

BASELINE NOISE ASSESSMENT

VALENCIA URANIUM LIMITED

MARCH 2008



Environmental Solutions Provider

Prepared By :
Digby Wells & Associates
Environmental Solutions Provider
Private Bag X10046,
Randburg, 2125,
South Africa
Tel : +27 (11) 789-9495
Fax : +27 (11) 789-9498
E-Mail : info@digbywells.co.za



EXECUTIVE SUMMARY

Digby Wells and Associates was commissioned by Valencia Uranium Limited to undertake an Environmental Impact Assessment (EIA) for the proposed Valencia Uranium Mine. The proposed 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 Valencia Site.

Measurements were taken from four points to the north, east, south and west of the site, representative of the proposed development boundaries. In addition, measurements were taken from a fifth site in the Khan River valley on the proposed access road. A-weighted sound pressure levels were recorded over the period of an hour during both day and night at the respective measurement points.

The median values of the measurements recorded during the day for the sites around the proposed development varied between 36.2dB(A) and 41.7dB(A), with a Khan River measurement of 42dB(A). The reading from one of the points, AR10 was affected by the operation of the diesel generator at the Exploration Camp, whilst wind, together with the reflective characteristics of the Khan River canyon walls may have resulted in the slightly elevated readings at that point. Night-time measurements varied between 33.2dB(A) and 37.6dB(A) for the various points. Both day and night measurements were substantially below the World Bank Guideline values of 45dB(A) and 55dB(A), respectively. According to SANS 10103:2004 a change of 10dB(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 the remote nature of the site and the corresponding low sound levels, the introduction of mining activity will greatly 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. There are two temporarily occupied homesteads on the surrounding farms but these are approximately 3.5km and 4km from the development. 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 Valencia 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.



TABLE OF CONTENTS

| | | |
|----------|--|-----------|
| 1 | INTRODUCTION | 1 |
| 1.1 | REGIONAL SETTING | 1 |
| 1.2 | DESCRIPTION OF THE PROJECT | 1 |
| 2 | METHODOLOGY | 2 |
| 3 | DESCRIPTION OF SURROUNDING ENVIRONMENT | 4 |
| 3.1 | CLIMATE..... | 4 |
| 3.1.1 | <i>Mean monthly rainfall and precipitation</i> | 4 |
| 3.1.2 | <i>Mean monthly maximum and minimum temperatures</i> | 4 |
| 3.1.3 | <i>Mean wind speed and direction</i> | 4 |
| 3.2 | TOPOGRAPHY | 5 |
| 3.3 | LAND USE | 6 |
| 4 | BASELINE RESULTS | 6 |
| 5 | IMPACT ASSESSMENT | 9 |
| 5.1 | CONSTRUCTION PHASE:..... | 13 |
| 5.1.1 | <i>Cause and comment</i> | 13 |
| 5.1.2 | <i>Significance:</i> | 13 |
| 5.2 | OPERATIONAL PHASE | 14 |
| 5.2.1 | <i>Cause and comment</i> | 14 |
| 5.2.2 | <i>Significance:</i> | 14 |
| 5.3 | CLOSURE..... | 15 |
| 5.3.1 | <i>Cause and comment</i> | 15 |
| 5.3.2 | <i>Significance:</i> | 15 |
| 5.4 | POST CLOSURE | 16 |
| 5.4.1 | <i>Cause and comment</i> | 16 |
| 5.4.2 | <i>Significance:</i> | 16 |
| 5.5 | CUMULATIVE IMPACT | 16 |
| 5.6 | INFORMATION GAPS AND FURTHER WORK | 17 |
| 6 | CONCLUSION AND RECOMMENDATIONS | 17 |
| 7 | REFERENCES | 17 |

LIST OF TABLES

| | |
|---|----|
| Table 1: Acceptable rating levels for noise in various districts (SANS 10103:2004). | 8 |
| Table 2: Sound pressure results 8 - 12 January 2008..... | 9 |
| Table 3: Categories of community/group response (SANS 10103:2004). | 10 |



| | |
|---|----|
| Table 4: Typical sound power level values dB(A) with the predicted sound pressure level at 1,000m for some equipment examples..... | 10 |
| Table 5: Mean meteorological conditions..... | 11 |
| Table 6: Predicted sound pressure level at farm houses from drilling (greatest constant sound pressure level as calculated in Table 4)..... | 13 |

LIST OF FIGURES

| | |
|---|---|
| Figure 1: Sound pressure measurement sites..... | 3 |
| Figure 2: Valencia Uranium wind rose for the period October 2006 to October 2007..... | 5 |



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 20 μ Pa. 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.



1 INTRODUCTION

Tsumeb Exploration Company (TECo) held the Exclusive Prospecting Licence (EPL) 1496 for the Valencia uranium deposit. Subsequent to the purchase of TECo by Forsys Metals Corp (FSY), listed on both the Toronto and Namibian Stock Exchanges, the name has been changed to Valencia Uranium Limited (Valencia), a wholly owned subsidiary of FSY.

Valencia is now in the process of preparing a Mining Licence (ML) application and has commissioned Digby Wells and Associates (Pty) Ltd. to conduct an Environmental Impact Assessment (EIA) for the proposed Mine. As the proposed Development will involve machinery with the potential for high noise generation, it is necessary as a component of the EIA, to establish baseline ambient noise levels. These levels can then be used for evaluation of the possible impacts and later comparison with operational monitoring data.

1.1 Regional setting

The proposed Valencia Mine is situated in the Erongo Region of western Namibia, approximately 80km from Swakopmund, 55km from Usakos and 28km from Arandis in a straight-line. Within the Erongo Region, Valencia Uranium is located on the privately owned Farm Valencia (No. 122), situated on the eastern side of the B2 road and the Khan River, about 25 km to the north-east of the Rössing Uranium Mine (**Error! Reference source not found.**, EIA/EMP Report). The extent of the area covered by the EPL 1496 is approximately 700 hectares. Access to the site is currently from the B2 through the Khan River. An alternative access exists via the D1914 from Usakos.

1.2 Description of the Project

The Valencia Uranium deposit is a relatively shallow deposit and will be mined using an open pit technique which is currently planned to be approximately 1,400m long, 700m wide and 360m deep (Snowden, 2007). The proposed run of mine (ROM) production will be approximately 1Mt/month. The estimated reserve is 116.8Mt with an average grade of 0.119kg/t U_3O_8 . Approximately 122Mt of waste will be removed progressively over the life of the mine (Snowden, 2007).

The ore will be handled through the following flow process:

Primary crushing – rotary mill and secondary crushing – acid leach – filtration/clarification – ion exchange – solvent extraction – precipitation – calcining and packing (GRD Minproc, 2007).

Tailings from the process will be deposited on a tailings dump to the west of the plant and south of the pit. The estimated tailings to be produced over the 11-year life of mine is approximately 120Mt, with the dump covering an area of about 250ha at a maximum height of 40m. In addition



there will be north and south waste rock dumps of 53m height, 64Mt and 50m height, 65Mt, respectively. A 15.5Mt low grade stockpile will also be developed on site.

2 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 1. 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.

The approximate weather conditions during the measurements were as follow:

Day

Temperature: 32°C.

Humidity: 40%

Wind: moderate NE

Night

Temperature: 22°C.

Humidity: 40%

Wind: light NE

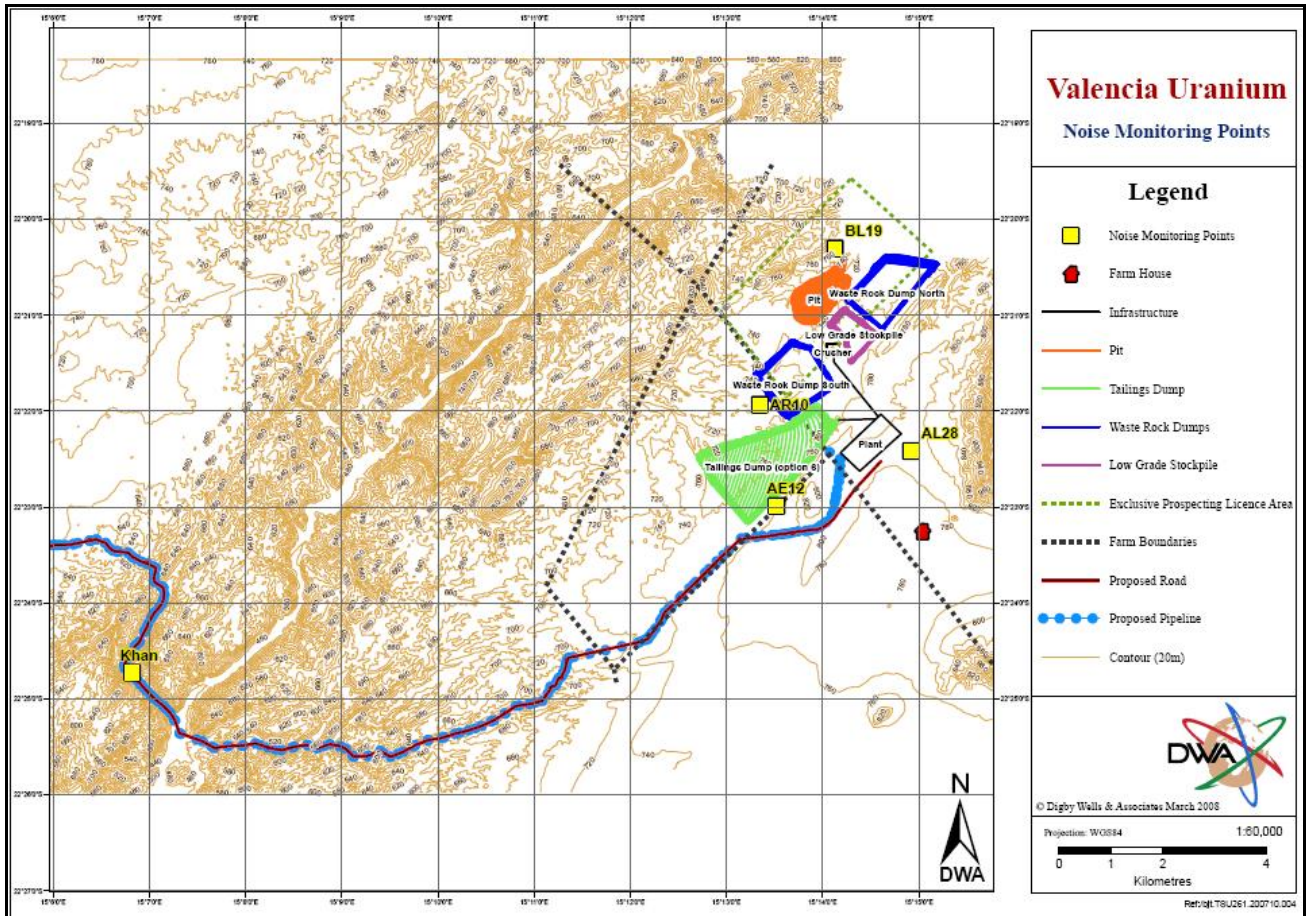


Figure 1: Sound pressure measurement sites.



3 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. These include quiver trees, *Euphorbia* species, corkwoods and elephant's foot. 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 Valencia site would be classified as non-absorbent or acoustically hard ground. A number of vegetation assessments have been undertaken for the area (see Appendix G of the EIA/EMP Report) and can be referred to for more detailed information on flora in the area.

3.1 Climate

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

3.1.1 Mean monthly rainfall and precipitation

The long-term regional rainfall varies from 50 to 100 mm per annum, with rainfall steadily decreasing westwards. Rainfall records recorded at the Rössing tailings site (situated 25km south-west of the Valencia site) indicate an annual rainfall of between 3 and 95 mm.

Although there is not a comprehensive data set accumulated for the Valencia site, it is evident from the station records and the Rössing data that arid conditions prevail in the area, which will inhibit the often used mitigation technique of establishing vegetation screens as sound barriers.

3.1.2 Mean monthly maximum and minimum temperatures

The monthly average temperatures recorded at the Valencia site varied between 17.3°C and 26.2°C. Diurnal fluctuations can however be large, with a maximum of 38.7°C and a minimum of 5.9°C recorded over the same time period. These fluctuations could affect the atmospheric sound level attenuation capacity, which is dependant on temperature, amongst other parameters.

3.1.3 Mean wind speed and direction

Figure 2 depicts the wind rose for the wind direction recorded by the Valencia station since its installation. As stated above, the data capture rate for this station was low; this included the wind direction records. Data from the Rössing station (Eco.plan, 2006; Airshed, 2008), however,



confirms that this is, in fact an accurate reflection of the prevailing wind direction. The predominant winds are north-east/south-west and wind speeds are mostly less than 15m.s^{-1} , although wind speeds do occasionally exceed 30m.s^{-1} .

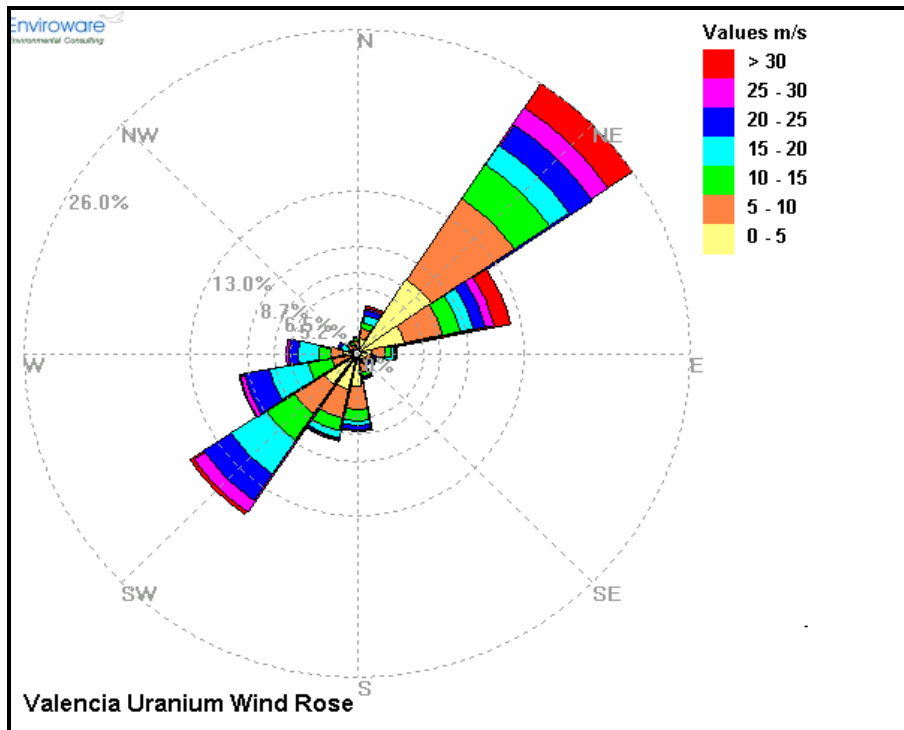


Figure 2: Valencia Uranium wind rose for the period October 2006 to October 2007.

3.2 Topography

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

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

The proposed Mine and plant site is broken by gulleys cut by sub-tributaries of the Khan River that currently only contain water, and flow, periodically after large storm events. South of the site,



the surface is broken more drastically by deeper, more frequent Khan River tributaries. To the north, west and north-east the topography rises into higher ground.

3.3 Land use

The Valencia farm is relatively undisturbed; wildlife occurs on the land, but it is not restricted by game fencing. Low intensity grazing of cattle (approximately 80 head) is also practised on the property. There is currently no significant development on the farm, although there is a farmhouse located approximately 3.5km to the south-east of the proposed open pit; there is also a farmhouse approximately 4km to the north of the proposed site, on the neighbouring Namibplaas. The Valencia farm landowner, Mr. Horn, has indicated that there are plans for a lodge development on the neighbouring farm, Gaudeamus, although these have not yet been realised. The topography, climate and nature of the soils do not provide conditions suitable for agricultural activities.

4 BASELINE RESULTS

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 occasion, did slightly exceed the guideline values. At point AR10 (Figure 1) this was likely due to the diesel generator operating at the time of the measurement, whilst the slightly higher measurements taken in the Khan River along the proposed road could be attributed to wind effects and the reflective nature of the canyon walls.

**Table 1: Acceptable rating levels for noise in various districts (SANS 10103:2004).**

| Type of District | Equivalent Continuous Rating Level ($L_{Req,T}$) for Noise | | | | | |
|--|--|-------------------------------|---------------------------------|-------------------------------|-------------------------------|---------------------------------|
| | dBA | | | | | |
| | Outdoors | | | Indoors, with open windows | | |
| | Day-night ($L_{R,dn}^a$) | Day time ($L_{Req,d}^b$) | Night time ($L_{Req,n}^b$) | Day-night ($L_{R,dn}^a$) | Day time ($L_{Req,d}^b$) | Night time ($L_{Req,n}^b$) |
| Residential Districts | | | | | | |
| Rural districts | 45 | 45 | 35 | 35 | 35 | 25 |
| Suburban districts with little road traffic | 50 | 50 | 40 | 40 | 40 | 30 |
| Urban districts | 55 | 55 | 45 | 45 | 45 | 35 |
| Non-Residential Districts | | | | | | |
| Urban districts with some workshops, business premises and with main roads | 60 | 60 | 50 | 50 | 50 | 40 |
| Central business districts | 65 | 65 | 55 | 55 | 55 | 45 |
| Industrial districts | 70 | 70 | 60 | 60 | 60 | 50 |

The proposed Valencia Uranium Mine is situated in what can be considered a remote location. Apart from low intensity cattle farming and the Exploration Camp, there is no anthropogenic activity in the area. As there is no substantial noise source in the vicinity, the baseline noise levels were expected to be low. This was confirmed by the sound levels measured during the site visit from 8 to 14 January 2008 (Table 2). The median A-weighted day sound pressure values ranged between 36.2 dB(A) and 41.7 dB(A), whilst the median night measurements for the different locations ranged between 33.2dB(A) and 37.6dB(A). Due to access difficulties when dark, no readings were taken in the Khan River valley at night. 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 55dB(A) and 45dB(A) for day and night, respectively. As defined by SANS 10103:2004, an increase of 10dB(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: Sound pressure results 8 - 12 January 2008.**

| Point No | Coordinates | | Day (L _{Aeq}) | | | Night (L _{Aeq}) | | |
|----------|-------------|----------|-------------------------|-----------|--------------|---------------------------|-----------|--------------|
| | South | East | Max dB(A) | Min dB(A) | Median dB(A) | Max dB(A) | Min dB(A) | Median dB(A) |
| AE12 | -22.38311 | 15.22537 | 39.1 | 34.7 | 36.2 | 35.1 | 31.2 | 33.2 |
| AL28 | -22.37359 | 15.24867 | 42.9 | 35.6 | 37.7 | 39.1 | 31.6 | 35.4 |
| AR10 | -22.3655 | 15.22243 | 47.8 | 36.3 | 41.7 | 37.1 | 32.3 | 35.2 |
| BL19 | -22.33837 | 15.2355 | 41.2 | 32.5 | 39.1 | 38.2 | 32.0 | 37.6 |
| Khan | -22.41208 | 15.11362 | 46.7 | 40.1 | 42 | No measurements taken | | |

5 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 Valencia Mine Site is not a proclaimed nature reserve but is a relatively pristine area that will potentially be impacted on by the noise generated during the construction, operation and closure of the proposed Mine. The only noise receptors are landowners that periodically occupy farm houses within a few kilometres of the Mine Site. These receptors could be affected by noise generated from the mining operations, particularly at night.

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 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 $\Delta L_{\text{Req,T}}^a$ 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 Concawe 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 | 118 | 111 | 109 | 107 | 103 | 97 | 45.6dB(A) |
| Excavator | 110 | 112 | 118 | 105 | 106 | 99 | 95 | 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 | 112.1 | 106 | 102.5 | 99.9 | 98.9 | 96 | 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 | 39.8 °C max |
| | 5.4 °C min |
| Wind | 11.7 m.s ⁻¹ |
| | NE |
| Humidity | 40% RHD |
| Static air pressure | 1,022.6 kPa |
| Cloud cover | 0-3/8 |
| Pasquill stability class | D - day F - night |
| Non-absorbent ground ¹ | |

¹As 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 are, however, farm houses located approximately 3.5km to the south-east and 4km north-east 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



Table 6. The sound pressure levels in Table 6 are those predicted from the specific source and do not take ambient noise into consideration. Where these levels are below ambient noise, the sound will be inaudible at the receptor points. The indiscernible sound level predicted to the north-east of the proposed site is largely due to the distance and presence of the topographical barrier between the site and the house. During north-easterly winds, the site will be downwind of the house, which will further decrease noise at this receptor point.



Table 6: Predicted sound pressure level at farm houses 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 | Farm | Distance | Wind direction | Predicted sound pressure level |
|------------|------------|----------|----------------|--------------------------------|
| South-east | Valencia | 3,500m | NE | 38.6dB(A) |
| | | | SW | 38.6dB(A) |
| North-east | Namibplaas | 4,000m | NE | 2.2dB(A) |
| | | | SW | 14.3dB(A) |

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 farm houses discussed above.

The noise impact ratings discussed below were based on the parameters provided in Section 7.2 of the EIA/EMP Report.

5.1 Construction Phase:

5.1.1 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.

5.1.2 Significance:

The impacts from noise will be limited, predominantly due to the absence of many receptors within the vicinity of the site. There are only two temporarily inhabited farm houses in the area, approximately 3.5km and 4km respectively. These sites will be affected by the construction operations. 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 | Direct | Negative | Short Term | Local | Definite | Moderate | Low (25%) | <ul style="list-style-type: none"> Select equipment with low sound power |



| Impact | Type | Nature | Duration | Scale | Likelihood | Severity | Significance | Mitigation |
|--------------------------|------|--------|----------|-------|------------|----------|--------------|--|
| construction activities. | | | | | | | | level rating and ensure it is well maintained. <ul style="list-style-type: none"> • Limit loud activities to daylight hours as far as possible. • Implement noise monitoring programme. • Implement grievance process. |

5.2 Operational Phase

5.2.1 Cause and 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 homestead residents but there should be very little chance of structural damage being caused.

5.2.2 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% | <ul style="list-style-type: none"> • Restrict blasting to daylight hours. |



| Impact | Type | Nature | Duration | Scale | Likelihood | Severity | Significance | Mitigation |
|---------------|--------|----------|-------------|-------|------------|----------|--------------|---|
| Trucks | Direct | Negative | Medium Term | Local | Definite | Moderate | Medium 35% | <ul style="list-style-type: none"> • Select vehicles with low sound power level rating, adequate exhaust silencers and ensure they are well maintained. |
| Process plant | Direct | Negative | Medium Term | Local | Definite | Moderate | Medium 35% | <ul style="list-style-type: none"> • 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. |
| | | | | | | | | <ul style="list-style-type: none"> • General Mitigation |
| | | | | | | | | <ul style="list-style-type: none"> • Continue noise and vibration monitoring programme. • Continue grievance process. |

5.3 Closure

5.3.1 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.

5.3.2 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% | <ul style="list-style-type: none"> • 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. |

5.4 Post Closure

5.4.1 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.

5.4.2 Significance:

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

5.5 Cumulative impact

There are no existing sources of noise pollution in the vicinity, with the closest industrial activity at Rössing Uranium Mine, approximately 25km away. There is also no planned mining nearby i.e. closer than Rössing. 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.



5.6 Information Gaps and Further Work

For reasons detailed above, no measurements were taken in the Khan River valley 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. This will be undertaken by Digby Wells & Associates during April 2008.

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 at the farm houses on Valencia and Namibplaas 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.

6 CONCLUSION AND RECOMMENDATIONS

Baseline sound levels recorded in the proposed Project area were within the standards for rural areas supplied by SANS 10103:2004. They were also substantially lower than the World Bank Guidelines. Although the development of a mine in the remote area of the proposed Valencia Project, where there is negligible anthropogenic impact, will increase ambient sound levels, the absence of any receptors within 1,000m of the development minimises the significance of the impact greatly. Surrounding farm houses will however be able to hear mining operations, including blasting.

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 B2 National road.

7 REFERENCES

AIRSHED Planning Professionals, 2008. Air quality impact assessment for the proposed Valencia Uranium mine in Namibia, APP/07/DWA-01. Johannesburg.

ECO.PLAN, 2006. Valencia Uranium Project – Preliminary Environmental Study for Mining, Prepared for Westport Resources Namibia (Pty) Ltd., Windhoek.

GRD MINPROC, 2007. Process Decision Note for the Valencia Uranium Project. Process Flow.



SNOWDEN, 2007. Forsys Metals Corp: Valencia Project, Namibia; Technical Report.

STANDARDS SOUTH AFRICA, 2003. SANS 10328:2003. Methods for environmental noise impact assessment.

STANDARDS SOUTH AFRICA, 2004. SANS 10103:2004. The measurement and rating of environmental noise with respect to land use, health, annoyance and to speech communication.

STANDARDS SOUTH AFRICA, 2004. SANS 10357:2004. The calculation of sound propagation by the Concawe method.

STROHBACH, B. 2006. Valencia Uranium Project: Detailed Botanical Survey. Westport Resources Namibia. Windhoek.