

APPENDIX N

Draft environmental management plan



**PUBLIC ACCESS
REPORT**

Compiled for
REPTILE URANIUM NAMIBIA (PTY) LTD
and its majority owned subsidiary
SHIYELA IRON (PTY) LTD
and minority Joint Venture Owner
OPONONA INVESTMENTS (PTY) LTD



**DRAFT ENVIRONMENTAL MANAGEMENT PLAN
FOR THE SHIYELA IRON PROJECT**

Report No SHIEMP/2011/01
5 October 2011



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EXECUTIVE SUMMARY

This environmental management plan was compiled as a requirement to Section 27(o) of the Namibian draft environmental assessment (EA) regulations that requires a draft environmental management plan to be included in the environmental impact assessment report. All components for such a draft environmental management plan in terms of Section 28 of the draft EA regulations have been included in this report, together with requirements contemplated to become part of future environmental management plans.

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1. INTRODUCTION

Deep Yellow Limited (DYL), through its 100% owned subsidiary Reptile Uranium Namibia (Pty) Ltd (RUN), proposes to extract iron for export from the Shiyela Iron deposit situated on exclusive prospecting licence (EPL) 3496 and intends to submit a mining licence application to the competent Namibian authorities. However, an environmental impact assessment (EIA) process must be undertaken by the relevant applicant and authorised by the Ministry of Environment and Tourism (MET, 2009) before any mining licence can be granted. In terms of Section 8 of the draft environmental assessment (EA) regulations (MET, 2009), RUN appointed Softchem as its environmental assessment practitioner (EAP) for this environmental impact assessment process.

As part of an environmental impact assessment report, Section 27(o) of the draft EA regulations requires that a draft environmental management plan (DEMP) be included in the EIA report. In terms of Section 28 of the draft EA regulations, the components of this draft environmental management plan are set out below, with references to the relevant sections within this report:

- details and expertise of the EAP who prepared this report (Section 9);
- information on any proposed management or mitigation measures that will be taken to address the environmental impacts identified in Section 8 of the EIA report through the anticipated stages of this activity (Section 4);
- a detailed description of the aspects of the activity that are covered by this DEMP (Section 3);
- identification of the persons who will be responsible for the implementation of the measures contemplated in Section 4 (Sections 5);
- time periods within which the measures contemplated in this DEMP must be implemented (Section 5); and
- proposed mechanisms for monitoring compliance with and performance assessment against the environmental management plan and reporting thereon (Section 5).

In addition to the requirements of Section 28 of the draft EA regulations, it is contemplated that the below components will become part of future environmental management plans. The additional components addressed in this DEMP are set out below, with references to the relevant sections within this report:

- measures for rehabilitation conforming to sustainable development, including, where appropriate, concurrent or progressive measures (Section 6);
- description of any modifications, remediation, control or stopping of any action, activity or process which causes pollution or environmental degradation and to remedy the cause of pollution or degradation and migration of pollutants (Section 4);
- compliance with any prescribed environmental management standards or practices (Section 2);
- description of compliance with any applicable provisions of Namibian legislation regarding closure, where applicable (Sections 6 and 7);
- compliance with any applicable provisions of Namibian legislation regarding financial provisions for rehabilitation, where applicable (Section 7);
- process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of this proposed activity (Section 2);

- an environmental awareness plan to inform employees of any environmental risk which may result from their work and how risks must be dealt with in order to avoid pollution or degradation of the environment (Section 8); and
- closure plans and objectives, where appropriate (Section 6).

This draft environmental management plan should be read in conjunction with the EIA report on this activity, and in particular Sections 8 and 10, and Appendices B to H, and Appendix O of the EIA report.

2. ENVIRONMENTAL MANAGEMENT SYSTEM

In Section 12 of the EIA report a brief introduction is given to the development of an environmental management system (EMS) in accordance with the ISO 14001:2004 standard (even if not accredited under the standard). ISO 14001 is the world's most recognised EMS framework, enabling organisations to demonstrate sound environmental management by minimising harmful effects on the environment and achieving continual improvement through a formal environmental management system, which is subject to external audit verification (Friend *et al.*, 2005). Implementation of such a system will involve, *inter alia*, the development, approval, authorisation and implementation of the following ISO 14001 aligned procedures (Friend *et al.*, 2005):

- *Environmental policy and management review procedure*;
- *Environmental management system planning procedure* (addressing environmental aspects; legal and other requirements; and objectives, targets and programmes);
- *Environmental management system implementation and operation procedure* (addressing resources, roles, responsibility and authority; competency, training and awareness; communication; documentation; control of documents; operational control; and emergency preparedness and response); and
- *Environmental management system checking procedure* (addressing monitoring and measurement; evaluation of compliance; nonconformity, corrective and preventive action; control of records; and internal audit).

Apart from an overall environmental management manual (acting as a roadmap to the complete EMS), the following documents will form part of the envisaged EMS for the proposed activity (Friend *et al.*, 2005):

- environmental aspects and impacts register,
- environmental legal register,
- environmental objectives, targets and programme,
- environmental training register,
- environmental complaints register, and
- EMS audit schedule.

An environmental management system contemplated above will principally be developed from the following sources:

- this draft environmental management plan,
- record of decision in the event of approval for this proposed activity, and
- mitigation measures and operational guidelines contained in Sections 8 and 10, and Appendices B to H, and Appendix O of the EIA report.

Such an EMS will make use of processes, practices, techniques, materials, products, services or energy to avoid, reduce or control (separately or combined) the creation, emission or discharge of any type of pollutant or waste, in order to reduce adverse environmental impacts. It will also address the management of any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of this proposed activity.

3. MEDIA TYPES AND ENVIRONMENTAL ASPECTS

The physical, chemical and biological processes that shape the global environment are fundamental to an understanding of how significant environmental problems really are. The global environment (Figure 1) comprises four linked systems (Friend, 2002):

- **atmosphere:** gases/air enveloping the earth.
- **biosphere:** that part of the earth that comprises a variety of habitats, containing all living organisms, inclusive of animals, plants and micro-organisms.
- **geosphere:** represented by the internal geological processes of the earth and the external physical features that shape the world.
- **hydrosphere:** comprises all the saltwater (94 %) and freshwater (6 %) resources of the earth.

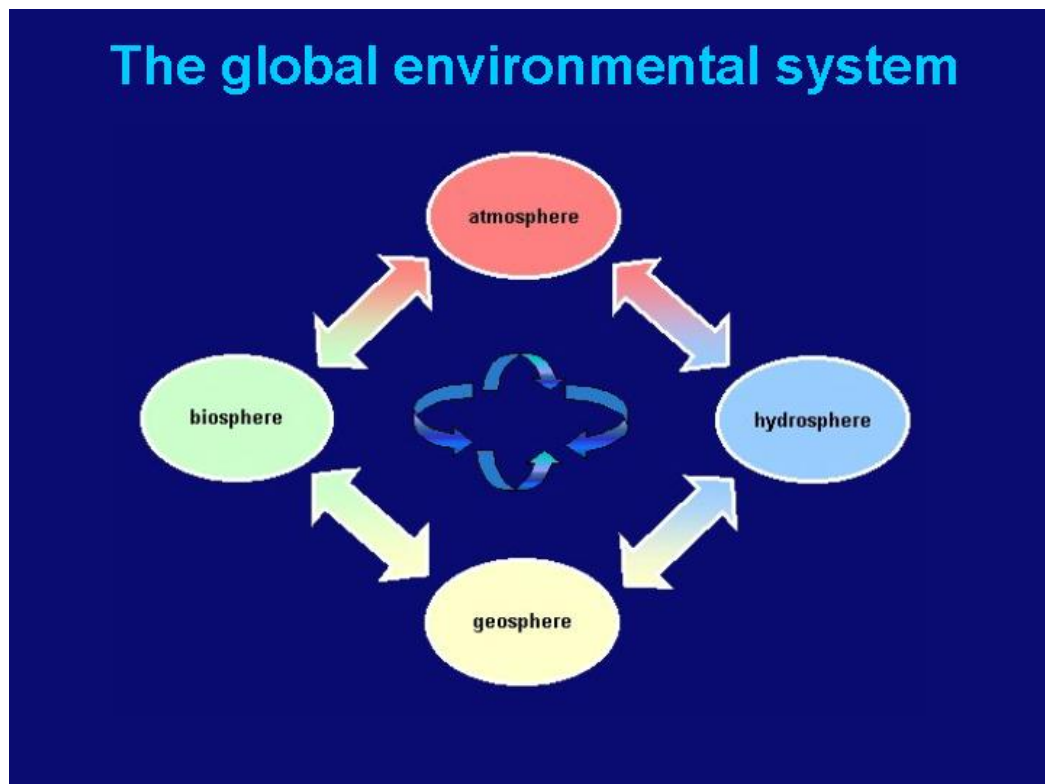


Figure 1 The global environmental system.

Each of these systems interacts with one another and the pollution sources, sinks and fluxes are controlled by specific processes that can be defined. As people have become aware of the more obvious attributes of environmental destruction, there has been a shift in priority towards monitoring and attempting to control the adverse effects of pollution. This resulted in, *inter alia*, the legal obligations enforced on companies to monitor their discharges and, regulatory authorities starting to compile comprehensive databases on the quality of the environment. (Friend, 2001)

Environmental damage to the above systems can be caused by both natural and man-made activities. The environmental effects of such activities are conveyed through the three principal media (IChemE, 1993):

- **Water** - discharges are dispersed down a concentration gradient in both freshwater and saltwater. The relative flowrates of pollutant and water, the degree of contamination and complexity of the ecosystem all have an effect on the rate of dispersal.
- **Air** - atmospheric emissions are dispersed and chemically converted to less damaging compounds. These processes are influenced by meteorological conditions, the pollutant source and the chemical and physical nature of the pollutant.
- **Land** - contaminated land can present particularly intractable problems. Ameliorating the adverse effects of pollution may only be possible by removing the contaminated material. Contaminated land can cause further problems with water courses and groundwater, thus extending the boundaries of pollution. Albeit that the third media is land, the actual field of study to address this media is normally referred to as waste management.

For the proposed mining activity the media aspects will be addressed according to water, air and land/waste issues. Based on the description of the proposed mining activity in Section 3 of the EIA report and the environment in Section 5 of the EIA report, the relevant aspects of this activity (classed in accordance to the three media types) are listed in Table 1.

Table 1 Aspects and media types.

Environmental aspect	Media
Geology – mining construction and operation	land
Land use capabilities - mining construction and operation	land
Hydrology - mining operation	water
Air – mining construction and operation and vehicle transport	air
Natural vegetation - mining construction and operation	land
Animal life - mining construction and operation	land
Sensitive landscapes and visual aspects - mining construction and operation	land
Noise - mining construction and operation and vehicle transport	air

4. IMPACTS AND MITIGATION

Environmental impacts are defined by DEAT (2006) as the changes in an environmental parameter that result from undertaking an activity. In order to address (mitigate) any impact on the environment, impacts must be evaluated according to acceptable criteria of assessment. The evaluation of impacts for this activity was comprehensively dealt with in Section 7 of the EIA report. These evaluations are summarised in Table 2, indicating relevant mitigation measures required to address impacts foreseen from this proposed activity.

From Section 7 in the EIA report and as required by Section 28(b) of the draft EA regulations, project impacts are subdivided into the following three phases*, from which impacting activities can be identified (DEAT, 1998); :

- construction phase [CP] – all activities on and off site, including the transport of material,

- operational phase [OP] – all activities, including operation and maintenance of structures, and
- decommissioning/rehabilitation phase [DP] – any activity related to the physical dismantling of the structures and/or restoring of process/mining land to some degree of its former state.

* note that while planning and design is recognised as a project phase, it is for this project and generally for most projects, of no negative impact significance.

However, the nature of this project is such that construction, operation and rehabilitation will take place nearly simultaneously for this activity (refer Sections 3 and 8 of EIA report). Thus impacts will not be described separately for these different phases (see also Section 7 of the EIA report).

The mitigation measures recommended in Table 2 will address the requirements contemplated by the draft EIA regulations in describing briefly the modifications, remediation, control or stopping of any action, activity or process which causes pollution or environmental degradation and to remedy the cause of pollution or degradation and migration of pollutants. More detailed explanations and descriptions are provided in Section 8, and Appendices B to H, and Appendix O of the EIA report.

Table 2 Environmental impacts and mitigation measures.

Environmental impact	Mitigation measures
Geology – mining operation, open pits and waste dumps..	Implementation of properly engineered backfilling, closure and rehabilitation of all mining activity. Use of waste material and tailings for backfilling. Use cover material for rehabilitation.
Land use capabilities – mining operation.	Implementation of properly engineered backfilling, closure and rehabilitation of all mining activity with simultaneous return to a nature conservancy environment.
Hydrology - surface and groundwater pollution.	Implementation of properly engineered water treatment plant/system for capture and effective treatment of any leachate/discharges from the activity. Spillage catchment and bunding areas.
Air - the mining operation and increased traffic lead to increased dust creation.	Implementation of mitigation and management measures as stipulated in Sections 8 and 10, and Appendix B of the EIA report. Scheduled personnel travel and optimised deliveries. Wetting of roads. Dust suppression and extraction equipment. Regular maintenance of mine vehicles.
Natural vegetation - with required construction and operational activities of the proposed facility certain vegetation will have to be removed and disturbed.	Implementation of mitigation and management measures as stipulated in Sections 8 and 10, and Appendix D of the EIA report. Demarcation. <i>In-situ</i> conservation. No off-road driving. Dust suppression and extraction equipment.
Animal life - with required construction and operational activities of the proposed facility certain fauna will be disturbed in their natural habitat.	Implementation of mitigation and management measures as stipulated in Sections 8 and 10, and Appendices E and F of the EIA report. Fencing off mining site. Strict speed limits
Archaeological – various impacts.	Implementation of mitigation and management measures as stipulated in Sections 8 and 10, and Appendix G of the EIA report. Demarcation.
Sensitive landscapes and visual aspects - impact on sensitive landscapes and visual impacts during construction and operational activities of the proposed activity.	Implementation of mitigation and management measures as stipulated in Sections 8 and 10 of the EIA report.
Noise - adverse noise levels due to increased traffic and operational activities	Implementation of mitigation and management measures as stipulated in Sections 8 and 10, and Appendix H of the EIA report. Noise abatement process and equipment.
Radiation – various impacts	Implementation of mitigation and management measures as stipulated in Sections 8 and 10, and Appendix O of the EIA report.

5. RESPONSIBILITIES, MONITORING AND TIME FRAMES

It is a requirement of Section 28(d) of the draft EA regulations that persons who will be responsible for the implementation of the measures contemplated in Section 4 be identified and is presented in Table 3.

In terms of Section 28(f) proposed mechanisms for monitoring compliance with and performance assessment against the environmental management plan (EMP) and reporting thereon must be included in a draft EMP. Various monitoring programmes are presented in Appendices B to H, and Appendix O of the EIA report. EVT (2011) states that the objectives of monitoring are:

- to verify that an activity conforms to the required standards and site-specific authorisations,
- for the data that is collected from sampling to be confidently used in interpretations to determine the effects that the activity has on the environment,
- to determine whether the design and its implementation, as well as operational controls, are adequate,
- to facilitate meaningful quality assessment, risk assessment and implementation of suitable management measures if so required, and
- to provide information for future planning and prioritisation.

Section 28(e) of the draft EA regulations requires that time periods within which the measures contemplated in this DEMP must be implemented be included in the draft EMP. These, together with responsible people and monitoring actions are given in Table 3.

6. REHABILITATION AND CLOSURE

Due to the nature of the activity, rehabilitation will take place on a continuous basis during the operational time of the activity. Specific legislated procedures will be followed once the closure stage of the activity is reached.

7. LEGAL COMPLIANCE

As part of an EMS, as described in Section 2 of this draft environmental management plan, legal compliance with regard all relevant legislation will form an integral part of the overall EMS. This will include, *inter alia*, keeping of legal registers, adhering to permit/licence requirements and forwarding relevant required month reports to government departments. Compliance with regard any applicable provisions of Namibian legislation regarding financial provisions for rehabilitation, where applicable; will be addressed as prescribed by relevant government authority. The relevant financial vehicle to be used for this to be determined through liaison with the relevant government department.

The legislation, policies and/or guidelines of any sphere of government that have been considered in the preparation of the scoping report, in terms of Section 26(e) of the draft EA regulations, will represent a starting point for the compilation of the legal register, as part of an overall EMS. Naturally more legislation is applicable once addressing operational issues at the proposed activity.

Table 3 Environmental impacts, monitoring actions, time frames and responsibilities.

Environmental impact	Mitigation measures	Monitoring actions and time frames	Responsibilities
Geology – mining operation, open pits and waste dumps..	See Table 2.	Periodic inspections.	Production supervisor. Plant foremen. Plant operators.
Land use capabilities – mining operation.	See Table 2.	Periodic inspections.	Environmental manager. All personnel.
Hydrology - surface and groundwater pollution.	See Table 2.	Periodic inspections and monitoring programmes.	Environmental manager. All personnel.
Air - the mining operation and increased traffic lead to increased dust creation.	See Table 2.	Periodic inspections and monitoring programmes.	Administration manager. Production supervisor. Plant operators. Environmental manager.
Natural vegetation - with required construction and operational activities of the proposed activity certain vegetation will have to be removed and disturbed.	See Table 2.	Periodic inspections.	Environmental manager. All personnel.
Animal life - with required construction and operational activities of the proposed activity certain fauna will be disturbed in their natural habitat.	See Table 2.	Periodic inspections.	Environmental manager. All personnel.
Archaeological – various impacts.	See Table 2.	Periodic inspections.	Environmental manager. All personnel.
Sensitive landscapes and visual aspects - impact on sensitive landscapes and visual impacts during construction and operational activities of the proposed activity.	See Table 2.	Periodic inspections.	Environmental manager. All personnel.
Noise - adverse noise levels due to increased traffic and operational activities	See Table 2.	Periodic inspections and monitoring programmes.	Production supervisor. Plant foremen. Environmental manager.
Radiation – various impacts	See Table 2.	Periodic inspections and monitoring programmes.	Radiologist. Environmental manager.

8. ENVIRONMENTAL AWARENESS

One of the preeminent requirements of an EMS is the setting up of an environmental awareness plan. Apart from informing employees of any environmental risk that may result from their work and how risks must be dealt with in order to avoid pollution or degradation of the environment, such a plan will contain, *inter alia*, the following elements:

- conducting an environmental training needs analysis at least once every two years (or earlier, if a management review indicates a need for such an analysis) to ascertain the level of environmental awareness of personnel;
- the identification of training needs and the frequency of testing competence and/or environmental awareness of employees, contractors and/or suppliers will be in accordance with guidelines set by the company;
- the attendance of an induction course on Environmental Awareness by all personnel, included in this prescribed induction process will be new employees, contractors and/or suppliers;

- making personnel aware of the importance of conformance with the company's environmental policy and procedures and with the requirements of the environmental management system; the significant environmental impacts, actual or potential, of their work activities and the environmental benefits of improved personal performance; their roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirements of the environmental management system, including emergency preparedness and response requirements; the potential consequences of departure from specified operating procedures; and the relevant procedure in the event of complaints received from external parties;
- ensuring that all personnel whose work may create a significant impact on the environment will receive and be competent on the basis of appropriate education, training and/or experience; and
- incorporation of required training of personnel in the environmental training register, and personal records of employees updated accordingly once specified training has been completed.

9. DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

In terms of Section 28(a) of the draft EA regulations it is a requirement to provide details of the environmental assessment practitioner (EAP) who prepared the report and the expertise of the EAP to compile an environmental management plan. Brief information in this regard is given below, with more detailed qualifications, experience and related publications available in Section 11 of the EIA report.

Name: John Francois Curling Friend
Education: BEng (Chem) Pretoria 1986
 MSc (Eng) Cape Town 1991
 Dip MktM IMM 1995

Affiliations: FSAIChE (Fellow, South African Institution of Chemical Engineers)
 FIChemE (Fellow, United Kingdom Institution of Chemical Engineers)
 FWISA (Fellow, Water Institute of South Africa)
 FIWM(SA) (Fellow, Institute of Waste Management of Southern Africa)

Registrations: PrEng (Professional Engineer, Engineering Council of South Africa)
 CEng (Chartered Engineer, United Kingdom Engineering Council)

Specialisation: Water management, treatment and recycling. Air quality and waste management. Environmental management, economics, assessments and auditing. Technical audits and effluent treatment. Specialised computer applications.

10. REFERENCES

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- EVT (ENVITECH SOLUTIONS PTY LTD) (2011)** Proposed Vlakfontein waste treatment and disposal facility. *Envitech Solutions design report*, June 2011, Johannesburg.
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