Palaeontological Impact Assessment for the proposed CSP and PV plants on the farm Sand Draai, near Groblershoop, Northern Cape Province

Desktop Study

For
Royal HaskoningDHV (Pty) Ltd

14 February 2016

Prof Marion Bamford
Evolutionary Studies Institute
University of the Witwatersrand
P Bag 3, WITS 2050
Johannesburg, South Africa
Marion.bamford@wits.ac.za
**Palaeontological Impact Assessment for the proposed CSP and PV plants on the farm Sand Draai, near Groblershoop, Northern Cape Province.**

**Background**

As requested here is a desktop palaeontological impact assessment on behalf of the client, Solafrica Energy (Pty) Ltd, who propose to construct two CSP (based on Central Receiver and Parabolic Trough technologies) and a PV plant on the farm Sand Draai, near Groblershoop, Northern Cape. SAHRA has requested a palaeontological impact assessment (Case ID 8370) for this project.

The site is near Groblershop but just to the north east of the Orange River, 28°45'15.50"S and 21°56'02.71"E (Figures 1,2).

**Methods and Terms of Reference**

1. In order to determine the likelihood of fossils occurring in the affected area geological maps, literature, palaeontological databases and published and unpublished records must be consulted.

2. If fossils are likely to occur then a site visit must be made by a qualified palaeontologist to locate and assess the fossils and their importance.

3. Unique or rare fossils should either be collected (with the relevant SAHRA permit) and removed to a suitable storage and curation facility, for example a Museum or University palaeontology department or protected on site.

4. Common fossils can be sacrificed if they are of minimal or no scientific importance but a representative collection could be made if deemed necessary.

The published geological and palaeontological literature, unpublished records and databases were consulted to determine if there are any records of fossils from the sites and the likelihood of any fossils occurring there.

**Geology and Palaeontology**

The site for the proposed CSP and PV plant lies on Quaternary alluvium (Kalahari sands) just to the north east of the Orange River (Figure 2, Table 1), and also on the Uitdaai and Groblershop Formations which comprise quartzites, sandstone and schists, i.e. of volcanic origin and also metamorphosed so they are most unlikely to contain any fossil material. Alluvium rarely contains any fossils in any useful context.

There are some reports of Stromatolites along the Orange River but much farther to the west. There are also palaeo-channels of the Orange River that cut into the basement
Figure 1: Location of the proposed CSP and PV plant near Groblershoop. Google map provided by Royal HaskoningDHV.

Figure 2: Geological map of the area around Groblershoop. The approximate location of the proposed CSP and PV plant shown in dark blue. Red dot shows position of Spitzkop (orange indication on SAHRIS palaeosensitivity map). Abbreviations of the rock types are explained in Table 1. Map enlarged from the Geological Survey 1: 1 000 000 map 1984.
Table 1: Explanation of symbols for the geological map and approximate ages (Cornell et al., 2006; Johnson et al., 2006; Moen, 2006).

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Group/Formation</th>
<th>Lithology</th>
<th>Approximate Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-Qk</td>
<td>Kalahari Group</td>
<td>Sand, limestone</td>
<td>Cenozoic</td>
</tr>
<tr>
<td>Mke</td>
<td>Keimos suite</td>
<td>Undifferentiated granitoid</td>
<td>ca 1080 Ma</td>
</tr>
<tr>
<td>Mz</td>
<td>Zondehuis Fm</td>
<td>Phyllite, quartzite, greenstone</td>
<td>ca 1300 Ma</td>
</tr>
<tr>
<td>Mg</td>
<td>Groblershoop Fm, Brulpan Group</td>
<td>Schist, quartzite, metalavas</td>
<td>ca 1800 Ma</td>
</tr>
<tr>
<td>Mu</td>
<td>Uitdraai Fm, Brulpan Group</td>
<td>Quartzite, sandstone, schist</td>
<td>ca 1800 Ma</td>
</tr>
<tr>
<td>Mbr</td>
<td>Brulsands subgroup, Volop Group, Olfantshoek Supergroup</td>
<td>Arenaceous; quartzite, shale, greywacke</td>
<td>ca 2000-1750 Ma</td>
</tr>
<tr>
<td>Mm</td>
<td>Matsap subgroup Volop Group, Olfantshoek Supergroup</td>
<td>Subgreywacke, quartzite, metalava</td>
<td>ca 2000-1750 Ma</td>
</tr>
<tr>
<td>Vk</td>
<td>Koegas Fm, Griquatown Group, Griquatown West sequence</td>
<td>Mudstone, iron formation, riebeckitite</td>
<td>&gt;2000 Ma</td>
</tr>
</tbody>
</table>

rocks and these have been exploited for diamonds. The channels at Auchas and Arrisdrift, far to the west, also contain fossil woods and mammals of Early Miocene age (Pickford et al., 2003). No palaeochannels have been recorded along this section of the river (Almond and Pether, 2009) where they could exist and be buried below the Kalahari sands.

According to the SAHRIS palaeosensitivity map there is a small area of high sensitivity ([http://www.sahra.org.za/sahris/map/palaeo](http://www.sahra.org.za/sahris/map/palaeo)) in the loop of the Orange River immediately to the southeast of this site, in the region of the farm Spitzkop. The sediments on this farm are also Groblershoop Formation and Kalahari sands and there is no published record of fossils from this area (Almond and Pether, 2009). It is, therefore, highly unlikely that fossils would be found on the farm to the north west, Sand Draai where the CSP and PV plants are planned.

**Recommendation**

If, in the unlikely event that fossil plant or animal material is discovered during the construction of the CSP and PV plants, then it is strongly recommended that a
professional palaeontologist be called to assess the importance and rescue the fossils if necessary (with the relevant SAHRA permit).

If the fossil material is deemed to be of scientific interest then further visits by a professional palaeontologist would be required to collect more material. Only when the excavations for foundations have commenced will it be possible to see if there are any fossils beneath the alluvium.

Therefore, as far as the palaeontological heritage is concerned, the construction of the proposed plants on the farm Sand Draai, may proceed. No further palaeontological assessments are required.

References


MKB
14 Feb 2016