

VISUAL IMPACT ASSESSMENT
VALENCIA URANIUM PROJECT

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1 INTRODUCTION

The proposed Valencia Uranium Mine is situated near Rössing Uranium Mine, and is approximately 80km east (inland) of Swakopmund and east of Arandis in Namibia (see Figure 1). The extent of the proposed pit will be approximately 1,400m long and 700m wide and the maximum depth of the pit is currently planned to be approximately 360m. Figure 2 shows the infrastructure which will be constructed for the Mining Project. There will be two waste rock dumps approximately 40 m high and a low grade stockpile. There will be an associated uranium extraction plant utilizing crushers, mills and a solvent extraction system. The tailings will be deposited on a large tailings dump approximately 40 m high. There will be offices, change rooms, workshops, water treatment plants and other items of infrastructure on site. The Mine will be operated for 24 hours per day and 365 days per year. At night time, the area will be lit. The expected mine life is approximately 11 years where after most of the surface infrastructure will be removed. The mine life could be extended by further drilling or by changes in the uranium price. The tailings dump, waste rock stockpiles and the pit will remain. The low grade stockpile could be treated in the plant dependant on Project economics.

The Project Area is extremely arid and the vegetation cover is very sparse. There are no large trees and there is no option of providing a visual screen for the Operation from vegetation. The native rock is exposed in most places and the current surface has resulted from years of erosion as a result of the lack of a vegetative cover rather than the presence of large amounts of rain. Where the native rock is not exposed it is covered in a thin layer of weathered rock and pebbles.

The harsh climate is not conducive to intensive agricultural activity and thus the human population density is very low. The only large industrial operation of any significance is the Rössing Uranium Mine. The closest towns are Arandis and Usakos which are approximately 40 and 65 km away in a straight line. The site will not be visible to these towns. The surrounding farms are utilised in a non-intensive manner, primarily for low intensity cattle grazing, when there is sufficient grass. Wildlife occurs throughout the area and is considered, by landowners, to add value to the properties. There are a few scattered farmhouses.

The B2 is a surfaced road which is used as the main transport route between the capital Windhoek and Swakopmund and from there to the main Namibian harbour town of Walvis Bay. The route is used by a large number of commercial and freight transport vehicles and by tourists traveling to the seaside resorts from the inland. There are no known tourist routes near to the proposed Project. The unique landscapes in Namibia and the desolation of large parts of the Country attract a number of residents and tourists. Some landowners have indicated that there is a campsite and lodge near the Khan River Valley on the farm Vergenoeg. In addition there is also apparently a 4x4 trail and plans for a lodge on the farm, Gaudeamus.

The mining activity could have significant visual impacts on the surrounding area, similar to that of the Rössing Uranium Mine, which has been in existence for over 30 years. The purpose of this study is to determine the visual impact of the proposed Mine on the surrounding landscape and to propose measures to mitigate any adverse visual impacts associated with the construction, operation and closure of the Mine on the surrounding visual environment. The '*Guideline for involving visual & aesthetic specialists in EIA processes*,' by Oberholzer (2005), was used as a guide for this assessment.



The main visual items assessed were:

- The large items of infrastructure such as the plant, waste rock dumps and the tailings dump.
- Lights at night being visible from large distances.

Blasting activities may generate clouds of dust, but these are generally of short duration. The movement of vehicles may also generate large clouds of dust if this is not adequately mitigated.

2 SCOPE AND LIMITATIONS

The scope of this assessment is that of a qualitative investigation determining the visual character of the area. It involves assessing the visual impacts of the proposed Project on the environment and includes addressing the following aspects:

- Visual Absorption Potential (ability of the landscape to accommodate the proposed project from a visual perspective);
- Identification of visual elements that would be affected and a description/evaluation of the specific visual impacts;
- Recommendations with reference to mitigation measures;
- Provision of graphic representations of these issues.

The major limitation of this study is the unavoidable subjectivity relating to the assessment of the visual impact. Findings will also be restricted to information on hand, as well as the quality of spatial data. Numerical weighting of criteria have been avoided due to their qualitative and subjective nature.



3 METHODOLOGY

3.1 Overview

Table 3-1 depicts the general expected level of visual impacts for various types of developments and environments. The Valencia Project is expected to have a very high visual impact.

Table 3-1: Categorisation of visual impacts (after Oberholzer, 2005).

Type of environment	Type of development (Low to high intensity)				
	Category 1 development	Category 2 development	Category 3 development	Category 4 development	Category 5 development
Protected/wild areas of international, national, or regional significance	Moderate visual impact expected	High visual impact expected	High visual impact expected	Very high visual impact expected	Very high visual impact expected
Areas or routes of high scenic, cultural or historical significance	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected	High visual impact expected	Very high visual impact expected
Areas or routes of medium scenic, cultural or historical significance	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected	High visual impact expected
Areas or routes of low scenic, cultural or historical significance / disturbed	Little or no visual impact expected. Possible benefits	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected
Disturbed or degraded sites / run-down urban areas / wasteland	Little or no visual impact expected. Possible benefits	Little or no visual impact expected. Possible benefits	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected

Key to Categories of Development:

- Category 1 development: e.g. nature reserves, nature-related recreation, camping, picnicking, trails and minimal visitor facilities.
- Category 2 development: e.g. low-key recreation / resort / residential type development, small-scale agriculture / nurseries, narrow roads and small-scale infrastructure.



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- Category 3 development: e.g. low density resort / residential type development, golf or polo estates, low to medium-scale infrastructure.
- Category 4 development: e.g. medium density residential development, sports facilities, small-scale commercial facilities / office parks, one-stop petrol stations, light industry, medium-scale infrastructure.
- Category 5 development: e.g. high density township / residential development, retail and office complexes, industrial facilities, refineries, treatment plants, power stations, wind energy farms, power lines, freeways, toll roads, large-scale infrastructure. Large-scale development of agricultural land and commercial tree plantations. Quarrying and mining activities with related processing plants.

The proposed Valencia Uranium Mine would be a Category 5 Development (Quarrying and mining) and the surrounding area could be classified as an area of high scenic, cultural or historical significance due to the pristine natural environment (as can be seen in Photograph 1). Hence the conclusion is that the risk of negative visual impacts associated with the Mine is very high (blue box in Table 3-1).



Photograph 1: Typical current visual aesthetic.



3.2 Specific criteria

3.2.1 Visibility of the Project

This section discusses the geographic area from which the Mine will be visible. A Digital Terrain Model (DTM) was created which displays the relief of the topography (Figure 2) surrounding the proposed Mine and the associated infrastructure. The general topography is undulating with the site for the proposed Mine being located on a westerly facing slope at an approximate altitude of between 725m and 780m. This slope drains into the lower drainage system which runs in a south-westerly direction towards the Khan River. The local slope at the site is at a gradient of approximately 1:72 (1.4%). Within the immediate 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. Locally there are numerous small valleys and hillocks. The B2 road is situated on high ground on the northern side of the Khan River valley.

The DTM was used to create a viewshed which is the total area that has a direct visual connection with the proposed Mine. Figure 3 spatially depicts the viewshed area and the areas which have direct visibility of the Mine. The total area which has a direct visual connection with the proposed Mine amounts to 3,100ha. This area is largely limited to the proposed Mine Area and the immediate surrounds. It is not visible from the area to the south of the site, but is visible from the north-east from $\pm 10\text{km}$ away.

The viewshed is further analysed in terms of the degree of visibility, with the yellow shaded areas being a low visibility and the dark red areas, high visibility.

Rating Standards:

- *High visibility – visible from a large area (e.g. several square kilometres).*
- *Moderate visibility – visible from an intermediate area (e.g. several hectares).*
- *Low visibility – visible from a small area around the project site.*

Due to the large viewshed; a High Visibility Rating has been assigned.

3.2.2 Visual exposure

This section is based on distance from the proposed Mine to selected viewpoints. Exposure or visual impact tends to diminish exponentially with distance.

Rating Standards:

- *High exposure – dominant or clearly noticeable.*
- *Moderate exposure – recognisable to the viewer.*
- *Low exposure – not particularly noticeable to the viewer.*

Due to the fact that the proposed Mine can be seen in places from up to 10km away, the exposure rating is high as it will be clearly noticeable in the context of the landscape. There is also minimal, if any tall vegetation to mask the visual disturbance. Lighting from the mine would



create a visual impact (light pollution) during the evenings which is at variance to the current rural nature of the area containing very few light sources.

3.2.3 Visual sensitivity

Visual sensitivity is described as the intrinsic character of the landscape, which is a combination of topography, landform, vegetation cover and settlement patterns, and the susceptibility to being aesthetically disturbed.

Rating Standards:

- *High visual sensitivity – highly visible and potentially sensitive areas in the landscape.*
- *Moderate visual sensitivity – moderately visible areas in the landscape.*
- *Low visual sensitivity – minimally visible areas in the landscape.*

The area surrounding the proposed Mine is an undisturbed natural environment and potentially sensitive to the visual impacts associated with a large-scale industrial activity. Thus a high visual sensitivity rating has been assigned to this Project.

3.2.4 Visual sensitivity of receptors

This section deals with the level of visual impact considered as acceptable, which is dependent on the type of receptors.

Rating Standards:

- *High sensitivity – e.g. residential areas, nature reserves and scenic routes or trails;*
- *Moderate sensitivity – e.g. sporting or recreational areas, or places of work;*
- *Low sensitivity – e.g. industrial, mining or degraded areas.*

Visual sensitivity is highly subjective and thus it is difficult to assess the nature of the impact. The proposed Project Area can in places be seen from the B2 highway which is approximately 20km away in a straight line. In general, the site is hidden behind the hills but there are a few places where the site is visible from the highway. This is depicted in Photograph 2 and Figure 1. Even though the site is visible, the distance makes the site less prominent. The B2 is both a main transport and tourist route.

The area is not visible from the Khan River course which would be a likely site of any tourist lodge developments. The waste rock dump is very close to the landowner's house which is occupied from time to time. There are plans to relocate this dwelling.

By analyzing the aerial photography, there appears to be no other residential areas within the viewshed area indicating that the visual sensitivity to humans would be very low. However in terms of natural beauty, the area has a high sensitivity.



Photograph 2: Site for proposed Mine as seen from the B2 highway (approximately 20km away).

3.2.5 Visual absorption capacity (VAC)

Visual absorption capacity is described as the potential for the landscape to conceal the proposed mining activity.

Rating Standards:

- *High VAC – e.g. effective screening by topography and vegetation;*
- *Moderate VAC - e.g. partial screening by topography and vegetation;*
- *Low VAC - e.g. little screening by topography or vegetation.*

The visual absorption capacity in this case is Low, as the topography and lack of tall vegetation is for the most part not conducive to hiding the mining activity effectively. The buildings will be a contrast to the landscape, but the waste rock dumps and the tailings deposit may blend in with the surrounding rocky landscape. This is dependant on the colour of the rock which emerges from the mine pit and the processing plant.



3.2.6 Visual intrusion

Visual intrusion is described as the level of compatibility of the project with the particular qualities of the area, or its 'sense of place'. This is related to the idea of context and maintaining the integrity of the landscape.

Rating Standards:

- *High visual intrusion – results in a noticeable change or is discordant with the surroundings;*
- *Moderate visual intrusion – partially fits into the surroundings, but clearly noticeable;*
- *Low visual intrusion – minimal change or blends in well with the surroundings.*

The study area is an undisturbed natural environment and thus the visual intrusion will be high.

3.3 Nature of the impact

The nature of the impact is an evaluation of the visual effect the mining activity would have on the surrounding environment.

3.3.1 Extent

The Extent deals with the spatial or geographic area of influence of the visual impact:

Rating Standards:

- *Site-related: extending only as far as the activity;*
- *Local: limited to the immediate surroundings;*
- *Regional: affecting a larger metropolitan or regional area;*
- *National: affecting large parts of the country;*
- *International: affecting areas across international boundaries.*

The proposed Project has a local to regional visual extent. (Note: regional in the sense that it will be seen from the B2 road).

3.3.2 Duration

The predicted life-span of the visual impact is rated:

Rating Standards:

- *Short term, (e.g. duration of the construction phase);*
- *Medium term, (e.g. duration for screening vegetation to mature);*
- *Long term, (e.g. lifespan of the Project);*
- *Permanent, where time will not mitigate the visual impact.*

The duration of the visual impact is expected to be permanent in as far as the rock and tailings dumps. When the Project is completed, the effect of the lights will no longer be noticeable, hence this impact is long term.

3.3.3 Intensity

Intensity refers to the magnitude of the impact on views, scenic or cultural resources.



Rating Standards:

- *Low, where visual and scenic resources are not affected;*
- *Medium, where visual and scenic resources are affected to a limited extent;*
- *High, where scenic and cultural resources are significantly affected.*

There are scenic or visual resources that will be affected, thus the rating is high.

3.3.4 Probability

Probability is the degree of possibility of the visual impact actually occurring.

Rating Standards:

- *Improbable, where the possibility of the impact occurring is very low;*
- *Probable, where there is a distinct possibility that the impact will occur;*
- *Highly probable, where it is most likely that the impact will occur; or*
- *Definite, where the impact will occur regardless of any prevention measures.*

The degree of possibility of the visual impact occurring is definite.

3.3.5 Significance

The significance of impacts is determined through a synthesis of the aspects analysed in the above and declares whether or not the visual impacts should have an influence on decision making.

Rating Standards:

- *Low, where it will not have an influence on the decision;*
- *Medium, where it should have an influence on the decision unless it is mitigated; or*
- *High, where it would influence the decision regardless of any possible mitigation.*

The significance of the visual impacts is low relative to the socio-economic gains to the Country. Open pit mining operations have permanent, unavoidable negative aesthetic implications. However, there are a very low number of receptors residing in the area; it is also not foreseen that proposed Mine would be very visible from the B2 highway due to the distance between the Mine and the highway.



4 SUMMARY

The above descriptions were summarised in Table 4-1. It gives a synopsis of the findings and the rating standards are colour coded with red indicating negative implications while yellow indicate more positive implications.

Table 4-1: Impact assessment synopsis.

Criteria	Rating Standards				Rating - Valencia	
3.2 Specific Criteria						
3.2.1 Visibility	HIGH	MODERATE	LOW		HIGH	
3.2.2 Visual Exposure	HIGH	MODERATE	LOW		HIGH	
3.2.3 Visual Sensitivity	HIGH	MODERATE	LOW		HIGH	
3.2.4 Visual Sensitivity at Receptors	HIGH	MODERATE	LOW		HIGH	
3.2.5 Visual Absorption Capacity	LOW	MODERATE	HIGH		LOW	
3.2.6 Visual Intrusion	HIGH	MODERATE	LOW		HIGH	
3.3 Nature of the Impact						
3.3.1 Extent	INTERNATIONAL	NATIONAL	REGIONAL	LOCAL	UNEXPLAINED	REGIONAL
3.3.2 Duration	PERMANENT	LONG TERM	MEDIUM TERM	SHORT TERM		LONG TERM
3.3.3 Intensity	HIGH	MEDIUM	LOW			HIGH
3.3.4 Probability	DEFINITE	HIGHLY PROBABLE	PROBABLE	IMPROBABLE		DEFINITE
3.3.5 Significance	HIGH	MEDIUM	LOW			LOW

The synopsis clearly shows that the proposed Project will have negative impacts on the visual nature of the landscape. This is primarily due to the fact that the proposed Project will have high visibility and exposure due to the nature of the topography. The Visual Absorption Capacity is low due to the vegetation and topography’s inability to conceal the activity.

The extent of the visual disturbance will be localised to the Mining Area and immediate surrounding farms which are not permanently occupied, as well as stretches of the B2 highway; this is unavoidable.

As with open pit mining in general, the visual impacts are negative and need to be weighted against the socio-economic benefit to the Country should the mine be constructed. Some people may view the visibility of the mine as industrial progress, others as an intrusion onto a natural landscape.

Mitigation measures have been planned and are to be set in place to lessen the visual impacts; these include:

- Using downward facing lighting in order to reduce light pollution.
- Painting the mine infrastructure (where applicable) in a ‘desert’ colour for the purpose of concealing the mine as far as possible.
- Full rehabilitation of the area post-decommissioning.
- The waste rock dumps, low grade stockpile and the tailings dump have been designed and positioned to limit their visibility (they have been hidden behind adjacent ridges as best as possible). Their total height has been reduced within economic constraints.
- Elevations of the mine infrastructure have been constrained to be less than that of the surrounding ridges in order to further reduce visibility.
- The tailings dump will be clad with rock.
- The dumps will be the most visible part of the Mine infrastructure. These have been designed fairly flat to blend in with the surrounding topography.



In conclusion, the proposed Development will have a negative visual impact on a generally pristine environment. Due to the fact that there are few receptors in the area which will be exposed to the visual disturbance, and the fact that Valencia Uranium Limited has provided substantial mitigation measures to reduce the visual impact beyond expected requirements; the effect of the visual impact will thus be substantially reduced.

6 REFERENCE

Oberholzer, B. 2005. Guideline for involving visual & aesthetic specialists in EIA processes: Edition 1. CSIR Report No ENV-S-C 2005 053 F. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.