Council for Geoscience

GEOLOGICAL REPORT COVERING FARM YORK A, FARM NO. 279 IN THE HOTAZEL DISTRICT, NORTHERN CAPE PROVINCE OF SOUTH AFRICA

Prepared by

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On behalf of

Atlantic Renewable Energy Partners (Pty) Ltd

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Table of Contents

1. INTRODUCTION

The Council for Geoscience has been requested by Atlantic Renewable Energy Partners (Pty) Ltd to prepare a geological report covering farm York A, Farm No. 279 in the Northern Cape Province of South Africa. The main focus of the report is on portion 0 of the farm measuring 636.7946 ha (hereafter referred to as the project area) on which Atlantic Renewable Energy Partners (Pty) Ltd intends to develop solar energy facilities. The farm is situated in the Hotazel area. This report is based on available information and data from geological maps, reports and the South African Mineral Deposits Database (SAMINDABA), etc and no field visits/investigations were conducted.

2. GEOLOGICAL SETTING

The geology of the project area is shown in Appendix 1. The geology of the project area is covered on the 1:250 000 scale, 2722 Kuruman geological map (1979) prepared by the Geological Survey of South Africa, now the Council for Geoscience. The area is covered by the Aeolian sand of the Gordonia Formation, Kalahari Group. As noted by Astrup and Tsikos (1998) almost the entire manganese field is covered by the Kalahari Formation. The Gordonia Formation is up to 20 m and consists of windblown, unlithified sand. Calcrete, calcified pandune and surface limestone is developed in the western portion of the project area. The Hotazel Formation consists primarily of the banded iron formation.

In the Kalahari Manganese Formation, the Hotazel Formation is underlain by lava of the Ongeluk Formation and in places is overlain by dolomite and chert of the Mooidraai Formation (Astrup and Tsikos, 1998).

3. MINERAL POTENTIAL

The project area forms part of the well-known high-grade manganese ore producer from the Early Proterozoic (2300 to 2100 Ma) Kalahari Manganese Field (Fig. 1). The Kalahari Manganese Field consists of five structurally preserved erosional relics of the Hotazel Formation, which comprises Superior-type iron formation with interbedded units of manganese ore (Astrup and Tsikos, 1998). According to Astrup and Tsikos (1998) the Hotazel deposit represents portions of the Hotazel Formation that have been downfaulted into graben structures. The ore has manganese content of over 60 % as a result of hydrothermal and supergene enrichment. The Kalahari Manganese Deposit is a resource of great economic significance. This Manganese Field represents the largest known land-based manganese

deposit. Most of the Kalahari Manganese Field is buried beneath a cover of Cenozoic deposits comprising wind-blown sands of the Gordonia Formation, as well as calcretes, calc-arsenites, and conglomerates, and a thick unit of clay.

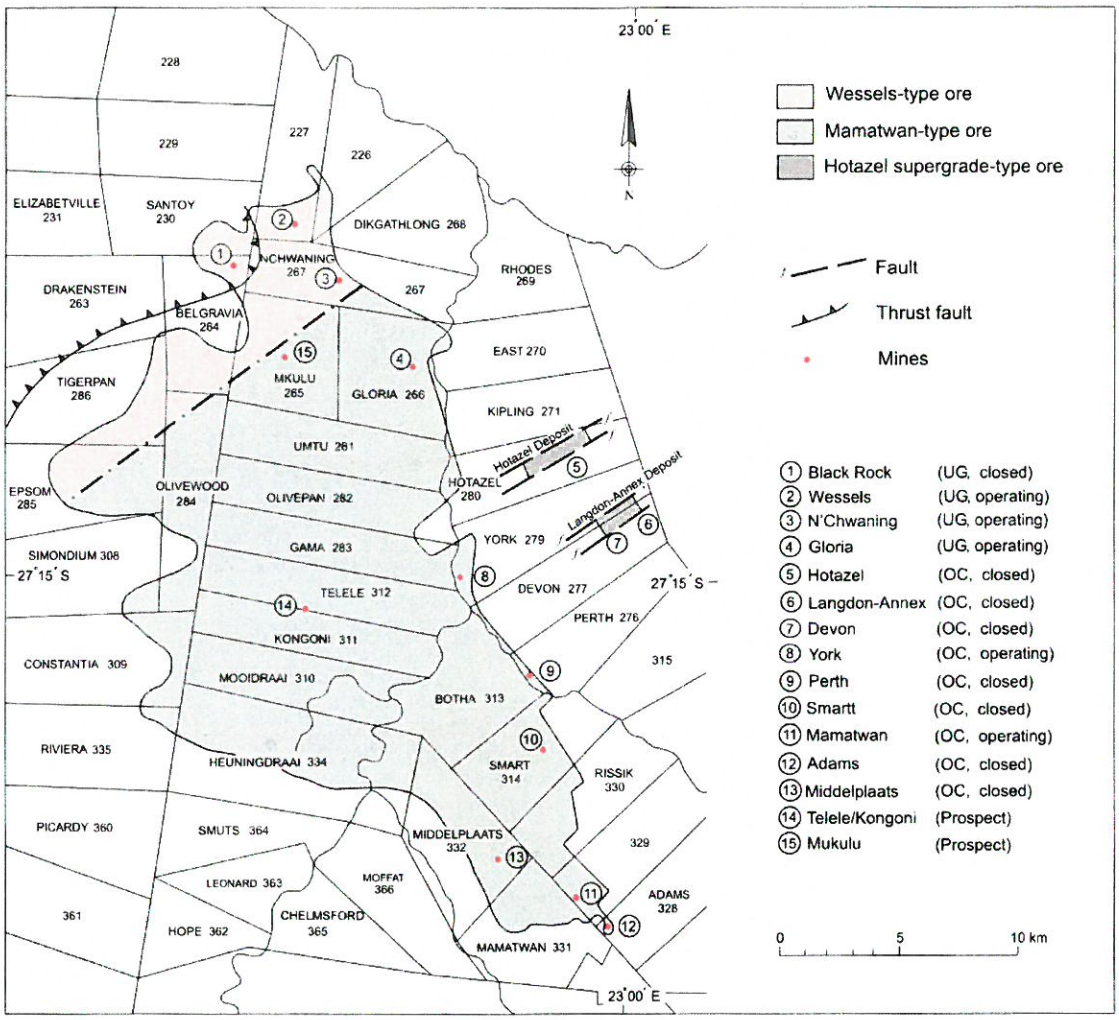

Fig. 1. The Kalahari Manganese Field showing the distribution of ore types and position of the more significant deposits (Astrup and Tsikos; 1998).

Manganese ores occur interbedded with iron-formations of the Hotazel Formation of the Voelwater Subgroup of the late Archaean-Paleoproterozoic Transvaal Supergroup. The primary manganese ore of the Kalahari manganese deposit is of sedimentary origin. Three laterally continuous stratiform manganese layers are interbedded within the BIF; upper, middle and lower manganese bodies. These manganese ore layers are also referred to as the Bottom body, the Middle body and the Top body. The lower body represents the main ore bed and varies in thickness from 5 to 45m. The middle body contains uneconomic grades of manganese and is only 1 to 2 m thick at neighbouring mines. The upper body is mined on a

local scale and averages between 5m and 20m thick. The manganese deposits of the Kalahari field occur as chemical precipitates consisting of banded iron formation.

4. MINERAL RIGHTS STATUS

For any legal mining or prospecting activities to be conducted in South Africa, the approval (i.e. prospecting right, mining permit/right) has to be obtained from the Department of Mineral Resources (DMR). Kudumane Manganese Resources operates an opencast manganese mine on the remainder of portion 2 of farm York A 279. Although mining has being taking place for some time on the others portions of the farm York 279, the author of this report is not aware of any mining right, mining permit or prospecting right issued by the DMR on the project area.

5. SUMMARY AND RECOMMENDATIONS

The project area is part of the well-known Kalahari Manganese Field. There are mining activities taking place on farm York 279, however it is not known if the mineral right issued (to Kudumane Manganese Resources) on the farm also covers the project area (Portion 0 of York 279). It is therefore recommended that the mineral right of the project be verified with the Department of Mineral Resources and if it found that there are valid mineral rights, detailed consultation should be conducted with the holders of the right to determine if mining and the proposed project can co-exist.

REFERENCES

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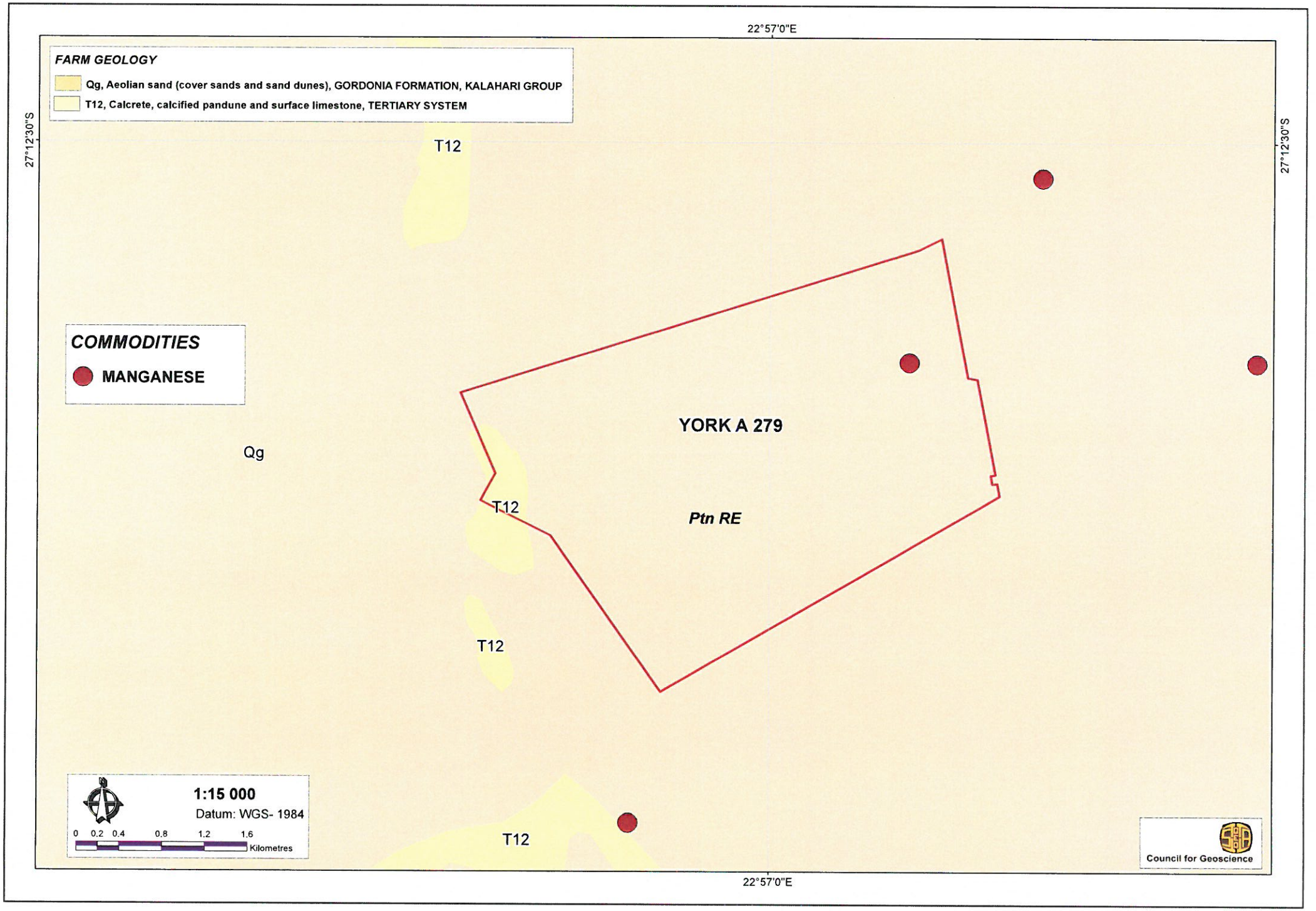
Mineral Resources of the Republic of South Africa (1976). Edited by C.B. Coetzee; Handbook 7, 5th Edition, Department of Mines/Geological Survey, Pretoria, 478p.

Map

1:250 000 Geological series, 2722 Kuruman, Geological Survey of South Africa (1979). Pretoria.

APPENDIX A
Geological map of the project area


22°57'0"E
27°12'30"S
FARM GEOLOGY
Qg, Aeolian sand (cover sands and sand dunes), GORDONIA FORMATION, KALAHARI GROUP
T12, Calcrete, calcified pandune and surface limestone, TERTIARY SYSTEM
T12
COMMODITIES
MANGANESE
YORK A 279
Ptn RE
Qg
T12
T12
T12
1:15 000
Datum: WGS- 1984
0 0.2 0.4 0.8 1.2 1.6
Kilometres
Council for Geoscience
22°57'0"E
27°12'30"S