

**ENVIRONMENTAL IMPACT ASSESSMENT (EIA)  
AND ENVIRONMENTAL MANAGEMENT PLAN (EMP)  
FOR EXCLUSIVE PROSPECTING LICENCE  
EPL3498 (AUSSINANIS)**



Completed as an Addendum to the approved EIA and EMP compiled by Colin Christian and Associates in August 2006 for the other three contiguous EPLs (3496, 3497 and 3499) held by Reptile Uranium Namibia by arrangement with Dr Fred Sikabongo of the Ministry of Environment and Tourism.

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**REPTILE URANIUM EXPLORATION PROJECT  
EPL 3498 Aussinanis**

**Addendum to:  
ENVIRONMENTAL IMPACT ASSESSMENT AND  
ENVIRONMENTAL MANAGEMENT PLAN FOR EXPLORATION  
By Colin Christian & Associates CC, August 2006**

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## **11 INTRODUCTION**

### **11.1 Background**

Exclusive Prospecting Licence (EPL) 3498 (known as Aussinanis), comprising an area of 250 km<sup>2</sup> within the Namib-Naukluft National Park (Figure 51) was granted to Reptile Uranium Namibia (RUN) on 15 June 2007. Since this was a delayed contiguous addition to three EPLs (3496, 3497 and 3499) already granted to RUN in June of 2006, permission was obtained from Dr. Fred Sikabongo of the Ministry of Environment and Tourism, to compile an Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) for the Aussinanis EPL as an addendum to the previously approved comprehensive EIA and EMP that was completed by Colin Christian and Associates in August 2006 for the other three EPLs.

### **11.2 Location & Earlier Exploration**

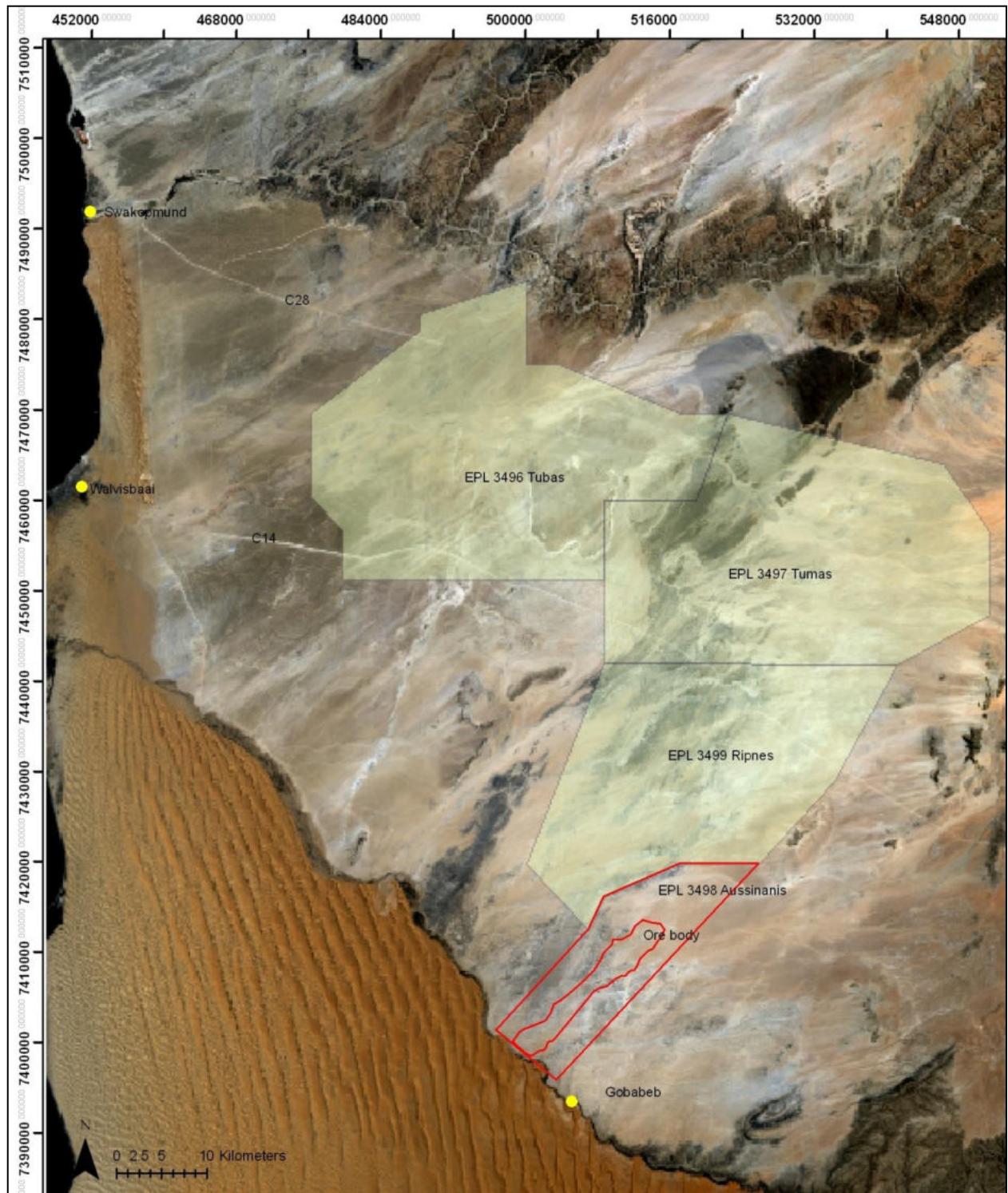
The name Aussinanis refers to a previously used village site situated at the confluence of the Aussinanis drainage and the Kuiseb River (Figure 52). The Aussinanis drainage, drains from the eastern border of the Namib-Naukluft Park through a network of channels across the Aussinanis plains (Dr. Joh Henschel Pers. Com.).

Between 1974 and 1982 the French mineral exploration company Elf-Aquitaine conducted uranium exploration work in this area. Methods of exploration included ground radiometric surveying, which was conducted in 1976, and an ongoing percussion drilling programmes of some 400 holes. These holes were then radiometrically logged and geochemically analysed. Five bulk sample pits were also excavated in the project area, which the damage is still visible (Figure 53).

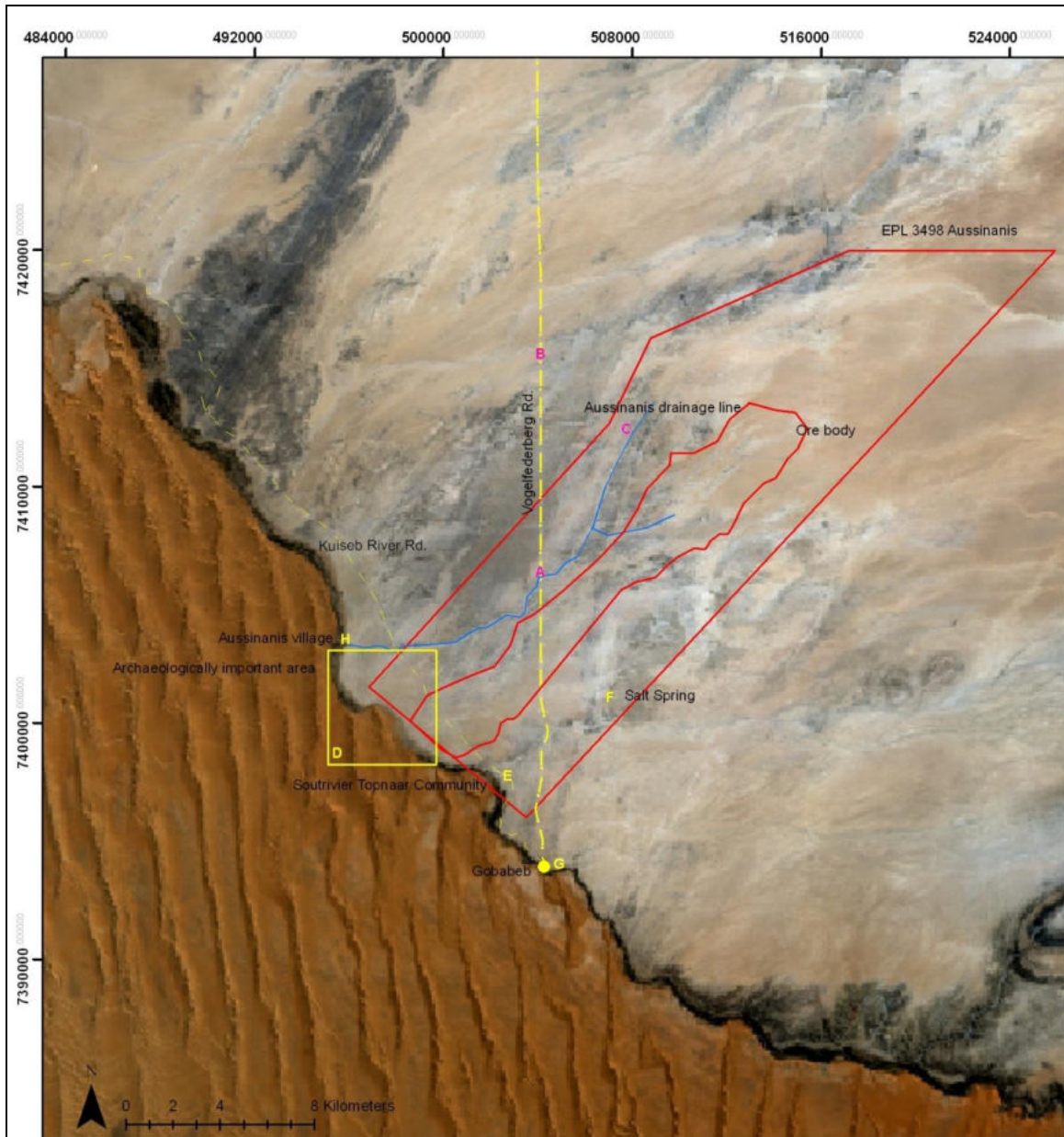
### **11.3 Methodology**

Fieldwork for this environmental assessment by RUN was conducted from 27 to 29 June 2007 and follows on from a detailed familiarisation of the general area covered by the other EPLs and ongoing knowledge refinement with RUN's exploration activities being monitored and approved by MET and Parks' personnel.

Access to this EPL was obtained via the two main roads leading off the C14 to Gobabeb. Further access tracks to the northern and northeastern parts were not found and instead the least invasive access to the area underlain by the ore body namely a wide, dry riverbed that crosses the Vogelfeder Road where a fresh set of previously made vehicle was followed (Figure 52).



**Figure 51.** Locality map of Exclusive Prospecting Licenses 3496 (Tubas), 3497 (Tumas), 3499 (Ripnes) and 3498 (Aussinanis) in the Namib-Naukluft Park.



**Figure 52.** Locality map of EPL 3498 Aussinanis. A: End of barren flood plains; B: Grassy Plains; C: End of track followed in the Aussinanis drainage line; D: Block of archaeologically important area; E: Soutrivier Topnaar community village; F: Salt Spring in the Soutrivier drainage line; G: Gobabeb Research Center.



**Figure 53.** Visible damage of bulk sample pits by previous exploration company in the Aussinanis EPL.

## 12 PROPOSED EXPLORATION ACTIVITIES

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The following exploration activities are proposed within the EPL area: -

- Remote sensing, and airborne geophysical surveys, which have no impact;
- Ground geological mapping with minimal impact;
- Possible ground geophysical surveys (variously EM, Resistivity, Ground Penetrating Radar, and Track Etch), where the impacts are confined to the vehicular access tracks;
- Reverse circulation and diamond drilling, which may have appreciable impacts; Excavation of sample pits.

The extent of drilling and other invasive activities has not been established at this stage, as it will depend to a large degree upon how much of the old data is retrievable and usable to define the known mineralisation. Nonetheless additional grid based drilling will be required.

Pitting will be limited in the initial exploration phase. RUN recognizes that, in the event that large scale pitting is required, this would require additional activity-specific environmental work. Exploration will focus on palaeo- and modern-riverine sediments, although geological mapping and geophysical surveys will extend beyond the confines of drainage channels.



A detailed evaluation of aerial photographs and use of Gobabeb knowledge to locate all existing tracks will be undertaken to enable mapping and ground surveys to wherever possible use these.

### **13 CONSULTATIONS**

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Consultations with the director of the Gobabeb Research Station, Dr. Joh Henschel, took place in person and by email, and correspondence with an Archaeologist working in an area within the Aussinanis EPL, Ms. Beatrice Sandelowsky, took place by email. Comments and recommendations, mainly from Gobabeb researchers, are included under the relevant subheadings contained in this document.

### **14 LEGAL & POLICY REQUIREMENTS**

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Refer to Section 4 (Christian 2006).

### **15 DESCRIPTION OF PROJECT ENVIRONMENT**

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This section provides a description of the Aussinanis EPL environment, with details of more sensitive areas following in Section 6. For a broad description of the entire project environment, refer to the comprehensive EIA as compiled by Colin Christian & Associates (2006).

#### **15.1 Geology, Topography, Drainage**

As with the five uranium deposits occurring in the other three EPLs namely Tubas, Oryx, Oryx Extension, Tumas and Ripnes, the Aussinanis deposit occurs in sediments filling ephemeral drainage courses and palaeo-channels, and specifically in the southwestward draining Aussinanis system (Figure 51) which flows toward the Kuiseb River. The mineralisation occurs close to the surface and rarely below a depth of 15 metre. The source of uranium in the Aussinanis ore body is from weathering of granites in the hinterland similar to that of the previously discussed five deposits (*cf.* Section 5.2, Christian 2006)

The geological map of the grant area shows that 30 percent of the area is essentially comprised of flat pediplain, which consists of a geologically recent surface layer of calcrete and gypcrete in places, shallowly dissected by the modern drainage system.

The palaeochannel infill is constituted of Tertiary “uplift and rejuvenation” detritus, largely consisting of angular to sub-rounded cobbles and fragments of a variety of granitic rock types and quartz pebbles of local derivation. The detrital material has been cemented together by a later occurring Tertiary lime or calcrete matrix which, although presently

manifested as an indurate rock type is still pervious to laterally migrating water tables and percolating capillary ground waters.

## 15.2 Soils

The Aussinanis EPL can be categorised and described according to soils and surface cover as follows:

- a) The southernmost portion of the EPL (Gobabeb to A, Figure 52), essentially the lower part of the palaeo-floodplain, is mostly barren alluvial plains of granitic gravel and loose soils, void of any vegetation (Figure 54) with intermittently dispersed, weathered granitic outcrops. Previous exploration activity is apparent here by a number of tracks crossing the weathered outcrops, as well as abandoned wooden stakes (Figure 55). Although the quartz pebbles associated with these plains do not sustain lichen communities, vehicle tracks crossing these reddish plains leave scars since the top soil layer is only weekly consolidated and easily give way to expose the fine, loose subsurface soils to erosion (Figure 56).
- b) The modern channel (Figure 52) is almost entirely void of vegetation, and is mostly comprised of coarse sand, mixed with some gravel in places. In places the sand is well packed and hard, while a thin hard surface layer is underlain by soft sand and powdery silt elsewhere. After the good rains in 2006, long-standing pans in the riverbed (Figure 57) attracted a number of small antelope, evident by their hoof prints in the now dried out salty surface crust. These pans are comprised of finer material – silt and clays mixed with carbonates and salts, and can become very soft after rain. The surface of such pans, in places where water has stood for some time, is devoid of vegetation.

Along some of the granitic channel banks water eroded away narrow incisions in the channel bed, which support a slight wider diversity of vegetation and, consequently, features a wider arthropod species compliment (Figure 58).

Together, these disjunct pans and narrow canals are to be viewed as island habitats, and will be discussed in more detail in Section 15.4 and 16.3.

- c) Palaeochannels essentially resemble the description of the barren southerly plains as described above.
- d) From the middle to northern reaches of the Aussinanis EPL area, beyond the banks of the flood plain, vegetation in the form of sparse, short tussocks of grass increases. Underlying these grassy plains are hard substrates comprised of coarse sandy material, which is probably stabilised by carbonates but not to the extent that hard crusts are formed (A to B, Figure 2). Old tracks across these plains are less visible.



**Figure 54.** Barren calcrete plains in the lower reaches of the Aussinanis EPL area.



**Figure 55.** Weathered granitic outcrops where stakes and tracks made by previous exploration companies are still visible.



**Figure 56.** Quartz pebbles associated with these plains do not sustain lichen communities, but vehicle tracks across these plains leave aesthetic scars.



**Figure 57.** Long-standing pans in the riverbed attracted a number of small antelope, evident by their hoof prints in the now dried out salty surface crust.



**Figure 58.** Narrow incisions in the channel bed that support a wider diversity of biota.

### **15.3 Vegetation**

The Aussinanis EPL lies within the Central Namib Desert Biome (Mendelsohn *et al.* 2002) and predominantly comprises Grassland Plains. As is the situation in the Tubas EPL, Aussinanis is situated the zone which gets the least precipitation, either from coastal fog or inland rain showers (Strohbach 2006). Consequently, this area falls in the Desert Biome, and specifically in a region of therophytic (ephemeral grass species) dominance (Irish 1994). After the heavy rains in 2006 in the Kuiseb catchment area, the study area was briefly co-dominated by chamaephytes (small shrubs, now apparent by dead remains), stressing that vegetation species composition and cover is highly fluctuant with rain.

As in the Tumas EPL, the Aussinanis plains presented a near monospecies stand of the grass species *Stipagrostis ciliate*, apart from the occasional dead specimens of the shrub (Mesembryanthemaceae: *Brownanthus kunze*) (Figures 59 & 60). *B. kunze* is described as only occurring in the fog-influenced region near the coast (Burke 2006), but its presence here could be ascribed to the high precipitation of the previous year. A single dollar bush (Zygophyllaceae: *Zygophyllum stapffii*) was noted on the plains.

Patchy distributions of pencil bush (Amaranthaceae: *Arthroerua leubnitziae*), a *Haalenbergia* sp., (as was found in the watercourse between Oryx and Oryx extension (Christian 2006) (Figure 61)) and Kuntze's brownanthus were noted in the dry washes and riverbeds of this EPL.



**Figure 59.** The Aussinanis plains presented a near monospecies stand of the grass species *Stipagrostis ciliate* along with some dead specimens of the shrub (Mesembryanthemaceae: *Brownanthus kunze*) (foreground).



**Figure 60.** Kuntze's brownanthus shrub (Mesembryanthemaceae: *Brownanthus kunze*).



**Figure 61.** *Haalenbergia* sp., in the dry washes and riverbeds of the Aussinanis EPL.

#### **15.4 Fauna**

Pans and intermittent canals of denser patches of vegetation can serve as (temporary) island habitats for apterous arthropods, small mammals and micro-organisms. Island habitats are known for their unique species composition, and usually support higher species diversities than its immediate surrounding environment. A number of these pans, although currently dry, as well as some islands of vegetation were noted in the dry washes (Figure 62).

According to Dr. Joh Henschel (Pers. Com.), the Aussinanis drainage area with its shallow groundwater and the vegetation in and around the drainage is an important passage corridor for springbok, ostrich and gemsbok (oryx). When they migrate from between Ganab in the northeast to Naravalley, across the Kuiseb River, to the southwest, the animals often linger around the lower Aussinanis plains.

Although the Namib plains support a highly endemic and diverse compliment of invertebrates, most of them and other small mammals and reptiles in the area are nocturnal burrowers.



**Figure 62.** Small patches of vegetation in the dry washes serve as island habitats for smaller animals.

### **15.5 Avifauna**

Most of the species of birds that frequent the Namib Desert are highly nomadic. Of those which are resident, they are mostly widespread. Although the avifauna composition of this EPL area might seem more diverse than that of the other EPLs, this is probably due to the dense vegetation associated with the nearby Kuiseb River.

### **15.6 Archaeological Sites**

The !Narob-Aussinanis-Klipneus area (mostly south of the active Aussinanis drainage line and west of 15-degree longitude) (Figure 52) is of high archaeological importance. A number of archaeological artefacts have been found and studied in this area, and a publication is soon to be submitted on the subject (Ms Beatrice Sandelowsky & Dr. Joh Henschel Pers. Com.).

### **15.7 Land Ownership & Use**

As mentioned in 5.8 (Christian 2006), the Namib-Naukluft Park is State Land, which is used primarily for conservation and tourism. Vast tracks of land are wilderness areas where there are no roads, and where tourists are not allowed to venture. Only limited access is allowed by means of a permit to gain access to the area for the purpose of study or mineral prospecting.



The Gobabeb Research Station is located just beyond the boundaries of the Aussinanis EPL area, as are a number of Topnaar community settlements. Current access roads to the EPL area all lead off of the C14, which are also access roads used by both the Topnaars and Gobabeb staff. The Kuiseb River road (Figure 52) between the village of Soutrivier and the research station is of particular importance, since a number of staff members of the Research Centre live in this close by village and usually walk to and fro along this road.

Gobabeb also has frequently monitored research sites in the EPL, such as the Salt Spring in the Soutrivier drainage line (Figure 52), and an area, 100 meter wide, on both sides of the Vogelfeder and Kuiseb Roads, in which vegetation is monitored annually.

## **16 ASSESSMENT: GENERAL ENVIRONMENTAL IMPACTS OF EXPLORATION**

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### **16.1 Impacts on Flora**

The potential impacts on vegetation in the Aussinanis EPL area are damage as a result of: -

- Direct impacts on plants by driving over them;
- Indirect impacts on regeneration of plants by compacting the soil, making it difficult for roots to penetrate;
- Dust from reverse circulation drilling, which may clog the stomata of plants affecting their respiration; and,
- Spillage of diesel and other hazardous fluids, which is toxic to plants.

In these very arid conditions, plants are very slow growing. Any impacts on plants should be regarded as a long-term impact. Therefore management should focus on avoiding damage to plants.

According to available plant lists from the NBRI and The Red Data Book of Namibian Plants (Christian 2006) the only Red Data species known to occur in the wider study area are *Adenia pechuelii* (Elephant's Foot) and *Welwitschia mirabilis*. Both of these are large and easy to recognise, but neither species was noted here. *Adenia pechuelii* would in any case occupy the higher rocky areas not affected by exploration drilling. *Welwitschia mirabilis* may occur along watercourses/washes in the study area but was not found.

Mitigation of impacts should focus on: -

- Avoid, where possible, driving off existing tracks;
- Avoid drilling close to any "special" species of plants. Any special plants should also be marked with painted stakes to warn exploration staff to avoid them (e.g. while reversing vehicles and maneuvering drill rigs into place);
- If dust from drilling covers any plants that are identified as "special" plants, the dust should be blown off with compressed air after drilling;
- Avoiding spilling oil and other toxic fluids, and special precaution should be taken when transferring fuel to vehicles. Diesel stores must also be adequately banded to prevent any seepage into the surrounding ground; and,
- Avoiding removal of any plants.

## **16.2 Impacts of Alien Invasive plants**

Alien plants can easily be introduced to the Park on vehicles, in firewood, or building materials (e.g. sand). The greatest threat in this regard is the alien Mesquite (*Prosopis glandulosa*) which easily gets established along watercourses in particular. Once introduced, aliens can spread rapidly and out-compete the natural vegetation, thus reducing species diversity and contributing to a loss amenity to tourists who are looking for a wilderness unspoilt by human influence.

Therefore precautions must be taken to prevent infestation, for example by: -

- Cooking on gas stoves only;
- Checking the source of any building materials, sand etc. to ensure that it is free of alien plants;
- Not cultivating any plants on site; and,
- Monitoring and eradicating any alien plant that grow.

## **16.3 Impacts on Fauna**

The fauna (mammals, reptiles and amphibians) of the Namib, including the many endemic species, are widespread in the Namib, and exploration therefore poses no direct threat to faunal biodiversity. Most animals will simply move away from disturbance, except for those inhabiting islands habitats (cf. section 15.4).

However, minor threats to some animals may arise, such as: -

- Slow moving animals e.g. chameleons that may be run over;
- Burrows of animals may be driven over, collapsing the burrow. In most cases the animals will be too deep to be harmed, as they dig burrows deep enough to avoid extreme temperatures on the surface. Vehicles are only likely to cause damage down to 20 cm deep, and the animal will normally dig its way out again; and,
- Animal poaching.

These impacts can largely be mitigated by: -

- Restricting access to existing tracks wherever possible, or pegging a new track after study to eliminate obvious damage;
- Driving slowly and carefully;
- Avoiding driving over visible borrows and sandy hummocks;
- Avoiding driving over or through island habitats; and,
- Enforcing a prohibition on possession of firearms, trapping or harming fauna in any way.

## **16.4 Impacts on Avifauna**

The Namib Desert is known to support several endemic species of birds, but none of these is confined to very restricted areas. The only species of concern from a biodiversity point of view is the Lappet-faced vulture, which does occur in the study area. This rare species has the habit of using the same nesting site year after year, and it is very sensitive to disturbance when nesting. Therefore any nesting sites would be of concern if they occurred near the exploration activities or access routes. However no

vulture nests were found so far that could be affected since the study area is almost entirely devoid of trees. It is therefore considered that the proposed exploration poses no threat to Lappet faced vultures. If, however any nest sites are encountered, the site location will be taken with a GPS and Parks authorities notified. No activities will be permitted within 1,000 metre of the site without the approval of the Parks authorities.

Numerous small species of birds frequent the Namib after rains. These include seed eaters and insectivorous species. However, most of the small species are highly nomadic and widespread. Some nest on the ground, where they would be vulnerable to vehicles or people walking about. But if an occasional nest is destroyed during exploration, this will have no significant impact on these populations.

Impacts on birds can be avoided or minimised by: -

- Restricting access to existing tracks;
- Driving slowly and carefully;
- Avoiding driving in river courses and sandy hummocks; and,
- Complete avoidance of areas with vulture nests, in the unlikely event of any nests being found.

### **16.5 Impacts on Archaeological Sites**

Since a number of sites of Archaeological importance has been found within a confined area in the Aussinanis EPL (*cf.* Section 15.6 and noted in Figure 52), the possibility does exist that there may be more. The mentioned site, as well as specific access routes leading to it should be strictly off limits without previous consultation with the scientists working at these site and/or Heritage Council of Namibia.

In the event of additional remains being found, the sites will immediately be reported to the Heritage Council in Windhoek. These sites are protected under the Heritage Act (2004) and must not be disturbed without a permit from the Heritage Council. Thus investigation by an archaeologist would be required to determine whether the find is significant, and whether mitigation (e.g. excavation and documentation) is required. Archaeological artifacts may not be removed from site.

### **16.6 Impacts of Campsites**

Campsites usually lead to both long term and short term impacts as a result of: -

- Concrete foundations, rubble and rubbish left by exploration and drilling teams;
- Compaction of ground so that vegetation cannot recover;
- Contamination of soil by oils and diesel, preventing vegetation from growing;
- Potential contamination of groundwater, due to disposal of waste water or contaminated soils;
- Collection of fire wood. Dead wood provides important habitat for many small creatures and must not be picked up or burned;
- Potential veld fires when there is fairly dense and extensive grass cover;
- Disturbance of archaeological sites;
- Removal of vegetation;
- Littering;

- Disposal of solid waste;
- Wastewater – if allowed to penetrate into groundwater; and,
- Domestic cats, which kill many small birds, reptiles, mice, moles etc.

All of these impacts are unnecessary and will be avoided. Mitigation should focus on: -

- Floors can be made with interlocks rather than concrete so that they can easily be removed. On closure of the camp, all foundations, rubble and rubbish must be removed to an approved waste disposal site at Walvis Bay or Swakopmund;
- Compaction of ground is difficult to mitigate in this environment as ripping may lead to erosion by wind. It is therefore recommended that the area affected should simply be restricted to the absolute minimum;
- Spills of diesel or oil can be prevented from infiltrating the ground by having all storage installations adequately bunded, and by having oil and fuel spill preventative measures under drill rigs and places where vehicles are refueled;
- Contamination of groundwater by wastewater is best prevented by appropriate siting of the camp. Camps should ideally be located on higher ground and well away from any watercourse or permeable ground conditions;
- Collection of fire wood must be forbidden, and cooking done on gas;
- Any archaeological sites must be avoided;
- All litter must be placed in wind- and animal-proof bins, collected regularly, and removed to an approved waste disposal site at Walvis Bay or Swakopmund; and,
- All domestic animals are forbidden in the Park.

With proper management, impacts from camping can be reduced to an insignificant level. The only exception is likely to be the vehicle tracks, which converge near the camp and are difficult to remove even in the long term.

### **16.7 Impacts on Soil & Visual / Sense of Place Issues**

Although the ecological impacts of exploration are expected to be of a very minor nature and short term, the area of intended exploration is located in a National Park and in close vicinity of the high profile research station of Gobabeb, so impacts on the wilderness character, particularly that of vehicle tracks, are long term and are more difficult to manage.

Impacts of vehicle tracks may include: -

- Erosion, that often ensues on steeper slopes due to water running along the tracks;
- Visual impacts that violate the sense of wilderness; and,
- Secondary impacts, such as tourists or poachers that may use the tracks for illegal entry or off road driving in areas where access is prohibited.

In order to minimise the impacts of tracks, access must be planned as such in order to use existing tracks wherever possible.

In general, the following mitigation measures must be strictly enforced in order to prevent further damage from vehicle tracks: -

- Plan access to the target area based on pre-existing tracks;

- To reduce the risk of tourists or poachers following exploration tracks, only a single track should lead off from the main road;
- Selected access tracks should be marked out with painted stakes and only the marked routes used;
- Where there is a choice, tracks that traverse the least sensitive substrates should be selected;
- When a track becomes deeply churned up due to regular use, drive on the shoulder of the track, rather than making a new one;
- Shoulders of terraces should be avoided where tracks tend to get deeply incised and erosion starts;
- Where possible, rather drive in riverbeds than on the plains. Tracks in the soft sand in riverbeds will disappear with the next flashflood, or even through wind activity;
- If a track has to cross a watercourse it should do so at 90 degrees. On the rare occasions when the rivers flow, tracks become obliterated. It then becomes difficult to find the old track again on the far bank, and the result is that new tracks are made. By crossing at 90 degrees, the risk of losing the track in future is reduced;
- When turning, make use of 3-point turns rather than circular turns, and turn places to be marked out for this purpose;
- Four wheel drive, where necessary, should be engaged where the slightest possibility of getting stuck exists;
- Rapid acceleration, hard braking and sharp turning should be avoided; and,
- Tracks should be rehabilitated after completion of exploration in all areas where mining is found not to be viable. Rehabilitation of tracks requires sweeping them with a broom so that they are as inconspicuous as possible.

### **16.8 Excavation of test pits**

Excavation of test pits has a minor impact as the extent is usually small. Replacing the material in the pit after removing samples is recommended, followed by smoothing the surface and replacing the gravel layer on top.

## **17 CONCLUSION**

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Exploration for uranium in the Aussenanis EPL area may have some environmental impacts, particularly in view of the fact that the area lies within the Namib-Naukluft National Park, and in close proximity of the Gobabeb Research Station and some Topnaar villages. However most of the impacts can be managed through the careful implementation of an Environmental Management Plan. The in the long term impact on substrate surfaces as a result of vehicle tracks will be mitigated to a large degree by using old tracks, and by avoiding the most sensitive areas. Tracks can also be swept to rehabilitate them to some degree. Nevertheless, these tracks may take many decades to recover. Although this is predominantly a visual, rather than an ecological impact, the fact that it occurs in a National Park makes this impact significant.

Continuous liaison with close by, possibly affected stakeholders, such as staff members of the Gobabeb Research Station and the Topnaar community members, will be of great benefit to all interested parties.

## **18 REFERENCES**

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## **19 ACKNOWLEDGEMENTS**

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I would like to thank the staff members of the Gobabeb Research Station for their hospitality during my three day assessment visit to the Aussinanis EPL area.

## **20 ENVIRONMENTAL MANAGEMENT PLAN (EMP)**

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### **20.1 Overview of the EMP**

This EMP is intended to give effect to the recommendations of the EIA. For this to be achieved, it is essential that all personnel who will be involved on site are fully aware of the environmental issues and the means to avoid or minimise the potential impacts of activities on site.

The proposed exploration activities are summarized in Section 12 of the EIA above.

Legal and policy requirements with which RUN, their staff, consultants, contractors and sub-contractors must comply are set out in Appendix B (Christian 2006).

A general description of the environment is contained in Section 15, and more site specific information on particularly sensitive areas is contained in Section 16.

Section 21, below translates the issues and concerns identified in the EIA into a set of Environmental Guidelines that shall be implemented on site.

It is the intention that these Environmental Guidelines should form the basis for an agreement between RUN and Ministry of Environment & Tourism. By virtue of that agreement, these Guidelines will become binding on RUN.

Environmental Management requires a joint effort on the part of all people involved. Certain individuals need to be assigned certain roles to ensure that all players fulfill their responsibilities in this regard. The roles are set out in Section 20.3 below.

## **20.2 Environmental Management Principles**

The following broad aims are expected to be upheld by all parties involved in the project.

A. RUN will be required to conduct all its activities in a manner that is environmentally and socially responsible. This includes all its Employees, Consultants, Contractors, Subcontractors, transport drivers, guests and anyone who enters the EPL area in connection with the project.

B. Health, Safety and Social Well Being

- Safeguard the health and safety of project personnel and the public against potential impacts of the project. This includes issues of road safety, precautions against natural dangers on site, and radiation hazards; and,
- Promote good relationships with the Parks Authorities and their staff.

C. Biophysical Environment

- Wise use and conservation of environmental resources, giving due consideration; to the use of resources by present and future generations;
- Prevention or minimisation of environmental impacts;
- Prevention of pollution of air, water, and soil;
- Conservation of biodiversity; and,
- Due respect for the Purpose and Sanctity of a National Park.

To achieve these aims, the following principles need to be upheld:

### *1) Commitment and Accountability*

Senior executives and line managers shall be held responsible and accountable for: -

- Health and safety of site personnel while on duty, including while traveling to and from site in company vehicles; and,
- Environmental impacts caused by exploration activities, or by personnel engaged in the exploration activities, including any recreational activities carried out by personnel in the Namib Naukluft National Park.

### *2) Competence*

The competence of the work force shall be ensured through selection, training, and awareness in all safety, health and environmental matters.

*3) Risk Assessment, Prevention and Control*

Identify, assess and prioritise potential environmental risks. Prevent or minimise priority risks through careful planning and design, allocation of financial resources, management and workplace procedures. Intervene promptly in the event of adverse impacts arising.

*4) Performance and Evaluation*

Set appropriate objectives and performance indicators. Comply with all laws, regulations, policies and the Environmental Guidelines. Implement regular monitoring and reporting on the compliance with these requirements.

*5) Stakeholder Consultation*

Create and maintain opportunities for constructive consultations with employees, authorities and other interested or affected parties. Seek to achieve open exchange of information and mutual understanding in matters of common concern.

*6) Continual Improvement*

Through continual evaluation, feedback and innovation, seek to improve performance with regard to social health and well being and environmental management throughout the lifespan of the project.

*7) Financial Provisions for Exploration*

In line with the internationally recognised “polluter pays principle” the Company will make the necessary financial provision for compliance with the Environmental Management Plan.

## **20.3 Roles & Responsibilities for Environmental Management**

### *20.3.1 The Exploration Company*

RUN carries the ultimate responsibility for all stages of the project and the resulting environmental impacts.

The responsible person will be the RUN General Manager. The General Manager must ensure that: -

- A properly qualified Environmental Control Officer (ECO) is appointed;
- The EMP and its Environmental Guidelines are included in Contract documents and that the Contractor, and all his Subcontractors, Consultants etc are able to carry out the requirements of the EMP;
- RUN and all its Employees, Subcontractors, Consultants etc. comply with all Legislation and Policies of the Namibian Government and any International Conventions of relevance;
- Compliance with the Environmental Guidelines on a day-to-day basis is enforced, Environmental Audits are conducted periodically by a suitably qualified ECO to confirm that the environmental requirements are being properly understood and effectively implemented;
- A sufficient budget is provided for the Contractor to implement those measures that have cost implications;



- Arrangements are made with the NBRI or Ministry of Environment and Tourism in the event that any plant rescue operations are required; and,
- Open and effective communication is maintained between all parties who can influence the Environmental Management on the project.

#### *20.3.2 Environmental Control Officer*

The Company shall assign the day-to-day responsibility for Environmental Management to a competent ECO, for the duration of all exploration activities. The ECO shall: -

- Be familiar with the contents of the EMP and communicate it to all personnel;
- Monitor compliance with the Environmental Guidelines on a daily basis and enforce the Environmental Guidelines on site;
- In the event of any infringements leading to environmental damage, consult with the General Manager and take remedial measures to limit or rectify the damage;
- Maintain a record (photographic and written) of “before-and-after” conditions on site;
- Facilitate communication between all role-players in the interests of effective Environmental Management;
- Plan and mark out access routes in advance;
- Undertake Environmental Audit's of overall compliance with the Environmental Guidelines;
- Submit a report on the site inspection to the General Manager;
- Advise the General Manager on any matters of interpretation and implementation of the Environmental Guidelines as required; and,
- Make recommendations for remedial action in cases of non-compliance with the Environmental Guidelines.

#### *20.3.3 Drilling / Exploration Contractor*

The Drilling Contractor shall have the responsibility to: -

- Be familiar with the contents of the EMP;
- Comply with the Environmental Guidelines contained in this EMP;
- Notify the ECO or General Manager in advance of any actions he has reason to believe will have significant negative impacts, so that mitigatory measures can be discussed and implemented before negative impacts arise;
- Conduct environmental training amongst his employees and subcontractors so that they are fully aware of the Environmental Guidelines and the reasons for them; and,
- Undertake rehabilitation measures where required by the General Manager. As far as possible, rehabilitation measures must be carried out progressively and not left till the end of the project.

#### *20.3.4 Communication between parties*

The importance of open communication between all parties is emphasised, as the attainment of environmental quality requires a joint effort. Only with open communication can a proactive approach be achieved. This approach should ensure that environmental impacts are anticipated and prevented or minimised.

## **21 ENVIRONMENTAL GUIDELINES**

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It is the intention that these Environmental Guidelines form the basis for an agreement between RUN and the Ministry of Environment & Tourism. By virtue of that agreement, these Guidelines will become binding on RUN.

### **21.1 Impacts on flora**

The potential impacts on flora are damage as a result of: -

- Direct impacts on plants by driving over them;
- Indirect impacts on regeneration of plants by compacting the soil, making it difficult for roots to penetrate;
- Dust from reverse circulation drilling, which may clog the stomata of plants affecting their respiration; and,
- Spillage of diesel and other petrochemical substances that is toxic to plants.

The potential impacts on flora can be minimised by: -

- Avoiding drilling close to any “special” species of plants e.g. elephant’s foot, Welwitchias, Aloes, extensive lichen fields etc. which will be clearly marked by the Environmental Control Officer (**ECO**) before drilling is to commence in that area; and,
- Not driving over large shrubs, trees or dense fields of lichens to get to a drilling location.

### **21.2 Impacts of Alien Invasive plants**

Alien plants can easily be introduced to the Park on vehicles or building materials (e.g. sand). Once introduced, aliens can spread rapidly and out-compete the natural flora of the Park.

The potential impacts of alien invasive plants can be minimised by: -

- Cleaning vehicles (especially tyres and chassis) and equipment that were used outside Park boundaries, before entering the Park.

### **21.3 Impacts on Fauna**

Slow moving animals e.g. chameleons, may be run over and burrows of animals may be driven over, collapsing the burrow.

These impacts can largely be mitigated by:

- Restricting access to existing tracks or a single new marked track;
- Driving slowly and carefully; and,
- Avoiding driving over visible borrows and sandy hummocks.

Rocks, stones and dry pieces of wood often provide important habitat for many small creatures such as lizards, insects, spiders or scorpions. Unnecessary disturbing or overturning such items causes disruption for these creatures in areas where not many other hideaways are available. Also, no natural fauna may be harvested or damaged unnecessarily.

It is an offence to poach wildlife in a National Park. No animal or bird shall be captured, killed or harmed in any way. The carrying of firearms on sites of exploration is strictly prohibited. Anyone found guilty of infringement in this regard will face disciplinary action as well as dismissal by RUN, and will be liable for prosecution by the Authorities. No dogs or other pets are allowed in the Park or at RUN work / camp sites.

#### **21.4 Impacts on Avifauna**

Impacts on birds (especially nesting birds) can be avoided or minimised by: -

- Restricting access to existing tracks;
- Driving slowly and carefully;
- Being on the lookout for nests, especially when driving in riverbeds; and,
- Complete avoidance of areas with lappet faced vulture nests, usually found in rocky, hilly areas. Should such a nest be observed, it should be waypointed, reported to the ECO and avoided.

#### **21.5 Impacts on Archaeological Sites**

A possibility exists that archaeological or historical remains, or even fossils, may be discovered. In the event of any such remains being found, the sites must be waypointed and reported to the ECO/GM. These sites are protected under the Heritage Act (2004) and must not be disturbed. Archaeological artifacts may not be removed from its discovery site.

#### **21.6 Driving, parking and general protocol when visiting drill sites**

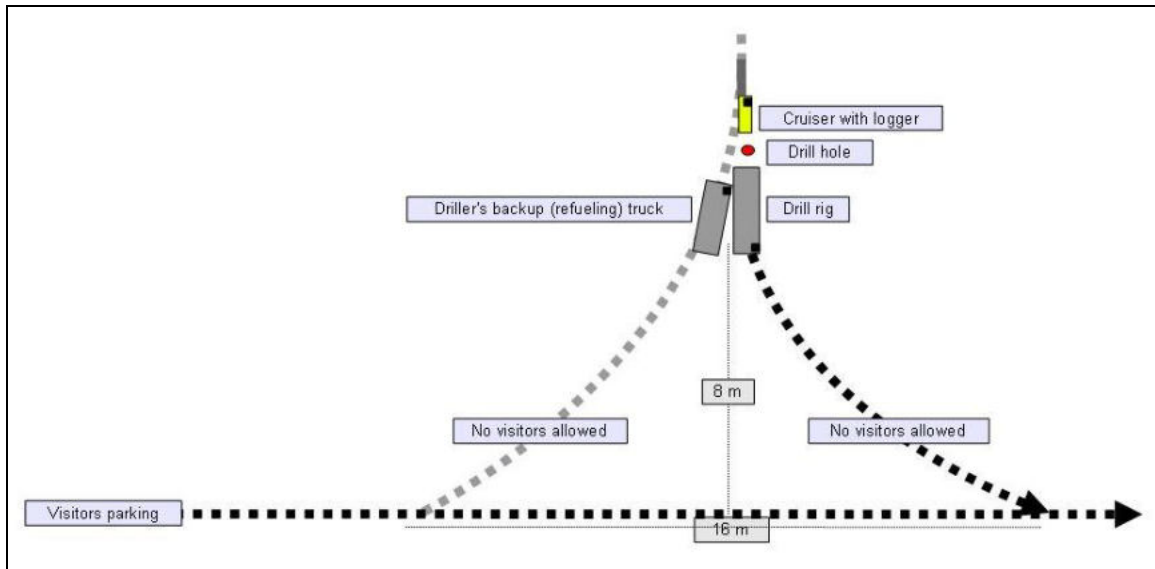
Since most of the holes to be drilled in future will be situated in the area where exploration took place in the 1970's and 80's old tracks still visible across the area will be used for access as far as possible. This serves as an indication of the extent of impact that vehicle tracks have in this sensitive area. In this light: -

- Already existing tracks, will be utilised as far as possible;
- Tracks will be marked with 50 cm tall wooden stakes painted brightly pink to be easily visible in the field (drill stakes are to be marked yellow), and driving will only be allowed where indicated by these stakes;
- There will be allocated turning points; and,
- When a drill hole is not directly on the track, only the drill rig, driller's support truck (occasionally) and the RUN geophysical logging vehicle will be allowed to leave the track (Figure 63), with approaches demarcated in advance by the ECO. Visitors should park in such a way as to not cause obstruction for the drill rig, support truck or logging vehicle to exit from drill points or to proceed to the next drill site.

#### **General:**

- New/different tracks can only be staked by the ECO. Any new tracks required should be discussed with and agreed to by the ECO and/or GM;
- When turning, make use of 3-point turns rather than circular turns, and only turn in specific places to be marked out for this purpose;

- Four wheel drive should be engaged early, where necessary;
- Avoid rapid acceleration, hard braking and sharp turning;



**Figure 63.** Driving, parking and general protocol when visiting drill sites. The drill rig reverses in to demarcated drill site and drives out. The backup truck drives in and reverses out, as does the logging vehicle. No vehicles are allowed to turn at the drill site, and visitors are to park well behind the drill site to give right of way to the heavy vehicles and the geologist to move on to the next site.

- Rehabilitation of tracks will only take place after completion of exploration, or of tracks that are no longer in use; and,
- Large trucks have right of way. When a truck approaches, slow down and leave the road at an appropriate place by pulling off and stopping on the shoulder of the road. Allow the truck to pass. To minimise the amount of new tracks, reverse back onto the road (if practical) and proceed.

## 21.7 Site Camp

- The location of each site camp shall be selected with environmental considerations in mind, and must be discussed in advance with the ECO who will clear it with the Parks authorities;
- The camp and surrounds should be maintained in a clean orderly and presentable condition at all times;
- Pit latrines should be made in the camp and should be maintained in a hygienic condition at all times;
- Wastewater from showers and the kitchen should be led to an underground soak-away;
- All water installations should be sealed and free of leaks. They should not be accessible to animals; and
- After completion of the works, the camp must be restored to a clean and tidy condition. All waste should be removed from site to an approved waste disposal

facility. The ECO will approve closure and MET/Parks must sign off on the closure.

### **21.8 Fire prevention**

After unusually good rains, there can be enough grass to pose a risk of veld fires in dry grasslands. To mitigate against this the following rules apply: -

- No fire should be made except in a camp, and contained in a drum. Fires should be made for cooking only, but cooking on gas equipment is preferred;
- The site should be selected where there is no risk of fire spreading to the veld even in the case of the onset of sudden strong wind gusts;
- Fires should be extinguished when not in use. No fire should be left unattended at any time; and,
- No firewood shall be collected in the National Park.

### **21.9 Fuel, oils and other hazardous substances**

Oil and fuel spills are not tolerated in the Park. It is suggested that: -

- Oil pans or plastic sheeting/ground covering should be placed beneath vehicles/ equipment that is bound to leak oil;
- Also, special care should be taken when these substances are transferred in the field to avoid spillage. Should an accidental leak/spill occur, urgent action should be taken to clean it up by removing the affected soil and disposing of it outside the Park in a proper manner in consultation with the ECO;
- All containers of fuel, oil and any other hazardous substances should be kept sealed, and clearly labeled for identification; and
- Toxic substances should not be permitted to soak into the ground.

### **21.10 General Waste**

Due to the sensitivity of the natural environment of the Park and the fact that decomposition in this arid area takes place at a very slow rate: -

- No rubbish will be dumped or buried in the Park. What you take in, you must take out again;
- No natural wastes such as fruit/vegetable peels or pips should be discarded on site or in the field;
- No cigarette ends should be dropped on site or in the field;
- No toilet paper should be left / buried in the field;
- No samples bags or other plastic bags must be allowed to blow away; and,
- All of the above also strictly apply for the road between Swakopmund and Walvis Bay and the EPL.

Where above mentioned impacts can't be avoided, consult with the ECO or General Manager before causing any untoward damage.

## **22. HEALTH & SAFETY MEASURES**

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### **22.1 RC drilling**

- To minimise health hazards and dust impacts on flora, rock flour should be disposed of down the drill holes as soon as possible after samples have been taken;
- Any person who comes within 10 (ten) metre of the drill is required to wear a hard hat; and,
- Any person who comes within 10 (ten) metre of the drill is required to wear a dust mask.

### **22.2 General**

All persons working in the field are advised to wear long sleeve shirts and long pants for protection against sunburn. Closed shoes are required at all times and if working within 5 metre of the drill steel cap boots are required.

### **22.3 Dust**

- If any dust-producing activities are carried out while working with uranium ore, dust masks will be supplied by RUN and must be worn by all affected staff to prevent inhalation of potentially harmful radioactive dust; and,
- Eating and drinking while working with any materials that may contain radioactive substances is forbidden. Good personal hygiene is encouraged (e.g. washing hands before eating) to prevent ingestion of potentially harmful radioactive materials.

## **23. CONDITIONS APPLICABLE TO ENVIRONMENTAL CLEARANCES IN PROCLAIMED PROTECTED AREAS**

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All site personnel shall maintain good relations with the Park Authorities and their staff, as well as members of the public (e.g. on roads). Any complaints received by the ECO will be addressed and the guilty persons disciplined and may be asked to resign from the project.

Everyone who enters the Namib Naukluft National Park off the main roads must be in possession of a valid permit issued by the Park Authorities. The permit shall be shown to any Park's official on request. Everyone who works on or visits the EPLs are also required to have a valid picture ID issued by RUN, on their person.

Notify the ECO through the General Manager at an early stage of any actions thought to possibly have significant negative environmental impacts, so that mitigatory measures can be discussed and implemented before such negative impacts arise.