

# Palaeontological Heritage Report for proposed Chlor-Alkali and Salt Plant at Coega

## Executive Summary

The proposed development will take place on potentially fossiliferous beds of the Alexandria Formation. A consultant will therefore be required to carry out an inspection of foundation trenches, prior to the throwing of foundations, to log and sample any important exposures.

The same procedure should be followed where the route of the pipeline crosses strata of the Alexandria Formation.

Where it is proposed that the pipeline should pass through the dune field, an interesting geologically recent peaty soil horizon was identified, associated with Strandloper artefacts. In addition a vlei deposit and both bird and mammal bones were identified. These should be studied in conjunction with archaeological material prior to the introduction of earth moving equipment into the area. It is recommended that, to minimise disturbance the pipeline is raised on pillars rather than buried in this area. Excavation of foundation holes for these pillars should be performed in the presence of a heritage consultant.

## Introduction

The study area may be divided into two components: **a.** The factory footprint  
and **b.** The pipeline footprint

Background information on the geology and palaeontological potential of the terrain were examined.

Within the proposed area of development the Alexandria Formation overlies the Uitenhage Group. The Alexandria Formation generally consists of alternating layers of calcareous sandstone, conglomerate and coquinite (shelly conglomerate), containing a rich assemblage of marine invertebrates. It is considered Miocene to Pliocene in age. Within the Coega region it has been measured to reach a thickness of seven meters, though over its full area of distribution, stretching from Port Elizabeth to the Kowie River, it varies between 3 and thirteen metres in thickness. In the sandstones some gastropod and pelycopod shells are preserved, as well as *in situ* *Echinodiscus* ("pansy shells"), and burrows. Oyster shells occur within the conglomerate, whereas the coquinite layer consists of about 70 percent invertebrate remains, including the remains of pelycopods, gastropods, corals, bryozoans, brachiopods, echinoids and sharks teeth. Some mammal bones have also been recorded. As the Alexandria Formation appears to have been laid down in a full range of coastal depositional environments ranging from shoreface and foreshore to lagoonal and/or estuarine it is likely that further exploration of the Alexandria Formation would provide an even greater range of fossils including possibly more vertebrate remains.

The underlying Uitenhage Group is of Early Cretaceous (+/- 140 - 120 myo) age and was deposited into the Algoa basin that opened up during the breakup of the Supercontinent Gondwana. The Sundays River Formation, a subdivision of the Uitenhage Group underlies the Alexandria Formation in the Coega region, and is classically exposed in the Coega brick quarry. It is a fully marine portion of the Uitenhage Group containing abundant marine invertebrates including Ammonites, in addition to woody material. Marine vertebrate remains, such as those of Plesiosaurs are also known from the Uitenhage Group.

On Monday 12 March, the site was visited in conjunction with the Archaeological Assessor. The factory footprint was thoroughly explored on foot. In addition the areas where the pipeline is proposed to approach the sea, through the dunes, was examined.

### **Description of Affected environment**

#### **a. The Factory Footprint**

The factory footprint lies on a flat planar surface with thin soils overlying calcareous sediments belonging to the Alexandria Formation, which in turn overlies the Uitenhage Group.

Within the factory footprint area a number of small disturbances of the overlying soil profile allow examination of the immediately underlying strata. This consisted largely of calcrete, which forms an altered capping over much of the Alexandria Formation. No fossils were observed, however, the lack of cuttings or river beds within the area precluded more than superficial examination.

**b.** The proposed course of the pipeline initially passes over Alexandria Formation strata before entering the coastal dune field. Here it passes over a peaty, Geologically Recent, horizon that underlies or intercalates with the dune field, as well as the remains of a shallow waterhole or vlei, the muds of which are, in places, exposed and include large terrestrial gastropod remains. The peaty layer is associated with strandloper artefacts and mammal bones. Remains of large to small mammals, including antelope and seals, in addition to birds, were seen in the area.

### **Potential impacts**

**a.** In the factory footprint it is probable that the excavation of foundation trenches will intercept fossiliferous horizons of the Alexandria Formation but unlikely, due to the thickness thereof, that they will penetrate to the depth of the Uitenhage Group.

**b.** The route of the pipeline will also probably intercept fossiliferous horizons of the Alexandria Formation.

Where it passes through the dune field, the use of machinery alone, in addition to any excavation required, either to bury the pipe, or to anchor concrete pillars therefore is

likely to cause extensive damage to the delicate record of past geographic patterns within this area.

### **Recommended Mitigation Measure**

**a.** It is recommended that after the excavation of foundation trenches for the factory, and prior to the throwing of foundations, a qualified consultant should be contracted to examine the trenches to log and sample any significant exposures.

**b.** It is recommended that where the pipeline passes over/ through the Alexandria formation, on completion of trenching or foundation excavation and prior to filling thereof a qualified consultant should be contracted to examine the excavations in order to log and sample any significant exposures.

Where the pipeline passes through the dunefield, a suitable professional should be asked to examine the vlei deposit and peaty deposit in conjunction with the archaeological team, prior to the introduction of industrial equipment into the area. Burial of the pipeline in this area should not be envisaged due to the extreme disturbance that would result. It is recommended that the pipeline should be borne on a series of concrete pillars. Excavation of foundations for these pillars should be monitored by at least one heritage assessor.

### **Conclusion**

A number of mitigation measures have been recommended, compliance with which should enable the developer to continue as planned.

### **Key Reference**

Le Roux, F.G., (1987) *Lithostratigraphy of the Alexandria Formation. South African Committee for Stratigraphy: Lithostratigraphic series, no. 1*: 1-18

Mathematical.....

## **Mathematical analysis**

**a.** The footprint of the proposed Desalination plant:

Affects: Low consequence (5)

as

Localised (1)  
Low intensity (1)  
Long term (3)

Probable

Therefore low significance -ve confidence high

With mitigation this would become: low significance +ve confidence high

**b.** Pipeline through the dunes

Affects: High consequence (7)

as

Regional loss of data (2)  
Medium intensity damage (2)  
Long term loss (3)

Definite

Therefore high significance -ve confidence high

With mitigation this would be reduced to: low significance -ve confidence high