APPENDIX H

Baseline noise survey
(National Environmental Health Consultants)

Confidential

BASELINE ENVIRONMENTAL NOISE ASSESSMENT REPORT

CONDUCTED ON BEHALF OF

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Baseline : August - October 2010

PROJECT NR: 2010/090/I

Statement

National Environmental Health Consultants CC is an Approved Inspection Authority in terms of the Occupational Health and Safety Act (85 of 1993). (Certificate No.: CI 057 0H) SA and A.I.A 09/29 Namibia, **Labour Act, 1992 (Act 6 of 1992)** as amended under the **Labour Act 2007, (Act 11 of 2007).**

J. Cornelissen, conducted this survey on behalf of **National Environmental Health Consultants CC** and hereby declares that the results given in the report are a true reflection of conditions encountered during the survey. Please note that results contained in this report only apply to conditions that existed at the time of the survey.

Whilst recommendations offered in this report are made in good faith and every effort made to ensure the professional integrity thereof, the final responsibility lies with the client to ensure the correctness and suitability of these recommendations prior to implementation. **National Environmental Health Consultants** or its officers shall in no way be liable for any losses suffered by the client as a result of the implementation of such recommendations.

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J. CORNELISSEN
Occupational Hygienist

I hereby accept technical responsibility for this report.

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15th of October 2010
DATE

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1. Executive Summary

National Environmental Health Consultants CC was commissioned by Softchem on behalf of **Reptile Uranium Namibia (Pty) Ltd** to undertake an Baseline Environmental Noise Impact Assessment (EIA) for the proposed **Reptile Uranium Namibia (Pty) Ltd** Mine "Omahola project".

The proposed Omahola Project will involve a construction phase, with typical heavy construction equipment generating noise, as well as an operational phase, involving drilling, blasting, crushing, milling, haul trucks and other associated noise generating activities. In order to adequately assess the impact caused by noise, it is necessary to obtain a baseline noise level. As a component of the EIA, therefore, baseline sound pressure measurements were recorded around the **Reptile Uranium Namibia (Pty) Ltd** Site.

Measurements were taken from three points to next to the C28 Road and one point at the existing weather station of **Reptile Uranium Namibia (Pty) Ltd** on the site, representative of the proposed development boundaries. A-weighted sound pressure levels were recorded over the period of an hour during different time's periods and spread over a five day period. One of the measurements was also taken on a Sunday at the respective measurement points.

The median values of the measurements recorded during the five days for the proposed development varied between 31.6 dB(A) and 65.6 dB(A). The readings of the first day at the respective points were affected by the operation of the road construction operators of the C28, whilst gusting winds, together with the reflective characteristics of the area may have resulted in the high elevated readings on one of the days measured. Weekend time measurements varied between 32.7 dB(A) and 37.3 dB(A) for the various points. Both day and weekend measurements were substantially below the World Bank Guideline values of 45 dB(A) and 55 dB(A), respectively. According to SANS 10103:2004 a change of 10 dB(A) is equivalent to an apparent doubling or halving of sound levels; this puts into perspective the difference between the measured sound levels and the World Bank Guideline.

Due to other mining activities in the area of the site and the corresponding higher sound levels next to the C28 road, the introduction of mining activity will also increase the ambient sound levels of the area. This will have a minor impact on the fauna of the area, which will potentially move out of the surrounding vicinity. The general activity of vehicles and people will, however, probably have a greater effect on animal movement than the noise alone.

Although the ambient sound levels will increase, the overall impact significance is considered low, predominantly due to the absence of any permanent receptors in the vicinity. Predicted sound levels from typical construction and process plant machinery is predicted to be below the World bank Guideline value of 55dB(A) at these distances according to the Concawe method described in SANS 1037:2004.

Although the impact is considered low and noise effects will not pose a fatal flaw to the Project, contractors and **Reptile Uranium Namibia (Pty) Ltd** employees should adhere to all recommendations in the Mine Environmental Management Plan (EMP), ensuring the impact from noise is mitigated as far as possible. A noise monitoring programme and grievance procedure must be implemented before construction begins and should be continued throughout construction, operation and closure. Once decommissioning activities have ceased and all machinery and vehicles have left the site, noise monitoring will not be necessary.

The latest guidelines for community noise published by the World Health Organization also accentuates the need for environmental noise control to protect the health of the community in relation to the noise environment to which the community is exposed.

The Labour Act 1992 (Act 6 of 1992), requires that every employer shall make an evaluation of the risks attached to conditions to which persons are exposed in the workplace and furthermore, that he shall take corrective action where necessary**.** However, the aim of this survey was not to verify legal compliance but to establish the impact of environmental noise.

The SANS 10103:2004 may be used as a guideline to conduct such surveys. However, it must be noted that according to the above mentioned Code of Practice no approved method for the monitoring of low frequency noise is available. Furthermore, the Code reaffirms the importance of identifying and appropriately zoning different noise zones to prevent long term problems regarding noise control.

It is the aim of this noise study to quantify the noise impact of the proposed new mine development.

The measurement results indicated that in some areas noise levels measured exceeded the statutory limits (Table1). However, the significant impact that external noise sources had on the noise levels recorded have to be taken into consideration when evaluating the survey results. These outside influences included noise generated by road traffic C 28 (heavy transport vehicles) and high wind speeds on and around the site.

Out of this survey it may be concluded that there is low frequency environmental noise present and this may result in complains from the neighbouring community.

The construction and operational phases of the Omahola project may contribute to higher environmental noise levels in this area.

The survey results and other relevant information will be discussed later in this report.

TERMINOLOGY

A-weighting: A commonly used frequency weighting that closely approximates the frequency response of the human ear. It should be noted that the human ear does not perceive sound of equal sound pressure level as being equally loud if the frequencies are different. The ear is less sensitive at low frequencies. For example, a sound of 50dB at 1000Hz will sound twice as loud at 152Hz.

Sound pressure level: The overall sound pressure level of a sound (including all frequencies) after it has been frequency weighted with the A-weighting filter, abbreviated dB(A).

Frequency: A measure of the pitch of a sound, expressed in Hertz (Hz)

Sound pressure level: A measure of the strength or intensity of a sound, expressed in decibels (dB) with a reference level of 20uPa. The sound pressure level generated by a steady source of sound will usually vary with both distance and direction from the source.

Sound power level: A measure of the total acoustic power output (in all directions) of a sound source, expressed in decibels (dB) with a reference level of 1 picowatt (10-12 watt). The sound power level of a source is totally independent of the receiver distance and location.

Octave: The audible frequency range is divided into bands of frequencies because sound transmission through solid barriers can vary dramatically with the frequency of the sound. The broadest bandwidth commonly used is an octave. An octave is a band where the highest included frequency is exactly twice the lowest included frequency. The entire frequency range of human hearing can be covered in the following 10 standard octave bands 31Hz, 63Hz, 125Hz, 250Hz, 500Hz, 1000Hz, 2000Hz, 4000Hz, 8000Hz and 16000Hz.

2. BASELINE ENVIRONMENTAL NOISE SURVEY REPORT

2.1 Purpose

- The purpose of this assessment is to identify areas where noise levels may present a possible annoyance and or exceed statutory limits.
- To identify the major existing noise sources in the areas surrounding the proposed new development.
- To measure the present ambient noise levels in the environment of the proposed development.
- To quantify the possible impact that the proposed new **Reptile Uranium Mine** and its construction phase has on ambient noise levels in the environment.
- To establish a baseline ambient noise emissions profile prior the commissioning of the new **Reptile Uranium Mine** into the environment.
- To assess the noise impact of the proposed development in terms of the applicable guidelines and legislation.

2.2 General

Noise is measured in decibels, a single value. The A-weighted sound level in decibel dB(A) is used to evaluate hearing damage risk.

The National Environmental Management Act recognises as follows in its pre-amble:

- Everyone has the right to an environment that is not harmful to his or her health or well-being,
- The state must respect, protect, promote and fulfil the social, economic and environmental rights of everyone and strive to meet the basic needs of previously disadvantaged communities, etc.

If a person is exposed to 85 dB(A) for eight hours a hearing loss risk is present. The risk depends on the noise intensity, duration of exposure, individual susceptibility and its intensity.

The protection of hearing sense is regarded as the most important aim because noise induced hearing loss is irreversible.

2.3 Statutory requirements

(1) Regulations for noise-induced hearing loss {Labour Act 1992 (Act 6 of 1992)}.
197. (1) Subject to sub-regulations (2) and (3), no employer shall require or permit an employee to work in an environment in which he or she is exposed to an equivalent noise level equal to or exceeding 85 dB(A).

(2) SANS 10103:2004: Code of Practice. This Code of Practice covers a method for the measurement of environmental noise to determine the suitability of an environment with respect to possible annoyance. Furthermore, it gives an indication if complaints can be expected. Limits for noise levels are also recommended.

(3) This document is entirely in line with the World Health Organization (WHO) guidelines.

(4) In SANS 10103 the maximum ambient noise levels for different kinds of districts are summarized in Table 1. According to this the maximum ambient noise level in 'urban districts' should on average not exceed 55 dBA and 45 dBA during the day (06:00 to 22:00) and night (22:00 to 06:00), respectively. This is also the limit for purely residential areas specified by the WHO guidelines.

Table 5 of SANS 10103 provides an estimate of a community's reaction to an increase in the general ambient noise level. If **A** is the increase in ambient noise level then for:

- **A <** 0 dB(A): There will be no community reaction.
- 0 dB(A) < **A <** 5 dB(A): There will be 'little' reaction with 'sporadic complaints'. It must also be stated that for a person with average hearing acuity an increase of 3 dB(A) in the general ambient noise level is not detectable.
- **A** = 3 dB(A) is, therefore, a useful significance indicator for a noise impact.
- 5 dB(A) < **A <** 10 dB(A): There will be a 'medium' reaction with 'widespread complaints'.
- **A** = 10 dB(A) is subjectively perceived as a doubling in the loudness of the noise.
- 10 dB(A) < **A <** 15 dB(A): There will be a 'strong' reaction with 'threats of community action'.
- 15 dB(A) < **A**: There will be a 'very strong' reaction with 'vigorous community action'.

Although not a statutory requirement the ISO 14001 standard requires the identification of all aspects that can have an impact on the environment. These aspects must be evaluated and assessed in order to determine the significance of the impact that it might have on the environment.

Table 1 gives an indication of the typical rating levels for ambient noise in districts. This table is an extract of the Code of Practice mentioned above and can be used as a guideline in establishing noise zones.

Table 1 reflects typical ratings of ambient noise in districts.

1	2	3	4	5	6	7
Type of district	**Rating Level L_r [1] for ambient noise dB(A)**					
	Outdoors			**Indoors, with open windows**		
	Day-time	**Evenings, weekends**	**Night - time**	**Day-time**	**Evenings, weekends**	**Night-time**
a) Rural districts	45	40	35	35	30	25
b) Suburban districts with little road traffic	50	45	40	40	35	30
c) Urban districts	55	50	45	45	40	35
d) Urban districts with some work-shops, with business, and main roads	60	55	50	50	45	40

1	2	3	4	5	6	7
Type of district	**Rating Level L_r [1] for ambient noise dB(A)**					
	Outdoors			**Indoors, with open windows**		
	Day-time	**Evenings, weekends**	**Night - time**	**Day-time**	**Evenings, weekends**	**Night-time**
e) Central business districts	65	60	55	55	50	45
f) Industrial districts	70	65	60	60	55	50

1) The values given in columns 2 to 7 are A-weighted sound pressure levels and include corrections for tonal character and impulsiveness of the noise.

NOTE – If the measurement time interval is considerably shorter than the reference time intervals, significant deviations from the values given in the table may result.

2.4 Instrumentation and Methods

a) **Method**

The method for evaluating workplaces for hearing conservation purpose prescribed in the SANS Code of practice 10103-2004, was used to record data during the survey.

b) **Instrumentation**

A Quest 1900 integrating sound level meter (Serial number 17453) was used to record the results of this survey. The instrument was calibrated before and after use with a Metrosonic CL 304 sound level calibrator (Serial no. 4943).

AM 4204 hot-wire anemometer was used to determine the average air velocities. The probe was held at the position where the air velocity was required. The most stable, or average, reading on the anemometer display was then noted.

WBGT Heat Stress Index Measurements were conducted with a Questemp^{0}15 Area Heat Stress Monitor WBGT Heat Stress monitor, Serial No. KL6030024.

2.5 Background information:

Deep Yellow Limited (DYL) is an Australian-based uranium company with extensive operations in Namibia and Australia. DYL's principal exploration and development activity is in Namibia through its 100% owned subsidiary Reptile Uranium Namibia (Pty) Ltd (RUN), with its main development focus being the Omahola project situated on exclusive prospecting license (EPL) 3496.

2.5.1 Omahola project outline

The Omahola project consists of the INCA uranium and magnetite, Tubas Red Sands (TRS) uranium and Shiyela magnetite deposits.

The INCA primary uranium deposit has moderate grade at 400 ppm U_30_8 and is best described as metasomatic introduction of uranium and iron into a northeast plunging syncline. It also contains substantial quantities of magnetite, which can potentially be separated from the other ore material during processing for possible sale as a by-product. In addition, drilling at INCA has identified areas of magnetite without uranium mineralisation that could be suitable for a saleable magnetite product as well.

The TRS deposit consists of secondary uranium mineralisation (camotite) in well-sorted aeolian (windblown) sand that occurs immediately $outh of the Tubas palaeochannel. The justification for the lower cut-off grade of the TRS deposit is based on unique aspects of the deposit. Firstly, the deposit is very near surface, with only minimal cover of windblown materials and gravel-gypcrete-calcrete of 1 - 2 metres. Secondly, TRS is predominately free-flowing to loosely consolidated sandy material. The combination makes the deposit amenable to simple and low cost (free-digging) mining techniques. Thirdly, TRS material tests positively to relatively simple physical beneficiation consisting of attritioning, scrubbing with ball loading, followed by screening; which results in a substantial upgrading in the contained uranium.

The Shiyela deposit is a substantial area of magnetite mineralisation without any uranium. The receipt and initial assessment of positive test results on magnetite bearing core samples from a 500 m vertical diamond drill hole into a regional aeromagnetic anomaly (M62) highlighted the potential of the M62 and magnetic bodies to generate high quality magnetite concentrate and underpin a possible magnetite 'iron-ore' mining operation. Present core sample testing yields a high-grade magnetite concentrate with very low silica, no deleterious elements ($Si0_2$, Al_20_3, P, S, $Ti0_2$) and uranium content of less than 10 ppm U_3O_s.

2.5.2 Environmental impact assessment

RUN intends to submit applications for three mining licences on EPL 3496 in the Namib- Naukluft Park to the competent Namibian authorities for the extraction of uranium, iron and associated minerals. However, before any mining licence can be granted, an environmental impact assessment (EIA) process must be undertaken by the relevant applicant and authorised by the Ministry of Environment and Tourism (MET, 2009). In terms of Section 8 of the draft environmental assessment (EA) regulations (MET, 2009), RUN appointed Softchem as its environmental assessment practitioner (EAP) for this environmental impact assessment process and to compile this scoping report as a requirement in terms of Sections 19 and 26 of the draft EA regulations.

2.5.2.1 Scoping report structure

The EIA process followed for the Omahola project, based on the Namibian Environmental Assessment Policy of 1995 and the draft EA regulations of 2009. The draft EIA regulations components of this scoping report are set In terms of Section 26, with references to the relevant sections within this report (MET, 2009):

2.5.3 Property Description:

2.5.3.1 Regional setting

RUN's Omahola project is located in the west of central Namibia, Southern Africa; situated approximately 40 km east of the major deepwater seaport at Walvis Bay and east- southeast of the coastal town of Swakopmund. The location of the project in relation to the mentioned towns, as well as mining operations in the area, is shown in Figure 1

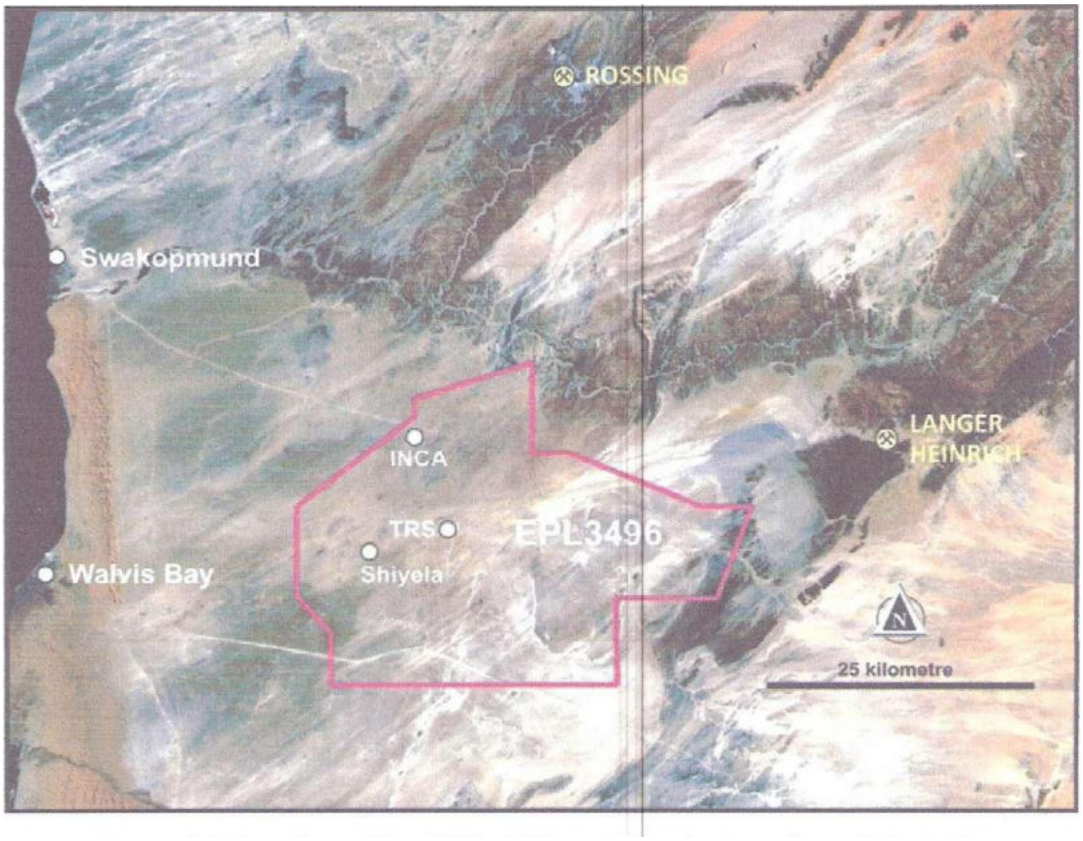


Figure 1: Location of the INCA, TRS and Shiyela deposits on EPL 3496.

2.5.4 Land use

The proposed Omahola project is contained within the Namib Naukluft Park, which is used primarily for tourism. However, mineral exploration, drilling campaigns and mining operations have previously been undertaken either on or near the proposed project site intermittently during earlier ownerships. According to SAIEA (2010), by the end of December 2009 four mining licences had been granted in the central Namib - two mines were operational, a third was undertaking trial mining, and the fourth was beginning construction.

2.5.5 Description of the proposed activity

The activities for the proposed Omahola project include, *inter alia,* construction of mining infrastructure, open cast mining, loading and hauling, processing of ore, tailings storage facility, the transport of U_30_8 product, the disposal of waste rock, continuous rehabilitation and ultimately mine closure and final rehabilitation.

2.5.5.1Resource INCA deposit

On 28 July 2010 Deep Yellow Limited (DYL) announced an update of the mineral resource estimate in accordance with the JORC Code* by the MSA Group of South Africa, for the main resource area at INCA. This resource update increased total indicated and inferred resources at INCA by 17% and increased grade by 9% with the updated resource totalling 17.1 million tonnes at 436 ppm e$U_30_8$for 7,429 tonnes (16.4 Mlbs) of U_30_8 at 200 ppm U_3O_s cut-off. In addition, total indicated resources doubled to 10 million lbs U_30_8. (DYL, 2010a)

2.5.5.2INCA process plant

INCA run-of-mine ore will be crushed in a primary open circuit jaw crusher, who ensures a reasonable top size to the plant, and the resulting coarse ore stored in a covered stockpile that buffers production from the mine. The ore will be ground in a two-stage milling circuit to produce

the required grind size. Process development test work indicated that the optimal grind for uranium recovery is between 150 to 300 pm. A coarser grind results in a lower uranium recovery due to large uranium "nuggets", found in the ore, that are not liberated enough to leach. A finer grind results in an increase in acid consumption without any significant increase in uranium recovery.

A flotation circuit follows where pyrite will be recovered in a small mass pull. Some of the uranium will also concentrate with the pyrite. The concentrate will be thickened prior to being treated in a pressure oxidation process that produces sulphuric acid, ferric sulphate and heat. Any uranium that follows the pyrite will also be leached. As a rule, complex and refractory uranium floats very similar to sulphides Highly oxidised, uranium silicates and other secondary uranium species do not float well They do, however, leach well in a standard agitated atmospheric leach circuit. The process will therefore naturally route the refractory uranium to the very intensive pressure leach, while the non-refractory uranium is treated in a mild atmospheric leach.

The pressure oxidation circuit feed will be stored in the autoclave surge tanks. This surge is essential to ensure that the autoclave operates with the minimal amount of interruption. Slurry from the surge tank will be pumped into the autoclave via positive displacement high pressure feed pumps. Oxygen and steam (during start-up) will be added directly into the autoclaves to enable the leach reactions to start taking place. Once operating temperature is reached, the heat generated by the oxidation of pyrite will be enough to maintain temperature.

The autoclave will be a 6-stage mechanically agitated horizontal pressure vessel rated for operation at 28 bar and 210 °C. Mechanical features of the autoclaves include: a mild steel pressure vessel with organic lining for protection against acid attack, and brick lined, to prevent abrasion of the organic membrane by the process slurry. Solid titanium agitators, baffles and clave internals are used.

After leaching, the slurry from the autoclave will be let down through a flash vessel where steam will be produced for use in a direct contact ("splash") heater that is used to heat up the flotation tails. The hot autoclave discharge will also be introduced into the atmospheric leach section as a source of further heat, acid and oxidising agent. The autoclave circuit has the following benefits:

- it halves the sulphuric acid consumption;
- produces heat that increases the uranium atmospheric leach circuit temperature;
- it produces ferric sulphate, an oxidation agent that is required during the uranium leach process - no additional oxidation agent like pyrolusite is therefore required; and
- it significantly increases the overall uranium recovery, due to the very high uranium leach efficiency inside the autoclave.

The uranium atmospheric and pressure leach products will be fed into the uranium leach reactor train. The train will consist of a number of large carbon steel rubber lined tanks with slurry cascading from one tank to the other. Additional sulphuric acid will be added to the leach reactors, if required, to maintain a target acid concentration in the leach discharge. This additional sulphuric acid required will be imported as concentrated acid and stored in two large tanks.

The pregnant leach solution (PLS) containing the uranium will be separated from the solids with the use of vacuum belt filters. The PLS will then be treated in a clarifier and routed to a direct solvent extraction plant. The remaining solids will be washed counter currently on the filter to remove all uranium and acid and the resulting weakly acidic uranium solution recycled back to the atmospheric loach section to capture the reagents and uranium.

Clarified PLS from the pin bed clarifier plant will be fed to two extraction columns in parallel, each operating at an aqueous to organic ratio of approximately 14:1. Barren solution from the extraction columns will be fed back to the autoclave feed and secondary milling circuits, where the acid will be neutralised by the carbonates contained in the ore. In order to prevent accumulation of other elements so utilized in the leach, a bleed stream from the raffinate

inventory will be taken to the effluent section. All the excess acid not neutralised by the carbonates in the ore, will be neutralised with the use of limestone and lime.

Loaded solvent will be fed to the 4-stage mixer-settler-scrubbing section. The scrubbing step will remove impurities such as iron, chlorides and fluorides from the solvent to produce a pure uranium product. Scrub liquor will be returned to the extraction feed tank, as it will/may contain some uranium.

Stripping will be done in a pulsed column, using ammonium sulphate from the ammonium diuranate (ADU) precipitation plant and ammonium hydroxide from the SX Utilities section. The stripped solvent will be periodically regenerated with caustic and soda ash in a single mixer-settler regeneration stage. The SX Utilities section will also include an ammonium hydroxide make-up section, demineralised water generation, regeneration solution makeup and a cooling water circuit.

The rich strip solution from the SX plant will be fed into the first of three precipitation tanks connected in series. Here the pH will be adjusted upwards by sparging of gaseous ammonia. ADU will precipitate out and the resulting slurry fed to a small thickener. The thickener overflow will be pumped back to the SX plant, as strip liquor, via a polishing filter.

Thickener underflow will be pumped to the first of two wash centrifuges where the ADU slurry will be dewatered to about 40% (w/w) solids, and washed with clean demineralised water. ADU cake from the first centrifuge will be re-pulped with clean water and the process repeated in a second centrifuge. Clean ADU cake will be transferred to the ADU storage tank prior to being filtered. The filtered ADU will be dried in an indirect closed drier and then calcined to produce dry uranium oxide powder, which will be drummed as the plant final product.

Waste streams, along with the raffinate bleed, will be routed to an effluent treatment section. This section will have four reactors where the pH of the solution will be adjusted with limestone, followed by milk of lime. The resulting metal hydroxides and gypsum solids will be thickened to produce a small concentred slurry stream that will be disposed off with the tailings. The thickener overflow (referred to as high pH process water) will be used on the final belt filter wash stage in the tails filtration section. Limestone will be supplied from sources locally and will be crushed, milled and classified on site. Milk of lime will be generated by slaking burnt lime.

2.5.5.3 Plant utilities

Other plant utilities will include, *inter alia*, air compressors, a diesel fired boiler to start the autoclave up, and high pressure flush and cooling water and an autoclave seal water system.

The compressors will generate compressed air for distribution as plant air, with some air dried with the use of a refrigerant drier and then "distributed as instrument air via a receiver. High pressure seal water and flush water for the pressure leach area will be situated close to the autoclave.

Water will be supplied from the mining pit or from water production boreholes. The water will be filtered and treated in a reverse osmosis (RO) plant. A portion of the water will be treated for the production of potable water and fire water to the plant. The remainder o1 the RO water will supply process water and gland seal water.

The process water will be stored in a dam next to the high pH process water dam. The fire water system will consist of a jockey pump, main e electrical pump on emergency power and a diesel powered pump.

2.5.5.4 Satellite TRS plant

A satellite plant that will be referred to as the TRS plant; will treat Tubas Red Sand as feed. This plant will be approximately 14 km away from the main plant. At this plant an uranium concentrate will be produced by scrubbing the feed and by size classification. Local saline underground water will be used for this plant using a local wellfield system.

The fines fraction that contains the uranium will be transferred to the main plant and fed into the atmospheric leach section. The barren oversize material will be de-watered and backfilled into the opencast pit area. Due to the secondary nature of the uranium in the concentrate, a shorter and milder leach will suffice. This feed will increase the PLS (SX feed) uranium concentration.

2.5.5.5 Iron recovery plant

An iron recovery plant will also be constructed for the recovery of magnetite from the uranium plant tails. The tails, that will contain very little uranium, will be re-slurried and subjected to three stages of low intensity magnetic separation (LIMS). The resulting magnetic concentrate that will contain very high leves of iron, will then be filtered and supplied in bulk to customers as a secondary plant product. The final plant tails, now containing less magnetite, will be filtered once again and disposed of as a solid final plant residue.

2.6 Other site infrastructure/requirements

Due to the closeness of EPL 3496, the proposed activity area, to the towns of Swakopmund and Walvis Bay; it is envisaged that no employees will be housed on site during either the construction or operational phase of the proposed project. Access to site will be principally via the existing district road from Swakopmund (C28).

No external water requirements for the proposed mine with its auxiliary services are foreseen at present. The water supply will be obtained from underground resources and treated on site for use within the process and for ablution and human consumption requirements. At this stage sufficient underground resources are believed to be available for desalination on site, as can be seen from the gusher exiting a hole 150 m away from where air pressure was applied to another drill hole.

With regard to power requirements, discussions with NamPower are still ongoing and at this stage it looks feasible to make use of the servitude supplying the existing Langer Heinrich Uranium operation.

The supply of telecommunications facilities to the site is being investigated at present, with once again the possibility of making use of existing infrastructure and servitudes.

3 METHODOLOGY

The noise measurements were taken in accordance with SANS 10103:2004: *The measurement and rating of environmental noise with respect to land use, health, annoyance and to speech communication.*

Sites were selected according to the following criteria:

- To represent baseline conditions surrounding the proposed area of development.
- Accessibility and reference for future monitoring.

Measurements were taken at the sites shown in Figure 2 and 3. These measurements were taken with the Quest technologies integrating impulse sound level meter. The microphone was mounted between 1.5m and 2.0m above ground level. Readings were taken every 5 minutes over a 60 minute period resulting in sufficient readings for viable statistical analysis.

Figure 2: GPS Points.

Figure 3: GPS Points reflected on Google Earth.

4 DESCRIPTION OF SURROUNDING ENVIRONMENT

The proposed Project site is situated in an extremely arid area. Due predominantly to the climate and soil conditions, the area is sparsely vegetated, with low, perennial grass cover on the aeolian plains to the east of the site and sporadic growth, of species tolerant to the arid conditions, occurring on the broken, rocky terrain covering most of the site. The nature of the ground and vegetation is important as it will determine to a large extent, the sound attenuation capacity of the terrain. According to the definition in SANS 10357:2004, the **Reptile Uranium Mine** site would be classified as non-absorbent or acoustically hard ground. A detail vegetation assessment will be undertaken for the area in the EIA/EMP Report and can be referred to for more detailed information on flora in the area.

4.1 Climate

Although a weather station was installed at **Reptile Uranium Mine** the climate data have therefore been assessed in comparison with data obtained from other stations such as Walvis Bay Air Port.

4.1.1 Mean monthly rainfall and precipitation

The long-term regional rainfall varies from 15 to 35 mm per annum, with rainfall steadily decreasing westwards.

4.1.2 Mean monthly maximum and minimum temperatures

The monthly average temperatures recorded at the **Reptile Uranium Mine** site varied between 15.0 °C and 35.0°C. These fluctuations could affect the atmospheric sound level attenuation capacity, which is dependent on temperature, amongst other parameters.

4.1.3 Mean wind speed and direction

The predominant winds differ for the three months August, September and October 2010. The predominant wind directions over the three month period is therefore East, West and South West and wind speeds are averaging 12km, although wind speeds do occasionally exceed 50km.

The approximate weather conditions during the measurements were as follow:

Month

Augustus 2010

Temperature:	**Max:** 35°C.	**Average:** 24°C.	**Min:** 15°C
Wind Speed:	**Max:** 69 km.	**Average:** 13 km.	**Min:** 0km
Sea Level Pressure:	**Max:** 1024 hPa.	**Average:** 1016 hPa.	**Min:** 1010 hPa
Wind:	**Predominant:**	East	

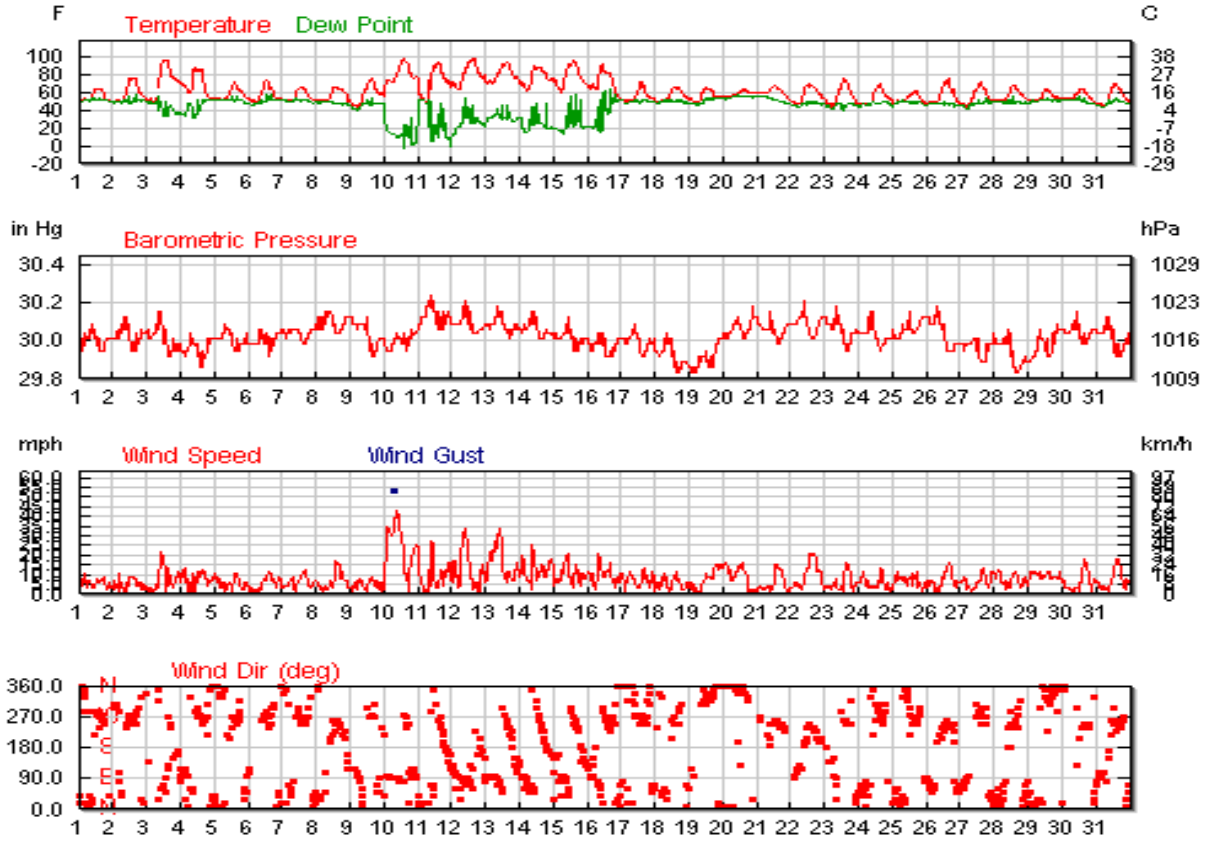
September 2010

Temperature:	**Max:** 35°C.	**Average** 22°C.	**Min:** 16°C
Wind Speed:	**Max:** 42 km.	**Average** 12 km.	**Min:** 0 km
Sea Level Pressure:	**Max:** 1023 hPa.	**Average** 1015 hPa.	**Min:** 1006 hPa
Wind:	**Predominant:**	West	

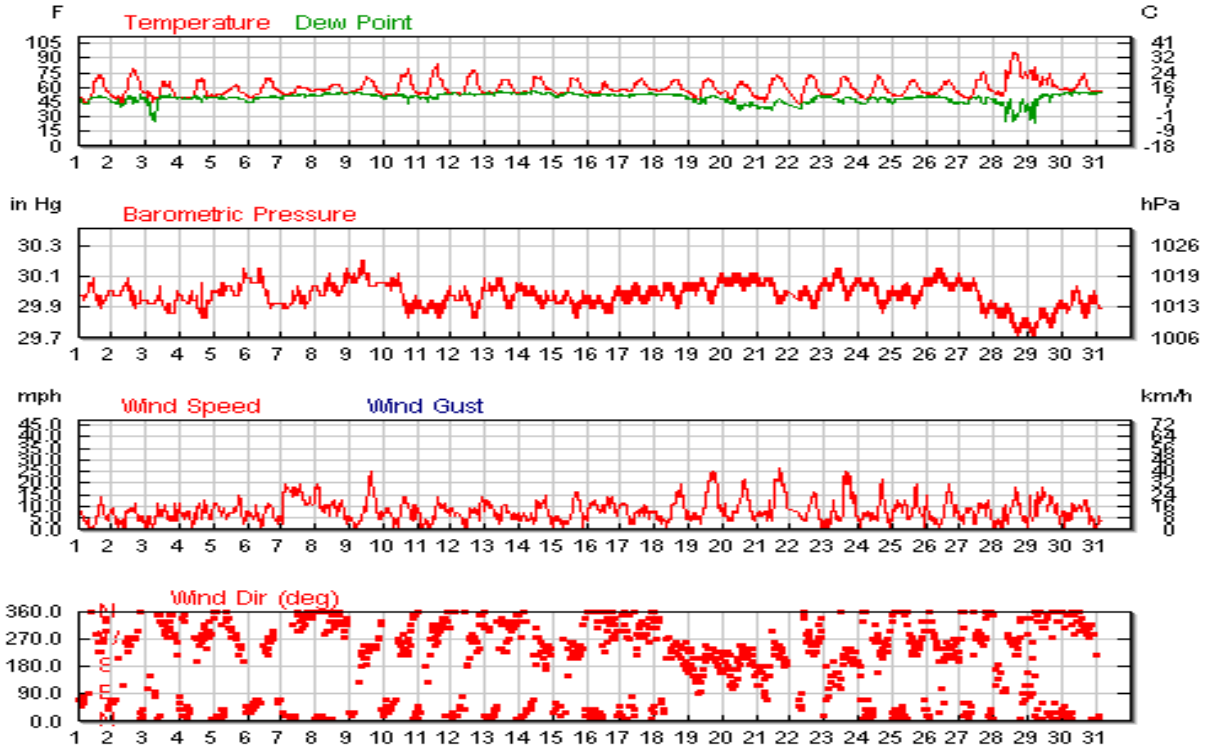
October 2010

Temperature:	**Max:** 27°C.	**Average:** 22°C.	**Min:** 16°C
Wind Speed:	**Max:** 52 km.	**Average:** 11 km.	**Min:** 0 km
Sea Level Pressure:	**Max:** 1021 hPa.	**Average:** 1014 hPa.	**Min:** 984 hPa
Wind:	**Predominant:**	South West	

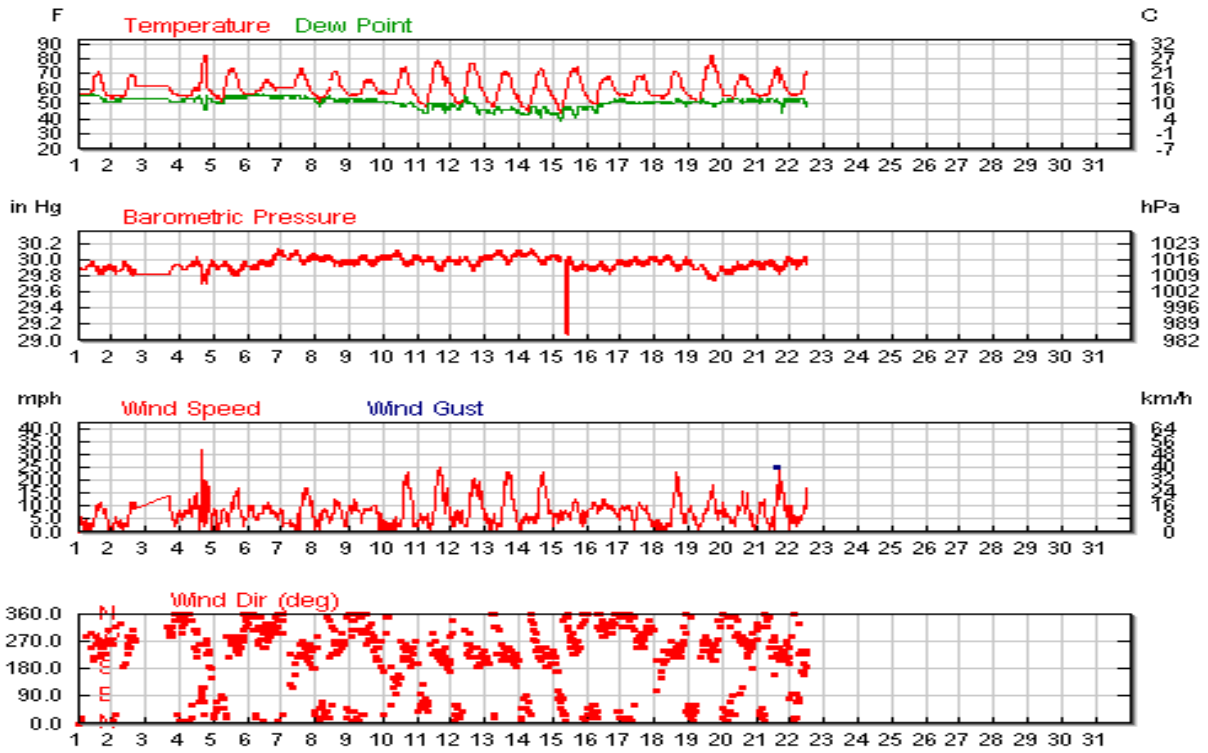
Summery of Prevailing Weather Conditions for the month August 2010



Summery of Prevailing Weather Conditions for the month September 2010



Summery of Prevailing Weather Conditions for the month October 2010 (Up to 14th of the month)



4.2 Topography

The proposed project area consists of a wide variety of granitic rocks that occur in the mountainous areas to the east and low-lying gravel plains that are generally fairly flat, except where they have been incised by rivers (erosion cycles, leading to shift in the horizontal and vertical alignments of watercourses, resulted in the formation of old river terraces that now stand elevations of several meters higher than the present watercourses). (Christian, 2006)

The approximate altitude of between 309m and 327m.

4.3 Land use

The **Reptile Uranium Mine** site is relatively undisturbed; wildlife occurs on the land, but it is not restricted by game fencing. There is currently no significant development on the **Reptile Uranium Mine** site, except for exploration activities. No is no farmhouse located near the proposed **Reptile Uranium Mine** site. The topography, climate and nature of the soils do not provide conditions suitable for agricultural activities.

5 BASELINE RESULTS

Based on the technical information available as discuss above and noise emission data available on the consultant's database for a typical Uranium Mine had to be used to estimate sound emission levels of the proposed new **Reptile Uranium Namibia Mine**.

Please take note that all results related to this Environmental noise survey were evaluated against above mentioned results and predictions.

4 Positions (points) were identified and GPS logged to be used in this survey. **Figure 2 and 3**

Wind direction, wind speed, season, humidity, temperature, distance from main activity, time and dB(A)/dB(C) sound levels were assessed and taken into consideration during the survey.

The prevailing wind direction was not taken into consideration. The main wind directions during the day time of the survey were a East, West and South West wind direction.

In the absence of Namibian standards for sound measurement, the South African National Standard (SANS) published by Standards South Africa were used.

Table 1, taken from SANS 10103:2004, depicts the noise ratings for various different types of residential and non-residential districts. The median values for measurements taken on site were below these recommended levels, although maximum sound pressure, on occasions, did exceed the guideline values. At points REP4, REP2 and REP3 (Figure 2 and 3) this was likely due to the road construction, vehicle movement on the C28 and to blistering wind effects at the time of the surveys and attributed to higher environmental noise measurements.

The proposed **Reptile Uranium Mine** is situated in what can be considered a remote location. The C28 is becoming busier due to that it is the main excess road leading to two other Uranium Mines and tourists visiting the surrounding Namib Naukluft Park. Taking above mentioned into consideration, the baseline noise levels were expected to be higher than expected for the area.

This was confirmed by the sound levels measured during the site visits from 8th of 2010 to the 14th of October 2010 (Table 2). The median A-weighted day sound pressure values ranged between 31.6 dB(A) and 65.6 dB(A), whilst the median weekend measurements for the different locations ranged between 32.7dB(A) and 37.3 dB(A). Due to access difficulties when dark, no readings were taken during night time. It is, however, anticipated that night time readings will not be higher than those taken during the day and therefore day time readings can be considered as the maximum baseline. These values are substantially below the World Bank Guideline (1998) values of 55 dB(A) and 45 dB(A) for day and night, respectively. As defined by SANS 10103:2004, an increase of 10 dB(A) corresponds to a doubling or halving in apparent loudness. Thus, the measured sound levels on site represent a perceived noise level that is half that of the World Bank Guideline limit i.e. although the measurement was not half the guideline value, the apparent loudness to a receptor will be about half that of the guideline level.

Table 2

Noise levels measured at RUN Swakopmund on the 09th of August 2010.

Site	Date	Time	Temperature				Wind Direction	Microphone position	Season	Rating level L_r [1)] For ambient noise dB(A) outdoors		Wind Speed m/s	Temp. °C
			WB	DB	GT	WBGT		1, 2 m		Day Time	Night Time		
1 S 22 °49,202 EO14°53,238	2010-08-09 **1.** Morning	**1.**08H22am	10.4	11.7	18.8	12.9	ENE	X	Winter	**1. 49.8 dB(A)*** 53.9 dB(C)	-	3.4	14.9
2 S 22 °48,501 EO14°53,588	2010-08-09 **2.** Morning	**2.**08H35am	12.6	15.0	25.5	16.8	ENE	X	Winter	**2.** 37.7 dB(A) **53.3 dB(C)***	-	2.65	15.1
3 S 22 °48,590 EO14°54,021	2010-08-09 **3.** Morning	**3.**08H42am	12.7	15.6	22.4	15.7	ENE	X	Winter	**3.** 38.1 dB(A) 44.7 dB(C)	-	1.44	15.8
4 S 22 °48,393 EO14°53,202	2010-08-09 **4.** Morning	**4.**08H53am	13.4	16.0	22.5	16.1	ENE	X	Winter	**4.** 38.2 dB(A) **56.2 dB(C)***	-	2.0	14.3

*** Above statutory limit of 45 dB (A) outdoors (Morning)**

- **WBGT** Wet and (dry bulb) globe temperature
- **WB** humidity
- **GT** radiant heat.
- **DB** dry bulb
- **m/s** meters per second.
- **°C** degrees Celsius.
- *Measurements taken during vehicle movements*

Please note: *that areas with dB(C) that is mark with * is areas where low frequencies are present due to the fact that there is a bigger then 10 dB difference between the dB(C) and dB(A) levels.*

Note: *Road works C28,*
No Trafic,
Exploration Drill Operating

Table 3

Noise levels measured at RUN Swakopmund on the 16th of September 2010.

Site	Date	Time	Temperature				Wind Direction	Microphone position	Season	Rating level L_r [1)] For ambient noise dB(A) outdoors		Wind Speed m/s	Temp. ^{0}c
			WB	DB	GT	WBGT		1, 2 m		Day Time	Night Time		
1 S 22 °49,202 EO14°53,238	2010-09-16 **1.** Day	**1.**12H10pm	12.3	13.5	20.5	12.6	WSW	X	Spring	**1.** 35.8 dB(A) **58.1 dB(C)***	-	3.6	18.6
2 S 22 °48,501 EO14°53,588	2010-09-16 **2.** Day	**2.**12H30pm	13.0	14.2	21.4	16.3	NNW	X	Spring	**2.** 34.5 dB(A) **61.0 dB(C)***	-	3.1	19.2
3 S 22 °48,590 EO14°54,021	2010-09-16 **3.** Day	**3.**12H55pm	12.5	13.8	22.5	15.8	SW	X	Spring	**3.** 34.1 dB(A) **60.0 dB(C)***	-	4.6	18.4
4 S 22 °48,393 EO14°53,202	2010-09-16 **4.** Day	**4.**13H15pm	12.1	13.6	22.3	15.0	SW	X	Spring	**4.** 35.2 dB(A) **58.3 dB(C)***	-	4.4	18.2

*** Above statutory limit of 45 dB (A) outdoors (Afternoon)**

- **WBGT** Wet and (dry bulb) globe temperature
- **WB** humidity
- **GT** radiant heat.
- **DB** dry bulb
- **m/s** meters per second.
- **°C** degrees Celsius.
- *Measurements taken during vehicle movements*

Please note: *that areas with dB(C) that is mark with * is areas where low frequencies are present due to the fact that there is a bigger then 10 dB difference between the dB(C) and dB(A) levels.*

Note: *Strong Wind,*
Medium Traffic,
Exploration Drill Operating.

Table 4:

Noise levels measured at RUN Swakopmund on the 26th of September 2010. - Sunday

Site	Date	Time	Temperature				Wind Direction	Microphone position	Season	Rating level L_r [1)] For ambient noise dB(A) outdoors		Wind Speed m/s	Temp. ^{0}c
			WB	DB	GT	WBGT		1, 2 m		Day Time	Night Time		
1 S 22 °49,202 EO14°53,238	2010-09-26 **1.** Afternoon	**1.**15H15pm	17.0	30.8	27.6	23.0	West	X	Spring	**1.** 32.4 dB(A) **49.1 dB(C)***	-	3.5	23.8
2 S 22 °48,501 EO14°53,588	2010-09-26 **2.** Afternoon	**2.**15H40pm	16.3	22.7	27.5	19.5	West	X	Spring	**2.** 32.7 dB(A) **59.3 dB(C)***	-	3.8	22.7
3 S 22 °48,590 EO14°54,021	2010-09-26 **3.** Afternoon	**3.**15H55pm	15.4	21.8	27.5	19.0	West	X	Spring	**3.** 37.3 dB(A) **62.1 dB(C*)**	-	6.9	21.8
4 S 22 °48,393 EO14°53,202	2010-09-26 **4.** Afternoon	**4.**16H20pm	15.7	22.2	27.9	19.2	West	X	Spring	**4.** 34.7 dB(A) **57.1 dB(C)***	-	3.5	22.2

*** Above statutory limit of 40 dB (A) outdoors (Afternoon) – Weekend**

- **WBGT** Wet and (dry bulb) globe temperature
- **WB** humidity
- **GT** radiant heat.
- **DB** dry bulb
- **m/s** meters per second.
- **°C** degrees Celsius.
- *Measurements taken during vehicle movements*

Please note: *that areas with dB(C) that is mark with * is areas where low frequencies are present due to the fact that there is a bigger then 10 dB difference between the dB(C) and dB(A) levels.*

Note: *Strong Wind,*
Low Traffic,
No Exploration Drilling

Table 5:

Noise levels measured at RUN Swakopmund on the 29th of September 2010.

Site	Date	Time	Temperature				Wind Direction	Microphone position	Season	Rating level L_r [1)] For ambient noise dB(A) outdoors		Wind Speed m/s	Temp. ^{0}c
			WB	DB	GT	WBGT		1, 2 m		Day Time	Night Time		
1 S 22 ˚49,202 EO14˚53,238	2010-09-29 **1.** Morning	**1.**10H12am	16.1	24.2	24.3	18.9	North	X	Spring	**1.** 41.9 dB(A) 80.2 dB(C)	-	9.7	16.2
2 S 22 ˚48,501 EO14˚53,588	2010-09-29 **2.** Morning	**2.**10H31am	16.6	24.6	24.7	19.0	North	X	Spring	**2.** 42.9 dB(A) **81.7 dB(C)***	-	9.9	16.6
3 S 22 ˚48,590 EO14˚54,021	2010-09-29 **3.** Morning	**3.**10H43am	16.6	24.2	25.6	19.1	North	X	Spring	**3. 58.2 dB(A)*** **84.4 dB(C)**	-	11.3	16.6
4 S 22 ˚48,393 EO14˚53,202	2010-09-29 **4.** Morning	**4.**11H00am	16.9	25.2	25.9	16.6	North	X	Spring	**4. 65.6 dB(A)*** **88.8 dB(C)***	-	12.6	16.9

*** Above statutory limit of 45 dB (A) outdoors (Morning)**

- **WBGT** Wet and (dry bulb) globe temperature
- **WB** humidity
- **GT** radiant heat.
- **DB** dry bulb
- **m/s** meters per second.
- **°C** degrees Celsius.
- *Measurements taken during vehicle movements*

Please note: *that areas with dB(C) that is mark with * is areas where low frequencies are present due to the fact that there is a bigger then 10 dB difference between the dB(C) and dB(A) levels.*

Note: *Strong Wetly Wind – Blizzard - Sand Storm,*
No Traffic,
Exploration Drill Operating

Table 6:

Noise levels measured at RUN Swakopmund on the 14th of October 2010.

Site	Date	Time	Temperature				Wind Direction	Microphone position	Season	Rating level L_r [1)] For ambient noise dB(A) outdoors		Wind Speed m/s	Temp. ^{0}c
			WB	DB	GT	WBGT		1, 2 m		Day Time	Night Time		
1 S 22 °49,202 EO14°53,238	2010-10-14 **1.** Morning	**1.**11H10am	15.6	22.9	31.8	20.3	East	X	Spring	**1.** 31.6 dB(A) **62.8 dB(C)*** **82.3 dB(A)*** **85.6 dB(C)***	-	6.2	22.3
2 S 22 °48,501 EO14°53,588	2010-10-14 **2.** Morning	**2.**11H35am	15.6	23.0	30.6	20.1	East	X	Spring	**2.** 32.2 dB(A) **55.5 dB(C)***	-	6.3	22.1
3 S 22 °48,590 EO14°54,021	2010-10-14 **3.** Morning	**3.**11H58am	14.4	22.0	29.9	18.9	East	X	Spring	**3.** 34.0 dB(A) **56.8 dB(C)***	-	4.6	21.2
4 S 22 °48,393 EO14°53,202	2010-10-14 **4.** Morning	**4.**12H15pm	15.4	23.2	35.99	21.6	East	X	Spring	**4.** 32.5 dB(A) **62.8 dB(C)***	-	4.9	22.5

*** Above statutory limit of 45 dB (A) outdoors (Morning / Afternoon)**

- **WBGT** Wet and (dry bulb) globe temperature
- **WB** humidity
- **GT** radiant heat.
- **DB** dry bulb
- **m/s** meters per second.
- **°C** degrees Celsius.
- *Measurements taken during vehicle movements*

Please note: *that areas with dB(C) that is mark with * is areas where low frequencies are present due to the fact that there is a bigger then 10 dB difference between the dB(C) and dB(A) levels.*

Note: *Strong Wind,*
No Traffic, Heavy Traffic – truck movement C28
Exploration Drill Operating.

Table 7:

Noise levels measured at RUN Swakopmund on the 14th of October 2010.

Site	Date	Time	Temperature				Wind Direction	Microphone position	Season	Rating level L_r [1)] For ambient noise dB(A) outdoors		Wind Speed m/s	Temp. ^{0}c
			WB	DB	GT	WBGT		1, 2 m		Day Time	Night Time		
1 S 22 °49,326 EO14°56,381	2010-10-14 **1.** Afternoon	**1.**12H30pm	15.8	23.2	32.7	20.8	North	X	Spring	**1.** 35.6 dB(A) 65.6 dB(C)	-	6.8	23.0
2 S 22 °48,062 EO14°53,934	2010-10-14 **2.** Afternoon	**2.**12H55pm	15.8	23.8	32.9	20.9	North	X	Spring	**2.** 33.2 dB(A) **62.8 dB(C)***	-	4.5	23.5

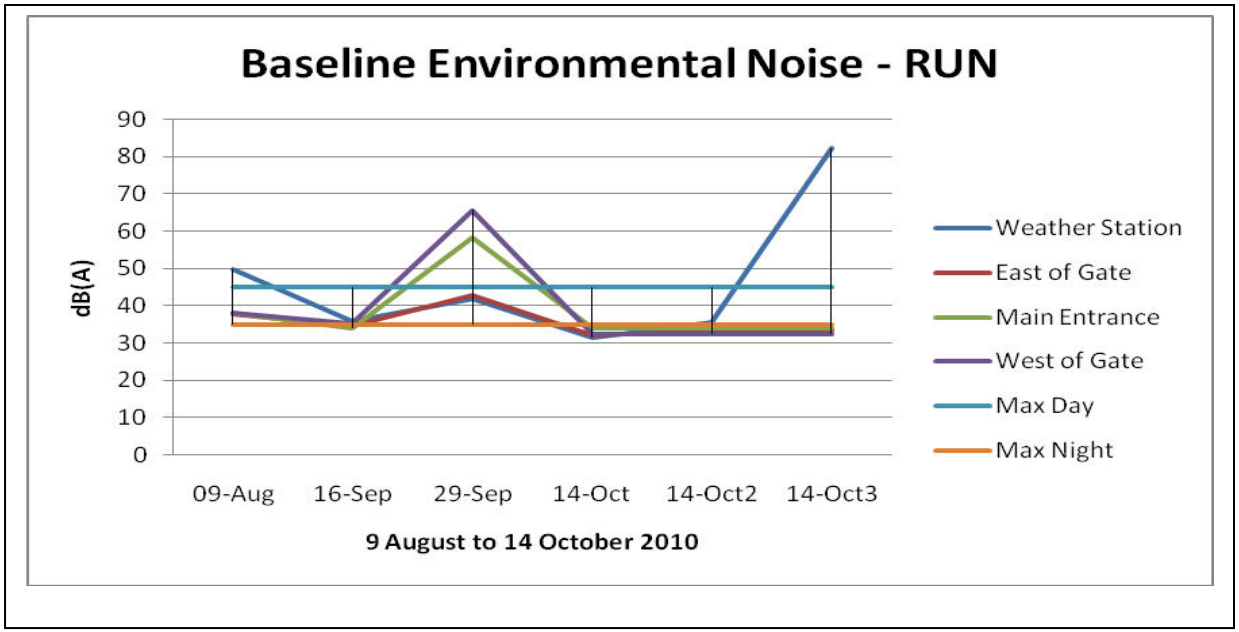
*** Above statutory limit of 45 dB (A) outdoors (Morning)**

- **WBGT** Wet and (dry bulb) globe temperature
- **WB** humidity
- **GT** radiant heat.
- **DB** dry bulb
- **m/s** meters per second.
- **°C** degrees Celsius.
- *Measurements taken during vehicle movements*

Please note: *that areas with dB(C) that is mark with * is areas where low frequencies are present due to the fact that there is a bigger then 10 dB difference between the dB(C) and dB(A) levels.*

Note: *Drill Rig Operating – 4000m from drill Rig,*
Exploration Drill Operating

Environmental Noise Graph



5.1 Evaluation of Results

Baseline Ambient Noise Level Measurements from the new proposed Reptile Uranium Namibia (Pty) Ltd Mine project in the Namib Naukluft Park, Swakopmund dated 15th of October 2010.

The measured ambient noise level in the environment of the new proposed Reptile Uranium Namibia (Pty) Ltd Mine project was sampled during different time periods of the day and weekend at four representative locations.

5.2 REPTILE URANIUM NAMIBIA (PTY) LTD MINE BASELINE NOISE STUDY 2010 RESULTS:

The following GPS points were logged based the new proposed Reptile Uranium Namibia (Pty) Ltd Mine project:

- **REP 1:** At the RUN on site Weather station. (S22° 49' 202";E14° 53'238)
- **REP 2:** Next to the C28, Directly East of the main entrance to the mine site. (S22° 48' 501";E14° 53'588)
- **REP 3:** At the main entrance next to the C28. (S22° 48' 590";E14° 54'021)
- **REP 4:** Next to the C28, Directly West of the main entrance to the mine site. (S22° 48' 393";E14° 53'204)

Figure 3: Satellite image showing the locations of the measurement points.

The measurements were taken in accordance with the procedures stipulated in SANS 10103 [1] and for determining possible impacts of the proposed mine project.

TABLE 2 - 7 reflex's Baseline Ambient noise levels measured at the new proposed Reptile Uranium Namibia (Pty) Ltd Mine project

An environmental baseline noise assessment survey to determine the level and rating of environmental noise with respect to land use, health, annoyance and speech communication was conducted at the four measuring positions of the new proposed Reptile Uranium Namibia (Pty) Ltd Mine project site - Figure 3

The environmental noise survey was conducted over the period of 09th of August 2010 to the 14th of October 2010. The environmental baseline noise survey was also conducted during different times of the day and weekends.

Please Note: The measurements indicated in the colour blue was taken with vehicle movement in order to determine the contributing factor of the areas as far as the generation of environmental noise is concerned.

The following contributing factors were noted during this survey:

- Vehicle movement especially during peek times (06H00-08H00, 13H00-14H00 and 16H00-18H00) contribute to higher environmental noise.
- Transport vehicles.
- Road Construction activities.
- Exploration Drill Rigs Operating.
- Tourist visiting Namib Naukluft Park.
- Blistering wind blowing over open plains.

Measuring points 1 and 4 must be evaluated against Table 1:

a) Rural districts.

Type of district	Rating Level L_r [1)] for ambient noise dB(A)					
	Outdoors			Indoors, with open windows		
	Day-time	Evenings, weekends	Night - time	Day-time	Evenings, weekends	Night-time
a) Rural districts	45	40	35	35	30	25

- dB(A) levels measured between 37.7 dB(A) – **49.8 dB(A)*** during the ***Morning*** of the 09th of August 2010.
- dB(A) levels measured between 34.1 dB(A) – 35.8 dB(A) during the ***Afternoon*** of the 16thof September 2010.
- dB(A) levels measured between 32.7 dB(A) – 37.3 dB(A) during the ***Afternoon-Weekend*** of the 26th of September 2010.
- dB(A) levels measured between 41.9 dB(A) – **65.6 dB(A)*** during the ***Morning*** of the 29th of September 2010.
- dB(A) levels measured between 31.6 dB(A) – 34.0 dB(A) during the ***Morning / Afternoon*** of the 14th of October 2010.
- dB(A) levels measured between 33.2 dB(A) – 33.2 dB(A) during the ***Afternoon*** of the 14th of October 2010.

The results indicate that the baseline environmental noise levels of the **Reptile Uranium Namibia Mine** Site did exceed the statutory limits for rural areas on two of the days monitored.

Furthermore, the prevailing wind direction was in a south westerly direction which means that sound will migrate towards the neighbouring community.

6 IMPACT ASSESSMENT

Although there are no permanent noise receptors in the area, SANS 10103:2004 does consider nature reserves as areas sensitive to noise disturbance. The surrounds of the proposed **Reptile Uranium Namibia Mine** Site is a proclaimed nature reserve and is a pristine area that will potentially be impacted on by the noise generated during the construction, operation and closure of the proposed mine.

Blasting generates noise and vibrations and even though it is of short duration could have an effect on surrounding land owners and change the rural nature of the surrounding area.

An anticipated impact of the continuous noise generated will be the initial movement of wildlife out of the area. As the fauna become accustomed to the noise, there will be less of an impact and possibly movement back into the Mine vicinity.

Table 3 from SANS 10103:2004 describes the estimated response from a community according to an excess

noise level becoming an annoyance. Although there are no communities who will be considered receptors for noise generated by the Development, this can be used as a guideline for noise impact. Although there are various calculations in the standard to determine excess noise, for the purpose of this study, it can be considered as the increase in ambient noise relative to the baseline because of the proposed mine development.

From Table 3 it can be noted that there are overlapping areas in the categories of responses to increases. This is specifically done to underline the fact that there is no clear-cut transition from one community response to another. Instead, the transition is more gradual and may differ substantially from one scenario to another, depending on a large number of variables.

Table 3: Categories of community/group response (SANS 10103:2004).

Excess ΔL_{ReqT}[a] dBA	Estimated community/group response	
	Category	Description
0 – 10	Little	Sporadic complaints
5 – 15	Medium	Widespread complaints
10 – 15	Strong	Threats of community/group action
>15	Very strong	Vigorous community/group action

SANS 10357:2004 describes the Concave method for predicting sound levels. This method takes into account distance, surface absorbance characteristics, meteorological conditions and the stability of the atmosphere, using the seven Pasquill stability classes. The scope of this study did not include producing a sound pressure model. In addition, the sound power levels specifications across the different octave frequency bands for the construction and operation plant that are necessary for the model were not yet available. No detailed model was therefore produced for the proposed Development, however if an indicative scenario is considered under the conditions shown in Table 5, with the typical sound power levels detailed in Table 4, the anticipated sound pressure level 1,000m downwind from the site should be below the 55dB(A) guideline. It should be emphasised that these predicted sound levels are typical values for these types of equipment and are not actual specified values from equipment to be used on the Project.

Table 4: Typical sound power level values dB(A) with the predicted sound pressure level at 1,000m for some equipment examples.

Octave bands (Hz)	63	125	250	500	1000	2000	4000	Predicted sound pressure level at 1,000m
Dozer D9	100.0	118.0	111.0	109.0	107.0	103.0	97.0	45.6dB(A)
Excavator	110.0	112.0	118.0	105.0	106.0	99.0	95.0	46.6dB(A)
Grader 14 H	102.2	107.6	108.6	105.8	102.2	98.8	92.8	41.5dB(A)
Dump Truck A35	118.7	110.9	106.7	104.7	107.1	99.4	96.1	42.7dB(A)
Vibrating roller	105.0	112.1	106.0	102.5	99.9	98.9	96.0	39.5dB(A)
Drill	99.4	116.4	111.4	112.7	113.1	109.6	104.9	49.4dB(A)
Conveyor (rounded rollers)	93.5	97.2	97.3	101.3	101.4	100.1	96.1	37.8dB(A)

Table 5: Mean meteorological conditions.

Parameter	Assumed value
Temperature	35.0 °C max
	15.0 °C min
Wind	12 km
	East, West and South West
Static air pressure	1012.56 kPa
Cloud cover	0-3/8
Pasquill stability class	D - day F - night
Non-absorbent ground	

As defined in SANS 10357:2004

According to SANS 10328:2003, Methods for environmental noise impact assessment, development for a mine or industry within a 1,000m of a receptor may be considered to have acoustic implications, hence the 1,000m limit for the calculations in Table 4. There is however no farm houses located approximately of the site, respectively. Although temporarily occupied, these will be the most affected receptor points in the vicinity.

Blasting will possibly be the loudest noise generated during the Project; however, this will be an intermittent noise of short duration. As there is currently no information on anticipated blasting sound pressure levels, the predicted sound at these receptor points has not been calculated. The predicted sound pressure levels, for the greatest predicted constant sound pressure level (drill) as calculated in Table 4, at these distances and wind orientation has therefore been calculated and is provided in According to SANS 10328:2003, Methods for environmental noise impact assessment, development for a mine or industry within a 1,000m of a receptor may be considered to have acoustic implications, hence the 1,000m limit for the calculations in Table 4.

Table 6:
Predicted sound pressure level at 4 km from drilling (greatest constant sound pressure level as calculated in Table 4). Although blasting may cause the greatest noise disturbance, the predicted sound pressure level at receptor sites has not been modelled due to unknown blasting sound pressure levels and the short duration of this noise.

Direction	GPS Points	Distance	Wind Direction	Predicted Sound Pressure Level
East	S 22 49,326 E 14 56,381	4,000m	East	35.6dB(A)
			East	65.6dB(C)
West	S 22 48,062 E 14 51,934	4,000m	East	33.2dB(A)
			East	62.8dB(C)

Although the anticipated sound pressure levels from blasting have not been modelled due to the momentary nature of the sound generation and uncertainty in generated sound levels, it can be assumed that blasting will be audible from the receptors in the surrounding areas.

The noise impact ratings discussed below as parameters must be included in the EIA/EMP Report.

6.1 Construction Phase:

6.1.1 Cause and comment

During construction, the predominant source of noise will be from trucks, diesel powered plant, drilling, grinding and concrete batching. Blasting will also take place during construction.

6.1.2 Significance:

The impacts from noise will be limited, predominantly due to the absence of any receptors within the vicinity of the site. There will be a slight affect on the fauna that will likely move out of the immediate vicinity. General vehicle and people activity will probably have a greater effect in this regard than noise alone. Consequently, the severity is considered moderate with low significance.

Impact	Type	Nature	Duration	Scale	Likelihood	Severity	Significance	Mitigation
Noise generated from construction activities.	Direct	Negative	Short Term	Local	Definite	Moderate	Low (25%)	· Select equipment with low sound power level rating and ensure it is well maintained. · Limit loud activities to daylight hours as far as possible. · Implement noise monitoring programme. · Implement grievance process.

6.2 Pre-Operational Phase:

6.2.1 Cause comment

During operation the predominant continuous noise source will be from haul trucks and components of the process plant such as crushers and mills. Blasting will also have a substantial noise effect, particularly when shallow, before containment by the pit, but will be of a short duration and therefore more limited impact. Vibrations from blasting may also affect nearby receptors but there should be very little chance of structural damage being caused.

6.2.2 Significance:

As with construction, the impacts from noise will be limited, predominantly due to the absence of any receptors within the vicinity of the site. Once again, there will be a slight affect on the fauna that will likely move out of the immediate vicinity. General activity will probably have a greater effect in this regard than noise alone. Consequently, the severity is considered moderate with medium significance.

Impact	Type	Nature	Duration	Scale	Likelihood	Severity	Significance	Mitigation
Blasting	Direct	Negative	Short Term	Local	Definite	Moderate	Low 25%	· Restrict blasting to daylight hours.
Trucks	Direct	Negative	Medium Term	Local	Definite	Moderate	Medium 35%	· Select vehicles with low sound power level rating, adequate exhaust silencers and ensure they are well maintained.

Impact	Type	Nature	Duration	Scale	Likelihood	Severity	Significance	Mitigation
Process plant	Direct	Negative	Medium Term	Local	Definite	Moderate	Medium 35%	· Enclose machinery. · Select equipment with low sound power level rating. · Ensure the rollers used for the conveyor system are machined for optimum roundness. · Limit loud activities to daylight hours as far as possible. · General Mitigation · Continue noise and vibration monitoring programme. · Continue grievance process.

6.3 Closure

6.3.1 Cause and comment

Closure noise sources will be similar to construction with heavy diesel equipment, grinders, pneumatic hammers and trucks generating most of the noise.

6.3.2 Significance:

As for construction and operation, general activity will have a greater effect than noise on fauna movement and the absence of receptors will reduce the severity of the impact. Consequently, the severity is considered medium to low with moderate significance.

Impact	Type	Nature	Duration	Scale	Likelihood	Severity	Significance	Mitigation
Noise generated from heavy machinery and trucks.	Direct	Negative	Short Term	Local	Definite	Minor	Low 20%	· Select equipment with low sound power level rating and ensure it is well maintained. · Limit loud activities to daylight hours as far as possible. · Continue noise Monitoring programme. · Continue grievance process.

6.4 Post Closure

6.4.1 Cause and comment

After closure, most machinery and personnel will be removed from or vacate the Site respectively. Apart from sporadic small vehicle activity, there should be limited noise generated and conditions should return to pre-mining baseline levels.

6.4.2 Significance:

As the impact source will be removed, the significance is considered neutral.

6.5 Cumulative impact

There are no existing sources of noise pollution in the vicinity, with the closest industrial activity at Langer Heinrich Uranium Mine, approximately ± 55km away. There is also no planned mining nearby i.e. closer than Langer Heinrich Uranium Mine. The cumulative impact is therefore considered negligible. Blasting from the various mines is, however, audible over a large distance and the addition of further blasting activities in the area may result in increased noise and vibration disturbance to receptors.

6.6 Information Gaps and Further Work

For reasons detailed above, no measurements were taken at the different point at night; whilst this is not seen as having any influence on the impact assessment, it may be necessary to obtain these sound pressure levels to complete the baseline data.

As discussed above, no predictions of the blasting sound pressure levels at receptor points have been modelled. It is, however, accepted that blasting will be heard in the surrounding Namib Naukluft Park and mitigation has been recommended.

It is recommended that monitoring continues to determine the impact that construction, operation and closure will have on the sound levels. As there are no sensitive receptors in the vicinity of the proposed Development, a detailed model to predict sound levels is not considered necessary. Once the sound power level specifications for construction and the operational plant are available, however, it will be possible to process the model, if required.

7. CONCLUSION AND RECOMMENDATIONS

The following conclusions could be made out of the measurement collected.

Out of this survey it may be concluded that low frequency environmental noise is present and this may result in complains from the neighbouring community.

When the value of the dB(A) is 10 dB smaller then the dB(C) value it may be concluded that low frequency is generated.

It must however also be noted that at this point in time there is no standardised test or assessment procedure available for the measurement of low frequency noise.

The new **Reptile Uranium mine** Project may contribute to higher environmental noise levels due to construction activities.

The baseline sound levels recorded for the proposed Project area were within the standards for rural areas supplied by SANS 10103:2004 for most of the times monitored. They were also substantially lower than the World Bank Guidelines. Although the development of a mine in the remote area of the proposed **Reptile Uranium mine** Project, where there is negligible anthropogenic impact, will increase ambient sound levels, the absence of any receptors within 1,000m of the development minimizes the significance of the impact greatly. Surrounding Namib Naukluft Park will however be able to hear mining operations, including blasting.

Please note that the wind factor and vehicle movement do have a significant effect on ambient sound levels next to the C28 road.

8. RECOMMENDATIONS

The following recommendations are made to assist **Reptile Uranium Mine** Site to mitigate environmental noise and to ensure that environmental noise is managed in such a manner that a permanent reduction could be insured for environmental noise:

- A maintenance plan for all transport and construction equipment and vehicles (Contractors on site) must be introduced to ensure that vehicles are inspected on a regular basis with specific reference to exhaust and muffler systems. Inspections must confirm that the said systems do meet the manufacturer's specifications and that it is in a good working condition. Contractors must be requested to provide proof a vehicle maintenance plan.

- **Reptile Uranium Mine** must consider introducing a requirement that contractors use equipment that does not generate excessive noise during operation. There are products available on the market that is specifically designed to operate at lower noise levels (high pressure equipment).

- Consideration can also be given to reduce speed limits within the boundaries of **Reptile Uranium Mine** Site as a measure to reduce noise.

- The construction activities must be limited to between 07:00 am to 17:00 pm to lessen complaints by neighbouring community.

- It may also be pertinent during a Strategic Environmental Assessment (SEA) for the region to consider the baseline sound levels and noise impact of additional heavy vehicles travelling on the C28 National road.

9. REFERENCES

In this report reference was made to the following documentation:

(1) SANS 10103:2008 'The measurement and rating of environmental noise with respect to annoyance and to speech communication', Edition 6.

(2) SANS 10357:2004 'The calculation of sound propagation by the "Concave method". Edition 1.2.

(3) Guidelines for Community Noise, World Health Organisation, Geneva, 1999.

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Certificate of Conformance

Calibration of:	SOUND LEVEL METER, ½" MICROPHONE, OCTAVE BAND FILTER & SOUND LEVEL CALIBRATOR
Manufacturer:	QUEST
Model number:	1900, 4146, OB-300
Serial number:	CC6020021, 18182, HV6050003
Calibrated for:	NATIONAL ENVIRONMENTAL HEALTH CONSULTANTS CC Brits
Calibration procedure:	NML-AV\AS-0008 NML-AV\AS-0009 NML-AV\AS-0028 NML-AV\AS-0031
Period of calibration:	05-07 May 2010

1. PROCEDURE

The sound level meter was electrically calibrated according to the relevant clauses of IEC 60651 and 60804 specifications. The microphone with the sound level meter was acoustically calibrated according to the relevant clauses of IEC 60651 specifications. The instrument complete with filters was electrically calibrated according to IEC 61260 specification. The sound level calibrator was calibrated according to the relevant clauses of IEC 942 specification.

The results of the measurements are traceable to the national measurement standards.

Calibrated by (012-841-2§34)	Checked by	For Chief Executive Officer
R Nel (Approved Signatory^ Metrologist: Acoustics	**CS Veldman (Approved Signatory) Metrologist: Acoustics & Vibration**	
Date of issue 07 May 2010	Page 1 of 4	Certificate number **AWAS-3768**

SCITEC (PTY) LTD.

"QUESTTEMP015" AREA HEAT STRESS MONITOR
CALIBRATION CERTIFICATE: Serial No: KL6030024

1. SENSOR CALIBRATION
1-po1nt adjustment 1n oil bath using Sensor Calibrator and Standard Sensor Set calibrated by Production Technology Division. CSIR; this Temperature Calibration is race able to RSA National Standard.

TEMPERATURE MEASURED	OUTPUT VOLTAGE (V)	SPECIFICATION
19.6	WB	$V = \frac{(T+273)}{100} \pm 0.002$ volt
19.7	GT	

2. INSTRUMENT CALIBRATION
2-po1nt adjustment using Instrument Calibrator set to produce the following voltages as Inputs to Instrument

INPUT VOLTAGE (V)	TEMPERATURE DISPLAYED	SPECIFICATION
2.8300 V	10°	T = (V-2.73) x IOO ± 0.2 degree C
3.1300V	40°	

3. ALARM SETTING nominal: 30 degree C
Range of probable WBGT when alarm sounds: 30.0 - 30.5 degrC

4- FINAL CHECK Conditions: Sensors 1n air. natural ventilation.
Wet Bulb dry, no wick Comparison with SCITEC Standard Instrument

FUNCTION	STANDARD INSTRUMENT	READING OF SERIAL No	SPECIFICATION
WB (dry)	19.6	19.7	± 0.2 degree C
GT	19.7	19.8	
WBGT	19.4	19.5	

Date. 07 MAY 2010

SCITEC (PTY) LTD

SABS

AirFlow INSTUMENTATION

Certificate of Calibration

No. 2133.ZG572-10

Calibration of	**HOT WIRE ANEMOMETER**
Manufacturer	LT LUTRON
Model Serial no	AM-4204 L937792
Calibration for	National Environment Health Consultant BRITS 0250
Calibration method	See page two
Date of calibration	2010-05-07
Re-calibration date	The re-calibration date should be determined on the basis of conditions of use as well as statistical records of previous calibrations.
Calibrated by	MM Mamabolo
Manager: Metrology	CG Kros

SANAS ACCREDITED LABORATORY

1 Dr Lategan Road Groenkloof, **Private Bag** X191 **Pretoria 0001, Tel: +27 (012) 428-7911, Fax: +27(012) 344-1568.**
This calibration was performed by SABS Commercial! (Pty) Ltd.
NOTE: The values in this certificate are correct at the time of calibration Subsequently the accuracy wilt depend on such Factors as the care exercised in handling and use of the instrument and the frequency of use, Recalibration should be performed after a period which has been chosen to ensure that the instrument's accuracy remains within the desired limits.

The Southern African Institute for Occupational Hygiene

This is to certify that

J Cornelissen

ID No. 650408 5019 00 3

Has satisfied the requirements of section 3.4
of the Constitution of the Institute
and on recommendation of the Certification Board
is registered as an

Occupational Hygienist

Membership No. 0159

Chairman: Certification Board

valid until 2010/12/31

IOHA Recognised Certification Scheme

IOHA

REPUBLIC OF NAMIBIA

MINISTRY OF LABOUR AND SOCIAL WELFARE

Certificate of Registration as an Approved Inspection Authority

In terms of Regulation 18 of the Regulations relating to Health and Safety of Employees at work made under the Labour Act, 1992 (Act 6 of 1992)

Authorization Number: **A.I.A. 09/29**

This is to certify that: **National Environmental Health Consultants cc**
P.O. Box 90242
WINDHOEK

have been approved as an Inspection Authority

Competency/cies: **Occupational hygiene, noise, dust, temp, stress, ventilation, Ergonomics, lead, asbestos, radiation, vibration. Biological monitoring, Training ISO 9001, 14001 OSH Act 18001 implementation. Fire Fighting First Aid Training, Audio Metric Test, Lung Function Eye vision screening and Software systems.**

From: **13/10/ 2009 to 20/10/2010**

Chief Inspector: _____

Date: 13/10/09.

MINISTRY OF LABOUR AND SOCIAL WELFARE
Occupational Health and Safety
13 OCT 2009
Private Bag 19005 • WINDHOEK
REPUBLIC OF NAMIBIA