



Clarens Dinosaur Hunting Expeditions CC

Dr Gideon Groenewald (PhD; Nat Dip Nat Con; Pr Sci Nat Earth Scientist)

Private Bag X62
Suite 91
Bethlehem
9700, RSA

Cell: +27 828294978
Fax: +27 58 3038412
E-mail: gideon@bhm.dorea.co.za

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Ruth Butcher
Project Manager: Elandspruit Mining Venture
Cabanga Concepts

Dear Ruth

POTENTIAL PALAEOLOGY ON FARM ELANDSPRUIT 291JS

1. Introduction

Following a request from Cabanga Concepts, a preliminary desktop study was done to determine the potential risk of finding unique fossil assemblages on the farm Elandspruit 291JS, south of Middelburg in Mpumalanga Province.

This HIA report on the Palaeontology of the formations involved forms part of the Environmental Impact Assessment (EIA) as required by the EIA Regulations in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) and was done in accordance with Section 38 of the National Heritage Resources Act, No. 25 of 1999 and is intended for submission to the South African Heritage Resources Agency (SAHRA).

This report is a summary of the desktop investigation. To prevent duplication of information, the description of the geology of the site is extracted from the EIA documentation.

“1.1 Geology

1.1.1 General geology

The Middelburg area lies in the northern extremity of the Karoo basin and forms the East Witbank Coalfield. Coal seams are susceptible to quality variations, such as grit patches, sandy lenses and secondary mineral deposits of sulphur and phosphorous. Channel deposits often cut into the coal seams causing "washouts". Adjacent to prominent channels, seams become split by crevasse splay deposits (GCS, 2008a).

The Ecca Group (Vryheid Formation) overlies the Dwyka Formation gradationally and comprises predominantly clastic sediments deposited in an extensive landlocked basin experiencing only rare marine incursion (GCS, 2008b).

The Dwyka Group of late Carboniferous to Early Permian age is characterized by sediments of glacial origin including tillites, diamictites and varvites which lie unconformably on the pre-Karoo igneous basement. The succeeding Vryheid Formation comprises a predominantly arenaceous deltaic sequence of sandstones and conglomerates with subordinate siltstones, shales and coal seams.

Five coal seams (numbered 1 through 5 from the base upwards) are contained in a 70 m thick succession comprising dominantly of sandstone with subordinate siltstone and mudstone.

The partings between the seams are remarkably constant although seam splits are common with up to 8 m between partings. The distribution and attitude of the No.1 and No.2 seams is largely determined by the pre-Karoo topography and the No.4 and No.5 seams are controlled by the present-day erosion surface. The No.3 seam is usually less than 0.5 m thick. Intrusive dolerite dykes and sills of Late Jurassic age (~144Ma) are ubiquitous and devolatilisation of the coal can be significant.

1.1.2 Geological features

Typically the Karoo Supergroup is intruded by Jurassic-aged dolerite, forming extensive sills and thin dykes. The Karoo rocks are not known for the development of economic aquifers but occasional high yielding boreholes may be present. Generally these rock types can be divided into two distinct aquifers, namely a shallow weathered aquifer and a deeper fractured aquifer. (GCS, 2008b).

1.1.3 Local Geology

The basement in the MTC area is generally felsitic, with occasionally reworked Dwyka tillite lying immediately below the coal seams and directly on basement. The No 1 Seam is well developed in the area and averages about 4.5m over most of MTC but drops to less than 4m in the west and southwest. The parting between this and the overlying No 2 Seam is generally about 50cm of sandstone but the No 2 Seam is generally 5 to 5.5m thick. South of the No 2 Seam Split, the total seam width increases to in excess of 6m. The seam displays minor parting in the north. However, in the southern part of the property the seam splits into the No 2 Upper and No 2 lower sub seams. This parting increases to 6 or 7m in the south. In this area the lower portion of the seam is generally of a better quality than the upper portion. The No 2 Lower Seam in the south of the property is approximately 2 to 2.5m thick.

The sediments overlying and underlying the No 2 Seam are generally mudstones. The No 3 Seam lies approximately 15 to 20m above the No 2 Seam. It is generally 30cm thick but is a good quality coal and an obvious interim economic target in the opencast operations.

The No4 seam caps the coal measures and is separated by coarse grained sandstone from the No3 seam. In the deeper areas of the mine recent drilling has recorded a persistent seam about a metre in thickness, some 4 metres above the No4 seam comprising a shaley coal upper section and a lower part of lustrous and bright coal, the analysis of this coal is not yet available.”

2. Palaeontology and its potential importance in this area

2.1 Dwyka Formation – No record of important palaeontological findings is presently known from the Dwyka Formation in the northern Karoo Basin. It is the responsibility of the developer to report any findings of palaeontological nature during mining operations. For this reason it is advisable that the developer appoints a professional palaeontologist to assist the ECO of the company to report on any unique discoveries of palaeontological material for the duration of the project and to report any new palaeontological finds to SAHRA. The professional palaeontologist should visit the site of the mine at least once every six months and, with the ECO, report to SAHRA on behalf of the Developer.

2.2 *Ecca Group* – It is known that the lower shale formations of this group of rocks represent a deep water deposit and that the most important palaeontological information is present as “trace fossils” or the remains of the tracks of animals and plants that lived in relatively deep water environments. Very little factual information exist on the trace fossils of the Northern Ecca Basin and it is recommended that the developer appoints a palaeontologist to assist the ECO to record any new finds of these important indicators of palaeo-environments.

An important transition to shallow water environments and deltaic deposits with a diverse collection of plant fossils and coal beds are of high importance in this region. Although recordings of plant fossils from the Northern Ecca Basin is well-known and well studied, it is of critical importance that a palaeontologist be nominated by the ECO, to record any new finds of palaeontological information during the lifetime of this project.

The ECO, or a palaeontologist in training, must record all relevant information gathered during normal mining operations and assessment of the quality of the coal being mined. This will require the appointment of a person that can report to the Environmental Controlling Officer (ECO) of the company on a regular (monthly) basis and report any unique fossil finds to SAHRA. It is recommended that the reporting of fossil finds be done under supervision of a professional palaeontologist that needs to visit the mine at least once in six months.

It is understood that this project is in principle a mining operation that will, by it's very nature, be totally destructive to all fossilized material. The destruction of fossils needs an appropriate Permit from SAHRA. The recording of any unique fossils must however be part of the Management Plan and also the Environmental Management Plan (EMP) of this project. Unique fossils discovered during operation must be recorded and housed with an Institute that is approved by SAHRA. To accomplish the goals of recording relevant palaeontological data the developer should consider funding of a student palaeontologist (Masters or Doctoral level) to study the coal field through an Approved Academic Institute and in such a way conform to all requirements of the National Heritage Legislation. The palaeontological data can then be recorded under supervision of a professional palaeontologist that must visit the mine at least once in six months.

Your kind attention and time is highly appreciated.

Greetings

**GIDEON GROENEWALD (PhD; Pr Sci Nat Earth Scientist)
Geologist**