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29 June 2013

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Dear Ms Dhemba,

Palaeontological Desktop Report – Kusile Power Station

As requested, herewith a Desktop Palaeontological Impact Assessment with regard to the proposed construction of the ash dump of the Kusile Power Station in the Witbank area, Mpumalanga Province.

Yours sincerely

Bruce Rubidge PhD, FGSSA, FRSSA, Pr Sci Nat

PALAEONTOLOGICAL DESKTOP STUDY
KUSILE POWER STATION
WITBANK AREA, MPUMALANGA PROVINCE

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EXECUTIVE SUMMARY

A desktop Palaeontological Impact Assessment was undertaken for the proposed ash dump of the Kusile Power Station situated in the Witbank area (south of the N4 highway between Witbank and Bronkhorstspruit) Mpumalanga Province. The development is for the construction of an ash dump for the Power Station.

The study area is underlain by rocks of the Pretoria Group over a small area in the in the northern part, but most of the area is underlain by the Karoo Supergroup comprising sedimentary rocks of the Carboniferous Dwyka and Permian Ecca groups.

Rocks of the Dwyka and Ecca groups have the potential to host fossils, but as the entire area of the prosed ash dump is sited on rocks of the Dwyka Group which were deposited in a glacial environment, it is unlikely that the proposed development will have a detrimental effect on fossil heritage.

As these potential fossils are not currently exposed because they are covered by vegetation and soil, the construction of the ash dump for the power station will enhance possibilities to discover fossils, particularly of plants. It is thus recommended that, from a palaeontological perspective, the development should proceed and there is no need for a detailed palaeontological impact assessment. If fossils are exposed in the course of construction and excavation activities for the development of the proposed ash dump a qualified palaeontologist must be contacted to assess the exposure for fossils so that the necessary rescue operations are implemented.

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REPORT

Background information of the development

This desktop report is part of a Heritage Impact Assessment to determine the effect that the development of the proposed ash dump for of the Kusile Power Station situated in the

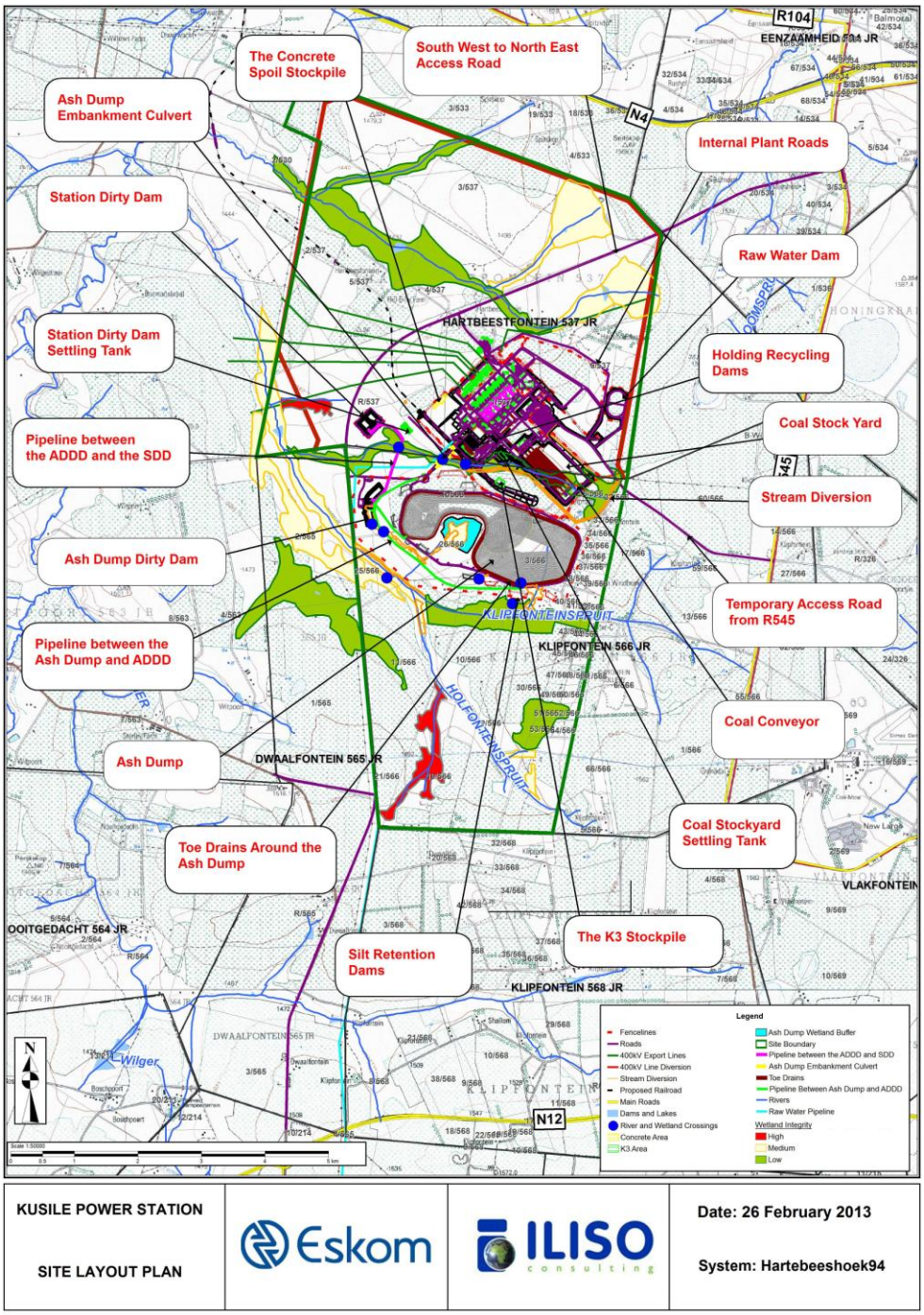

Figure 1: Plan of the Kusile Power Station showing position for the proposed ash dump in grey.

Witbank area, Mpumalanga Province will have on palaeontological heritage.

The study was commissioned by ILISO Consulting (Pty) Ltd, Highveld Park, and I was asked to provide a desktop assessment of the risk that the proposed development will have on the palaeontological heritage.

Details of the study area

The study area of the power station and proposed ash dump are situated south of the N4 highway between Witbank and Bronkhorstspruit (Figure 1). The proposed ash dump is sited on 2 500 ha of land on the Farm Hartebeesfontein 537 JR and the Farm Klipfontein 566 JR (Figure 1), and is covered by the 1:50 000 topographical map, Sheet 2528 DD. The surface extent of proposed ash dump covers a surface area of some 250 ha.

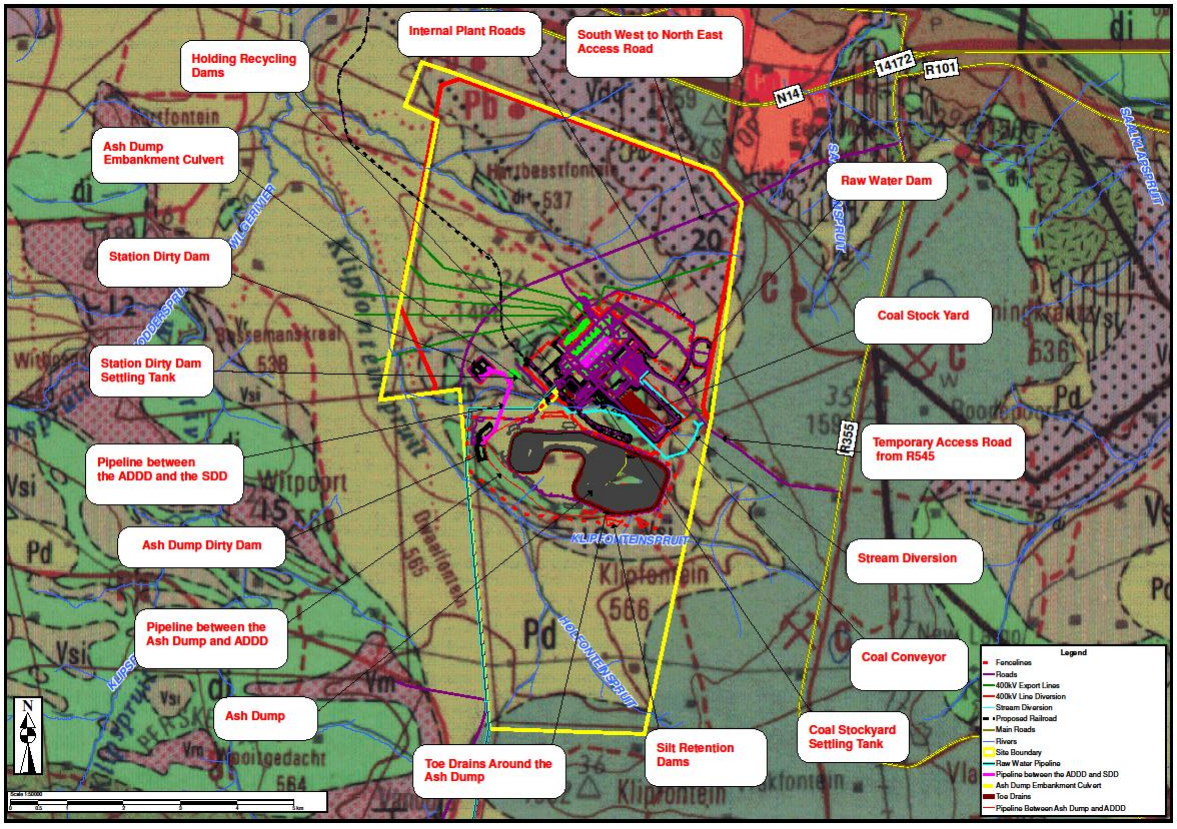

Figure 2: Geological map showing the position of the proposed ash dump of the Kusile Power Station in relation to the regional geology.

Geological Setting

The northerly portion of the study area is situated on rocks of the Precambrian Pretoria Group, but most of the affected area is underlain by rocks of the Karoo Supergroup comprising sedimentary rocks of the Carboniferous Dwyka Group and the Permian Ecca

Group. As is evident in Figure 2 (*1:250 000 Geological Map Sheet 2528 Pretoria, 1978*). the entire proposed ash dump is situated on the rocks of the Dwyka Group. In the study area the tillites and mudrocks of the Dwyka Group were deposited in a continental glacial environment.

Palaeontological Heritage

The 1: 250 000 geological map consulted for this study does not differentiate between the Formations of the Ecca Group, but the rocks of this Group in the area under consideration are known for their wealth of plant fossils of the famous Gondwanan *Glossopterus* flora which has been described from Permian-aged rocks. This flora is the source of the coal which is mined from the rocks of the Ecca Group Vryheid Formation in South Africa.

The rocks of the Dwyka Group, comprising largely of very course tillites, were deposited in a glacial environment and are known to be depauperate in fossils. Fossils discovered so far include fragmentary fossil plant material. Collections of fossils from the Dwyka and Ecca Groups are present in the collections of the Council for Geoscience in Pretoria and the BPI Palaeontology at the University of the Witwatersrand in Johannesburg.

Recommendation

Because the entire proposed ash dump is situated on rocks of the Dwyka Group which are known to be very poor in fossils, and in any case are currently covered by soil and vegetation and are not exposed, it is unlikely that the construction of the proposed ash dump of the Kusile Power Station will be detrimental to palaeontological heritage.

It is thus recommended that, from a paleontological perspective, construction of the ash dump should proceed and there is no need for a detailed palaeontological impact assessment. If construction activities expose extensive rock outcrops, it will create a unique opportunity to explore the area for fossils. It is thus recommended that, should fossils be exposed, a qualified palaeontologist be contacted to assess the exposure for fossils before further development takes place so that the necessary rescue operations are implemented. Depending on the nature of the fossils discovered this could entail excavation and removal to a registered palaeontological museum collection. A list of professional palaeontologists is available from South African Heritage Resources Agency (SAHRA).

Conclusions

The development of the proposed ash dump of the Kusile Power Station will cover Carboniferous-aged sedimentary rocks of the Dwyka Group of the Karoo Supergroup. There is only a slight possibility that the rocks of the Dwyka Group in this part of South Africa could contain fossil material. However, as these potential fossils are not currently exposed because the rocks are covered by soil and vegetation, the construction activities for the proposed ash dump may provide unique opportunites to find fossils in the Dwyka Group. If fossils are exposed as a result of construction activities of the prosed ash dump

a qualified palaeontologist must be contacted to assess the exposure for fossils so that the necessary rescue operations are implemented.

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