RECOMMENDED EXEMPTION FROM FURTHER PALAEONTOLOGICAL STUDIES & MITIGATION:

PROPOSED 10 MW SOLAR FACILITY ON FARM SKUITDRIFT 426, KENHARDT DISTRICT, NORTHERN CAPE

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1. OUTLINE OF DEVELOPMENT

The COMPANY *Scuitdrift Solar Project (Pty) Ltd* is proposing to develop a 10 MW capacity photovoltaic (PV) solar facility to be constructed on Farm Skuitdrift 426, situated some 70 km northeast of Pofadder in the Kenhardt District, Northern Cape (Fig. 2).

The footprint of the solar facility will be *c*. 20 hectares. In addition to the clusters of PV arrays, associated infrastructure will include underground cables, internal access roads, a new access road, an onsite substation, auxiliary buildings for maintenance and storage and a pipeline from Southern Farms agricultural area located 9 km to the northwest.

The present palaeontological heritage comment has been commissioned by PERCEPTION Heritage Planning, George as part of a comprehensive Heritage Impact Assessment of the proposed development (Contact details: PERCEPTION Heritage Planning, PO Box 9995, GEORGE, 6530, Western Cape, South Africa, Fax: +27(0)86 510 8357, Mobile: +27(0)82 568 4719).

2. GEOLOGICAL BACKGROUND

The proposed solar plant study area (28˚ 36' 47'S, 19˚ 46' 48"' E) is situated some 12 km south of the Orange River on arid, gravelly to sandy terrain at *c*. 670-690 m amsl, sloping gently towards the Orange River (Fig. 2). A rocky ridge projects through the superficial alluvial fan deposits about 1.4 km to the west.

The geology of the study area northeast of Pofadder is shown on the 1: 250 000 geology map 2818 Pofadder (Council for Geoscience, Pretoria; Fig. 1 herein). A comprehensive sheet explanation for this map has been published by Moen and Toogood (2007). The proposed solar plant and associated infrastructure are underlain by ancient Precambrian basement rocks – the **Schuitdrift Gneiss (Nsc**) – that belong to the **Namaqua-Natal Province** of Mid Proterozoic (Mokolian) age (Cornell *et al.* 2006, Moen 2007). These basement rocks are approximately two to one billion years old and entirely unfossiliferous (Almond & Pether 2008).

The Precambrian basement rocks within the study area are mantled with a spectrum of other coarse to fine-grained **superficial deposits** such as rocky soils, downwasted gravels, colluvium (slope deposits), sheet wash, and alluvium of intermittently flowing streams. These deposits are generally young (Quaternary to Recent) and largely unfossiliferous. It is considered unlikely that significant deposits of Late Tertiary **Orange River alluvial gravels** are present within this area, and none are mapped here on the 1: 250 000 Pofadder geology sheet.

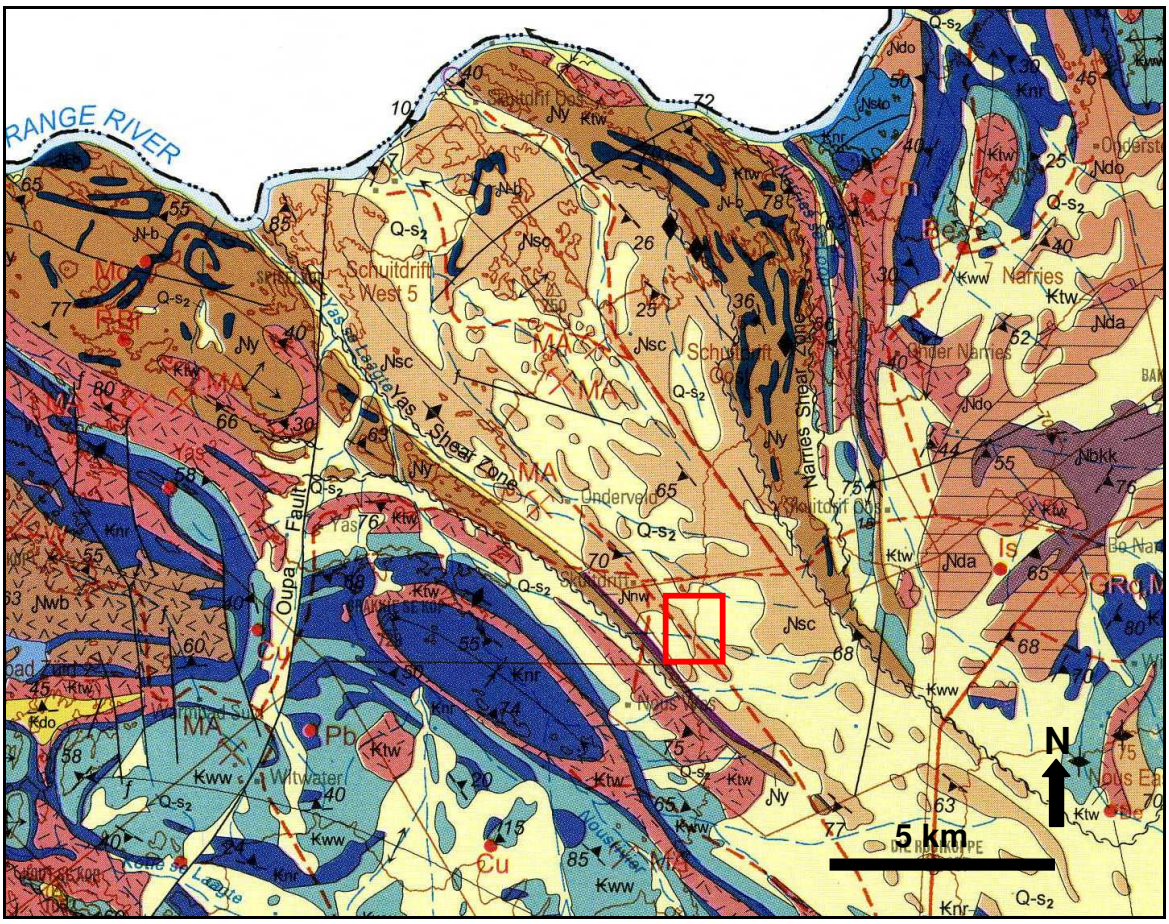

Fig. 1. Extract from 1: 250 000 geological map 2818 Onseepkans (Council for Geoscience, Pretoria) showing the approximate location of proposed 10 MW Skuitdrift Solar Facility on Skuitdrift 426, Kenhardt District, Northern Cape Province (small red rectangle). The study area is underlain by unfossiliferous Precambrian (Middle Proterozoic / Mokolian) basement rocks of the Namaqua-Natal Metamorphic Province, principally the Schuitdrift Gneiss (Nsc). The basement gneisses are locally blanketed by pediment sands, gravels and gravelly soils (Q-s_2, yellow).

3. PALAEONTOLOGICAL HERITAGE

The Precambrian metamorphic and igneous basement rocks of the Namaqua-Natal Metamorphic Province in the study area, notably the **Skuitdrift Gneiss**, are entirely unfossiliferous.

Alluvial gravels of the Orange River of Miocene and younger age are locally highly fossiliferous (*e.g.* Hendy 1984, Schneider & Marias 2004, Almond 2009 and extensive references therein) but, as argued above, these are *not* mapped within the study area.

The palaeontological sensitivity of the Skuitdrift solar plant study area is accordingly assessed as VERY LOW.

Fig. 2. Google earth© satellite image showing the study area for the proposed 10 MW Skuitdrift Solar Facility on Skuitdrift 426, Kenhardt District, Northern Cape. The small site (20 ha) is located in the south. The turquoise line shows a proposed pipeline route from Southern Farms on the south bank of the River Orange.

4. CONCLUSIONS & RECOMMENDATIONS

The overall impact significance of the proposed Skuitdrift 10 MW solar plant development on fossil heritage is considered to be VERY LOW because:

- Most of the study area is underlain by unfossiliferous metamorphic basement rocks (granite-gneisses *etc*) or mantled by superficial sediments of low palaeontological sensitivity;

- Extensive, deep excavations are unlikely to be involved in this sort of solar park project.

It is therefore recommended that exemption from further specialist palaeontological studies and mitigation be granted for this solar plant development.

Should any substantial fossil remains (*e.g.* vertebrate bones and teeth, shells, petrified wood) be encountered during excavation, however, these should be reported to SAHRA for possible mitigation by a professional palaeontologist.

5. REFERENCES

ALMOND, J.E. & PETHER, J. 2008. Palaeontological heritage of the Northern Cape. Interim SAHRA technical report, 124 pp. Natura Viva cc, Cape Town.

ALMOND, J.E. 2009. Contributions to the palaeontology and stratigraphy of the Alexander Bay sheet area (1: 250 000 geological sheet 2816), 117 pp. Unpublished report for the Council for Geoscience. Natura Viva cc, Cape Town.

CORNELL, D.H. *et al.* 2006. The Namaqua-Natal Province. In: Johnson, M.R., Anhaeusser, C.R. & Thomas, R.J. (Eds.) The geology of South Africa, pp 325-379. Geological Society of South Africa, Johannesburg & Council for Geoscience, Pretoria.

HENDEY, Q.B. 1984. Southern African late Tertiary vertebrates. In: Klein, R.G. (Ed.) Southern African prehistory and paleoenvironments, pp 81-106. Balkema, Rotterdam.

MOEN, H.F.G. 2007. The geology of the Upington area. Explanation to 1: 250 000 geology Sheet 2820 Upington, 160 pp. Council for Geoscience, Pretoria.

MOEN, H.F.G. & TOOGOOD, D.J. 2007. The geology of the Onseepkans area. Explanation to 1: 250 000 geology Sheet 2818, 101 pp. Council for Geoscience, Pretoria.

PARTRIDGE, T.C., BOTHA, G.A. & HADDON, I.G. 2006. Cenozoic deposits of the interior. In: Johnson, M.R., Anhaeusser, C.R. & Thomas, R.J. (Eds.) The geology of South Africa, pp. 585-604. Geological Society of South Africa, Marshalltown.

SCHNEIDER, G. & MARAIS, C. 2004. Passage through time – the fossils of Namibia. 159 pp. Gamsberg MacMillan, Windhoek.

6. QUALIFICATIONS & EXPERIENCE OF THE AUTHOR

Dr John Almond has an Honours Degree in Natural Sciences (Zoology) as well as a PhD in Palaeontology from the University of Cambridge, UK. He has been awarded post-doctoral research fellowships at Cambridge University and in Germany, and has carried out palaeontological research in Europe, North America, the Middle East as well as North and South Africa. For eight years he was a scientific officer (palaeontologist) for the Geological Survey / Council for Geoscience in the RSA. His current palaeontological research focuses on fossil record of the Precambrian - Cambrian boundary and the Cape Supergroup of South Africa. He has recently written palaeontological reviews for several 1: 250 000 geological maps published by the Council for Geoscience and has contributed educational material on fossils and evolution for new school textbooks in the RSA.

Since 2002 Dr Almond has also carried out palaeontological impact assessments for developments and conservation areas in the Western, Eastern and Northern Cape under the aegis of his Cape Town-based company *Natura Viva* cc. He is a long-standing member of the Archaeology, Palaeontology and Meteorites Committee for Heritage Western Cape (HWC) and an advisor on palaeontological conservation and management issues for the Palaeontological Society of South Africa (PSSA), HWC and SAHRA. He is currently compiling technical reports on the provincial palaeontological heritage of Western, Northern and Eastern Cape as well as Limpopo, Free State and Gauteng for SAHRA and HWC. Dr Almond is an accredited member of PSSA and APHP (Association of Professional Heritage Practitioners – Western Cape).

Declaration of Independence

I, John E. Almond, declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed project, application or appeal in respect of which I was appointed other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of my performing such work.

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