project development.

In terms of the Water Act 54 of 1956 section 23, persons who carry on industrial activities are also liable for clean up costs after closure of the activity. Where industrial operations have been abandoned, the Minister may take any steps which he may consider necessary to prevent the pollution, as a result of seepage or drainage from any area on which such industrial operations have been carried on, of public or private water, including underground water, and recover the costs associated therewith from any person who carried on or is entitled to carry on such operations (section 23(2)).

Minerals (Prospecting and Mining) Act 33 of 1992: following Cabinet approval and Parliament endorsement of the Minerals Policy of 2003 a new Minerals Bill is being prepared which introduces requirements for financial guarantees for reparation of environmental damage and the setting up of trust funds for rehabilitation after mine closure. Specification of these requirements will be contained in yet to be drafted Regulations. Penalties for non-compliance are also included. Valencia Uranium (Pty) Limited should thus ensure that adequate provision is made for the rehabilitation of the exploration and mining areas to remedy, to the satisfaction of the Minister, any damage caused to the environment by its mining operations.

According to the Explosives Act 26 of 1956 (as amended in SA to April 1978) at closure, all explosives are to be disposed of accordingly.

Petroleum Products and Energy Act 13 of 1990: general conditions apply to all certificates issued in terms of this Act. These include conditions relating to petroleum spills and the abandonment of the site. The regulation further provides that the Minister may impose special conditions relating to the preparation and assessment of environmental assessments and the safe disposal of petroleum products.

Atomic Energy and Radiation Protection Act 5 of 2005 Section 31: Notice of intended termination of operations. A licence holder must notify the Director-General of his or her intended termination of operations as prescribed and must follow the prescribed decommissioning procedure or if no procedure is prescribed, such procedure as the Director-General may determine in order to ensure the safety of the public and the environment.

Minerals Policy of Namibia, 2003: the Policy sets out guiding principles for the development of the mining sector designed to ensure that it maintains its leading role in the growth of the national economy while *at the same time operating within environmentally acceptable limits*. To this end, one of the objectives of the policy is listed as ensuring compliance with national and other relevant environmental policies.

It recognises that some prospectors and mining companies have in the past, shown little respect for the environment and as a result have caused significant adverse environmental impacts. The Policy therefore commits MME to ensuring that the development of the mining industry proceeds on an environmentally sustainable basis, that mineral development in proclaimed protected areas commences only when rehabilitation is guaranteed, to investigating the establishment of financial mechanisms (environmental trust funds or bonds) for environmental rehabilitation and aftercare in other areas, and to developing national waste management standards and guidelines in consultation with the mining industry. It stipulates that the government will enact exploration and mining legislation benchmarked against environmental global best practice, that it will investigate the establishment of mandatory mechanisms for funding of final mine closure plans (including rehabilitation) and that it will monitor industry compliance with this through the use of Environmental Management Plan (EMP) contracts.

The Namibian Chamber of Mines (CoM) is currently busy compiling guidelines for mine closure in Namibia. These guidelines were not complete at the time of compiling this report, but Digby Wells and Associates was advised by the CoM that the completed documents would be based on the Australian Best Practice Guidelines for mine closure as issued by the Minerals Council of Australia (Minerals Council of Australia, 2000). Hence the contents of this document and a number of references are to these guidelines.

### **Radioactive materials (from Alara 2008)**

The uranium mining and minerals processing operations at the Valencia Project will require compliance with the current Namibian legislation on the control of radioactive materials and exposures to ionising radiation.

The Government of the Republic of Namibia has developed a set of Acts and Draft Regulations regarding the control of all types of radioactive materials since 1974.

In 1994 the Government of the Republic of Namibia approved the National Radiation Protection Policy covering all matters related to radiation protection, nuclear energy and regulation. The Policy provides for the establishment of an Atomic Energy Board as an independent advisory body to the Government on the implementation of the Policy and the National Radiation Protection Service as the enforcement agent of the regulatory requirements. The control of radioactive materials falls under the Atomic Energy and Radiation Protection Act No. 5 of 2005 (GRN 2005). Under the terms of Section 43 of the Act a set of Draft Regulations has been promulgated.

In addition, the authorisation holders are required to ensure that the treatment and conditioning of radioactive wastes are carried out in accordance with the national waste management strategy, and, in particular, meet any waste acceptance criteria established by the Regulatory Authority.

The safety of radiation sources and the security of radioactive materials in Namibia are regulated by the Hazardous Substances Ordinance of 1974 (RSA 1974). This ordinance applies primarily to sealed sources which comprise artificial radionuclide sources used in mining and industry.

All radiation protection related documents will be submitted to the National Radiation Protection Services for review, comment and approval.

### **6.2 International Regulations and Guidelines**

Some of the International Best Practice Guidelines consulted for the compilation of this document are listed below:

- Regulations of the Canadian Environmental Assessment Act for Projects outside Canada;
- Minerals Council of Australia. (2000). Australian and New Zealand Minerals and Energy Council, (ANZMEC) Strategic Framework for Mine Closure;
- International Finance Corporation (IFC) April 2006 Performance Standards on Social and Environmental Sustainability;
- Guidelines from the 2006 FTSE4Good Index Series for Uranium Mining Criteria;
- International Finance Corporation Policy on Social and Environmental Sustainability; and
- World Bank Health and Safety Guidelines.
- ICMG Guidelines
- Equator Principles

This document was compiled according to the Minerals Council of Australia (2000) guidelines.

The IFC launched a set of business standards for managing environmental and social risks for project finance in 2006. The IFC Performance Standards comprise a collection of eight quality standards which the developer is required to meet throughout the life of an investment by the financial institution. These Performance Standards include the following:

- Performance Standard 1: Social and Environmental Assessment and Management

#### System

- Performance Standard 2: Labour and Working Conditions
- Performance Standard 3: Pollution Prevention and Abatement
- Performance Standard 4: Community Health, Safety and Security
- Performance Standard 5: Land Acquisition and Involuntary Resettlement
- Performance Standard 6: Biodiversity Conservation and Sustainable Natural Resource Management
- Performance Standard 7: Indigenous Peoples
- Performance Standard 8: Cultural Heritage

Of particular importance is the introduction of Performance Standard 1, the Social and Environmental Management System, which requires the project proponent not only to assess the social and environmental impacts of the proposed project but in addition ensure the continued management of social and environmental performance throughout the lifecycle of the project. Valencia Uranium (Pty) Limited is committed to the establishment and maintenance of a Social and Environmental Management System which will incorporate management responsibilities for social and environmental aspects, engagement with workers and local communities, local government and regulators and put in place procedures for long-term monitoring and reporting on the effectiveness of the risk management measures.

**FTSE Group (FTSE)** is an independent company owned by The Financial Times and the London Stock Exchange. FTSE does not give financial advice to clients, which allows for it to give objective market information. FTSE indices are used extensively by investors worldwide such as consultants, asset owners, asset managers, investment banks, stock exchanges and brokers. The FTSE4Good Inclusion Criteria aims to provide a tool for responsible investors to identify and invest in companies that meet globally recognised corporate responsibility standards. The FTSE4Good Index Series (Uranium Mining Criteria) was promulgated in 2006. These criteria acknowledge the risks associated with uranium mining, as well as the challenges and threats posed to investors, companies and stakeholders. The FTSE4Good Uranium Mining Criteria were implemented to identify effective risks management techniques and to monitor challenges in the uranium mining industry.

In essence, the FTSE4Good Index criteria aim to identify the most responsible uranium mining companies and provide a clear framework of standards and criteria they must meet in order to become constituents of the FTSE4Good series. These criteria require a commitment from the company for:

- Adequate site rehabilitation, decommissioning and post decommissioning activities.
- Making adequate provision for the execution of these activities.
- Providing bond guarantees from the parent company to ensure that there are adequate financial resources to be able to pay for the rehabilitation of sites in case of the sites closing in a planned or unplanned manner or to deal with unexpected environmental damage rectification.

Equator Principles (from Envirolex, 2007)

The Equator Principles is a set of environmental and social benchmarks for managing environmental and social issues in development project finance in the emerging markets. Once adopted by banks and other financial institutions, the Equator Principles commit the adoptees not to finance projects that fail to follow the processes defined by the Principles. The Equator Principles were developed by private sector banks and were launched in June 2003. The banks chose to model the Equator Principles on the environmental standards of the World Bank and the social policies of the International Finance Corporation IFC). Over 50 financial institutions have adopted the Equator Principles, which have become the *de facto* standard for banks and investors on how to assess major development projects around the world. In July 2006, the Equator Principles were revised, increasing their scope and strengthening their processes.

The Equator Principles state that adopting financial institutions will provide loans directly to projects only under the following circumstances:

Scope: The Principles apply to projects over 10 million US dollars.

**Principle 1: Review and Categorisation**

The risk of the project is categorised in accordance with internal guidelines based upon the environmental and social screening criteria of the IFC. Projects are classified, relating to social or environmental impacts, in Category A (significant impacts), Category B (limited impacts) and Category C (minimal or no impacts).

**Principle 2: Social and Environmental Assessment**

For all medium or high risk projects (Category A and B projects), sponsors complete an Environmental Assessment, the preparation of which must meet certain requirements and satisfactorily address key environmental and social issues.

**Principle 3: Applicable Social and Environmental Standards**

The Environmental Assessment report addresses baseline environmental and social conditions, requirements under host country laws and regulations, applicable international treaties and agreements, sustainable development and use of renewable natural resources, protection of human health, cultural properties, and biodiversity, including endangered species and sensitive ecosystems, use of dangerous substances, major hazards, occupational health and safety, fire prevention and life safety, socio-economic impacts, land acquisition and land use, involuntary resettlement, impacts on indigenous peoples and communities, cumulative impacts of existing projects, the proposed project, and anticipated future projects, participation of affected parties in the design, review and implementation of the project, consideration of feasible environmentally and socially preferable alternatives, efficient production, delivery and use of energy, pollution prevention and waste minimization, pollution controls (liquid effluents and air emissions) and solid and chemical waste management.

**Principle 4: Action Plan and Management System**

Based on the Environmental Assessment, Equator banks then make agreements with their clients on how they mitigate, monitor and manage those risks through a 'Social Environmental Management Plan'.

**Principle 5: Consultation and Disclosure**

For risky projects, the borrower consults with stakeholders (NGOs and project affected groups) and provides them with information on the risks of the project. The borrower has to

consult the project affected communities in a structured and culturally appropriate manner. The process will ensure free, prior and informed consultation for affected communities.

**Principle 6: Grievance Mechanism**

The borrower will establish a grievance mechanism as part of the management system.

**Principle 7: Independent Review**

There shall be an independent review of the Assessment, Assessment Plan and consultation process.

*International Council on Mining and Metals: Sustainable Development Framework (from Envirolex 2007)*

The 10 Principles were developed by benchmarking against other leading global standards including: the 1992 Rio Declaration, the Global Reporting Initiative, the OECD Guidelines for Multinational Enterprises, the World Bank Operational Policies, the OECD Convention on Combating Bribery, ILO Conventions 98, 169, 176, and the Voluntary Principles on Human Rights and Security.

**Implement and maintain ethical business practices and sound systems of corporate governance**

- Develop and implement company statements of ethical business principles and practices that management is committed to enforcing.
- Implement policies and practices that seek to prevent bribery and corruption.
- Comply with or exceed the requirements of host-country laws and regulations.
- Work with governments, industry and other stakeholders to achieve appropriate and effective public policy, laws, regulations and procedures that facilitate the mining, minerals and metals sector's contribution to sustainable development within national sustainable development strategies.
- Integrate sustainable development considerations within the corporate decision-making process.
- Integrate sustainable development principles into company policies and practices.

**Plan, design, operate and close operations in a manner that enhances sustainable development**

- Implement good practice and innovate to improve social, environmental and economic performance while enhancing shareholder value.
- Encourage customers, business partners and suppliers of goods and services to adopt principles and practices that are comparable to our own.
  
- Provide sustainable development training to ensure adequate competency at all levels among our own employees and those of contractors.
- Support public policies and practices that foster open and competitive markets.

**Uphold fundamental human rights and respect cultures, customs and values in dealings with employees and others who are affected by our activities**

- Ensure fair remuneration and work conditions for all employees and do not use forced, compulsory or child labour.
- Provide for the constructive engagement of employees on matters of mutual concern.
- Implement policies and practices designed to eliminate harassment and unfair discrimination in all aspects of our activities.
- Ensure that all relevant staff, including security personnel, are provided with appropriate cultural and human rights training and guidance.

- Minimize involuntary resettlement, and compensate fairly for adverse effects on the community where they cannot be avoided.
- Respect the culture and heritage of local communities, including Indigenous Peoples.

**Implement risk management strategies based on valid data and sound science**

- Consult with interested and affected parties in the identification, assessment and management of all significant social, health, safety, environmental and economic impacts associated with our activities.
- Ensure regular review and updating of risk management systems.
- Inform potentially affected parties of significant risks from mining, minerals and metals operations and of the measures that will be taken to manage the potential risks effectively.
- Develop, maintain and test effective emergency response procedures in collaboration with potentially affected parties.

**Seek continual improvement of our health and safety performance**

- Implement a management system focused on continual improvement of all aspects of operations that could have a significant impact on the health and safety of our own employees, those of contractors and the communities where we operate.
- Take all practical and reasonable measures to eliminate workplace fatalities, injuries and diseases among our own employees and those of contractors.
- Provide all employees with health and safety training, and require employees of contractors to have undergone such training.
- Implement regular health surveillance and risk-based monitoring of employees.
- Rehabilitate and reintegrate employees into operations following illness or injury, where feasible.

**Seek continual improvement of our environmental performance**

- Assess the positive and negative, the direct and indirect, and the cumulative environmental impacts of new projects - from exploration through closure.
- Implement an environmental management system focused on continual improvement to review, prevent, mitigate or ameliorate adverse environmental impacts.
- Rehabilitate land disturbed or occupied by operations in accordance with appropriate post-mining land uses.
- Provide for safe storage and disposal of residual wastes and process residues.
- Design and plan all operations so that adequate resources are available to meet the closure Requirements of all operations.

**Contribute to conservation of biodiversity and integrated approaches to land use planning**

- Respect legally designated protected areas.
- Disseminate scientific data on and promote practices and experiences in biodiversity assessment and management.
- Support the development and implementation of scientifically sound, inclusive and transparent procedures for integrated approaches to land use planning, biodiversity, conservation and mining.

**Facilitate and encourage responsible product design, use, re-use, recycling and disposal of our products**

- Advance understanding of the properties of metals and minerals and their life-cycle effects on human health and the environment.

- Conduct or support research and innovation that promotes the use of products and technologies that are safe and efficient in their use of energy, natural resources and other materials.
- Develop and promote the concept of integrated materials management throughout the metals and minerals value chain.
- Provide regulators and other stakeholders with scientifically sound data and analysis regarding our products and operations as a basis for regulatory decisions.
- Support the development of scientifically sound policies, regulations, product standards and material choice decisions that encourage the safe use of mineral and metal products.

**Contribute to the social, economic and institutional development of the communities in which we operate**

- Engage at the earliest practical stage with likely affected parties to discuss and respond to issues and conflicts concerning the management of social impacts.
- Ensure that appropriate systems are in place for ongoing interaction with affected parties, making sure that minorities and other marginalized groups have equitable and culturally appropriate means of engagement.
- Contribute to community development from project development through closure in collaboration with host communities and their representatives.
- Encourage partnerships with governments and non-governmental organizations to ensure that programs (such as community health, education, local business development) are well designed and effectively delivered.
- Enhance social and economic development by seeking opportunities to address poverty.

**Implement effective and transparent engagement, communication and independently verified reporting arrangements with our stakeholders**

- Report on our economic, social and environmental performance and contribution to sustainable development.
- Provide information that is timely, accurate and relevant.
- Engage with and respond to stakeholders through open consultation processes.

## **7 Stakeholder Involvement**

### ***7.1 Stakeholder identification***

Stakeholders are those parties with the potential to be affected by the mine closure process. They would be stakeholders from the surrounding towns of Usakos, Arandis and Swakopmund, neighbouring land owners and regulatory agencies. These stakeholders are distinct from interested parties, who have an interest in the process or outcomes of mine closure. Identifying key stakeholders and interested parties, and developing a good relationship with them, is fundamental to a successful closure process. Stakeholders fall into three broad categories: the Company, the Community and the State. Outlined below are some of the key sub-groups within these broad stakeholders categories, however, the list is not exhaustive and will vary with individual circumstances.

#### **7.1.1 The Company**

Key Valencia Uranium (Pty) Limited stakeholders include:

- Management;
- Employees; and
- Shareholders.

### **7.1.2 The Community**

Significant Community stakeholders include:

- Local business and service providers in Usakos, Arandis, Swakopmund and Walvis Bay;
- The owner of Valencia farm and neighbouring farm owners; and
- Non-Governmental Organisations (NGOs) and Community Groups.

### **7.1.3 The State**

Important Government stake holders include:

- The Ministry of Mines and Energy, Directorate of Mining;
- The Ministry of Environment and Tourism, Directorate of Environmental Affairs;
- The Ministry of Agriculture, Water and Forestry, Department of Water Affairs;
- The Ministry of Regional, Local Government and Housing;
- The Ministry of Health and Social Services;
- The Town Councils and other appropriate representation in Usakos, Arandis, Swakopmund and Walvis Bay; and
- Councillor and Traditional Authorities of Arandis and Daures Constituencies, representing rural communities.

## **7.2 Community consultation**

The process of consultation should begin early in the mine life, preferably during the planning phase. The Public Participation Process (PPP) for Valencia Uranium (Pty) Limited has attempted to ensure that all Interested and Affected Parties (I&APs) have been adequately involved in the project from the outset. I&APs were afforded the opportunity to participate in and contribute to the Valencia Study so that the environmental and social specialist studies could be well informed. I&APs were provided with detailed and up-to-date information that was comprehensible to them. This ensured that all feedback was relevant and well-informed.

Public meetings, authorities' meetings, and farmers' meetings formed the essence of the PPP. This served to inform affected parties of the proposed activities, involve them in the process, and determine their concerns, expectations, and perceptions regarding the Project. The process was intended to record and address specific issues to the satisfaction of both Valencia Uranium (Pty) Limited and I&APs. Refer to the PPP document (Appendix M of the EIA).

This process should continue through the operational phase and also into the closure and relinquishment phase. Consultation should not be on a selective basis, but should involve all parties with a stake in the Project and the post-mining land use. Other parties such as conservation organisations and other NGOs may have an interest in the Project and should be included in the consultation process. To be effective, consultation must involve listening and feedback, as well as informing. Consultation is about both perception and reality (EPA, 1995), and perception can be gauged by listening to the affected stakeholders and interested parties.

Mine closure often causes significant social concern, particularly in local communities where a mine may be the major commercial activity (WMI, 1994). To minimise the impact on these local communities it is essential that companies work with them to manage such impacts. During the life of the mine it may be possible to encourage and assist the development of community cooperative industries which can persist after closure. Local industries that have a broader focus than the mine could also be supported. Working with communities through community consultative committees should assist in the development of programmes to offset the inevitable changes that will occur at closure.

## 8 Risk Assessment

A formal risk assessment needs to be conducted for the Project once the Mine Management Team is in place. The findings of the EIA highlight the following major environmental issues which would need to be addressed for any closure plan of the Valencia Uranium Project.

- Dust control during operation, during decommissioning and post closure to prevent the dispersion of waste rock, or tailings material.
- Pit safety to ensure safety and stability of the pit open void and to prevent inadvertent access and accidents occurring in the pit.
- Groundwater impacts: to understand and mitigate the effects on surrounding ground and surface water users.
- Erosion of the surface of various topographical features which have been added to the landscape such as the waste rock dumps, low grade stockpile and tailings dump by air and water. (Note: the low grade stockpile may be processed depending on market conditions).
- Pit water quality and the impact this could have on the potential users of the pit after closure.
- Infrastructure, roads, pipelines, offices, housing and what the final fate of these items should be.
- Radioactive residues and wastes remaining after closure.

It will be necessary to conduct a formal risk assessment on environmental and closure issues as soon as possible. This then needs to be repeated with the update of the closure plan.

Issues pertinent to the closure of the operation are:

- The population density in the Project area is extremely low.
- Due to the arid environment and the soil conditions, the chances of successfully introducing a vegetative cover over any disturbed area to prevent erosion will be low.
- The workforce is planned to be housed elsewhere and thus the amount of infrastructure to be constructed on site is limited.
- The life of the operation is relatively short being 11 years but may change as the Project Team is still busy with exploration.
- The aridity and exposure to winds makes disturbed ground susceptible to dust generation.
- The deposition of dry tailings, the lack of rainfall, the presence of an open pit and the absence of significant aquifers in the vicinity of the tailings dump reduces the likelihood of groundwater contamination migrating from this site.

## 9 The fate of infrastructural items at closure

### 9.1 Metallurgical plant

This area includes the leach and solvent extraction plant, the acid plant, the crusher and milling circuit, explosives plant and all the associated processing plant infrastructure items.

- At present it is planned that the metallurgical plant and the associated equipment should be dismantled or demolished, decontaminated and cleared for release (e.g. sale) into the public domain.
- As this is an uranium treatment operation, it is expected that metal, rubber and other material surfaces will be contaminated with radionuclides. These items will be decontaminated on site in accordance with the guidelines provided in the Mine's Radiation Protection Programme.
- Motors, electrical cabling, etc. should be sold as appropriate after going through a suitable decontamination programme and contamination clearance survey.
- The concrete foundations of the plant should either be placed at the bottom of the pit or at the base of the waste rock dumps where they should be covered as directed by

the recommendations of the radiation studies to be conducted at closure. All foundations should be removed to at least a meter below ground level or to a depth at which they are no longer considered to be contaminated with radioactive materials.

- Where soils have been affected by spillages such as nitrates or hydrocarbons, these soils should be stockpiled and appropriately treated to ameliorate the contamination levels prior to being placed on the tailings facility.
- Soils and concrete contaminated with radionuclides will require to be disposed of into the tailings dam.

### **9.2 Tailings storage facility**

The environmental objective of this final facility after closure is to prevent erosion, at a rate greater than the surrounding surface, reduce the radioactive emissions to acceptable levels and the dispersion of dust greater than existing levels.

- The tailings dump should be constructed during the operational phase from a mixture of coarse and finer tailings material.
- If the dust generation rate is high, then the tailings disposal methodology should be modified, or other means implemented, to prevent this from occurring.
- The stability should be checked regularly by a professionally qualified person to ensure that it will be stable at all times.
- The tailing construction methodology should continue to be practised during the life of the mine. This should entail the cladding of the sides of the tailings dump with coarse rock for all areas which have a large enough face for machinery to work on. At closure, waste rock cladding should continue to be placed around the tailings facility to ensure that, at all times, there is at least a 1 meter thick layer of waste rock around the tailings material.
- The upslope water should be diverted around the tailings facility in trenches sufficiently sized to ensure that flood water can be diverted around the site in a sustainable manner.
- Any seepage from the tailings facility should be caught in a seepage collection pond. This pond should be cleared when the entire tailings facility is rock covered.

### **9.3 Waste rock dumps**

The environmental objective of this final facility is to prevent erosion, at a rate greater than the surrounding landscape, reduce the radioactive emissions to acceptable levels and the excessive dispersion of dust.

- The waste rock dumps should be constructed during the operational phase to have an overall slope of less than the angle of repose. The outer slopes should be done in benches 10 m high with 5 m step-ins. These bench characteristics should be checked during the life of the mine to see if they are suitable.
- The stability of the dumps should be checked by a suitably qualified person at regular intervals during the mine's life.
- Coarse rock should cover the outer slopes to ensure that wind erosion is minimised.
- Water diversion measures should be constructed around the waste rock dump to ensure that the surface run off can pass around the rock dumps in a sustainable manner.
- It should be ensured that large rocks are not left such that the gaps between them can be accessed by humans.

### **9.4 Low grade stockpile**

The environmental objective of this facility is to prevent erosion, reduce the radioactive emissions to acceptable levels and the dispersion of dust if it had to remain behind at closure.

- If at all possible, this low grade stockpile should be retreated during the operational phase as a mineral resource and processed through the plant; if it is not done, it

should remain as a resource stockpile and should be treated similar to the waste rock dumps that will be left behind.

- The radiation levels of this dump should be assessed to see if additional covering of rock with low levels of radioactivity are required.
- The overall slope should be less than the angle of repose and upslope service water diverted around it in a sustainable manner.
- It should be ensured that large rocks are not left such that the gaps between them can be accessed by humans.
- Coarse rock needs to cover the outer slopes to prevent wind erosion.

### **9.5 Mining pit**

The environmental objective of this final facility is to make it as safe as possible for humans and animals at closure without filling the pit.

- The sides of the mining pit should be assessed for geotechnical stability prior to closure as part of the ongoing monitoring programme during the operational phase of the mine. Wherever significant areas of weakness are found these should be identified and additional areas of bunding will be provided to make it safe if a hazard to people.
- A berm should be constructed around the outer edges of the pit to ensure that all human pedestrian access, vehicles driving, or any animals cannot inadvertently access this area and fall into the pit. This should be done by providing a berm, and stockpiling any rubble on the inner slopes. The intention should be to create a berm of at least 1,5 m high. The berm should be sufficiently far from the pit to ensure that any pit instability or sliding does not affect the integrity of the berm and to ensure that cattle cannot cross it.
- Fences should be erected around the pit to prevent access by livestock and larger mammals. It is recognised that these are however not sustainable in the long-term.
- The berm should be at least 10 m from the final pit slope position.
- It is not intended that there should be access to the base of the pit for use of the water by humans or large mammals because there is an expectation that the pit water may become extremely saline and possibly hazardous. Access roads should be blocked.

### **9.6 Power line and electrical infrastructure**

The environmental objective is to remove all infrastructure not required by future users of the property.

- All onsite electrical reticulation infrastructure should be removed from site or, if the property of Valencia Uranium Limited, should be sold and disposed of. The regional power line will be the property of Nampower and should remain on site for future use as it will serve the other customers around the area.

### **9.7 Offices, administration facilities, fences and support areas**

The environmental objective is to remove all infrastructure not required by future users of the property.

- Three years before the planned closure, formal discussions should be held with the surface owner and other potential users of infrastructure to see if any of the site infrastructure can be used in a sustainable manner and whether somebody agrees to take over the management thereof. This management should be ceded to them, and the facilities left behind, if they are deemed to be able to manage this in a sustainable manner. If this does not occur then the facilities should be demolished, the foundations broken down to at least 1 m below ground level and the facilities removed from site.
- Any concrete rubble should be placed on the waste rock dump, or in the pit, and covered with waste rock. All infrastructure such as piping, electrical cabling, etc. should be removed from site to prevent later potential excavation by people trying to recover any sort of saleable or usable scrap.

### 9.8 *Water reticulation infrastructure*

The environmental objective is to remove all infrastructure not required by future users of the property.

- The local boreholes around the site and in the Paleochannel should be left open for use by the land owner or any other future user of the infrastructure, once they have been made safe. The borehole pumps may be left in place.
- The pipelines from the Rössing water tanks should be removed unless the future user takes control of this line and signs that he/she should maintain and manage this pipeline; if not, the pipes should be removed and any surface disturbance associated with it such as tanks, booster stations, or trenches should be dug up and rehabilitated.

### 9.9 *Borrow pits and quarries*

- Rehabilitation of the borrow pits entails shaping down of the side walls to produce a landform which grades into the surrounding landscape, while ensuring that, if at all practical, the borrow pit is free draining.
- The borrow pit floor and flattened side walls should be ripped to roughen them up.

### 9.10 *Access Roads*

- Local roads around the actual site of the waste rock dumps and plant and infrastructure areas should be ripped for all areas except those needed to access the facilities for inspection after closure. Wherever there are access roads that should be useable by the surface owner, these should be left.
- Main access road – this road should be maintained before closure and negotiations started with the Namibian Roads Authority for the closure of the mine. If the Namibian Roads Authority cannot maintain this road into the future it should be demolished and removed by Valencia Uranium Limited.
- Crossing through the Khan River – monitoring during the operational phase will determine whether the traffic impact on the Khan River is significant. If this found to be a major issue, then the volume of road users should be restricted to what it was before mine construction, i.e. the road bed could be lifted to reduce to reduce traffic. If traffic is not a big issue then the road should be left in a good condition and handed over to the Namibian Roads Authority.

## 10 **Timing of activities at closure**

Table 1: Timing of activities at Closure

<b>Activity\year</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Demolition of metallurgical plant		X	X			
Covering tailings facility	X	X	X			
Shaping rock dumps	X	X	X			
Removal of electrical reticulation					X	
Removal of water line from Rössing (if required)					X	
Access road rehabilitation (if required)						X
Shaping and possible covering of low grade stockpile		X				
Breakdown of offices, admin. facilities, etc				X	X	X
Making the pit safe	X	X				
Closure of waste disposal sites						X

Note: Year 0 refers to when production ceases or closure.

## **11 Management Plans**

### ***11.1 Objectives***

For the purposes of this Plan, the final land use post-closure for Valencia at this stage is to return the land back to at least a grazing land use capability as this is the current land use. It should be noted that grazing in this area has to be of low intensity due to the low rainfall. This final land use may be amended as this Closure Plan is revised. Although closure occurs once operations cease, rehabilitation measures should take place as soon as construction commences and should continue through each phase of the Project. The rehabilitation strategies and the necessary closure management measures for each phase of the Valencia Uranium Project are discussed in this section.

A number of Management Plans have been drawn up for Valencia, from which information has been extracted. For more detail please refer to the individual plans as referenced.

### ***11.2 Management during Construction***

From the rehabilitation perspective, the key factors to consider during the construction phase are to minimise the area affected by the development, minimise potential future contact of contaminating materials with the environment, and to maximise the recovery and effective storage of those profile materials that should be most useful during the rehabilitation process after the Project is complete. In other words, construction should be done bearing closure in mind. The following management measures apply:

- Ensure that project planning has, where possible, minimised the area to be occupied by infrastructure or affected by vehicles. This area should be clearly demarcated on a map. In the event that additional areas are to be disturbed, a motivation should be compiled and permission sought from the appropriate personnel (i.e. Environmental Project Unit).
- Ensure that construction crews restrict their activities to the planned areas.
- Locate all soil and waste rock stockpiles in areas where they will not require relocating prior to replacement for final rehabilitation.
- Ensure that all stockpiles (especially soil) are clearly and permanently demarcated and located in defined no-go areas.
- All infrastructure should have been designed with closure in mind – either with clearly defined dual purpose (i.e. buildings to be used as permanent housing post closure) or with ease of deconstruction.
- All soil stripping in areas of surface disturbance should be done in strict compliance to the soil stripping guidelines.

### ***11.3 Management during Operation***

Although closure planning should be performed prior to the Project commencing, the lifespan of the Project means that major societal changes may have occurred that will preclude the original planned land use.

While certification to a formal Environmental Management System (EMS) is not required, it is the intention of Valencia Uranium (Pty) Limited that such a system will be implemented for the Valencia Uranium Project. The EMS should include an in-house risk assessment and risk management system, with systems and protocols in place, maintenance and monitoring systems, and regular review of performance leading to correction of the system to eliminate non-conformances in respect of the rehabilitation risk.

With respect to ensuring that the rehabilitation process remains on track throughout the life of the project, the EMS should include the following:

- A listing of the physical attributes of the Project site.
- A listing of the objectives to be achieved with respect to rehabilitation.

- A listing of all activities that are to be undertaken throughout the life of the Project.
- An assessment of how each activity may impact on the potential for the Project to achieve its rehabilitation objectives.
- An evaluation (rating) of the risk of rehabilitation failure occurring as a result of each action, or failure to act.
- For those risk items rated “high”, methods of prevention, mitigation, avoidance – and if all else fails, treatment – to be identified and operational management procedures developed to manage each key risk.
- Performance in relation to these policies and procedures should be monitored, and the efficiency with which the procedures worked must be assessed.
- The effectiveness of implementation of each procedure must be assessed regularly (monitoring of performance against procedure), as must the intrinsic effectiveness of the procedure (monitoring of effectiveness of the procedure to ensure achievement of the rehabilitation objectives).
- For the system to be certified there is a requirement for continuous improvement with time. This can either refer to improvement in performance in managing the key risks identified at each site, or a progressive incorporation of the lower-rank risks into the formal management, prevention and mitigation regime provided by the EMS.
- Finally, regular review of the system and its procedures should be done to ensure that all objectives are being met.

With respect to ensuring that the EMS effectively ensures that the rehabilitation activities should be done in conformity to the commitments given in the Environmental Impact Assessment and Management Plan (EIA and EMP) the following activities are required:

- Develop a list of key items to be maintained during the life of the Project. These include soil stockpiles, ensuring the Project affected area does not expand, etc.
- Ensure that all contaminating mining residues are correctly handled (for instance, horizons with Acid Rock Drainage (ARD) potential to be located in zones where their ability to generate acidity will be minimised).
- Ensure that all changes in project planning are fully assessed for their potential impact on land rehabilitation prior to their implementation.

Rehabilitation should commence during operations for some aspects of the waste rock stockpiles and tailings facility. Final rehabilitation should then take place during decommissioning and closure. The rehabilitation guidelines described below should also apply during decommissioning and closure. These guidelines have been compiled by a number of specialists. Rehab Green Monitoring Consultants CC compiled a soil, land capability and land use assessment report for the proposed Valencia Uranium Mine (Appendix C of the EIA). A comprehensive Fauna and Flora report has been compiled (Appendix G of the EIA), which includes surveys of *Adenia pechueilii* (Kolberg and Tholkes, 2007a, 2007b), a detailed Botanical Survey (Strohbach, 2006), an Avifauna Study (Simmons, 2007) and a Reptile Study (Cunningham, 2007).

In addition, Airshed Planning Professionals (PTY) Ltd. (Airshed) was appointed to conduct studies on the air quality aspects of the proposed Valencia Uranium Mining Project (Appendix E) and Alara Consultants CC was appointed to conduct studies on aspects related to radiation (Appendix K). Envirolex Namibia CC conducted studies regarding the legal requirements (Appendix A), which was compiled in January 2008. With regards to socio-economic aspects, Independent Economic Researchers from Cape Town (Barbour and Hugo, 2007) were appointed to conduct studies on the socio-economic aspects of the proposed Valencia Uranium Mining Project (Appendix J). Quaternary Research Services (QRS) was sub-contracted to undertake an archaeological survey (Appendix H) under the National Heritage Act of 2004 and Water Sciences CC was appointed to conduct studies relating to the

hydrogeology and groundwater requirements of the proposed Valencia Uranium Mining Project (Appendix D).

### **Soil Stripping and Stockpiling**

The following guidelines should be observed in regard to soil handling:

- Where practical, strip and place soils when dry, and not when wet. Handling of wet soils increases the loss of soil structure.
- Minimise the amount of handling, as the more handling takes place, the more the soil's structure is deteriorated and the more costly for the developer.
- Avoid compaction of the soil, in situ, during handling and storage, as well as during placement.

### **Vegetation Establishment**

Due to the very low vegetation density there are no plans to formally vegetate the disturbed areas but rather to spread cleared soils on disturbed areas and to make use of natural seed beds contained in them. Use may be made of wind shields and irrigation but the need and effectiveness of these measures need to be assessed.

A sanctuary for elephant's foot plants is planned to be established. Other plants may be added to this sanctuary. There are plans by Valencia Uranium (Pty) Limited to support the research into the propagation of elephant's foot plants at other places. *Commiphora* and *Aloe* species could be transplanted/translocated to the sanctuary, or other areas, or these species could be offered to interested and competent botanical gardens during the construction phase.

### **Operations and Infrastructure Requiring On-going Rehabilitation**

While most of the infrastructure related to the proposed Valencia Uranium Mine should be rehabilitated at decommissioning and closure, some of the operations should be progressively rehabilitated during operations. This infrastructure is discussed below:

#### **Waste Rock Dumps and Low Grade Stockpile**

The low grade stockpile will be constructed in terraces and the footprint cover will be staged. The detailed design still needs to be confirmed.

#### **Tailings Facility**

The tailings dump area will be cleared in stages. Rehabilitation should occur continuously and be completed for each section until the final face needs to be covered at closure.

Usable soil should be stripped, stockpiled and used during the appropriate phases.

#### **Waste Sites**

Waste sites, including the domestic waste landfills, are discussed in more detail in the Waste Management Plan which is contained as an appendix to the EIA/EMP (Appendix N). The waste sites should undergo continuous rehabilitation throughout operations as per the rehabilitation guidelines in this document.

#### **11.4 Management for Decommissioning and Final Closure**

Once operations cease, decommissioning can commence. The sequence of decommissioning is vital to ensure that facilities that are required during decommissioning remain active until they too can be finally rehabilitated and closed. This refers to the solid waste sites which should remain open to receive waste from the project sites during decommissioning, as well as services and amenities such as the provision of diesel, water, electricity, sewage systems

and cement plants. Once all infrastructure has been removed and rehabilitated, these sites can then be rehabilitated.

Experience from the South African uranium mining industry has shown that all types of contaminated metals, including stainless steel, can be successfully decontaminated provided that sufficiently aggressive methods (e.g. very high pressure water jetting and chemical decontamination baths) are used. The only contaminated items that will resist decontamination are likely to be rubber and plastic items which will have to be disposed of as radioactive wastes. (Alara Consultants, 2008)

Impacts relative to each environmental and social component have been detailed in the EIA/EMP and detailed Management Plans contained in the specialist studies. A summary of the impacts and issues that apply to the decommissioning and closure phase include:

*Environmental Impacts:*

- Potential for groundwater contamination due to evaporation, salt generation and acid mine drainage conditions during water level recovery, post mining.
- Altered groundwater gradients associated with the mined pit.
- Increased levels of dust and noise above background.
- Impact on soil and water due to hydrocarbon spills.
- Impact on flora and fauna due to hydrocarbon spills and deterioration in quality of soil and water resources.
- Generation of radioactive tailings and waste rock on surface which will result in the emission of radioactive materials and the radiation exposure of the public.
- Elevated levels of radioactive surface contamination on equipment used in the mine and processing plant.

*Social Impacts:*

- Discontinuation of programmes to manage communicable diseases.
- Changes in livelihood strategies and income generation.
- Temporary increase in heavy machinery on site.
- Safety and security implications from activity on site.

## **Objectives and Targets**

*Environmental Objectives and Targets-*

- Mining infrastructure must be rendered safe.
- The final landform agreed for the area disturbed by infrastructure should be created.
- To minimise and contain seepage and ensure water quality meets the statutory requirements for existing water users.
- To monitor for potential contamination from waste sites and rehabilitated sites.
- To ensure proper decommissioning, demolition and decontamination of building structures and waste storage areas.
- To manage the post-mining rising, or falling, water table and consequent impacts on private groundwater use.
- Control dust from remaining dumps.
- Agree on a finalised plan for the use of facilities.
- No deviation from international laws, national laws and company standards of behaviour.
- Compliance with internationally accepted safe practise with respect to radiation issues.

### *Social Objectives and Targets*

- Identify infrastructure items that will be of use to the future land users. In association with those users and the authorities, define what should be left, and how it will be used. The hand over procedure of these sites must be carefully documented to ensure that the use of the infrastructure can be sustained.
- To re-skill staff when the mine is nearing closure or to change the age profile of employees such that they may reach retirement age at roughly the time the mine needs to close.
- To help prepare Government for the additional pressure on its health resources.
- To begin implementation of an exit strategy at the appropriate time.
- Design a training programme that allows employment opportunities to be tapped into by the local Community during decommissioning and closure. Ensure that training is implemented in time and to the right standards to allow those trained to have potential access to employment opportunities in this phase.
- Ensure that those people directly employed by the mine have an opportunity to learn basic life skills and gain basic education such that they can gain access to other economic opportunities.
- Ensure that where possible, local companies can be involved in the provision of high quality products and services of international standard.
- Decreased active or direct financial involvement in assistance to vulnerable groups, while ensuring that they are taken care of.
- Implement Health/HIV Transition Plan as well as interactive education workshops on STDs, infectious diseases, and other health topics for mine workers and their families prior to closure.
- Regular meetings with land owners and security staff.
- Final assessment and report of local incidents of crime and responses drawn up by the police.
- Zero health, safety or security incidents at the Valencia Project Site.

### **Management Measures**

Management measures recommended for the project are described below for Project-related infrastructure, environmental aspects and social aspects. Further detail on the mitigation and management measures can be found in the EIA and EMP.

### **Surface Water Management**

During decommissioning and closure, it is recommended that the following management measures be implemented:

- On gentle slopes, water should be encouraged to flow off the rehabilitated surface, as surface flow, as quickly as possible, without causing erosion.
- Clean and dirty water areas should be kept separate.
- Erosion control measures to be put into place at all disturbed areas.
- The tailings dump containment dams will stay in place until monitoring shows that they are no longer required.
- Monitoring should continue for a period of at least five years after mining, or until a trend is established. In the event that water quality is affected by the Project, such that it affects the fitness for use, an analysis will be performed to determine the possible sources of pollution and recommend mitigation measures.
- Post closure monitoring could last for up to 50 years and must be catered for in the closure plan.

### **Groundwater Management**

The groundwater study has indicated that it is unlikely that a decant of groundwater will take

place in the decommissioning and closure phases. Thus the treatment of mine water, in the post mining phase is not required. Groundwater monitoring should take place until trends are established. The management actions are detailed below:

- Containment of “dirty” water runoff.
- Rehabilitation of waste storage areas (shaping, soil cover and re-vegetation) to minimise seepage.
- 500 m groundwater protection zone restricting future groundwater abstraction.
- Monitoring the possible spread of radionuclides and acid mine drainage from the tailings and waste dumps and the pit into the underlying groundwater.

### **Air Quality Management**

Rehabilitation and mitigation should be continuous throughout the life of the Project in order to result in minimal effort to apply final rehabilitation strategies.

Dust is the most problematic air quality impact during decommissioning. Dust control measures for open areas can consist of wet suppression, chemical suppressants, vegetation and wind breaks. Wet suppressants and chemical suppressants are generally applied for short storage durations. For long-term control measures, vegetation and rock cladding frequently represents the most cost-effective and efficient control.

Vehicle fleets covering areas with waste rock, establishing suitable profiles and removing equipment and infrastructure have a high probability of generating dust. This should have to be managed by chemical soil binders and by limiting vehicle speeds.

### **Fauna and Flora**

During decommissioning and closure the infrastructure no longer required should be removed from the area. This should result in activities similar to those during the construction phase with regard to increased heavy machinery and trucks in the area. These should remain in designated areas and on roads.

All areas from which infrastructure is removed should have soil spread on it where there is enough soil. If none is available the surface should be roughened.

The possible introduction of alien species will continue to need monitoring and all alien species should be removed in such a way so as to prevent spreading.

### **Environmental Awareness**

An Environmental Awareness Plan (EAP) should be developed to make all individuals (contractors working on site during the various phases of the Project, employees and the community at large) aware of the various social, health and environmental management plans that have been developed and their roles and responsibilities with respect to each of these plans.

The environmental awareness aspects related to the decommissioning and closure phase will need to be developed through the various practicable interventions developed during the construction and operational phases, respectively. It is expected that these interventions together with International Best Practice environmental options at that given point in time, will form the basis of the strategy which will inform the closure of Valencia Uranium Limited’s Mine.

## **Archaeological and Cultural Aspects**

During the decommissioning and closure phase of the Project, no new surface areas are expected to be disturbed and/or impacted on, hence there will be no impact on sites of archaeological and heritage significance. Furthermore, the majority of sites of archaeological and heritage significance (cultural and natural) would have been recorded and/or assessed in preceding phases. An archaeological report has been completed and is appended to the EIA/EMP (Appendix H).

If new areas are disturbed during this phase which have not been previously assessed then assessments must take place prior to disturbance.

## **Human Resources**

The objective of human resource management during closure is to make timely provision and planning to mitigate the adverse impacts of closure on employees.

At the termination of employment during operation, all employees should be issued a certificate of previous employment, verifying his/her experience on the job. This should include information on the dates and duration of employment, type of employment held, and a referral based on performance. It should also contain a list of training received while in the employment of Valencia Uranium Limited. All employee details should be entered into the Valencia Uranium (Pty) Limited skills database to ensure details are captured for future assessments, recruitment needs and monitoring.

A Closure/Downscaling, Re-skilling and Retrenchment Policy should be drawn up, the aim of which is to ensure that all individuals who will be influenced by downscaling and retrenchment will have the necessary skills and competencies, whether professional or technical, to take up new positions in other organisations. If re-skilling is not an option, then use could be made of manipulating the workforce age or of redeploying the workforce.

A summary of the management measures associated with decommissioning and closure will be included in the Social Development Plan.

## **Social Development Plan**

Impacts associated with the decommissioning and closure of the Valencia Mine include the loss of employment and procurement, directly at Valencia Uranium Limited, but also indirectly through the supply chain and the decrease of employees in the area, and the associated impact on the economy and economic development. It may also affect economic vulnerability as people who will have become accustomed to the size and type of economic activity in the area, will be subjected to a sudden change with the withdrawal of the Valencia Mine.

One of the most important ways in which this should be addressed is through the provision of training and adult education to people in the directly affected Project area over the life of the Valencia Project, and the investment in sustainable social projects and alternative livelihood development. By the time decommissioning and closure take place, a well functioning (though perhaps smaller) economy should be in place that is not dependent on the Valencia Project for its sustainability.

Management actions relating to impacts associated with decommissioning and closure are deliberately broad. Given the medium life span of the Valencia Mine, and the variables involved in economic development, it will be more appropriate to identify more specific measures in the period leading up to decommissioning and closure.

Valencia Uranium (Pty) Limited should develop a Community Exit Strategy. This will need to consider the following:

- Status of community and economic dependence;
- Opportunities for further economic diversification;
- Government plans for investment and development; and
- Requirements for closure and subsequent handover of facilities and infrastructure.

At the time of decommissioning and closure, there will be a number of the Valencia Mine facilities that may potentially be handed over to the land owner for alternative future uses. Three years prior to the commencement of decommissioning and closure, Valencia Uranium (Pty) Limited should begin consultation and negotiation with local Communities, local Government and the community development mechanism (e.g. the Trust or some other such mechanism which has been set up to further community development). Agreement should be made as to the future uses of the facilities, based on sustainable socio-economic development considerations.

The detailed actions for the decommissioning and closure phase will be included in the Social Development Plan.

### **Community Health, Safety and Security**

One of the primary concerns of decommissioning and closure is to ensure public health and safety. Where Valencia Uranium (Pty) Limited has been contributing to the improvement of local health and safety, sustainable alternatives to continue these initiatives should be identified.

A summary of the recommended management measures is included below:

- Hand over all data on employees to Government for record purposes if these are not confidential.
- Plan with Government officials the smooth switch from Valencia Uranium Limited's medical aid into Government treatment programmes for employees with TB, or other diseases,
- Appropriately trained medical staff needs to be on call in case of emergencies.
- The Valencia Mine's Grievance Resolution mechanism should be accessible to anyone wanting to report an incident or grievance related to Valencia Uranium Limited's vehicle activity.
- The Valencia Mine's Security Guard Force should be primarily deployed to watch, deter, warn, defend, and report serious assault or forcible entry within their capabilities and within the Valencia Mine fenced area. They should defer to the Namibian Government Police for law enforcement or security functions.
- Valencia Uranium (Pty) Limited should manage the threats to Project activities and continuity in coordination with the community structures.
- Ensure all explosives are removed from site or otherwise safely disposed of.

### **Stakeholder Engagement**

The strategy and mechanisms for stakeholder engagement are detailed in the EIA/EMP. Refer to the PPP document (Appendix M of the EIA). It should be noted that the approach taken is largely similar for each of the Project phases, with the exception of timing, which differs as the Project activities and associated issues change across the phases.

The appropriateness of the mechanisms for the decommissioning and closure phase should be reviewed during the life of the Project, and changed if necessary. Engagement around Project closure will begin in the operational phase, taking careful cognisance of stakeholder concerns and anxieties with a view to tailoring stakeholder engagement to meet these needs.

Once rehabilitation is complete, the following on-going consultation should be initiated:

- *Implement grievance process:* Regular engagement with the affected communities should be initiated by an appointed person to record and respond to any grievances that arise as a result of the Project impacts.
- *Implement monitoring process:* Regular monitoring should seek feedback from affected communities on the resettlement and rehabilitation process.

### **11.5 Post Closure**

Post closure follows decommissioning and rehabilitation and is the phase during which monitoring continues to ensure that residual impacts are being managed and to ensure that necessary maintenance activities are carried out. Monitoring should continue until predictable trends, that indicate environmental acceptability, are established. Residual impacts are expected to include impacts associated with dust, groundwater, visual impact of residual dumps and subsidence and potential socio-economic impacts which are currently difficult to quantify.

The criteria for post closure fall into the following broad categories:

- Dust and Radon Gas
  - Has monitoring demonstrated that dust and airborne radionuclide dispersion is within acceptable levels?
- Surface and groundwater quality compliance with agreed conditions
  - Ensuring water qualities meet the objectives
  - Modelling of pollution plumes (including radionuclides)
  - Measuring effect on water users
- Reconstructed landform stability and ability to support the intended final land use
  - Ensure topography conforms to requirements of ultimate land user
- Cover health, sustainability, and suitability for final land use
  - Ensure ecosystem is established and progressing as required
- Managing residual or latent risk
  - Assessment of future risk

Post closure is managed through a monitoring plan and with liaison with the relevant authorities mentioned in section 7.3. Post closure objectives should comply with objectives and targets for closure. If the monitoring results show that remedial measures are required then there should be sufficient funds, staff and commitment to correcting the deficiencies.

Towards the end of the life of the Project, the post closure objectives should be refined to accommodate the site conditions prevailing at the time. Once it can be proven that the above categories satisfy the post closure objectives, an application for closure can be made. Monitoring recommendations have been included in the EIA and EMP.

Table 2: Summary of Key Management Measures for Rehabilitation, Decommissioning and Closure;

(The responsibility for implementation lies with Valencia Uranium Limited.)

ASPECT	MANAGEMENT OBJECTIVE	MANAGEMENT MEASURES
Soil stripping, preparation of foundations, construction of buildings, etc.	<ul style="list-style-type: none"> <li>• Minimise the area affected by the development.</li> <li>• Minimise potential future contact of contaminating materials with the environment.</li> <li>• Maximise the recovery and effective storage of those profile materials that will be most useful during the rehabilitation process.</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure Project planning has, where possible, minimised the area to be occupied by infrastructure and to be affected by vehicles. This area will be clearly demarcated on a map and laid out on site.</li> <li>• Ensure that construction crews restrict their activities to the planned areas.</li> <li>• Locate all soil and waste rock stockpiles in areas where they will not require relocating prior to replacement for final rehabilitation.</li> <li>• Ensure that all stockpiles (especially topsoil) are clearly and permanently demarcated and located in defined no-go areas.</li> <li>• All soil stripping in areas of surface disturbance will be done in strict compliance to the soil stripping guidelines.</li> </ul>
Soil Stripping and stockpiling	<ul style="list-style-type: none"> <li>• To strip soils in such as way as to minimise erosion, compaction and dispersion.</li> <li>• To maintain the fertility and capability of soils as far as possible during their storage.</li> </ul>	<ul style="list-style-type: none"> <li>• Where practical, strip and place soils when dry, and not when wet.</li> <li>• Minimise the amount of handling.</li> <li>• Avoid compaction of the soil, in situ, during handling, storage, as well as during placement.</li> <li>• Restrict the height of topsoil stockpiles, where possible, to less than 1.5 m.</li> <li>• Vegetate the stockpile after formation or clad with rock, to reduce risk of soil loss due to wind erosion, prevent weed growth and to reinstitute the ecological processes within the soil.</li> <li>• The depth of soil to be stripped as “topsoil” will be determined by evaluation of the soils on a site by site basis, but in practice should not be in excess of 30cm where there is no rock cover.</li> <li>• All soils affected by hydrocarbon contamination need to be treated.</li> </ul>

ASPECT	MANAGEMENT OBJECTIVE	MANAGEMENT MEASURES
Vegetation establishment	<ul style="list-style-type: none"> <li>To maintain and monitor the success of the sanctuary and transplanted plants.</li> <li>To assess where plants could be re-established on mined ground using seed banks from soil or small planted areas.</li> </ul>	<ul style="list-style-type: none"> <li>A sanctuary for elephant's foot plants is planned to be established. Other plants may be added to this sanctuary.</li> <li>Support the research into the propagation of elephant's foot plants at other places.</li> <li><i>Commiphora</i> and <i>Aloe</i> species could be transplanted/translocated to the sanctuary or other areas or these species could be offered to interested and competent botanical gardens during the construction phase.</li> <li>It is proposed that a program will be instituted whereby seed of suitable local species occurring in the area will be harvested and propagated in local nursery. Collection of seed and propagation of local species could be developed into a viable local small business opportunity for a local resident who can be taught the required expertise.</li> </ul>
Mining pit	<ul style="list-style-type: none"> <li>Leave a safe environment for both humans and animals.</li> <li>Make all areas stable and sustainable.</li> <li>To prevent soil and surface/groundwater contamination by managing all water on site to acceptable and agreed standards.</li> <li>Comply with local, district and National regulatory requirements.</li> </ul>	<ul style="list-style-type: none"> <li>Undertake continuous rehabilitation of the waste rock dumps once each level is completed.</li> <li>Repair pit instabilities to ensure final pit slopes are stable in the long-term.</li> <li>Make first and second pit bench, at least, stable in longer term.</li> </ul>
Tailings Dump	<ul style="list-style-type: none"> <li>To prevent soil and surface/groundwater contamination by managing all water and wind dispersed dust on site to acceptable and agreed standards.</li> <li>Comply with National regulatory requirements.</li> </ul>	<ul style="list-style-type: none"> <li>Clad the tailings with waste rock to at least a meter thick as construction progresses (or less if proven sufficient to prevent dust dispersion and for radiation protection purposes).</li> <li>Waste rock generated in the plant from coarse rock sorting or other sources should be mixed with fine tailings to minimise dust generation.</li> <li>Ensure that upslope water is diverted around the site such that erosion is prevented should unusual rainfalls occur.</li> </ul>

ASPECT	MANAGEMENT OBJECTIVE	MANAGEMENT MEASURES
Haul Roads, Access Roads, Conveyor Belt and Transmission Lines	<ul style="list-style-type: none"> <li>Maximise the recovery and effective storage of those profile materials that will be most useful during the rehabilitation process.</li> </ul>	<ul style="list-style-type: none"> <li>At closure, the conveyor structures including plinths will need to be removed. Mined material which has fallen from the conveyor belts will need to be collected and properly disposed of on the tailings dump.</li> <li>The routes will then be ripped on contour and the stockpiled topsoil replaced by pushing it back onto the route. This will be followed by vegetation establishment.</li> <li>Roads to be ripped and rehabilitated if not used by a subsequent landowner.</li> <li>Regional Transmission Lines will be under the control of Nampower and as such, they will control the lines at closure and no closure plan has been designed for them.</li> </ul>
Accommodation, Offices, Industrial Yard	<ul style="list-style-type: none"> <li>Maximise potential use of infrastructure by Communities and businesses post mining.</li> <li>Maximise the recovery and effective storage of those profile materials that will be most useful during the rehabilitation process.</li> </ul>	<ul style="list-style-type: none"> <li>Determine what can be used by the local community or businesses and hand over through appropriate systems.</li> <li>Include support infrastructure, such as water, electricity and waste.</li> <li>Housing not required will be demolished and disposed of on in the pit, or sold.</li> <li>Rehabilitate and monitor.</li> </ul>
Borrow Pits	<ul style="list-style-type: none"> <li>Minimise the need for borrow pits and where possible, make use of existing operations in the area and mining areas.</li> </ul>	<ul style="list-style-type: none"> <li>Rehabilitation of the borrow pits entails shaping down of the side walls to produce a landform which grades into the surrounding landscape, while ensuring that, if at all practical, the borrow pit is free draining (unless it is the stated intention to provide a water collection facility).</li> <li>The borrow pit floor and flattened side walls will be ripped on contour (this can be done either prior to or after topsoil placement), and the borrow pit will then be vegetated.</li> </ul>
Waste Sites	<ul style="list-style-type: none"> <li>To comply with the Waste Management Plan.</li> <li>To monitor for potential contamination from waste sites and rehabilitated sites.</li> </ul>	<ul style="list-style-type: none"> <li>Waste sites, including the domestic waste landfills, are discussed in more detail in the Waste Management Plan. The Namibian Authorities have regulations for waste facilities and these will be followed. The waste sites will be one of the final sites to be rehabilitated as these need to remain open for the duration of the decommissioning phase in order to receive waste from the site(s). All waste sites will require post closure monitoring.</li> </ul>

ASPECT	MANAGEMENT OBJECTIVE	MANAGEMENT MEASURES
Surface Water	<ul style="list-style-type: none"> <li>• Prevent contamination to surface water.</li> </ul>	<ul style="list-style-type: none"> <li>• On gentle slopes, water will be encouraged to flow off the rehabilitated surface, as surface flow, as quickly as possible without causing erosion.</li> <li>• Erosion control measures to be put into place at all disturbed areas.</li> <li>• Monitoring should continue for a period of at least five years after mining, or until a trend is established. In the event that water quality is poor, a stream analysis will be performed to determine the possible sources of pollution and recommend mitigation measures.</li> </ul>
Groundwater	<ul style="list-style-type: none"> <li>• To minimise the impact on local groundwater users.</li> <li>• To ensure proper decommissioning, demolition and decontamination of building structures and waste storage areas.</li> <li>• To manage the post-mining rising water table and consequent impacts on private groundwater use.</li> <li>• Modify groundwater monitoring plan to monitor natural attenuation.</li> <li>• Monitoring for residual impacts on groundwater.</li> <li>• Prevention of seepage/decant of contaminated water into regional aquifers.</li> <li>• Prevent negatively affecting existing groundwater users in the area of influence.</li> </ul>	<ul style="list-style-type: none"> <li>• Post closure monitoring could last up to 50 years.</li> <li>• The groundwater study has indicated that no decant of groundwater from the pit will take place in the decommissioning and closure phases which will result in the need for the treatment of mine water, in the post mining phase. Groundwater monitoring should take place until the closure trend is established and until this trend results in an acceptable environmental condition.</li> <li>• Leave a 500 m protection zone between the mine and potential future groundwater abstraction points.</li> <li>• Containment of “dirty” water runoff.</li> <li>• Rehabilitation of waste storage areas (shaping, soil cover and re-vegetation) to minimise seepage.</li> </ul>

ASPECT	MANAGEMENT OBJECTIVE	MANAGEMENT MEASURES
Air Quality	<ul style="list-style-type: none"> <li>• To minimise dust from demolition activities.</li> <li>• Identification of sources of emissions and types of pollutants released.</li> <li>• Determination of pertinent source parameters, establishment of particle size distributions and chemical compositions of particle emissions.</li> <li>• Minimise and control sources of emissions.</li> </ul>	<ul style="list-style-type: none"> <li>• Dust control measures for open areas can consist of wet suppression, chemical suppressants, vegetation, wind breaks, etc.</li> <li>• Wet suppressants and chemical suppressants are generally applied for short storage pile durations. For long-term control measures, vegetation or a rough surface frequently represents the most cost-effective and efficient control.</li> </ul>
Fauna and Flora	<ul style="list-style-type: none"> <li>• Prevent further destruction of the vegetation.</li> <li>• Re-establish some vegetation and improve the diversity and vigour of the vegetation in order to establish and maintain ecosystem sustainability post closure.</li> <li>• Monitoring of the efficacy of rehabilitation programmes.</li> </ul>	<ul style="list-style-type: none"> <li>• The possible introduction of alien species will continue to need monitoring and all alien species will be removed in such a way so as to prevent spreading and seed dispersal.</li> </ul>
Environmental Awareness	<ul style="list-style-type: none"> <li>• Educate Employees and Communities of the impacts and effects of closure.</li> </ul>	<ul style="list-style-type: none"> <li>• An Environmental Awareness Plan (EAP) should be developed to make all individuals (contractors working on site during the various phases of the Project, employees and the community at large) aware of the various social, health and environmental management plans that have been developed and their roles and responsibilities with respect to each of these plans.</li> <li>• The environmental awareness aspects related to the decommissioning and closure phase will need to be developed through the various practicable interventions developed during the construction and operational phases, respectively. It is expected that these interventions together with International Best Practice environmental options at that given point in time, will form the basis of the strategy which will inform the closure of Valencia Mine.</li> </ul>

ASPECT	MANAGEMENT OBJECTIVE	MANAGEMENT MEASURES
Archaeological and Cultural	<ul style="list-style-type: none"> <li>Minimise disturbance to archaeologically sensitive areas.</li> <li>Preserve, protect and enhance sites of archaeological and cultural significance.</li> </ul>	<ul style="list-style-type: none"> <li>During the decommissioning and closure phase of the Project, no new areas are expected to be disturbed and/or impacted thus no additional sites of archaeological and heritage significance are expected to be impacted on during decommissioning.</li> </ul>
Human Resources	<ul style="list-style-type: none"> <li>Address issues and impacts created through loss of income and employment.</li> <li>Ensure that decommissioning and retrenchments take place in a legally compliant and humane manner.</li> <li>Ensure that those people in the directly affected Project area have an opportunity to learn basic life skills and gain basic education such that they can gain access to other economic opportunities.</li> <li>Adhere to open and transparent communication procedures with stakeholders at all times.</li> </ul>	<ul style="list-style-type: none"> <li>The objective of human resource management during closure is to make timely provision and planning to mitigate the adverse impacts on closure on employees.</li> <li>At the termination of employment during operation, all employees will be issued a certificate of previous employment, verifying his/ her experience on the job.</li> <li>All employee details should be entered into the Valencia skills database to ensure details are captured for future assessments, recruitment needs and monitoring.</li> <li>A Provision for Closure – Downscaling, Re-skilling and Retrenchment Policy should be drawn up (Human Resource Development Plan), the aim of which is to ensure that all individuals who will be influenced by downscaling and retrenchment will have the necessary skills and competencies, whether professional or technical, to take up new positions in other organisations.</li> </ul>

ASPECT	MANAGEMENT OBJECTIVE	MANAGEMENT MEASURES
Social Development Plan	<ul style="list-style-type: none"> <li>• Address issues and impacts created through loss of income and employment.</li> <li>• Ensure that decommissioning and retrenchments take place in a legally compliant and humane manner.</li> <li>• Ensure that those people in the directly affected Project area have an opportunity to learn basic life skills and gain basic education such that they can gain access to other economic opportunities.</li> <li>• Adhere to open and transparent communication procedures with stakeholders at all times.</li> </ul>	<ul style="list-style-type: none"> <li>• Provision of training and adult education to people in the directly affected Project area over the life the Valencia Mine, and the investment in sustainable social projects and alternative livelihood development.</li> <li>• By the time decommissioning and closure takes place, a well functioning (though perhaps smaller) economy should be in place that is not dependent on Valencia Uranium Mine for its sustainability.</li> <li>• In the three years preceding decommissioning and closure, Valencia Uranium (Pty) Limited should develop a Community Exit Strategy. This will need to consider the following: <ul style="list-style-type: none"> <li>○ Status of community and economic dependence;</li> <li>○ Opportunities for further economic diversification;</li> <li>○ Government plans for investment and development; and</li> <li>○ Requirements for closure and subsequent handover of facilities and infrastructure.</li> </ul> </li> <li>• At the time of decommissioning and closure, there will be a number of the Valencia Uranium Mine facilities that may potentially be handed over to the land owner for alternative future uses. Five years prior to the commencement of decommissioning and closure, Valencia Uranium (Pty) Limited should begin consultation and negotiation with local Communities, local Government and the community development mechanism (e.g. a Trust or other suitable mechanism). Agreement will be made as to the future uses of the facilities, based on sustainable socio-economic development considerations.</li> </ul>

ASPECT	MANAGEMENT OBJECTIVE	MANAGEMENT MEASURES
Community Health, Safety and Security	<ul style="list-style-type: none"> <li>• Adhere to open and transparent communication procedures with stakeholders at all times.</li> <li>• Ensure the Valencia Mine area is safe and suitable for use post mining.</li> </ul>	<ul style="list-style-type: none"> <li>• Hand over all data to Government for record purposes.</li> <li>• Plan with Government the smooth switch from the Valencia medical aid into government treatment programmes for employees with TB and other such diseases.</li> <li>• Traffic calming measures will be implemented on roads within the Project area and associated facilities.</li> <li>• Appropriately trained medical staff to be on call in case of emergencies.</li> <li>• Valencia Grievance Resolution mechanism will be accessible to anyone wanting to report an incident or grievance related to Valencia vehicle activity.</li> <li>• Valencia Security Guard Force will be primarily deployed to watch, deter, warn, defend, and report serious assault or forcible entry within their capabilities and within Valencia fenced area. They will defer to the Namibia Government police for law enforcement functions.</li> <li>• Valencia will manage the threats to Project activities and continuity in coordination with the community structures.</li> <li>• Ensure all explosives are safely disposed of.</li> </ul>
Stakeholder Engagement	<ul style="list-style-type: none"> <li>• Address issues and impacts created through loss of income and employment.</li> <li>• Adhere to open and transparent communication procedures with stakeholders at all times.</li> </ul>	<ul style="list-style-type: none"> <li>• The appropriateness of the mechanisms for the decommissioning and closure phase will be reviewed during the life of the Project, and changed if necessary.</li> <li>• Engagement around Project closure will begin much earlier in the operational phase, taking careful cognisance of stakeholder concerns and anxieties with a view to tailoring stakeholder engagement to meet these needs.</li> <li>• Once rehabilitation is complete, the following on-going consultation should be initiated: <ul style="list-style-type: none"> <li>○ Implement a grievance process: regular engagement with the affected communities will be initiated by the Grievance Officer, to record and respond to any grievances that may arise as a result of the Project impacts.</li> <li>○ Implement a monitoring process: regular monitoring will seek feedback from affected communities on the resettlement and rehabilitation process.</li> </ul> </li> </ul>

## **12 Monitoring**

### ***12.1 Air***

The directional and fallout dust stations should be maintained for a period of 5 years after the closure of production operations at Valencia, or until a trend is established whereby it is understood what the impact from air erosion is in the longer term. If it is known that dust in excess of the baseline levels are occurring then the source of this dust should be established and suitable mitigation measures should be instituted.

### ***12.2 Water***

Groundwater monitoring should continue for a period of at least 5 years after the cessation of production activities or until the impacts from the various facilities are understood. These groundwater monitoring points should be left open for future monitoring by Authorities if required, with suitable access control.

### ***12.3 Social Issues***

The social impact of the mine closure should be managed for a period of 3 years after final closure to ensure that any plans and closure activities related to training of staff and resettling of staff have proved successful. Also, the surface owners should be consulted with for a period of 3 years to ensure that they know how to maintain the various facilities which could have been left behind for them.

Monitoring of the social aspects should also take place during decommissioning and closure.

### ***12.4 Community development***

The community development impact should be monitored for a period of 3 years after closure. This could be in the form of a trust which will manage community projects or some other co-operative mechanism to be established.

## **13 Reporting and documentation**

### ***13.1 Government/Authority Reporting***

A final closure plan will need to be submitted to the Namibian Authorities for approval prior to closure.

Post closure monitoring results should be incorporated into a report and submitted to the Authorities for review.

### ***13.2 Lender Reporting***

Any reporting to the lenders will be stipulated in their conditions of approval.

### ***13.3 Internal Reporting***

- A representative team from Valencia Uranium (Pty) Limited will be required to ensure monitoring is ongoing (3 – 5 years intensively) and to liaise with Authorities and I&APs.
- Monitoring can be up to 50 years – however this will be determined closer to the time.

## **14 Provision for financial means for closure**

Estimates of what the closure liability for Valencia Uranium (Pty) Limited would be at the planned closure of the operations is presented in the Table below. This amount should be provided for by Valencia Uranium (Pty) Limited over the life of the Mine to ensure that at closure the full amount is available for these closure activities. The amount calculated does not include ongoing operational costs for rehabilitation.

It is recommended that funds be deposited into a closure trust fund account. The trust should be managed by Valencia Uranium (Pty) Limited but with representatives from either the Namibian Government, or local interested parties also present to ensure that the trust funds are spent on what they are intended for. The quantum of financial provision required should be updated annually and contributions to this trust fund adjusted accordingly. The required amount of funds needs to be updated in line with the revision of the closure plan. The trust fund should be set up prior to commencement of operations to ensure that sufficient money is set aside for the rehabilitation at closure of this facility.

The Government of Namibia should have full access to funds sufficient to conduct closure activities should Valencia Uranium (Pty) Limited not be able to do so at any point.

It is thus recommended that financial planning be instituted for unplanned closure. The closure liabilities of the Valencia operations need to be assessed annually using the assumption that the total liabilities should be determined as if the mine had to close immediately, i.e. a snapshot in time approach. The difference in the funding required for final closure of the facilities and the amount in the trust fund could be made up by bank guarantees or by bonds issued by the Parent Company. No allowance should be made for the recovery of assets from the sale of equipment as the proceeds for these depend very much on market conditions prevailing at the time.

Table 3: Estimates of closure liability for Valencia Uranium (Pty) Limited at the planned closure of the operations

Activity	Decommissioning, Closure & Post Closure Amount (Namibian \$)
<b>Decommissioning, Rehabilitation and Removal</b>	
Metallurgical Processing Plant and related infrastructure *	\$10,000,000
Decontaminate equipment to enable sale	\$5,000,000
Tailings dump closure	\$2,400,000
Waste rock dump	\$900,000
Low grade stockpile	\$505,000
Mining pit	\$1,907,500
Power infrastructure	\$2,000,000
Offices, administration facilities, support areas	\$900,000
Water reticulation infrastructure	\$450,000
Borrow pits and quarries	\$450,000
Running costs for the mine site during closure activities	\$6,000,000
Access roads	\$500,000
Cleanup of areas contaminated with radioactive materials and clearance surveys for release back to the public domain.	\$5,000,000
General cleanup of area	\$2,500,000
<b>Environmental Management</b>	
Environmental Awareness for closure & post closure	\$1,000,000
Professional Environmental Consulting & Auditing	\$700,000
<b>Monitoring</b>	
Air Quality	\$1,400,000
Surface Water Monitoring	\$0
Groundwater Monitoring	\$1,000,000
Numerical Model Update	\$250,000
Erosion control and management	\$900,000
<b>Social Development</b>	
Retrenchment & long service	\$24,000,000
Training for re-skilling	\$4,000,000
Develop an exit strategy from SD investments and relationships	\$500,000
Health continuation programme	\$4,000,000
<b>Stakeholder Engagement</b>	
Community engagement committees venue and catering	\$600,000
Authorities Engagement Forum	\$400,000
Special Interest Group Forum	\$400,000
Press Release (advertorials)	\$50,000
Grievance resolution procedure (ongoing throughout closure)	\$300,000
<b>TOTAL</b>	<b>\$78,012,500</b>

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