Clarens Dinosaur Hunting Expeditions CC
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28 March 2009

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PROGRESS REPORT – MARCH 2009 - ON FOSSIL FINDS AT BEDFORD DAM

Introduction

Dr Gideon Groenewald was requested to assist with the recording of fossil finds at the construction site of the Ingula Pump and Storage Scheme, developed by Eskom Holdings (Pty) Ltd. This report is a short summary of new finds made during February and March 2009,with an interpretation of possible palaeo-environments at the Ingula Pumped Storage Scheme site.

Recording and excavation of fossils

Following the meeting of 17 November 2008, site inspections of all excavations were conducted on a regular basis after every blast. The visits to the site are recorded in the logbook for palaeontology and all fossil finds were recorded in a separate report where results are tabulated for ease of summary.

Tree Fossils on site

A Palaeontological survey was done in the area below the low water mark where the dam basin will be filled with spoil material. Several sites were identified where fossils of trees occur. The sites were recorded on GPS and the collection of the fossils was discussed with the contractor on site. The fossils will be collected with assistance from the contractor during April 2009.

Fossils of vertebrates

The sites of the excavations were inspected on a continuous basis during excavation since 12 January 2009 and up to date twenty five sites were recorded where fossilised bone were found. Remains of the vertebrates discovered were very broken and unfortunately disturbed by the excavations. It was not possible to collect complete skeletons of the animals recorded up to date. From the information gathered it is however feasible to report that the

jawbone of at least one predator was found. A very well preserved tusk of a plant-eating reptile, possibly Dicynodon lacerticeps have been recorded.

The discovery of very well preserved bone fossils in the main quarry indicates the fact that the interbedded mudstones in the region might provide valuable information on the fauna of the ancient environment in that region.

Recording of Fossil Finds

Following discussions with Eskom, the official surveyor of WBHO records every fossil find on site accurately. The fossil sites will be recorded on the plan of the dam as provided by Eskom and a short report on the condition of each find will be kept on file for future reference. Excavation of fossils is only considered in cases where at least enough material is preserved to identify the animals. Up to date the remains were highly scattered and it was not possible to excavate complete skeletons.

Geological Information from excavation site at Conduit

Excavation of the conduit exposes very good examples of fluvial deposits, including some floodplain environments with well-defined desiccation cracks exposed in the mudstone underlying the main sandstone members. The mudstone also contains structures that might indicate palaeosoil profiles preserved at this site. The mudstones and clay stones are highly unstable and dissipate very quickly after exposure. Mudstone underlying the main sandstone at the conduit also contains high volumes of carbon rich clays and in some cases coal beds of up to 2cm thick. The remains of both predators (large Gorgonopsian and Dicynodon bones) indicate that the area was populated with large herbivores and carnivores of the time (Figure 1).

Fig 1. Carnivores and herbivores of the Permian landscape at Bedford Dam

The overlying sandstone at the conduit also contain very large scale trough cross-bedding (units up to 2m high) overlying prominent conglomerates with

pebbles of up to 2cm in diameter. The remains of very large trees (30m tall, 1.5m diameter) are scattered in the sandstone (Figure 2) indicating lush vegetation on the banks of the ancient rivers. The discovery of a complete imprint of the top part of one of the Glossopteris trees is highly significant. The tree fell over and the imprint of the tree is clearly visible on the bedding plane of the sandstone layer (Figure 3).

Fig 2. Fossil of large tree at Bedford Dam site

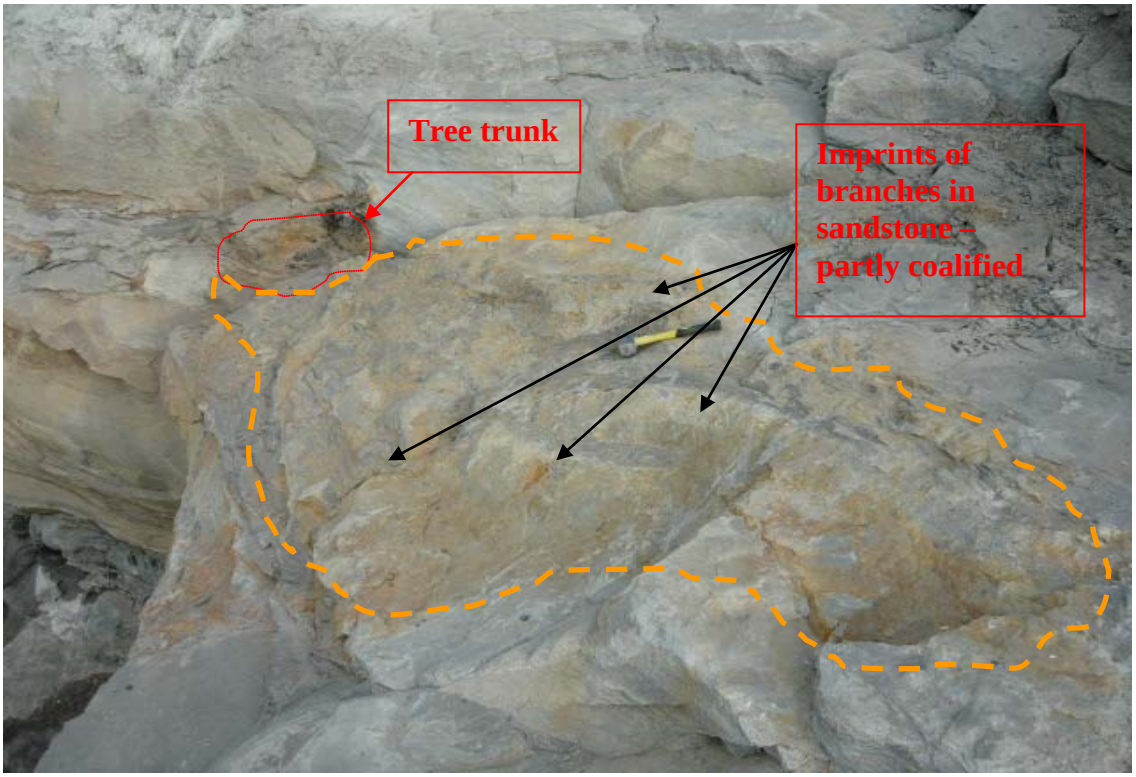

Fig 3. Imprint of large tree with branches in sandstone

Geological Information from excavations at the Main Quarry

Excavation at the main quarry exposes similar palaeo-environments as what are found at the conduit site excavations. Sandstone deposits reveal very large scale trough as well as low angled planar cross-bedding, overlying a very prominent clay-pellet conglomerate with coalified plant material suspended in both the sandstone and clay-pellet conglomerates. Fossil remains of very large vertebrates occur in the interbedded mudstone at this site, indicating abundant animal life on the inter-channel islands in this, dominantly braided river system. Extensive layers of coalified plant material (150mm thick) are present in the sandstone/mudstone interfaces, indicating highly productive marsh conditions in the inter-sandbar regions. The absence of large tree fossils in this region is apparent.

Geological Information from excavations at the Tunnel Intake Works

Excavation at the tunnel intake works did not expose deeper geology than the sandstone of the Normandien Member and from the information gathered it is apparent that the sandbars in this part of the palaeo-environment was overgrown with extensive stands of the well-known *Phyllotheca* or “horsetail” ferns, resembling bamboo of today (Figure 4). The discovery of a single vertebra of a small animal indicates that the sandbars were also used as grazing and possible hunting grounds by the reptiles of the time. It is not possible to identify any of these animals with the information available.

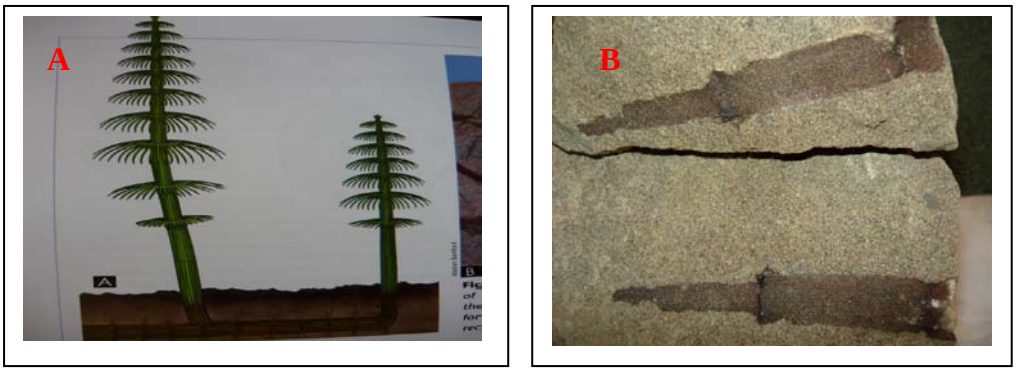

Fig 4. Phyllotheca illustrated (A) and as found in the sandstone on site (B)

Housing of fossils on site

Eskom Holdings (Pty Ltd) provided a container for storage of fossils on site. Temporary curation of fossils will be done for this storage. The Gorgonopsian and other fossils recorded up to 31 January 2009 were be transported to the National Museum in Bloemfontein on 11 March 2009. New finds will be stored in the container and only fossils that need urgent identification will be transported to Bloemfontein.

Way Forward

Inspection of all excavation sites at Ingula Pumped Storage Scheme will be done on a regular basis and with a minimum of three site visits per week and possibly daily sites visits up to the point where initial excavations of the conduit are complete. Monitoring of the conduit area is of critical importance because the excavations are at the level of the Permian Extinction Zone and follows a prominent claystone bed with casts of desiccation cracks, indicating a very high potential zone for finding the remains of reptiles. Similarly important finds have been recorded from the mudstone beds in the main quarry and these areas will be monitored as regularly as possible to prevent unfortunate loss of fossil material during the excavation of rock fro construction purposes.

Your time is highly appreciated.

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