REVISED ENVIRONMENTAL MANAGEMENT PLAN FOR EPL 3138 AND EPL 3439

JANUARY 2013

ORIGINALLY PREPARED IN 2011 BY:

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UPDATED BY SWAKOP URANIUM

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Signed: _____

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Manager: Environmental
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Signed: _____

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ACRONYMS

Acronyms

ASEC	A. Speiser Environmental Consultants cc
GCNPC	China Guangdong Nuclear Power Company
DEA	Department of Environmental Affairs
DCP	dynamic cone penetration
DPGS	differential global positioning system
DPW	Department of Parks and Wildlife
DWA	Department of Water Affairs
EIA	environmental impact assessment
EMP	environmental management plan
EO	environmental overview
EPL	exploration prospecting licence
MET	Ministry of Environment and Tourism
MME	Ministry of Mines and Energy
MoHSS	Ministry of Health and Social Services
NNNP	Namib Naukluft National Park
NPRA	Namibian Radiation Protection Authority
RMP	radiation management plan
RC	reverse circulation
SU	Swakop Uranium (Pty) Ltd
WAGE	West Africa Gold Exploration

REVISED ENVIRONMENTAL MANAGEMENT PLAN FOR EPL 3138 AND EPL 3439

1 INTRODUCTION

In 2004, West Africa Gold Exploration (WAGE), a subsidiary of Kalahari Minerals PLC, commenced uranium exploration activities on exploration prospecting Licence (EPLs) 3138 and 3439, after the EPLs were awarded by the Ministry of Mines and Energy (MME). A number of prospects were identified and drilled. In early 2007, the existing Husab Joint Venture between Extract Resources Limited, and a subsidiary of Kalahari Minerals PLC (West Africa Gold Exploration (Pty) Ltd) was terminated, and the Husab Project was consolidated within a wholly owned Namibian subsidiary of Extract Resources called Swakop Uranium (Pty) Ltd (SWU). The EPLs were then taken over by Swakop Uranium in 2007. The environmental contract was signed in

Drilling results revealed a very large, economically viable, uranium ore body at the Husab prospect (previously referred to as Rössing South Prospect). In December 2010, SU submitted an environmental impact assessment (EIA) and environmental management plan (EMP) for the proposed Husab Mine and its associated infrastructure. The environmental clearance was obtained in January 2011. The Husab Mine linear infrastructure EIA environmental clearance certificate was received in July 2011. The Mining Licence 171 for Swakop Uranium's Husab Mine was received in November 2011. Swakop Uranium has since been active with mine optimisation and resource recovery studies.

Exploration drilling on EPLs 3138 and 3439 has continued, and will continue for some years to come, as there are a number of other promising prospects to be drilled. This document contains the updated Exploration EMP for **exploration** activities on EPLs 3138 and 3439, as requested by the Ministry of Environment and Tourism (MET) in a letter dated 22 June 2010 (**Annexure 1**). Prior to this, EPLs 3138 and 3439 had separate EMPs for the same set of activities.

This version of the updated and combined EMP is submitted in support of the application for renewal of the environmental clearance certificate for exploration on EPLs 3138 and 3439.

1.1 Background on licence holders

The Husab Project (previously called Rössing South) Joint Venture between Extract Resources Ltd and Kalahari Minerals PLC was established in May 2005. The Joint Venture covered only EPL 3138, as Extract Resources was the sole applicant for EPL 3439. West Africa Gold Exploration (Pty) Ltd (WAGE), a subsidiary of Kalahari Minerals PLC, held the title for EPL 3138. Subsequent to this the EPLs were taken over by SU as per the history described above and documented in **Table 1**.

In March 2012 CGNPC Taurus Minerals Limited, owned by China Guangdong Nuclear Power Company (CGNPC) Uranium Resources and China Africa Development Fund purchased all of Extract Resources. The construction phase of the Husab Project started in October 2012, first production is expected some 36 months later.

1.2 Location of the exclusive prospecting licences

EPLs 3138 and 3439 are located within the Namib Naukluft National Park (NNNP), about 60 km east of the coastal town of Swakopmund (**Figure 1**).

1.3 History of exploration on EPLs 3138 and 3439

This section provides an overview of the exploration and associated activities that took place prior to West Africa Gold, and subsequently SWU, becoming the licence holder of EPLs 3138 and 3439 in 2007. This has been done in order to provide the sequence of events and corporate name changes of the different holders of the EPLs prospecting licenses, and to contextualize the environmental legacy in which SU exploration now operates.

1.3.1 Husab fluorite mine

1970: The fluorite deposit was opened via a number of trenches, a vertical shaft and two inclined shafts, which were sunk to depths ranging from 55 m to 60 m. Further, several drives were developed to two levels (Grimmer, 1973).

1971: Approximately 50 000 t of low-grade material was stockpiled on surface, and about 11 000 t shipped to West Germany for treatment.

1973: The Husab fluorite mine closed for economic reasons.

Open trenches, old mining buildings, grid lines, etc. are still visible as only very rudimentary rehabilitation was undertaken when the fluorite mine closed.

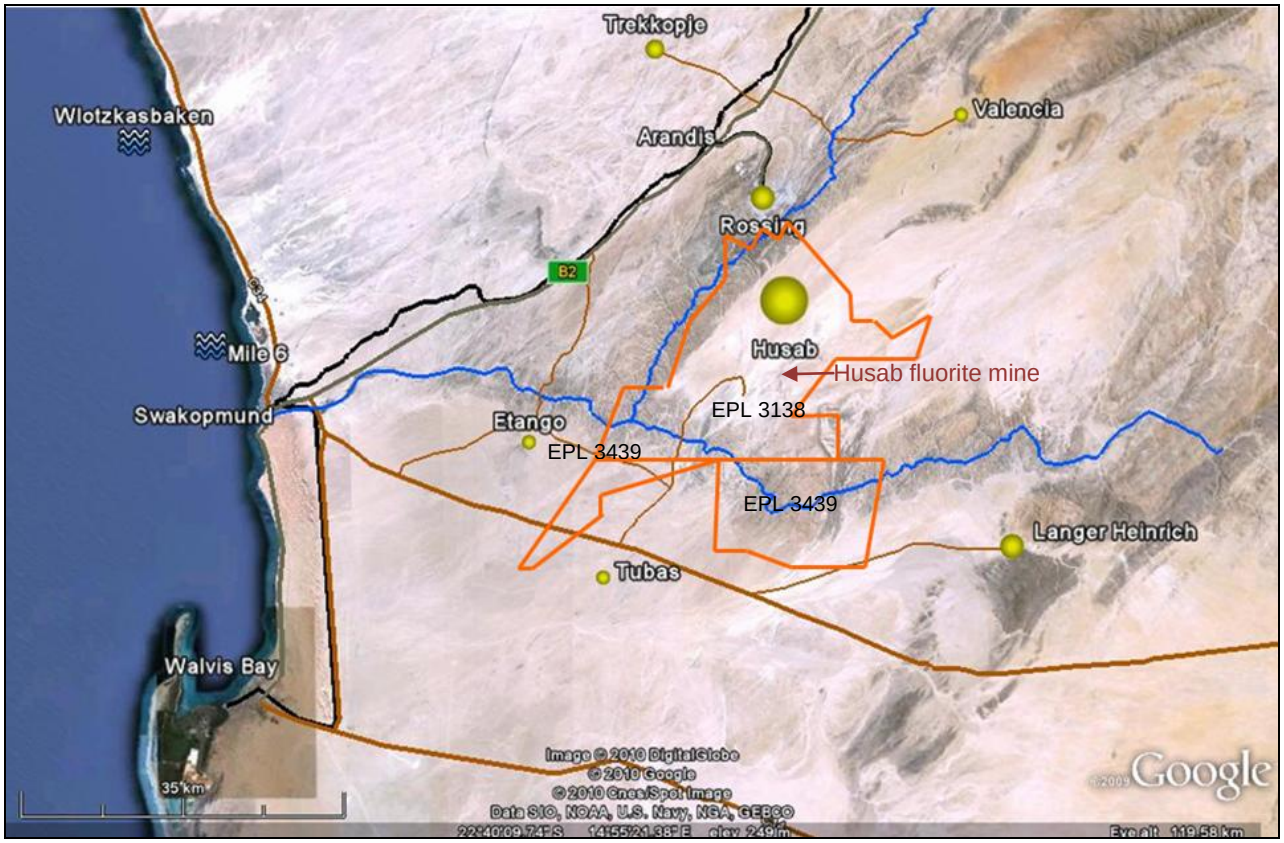

Figure 1: Regional Map showing the location of EPLs 3138 and 3439

1.3.2 Ida Copper Mine

Prior to 1914: The copper deposit was mined and 17 excavations and a 75 m deep shaft was sunk. A small amount of the copper ore was transported to the Khan Mine, and the rest stored on the surface.

After the Second World War low-grade uranium was discovered in the area.

As with the Husab fluorite mine, the buildings and trenches remain as very little rehabilitation was undertaken.

1.3.3 Uranium exploration activities in the 70s

In the 1970's Anglo American conducted an uranium exploration programme, which comprised 6 diamond drill holes and 26 percussion holes at Anomaly A (Garnet Valley) and 25 percussion holes about 1.8 km to the southeast at Anomaly D (Holland's Dome). Both of these uranium prospects are located south of the Swakop River on EPL 3439 (**Figure 5**).

Access tracks created by Anglo American, old sample chips from the percussion drilling programme, trench lines, as well as parts of the old Anglo American camp site are still visible.

Tracks remaining from prospecting activities during the 1970's and early 1980's have been used during current exploration activities, thereby minimising the need for new tracks.

1.3.4 Uranium exploration activities from 2004 to present

Table 1 overleaf describes, in chronological order, the various uranium exploration activities that took place between 2004 and the present day (January 2011). The information has been taken from available documents, such as the WAGE/SU Bi-annual Reports, the earlier Exploration EMPs and addenda to the EMP for EPL 3138, correspondence between various departments of the MET, MME and WAGE/SU and the EIA baseline assessments for the Husab Project.

2 BI-ANNUAL AUDITS

Bi-annual audits have been undertaken by an independent consultant for the exploration activities on EPLs 3138 and 3439 every year since 2007. The reports have all been submitted to the MET upon completion. The past two year's Bi-annual audits have been assessed against the updated EMP provided to the MET in February 2011. The next Bi-annual audit will occur in January 2013.

3 PURPOSE OF THE EXPLORATION ENVIRONMENTAL MANAGEMENT PLAN (EMP)

The purpose of the EMP is: -

- To describe exploration and feasibility study stage project activities that have the potential for adverse environmental impacts.
- To identify and outline the aspects of the environment which require management.
- To compile project environmental specifications for inclusion in contract documents and enforcement on site.
- To set out the roles and responsibilities of all role-players with regard to environmental management.
- To specify rehabilitation requirements.
- To establish monitoring requirements to ensure that all personnel on site comply with the environmental specification.

Table 1: Description of activities that occur on EPLs 3138 and 3439 (from 2004 until present).

Date	Activity
5 April 2004	West Africa Gold Exploration (Namibia) (WAGE), a subsidiary of Kalahari Minerals PLC, was awarded the mineral rights to Exclusive Prospecting License (EPL) No 3138, for precious base and rare metals.
22 Sept 2004	WAGE submitted the Environmental Contract and Questionnaire for EPL 3138 to MET for consideration**.**
29 Sept 2004	WAGE extended EPL 3138 mining license to include nuclear fuels and industrial minerals.
22 Oct 2004	MET informed WAGE that because EPL 3138 is in the Namib Naukluft National Park (NNNP), an EIA is required.
3 May 2005	Environmental clearance **(Annexure 2)** was awarded for EPL 3138 based on Environmental Overview (EO) and Environmental Management Plan (EMP) compiled by A. Speiser Environmental Consultants cc (ASEC). The scope covered exploration for precious and base metals and rare metals.
29 Sept 2005	WAGE requested MET for permission to establish a camp (now known as the Ida camp) in the National Park.
21 Nov 2005	WAGE requested MET for permission to set up survey points for satellite photography.
12 Dec 2005	MET granted permission for the Ida camp.
6 March 2006	MET granted WAGE permission to close and rehabilitate an existing road that passes close to the Giant Welwitschia. They also granted WAGE permission to dig a sand well for water extraction. Use of the sand well was discontinued, and water abstraction permits were obtained for two replacement bores, together with an additional borehole on the Rössing South plain.
3 Nov 2006	EPL 3439 awarded to Extract Resources Namibia (Pty) Ltd (nuclear fuel rights only)
9 Feb 2007	The application for the transfer of EPL 3138 from West Africa Gold Exploration to TLP Investments Seventy One (Pty) Ltd is accepted by the MME.
2007	Extract took over the mineral licenses from WAGE early in 2007.
26 Feb 2007	Environmental clearance **(Annexure 3)** was awarded for EPL 3439 based on Environmental Overview (EO) and Environmental Management Plan (EMP) compiled by A. Speiser Environmental Consultants cc (ASEC). The scope covered exploration for nuclear fuels.
28 Feb 2007	The change of company name, from TLP Investments Seventy One (Pty) Limited to Swakop Uranium (Pty) Limited, was entered into the Register of Companies.
24 Aug 2007	MET awarded Extract Resources Namibia (Pty) Ltd permission to dispose of the RC drill chips in the open trenches at the Husab fluorite mine.
2007	Renewals were granted in respect of EPL 3138 in 2007. The holder at that stage was Swakop Uranium (Pty) Ltd (i.e. no longer WAGE).
7 Mar 2008	SU requested MET for permission to drive at night in the NNNP, to allow for a night shift.
12 Mar 2008	SU asked permission to re-locate their fuel facility to the old Husab fluorite mine site.
17 Mar 2008	A copy of the EO and EMP was submitted by ASEC to MME for uranium exploration activities by Swakop Uranium on EPLs 3138 and 3439.
26 Mar 2008	MET granted permission for the relocation of the fuel depot, but denies the request to drive at night in the NNNP.
7 April 2008	Swakop Uranium submitted a proposal to MET to drill boreholes in order to obtain water for diamond drilling at the Rössing South Prospect (EPL 3138).
21 July 2008	DWA awarded ground water extraction permit 10 650 to Swakop Uranium which allowed extraction from two bores (100 m^3 and 120 m^3/ day respectively) in the Swakop River
2008	Regular discussions, (in person, telephonic or e-mail) were held with representatives of the DPW regarding accommodation of the geologists and drilling teams. It was agreed that no camps could be established on Rossing South, and that the old Husab fluorite mine buildings could be used for accommodation purposes.

Date	Activity
October 2008	Camp facilities were improved at both the Rössing South (Husab) camp (the old fluorite) and the main camp (Ida camp).
21 Oct 2008	MET gave WAGE's contractor permission to bring in foreign material to fill in holes in the roads, as part of road maintenance and rehabilitation.
Early 2009	The renewal for EPL 3439 was submitted and awarded in 2009 until November 2011.
12 Mar 2009	Swakop Uranium submitted a request to MET establish a ground water monitoring programme that included drilling 9 boreholes in the vicinity of the Rössing South Prospect (now called the Husab Project) and 3 in the Swakop River.
28 Aug 2009	Swakop Uranium sent a request to MET regarding an amendment to the way that fuel transport and storage is handled.
16 Sept 2009	MET granted Swakop Uranium permission to change to the newly proposed fuel transport and storage system, which includes using 2 self-bunded tanks (one at each of the Husab camps) instead of 200 litre drums.
3 June 2010	Swakop Uranium issued a request to amend the EMP for EPL 3138 to include a bulk sampling pit.
22 June 2010	MET request that the EMPs be revised and updated.
24 Sept 2010	Permission received from MET to dump plastic sample bags containing drill chips and dust in old trenches at Husab fluorite mine, primarily for health reasons.
Dec 2010 / Jan 2011	EO and EMP, Revision 3, for uranium exploration activities by Swakop Uranium on EPLs 3138 and 3439, was compiled by ASEC and submitted to MET for consideration on 4 February 2011 (an earlier version of this document). No official acknowledgement of the updated EMP received as no legal processes were available at that time to accommodate an amendment to the approved EMPs.
Dec 2010	Exploration Radiation Management Plan submitted to the Nuclear Board.
Dec 2010	EPL 3138 was renewed in December 2010
17 Dec 2010	Approval of water abstraction permit – Permit No. 10812 for 5 years
22 Jan 2011	The environmental clearance for the EIA and EMP for the proposed Husab Mine was received from the MET.
21 Feb 2011	Swakop Uranium's exploration radiation management plan was accepted by the Ministry of Health and Social Services on in February 2011.
8 March 2011	Initial potential offer by CGNPC for Kalahari Minerals.
11 Mar 2011	Tsunami and nuclear accident at the Fukushima Daiichi nuclear power plant in Japan.
01 April 2011	EPL 3138 renewal granted from 10 April 2011 to 19 April 2013.
11 May 2011	Withdrawal of potential offer by CGNPC for Kalahari Minerals.
14 July 2011	The Environmental clearance certificate for the linear infrastructure associated with the Husab Mine was received from the MET.
28 Nov 2011	The Ministry of Mines and Energy granted Swakop Uranium a Mining License (ML 171) to mine Zones 1 and 2 of the Husab deposit.
8 Dec 2011	Taurus announces cash offer for Kalahari Minerals.
28 Mar 2012	CGNPC acquires, through Taurus Minerals, the majority of shares in Extract Resources.
14 Feb 2012	Taurus launches conditional offer for Extract Resources.
29 April 2012	Extract Resources removed from the Australian, Toronto and Namibian stock exchanges.
Feb 2012	EPL 3439 was renewed from 03 November 2011 until 02 November 2013.
5 Aug 2012	Receipt of additional water abstraction for construction purposes on Permit No 10812.
Oct/Nov 2012	Construction begins on the temporary access road, the raw water pond and the temporary water pipeline.
Feb 2013	Earthworks commence at Husab.

(reference documents are available if required).

4 EXCLUSIVE PROSPECTING LICENCE HOLDER DETAILS

Table 2 outlines Licence Holder details for both EPLs 3138 and 3439, while **Table 3** provides EPL coordinates.

Table 2: Details of Holder for EPLs 3138 and 3439

Company Name	**Swakop Uranium (Pty) Ltd**
Name of Holder	Swakop Uranium (Pty) Ltd
Name of Accredited Agent	Andrea Townsend – company secretary
Telephone, Fax, Email	Tel. +264 (0) 61 300 220; Fax +264 (0) 61 300 221 Email: andrea.townsend@swakopuranium.com.na
Postal Address	Swakop Uranium (Pty) Ltd., P.O. Box 81162, Olympia, Windhoek, Namibia
Reference number of the Licence **Expiry date of EPL**	EPL 3138, expiry date 19 April 2013 EPL 3439, expiry date 02 November 2013
Registered names of land	Namib Naukluft National Park
Minerals to be explored	Base, rare and precious metals, nuclear fuel, and Industrial Minerals (EPL 3138), nuclear fuel only (for EPL 3439).

Table 3: Coordinates for EPL 3138 and 3439

EPL Number	Point No.	Latitude	Longitude	Point No.	Latitude	Longitude
EPL 3138	1	-22.59845815	14.96453238	17	-22.54361283	15.00383454
	2	-22.59267463	14.96688114	18	-22.54003074	15.00797098
	3	-22.58282337	14.97520856	19	-22.53784530	15.00743773
	4	-22.57763420	14.97577337	20	-22.54911298	15.03385314
	5	-22.57270572	14.97827430	21	-22.53495890	15.04193285
	6	-22.57127709	14.97795435	22	-22.54305862	15.06076382
	7	-22.57140528	14.97634388	23	-22.52650155	15.06978083
	8	-22.56887782	14.97605983	24	-22.59158593	15.13317796
	9	-22.56891872	14.97927628	25	-22.61666705	15.13333053
	10	-22.56686490	14.98123704	26	-22.61650986	15.15694215
	11	-22.56515005	14.98655590	27	-22.63517700	15.17410811
	12	-22.56606544	14.98847253	28	-22.61710054	15.21121351
	13	-22.56601217	14.99602836	29	-22.74999992	15.16666681
	14	-22.56166867	14.99728171	30	-22.75031240	14.87890765
	15	-22.55606516	15.00187750	31	-22.57367929	14.94763811
	16	-22.54638710	15.00253642	32	-22.59842372	14.96437688

EPL Number	Point No.	Latitude	Longitude	Point No.	Latitude	Longitude
EPL 3439	1	-22.74999992	15.16666681	7	-22.78333295	14.88333240
	2	-22.84999992	15.14999707	8	-22.79999994	14.88333592
	3	-22.85006256	15.07794177	9	-22.85001324	14.81301921
	4	-22.83333291	15.03333583	10	-22.84999979	14.79999728
	5	-22.83333332	14.99999883	11	-22.75031240	14.87892765
	6	-22.75024415	14.99996451	12	-22.74999992	15.16666681

5 LEGAL FRAMEWORK & OTHER REQUIREMENTS

5.1 Namibian Legislation

5.1.1 Constitution of the Republic of Namibia, 1990

Administrative body:

Various Ministries of the Government the Republic of Namibia

Main objective:

The constitution is the fundamental & supreme law of Namibia and sets out the rights of all of its people, regardless of race, colour, ethnic origin, sex, religion, creed or social or economic status.

Sections that have environmental relevance:

Article 91 (c) gives the Ombudsman rights to investigate complaints concerning the over-utilisation of living natural resources, the irrational exploitation of non-renewable resources, the degradation and destruction of ecosystems and failure to protect the beauty and character of Namibia.

Article 95 of the Constitution of the Republic of Namibia states that "*the State shall actively promote and maintain the welfare of the people by adopting, inter alia, policies aimed at … maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of natural resources on a sustainable basis for the benefit of all Namibians both present and future*;..."

Applicability to Swakop Uranium

As a responsible operator in Namibia, Swakop Uranium's board, management and employees must uphold the supreme law of the Country. As far as environmental issues are concerned, Swakop Uranium must ensure that the fundamental principles of the preservation of the environment are upheld, and that business is undertaken within the ambit of sustainable resource management.

5.1.2 The Environmental Management Act, No 7 of 2007 and Regulations – Feb 2012

Administrative body:

Ministry of Environment and Tourism

Main objectives:

The Environmental Management Act (EMA) has three main purposes, namely to ensure that:

- People consider the impacts of activities on the environment carefully and in good time;
- All interested and affected parties have a chance to participate in EAs;
- Findings of EAs are considered before decisions are made to undertake certain activities.

Activities that are subject to EAs are listed in Section 27 of the Act, and include resource removal, such as exploration and mining.

The Environmental Regulations give effect to the Environmental Management Act.

- Lists those activities that require an environmental clearance;
- Provides the process and systems by which the environmental clearance is to be obtained.

Applicability to Swakop Uranium – exploration

Exploration Prospecting requires a permit under the terms of the Minerals Act of 1992 and thus is considered to be a listed activity under the EMA. Exploration therefore requires an Environmental Clearance Certificate.

EPLs 3138 and 3439 are situated in a National Park, therefore an EIA is required for the ECC.

The regulations gave effect to the EMA which requires that all environmental clearances issued before 6 February 2012 must apply for a renewal of the Environmental Clearance Certificate (this document).

5.1.3 The Minerals (Prospecting & Mining) Act, No 33 of 1992

Administrative body:

Department of Mines, Ministry of Mines and Energy

Main objectives:

The Minerals (Prospecting & Mining) Act, No. 33 of 1992 (the Minerals Act) regulates reconnaissance, prospecting and mining of minerals. Various license types, and their implications, are stipulated.

Sections that have environmental relevance:

This act contains several explicit references to the environment and its protection. The act provides for environmental impact assessments, for rehabilitation of prospecting and mining areas, and for the prevention of pollution.

Applicability to Swakop Uranium - exploration

Swakop Uranium must be in possession of current prospecting licenses (for all of its EPLs).

In its application for any prospecting license, Swakop Uranium must compile an environmental report which describes:

(i) the condition of, and any existing damage to, the environment in the area to which the application relates;

(ii) an estimate of the effect which the proposed prospecting operations may have on the environment, and the proposed steps to be taken in order to minimise or prevent any such effect; and

(iii) the manner in which it is intended to prevent pollution, to deal with any waste, to safeguard the mineral resources, to reclaim and rehabilitate land disturbed by way of the prospecting operations and mining operations, and to minimize the effect of such operations on land adjoining the mining area.

The minister may choose to refuse a prospecting application if there is inadequate protection of the environment.

Swakop Uranium must ensure that adequate provision is made for the rehabilitation of the exploration areas to fix, to the satisfaction of the Minister, any damage caused to the environment by its operations.

Swakop Uranium must report spills, pollution, loss or damage to the environment to the Minister of Mines and Energy, and must undertake at their cost, any actions required to remedy the situation.

5.1.4 The National Heritage Act, No 27 of 2004

Administrative body:

Ministry of Youth, National Service, Sport and Culture

Main objectives:

This Act provides for the protection and conservation of places and objects of heritage significance and the registration of such places and objects.

Applicability to Swakop Uranium – exploration

Swakop Uranium should ensure that if any archaeological or paleontological objects as described in this Act are found during exploration activities that they are reported to the Ministry immediately.

All objects of heritage significance belong to the state (subject to some exceptions) and an area may be declared a conservancy area to preserve the heritage subject to various conditions and permitting requirements.

The Heritage Council maintains a register, which may be searched, to establish whether or not EPLs fall within a declared conservancy.

5.1.5 The Water Act, No. 54 of 1956

Main objectives:

The Water Act, No. 54 of 1956 (the Water Act) was inherited from South Africa. It provides for the control, conservation and use of water for domestic, agricultural, urban and industrial purposes and for the control of certain activities on or in water in certain areas. A distinction is made between private and public water in terms of ownership, control and use. It refers to surface water, sea water and ground water use.

Although the Water Resources Management Act was promulgated in 2004, regulations have not yet been drafted so this piece of legislation cannot be enacted. For this reason The Water Act, No. 54 of 1956 continues to be the governing piece of legislation with regard to water.

Sections that have environmental relevance:

The Water Act does not recognise the natural environment as a water user, nor does it specifically address environmental sustainability, and is thus not consistent with the Constitution. Nevertheless there are certain requirements that are relevant to Swakop Uranium's exploration activities.

- Section 21(1) provides for the users of water for industrial purposes to purify the water, effluent or waste so as to conform to the standards set by the Minister. The applicable standard was promulgated and gazetted in 1962 (R553 Regional Standards for Industrial Effluent, in Government Gazette No 217 dated 5 April 1962).
- Section 21(5) stipulates that if a user cannot treat effluent to the desired standard or cannot return it to the appropriate public stream, an exemption permit must be obtained from the Minister.
- Section 22(2) stipulates that every person with control over any land shall take steps to prevent water pollution
- Section 23 stipulates that any person who wilfully or negligently pollutes any public or private water, including underground water, to such an extent that renders the water less fit for the purposes for which it is ordinarily used will be guilty of an offence.
- Section 30 (4a) gives mining (and exploration) operations permission to remove, where necessary, any subterranean water encountered during operations and to use it or obtain a permit to sell it.

With regard to permitting, the Water Act stipulates in sections 11 and 12 respectively that a permit must be obtained if:

- More than 60 000 gallons (272.77 m^3) of public water is used on any one day, or 50 000 gallons (227.30 m^3) on an average per day any month;
- Any person wishes to establish an industrial undertaking in respect of which any quantity of water is required to be used.
- Any person wishes to discharge effluent.

Applicability to Swakop Uranium - exploration

Freshwater is purchased from Namwater and transported to site. It is used for human consumption. No permits are required for this water.

Swakop Uranium has drilled three ground water extraction boreholes in the Swakop River and another three are currently being drilled. Extraction permits are required for all these boreholes.

Swakop Uranium generates effluent in two forms, sewerage from its three camps and industrial effluent from its diamond drilling operations. Septic tanks service the Husab and Contractors Camps. These are emptied on a regular basis by the contractor and the sewage is discharged at the Swakopmund sewerage treatment plant. The Ida Camp is serviced by 12 French drains.

Swakop Uranium requires, and has obtained, a permit for the Ida camp French drains from DWA. It must treat its effluent such that it meets the requirements outlined in the applicable standards (R553 Regional Standards for Industrial Effluent).

5.1.6 Forest Act, No 12 of 2001

Administrative body:

Ministry of Environment and Tourism

Main objectives:

This Act makes provision for the protection of various species of plants.

Section 22(1) states that it is unlawful for any person to: "cut, destroy or remove:

(a) any vegetation which is on a sand dune or drifting sand or on a gully unless the cutting, destruction or removal is done for the purpose of stabilising the sand or gully; or

(b) any living tree, bush or shrub growing within 100 meters of a river, stream or watercourse"

(c) that is on any land that is not part of a surveyed erven of a local authority area without a license.

Should removal of protected trees or dune vegetation be required, a permit in this regard must be obtained from the Department of Forestry

Applicability to Swakop Uranium – exploration

Any vegetation on sand dunes or trees living within a water course potentially affected by exploration activities should be mapped, identified and a permit obtained for the removal or destruction thereof.

5.1.7 Nature Conservation Ordinance, No 4 of 1975

Administrative body:

Ministry of Environment and Tourism

Main objectives:

The Nature Conservation Ordinance, 1975 (the Ordinance) establishes a guiding framework for habitat and species conservation, including wildlife management and utilisation. Important habitats are offered protection under national and private parks, or reserves. The rationale is to establish areas for the protection, preservation, propagation and study of wildlife, plants, landforms and cultural resources.

The Ordinance was inherited from South Africa. The Draft Parks and Wildlife Management Bill should supersede this piece of legislation, but as it has not been yet been finalized and promulgated, the Ordinance remains the piece of legislation that governs management within National Parks.

Applicability to Swakop Uranium - exploration

EPLs 3138 and 3439 are located within the Namib Naukluft National Park (NNNP). In terms of the Ordinance care must be taken to ensure that exploration activities do not disturb or destroy protected plants and the eggs of protected and huntable (game) bird species.

If disturbance or destruction is unavoidable, a permit must be obtained in this regard from the Minister of Environment and Tourism.

5.1.8 Hazardous Substances Ordinance 14 of 1974

Administrative body:

Ministry of Health and Social Services

Main objectives:

This ordinance provides for the safe handling, storage and disposal of hazardous substances. The only regulations which have been promulgated in terms of this Ordinance relate to the declaration of certain substances as hazardous substances, and regulations concerning the control of Group I Hazardous Substances. As regulations have not been gazetted for the transport or the dumping of hazardous waste, these activities are not yet regulated.

The potential for this to change exists because the Environmental Management Act, No 7 of 2007 deals with the disposal of waste. However, regulations have also not been developed in terms of this Act, thus disposal of hazardous material remains unregulated.

The Draft Pollution Control and Waste Management Bill aims to integrate the management of all waste in Namibia for the effective control and prevention of pollution (air, water and land), the reduction and minimisation of waste, and the management and disposal of any such waste so as to prevent pollution, and the regulation of waste imports and exports. However, as waste disposal has been dealt with in the Environmental Management Act, it is not clear if this bill will ever be promulgated.

Applicability to Swakop Uranium – exploration

Radioactive material and hydrocarbons are classed as hazardous substances. In the absence of regulations promulgated in terms of this Ordinance, Swakop Uranium must comply with the Regulations on Health and Safety in the Workplace in so far as they relate to hazardous substances, promulgated under the Labour Act, 6 of 1992.

In addition, Swakop Uranium should adopt best practice with regard to the transport, storage, use and disposal of hazardous waste.

5.1.9 Atomic Energy and Radiation Protection Act, 5 of 2005

Administrative body:

Ministry of Health and Social Services

Main objectives: This Act provides for the mechanism for obtaining authorization related to activities involving possible exposure to ionizing radiation, including exploration. One of the objectives of this Act is to minimise exposure of persons and the environment in Namibia to the effects of harmful radiation.

Sections that have environmental relevance:

The Act does not make specific reference to the environment, except in section 16 (1)(c) which stipulates that radioactive waste may not be disposed of without a license issued by the Director- General and section 24 (1)(b) which refers to the issuing of compliance orders in the event of a contravention.

Draft regulations for the Protection Against Ionising Radiation and for the Safety of Radiation Sources have been developed and promulgation thereof expected by the end of 2010.

Namibian regulatory authorities follow the recommendations of the International Atomic Energy Association, as defined in the Basic Safety Stuarts (IAEA, 1996a).

Applicability to Swakop Uranium – exploration

Swakop Uranium has finalized and submitted a radiation management plan (RMP), which has to accompany either the notification or the application for authorization as contemplated in the requirements of the this Act. The RMP was approved in February 2011.

Pursuant to the requirements of the draft regulations 29 – 31, the RMP should provide a comprehensive radiological analysis, including:

- Prior radiological evaluation of all aspects of the operations to identify the potential sources of exposure, to make realistic estimates of the doses, and to identify the measures necessary for radiological protection;
- Provide the Authority with information on the likely radiation hazards and the methods to be adopted for controlling exposure to radiation and radioactive substances.

Subject to the above submission, and provided that the practice is not exempted (Regulation 14), the Authority may direct Swakop Uranium to comply with specific requirements of the Regulations (i.e. Chapter 7, Occupational Exposure Protection; Chapter 9: Public Exposure Protection; Chapter 11: Transport Requirements; etc).

5.2 Namibian policies

5.2.1 Namibia's Environmental Assessment Policy for Sustainable Development and Environmental Conservation, 1994

Administrative body:

Ministry of Environment and Tourism, Directorate of Environmental Affairs

Main objectives:

This policy requires that the proponent follow the Integrated Environmental Management Procedure set out in the Policy in order to ensure that the environmental consequences of development projects and policies are considered, understood and incorporated into the planning process, and that the term environment (in the context of IEM and EA's), is broadly interpreted to include biophysical, social, economic, cultural, historical and political components.

Applicability to Swakop Uranium – exploration

Exploration is a listed activity, thus in terms of the Policy, a detailed Environmental Assessment is required to be submitted to the Ministry of Environment and Tourism (MET).

5.2.2 Policy for Prospecting and Mining in Protected Areas and National Monuments, 1999

Administrative body:

Ministry of Environment and Tourism, Directorate of Environmental Affairs

Main objective:

To promote the sustainable development of Namibia by guiding prospecting and mining in the country's Protected Areas and National Monuments.

Sections that have environmental relevance:

This document recognises that prospecting and mining can have major negative impacts on landscape, ecology, and tourism and also has the potential to increase the opportunity costs for developing tourism and conservation in protected areas.

Applicability to Swakop Uranium – exploration

The granting of Exclusive Prospecting Licenses and Mining Licenses ("EPL" and "ML") is generally allowed in Protected Areas and National Monuments, except areas within parks and monuments that are particularly sensitive, or are of special ecological or tourism importance.

A full EA will usually be required for any prospecting or mining in a Protected Area and/or National Monument, according to the procedures set out in the Environmental Assessment Policy. Should approval be granted, an Environmental Management Plan ("EMP") and an Environmental Contract must be concluded before any prospecting or mining commences.

5.3 Other requirements

5.3.1 Namib Naukluft National Park rules

Swakop Uranium is obliged to ensure that their employees, contractors and visitors adhere to the Namib Naukluft Park rules which are provided in **Annexure 4**.

6 BASELINE DESCRIPTIONS OF THE BIO-PHYSICAL ENVIRONMENT

The information for the baseline descriptions have been sourced primarily from the Environmental Impact Assessment report written for the proposed Husab Mine located on the Husab Project on EPL 3138, and from the original Exploration EMP compiled for EPL 3439 in 2006. The description of the topography and vegetation is taken from a vegetation study undertaken for EPLs 3138 and 3439 by C. Mannheimer in 2008. The archaeological description is taken from the study undertaken by Quaternary Research Services in 2010. Data from the EIAs undertaken for the Husab mine and associated linear infrastructure have also been used to update to the baseline descriptions

6.1 Climate

6.1.1 Rainfall

EPLs 3138 and 3439 fall within the west coast arid zone of Southern Africa. The average rainfall in the west coast region is slight with an annual average of 23 mm measured over the period 1962 - 1967 at Gobabeb. Historical records for Swakopmund, dating as far back as 1899, indicate an annual average of 14 mm. As is typical of arid areas, rainfall can vary considerably and can be of great intensity. According to the Directorate of Environmental Affairs, Ministry of Environment and Tourism Digital Atlas of Namibia, rainfall within the Erongo Region ranges between 0 - 50 mm at the coast to 400 mm in the northeast of the region. EPLS 3138 and 3439 fall within the 50 - 100 mm/year rainfall belt and in the 3 000 – 3 200 mm per year evaporation rate region (http://209.88.21.36/Atlas/Atlas_web.htm). **Figure 2** shows the total monthly rainfall measured at the Husab Project weather station.

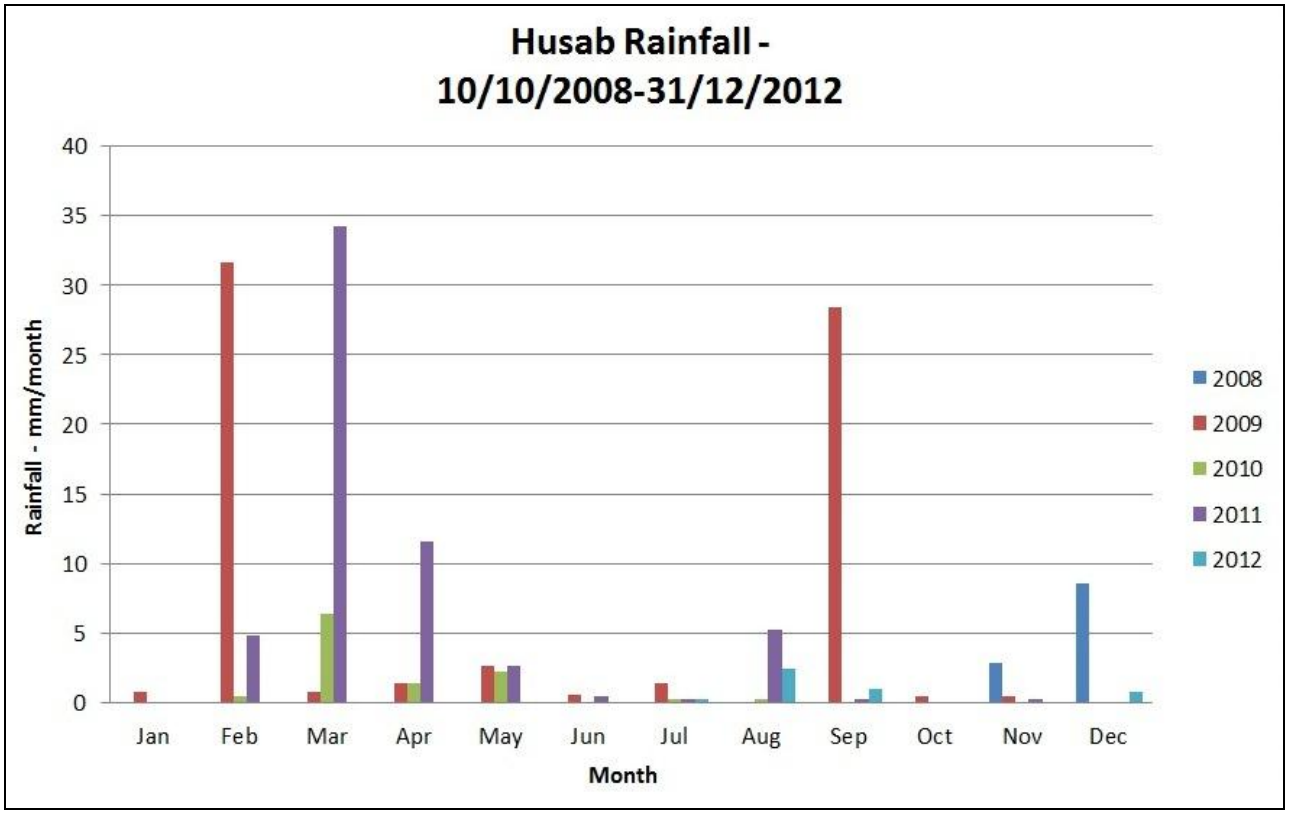

Figure 2: Monthly rainfall at the Husab Project on EPL3138 from Oct 2008 to Dec 2012

6.1.2 Fog

Fog, a form of precipitation, is characteristic of this region. Swakopmund, for instance, has high incidences of fog days of more than 125 days per year (http://209.88.21.36/Atlas/Atlas_web.htm). Within the Erongo Region, fog can extend up to 110 km inland with an average number of days per annum recorded at Gobabeb of 102 between 1964 and 1967 (Goudie, 1972).

6.1.3 Temperature

Along the coast, the air remains humid throughout the year because of moist air feeding off the Atlantic. Historical data for the region indicate similar average monthly and annual temperatures along the Namib Coast. The range between the coldest and warmest months is also small being 9°C at both Swakopmund and Walvis Bay. Frost is not associated with the region but extreme temperatures of over 40°C have been linked to strong easterly "Berg" winds (Goudie, 1972). The coldest month on average (based on data from 1996 - 2005) is August at 9°C, whilst the hottest is April at 27°C. The average annual minimum temperature was 13°C, whilst the average annual maximum temperature was 25°C.

Incoming solar radiation increases from sunrise (06:00) to reach a maximum at midday (12:00 – 13:00) and then decreases till sunset (19:00). EPLS 3138 and 3439 fall within the 5.6-5.8 kWhr per m² per day category (http://209.88.21.36/Atlas/Atlas_web.htm).

The Husab weather station indicates the highest average temperatures to be during March with the lowest during June. Minimum temperatures drop just below 10°C in the early hours of June with maximum summer temperatures reaching 31°C.

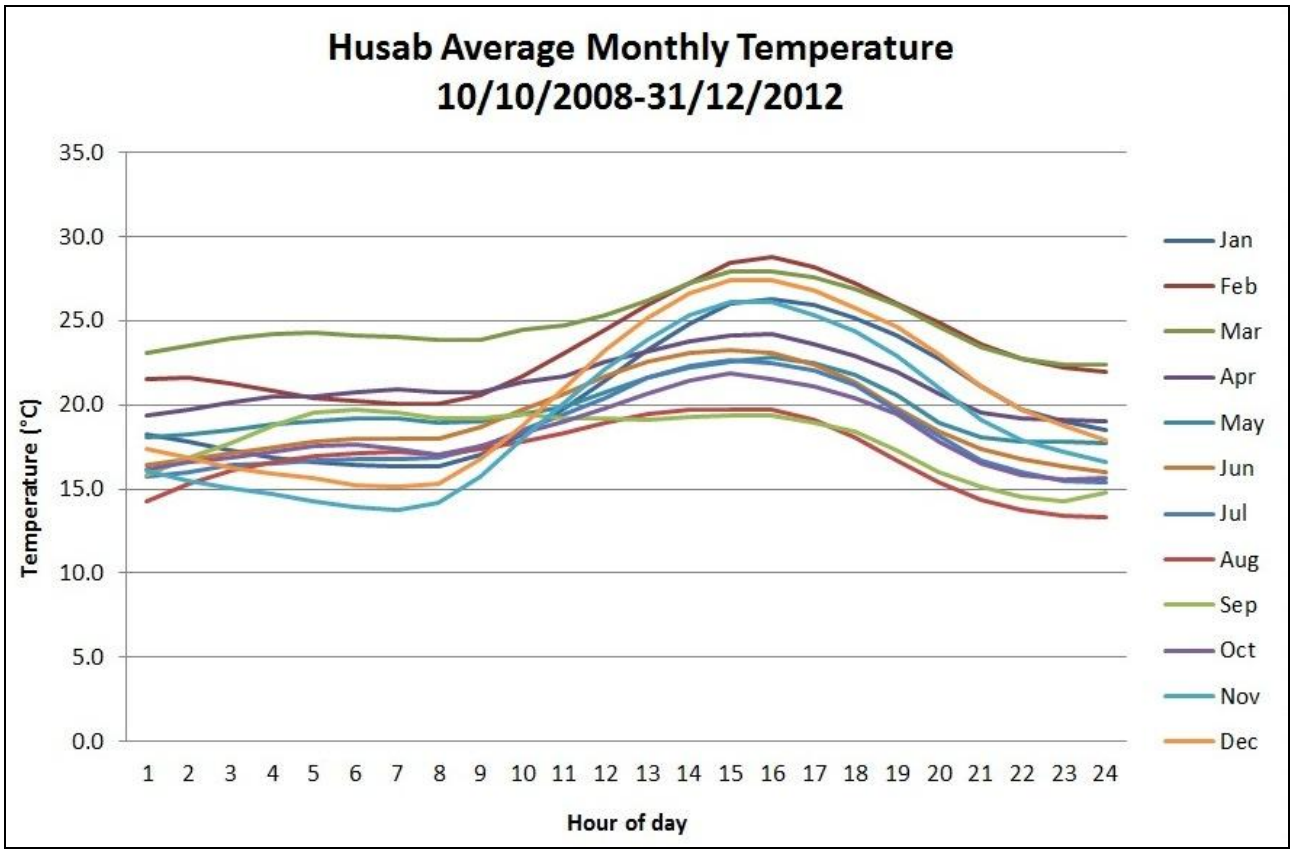

Figure 3: Monthly Average Temperature at the Husab Station (Oct 2008 to Dec 2012)

6.1.4 Wind

The wind field of the region represents a combination of the synoptic-scale circulation and the local land-sea breeze circulation. Along the coast winds are predominately from the south and west, whilst wind direction in the central northern part of Erongo is predominantly easterly, north-easterly and south-westerly. High-pressure systems over the interior of southern Africa cause strong north-easterly winds, the so-called "berg winds", during the winter months. These berg winds can blow for a number of days, and are characterised by very high temperatures associated with dry and dusty conditions (Pallett, 1995). Typically they are also characterised by high wind speeds.

On EPL 3138 and EPL 3439 the predominant west-south-westerly winds are in keeping with prevailing winds in the area. The strong winter berg winds are also noticeable on the wind rose. Wind speeds for the region also varies but most of the stations' record wind speeds between 0 - 10 m/s (**Figure 4**).

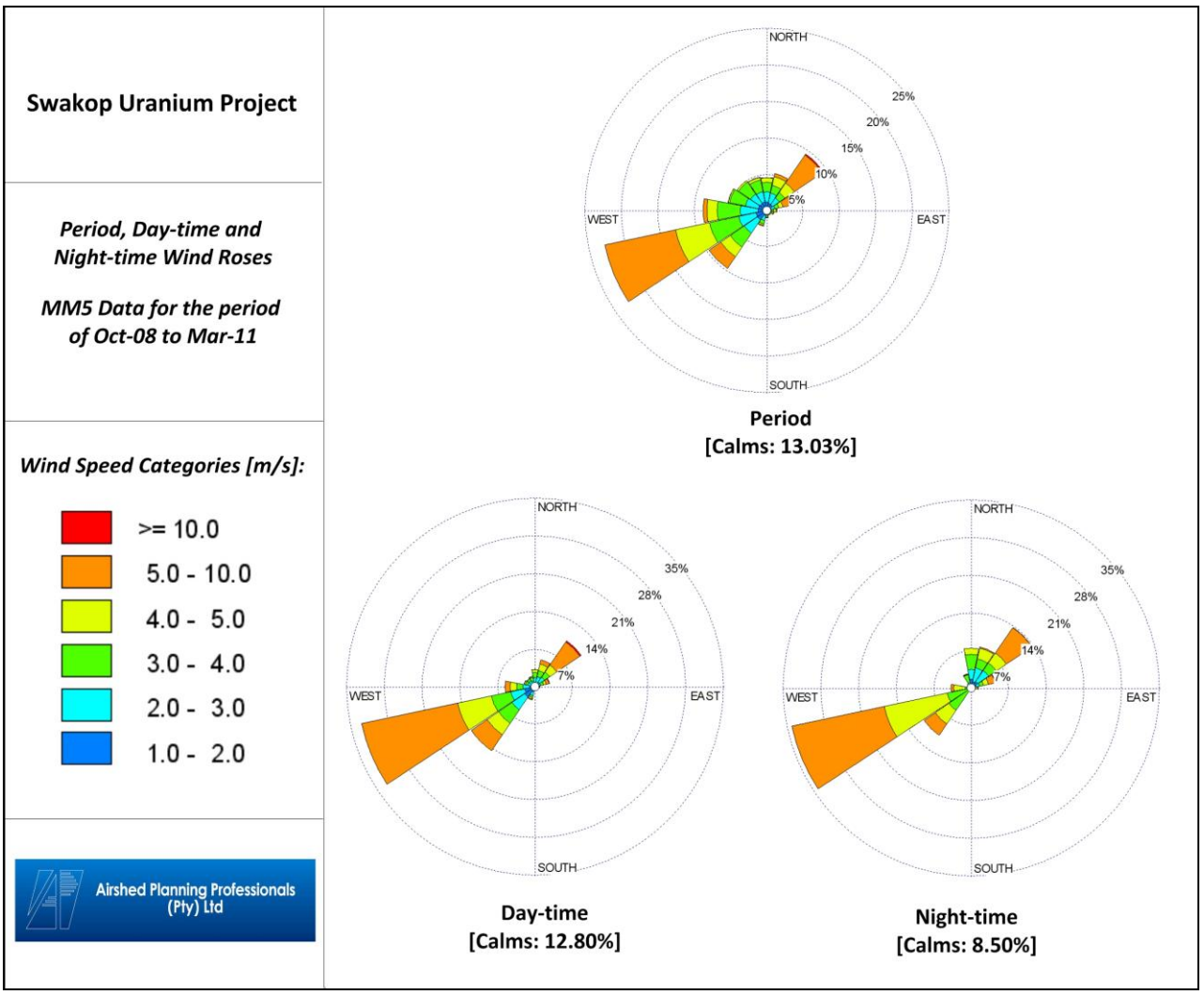

Figure 4: Wind Roses for the Husab site – (MM5 data Oct 2008 to March 2011).

6.2 Topography

EPL 3138 and EPL3439 are located on the eastern edge of the desert zone, in the most northerly part of the Namib Naukluft National Park (NNNP). Overall the area consists largely of sandy gravel plains dissected by ephemeral watercourses and washes that generally trend north-east to south-west **(Figures 1 and 5)**. These plains are incised in the south-central reaches of EPL 3439 by the Swakop River canyon and towards the north-west of EPL3138 by the Khan River canyon.

The gravel plains to the north of the Swakop River tend to lie higher than the river, draining towards it, while a little south of the Swakop River the plains drain towards the south rather than northwards towards the river. In the vicinity of both rivers the plains tend to gradually metamorphose into gravelly, undulating gravelly-gneiss hillocks dissected by sandy washes finally becoming a broad band of high mountainous ridges forming the river canyons, dissected by sandy washes and valleys of varying size and accessibility all of which drain towards the rivers. The plains are scattered with koppies and rocky ridges of varying composition, including marble ridges.

6.3 Soils

The soils encountered can be broadly categorised into three groupings, with those associated with the more mountainous/hilly and rocky terrain being distinctly different from the colluvial/alluvial materials found in the washes/waterways, with extensive area of in-situ derived materials associated with the desert plains and that form the transition zone between the erosive environment and the depositional environment.

- As with any natural system, the transition from one system to another is often complex with multiple facets and variations. In this context, three groupings of soil forms were identified The transition zone between the rocky outcrops and the washes and desert plain comprises a group of generally shallow to very shallow (less than 400 mm), well sorted, but poorly structured (apedel to single grained), fine to very fine grained sandy loams and silty loams. These are associated with the in-situ materials of the rocky mountainous/hilly terrain upslope of both the desert plains and associated wash zones. These soils are generally founded on a hard rock base or lithocutanic horizon, and returned poor vegetative cover for the most part.
- The soils that make up the washes comprise unconsolidated materials of varying composition, are generally deep (from 600 mm to more than 800 mm), and vary in texture from fine grained silt and sand to pebble and cobble size materials. In almost all cases mapped, the outwash materials are founded on a hard rock base that comprises either the host lithology (bedrock) or a sequence of evaporite derived sediments of varying consistency (calcium carbonate). (Note: gypsum is calcium sulphate, and is usually a surface or near surface product. Calcium carbonate (calcite) is usually located deeper within the regolith profile). This underlying layer may be significant to the overall ecological success of the area in its natural state, and could form a potential barrier layer that can potentially hold water close to the surface, but below the sands where it is available to some fauna and flora, and does not easily evaporate.
- The desert plain soils are characterised by moderately deep to shallow (400 mm to 600 mm) silty sands which may have one, or both, of the surface crusting and the deeper calcrete layer. The soil structure is generally apedel to single grained and is associated with tufts of grass cover where the crust is absent or thin, and almost barren desert plains where the crust is greater than 100 mm in thickness.

In terms of the Taxonomic Classification the major soil types encountered on the project site include those of the orthic phase Clovelly, Oakleaf, Dundee, Fernwood, Mispah, Glenrosa, Augrabies, Coega, Trawal, Montagu and Prieska Forms with minor areas of hydromorphic form soils including the Pinedene and Avalon Forms.

6.3.1 Soil fertility

The soils mapped as part of the environmental baseline studies conducted for the Husab and Linear Infrastructure EIAs returned moderate levels of some of the essential nutrients required for plant growth with sufficient stores of calcium and sodium. However, levels of Zn, P, Mg, Al, Cu and K are generally lower than the optimum required. Significantly large areas of soil with a lower than acceptable level of plant nutrition were mapped. These poor conditions for growth were further compounded by the high permeability and low clay and carbon contents of the majority of the soils. There are no indications of any toxic elements that are likely to limit natural plant growth in the soils mapped within the area.

6.3.2 Soil erosion potential

The majority of the soils mapped for the Husab Project can be classified as having a high erodibility index in terms of their clay content (very low), organic carbon (very low) and structure (structureless), which is off set and tempered by the almost flat terrain to an index of moderate.

These factors are enhanced on the more mountainous terrain by the low level of vegetative cover and steepness of the slopes, while the valley environments and desert plains are characterised by low erosion indices due to the flatness of the terrain, the presence of the hardened evaporite layer and the generally better vegetative cover associated with a better soil cover.

The vulnerability of the “B” horizon to erosion once/if the topsoil is removed must not be underestimated. The concerns around erosion and inter alia compaction, are directly related to the disturbance of the protective vegetation (all be it sparse) cover and topsoil that will be disturbed during exploration. Once disturbed, the actions of wind and water are increased.

6.4 Geohydrology

The area does not have aquifer systems which have a high supply potential. Three different aquifer systems, all with relatively low supply potential, exist in the area;

- Saturated alluvium associated with major rivers (i.e. Khan and Swakop rivers).
- Saturated alluvium associated with the Husab plain.
- Fractured / weathered bedrock aquifers.

Bore yields and storage for all of these aquifers are low. Existing water supply bores in the Khan and Swakop alluvial aquifers are the highest yielding (5 - 15 L/s), although abstraction from these narrow alluvial aquifers is tightly controlled (require Government abstraction licenses) to limit drawdown in the aquifer system. The site's bedrock aquifers have negligible storage due to the low permeability and porosity.

6.4.1 Groundwater recharge

With a rainfall significantly less than 100 mm per annum, recharge to most aquifers (especially bedrock aquifers) is expected to be very low (below 1% of total rainfall). Where surface water runoff is concentrated (i.e. alluvial aquifers) recharge to the aquifer systems can be enhanced.

The Khan and Swakop Rivers are recharged after most large flood events although surface runoff generated in the higher rainfall inland areas seldom reaches the coast (for example as a result of dams upstream), resulting in lower recharge to the alluvial aquifers in the coastal areas. The alluvial aquifers of both the Khan and Swakop Rivers are not homogenous, but separated into sections called compartments created by outcropping bedrock or narrowing of the river gorge. These compartments are mostly dominated by vertical flow (evapo-transpiration and recharge), rather than lateral flow. The stored water volumes in each compartment are therefore not replenished on a continual basis from upstream, but rather from occasional flood events (SAIEA, 2010).

6.5 Biodiversity

6.5.1 What is biodiversity?

Biological diversity is a term that was coined at the 1992 Earth Summit in Rio de Janeiro. It can be described as the variability amongst living organisms from all sources including inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexities of which they are a part; this includes diversity within species, between species and of ecosystems.

To understand biodiversity one must appreciate all of its components. It is not just about the species of plants and animals and the different habitats in which they live (biodiversity patterns) but the way that factors, such as wind, water, steepness of slope and presence of pollinators, affect the habitats and the species living in them (ecosystem processes).

Understanding biodiversity can help not only to maximize conservation of fauna and flora, but to ensure that the ecosystem services such as nutrient cycling, soil formation and primary production are not disturbed, for without these services, the primary land uses of the area, namely conservation and eco-tourism would become impossible.

6.5.2 Regional context

According to Irish's biome scheme, used to map the major biomes in Namibia, EPLs 3138 and 3439 are situated in the desert biome (Barnard, P. 1998). The biomes are further divided into vegetation types of which there are 29 broad types in Namibia (Mendelsohn et al, 2003). EPLs 3138 and 3439 fall within the Central Desert Vegetation type. The dominant structure is sparse shrubs and grasses and the dominant landscape is the central western plains (Mendelsohn et al, 2003).

The desert biome is characterized by a high level of endemism (a species is considered endemic to an area if its entire population occurs in that area) even thought the abundance/density of fauna and flora is low. EPL 3138 encompasses the well-known Welwitschia plains and famous Giant Welwitschia of the central Namib – a popular tourist destination.

6.5.3 Ecosystem processes

The primary ecosystem processes in the central Namib are wind, fog, soil and water. Wind is always prevalent and is responsible for erosion and deposition of sand and the transport of detritus, seeds and pollen.

Fog provides a large percentage of the moisture that plants and animals utilize and also helps to mediate the climate (elevated humidity and lower temperatures), creating environmental conditions suitable to a greater range of plants and animals than areas not fed by fog.

Although soils are undefined and shallow, they not only form substrates in which plants can germinate, but substrates into which animals can burrow. The characteristics of the soils in some parts of the EPL are such that surface water is probably trapped in shallow aquifers and is accessible to plants for use long after the surface water has evaporated.

Surface water in the area is sporadic and associated with flooding of the Swakop and Khan Rivers when rain falls inland, or with patchy rainfall events that occur in the desert. Flash floods in the desert are very important as they recharge ground water aquifers (shallow and deep) and transport soil, plant matter and seeds from one area to another, thus helping to shape the landscape.

In a desert the surface flow and capture of water is arguably one of the most important factors that determine the presence and spatial distribution of organisms. The drainage lines and washes are characterised by perennial vegetation which are important ecosystem drivers in the landscape, providing islands of habitat and sources of food for animals, sources of seeds for colonization, traps for windblown detritus, sand and seeds and the vegetation, albeit it sparse, are also stabilizers of the soil.

6.5.4 Biodiversity patterns

6.5.4.1 Habitats

Four main habitats were identified across the two EPLs.

Zone A - Sandy-gravel plains

The greater part of the EPL consists of sandy-gravel plains, which are extremely sensitive to vehicle tracks, particularly where a gypsum crust is present. The vegetation study conducted in 2008 revealed that the plain lying between the Khan and Swakop Rivers river (northern plain) carries a far higher species diversity than the plain to the south of the Swakop River (southern plain). Sub-zones within Zone A are the plains (A1), the drainage lines and washes (A2) and the koppies and ridges (A3).

The northern plains are of particular importance as they are home to a large population of Welwitschias including the "giant Welwitschia". The drainage lines and washes are characterised by perennial vegetation which are important ecosystem drivers in the landscape. A number of koppies and ridges of varying composition occur in the plains. On the less vegetated plain south of the Swakop River, virtually no plants were found in the koppies, particularly the smaller outcrops. The northern plain, in contrast, is crossed by several ridges that harbour considerable numbers of species of conservation concern, particularly on marble and limestone/dolomite substrates.

Zone B – Gravelly-gneiss hillocks

These undulating hillocks fall mainly between the plains and the mountainous ridges that form the canyons of the Swakop and Khan rivers. Superficially they appear largely un-vegetated, but they are dissected by narrow, sandy-rocky washes that harbour considerable plant life, including endemic and near-endemic species. As was the case in the plains, the far southern hillocks (between the southern plain and the Swakop River) were found to be less densely and diversely vegetated than the more northern ones (e.g. at the Garnet Valley deposit and between the Husab deposit and the Khan River).

Zone C- Mountainous Ridges (Swakop River Canyon)

Between the hillocks and the Swakop River lies a broad belt of high, steep mountainous ridges that form the Swakop River canyon. These are dissected by many narrow rocky-sandy washes but also by some broad, sandy valleys that are discussed under Zone D. As was found in the previous zone, the slopes of these koppies are largely un-vegetated. However, the washes that run through them similarly support a diverse vegetation, including a few individuals of large woody trees such as *Vachellia erioloba, Aloe dichotoma, Sterculia africana* and *Ficus cordata* (all protected trees).

Zone D – the Swakop River and valleys

The Swakop River is one of several large, ephemeral western-flowing watercourses in Namibia. Within these two license areas are also a number of broad valleys that lead down to the river itself (e.g. the one south-east of the Husab camp presently being used to access the river and reach Ida Dome). Zone D consists of two subzones, the Swakop River (D1) and the Valleys (D2)

The Swakop River consists of a broad, sandy riverbed and alluvial floodplain with a robust riparian vegetation characterised large trees (*Faidherbia albida, Vachellia erioloba, Euclea pseudebenus*, all of which are protected), small trees (*Tamarix usneoides*) and large bushes (*Salvadora persica*). The floodplain supports many other species, including endemics and near-endemics.

The large, navigable valleys that drain into the river are scenically very appealing and are also characterized by large trees and bushes.

6.5.4.2 Vegetation

While approximately 17% of the total Namibian flora is thought to consist of endemic species (Barnard 1998), over 30% of plants that occur in the Namibian section of the Desert Biome are believed to be endemic to that biome. This is a significant figure, but in the context of this project it is important to note that the areas of highest plant endemicity in the Namib are the Kaokoveld and the southern Namib, both regarded as major centres of endemicity in Namibia (Maggs et al, 1998). Levels of plant endemicity are comparatively lower in the central Namib. Regardless, the proportion of endemic plants recorded in the general area (quarter-degrees 2215 CA and CD) is still high, at 19%. The total proportion of endemic and near-endemic species is 34%.

Not all the plants listed in the vegetation study of 2008 will necessarily be present in the study area because the list is generated from the database of the National Herbarium, which is based on quarter-degree squares, as well as from observations and collections during the study. Nevertheless it is indicative of the sensitivity of this area and the necessity to minimise the extent of impacts as far as possible. The sensitivity has been ratified by the additional studies undertaken for both the Husab and Linear infrastructure EIAs

The plant species of conservation significance that found in each of the habitats described above are summarized in **Table 4**.

6.5.4.3 Fauna

A faunal study was not been taken for the entire area covered by EPLs 3138 and 3439 during 2008. However, the section of EPL 3138 that was considered for the proposed Husab Mine and all linear infrastructure routes were specifically studied in 2010 and 2011. A summary of the findings is provided below and is at least indicative of what might be found on the EPLs.

The known central Namib endemics comprise 6 solifuges, 3 scorpions, 7 beetles, 2 flies, 2 silverfish and 1 grasshopper. Five of them are considered Critically Endangered, four Endangered and two are Vulnerable.

<u>Invertebrates</u>

The biodiversity study undertaken for the Husab Project revealed that 194 invertebrate species or morphospecies are expected to occur in the proposed mine area. Of these 132 (all Phylum Arthropoda) were actually recorded. At least 45 invertebrates endemic to Namibia occur in the study area of which 21 (47%) are endemic to the central Namib only, 13 (29%) are endemic to a wider area, but still found only within the borders of Namibia, while the remaining 10 (22%) are near-endemic.

Table 4: Vegetation of conservation significance found in the four habitats on EPLs 3138 and 3439

Zone	Description	Subdivision		Species of conservation concern (bold = high) and vegetation sensitivity
A	Sandy-Gravel plains	1	Plain	*Zygophyllum stapfii, Arthraerua leubnitziae, Commiphora saxicola*, sensitivity low
		2	Drainage lines and washes	*Z. stapfii, A. leubnitziae, Adenolobus pechuelii, Commiphora saxicola, Petalidium pilosi-bracteolatum*, sensitivity low
		3	Koppies and ridges	***Aloe asperifolia,Hoodia pedicellata**, Larryleachia marlothii, Commiphora saxicola, **C. oblanceolata***, sensitivity high
B	Gravelly-gneiss hillocks			***Aloe asperifolia**, **Commiphora oblanceolata**, C. saxicola, Sterculia africana, Zygophyllum stapfii, Arthraerua leubnitziae, Petalidium pilosi-bracteolatum, Adenolobus pechuelii*, sensitivity medium
C	Mountainous ridges (canyon)			***Commiphora oblanceolata**, Aloe dichotoma, erioloba, Ficus cordata, Sterculia africana, Adenia pechuelii, Zygophyllum stapfii, Arthraerua leubnitziae, Petalidium variabile*, sensitivity medium
D	Swakop River and large valleys that drain into it	1	Swakop River	*erioloba, Euclea pseudebenus, Faidherbia albida, Petalidium variabile*, sensitivity low
		2	Other large valleys and drainage lines	*A. erioloba, Zygophyllum stapfii, A. leubnitziae, Petalidium variabile*, sensitivity low

Mammals

45 mammal species that have either been recorded on the study area, or are expected to occur based on their habitat affinities. About 12% of the 41 species listed in **Table 5** are endemic or near-endemic to the sub-continent, ~8% to Namibia, and ~9% to the Namib.

Four of the species are considered near-threatened, and one, Hartmann's mountain zebra, is considered vulnerable.

Birds

During a desktop study 108 species were identified that have ranges that overlap with the study area although not all of these species' habitats will occur here. Although a significant proportion of the species (31%) are either endemic or near-endemic to the subcontinent, only about 4% are near-endemic to Namibia and 1 species (1%) is endemic to the Namib.

One species (Martial Eagle) is Endangered in Namibia and Near-Threatened across its range, and one more species (Lappet-faced Vulture) is rated as Vulnerable in Namibia.

A full study on avifauna was undertaken for the Linear Infrastructure EIA, specifically focussing on the impacts of power lines on birds.

Reptiles

Twenty three reptile species were observed in the study area, and it is expected that a further 30 species might occur. All but seven of the 53 species are endemic to the sub-continent, ~53% to Namibia, ~21% to the Namib, and ~9% to the central Namib. Two species are considered vulnerable and four species are data-deficient, to be treated as vulnerable, two of these being species yet to be named (sp.nov.), two to be redefined in a taxonomic revision, and one species is found in an isolated population far from the main population and could also be a new species.

One species is considered to be at high risk from exploration and mining activities, namely, the Husab Sand lizard. SU initiated further studies into the habitat range of this lizard which was found to extend across a greater area than just the mine site.

Amphibians

In the Namib, living conditions for frogs occur only in the form of springs and ephemeral pools. Four amphibian species have ranges that overlap with EPL3138. None were recorded during field surveys but all were previously recorded by specialists in nearby areas of the Namib Desert. Although none of these species have a special conservation status, the occurrence of amphibians in this hyper-arid area is considered to be of special significance, and their habitats worthy of special attention.

6.5.4.4 Red Data or Protected Fauna and Flora

The contrasting habitats associated with the plains, the river valleys and the transitional zones in-between provides a range for many taxa of conservation importance, some of which are endangered, data deficient, vulnerable, near threatened and/or protected (**Table 5**).

Table 5: Red Data and/or Protected Species found in the Husab Mine study area (Metago, 2010)

Scientific Name	Common Name	Red Data Status
Plant Species		
Aizoanthemum galenioides		Least concern
Cleome carnosa		Least concern
Aloe namibensis	Namib Aloe	Protected. Least concern, Cites ll
Lithops ruschiorum		Protected, Least concern
Aloe asperifolia	Kraal Aloe	Protected, Least concern
Arthraerua leubnitziae		Least concern
Commiphora saxicola	Rock Corkwood	Least concern
Commiphora virgata	Slender Corkwood	Least concern
Dauresia alliariifolia		Least concern
Euphorbia giessii		Least concern
Petalidium canescens		Least concern
Petalidium pilosi-bracteolatum		Least concern
Zygophyllum cylindrifolium		Least concern
Zygophyllum stapffii		Least concern
erioloba	Camel Thorn Tree	Protected
Combretem imberbe	Leadwood	Protected
Commiphora oblanceolata	Swakopmund Corkwood	Near Threatened
Euclea pseudebenus	Wild Ebony	Protected
Faidherbia albida	Ana tree	Protected
Hoodia currorii	Hoodia	Least Concern
Hoodia pedicellata	Hoodia	Vulnerable
Larryleachia marlothii		Protected
Maerua schinzii	Lamerdrol	Protected
Sterculia Africana	Tick Tree	Protected
Tamarix usneoides	Wild Tamarisk	Protected

Scientific Name	Common Name	Red Data Status
Welwitschia mirabilis		Protected, Least Concern
Ziziphus mucronata	Buffalo Thorn	Protected
Invertebrate Species		
Blossia planicursor	Solifuge	Critically Endangered
Ctenolepisma occidentalis	Silverfish	Critically Endangered
Metaphilhedonus swakopmundensis	Flower beetle	Critically Endangered
Nothomorphoides irishi	Jewel beetle	Critically Endangered
Pteraulacodes hessei	Bee fly	Critically Endangered
Julodis namibiensis	Jewel beetle	Endangered
Lawrencega longitarsis	Solifuge	Endangered
Lawrencega solaris	Solifuge	Endangered
Zophosis (Z.) cerea	Toktokkie	Endangered
Acmaeodera liessnerae	Jewel beetle	Vulnerable
Zophosis (Z.) dorsata	Toktokkie	Vulnerable
Mammals		
Crocuta crocuta	Spotted hyena	Near Threatened
Proteles cristatus	Aardwolf	Near Threatened
Procavia capensis	Rock hyrax	Near Threatened
Cistugo seabrai	Angolan hairy bat	Near Threatened
Equus zebra hartmannae	Hartmann’s mountain zebra	Vulnerable
Birds		
	Martial Eagle	Endangered
	Lappet-faced Vulture	Vulnerable
Reptiles		
Stigmochelys pardalis	Leopard tortoise	Vulnerable
Atractaspis bibronii	Bibron’s burrowing asp	Data deficient
Telescopus nov.sp.	Damara tiger snake	Data deficient
Pedioplanis husabensis	Husab sand lizard	Data deficient
Pedioplanis nov.sp. cf. *inornata*	Northern plains sand lizard	Data deficient
Pedioplanis namaquensis quadrangularis (poss.nov.sp.)	Quadrangular Namaqua sand lizard	Data deficient
Varanus alibgularis	Rock monitor	Vulnerable

6.6 Archaeology and Cultural History

The description provided below is taken from a report compiled by Quaternary Research Services for the Husab Project. A survey of EPL 3138 was undertaken for the Husab EIA and the rest of EPL 3439 was surveyed during 2010/2011 when the linear infrastructure was surveyed.

The Swakop Uranium Husab Project is located in an archaeologically sensitive area of the Erongo Region of Namibia. A reconnaissance survey of EPL 3138 carried out in 2008 located a total of 81 archaeological sites, representing a discontinuous sequence of human occupation from the late Pleistocene to the early colonial era. More sites have since been found during the additional surveys. The variety of archaeological sites found in the project area is similar to that found in adjacent parts of the Namib, reflecting a number of highly specific human adaptations to this environment.

During the reconnaissance surveys of EPL 3138 and the adjacent part of ML-28 Rossing Uranium Ltd), only one site of high significance was documented: the remains of the Welwitschia siding of the early colonial narrow gauge railway (QRS 105/27). Nothing new of consequence except for a suspected burial cairn, some distance from any possible mine related work was discovered during the subsequent surveys. The remaining sites were generally isolated minor finds of low archaeological significance. However, despite their low individual significance, the sites form part of an archaeological landscape.

The archaeology of the wider EPL 3138 and surrounding area, has a small number of late Pleistocene occurrences in the form of isolated stone artefacts found on the gravel plains. The late Holocene archaeology is represented by a number of surface artefact scatters, small rock shelters with evidence of occupation and stone features including hut remains and hunting blinds. The late Holocene sites are dominated by seed diggings mainly on the gravel plains, but occasionally associated with deeply weathered outcrops.

The relatively high number of historical sites reflects the strategic importance of the Swakop and Khan River valleys during the early colonial period. Although their individual significance is not very high, the historical sites within the Husab Project area are among the few landscape counterparts to the documentary historical record of the early colonial period (late 18th and 19th Century's) in Namibia. For example, the section of the narrow gauge railway embankment and the remains of the Welwitschia siding at the top of the railway ascent from the Khan River, the latter being a unique and highly sensitive heritage site. (The rails and steel ties were removed from the rail embankment in about 1910).

Of related interest is the railway embankment itself, along with a number of cuttings and other features. Although the tracks and the corrugated iron buildings of the siding are long gone, the outlines of these features are still clearly visible, as are various cinder dumps and refuse piles that delineate the site.

Access to and from the Khan River, until early 2011, went directly through the station site, and this has had a significant cumulative impact over the past few decades. Although these sites have been severely damaged, they are still of interest and warrant conservation. In 2011, Swakop Uranium marked the area as a no-go area, redirected traffic from it, and will protect the siding and embankment from inadvertent damage during the construction phase of the Husab Mine.

7 EXPLORATION AND FEASIBILITY STUDY STAGE ACTIVITIES CONDUCTED ON THE EPLS 3138 AND 3439

7.1 Introduction

The locations of the various prospects that have been identified on the two EPLs are indicated on Figure 5.

In April 2006 drilling commenced on the Ida Central Prospect, after drilling targets were identified through extensive ground radiometric surveys and channel (chip line) sampling. With the granting of EPL 3439, and the issuing of an Environmental Clearance in early 2007, the focus of drilling activities moved to the south side of the Swakop River.

The main prospect area was Garnet Valley (formerly known as Anomaly A), with lesser drilling activities carried out on Holland's Dome (formerly known as Anomaly D), and New Camp. At the same time the exploration camp known as Ida Camp was established. Ida Camp remains the main administration and core processing area for the Husab Project.

The Husab Project (formerly known as the Rössing South Project) gravel plain was identified as a significant exploration target in 2006, however reconnaissance drilling did not commence until April 2007. Follow up drilling during November 2007 intersected significant uranium mineralization, and the announcement for a potential uranium discovery was made in February 2008. Since that time, a very large resource drilling programme, utilizing up to 17 drill rigs, and possible one of the largest exploration programmes in the world, has been underway at the Husab Project. In addition, during 2009 and 2010, geotechnical test pits were dug, and closed, beneath the sites of the planned Husab infrastructure.

Drilling activities had largely ceased on the Husab prospects by February 2012 due to the completion of the resource definition drilling. Since the start of 2012, exploration was again focused on the EPL areas and drilling was undertaken on the Pizarro and Holland's Dome areas. Further work is also planned on the Hildenhof and Etherandu areas. Initially this work will consist of non-destructive exploration like mapping which will be followed up by drilling if warranted. Swakop Uranium's exploration activities are explained in a little more detail below.

7.2 Defined Prospects – exploration through to feasibility study stage

The Husab Project comprises two large uranium deposits, known as Zone 1 and Zone 2 and were the subject of a detailed feasibility study for proposed mining of uranium. A full EIA and EMP, to World Bank standards, was conducted for the proposed construction, mining and processing of these two deposits and the environmental clearance was received in January 2011.

Other prospects that may be defined as a result of exploration and drilling work on EPLs 3138 and 3439 will likely undergo the same studies required during a projects pre-feasibility stage, that is, infill drilling on a progressively smaller grid, bulk sampling for metallurgical test work, test pitting to determine geotechnical structures and soil profiles, etc work. The MET will be consulted prior to any new potential deposits becoming part of an in-depth feasibility study.

7.3 Exploration - EPL 3138 and EPL 3439

In addition to ongoing work at the Husab Project site, exploration activities are still underway on various parts of both EPLs as shown in **Figure 5**. Targets are identified based on geophysical mapping (e.g. mapping, ground surveying, drilling and sometimes aerial surveys). Identified targets are then drilled to determine if potential resource minerals exist within them. For example, drilling has been undertaken at the Salem prospect (EPL 3138), and the Etherandu and Pizzaro prospects (EPL 3439). Additional targets will also be drilled as they are delineated.

Swakop Uranium has an environmental manager based at head office, a site environmental manager who undertakes *ad hoc* audits of the site, an environmental control officer, and a safety officer, based on site for the implementation of the EMP and safety rules. A radiation safety officer and 3 radiation safety assistants have been appointed to meet the requirements of RMP that was approved on 21 February 2011. All visitors to site are inducted on SHE and radiation matters, and access to site is controlled at a boom gate.

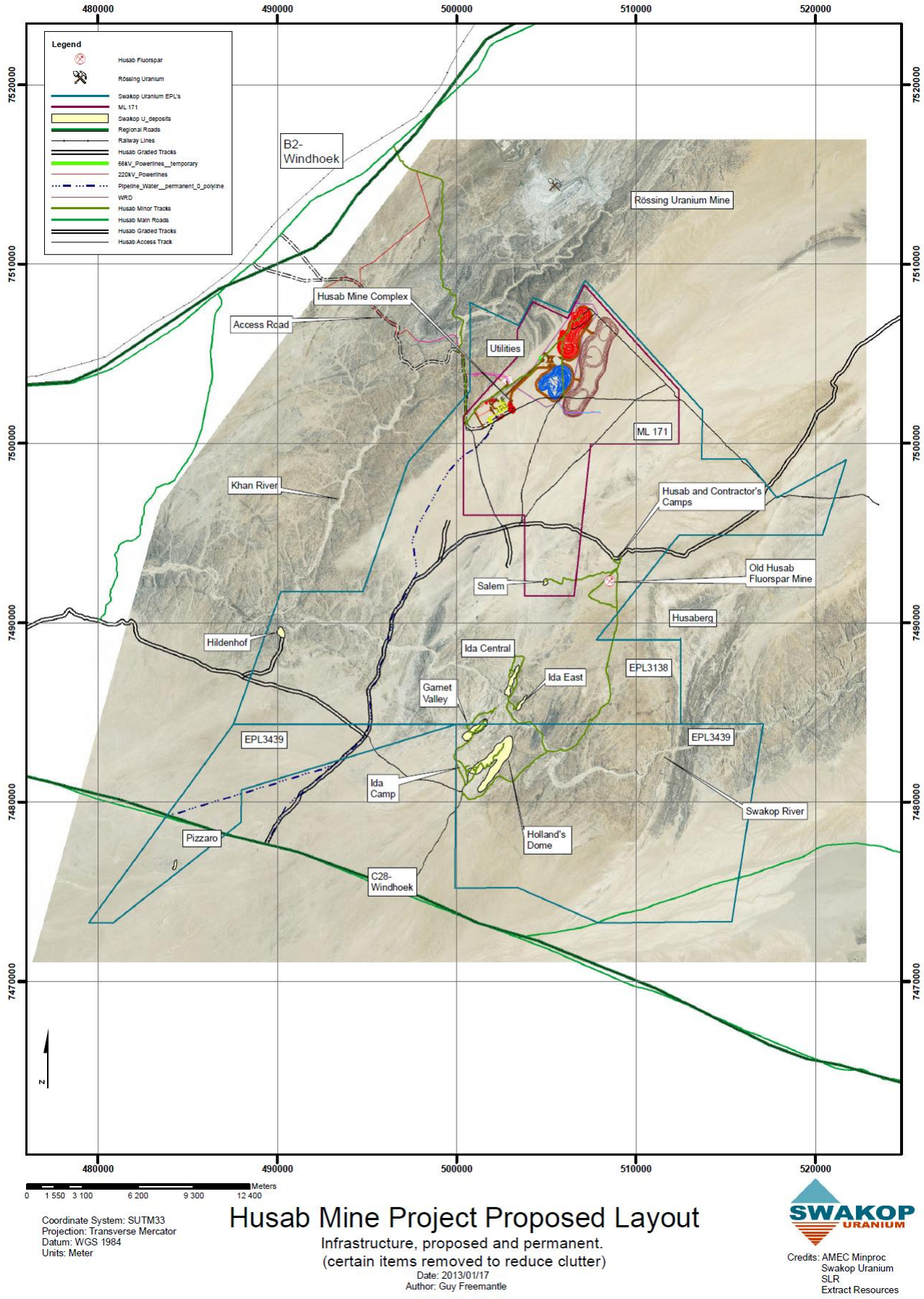

Figure 5: Map with location of EPLs 3138 and 3439 and the major uranium prospects.

All exploration activities are undertaken during daylight hours only, and Swakop Uranium staff, contractors and any additional visitors are required to be in the possession of a NNNP permit and to adhere to the rules of the NNNP and the Exploration EMP.

Activities associated with exploration are explained below. In addition, as a deposit moves from a defined resource into a prefeasibility study stage, activities associated with prefeasibility (survey, test pits etc) are also included in this EMP.

7.4 Aerial and ground surveys

Different geological exploration techniques utilize geophysical or airborne mapping techniques.

High resolution surveys are often flown over the EPL areas, as have lidar surveys that flew over the EPLs and along the Husab Project's potential infrastructure corridors. Other airborne surveys may be considered from time, and may include electromagnetic (EM) and gravity surveys.

In the event of the need for another aerial or ground survey, SU will engage with the DPW in this regard. Generally ground control survey beacons or reference points are needed and these can vary from white crosses painted onto black plastic that is fastened to the ground, to concrete beacons.

7.5 Drilling

7.5.1 Access to drill sites

Each drill site is planned according to the geological results obtained from earlier mapping, geophysical surveys and previous drilling. The environmental control officer determines the best route to the site, and takes care to avoid sensitive vegetation (particularly when in the Welwitschia fields). The tracks are clearly marked for the drill rigs and support vehicles, and generally, the tracks are not completely straight, so as to reduce the visual impact. Observations however, suggest that tracks that have sharp turns are prone to a pattern of tyre wear that is less easy to rehabilitate, so care is taken not to establish sharp bends.

If drilling is to take place in areas not easily accessible from an existing track, or in a new area entirely, Swakop Uranium's geologists will engage with the Department of Parks and Wildlife (DPW) to discuss options for the best route. For example in late 2010 SU consulted with DPW regarding access routes to the Etherandu and Pizarro sites. The geologists will also advise the site environmental manager who will undertake a site specific mini assessment of the proposed exploration site, if it is not covered sufficiently in this EMP.

7.5.2 Reverse circulation (RC) drilling

Drilling rigs, compressor and generators are mounted on trucks suitable for most terrains (i.e. 4-6 wheel drive vehicles) and fitted with the appropriate tyres for the area. RC rigs are manned by approximately ten personnel, who are a combination of Swakop Uranium and contractor staff. Additional drilling support personnel are regularly on site (mechanics etc).

Efforts are made to keep drill pads as small as possible and the access to each site is planned in advance, tracks are kept to a minimum, the drill area is marked off to limit the footprint thereof. All "RC" rigs use water injection to minimise dust. Water injection is limited by the requirement to maintain samples in a dry state to prevent contamination. The sample discharge is channelled through a cyclone which separates the sample from fines. The fines are ejected via a dust chimney.

RC drilling produces rock chips which are funnelled through a primary and secondary cyclone into 900 x 600 mm plastic bags. Smaller geological samples are taken from these bags for analysis. Drill chips which are not used for geological analysis are disposed of in open trenches at the old Husab fluorite mine according to the approval of the MET and requirements of the RMP **(Annexure 5 and 7)**.

In order to prevent pollution from hydrocarbons spills and leaks, oils, lubricants and other drilling additives used during the course of drilling, these items are stored in drip proof trays/containers.

Once the exploration is complete the boreholes will be capped to make them safe and all borehole collars will be cut and sealed off permanently.

Fuel to power drill rigs is transported by fuel tankers to purpose-built storage tanks at the contractor's camp at the old Husab fluorite mine. From there, fuel is trucked by the drilling contractors in purpose built, truck-mounted fuel tanks to the drill site for refuelling. Fuel is transferred using gasoline pistols.

Groundwater extracted from boreholes located on EPL 3138 is used for dust suppression on the roads. Permits for this water use have been obtained from DWAF **(Annexure 6).**

7.5.3 Diamond Drilling

Diamond drilling is essentially the same as RC drilling except that water is used to keep the drill rods cool whilst drilling and a solid rock core, not rock chips, is removed from the ground. Water is pumped from various boreholes on EPL 3138 to support drilling activities at the Husab Project. Water is piped to water storage facilities (total storage capacity ~ 240 kl) and distributed to drill sites via a network of polyethylene pipes, or alternatively, carted by the drillers using purpose built water trucks/carts. A sump is constructed at each drill site to capture and recycle some of the water used for the diamond drilling. Usually a biodegradable lubricant is added to the water to assist drilling.

Diamond drilling machines are staffed by about five personnel. Additional drilling support personnel are regularly on site (mechanics, water truck drivers etc).

Solid cores are recovered during diamond drilling. The core is stored in core trays at the Ida camp, where logging and cutting of the core is undertaken. Once exploration ceases, the core samples will be submitted to the Geological Survey of Namibia, as stipulated in the law.

During the diamond drilling operation the drill crew has to ensure that their vehicles and rigs do not spill hydraulic oils or fuel. Decanting of fuel, oils etc. is either carried out in designated areas specifically designed for the management of fuels and lubricants, or the work area is covered by tarpaulin as a minimum.

7.6 Drill Hole Surveying – Down Hole and Surface

Various down hole surveys are undertaken on completed drill holes by a geophysical contractor. Generally, one to two logging vehicles and operators are on site at any given time. Additionally, Differential GPS (DGPS) drill hole collar surveys are completed on a regular basis by a team of 1 - 3 survey contractors.

7.7 Diamond Core Logging / Cutting – Ida Camp

All diamond drill core is transported from the respective drill sites to the Ida Camp for logging, sampling and cutting. Swakop Uranium's diamond core team consists of about twelve personnel. All personnel wear the appropriate PPE for the job being undertaken. Water is used to cut the core. The area beneath the saw is concreted, and cutting fines and waste water are collected in an adjacent sump. Sump material from core cutting activities at the Ida Camp are collected and dumped within the Husab fluorite mine waste pit twice a week.

7.8 Reverse Circulation Sample Sorting / Dispatch

A group of about five Swakop Uranium personnel collect and process all RC drill samples destined for dispatch to the analytical laboratory of choice. Drill samples are packaged in 12 kg bags, transported by road to a laboratory in Swakopmund.

7.9 Disposal of Reverse Circulation Samples

Dumping of bulk RC sample material is conducted in accordance with the letter of permission and accompanying guidelines issued by the Ministry of Environment and Tourism (MET) on 24 August 2007 **(Annexure 7)**, and in accordance with the requirements of the RMP. Two contractor teams of five personnel each undertake this work at present. The disposal process requires that sample bags are loaded onto flatbed trucks at the drill site and trucked to the designated, pre-existing trenches at the old Husab fluorite mine. Prior to September 2010 all sample material was emptied out of the bags into nominated trenches, and all plastic bags were kept and separately disposed of at the Swakopmund Municipal waste dump.

Since October 2010 the MET approved the disposal of the drill chip samples in the bags to reduce health and safety risks. All trenches are covered on a monthly basis with waste rock from the old workings using a front end loader. A track mounted dozer pushes waste rock over the pit and compresses the disposed samples.

7.10 Bulk Sampling

As part of project feasibility studies, Swakop Uranium, has, and may again, undertake bulk sampling from the identified mineralised zones on either of the EPLs.

The bulk sample taken in June 2010 is situated on the north western edge of Zone 1, just south of the Khan River and the existing Rössing Uranium Mine. A detailed explanation of where and how the box cut was to be excavated, as well as a box cut specific EMP, was provided in a letter that was submitted to MET in June 2010.

The entire preparation and excavation of that box cut took about two weeks. The total surface area that was disturbed was in the order of 5 ha and the depth of the cut was estimated at 12 m. Blasting was required to penetrate the un-weathered rock.

Swakop Uranium will consult with the MET should other bulk sample pits be required in future.

7.11 Geotechnical Test Pits

As part of feasibility studies geotechnical test pits need to be excavated. The test pitting process generally involves four wheel drive tractor mounted loader-backhoes (TLBs) that are used to dig approximately 4 m long, by 1 m wide and approximately 3 m deep pits. The pits are logged by the geotechnical team before being closed again. The geotechnical team would typically use 4 x 4 vehicles to get to and from the test pit sites.

The pit sites are typically chosen, as far as is possible, away from known archaeological or historical sites, sensitive rocky outcrops and vegetation. Topsoil is removed to a depth of 300 mm and stored separately, before the pit is dug and logged. On completion of the test pit work, the soil is replaced in the order in which it was removed, and the pit finished with the reserved topsoil. A single track to and from the site will preferentially be made. Generally, two types of soil samples are taken for further test work. The area disturbed by test pitting is about 50 m^2 and is rehabilitated upon completion of the test pits.

Dynamic cone penetration tests (DCP tests) may also be carried out in undisturbed ground adjacent to test pit positions to obtain an indication of the consistency of the soil profile. The DCP tests involve hammering a 20 mm rod into the ground to measure the soil consistency. The area temporarily impacted is less than one square meter.

7.12 Maintenance of access roads on the EPLs

Swakop Uranium now has a team of about six personnel to undertake the road maintenance and rehabilitation of its drill sites.

The access roads to all field camps (Husab Camps and Ida Camp), and the main access road through EPL 3138 area are regularly “dragged”, the process of which consists of passes by a truck dragging large heavy tyres behind it. This ensures that corrugations are kept to a minimum, and that drivers are not tempted to drive alongside the track. It also improves safety on the roads.

Dust suppression by means of water bowser will take place, if needed, on main tracks that are regularly used to access a drill area. Access roads to and from Ida Camp are maintained when necessary. The track from Ida Camp to the Moon Landscape intersection is restricted to light vehicles. The main park road to the Big Welwitschia is graded twice per month by Swakop Uranium.

7.13 Storage and Disposal of Waste from Metallurgical Test Work

Remains of the metallurgical test work undertaken in Australia and in South Africa have to be returned to Namibia (by law) for their safe disposal. All laboratory return material, such as pulp, is currently stored on site as per the RMP requirements. Eventually most sampling rejects/pulps, together with metallurgical materials originating within the project will need to be disposed of. Ultimate disposal will be within the future waste rock/tailings facilities. Eventually drill cuttings will be disposed of in the same way.

7.14 Other

Survey beacons are required for accurate topographical mapping of the proposed mine. Generally beacons are placed at high points on the site and calibrated with both aerial and land surveys. A concrete block is cast, into which the survey beacon is mounted.

The survey beacons need nearby access by road, and then a pathway to the site itself.

7.15 Vehicles and drilling equipment on site

The numbers of vehicles linked to an exploration programme can change from time to time. Many vehicles were needed on site to support the 17 drill rigs utilised during 2011 to delineate the Husab ore body. **Table 6** lists the vehicles and equipment required for use during current exploration activities (2013). The majority of the equipment on site is owned and maintained by drilling contractors. Any changes in the size of the drilling fleet are reported in the Bi-annual reports submitted every six months to the MET.

Table 6: List of vehicles and drilling equipment in use for geological exploration – January 2013.

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Equipment and vehicles	Swakop Uranium	RC drilling	Diamond drilling	Survey crews	Road maintenance & rehabilitation	Waste and sewerage management	Totals
Light Vehicles	12	3	3	2	1	1	22
Trucks	2	4	3				9
Drilling rigs		2	1				3
Tractors							0

The numbers vary depending on the number of drill rigs on site and stage of exploration

7.16 Vehicles for bulk sampling, test pits, geophysical surveys, airborne surveys

Equipment needed for feasibility study test work or bulk sampling will vary in size and type.

The bulk sample pit (box cut) was excavated by small conventional mining equipment using a local contractor. No other bulk sample pit is required prior to mining, although geotechnical soil profile pits will be dug using back actors.

As exploration proceeds, new deposits may require bulk sampling, or areas need test pitting, to determine foundation conditions. The equipment to be used will depend upon the bulk sample pit depth.

7.17 Field Camps

Two field camps were established by Swakop Uranium – the Ida Camp on EPL 3439, and the Husab Camp on EPL 3138 **(Figure 5).** Additionally, a third camp was established at the derelict buildings of the old Husab fluorite mine site on EPL 3138 near the Husab Camp. This 3rd camp is used, and maintained, by various drilling contractors contracted to Swakop Uranium. Permission from the MET (Parks and Wildlife) was obtained to establish all three of the camps.

7.17.1 Ida Camp (main geological camp)

Facilities

- Main office on wooden deck (including storage area)
- Mess building on wooden deck (including kitchen, dining area, 2 x toilets and outside entertainment area)
- 1 demountable office unit
- 10 tents with attached toilet / shower on wooden decks (senior staff)
- 8 x wooden decks fitting 3 tents each (general exploration staff)
- 8 x separate toilet / shower blocks for the above
- Shade cloth huts include:
    - Coreyard logging area
    - Sample storage hut
    - Core cutting hut
    - Generator hut
    - Oil / lubricant storage hut (in drip trays)
- 4 000 l purpose-built diesel storage tank – refilled as required by fuel supplier from fuel tanker
- 35 000 l of water tank storage (4 tanks) – potable water, cooking, core cutting, washing etc.

Activities

- Administrative camp, senior staff offices
- Accommodates 29 staff.
- General roster is 3 weeks on 1 week off – staff on site over weekends
- Diamond core processing (logging, cutting etc)
- Soccer field for recreation
- DSTV equipped TV in mess hall

Physical area/footprint estimated from Google at <10 ha.

7.17.2 Husab Camp

The Husab Camp is located on the footprint of the old office block and workshops at the Husab fluorite mine.

Facilities

- Main camp area – 3 demountable units arranged in an "L" shaped pattern, used for field office, kitchen and TV room. Units and surrounding area covered with shade netting and floored with interlock bricks – this serves as an outside dining hall and entertainment area.
- 3 additional sea containers used for storage (food, tools and field supplies)
- Positioned in/under remains of old Husab mine buildings, plus beneath shade cloth huts fabricated by Swakop uranium – 78 tents for staff.
- 1 caravan and small shade cloth hut for Swakop Uranium's OHS Officer.
- 2 x demountable toilet/shower blocks with 4 showers and 4 toilets respectively. Gas geysers for hot water.
- Additional 3 portable toilets
- Additional sheds/shade cloth huts for:
    - Generator
    - Oil and lubricant storage (on drip trays)
    - Gas bottles
    - RC reference sample storage
- 20 000 l of water tank storage (4 tanks) – potable water, cooking, washing etc.
- 9 000 l purpose built diesel storage tank – refilled as required by the fuel supplier from a fuel tanker.

Activities

- Accommodates up to 80 staff – at peak of exploration programme
- General roster is 3 weeks on 1 week off – staff on site over weekends.
- Field camp for general staff involved with Swakop Uranium.
- Soccer field for recreation.
- DSTV equipped TVs (X2).

Physical area/footprint estimated from Google at < 5 ha

7.17.3 Contractors' Camp

This camp is located on the footprint of the mine hostel at the old Husab fluorite mine. It houses employees drilling contractors. Each contractor is responsible for maintaining their own camp area and facilities.

Facilities (Total)

- Up to 40 demountable sleeping units (depending on numbers in camp)
- 0-7 Caravans
- 1 - 12 portable toilets (depending on numbers in camp)
- 1 pit latrine
- 1 - 7 portable showers (depending on numbers in camp)
- Individual kitchen units - the number of which depend on how many are in camp
- 1 demountable TV room
- 28 000 l of water tank storage (8 tanks) – potable water, cooking, washing etc
- 3 x purpose built diesel storage tanks (23 000 l each) – refilled as required by the fuel supplier from a fuel tanker. Only one is currently being utilised.

Activities

- Accommodates ~75 staff at peak
- General roster is 3 weeks on 1 week off – staff on site over weekends
- Field camp for drilling contractors
- DSTV TV x1

Physical area/footprint estimated from Google at < 5 ha

7.18 Water consumption

Potable water for human consumption (drinking, cooking) and for ablutions is purchased from NamWater and transported from Swakopmund in water tankers to the 3 field camps on an almost daily basis. Water quantities stored at each camp vary, but a maximum capacity of 35 000 l of water can be stored at the Ida Camp, 20 000 l at the Husab Camp and 28 000 l at the Contractor's Camp. In addition, abstraction of groundwater takes place from fractured bedrock aquifers on the Husab prospect, to supply water for diamond drilling and dust suppression.

In 2008, Swakop Uranium drilled two abstraction boreholes in the Swakop River: these holes are not in use although a license to abstract water form them for construction purposes was obtained. Water for diamond drilling and dust suppression is currently being abstracted from five converted RC boreholes in close proximity to the Husab Project. The number of boreholes active at any one time is dependent on day-to-day requirements. A sixth converted RC borehole located at the Salem prospect has also been drilled and will be used to provide water for drilling activities at the new Etherandu prospect. Three boreholes were drilled for monitoring purposes in the Khan River at the end of 2011.

The amount of water used for drilling is recorded. The abstraction rates from bedrock aquifers are however lower than from the alluvial aquifers with yields in current bores ranging from 1.8 kl/hr to 4.5 kl/hr.

The groundwater is stored in a series of above ground temporary reservoirs. These dams have a maximum storage capacity of approximately 240 kl. The average daily abstraction rate for 2010 over twenty one weeks was ~132 kl/day

A permit to abstract water is required from the Department of Water Affairs (DWA) for all operating boreholes. These permits are in place and abstraction figures are reported quarterly.

7.19 Fuel storage

Fuel, in the form of diesel can be stored at the three camps located on EPLs 3138 and 3439. The fuel storage facilities at each camp are listed below:

Ida Camp	4 000 l – one tank
Husab Camp	9 000 l – one tank
Contractors' Camp	28 000 l – three tanks

All tanks are stored above ground within concrete or steel bunds.

7.20 Sewage Management

A contractor from Swakopmund provides and services chemical portaloos, which are located at the drill sites. The portaloos are cleaned and serviced daily by two personnel driving a light vehicle. Septic tanks service the Husab and Contractors' Camps. These are emptied on a regular basis by the contractor and the sewage is discharged at the Swakopmund sewerage treatment plant. The Ida Camp is serviced by 12 French drains. All French drains have received authorization from DWA.

7.21 Disposal of domestic waste

The management of domestic waste is contracted out. The contractor provides skips and bins into which Swakop Uranium personnel and contractors discard their waste. Recycling is promoted and separate receptacles are provided for kitchen waste, cans and bottles, and paper and cardboard. On a regular basis, the waste contractor truck drives to site from town, collects the domestic waste and transports it to the Swakopmund landfill for disposal.

7.22 Disposal of hazardous waste

Hazardous wastes that are disposed of off-site include soil contaminated by hydrocarbons and RC drill chips. Contaminated soil is collected by the domestic waste disposal contractor and sent to a disposal facility in Walvis Bay. Radioactive drill chips, contained in plastic bags, are disposed of on site at the old Husab fluorite mine (see Section 7.9).

7.23 Rehabilitation Activities

Rehabilitation of drill sites and tracks is undertaken by both Swakop Uranium and contractor rehabilitation teams. Rehabilitation is an ongoing process and efforts are made to rehabilitate drill sites as soon as drilling has been completed.

Waste material (plastics/contaminated soil etc) is collected and disposed of into the appropriate waste skip bins. Bulk RC samples are collected and disposed of as per the practice outlined in Section 7.9.

Diamond drilling sumps are left to evaporate and are then filled in. Open drill hole collars are initially plugged, and then subsequently cut and buried once all geological data has been collected.

All drill sites are smoothed as soon as practical, using rakes and brooms, in order to improve the visual impact. If vegetation was removed when establishing the track or drill pad, this is replanted once raking of the site is complete. Drill site access tracks are only rehabilitated once all activities at drill sites are complete. To date many of the drill sites have been rehabilitated, however, most of the access roads and tracks remain. These will be rehabilitated in areas that are not part of the Husab Project.

7.24 Welwitschia Field Survey – population count

In August 2009 a team of Swakop Uranium personnel commenced with a field survey (on foot) to count the number of Welwitschias living on the Welwitschia plains, located to the south of the Husab Project.

Each plant is geo-referenced, described as male, female or unknown. Every plant is photographed with a ruler for scale, and its position in the landscape noted (in or out of a channel). The plants state of health assessed subjectively, good, poor or dead. A small blue chalk marker is left at the plant once it has been surveyed.

As of December 2012, over 52 000 individual plants had been mapped (**Figure 6**). The intention is to continue mapping the entire Welwitschia field in the area of Swakop Uranium's Mining License 171 boundary. Data collected from these surveys will be used to determine the population dynamics of the plants and to provide the basis for other scientific studies.

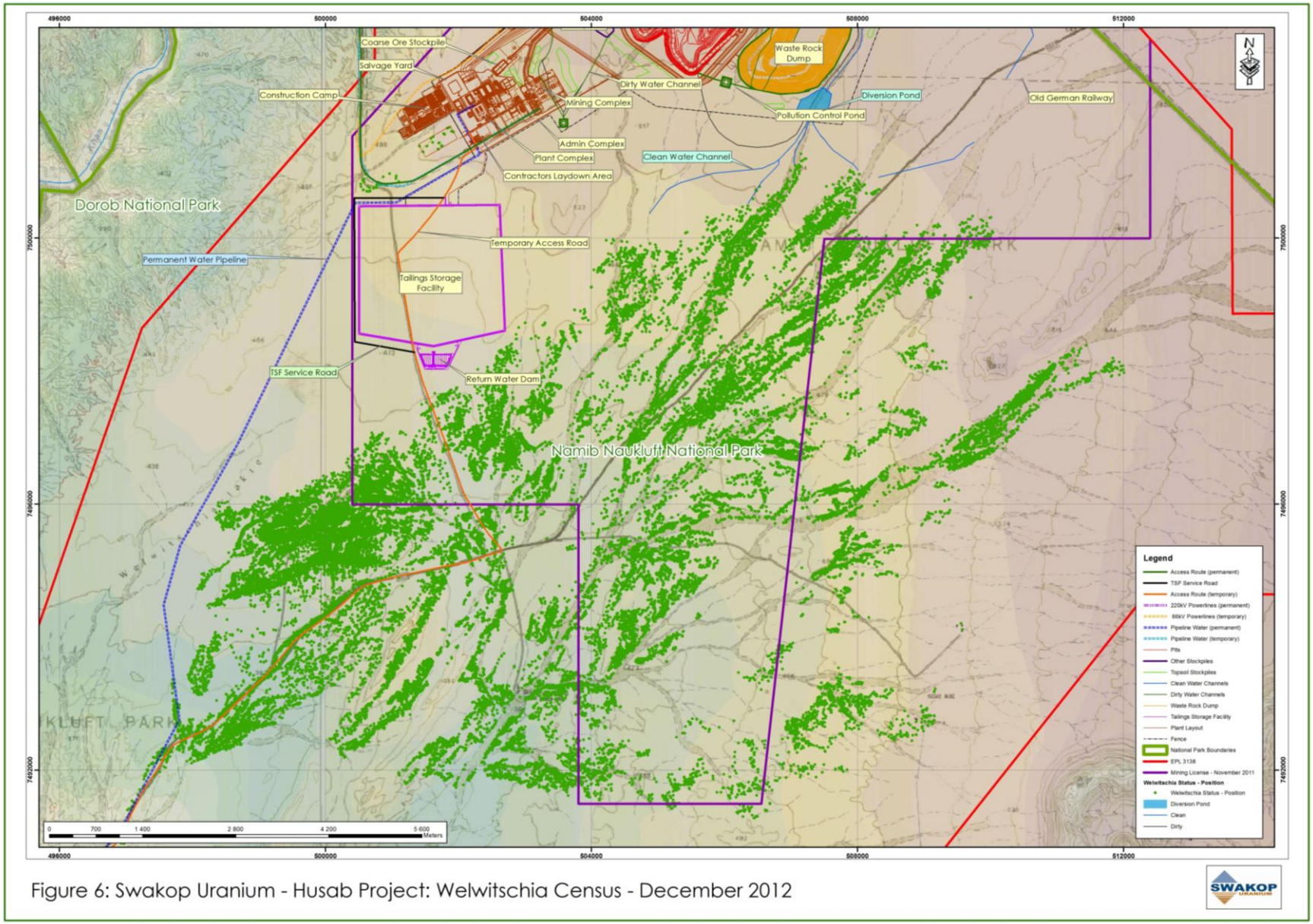

Figure 6: Welwitschia Census December 2012.

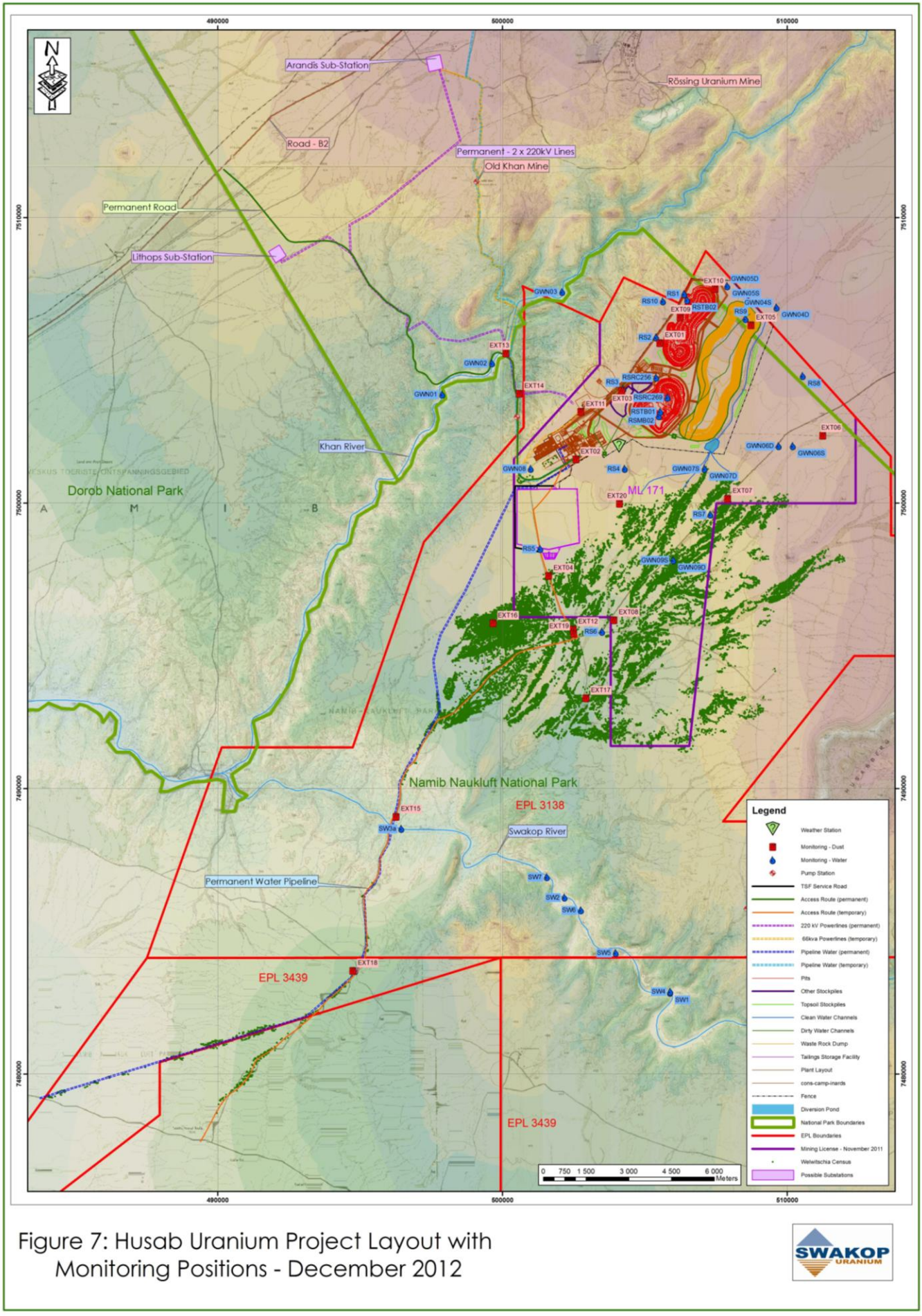

Figure 7: Husab Uranium Project Layout with Monitoring Positions - December 2012

Figure 7: Swakop Uranium's ground water and dust monitoring site layout (Dec 2012).

7.25 Dust monitoring

A dust monitoring program was implemented on the Husab Project site in 2008 **(Figures 7 and 8).** Some 20 dust buckets are in place and there is also a PM_{10} sampler situated with the original weather station in the north of the EPL, to the west of the Zone 1 resource and planned pit. Dust buckets are changed monthly; PM_{10} filters weekly. All samples are sent to a suitable laboratory, and the data then forwarded to the contracted air quality consultant and the environmental manager. Air quality is reported upon internally, and quarterly air quality reports are produced by the air quality consultant.

The dust buckets are situated near to exiting tracks and, in future, some may be located to the periphery of the Mining License area and out of the mining footprint. To access the buckets a field vehicle drives to a nearby point on the road/track, then the technician/geologist walks to the dust bucket with a ladder and new buckets to effect the changeover. Any dust buckets north of the NNNP fence will be accessed by vehicle through the Camp 12 gate. Sites west of the proposed mine will be accessed by established tracks.

At some of the sites a short track leads to the dust bucket. The driver reverses the vehicle in to the site in order to avoid a three point turn and consequent widening of the area of impact.

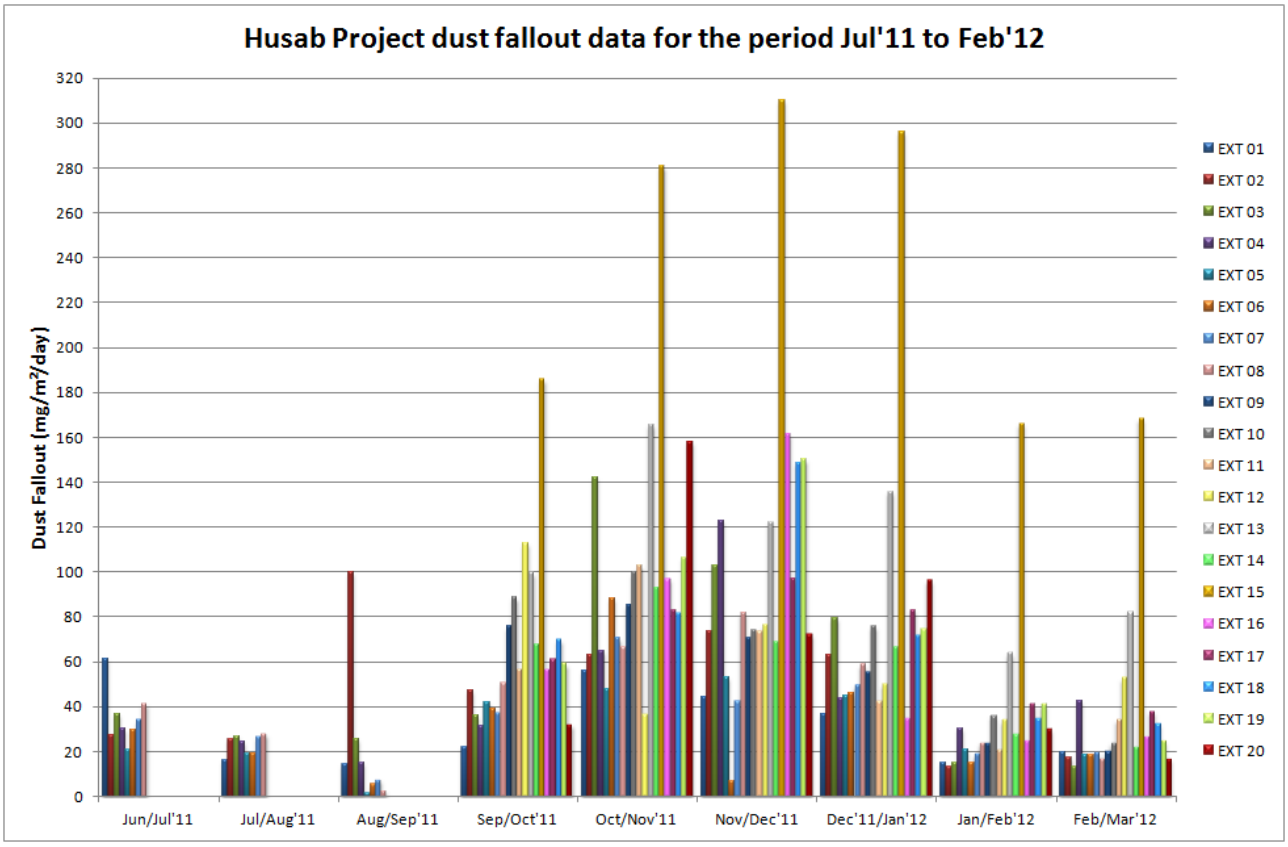

Figure 8: Dust fallout rates from the Husab Project monitoring network for the period July 2011 to February 2012.

The dust fallout rates are generally low and well within the standards selected for the Husab Project; 600 mg/m²/day and 350 mg/m³/day. The highest and second highest rates to date of 310 mg/m²/day and 296 mg/m²/day were collected at EXT15 during Nov/Dec 2011 and Dec 2011/Jan 2012. EXT15 is located to the southwest of the main exploration activities in the Swakop River valley, near the Ida campsite.

7.26 Groundwater monitoring

Swakop Uranium has at least eighteen water boreholes for groundwater monitoring purposes **(Figures 7 and 9)**. Three holes are located in the Swakop River, and three have been drilled in the Khan River. The remainder are spread around the Husab Project area. The groundwater monitoring programme consists of the following procedures.

Initially, after all exploration holes have been drilled, they are dipped to determine the water levels. This provides some baseline data. Secondly, SU personnel dip the water monitoring bores on a monthly basis to

get baseline groundwater level data. This is provided to the groundwater consultant for annual reporting purposes.

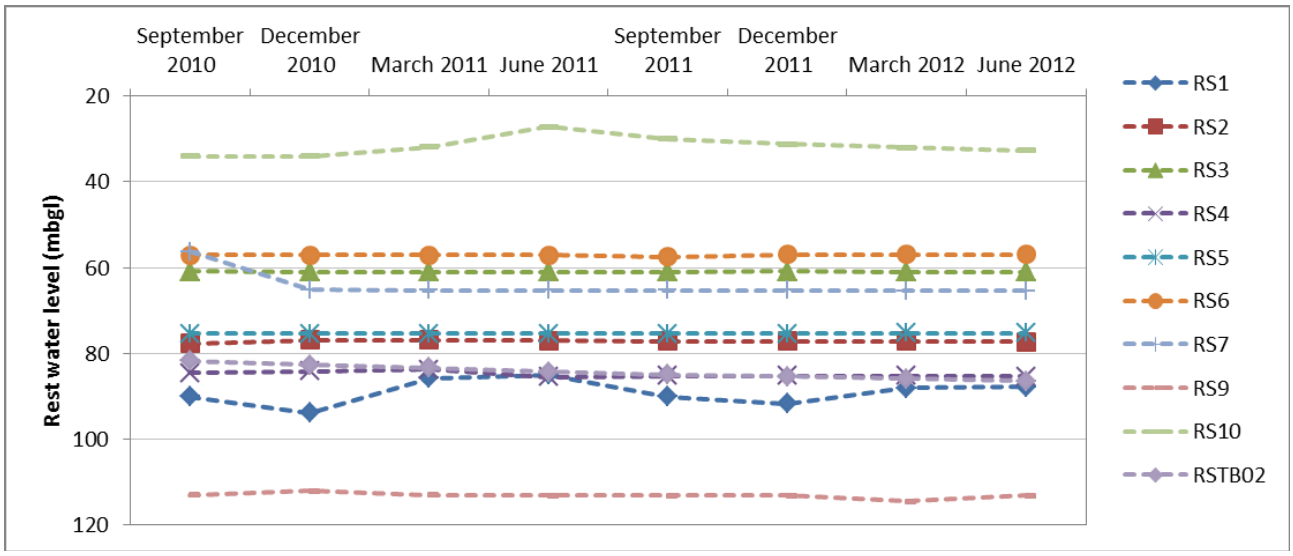

Figure 9: Groundwater Hydrograph in Basement Aquifer Monitoring Boreholes from September 2010 to June 2012

The boreholes are also sampled by an independent groundwater consultant on a quarterly basis for anions, ions, and various radioactive elements. Two vehicles go to site, one towing a pump for purging water from the holes prior to taking a clean water sample. Any boreholes to the north of the NNNP fence can be accessed by vehicle though Camp 12 gate.

The purged water is discharged onto the ground. The samples are prepared according to accredited procedures, stored and then dispatched to various laboratories for different analyses. The data will provide input to the groundwater model for the Husab Mine, and to the SEMP ground water monitoring program that is being implemented for the Central Namib. Ground water results are provided in regular reports to the DWAF as per permit requirements **(Annexure 6)**.

7.27 Radiation monitoring

Swakop Uranium's exploration team operates a system of fixed and mobile personnel radiation dosimeters which record local exposure rates, and give a qualitative view of exposure rates over different areas within the Husab Project. Urine samples are also taken and tested regularly.

Passive radon cups have been deployed over the EPLs and the data from this sent to NESCA as part of the radiation monitoring for the Husab Mine EIA baseline data.

This radiation monitoring system has been revised with the completion of the Exploration Radiation Monitoring and Safety Plan (RMP). Approval for the Exploration RMP was received in February 2011 **(Annexure 5).** The RMP does not form part of this EMP as it is a requirement of other legislation.

Swakop Uranium is currently in the process of producing a radiation management plan for the construction, mining and processing activities for the Husab mine.

7.28 Vegetation removal / monitoring

Permits are required from the Department of Forestry and/or the NBRI to remove sensitive vegetation prior to excavations. Swakop Uranium removed several plants from the box cut area, with the necessary permits in place. The plants have been housed at the National Botanical Gardens in Windhoek.

If, during future exploration, plants need to be removed, the necessary permits will be sought from the relevant departments.

Permits were applied for by SWU, and issued by the MET, for the removal of several protected species from the footprint of the proposed mine and its linear infrastructure. Several relocation exercises have taken place, and five Welwitschia were excavated with the specific intent of understanding their root systems.

7.29 Accessing sites across the park fence

Swakop Uranium has a number of old drill sites, new ground water monitoring site(s) and a fall out dust monitoring site to the north of the NNNP fence **(Figure 7).** Previously, in order to access the drill rigs and monitoring sites on the north of the fence, Swakop Uranium personnel would drive over fallen sections of the fence. Subsequent to the end of the drilling in that area, the fence was re-erected.

Although there is no further drilling in the area, according to DPW officials the fence is still being flattened, either by unknown persons or by natural causes (high winds maybe). SU may need to access future groundwater monitoring holes and fall out dust buckets as part of its environmental monitoring commitments. Past requests to have a lockable gate, exclusively for the use of SU put into the NNNP park fence were denied. Therefore future access to the north of the fence will require (for vehicles) a detour via the Camp 12 gate, or require that the monitoring sites are accessed on foot.

With the start of the construction of the Husab mine, the mine fence line will extend into the area north of the park fence, and access to all monitoring or drill sites will then be on designated tracks on Swakop Uranium's mining license area.

7.30 Environmental Reporting

As stipulated in the previous Pro-forma Environmental Contracts issued by the Ministry of Environment and Tourism (MET) for EPLs 3138 and 3439, Swakop Uranium is required to submit an Environmental Report to the MET every six months.

WAGE/Swakop Uranium has been submitting reports, undertaken by an independent environmental consultant, since 2006 (approximately 14 reports). The bi-annual reports detail exploration activities from the preceding six months and measure performance against the commitments detailed in the EMP.

New activities or changes are also described, and the areas that have been rehabilitated are listed. Deviations to the management plan are noted and time frames given to Swakop Uranium in which to rectify any non-compliances.

7.31 Communications with MET

Swakop Uranium endeavours to maintain good working relationships with the MET's Department of Parks and Wildlife (DPW) personnel that manage the Namib Naukluft National Park. Regular correspondence has taken place between them since 2006, and ongoing communication is envisaged, particularly when new activities are planned or situations arise that need input from DPW personnel. The warden and chief ranger have been actively involved in the independent audits of the exploration activities over the past two years (**Figure 10**).

Swakop Uranium has also been removing waste from the bins at the three main tourist sites on its EPLs, the Big Welwitschia, the Welwitschia camp and the Swakop River camps. Recently SU sponsored the placement of sets of recycle bins at these sites (**Figure 11**). The bins are similar to those placed by Langer Heinrich at Bloedkoppie.

Figure 10: DPW and MET officials regularly visit site and engage in problem solving, and/or join the lead auditor on Bi-annual audit days.

Figure 11: The NNNP accepts the recycle bins sponsored by Swakop Uranium.

8 POTENTIAL ENVIRONMENTAL IMPACTS ARISING FROM EXPLORATION ACTIVITIES

8.1 Overarching issues that impact on the environment

A few overarching issues that are associated with Swakop Uranium's exploration activities and have the potential to impact greatly on the environment are discussed below.

Swakop Uranium's exploration team is made up of a core group of Swakop Uranium personnel and a number of Contractors (drilling, rehabilitation waste management), all of whom work and live on the EPLs and have the potential to impact negatively or positively on the environment. The biggest risk that Swakop Uranium Exploration has to manage is its Contractors, to ensure that they adhere to the mitigation measures outlined in the EMP (Section 10).

One of the main principles of environmental management is responsibility of an impact from cradle to grave. Swakop Uranium needs to be aware that when it removes an impact from site (e.g. removal of waste from site to disposal facility) that new site is being well managed. If this is not being done then all that Swakop Uranium has done is transfer the negative impact from one area to another and stopped taking responsibility for it.

8.2 Impacts associated with specific activities

Table 7: Potential environmental impacts associated with exploration activities at EPL 3138 & 3439

X = small impact; X = medium impact; **X** = high impact; **+ve** = positive impact

Exploration activities	Surface / ground water	Soils	Air	Bio-diversity	Visual	Sense of place	Safety & Health
Mapping, aerial surveys					X	X	
RC drilling		X	X	X	**X**	**X**	X
Diamond drilling	X	X	X	X	**X**	**X**	X
Drill Hole Surveying – Down Hole & Surface		X		X			X
Bulk sampling		X	X	X	**X**	**X**	X
Geotechnical test pits		X		X	X	X	
Diamond Core logging & Analysis			X	X	X		X
Disposal of RC samples	X	X	X	X	X	X	X
Camp establishment and management		X	X	X	**X**	**X**	
Maintenance of roads	X		X		**+ve**	**+ve**	**+ve**
Energy consumption					X	X	
Water consumption	X						
Generation of solid waste		X	X	X	X	X	X
Generation of sewage and grey water		X	X		X		X
Radiation	X	X	X				X
Establishment of access roads and tracks		**X**		**X**	**X**	**X**	
Vehicle activity (incl driving to site & moving around on the EPLs)			X	X		X	X
Rehabilitation		**+ve**	**+ve**	**+ve**	**+ve**	**+ve**	

9 ENVIRONMENTAL MANAGEMENT PLAN FOR EXPLORATION ACTIVITIES AT SWAKOP URANIUM

The environmental management plan (EMP) covers the potential impacts associated with the proposed exploration and feasibility study activities outlined in the Project Description (Section 8). Management or monitoring of some of the environmental elements (e.g. air or water) that can be affected by the different activities are grouped together and are also addressed.

Table 8 is the Environmental Management Plan (EMP). For effective implementation, the EMP should be incorporated into the management control system for the exploration project. Bi-annual reporting must be done against the commitments outlined in the EMP.

The overall responsibility for sound environmental compliance on EPL 3138 and 3439 (outside of the Mining License area) lies with the Ore Resource Manager. If they are not permanently on site, they must appoint a person responsible of the implementation of the EMP during their absence.

Table 8: EMP for EPLs 3138 & 3439

Issue	Aspect	Potential impact	Mitigation measure/recommendations/explanation
Governance	To establish and ensure a strong commitment to environmental management throughout exploration To ensure that the roles and responsibilities for implementation of the EMP are defined	Poor commitment by management to adequate resources and support will result in poor implementation success.	Provision is made in the budget for • Environmental Awareness and training, • Implementation of the commitments on this EMP, • Environmental monitoring, • Rehabilitation costs, • Communications with relevant stakeholders, • Regular auditing and reporting. Formal appointment of a senior person to assume overall responsibility for environmental management. Appointment of a qualified environmental officer to implement the EMP. A culture of respect for the environment and a commitment to managing environmental impacts is promoted. Senior exploration staff and all senior contractors understand their roles and are taking responsibility for implementing the EMP. Regular liaison with MET (specifically DPW) whenever new activities (e.g. additional access roads, or camps, new disposal sites etc) are planned.
Contractor Management	To ensure that Contractors abide by the commitments made in the EMP and help implement the EMP	Failure of contractors to practice good environmental management can compromise effective environmental management on site	The EMP should be included in all Tender Documents, so that Contracts can factor in the cost of environmental compliance in their tender proposals. All Contracts must stipulate the need for contractors to adhere to, and help, implement the commitments made in the EMP. The Contractor must develop and submit to Swakop Uranium (SU) an Environmental Management Plan based on SU's exploration EMP, but specific to the contractors' activities All Contracts should have penalty clauses to ensure that Contractors can be penalised if they fail to meet their environmental commitments. Contractors should appoint their own environmental officer to oversee their activities. This person will be required to meet regularly with SU to discuss environmental issues.

Issue	Aspect	Potential impact	Mitigation measure/recommendations/explanation
Environmental awareness briefing / training	To implement environmental awareness briefing / training for all individuals who visit, or work, on site.	If personnel are not aware of their roles and responsibilities and do not understand the rationale for environmental management, effective implementation is unlikely to take place	All personnel who work on or visit the site (including contractors) are inducted so that they are aware of the contents of the EMP and the rules of the Namib Naukluft National Park (see section 5.3.1). Regular environmental awareness campaigns / briefings are held to ensure that personnel (staff and contractors) improve their understanding of environmental issues. Training on specific issues (e.g. rehabilitation, waste management, radiation control etc) will be undertaken regularly.
Relationships with government authorities	To maintain sound relationships with the landowner (MET – Parks and Wildlife). To ensure compliance to the terms of the environmental contract (MET-DEA). To ensure compliance with all issues regarding water consumption and disposal (MWAF – DWA) To ensure compliance will all matters pertaining to radiation safety (National Radiation Protection Authority (NRPA), an independent authority that is currently attached to the MoHSS) To ensure compliance to all Health and Safety requirements (Ministry of Labour)	Failure to establish and maintain good relationships with the regulators may make it difficult for Swakop Uranium to maintain its license to operate.	Ensure regular liaison with Department of Parks and Wildlife (e.g. Chief Warden) whenever new activities (e.g. additional access roads, or camps, new disposal sites etc) are planned. Establish a protocol regarding activities that involve moving across the NNNP boundary fence. Report to Department of Parks and Wildlife (Chief Warden) in the event of road kills, removal of plants or when any other misdemeanour occurs. Report regularly to Department of Water Affairs in terms of the conditions laid out in the water extraction permit Obtain relevant sewage disposal permit for French drains Obtain permits when collection and/or removal of plants or trees is required. Report bi-annually to MET (DEA) Ensure the Radiation Management Plan, is current and approved by the NRPA. Report against the commitments made in that plan. Develop a Health and Safety Management plan and report against the commitments made in that plan.
Safety and health of personnel on site	To ensure that a workplace, conducive to the safety and health of personnel is maintained	The protection of worker health and safety is paramount. Failure to establish good safety and health practices could result legal disputes that negatively affect SU's integrity.	Develop a Safety and Health Management Plan (not included as part of this EMP). Appoint and train a safety officer. Implement the Safety and Health Management Plan.

Issue	Aspect	Potential impact	Mitigation measure/recommendations/explanation
Driving in the NNNP	Corporate image, tourism, dust, health and safety	Negative publicity Accidents, with or without injuries Injury / death of animals Dust (see below) etc	The track from Ida Camp to the Moon Landscape intersection is restricted to light vehicles. Speed monitoring tracking devices shall be installed in all vehicles operating on site to ensure compliance with site and NNNP speed limits. Gravel road driving procedure/rules shall be followed.
Dust created during drilling (RC and diamond) and bulk sampling	To manage dust generated at drill and bulk sampling sites	Deterioration in air quality from PM10s, fallout dust and long lived radioactive dust Deterioration in safety due to bad visibility Deterioration in health due to the inhalation of dust.	Establish a dust monitoring programme for relevant dust producing activities on both EPLs. Fall out dust, radioactive dust and PM10s should be monitored. Ensure that all personnel working on drill or bulk sampling sites wear appropriate PPE when dust is being generated. Wherever possible, minimise dust generation by adopting different technology or applying dust suppressants.
Management of soil pollution	To avoid and minimise the pollution of soils	Damage to structure and composition of soil. This will make it difficult for plants and animals to re-establish once exploration activities cease.	Prevent pollution of soil by ensuring that all hazardous materials are stored in bunded areas. Ensure that all drill rigs and fuel trucks have hydrocarbon spill prevention equipment on site and are using it. For example, drip trays, HDPE plastic sheeting, oil absorbent materials etc. Clean up all spills immediately. For small spills, the contaminated soil is to be removed and dumped at an appropriate disposal facility. Large spills are to be treated *in situ* to the satisfaction of the Site Environmental Manager Once the spill has been treated the area is to be rehabilitated.
Management of soil compaction and erosion	To minimise compaction, erosion	The desert soils typically form crusts that are very stable. Once disturbed, they are prone to erosion and easily lost.	Minimise compaction of soils by keeping the disturbance footprint (vehicle tracks, camp sites, drill sites) as small as possible. Promote use of walkways at the campsites to limit compaction from footpaths. Avoid sharp bends in roads as these typically become eroded and the soil blows away leaving holes. Use three point turns to turn a vehicle around to keep within the road footprint and to avoid disturbance of areas adjacent to the road. Rehabilitation of disturbed sites must be done carefully to minimise the potential for wind and water erosion. The use of fine mist sprays or dust suppression products is one technique that might be tried to help re-establish the soil crust.

Issue	Aspect	Potential impact	Mitigation measure/recommendations/explanation
Consumption of groundwater	To avoid over extraction of groundwater	Decrease in local and possibly regional water supply. Reduce / avoid negative public perceptions regarding mining use of ground water.	Establish a water monitoring programme that encompasses the relevant groundwater use activities on both EPLs. Quantities used, rest water levels, and quality should be monitored. Ground water level data must be recorded for all new boreholes. Reuse water as much as possible.
Pollution of groundwater	To avoid the pollution of any water and prevent polluted water from entering stream channels or underground aquifers.	Pollution of ground water has the potential to impact on water users such as plants, animals or downstream users Breaking of the law as the water act forbids the pollution of any water bodies in Namibia	There will be no discharge of untreated effluent (sewerage, grey water, and water from diamond drill sumps) into the environment. All effluents must be contained and, if necessary, treated (the effluent discharge standards must be met) before discharge to the environment. Evaporate water from diamond drill sumps.
Management of biodiversity	To avoid / minimise disturbance to biodiversity	Permanent destruction or long term disturbance to plants, animals, the habitats in which they live and the ecosystem processes on which they depend.	Avoid disturbance of the Welwitschia plains. Avoid activities on the rocky outcrops and ridges Avoid damage to all protected plants, trees and animals. If disturbance is unavoidable, ensure that the necessary permits are obtained before plants are removed or destroyed (Permits obtainable from Dept. of Forestry for trees and from National Botanical Research Institute (NBRI) for plants). The area of disturbance resulting from exploration activities must be kept to a minimum (i.e. as small a footprint as possible). Open water reservoirs are discouraged as they attract wildlife and insects. Sumps at diamond drill sites should be fenced off to prevent access by wildlife. Minimise the opportunity for scavenging by enforcing strict litter and waste disposal control. Minimise the potential for road kills by observing park speed limits. Report all animal kills to DPW. Minimise the amount of lighting in camp sites to reduce the potential for insect fatalities. Feeding of wildlife is not permitted. Collection of plants or animals is prohibited. Plants may only be removed, where necessary, with the relevant permit.

Issue	Aspect	Potential impact	Mitigation measure/recommendations/explanation
Management of impacts on visual environment and the sense of place	To preserve the scenic aspects of the target area and surroundings. To minimise visual impacts created by exploration as far as reasonably possible.	EPLs are located in a national park. This section has a high visual appeal and a special sense of place that will be compromised by exploration activities. This may impact on tourism.	Ensure that any new campsite is established in area of low visual intrusion and must be designed and built in such a way as to minimise visibility from tourist routes and viewpoints. Minimise lighting in camps to reduce light pollution at night. Use yellow lighting where possible Noise levels in camp sites are to be strictly controlled. Minimise the number of access roads and tracks created. Minimise dust. Ensure strict waste management, especially littering along roads and at drill sites. Avoid damage to plants and animals. Maintain a neat and orderly operation. Rehabilitate drill sites and tracks as soon as possible after drilling has ceased. Rehabilitate illegal tracks as soon as noticed. Maintain access roads in good condition. Ensure that geological features worth preserving, or that could be potential sites of scientific interest, are not defaced. The exploration camp and any other areas disturbed by exploration activities are rehabilitated in consultation with Department of Parks and Wildlife.
Management of domestic waste	To maintain a clean, tidy and safe site at all times	Disturbance to biodiversity (scavenging), visual impact (litter), soil (spillages)	It is recommended that the following waste management procedures are implemented on site and at the camp: • Minimise waste generation, • Separate and recycle waste as far as practically feasible, • Dispose of domestic waste at the landfill site in Swakopmund, • Provide waste containers with lids (to prevent wind blown litter and scavenging) at the camp, • Remove litter from drill sites on a daily basis and dispose of in the waste bins at camp. Illegal dumping and littering will not be tolerated. Swakop Uranium will make it clear that repeat offenders will have to leave the site.

Issue	Aspect	Potential impact	Mitigation measure/recommendations/explanation
Establishment of access Roads and Tracks for exploration activities	To minimise the impact that roads and tracks have on the environment	Impact on soils, biodiversity, visual, sense of place, and archaeological sites	Access to the EPLs will be restricted to the official access roads as discussed with the Chief Warden of the Park. As far as possible existing tracks will be used. As far as possible avoid the creation of sharp bends in the road as these areas become badly eroded very quickly and are difficult to rehabilitate. However, try to avoid the establishment of completely straight tracks as these are very visible. Rehabilitate drill tracks as soon as possible after drilling ceases. Maintain access roads in good condition to prevent people having to drive on the curb – thus widening the road. Implement dust suppression on roads where there is a lot of activity.
Management of hazardous substances (excluding radioactive materials)	To minimise the risk of pollution through the implementation of all reasonable measures to prevent leakage, spillage or inappropriate disposal of hazardous substances. To minimise the risk of hazardous substances affecting the health of all individuals and plant and animal life. To use biodegradable products as far as is reasonably possible.	Disturbance to biodiversity (scavenging), visual impact (litter), soil (spillages), safety and health of personnel	Develop a hazardous materials register. All contractors to supply a list of materials to be used and their MSDS sheets. Identify how each hazardous substance must be stored, handled and disposed of. Train relevant personnel in the safe handling of hazardous substances. Follow all regulations outlined in the law regarding the storage and handling of hazardous waste. Wherever possible substitute hazardous substances with less harmful (preferably environmentally friendly / bio-degradable) equivalents. Develop emergency spillage procedures for the various hazardous products kept on site. Deal with spills immediately by containing and then treating the spill. All spill sites must be rehabilitated once the spill has been cleaned up. Soil contaminated by hazardous materials must be disposed of at the appropriate disposal facility. Report hazardous spills (200 l or more) to the Chief Warden and other relevant authorities. Dispose of hazardous waste at the appropriate disposal facility. A disposal register should be developed that explains where and how each hazardous material will be disposed.

Issue	Aspect	Potential impact	Mitigation measure/recommendations/explanation
Management of radiation associated with uranium exploration	To ensure that radiation exposure for both personnel and the public is as low as reasonably achievable (ALARA principle)	Impact on personnel and public health	Ensure that the radiation management plan is current and approved by the NRPA. Appoint and train a radiation safety officer and radiation safety assistants Implement and monitor the Radiation Management Plan
Management of radioactive waste	To ensure the safe and responsible disposal of all materials that are radioactive	Impact on safety and health of personnel and public	Dispose of RC drill chips in plastic bags at the Husab fluorite mine as arranged with the Department of Parks and Wildlife
Disturbance to archaeological sites and artefacts	To prevent or minimise damage to archaeological sits and artefacts. To record accurately any new sites found and report to the responsible authority.	Limited access to and from the Khan River goes directly through the remains of the Welwitschia siding of the early colonial narrow gauge railway (QRS 105/27). This track was in place prior to the commencement of exploration, and in order to avoid creating new tracks, was it use was continued. However, the track has impacted on the embankments and siding. The remnants, although damaged, are still of interest and require conservation.	Vehicle traffic through the Welwitschia siding site should be re-directed, and kept away from both the siding and the railway earthworks in the stream channel leading down to the Khan River. To assist in this action, warning/deviation signs should be placed on the approaches to the siding and all unnecessary vehicle traffic should be routed away from the earthworks. Make use of the available archaeological survey(s) of EPLs 3138 and 3439 Husab Project to establish where the archaeological sites of importance are. Any new archaeological sites that are found are not be disturbed, but be reported to the SU exploration and site environmental managers who will appoint a professional archaeologist to document and record the site. The Chance Find procedure shall be used as guideline. Due to the sensitivity of heritage sites, all reasonable precautions must be taken by management to prevent disturbance, preferably without revealing exactly where the location is. This is to avoid destruction or looting thereof No heritage objects may be moved without a permit from the National Monuments Council and any permitted removal of heritage objects is done under the supervision of a qualified archaeologist, palaeontologist or historian.
Camp establishment and management	To ensure that temporary exploration camps are located in an area deemed suitable by MET. To ensure that the disturbance footprint of the camp remains as small as possible	Disturbance of soil, biodiversity and sense of place	The location of all camp sites are to be established in consultation with the Chief Warden of the Park. The area of camp sites is to be kept as small as possible. Camps must be designed to minimise disturbance to soils, biodiversity and sense of place. At the end of the exploration phase, the camp must be removed and the disturbed area rehabilitated (unless otherwise specified by Department of Parks and Wildlife). Waste will be managed according to the waste management system. No littering is allowed and recycling is to be encouraged.

Issue	Aspect	Potential impact	Mitigation measure/recommendations/explanation
			Kitchen grease must be captured and disposed of in an appropriate manner. Bins must be covered to prevent flies and other pest animals from gaining access. Washing may only be done in allocated facilities and water disposed of into the septic tank / French drains. Encourage the optimal use of water, avoid waste, fix leaks etc. Lighting must be kept to a minimum; any mast light must be a low as possible and directed downwards to reduce night time visual impacts. The lights should be fitted with yellow bulbs to limit impacts on insects and night animals. Noise should be restricted. Regular communication on the issue of STD's and HIV/AIDS should be provided.
Site rehabilitation	To rehabilitate all sites disturbed as a result of exploration activities to the pre exploration state or a state predetermined by MET and other relevant stakeholders.	Visual impact Tourism activities Soil erosion Re-establishment of vegetation	The following rehabilitation measures are to be carried out as a minimum requirement: Infrastructure is removed. Boreholes are cut and capped. All drill cores are removed from site. All drill chips are disposed of at the old Husab fluorite mine as per agreement with DPW. All debris, scrap metal, etc is removed before moving to a new drill site. All non-mineralised mud generated during drilling is either disposed of in the borehole, in designated holes, or taken off site and disposed of at an official waste site. All diamond drill sumps are to be drained / evaporated, filled in and contoured. The drill site and access tracks are rehabilitated as per the rehabilitation procedure. Rehabilitation of the soils should be done to meet both visual and ecological objectives. Transplanting of plants is undertaken if necessary.

10 REFERENCES

Grimmer, M.E., 1973. Report on the Husab Mine. Unpublished rep. Inspector of Mines, Windhoek

Mannheimer, C. 2008. Husab Project Vegetation study. Unpublished report.

Metago Environmental Engineers, 2010. EIA for Swakop Uranium's Husab Project. Unpublished report.

SAIEA, 2010. Draft chapter on water from the Strategic Assessment of Uranium Mining in the Central Namib. Unpublished report.

QRS, 2009. Archaeological impact assessment of proposed Swakop Uranium Husab Project on EPL 3138, Erongo Region, Namibia: baseline report. Unpublished report.

Annexure 1: MET letter requesting Swakop Uranium to update the exploration EMP.

From:WEST AFRICA GOLD EXPLORATION To:0027118407513 22/06/2010 15:06 #164 P.003/008

22.JUN.2010 14:57 0926461240339 MIN OF ENV TOUR DEA #2764 P.002 /007

Republic of Namibia

MINISTRY OF ENVIRONMENT AND TOURISM

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OFFICE OF THE PERMANENT SECRETARY

The Managing Director
SWAKOP Uranium
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NAMIBIA

23/6/10

Tel.: +264 61 300 220
Fax: +264 61 300 221

Dear Sir,

Re: Sampling by Blasting in the Namib Naukluft National Park in Terms of EPL3138

I refer to your letter dated 7 June 2010 concerning your mini-update to your Environmental Management Plan (EMP). The update is too narrow to capture our environmental concerns on sampling by blasting. But since blasting is recorded as a basic requirement for your project to proceed, this Ministry is generally without objection to its implementation.

However, your EMP must be comprehensively updated concurrently with your initial implementation of this activity but in consultation with this Ministry to ensure that blasting and related noise in the park are not performed indiscriminately. *Moreover, it is your primary responsibility to ensure that blasting instruments, particularly mining explosives, are permitted by both the Ministry of Safety and Security and the Ministry of Mines and Energy.*

Thank you once again for your kind co-operation.

Yours sincerely,

Dr. K. Shangula
Permanent Secretary

Ministry of Environment & Tourism
22 JUN 2010
PERMANENT SECRETARY
REPUBLIC OF NAMIBIA

All official correspondence must be addressed to the Permanent Secretary

Annexure 2: Environmental Clearance Certificate for EPL 3138

Annexure 3: Environmental Clearance Certificate for EPL 3439

Annexure 4: Namib Naukluft National Park Rules

It is unlawful to:

(a) Drive anywhere other than on a road indicated by a road sign

(b) Drive in the park after sunset or before sunrise except on proclaimed thoroughfare

(c) Leave behind or throw away any smouldering objects

(d) Overnight anywhere other than a designated camping site

(e) Bring any animal, domestic or otherwise, into the Park

(f) Throw away, bury or leave any refuse behind in any place other than in the containers provided

(g) Relieve oneself anywhere other than at a sanitary convenience provided

(h) Pollute any water or tamper with water installations

(i) Make a fire anywhere other than in officially designated fireplaces

(j) Kill, disturb or injure any animal

(k) Pick, collect, mutate, uproot or unnecessarily tamper with any plant

(l) Mutilate or damage any object in the Park

(m) Be in possession of an unsealed or loaded firearm

(n) Enter any area to which admission is prohibited by means of a notice board

(o) Ignore the instructions of a nature conservator

(p) Make any undue noise, disturb or inconvenience others

(q) Enter the Park with a motorcycle, powered cycle or scooter.

Annexure 5: Exploration Radiation Management Plan Approval

Annexure 6: Water Use Permit

Annexure 7: Letter and approval for dumping of drill chips